# INEQUALITIES IN HEALTH CARE IN SPAIN: THE CASE OF CATALONIA

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## Abstract.

Equity is a major policy objective in the Spanish health care system, both at national and regional levels. Partly in consequence, thre have been many studies of inequalities in health and health care in Spain. However, given the decentralisation process of health care such research efforts should better be addressed at the appropriate level of policy-making, which in the case of Spain are largely the regions enjoying full competencies such as Catalonia. The objectives of this research were to study the extent to which the health system in Catalonia delivered services according to need criteria and, further, to find patterns of inequality in the utilisation of health care services by types of care.

The 1994 Catalan Health Survey (15,000 interviews) has been used to assess whether the goal of equal treatment for equal need has been achieved, taking equal treatment as equal expenditure, and equal need as equal ill-health and self-reported morbidity. Concentration curves, Le Grand and Collins and Klein indices of inequality have been used together with logistic regressions models of the determinants of utilisation.

The results suggest that, to a large extent Catalonia has achieved equity in the provision of health care overall. Despite this, different patterns of utilisation of services according to primary care, outpatient care and inpatient care have emerged. Utilisation of primary care is marked, by infants and old age groups, by women, and low income groups and education levels. Out-patient care utilisation is dominated by intermediate age groups, particularly among women, and high income groups and education levels. Finally, inpatient care, representing almost half of the health care budget, has not shown income nor education as significant variables, pointing to medical need as the variable that could best explain utilisation. In all three patterns described it is need, in terms of acute sickness, limiting chronic illness and self-perceived health status,

which stand out as significant predictors of utilisation. Among many other issues, this research has disclosed at a regional level of analysis that overall equitable systems may co-exist with inequalities in more specific services and types of care.

Policy implications derived from this study aim at better targeting the causes of inequality and to foster the need of continuing research along these and other lines, both better to understand the dimensions of inequalities and to monitor the effectiveness of policy responses.

# Contents.

# List of Tables.

## Chapter 1.



## Chapter 2.



## Chapter 3.



## Chapter 4.

# List of Figures.

**Chapter 1.**



**Chapter 4.**



**Chapter 5.**

## List of Abbreviations.

**ACUTE:** Acute Sickness indicator of need.
**Cacute:** Acute Sickness Concentration index.
**Cat.:** Catalonia.
**Cexp C-K:** Expenditure concentration curve for the Collins and Klein Inequality Index.
**Cexp LG:** Expenditure concentration curve for the Le Grand Inequality Index.
**CHNG:** Acute Sickness Concentration index
**CHS:** Catalan Health Survey
**Cill:** Illness Concentration index
**Climcro:** Limiting Chronic Illness Concentration index
**CnotSick:** Not-Sick Concentration index
**COMAC-HSR:** Commité d'Action Concretée, European Commission (DG XII) on health services.
**Csick:** Sick Concentration index
**Cum.:** Cummulative
**DI:** Disimilarity Index
**DK:** Denmark
**DSSS:** Department of Health and Social Security of the Catalan Government.
**DV:** Dependent Variable.
**ESCA:** Catalan Health Survey
**esp.:** Especialist care
**EV:** Explanatory variable
**EXP_IP:** Expenditure in inpatient care
**EXP_PC:** Expenditure in primary care
**EXP_SPEC:** Expenditure in specialist care
**EXP_TOT:** Total Expenditure
**F:** France
**FOESSA:** Fundación FOESSA.
**GDP:** Gross Domestic Product.
**GHA:** General Health Act
**GP:** General Practitioner
**HI CK:** Collins-Klein Health Inequality Index
**HI LG:** Le Grand Health Inequality Index
**HNG:** Health Not Good indicator of need
**I:** Italy
**IC:** Confidence Interval
**INE:** National Institute of Estatistics
**INEM:** National Institute for employment
**INP:** National Intitute of Health Prevision
**INSALUD:** National Institute of Health
**INSERSO:** National Institute of Social Services

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| **INSS:** | National Institute of Social Security |
| **ip.:** | Inpatient Care |
| **LIMCRO:** | Limiting Chronic Illness indicator of need |
| **LOSC:** | Catalan Health Organisation Law (*Llei d'Ordenació Sanitària de Catalunya*) |
| **n.a.:** | Not applicable |
| **NHS:** | National Heallh Service/System |
| **NL:** | The Netherlands |
| **NOT-SICK:** | Not Sick indicator of need |
| **Not Stand.:** | Nots Standardised results |
| **n.s.:** | Not statistically significant or statistically significant $p > 0.05$ |
| **OECD:** | Organisation for Economic Co-operation and Development |
| **pc.:** | Primary care |
| **PCE :** | Spanish Comunist Party |
| **Pop.:** | Population |
| **PPP:** | Parity Purchasing Power |
| **PSOE:** | Spanish Socialist Party |
| **Q#:** | Question number |
| **RAD:** | Restricted Activity Days |
| **RII:** | Relative Index of Inequality |
| **RhS:** | Regional Health Service |
| **SCS:** | Catalan Health Service |
| **SICK:** | Sick indicator of need |
| **SIG-7:** | *Sistema Informació per a la Gestió d'atenció primaria* - Primary care information system |
| **SNS:** | *Servicio/Sistema Nacional de Salud* - National Health Service |
| **SOE:** | Compulsory Health Insurance |
| **SPSSwin 7.5:** | Statistical software package used in this research |
| **UBA:** | Basic Care Units |
| **UCD:** | Centre and Democratic Party |
| **UK:** | United Kingdom |
| **USA:** | United States of America |
| **VAT:** | Value Added Tax |
| **WHO:** | World Health Organisation |

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*Pedro Gallo de Puelles*
*Barcelona, December 1999*

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[a] *Summum Ius, Summa Iniuria* [Cicerone, De Officiis, I,2] I strongly recommend the discussion of any thesis topic with outsiders to the field. They have plenty of enriching visions of what the topic should deal with and suggest valuable comments and angles to look from. Jaume Soler was one of these outsiders. Lawyer, almost sixty, and the person I would always set as example of bon vivant. He mentioned this latin expression to me in a hot summer day in Rocas (Sant Pol, Barcelona), close to the Costa Brava. *Descansa en pau, Jaume.*

## Preface.

Egalitarian principles of social justice argue health care services should be delivered according to need criteria and not according to other such as socioeconomic conditions. This research focusses on such ideal of justice and explores, for the case of health care in Catalonia, the extent to which individuals and groups in equal need receive equal amount of health care services.

Equity has been high up in the health care policy agenda in Spain particularly since the 1986 General Health Act. The decentralization of health care as a policy area has brought the equity principle into the areas of concern of regional governments such as Catalonia. Further, it is at that level of policy action that equity in the provision of health care services coould best be addressed, both for proximity and competency reasons. Indeed, since the early eighties Catalonia is invested with almost full competencies in health care, particularly as regards the organisation and management of health care at the level of its territory. In the scope of this devolved competencies the regional authorities arrange the provision of services to the population. This research therefore addresses the issue of equity in the provision of health care services at the decentralised level of Catalonia.

The research is structured in eight chapters. The first chapter covers a review of the evolution of both the Spanish and Catalan health care systems starting in the early forties, distinguishing three periods in time and evolution, accounting for the main problems and solutions raised in each of them. It also offers an overview of how the system stands today as regards health outcomes and the prevailing finance and delivery arrangements of health care services, both nationally and in an international perspective.

The second chapter reviews the main concepts and methods for assessing equity as a policy objective. It addresses a series of controversial and debated questions such as what is meant by equity, and how the measurement of equity is attempted. A brief account of the major theories on equity in health care is given together with a review of the most commonly used measures and methods to its assessment. This second chapter concludes with a review of the main studies on inequalities in health and health care in Spain, covering a twenty year period (1978 to 1998). The main findings and methods are displayed and commented so as to later set and compare the results of this research.

The third chapter reports on the methods used in this thesis, discussing the study objectives and hypothesis, the morbidity measures and use/need ratios used, as well as the standardisation procedures and the logistic regressions methods applied.

The fourth chapter gives an account of the findings regarding the distribution of need, that is, how the various indicators used to approximate the concept of need distribute across income groups in Catalonia. A series of concentration curves and indices are used to this purpose.

Chapter five reports by means of illustrative tables, charts and text the extent to which the Catalan health care system provides services according to need situations at the three levels of medical assistance studied, namely primary, specialist and inpatient care. To this end Le Grand and Colins and Klein use/need ratios are used.

Chapter six takes account of logistic regression results. The use of logistic regressions has allowed for a finer analysis within each type of service as regards the relevance of variables such as age, gender, need, income and education.

The seventh chapter in this research focusses on the interpretation of the results, both as regards inequalities in health and in health care, and discusses possible explanations, policy implications and areas of future research in this field of knowledge. This chapter also accounts for the limitations to this research and how these may affect the findings and conclusions.

Finally, Chapter eight summarises the conclusions, placing emphasis on the levels of analysis to the study of inequalities and recapitulating the main findings and plausible policy responses to the disclosed inequalities.

## CHAPTER 1.

# Health Care in Spain.

It is difficult to disentangle the trends and policies in health care in Spain and Catalonia from Spanish history itself. I am going to handle it by reviewing the historical events that have shaped the various policies from 1942 to 1996.

This chapter is therefore a review of the Spanish health care system. It provides a chronological overview of the development of health care in Spain from the Francoist era to democracy, comprising three separate periods: from 1942 to 1966, from 1966 to 1986, and from 1986 to the present day. I will be pointing out which were some of the unsolved problems in each period and how the following period was to overcome them. Finally, I will give an outline of how the system stands today in terms of both the delivery and finance of health care services accounting for coverage, health expenditures, regional allocation of resources and health outcomes.

Today, Spain's GDP per capita is $15,162 (PPPs in 1996) and has a population of over 39 million. Despite spending only 7.4% of GDP (1997) in health care it performes remarkably well in morbidity and mortality indicators: 674.5 mortality rate for all causes (per 100,000 pop.), 6.0 infant mortality rate (per 1,000 live births), 81.0 years and 73.3 female and male life expectancy respectively (1994), and 9% population in hospital[1]. The Spanish health care system covers 99.8% of the population and is mainly publicly funded (75%), largely through taxes. As regards private funding (25%) almost 90% are direct payments. Private insurance premia only accounts for 2.5% of the total expenditure, although there are significant differences across regions. Above 70% of the available beds are publicly owned, although this varies greatly from

[1] See Tables 1.4, 1.11 and 1.12. in this chapter.

region to region, too. The organisational structure is decentralised to the seventeen Spanish regions but only seven of them are invested with full competencies in health care. The allocation of resources to the regions is - mainly done on the bases of population in the territory[2]. The resulting management scenario is that of a group of ten regions directly controlled by central Madrid-INSALUD (National Health Institute) and seven highly autonomous regional health services. The whole of the INSALUD and the regional health services shape the Spanish National Health System.

### 1.1. The diversity of social insurance schemes (1942-1966).

Throughout the literature, most authors (De Miguel, 1985; Saturno, 1988; Aparicio, 1989; Rodríguez and De Miguel, 1990) agree that the origins of contemporary Spanish public health system started after the Spanish civil war, in 1942, with the creation of a Compulsory National Health Insurance scheme called SOE (*Seguro Obligatorio de Enfermedad*). The public health system as we know it today was completed half a century afterwards, when the Socialists' 1986 General Health Act (GHA) developed the prevailing national health service.

The SOE, as a health insurance scheme, was a key feature in the social security system until 1966, when a comprehensive Social Security Act (*Ley de Bases Seguridad Social)* was put through. During the 1938-1966 period the development of social insurance schemes was rapid despite uncoordinated. The model set up by the SOE in the mid forties was originally designed to protect only those "weak" workers who lacked some sort of insurance, but gradually turned into a model that covered all manual workers, general employees and

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2 As it will showed later, two resource allocation systems coexist in Spain, namely a common system and the so-called *imputaciones de cupo* which only relate to the Basque Country and Navarre.

the middle class. The Spanish social security system became consequently more complex, not only due to the changes affecting the SOE itself, but because of the appearance of new schemes [3]. At this early stage, although the diversity of schemes was the rule, a line could be drawn between those managed by the 1908 created National Institute for Social Security, called the *Instituto Nacional de Previsión* (INP), mainly accidents, retirement, health, family, unemployment and rural workers schemes, and those others, mainly occupational schemes, managed by the 1946 born Mutualities (*Mutualidades Laborales*) in charge of pension schemes and funds.

The SOE was not only the first step towards the creation of a social security system but was also a landmark in the building of a health care market, gradually controlled by the State. As Rodríguez and De Miguel argue, from the very moment of launching the SOE, the State undertook the creation of a large public health care system that limited the possibilities for the development of the private sector (Rodríguez and De Miguel, 1990). By the mid-sixties, the SOE had covered half of the Spanish population leaving hospital care as an area for further private action. The development of a private sector would not have been easy, however, if it were not for the rise in the health care demand as a result of having created and expanded the SOE. The private market started then satisfying the health care needs of the welthier classes, depriving the less privileged social groups of modern medical health services (Kelley, 1984).

In the sixties, the two management bodies in the Spanish system, INP and Mutualities, faced a crisis that prompted the need for reform. The accelerated growth of the number of pensioners, from 240,000 in 1956 to 703,000 in 1966,

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These new schemes were:

* Compulsory Old Age and Incapacity scheme *(Seguro Obligatorio de Vejez e Invalidez)* created in 1947.
* The 1956 Work Accidents scheme *(Seguro de Accidentes Laborales).*
* The 1961 Unemployment benefit scheme *(Seguro de Desempleo).*

(González *et al.*, 1987) along with the increase in the average pension benefit, forced an economic crisis in the core of the Mutualities. The INP followed a similar path. The SOE experienced a steady expansion which, together with the revaluation of other politically important schemes, led to its financial crisis. Major changes were needed, not only regarding financial issues but also other measures that would lead to a greater unity regarding schemes. Accordingly, the 1966 Social Security Act (*Ley de Bases de la Seguridad Social)* put an end to the diversity of social insurance schemes unifying them within an organised structure typical of a social security system. Soon afterwards, the 1974 Financial Law tried to overcome the existing financial difficulties. These two laws together implied a reform of Spanish social security arrangements.

### 1.2. The social security reform (1966-1986).

The Spanish social security system operated until the mid-sixties under the conventional elements of a corporative Bismarkian welfare state. The 1966 Social Security Act implied a substantial change to the ruling Spanish model. A more Beveridgean oriented social security system was legally implanted. The clash of the two models led to a series of tensions, contradictions and inefficiencies that persisted until 1978, when the Spanish Constitution Act clearly favoured the British-like universal coverage model.

The INP and the Mutualities, nevertheless, continued managing the system until 1978, financially sustained by social contributions (90%of public expenditure in the period 1972-76), with an almost absent State's direct financial involvement. The 1966 Social Security Act extended the levels of social protection, and drafted the uniformity of the existing social insurance schemes. In the following years, the 1966 Act needed substantial amendments regarding financial and protection issues. Accordingly, a complementary Financial Law was put through in 1974 setting the bases for universal coverage, better coordination of the managing agencies, greater financial involvement of the

State, and redistribution. In 1975 the social security budget became part of the Government's budget, which ultimately meant a tighter control by the Spanish Parliament.

The 1966-78 period witnessed, moreover, a considerable increase of the Spanish population with free access to the public health system, from 55% in 1965 to 81% in 1975, and 90% in 1985 (OECD, 1998; Coll, 1990) (See also Table 1.4), along with the building and strengthening of the public health care system. This was done through a considerable expansion of the social security hospital network and the employment of more health care workers, mainly physicians. The reasons that lay behind this expansion are various, including a better response to need, professional pressure, and the fascists preference for huge public building projects. The growth in the hospital sector reinforced, however, the curative dimension of the system in detriment of rather more preventive policies, since the increase in hospital beds was not complemented by similar improvements in primary care services (Saturno, 1988).

The pre-democratic decade was also the starting point for *Conciertos hospitalarios*, that is hospital services contracted to the private sector by public administration bodies, which became, starting in the seventies, a permanent solution to a still deficient public hospital system. Indeed, the practise of the so-called *conciertos* began, as Coll argued, as a temporary answer for an incipient social security system which had only limited physical resources itself (Coll, 1980). The advantage this sort of contracts had was the utilisation of adequate and unused private facilities as social security grew rather than constructing new public hospitals. The financial value of these contracts for 1972 represented 17% of all social security health expenditures. By 1980 it had grown to 22%, increasing not only in absolute figures but also as a percentage of total inpatient expenditure. Since then, the *conciertos* have shaped the "modus-vivendi" of the public-private mix in Spain, intensifying the dependent position of the private sector, and defining its role as a complementary one rather than substitutory.

The reasons that lay behind the continuing and expanding of *conciertos* as a mixed delivery solution were threefold. First, there was a widespread, albeit probably erroneous, asumption that the private system provided cheaper health care. It only appeared to be cheaper because less services were provided. In terms of size, medical equipment, degree of medical education of the health personnel, and their number per patient and bed, private facilities were inferior to those of social security hospitals. The second argument to favor *conciertos* came from the political pressures to the governmental bureaucracy, particularly from the health industrial sector and pharmaceutical companies, conservative parties and professionals, investment institutions, and private hospitals. Finally, the insuficient public investment in capital facilities in the past, which had contributed to a lack of public beds in almost all the regions, still affects today's public hospital network, which makes of these contracts an essential issue in the public-private relationship (Kelley, 1984).[4]

The 1979 first party elected in the democratic period, *Unión de Centro Democrático* (UCD), admitted the Francoist system needed to be corrected regarding inefficiencies and imbalances, although preserving and improving some of their technical structures. UCD's policy makers believed the problems with the regime's system were consequence of an increasing bureaucracy, deficient planning and an absence of priorities regarding structures and benefits. Finally, the system's financial difficulties in the past were judged by the ruling UCD as the result of the mid-sixties economic growth, the parallel expansion of social benefits, and the 1973-75 economic crisis which made that

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4 This has been of particular importance in Catalonia as it will be shown later.

advancing trend impossible to sustain. [5]

Overcoming the outlined problems of persistant financial difficultes, inefficient managing bodies, and poor levels of redistribution and coordination became the major concern of the *Pactos de la Moncloa*. Indeed, major social policies under UCD came as a result of the 1977 *Pactos de la Moncloa*, a multi-party agreement (*pactos*) set up in order to address the main economic, social and political changes the new born democracy required. In *Pactos de la Moncloa* a four point proposal regarding social security was discussed. First, the restructuring of the managing bodies, towards simplification, rationalisation, cost-containment, social efficiency and decentralisation. In this respect, the gradual transformation of the social security system since 1966 was completed in 1979 with the disappearing of the Mutualities. In parallel, new managing agencies replaced the INP [6], although experts argue these were new names to old and well known bodies (Rodríguez and De Miguel, 1990).

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The democratic period is profoundly marked in its begining by the economic crisis and by the changes in the health policy models. The world economic crisis of 1973 forced the reduction of hospital beds and services in the great majority of European countries. In Spain this was done onto a still deficient hospital structure, breaking off the modernisation process in hospitals started in the mid-sixties and being the cause for the historical underdevelopment of the public health care system for years (De Miguel, 1985).

6

These bodies were INSS, INSALUD, INSERSO and INEM, and had the following competencies:

**INSS**-1978 (Instituto Nacional de Seguridad Social) Economic and budgetary issues:
- * Companies register.
- * Admissions of beneficiaries.
- * Recognition of the right to assistance benefits and medical assistance.

**INSALUD**-1979 (Instituto Nacional de Salud) Health care:
- * Health Asssitance (preventive health and health promotion included).
- * Management and administration of staff, centres, and health services.
- * Coordination *(conciertos)*.

**INSERSO**-1979 (Instituto Nacional de Servicios Sociales) Social Services:
- * Old aged.
- * Disabled (physical and psychical).
- * Special programmes.

The second element of the proposal looked for a more powerful control of the management itself. Accordingly, the management came under the responsibility of two Ministries, the Ministry of Labour, responsible for social security issues, and the Ministry of Health, in charge of health and health care policies. For the first time in the history of Spanish social security system public health insurance was managed by a distinct department in government. Third, the *Pactos* claimed for a more progressive and redistributive finance of the social services together with a greater involvement of the State in these matters. Although the finance was common to both Ministries, through the social security Treasury, the balance in its sources changed since. Social contributions fell from 89% of the total public expenditure in 1977 to 76% in 1985, and the State's transfers from the general budget raised from 3.3% to 21.3% in those same years (Coll, 1990). Pensions and health persisted as the two main expenditure chapters within Spanish social security, accounting respectively for 60% and 30% of the total amount. Finally, the *Pactos de la Moncloa* pressed for an increase in the level of assistance, specially regarding health issues, looking for a more integrated concept of health, the so-called integral health.

Five were then the main characteristics that defined the Spanish social security system in the 1975-1986 transitional period before the socialist government put through a National Health Service. First, it was a **mixed financed system**, where contributions to the budget were raised by employers and employees on one hand, namely social contributions, and the State on the other, through taxes. Second, the management of the system has become the **State's concern.** Although the employer was understood to be both responsible for and cause of employees damages, through the social security system this responsibility was transfered onto the State. Third, it provided **social assistance** since the State aimed at raising people's welfare through individual benefits. Despite the system still did not cover the entire population, beneficiaries were not just those who had a job but also other targetted groups. Fourth, the benefits aimed at a **compensatory** concept, more than to a really redistributive one, although the latter was increasingly important. Finally, the system was not as fragmented as before 1966, and a larger **unity** of schemes and bodies was in place.

To sum up, starting after Franco's death in 1975, the democratic period raised new political expectations, new parties, and new leaders. Along with political reforms the Social Security experienced rather incrementalist albeit necessary changes until 1986 when the General Health Act established the foundation of a decentralised National Health System. Although there was still plenty of room for improvement in the unity of schemes and bodies, the range of issues the Socialist 1986 General Health Act were to address were mainly those derived from two principles outlined in the 1978 Constitution Act, namely achieving universal coverage and fostering decentralisation.

### 1.3. The General Health Act and the National Health Service (1986-1996).

The Spanish socialist party, *Partido Socialista Obrero Español (PSOE)*, remained throughout these first democratic years, as a powerful opposition to UCD until 1982 when general elections gave PSOE and Felipe González access to power. However, it was not until the 1986 General Health Act *(Ley General de Sanidad)*, and following a period of confrontation and strikes from the highly organised medical professional bodies, that the socialists' law was put through. The law proposed the creation of a National Health System (*Sistema Nacional de Salud)*, similar in concept and objectives to those national health services already in place in different European countries.[7] In particular, this new, universalistic, *a priori* equitable and solidaristic model, resembled to the British system and counted with citizens' participation and control as additional

7

In the months previous to to the final draft of the Law, a controversy was raised about whether using National Health Service (*Servicio Nacional de Salud*) or National Health System *(Sistema Nacional de Salud*), since "System" better applied to the whole of public and private activities in the finance and delivery of health care. Regardless of the different views on this point, the socialist government in Spain opted for National Health System (Elola, 1991).

endorsement elements.[8] The national health service model was seconded by a minor part of the medical organisations, the left wing parties both PSOE and the comunist PCE, and the majority of the population.[9] However, the earliest ideas of the socialist Ministry for Health regarding the contents and objectives of the GHA were gradually redefined according to the distribution of power in the health sector. The struggle between the different agents in the health system was reflected in the GHA in two ways. On one hand, the long time it took to be put through Parliament, almost three years and, on the other, what soon was believed to be its main characteristic, namely ambiguity.[10]

Primary health care, efficiency, universal coverage, and decentralisation were the main priorities outlined by the GHA. **Primary health care** was given priority by the socialist Ministry of Health for two main reasons. First, it was the main cause for criticism within the public health system, not only by physicians and managers but also by the vast majority of its beneficiaries. Second, the socialist policy makers took on the World Health Organisation (WHO) principle of a rational health system, stressing the importance of primary care, health promotion and preventive health services.[11] **Efficiency** was the second

8

The health system until then was perceived as both imposed to the medical professionals and foreign to the needs of the Spanish population. In fact, giving more power to the people as a policy strategy was almost absent from the priorities during the first years of socialist government (1982-1986). In 1986 the final draft of the GHA conceived a patient charter and the development of an institutional body to deal with patient' comments and suggestions.

9

There was an alternative model, closer to the French type, supported by the right wing party and 3/4 parts of the medical professional associations. However, Spain already had a fairly extense public hospital system and this model was refused by the government.

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Aparicio aknowledged that ambiguity seems to be the main characteristics of laws that develop economic and social rights (Aparicio, 1989).

11

WHO Alma Ata declaration (September 1978). The use the socialist government made of the WHO recommendations has been considered slanted by the different interest groups, particularly important by the medical organisations.

objective of the GHA. It was to be achieved through two policies: a hospital structure reform, and the improvement of the existing managing bodies in the frame of the constitutionally born Autonoumous Communities or regions. The goal was to unify the fragmented public health system within each region overcoming problems of coordination, duplication of services, and inefficient allocation and distribution of resources.[12]

The objectives of universal coverage and decentralisation were the core of the GHA. These two objectives were first raised by the 1978 Constitution Act, but not formally addressed in health care until the 1986 GHA was passed. Regarding **universal coverage**, the GHA claims , for example, public health care will be extended to cover all Spanish population, and access to services will be carried out on conditions of effective equality. This proves as a clear commitment of public authorities to universality and equity[13]. Further, the **decentralisation** of health services to the seventeen Autonomous Communities, and the creation of their respective regional health services, is an omnipresent issue throughout the GHA. The Spanish NHS is thus to be taken as the adequate coordination and integration of the seventeen regional health services (GHA, art. 50 and following). The effective integration of these regional health services is a basic condition to achieve the objectives outlined in Art.1 of the GHA, namely the right to health protection of all citizens, the convergence of life conditions, the coordination of public policies, the uniformed levels of functioning of public services, and an effective health planning, that would result in the improvement of service related issues.

12

De Miguel argued, on the contrary, that the establishment of the so-called State of the Autonomies *(Estado de las Autonomías)*, political and administrative model regarding the relationship between the State and the regions, complicated the efforts of the reform insofar it promoted power struggling in the modelling of the Law, transforming it into a legal instrument that would lead to the division of the National Health System (De Miguel, 1985).

13

In following chapters a deeper discussion of the way the various legal texts take account of both universalisation and equity will be given.

The regions were entitled to elaborate on the GHA through development and complementary laws, in the use of their competencies and according to their Estatutes (*Estatutos de Autonomía)*. Therefore, so as to achieve the objectives outlined in the GHA the first step was the gradual creation of the seventeen Regional Health Services (RHS), one for each region. There was, however, an implicit danger for the system to become highly centralised at the regional level once the decentralisation process to the regions had started. In order to avoid this the GHA structures the RHS in smaller health districts *(Areas de Salud)*) where an important role is played by the local authorities and municipalities.

Every RHS would produce a regional health plan according to the region's health needs, and within a rational use of resources. The resulting seventeen health plans would be essential in the shaping of the National Integrated Health Plan (*Plan Integrado de Salud)*. This latter plan would result from the combination of four sources, that is, the forementioned regional health plans, specific plans of a national scope, specific common plans of the regions and the State, and other particularities related to financial and resource allocation arrangements.[14]

The GHA also advocated for general **coordination** among regional authorities in areas such as personnel, prevention, promotion and assistance, principles of coherence, armony and solidarity of the health system, and basic and common criteria to efficiency evaluation. This general coordination, which would lead to reciprocal information, common action, and integration of services, is the task of central administration bodies so as to actually achieve the integration of the NHS. Regardless of the level of competencies the seventeen regions may have, the State holds exclusive competence on High Inspection *(Alta Inspección)*. High inspection is addressed by the GHA in Art.43 in reference to

14 To date, no National Integrated Health Plan has seen the light yet.

three main issues: adecuacy of regions' plans and health programmes to the general objectives set up by the State; evaluation of the achievement of common goals; and supervision of those regions with full transfered competencies in health care.

Finally, the GHA dealt with the system's **integration** (art.44 to 47), and the body set up to preserve that integrity principle was the Interregional Health Council *(Consejo Interterritorial de Salud)*. This body is a permanent body of reciprocal information among regions and with the State. The task of this institution is threefold: coordination of the basic lines of policy regarding adquisitions, contracts, pharmaceuticals, and personnel; some planning role; and the general coordination role.

However, the ambiguity in the GHA, outlined as one of its characteristics when assessing its birth process, is of particular relevance regarding this point. Indeed, in reference to the Interregional Health Council tasks, it is far from clear what should be understood by "basic lines of policy" (De Miguel, 1985). Furthermore, the law does not provide the Interregional Health Council with any monitoring nor control mechanisms to properly address its task, which may lead to a diversity of regional policies in the health care area, threatening the unity of the NHS. Integrity, moreover, should go beyond the coordination of regional objectives in order to achieve a National Integrated Health Plan, which should be something more than stitching together the seventeen regional health plans, to encourage the linkage of health policies as well as other areas of policy that affect the final health status of the Spanish population.[15]

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15 The existing Consejo Interterritorial de Salud (Interregional Health Council) needs to be invigorated undertaking aspects such as general policy for the country, research coordination, and information systems.

### 1.3.1. Decentralisation in Spain.

Since decentralisation has been high up in the agenda from the very early years of democracy, and it is a key element to understand the need for this piece of research, it is necessary to explore in greater detail what is meant by that and what forms does it take in the case of Spain.

Decentralisation can be broadly defined as the transfer of authority, or dispersal of power, in public planning, management and decision making, from the national level to subnational levels, or more generally, from higher to lower levels of government (Rondinelli, 1981). However, as Mills argued, in practice, health system decentralisation takes many different forms depending not only on overall government political and administrative structures and objectives, but also on the pattern of health system organisation prevailing in the particular country. Although it is important to acknowledge that decentralisation policies are concerned with changing power relationship between levels of government (Smith, 1985), political considerations are not the only explanation to why a country implements a decentralisation process (Mills *et al.*, 1990).

Indeed, the decentralisation literature and theory argue that there are six major benefits to the health care sector that should result from implementing a satisfactory decentralisation process (Mills *et al.*, 1990). In the first place, it is expected a greater rationality in the organisation of the services on the basis of smaller geographical and administrative areas. Second, communities will benefit from larger involvement in the management of their own health, leading to more appropriate health plans at regional or local level in relation to the needs and problems of the area. In short, a higher degree of community participation. Third, decentralisation is argued to help to contain costs and reduce duplication of services by relating reaponsibilities to defined catchment populations. Fourth, it would help to reduce inequalities among regions and rural-urban areas through a selective reallocation of central resources. In fifth place, it is said to bring up a closer interaction of activities from governmental, non-governmental and private health organisations. Finally, decentralisation would improve health programmes implementation by reducing centralised control over local administration matters.

Within this theoretical scenario, four main types of decentralisation can be distinguished in practice: deconcentration, devolution, delegation and privatisation, each of these entailing different degrees of responsibility[16]. Table 1.1. shows in which areas of health policy the aforementioned types of decentralisation enjoy responsibilities.

**Table 1.1.**
**Health policy areas and types of decentralisation.**

| Health Policy areas | Deconcentration | Devolution | Delegation | Privatisation |
|---|---|---|---|---|
| Legislative | – | ** | – | – |
| Revenue raising | * | ** | ** | *** |
| Policy making | – | ** | ** | ** |
| Regulation | – | ** | * | – |
| Planning and resource allocation | ** | ** | *** | *** |
| Management | | | | |
| - personnel | * | ** | *** | *** |
| - budgeting and expenditure | ** | ** | *** | *** |
| - procurement of supplies | * | ** | *** | *** |
| - maintenance | * | ** | *** | *** |
| Intersectoral collaboration | * | *** | *** | *** |
| Interagency coordination | * | * | *** | *** |
| Training | * | ** | *** | *** |

– no responsibilities   * limited responsibilities   ** some responsibilities   *** extensive responsibilities

Source: Mills *et al.* (1990).

16 For a full description of each type of decentralisation, please see Mills *et al.* 1990.

In Spain, the decentralisation process took the particular form of **devolution**. Devolution has been defined as the creation or strengthening of subnational levels of government that are substantially independent of the national level with respect to a defined set of functions (Mills *et al.*, 1990). The theory asserts these levels of government normally have a clear legal status, recognised geographical boundaries, a number of functions to perform, and statutory authority to raise revenue and make expenditures. They are rarely completely autonomous but are largely independent in their areas of responsibilities. Spain's legal frame for health decentralisation is shaped by three elements: the 1978 Constitution Act, the regions' Estatutes, and the 1986 General Health Act (GHA). Thus, the GHA is part of a much wider, comprehensive and constitutional process of decentralisation and State redefinition known as the State of the Autonomies.[17] The regions have become the administration level in charge of health management and control through their Regional Health Services (RHS).

However, the decentralisation process in Spain has not been homogeneous and is still to be completed. The transfer of authority in the health policy area from central government to the regions has been done in different degrees, which has resulted in diverse levels of autonomy. Accordingly, only seven of the seventeen Spanish regions enjoy today full decentralisation of health care and a thorough body of competencies. The other ten, although with some degree of autonomy, are still under the central and direct management of the National Health Institute-INSALUD in Madrid.

Following both the decentralisation process and the use the regions made of the transferred competencies, a twofold set of difficulties emerged (Min.Adm.Púb.,

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17 The Spanish Constitution of 1978 and the regions' Estatutes of Autonomy set the grounds of a new organisation of the State in seventeen Autonomous Communities or regions, and were the landmarks for the begining of an agreed and slow process of decentralisation of important areas of public management among which we find health care.

1992). On one hand, those problems that follow from an imperfect definition of responsibilities in the legal framework of the 1978 Constitution, the Regions' Estatutes, and the 1986 GHA, which has resulted in different, even opossite, interpretations of the Law when coming from the State and the regional authorities. The so-called Constitutional Appeals and the Competence Conflicts derived have forced the customary intervention of the Spanish Constitutional Court. However, we should think of these conflicts and appeals as something proper to the development of the State of the Autonomies, in which political bargaining is everydays course of action. The purely administrative problems define a second group of difficulties. Regions with administrative defficient tradition face management problems in the use of the competencies they have assumed.

Both groups of difficulties back up the idea that the health decentralisation process should be thought as a long time process that requires high dosages of political consensus and calls for continuous development and adjustment. Any further reform in the health care area should, thus, bear in mind both the decentralisation process and the principles originated in the Constitution, the Estatutes and the GHA. The needs for political consensus, development, coordination and adjustment go beyond the decentralisation process itself affecting any coming reform proposal at regional or national level. The fact that regions with invested competencies in health care may implement policies disregarding those needs could foster the breaking-up of the system, endangering the Spanish NHS as we know it today.

### 1.4. The present situation.

Although punctual data has been given in the previous sections when necessary, I consider both illustrative and mandatory to provide an all-embracing statistical view of the Spanish health care system as it stands today, describing some existing geographical disparities, the trends in expenditure and finance, availability of resources, and health outcomes. I also account here for an overview of the remaining problems and porposed reforms. Finally, although Catalonian statistics are shown here together with the rest of the regions, a brief introduction to the particularities of the Catalan Health System is also offered.

Despite in some of its articles the GHA encourages territorial equity there are still some geographical differences among regions as regards the number of total beds per 1,000 inhabitants, doctors per bed, and doctor-nurse ratios. In reference to those disparities, two significant issues should be noted. First, north-east regions and Madrid prevail as the best equipped regions in terms of beds per 1,000 inhabitants and personnel per 100 beds, while the south-west areas in Spain remain below with reference to the same ratios (Tables 1.2 and 1.3). Second, *conciertos* correct in some degree the existing public sector differences among regions. Indeed, private-public *conciertos* in regions such as Catalonia and the Basque Country are the solution to a deficient public system as bed provider. This has defined a mutual dependency relationship between both sectors since the private sector sees *conciertos* as the means to survive in the health care market.[18]

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The private sector remains fairly dependant of the public sector insofar the latter has become the most important client in terms of resources. As it will later be shown, private insurance premia in Spain is only around 2 to 3% of total expenditure in health care.

## Table 1.2.
## Health personnel per 100 beds (1994).

| REGIONS | NHS | | OTHER PUBLIC | | PRIVATE | |
|---|---|---|---|---|---|---|
| | MDs | Nurses | MDs | Nurses | MDs | Nurses |
| Andalucia | 45.8 | 92.0 | 24.4 | 46.0 | 8.3 | 15.2 |
| Aragon | 47.4 | 94.5 | 10.4 | 16.8 | 16.9 | 19.5 |
| Asturias | 47.0 | 85.4 | 8.9 | 17.3 | 17.6 | 22.4 |
| Balearic Islands | 46.6 | 89.7 | 11.9 | 17.8 | 10.0 | 28.8 |
| Canary Islands | 47.2 | 86.5 | 14.6 | 29.0 | 7.4 | 9.0 |
| Cantabria | 39.8 | 87.8 | 14.8 | 23.9 | 5.4 | 7.4 |
| Castille-Leon | 43.5 | 82.1 | 10.3 | 18.6 | 4.0 | 8.3 |
| Castille-La Mancha | 39.8 | 73.1 | 9.7 | 12.8 | 16.2 | 20.1 |
| **Catalonia** | **44.3** | **101.9** | **26.8** | **46.4** | **16.8** | **32.3** |
| Valencia | 45.7 | 90.7 | 23.4 | 42.6 | 14.8 | 22.4 |
| Extremadura | 39.8 | 75.9 | 2.1 | 4.6 | 3.4 | 8.1 |
| Galicia | 39.0 | 69.7 | 22.2 | 31.5 | 10.5 | 14.7 |
| Madrid | 54.6 | 102.4 | 28.1 | 52.8 | 11.2 | 22.7 |
| Murcia | 55.6 | 95.0 | 31.3 | 58.3 | 3.5 | 8.5 |
| Navarre | 33.7 | 74.3 | 15.6 * | 45.8 * | 18.0 | 64.2 |
| Basque Country | 37.0 | 70.6 | 2.3 * | 3.9 * | 4.7 | 17.4 |
| Rioja | 42.9 | 92.7 | 10.2 | 21.0 | 3.0 | 5.0 |
| Ceuta and Melilla | 40.0 | 86.7 | 34.4 | - | - | - |
| **SPAIN** | **44.8** | **87.2** | **20.2** | **50.3** | **12.2** | **23.3** |

MDs = Medical Doctors
* (1989)
Source: INE. (1997b)

## Table 1.3.
## Available beds per region (1994).

| REGIONS | NHS | | OTHER PUBLIC | | TOTAL PUBLIC | | PRIVATE | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | Per 1,000 inhab. |
| Andalucia | 17,035 | 71.6 | 1,235 | 5.2 | 18,270 | 76.8 | 5,523 | 23.3 | 23,793 | 3.37 |
| Aragon | 3,348 | 53.1 | 1,976 | 31.3 | 5,324 | 84.4 | 977 | 15.6 | 6,301 | 5.32 |
| Asturias | 3,166 | 67.9 | 428 | 9.2 | 3,594 | 77.1 | 1,070 | 22.9 | 4,664 | 4.31 |
| Balearic Islands | 1,261 | 35.4 | 1,163 | 32.7 | 2,424 | 68.1 | 1,134 | 31.9 | 3,558 | 4.93 |
| Canary Islands | 2,914 | 34.3 | 2,860 | 33.7 | 5,774 | 68.0 | 2,713 | 32.0 | 8,487 | 5.53 |
| Cantabria | 1,878 | 62.1 | 431 | 14.2 | 2,309 | 76.3 | 717 | 23.7 | 3,026 | 5.75 |
| Castille-Leon | 6,498 | 47.9 | 3,959 | 29.2 | 10,457 | 77.1 | 3,120 | 22.9 | 13,577 | 5.38 |
| Castille-La Mancha | 4,317 | 74.2 | 975 | 16.8 | 5,292 | 91.0 | 523 | 9.0 | 5,815 | 3.46 |
| **Catalonia** | **4,846** | **15.3** | **7,397** | **23.3** | **12,243** | **38.6** | **19,426** | **61.4** | **31,669** | **5.22** |
| Valencia | 8,987 | 68.8 | 1,992 | 15.2 | 10,979 | 84.0 | 2,091 | 16.0 | 13,070 | 3.28 |
| Extremadura | 2,977 | 66.2 | 1,196 | 26.6 | 4,173 | 92.8 | 323 | 7.2 | 4,496 | 4.20 |
| Galicia | 6,725 | 59.3 | 1,565 | 13.8 | 8,290 | 73.1 | 3,044 | 26.9 | 11,334 | 4.15 |
| Madrid | 10,741 | 44.4 | 6,387 | 26.4 | 17,128 | 70.8 | 7,051 | 29.2 | 24,179 | 4.83 |
| Murcia | 1,849 | 50.6 | 862 | 23.6 | 2,711 | 74.2 | 944 | 25.8 | 3,655 | 3.41 |
| Navarre | - | - | - | - | 1,785 | 65.7 | 931 | 34.3 | 2,716 | 5.18 |
| Basque Country | - | - | - | - | 6,161 | 66.0 | 3,172 | 34.0 | 9,333 | 4.48 |
| Rioja | 504 | 51.7 | 371 | 38.1 | 875 | 89.8 | 100 | 10.2 | 975 | 3.73 |
| Ceuta | 163 | 62.0 | 100 | 38.0 | 263 | 100.0 | - | - | 263 | 3.75 |
| Melilla | 172 | 57.5 | 127 | 42.5 | 299 | 100.0 | - | - | 299 | 4.98 |
| **SPAIN** | **85,597** | **50.0** | **33,024** | **19.2** | **118,621** | **69.2** | **52,859** | **30.8** | **171,480** | **4.40** |

N = Total number
Source: INE (1997a).

Overall, the private hospital sector accounts for almost 30% of the available beds in Spain, but these are concentrated in the northern regions of Spain, namely Catalonia, the Basque Country, Navarre, Galicia, Asturias and Cantabria. The reasons that could explain this pattern are largely historical. *Beneficiencia* and non-for-profit private centres have a long tradition in these regions. When the expansion of the public hospital system was undertaken in the sixties the presence of private centres in these areas was taken into account and, in an attempt to reduce regional disparities, fewer public facilities were allocated to these regions.

According to 1998 OECD data the Spanish system today covers 99.8% of the population. As stated in the evolution of the health care system in Spain, there has been an increasing trend in coverage since the creation of the SOE. In Table 1.4. a cross-national comparison of coverage percentages is offered for the period 1960 to 1996. Spain has traditionally been a laggard among European countries. At the end of the sixties the gap started to be reduced probably by effect of the extension of health schemes and the appearance of new health care legal arrangements such as the Social Security Act *(Ley de Bases de la Seguridad Social*) and the 1974 Financial Law. The GHA in 1986 should also be considered as a landmark in terms of its effect on coverage. Indeed, soon after the GHA the population under public health care reached to 97%, slowly progressing upto date. Therefore, universalisation of public services is almost a reality in Spain today. The pursue of equity, in terms of universal coverage, have counted on political commitment, financial resources into the system, and have also used the existing private facilities network in some regions by means of the forementioned *conciertos*.

**Table 1.4.**
**Population coverage of medical care (% of population).**

| Selected Countries | 1960 | 1963 | 1966 | 1969 | 1972 | 1975 | 1978 | 1981 | 1984 | 1987 | 1990 | 1993 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Spain** | **54** | **54** | **55** | **58** | **72** | **81** | **84** | **84** | **88** | **97** | **99** | **99.5** | **99.8** |
| Italy | 87 | 88 | 91 | 92 | 94 | 95 | 98 | 100 | 100 | 100 | 100 | 100 | 100 |
| France | 76.3 | 85 | 88 | 88 | 96 | 96 | 98 | 99 | 99 | 99 | 99.5 | 99.5 | 99.5 |
| Germany | 85 | 85 | 85.8 | 85.8 | 90 | 90.3 | 91 | 90 | 92 | 92.2 | 92.2 | 92.2 | 92.2 |
| Netherlands | 71 | 71 | 71 | 83 | 98 | 75 | 75 | 74.5 | 73.3 | 69.3 | 70.7 | 70.9 | 72 |
| Sweden | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| United Kingdom | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Australia | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Canada | 71 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Japan | 88 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| United States | 20 | 22 | 38 | 38 | 40 | 40 | 40 | 42 | 42.6 | 43 | 44 | 44 | 45 |

Source: OECD (1998).

The extension of public health care to almost the entire population has not been at the expense of an outraging public expenditure. According to OECD data, the total expenditure in health care in Spain, as shown in Table 1.5., represents 7.4% of GDP in 1997, close to European and OECD standards. Historically, however, this has not been the case. In 1965 the health expenditure-GDP ratio was below 3%. The succesive health reforms, with a greater involvement of public authorities in the provision and finance of health services brought up this figure to 5% in 1975 and to 6.3% in the 1980s, closing the historical gap with the rest of European countries.

## Table 1.5.
## Total expenditure on health (% GDP).

| Selected Countries | 1965 | 1969 | 1973 | 1977 | 1981 | 1985 | 1989 | 1993 | 1997 |
|---|---|---|---|---|---|---|---|---|---|
| **Spain** | **2.6** | **3.4** | **4.3** | 5.6 | 5.8 | 5.6 | 6.5 | 7.5 | 7.4 |
| Italy | 4.3 | 4.9 | 5.9 | 5.7 | 6.9 | 7.1 | 7.7 | 8.6 | 7.6 |
| France | 5.2 | 5.8 | 6.2 | 7.0 | 7.9 | 8.5 | 8.7 | 9.8 | 9.9 |
| Germany | 4.6 | 5.8 | 7.4 | 8.6 | 9.2 | 9.3 | 8.8 | 10.0 | 10.4 |
| Netherlands | 4.3 | 5.2 | 6.7 | 7.5 | 8.1 | 7.9 | 8.2 | 9.0 | 8.5 |
| Sweden | 5.5 | 6.9 | 7.3 | 9.1 | 9.5 | 9.0 | 8.8 | 8.9 | 8.6 |
| United Kingdom | 4.1 | 4.4 | 4.6 | 5.3 | 5.9 | 5.9 | 5.8 | 6.9 | 6.7 |
| Australia | 5.1 | 5.2 | 5.9 | 7.8 | 7.4 | 7.7 | 7.8 | 8.5 | 8.3 |
| Canada | 6.0 | 6.7 | 6.9 | 7.2 | 7.5 | 8.4 | 8.7 | 10.2 | 9.3 |
| Japan | - | - | 4.5 | 5.7 | 6.5 | 6.7 | 6.1 | 6.6 | 7.3 |
| United States | 5.9 | 6.8 | 7.5 | 8.6 | 9.4 | 10.6 | 11.9 | 14.1 | 14.0 |

Source: OECD (1998).

Although public expenditure is the most significant source of health care finance in Spain, the Spanish health care system remains a mixed financed system. The four main sources of finance are, taxes and social contributions on the public side, and out-of-pocket payments and private insurance premia on the private side. However, public and private financing have historically followed different paths, and the balance between both today is not the same as in the sixties and seventies. Private finance nowadays is approximately 25% of the total expenditure in health. Out of this 25%, more than 90% are out-of-pocket payments on pharmaceuticals and on private medicine, particularly on those services that are not entirely covered by the public health system such as dentists, ginaecology and opticians. Public finance is now above 75% of total health expenditure. During the 1960-1987 period, public expenditure grew at a real annual rate of 9%, well above the rest of OECD countries, as shown in Table 1.6. This growth was consequence of greater public involvement in health care as policy area, which was also expressed in the forementioned 1974

Financial Law[19].

**Table 1.6.**
**Public expenditure on health (% GDP)**

| Selected Countries | 1965 | 1969 | 1973 | 1977 | 1981 | 1985 | 1989 | 1993 | 1997 |
|---|---|---|---|---|---|---|---|---|---|
| **Spain** | **1.3** | **2.1** | **3.3** | **4.2** | **4.5** | **4.6** | **5.1** | **5.9** | **5.8** |
| Italy | 3.8 | 4.3 | 5.2 | 4.9 | 5.4 | 5.5 | 5.9 | 6.3 | 5.3 |
| France | 3.6 | 4.1 | 4.7 | 5.4 | 6.3 | 6.5 | 6.5 | 7.3 | 7.7 |
| Germany | 3.2 | 4.3 | 5.7 | 6.8 | 7.2 | 7.2 | 6.7 | 7.7 | 8.1 |
| Netherlands | 3.0 | 4.5 | 4.8 | 5.5 | 6.1 | 5.9 | 6.0 | 7.0 | 6.1 |
| Sweden | 4.4 | 5.8 | 6.3 | 8.3 | 8.7 | 8.1 | 7.9 | 7.7 | 7.1 |
| United Kingdom | 3.5 | 3.8 | 4.1 | 4.8 | 5.3 | 5.0 | 4.9 | 5.8 | 5.7 |
| Australia | 2.7 | 2.8 | 3.6 | 4.9 | 4.6 | 5.5 | 5.3 | 5.7 | 5.7 |
| Canada | 3.1 | - | 5.1 | 5.5 | 5.7 | 6.4 | 6.5 | 7.4 | 6.4 |
| Japan | - | - | 3.1 | 4.1 | 4.6 | 4.7 | 4.7 | 5.2 | 5.7 |
| United States | 1.5 | 2.6 | 2.9 | 3.6 | 4.0 | 4.3 | 4.8 | 6.1 | 6.5 |

Source: OECD (1998).

Public finance itself has undergone substantial changes in time, particularly in the balance of public sources, that is social constributions and taxes. The Social Security Act (*Ley de Bases de la Seguridad Social*) until 1986 and the GHA from 1986 to 1989 relied on social contributions as their main source of public finance. In the sixties and seventies, the State's money contributions through taxes to the health system were less than 5% of the total public expenditure in health. By 1980 taxes already represented 10%, and from 1982 there was a rapid increase to reach 30% in 1988. As illustrated in Table 1.7, in 1993 the State's transfers were 80% of the total public finance and social contributions

19 Until the 1974 Financial Law, public finance accounted for just over half of the total expenditure in health.

were down to 20%.[20]

**Table 1.7.**
**Health care financing (1980 and 1993).**

| Sources | 1980 (a) | % | Kakwani index (a) | 1993 (b) | % | Kakwani index (c) |
|---|---|---|---|---|---|---|
| Direct Taxes | 7.6 | - | 0.170 | - | - | 0.212* |
| Indirect Taxes | 6.4 | - | 0.023 | - | - | - 0.153* |
| Total Taxes | 14.0 | 18 | 0.102 | 60.0 | 80 | 0.046* |
| Social Contributions | 62.0 | 82 | - 0.063 | 15.0 | 20 | n.a. |
| **TOTAL PUBLIC** | **76.0** | **100** | **- 0.032** | **75.0** | **100** | n.a. |
| Private Insurance | 3.0 | 12 | - 0.079 | 2.5 | 10 | - 0.180* |
| Direct Payments | 21.0 | 88 | 0.016 | 22.5 | 90 | n.a. |
| **TOTAL PRIVATE** | **24.0** | **100** | **0.005** | **25.0** | **100** | n.a. |
| **TOTAL** | **100.0** | | **- 0.023** | **100.0** | | **0.0004*** |

n.a - not available.
* 1990
Sources:
(a) Van Doorslaer et *al.* (1993).
(b) López Casanovas (1993).
(c) Rodríguez and Calonge (1998).

Note: Kakwani health finance index is based on the extent to which a tax system departs from proportionality, ranging from -2.0, when all pre-tax income is concentrated in the hands of the richest person and the entire tax burden falls on someone else, to 1.0, when pre-tax income is distributed equally and the entire tax burden falls on one person.

As regards equity in the finance of health care, the distribution and relative weight of the various sources is of primary importance. The cross-national study by Van Doorslaer *et al.* (1993) points out, through the use of various equity indicators (Kakwani Index is one of them), the degree of inequity of the Spanish health financing system in 1980 (Table 1.7.). In an attempt to summarise the main points brought up in that study, four issues should be noted. First, the fact

20 The GHA did not introduce any drastic change in the way the public system was financed. However, the 1989 Law on General Budget explicitly set how the system should be financed, increasing State's participation and bringing social contributions at a much lower level. Today, in 1999, social contributions to health care expenditure are almost inexistent.

that social contributions were found as slightly regressive, since they could be perceived as a tax on wages and these are proportionally a lower part of the final income in high income groups. Second, taxes were certainly more progressive, and so would be the finance of the system through the State's budget. However, we should question whether the progressive index for total taxes has changed after indirect taxes like VAT were introduced. Third, although universal coverage of public health assistance was almost accomplished there were still some minor groups for which private insurance premia were the only sort of health scheme available. This could help to explain the fact that private insurance was only slightly regressive. Finally, out-of pocket-payments were pointed to be progressive. This may be due to the fact that they are mainly payments on pharmaceuticals which are exempted for lower income groups such as pensioners. Progressivity in direct payments made the whole of private finance progressive since they represented 90% of the total amount. On the whole the Spanish system in 1980 was somewhat regressive. An equity study after the 1989 took account of the move towards a more tax-raised public finance and found the system today is more progressive. This is shown in the last column in Table 1.7 in which the Kakwani index for total expenditures is 0.0004, that is of a positive sign, pointing to the overall progressivity of the system, practically proportional. This could largely be explained by the positive effect of direct taxes on the overall equity of the system.

The change towards a more direct State financial provision was the outcome of three objectives. In the first place, the need to control and correct the financial difficulties the health agencies had, and still have, due to overspending (Table 1.8). Second, the awareness that high social contributions were a burden to employers and firms. And third, to promote equity in the finance of public health care services.[21]

**Table 1.8.**
**Public health budget deviations from original budget allocations (1984-1992) (in percentages)**

| Years | INSALUD Direct Management | Regions with full competencies | TOTAL |
|---|---|---|---|
| 1984 | 4.1 | 0.4 | **2.9** |
| 1985 | 6.2 | 1.7 | **4.7** |
| 1986 | 8.8 | 12.4 | **10.1** |
| 1987 | 16.1 | 7.6 | **13.2** |
| 1988 | 10.5 | 11.2 | **10.9** |
| 1989 | 18.2 | 10.0 | **14.1** |
| 1990 | 9.9 | 13.2 | **11.6** |
| 1991 | 9.1 | 15.3 | **12.7** |
| 1992 | 11.0 | 17.0 | **14.4** |

Source: Sanfrutos (1993).

**Table 1.9.**
**Total expenditure in in-patient care as % of Tot. Exp. in health.**

| Selected Countries | 1985 | 1987 | 1989 | 1991 | 1993 | 1995 | 1997 |
|---|---|---|---|---|---|---|---|
| **Spain** | **55.7** | **53.7** | **45.3** | **46.1** | **46.9** | **45.2** | **-** |
| Italy | 47.9 | 46.1 | 45.3 | 46.3 | 46.5 | 47.0 | 49.4 |
| France | 47.2 | 45.8 | 44.4 | 43.9 | 44.3 | 44.4 | 44.4 |
| Germany | 34.0 | 34.3 | 34.5 | 34.4 | 35.5 | 34.6 | - |
| Netherlands | 56.1 | 54.8 | 52.0 | 52.6 | 52.5 | 54.0 | 52.6 |
| Sweden | - | - | - | - | - | - | - |
| United Kingdom | - | 44.5 | 44.1 | 44.6 | 42.8 | 42.2 | - |
| Australia | 49.6 | 56.2 | 47.0 | 46.7 | 44.5 | 43.3 | - |
| Canada | 51.1 | 49.8 | 48.9 | 48.4 | 47.1 | 45.3 | 43.7 |
| Japan | 32.8 | 33.4 | 33.5 | 31.9 | 32.0 | 29.4 | - |
| United States | 46.4 | 46.0 | 44.4 | 44.3 | 43.5 | 42.6 | 42.0 |

Source: OECD (1998).

21

The financing model of health care in Spain does not allow for a regional analysis for Catalonia as regards equity aspects. Indeed, since taxes and social contributions are collected centrally and regionally distributed later according to population criteria, it becomes impossible to assess the degree of equity in the finance of services in each region.

Despite having achieved a quite European level of expenditure in health care (according to GDP), Spain still faces an underdevelopment of public primary care services. Hospital care accounts for approximatelly half of public expenditure in health care (as shown in Table 1.9), and although the table does not show separate data for primary care they represent 25-30% of total public expenditure.

The insufficient development of primary care and other ambulatory services (polyclinics) has become in Spain a public-private issue in a number of ways since it has fostered the growth of private practice by physicians, it has required the use of private clinics for some services, and has increased the amount of payments on pharmaceuticals. The socialist primary care reform in the eighties have not had the expected results since, first, there is still a generalised referral to hospital treatment, second, there is no important reduction in the consumption of pharmaceuticals and, third, there is a low level of community participation overall. The fact that physicians dedicate very little time to each patient visit (average 6 minutes), with the resulting inadequacies of care, persists as a major problem in ambulatory care in Spanish public health system.

In primary care, as De Miguel (1979) argues, there has been a heavy reliance on medication and referrals for hospitalisation because of inadequate diagnosis and treatment. Hospital emergency services were, and still are, increasingly used as an alternative to primary care, causing financial, organisational and other problems. Consequently, some patients use private physicians, paid either on an out-of-pocket basis or by private insurance premia, as a means to avoiding "unpersonal" treatment and waiting lists. These are also causes for a frequent referral of patients by public physicians to themselves as private practitioners, increasing the overall amount of out-of-pocket payments.

The deficient primary care service forced health authorities to extend contracts with private clinics (similar to *conciertos* with hospitals and accounting for 25% of primary care expenditure by social security) for rehabilitation and other specialised services not available through public health care. The potential growth of these contracts in certain areas is still high. However, Kelley (1984) agrees this is a situation that was somehow intended by bureaucrats, politicians, physicians and patients, since the underdevelopment of primary care facilitates the development of private practice and benefits pharmaceutical industries. Whatever the causes, since not all patients are able to use private facilities, it is said that a two-tier system has developed in primary care -one for the poor (public health care) and another for the rich (private practices).

Regarding health care expenditures as a whole, it must be noted that over 95% are current expenditures allocated to personnel, goods and services, *conciertos*, and pharmaceuticals. Although the capital expenditure figure has increased slightly as a percentage of total expenditure since 1988 it only accounts for the remainig 5%, a very low investment rate in a system that has historically proved as highly dependant on the private sector.

Despite only spending 7.4% of GDP in health care, health outcomes in Spain are fairly good. Mortality rate for all ICD causes is among the lowest of the OECD countries considered in Table 1.10, infant mortality rate is below European average (fifth among the countries in the table) and life expectancy, both for women and men, are average of the countries analysed in Table 1.10.

As regards mortality per cause of death, Table 1.10 shows that the two major causes of death in Spain are circulatory diseases and cancer. However, in both cases Spain is one of the two countries with the lowest rates. As regards infectious diseases, digestive and respiratory system diseases, Spain ranks average among those countries in the same table.

In brief, four main facts could be inferred from these sequence of tables and figures. First, Spain shows as one of the European countries where health outcome indicators are better, keeping health expenditures well among the European standards. In second place, the Spanish system has achieved universal coverage and is being mainly financed through taxes, which has benefitted the overall equity of the system as regards its finance. Third, health services are mainly provided by the public sector, through the hospital network, although the role of contracts with the private sector should be acknowledged. Such a relationship may better be understood as complementary. Despite minor improvements, primary care is still lagging behind as a service network in most of Spanish regions. Finally, the decentralisation of public health services is still to be completed in Spain, not only regarding the number of regions presently benefiting from full competencies, but also regarding the need to correct the standing inequities in the finance and delivery of services across regions.

## Table 1.10.
## Life expectancy, mortality and morbidity indicators (1994).

| **Selected Countries** | Life expectancy Females at birth (years) | Life expectancy Males at birth (years) | Mortality causes, ICD All causes Deaths/100,000 pop. | Mortality causes, ICD Infectious, parasit. dis. Deaths/100,000 pop. | Mortality causes, ICD Neoplasms Deaths/100,000 pop. | Mortality causes, ICD Circulatory system dis. Deaths/100,000 pop. | Mortality causes, ICD Respiratory system dis. Deaths/100,000 pop. | Mortality causes, ICD Digestive system dis. Deaths/100,000 pop. | Maternal and infant mort. Infant Mort Death/1,000 births | Maternal and infant mort. Perinatal Mort Death/1,000 births |
|---|---|---|---|---|---|---|---|---|---|---|
| **Spain** | **81.0** | **73.3** | **674.5** | **8.3** | **179.7** | **245.9** | **57.5** | **37.8** | **6.0** | **6.5** |
| Italy | 80.7 | 74.3 | 972.5 | 3.8 | 273..0 | 424.1 | 59.1 | 49.9 | 6.6 | - |
| France | 81.8 | 73.7 | 639.7 | 8.8 | 194.3 | 182.8 | 39.6 | 33.3 | 5.9 | 7.4 |
| Germany | 79.5 | 73.0 | - | 10.0 | 268.3 | 528.8 | 64.9 | 52.6 | 5.6 | 6.5 |
| Netherlands | 80.3 | 74.6 | 725.3 | 5.6 | 210.3 | 271.9 | 57.3 | 26.6 | 5.7 | 8.6 |
| Sweden | 81.4 | 76.1 | 646.2 | 4.5 | 159.5 | 296.0 | 43.7 | 21.5 | 4.4 | 5.4 |
| United Kingdom | 79.5 | 74.2 | 762.2 | 4.2 | 209.6 | 321.6 | 99.4 | 26.5 | 6.2 | 8.9 |
| Australia | 80.9 | 75.0 | 7.09.9 | 5.8 | 188.6 | 307.5 | 55.8 | 21.6 | 5.9 | 4.5 |
| Canada | 81.1 | 75.1 | 707.8 | 10.9 | 199.3 | 268.6 | 62.7 | 26.3 | 6.3 | 7.2 |
| Japan | 83.0 | 76.6 | 710.0 | - | - | - | - | - | 4.2 | 4.8 |
| United States | 79.0 | 72.4 | 875.4 | 28.9 | 205.2 | 362.9 | 81.2 | 29.7 | 8.0 | 7.9 |

Source: OECD (1998).

**Table 1.11.**
**Demographic and macroeconomic dimensions (1994).**

| Selected Countries | Population (in 1,000s) | Dependency Pop<20 and 65+/ pop.20-64 | Labour Force unemploy. | GDP PPP/capita ($) | Tot Pub Exp. PPP/capita ($) |
|---|---|---|---|---|---|
| **Spain** | **39,150** | **67.0** | **24.2** | **15,162** | **6,626** |
| Italy | 57,204 | 61.7 | 11.3 | 20,236 | 10,664 |
| France | 57,900 | 70.5 | 12.1 | 20,464 | 11,519 |
| Germany | 81,423 | 58.3 | 9.6 | 21,622 | 10,811 |
| Netherlands | 15,381 | 60.4 | 6.7 | 20,481 | 10,843 |
| Sweden | 8,816 | 73.1 | 8.7 | 19,419 | 14,063 |
| United Kingdom | 58,395 | 70.3 | 9.8 | 19,055 | 7,565 |
| Australia | 17,838 | 68.2 | - | 20,801 | 7,447 |
| Canada | 29,256 | 63.9 | - | 21,604 | 9,656 |
| Japan | 124,960 | 60.2 | - | 23,150 | 8,311 |
| United States | 260,682 | 71.0 | - | 27,821 | 9,098 |

Source: OECD (1998).

### 1.4.1. Decentralisation and regional allocation of resources.

The decentralisation process in Spain has meant an important shift in the financial resources public management bodies use. In 1982, when only Catalonian regional authorities had direct control over health care resources, almost 85% of the total resources were allocated by central authorities. Along time, Andalucia (1984), The Basque Country and Valencia (1987), Navarre and Galicia (1990), and Canary Islands (1994), have joined Catalonia, increasing the share of resources directly managed by regional authorities from 8% in 1982 to 54% in 1991.

The regional allocation of public health care resources in Spain remains today a matter of vivid debate and continuing negotiation between the different actors in the system, namely central health authorities and representatives of regional departments of health. The debate is rooted on the coexistence of two radically different systems, the common system and the so-called *imputaciones de cupo* system. The basis for the territorial allocation of resources under the common system is population. This criteria, also recognised in the GHA (Art.82), accounts for the population in the territory, either covered by the public insurer or included in the demographic census.

However, as stated, there are two Autonomous Communities in Spain, namely the Basque Country and Navarre, who run under a different system: the *imputaciones de cupo* system The resulting monnies allocated to each of these communities represent a higher percentage than what the corresponding allocation following the per capita criteria would be. Further, it is not just an issue of more resources but also a question of faster and less bureaucratic procedures to follow under this *imputaciones de cupo* system.

Catalonia follows the common system. That is Catalonia's public health care is financed according to censed population. When compared to the Basque

Country or Navarre, this implies a series of drawbacks such as fewer resources, the forementioned more bureaucratic procedures, and the extensive timing of the process. As a consequence, two financial principles are said to be in threat, the principle of sufficiency and the principle of autonomy. The first principle argues in favour of overcoming continuous regional budget deficits as a result of delayed payment and persistent underbudgetting from central authorities, which has forced the need for public debt. The lack of autonomy comes largely as a result of excessive financial dependency from central authorities in Madrid.

Further, detractors from the per capita criteria argue such a system does not acknowledge differences in health nor health care needs across regions, neither differences between utilisation rates or socioeconomic factors like income, age and gender distributions. Finally, the ruling system does not account for patients movements across regions nor for an increased number of population in seasonal waves as a consequence of turism. [22]

Health economists in Spain have dedicated research efforts to looking into alternative sets of criteria for the allocation of regional budgets. They have come to the conclusion that the GHA's population criterion should include additional criteria such as morbidity, socio-economic conditions, migrant patients, utilisation rate of services, coverage, and tourism. Despite this, there are important information lacks on hospital care, primary care and pharmaceuticals use so as to adequately target the issue. Policy-makers should take this fact into account, too, and balance the benefits of using a probably more adequate criteria and the cost derived from setting up a complex resource allocation formula, including overcoming data information needs.

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22

Regarding this latter point there is a will to create either a new compensation fund for this purpose or modify the per capita criteria introducing a tourism corrector.

Today the regional financing model consists of three separate funds. The first is the basic fund, also called general fund, which accounts for 98% of the total amount to be distributed to the regions. The criteria used for the regional allocation of these funds is only population. The second fund is mainly concerned about patients flows across regions and educational activities. Finally, a third fund is added as a result of a series of governmental negotiations with the pharmaceutical industry from which some 65,000 milllion Spanish Pesetas have been saved to the budget. This sum, however, is also distributed according to population in each region (see Table 1.12).

**Table 1.12.**
**Regional distribution of resources 1998-2001 (in thousands of Pesetas).**

| **Regions** | Population (in 1,000s) | % | General Fund | % | Ear-marked Fund | % | Total resources (1) | % | Pharm. Savings | % | TOTAL Resources (2) | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Catalonia** | **6,069.5** | **15.50** | **593,665.3** | **15.75** | **30,827.8** | **45.09** | **624,493.1** | **16.27** | **10,237.2** | **15.75** | **634730.3** | **16.27** |
| Galicia | 2,729.7 | 6.97 | 260,559.7 | 6.91 | 5,282.9 | 7.73 | 265,842.6 | 6.93 | 4,493.1 | 6.91 | 270,335.7 | 6.92 |
| Andalucia | 7,064.8 | 18.04 | 681,160.9 | 18.07 | 12,334.2 | 18.04 | 693,495.1 | 18.07 | 11,746 | 18.07 | 705,241.1 | 18.07 |
| Valencia | 3,893.3 | 9.94 | 385,440.5 | 10.23 | 3,314.1 | 4.85 | 388,754.6 | 10.13 | 6,646.6 | 10.23 | 395,401.2 | 10.13 |
| Canary Islands | 1,535.3 | 3.92 | 153,310.5 | 4.07 | 1,099.7 | 1.61 | 154,410.2 | 4.02 | 2,643.7 | 4.07 | 157,053.9 | 4.02 |
| Basque Country | 721.6 | 1.84 | 205,263.7 | 5.45 | 3,536.5 | 5.17 | 208,800.2 | 5.44 | 35,396 | 5.45 | 212,339.8 | 5.44 |
| Navarre | 524.0 | 1.34 | 50,669.2 | 1.34 | 968.6 | 1.42 | 51,637.8 | 1.35 | 873.8 | 1.34 | 52,511.6 | 1.35 |
| Subtotal | 22,538.2 | 57.56 | 2,330,069.8 | 61.28 | 57,363.8 | 83.91 | 2,387,433.6 | 62.21 | 40,180 | 61.28 | 2,427,613.6 | 62.20 |
| INSALUD | 16,611.2 | 42.44 | 1,439,326.7 | 38.18 | 10,999.0 | 16.09 | 1,450,325.7 | 37.79 | 24,820 | 38.18 | 1,475,145.7 | 37.80 |
| TOTAL | 39,149.4 | 100.0 | 3,769,396.5 | 100.0 | 68,362.8 | 100.0 | 3,837,759.3 | 100.0 | 65,000 | 100.0 | 3,902,759.3 | 100.0 |

Source: Generalitat de Catalunya (1998)

### 1.4.2. Broad remaining problems and reform proposals.

Despite all the above, there are important critical elements in the organisation and financing of Spanish health care system that should also be noted. Elola (1991) identified three aspects that critically represent the present situation, namely legitimation, financial and rational problems.

The **legitimation** component (political and professional acceptability, responsiveness to need, community allegiance to the system) is said to be the consequence of three combined features: lack of community participation, alienation of the system, and bureaucracy. Before the GHA was put through, the health system was perceived as both imposed on the medical professionals and foreign to the needs of the Spanish population. On the bases of this historical legitimation crisis, the 1986 reform was set as an alternative model. As it has been already stated, the GHA tried to promote community participation through the establishment of a patients' charter. However, the law did not consider the patient as an active part in the planning and decision processes (typical from other National Health Services operating in Europe) but as a client asking for more and better services (increasing health consumption in the system). As a result, the Spanish NHS appeared as distant from the individuals benefiting from it as it was before, hardly adaptable to the population's needs, and therefore poorly legitimated, specially when rationalisation measures had to be implemented. Moreover, bureaucracy (a tradition inherited from the INP of the 1940s) did not help to bring the system any closer to its objective.

The critical **financial** component is a direct consequence of a persistent increase in health expenditure due to three incentives: the expansion towards universal coverage, the ageing of the population, the increasing use of new technology, and new health care demands[23]. Cost-containment measures in the mid eighties in Spain targeted on wages (of those professionals working in the public sector) and, in a minor scale, on holding back capital investment and controlling the number of *conciertos*. These policies were more concerned with short-term direct controls on budgetary expansion than in improving the efficiency of the system. However, their outcome could be judged as positive within that period, since the public health expenditure-GDP ratio was kept within an acceptable margin. It was done, nonetheless, at a high political cost: the resulting confrontation with the medical professional organisations. Today, the pressure on the health budget is still high and it annually shows significant deficits. Accordingly, the government cost-containment policy has extended to areas such as pharmaceuticals, service provision, and efficiency. [24]

Finally, the criticisms regarding the **rational** component is a consequence of a decrease in both the efficiency and the effectiveness of the system to meet its objectives. The health authorities attempted to improve efficiency by the expansion of primary care services with no proper evaluation of outcomes, and by a hospital reform that has not improved productivity but prompted the medical professionals' discontent. In addition, the increase in chronic and degenerative illnesses together with the system's deficient adjustment to match

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Rising expectations among the population about medical services together with a third payer phenomenon incentive to demand services, have also been argued as elements to explain increased expenditures in health systems in developed cointries.

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The *Ley del Medicamento* (pharmaceutical law) has set tighter controls and selective exclusion of pharmaceuticals from the list of those eligible to be prescribed by NHS physicians. A redefinition of the services provided by the NHS has also been put through (although central health authorities claim it has been an adequate and necessary updating of the services offered by the public system). Finally, regarding efficiency issues, contracts between health agencies on one hand (INSALUD and Regional Health Services) and public hospitals on the other have increasingly been based on cost-per-case criteria. However, these measures have been more concerned with improving efficiency in the management of services rather than looking for the economic efficiency derived from a more competitive health market. In short, the financial constraints the health system has faced, and is still facing in the present, have been fought back with cost control measures, more in the line of an economistic policy than by improving the overall efficiency and effectiveness of the system.

these population needs have culminated in the decline of the overall efficiency. The decrease in the effectiveness has come as a result of, first, the outlined decline in efficiency and the parallel increase in the health expenditure, second, the expansion in bureaucracy and, third, the unadequate use of new medical technology[25].

The reform proposals under debate are concerned with overcoming the reported financial, rational and legitimation problems (Elola, 1991). The instruments to do so vary. The economism of the system (thought to bring down costs) would be replaced by a more efficient entrepreneurial management. Expansionism as a policy would be taken over by a proper evaluation of both technology and quality, promoting those services which are more efficient, according to equity and to the available resources. Finally, bureaucratisation would be corrected through a greater community participation closer of the original National Health Service concept.

There is a general agreement about the elements the reform should incorporate (those stated above) but there is still scope for the debate about how to implement the objectives of economic efficiency, evaluation and community participation. In short, about how to reform the health system so it could be more receptive to population needs and more flexible regarding its constraints. For this purpose, experts, health managers and politicians try to bring into the Spanish health care system the internal market practices and theories from other countries in Europe, specially Great Britain.

The first approach to a market reform in Spain was reflected in a Parliamentary Commission report, better known as Informe Abril, on the analysis and

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25

A satisfactory technology evaluation and its assimilation by the health services are key elements to solve the rationality crisis in the system. Health Technology Assessment agencies in Spain have a major role to play here.

evaluation of the National Health Service *(Comisión de Análisis y Evaluación del Sistema Nacional de Salud 1991)*. This report acknowledged the present NHS has positively contributed to the well-being of the Spanish population, but argued at the same time that new trends in health demand made a restructuring necessary. The changes that were to be applied should aim at setting the ideal conditions to benefit from a greater level of decentralisation, managed competition and a clearer allocation of responsabilities. Its recomendations were divided in two groups, with regard to the organisational and financial aspects. [26]

This report, however, was put aside since the financial considerations it contained were not of the like of the socialist government, that is, not too viable, politically speaking. Despite the favourable comments of most experts

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26

Regarding the **organisation**, any proposal of reform should take account of the fact that the system is immersed in a process of decentralisation that is still to be completed. Whatever the new organisation looks like, it would have to fit into the existing administration arrangements of the *Estado de las Autonomías*. The lost of power by the central bodies due to the decentralisation process would coincide with the reinforcement of general strategical aspects at a central body. A reinbursement mechanism between regional authorities would also be attempted since there is an outstanding movement of patients across regions. I brief, the new model would imply an structural change in the existing system as well as new functioning rules (in the line of private law regarding hospitals and personnel). A division between the purchase and the provision of services (like in other European countries) would be necessary, making the gradual introduction of competition rules among providers possible and increasing, as a consequence, efficiency and choice in the system. New management bodies would also be necessary since today's INSALUD is too big for the purpose of such reform. The ideal size would either be the *Areas de Salud* (Health Areas) mentioned in the GHA or the smaller *Zonas de Salud* (Health Zones, similar to District Health Authorities in the British model). The regions will be in charge of coordinating the Health Areas/Zones in their territory, acting as holdings. The new management bodies would have greater autonomy and flexibility so as to more properly address the population needs, and would link their budgets -now more accurate and flexible- to the needs of the new management competencies. In this more competitive system, the private sector would have a more participative role. To enter this market, however, private organisations would need to show their financial viability and give credit of the quality of their services.
Regarding the **financial** side, the State's budget contributions would continue being the main source of financing the system, completed with the existing social contributions (these would not disappear), and some undetermined and originally minimal user co-payments regarding some services (in order to promote a concience over the cost of services) would be introduced. A clearer definition of those services covered by the NHS would be necessary, specifying which would be cataloged as basic, complementary or additional. A further user co-payment is conceived regarding pharmaceuticals if economic and budget conditions require it.

in the area regarding the organisational issues (López Casanovas, 1991; Ventura, 1992 ; Moreu, 1993; Olavarrieta, 1993), the non-systematic appoach displayed in the report, the scarce comments on public health and primary care issues, and the combination of very detailed and too general aspects, turned the report into a declaration of principles.

The ideas that inspired this Comission's report, however, were also present at the level of some regions. Indeed, in April 1991 the Health Organisation Law by the Catalan Government (*Llei d'Ordenaciò Sanitària de Catalunya*-LOSC) set, in the scope of its competencies, the bases of a new organisational structure of health services In Catalonia. Catalonia was joined later by the Basque Country (*Plan Estratégico Vasco*), and together have become the reference to those other regional governments with full competencies in health care that are presently thinking of similar reforms in their Regional Health Services. The rest of the regions (INSALUD-direct management) still depend on decisions coming from central INSALUD in Madrid, and so far, very slight moves in this direction have been attempted.

Recent Ministry's policies such as the redefinition of services, the gradual economic evaluation of types of treatment, and the pharmaceutical law, have aimed at both the improvement in the quality and quantity of information, and at the amelioration of the public system's critical financial situation. What is relevant, however, is the fact that there has been a change in the Ministry's attitude towards the Catalonian experience. In the first place, the central government reaction to the Catalan law (LOSC) was a mixture of scepticism and very slight opposition. In two years time, this first opinion has changed drastically, and Madrid is now admitting this sort of policy may be the answer to its own difficulties. Yet, on the other hand, central authorities are not totally sure of how to deal with the negative effects the reform may have on the equity[27] and universality of the present system. It is my belief that, since the decentralisation process is still on its way, and INSALUD would gradually disappear in the future (as Regional Services from the rest of regions will take hold of its competencies), the Ministry in Madrid is implicitly expecting regional governments to take hold of the reforms by themselves, avoiding the political cost these changes may carry, and at the same time learnig from pilot experiences like the Catalan and Basque's.[28]

Since the improvement of the health system is a common concern to all political parties, both regionally and nationally, parties' ideological strictness should be overcome in order to reach a common strategy towards change. Furthermore, the fact that any health reform embodies high political costs to the governmental party must convince politicians to reach a comprehensive agreement on the policy option. The *Pactos de la Moncloa* in 1977 was a valid experience of this sort of multi-party commitment in the past.

Finally, it should be noted that for any health care reform to succeed in Spain it will have to count on a plausible policy option to be applied and a favourable social and political climate, but should also account for the characteristics, objectives and values of the Spanish health care system, equity among them, and fit into the ongoing decentralisation process.

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27

In 1989 a more tax-financed public health system was prompted aiming at achieving greater equity in the finance. This late-eighties effort could now be threatened by the reform proposal outlined in the Commission's report regarding the increase in the level of co-payments (out-of-pocket payments) in pharmaceuticals and services provided by the NHS. The consequent increase in direct payments would result in substantial social inequity, since these represent a greater part of income in the lower income groups.

28

The introduction of internal market policies in some regions and not in others could give way to a notorious spatial inequity. Those regions with full decentralised competencies and with a powerful private sector would be able to benefit from the expected increase in economic efficiency derived from a more competitive market, while the rest of regions would still depend on Madrid for such decisions.

### 1.4.3. The Catalan model within the Spanish health system.

Catalonia is one of existing seventeen Autonomous Communities in Spain. It accounts for approximately six million people, that is 15% of the Spanish population. Its population growth is extreamly low, around 1.9%, when compared with 3.1 in Spain and 3.9 in the EU (1996). Around 76% of the population live in the urban setting compared with 65% in Spain (1996). Per capita GDP is 15,054 ECU, which is 19% of total Spanish GDP (1995) (Cambra de Comerç, Industria i Navegació, 1998).

As stated before, Catalonia enjoys an important range of competencies in the public sector policy area. Health is one of this area of policy devolved to Catalonia in the early eighties. In the early nineties Tha Catalan Parliament passed the Catalan Health Organisation Law (*Llei d'Ordenació Sanitària de Catalunya -LOSC*). This is the fundamental law in the organisation, planning and management of health care in Catalonia. Its main characteristic is the consolitation of a public-private mix system as regards the provision of health care services. As a consequence of a historical desequilibrium in the investment trend in the health care area in Spain, Catalonia had to bet on the available health care services network to cover the entire Catalan population. This network was, and remains, quite different in terms of ownership to that prevailing in the rest of Spain. Only 40% of available beds belong to the strictly speaking public health care network, while the remainig 60% are of a diverse ownership, including municipalities, districts, religious institutions, and for-profit institutions.

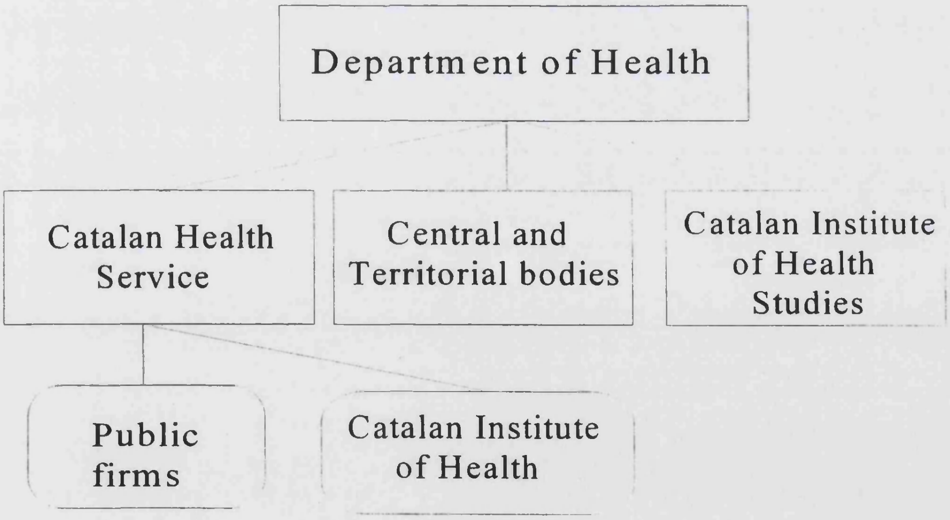
Following the Spanish health care system characteristics, the Catalan model can be also described as a mix financed model. Differently from the rest of Spain 25% of the population in Catalonia enjoy both public and private insurance. A series of health goals are recognised by the Catalan health care authorities and shown in Table 1.13. The organising structure of the public management bodies is graphically displayed in Figure 1.1.

**Table. 1.13.**
**Health care goals in Catalonia.**

| AIMS | MEANS |
|---|---|
| * Health care is a public service, financed by public sources.<br>* Health care is provided to all the population under universal coverage principles.<br>* The Catalan health system is an integral system. Special emphasis on health promotion and preventive mesasures is given.<br>* Equity and amelioration of geographical and social unbalances.<br>* Rationalisation, efficacy and efficiency in health care organization. | * Create the Catalan Health Service as a public body responsible for the provision of public health care services.<br>* Consolidation of the private-public mix as regards provision of services.<br>* Formulation of a managed competition model (diversity of providers, purchasing-provider split)<br>* Decentralisation to the territory.<br>* Diversity in the management formulae.<br>* Citizen and community Participation in the management of the SCS. |

Source: Adapted from LOSC (1991).

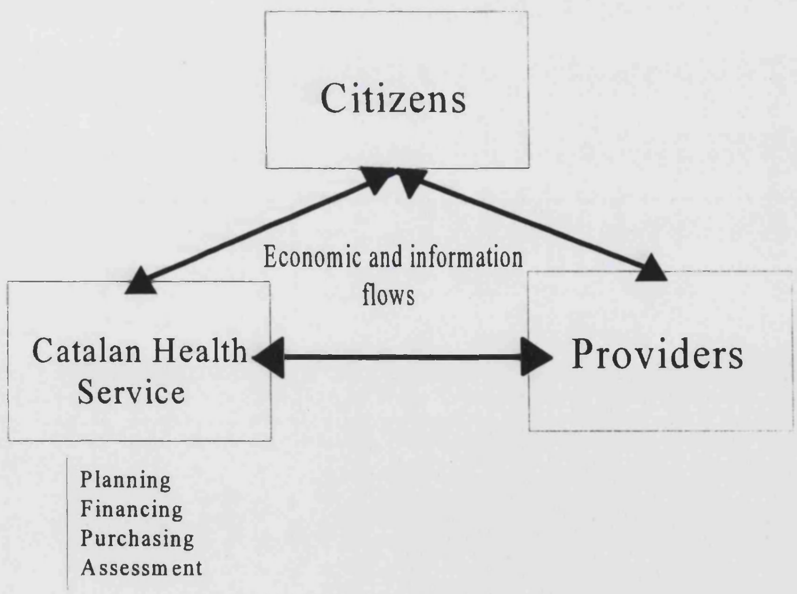
**Figure 1.1.**
**Organising structure of the public management bodies in Catalonia.**




Source: Generalitat de Catalunya (1997a)

The Department of Health is in charge of setting priorities in health care policy. It is clearly a planning body. It is also responsible for competencies in the areas of control, inspection and evaluation of health care activities and the Catalan Health Service. The Catalan Health Service is attached to the Department of Health. It is in charge of guaranteeing public coverage of medical assistance. It therefore acts as a public insurer and contracts health care services with both public and private providers (see Figure 1.2.). The provision of health care services is done on the bases of an acreditation mechanism, and the valid instrument for the purchase of health care services is the contract. The whole of providers that sign service contracts with the Catalan Health Service constitute the Catalan Network of Public Health Care Provision. In this respect, the Catalan Health Institute, the major public provider, is one more of these providers.

**Figure 1.2.**
**Public-private mix system in the provision of health care in Catalonia.**




Source: Generalitat de Catalunya (1992)

The Catalan Health Organisation Law (LOSC) has been studied regarding many aspects and from diverse standpoints. It would then be extreamly difficult to show here a complete assessment of what has been produced in this respect. It is, however, illustrative to account for some interesting, albeit neccessarily broad, implications.

First, although the Catalan Health Organisation Law does not explicitly mention the purchaser-provider split, the system has evolved to a much clearer division of tasks among management and service bodies. At the purchaser level, the Catalan Health Survey acts as the public insurer and therefore finances, controls, assesses and buys services from a wide range of providers included in the public health care provision network. As stated, the contracts serve to this purpose. These contracts follow the guidelines and priorities pointed out in the Catalan Health Plan and the Catalan Plan for Sociosanitari Services.

At the provider level, the system remains a public-private mix. However, it is arguable there is any competition for contracts with Catalan Health Service, the purchaser. Although on the one hand, the LOSC may have meant a loss in public monopoly power, on the other hand it could well have implied a publicitation of the health care services network (Gallego-Calderón, 1999). The contract has served to the purpose of activity control, although it is unclear whether this control counts on the necessary assessment mechanisms, information sources and sanction power. What has become evident is the need, at the provider side, of better health services management, and managers.

Finally, at the user level it seems that the Catalan Health Organisation Law takes into account a greater degree of participation. It is therefore also to them the claim of a better service quality in terms of trained personnel, infrastructures and costs, as well as the possible trade-offs among these issues.

## 1.5. Concluding remarks.

The four most distinguished elements in Spanish health care system today are universal coverage, public provision of health services, strength of the hospital network over primary care services, and decentralisation.

In some ways, the Spanish health care system is still based in some of the social security principles of the Francoist period. The GHA pointed to a change towards a National Health System, covering almost the entire Spanish population and being largely financed through State's budget transfers. Both of these are basic conditions to qualify the ruling system as a National Health Service type. However, some aspects of the organisation and the level of the services provided are proper to a social security system. Indeed, public finance accounts for 75% of the total finance, which places Spain among countries like Germany or Holland, rather than among those other like the UK or Sweden.

Secondly, health services in Spanish regions are mainly delivered in publicly owned centres and by NHS doctors and nurses. Only Catalonia provides health services mostly through the not-public sector (60% of total beds). The Basque Country, rating second in the same ratio, is down to 44% of the beds. The rest of regions vary enormously regarding the size of the private sector, from 5% in Extremadura to 33% in Navarre and Valencia. This has forced regional authorities in Catalonia to look to the private sector as a means to guarantee universal coverage principles.

Finally, decentralisation. Spain started in the eighties a slow process of health decentralisation to the regions that is far from being complete. Only seven out of seventeen regions benefit from full competencies in the health care area. Along time, this process has encountered various difficulties among which the unclear definition of responsabilities should be mentioned. In addition, a stronger coordination between regions' policies as well as between regions' health plans is needed if we are to avoid having a National Health Plan as a result of simply getting together seventeen different regional plans.

This research focusses on various of these aspects. Universalisation together with the decentralisation process have brought on the need to study whether Catalonia, a region endowed with full competencies in health and with a particular private-public mix in the provision of services, has achieved the equity objective. The next chapter is concerned with the equity principle as mentioned in the fundamental laws that rule Spanish health care, both at the national and regional level of Catalonia.

# CHAPTER 2.

## Equity as a Policy Objective.

Equity is a key objective in most health care systems, particularly in terms of policy documents and policy statements (Mooney, 1994). However, much is debated regarding what is meant by equity and how equity should be measured. This chapter addresses both issues and brings in the results and conclusions of the most relevant studes on the topic in Spain.

The Spanish Constitution and the General Health Act (GHA) have commonly been given as suitable examples of these sort of aspirational priorities. The way both address the issue of equity in the health care arena could be defined as of general ambiguity. In this respect, articles 31(Title I, Ch.2), 41, 43 and 49 (Title I, Ch.3) in the 1978 Spanish Constitution literally read:

> ***Title I, Chapter 2, Section 2, Art 31.2.*** *Public expenditure would be allocated according to equity principles, and its planning and implementation would consider efficiency and economy criteria.*
> ***Title I, Chapter 3, Art 41.*** *Public authorities would keep a social security system for all citizens that would guarantee assistance and social services according to need situations, specially unemployment .*
> ***Art.43.1.*** *The right for health protection is recognised.* ***2.*** *It is competence of the public authorities the organisation and guardianship of public health by means of preventive services and the provision of the necessary health services. Forthcoming law enforcements would establish rights and duties in this respect.*
> ***Art 49.*** *Public authorities would create and promote the necessary policies for the treatment, rehabilitation and integration of those citizens with physical, psichological or other impairments to which specialised atention should be provided.*
>
> Note: Author's translation.

The 1986 GHA, passed eight years later, developed more specifically these equity considerations raised in the Spanish Constitution:

> ***Title I, Chapter 1, Art.3.2.*** *Public provision of health care services will cover the whole of Spanish population. Access to these services would be under conditions of effective equity.*
> ***Art 3.3.*** *Health policy would be addressed to overcome territorial and social unbalances.*
> ***Art 6.4.*** *Health Authorities would address their action towards guaranteeing health care services provision in all cases when health status is lost.*
> ***Art 12.*** *Health Authorities will devote health expenditures to the correction of health and health care inequalities and to guarantee equity of access to public health care services in all the Spanish territory [...].*
> ***Art 16.*** *The rules of use of health care services should be equal for all, regardless of the condition under which the person has accessed these services. [...]*
> ***Title III, Chapter 1, Art 46.*** *The basic characteristics of Spanish Health Care System are: (a) Coverage of health care services to all the population.[...]*

Note: Author's translation.

The decentralisation process, recognised by the Spanish Constitution and the GHA, has also brought the equity objective to the policy level of the Autonomous Communities. Indeed, the Catalan legal dispositions, of interest to this research, addressed equity issues in several of the Catalan Health Organisation Law (LOSC) articles:

> ***II.*** *Following the 14/1986 Spanish General Health Act, the present legal disposition recognises the constitutional right to health protection [...]. Within this framework the LOSC aims at the arrangement of the public health care system in Catalonia according to the principles of universal coverage, integration of services, [...]*
> ***Title I General dispositions, Art 2.*** *Health protection, and the arrangements and organisation of health services in Catalonia should comply with the following*

*principles:[...]* **c.** *Universalisation of individual and colective health care services to all citizens in Catalonia. [...]* ***f.*** *Equity and overcoming of geographical and social inequalities in the provision of health care services.*

Note: Author's translation.

From all the above, the equity objective stands out clearly in all the relevant legal dispositions in the context where the present research takes place. However, little is said as to how the assessment of equity should be approached and what to do to overcome inequalities in the provision of health care. Accordingly, we have few clues so as to how to assess whether the system has achieved or not one its most outstanding and explicit policy goals.

## 2.1. Equity, health and health care.

The notion of equity has been largely a matter of schools of thought and values. Thus, so as to attempt a definition of equity we should look into what are the different values within each of these schools and ideologies. We can find at least six distinct approaches to the term of equity in health care, each of them closely related to the role played by both the State and individual freedom in this policy area, and briefly revised here: (a) egalitarianism, (b) libertarianism, (c) neo-libertarianism, (d) the utilitarian approach, (e) rawlsianism, and the (f) envy-free allocation theory.

The concept of equity in health care under **egalitarianism** needs some interpretation since the school did not originally addressed this particular policy issue in its formulation. The first interpretation proposed is that of equality of public expenditure, for example, where no regard was paid to differences in health status or need for health care. A second body of interpretation insists on equality of outcome, that is, on the distribution of health itself.

Besides the interpretation taken, the school has been criticised for failing in relating detailed policy statements to its philosophical standpoint. The concerns with the egalitarian approach have been numerous. As stated, most of them concentrate on the difficulties in translating what the school defines as equity into valid policy recommendations. Further, if we are to equalise health outcomes this would require inmense ammounts of resources devoted to those with very poor health so as to get them from where they are to an equal situation with the rest of members of society, for which it has been described as too costly in terms of sacrifices to health and other good things in life (Mooney, 1992a;1992b).

A third interpretation, adopted in this research, takes into account the concept of need for health care services and, thus, equality of treatment for equal need. This interpretation does not imply equilising health outcomes and, as it will be shown later, has been translated into clearer policy recommendations.

**Libertarianism** as a doctrine conceives equity in terms of distribution according to entitlement. This proposition suggests that one is entitled to what the individual posseses provided that it was acquired justly. Nozick proposed that just acquisitions are based on earnings, inheritance or through redistribution by government of holdings acquired illegally (Pereira, 1993). Hence, what may be judged as an equal situation depends entirely on the process or path used to get to it.

It seems like the libertarian approach is clearly at a far distance from any equity statement in the policy area in most European countries. The doctrine envisages health and health care as commodities the individual may acquire, and hence it is in this process that equity should be defined in regard to health and health care. A drastical extrapolation of this approach would lead to consider as just situations one may normally judge as terribly unfair. Down syndrome, for instance, is a chromosomal abnormality. The individual is born with this malformation. There is nothing you can do about it since there is no possible treatment once born. It is consequenty inherited by the individual. Libertarians, would consider this situation as equitable leading to no action or redistribution of resources towards individuals in these situations. Further, this is also the case of most chronic medical conditions. In all these circumstances the resulting situation will be that of a fair distribution of health or health care since it was acquired either through entitlement or inheritance. Finally, libertarians suggest that the market is an additional source of fairness. Health care is not a right in itself, and only when the individual acquires this commodity through the market it could be considered to have a right over it.

Redistribution and the role of the state under strict libertarian thought are seen as unjust in themselves. Accordingly, no attention is paid to the worse-off, to those sick or ill, to the poor, to those with physical or psychological impairments. That is, no value is attached to caring, generosity, altruism nor solidarity principles. The market rules the way to fair acquisitons and the allocation of resources. Finally, this approach disregards issues such as public and social goods, externalities and consumer imperfect information, whose presence in the health care market cannot be denied.

**Neo-libertarian** doctrines tried to alleviate this extreme libertarian approach to equity by means of formulating the decent minimum proposition. This suggests a role by the State as the provider of some sort of safety net, that is, a standard below which individuals should not be allowed to fall. However, it is unclear whether this decent minimum refers to health or health care. Are we referring to a decent minimum of health, or to the provision of a minimum standard of health care? In any of these cases the State is reserved a minimal role in terms of providing that minimum standard to the poor and to those that do not actively participate in the market.

Once more, the role of the State as a guarantee of a minimum does not match the European governments' involvement in health care policy at all, let alone the achievement of universal coverage as a policy objective.

Moreover, one of the main concerns with this approach is what constitutes a decent minimum the State should guarantee. The theory is certainly opaque in this sense. Should we take this decent minimum as given, static, constant across cultural heterogeneity, unchangeable with increased knowledge and the fast development of technology, invariable with the appearance of new needs and demands, and non-responsive to the availability of resources? All this suggests that the clarification of what is an acceptable minimum standard is a fairly complex, yet unsolved, issue.

The **utilitarian** school focusses attention on maximisation principles. According to this doctrine resources should be allocated so as to maximize total or aggregated utility. The relevant issue here would be the maximisation of health gain by means of providing health care services. Redistribution is clearly out of the way, and no role for State action is prioritised. It has been widely argued that it is not equity what the underlying propositions pursue, but a clearly defined concept of efficiency. Sen, for example, has clearly disclosed some of the criticisms to this approach, namely welfarism, sum-ranking and consequentalism (for a wider view on this issue see: Sen, 1993; Sen and Williams, 1982). Further, there are various technical and methodological difficulties and limitations in operationalising the utilitarian approach. If such an approach is to be used then we should find answers to questions such as, whose utilities matter? How should we attempt to measure them? How can we actually compare interpersonal utilities? How should we proceed in the aggregation of such utilities? All these questions are still part of the most vivid debate among health economists today.

**Rawls' maximin** and the veil of ignorance suggest that social policies should seek to maximise the position of the least well-off. Accordingly, an inequitable distribution would be justified only on the grounds of favouring this group. Rawls standing point has been criticised on various bases (Le Grand, 1987a, 1987b). How should the most disadvantaged group be defined? How can we tell whether inequalities are to their advantage or not?

Daniels has brought Rawlsian ideas into the health care domain. He argues in favour of including health in the set of Rawlsian primary social goods that should not be left to individual choice, since health care is necessary for species functioning. However, we still find some practical problems in terms of how such a rawlsian concept of equity may be applied to empirical analysis.

An alternative approach to equity is the **envy-free allocation** theory. Non-envy allocations do not count on external moral viewpoints so as to judge a distribution as equitable. The bases for such a judgement are individual preferences. Once more, criticisms have been raised as regards practical application problems.

The approach used in this research is a pro-egalitarian view of equity. Egalitarians may judge equity by assessing the extent to which health care is, in practice, distributed according to need, and financed according to ability to pay (Van Doorslaeer *et al.*, 1993). More specifically, whether individuals that could be catalogued as in equal need as a result of sharing a similar health status (as measured by a series of ill-health indicators), receive equal treatment as measured by the use of primary, specialist and inpatient care and their corresponding expenditures.

The reasons for such a choice are various. First, most European countries share this egalitarian viewpoint as regards equity in health care. Certainly, as seen from the Spanish Constitution, the 1986 GHA and the Catalan LOSC, the conceptualisation of the term equity in Spain and Catalonia seem to refer to equal treatment for equal need. Second, much empirical work to date on equity in health care in western countries has reflected also this egalitarian standpoint for similar reasons. Therefore, for the purpose of comparative research one may also argue in favour of using this approach. An additional interpretation of the term equity under egalitarianism refers to equality of access, particularly in reference to costs and time faced by individuals receiving health care. Acknowleging the relevance of this approach, given the universal coverage conditions in Spain and Catalonia, this research has focussed on equality of utilisation

## 2.2. Inequalities in health care.

Since the late 1970s inequalities in health care have been on the agenda of many researchers in the social sciences. For the last fifteen years, plenty of research efforts have contributed, both methodologically and empirically, to what has been, and remains, a vivid debate on inequalities in the European perspective (Le Grand, 1978,1982,1991; Collins and Klein, 1980; Puffer, 1985; Illsley and Svensson, 1986; Aïach *et al.*, 1987; Mooney, 1987,1991; Culyer, 1988,1991; Culyer and Wagstaff, 1993; Pope, 1988; Green, 1988; Fox, 1989; O'Donnell and Propper, 1991a,1991b; Wagstaff *et al.*,1991a,1991b, 1991c, 1994,1997; Van Doorslaer *et al.*,1992, 1993; Van der Meer *et al.*, 1996; Gerdtham, 1997; Marmot *et al.*, 1997; Poland *et al.*, 1998, among others). It has also formed part of a wider debate on inequalities in health, sparkled by the Black Report (DHSS, 1980) and much debated since (Anderson and Newman, 1973; Dworkin, 1981; Whitelegg, 1982; Daniels, 1985; Sen, 1985; Baumol, 1986; Le Grand, 1987a, 1987b; Fox, 1989; House and Kessler, 1990; Pereira, 1990; Vagero, 1991; Monroe, 1992; Whitehead, 1992; Benzeval *et al.*, 1995; Blane, 1995; Blazer *et al.*, 1995; Lairson *et al.*, 1995; Siegrist, 1995; Arblaster *et al.*, 1996; Foster, 1996; Rosenberg and Hanlon, 1996; Blaxter, 1997,1998;

Macintyre, 1997; Mackenbach and Kunst, 1997; Manor *et al.*, 1997; Wadsworth, 1997; Bloom and Macintyre, 1998; Judge, 1998, among others).

In Spain, health and equity have been highlighted issues in different studies throughout the literature on the Spanish health care system. However, as it will be shown in the literature review later in this chapter, most of the research done to date has been largely devoted to inequalities in health rather than inequalities in health care.

Recently, some studies have addressed the issue of inequalities in health care in Spain, that is, inequalities in the delivery and financing of health care services. During the 1980's the first National Health Surveys were produced and, in consequence, a number of studies addressed more specifically the area of inequalities in health care (among the most important authors we should mention Gol, 1978; Durán, 1983; Lemkow, 1986; González and Regidor, 1988; Murillo *et al.*, 1988; Alonso *et al.*, 1988; Ortún, 1990; Guillén, 1990; De Miguel and Rodríguez, 1990; Bandrés, 1991; Freire, 1993, Rodríguez *et al.*, 1993; FOESSA, 1983,1994; Borràs, 1994; Benach, 1995, Díez *et al.*, 1995; Ramis, 1995; Librero and Benavides 1995; Navarro-Rubio *et al.*,1995; Fernández *et al.*, 1996; Regidor *et al.*, 1996; Fernández *et al., 1996;* Luengo *et al.*, 1996, Marín *et al.*, 1997; Abásolo, 1998; Fernández *et al.*, 1999; Borrell *et al.*, forthcoming). Yet, only a minority of these studies were comprehensive enough to draw a full picture of health care inequalities in the Spanish health care system.

The scope of these studies on inequalities in health care was largely national, that is for the whole of Spain. No separate all-embracing regional analysis was performed. This indeed limited the usefulness of the information provided to regional health authorities since it was largely referred to inequalities at a higher level of analysis. This is particularly important since in the eighties, as stated, Spain embarked on a major decentralisation process of health care to the regions. Once decentralisation had taken place and regions were gradually devolved competencies in health care, studies of a national scope became insufficient since the tackling of inequalities in health care had became an area of major concern for regional authorities and the local governments. It is within this new scenario of three different levels of administration, namely national, regional, and local, that inequalities in health care should now be informed. National data should thus be complemented with regional and local data and analysis to draw a more accurate picture of inequalities in health care and better target health objectives and policy responses. This research addresses the regional level of analysis using specific data from Catalonia.

### 2.2.1. The measurement of inequality.

The measurement of inequalities in health have traditionally been based on the use of a series of measures and indices which are worth to briefly recapitule here. Wagstaff *et al.* (1991c) have summarised these measures in six, namely Ranges, Gini Coefficients, Pseudo-Gini Coefficients, Dissimilarity Indexes, and Concentration Indexes. All of them address the notion of inequality as regards the distribution of health, and are ultimately used to the measurement of the distribution of health care across the population.

The first of the measures pointed out here are **Ranges**. This approach compares health indicators between top and bottom groups in a classification of individuals according to a given socio-economic variable. The results are given in the form of percentage point differences between groups or, alternatively, in terms of ratios including both groups. However, the use of ranges is not without shortcomings and limitations. Two main points are raised at this stage and briefly mentioned before. First, ranges fail to consider what happens in intermediate socioeconomic groups. The use of this measure also comes short to account for differences in the relative size of the groups. Not always the socio-economic groups considered include the same number of individuals and, consequently, using ranges would ignore changes in their relative size. Further, following from this last remark an additional problem arises and that is the one derived from making international comparisons on the bases of such measures.

The second set of the measures accounted for in Wagstaff *et al.* (1991c) work are the **Lorenz curves and Gini coefficients.** Lorenz's curves plot cumulative proportions of population ranked by health, against the cumulative proportion of health. An equal distribution of health would result from a Lorenz curve that matches the diagonal in the box. The further the Lorenz curve moves away from the diagonal the greater the inequality. The area between the resulting Lorenz curve and the diagonal provides an additional measure of inequality, namely the Gini coefficient. This Gini index represents the area between the Lorenz curve and the diagonal as a percentage of the whole triangular area below the diagonal, and ranges from 0 to 1. Lorenz curves represent all people in a given population not just two extreme groups (i.e. bottom and top socio-economic groups) as in the previous Ranges measures. Further, these Lorenz curves do not classify people according to their socio-economic group or any alternative measure of class or income classification. People are ranked according to health which overcomes any problems that a classification and size of groupings may hinge.

However, this approach does not capture whether there are inequalities in health that are systematically related to socioeconomic status. Indeed, the Lorenz curves, as described above, fail to capture the socioeconomic dimension of inequalities in health, that is how health is distributed across socio-economic groups or any particular classification such as income level. This is an important criticims to the use of Lorenz curves since what it is intended in the measurement of inequality is to know not just whether inequalities in health exist, but rather if they are associated in anyway to inequalities in socioeconomic status.

**Pseudo-Lorenz Curves and Gini Coefficients** try to overcome this problem. Leclerc (1990), for instance, use group data instead of individual data. These groups do not reflect health classes but rather occupational classes, ranked by mortality starting with the lowest mortality class. Alternatively, the groups can also be formed on the bases of other criteria such as socio-economic groups or income. Pseudo-Lorenz curves then plot cumulative percentages of population, classified by socioeconomic variables such as occupational class, ranked by health, against cumulative percentages of deaths. As it could be deducted, this is not a proper Lorenz curve. However, pseudo-Lorenz curves also present a shortcoming worth mentioning here. Since socioeconomic gropus are still ranked according to their health, they fail to capture the socioeconomic gradient in the distribution. This translates, for example, in the incapacity of this measure to capture the fact of the lowest health group being full of millionaires, for example. This measure will tend, thus, to register positive inequality even when no class gradient exist.

Another set of measures included in Wagstaff *et al.* (1991c) contribution are the **Dissimilarity Indexes.** The idea behind them is straightforward. They try to measure differences between groups shares of population and groups shares of health:

$$DI = \tfrac{1}{2} \sum_j |S_{jh} - S_{jp}|$$

where $S_{jh}$ is the group "j" share of population and $S_{jp}$ is the group "j" share of population's health. This approach, however, is insensitive to socioeconomic dimensions, since it also fails to show any class gradient in the measurement of inequalities and, accordingly remains insensitive to changes within this same class gradient.

**Slope and Relative Indexes of Inequalities** overcome the outlined shortcomings in reflecting socio-economic dimensions in the measurement of inequalities in health. First, the mean health status of each socio-economic group is calculated and then groups are ranked according to a socio-economic variable, not health as before. The Slope Index of Inequality (SII) will be defined as the slope of the regression line between both points in the axes using Weighted Least Square. If SII is divided by the mean level of health then we have the Relative Index of Inequality (RII). This approach, thus, avoids the defects of previous measures in so far, first, it reflects the experience in health of all the population not only extreme groups, second, it is sensitive to the distribution of population in socio-economic groups, and third, it reflects the socio-economic dimension of health within the measurement of inequalities. At the same time this measure is sensitive to changes in mean health status.

**Concentration Indexes** are the last of the measures of inequalities mentioned above and examined here. According to this measure, people are ranked by socio-economic groups begining with the most disadvantaged groups, just the same as SII and RII do. Then, a concentration curve is defined by the line resulting from plotting the cumulative percentage of population, ranked by this socioeconomic dimension, against the cumulative percentage of health. An equal distribution is defined in comparison with the diagonal in the box. The further the concentration curve moves away from the diagonal the greater the degree of inequality in health. The resulting index offers a measure of inequality in health systematically associated with socio-economic groups or status. The index will fall between 1 and -1, reflecting curves above and below the diagonal, respectively. Concentration indexes avoid some of the outlined shortcomings in so far they reflect the entire population, and they are sensitive to changes in the distribution of the population across socio-economic groups, representing well enough the socio-economic dimension in health. The main difference beween pseudo-Lorenz curves and concentration indexes lies in the criteria used to rank individuals, health versus socio-economic status.

Much of the empirical work on equity in health care has been based on previous work by Le Grand (1978), in which the distribution of public expenditure across socioeconomic groups in the UK is compared with the distribution of illness across these same groups of people. Le Grand's work has been criticised in various ocasions mainly through the work of Collins and Klein (1980), Wagstaff, Van Doorslaer and Paci (1991a), and O'Donnell and Propper (1991a).

Le Grand's approach to the analysis of equity explores along the equal treatment for equal need principle. The analysis lies on the fact that the total cost to the NHS per person reporting illness in each socio-economic group can be obtained. This is calculated dividing each group's total imputed expenditure by the number of persons reporting morbidity in each group. The share of expenditures received by each socio-economic group is then compared with the share of ill-health in each group. This approach assumes that persons reporting ill-health are in equal need and that only persons that report ill-health receive health care. Horizontal equity will therefore be achieved when those in equal need receive the same amount of public expenditure, that is, expenditure per person reporting ill-health will be the same across socio-economic groups. If that is the case, then the share of expenditure going to each socio-economic group will be proportional to its share of reported ill-health. This analysis is done for a series of morbidity indicators considered as proxies to ill-health in the study.

A number of criticisms have been raised to Le Grand's approach. The first of them refers to the *measurement of inequality*. It is argued that Le Grand relies on comparisons between bottom and top socio-economic groups, and therefore focussing only on two extreme cases, failing to take account of inequalities considering the rest of socio-economic groups. The second of the criticisms to Le Grand is based on *the proportionality assumption*. It is argued that Le Grand assumes that only people reporting ill-health receive health care. Collins and

Klein (1990) questioned this assumption. They argued that Le Grand assumed that the not-sick are not consumers of health care, and differently from what Le Grand's assumption may lead to, that the sick and those receiving health care may not be the same population. They go on discussing that Le Grand's model should include a variable accounting for the fact that not only people reporting ill-health finally receive medical care. Not introducing this additional variable in Le Grand's model would utlimately lead us believe that this approach is biased fostering the detection of inequalities favouring the rich.

These points have received a reply from Le Grand (1991) and a further answer from his colleages (Wagstaff *et al.*,1991b,1991b), which has brought the issue of the distribution of public expenditure on health care back into debate, as well as the proposal of alternative models to the measurement of horizontal equity in health care.

In this respect, Wagstaff *et al.* suggest a different approach to the measurement of equity. Their approach is said to overcome the main criticisms pointed out above. The authors classified individuals according to income levels and then construct illness concentration curves reflecting how illness is distributed according to income. If illness is concentrated among lower income groups then the illness concentration curve will be drawn below the diagonal that ideally represents proportionality. The illness concentration curves are then compared with the expenditure concentration curve. The latter will lie above the diagonal if lower income groups are greater users of health services than higher income groups. If those in lower income groups receive less medical treatment when ill than those other in higher income groups then the expenditure concentration curve will show below the illness concetration curve. If the illness concentration curves and the expenditure concentration curves are identical to each other, then expenditure is allocated across income groups in proportion to their share of ill-health. Given both types of curves, the extent of inequity will be assessed by looking at the size of the area between both concentration curves. The concentration curves approach outlined here overcomes only one of the problems in Le Grand's methodology, namely the use of ranges (comparing top and bottom groups in the scale) as measures of inequality.[29]

The third criticism raised to Le Grand's work addresses an additional assumption in Le Grand's model and that is that *all people reporting illness are in equal need.* Collins and Klein (1990) argue this is not neccessarily true since within the chronic label, for instance, one can find different conditions that, ultimately, imply a different consumption of health care services.

On the basis of self-reported health status Collins and Klein studied the use of GP services across socio-economic groups. To the standard set of morbidity indicators used in other studies on inequalities, namely acute sickness and chronic illness, they added the Not-Sick indicator (Collins and Klein, 1980). This indicator accounts for the fact that not only those reporting morbidity are consumers of health care services. This indicator will therefore include individuals that have neither reported acute nor chronic conditions but may also use health care services. The inclusion of the Not-Sick indicator has also been applauded by other authors such as Wagstaff *et al.* (1991a,1991b), and O'Donnell and Propper (1991a,1991b). Indeed, those not reporting ill-health may well be in need of health care, and what really happens is that their need is below some critical level. Not considering the not-sick as consumers of health care may lead to the fact that those sick and those receiving health care not being the same population.

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Please, see also Chapter 3 for an extended explanation of these points.

It looks like the current debate on inequalities has come largely as a result of using different definitions of "need". Indeed, the terms in which "need" is defined determines the set of morbidity indicators the authors use in their subsequent analysis of inequalities. Le Grand (1978,1991) operationalises the stated definition of equity defining "need" in terms of ill-health. It follows from this that people in different degrees of ill-health have different medical needs and that people in the same level of ill-health have the same need. An implication of using reported illness as the only basis for need is that those who do not report illness are not in need of treatment. As stated, other authors insist that those that do not report ill-health, i.e. not-sick, are also consumers of health care services and should be taken into account in the model.

All authors agree, however, that inequalities in health, as measured by any given set of indicators, is only one side of the coin. Albeit closely related, we must be able to tell apart two concepts. On one side, inequalities in health, and on the other, inequalities in the delivery of health care. If we want to know whether equal treatment is given to people in equal situations we first need to know how need is distributed across any socioeconomic classification of the population of study. Before embarking in the analysis of inequalities in health care, it is necessary to know about how health and ill-health are distributed across the population. Only after the distribution of health care becomes relevant and, consequently, whetehr such distribution mathches that of health and ill-health.

### 2.2.2. Morbidity and health indicators.

When measuring inequalities in health care we should not only settle on an appropriate measure of inequality from the ones reviewed above, but also on measures of both morbidity and utilisation. The definition of horizotal equity as equal treatment for equal need assumes that need is not distributed equally across society and that, whatever interpretation we give to the term need, health care services in the community should be distributed according to the different levels of need, so that people in greater need receive greater amount of health care services than those other in a lesser degree of need.

To this purpose, "need" as a concept has to be operationalised somehow. The approaches to this have been numerous and attending to various interpretations of the term[30]. However, there is wide agreement regarding the fact that when we talk about need we refer both to a gap and to the means to overcome this gap. Indeed, when mentioning the term need we implicitly assume that there is some distance between what the actual situation is and what a desired situation would be. The people falling under this ideal or desired standard are said to be "in need". But at the same time, it is argued that need implies some conception of action. The gap should be overcome, and those "in need" are certainly in need of something, for example health care services, that would eventually bring them from the deficient situation they are into an ideal or better position regarding health.

Intrinsically, we should therefore be interpreting differently need for health and need for health care. We should be separating these two concepts attending to ends in themselves and means to these ends. The end point is, therefore, a better health status or a better health in general, and the means used to get individuals to this end point include, among others, health care services. Health care as a means to an end is a useful interpretation of the role of health care authorities in the correction of not healthy situations. Further, it centres the role

30

The vey concept of need has centered debate in social economic disciplines over time. Visions on the term and its meaning and implications are numerous (Goodman and Craig, 1982; Culyer and Wagstaff,1991;Ong and Humphris, 1994;Stevens and Raftery, 1994,1997; Hopton and Dlugolecka, 1995; Lightfoot, 1995; Shanks *et al.*,1995; Soriano, 1995; Witkin and Altschuld, 1995; Percy-Smith *et al.*, 1996; Riviere *et al.*, 1996; Sheaff, 1996; Sanderson *et al.*,1997; Stevens and Gillam, 1998; Williams and Wright, 1998; Wright *et al.*, 1998).

of health care authorities in satisfying health care needs and not health needs, which clearly requires of a broader approach of means including interventions of a wide number of areas of social policy such as housing, environmental policy, income mantenance, promotion of healthy life styles, or intervention on areas such as food inspection, diet, hygene, or education. Equity as a policy-makers' objective should consider all these areas, but as regards to health care it comes down to the provision of equal health services to those in equal need of those services. We will see now how the two components of this definition, health care services and need, are operationalised.

Since health needs have been described as situations in which individuals are placed in reference to a given standard, and those falling under such a standard are said to be "in need", need is frequently defined in terms of ill-health. Different degrees of ill-health reflect different medical needs, and people in the same degree of ill-health are said to have the same need.[31] The issue is then how to approach the term ill-health, that is, how to tell whether an individual or a group could be catalogued as in ill-health. I will use Blaxter's model and approaches, largely based on population health surveys, to relate self-reported morbidity as an indicator of need or ill-health. As Ignatieff argued, there are few presumptions in human relations more dangerous than the idea one knows what another human being needs better than they do themselves (Ignatieff, 1984). Both authors clearly advocate for asking the individual, the population at large, whenidentifying and measuring needs. Who better ask than those who best know about their own health.

Blaxter points to the fact that in the measurement of inequalities in developed countries, morbidity or self-perceived general health status are increasingly

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31

The operationalisation of need as ill-health is not, however, without criticisms (Wagstaff *et al.*, 1991:17). It has been argued that given the existing limitations in data availability, fiability and completeness, ill-health could be taken as the best option to aproximate need. Accordingly, when measuring ill-health we intrinsically attempt to measure need.

important indicators rather than more traditional indicators such as mortality (Blaxter, 1989). Without denying the importance of death, and specially premature dealth, as a dimension within health inequalities, Blaxter insists it may be the lifelong experience of health an illness of individuals that most clearly reflects the differences between socio-economic groups. Further, these measures of morbidity are better drawn from population health surveys rather than from epidemiological or disease-specific surveys, since they do not normally include all relevant socio-economic variables necessary to the adequate meaurement of health and health care inequalities.

Blaxter's contribution to the measurement of needs identifies three underlying conceptual models: medical, functional and subjective. The fact that Blaxter classification is present in most health surveys carried out in developed countries is of primary importance to this research. Indeed, Blaxter's classification operationalised a series of needs indicators, that stem for the aboventioned conceptual models, and are assessed in the form of questions in the health survey used in this research.[32]

The first conceptual model is the so-called *medical or physiological-psychiatric model*. The author argues that common to health surveys is the measurement of prevalence of diseases, specially chronic conditions, long-standing illness, lasting complaints, or health problems in general. This is done by means of a number of standard questions of the type: "Do you have any long-standing health problem or chronic illness?" This approach is questioned over the fact that only known diseases are reported and, therefore, silent disease stay in the shadow. Further, it also raises the issues of whether respondents to the question believe a given condition is worth mentioning at all. Blaxter offers two possible solutions to this. On one hand, the stressing of chronicity in the question using

32

In this research the 1994 Catalan Health Survey is used. I will be describing the main characteristics of this survey in a Chapter 3.

the alternative terminology of "keeps recurring", or "which you have most of the time". On the other hand, a checklist of chronic conditions is offered, which additionally provides the respondent the necessary vocabulary, although stimulates reporting at the same time. An additional concern remains, however. People answering the survey may see that some of the conditions they suffer may have a social stigma attached and, therefore, avoid responding. This is frequently the case in mental health problems or sexual contagious diseases, for example.

The second conceptual model pointed out by Blaxter is the *functional model,* also called interactual model. It is frequently used in combination with the medical model to explore in which ways disease has an effect on people's daily life activities, that is, if it has an effect on the functional status of the individual. Functionality is conceived here as regards the limitation of activity or ability to perform normal tasks in any way. According to Blaxter, functionality is the "greatest mark of inequalities in health between social groups" (Blaxter, 1989:210). The functional model uses a series of measures among which we find days lost from work, that is restricted activity days, reflecting incapacity rather than presence or absence of disease, and bed days, reflecting a more serious lost of social function. When these two measures are combined, restricted activity days and bed days, a third measure is constructed, namely sick days.

The last of the models outlined by Blaxter refers to self perception of health and is labelled as the *subjective model.* It reflects a more positive approach to the measurement of health, trying to describe health rather than illness. It is normally expressed by the individual answering to a question of the type "Over the last 12 months, would you say that on the whole your health has been good, fairly good, or not good?" The listed categories could, however, be more than the three mentioned here, reflecting a wider range of different health states. There are a number of complications or limitations to the use of this model, however. Among the most important, explicit mention should be given to distorsion factors such as education, age, family support or health experience in general.

The models outlined by Blaxter above have shaped the nature of morbidity indicators used in all the approaches to the measurement of inequalities in health care reviewed, from ranges to concentration curves. Indeed, self-reported morbidity measures such as health not good, acute sickness, chronic illness - limiting or not-, and not-sick reflect either one or another model, and comprehensively help us to describe how illness is distributed among the population of study as well as telling us about how those that have not reported ill-health at all are distributed across income groups.

In Chapter 3 I will take more precise account of Blaxter's conceptual models to build up the set of indicators to be used in this research, which will also reflect what the rest of authors mentioned here have suggested in this respect.

### 2.2.3. Measures of utilisation and allocation of expenditure.

The literature has approached the measurement of health services utilisation using a set of indicators that relate to the types of care available to the population. Collins and Klein considered only visits to General Practitioners, that is primary care services (Collins and Klein, 1980). In Le Grand's approach hospital services utilisation, both inpatient and out-patient, was added to primary care (Le Grand 1978,1982,1991). The source of data in both cases correspond to the General Health Survey in the UK and captured the number of GP consultations made by the respondent in a two week reference period, the number of out-patient attendances in a three months reference period, and the numbers of in-patient spells in a three months period and the number of days per spell. These data were then transformed into an homogeneous reference period of one year and then translated into expenditure.

Utilisation results may be given in the number of days of stay in hospital and number of visits paid to the various types of care. So as to have a common measure of utilisation most studies that use concentration curves come up with the total cost of the services used by persons within each income group and morbidity group. The total cost will then be divided by the number of persons reporting illness within each group so as to obtain the **expenditure per person in need** ratio. Expenditure is, thus, the way by which the amounts of services received by each group is compared, and it comes as a result of translating into monetary units the use of resources in all levels of care considered. As it will be detailed in Chapter 3, this approach to the measure of utilisation of health care services is the one taken in this research.

## 2.3. Inequalities in health and health care in Spain: a review of the literature.

Global sociological studies as the FOESSA reports (FOESSA, 1966,1970,1975, 1983, 1994) are good reference points to the chronological analysis of studies on inequalities in health and health care. These reports also contributed significantly to a much wider understanding of the main determinants of inequalities as well as to how macro policies in the health care arena have responded to them.

As seen from the review of the evolution of the Spanish Health Care System, the late sixties and early seventies have characterised by the birth of socialisation of medicine in Spain. This movement paid special attention to social justice principles in the organisation, finance and delivery of health care. Inherent to this concept was the creation of a National Health Service in the eighties, a system to cover the total Spanish population with a wide range of services. The socialisation of medicine translated, as De Miguel *et al.* argued (1994), in an increasing number of people covered by public insurance of any kind. In this respect, policies addressed social differences through the extension of the 1944 SOE to all social strata and to all regions and municipalities. The universalisation of coverage under SOE insurance was therefore a fundamental policy towards the correction of inequalities in health and health care.

In the mid seventies the significant extension of public system needed of unification. The policy responses to inequalities in health care were now twofold, to continue universalisation on one hand, and to pursue unification within the system, on the other. Health services were still provided according to social classs and not according to entittlement as citizens, that is, some conception of right to health, or better, right to health care. The scenario was that of a clear public-private divide, with hospital services for the rich and hospital services for the poor clearly differentiated. Further, it was argued that even within the public system there were important differences in use regarding social class. The 1975 FOESSA report claimed Spanish health care system was not an integrated one, still attending population according to their social position in society. The efforts towards universalisation of coverage had been important throughout the previous years but had resulted incomplete in so far the two extreme layers in society remained outside public coverage. Indeed, the SOE solved many of the problems associated with a large number of people not covered by public health care, specially those in lower social and income groups, but in 1978 the creation of INSALUD cristalised a dual system (De Miguel *et al.*, 1994) and hence inequalities.

In the early eighties the socialists came into power and health policies tried to overcome the outlined deficiencies with the creation of a proper National Health Service, further decentralised. That meant a serious effort towards the final unification of the public sector. In broad terms, the nature of the problems since then are somewhat different, specially regarding use of services. The public service covered the vast mayority of the population although social classes were said to make use of the available servicies in a different manner. While low classes used public services extensively, the upper classes used both public and private servicies better, using the latter only when thought to be profitable. It was the combination of public and private insurance that characterised upper and upper-middle classes in Spain. To a large extent this remains similar today.

Spain benefits nowadays from a good standard of health according to the major health indicators available. It has, however, become clear that an increase in resource devoted to health care does not necessarily come proportionally associated to an increase in the health status of the total population. Accordingly, policies should not now aim at improving the overall health status of the population, but should best be addressed to the correction of inequalities both in health and health care. To this aim, good quality information of the nature and characteristics of the remaining inequalities in health and health are an imperative.

This section reports on the most relevant studies on inequalities and health in Spain over the period 1980 to 1998. Its purpose is to account for the more specific areas and topics to which analysts have addressed their attention, to disclose the main characteristics of some selected studies relevant to this research and, finally, to explain how this research contributed to fill in an existing gap in the study of inequalities in health care in Spain.

### 2.3.1. Major trends in the study of inequalities in Spain.

In the mid nineties Benach (1995) carried out a bibliometrical analysis of available studies on inequalities in health and health care in Spain over the period 1980 to 1994, reporting on what have been the major contributions to the study of inequalities in health status, in use and in access to health care services. The purpose of Benach's study was to determine the main characteristics of research efforts on inequalities accounting for subject - differentiating between conceptual reviews and empirical studies-, geographical origin, place of edition, and distribution over time. The author consulted the existing databases, used direct consultation on libraries, direct consultation with Public Health specialists, and direct sources of information, as well as sources reported as of difficult access. The results of Benach's analysis identified a volume of 233 studies within the referenced period, most of them not published in books nor journals. The great majority were conducted in two geographical areas, namely Catalonia and Valencia. An steep raise was found as regards the distribution over time, and a clear increase was reported on the number of studies as well as in their formal publication, specially starting in the 1986-1988 period.

A later report on social inequalities in health showed a very similar pattern (Navarro and Benach, 1996a,1996b). The report came as a result of a government appointed Commission to extensively study class, gender and regional inequalities. In their review the authors considered mortality, morbidity, health status, health behaviour and utilisation and access to health services as the variables of interest. These variables were also explored as regards their geographical dimension, distinguishing between national, and regional and local studies [33].

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33

Navarro and Benach classified studies into six categories. I here account for some relevant contributions in each of these categories:

Both reports showed that the increase in the number of inequality studies in this period came largely as a consequence of studies on mortality. The trend identified by Benach (1995) and Navarro and Benach (1996a,1996b) has largely remained the same over the recent years. Among the most recent contributions we still find studies on inequalities in mortality (Arias and Borrell, 1998; Segura and Fernández, 1998; Llorca *et al.*, 1998), morbidity studies addressed to specific clinical conditions (Rohlfs *et al.*, 1998; Luengo *et al.*, 1996; Latour-Pérez *et al.*, 1995), mother an infant health (Díez *et al.*, 1995; Navarro-Rubio *et al.*, 1995; Valero *et al.*, 1995; Sánchez-Fernández *et al.*, 1995), specific services (Ruíz *et al.*, 1995; Ibáñez-Fraile and Tejedor, 1995), and disability (Regidor *et al.*, 1997), among others.

Relevant to my research are studies in the context of Barcelona and Catalonia. Trigered by the existance of good databases such as the Barcelona Health Survey we have seen numerous studies on inequalities and health in Barcelona, covering issues such as mortality (Borell *et al.*, 1988, 1993), utilisation of health services and public coverage (Cuervo *et al.*, 1985; Fernández *et al.*, 1999; Borrell *et al.*, forthcoming), health determinants (Ginestal, 1987), morbidity (Plasencia *et al.*, 1991), women and infant health (Rohfls *et al.*, 1991, 1994; Valero *et al.*, 1994; Díez *et al.*,1995), and life styles, i.e. alcohol and

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(i) Mortality at national level (Canela, 1985; Solas, 1988; García *et al.*, 1989; Regidor and González, 1989; Ministerio Sanidad y Consumo, 1989; Rodríguez and Lemkow, 1990; Lardelli *et al.*, 1991,1993a,1993b; Vázquez-Vizoso *et al.*, 1993; Regidor *et al.*, 1994,1995a; Domínguez, 1994).
(ii) Mortality at regional and local levels (Latour *et al.*, 1987; Alonso and Antó, 1988; Costa, 1989; Latour *et al.*, 1991; Armero *et al.*, 1991; Borrell *et al.*, 1991; Terol, 1991; Borrell, 1992,1995; Nolasco *et al.*, 1992; Martín and March, 1992; Casi and Moreno, 1992; Borrell and Arias, 1993,1994,1995; Arias *et al.*, 1993; Pérez-Domínguez *et al.*, 1993; Etxenike, 1994).
(iii) Morbidity and life styles at national level (Durán, 1983; INE, 1987,1989; Nebot *et al.*, 1992; FOESSA 1994; Regidor *et al.*, 1994,1995a,1995b; Jovell, 1994; Collado and De Miguel, 1995).
(iv) Morbidity and life styles at regional and local levels (Alonso and Antó, 1988; Silvestre *et al., 1990*; del Llano, 1991; Peruga *et al.*, 1993; Valero *et al.*, 1994; Gutiérrez *et al.*, 1994; Garrido *et al.*, 1994; Borrell, 1995).
(v) Use and Access to health services at national level (Gonzalez and Regidor, 1988; Caīs *et al.*, 1991; Guillen, 1991; Fernandez, 1993; FOESSA, 1994).
(vi) Use and Access to health services at regional and local levels (Alonso and Anto, 1988; Cruz and Almises, 1990; Ruiz *et al.*, 1993; Rohlfs, 1994; Gutierrez *et al.*, 1994; Borrell, 1995).

smoking. Given the fact that no regional health survey for Catalonia was available before the one used in this research (ESCA, 1996), we found an important lack of studies on inequalities in health and health care for the whole of the Catalan territory, although some studies need to be mentioned in reference to heart and liver trasplantation (Rovira, 1990), hepatitis B markers in the population of Catalonia (Salleras *et al.*, 1992), and gender (Fernández *et al.* 1999).

### 2.3.2. Overall results and conclusions.

As early as 1976 De Miguel identified some of the most important factors in the study of inequalities in health, namely gender, age and social class, rural versus urban areas, and regions. As the author pointed out much later in one of the FOESSA reports (FOESSA, 1994) these same factors are still present today in many ways.

The greatest social inequalitiy was death (De Miguel, 1994). As seen in Benach (1995) and Navarro and Benach (1996a, 1996b) reports, mortality has been a widely studied issue in Spain. Morover, mortality and social inequalities largely correlate with morbidity, particularly hospital morbidity. Although mortality is a relevant variable to the study of social inequalties in health, we should also, even more, be interested in the way people live their lives and their health life experience (Blaxter, 1985). In this respect, it is studies on morbidity and utilisation which are of a wider interest to this research.

I here point to the most relevant findings and conclusions from the main studies on the measurement of inequalities in morbidity and utilisation in Spain since the 1980s. An illustrative comparative table is also given for a better reporting and understanding (see Table 2.1.).

Numerous studies have used the information provided by hospital morbidity databases. For many years, this source of data has been widely used among researchers in Spain when measuring inequalities in health and health care, and has been used as a traditional way to disclose the existing inequalities in Spain, particularly inequalities according to diagnosis, gender and age. Great inequalities were pointed out when showing the percentage distribution of hospitalisation according to age groups, concentrating in the extreme poles of the scale, namely the youngest and the oldest. The lowest percentages corresponded to intermediate age groups. The use of hospital services according to age draws an interesting U shape curve. However, a difference was made regarding gender inequalities in hospitalisation. There is a great confounding factor in the analysis, namely reproduction and gynaecology. Once this factor was ajusted for, it was found men used hospital facilities more than women. This fact remained constant through almost every cause of hospitalisation. These gender differences, moreover, seem to disappear when moving towards the oldest age group (De Miguel, 1994).

Alonso *et al.* (1988) made use of the 1986 Health Survey for Barcelona to study inequalities in health by socioeconomic status, using occupation as the variable to classify individuals. Data on morbidity and use of health care services were later standardised for age and gender. The need indicators used were self-rated health status, chronic illness, limiting chronic, and restricted activity days. Findings pointed to higher social classes being in better health than lower social classes. As regards the use of services, the number of visits in the lower classes was higher than in the upper classes. The same occurred when looking into hospitalisation. While 100% of those in poor health in high classes visited the doctor, only 86% of those in lower classes did so. Similar findings were reported regarding inpatient days. This study concluded there were inequalities in health and health care in Barcelona regardless the indicator of need used in the analysis.

González and Regidor (1988) used the 1987 National Health Survey to the study of inequalities in the utilisation of health care services across income levels, educational levels, size of the habitat, and regions in Spain. The use of health care services was taken as doctor and dentist visits. The results showed social and geographical inequalities. Lower socioeconomic groups used doctor services in a greater degree whereas they also used dentists less. When adjusted for need the results pointed to smaller social inequalities.

Portella *et al.* (1990) studied inequalities in the utilisation of primary health care services in one health care district in Catalonia, the Centre Region, with a population of 1,123,000 inhabitants. They explored in depth the influence of age, gender, occupational status and social security regime in the use of primary care services. The necessary data to run the analysis was drawn from a primary care information system (SIG-7), as well as from a complementary sample information source. The study accounted for how health problems and medical visists were distributed across the population. The conclusions suggested a higher use of primary care services among older people, closely related to chronic conditions. It was found that the characteristics of health care services supply conditioned the nature of its utilisation.

In 1990 Guillén (1990) performed an interesting exploratory exercise using the 1987 National Health Survey. In agreement with most previous studies in the area, the author acknowledged that health and illness in Spain followed more a social pattern than a health care services pattern. He argued one of the most important sociological problems worth studying in depth was inequalities in access to health care services according to social class. In the analysis Guillen made use of lineal and logistic regression models, studying the relationship between social structure and the health of the population. Age was found as a highly influential variable in the use of health care services in general, and specially from 16 years old onwards. Further, women visited the doctor more frequently, either as a consequence of greater need (ill-health), higher number of visits per health problem, greater response and precision of responses in the survey, or simply as a consequence of being less socially conditioned towards (not) reporting illness and visits to doctors (see also Durán, 1983). Guillén, however, established that age and gender variables were not the only variables that explained access to health care services. Indeed, socio-economic variables were of utmost importance, too. Family income was among the first variables to consider here. Greater family income increased the probability of visiting a doctor.

Rodriguez and Lemkow (1990) examined how socioeconomic variables influenced health and illness in Spain. They studied, yet again, the social distribution of health -using subjective levels of health as need indicators-, as well as the relationship between health and poverty, living conditions and life-styles. They found major economic, social and regional differences in health among the Spanish population. Poverty, living conditions, income and socioeconomic status played an important role in explaining such differences.

De Miguel *et al.* (1994) pointed to the fact that quality and utilisation of services were major contributors to inequalities in Spain, too. It was not access, which had largely become universal, but the way the services were used and the quality of the treatment received that best explained the existence of inequalities. Despite the 1983 Barcelona Health Survey, for example, showed medium and low social classes paid visits to the doctor and hospital much often than lower classes, De Miguel argued there were still important differences in the way the different social classes were treated. While visits in lower social classes were less time consuming to the system, in 65% of cases less than five minutes, only 5% of visits paid by higher social classes lasted less than five minutes (see also Durán, 1983). It was therefore not a problem of different access but of different use of health care services.

Jovell (1994) made use of another set of data (CIRES) to the study of inequalities in health and health care. He argued that besides mortality, self-reported health was shown as a useful indicator in the assessment of the population health and wellbeing, representing well enough how people valued their health status. Further, these measures were also of value as predictor variables, since they were said to be the triger to the decision to pay a visit to the doctor, and therefore of health care utilisation as well as morbidity, discapacity and mortality (Mossey and Shapiro, 1982; Kaplan *et al.*, 1988; Idler and Kasl, 1991). Jovell addressed the study of subjective health status and socio-economic groups, trying to capture the gradient effect and socio-economic dimension of inequalities in health by means of ordinal logistic regression analysis. These logistic regression models included the self-reported health status in the ordinal form as dependent variable, and age, gender, marital status, healthy life styles, chronic comorbidity, and socioeconomic indicators, i.e. education, family revenue and perceived social class, as predictor variables. The author's conclusions confirmed the existence of socio-economic inequalities in Spain when using subjective measures of health status. These inequalities were said to be independant of the measure used to approximate socio-economic status, and independant of the control variables included in the analysis.

Marín *et al.* (1995) reported on socioeconomic determinants of utilisation of hospital emergency services. By means of a specific survey to 800 patients and bivariate and logistic regression methods, they explored the social predictors of emergency services utilisation. Results from the bivariate analysis showed there was a significant positive association between low income and low educational level to the use of emercency services. Further, stepwise logistic regression selected income and lifestyles, i.e. alcoholism, as the most relevant independant predictors.

Navarro-Rubio *et al.* (1995) examined the relationship between socioeconomic status as measured by education, employment status, and total monthly family income, and preventive health care utilisation by children, as measured by vision, hearing and dental examinations. The authors introduced some control variables for confounding factors such as the presence of chronic illness, family size, and gender. The analysis was performed by means of weighted ordinal logistic regressions, and the results reported a positive relationship between the use of preventive services and socioeconomic status of families. The level of education and family income were found as the most influential variables in this relationship. The higher these levels the more likely to receive preventive examinations.

Among the most recent stduies on inequalities in health care we should mention those by Rodríguez *et al.* (1993), Fernández de la Hoz and León (1996), Fernández *et al.* (1996), Navarro and Benach (1996a,1996b), Regidor *et al.* (1996), Abásolo *et al.* (1998), Fernández *et al.* (1999), and Borrell *et al.* (accepted for publication).

Rodríguez *et al.* (1993)[34] study was among the first to use a similar methodology to the one proposed here to the study of inequalities in health and health care. The authors assessed both equity in the finance and delivery of health care in Spain. Equity in the delivery was taken as equal tretament for equal need, and made use of data from the 1987 National Health Survey. This survey reported information on the socioeconomic characteristics of the population as well as on utilisation measures and morbidity indicators. The authors set on four need indicators to try to capture different dimensions of health and ill-health, namely chronic illness, limiting chronic, health not good, and restricted activity days. Utilisation of health care services was expressed in terms of their associated expenditure. The Spanish population was split in

34 Rodríguez *et al.* study (1993), among the most relevant to this research, focussed on equity issues in the delivery and finance of health care services, showing some interesting conclusions for the Spanish case following the methodology outlined in the COMAC-HSR project.

quintiles according to income and both expenditure and morbidity concentration curves were built to assess inequity in the delivery of services. The results were given in the shape of illness concentration indices, as well as Le Grand's and Wagstaff's *et al.* indices of horizontal inequity. Their overall conclusions suggested that the distribution of health services in Spain was not equitable, favouring the better-off, albeit to a small degree[35].

Fernández de la Hoz and León (1996) carried out a study of inequalities in the use of health services in Spain across socioeconomic groups making use of the 1987 National Health Survey data set. Socioeconomic status was measured by education level and household income. Health care use was measured by doctor consultations and hospitalisation over a defined period of time. The authors used logistic regressions to the analysis of the relationship between self-reported health status as a measure of need and utilisation of health care services. The results suggested that among those with poorer self-reported morbidity it was the most privileged groups who used health services more often. These conclusions did not vary significantly according to gender.

Fernández *et al.* (1996), in an unpublished report to the Catalan Health Service, explored health and health care utilisation inequalities in Catalonia according to social class using the 1994 Catalan Health Survey. The authors used self-perceived health status, restriction of activity, and presence of chronic conditions as indicators of neeed, and visits to health care professional, waiting times, unattended health problems and hospitalisatiions as indicators of utilisation and access. Logistic regressions were used to study the association among variables. Their conclusions point to inequalities in health, being lower

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35 These same authors are presently working, also at national level, on the updating of this analysis both on the finance and the delivery sides using the 1993 version of the National Health Survey. To my knowledge no results have been reported on the delivery side so far. Only some new findings have been published regarding equity in the finance of health care which have been accounted for in Table 1.7.

social classes in a worse health status. The utilisation of health services remained fairly equitable although differences were found in the use of particular services such as dentists, optometrists, and preventive measures to the disadvatage of the lower social classes.

Navarro and Benach (1996a,1996b) devoted their efforts to the study of class, gender and regional inequalities in health status, health behaviour, utilisation and access to health care services. Four relevant findings should be highlighted. First, social inequalities in the use of health serveices have largely dissappeared, in Spain. On average, Class V, that is unskilled workers, had the same frequency of use of health services as members of Class I, that is managers and professionals with a university degree. Second, equality of access to health services had not led to the supression of the class gradient in health status in Spain. The upper classes continued to enjoy a much better health status than lower social classes. Third, if the term equity was taken in relation to need, then the findings point intuitively to the working class underusing the health services, since given their worse health status, i.e. greater need, they should be using these services in a more extensive way than those in upper classes (Navarro, 1997). Finally, inequalities in health status by gender class and region showed women live longer than men but had more health problems. They pointed out that the most dramatic gender differences were in health related behaviour, increasing smoking habits among women, for example.

Regidor *et al.* (1996) used the 1993 National Health Survey to study inequalities in the utilisation and access to health care services according to socioeconomic status. Utilisation was measured by the use of inpatient health services, dentist consultations and gynaecologist consultations. Accessibility considered the time spent travelling to the health centre, waiting time at the health centre, and waiting time for admission at hospital. Socioeconomic status was aprproximated using education levels. The analysis was performed using logistic regression for utilisation, and multiple lineal regression for access variables and time. Independant variables included in the model were age, gender, size of habitat, public or private insurance, need i.e. poor health, chronic illness, and restricted activity, and related variables to odontological and gynaecological services, together with levels of education. The results of the study showed that although individuals in lower education levels made use of health care services more often than those in higher education levels, this overutilisation disappeared when predictor variables like gender, age, health insurance and need were taken into account. These results contrasted with other studies' results in Spain that showed lower social classes and lower education levels used health services less than higher social classes and education levels (Alonso and Antó, 1988; González and Regidor, 1988; Fernández de la Hoz, 1996). The authors concluded there were no differences regarding the use of inpatient facilities and doctor consultation once adjusted by age, gender and other confounding variables. Differences across education levels were found relevant in odontology and gynaecology utilisation, as well as in access to services in general. Lower education levels showed the longest average waiting times, only significant regarding time spent travelling to the centre and waiting times at the centre.

Abásolo *et al.* (1998) have recently studied the use of GP and primary care services across Spanish population The authors applied econometric models to the 1993 National Health Survey data, paying particular attention to equity from a socioeconomic, geographical and intergenerational perspectives. They also made use of other variables such as demand, supply and demography to help to explain GP utilisation. The results showed the higher the medical need the higher the probability of contacting a GP, i.e. vertical equity. Differently, horizontal equity did not seem to be fulfilled. Socioeconomic, geographical and demographic characteristics seemed to affect the probability of using GP public services in Spain.

Fernandez *et al.* (1999) have recently studied inequalities in health and health care services utilisation between men and women in Catalonia. The authors used the 1994 Catalan Health Survey and logistic regressions. They studied how self-percieived health, restriction of activity and presence of chronic conditions were present in the male and female population, and how these variables together with age explained utilisation of hospital facilities, dentists, optometrists and visiting a health professional. Their results point to women in worse health than men as measured by all need variables in the analysis. The porportion of women visiting a health professional was slightly greater than that for men. The same was found for utilisation of dentists and optometrists. Differently, it was found that women used hospital facilities less than men. When taking account of self-reported health then women declaring good health reported a greater probability of counsulting a health professional, although no differences were found for utilisation of inpatient care, dentists or optometrists. They conclude that women despite being in greter need they do not use health services more frequently than men.

Borrell *et al.* (forthcoming) studied inequalities in health and health care in the city of Barcelona according to social class. The data set used in the analysis is that of the 1992 Barcelona Health Survey and social class was obtained from an adaptation of the British Registrar General classification. The authors explored health status (self-perceived health status, restriction of activity, days in bed and presence of chronic conditions) and utilisation of preventive services, hospitalisation and visit to a health professional. Logistic regressions were used accounting also for age, employment status and family structure. The study concluded that there are still relevant inequalities in health among the population of Barcelona, with people in lower classes having worse health. No differences were found in visits to the doctor or hospitalisation, although preventive practices were undertaken in a lesser degree by those in lower social classes.

### 2.3.3. Concluding remarks.

The study of inequalities in health have filled economists, sociologists, medical, professionals and philosofers' agendas in Spain for many years now. Traditionally, most studies have concentrated on inequalities in mortality. In recent years, however, we have witnessed important efforts towards the study of equity regarding utilisation of services, both specific services addressed to particular clinical conditions and utilisation of primary, specialist and inpatient care.

The available data sets in Spain have largely shaped the methodology to assess inequalities in health and health care. Indeed, as De Miguel put it, many of the difficulties to perform these studies during the seventies and eighties should not come as a surprise given information limitations (De Miguel *et al.*, 1994). The improvements in the studies come both as a result of better data sets becoming available, largely population health surveys, and the application of a wider range of methodologies to the assessment of equity, including ranges, concentration curves, and regression models. These improvements have opened a window of opportunity in many senses. My research takes advantage of them.

As regards policy relevant arguments contained in the published papers, De Miguel *et al.* (1994) stated the creation of the SOE in the early forties was in itself a way to overcome some of the most important health problems of the most disadvantaged groups in the population, namely the industrial workers. The Social Security reform and the creation of the INSALUD as management body forced the appearance of a dual health care system, differentiating between those that receive public health services and those others, the better off, that gain access to a private and high technology medicine. The socialists government in power in 1982 tried to overcome this dual system with the creation of a NHS very much along the lines of unification of services to the entire population, i.e. universalisation. In this respect, Navarro (1997) has recently reported on the findings of a Government Commission on the study of inequalities in health, and argued that social inequalities in the use of health services have largely dissappeared, and that the main reason for that being the case was the extension of public universal coverage to almost 100% of the population during the eighties and nineties. The relevance of already existing studies as well as future research on inequalities should contribute to the way decision-makers shape policies towards the tackling of such inequalities. The design and implementation of successful policy responses to inequalities remains a major issue for research in health care in the coming century.

## Table 2.1.
## Selected studies on inequalities in health and health care in Spain: Area, data used, methodology and main conclusions.

| Study | Area | Data used | Methodology | Results and conclusions |
|---|---|---|---|---|
| Alonso *et al.* (1988) | (1) Inequalities in health<br>(2) Inequalities in health care<br>* Utilisation of medical services | 1986 Barcelona Health Survey | (1) Ranges: Self preceived health status, RAD, Limiting chronic illness, Chronic illness across social class<br>(2) Use/need ratios: Total number of visits to doctor by total number of days in bed in same period and social class | (1) The lowest the social class the worst the morbidity indicators<br>(2) The higher the social class the higher the use/need ratio |
| González and Regidor (1988) | (2) Inequalities in health care<br>* Utilisation of medical services, and dentists | 1987 National Health Survey | (1) Use/need ratios: Total number of visits to doctor by total number of days in bed in same period and education level, and income level | (1) The higher the education level the higher the use/need ratio in medical and dentist visits. Intermediate income levels show the highest use/need ratio in medical visits. The higher the income level the higher the dentists use/need ratio |
| Murillo *et al.* (1988) | (1) Inequalities in health | 1986 Barcelona Health Survey | (1) Regression models<br>DV: Income (six income categories).<br>EV: *Self-reported health status*, chronic illness, RAD, pathologies, education, sociodemographic variables. | The higher the income level the better the health status. Human capital variable such as education and health are important to income level. |
| Rodriguez and Lemkow (1990) | (1) Inequalities in Health. | 1983 DATA S.A. Study on System of Values in European Values Study | Correlation and regression coefficients<br>DV: Self-perceived health status and lifestyles<br>EV:Age, gender, income, socio-professional status | Poverty, living conditions, income and socio-professional statusplay an important part in explaining variations in health in Spain. |
| Portella *et al.* (1990) | (2) Inequalities in Health Care<br>* Utilisation of Primary Care | SIG-7 | Distribution of use according to: Age groups, gender, among centres, coverage | The oldest and women use primary care services more often. This may come explained by need, supply and access variables not explored here. |
| Guillén (1990) | (1) Inequalities in health<br>(2) Inequalities in health care<br>* Utilisation of Health Services | 1987 National Health Survey | Lineal and logistic regressions<br>DV: *Utilisation of health services (primary care, ginecologist,* psiquiatry, hospital<br>EV: income, education level, age, gender, rural-urban setting | Greater family income and age increases the probability of visiting a doctor. Women visit the doctor more frequnetly |
| Rodríguez *et al.* (1993) | (1) Inequalities in health<br>(2) Inequalities in health care | 1987 National Health Survey | (1) Morbidity concentration curves: HNG, Chronic illness, Limitic Chronic, RAD<br>(2) Expenditure concentration curves, Le Grand's and Wagstaff Indexes, and regression models:<br>DV: Expenditure<br>EV: Morbidity indicators, income age and gender | (1) The highest the income level the better the need indicators<br>(2) Regardless of need indicator used, and the procedure to test inequity (shares, indexes and concentration curves, expenditure per prerson ill across income groups) there is a certain degree of inequity favouring the better-off. |

**Table 2.1. (Cont.)**
**Selected studies on inequalities in health and health care in Spain: Area, data used, methodology and main conclusions.**

| Study | Area | Data used | Methodology | Results and conclusions |
|---|---|---|---|---|
| De Miguel *et al.* (1994) | (1) Inequalities in Health<br>(2) Inequalities in Health Care<br>* Utilisation of Health Services | 1993 FOESSA 5 Survey and<br>1980 and 1989 INE Hospital Morbidity data | Percentage distributions<br>(1) Explored variables: Self-perceived health status, Discapacity and symptoms<br>According to age, gender, civil status, social class, education, occupation, rural-urban setting, region,<br>(2) Explored variables: Doctor type, Dentisit, and Hopital visits<br>According to age, gender, civil status, social class, education, occupation, rural-urban setting, region, and diagnosis | Multiple conclusions. See FOESSA report for details. |
| Jovell (1994) | (1) Inequalities in Health | 1990 CIRES Survey | Logistic regressions<br>DV: Self-perceived health status<br>EV: Income, education level, socail class, gender.age, marital status, lifestyles | The higher the socioeconomic status the worse the self-perceived health indicators. This remains the same when controlling for age, lifestyles and co-morbidity.<br>There is a clear socioeconomic gradient in self-perceived health status, regardless of the indicator of socioeconomic status used. |
| Marin *et al.* (1995) | (2) Inequalities in health care<br>* Utilisation of Emergency Services | Sample of 800 patients attended in one Hospital | Bivariate analysis and Stepwise logistic regression<br>DV: frequency of visits<br>EV: Age, gender, rural-urban, income, education, occupation, lifestyles, domestic violence, loneliness | Low income, low educational levels, alcoholism and violence were significantly correlated to utilisation of emergency services.<br>Logistic regressions selected income and alcoholism as independant predictors. |
| Fernândez la Hoz *et al.* (1996) | (2) Inequalities in health care<br>* Utilisation of Health Services | 1987 National Health Survey | Logistic regressions<br>DV: Visits to doctor and hospital<br>EV: Education level and household incom, self-perceived health status | The more priviledged have higher levels of health service (visits to doctor and hospital) use than others |
| Regidor *et al.* (1996) | (2) Inequalities in Health Care<br>* Utilisation of Health Services | 1993 National Health Survey | Logistic regressions<br>DV: Visits to doctor, hospital, dentist and ginecologist<br>EV: Education level, age, gender, size of household, coverage, self-perceived health status, limiting chronic, RAD | Individuals in lower education levels make use of health care services more often than those in higher education levels. When gender, age, health insurance and need are taken into account differences disappear |

## Table 2.1. (Cont.)
## Selected studies on inequalities in health and health care in Spain: Area, data used, methodology and main conclusions.

| Study | Area | Data used | Methodology | Results and conclusions |
|---|---|---|---|---|
| Navarro and Benach (1996) | (1) Inequalities in Health<br>(2) Inequalities in Health Care | 1987 and 1993 National Health Surveys | Descriptive analysis and Logistic regressions<br>(1) DV: HNG, RAD, chronic, lifestyles<br>EV: Social class, education level, region, occupational status, civil status,income, age, gender<br>(2) DV: Medical visits to Primary Care, hospital days and dentist<br>EV: Social class, education level, region, occupational status, civil status,income, age, gender | All morbidity indicators worsen when moving from high social class to lower social class. Inequalities increase with age.<br>Between 1987 and 1993 there has been an increase in medical visits but this is attributed to the period when the survey was carried out.<br>The overall conclusion as regards mmedical visits is that is that inequalities decreased over the period.<br>Hospitalisation do not show inequalties either. Dentist visits show a clear Inequaltiy pattern among social classes.<br>Lower education levels tend to use health care services more often than higher education levels, this overutilisation disappears when predictor variables like gender, age, health insurance and need are taken into account. |
| Fernández *et al.* (1996) | (1) Inequalities in Health<br>(2) Inequalities in Health Care | 1994 Catalan Health Survey | Logistic regressions (most relevant variables):<br>(1/2)) DV: Medical visits, hospital days, dentist, optometrists, preventive measures<br>EV: self-rated health, RAD, chronic, social class, age, gender, waiting times | Inequalities in health by social class persist. The utilisation of health services remain fairly equitable although differences were found in the use of particular services (dentist, optometrists, preventive measures) to the disadvantage of the lower socioeconomic groups. |
| Abásolo *et al.* (1998) | (2) Inequalities in health care<br>* Utilisation of Primary Care | 1987 National Health Survey | Regressions models<br>DV: GP Visit<br>EV: morbidity, demography, geography, socioeconomic, lifestyles,demand, supply, others | Socioeconomic, geographical and demographic characteristics significantly affect the probability of using GP services |
| Fernández *et al.* (1999) | (1)Gender Inequalities in Health<br>(2) Gender Inequalities in Health Care | 1994 Catalan Health Survey | Logistic regressions (most relevant variables):<br>DV: Medical visits, hospital days, dentist, optometrists<br>EV: Self-rated health, RAD, chronic, gender, age | Women are in worse health than men. The porportion of women visiting a health professional, dentists and optometrists was slightly greater than that for men. Differently, women used hospital facilities less than men. When taking account of need, women declaring good health reported a greater probability of counsulting a health professional, although no differences were found for utilisation of inpatient care, dentists or optometrists. They conclude that women despite being in greter need they do not use health services more frequently than men. |
| Borrell *et al.* (forthcoming) | (1) Inequalities in Health<br>(2) Inequalities in Health Care | 1992 Barcelona Health Survey | Logistic regressions (most relevant variables):<br>DV: Medical visits, hospital days, dentist, optometrists<br>EV: Self-perceived health status, RAD, chronic, days in bed, gender, age, social class, employment status, family structure. | There are still relevant inequalities in health among the population of Barcelona, with people in lower classes having worse health. No differences were found in visits to the doctor or hospitalisation, although preventive prcatices were undertaken in a lesser degree by those in lower social class. |

# CHAPTER 3.

# Methodology.

This research relates the distribution of expenditure on health services to that of health in order to see whether individuals in equal need for health care really get equal share of health care services across income groups. To this aim I have followed a combination of methods. On one hand, I have incorporated the contributions made by Le Grand, as well as the later criticisms and approaches raised by Wagstaff *et al.* (1991a, 1991b) and O'Donnell *et al.* (1991a, 1991b) and Collins and Klein (1980) to the measurement of inequalities in health care. On the other, I have used logistic regressions to explain in more detail how the different variables in these regression models, namely age, gender, need and socioeconomic varaibels are associated to the utilisation of the available types of care.

The contents of this Chapter 3 includes, first, a specification of objectives and hypotheses of the study. Second, there is a brief description of the data set used in the analysis, that is the 1994 Catalan Health Survey (ESCA, 1996). Third, an account is given of how the allocation of the sample to five income groups has been done. Fourth, I illustrate how a comprehensive set of morbidity indicators was built on the bases of the information contained in the Catalan Health Survey (CHS). Fifth, I specify how expenditure was estimated for each type of care and how both Le Grand, and Collins and Klein use/need ratios were calculated, as well as how the concentration curves and concentration indices were built. Finally, the logistic regression approach is detailed as regards methods and variables included.

### 3.1. Study objectives and hypotheses.

The study hypotheses were two. On one hand, it was considered that given universalisation of coverage to the entire population, the Catalan Health System was largely providing services according to need. The second hypothesis tested in this research accounted for the possibility that despite an overall equitable provision of services it may be the case of distinct patterns of utilisation according to income, age and gender in the three types of services studied, namely primary care, specialist care and inpatient care.

The aim of this research was to test the above hypotheses. The general objective was therefore to assess in which way the Health System in Catalonia delivered health care services according to need criteria. More specific objectives were to study inequalities in health in Catalonia accounting for a series of need indicators, to get to know better the plausible different patterns of utilisation of the various services across income groups, and to study which and how different variables, namely age, gender, need, and socioeconomic variables such as income and education were associated to utilisation of primary, specialist and inpatient care.

### 3.2. The 1994 Catalan Health Survey.

In this research I have used the 1994 Catalan Health Survey (CHS) (*Enquesta de Salut de Catalunya, ESCA* 1996) as the principal data source. One of the aspects that adds particular importance to my research is precisely the use of this data set to the measurement of horizontal equity in a decentralised policy area. Other horizontal equity studies in Spain has focussed on the national level since the only data set available then was either the 1987 or 1993 National Health Surveys. The fact that the CHS has recently become available allows for the study of inequalities at regional level, and that is probably the most adequate level to inform policy decisions once decentralisation of health care has taken place.

The CHS, performed by the Catalan Regional Health Service in 1994, is a survey sample of 15,000 individual interviews, geographically distributed across the eight health districts in Catalonia. The main characteristics of the CHS are described in Table 3.1.

Access to the CHS data set was gained on software format which has made the data processing a manageable task through SPSS 7.5 for Windows software. The use of this data set, together with the approach to the measurement of inequalities in health care, makes this study an empirically innovative piece of research in Spain.

**Table 3.1.**
**Main characteristics of the 1994 Catalan Health Survey.**

**Scope:** Regional (Catalonia), accounting for the eight health districts into which the territory of Catalonia is divided according to the Catalan Health Plan.
**Universe:** Population living in Catalonia (6,059,494).
**Size:** 15,000 interviews for the whole of Catalonia. All interviews targeted individuals.
**Sampling error:** The sampling error is fully acceptable.
**Number of questions:** 151.
**Main issues raised in the questionnaire:**
* Sociodemographic data (family).
* Sociodemographic data (individual).
* Self-reported health status.
* Restricted Activity.
* Chronic morbidity.
* Accidents.
* Medical Visits.
* Hospitalisation (in-patient care).
* Preventive medicine.
* Drugs and pharmaceutical consumption.
* Life styles and nutrition, physical activity, smoking and alcohol consumption.
* Disabilities and handicaps.
* Mental health.
* Family expenditure in private health services.
* General opinion and satisfaction with health care services.
* Family income.

### 3.3. Social groups classification.

There are several ways of dividing the population. Much of the research carried out both in the UK and in Spain has used occupation as the variable of choice so as to classify the population into groups. Other ways of proceeding include income, education, gender, etnicity, or place of residence. I have set on income, and later on education, to break up the population of Catalonia. I have intentionally avoided the use of occupation to classify individuals in the sample for three important reasons. First, because according to existing studies in Spain (Durán, 1993) occupation has been found as a misleading variable in many ways since over 50% of the population in Spain cannot be classified according to the occupation variable as a consequence of either being students, housewives, retired persons, or unemployed. Second, the occupational classification table used for such a purpose in Spain is rather old and the labour market has changed considerably since then. Finally, what this research tries to ascertain is whether people in equal need get equal treatment, irrespective of income, allowing also for a national and international comparison of results with other studies that also used income as the socioeconomic variable of interest.

The sample was divided into quintiles according to household income so as to assess whether there was a trend in the distribution of health services favouring the better-off. As stated, in addition to income, education levels were used, particularly in regard to the logistic regression models described later in this chapter. The variable education has been used in many of the studies on inequality in Spain reviewed in chapter two. I wanted to test whether the use of a different socioeconomic variable made any difference to the results, either when used alone or in combination with other variables.

### 3.4. Quintiles definition.

I hereby account for the way in which quintiles groups according to income have been defined. Question Q#151 in the CHS allows for a classification according to household income. The total number of individuals that answered this question and were finally included in the analysis was 10,272.

| |
|---|
| **Q#151.** Refers to HOUSEHOLD GROSS INCOME per year (12 categories). |

The list of 12 categories in Q#151 was reduced to 5 categories accounting for 20% of the population each. The allocation of individuals to one of the five income groups followed proximity first, and randomisation by means of *SPSS 7.5 windows software*. The final composition of quintile groups was the following:

| |
|---|
| *Group-a* (Bottom) = **2,022** (income groups 1,2,3) + **32** (individuals randomised from income group 4) = **2,054** |
| *Group-b* = **2,055** (individuals from income group 4) = **2,055** |
| *Group-c* = **325** (individuals left from income group 4) + **1,729** (individuals randomised from income group 5) = **2,054** |
| *Group-d* = **311** (individuals left from income group 5) + **1,383** (income group 6) + **361** (individuals randomised from income group 7) = **2,055** |
| *Group-e* (Top) = **602** (individuals left from income group 7) + **1,452** (income groups 8, 9, 10, 11 and 12) = **2,054** |

For further use I created a new variable "income" in the file accounting for the new income groups and taking values 1 for group-a (lowest income group) to 5 for group-e (top income group) as in the box.

### 3.5. Distribution of morbidity and need indicators.

The selection of a good indicator of morbidity has been a problem outlined throughout the literature. All the existing indicators have deficiencies of one kind or another and, since a choice must be made and restriction of data availability are present, it is agreed that a set of acceptable indicators is that derived from health interviews surveys (Le Grand, 1978). Accordingly, I have selected a set of morbidity indicators from the CHS that try to capture different aspects of health: Acute sickness and Limiting Chronic illness, as used by Le Grand (1978), and Health Not Good and Not-sick, as used by other authors such as O'Donnell and Propper (1991a). Further, these indicators reflect the use of the three models of needs assessment outlined by Blaxter in the literature: Medical, Functional, and Subjective.

Following the review of studies on inequalities in health care, both nationally and internationally, I have used five morbidity measures as proxies to ill-health, namely, Health Not Good, Acute sickness, Limiting Chronic illness, Not-sick and Sick.[36] I hereby briefly describe the process of building such new variables into the data set.

**(A) Health Not Good.**

Self-rated health status was appraised by the CHS in Question 28 (Q#28) using a list of ordinal categories, ranging from a perfect health to a very poor health status. Individuals were asked to position themselves in an ordinal scale according to what they believed was their health status at the moment of the

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36

The CHS used in this study only consider living and not institutionalised individuals. Thus, the set of need indicators I have used here do not include mortality measures nor consider patients within hospital at the time the survey was carried out.

interview.

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| **Q#28.** *"How would you describe your health status?"* Five possible answers are offered: excellent, very good, good, fair and bad. |

Individuals that answered YES to any of the last two categories (Fair and Bad health) were classified as Health Not Good. The Health Not Good (HNG) indicator is used here as a way to approach the concept of ill-health using an interpretation of Blaxter's subjective perceptions of health status, as discussed in Chapter two.

**(B) Acute Sickness.**

The acute sickness indicator reflected ill-health status when the cause of such a poor health is an acute problem that has resulted in a restriction of individual activities, either main or secondary daily activities, at some point in time and for a small number of days, as opposed to limiting chronic or long term. Acute sickness indicators correspond in many ways to what Blaxter defined as the functional component. The CHS identified acute sickness in a number of Questions (Q#32 to Q#40) where acute conditions are defined as illness or injury that resulted in a restriction of activity at any time during a two week reference period.

| |
|---|
| **Q #32.** *"During the last 15 days have you had to stay in bed including in-patient care because of a health problem (illness or injury)?"* Yes/No answer.<br>**Q #33.** Referring to Q#32: *"How many days?"*<br>**Q #34.** Only for those working, studying or housewives. *"In addition to those days in Q#32 have you stopped your main activities (not going to work, not studying or not doing housework) during the last 15 days because of your health?"* Yes/No answer.<br>**Q #35.** Referring to Q#34: *"How many days?"*<br>**Q #36.** *"In addition to those days in Q#32 and Q#34 have you stopped your other activities (walking, sports, shopping...) during the last 15 days?"*. Yes/No answer.<br>**Q #37.** Referring to Q#36: *"How many days?"*<br>**Q #38.** *"What caused the restriction on your activities in Q#32-34-36?"*. Open answer.<br>**Q #39.** *"Would that problem last for less than three months?"* Yes/No answer.<br>**Q #40.** *"Has it been caused by an accident?"* Yes/No answer. |

Acute sickness was thus used here as an additional morbidity indicator (ACUTE), classifying individuals in reference to their answers to some relevant questions in this list. Indeed, so as to classify a person as "Acute" I looked for YES answers to any of the questions Q#32-34-36, and a NO answer to Q#39.

**(C) Limiting Chronic Illness.**

The chronic indicator selected was Limiting Chronic Illness (LIMCRO). This indicator identifies long-term health problems that have resulted in a limitation of activities in any way. It corresponds to both the medical and functional models identified by Blaxter since it refers to a functional limitation of activity and chronic diseases or conditions are listed in the form of checklist in the survey. Questions Q#41 to Q#46 in the survey identified long-term health problems that resulted in a limitation of activities in some way.

**Q #41.** *"During the last 15 days have you had to cut down your main activity as a result of a chronic illness?"*. Yes/No answer.
**Q #42.** *"In addition, have you had to cut down your other activities as a result of a chronic illness?"*. Yes/No answer.
**Q #43.** If the answer to Q#41 and Q#42 has been YES then: *"What was the cause?"*.
**Q #44.** Related to Q#43: *"When did the problem start?"*
**Q #45.** *"Do you suffer from any of the conditions in this list?"*. A check-list with 16 categories of chronic illnesses is given.
**Q #46.** *"Do you suffer from any other illnesses not included in list and identified by the doctor?"*. Open answer.

On the bases of individual answers to these questions I built the Limiting Chronic indicator which I named LIMCRO. So as to determine whether a person fell in this morbidity group I looked for YES answers to any of the following questions: Q#41-42-45-46 (if completed) and Q#39 (see previous box).

**(D) Not-sick and Sick.**

Some authors' contributions and criticisms to previous work in the area of equity in health care have also been found relevant to the specification of the set of morbidity indicators, and have consequently been incorporated to this research. These contributions take into account the fact that what is being measured is inequalities in reference to service utilisation. Consequently, although ill-health morbidity measures are of primary importance they are not to be judged as the only ones. Other, rather more positive health indicators, may also explain utilisation. This is the reason for including the Not-Sick indicator. Not-sick tries to capture in the analysis one of the criticisms raised by Wagstaff *et al.* (1991a, 1991b) and O'Donnell *et al.* (1991a, 1991b) and Collins and Klein (1980) to Le Grand's approach. That is, the fact that those who do not report neither restricted activity (acute sickness) nor long-standing chronic illness may also benefit from the use of health care services. The construction of the indicator using the CHS has come as a combination of the same questions used to define the Acute and Limcro indicators. Instead of looking for YES answers to Q#32-34-36-39 (ACUTE) and Q#41-42-45-46 (LIMCRO), this time I have looked for NO answers to both sets of questions. Finally, the Sick indicator was relatively easy to build since it could be defined as: Sick=1-Notsick.

All morbidity indicators described here were included in the data set as new variables, taking a value of 1=YES and 0=NO for each individual answer.

## 3.6. Utilisation of health care services.

Within the CHS the utilisation of the various services and types of care is included under questions Q#52 to Q#74. A first group of questions (Q#52 to Q#67) refer to *medical visits* (GP, pediatrician and nurse, as wells as out-patient visits). The rest of questions are related to *in-patient care* (Q#58 to Q#74).

As regards Primary Care, I selected the questions that were relevant to this exploration, particularly Q#52, Q#59 and Q#63. However, Q#52 is not a single question but a multiple response question. The data set accounts for this by splitting Q#52 into several Q#52_"j", taking "j" as many as thirteen possible values representing equal number of health personnel categories attending the visit. The categories that are relevant to *Primary Care* services utilisation are Q#52_1, Q#52_2 and Q#52_8 since they referred to either General Practitioners, Pediatricians and Nurses, respectively. These same questions account for the absolute number of visits to these professional categories during the last twelve months. I created a new variable in the data set accounting for "primary care utilisation". I named it **"pc"** and accordingly assigned individuals values 0=no (being zero no visits paid) or 1=yes (answers greater than 0, that is if {Q#52_1>0 <u>or</u> Q#52_2>0 <u>or</u> Q#52_8>0 }.

**Q#52.** *"What type of health professional did you visit?"*. A list of 13 categories is given (Q#52_1 to Q#52_13). The question refers to the last 12 months and also gives account of how many times had the respondent visited the doctor.
**Q#53.** *"When was the last time you visited a health professional?"*. Open answer.
**Q#54.** *"Have you made any consultation on the telephone?"*. It refers to the last 15 days. It is a Yes/No answer.
**Q#55.** Related to Q#54: *"How many times?"*.
**Q#56.** *"Have you visited a health professional during the last 15 days?"*. It is a Yes/No answer.
**Q#57.** Related to Q#56: *"How many times?"*.
**Q#58.** *"When was the last time you visited a health professional within the last 15 days?"*. Open answer.
**Q#59.** Related to Q#58: *"Where was the visit paid?"*. A list of 10 categories is given.
**Q#60.** Related to Q#59: *"How long did you have to wait in the waiting room?"*.
**Q#61.** If answer to Q#59 has been answer #3 or #4, then: *"What was the reason for the visit?"*.
**Q#62.** *"Why did you pay the visit?"*. It is an open answer.
**Q#63.** *"What type of health professional did you then visit?"*. A list of 13 categories is given.
**Q#64.** *"Which specialty did the professional belong to?"*. A list of 5 categories is given.
**Q#65.** *"Which was your level of satisfaction with that visit?"*.
**Q#66.** *"Did you have a problem that you think required medical assistance but did not go?"*. It is a Yes/No answer and it refers to the last 15 days.
**Q#67.** Related to Q#66: *"Why did you not go?"*. A list of 9 categories is given.

Specialist Care was the second type of care explored as regards utilisation. The information needed to build up the utilisation variable, as well as to quantify the number of visits paid to specialist care services, was contained in one of the categories within Q#52, particularly Q#52_3. I created a new variable in the files accounting for "specialist care utilisation". I named it **"esp"** and assigned individuals values 0=no (being zero no visits paid) or 1=yes (answers greater than 0, that is if Q-52_3>0 ).

In-patient Care is considered in the questionnaire under Questions Q#68 to Q#74, separate from primary care and specialist care visits. I selected individuals according to their answers to Q#68. I then created a new variable in the files which I named **"ip"** and assigned individuals values 0=no or 1=yes (a YES answer to Q#68). Another question in the CHS (Q#70) allowed for the quantification of the number of days in-hospital during the reference period.

**Q#68.** *"Have you been in-patient care during the last 12 months?"*. It is a Yes/No answer.
**Q#69.** Related to Q#68: *"How many times?"*. Open answer.
**Q#70.** *"On the whole, how many days during the last 12 months?"*. Open answer.
**Q#71.** *"Where did the stay take place the last time?"*. Open answer.
**Q#72.** *"What was the cause of your stay the last time?"*. Open answer.
**Q#73.** *"How many days in hospital dis you stay the last time?"*. Open answer.
**Q#74.** *"What is your level of satisfaction with the last stay?"*. A list of 5 categories is given.

So as to relate utilisation, and ultimately expenditure, to the distribution of morbidity, those reporting illness in each of the groups were studied regarding their utilisation of health services. The level of utilisation of health services is given by the number of visits paid to a GP, pediatrician or nurse, in the case of primary care, visits paid to the out-patient ward (Q#52 and Q#57) for specialist care, and the number of days in care in hospital (Q#70).

### 3.7. Expenditures.

The utilisation of each of these services per quintile group was then translated into expenditure. In all cases official 1994 reimbursement tariffs from the Catalan Health Service authorities were used.

As regards inpatient care, the total cost of one hospital stay in Catalonia used here depended on both the type of hospital where that stay took place as well as the number of days in hospital (Q#70). Hospitals in Catalonia have traditionally been classified under three different categories, namely type A: Basic General Hospital, type B: Reference Hospitals, and type C: High Technology Hospitals. Despite this functional-assistance classification there are five finance categories to reimburse hospital stays, one category for each type of hospital described above and two additional categories, namely types A/B and B/C. The latter two take into account the fact that there are hospitals that do not fall strictly under the three first categories either because they would have an intermediate number of beds or simply because of their location. These two extra categories, A/B and B/C, only respond to financial needs, and they do not mean a difference regarding the assistance level, only regarding the economic-financial level.

Hospitals are largely financed by means of Basic Care Units-UBA (1 UBA equals 1 inpatient day). According to the type of hospital the UBA receives a value in Spanish Pesetas which is revised annually. Table 3.2. shows for 1994 the approved value in Pesetas of one UBA according to the five hospital categories. The CHS, however, does not provide enough information as regards hospital category used in all individual inpatient stays for which a weighted system must be used. The Soanish and Catalan hospital statistics (INE, 1996; Generalitat de Catalunya, 1994a, 1994b,1995c) allows for the construction of a weighted system to calculate the average cost per stay in a Catalan hospital accounting for (i) financial category, (ii) health region, (iii) number of discharges and, (iv) average number of days. The weighted value of one UBA in 1994 taking into account all these factors is also given in Table 3.2. The in-patient expenditure for each individual in the sample is calculated multiplying number of days in hospital by the weighted value of 1 UBA.

**Table 3.2.**
**Hospital care financial categories and expenditure.**

| Hospital Financial Category | Tariff applied to 1 UBA (in 1994 Pesetas) |
|---|---|
| A | 17,110 |
| A/B | 20,320 |
| B | 23,030 |
| B/C | 26,000 |
| C | 30,590 |
| Weighted Value of 1 UBA | 24,512 |

Sources: Generalitat de Catalunya 1994a, 1994b, 1995c; INE, 1996.

According to the values shown in Table 3.2., individual expenditure in inpatient care was calculated as follows:

Exp_IP = Q#70 * 24,512 Pesetas

The Basic Care Unit-UBA is also used in Catalonia to reimburse the cost of out-patient visits. The equivalence is stated as follows:

1 In-patient day = 1 UBA = 24,512 Pesetas (as in Table 3.2.)
1 Out-patient visit = 0.4 UBA (first visit) = 9,805 Pesetas
= 0.2 UBA (further visits) = 4,902 Pesetas

Since the questionnaire gives us exact information about the number of visits paid to outpatient or other specialist care services outside hospital, largely policlinics, the total expenditure per individual in this type of care is easily calculated. However, as stated above, a differentiation must be made between first and following visits.

Exp_SPEC = 9,805 + (Q#52_3 - 1) * 4,902

The only type of care that is not reimbursed according to UBAs is Primary care. Since no formal tariff has been established for these purposes I opted for looking into the total 1994 expenditure in Primary care services in Catalonia (225,676 million Pesetas)[37] and divide it by the total number of visits to primary care services in Catalonia the same year 1994. Official statistics (Generalitat de Catalunya, 1995b; ESCA, 1996) provided the average number of visits per inhabitant in each Catalan health district as well as the population within each health region. That gave a total number of 63,612,080 visits to primary care services for the whole of Catalonia during 1994. The resulting figure allowed us to approximate the cost per primary care visit to be 3,552 Pesetas. Primary Care expenditure for each individual is then calculated as:

Exp_PC = (Q#52_1 + Q#52_2 + Q#52_8) * 3,552

Total expenditure for health care services for each individual in the sample could then be calculated as the summatory of three types of expenditure. A new variable is then created, namely Exp_TOT:

Exp_TOT = Exp_PC + Exp_SPEC + Exp_IP.

The use of expenditures as proxy to treatment and the use of these measures of unit costs impose a series of limitations which are discussed in Chapter 7.

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[37] Generalitat de Catalunya (1995a).

## 3.8. Use/need ratios.

In this research, each need indicator is explored separately as regards utilisation of health services. As described above, the needs indicators used here have been Health Not Good, Acute Sickness, Limiting Chronic, Not-Sick and Sick. The use of the various health services is measured by the resources used in the different types of care expressed in number of visits to primary care, out-patient visits, and days in hospital. Further, an aggregate measure was used to express the use of these resources in monetary units. As stated, the calculation of expenditure was possible by multiplying the average cost of each visit or day in hospital by the number of episodes.

Two disaggregated use/need ratios were used to assess the extent of inequalities in health care, namely Le Grand's and Collins and Klein's. The Le Grand Index of Inequity ($HI_{LG}$) is calculated by dividing total expenditure allocated to income group-i on the various types of services, by the total number of persons in the selected morbidity group and income group-i. This is done for each income group and morbidity indicator. Differently, Collins and Klein ($HI_{C-K}$) index takes account of expenditure allocated to those in income group-i who report morbidity divided by the number of those in income group-i who reported morbidity. This is also done for all need indicators and income groups. Both indices were later standardized for age and gender.

The distribution of ill-health and expenditure across income groups together with the distribution of expenditure draw a series of concentration curves in a box diagram. The differences between ill-health curves and expenditure curves determine the value of the concentration indices. This was also done for each need indicator.

### 3.9. Standardisation of morbidity and expenditure.

A standardisation process assesses the extent to which the results to be standardised vary if a standard age and gender composition was taken instead of the one in the sample or subsample. It is likely that both age and gender will be associated to income, to the reporting of morbidity, and to the utilisation of health care relative to morbidity. Therefore, the standardisation process aims at controlling for the fact that age and gender might influence use and need in different ways. The method used here was direct age/gender standardization (O'Donnell and Propper, 1991a;1991b) using the whole CHS sample as the standard age/gender distribution.

The formula used here to calculate the age/gender standardised number reporting morbidity for each morbidity indicator was[38]:

$$\sum_j \sum_k \frac{B_{ijk}}{n_{ijk}} \frac{(n_{i..} n_{.jk})}{N}$$

where:

$b_{ijk}$ = Number of individuals reporting morbidity in the "i" income group, "j" age group, "k" gender group.

$n_{ijk}$ = Number of individuals in the "i" income group and "j" age group, "k" gender group.

$n_{i..}$ = Number of individuals in the "i" income group.

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38 Income groups considered are five (accordingly, "i" takes values from 1 to 5). The gender groups considered are two, male and female. The age groups considered are four (accordingly, "j" takes values from 1 to 4): j(1) = People 0-16; j(2) = People 17-39; j(3) = People 40-59; j(4) = People over 60.

$n_{.jk}$ = Number of individuals in the "j" age group, "k" gender group.

$N$ = Number of individuals in the sample.

The formula used to standardise utilisation indicators [39]:

$$\sum_j \sum_k \frac{a_{mijk}}{n_{mijk}} \frac{(n_{mjk})}{N_m}$$

where:

$a_{mijk}$ = Health care use by individuals in morbidity group "m", income group "i", age group "j" and gender group "k".

$n_{mijk}$ = Number of individuals in morbidity group "m", income group "i", age group "j" and gender group "k".

$n_{mjk}$ = Number of individuals in morbidity group "m", age group "j" and gender group "k".

$N_m$ = Total number of individuals in morbidity group "m".

This process was done for each type of care, namely inpatient care, primary care and specialist care.

39

Morbidity groups considered are four. Accordingly, "m" takes the following names: m(1) = Health Not Good (HNG), m(2) = Acute sickness (ACUTE), m(3) = Limiting Chronic (LIMCRO), m(4) = Not Sick (NS). Income groups considered are five (accordingly, "i" takes values from 1 to 5). The gender groups considered are two, male and female. The age groups considered are four (accordingly, "j" takes values from 1 to 4): j(1) = People **0-16**, j(2) = People **17-39**, j(3) = People **40-59**, j(4) = People **over 60**.

### 3.10. Logistic regressions.

Logistic regressions have widely been used in many applied areas of social sciences, including inequality studies, with the purpose of examining the simultaneous influence and association of a given set of variables with a defined dichotomous dependant variable. Thus, the objective of this research was to explore how the variables included in the models, namely need indicators, age, gender and socioeconomic variables are associated to the utilisation of the various types of care. Logistic regressions results will also allow us to know whether the size of the effect of any variable in the utilisation of health services is significant or not. Since some of these variables are represented in terms of categories, particularly age and income, logistic regressions will give also us a detailed information of how any of these categories are associated to utilisation in reference to a given category within the same variable.

A series of models were run including different combinations of variables. Improvement in the models was measured by decreases in the -2 Log Likelihood ratio. Both forced and stepwise methods have been used to define the different models. In brief, 36 logistic regressions models were ran (see Tables 3.3.). Each model explored utilisation of services by the total population in Catalonia, the male population and, finally, the female population group.

As stated, primary care, specialist care and inpatient care have been considered as the dependant variables in all cases. Logistic regression models consider the dependant variable as a dichotomous variable, that is, taking a 0 value when there is no utilisation, and a 1 value when utilisation takes place.

The rest of the variables are considered as utilisation explanatory variables. All the variables in the model are fully described in Table 3.4., accounting for the categories, coding and the reference category used for comparison purposes. In addition a series of regression models were used changing the reference category for age and income variables, selecting the immediate superior category as reference category for comparison.

In building the regression analysis models for the purpose of this research, income was the socioeconomic variable selected first. This was consistent with the analysis of the distribution of health and health care at the global level. Later in the research it was considered relevant to include an additional socioeconomic variable, namely education level, to assess whether it made any difference to the analysis of equity at the level of primary care, outpatient care and inpatient care services. Accordingly, the education variable was included in the regression models together with income. The Catalan Health Survey explored education level in Question Q#11. A recoding of the variable was needed to account for four differential categories or levels of education, namely illiterate, primary education, intermediate/secondary education, and higher education. Since there might be a case of multicolinearity between income and education categories, the regression analysis results are shown for both education and income on their own, and together, which allows for a better interpretation.

The results of logistic regressions are given in the form of odds ratios and significance levels (99%, 95%, and not significant) in all cases. The results are presented in a series of tables.

# Table 3.3.
## Logistic regression models for primary care, specialist care and inpatient care.

| Files | Explanatory variables in the model | Dependant variables (Utilisation) | | |
|---|---|---|---|---|
| | | Primary Care | Specialist Care | Inpatient Care |
| **Catalonia** | [age, gender, hng, income] | (PC-A) | (SC-A) | (IPC-A) |
| **Catalonia Males** | [age,hng, income] | (PC-A-Male) | (SC-A-Male) | (IPC-A-Male) |
| **Catalonia Females** | [age, hng, income] | (PC-A-Female) | (SC-A-Female) | (IPC-A-Female) |

| Files | Explanatory variables in the model | Dependant variables (Utilisation) | | |
|---|---|---|---|---|
| | | Primary Care | Specialist Care | Inpatient Care |
| **Catalonia** | [age, gender, hng, sick, income] | (PC-1) | (SC-1) | (IPC-1) |
| | [age, gender, hng, acute, limcro, income] | (PC-2) | (SC-2) | (IPC-2) |
| **Catalonia Males** | [age, hng, sick, income] | (PC-Male1) | (SC-Male1) | (IPC-Male1) |
| | [age,hng, acute, limcro, income] | (PC-Male2) | (SC-Male2) | (IPC-Male2) |
| **Catalonia Females** | [age, hng, sick, income] | (PC-Female1) | (SC-Female1) | (IPC-Female1) |
| | [age, hng, acute, limcro, income] | (PC-Female2) | (SC-Female) | (IPC-Female2) |

| Files | Explanatory variables in the model (a) | Dependant variables (Utilisation) | | |
|---|---|---|---|---|
| | | Primary Care | Specialist Care | Inpatient Care |
| **Catalonia** | [age, gender, hng, acute, limcro, income, education] | (PC-E) | (SC-E) | (IPC-E) |
| **Catalonia Males** | [age,hng, acute, limcro, income, education] | (PC-E-Male) | (SC-E-Male) | (IPC-E-Male) |
| **Catalonia Females** | [age, hng, acute, limcro, income, education] | (PC-E-Female) | (SC-E-Female) | (IPC-E-Female) |

(a) The regression models using Education as an additional variable considered as Need variables: HNG, Acute and Limcro.

## Table 3.4.
## Variables in the models: categories, codes used and reference category.

| Variable | Categories or Groups | Coding | Reference category (a) |
|---|---|---|---|
| PC (Primary Care) | Dichotomical [ no, yes ] | [ 0, 1 ] | - |
| SPC (Specialist Care) | Dichotomical [ no, yes ] | [ 0, 1 ] | - |
| IP (Inpatient Care) | Dichotomical [ no, yes ] | [ 0, 1 ] | - |
| Age | Categorical [ 0-16, 17-39, 40-59, 60 or more] | [ 1, 2, 3, 4 ] | (a) 4 - 60 or more<br>(b) Immediate superior |
| Gender | Dichotomical [male, female ] | [1, 2 ] | 1 - male |
| HNG | Dichotomical [ no, yes ] | [ 0, 1 ] | 0 - not HNG |
| Acute | Dichotomical [ no, yes ] | [ 0, 1 ] | 0 - not Acute |
| Limcro | Dichotomical [ no, yes ] | [ 0, 1 ] | 0 - not Limcro |
| Sick | Dichotomical [ no, yes ] | [ 0, 1 ] | 0 - Not Sick |
| Income | Categorical [ quintiles ] | [ 1, 2, 3, 4, 5 ] | (a) 5 - top quintile<br>(b) Immediate superior |
| Education | Categorical [illiterate, primary, intermediate, higher] | [ 1, 2, 3, 4 ] | 4 - higher education |

(a) In some cases the reference category was changed to explore a different hypothesis (see Chapters 4 and 5).

# CHAPTER 4.

# The Distribution of Need.

The study of the distribution of need and morbidity is a first step in the study of inequalities in health care. This chapter explores the distribution of need in the population in Catalonia as regards the five indicators outlined in the previous chapter. Following the methodological chapter, I first looked into the percentual distribution of the five indicators across income groups. This alloed, later, for the construction of illness concentration curves and the calculation of concentration indices. Both standardised and not standardised results are reported.

## 4.1. The distribution of morbidity and need indicators.

As stated in Chapter 3: Methodology, I have clustered the population surveyed in Catalonia into five quintile groups according to household income, each representing exactly 20% of the sample. The final distribution of individuals in the file is given in Table 4.1.

**Table 4.1.**
**Sample distribution across income groups.**

| Income groups (from bottom to top) | CATALONIA |
|---|---|
| Group-a (lowest) | 2,054 |
| Group-b | 2,055 |
| Group-c | 2,054 |
| Group-d | 2,055 |
| Group-e (highest) | 2,054 |
| TOTAL | 10,272 |

I then explored how these income groups accounted for morbidity, ill-health and health. As mentioned, I have selected five need indicators: Health Not Good, Acute sickness, Limiting Chronic illness, Not-sick and Sick, and new variables were created in the file corresponding to the presence or not of these need indicators for each individual entry.

Table 4.2. shows the distribution of Health Not Good *(HNG)* distribution according to income groups for Catalonia. In the table, ***N*** indicates the number of individuals categorised as HNG according to their answer to Q#28 in the survey. The ***%HNG*** column indicates the percentage distribution across income groups of people that said HNG, adding up 100%. Finally, the ***%Pop. in group-i that answered HNG*** column alludes to the percentage of people, within each income group, that answered HNG. The distribution of HNG was then standardised following the direct standardisation procedure described in the methods chapter. The same steps and standardisation procedure were followed and applied to the rest of morbidity indicators used in this research.

**Table 4.2.**
**Distribution of HEALTH NOT GOOD across income groups in Catalonia.**

| | NOT STANDARDISED | | | STANDARDISED | |
|---|---|---|---|---|---|
| **Income Groups** | N | **% HNG** | **% pop. in group-i that answered HNG** | **% HNG** | **% pop. in group-i that answered HNG** |
| *Group-a* | 910 | 33.94 | 44.30 | 25.85 | 33.83 |
| *Group-b* | 678 | 25.29 | 32.99 | 22.40 | 29.31 |
| *Group-c* | 478 | 17.83 | 23.27 | 19.41 | 25.40 |
| *Group-d* | 375 | 13.99 | 18.25 | 17.64 | 23.07 |
| *Group-e* | 240 | 8.95 | 11.68 | 14.70 | 19.24 |
| TOTAL | 2681 | 100.0 | 26.10 | 100.0 | 26.17 |

The second indicator explored was *Acute Sickness*. Both unstandardised and standardised results are displayed in Table 4.3.

**Table 4.3.**
**Distribution of ACUTE sickness across income groups in Catalonia.**

| | NOT STANDARDISED | | | STANDARDISED | |
|---|---|---|---|---|---|
| **Income Groups** | N | % ACUTE | % pop. in group-i that answered ACUTE | % ACUTE | % pop. in group-i that answered ACUTE |
| *Group-a* | 277 | 27.32 | 13.48 | 26.01 | 13.04 |
| *Group-b* | 224 | 22.09 | 10.90 | 21.33 | 10.68 |
| *Group-c* | 191 | 18.84 | 9.30 | 18.96 | 9.51 |
| *Group-d* | 171 | 16.86 | 8.32 | 16.98 | 8.51 |
| *Group-e* | 151 | 14.89 | 7.35 | 16.72 | 8.38 |
| TOTAL | 1014 | 100.0 | 9.87 | 100.0 | 10.02 |

The need indicator used within the analysis of Chronic illness was *Limiting Chronic*. That is, individuals whose chronic pathologies or clinical conditions have resulted in a limitation of their activities in some way. Results are reported in Table 4.4.

**Table 4.4.**
**Distribution of LIMITING CHRONIC across income groups in Catalonia.**

| | NOT STANDARDISED | | | STANDARDISED | |
|---|---|---|---|---|---|
| **Income Groups** | N | % LIMCRO | % pop. in group-i that answered LIMCRO | % LIMCRO | % pop. in group-i that answered LIMCRO |
| *Group-a* | 234 | 24.30 | 11.39 | 20.66 | 9.57 |
| *Group-b* | 210 | 21.81 | 10.22 | 22.02 | 10.19 |
| *Group-c* | 189 | 19.63 | 9.20 | 20.87 | 9.66 |
| *Group-d* | 174 | 18.06 | 8.47 | 18.33 | 8.48 |
| *Group-e* | 156 | 16.20 | 7.59 | 18.12 | 8.38 |
| TOTAL | 963 | 100.0 | 9.37 | 100.0 | 9.26 |

The last two need indicators explored were *Not-Sick* and *Sick*. *Not-Sick* tries to capture the fact that there are individuals that despite feeling healthy still use health care services. The distribution across income is reported in Table 4.5. *Sick* captures an aggregate measure of Acute and Limcro. It is relatively easy to build since it comes as a result of individuals saying NO to the Not-Sick indicator. The distribution of individuals reporting Sick is given in Table 4.6.

Table 4.5.
Distribution of NOT-SICK across income groups in Catalonia.

| | NOT STANDARDISED | | | STANDARDISED | |
|---|---|---|---|---|---|
| **Income Groups** | N | **%<br>NOTSICK** | **% pop. in group-i that answered NOTSICK** | **%<br>NOTSICK** | **% pop. in group-i that answered NOTSICK** |
| *Group-a* | 133 | 7.63 | 6.48 | 13.00 | 10.55 |
| *Group-b* | 239 | 13.70 | 11.63 | 17.13 | 13.90 |
| *Group-c* | 390 | 22.36 | 18.98 | 22.48 | 18.26 |
| *Group-d* | 470 | 26.95 | 22.87 | 23.61 | 19.17 |
| *Group-e* | 512 | 29.36 | 24.93 | 23.78 | 19.31 |
| TOTAL | 1744 | 100.0 | 16.98 | 100.0 | 16.24 |

Table 4.6.
Distribution of SICK across income groups in Catalonia.

| | NOT STANDARDISED | | | STANDARDISED | |
|---|---|---|---|---|---|
| **Income Groups** | N | **%<br>SICK** | **% pop. in group-i that answered SICK** | **%<br>SICK** | **% pop. in group-i that answered SICK** |
| *Group-a* | 1921 | 22.53 | 93.52 | 21.80 | 91.83 |
| *Group-b* | 1816 | 21.29 | 88.37 | 20.44 | 86.06 |
| *Group-c* | 1664 | 19.52 | 81.02 | 19.40 | 81.75 |
| *Group-d* | 1585 | 18.58 | 77.13 | 19.20 | 80.80 |
| *Group-e* | 1542 | 18.08 | 75.07 | 19.16 | 80.70 |
| TOTAL | 8528 | 100.0 | 83.02 | 100.0 | 84.23 |

All the relevant data derived from the distribution of the morbidity indicators explored above across income has been synthesized through a series of tables and figures. I have also accounted here for the illness concentration curves originating from the distribution of morbidity across income groups as measured by the indicators above.

The *HNG* distribution shows a negative slope. This slope is a pronounced slope when compared with the rest of indicators used. This negative gradient indicates, first, that people in Catalonia that answered HNG are distributed differently across income groups and, second, that people that say HNG are much more numerous in the lower income groups that in higher income groups. Indeed, when moving towards lower income groups the %HNG increases. From all individuals in the Catalonia file that answered HNG only 9% are in income group-e while 34% are in group-a, that is four times as much as in the highest income group-e.

As regards the column **%Pop. in group-i that answered HNG**, the average for Catalonia is 26%. That is, on the whole and regardless of income group, 26% of the people in Catalonia affirm their health was not good. When looking into income distribution in the same column, important differences across groups of income were found, varying from 12% of the population in income group-e, to 44% in group-a, almost 4 times as much. Standardised results for HNG flattens the income slope considerably.

*Acute* as an indicator of ill-health has a less sharp a gradient than HNG. Up to 27% of the people that answered Acute are in the lowest income group-a, while the top income group-e only accounts for 15%. On average, almost 10% of the population of Catalonia responded Acute, although this percentage varies from 13% in the lowest income group-a to approximately 7% in the highest income group-e. That is, individuals in the bottom income group-a restrict their activities as a result of an acute condition twice as much as those in group-e.

*Limiting Chronic* as a need indicator invokes restriction of activity as a result of a chronic condition. The gradient for the population in Catalonia is again negative, showing that the lower the income level the higher the value of the indicator. However, this slope is less pronounced than that of HNG or Acute, meaning that for limiting chronic conditions there is not as much difference according to income groups as there are regarding the previous two ill-health indicators. Around 24% of the population in Catalonia that restrict their activity as a consequence of a chronic condition are allocated in bottom income group-a, while in the top income group-e they come down to 16%. On average, just above 9% of the population in Catalonia state Limcro, ranging from 7.6% in group-e to 11.4% in the lowest income group-a, that is 50% more in the bottom income group.

Not surprisingly, *Not-sick* is the only indicator of need that follows a positive gradient, that is, the higher the income the higher the Not-sick indicator. Only 7.6% of those that assert not-sick in Catalonia are allocated in income group-a, compared with almost 30% in the highest income group-e. On average around 17% of the population of Catalonia are considered as not-sick, but there is a considerable disparity across groups. Indeed, almost 25% of the population in the top income group-e state Not-sick while in income group-a they fall down to 6.5%, that is almost four times less.

The distribution of *Sick* across the defined income groups is fairly horizontal with a very smooth negative gradient, reflecting, once more, the fact that people in lower income groups are sicker than in higher income groups. According to this need indicator, while approximately 22% of the people that say to be sick are in income group-a, in group-e the percentage is close to 18%. The difference between these two extreme income groups is therefore of just over four percentage points. Differences are higher when it comes to describe what happens in the second column, that is **%Pop. in group-i that answered sick.** Certainly, while 93% of the people in group-a said they were sick at any time within the reference period due either to an acute or a chronic condition, in income group-e they only represented 75% of the population in the group.

In brief, the results above suggest an income gradient in the way ill-health is distributed across the Catalan population. Table 4.7. shows both standardised and unstandardised results. The standardisation process applied does not change drastically the overall described picture of inequalities in health. Age and gender standardisation has an overall smoothing effect on the distribution of ill-health across income groups in the population of Catalonia (see Figure

4.1.). This smoothing effect proves the existence of a different age and gender distribution across income groups in the sample. Despite the standardised results diminish the existing differences across groups we can still argue that low income groups are in poorer health than higher income groups, and that is regardless of the ill-health indicator used.

Figure 4.1. shows complementary graphical displays of the same data. nt percentages according to each need indicator (in the case of HNG, %hng = **N-hng in group-i / N-hng Total**), both unstandardised and standardised results are given.

**Table 4.7.**
**Summary of needs indicators results for Catalonia.**

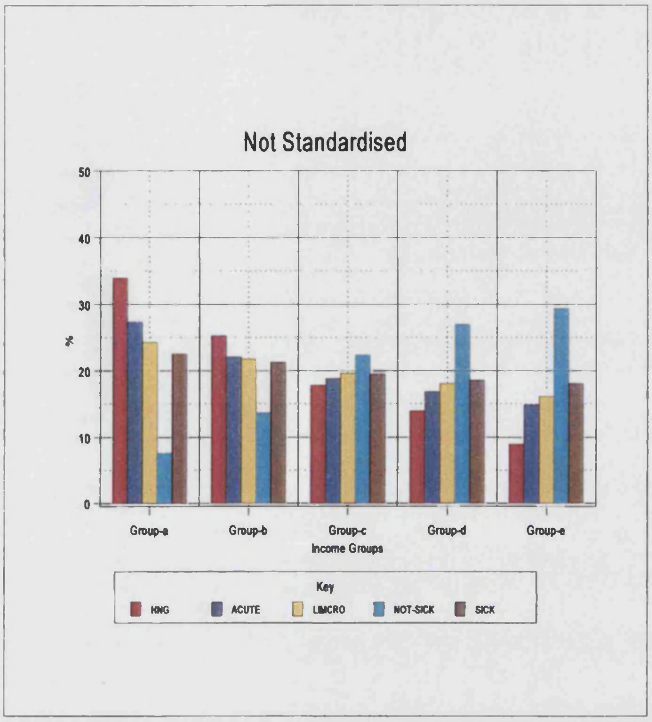
NOT STANDARDISED

| Income Groups | HNG | | ACUTE | | LIMCRO | | NOTSICK | | SICK | |
|---|---|---|---|---|---|---|---|---|---|---|
| | %hng | %Pob group-i | %acute | %Pob group-i | %limcro | %Pob group-i | %nosick | %Pob group-i | %sick | %Pob group-i |
| *Group-a* | **33.94** | 44.30 | **27.32** | 13.48 | **24.30** | 11.39 | **7.63** | 6.48 | **22.53** | 93.52 |
| *Group-b* | **25.29** | 32.99 | **22.09** | 10.90 | **21.81** | 10.22 | **13.70** | 11.63 | **21.29** | 88.37 |
| *Group-c* | **17.83** | 23.27 | **18.84** | 9.30 | **19.63** | 9.20 | **22.36** | 18.98 | **19.52** | 81.02 |
| *Group-d* | **13.99** | 18.25 | **16.86** | 8.32 | **18.06** | 8.47 | **26.95** | 22.87 | **18.58** | 77.13 |
| *Group-e* | **8.95** | 11.68 | **14.89** | 7.35 | **16.20** | 7.59 | **29.36** | 24.93 | **18.08** | 75.07 |
| TOTAL | **100.0** | 26.10 | **100.0** | 9.87 | **100.0** | 9.37 | **100.0** | 16.98 | **100.0** | 83.02 |

STANDARDISED

| Income Groups | HNG | | ACUTE | | LIMCRO | | NOTSICK | | SICK | |
|---|---|---|---|---|---|---|---|---|---|---|
| | %hng | %Pob group-i | %acute | %Pob group-i | %limcro | %Pob group-i | %nosick | %Pob group-i | %sick | %Pob group-i |
| *Group-a* | **25.85** | 33.83 | **26.01** | 13.04 | **20.66** | 9.57 | **13.00** | 10.55 | **21.80** | 91.83 |
| *Group-b* | **22.40** | 29.31 | **21.33** | 10.68 | **22.02** | 10.19 | **17.13** | 13.90 | **20.44** | 86.06 |
| *Group-c* | **19.41** | 25.40 | **19.96** | 9.51 | **20.87** | 9.66 | **22.48** | 18.26 | **19.40** | 81.75 |
| *Group-d* | **17.64** | 23.07 | **16.98** | 8.51 | **18.33** | 8.48 | **23.61** | 19.17 | **19.20** | 80.80 |
| *Group-e* | **14.70** | 19.24 | **16.72** | 8.38 | **18.12** | 8.38 | **23.78** | 19.31 | **19.16** | 80.70 |
| TOTAL | **100.0** | 26.17 | **100.0** | 10.02 | **100.0** | 9.26 | **100.0** | 100.0 | **100.0** | 84.23 |

**Figure 4.1.(a)**
**Needs Indicators and Income Groups in Catalonia.**



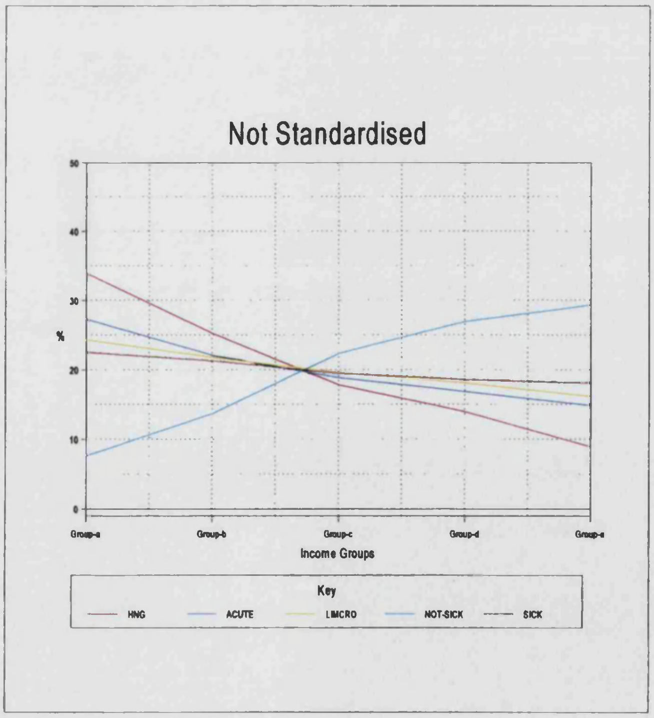
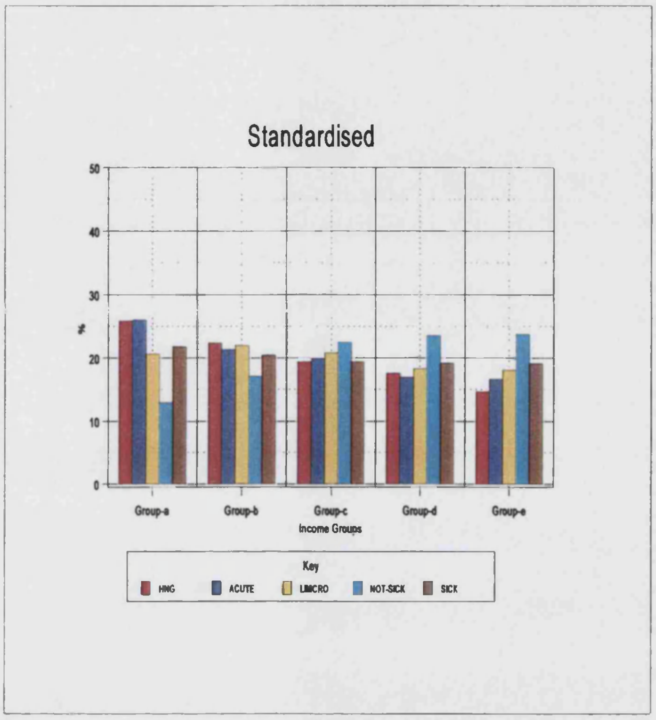
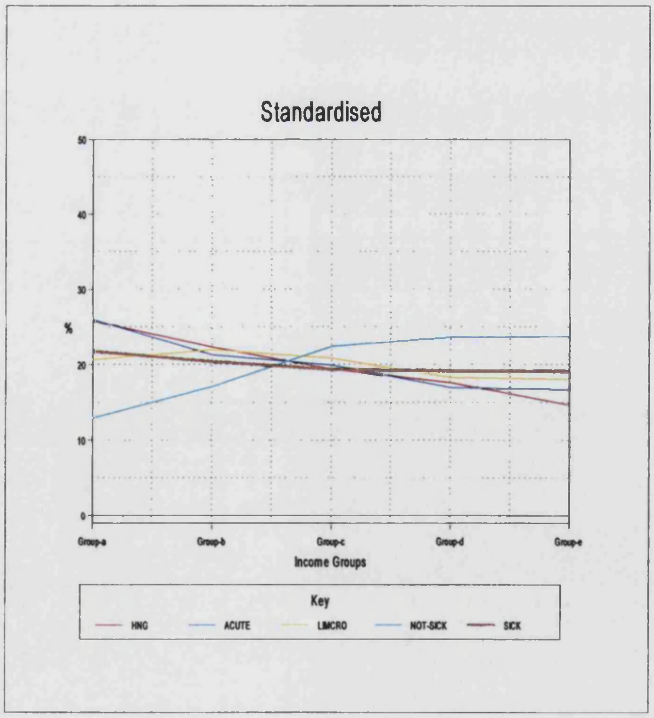



**Figure 4.1.(b)**
**Needs Indicators and Income Groups in Catalonia.**



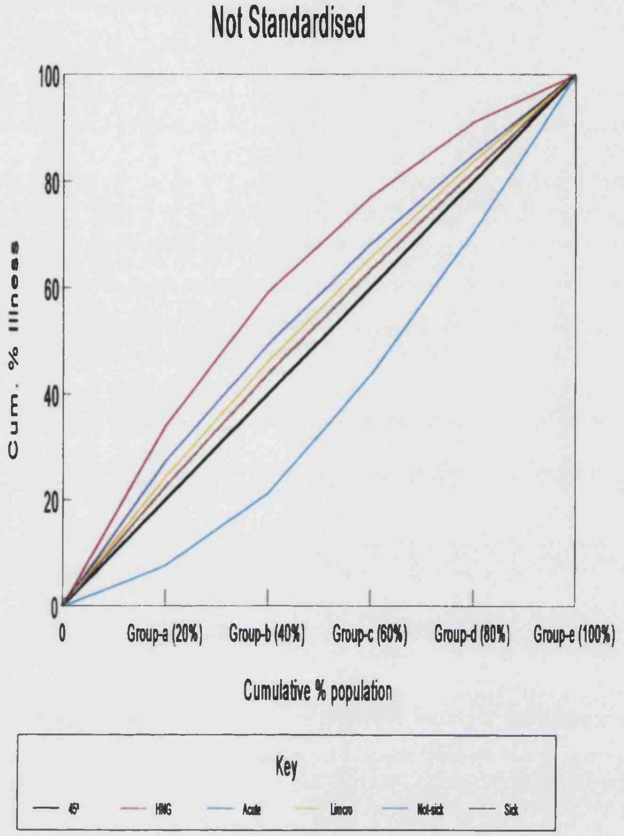



### 4.2. Illness concentration curves and indices.

If we are to measure how ill-health is distributed according to income, and give a numerical value to the income gradient in the distribution, we ought to be using illness concentration curves and indices. Illness concentration curves represent cumulative illness distribution and cumulative population distribution ranked by income, being group-a the lowest income group and group-e the highest. Accordingly, Figure 4.2. included here also represent how illness is distributed across income groups in Catalonia. The different curves account for the various ill-health indicators, namely HNG, Acute, Limcro, Not-sick and Sick. The diagonal line has been included to represent a perfect proportional distribution of need and income (the 45º line). Points along this 45º line show distributions where ill-health is equally distributed across income groups, that is, people in group-a (20% of the population) represent exactly 20% of all those that say their health was not good, for example. Illness concentration curves would be plotted above the 45º line if poor health is concentrated in lower income groups, and below the diagonal if the opposite is the case. The closer the concentration curve is to the 45º diagonal the less inequitable the distribution of ill-health. Once more, both standardised and unstandardised results are reported, which allows for a better picture of the smoothing effect of standardisation.

The degree of equity in the distribution of ill-health can be measured by the indices resulting from illness concentration curves. Concentration indices are symbolised here by $C_{HNG}$ , $C_{Acute}$ , $C_{Limcro}$ , $C_{NotSick}$, and $C_{sick}$ and reported in Table 4.8. They are calculated as minus twice the area between the selected concentration curve and the diagonal (45º). Their values would range from -1 to +1, speaking for maximum inequity in the distribution of ill-health, to the advantage of the least well-off and the best-off individuals, respectively. Indices will take the value 0 when all individuals have the same ill-health regardless of the income group they are in.

**Figure 4.2.**
**Illness concentration curves in Catalonia.**



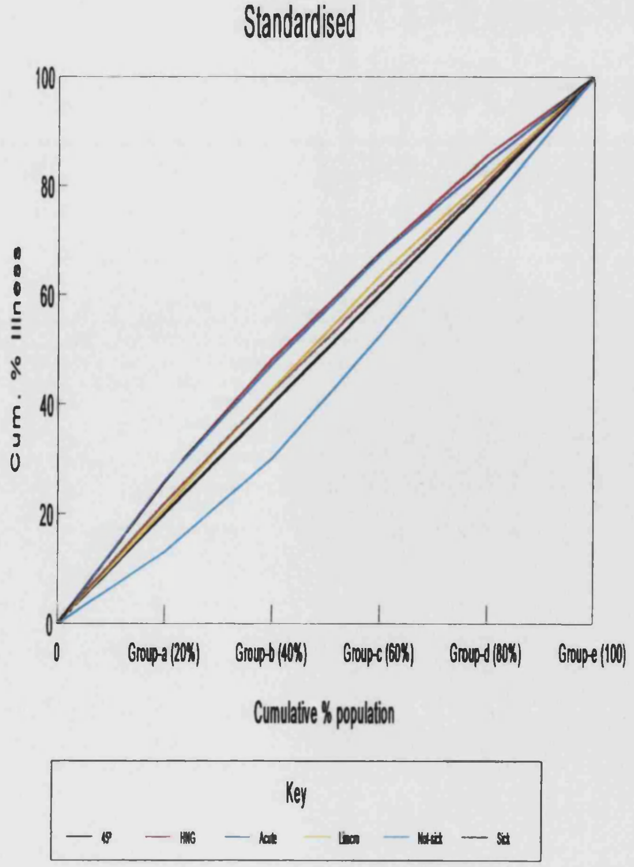



**Table 4.8.**
**Illness concentration indices in Catalonia.**

| | CATALONIA | |
|---|---|---|
| | **Unstandardised** | **Standardised** |
| $C_{HNG}$ | - 0.24514 | - 0.10772 |
| $C_{Acute}$ | - 0.12036 | - 0.09172 |
| $C_{Limcro}$ | - 0.07980 | - 0.03508 |
| $C_{NotSick}$ | 0.22684 | 0.11216 |
| $C_{Sick}$ | - 0.04764 | - 0.02162 |

As stated, the concentration indices quantitatively illustrate the degree of inequality regarding the distribution of ill-health across income groups. Table 4.8., therefore, exhibits how the distributions differ from proportionality. Not-sick is the only need indicator with a positive value, that is, above zero in the given range [+1 to -1]. Not standardised concentration indices point to HNG and Not-Sick as the two indicators with the highest value, and hence expressing greater inequity, albeit in a different direction. HNG concentration index clearly indicates inequity towards the poor[40] while the Not-Sick indicator distinctly favours the rich. All the other indicators show negative values in various, although smaller, degrees.

Standardisation of results by age and gender flattens the illness concentration curves and reduces the resulting indices. Indeed, all indices come closer to proportionality (value=0) when the standardisation process takes place. Once more, all indicators, except Not-Sick, show a negative sign, although this time their values are closer to proportionality.

40 Inequalities towards the poor refers to situations in which ill-health is distributed mainly among the lowest income groups.

So far I have explored the ways the different ill-health indicators behave across income groups in Catalonia, both unstandardised and standardised by age and gender. The findings point to an income gradient in the distribution of ill-health and health, regardless of the ill-health indicator used. The magnitude of this gradient, however, does depend on the indicator used and the effect of standardisation by age and gender.

This research now needs to show whether this income gradient is matched by a similar distribution of health care services. The next section deals with this issue and discloses the use the different income groups make of the services available. What is central to this research is to assess whether the distribution of services follows, or not, a similar pattern as the distribution of ill-health, and thus those in need get their proportional share of health care resources.

# CHAPTER 5.

# The Utilisation of Health Care Services.

## 5.1. The utilisation of primary, specialist and inpatient care.

Having explored how need is distributed across income groups in Catalonia we hereby looked into how these income groups suse the different services. The utilisation of the various services and types of care is appraised by the Catalan Health Survey in Questions 52 to 74. The analysis of utilisation of services for each need indicator is thus done according to Primary Care, Specialist Care and Inpatient Care. Full description of the steps here is given in Chapter 3: Methodology. Table 5.1. shows how I proceeded to the analysis of the utilisation by need indicators throughout the file.

*Primary Care* was the first type of care explored regarding utilisation. The data set gives statement of the number of visits paid to general practitioners, nurses and pediatrics by the population surveyed. *Specialist Care*, as mentioned before, includes here not only all out-patient care within hospital centres but also all other specialist care still provided in other health care centres, primarily policlinics. Both primary care and specialist care utilisation were calculated according to the number of visits paid to each type of service. Utilisation of *Inpatient care* services was measured in number of days in hospital.

The analysis of utilisation of services is done for each indicator of ill-health considered before. Results are reported in the form of how much amount of services was used by those that said their Health was Not Good, by those that said they suffered Acute Sickness or Limiting Chronic Illness, and by those other that fall under Not-Sick and Sick categories. All results are included in Tables 5.2, 5.3 and 5.4, picturing primary care, specialist care and inpatient care across income and need, respectively. At this stage only unstandardised results are given. Once translated into expenditure both standardised and not standardised results will be presented.

**Table 5.1**
**Classification of files according to utilisation and needs indicators.**

| | | Primary Care | Specialist Care | Inpatient Care |
|---|---|---|---|---|
| HNG | *Group-a* | pchng-a | eshng-a | iphng-a |
| | *Group-b* | pchng-b | eshng-b | iphng-b |
| | *Group-c* | pchng-c | eshng-c | iphng-c |
| | *Group-d* | pchng-d | eshng-d | iphng-d |
| | *Croup-e* | pchng-e | eshng-e | iphng-e |
| ACUTE | *Group-a* | pcac-a | esac-a | ipac-a |
| | *Group-b* | pcac-b | esac-b | ipac-b |
| | *Group-c* | pcac-c | esac-c | ipac-c |
| | *Group-d* | pcac-d | esac-d | ipac-d |
| | *Croup-e* | pcac-e | esac-e | ipac-e |
| LIMCRO | *Group-a* | pclc-a | eslc-a | iplc-a |
| | *Group-b* | pclc-b | eslc-b | iplc-b |
| | *Group-c* | pclc-c | eslc-c | iplc-c |
| | *Group-d* | pclc-d | eslc-d | iplc-d |
| | *Croup-e* | pclc-e | eslc-e | iplc-e |
| NOT-SICK | *Group-a* | pcns-a | esns-a | ipns-a |
| | *Group-b* | pcns-b | esns-b | ipns-b |
| | *Group-c* | pcns-c | esns-c | ipns-c |
| | *Group-d* | pcns-d | esns-d | ipns-d |
| | *Croup-e* | pcns-e | esns-e | ipns-e |
| SICK | *Group-a* | pcsic-a | essic-a | ipsic-a |
| | *Group-b* | pcsic-b | essic-b | ipsic-b |
| | *Group-c* | pcsic-c | essic-c | ipsic-c |
| | *Group-d* | pcsic-d | essic-d | ipsic-d |
| | *Croup-e* | pcsic-e | essic e | ipsic-e |

These results can best be commented when using illustrative charts, concentration curves and indices (see Figures 5.1, 5.2, 5.3, 5.4, 5.5).

**Table 5.2.**
**Unstandardised utilisation of primary care services according to needs indicators and income groups in Catalonia.**

| INCOME GROUPS | HNG | | | ACUTE | | | LIMCRO | | | NOT-SICK | | | SICK | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N. Visits | **% Visits** | HNG-PC / HNG-tot. | N. Visits | **% Visits** | Acute-PC / Acute-tot. | N. Visits | **% Visits** | Limcro-PC / Limcro-tot. | N. Visits | **% Visits** | NotS.-PC / NotS- tot. | N. Visits | **% Visits** | Sick.-PC / Sick- tot. |
| *Group-a* | 9848 | **39.62** | 90.77 | 3383 | **38.77** | 93.50 | 3000 | **35.29** | 92.31 | 202 | **11.09** | 54.13 | 14492 | **32.65** | 84.17 |
| *Group-b* | 6608 | **26.58** | 88.05 | 2103 | **24.10** | 91.96 | 1968 | **23.15** | 93.33 | 243 | **13.34** | 49.79 | 10848 | **24.44** | 82.49 |
| *Group-c* | 3902 | **15.70** | 84.94 | 1433 | **16.42** | 87.43 | 1396 | **16.42** | 87.30 | 396 | **21.73** | 47.49 | 7410 | **16.69** | 77.52 |
| *Group-d* | 2710 | **10.90** | 81.86 | 1075 | **12.32** | 85.38 | 1391 | **16.37** | 90.23 | 467 | **25.63** | 51.06 | 6550 | **14.76** | 76.91 |
| *Group-e* | 1790 | **7.20** | 80.83 | 732 | **8.39** | 82.12 | 746 | **8.75** | 84.61 | 514 | **28.21** | 49.80 | 5083 | **11.46** | 70.79 |
| TOTAL | 24858 | **100.0** | 86.91 | 8726 | **100.0** | 88.95 | 8501 | **100.0** | 89.93 | 1822 | **100.0** | 50.05 | 44383 | **100.0** | 79.19 |

Note: The columns in grey represent, for each morbidity indicator, respondents that used primary care services as a percentage of those within each morbidity group.

## Table 5.3.
## Unstandardised utilisation of specialist care services according to needs indicators and income groups in Catalonia.

| INCOME GROUPS | HNG | | | ACUTE | | | LIMCRO | | | NOT-SICK | | | NOT-SICK | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N. Visits | % **Visits** | HNG-SC ----------- HNG-tot. | N. Visits | % **Visits** | Acute-SC ----------- Acute-tot. | N. Visits | % **Visits** | Limcro-SC ----------- Limcro-tot. | N. Visits | % **Visits** | NotS.-SC ----------- NotS- tot. | N. Visits | % **Visits** | Sick.-SC ----------- - Sick-tot. |
| ***Group-a*** | 2697 | **30.92** | 59.34 | 875 | **25.76** | 61.37 | 842 | **21.23** | 75.64 | 116 | **8.17** | 33.08 | 3714 | **23.72** | 46.95 |
| ***Group-b*** | 2267 | **25.99** | 64.01 | 930 | **27.38** | 67.41 | 974 | **24.56** | 75.24 | 190 | **13.37** | 29.71 | 3512 | **22.43** | 47.68 |
| ***Group-c*** | 1570 | **17.99** | 65.48 | 576 | **16.96** | 60.73 | 855 | **21.57** | 76.72 | 224 | **15.77** | 24.61 | 2974 | **18.99** | 48.37 |
| ***Group-d*** | 1268 | **14.54** | 64.53 | 542 | **15.95** | 59.65 | 646 | **16.30** | 77.01 | 340 | **23.94** | 31.27 | 2808 | **17.94** | 51.54 |
| ***Group-e*** | 921 | **10.56** | 71.66 | 474 | **13.96** | 60.26 | 648 | **16.34** | 82.69 | 551 | **38.75** | 48.83 | 2648 | **16.92** | 54.41 |
| **TOTAL** | 8723 | **100.0** | 65.44 | 3397 | **100.0** | 62.13 | 3965 | **100.0** | 77.15 | 1421 | **100.0** | 31.99 | 15656 | **100.0** | 49.58 |

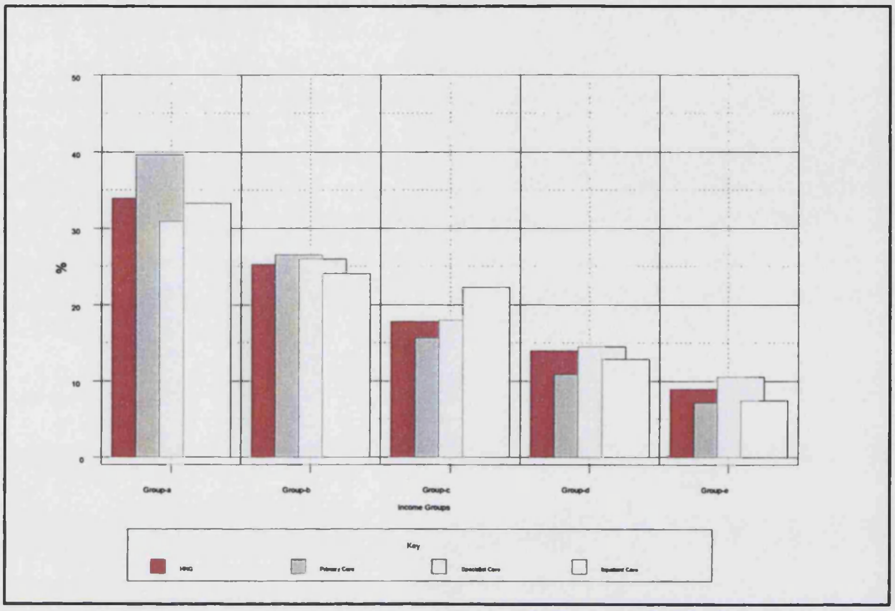
Note: The columns in grey represent, for each morbidity indicator, respondents that used specialist care services as a percentage of those within each morbidity group.

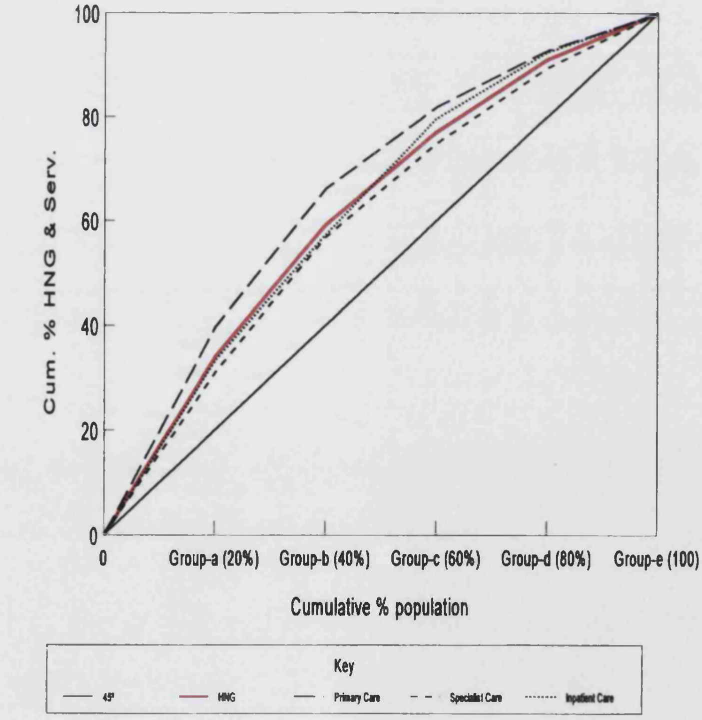
**Table 5.4.**
**Unstandardised utilisation of inpatient care services according to needs indicators and income groups in Catalonia.**

| INCOME GROUPS | HNG | | | ACUTE | | | LIMCRO | | | NOT-SICK | | | SICK | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N. Days | **% Days** | HNG-IP ---------- HNG-tot. | N. Days | **% Days** | Acute-IP ---------- Acute-tot. | N. Days | **% Days** | Limcro-IP ---------- Limcro-tot. | N. Days | **% Days** | NotS.-IP ---------- NotS- tot. | N. Days | **% Days** | Sick.-IP ---------- Sick- tot. |
| ***Group-a*** | 2410 | **33.28** | 15.93 | 732 | **31.11** | 16.06 | 778 | **19.73** | 22.22 | 92 | **20.22** | 5.26 | 3152 | **29.26** | 10.98 |
| ***Group-b*** | 1743 | **24.07** | 19.30 | 539 | **22.91** | 16.07 | 794 | **20.13** | 23.33 | 139 | **30.55** | 4.18 | 2577 | **23.92** | 9.80 |
| ***Group-c*** | 1616 | **22.31** | 14.02 | 502 | **21.33** | 14.13 | 1094 | **27.73** | 28.04 | 47 | **10.33** | 2.82 | 2247 | **20.86** | 8.47 |
| ***Group-d*** | 932 | **12.87** | 14.66 | 301 | **12.79** | 12.28 | 539 | **13.67** | 24.71 | 66 | **14.51** | 3.62 | 1438 | **13.35** | 8.89 |
| ***Group-e*** | 541 | **7.47** | 13.33 | 279 | **11.86** | 13.91 | 739 | **18.74** | 26.28 | 111 | **24.39** | 5.86 | 1358 | **12.61** | 7.91 |
| **TOTAL** | 7242 | **100.0** | 14.77 | 2353 | **100..0** | 14.89 | 3944 | **100.0** | 24.71 | 455 | **100.0** | 4.30 | 10772 | **100.0** | 9.29 |

Note: The columns in grey represent, for each morbidity indicator, respondents that used inpatient care services as a percentage of those within each morbidity group.

**Figure 5.1.**
**Unstandardised utilisation of services by HNG in Catalonia: Percentual distribution and Concentration curves.**



The chart bar in Figure 5.1. shows the percentage distribution of utilisation of services across income groups of those that stated their health was not good. The first bar in each group represents the distribution of HNG seen in the previous section. The other three bars show the share of services received by each income group. As seen from the chart, HNG and utilisation are distributed across income in a similar way. The higher the income the smaller the need and also the utilisation of services. However, despite this being a well stablished trend, it seems like different patterns could be observed across income groups. Indeed, the utilisation of primary care seems to decrease proportionally in a greater amount than HNG when moving from lower income groups to higher levels of income. Specialist care follows a similar but opposite pattern, decreasing less than proportionally as income raises. Inpatient care seems to behave rather homogeneously across income groups, although middle income group-c) shows the highest utilisation of this type of care relative to ill-health when HNG is used.

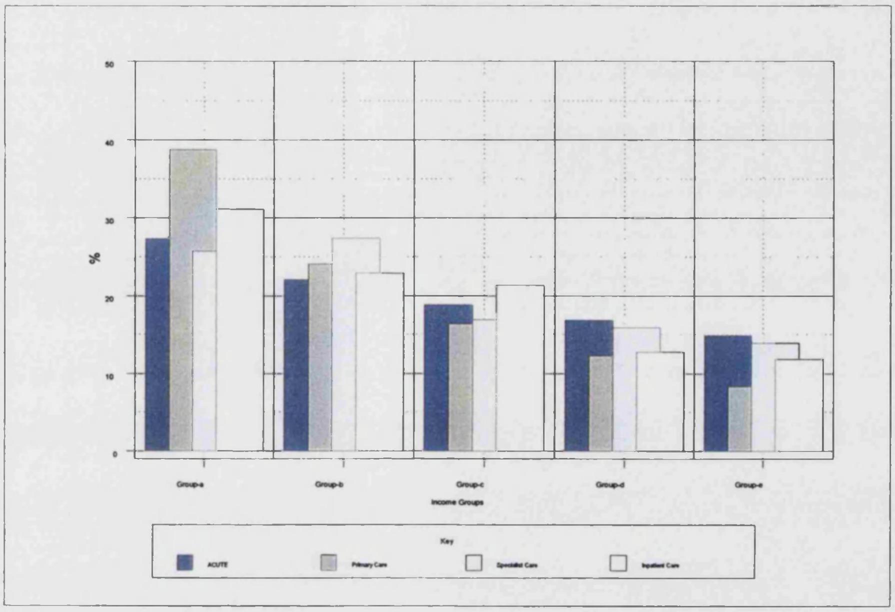
Concentration curves in Figure 5.1. confirm this picture. The first aspect to notice is the fact that all curves lie above the diagonal (45º), meaning that both ill-health, as measured by HNG, and utilisation of the various types of services are distributed in the direction of the less well-off. That is, the lowest the income group the greater the need (HNG) and, at the same time, the highest the utilisation of the different types of care considered here. The HNG curve is denoted by a red line in the box, and could serve as a reference to the study of equity in the delivery of services. Conceptually, when the HNG curve lies above the services curves then the need is greater among lower income groups than the proportion of services received by this same group. That is the case for Specialist Care, and only partly for Inpatient Care in Figure 5.1. Contrarily, if the service curve lies above the need curve, then services are distributed inequitably to the advantage of the lowest income groups since their share of utilisation is greater than their share of ill-health. This is clearly the case of Primary Care services here.

When looking into the distribution of utilisation by those that state restriction of activity as a consequence of an Acute episode we find both some similarities and differences with that shown when HNG was used as indicator of need. First, once more, ill-health as measured by Acute, decreases as income raises, although the slope is smoother and the corresponding utilisation of services also diminishes with income. However, the concentration curves plotted in Figure 5.2. point to a fairly inequitable distribution of utilisation of all typed of services to the advantage of the least well-off. Indeed, all services curves in the box lie above the diagonal but also above the illness concentration curve for Acute. This means lower income groups receive proportionally a greater share of the various services than higher income groups do, and these shares of services received are also greater than their respective share of ill-health (Acute). According to the concentration curves in the diagram, the most equitably distributed service when using this indicator as a proxy to need is Specialist care, followed by inpatient care and primary care, in that order.

The results displayed in Figure 5.3 show utilisation and illness distribution of those that stated Limiting Chronic conditions. The yellow line in the concentration box identifies how Limcro is distributed across groups of income. The rest of curves in the diagram reveal the distribution of the utilisation of the various types of care made by those that affirm Limcro.

The resulting picture allows for a pattern of primary care services being used substantially more by lower income groups. Middle income groups (group-c) seem to use inpatient care facilities much more than the rest of income groups. The concentration curves identify primary care services as being clearly inequitably distributed to the advantage of the least well-off, while the other two types of care remain fairly equitably distributed, slightly favouring the better-off.

**Figure 5.2.**
**Unstandardised utilisation of services by ACUTE in Catalonia: Percentual distribution and concentration curves.**



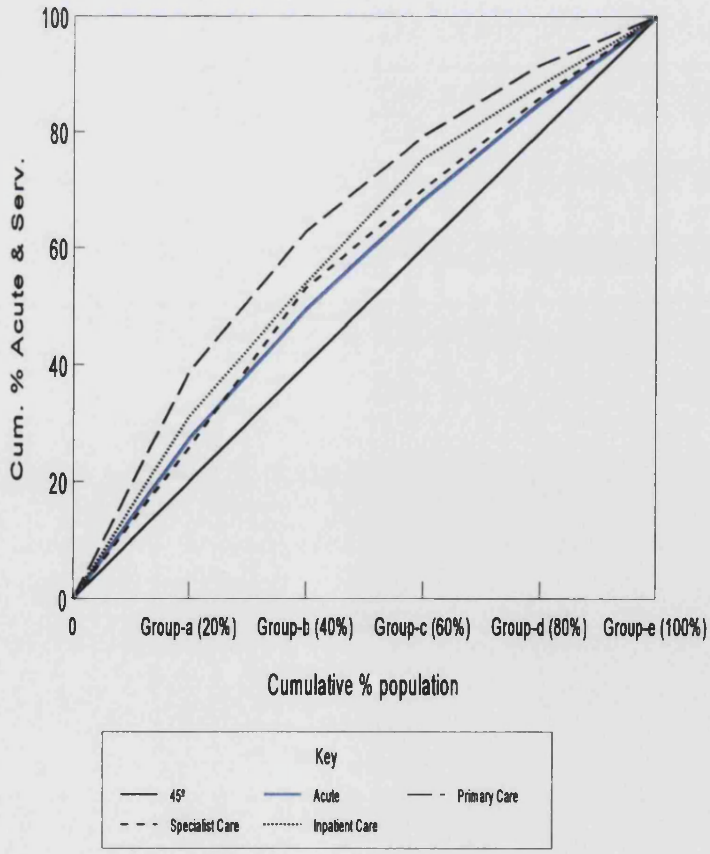


**Figure 5.3.**
**Unstandardised utilisation of services by LIMCRO in Catalonia:**
**Percentual distribution and concentration curves**

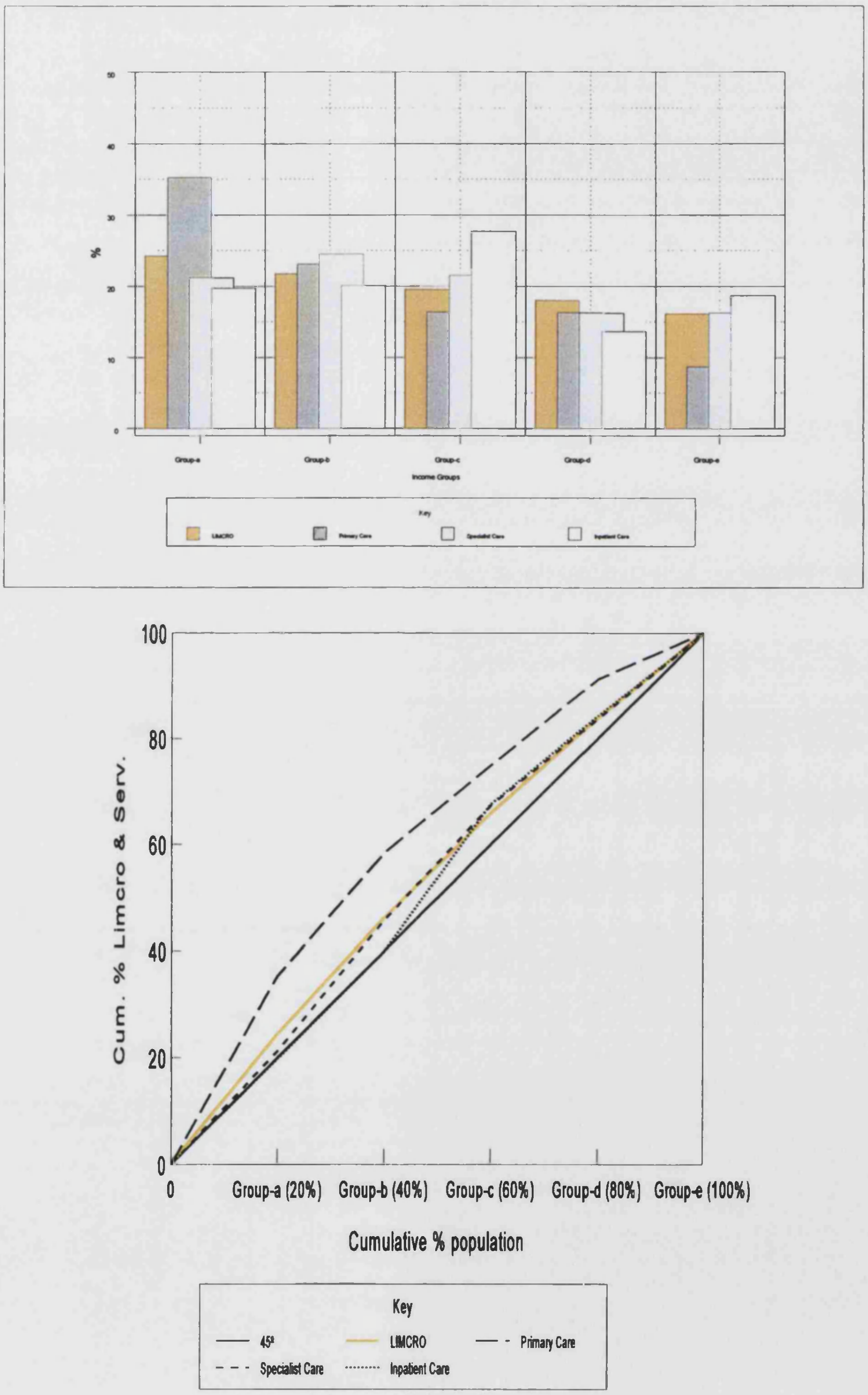
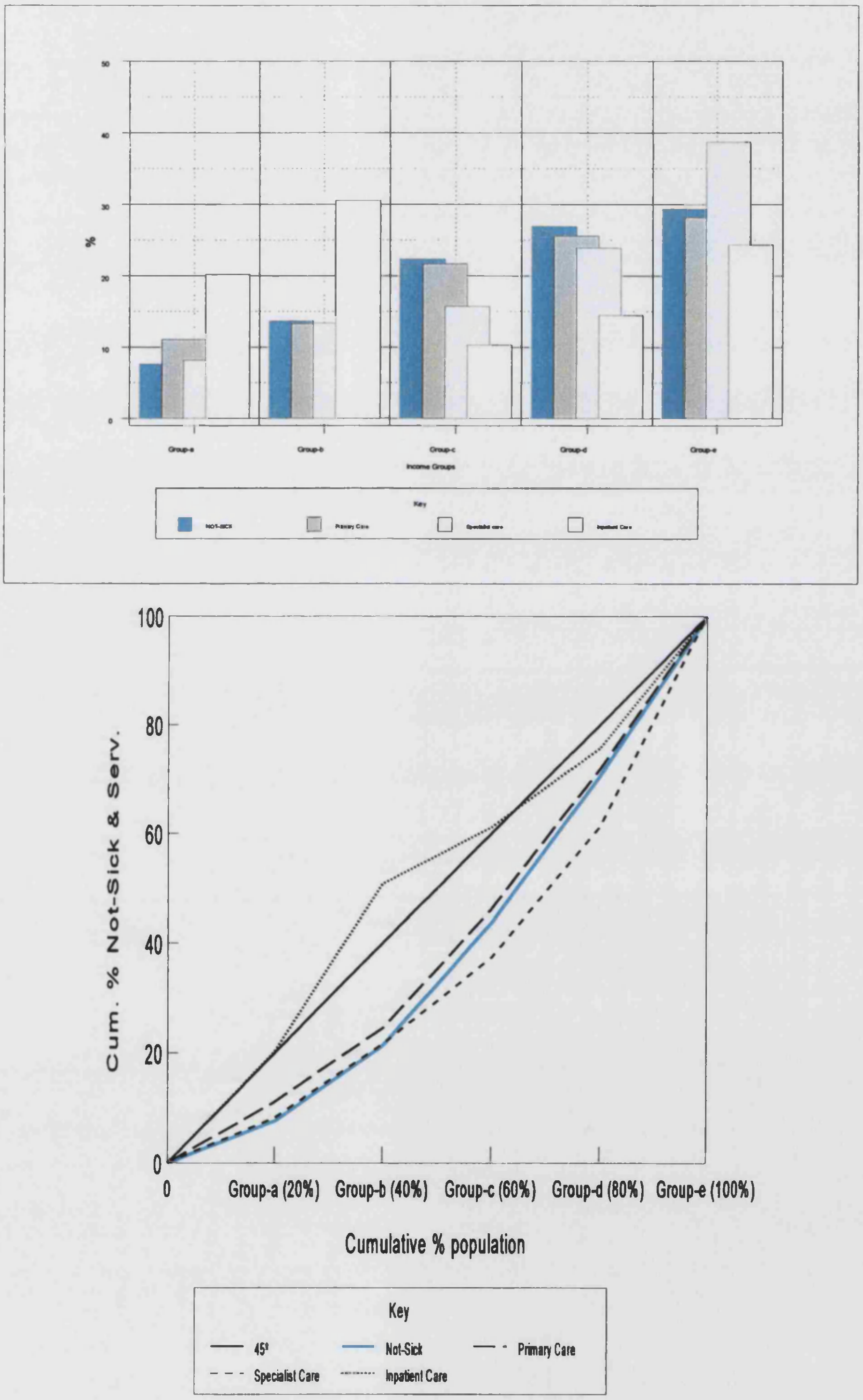


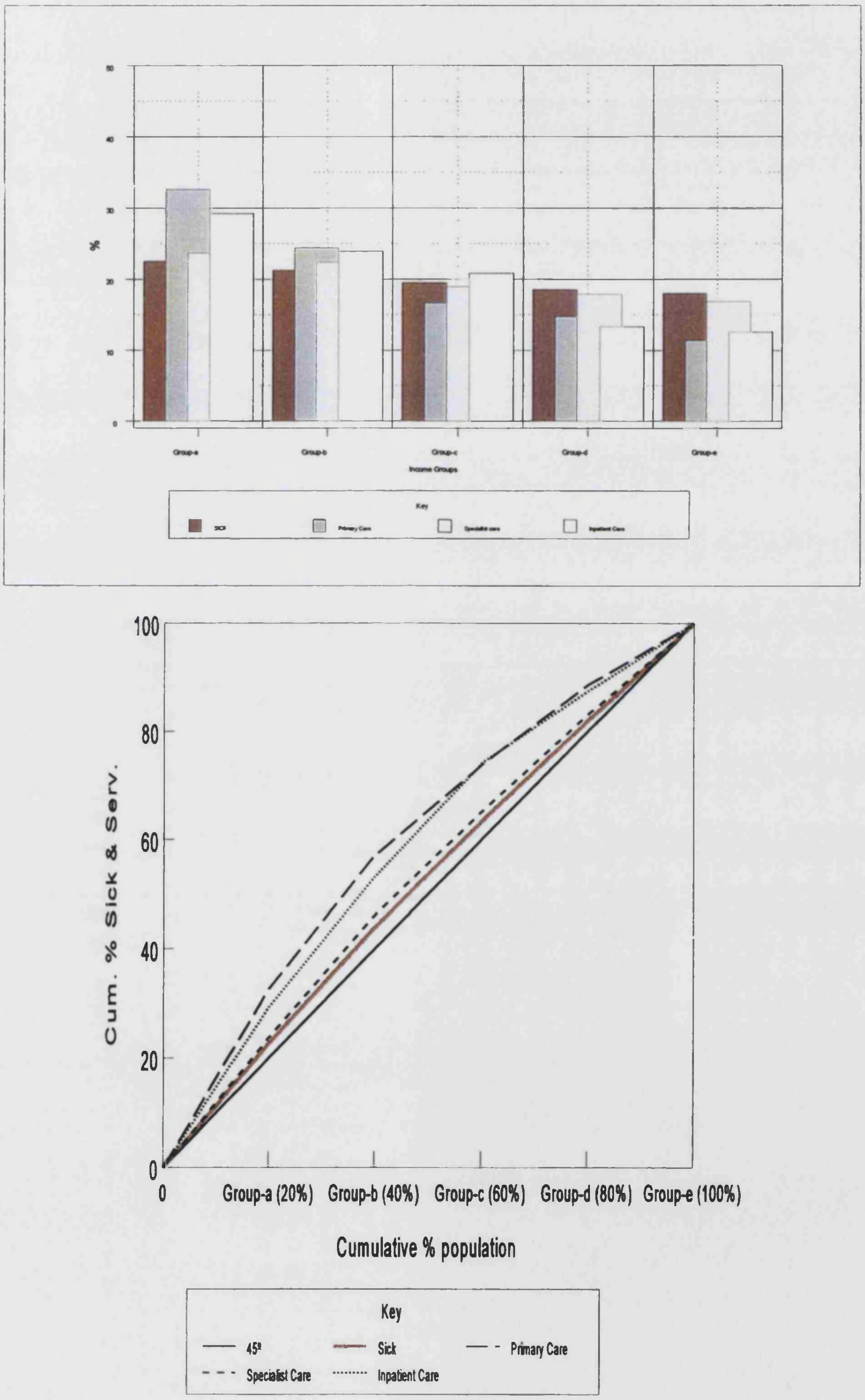
**Figure 5.4.**
**Unstandardised utilisation of services by NOT-SICK in Catalonia: Percentual distribution and concentration curves.**



The Not-Sick indicator displays a completely different picture to what the other indicators have shown up to now. As seen from Figure 5.4, those that state Not-Sick are more numerous in higher income groups than in the lower strata. The pattern of utilisation follows also a similar trend, concentrating in the upper income groups. However, some relevant points must be made in this respect. First, while the distribution of primary care and specialist care are within the trend of the indicator, the distribution of inpatient care is rather irregular. Indeed, the two bottom income groups account for over 50% of total inpatient care utilisation of those that said they were not-sick. Second, the utilisation of inpatient care, from income group-c onwards, clearly increases with income. The concentration curves allow for a clearer identification of these two remarks. Indeed, the inpatient care concentration curve cleanly separates from the rest of services concentration curves, crossing the diagonal once, but overall to the advantage of the least well-off. We refer to a population that do not report neither suffering form acute nor chronic conditions but visit the hospital facilities proportionally more than the rest. This could be the effect of maternity as a whole, or also the case of other services provided at the inpatient care level such as accidents. The other two services concentration curves, primary and specialist care, follow a similar path to each other, both favouring the better-off overall. This reinforces the idea that those that say Not-Sick use these two types of services proportionally to the number of people stating Not-Sick.

As illustrated in Figure 5.5, the sick indicator shows the smoother picture of all. Both illness and utilisation of services decrease as income raises. The resulting concentration curves for utilisation of services all lie above the diagonal. When compared with the illness concentration curve, the utilisation of the different services are to the advantage of the least well-off groups of income. According to the diagram, the distribution of specialist care is the closest to the distribution of illness (Sick). The other two types of care clearly lie above the Sick curve disclosing inequity to the advantage of the worse-off.

**Figure 5.5.**
**Unstandardised utilisation of services by SICK in Catalonia: Percentual distribution and concentration curves.**



Figures 5.6, 5.7. and 5.8 illustrate the grey columns in Tables 5.2, 5.3, and 5.4. They show for each indicator of need the percentage of individuals within each income group that said that used primary, specialist and inpatient care facilities, respectively.

For instance, Figure 5.6. shows that over 90% of those that said their health was not good in income group-a used primary care services. The graph indicates that this percentage decreases slightly when moving towards higher income groups, not only for HNG as indicator but also for the rest of ill-health indicators. This suggests that lower income groups seem to use primary care more often than upper income groups since the number of individuals that did so being in similar need, i.e. same need indicator, decreases in number as we move towards higher income groups.

As regards specialist care utilisation, Figure 5.7. shows the oppossite picture. Indeed, the percentage of people in each need indicator that used specialist care increases with income. Consequently, the picture is that of upper income groups using specialist care more often given their need. This is the case for all ill-health indicators explored exception made of Acute. Finally, Inpatient care displays quite an blurred picture.

**Figure 5.6.**
**Utilisation of Primary Care as a percentage of population in need.**

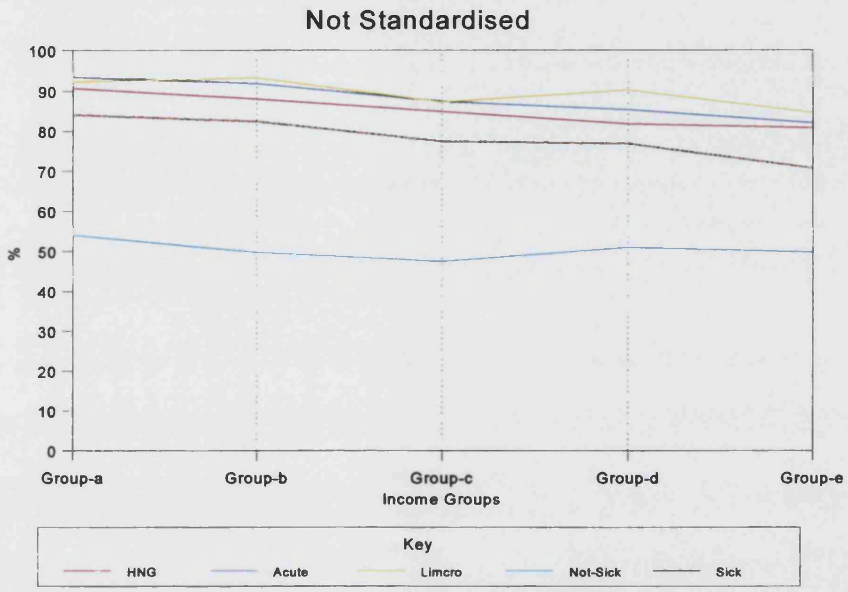



**Figure 5.7.**
**Utilisation of Specialist Care as a percentage of population in need.**

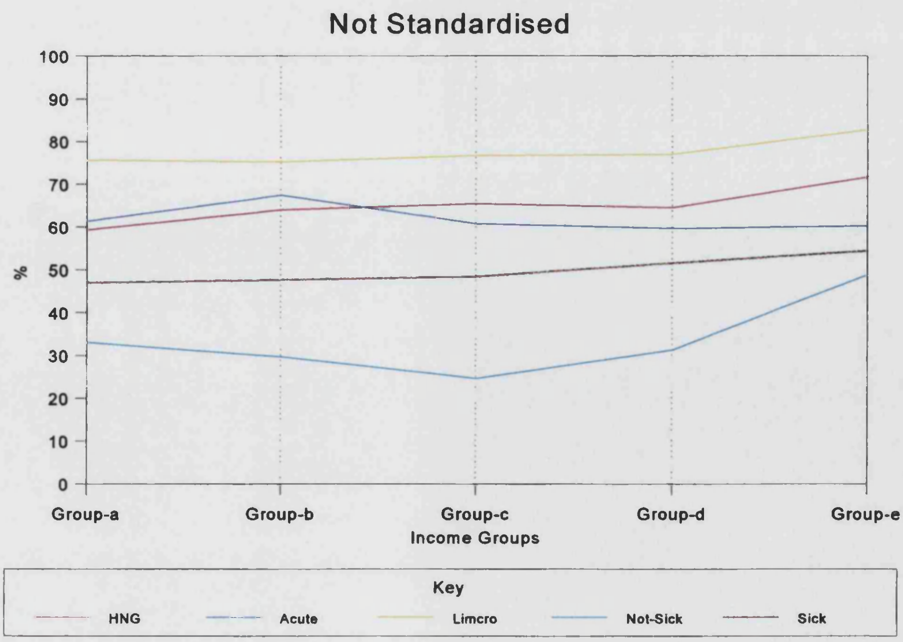
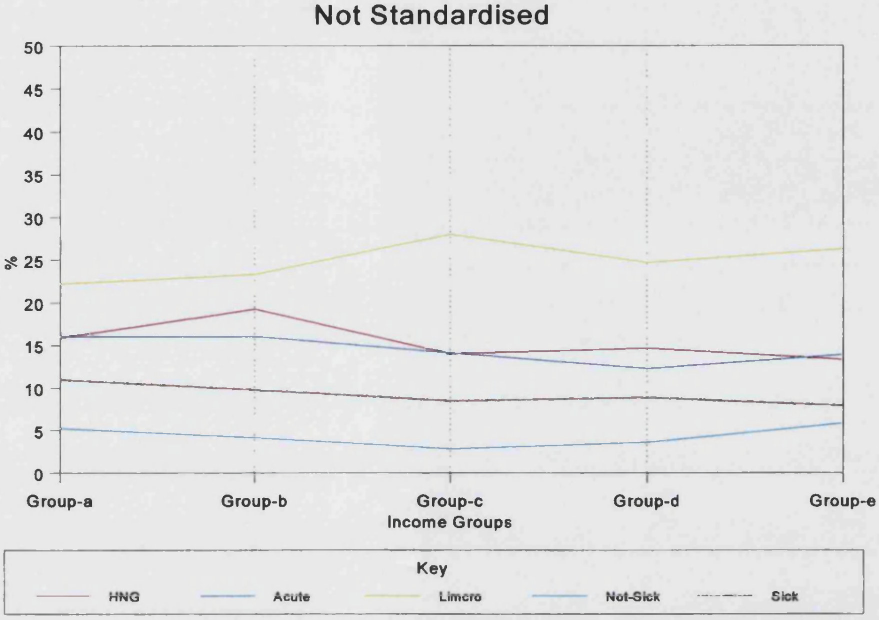


**Figure 5.8.**
**Utilisation of Inpatient Care as a percentage of population in need.**




An additional comment must be made. It has become clear that when looking into the Not-Sick indicator of need we find that people within all income groups use services of the three kinds. That is, despite explicitly stating their health status is good in general term, i.e. no acute nor limiting chronic conditions, they still make use of health care services, particularly primary and specialist care. In the case of primary care the percentage of people decreases slightly with income, quite the opposite to what happens at specialist care level.

To sum up, we have explored how morbidity and the utilisation of services are distributed across income groups in Catalonia. Unstandardised results overall point to inequalities to the advantage of the least priviledge groups in the way services are distributed when need is considered. In addition, some patterns seem to emerge. Lower income groups are greater users of primary care services, in relation to their share of ill-health, than higher income groups. Specialist care seems to allow for an opposite pattern since utilisation of such services favours the upper income groups. Inpatient care services shows an unclear picture as regards which income groups use this type of services in greater proportion given their needs.

We now need to know whether, overall, the utilisation of services favours the better-off or the worse-off. Further, we should allow for a standardisation of these utilisation results by age and gender across income groups. These issues are dealt with in the coming section, where an aggregate measure of utilisation is proposed, namely expenditure, and the standardisation of utilisation, and hence expenditure, is performed.

## 5.2. The standardisation of utilisation and expenditures.

The translation of utilisation into expenditures is a necessary step so as to assess whether individuals in equal need really receive equal health care services, i.e. treatment. The way proposed here is to consider treatment to be expenditure resulting from the utilisation of the various types of health care services, i.e. primary care, inpatient care and specialist care. The expenditure per visit or per day to each type of care in Catalonia in 1994 is shown in Table 5.5.

**Table 5.5.**
**Expenditure per visit/day according to type of service.**

| Type of Care | 1994 Spanish Pesetas |
|---|---|
| Inpatient Care | 24,512 (day) |
| Specialist Care | 9,805 (first visit)<br>4,902 (subsequent visits) |
| Primary Care | 3,552 (visit) |

Tables 5.6 and 5.7 present both unstandardised and standardised results of expenditure across income groups according to the various ill-health indicators considered here. Each table is split according to the type of services used (inpatient care, primary care and specialist care). Thus, in each of the cells three sets of figures are ordered vertically. The figure at the top represents the absolute amount of Spanish Pesetas -in thousands- allocated to each category of ill-health, income and service used. The second figure shows for each income group the percentage distribution of expenditure resulting from the utilisation of each type of care. Finally, the third figure represents the percentage of the total utilisation of the service allocated to each income group and category of ill-health.

Figures 5.9 to 5.13 are graphical representations of the data in Tables 5.6 and 5.7. They compare patterns of utilisation across income groups and for each category of need, that is how the total amount of expenditure allocated to, for example, HNG and income group-a, is distributed across the types of services used. Each figure exhibits both unstandardised and standardised results.

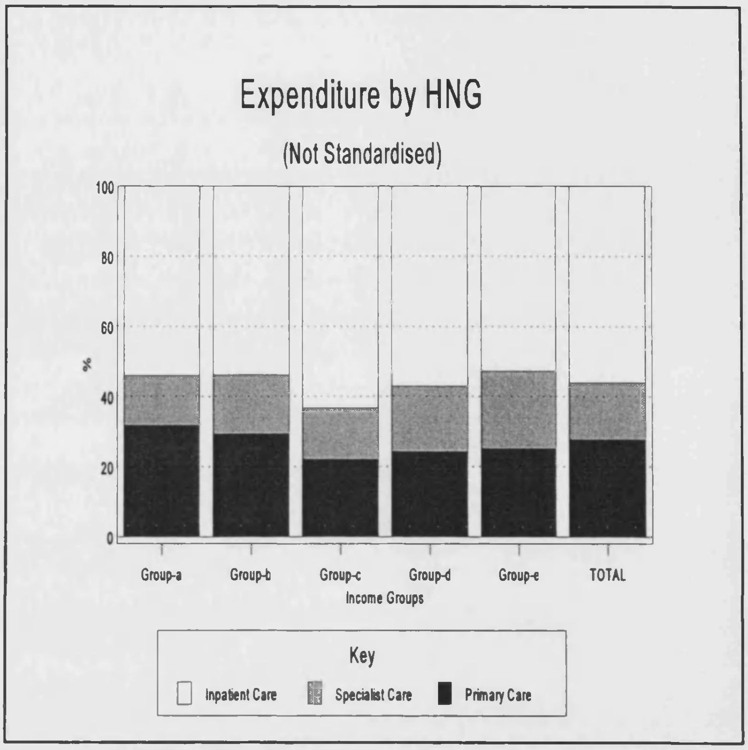
## Table 5.6.
## Unstandardised results of expenditure according to need indicators in Catalonia (In thousands of Pesetas).

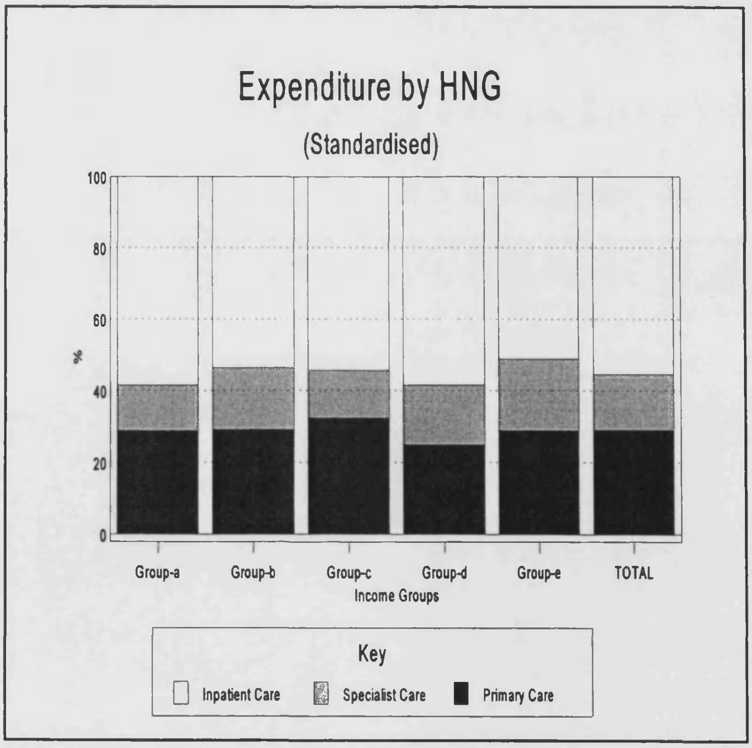
| INCOME GROUPS | HNG | | | | ACUTE | | | | LIMCRO | | | | NOT SICK | | | | SICK | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PC | ESP | IP | TOT | PC | ESP | IP | TOT | PC | ESP | IP | TOT | PC | ESP | IP | TOT | PC | ESP | IP | TOT |
| *Group-a* | 34707 | 15310 | 58706 | 108722 | 13293 | 5142 | 17502 | 35037 | 10387 | 4991 | 18703 | 34083 | 718 | 784 | 2255 | 3757 | 51476 | 22629 | 77261 | 151366 |
| *[%]* | [31.92] | [14.08] | [54.00] | [100.0] | [37.94] | [14.68] | [47.38] | [100.0] | [30.47] | [14.64] | [54.89] | [100.0] | [19.11] | [20.87] | [60.02] | [100.0] | [34.01] | [14.95] | [51.04] | [100.0] |
| *(%)* | (39.44) | (30.22) | (33.16) | (34.44) | (40.81) | (25.85) | (30.58) | (32.20) | (34.74) | (21.43) | (19.42) | (22.80) | (11.02) | (8.10) | (20.22) | (13.74) | (32.65) | (23.21) | (29.26) | (29.15) |
| *Group-b* | 23383 | 13226 | 42724 | 79333 | 7647 | 5466 | 13212 | 26325 | 6948 | 5540 | 19463 | 31951 | 934 | 1280 | 3407 | 5621 | 38532 | 21462 | 63167 | 123161 |
| *[%]* | [29.47] | [16.67] | [53.86] | [100.0] | [29.05] | [20.76] | [50.19] | [100.0] | [21.74] | [17.34] | [60.92] | [100.0] | [16.61] | [22.77] | [60.62] | [100.0] | [31.28] | [17.42] | [51.30] | [100.0] |
| *(%)* | (26.57) | (26.11) | (24.13) | (25.13) | (23.48) | (27.48) | (23.08) | (24.20) | (23.24) | (23.79) | (20.21) | (21.37) | (14.34) | (13.23) | (30.55) | (20.56) | (24.34) | (22.01) | (23.92) | (23.72) |
| *Group-c* | 13860 | 9221 | 39612 | 62692 | 5204 | 3353 | 12305 | 20862 | 4930 | 5137 | 26816 | 36883 | 1407 | 1578 | 1152 | 4137 | 26320 | 18525 | 55078 | 99924 |
| *[%]* | [22.11] | [14.71] | [63.18] | [100.0] | [24.95] | [16.07] | [58.98] | [100.0] | [13.36] | [13.93] | [72.71] | [100.0] | [34.01] | [38.14] | [27.85] | [100.0] | [26.34] | [18.54] | [55.12] | [100.0] |
| *(%)* | (15.75) | (18.20) | (22.38) | (19.86) | (15.98) | (16.86) | (21.50) | (19.17) | (16.49) | (22.06) | (27.84) | (24.67) | (21.60) | (16.31) | (10.33) | (15.13) | (16.69) | (19.00) | (20.86) | (19.25) |
| *Group-d* | 9690 | 7397 | 22723 | 39809 | 3825 | 3157 | 7378 | 14360 | 4895 | 3819 | 13212 | 21926 | 1627 | 2348 | 1618 | 5593 | 23266 | 17771 | 35248 | 76285 |
| *[%]* | [24.34] | [18.58] | [57.08] | [100.0] | [26.63] | [21.98] | [51.39] | [100.0] | [22.32] | [17.42] | [60.26] | [100.0] | [29.09] | [41.98] | [28.93] | [100.0] | [30.50] | [23.29] | [46.21] | [100.0] |
| *(%)* | (11.01) | (14.60) | (12.84) | (12.61) | (11.74) | (15.87) | (12.90) | (13.20) | (16.37) | (16.40) | (13.72) | (14.67) | (24..97) | (24.27) | (14.50) | (20.45) | (14.75) | (18.23) | (13.35) | (14.69) |
| *Group-e* | 6358 | 5505 | 13261 | 25124 | 2600 | 2770 | 6839 | 12209 | 2735 | 3799 | 18114 | 29648 | 1829 | 3686 | 2721 | 8236 | 18055 | 17094 | 33287 | 68436 |
| *[%]* | [25.31] | [21.91] | [52.78] | [100.0] | [21.29] | [22.69] | [56.02] | [100.0] | [9.22] | [12.81] | [77.97] | [100.0] | [22.21] | [44.75] | [33.04] | [100.0] | [26.38] | [24.98] | [51.36] | [100.0] |
| *(%)* | (7.23) | (10.87) | (7.49) | (7.96) | (7.98) | (11.91) | (19.94) | (11.23) | (9.15) | (16.31) | (18.81) | (16.48) | (28.07) | (38.09) | (24.40) | (30.12) | (11.45) | (17.53) | (12.60) | (13.18) |
| TOTAL | 87998 | 50659 | 177026 | 315680 | 32569 | 19888 | 57236 | 108793 | 29895 | 23286 | 96308 | 149491 | 6515 | 9676 | 11153 | 27344 | 157670 | 97481 | 264041 | 519172 |
| *[%]* | [22.87] | [16.05] | [56.08] | [100.0] | [29.94] | [18.28] | [51.78] | [100.0] | [20.00] | [15.58] | [64.42] | [100.0] | [23.83] | [35.39] | [40.78] | [100.0] | [30.37] | [18.77] | [50.86] | [100.0] |
| *(%)* | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) |

## Table 5.7.
**Standardised results of expenditure according to need indicators in Catalonia** (In thousands of Pesetas).

| INCOME GROUPS | HNG | | | | ACUTE | | | | LIMCRO | | | | NOT-SICK | | | | SICK | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PC | ESP | IP | TOT | PC | ESP | IP | TOT | PC | ESP | IP | TOT | PC | ESP | IP | TOT | PC | ESP | IP | TOT |
| *Group-a* | 25239 | 10980 | 50976 | 87195 | 9930 | 4728 | 15205 | 29863 | 6674 | 4166 | 10489 | 21329 | 1105 | 1372 | 5237 | 7714 | 41017 | 21965 | 73419 | 136401 |
| *[%]* | [28.95] | [12.59] | [58.46] | [100.0] | [33.25] | [15.83] | [49.08] | [100.0] | [31.29] | [19.53] | [49.18] | [100.0] | [14.32] | [17.78] | [67.90] | [100.0] | [30.07] | [16.10] | [53.83] | [100.0] |
| *(%)* | (25.09) | (20.66) | (26.74) | (25.32) | (32.44) | (23.48) | (27.39) | (28.10) | (23.19) | (17.74) | (10.52) | (14.03) | (16.81) | (13.91) | (37.16) | (25.26) | (25.42) | (26.14) | (25.25) | (24.56) |
| *Group-b* | 20382 | 11984 | 37242 | 69608 | 6900 | 4992 | 12492 | 24384 | 6599 | 5649 | 19981 | 32229 | 1080 | 1536 | 3969 | 6585 | 34600 | 20652 | 57380 | 112632 |
| *[%]* | [29.28] | [17.21] | [53.51] | [100.0] | [28.30] | [20.47] | [48.77] | [100.0] | [20.47] | [17.53] | [62.00] | [100.0] | [16.55] | [23.32] | [60.13] | [100.0] | [30.72] | [18.34] | [50.94] | [100.0] |
| *(%)* | (20.27) | (22.55) | (19.54) | (20.21) | (22.54) | (24.79) | (22.50) | (22.95) | (22.93) | (24.09) | (20.03) | (21.20) | (16.42) | (15.57) | (28.16) | (21.57) | (21.44) | (24.57) | (19.73) | (20.28) |
| *Group-c* | 26322 | 10754 | 44086 | 81162 | 5543 | 3353 | 13098 | 21994 | 5308 | 5436 | 27915 | 38659 | 1365 | 1564 | 1150 | 4079 | 28103 | 19192 | 59346 | 106641 |
| *[%]* | [32.44] | [13.25] | [54.31] | [100.0] | [25.20] | [15.24] | [59.56] | [100.0] | [13.73] | [14.06] | [72.21] | [100.0] | [33.46] | [38.34] | [28.20] | [100.0] | [26.35] | [18.00] | [55.65] | [100.0] |
| *(%)* | (26.16) | (20.24) | (23.13) | (23.57) | (18.11) | (16.66) | (23.59) | (20.70) | (14.45) | (23.15) | (27.98) | (25.43) | (20.76) | (15.85) | (8.16) | (13.36) | (17.42) | (22.84) | (20.41) | (19.20) |
| *Group-d* | 13696 | 9201 | 32013 | 54910 | 4376 | 3599 | 6850 | 14825 | 4873 | 3758 | 13497 | 22128 | 1389 | 2016 | 1326 | 4731 | 29001 | 19202 | 44716 | 92919 |
| *[%]* | [24.94] | [16.76] | [58.30] | [100.0] | [29.52] | [24.27] | [46.21] | [100.0] | [22.02] | [16.98] | [61.00] | [100.0] | [29.36] | [42.61] | [28.03] | [100.0] | [31.21] | [20.66] | [48.13] | [100.0] |
| *(%)* | (13.62) | (17.32) | (16.79) | (15.95) | (14.29) | (17.88) | (12.34) | (13.95) | (16.94) | (16.01) | (13.53) | (14.56) | (21.12) | (20.43) | (9.41) | (15.49) | (17.98) | (22.85) | (15.37) | (16.73) |
| *Group-e* | 14493 | 10222 | 26309 | 51473 | 3862 | 3460 | 7869 | 15191 | 5319 | 4468 | 27870 | 37657 | 1636 | 3378 | 2411 | 7425 | 28599 | 22218 | 55941 | 106758 |
| *[%]* | [28.16] | [19.86] | [51.48] | [100.0] | [25.42] | [22.78] | [51.80] | [100.0] | [14.12] | [11.86] | [74.02] | [100.0] | [22.03] | [45.49] | [32.48] | [100.0] | [26.79] | [20.81] | [52.40] | [100.0] |
| *(%)* | (14.86) | (19.23) | (13.80) | (14,95) | (12.62) | (17.18) | (14.17) | (9.76) | (18.49) | (19.03) | (27.94) | (24.77) | (24.88) | (34.24) | (17.11) | (24.32) | (17.73) | (26.44) | (19.24) | (19.22) |
| TOTAL | 100582 | 53141 | 190625 | 344348 | 30611 | 20132 | 55514 | 106257 | 28773 | 23477 | 99752 | 152002 | 6575 | 9866 | 14093 | 30534 | 161320 | 84027 | 290802 | 555351 |
| *[%]* | [29.21] | [15.43] | [53.36] | [100.0] | [28.81] | [18.95] | [52.24] | [100.0] | [18.93] | [15.44] | [65.63] | [100.0] | [21.53] | [32.31] | [46.16] | [100.0] | [29.05] | [15.13] | [55.82] | [100.0] |
| *(%)* | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) | (100.0) |

**Figure 5.9.**
**HNG as indicator of need and expenditures by service in Catalonia.**

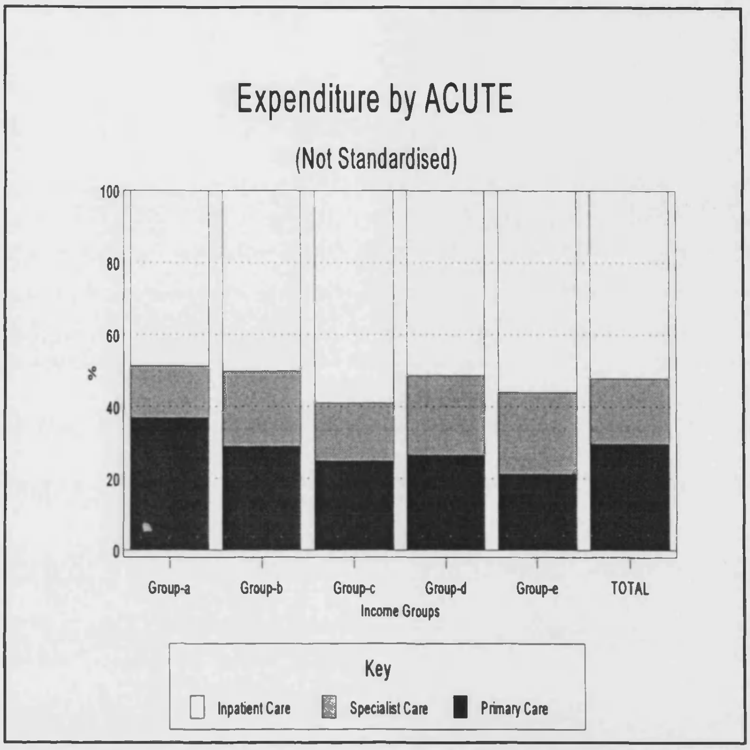


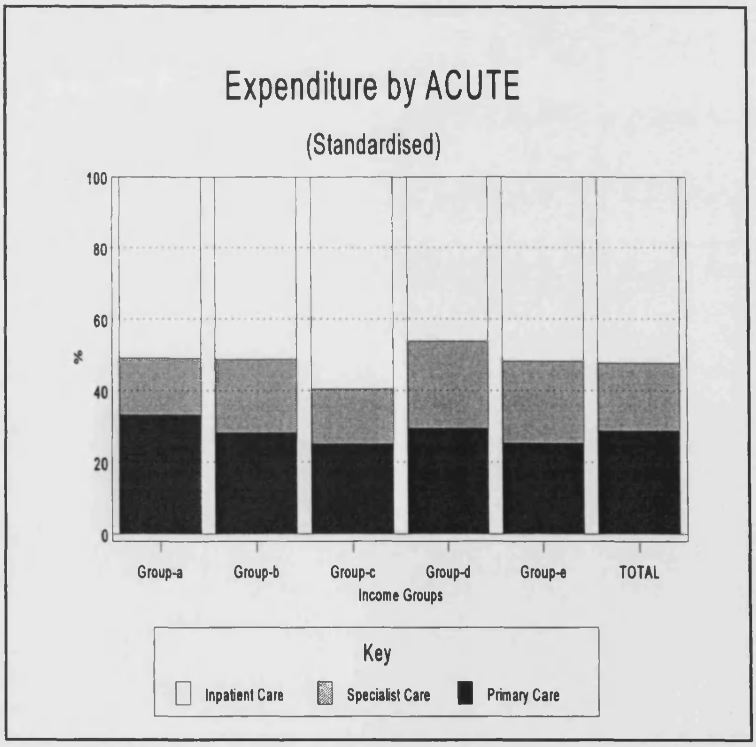



Standardised results from Table 5.7. and Figure 5.9 indicate those individuals within the lowest income group-a receive over 25% of the total expenditure allocated to HNG, while the top income group-e gets approximately 15% of the amount. However, the way the total amount of expenditure is distributed across services is very similar across income groups, ranging form 32% to 25% for primary care, 13% to 20% for specialist care, and 51% to almost 59% for inpatient care. Probably, the greatest differences refer to the use of specialist services for which utilisation is relatively higher among the upper income groups. Overall, however, income groups distribution of expenditure across services is fairly homogeneous in the case of HNG, specially when standardisation takes place. The resulting general pattern for those in HNG as regards expenditure is that of 29% for primary care, 15% to specialist care, and over 55% to inpatient care.

As regards Acute, the differences among income groups are more visible, both regarding the total amount of expenditure allocated to each group and how this total amount is distributed across services. As regards the first, while lowest income group-a receives over 28% of the total expenditure in Acute, the top income group-e gets less than 10%. The income gradient is of a clear negative sign, that is, the highest the income the smaller the expenditure, similar to how Acute sickness is distributed. Different income groups use the three types of care in rather similar ways, too (see Figure 5.10), although differences across groups are higher than when using HNG. Overall almost 29% is spent in primary care, almost 20% in specialist care, and 52% in inpatient care.

**Figure 5.10.**
**Acute as indicator of need and expenditures by service in Catalonia.**



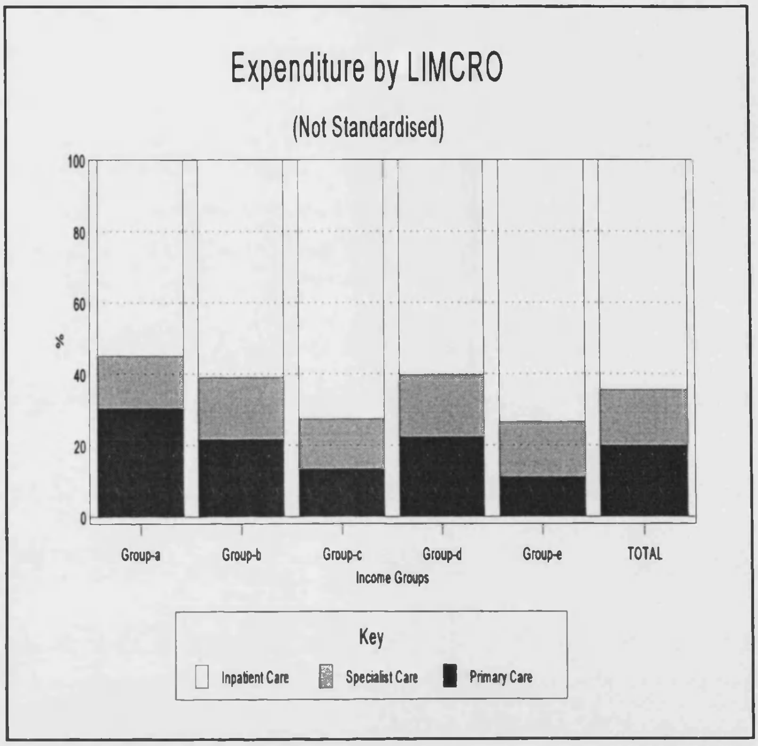



The expenditure allocated to Limcro as ill-health indicator is distributed across income groups in a rather different way than either using HNG or Acute. Indeed, as seen from Table 5.7, expenditure is greater among middle-low and upper income groups primarily as a result of utilisation of inpatient care. While income group-a receives 14% of total expenditure, income group-c, -b and -e get over 20% each. Figure 5.11 also shows differences as regards how this expenditure is divided across types of care. Clearly, income group-a's use of primary and specialist care is the highest of all income groups. That means, that the share of total expenditure in the other income groups is markedly dedicated to inpatient care when limiting chronic is considered as the variable of interest.

Expenditures to the not-sick are distributed to the advantage of lower income groups, and that seem to be because the use of inpatient care services is greater among these groups (see Figure 5.12). The middle and upper income groups use primary and specialist services to a greater degree than lower income groups. These differences between low income groups on one hand, and middle and upper income groups on the other are clearly reflected both in Table 5.7 and Figure 5.12.

**Figure 5.11.**

**Limcro as indicator of need and expenditures by service in Catalonia.**



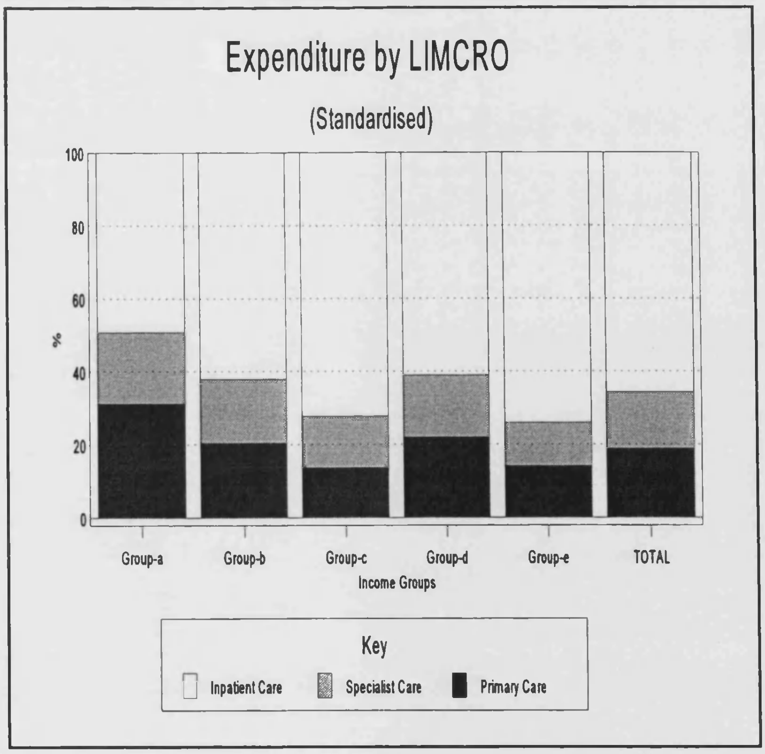
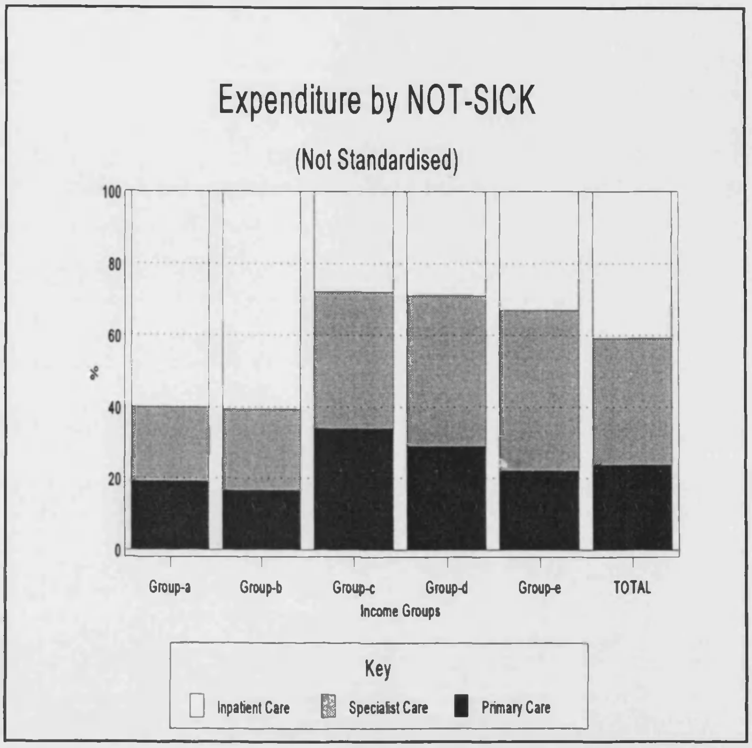



Figure 5.12.

Not-Sick as indicator of need and expenditures by service in Catalonia.



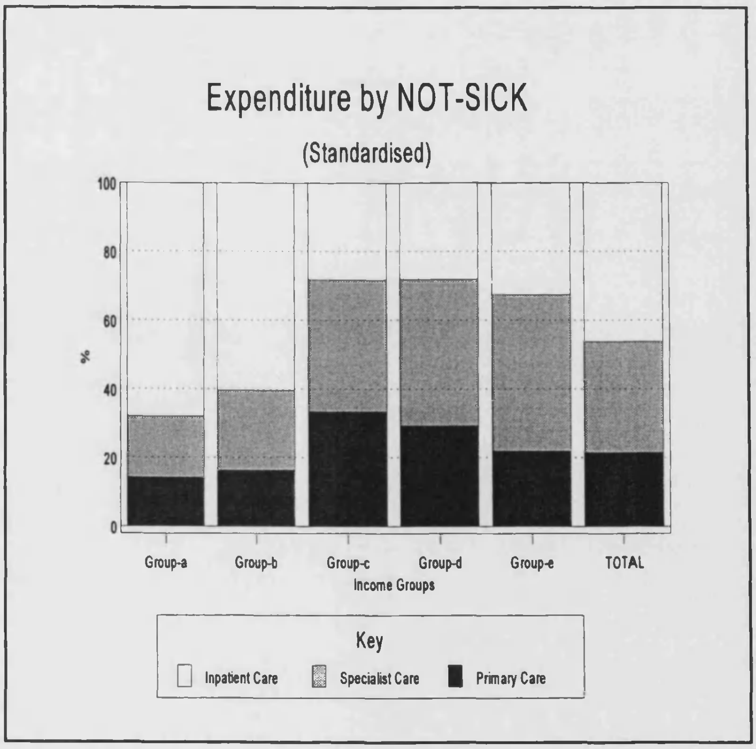
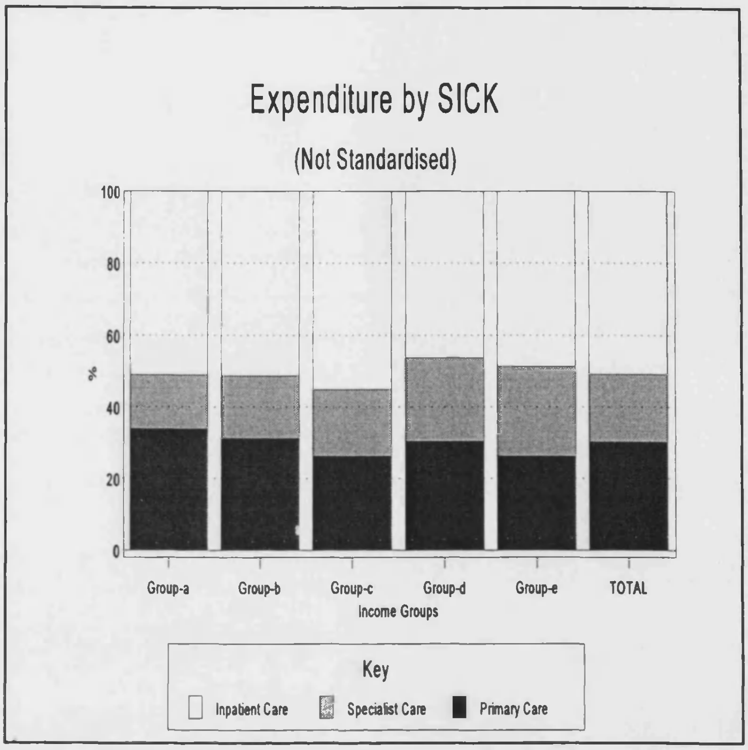
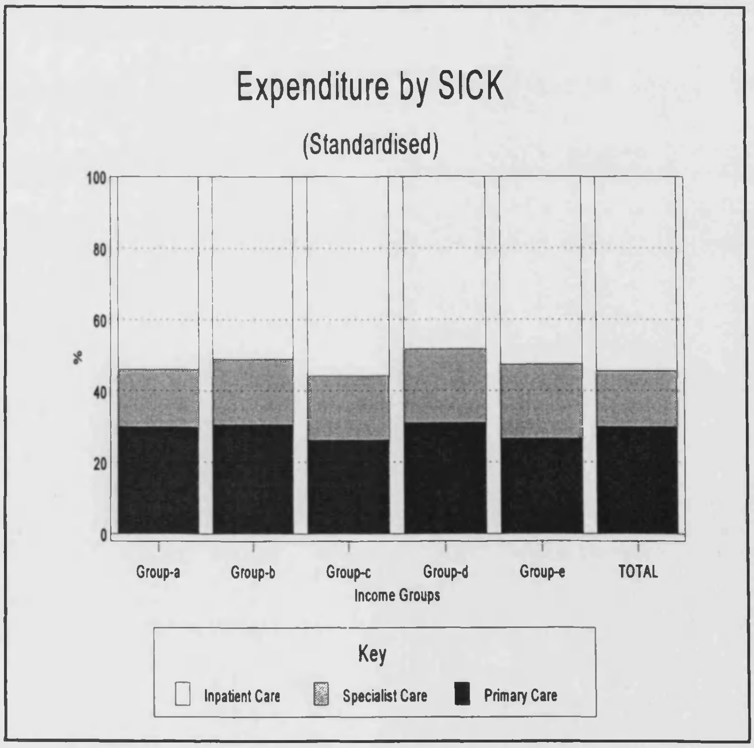



Figure 5.13.
Sick as indicator of need and expenditures by service in Catalonia.



When looking into what happens at the level of the Sick indicator, although the distribution of total expenditure across income groups is once more to the advantage of the least priviledged groups, the use of service across groups is fairly similar (see Figure 5.13).

In brief, only when looking at the Limcro and Not-Sick groups it could be argued that there are remarkable differences across income groups as regards how they use the services offered. The rest of ill-health indicators show quite a similar pattern across income groups. Despite this, the total amount of expenditure assign to each income group tends, overall, to be to the advantage of the least well-off. It is, therefore, mandatory to look into how both expenditures and morbidity are distributed to ascertain the degrees of inequality in the delivery of health care in Catalonia. The way to operationalise this is by means of Le Grand and Collins and Klein use/need ratios.

### 5.3. Le Grand and Collins and Klein use/need ratios.

I hereby illustrate how unstandardised and standardised results of morbidity and utilisation, i.e. expenditure, build up both Le Grand's and Collins and Klein use/need ratios. The Le Grand use/need ratio for each need indicator, is calculated by dividing total expenditure allocated to income group-a on the various types of services, by the total number of persons in income group-a who report a particular kind of morbidity, e.g. HNG. This is done for each income group. Differently, Collins and Klein use/need ratio take account of expenditure allocated to those in income group-a who report HNG divided by the number of those in income group-a who report HNG. This is also done for all ill-health indicators. Table 5.8. accounts for the results of calculating both use/need ratios for Catalonia in the format of expenditure per person in need.

**Table 5.8.**
**Expenditure per person in need: Le Grand and Collins and Klein use/need ratios.**

Le Grand Use/need ratios (in Spanish Pesetas)

| | NEED INDICATORS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| INCOME GROUPS | HNG | | ACUTE | | LIMCRO | | NOT-SICK | | SICK | |
| | Not Standard. | Standard. | Not Standard. | Standard. | Not Standard. | Standard. | Not Standard. | Standard. | Not Standard. | Standard. |
| Group-a | 170,465 | 207,360 | 560,010 | 537,742 | 662,918 | 735,281 | 1,166,338 | 664,124 | 80,751 | 76,413 |
| Group-b | 189,944 | 198,035 | 574,920 | 541,895 | 613,248 | 570,416 | 538,837 | 416,843 | 70,915 | 67,392 |
| Group-c | 217,702 | 227,331 | 544,824 | 605,872 | 550,590 | 593,693 | 266,823 | 315,053 | 62,537 | 70,366 |
| Group-d | 218,339 | 206,013 | 478,814 | 558,000 | 470,559 | 561,207 | 174,206 | 247,843 | 51,657 | 58,825 |
| Group-e | 319,470 | 287,615 | 507,767 | 663,855 | 491,492 | 663,854 | 149,752 | 287,615 | 49,723 | 68,868 |

Collins and Klein Use/need ratios (in Spanish Pesetas)

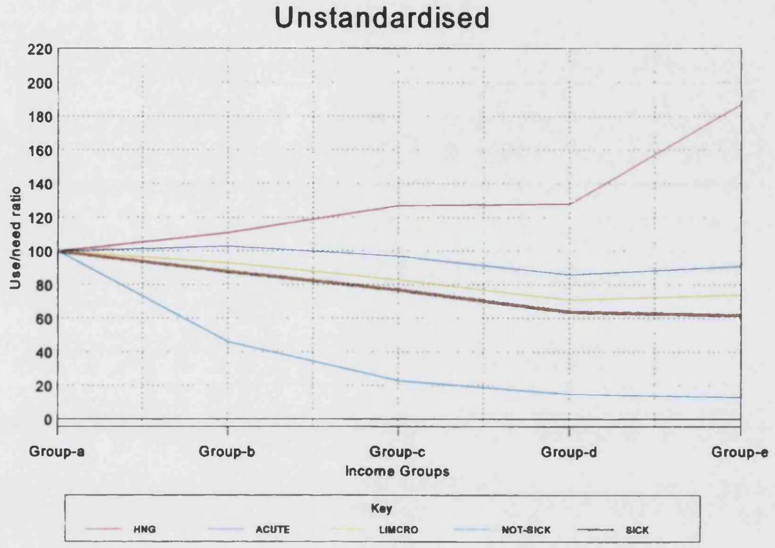
| | NEED INDICATORS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| INCOME GROUPS | HNG | | ACUTE | | LIMCRO | | NOT-SICK | | SICK | |
| | Not Standard. | Standard. | Not Standard. | Standard. | Not Standard. | Standard. | Not Standard. | Standard. | Not Standard. | Standard |
| Group-a | 119,475 | 125,460 | 126,487 | 111,429 | 145,654 | 108,821 | 26,428 | 35,548 | 78,795 | 72,323 |
| Group-b | 117,010 | 115,628 | 117,522 | 110,836 | 152,147 | 154,206 | 23,519 | 23,024 | 67,820 | 63,670 |
| Group-c | 131,155 | 155,781 | 109,225 | 112,789 | 195,148 | 194,266 | 10,607 | 10,877 | 60,050 | 63,514 |
| Group-d | 106,159 | 115,844 | 83,976 | 84,714 | 126,011 | 127172 | 11,900 | 12,007 | 48,129 | 55,975 |
| Group-e | 104,684 | 129,655 | 80,854 | 88,320 | 158,000 | 218,936 | 16,086 | 18,703 | 44,381 | 64,389 |

Figures 5.14 and 5.15 show four graphical displays of the data contained in Table 5.8, accounting for both use/need ratios under unstandardised and standardised scenarios, and taking income group-a as a baseline for comparison (group-a = 100). Unstandardised results of Le Grand use/need ratio show how, when using the different ill-health indicators, the expenditure per person in need varies. When considering HNG as indicator of ill-health the expenditure per person in need increases as income increases. Le Grand use/need ratio when using the rest of ill-health indicators show an opposite trend. Indeed, expenditure by person in need when making use of Acute, Limcro, Sick and Not-sick decrease when moving away from the lowest income groups, showing that inequalities regarding these indicators favour the least well-off.

When standardising by age and gender, differences among Le Grand use/need ratio are much less pronounced. However, we still find HNG and Acute as the two ill-health indicators for which the use/need ratio favours the rich. The other three use/need ratios, resulting from using Limcro, Sick and Not-Sick, still favour the poor, albeit to a smaller degree. Once more the standardisation process acts as a smoothing agent to the use/need ratios under Le Grand's Indices of inequity.

Unstandardised Collins and Klein ratios also show some degree of inequity. When moving towards higher income groups the use/need ratios change, favouring the rich in the case of Limcro, or to the advantage of the worse-off in the case of the rest of indicators. When standardisation is in place, these results change considerably specially regarding the Limcro and the Not-Sick indicators, accentuating their use/need ratios towards favouring the better-off and worse-off respectively. The rest of ill-health indicators under standardisation are smoother, albeit still to the advantage of lower income groups overall (see Figure 5.15).

**Figure 5.14.**
**Le Grand's use need ratios (income group-a = 100).**



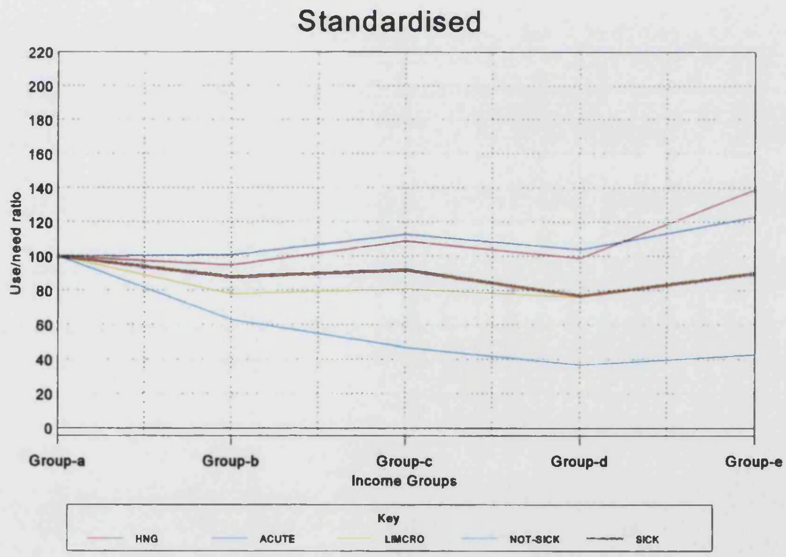
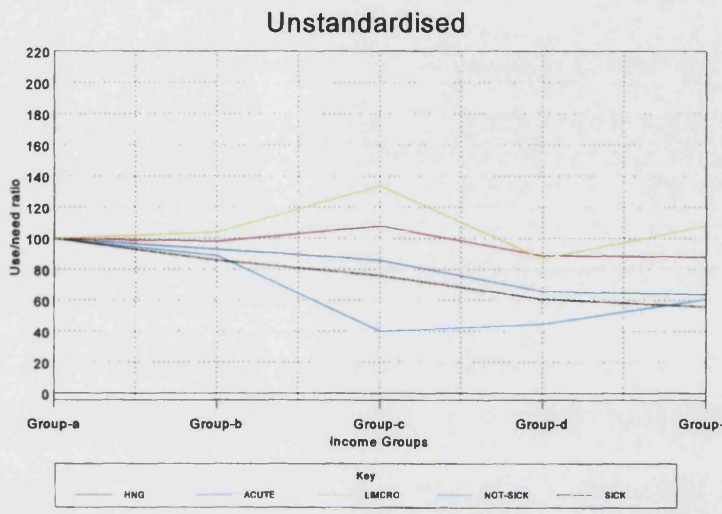
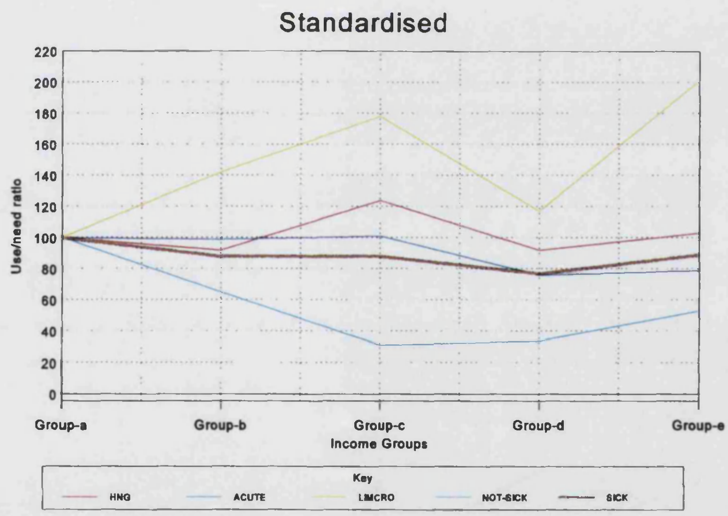



**Figure 5.15.**
**Collins-Klein's use/need ratios (income group-a = 100).**

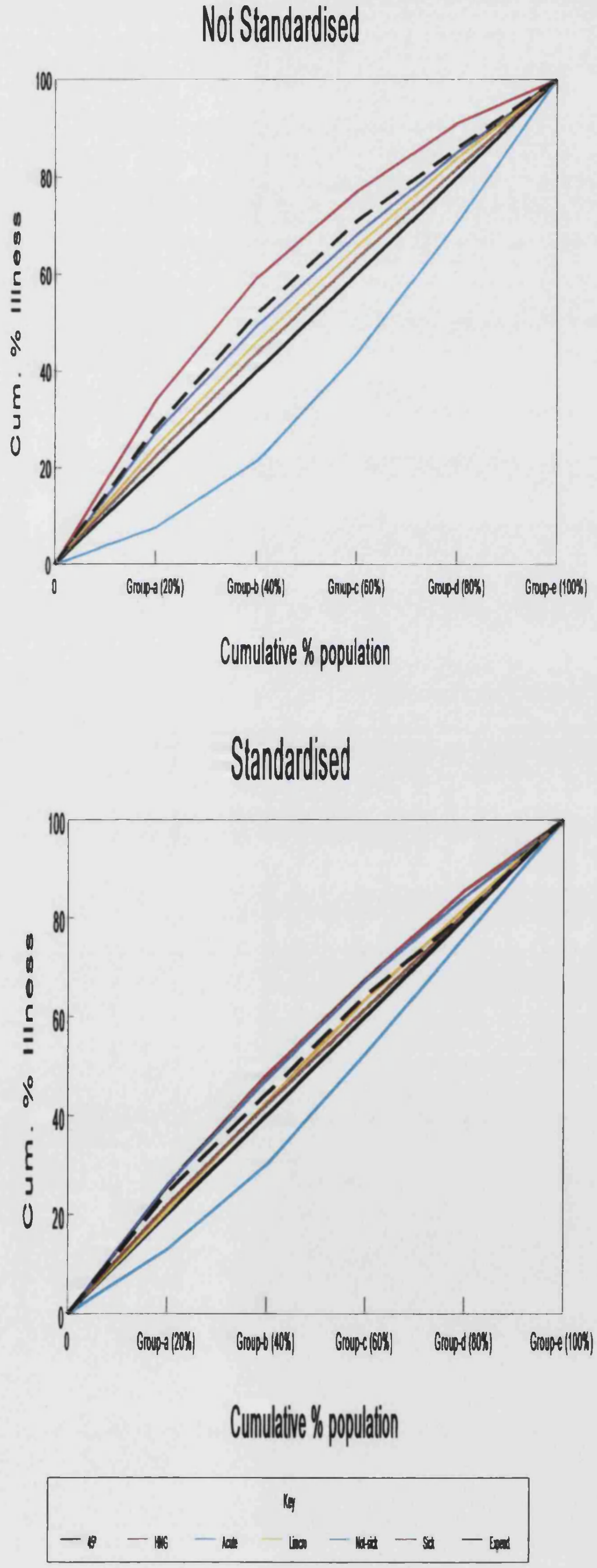


In brief, both Le Grand and Collins and Klein use/need ratios for Sick and Not-Sick under standardisation show inequalities to the advantage of the poorer. Only in the cases of HNG and Acute indicators as regards Le Grand ratio, and the case of Limcro under Collins and Klein's, we find inequalities favouring the better-off. Differently, the Le Grand use/need ratio for Limcro shows inequities to the advantage of the worse-off.

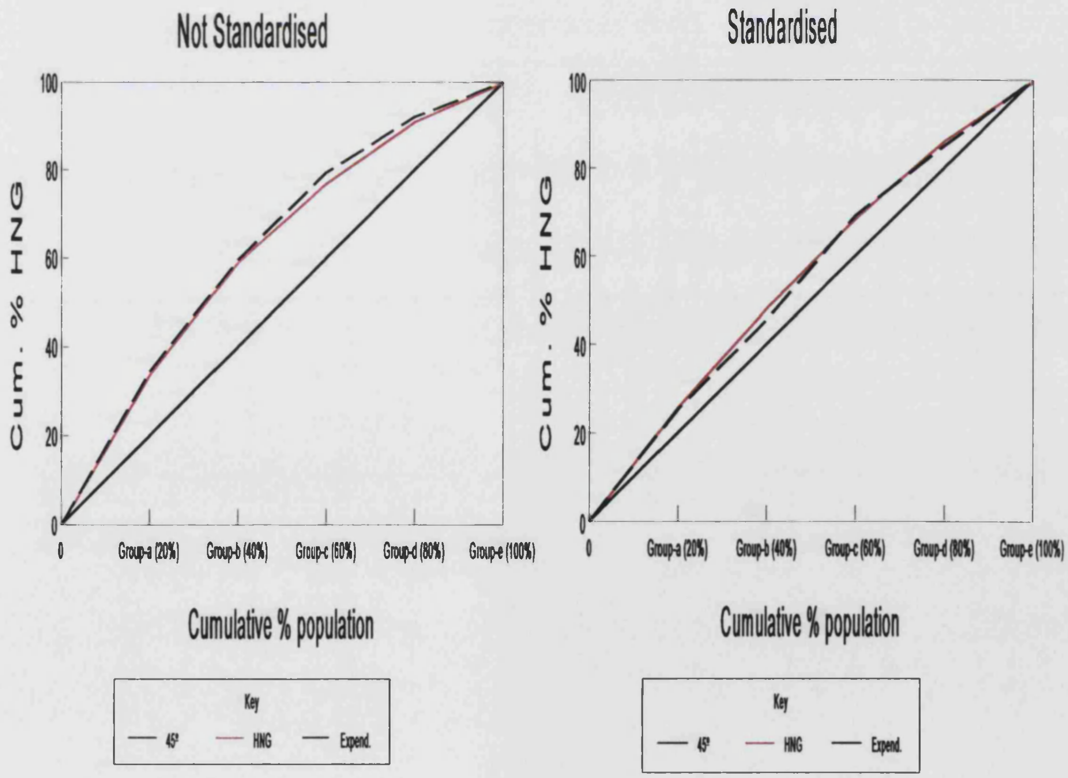
Further, concentration curves and indices allow for a quantification of the magnitude of the disclosed inequalities. As seen from Figure 5.16, unstandardised Le Grand expenditure concentration curve remains above all the illness concentration curves in the box, except for HNG's. This implies that all resulting Le Grand indices ($HI_{LG}$) will be of a negative sign except for HNG. A negative sign points to inequality to the advantage of the least well-off. Standardised results do not alter this picture much. Under this scenario, the index when using Acute changes to a positive sign, meaning the better-off receive a greater share of expenditure than their share of need. The rest of indices, that is for HNG, Limcro, Not-Sick and Sick indicators, keep their positive or negative sign unchanged, although their values are reduced as a consequence of the smoothing effect of standardisation. This is both shown in Figure 5.16, where it can easily be observed how concentration curves move closer to the diagonal when standardised, and Table 5.9, at the end of this chapter, where the exact values of the indices are given.

**Figure 5.16.**
**Concentration curves and Le Grand index of Inequity.**



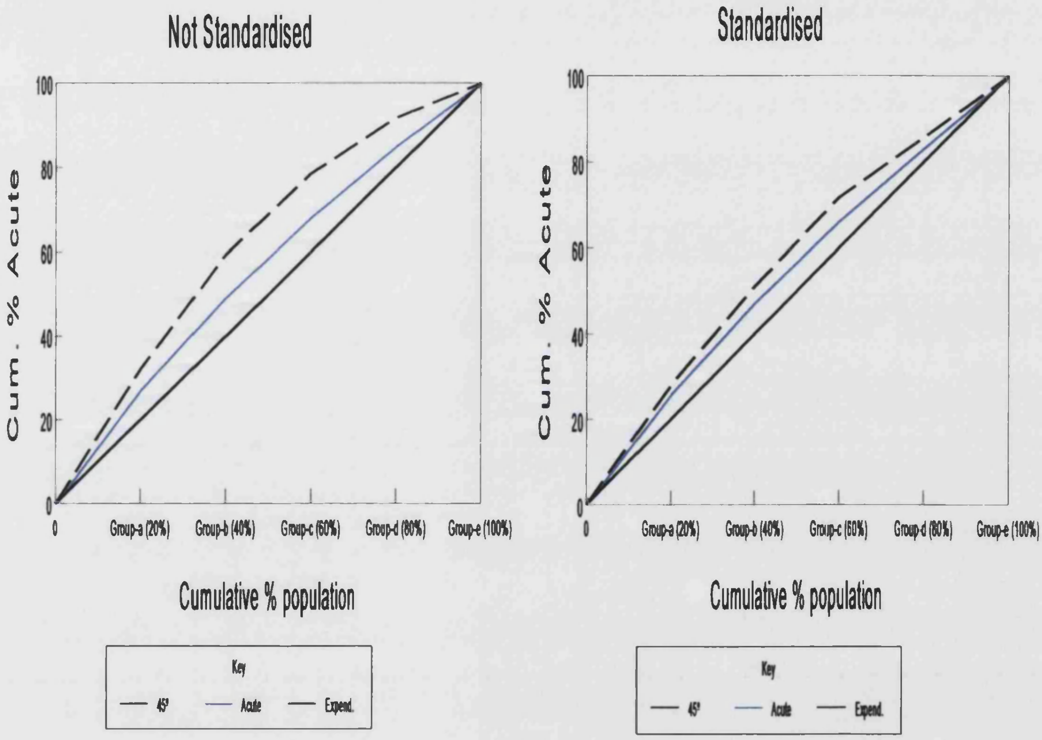
A series of ten graphs (Figures 5.17 to 5.21) are needed to represent all Collins and Kleins need and expenditure concentration curves and resulting indices ($HI_{C-K}$). Each pair of graphs represent standardised and unstandardised results for each need indicator used. When using HNG (see Figure 5.17), the results of the Collins and Klein index point to a very small degree of inequity, that is, HNG and expenditure concentration curves almost overlap. Differences should be noted when reporting standardised results for this need indicator, since the index changes its sign from negative to positive once standardised for age and gender. This change, although important regarding the sign, does not imply a huge alteration in the value. Both standardised and unstandardised indices are very close to proportionality and, thus, to equity.

**Figure 5.17.**
**HNG and expenditure concentration curves under Collins and Klein.**



The Collins and Klein index when using Acute as indicator of need shows inequalities to the advantage of the worse-off, both under unstandardised and standardised scenarios. Once more, Figure 5.18 shows the smoothing effect of standardisation by age and gender on both distributions.

**Figure 5.18.**
**Acute and expenditure concentration curves under Collins and Klein.**




Limcro is the other Collins and Klein index that favours the highest income group, although differences between standardised and unstandardised are very small (see Figure 5.19). The other two indices resulting from using Sick and Not-Sick both show inequalities to the advantage of the worse-off groups, albeit to different degrees (see Figures 5.20 and 5.21, respectively).

Figure 5.19.
Limcro and Expenditure Concentration curves under Collins- Klein.

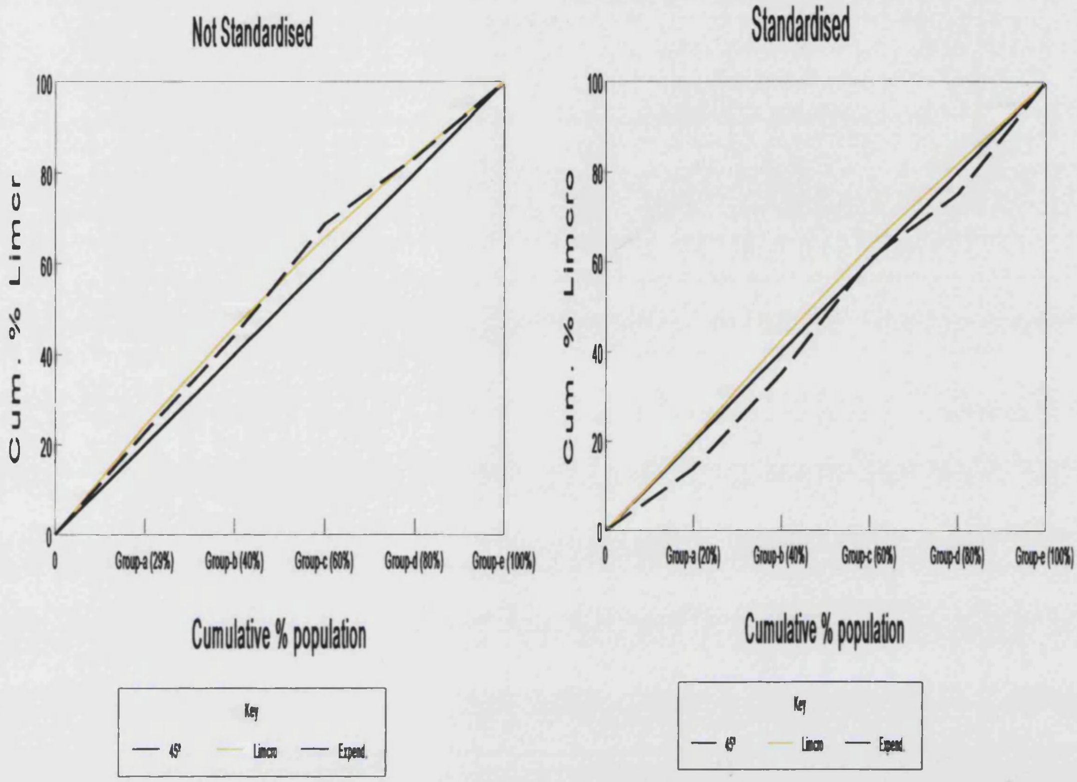



Figure 5.20.
Not-Sick and Expenditure Concentration curves under Collins-Klein.

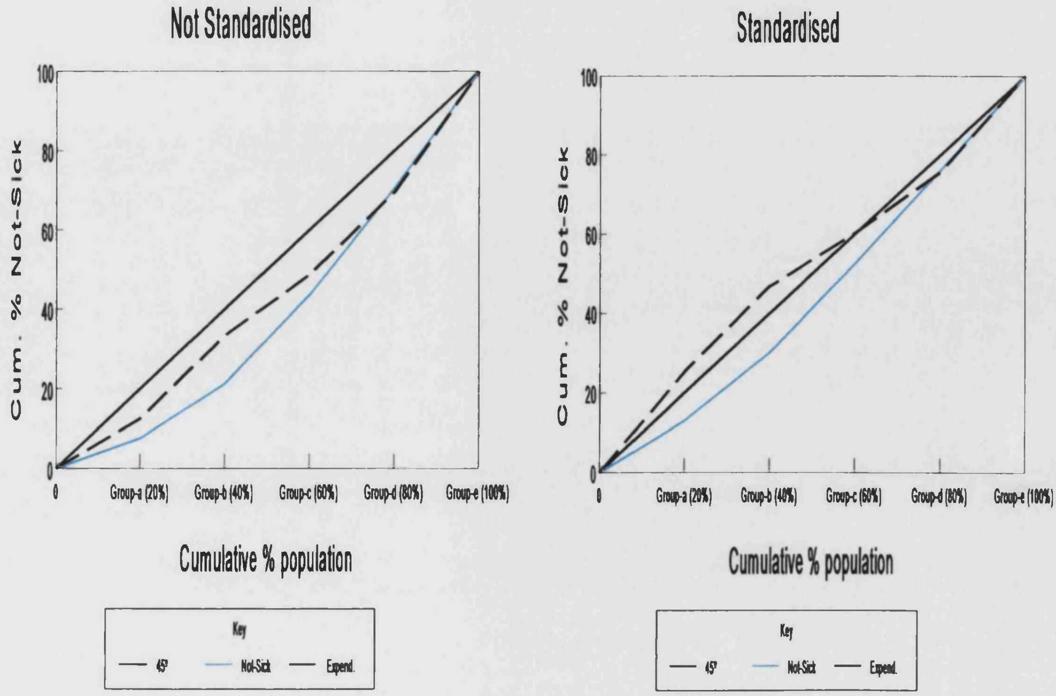
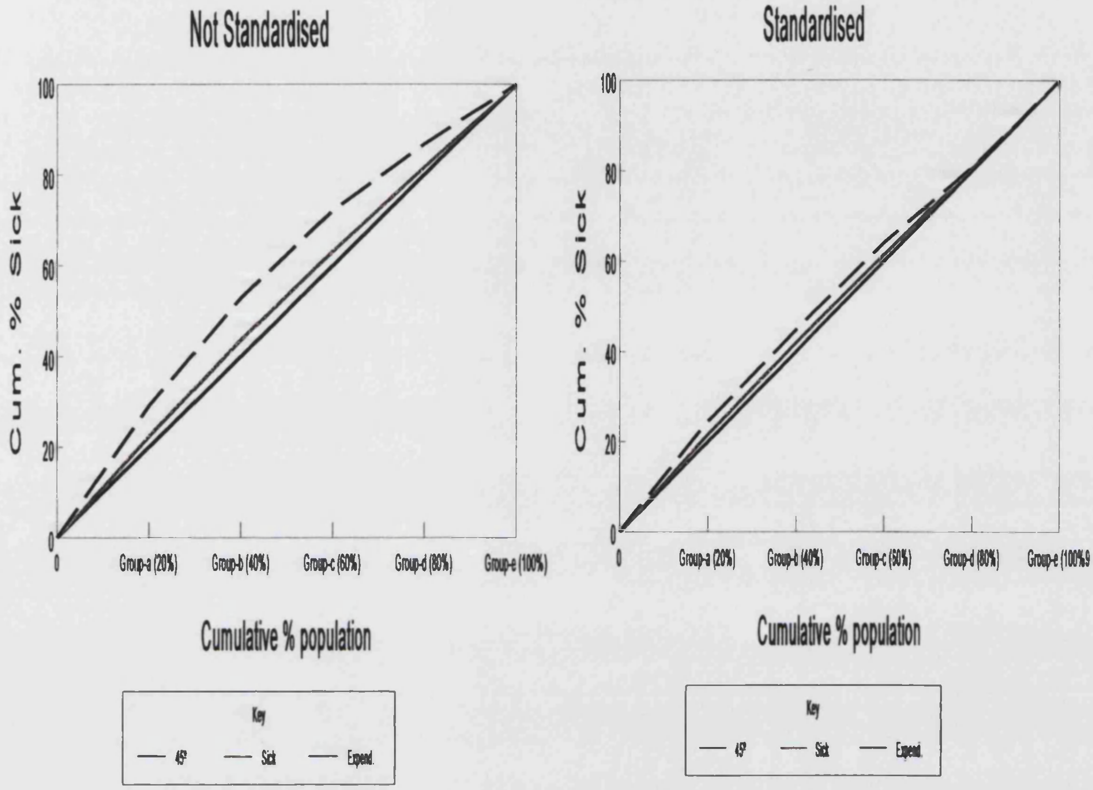


**Figure 5.21.**
**Sick and expenditure concentration curves under Collins an Klein.**




When comparing HI $_{LG}$ and HI $_{C-K}$ some interesting points should be made. Both types of indices agree on the sign when Not-Sick and Sick are used as ill-health indicators[37]. However, they disagree regarding Acute and Limcro. HNG seems to be a bit controversial, no such a clear statement can easily be made. However, in this case, I would argue both indices approximate each other once standardised.

Table 5.9 gathers up all the above information, where positive and negative values reflect inequity to the advantage of the better-off and worse-off, respectively.

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37 An agreement in the sign of both indices point to inequalities going in the same direction.

**Table 5.9.**
**Not standardised and standardised results of HI Le Grand and HI Collins and Klein indices.**

Not Standardised

| | $C_{\text{Exp LG}}$ | $C_{\text{Exp C-K}}$ | $C_{\text{ill}}$ | $HI_{\text{Le Grand}}$ | $HI_{\text{Collins- Klein}}$ |
|---|---|---|---|---|---|
| HNG | - 0.15072 | - 0.26192 | - 0.24514 | 0.09442 | - 0.01678 |
| Acute | - 0.15072 | - 0.21184 | - 0.12036 | - 0.03036 | - 0.09148 |
| Limcro | - 0.15072 | - 0.07728 | - 0.07980 | - 0.07092 | 0.00252 |
| Not-Sick | - 0.15072 | 0.14448 | 0.22684 | - 0.37756 | - 0.08236 |
| Sick | - 0.15072 | - 0.16396 | - 0.04764 | - 0.10308 | - 0.06088 |

Standardised

| | $C_{\text{Exp LG}}$ | $C_{\text{Exp C-K}}$ | $C_{\text{ill}}$ | $HI_{\text{Le Grand}}$ | $HI_{\text{Collins-Klein}}$ |
|---|---|---|---|---|---|
| HNG | - 0.05484 | - 0.10000 | - 0.10772 | 0.05288 | 0.00772 |
| Acute | - 0.05484 | - 0.14640 | - 0.09172 | 0.03688 | - 0.05468 |
| Limcro | - 0.05484 | 0.05944 | - 0.03508 | - 0.01976 | 0.09452 |
| Not-Sick | - 0.05484 | - 0.03184 | 0.11216 | - 0.16700 | - 0.14400 |
| Sick | - 0.05484 | - 0.05684 | - 0.02162 | - 0.03322 | - 0.03522 |

Key:
$C_{\text{Exp LG}}$ – Le Grand expenditure concentration index
$C_{\text{Exp C-K}}$ – Collins and Klein expenditure concentration index
$C_{\text{ill}}$ – Illness concentration index
$HI_{\text{Le Grand}}$ – Le Grand inequality index
$HI_{\text{Collins-Klein}}$ – Collins and Klein inequality index

To sum up, Table 5.9 has shown how much the results of the different indices favour either the richer or the poorer. Differences among both sets of indices, Le Grand and Collins and Klein, follow from the way each index is calculated. While the denominator remains the same to both indices, that is the distribution of morbidity, the numerator, namely expenditure distribution, differs. Indeed, Le Grand's index incorporates to the numerator total expenditure to each income group, whereas Collins and Klein index only accounts for that expenditure allocated to individuals falling within each ill-health indicator. Only when total expenditure and expenditure to each need indicator coincide will the resulting Le Grand's and Collins and Klein's indices be the same. This is only the case, and not entirely, under the Sick scenario in our research.

As Gerdtham pointed out (Gerdtham, 1997) the departure from income related equity at global level does not reveal where in the health care system inequity arises, e.g. is there inequity in primary care or hospital care? It does not reveal, moreover, whether it is the behaviour of the individual or that at the provider that changes with income. Finally, it could also be argued that income related equity infromation at the level of the entire system does not even disclose whether it is income for sure that affects utilisation or some other, related or not, variables such as health information, attitudes or behaviour at the time of seeking care. The next section tries to overcome some of these limitations by means of logistic regression within each type of care.

# CHAPTER 6.

## Logistic Regression Models.

Logistic regression methods have been widely described elsewhere (Cox and Hinkley, 1974; Hosmer and Lemeshow,1989). In essence their aim is to examine the simultaneous influence of a given set of variables on a dependent dicothomous variable. The main difference with multivariate regression stems from the presence of dummy variables, distinctly in the dependant variable, in our case utilisation of the various types of care.

The purpose of this section is to ascertain, first, which variables, namely age, gender, ill-health/need, income and education levels, best explain the utilisation of the different types of care explored above, i.e. primary care, specialist care, inpatient care. Secondly, this section attempts to disclose the relative importance of the presence of each variable, and whether they are statistically significant or not.

A total of thirty-six logistic regressions models were ran. The models explored utilisation of services by the total population in Catalonia, the male population, and the female population separately. Full decription of the characteristics of the models as regards to variables, categories and codes within each variable is given in Chapter 3: Methodology.

As stated, primary care, specialist care and inpatient care are the dependent variables studied in the models. Logistic regression models take these dependant variables as dichotomous variables, that is taking a 0 value when there is no utilisation, and a 1 value when there is utilisation. The rest of variables are considered as utilisation explanatory variables.

The regression models built here offer a complementary picture of how health care resources are distributed across the Catalan population. The proposed models explore in which way are the different types of care used by men or women, different ages, different conceptions of the terms need, and different income and education levels. The results are presented in the form of odds ratios and their respective 95% and 99% confidence intervals. Only a summary table is given here. Full account of the results of all logistic regressions is included in the annexes.

### 6.1. Logistic regressions and primary care utilisation.

Table 6.1. offers a comprehensive picture of primary care utilisation as regards the selected variables. The use of primary care across age categories shows a clean U shape in which 0-16 years old is the category that most uses primary care services, followed by the top 60 or more category, used here as a reference category and identifying the eldest group of individuals. Intermediate age groups, ages from 17 to 59, overall make a relatively lower use of primary care services than the identified children (0-16 years old) and old people (60 and over) groups.

In the study of age, if we take as a reference category for comparison not the last category but the next category to the one studied, we find that the picture changes slightly. Significant differences were still found between 0-16 and 17-39 age groups, although this time the odds ratios rised to 3.0. No significant differences were found between 17-39 and 40-59 age groups as regards utilisation of primary care. Gender differences are also present in the use of primary care services. Women use primary care more than men in all models (95% IC).

Ill-health indicators, HNG and Sick in the first model, and HNG, Acute and Limcro in the second model in Table 6.1., all show odds ratios greater than 1, revealing that those in the HNG, Sick, Acute and Limcro categories make a significant greater use of primary care services than those that do not fall under these need categories.

Finally, the odds ratios regarding income categories in the models show a certain pattern of inequality to the advantage of the lower income groups in the utilisation of primary care services. Indeed, the results point to the lower income groups being greater users of primary care services than the top income groups. The gradient as regards income categories exhibits a clear downstream slope, starting with the lowest income groups using primary care services the most, and the top income group the least, regardless of using Sick or Acute and Limcro as ill-health/need variables. Differences between the richest group and the third and fourth income groups, however, are not significant. Statistically significant differences in income are found only when the two lowest income groups are compared with the top income group. If we take income (2) as reference category for comparing income group (1) the results point to not significant differences as regards primary care utilisation.

## Table 6.1.
## Summary of regression results for primary care utilisation.

| Variable in PRIMARY CARE | Odds Ratio CATALONIA | | | Odds Ratio CATALONIA Males | | | Odds Ratio CATALONIA Females | | |
|---|---|---|---|---|---|---|---|---|---|
| | (a) using Sick *-last category as reference-* | (b) using Acute and limcro *-last category as reference-* | (c) using Acute and limcro *-next category as reference-* | (a) using Sick *-last category as reference-* | (b) using Acute and limcro *-last category as reference-* | (c) using Acute and limcro *-next category as reference-* | (a) using Sick *-last category as reference-* | (b) using Acute nd limcro *-last category as reference-* | (c) using Acute and limcro *-next category as reference-* |
| Age | | | | | | | | | |
| 0-16 | 1.3326 ** | 1.3407 ** | 3.0017 ** | 1.2756 * | 1.2439 n.s. | 3.1933 ** | 1.4168 * | 1.4712 * | 2.8133 ** |
| 17-39 | .6054 ** | .4466 ** | .9729 n.s. | .5671 ** | .3895 ** | .9295 n.s. | .6596 ** | .5229 ** | 1.0432 n.s. |
| 40-59 | .5558 ** | .4591 ** | .4591 ** | .5366 ** | .4191 ** | .4191 ** | .5683 ** | .5013 ** | .5013 ** |
| Gender | 1.1743 ** | 1.1876 ** | 1.1876 ** | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| HNG | 2.1981 ** | 2.1283 ** | 2.1283 ** | 1.8407 ** | 1.9270 ** | 1.9270 ** | 2.6227 ** | 2.4172 ** | 2.4172 ** |
| Sick | 2.4150 ** | n.a. | n.a. | 2.4465 ** | n.a. | n.a. | 2.3971 ** | n.a. | n.a. |
| Acute | n.a. | 2.0348 ** | 2.0348 ** | n.a. | 2.2376 ** | 2.2376 ** | n.a. | 1.8404 ** | 1.8404 ** |
| Limcro | n.a. | 2.5789 ** | 2.5789 ** | n.a. | 3.0478 ** | 3.0478 ** | n.a. | 2.2668 ** | 2.2668 ** |
| Income | | | | | | | | | |
| Group 1 (bottom) | 1.2662 ** | 1.3264 ** | 1.0212 n.s. | 1.1721 n.s. | 1.2817 * | 1.1575 n.s | 1.3947 * | 1.4196 * | .9025 n.s. |
| Group 2 | 1.2478 ** | 1.2989 ** | 1.2671 ** | 1.0631 n.s. | 1.1073 n.s. | 1.1914 n.s | 1.5257 ** | 1.5729 ** | 1.3537 * |
| Group 3 | 1.0219 n.s. | 1.0251 n.s. | .9340 n.s. | .9319 n.s. | .9294 n.s. | .8471 n.s | 1.1553 n.s. | 1.1619 n.s. | 1.0541 n.s |
| Group 4 | 1.1031 n.s. | 1.0975 n.s. | 1.0975 n.s. | 1.1211 n.s. | 1.0971 n.s. | 1.0971 n.s | 1.0910 n.s. | 1.1023 n.s. | 1.1023 n.s. |

** p<0.01    * p<0.05    n.s. Not significant   n.a. Not applicable

Differences between the two models, the first using Sick as need indicator and the second one using Acute and Limcro, are not worth a full separate commentary. Both models allow for the same pattern, that is primary care services in Catalonia are used mostly by lower income groups, women, and children and old age groups.

When looking closer to the differences between male and female in the utilisation of primary care, the picture remains overall similar, albeit with some interesting shades to highlight. Neither in the male nor in the female groups is income a significant variable in all cases, just the same as in the analysis for the whole of Catalonia. Despite lower income groups within the female population use primary care services more than the upper income group, no statistically significant difference were found within the male population as regards utilisation of primary care, exception made of one of the models. In brief, income is shown as a significant variable in explaining utilisation of primary care by the female population but not by the male population.

As regards age, both male and female share the same a distinct U shape, in which the extreme age groups, namely children and old age groups, use primary care services significantly more than intermediate age groups.

Finally, in terms of ill-health indicators the Limcro variable shos significant both in the male and the female groups. HNG and Acute are significant, too, albeit with a minor odds ratio. The importance of HNG versus not HNG as indicator of need in the female group is much greater than it is in the male analysis. However, the oppossite is true when using Acute and Limcro as indicators of need.

To sum up, the study of primary care utilisation by means of logistic regression anaysis has allowed for the identification of significant variables in explaining such utilisation, namely, age, gender, need and to some extent, income. The results point, overall, to children, old-aged, and female making a greater use of primary care services. Moreover, the income variable was found significant only when comparing the most disadvantage groups with the top income group. As regard need variables, all of them were found significant although differences betwen female and male should be noted[41].

### 6.2. Logistic regressions and specialist care utilisation.

Table 6.2. for utilisation of Specialist Care renders a different picture from that of Primary Care utilisation. Age differences in the utilisation of specialist services displays an inverted U shape, quite the contrary to what was observed for primary care. Taking the total of the sample, the age groups that make greater use of specialist services are middle age groups, that is 17-39 and 40-59, whereas children and old ages remain as relatively minor users of this type of care. This is true for both models, that using Sick and the other using Acute and Limcro together, although in the latter no statistically significant differences where found between the 40-59 age group and the over 60 group.

Gender differences seem to increase in the use of specialist care, but remaing females as greater users than male. In all cases, difference between gender groups are significant at 99% IC.

The two models also show significant and important differences between those in need, as measured by HNG, Sick, Acute and Limcro, and those not categorised as in ill-health. Need, is therefore a relevant explanatory variable in the use of specialist services, too.

41

In the Annexes a much simpler model is included in which the only indicator of need considered is HNG. This simple model is justified not only on the bases of simplicity but also on the possible colineality among need variables. The results of this simple model in which the variables included have been age, gender, HNG and income, confirm the pattern disclosed above in primary care utilisation and the odds ratios vary only slightly.

## Table 6.2.
## Summary of regression results for specialist care utilisation.

| Variable in SPECIALIST CARE | Odds Ratio CATALONIA | | | Odds Ratio CATALONIA Males | | | Odds Ratio CATALONIA Females | | |
|---|---|---|---|---|---|---|---|---|---|
| | (a) using Sick -last category as reference- | (b) using Acute and limcro -last category as reference- | (c) using Acute and limcro -next category as reference- | (a) using Sick -last category as reference- | (b) using Acute and limcro -last category as reference- | (c) using Acute and limcro -next category as reference- | (a) using Sick -last category as reference- | (b) using Acute and limcro -last category as reference- | (c) using Acute and limcro -next category as reference- |
| Age | | | | | | | | | |
| 0-16 | .5466 ** | .5592 ** | .4862 ** | .6695 ** | .6404 ** | 1.0297 n.s. | .4400 ** | .4682 ** | .2425 ** |
| 17-39 | 1.4819 ** | 1.1503 * | 1.1391 * | .8959 n.s. | .6219 ** | 1.0938 n.s. | 2.3786 ** | 2.0140 ** | 1.1453 n.s. |
| 40-59 | 1.1920 ** | 1.0098 n.s. | 1.0098 n.s. | .7391 ** | .5686 ** | .5686 ** | 1.9291 ** | 1.7585 ** | 1.7585 ** |
| Gender | 1.9469 ** | 1.8979 ** | 1.8979 ** | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| HNG | 2.2670 ** | 2.1555 ** | 2.1555 ** | 2.4477 ** | 2.4673 ** | 2.4673 ** | 2.1856 ** | 1.9589 ** | 1.9589 ** |
| Sick | 2.3062 ** | n.a. | n.a. | 2.3715 ** | n.a. | n.a. | 2.1518 ** | n.a. | n.a. |
| Acute | n.a. | 1.2796 ** | 1.2796 ** | n.a. | 1.4545 * | 1.4545 * | n.a. | 1.1726 n.s. | 1.1726 n.s. |
| Limcro | n.a. | 2.9912 ** | 2.9912 ** | n.a. | 4.4845 ** | 4.4845 ** | n.a. | 2.7814 ** | 2.7814 ** |
| Income | | | | | | | | | |
| Group 1 (bottom) | .5138 ** | .5351 ** | .8603 * | .5802 ** | .6268 ** | .9186 n.s. | .4308 ** | .4374 ** | .9092 n.s. |
| Group 2 | .5962 ** | .6220 ** | .9580 n.s. | .6636 ** | .6824 ** | 1.0571 n.s. | .4675 ** | .4811 ** | .8526 n.s. |
| Group 3 | .6408 ** | .6492 ** | .8212 * | .6479 ** | .6455 * | .8444 n.s. | .5581 * | .5642 * | .7612 ** |
| Group 4 | .7888 ** | .7906 ** | .7906 ** | .7785 * | .7645 ** | .7645 * | .7360 ** | .7412 ** | .7412 ** |
| ** p<0.01   * p<0.05   n.s. Not significant   n.a. Not applicable | | | | | | | | | |

The income variable behaves in a complete different way than in the case of primary care utilisation. In specialist care the differences among income groups are all statistically significant, being the lowest income group the one that uses specialist services less and the top income group the most. The income gradient, therefore, is a clear one, the closer to the highest income group the greater the use of specialist care. Only when comparing income group (2) with (3) no statistical differences were found.

Income is a significant variable in explaining utilisation of Specialist Care both for male and female. In the two analyses the upper income groups use these type of services more often than the less well-off. Further, there is a clear ascending trend. That is, as we move towards the highest income group the use of specialist services increases for both gender groups. Inequalities exist here clearly to the advantage of the better-off.

Age, however, affects utilisation of specialist services differently according to gender. In the male group, the closer to the eldest group the greater the use of specialist services. This trend is not matched by what happens in the female group, in which intermediate age groups, markedly maternity ages, are of utmost relevance to the use females do of specialist services.

Finally, as regards need, the Acute indicator is only significant as a need variable in the female group. In both gender groups, however, it is Limcro and HNG which stand out as the two ill-health indicators that show significant differences in utilisation.

From all the above a specific pattern in the use of specialist care emerges. The use of specialist care is greater among women than men, among middle ages rather than among children and old people, and in upper income groups rather than lower income groups. Need indicators are seen significant for the entire sample but of different importance according to male or female.

## 6.3. Logistic regressions and inpatient care utilisation.

Finally, Table 6.3. regarding in-patient care utilisation allows for a third picture in the use of health care services by the population of Catalonia. As regards age, it is the eldest group (60 or over) which uses in-patient care services more than any other age group considered. No statistically significant differences where found, however, between the 17-39 years group and the reference group.

Gender differences have not been found significant in the first model, that is, when using Sick as indicator of need. In the second model in the Table, men use in-patient care services more than women but only significant at $p<0.05$.

Ill-health and need, once more, behaved as a clear explanatory variable in the use of in-patient care services. Those catalogued as in need by the different indicators make a greater use of hospital facilities than those other not in need. In the case of HNG, those falling under this category use hospital beds more than those that say their health status is good, very good or excellent. The Sick and Limcro indicators reflect a similar pattern. On the contrary, Acute does not show as a significant variable in any case.

Differently from primary and specialist service utilisation, income did not show as a significant variable to the use of inpatient care services for the whole of the Catalan sample. That is, the regression analysis did not find the use the population made of hospital services varied according to income, suggesting other variables, particularly age and need, could better explain the use of such facilities.

The main points revealed for Catalonia as a whole remain fairly steady in the gender analysis, particularly in the male group. Indeed, income remains as not significant to the male utilisation of inpatient services, while it is to some extent relevant in the female group. In this sense, female in the upper income groups use inpatient care services more than those in intermediate income groups. Age is a significant variable to both gender groups. In general terms, the oldest make more use of inpatient care services, although intermediate age groups in females are even more important users than the eldest group. Finally, Acute remains as a not significant variable, neither for male nor female when explaining inpatient care utilisation. HNG, and particularly Limcro, stand out as strong predictors of utilisation, and that seems greater in men than in women.

To sum up, regression results for in-patient care has offered a third pattern of use marked by intermediate age groups in female and old age groups in male, slightly greater use among men, and no statistical significance of the income variable. Need, particularly Limcro, was found as a highly important variable in explaining utilisation in all cases.

## 6.4. Logistic regressions using education level as additional socioeconomic variable.

The results of incorporating education level as a variable in the model are reported in Tables 6.4 to 6.6. It could be argued that, although the odds ratios changed slightly since a new variable has been included, the main findings are not altered as a consequence of considering education levels together with income as socioeconomic variables in the models. Indeed, the three patterns of service provision outlined above remain the same as when only income was considered in the analysis. In this respect, low education levels are associated to a greater utilisation of primary care services, and to a lesser utilisation of specialist care facilities, just the same as the income variable. As regards inpatient care utilisation, neither income nor education were found significant variables for the whole of the Catalan sample. This points to a certain consistency in the results when controlling for an additional socioeconomic varible such as education.

## Table 6.3.
## Summary of regression results for inpatient care utilisation.

| Variables in INPATIENT CARE | Odds Ratio CATALONIA | | | Odds Ratio CATALONIA Males | | | Odds Ratio CATALONIA Females | | |
|---|---|---|---|---|---|---|---|---|---|
| | (a) using Sick -last category as reference- | (b) using Acute and limcro -last category as reference- | (c) using Acute and limcro -next category as reference- | (a) using Sick -last category as reference- | (b) using Acute and limcro -last category as reference- | (c) using Acute and limcro -next category as reference- | (a) using Sick -last category as reference- | (b) using Acute and limcro -last category as reference- | (c) using Acute and limcro -next category as reference- |
| Age | | | | | | | | | |
| 0-16 | .5705 ** | .5704 ** | .6804 ** | .6727 * | .5707 * | 1.5212 * | .4550 ** | .4789 ** | .3232 ** |
| 17-39 | 1.0369 n.s. | .8383 n.s. | 1.4698 ** | .6487 * | .3752 ** | .8521 n.s. | 1.5553 * | 1.4820 * | 2.2135 ** |
| 40-59 | .7061 ** | .5704 ** | .5704 ** | .7107 * | .4403 ** | .4403 ** | .7413 * | .6695 * | .6695 * |
| Gender | .9308 n.s. | .8051 * | .8051 * | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| HNG | 2.2132 ** | 1.8514 ** | 1.8514 ** | 2.4992 ** | 2.2719 ** | 2.2719 ** | 2.0593 ** | 1.5826 ** | 1.5826 ** |
| Sick | 1.9248 ** | n.a. | n.a. | 2.7934 ** | n.a. | n.a. | 1.3357 n.s. | n.a. | n.a. |
| Acute | n.a. | 1.0988 n.s. | 1.0988 n.s. | n.a. | 1.2026 n.s. | 1.2026 n.s. | n.a. | 1.0708 n.s. | 1.0708 n.s. |
| Limcro | n.a. | 3.8545 ** | 3.8545 ** | n.a. | 7.5555 ** | 7.5555 ** | n.a. | 3.1796 ** | 3.1796 ** |
| Income | | | | | | | | | |
| Group 1 (bottom) | .9423 n.s. | .9773 n.s. | 1.0360 n.s. | 1.0957 n.s. | 1.2961 n.s. | .9455 n.s. | .8324 n.s. | .8254 n.s. | 1.3249 n.s. |
| Group 2 | .9140 n.s. | .9434 n.s. | 1.1114 n.s. | 1.2781 n.s. | 1.3709 n.s. | 1.1891 n.s. | .6330 * | .6230 * | .9912 n.s. |
| Group 3 | .8434 n.s. | .8488 n.s. | .8762 n.s. | 1.0979 n.s. | 1.1528 n.s. | .8656 n.s. | .6462 * | .6285 * | .9239 n.s. |
| Group 4 | .9592 n.s. | .9688 n.s. | .9688 n.s. | 1.3178 n.s. | 1.3318 n.s. | 1.3318 n.s. | .6797 * | .6803 * | .6803 * |

** $p<0.01$ * $p<0.05$ n.s. Not significant n.a. Not applicable

**Table 6.4.**
**Summary of regression results for primary care utilisation using income and education as socioeconomic variables.**

| Variable in PRIMARY CARE | Odds Ratio CATALONIA | Odds Ratio CATALONIA Male | Odds Ratio CATALONIA Female |
|---|---|---|---|
| | Using Acute and limcro *-last category as reference-* | Using Acute and limcro *-last category as reference-* | Using Acute and limcro *-last category as reference-* |
| Age | | | |
| 0-16 | .7237 * | .6681 * | .8085 n.s. |
| 17-39 | .4979 ** | .4227 ** | .6148 ** |
| 40-59 | .4812 ** | .4421 ** | .5261 ** |
| Gender | 1.1850 ** | n.a | n.a |
| HNG | 2.0145 ** | 1.7800 ** | 2.3509 ** |
| Acute | 2.0048 ** | 2.2052 ** | 1.8007 ** |
| Limcro | 2.7511 ** | 3.1765 ** | 2.4321 ** |
| Income | | | |
| Group 1 (bottom) | 1.2690 * | 1.2048 n.s. | 1.3726 n.s. |
| Group 2 | 1.1959 * | 1.0365 n.s. | 1.4230 * |
| Group 3 | .9709 n.s. | .8960 n.s. | 1.0718 n.s. |
| Group 4 | 1.0811 n.s. | 1.1020 n.s. | 1.0555 n.s. |
| Education | | | |
| Illiterate | 1.8918 ** | 1.9452 ** | 1.9076 * |
| Primary studies | 1.3465 * | 1.3795 * | 1.3354 * |
| Secondary studies | 1.1257 n.s. | 1.2629 n.s. | .9831 n.s. |

** $p<0.01$
* $p<0.05$
n.s. Not significant
n.a. Not applicable

**Table 6.5.**
**Summary of regression results for specialist care utilisation using income and education as socioeconomic variables.**

| Variable in SPECIALIST CARE | Odds Ratio CATALONIA | Odds Ratio CATALONIA Male | Odds Ratio CATALONIA Female |
|---|---|---|---|
| | (b) using Acute and limcro *-last category as reference-* | (b) using Acute and limcro *-last category as reference-* | (b) using Acute and limcro *-last category as reference-* |
| Age | | | |
| 0-16 | .5809 ** | .6678 * | .5196 ** |
| 17-39 | 1.0493 n.s. | .5963 ** | 1.8203 ** |
| 40-59 | .9600 n.s. | .5438 ** | 1.7484 ** |
| Gender | 2.1628 ** | n.a. | n.a. |
| HNG | 2.2141 ** | 2.5377 ** | 2.0062 ** |
| Acute | 1.2911 * | 1.3945 * | 1.2333 n.s. |
| Limcro | 3.0391 ** | 4.7013 ** | 2.7059 ** |
| Income | | | |
| Group 1 (bottom) | .5815 ** | .6713 ** | .4874 ** |
| Group 2 | .6775 ** | .7196 ** | .5310 ** |
| Group 3 | .6992 ** | .6976 ** | .5942 ** |
| Group 4 | .7956 * | .7883 n.s. | .7179 ** |
| Education | | | |
| Illiterate | .5694 ** | .7801 n.s. | .4216 ** |
| Primary studies | .7251 ** | .7684 * | .6280 ** |
| Secondary studies | .7345 * | .8857 n.s. | .5631 ** |

** $p<0.01$
* $p<0.05$
n.s. Not significant
n.a. Not applicable

## Table 6.6.
## Summary of regression results for inpatient care utilisation using income and education as socioeconomic variables.

| Variable in INPATIENT CARE | Odds Ratio CATALONIA | Odds Ratio CATALONIA Male | Odds Ratio CATALONIA Female |
|---|---|---|---|
| | (b) using Acute and limcro *-last category as reference-* | (b) using Acute and limcro *-last category as reference-* | (b) using Acute and limcro *-last category as reference-* |
| Age | | | |
| 0-16 | .3538 ** | .3174 ** | .3227 * |
| 17-39 | .8296 n.s. | .3625 ** | 1.5640 * |
| 40-59 | .5648 ** | .4477 ** | .6746 * |
| Gender | .8501 * | n.a. | n.a. |
| HNG | 1.7954 ** | 2.2847 ** | 1.4784 * |
| Acute | 1.1015 n.s. | 1.1197 n.s. | 1.1043 n.s. |
| Limcro | 4.1808 ** | 8.5525 ** | 3.3640 ** |
| Income | | | |
| Group 1 (bottom) | 1.0108 n.s. | 1.3884 n.s. | .8375 n.s. |
| Group 2 | .9949 n.s. | 1.4924 n.s. | .6322 * |
| Group 3 | .8956 n.s. | 1.2992 n.s. | .6085 * |
| Group 4 | .9404 n.s. | 1.3126 n.s. | .6495 * |
| Education | | | |
| Illiterate | .8218 n.s. | 1.0128 n.s. | .8942 n.s. |
| Primary studies | .7657 n.s. | .9881 n.s. | .7143 n.s. |
| Secondary studies | .7087 n.s. | 1.0459 n.s. | .5853 * |

** p<0.01
* p<0.05
n.s. Not significant
n.a. Not applicable

# CHAPTER 7.

# Discussion.

This discussion chapter is structured in five sections. The first section refers to inequalities in health and it briefly summarises the main findings regarding inequalities in Catalonia disclosed in the results chapters. It also comments on how these findings compare with those of previous studies in the area reviewed from the literature. The second section covers inequalities in the delivery of health care, accounting for the main results and comparing them with those from other studies on inequalities in the provision of health care, both in Spain and internationally. The third section discusses possible explanations to the findings. The fourth section is a discussion of the main limitations imposed by the data and the methods, together with the improvements this research offers. Finally, in the light of these results and discussion, some possible policy responses are disclosed together with the identification of some areas for future research. The chapter ends with some concluding remarks.

## 7.1. Inequalities in health.

The study of the social pattern in health distribution is important in itself for many reasons (Blane, 1995). First, it gives an idea of the potential for improvement in health status of the different social classes, education levels, or income levels, and consequently for improvement for the whole of the population. Second, if the objective is to increase the health of the population then the revealed patterns would also give policy makers an idea of where to act, namely on those groups at greater risk or with poorest health status. Third, such studies could give hints on the origins and causes of diseases among the population. A better understanding of the causes of inequalities would contribute to improve policy responses addressed to such differences. Finally, but of most relevance to this research,if we aim to study inequalities in the provision of health care relative to need, we first have to know how health, and therefore need/morbidity, are distributed across socioeconomic groups so as to be able to assess whether the distribution of health care resources follow a similar pattern or not.

To assess whether there are inequalities in health to the advantage of any socioeconomic group I have specified a series of indicators of health and ill-health, as well as specific measures of inequalities. Both the literature review and the methods chapter give a full account of the characteristics of such indicators and measures. Briefly, the self-reported morbidity indicators selected were Health Not Good, Acute, Limcro, Sick and Not-sick. Data to build up these indicators were drawn from the data set used in this research, namely the CHS (ESCA, 1996). These indicators were explored across the distribution of the population in Catalonia ranked by income. Further, standardisation by age and gender was necessary since the different income groups considered in the analysis had a different age and gender distribution, and both demographic variables could be strongly associated with health status (see Annex D.)

It was argued that an appropriate measure of inequality should meet three conditions. The first condition requires that it should reflect the frequently reported socioeconomic dimension of inequalities in health. The second condition demands that the experience of the entire population should be reflected, not only that of those in extreme groups in the distribution. Finally, the chosen measure of inequality should be sensitive to differences and changes in the distribution of the population by sex and gender across socioeconomic groups.

The results point to the existence of income inequalities regarding the distribution of self-reported health status indicators in Catalonia. Irrespective of the indicator used, there is a socioeconomic gradient in how ill-health was distributed. The lower the income group the worse is the health status, as measured by the Health Not Good, Acute sickness, Limiting Chronic illness, Sick and Not-Sick indicators. Further, these inequalities remain, albeit less pronounced, when standardised by age and gender. All the concentration curves, standardised and not standardised, resulting from plotting cumulative percentages of population and ill-health, lie above the diagonal, graphically identifying an unequal distribution of ill-health across the population. Only the Not-Sick indicator is distributed below the diagonal, reinforcing the idea that the better-off are also better in terms of a more positive concept of health.

Concentration curves were transformed into concentration indices. These indices tell us also about the relative sizes of the income inequalities in health. The results show negative indices for almost all indicators. Although all of them revealed inequalities to the disadvantage of the worse-off, they do so in different degrees. HNG remains as the need indicator that shows the greater inequalities of all, followed by Acute, Limcro and Sick, in that order. Not surprisingly, the Not-Sick concentration index was positive, identifying inequalities to the advantage of the better-off as regards the distribution of good health.

The differences in these indices may be responding to the fact that the different indicators are actually measuring different issues, for example, chronic versus acute conditions that limit individuals' activities. Further, as will be pointed out later when discussing utilisation, different gradients for different indicators could also be explained by reporting bias either as a consequence of an associated stigma or of a failure to recall. Finally, it has become clear that the gradient in each distribution is partly a consequence of different age and gender distributions. Once standardised for age and gender all illness concentration curves move closer to the diagonal, although not all of them do so in the same magnitude. The effect of standardisation on HNG seems relatively greater than, for instance, on Acute, which suggests that age and gender distributions among individuals reporting HNG and Acute are different.

The presence of income inequalities for all indicators considered here reinforces the trend in the Spanish literature on inequalities favouring the better-off in the distribution of health, including Alonso *et al.* (1988), Guillén (1990), Portella *et al.* (1990), and Rodríguez and Lemkow (1990). Among more recently published studies on inequalities, those by Rodríguez *et al.* (1993), De Miguel (1994), Jovell (1994), Navarro and Benach (1996), Fernández *et al.* (1999) and Borrell *et al.* (forthcoming) agree in their general conclusions. Despite using different variables to classify the population into groups, and despite measuring health and ill-health in slightly different ways (using different indicators), all of them identified the presence of an socioeconomic gradient in how health and ill-health was distributed, for either Spain, Catalonia or Barcelona. The lower the social class, education level, income level or professional status the worse the health indicators in the population.

More specifically, Jovell (1994) disclosed the existence of the socioeconomic gradient in the distribution of health using a self-perceived health status indicator from the CIRES data. The author concluded there was a socioeconomic dimension to the measure of inequalities in health in Spain, and these inequalities were independent of the socioeconomic variable used to classify the population.

Navarro and Benach (1996) studied inequalities across social class using the HNG indicator. Their results pointed, once more, to the existence of a socioeconomic gradient in the distribution of ill-health. These authors further studied how the gradient varied with age. Again, self-perceived health status improved as one moved towards higher social classes, irrespective of age. Restriction of main activity and chronic illness were two additional indicators used in this same study. It was found that the presence of chronic illness and the limitation of activity was greater in lower social classes than in higher social classes. However, the authors did not consider illness concentration curves nor indices, and instead used multiple regression models and the resulting odds ratio measures.

Fernández *et al.* (1996) argued that inequalities in health by social class persist in Catalonia. This unpublished study is of particular interest to this research insofar it uses the same data set (ESCA, 1996), although classifying the population according to social class rather than income. It could then be argued that inequalities in health in Catalonia do not seem to depend on the socioeconomic variable used to classify the population. Fernández *et al.* (1999) explored in greater detail inequalities in health by gender, showing women were also in worse health than men.

Finally, Borrell *et al.* (forthcoming) outline the fact that there are still relevant inequalities in health in Barcelona, with people in lower social classes being in worse health status, although the setting of the analysis was an urban area, not Catalonia as a whole.

The only study on inequalities in health in Spain that made use of concentration curves and indices is that of Rodríguez *et al.* (1993). The authors applied a similar methodology to the one used in the first part of this research in reference to Spain, not to Catalonia, using the 1987 National Health Survey data set. The concentration curves and indices considered in Rodríguez's study referred to the distribution of HNG, Acute and Limcro as need indicators across the Spanish population ranked also by income. Overall, the study results regarding inequalities in health were fairly similar to the ones presented here. As illustrated in Figure 7.1 all unstandardised morbidity concentration curves resulting from the use of the above mentioned indicators, both for Spain and Catalonia, lay above the diagonal. That is, whatever the indicator of need chosen they all display inequalities in health to the advantage of the better-off, albeit to different degrees depending on the indicator one looks at[42].

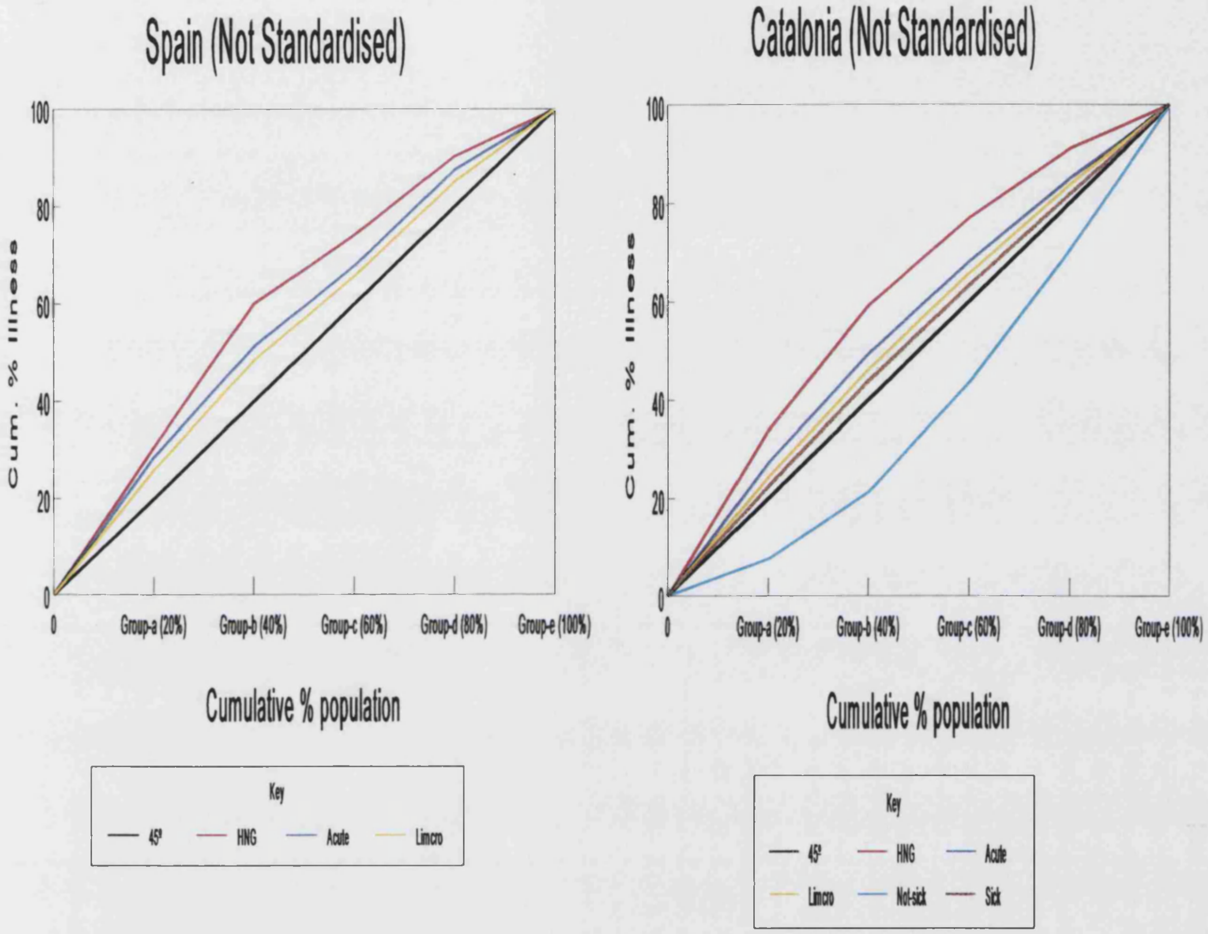
As seen from Figure 7.1. and Table 7.1. the comparison between Spain and Catalonia in relation to the size of these inequalities by means of their respective unstandardised concentration indices ($C_{ill}$) indicate a similar pattern. For example, HNG points to -0.2204 in Spain and to -0.2451 in Catalonia; the Acute index ranges from -0.1333 for Spain to -0.1203 for Catalonia; and Limcro shows -0.1036 for Spain and -0.0798 for Catalonia. Further, the ranking of indicators from the one exhibiting the highest inequality, namely HNG, to the ones revealing the lowest, namely limiting chronic, is also the same. Standardisation by age and gender in Catalonia reduces the size of inequalities as measured by $C_{ill}$ indices in Table 4.17. This confirms that the choice of morbidity indicator is crucial to the measurement of the magnitude of inequalities in health, and hence to the size of inequalities in health care as will be showed later on.

To sum up, this research points to the presence of inequalities in health to the advantage of the better-off, results that are fully compatible with previous research findings for the whole of Spain, for Catalonia, and for the particular case of Barcelona. In some of the studies reviewed the methods applied to the measurement of inequalities allowed for direct comparisons with this research, and it was then found, once more, that the findings presented here clearly fall within the identified pattern of inequalities in health to the advantage of the highest income groups regardless of the morbidity indicator used.

42

The direction and magnitude of these inequalities for Catalonia was displayed in Table 4.17. Under both standardised and unstandardised scenarios, all indices, exception made of the Not-Sick index, showed a negative sign pointing to inequalities in health to the advantage of the highest income groups.

**Figure 7.1.**
**Illness Concentration curves for Spain and Catalonia.**




Source: Catalonia, authors estimates; Spain, Rodríguez *et al.* (1993)

**Table 7.1.**
**Unstandardised illness concentration indices for Spain and Catalonia.**

| | CATALONIA | SPAIN |
|---|---|---|
| HNG | - 0.24514 | - 0.2204 |
| Acute | - 0.12036 | - 0.1333 |
| Limcro | - 0.07980 | - 0.1036 |
| Not-Sick | 0.22684 | n.a. |
| Sick | - 0.04764 | n.a. |

Source: Catalonia, authors estimates; Spain, Rodríguez *et al.* (1993)

## 7.2. Inequalities in health care.

Building on the reported findings on how self-reported morbidity is distributed across the population in Catalonia ranked by income, this research has also studied (i) how those in need made use of the different types of care and services and, (ii) which variables might have an important role in explaining utilisation in each case. This section discusses the main results regarding these two issues.

To assess the extent of inequalities in health care two indices of inequalities have been used, more specifically, those of Le Grand and of Collins and Klein's. The Le Grand Index of Inequity ($HI_{LG}$) for each morbidity indicator is calculated by dividing total expenditure on the various types of services allocated to income group-i, by the total number of persons in the selected morbidity group. The Collins and Klein ($HI_{C\text{-}K}$) index takes account of expenditure in the various types of care by those in income group-i who reported morbidity, divided by the number of those who reported morbidity in income group-i. Both indices were calculated for all self-reported morbidity indicators and income groups, and were later standardized for age and gender.

The results point to similarities and differences across indices. Under the unstandardized scenario for Le Grand and Collins and Klein indices, only HNG and Limcro respectively showed inequalities to the advantage of the better-off (see Table 4.17). When standardised for age and gender, two additional indicators of need changed sign towards favouring the rich, namely Acute in the case of the Le Grand index, and HNG in the case of the Collins and Klein. Overall, however, the picture shown by these results is of small inequalities, close to proportionality.

The Not-Sick indicator was argued as necessary in the overall picture of inequalities in health care since those that say to be in good health may also use health care services. From the results shown, the Le Grand index of inequality for the Not-Sick indicator clearly points to inequalities to the advantage of the worse-off, both for not standardised and standardised ratios. This is also the case for the Collins and Klein counterparts. Under the standardised scenario the Le Grand and Collins and Klein indices for Not-Sick and Sick are almost the same, both identifying inequalities to the advantage of the worse-off.

In brief, both the choice of self-reported morbidity indicator and the selection of the index of inequality, i.e. Le Grand or Collins and Klein, are of importance to the measurement of inequalities in health care in Catalonia. Differences in the results offered by both indices stem from how these indices are built. Although using the same denominator, the numerator in each index refers to a different concept. While in Le Grand's use/need ratio the numerator accounts for total expenditure in group-i of income, Collins and Klein ratio only includes total expenditure to those who reported a particular need, e.g. HNG. Therefore, the Collins and Klein use/need ratio is marked by the number of individuals reporting a given health status or condition on both the numerator and denominator, and this has an influence on the $C_{Exp.\,C\text{-}K}$ index. Therefore, although both indices use the same $C_{Ill}$ for each indicator, the way $C_{Exp.\,LG}$ or $C_{Exp.\,C\text{-}K}$ are constructed determines the size and direction of the final index of inequality.

It has been argued that the Le Grand Index of Inequality systematically favours the rich even when such inequality does not exist (Wagstaff *et al.*, 1991a). If we took the Collins and Klein index as an unbiased index of inequality the results in Table 4.17 show that may be the case for HNG under the not standardised scenario, but it is not the case for Limcro. Once standardised, the bias towards the rich could still be the case for HNG or Acute, but not for Limcro.

The results shown for the Le Grand index of inequality allow for a series of international and national comparisons, too. In this respect, the work by Van Doorslaer *et al.* (1993) is a valid reference for such a comparative exercise. Figure 7.2 in this section shows a series of unstandardised Le Grand indices of inequality, calculated for a selection of countries[43] according to Van Doorslaer study. In three of the selected countries, USA, UK and Spain, the unstandardised distribution of health care is inequitable to the advantage of the better-off, regardless of the indicator of need chosen. The rest of the countries in the graph display various directions of inequalities in line with the self-reported morbidity indicator selected. However, it should be noted that all HNG indices for the countries included in this graph show inequalities favouring the better-off. With the exception of Catalonia and Italy, the indices for Limcro followed a similar pattern as that described for HNG, although to a lesser degree. The rest of the indices displayed different trends. For all

43

Not all the countries included in Van Doorslaer *et al.* (1993) study reported these indices for all the self-reported morbidity indicators used in this research. The choice of one standardisation process or another, together with the selection of variables for standardisation present some differences across country reports for which a comparative table of standardised indices could lead to bias in interpretation.

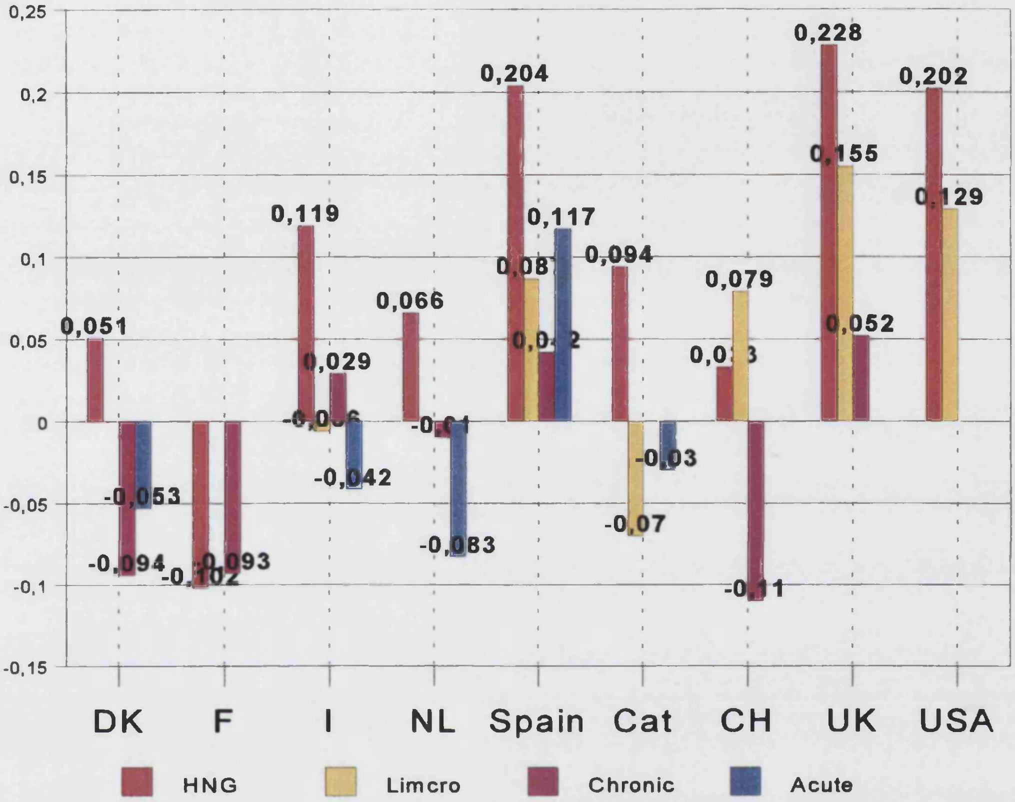
countries, with the exception of Spain, it could be argued that the distribution of health care when using Acute as an indicator of need resulted in inequalities to the advantage of the least well-off. Finally, the chronic indicator, when used, behaved fairly irregularly across countries in the graph.

This same Figure 7.2 allows for a comparison of the indices not just regarding its negative or positive sign but regarding its magnitude, too. In this respect, the indices for HNG, followed by those of Limcro, tend to be of a greater size, that is, they show greater inequalities than any other index for any other need indicators.

Focussing on Catalonia in the graph, it is apparent that it follows a pattern that is closer to that of the Netherlands or Denmark than to, for example, Spain. The Catalan case fits in reasonably well within the set of countries for which the choice of need indicator makes a difference to both the size and direction of inequalities in health care. Certainly, the use of HNG as indicator of need in Catalonia shows inequalities to the advantage of the better-off, whereas using Limcro or Acute shows the opposite.

Differently from what was reported for Spain (Rodríguez *et al.*, 1993) the choice of need indicator is crucial to the assessment of equity in the delivery of health care in Catalonia. Despite, the fact that, as discussed in the previous section, ill-health is distributed in a similar way to the Spanish case, there are relevant differences between Spain and Catalonia as far as the distribution of expenditure, which ultimately translates into different indices in size and direction of inequalities in health care, as shown by Figure 7.3.

**Figure 7.2.**
**Unstandardised Le Grand Indices of Inequality:**
**International perspective.**




On the bases of the Van Doorslaer *et al.* (1993) study and the findings from this research, differences between Spain and Catalonia as regards inequality in health care (see Figure 7.3) seem better explained by how health care expenditure is allocated across income groups (expenditure concentration curves) than by how health and ill-health are distributed across the population (illness concentration curves). In this respect, however, an important remark must be made. The date set used in the Spanish case refers to 1987, that is shortly after the 1986 General Health Act was passed twelve years ago. Recent research using a different methodology and reported in the literature review, argue in favour of very small inequalities in health care in Spain, once need was taken into account (Navarro and Benach, 1996; Regidor *et al.*, 1996).

There is an interesting corollary to this national and regional comparison. This refers to the relationship between equity in the provision of health care and the prevailing public-private mix in Spain and Catalonia. While Spanish health care is largely provided through public centres, the public-private mix in Catalonia is radically different from that of Spain, favouring much more the private provision of health care, although largely financed by public funds. When studying equity in the delivery of care this research shows that a public-private mix weighted towards the private side does not necessarily betray the equity principle. However, the implications of such a mix on the equity in the finance of health care should be explored in greater detail.

In brief, the first hypothesis raised at the beginning of this research regarding inequalities in health care is confirmed: overall, the Catalan system is close to proportionality, as measured by the two indices of inequality mentioned above and illustrated by Figure 7.2, Figure 7.3 and Table 4.17.

Further, the age and gender standardisation of results for Catalonia smoothes the indices further, particularly when using the Le Grand index of inequality. The range under the not standardized scenario [0.09442, -0.07092] turns to [0.05288, -0.01976] under standardisation. Some additional changes as a consequence of standardisation should be noted. In Catalonia, once the standardisation takes place, both HNG and Limcro[44] move closer to zero whereas Acute changes sign from indicating inequalities to the disadvantage of lower income groups to inequalities favouring the better-off. The choice of need indicator remains significant in determining both the magnitude and the direction of inequalities in health care in the Catalan case.

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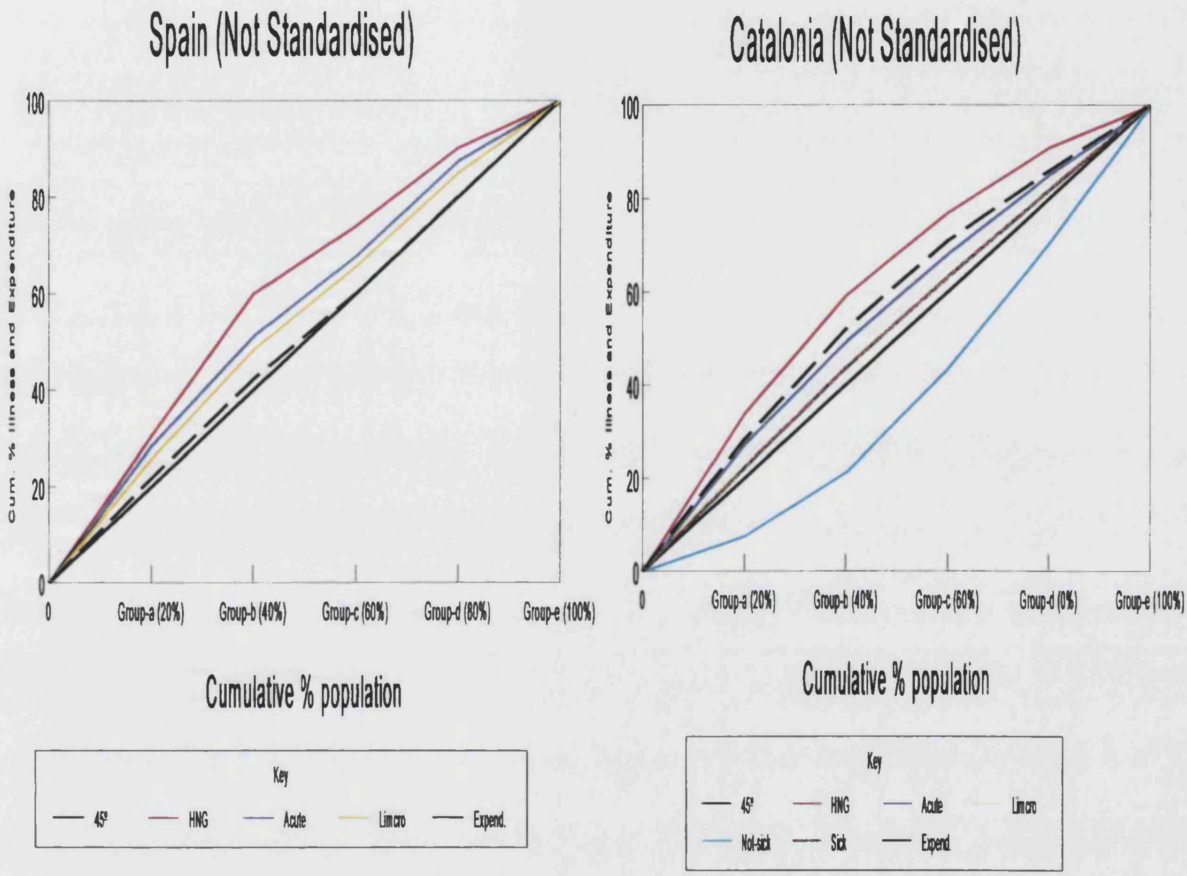
The fact that results for Limcro remain to the advantage of the worse-off is of special importance given the ageing trend in the population, not only in Catalonia but worldwide.

**Figure 7.3.**
**Illness and expenditure Concentration curves for Spain and Catalonia.**




Despite the degree of equity achieved overall i.e. almost proportionality, different patterns of utilisation of health care services according to primary care, outpatient care and inpatient care emerged from the logistic regression analysis. Primary care utilisation is weighted towards children and elderly people, women, and lower income groups and education levels, overall. Out-patient care utilisation is dominated by intermediate age groups, female in particularly, upper income groups, and higher education levels when models. Finally, the analysis for inpatient care did not show income nor education as significant variables, suggesting it is need rather than, for example, capacity to pay which explained hospital utilisation. In all three types of care, need, in terms of acute sickness, limiting chronic illness and self-perceived health status, remained as significant predictors of utilisation, which falls within the findings of major research centres.[45]

Need variables, however, have dfferent weights according to types of care. Limcro is particularly stresssed in reference to specialist and inpatient care, while Acute takes a greater role in explaining primary care than specialist and inpatient care. Health not good remains fairly the same across types of care. The fact that need, in its various forms, stands out clearly as a determinant of utilisation in almost all cases underlines the importance of studying in depth such concept, its multidimensionality, and draws attention to the benefits of using a wide range of need indicators when studying equity in health and health care.

Socioeconomic variables have also shown as important determinants of utilisation, particularly in primary and specialist care. It has become clear that utilisation of these types of services does not only respond to need criteria, age of gender but also to socioeconomic differences in income and education in the population.

All the above suggests that the second hypothesis in this research has been confirmed: despite the overall equity in the system it is the case of distinct pattern of utilisation according to primary, specialist and inpatient care.

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45 The Agency for Health Care Policy and Research (AHCPR, 1999) has recently issued a report arguing in favour of self-reported health status as a strong predictor of health care utilisation. This report is based on the work by Bierdman *et al.* (1999).

To sum up, at the global level of analysis the Catalan Health System shows as only a slightly inequitable system. However, it has been found this overall equity coexists with three different patterns of utilisation of health care services which pinpoints particular inequalities in the provision of health care at lower levels of analysis.[46]

### 7.3. Possible explanations.

The aim of this discussion chapter is also to offer some plausible explanations of why, on the one hand, the Catalan Health System is fairly equitable overall and, on the other hand, it shows particular service inequalities according to the different types of care. When studying equity in health care, researchers are used to find relevant inequalities for which they try to find explanations. This particular case-study, Catalonia, has proven somewhat different and, at least at the global level, we are confronted with explaining equity rather than inequity. This is a challenge in itself.

In interpreting the degree of equity in Catalonia, the first issue to be acknowledged is the role played by egalitarian health care systems arrangements in the provision of services. Titmuss (1968) argued that universal coverage in health care, like other aspects of social welfare provision, plays a fundamental role in the distribution of resources in a given society. In the case of Spain, Regidor *et al.* (1996) have also pointed to issues such as universalisation of health care as one of the explanations to inequalities in utilisation not being of great importance once need was taken into account. The authors have further argued that the extension of primary care services, the decentralization process in health care, and the increased resources into the

46 As stated, the regression models used a variety of variables resulting in a range of simple and complex models. Results for each model are included in the Annexes A, B, and C.

system, specially in hospital care, have also contributed as possible explanations in the Spanish case. However, no detailed account is given as to how these aspects may have in fact contributed to equity.

According to the methodology used in this research, equity in health care at the global level is illustrated by a close to equal distribution of expenditures according to need across income groups. The precise degree of equality or inequality depended on the indicator of need one looked at. Using one or other indicator meant a difference as regards the overall equity of the system, pointing out slight inequalities to the advantage of the poor or the rich accordingly. The respective standardised indices of inequality were usually close to proportionality, which conveys that once age and gender are taken into account the utilisation of health care services largely corresponds to need as captured by the selected indicators.

However, this equitable picture at the aggregate level changes when looking into utilisation by types of services. It was found that the overall equity in the health care system comes as a result of three different patterns of utilisation balancing each other. For this, special attention should be paid to the reasons behind the appearance of such distinct patterns, to find out why do they exist, that is, why individuals in different income groups make a different use of health care services. Two possible explanations are offered. First, that there are differences in the incidence of disease across income groups than ultimately determines the utilisation these groups make of the health care system. Second, there are other underlying reasons that make individuals use services differently for the same diseases. I will address these two issues separately.

### 7.3.1. Differences in the incidence of disease.

The relevant issue here is whether differences in the utilisation of services stem from differences in the presence of disease patterns and need across groups. That is, whether income groups differ as regards the weight of specific diseases, not in respect to the overall level of disease. The data set used here does not provide with very precise data about the clinical conditions, both acute and chronic, that affect the population by income group. Some data is available, however, as regards specific chronic conditions identified in the survey.

The survey explores the presence of sixteen clinical chronic conditions in the population. The results by income group are displayed in Annex E. The graph in Annex E shows percentual distributions of the these sixteen conditions within each income group. Percentages refer to the proportion each clinical condition represents of the total number of clinical conditions declared by people in each income group. Briefly, the results point to similarities rather than differences among income groups as regards the pattern of diseases. Allergies and Skin problems, however, seem to be more important for upper income groups than for lower income groups, while Cataracts represent a higher percentage among lower income groups. Despite these differences the patterns are fairly similar for which it is unclear differences in the utilisation of services could be explained by the presence of dissimilar disease patterns. More detailed research is needed so as to uncover the reasons for differences in the presence of specific pathologies across groups.

Moreover, the results offered by the concentration curves (Figure 4.18) and indices (Table 4.17) show that, once standardised by age and gender, inequalities in the delivery of care in Catalonia are reduced significantly but they do not disappear completely. An epidemiological explanation of differences between male and female utilisation may also contribute to explain a higher use of services by females. In this respect, the CHS survey (ESCA,

1996) has identified the most prevalent chronic conditions among men and women, showed in Table 7.2.

According to this data, women seem to suffer more from high pressure, high cholesterol, cataract, skin problems, constipation, depression, varicose veins, arthrosis, and allergies, while men suffer more from urinary problems, bronchitis, and ulcers. Further, the table seems to point out also the fact that female tend to accumulate chronic problems more than men.

**Table 7.2.**
**Most prevalent chronic conditions among men and women.**

| Chronic illness | Male | | Female | |
|---|---|---|---|---|
| | N | % | N | % |
| High pressure | 650 | 12.5 | 955 | 18.8 |
| Urinary | 433 | 8.4 | 262 | 5.1 |
| High Cholesterol | 472 | 9.1 | 532 | 10.5 |
| Cataract | 194 | 3.7 | 300 | 5.9 |
| Skin | 219 | 4.2 | 317 | 6.2 |
| Constipation | 171 | 3.3 | 662 | 13.0 |
| Depression | 281 | 5.4 | 728 | 14.3 |
| Emboly | 69 | 1.3 | 64 | 1.3 |
| Heart disease | 305 | 5.9 | 338 | 6.6 |
| Varicose veins | 263 | 5.1 | 1,178 | 23.2 |
| Arthrosis | 1,216 | 23.5 | 1,883 | 37.0 |
| Allergies | 456 | 8.8 | 725 | 14.2 |
| Asthma | 206 | 4.0 | 196 | 3.9 |
| Bronchitis | 433 | 8.4 | 245 | 4.8 |
| Diabetes | 222 | 4.3 | 258 | 5.1 |
| Ulcers | 368 | 7.1 | 229 | 4.5 |

Source: Catalan Health Survey ( ESCA), 1996.

Differences in the incidence of disease may thus explain some of the utilisation different groups make of the health care services. However, it is also true these differences within the population do not fully explain differences in the utilisation of services.

According to the results shown, differences persist across socioeconomic groups as regards the overall presence of disease in the population of Catalonia.[47] The logistic regression results pointed out that need, in its various forms, is a relevant determinant of utilisation of the services provided. Certainly, both in primary care and specialist care utilisation all indicators of need used (HNG, Limcro, Acute, Sick) showed as statistically significant. Those individuals falling into any of those categories used services in a greater amount that those other that did not manifested need. As regards Inpatient care utilisation, however, Acute did not show as a significant variable in explaining use but other indicators such as HNG, Sick and particularly Limcro.

Logistic regressions also served to the purpose of exploring the association of age and gender with utilisation. It was then found that the use of primary care was weighted towards children and elderly people, which falls within what was expected since the survey considered both general practitioners and pediatricians under primary care services. It is therefore unsurprising to find the 0-17 and the over 60 age groups using primary care more since, first, pediatric facilities are considered under primary care services and, second, there is an accumulation of morbidity in the eldest age groups which ultimately need a constant medical surveillance and control provided at the primary care level.

Moreover, within gender, a clear age pattern was found according to which intermediate female age groups were greater users of specialist care than any

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47 The literature on possible explanations to the existence of inequalities in health in western countries is vast (Black *et al.*, 1980; Blane, 1987; Szreter, 1988; Wilkinson, 1994, 1996; Siegrist, 1995; Marmot *et al.*, 1997; Wadsworth, 1997; Shi and Lu, 1997; Poland *et al.*, 1998). Similarly, the notion of social determinants of health has also been widely debated (McKeown, 1979; Evans *et al.*,1994), and a series of sociological models have been offered to explain social differentials in health. The general understanding around these contributions is that the health of the population is determined by many factors in the social and economic sphere and not just by the health care sector performance (Macintyre, 1989; Dahlgren and Whitehead, 1991; Benzeval *et al.*, 1995). Health inequalities persist even in the most egalitarian societies (Lahelma *et al.*, 1997a; 1997b). The possible explanations offered by the literature, namely artefact, health selection, social causation, behavioural, materialist, life cycle and human capital arguments, should not be taken as mutually exclusive.

other female age group in the scale, most probably as a consequence of maternity and gynaecology. When looking into the association between use and need variables such as HNG, Acute, Limcro or Sick, we find that indicators of need among men are better predictors, as shown by higher odds ratios, of primary care and specialist care than those of women. Taking all these facts together one may suggest it is a "natural cause", such as maternity/gynaecology, not necessarily falling under any category of need considered, which could explain the greater use of specialist care among intermediate age females.

### 7.3.2. Differences in the utilisation of services for the same diseases.

Researchers have worked thoroughly in the building and development of explanatory models of utilisation and in pointing out the relevant specific factors and elements both in the process of decision-making and the decision itself. Rogers and Elliot (1997) argued there are a series of traditional models that have attempted to explain health care use: the health belief model, the socio-behavioural model, the social network model, and the rational choice model. Further, these models are not necessarily mutually exclusive. They models point, overall, to utilisation being the outcome of a decision to weigh up costs and perceived benefits of receiving care, together with other factors such as organisational arrangements in primary, secondary and inpatient care.

These research findings indicate lower income groups and education levels use primary care services more than higher income groups. This is a well documented fact in previous studies on inequalities in Spain (Portella *et al.*, 1990; De Miguel, 1994; Navarro and Benach, 1996; Regidor *et al.*, 1996; Abásolo *et al.*, 1998), including the second Health Plan for Catalonia which explicitly reads:

> *"[...] the use of primary care services favours the less advantaged groups"*
>
> Generalitat de Catalunya (1997) Pla de Salut de Catalunya 1996-1998:223.

Greater use of primary care among lower socioeconomic groups while the opposite is true for specialist care services, suggests that the different groups are facing different costs, and perceiving different benefits from receiving care. Costs could be higher to lower income groups as a result of greater distances (and/or other barriers such as owning some sort of transportation) to access health care centres which would translate into larger travelling times, or to a greater reliance on the public transportation system, overall.

Less knowledge among lower socioeconomic groups of what services are available and how to make use of them could equally determine access to the specialist physician (Kee *et al.*, 1993; Ben-Shlomo *et al.*, 1995). Higher socioeconomic groups, differently, may be more aware of health disturbance, have greater capacity to solve bureaucratic problems, better communication skills in general, better knowledge of how the system operates, and therefore better informed about care-seeking options, making overall a better use of health services resources.

Other factors explaining differences in the utilisation of health care among socioeconomic groups in the population may include differences in how individuals value health or simply differences in the attitudes among such groups towards seeking medical attention. In this respect, lower social groups may be inclined to visit the GP relatively more often with minor complaints that do not need referral. Moreover, referrals could also be determined by pressure on the GP to refer, even when the complaint itself could be adequately handled within the GP surgery. Hence, greater ability to pressure primary care physicians for referral could be one reason for higher social groups using specialist care more.

Finally, lower income groups and education levels may be confronting higher costs as a consequence of a lower capacity to pay for health care outside the public sector, particularly in the case of specialist care. The Catalan Health survey used in this research explores utilisation of services regardless of whether it was privately or puclicly provided. Individuals in higher income groups may well be avoiding using public primary care and accessing specialist either directly or within the private sector. Accordingly, we may be picking up here the effect of private medicine in the overall equity in the delivery of care in the system.

In this respect, Van de Meer *et al.* (1996) argue that fewer specialist contacts in low socioeconomic groups in Denmark, while the reverse is true for contacts with the GP, is perhaps partly to be explained by a substitution phenomenon in the system with private insurance common among the better-off and the GP being the gatekeeper in the public sector, not in the private sector. The fact that in Catalonia low income and education level groups do not visit the specialist doctor as much may be a consequence of primary care services remaining largely in public hands, while specialist care has a well known private side accessed by insurance premia and out-of-pocket payments.

As reported, women use primary care services more than men and use specialist care even more.[48] Such differences, beyond the described epidemiological and biological explanations, could also be explained by women facing either lower costs to receiving care and/or by their having a greater perception of benefit of receiving care a priori. In this respect, Fernández *et al.* (1999) report that when taking account of need, women declaring good health reported a greater probability of consulting a health professional, although no differences were found for utilisation of inpatient

48 Besides, differences in the use of primary care and specialist care across income groups seem to be more important both in magnitude and statistical significance among women than men.

care, nor for dentists nor optometrists.[49]

In this regard, higher utilisation may be caused by lower costs faced by women at the time of expressing/reporting needs. The cost of opportunity of getting care could be smaller among females than males since in Catalonia there is still a sizeable percentage of the female population taking care of households. Not too regular nor fixed working hours in their activities may be also a reason for a greater use of health care services, not only on their own behalf but also acting as informal care seekers for the rest of the family. Indeed, particularly in primary care services, it may well be the case that the reason for using primary care services could be different from seeking care for oneself, but for other members of the family. The role of women as informal care providers in Spain may well be related to a number of visits to primary care physicians seeking advice, referral or getting a prescription for their children and husbands[50].

On the perceived benefit side, we may argue that females could be more receptive to getting medical treatment, and share a higher perception of benefit of getting such care than males, either as a consequence of greater health knowledge, a more positive attitude to medical care, or better information on availability of treatment.

At the level of inpatient care it was found that inequalities were small overall. This may point to medical need as the principal criterion to use hospital services, that is, it is medical professionals that determine the use the population makes of inpatient care facilities. As regards the rest of variables in

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49 Hunt *et al.* (1999) argue against the most widely accepted explanation for gender differences in consulting for the most common chronic conditions, namely that women are simply more likely to consult a GP than men, once account was taken of the presence of specific individual symptoms. The authors also refer to other studies to support such an argument.

50 It should also be noted that a visit to a GP or a specialist could also be reflecting bureaucratic processes and not strictly medical attention.

the inpatient care models the role of age and gender together should be given emphasis. Once more, in a similar way to specialist care utilisation, women in intermediate age groups seem to be associated to higher inpatient care use. The rationale for this may be found once more in gynaecologic and maternity services.

Differences between males and females as regards utilisation of hospital care were not significant when using HNG and Sick together, or HNG alone, as need indicators. When other need indicators were used in the regression analysis these differences, although significant, were not of a great magnitude. Fernández *et al.* (1999) and Borrell *et al.* (forthcoming) reported also not significant differences in the utilisation of inpatient care by gender. When looking into other sources of information it was found that differences in hospitalisation episodes and days of stay between male and female were not very important in size. Indeed, the hospital discharge statistics and average length of stays reported in Table 7.3 show that, although there are some gender differences as regards the type of illness that causes the institutionalisation of the patient, overall the number of discharges and length of stays are quite similar between both gender groups.

The regression analyses showed that those reporting Limcro used inpatient care facilities more than those that do not, especially for men. It could be argued that among those that used hospital facilities there is a relevant presence of chronic pathologies that limit individual daily activities, and that had caused hospital admissions probably as a consequence of an acute episode in their limiting chronic condition.

As stated, neither income nor education level have proven to be significant in explaining inpatient care utilisation for the whole of the population sample as well as for males. However, both were found to have some role in explaining utilisation in the female sample. This does not mean that it is purely the income or education variables which directly explained utilisation of inpatient care but also other related factors to income or education that have an impact in patterns of services and types of services consumption, for example cosmetic surgery versus treatment of acute or chronic conditions.

The global picture is that of inequalities across services, according to which low income groups and lower education levels preferably use primary care services and upper-income groups and higher education levels make a greater use of specialist care. Hospital care remains fairly independent of income and education, but is characterised by other variables within the need category such as age, gender, and ill-health in its various forms and indicators.

On the whole, it is difficult to disentangle the many different factors determining utilisation. This study has tried to discuss plausible explanations both on utilisation influenced by the presence of disease and by other factors.

The difficulties in determining by means of a population survey such as the one used here, whether the use made of services was adequate or not, are enormous. We are unable to tell whether the visit paid to the general practitioner, for example, was proper in all cases, and whether this appropriateness was higher among upper income groups than lower income groups, among younger age groups rather than older groups, or among male rather than female. This is of utmost importance in so far its policy implications. If the amount of care received by females in general is higher than by men, how can we be sure all that utilisation is not an unjustified use of services? Or, similarly, how can we be certain that there is an underuse of services among men? Assuming that all care provided, and therefore all utilisation made of the services, is appropriate is far from being true in all cases. Further, there might be a large amount of unmet need in terms of waiting lists and unrevealed need coexisting with well known unnecessary visits.

**Table 7.3.**
**Average length of stay and discharges in Catalonia in 1994.**

| Morbidity group | Average length of stay | | Discharges | | Average total days | |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female |
| Intestine Infectious diseases | 4 | 5 | 2,516 | 2,213 | 10,064 | 11,065 |
| Tuberculosis | 15 | 18 | 1,269 | 592 | 19,035 | 10,656 |
| Other bact. diseases | 16 | 15 | 720 | 655 | 11,456 | 9,825 |
| Virus infections | 9 | 7 | 1,742 | 1,121 | 15,678 | 7,847 |
| Equinocococis | 16 | 14 | 132 | 105 | 2,112 | 1,470 |
| Other infectious diseases | 7 | 12 | 992 | 739 | 6,944 | 8,868 |
| Malign tumours | 13 | 13 | 25,090 | 16,932 | 326,170 | 220,116 |
| Benign tumours | 6 | 7 | 2,560 | 7,179 | 15,360 | 50,253 |
| CIS | 3 | 12 | 46 | 201 | 138 | 2,412 |
| Not specified tumours | 10 | 8 | 3,996 | 3,130 | 39,960 | 25,040 |
| Endocrine glands | 14 | 10 | 6,320 | 8,239 | 88,480 | 82,390 |
| Nutrition | 13 | 10 | 63 | 30 | 819 | 300 |
| Blood disease-hemat. org | 10 | 11 | 2,236 | 3,121 | 22,360 | 23,331 |
| Mental illness | 98 | 146 | 11,498 | 9,747 | 1,126,804 | 1,423,062 |
| Nervous system disease | 17 | 9 | 4,474 | 5,988 | 76,058 | 53,892 |
| Eye and annexes | 3 | 4 | 15,497 | 17,140 | 46,491 | 68,560 |
| Ear | 4 | 3 | 3,386 | 3,489 | 13,544 | 10,467 |
| Circulatory system | 11 | 11 | 39,528 | 31,916 | 434,808 | 351,076 |
| Respiratory system | 8 | 8 | 35,144 | 20,857 | 281,152 | 166,856 |
| Mouth and annexes | 3 | 4 | 2,446 | 3,091 | 7,338 | 12,364 |
| Digestive system | 8 | 9 | 44,996 | 32,027 | 359,968 | 288,243 |
| Urinary system | 8 | 8 | 10,583 | 8,814 | 84,664 | 70,512 |
| Genital system Male | 6 | - | 14,062 | - | 84,372 | - |
| Breast Female | 5 | 4 | 340 | 3,055 | 1,700 | 12,220 |
| Genital system Female | - | 5 | - | 16,073 | - | 80,365 |
| Abortion | - | 2 | - | 6,724 | - | 13,448 |
| Obstetric direct causes | - | 6 | - | 20,642 | - | 123,852 |
| Obstetric indirect causes | - | 4 | - | 612 | - | 2,448 |
| Delivery | - | 4 | - | 35,359 | - | 141,436 |
| Skin | 9 | 8 | 4,293 | 4,385 | 38,637 | 35,080 |
| Osteomuscular system | 9 | 9 | 20,296 | 22,484 | 182,664 | 202,356 |
| Congetic abnormalities | 6 | 10 | 3,747 | 2,791 | 22,482 | 27,910 |
| Perinatal care | 10 | 11 | 4,584 | 4,024 | 45,840 | 44,264 |
| Not defined morbidity | 8 | 8 | 27,994 | 27,392 | 223,952 | 219,136 |
| Fractures | 11 | 14 | 14,015 | 12,754 | 154,165 | 178,556 |
| Dislocations and sprains | 5 | 6 | 4,214 | 2,332 | 21,070 | 13,992 |
| Internal trauma | 8 | 9 | 5,008 | 2,320 | 40,064 | 20,880 |
| Injures | 7 | 9 | 2,848 | 925 | 19,936 | 8,325 |
| Burns | 15 | 12 | 760 | 418 | 11,400 | 5,016 |
| Poisoning | 8 | 7 | 953 | 826 | 7,624 | 5,782 |
| Other trauma and poisoning | 9 | 11 | 5,652 | 4,388 | 50,868 | 48,268 |
| Other causes | 8 | 7 | 33,098 | 32,530 | 264,784 | 227,710 |
| **TOTAL** | **12** | **11** | **357,099** | **378,757** | **4,158,961** | **4,309,649** |

Sources: INE (1996, 1997a)

## 7.4. Limitations and improvements.

### 7.4.1. Limitations.

There is no such thing as perfect research. Improvements in research methodologies, as well as information systems and databases in any particular field, have been in the minds of researchers all over the world and have contributed to the research debate and literature ever since science was born as a concept. In this respect, there are a number of limitations to the study of inequalities in health and health care. These are of a diverse nature, ranging from those that relate to the data set used and how this data was collected, together with its implications to the measurement of morbidity and utilisation, to those other limitations imposed by the methods applied.

Population health interview surveys are well known and frequently used sources to the study of how both health and health care are distributed across a given population. However, such surveys share a series of shortcomings that need to be acknowledged. First, health surveys do not usually consider people in hospital or institutionalised of any kind at the moment of the interview, and these are usually a group of people in great need[51]. This may have important implications to the analysis of equity depending on whether those instutionalised follow the income and morbidity patterns shown for those that completed the questionnaire. If lower income groups in hospital represent a higher percentage of the population than they do in the sample then we would say our study is underestimating need in those groups and, consequently, inequalities in health. Since the information sources used in this research do not allow for such issue to be explored there is little one can do to alleviate this difficulty but to encourage new research and to make explicit this limitation

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51 Further, sometimes indirect informants are used which can also bias the real impact of morbidity (Alonso et *al.*, 1988).

when reporting results.

The wording of the questions and their interpretation could be argued as an additional limitation to the use of questionnaires and surveys (Collins and Klein, 1980). In this respect, it could be the case that those classified as in equal need by the selected indicators were not really in an equal situation as regards the presence of morbidity, disability or other images of ill-health. That is, the indicators used to measure need may not be reflecting the same situations in lower income groups than in higher income groups, which may ultimately translate into a different use of health care services and, hence, to inequalities in the provision of health care. It is difficult to ascertain the reasons why this may happen. There may be different perceptions over symptoms and overall dissimilar concepts of health across income groups. The very concept of illness, or poor health could be different among the poor (Blaxter, 1989). Individual perception may also vary according to what is understood by activity, and restriction of activity, in each case (Alonso *et al.*, 1988; González and Regidor, 1988). This will lead to people falling in the same group of need, e.g. HNG, being objectively different across income groups. For instance, people in higher income groups may enjoy better health in general. In brief, levels of actual health status may not be comparable across groups despite having produced similar answers to the questionnaire.

However, it is difficult to ascertain in which direction this could affect the results shown. In the case there was a higher perception of activity restriction among the worse-off this would lead to an overestimation of, particularly, Acute and Limcro as morbidity indicators to the advantage of these groups. Such an overestimation would have an effect on the illness concentration curves, making the real distribution of morbidity less inequitable, and the corresponding inequality indexes would move more to the advantage of the better-off. That is, the effect of having overestimated the size of the inequalities in health to the benefit of the worse-off will ultimately led us to believe that, *ceteris paribus,* inequalities in the provision of health care would be closer to zero as far as the Limcro indicator refers, and more to the advantage of the better-off when considering Acute as indicator of need.

Since the need indicators used in this research are based on self perception of health status the ways of conceiving health may therefore be different across income groups, social class, status and gender[52]. However, these are shared problems of socioeconomic research using surveys, particularly if no standard medical examination is performed in situ at the time the questionnaire is administered.

Moreover, Schrijers *et al.* (1994) noted there is some evidence that lower socioeconomic groups systematically underreport certain health conditions such as cancer, asthma and heart disease. However, these same authors also point out that a combination of health status measures, covering the three important dimensions of health – perceived complaints, diseases, and handicaps –, enables extensive control for health status in surveys aiming at measuring socioeconomic differences in health care utilisation. This research has used up to five need indicators to try to overcome this limitation.

A third set of problems to research using health surveys are those associated to the use of utilisation indicators. Biases can come as a result of, for example, relevance, memory and stigma in reporting. It has been argued, however, these sources of bias are not necessarily correlated with social class or income groups (Alonso *et al.*, 1988; Jovell, 1994), for which it is reasonable to conclude that they are of a lesser importance to this research. If, on the contrary, there was a true association between under-reporting for these reasons and income group distribution one will be facing a sizeable problem in the measurement of

52

People in higher income groups may make greater use of services as a consequence of a better perception of symptoms, and not just those that affect their capacity to work typical of low income groups, as well as a quicker response to them.

inequalities in health care. Indeed, if the less advantaged groups systematically under-report utilisation for any of the forementioned reasons the results of this research would be indicating these groups use services less than they really do[53]. The true expenditure concentration curve will shift towards the upper-left corner in the box, that is, more to the advantage of the least well-off and, *ceteris paribus,* the inequality indexes will then show greater inequality to the advantage of lower income groups.

The use/need ratios and the inequality indices used share an unsolved implication. That is, the so-called proportionality assumption. It is difficult to ascertain how much medical care is adequate to a certain degree of need, and hence, whether greater amount of need would require equal greater amount of medical treatment, that is, proportional medical assistance.

Further, the use/need ratios used here, and elsewhere, do inform us about services being provided according to need, but they do not tell us about the appropriateness of such utilisation nor about the effectiveness, cost-effectiveness nor quality of the services provided in each case (González and Regidor, 1988; Borràs, 1994). Such an exercise would require immense effort in gathering and processing the necessary information. Even when possible, the researcher would still have to face a common definition of what is to be consider as appropriate and beneficial. Certainly, we should not only provide care to those that need care but ensure that the care provided is the adequate care. We should be looking into more research regarding treatment decisions, development of standards, clinical practice guidelines, studies on cost-effectiveness of interventions, as well as accreditation mechanisms, and whether individuals in the same need are really equally responsive to treatment. The role of evidence based health care should be crucial to the

53 Survey data rely too heavily on respondents and, as reported, results may change if hospital records were used instead (Van de Meer *et al.,* 1996).

provision of care on both individual and population bases. For such a purpose, efforts should be committed to technology assessment and health services research initiatives.

A further problem is that the number of medical visits and in-patient days considered in the calculation of the use/need ratios do not necessarily relate to the identified morbidity and, accordingly, health problems reported by respondents may or may not be the reasons for utilisation of the services at the various levels. However, the data used, as well as many other data sets in other countries, does not provide this information. Further, the potential of population health surveys to find causal relationships between utilisation and the rest of variables is very limited. Although a series of associated factors have been raised here, further research should be encouraged towards the disclosure of the causal relationship between utilisation and age, gender, income or education in general.

The study of the Catalan Health System as a whole, both public and private provision, forces a number of limitations, some of them commented upon previously. From the Catalan health survey data (ESCA, 1996) one cannot tell whether a particular visit was paid to private or public centres, for which an homogeneous monetary value for both public and private medical visits and hospitals stays was used. It could be argued, however, that a visit paid to a private physician, or an inpatient stay in a private hospital, is rather more expensive in monetary terms. If that was the case our results will point to greater inequality to the disadvantage of lower income groups, particularly in specialist and hospital care, since those groups would use these private services in a lesser degree (Fernández *et al.*, 1996). Further, the use of a single unit of costs implies that no differentiation is being made among specialties, for example, accounting for their different resource implications. However, given the source of data used there was little that could be done around this problem since the Catalan health survey does not provide information on the particular hospital resources involved in the process of care. It was therefore assumed that the case-mix attended in each hospital was broadly similar and that no differences existed among income groups as regards resource intensive pathologies. If on the contrary, lower income groups were affected by pathologies that implied a higher use of resources then our results would under-estimate their utilisation and hence any reported inequality favouring the better off.

It is important to highlight the fact that the results refer to the whole of the Catalan Health System, and hence to the existing public-private mix. Despite the CHS allowing for the identification of those individuals that prefer to use private services it does not allow for the separation of private and public use. Rather than a limitation this could well be thought as an advantage to some extent. Certainly, the results displayed for the whole system are of utmost importance, since we are contemplating not just the impact on equity from public provision but also from private services. The split between provision and purchasing in the Catalan Health system since the early 90s took account of the different nature of the ownership of health care centres in Catalonia. As seen in the literature review chapter, the presence of numerous non-public institutions shaped the future structure of the Catalan Health System in which over 60% of the hospital beds are non-public. However, the finance of the system remains largely on public hands, despite almost 25% of the population in Catalonia enjoys a double insurance (public and private). This fact reinforces the need to study not only the public side but both, assessing which is the equity impact of such a private-public mix in the provision of health care.

In any case, the study of equity in the provision of health care in Catalonia should be complemented with the analysis of equity in the finance of these same health care services, also at the decentralised level of analysis. However, although Catalonia has been endowed with full competencies in health care organisation and management in its territory, this is far from also being the case on the finance side. The Spanish system is largely financed by taxes centrally collected by authorities in Madrid and, as shown in previous chapters, geographically distributed later to the regions according to their population. This makes the analysis of equity in the finance extraordinarily complicated.

Although the limitations pointed out above have identified a series of possible biases in to the measurement of inequalities in health and health care, health interview surveys do offer researchers a very rich source of information. Above all, they are said to improve information gathered by hospital medical records and the way they account for both individuals that use health care services and individuals that do not. Further, the inclusion in the surveys of socio-economic and others variables would allow for prediction of utilisation and adequate policy responses. Finally, as Blaxter has argued, despite the acceptance of self reports may be thought problematic, in fact, where comparisons have been made, the agreement with doctors' assessments or medical records has been high (Blaxter, 1985).

### 7.4.2. Improvements.

Despite these limitations, it is my belief that this study has made some improvements to previous research in the area. The first, and probably most important, is the geographical area of interest in which the hypotheses of the study have been tested, namely Catalonia. This is of particular importance in the future as far as policy responses design and implementation. Devolution of health care policy in Spain to regional administrative levels such as Catalonia necessarily shifts any analysis from national to regional level. This research takes account of this context and, using a specific Catalan data set, studied equity at the level of the Catalan health care system. At the time of writing this report there was no comprehensive regional analysis published exploring inequalities in health care as the one presented here. Despite the important information and conclusions gathered, further research should also be encouraged at smaller geographical levels of analysis within Catalonia, beyond the existing one on Barcelona.

Secondly, this research has used a wider range of need indicators than any other similar study. Indeed, this study has explored the distribution of five indicators, as proxies to need, across the population ranked by income, namely Health Not Good, Acute illness, Limiting Chronic illness, Sick and Not-sick. This has allowed for a greater picture of self-reported morbidity distribution, as well as a better assessment of equity in the provision of health care since the choice of indicator has proven crucial in determining the magnitude of the disclosed inequalities. The selection of such a wide range minimises the bias inherent in the use of just one or two particular indicators, such as the not-sick making use of health care services, too.

Further, this research has brought into play two inequality indices, namely Le Grand's and Collins and Klein's. This has also proven useful to ascertain in which magnitude and direction any of these indices could be biased to favour the better-off or the least well-off, as pointed out by the literature review.

Finally, this study has gone further in the analysis of equity to account for service delivery inequalities at three levels of provision, namely primary care, specialist care and inpatient care. This has proven of great value since it has shown that overall equitable systems may hide sizeable inequalities at the three different levels of provision, for which variables such as age, gender, income and education may have different weights. Accordingly, more targetted policy responses could possibly be designed.

### 7.5. Policy implications.

One of the ultimate ends of applied research in social sciences is to inform policy-making in the specific area of concern. From this piece of research one should be able to extract a number of relevant policy implications which ought to promote the debate, for instance, on the most appropriate policy responses to the disclosed inequalities. In this sense, policy implications derived from this study aim at better targeting the causes of inequality and to foster the need of continuing research along these and other lines, both to better understand the dimensions of inequalities and to monitor the effectiveness of policy responses.

In the first place, the reported findings direct attention to the existence of a relatively small degree of inequality in the delivery of health care in Catalonia. Overall, the Catalan health care system was found fairly equitable as a consequence of expenditures in health care being distributed, across socio-economic groups, only in a slightly different way from ill-health and health. If that were not the case, a relevant policy implication would be to re-allocate expenditure to meet need across income groups, that is equalising the distribution of expenditure in medical care across socioeconomic groups (Le Grand, 1982). In this case study, however, there is not a great margin for such a policy since equity in the provision of care has broadly been achieved

Nevertheless, the reasons why the system shows a small degree of inequity are found in the balance of utilisation of the different health care services, namely primary care, specialist care and hospital care. For this, it matters less as to whether the equity principle has been achieved or not at the global level, but more as to how or why is this the case and, hence, to a better understanding of the factors behind the emergence of different patterns of utilisation of services across income groups, education levels, gender and age. In terms of policy implications, one may better give thought to adequate policy instruments and tools that would correct the dislosed inequalities.

In this respect, primary care and specialist care utilisation are clear examples of income inequalities to the advantage of the worse-off and better-off, respectively. Policy recommendations should therefore address these two

levcels by means of exploring into the reasons for that being the case:
(i) differences in the incidence of types of disease across income groups, and/or
(ii) differences in the rates at which those reporting a given condition use the health services.

### 7.5.1. Differences in the incidence of disease.

Under the first scenario of inequalities being caused by a different distribution of epidemiological variables such as incidence, prevalence and risk of disease, the resulting policy implications seem clear. Policy makers should be targetting disease as a whole, with particular emphasis on those less advantaged groups and their particular morbidity components[54]. The policy instruments to do so may vary from educational programs to prevention of disease and risk assessment. The wide range of measures fall in part under health care policy competencies but also, and probably more important, under the capacity, expertise and competency of other policy areas such as housing, education, and economic and social policies in general.

In this respect, it has been frequently argued that there is little the health care system can do to correct inequality in health since most of the elements and factors influencing health are beyond its direct control and competency, and inequalities in health care and in health reflect the basic structure of social and economic inequality (Le Grand, 1982). However, there is a complementary vision to this. It has been pointed out that the health care sector could have a major role in encouraging the development of an equity orientation across the whole range of public policies that have and impact on health, as suggested by

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54 Targetting less advantaged groups could be of primarily importance in drafting and implementing policies. It could well be the case of certain health education/prevention policies that, despite being of a universal nature when being drafted, could at the end benefit particular population groups. For instance, a universal anti-smoking campaign would probably reduce smoking rates more among the best educated or higher income groups than among those other less priviledged groups as a consequence, for instance, the former attaching a greater social importance to health.

Benzeval *et al.* (1996) and Foster (1996). The authors argue that, first, the health sector is in a pivotal position in terms of experience to assess link between health status and socioeconomic variables and, second, it is the door at which health problems are presented. Credibility is also at stake. If the health sector is not concerned with equity in health and health care, who will? There should always be a role for health care services in tackling inequalities in health, or at least helping to prevent an increase in inequalities as a consequence of external influences (Van Doorslaer *et al.*, 1993).

Age and gender differences in the presence of illness may well be rooted on biological and epidemiological factors. In this case there is little the health care services could do to equalise utilisation of primary or specialist care if there is an age pattern in utilisation of primary care as a consequence of infant care and/or the presence of chronic pathologies among the elderly. Further, the eldest use health care services more often, particularly primary care as a result of greater morbidity levels in general and the greater presence of chronic illness. The role of health care policy is unknown in terms of correcting such age marked patterns since they largely come as a consequence of factors of a biological nature and life cycle epidemiology.

However, policy responses may well consider epidemiology and medical research so as to improve the knowledge on the distribution of illness and disease across the disadvantage groups.

### 7.5.2. Differences in the utilisation of services for the same disease.

Inequalities could also come as a consequence of different rates of reporting illness, disease, or ill-health in general to the health care system. A number of reasons for which low income groups may actually be under-reporting illness was given in the previous section. It was argued that the utilisation of services came largely as a consequence of the population balancing costs and perceived benefits of receiving care. Policy responses should then be addressed to alter these particular circumstances, changing behaviour and attitudes towards health care, improving communication skills and information to disadvantaged groups, altering their perception of benefits by means of health education, and ensuring that referrals to specialist care are not a consequence of pressure to the GP but of adequate medical assessment.

Similarly, some thought should be given to increasing males' lower perception of benefit by adequate information on disease symptoms, severity of illness, and availability of appropriate medical treatment and adequate information on treatment availability in general.

Also the role of incentives and desincentives may be considered, not only as a means to make possible a particular policy to reduce inequalities but also to signal the possible negative effects of other policy options. For example, this study has disclosed that primary care utilisation is weighted towards the least advantaged groups. In order to preserve equity it would therefore not be appropriate to encourage a policy on co-payment of primary care services since that is likely to have a major effect on lower income groups' utilisation. An additional example relates to the role of the GP as gatekeeper in the public sector, since it may be the case that GPs do not refer the poor to specialist care as often as the rich. Incentives would then contemplate a change in suppliers' behaviour towards these groups, improving communication and information flows to low socioeconomic groups, as well as a referral policy operative on a need bases and not on a pressure bases. In brief, these research findings would help policy makers concerned with equity to design and implement positive and negative incentives to the utilisation of the different forms of care.

Different patterns of use of services across income groups may be triggering the appearance of inefficiencies at each level of provision, either as a consequence of misuse, bad use or unjustified overuse. Indeed, as a result of receiving different shares of care from each service as compared with need, those shares received may well be above the need or below the need, pinpointing inadequate use of services.

The fact that the distribution of health care is equitable is undoubtedly important in itself. Health care is indeed a contributor to a fairer society if provision addresses the needs of the population. But the determinants of the health of the nation may be posing enormous challenges to health care policies. Most of the time factors beyond health policy control continue to shape inequalities in health. Great inequalities in health, as measured by illness concentration curves, may exist in a given country with a fair distribution of health care resources across socioeconomic groups, as measured by a similar expenditure concentration curve. There must be something more the health care authorities could do besides ensuring services are provided according to need. Since it is health and its distribution what is considered here as the ultimate end, there should be a role for health authorities to enhance health, not only by means of providing services equitably, but to lead a wider debate and policy action agenda in the pursuit of equity in health, as mentioned before.

### 7.5.3 Further research.

Any research should encourage further research and this study is no exception. If there is a policy commitment to the amelioration of inequalities there are important research needs to fulfil in the future. First, it should be highlighted that any future applied research in this field of knowledge should also be encouraged at the decentralised level where action is taken by policy makers. This is particularly important in the case of Spain given the decentralisation process started in the eighties. Autonomous Communities should then count on both the competencies to tackle inequality problems as well as the instruments to inform such decisions, particularly context specific population health surveys. Further, the fact that the system has been found equitable on the whole, it does not follow that health districts within Catalonia share the same level of equity in their respective territory. District research should be encouraged as far as local needs assessment and the geographical allocation of resources.

More generally, the instruments needed to inform policy decisions regarding inequalities should include health surveys carried out at the appropriate level of decision-making. The development of other epidemiological and demographic information systems should also be in place to inform policy on these matters. Similarly, adequate instruments to measure and monitor changes in inequalities are also needed. In this respect, future research should be addressed to generate evidence of what works and what does not in the correction of inequalities in health and health care in the specific context of action.

Moreover, there is a need of continuous research on the equity impact of present and future arrangements in the health care system at the provider and purchasing levels. The primary care reform in place in Catalonia at the moment together with the appearance of new forms of health services management and incentives, both positive and negative, should be studied not only as regards their impact on efficiency but also on equity, particularly in terms of correcting, or not, the existing patterns of utilisation. Research should also be promoted at a micro level of provision. The existence of inequalities in health care at the broadest sense within a population scope could just be the tip of the iceberg in this sense. The existence of inequalities in access and utilisation of particular services should not be neglected (Luengo et *al.* 1996), ranging from screening programs to big ticket technologies. Targeted research to these areas should be promoted so as to define a better picture of inequalities in the provision of health care data at lower level of analysis. The asessment of emerging and existing technologies should also account for equity considerations together with the well known safety, effectiveness and cost-effectiveness criteria.[55]

## 7.6. Conclusions.

The research here has shown that broadly the Catalan health system provides equal treartment for equal need. This confirms the first research hypothesis raised in the methodology chapter. However, this study has also demonstrated that there are inequalities within the system with respect to specific services for which adequate policy responses should be in place. The existence of service inequalities has served the purpose of confirming our second hypothesis of research, but also of fostering the need for specific and targetted research at lower levels of analysis.

Catalan Health authorities have frequently claimed equity to be among their policy objectives. The findings of this research show that this aspiration has broadly been achieved, although they also suggest the need for constant surveillance and monitoring regarding the equity impact of health policy instruments and choices.

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Technology should here be understood in the widest sense, from an aspirin to the most sophisticated diagnostic, treatment and rehabilitation procedures and services. Evidence based medicine and policymaking may provide most useful information as regards the introduction adoption and difussion of medical technologies.

# CHAPTER 8.

## Conclusions.

Equity is a major policy objective in the Spanish health care system, both at national and regional levels. However, most of the studies on inequalities in health and health care in Spain have concentrated on the national perspective. Given the decentralisation process of health care such research efforts should better be addressed at the adequate level of policy-making, which in the case of Spain are largely the regions enjoying full competencies such as Catalonia.

This research has studied equity in the delivery of health care in Catalonia. It has first shown that important inequalities in health persist in the territory, as revealed by all indicators of self-reported morbidity used in this research, largely reflecting social and economic inequalities. However, the provision of health care in Catalonia has proven to be fairly equitable. That is, once self-reported morbidity is take into account, the utilisation of health care services by the population is only slightly inequitable, to the advantage of the better-off or worse off depending on the indicator of self-reported morbidity and the index of inequality used.

Possible explanations to this could be found in the nature, development and arrangements of the Spanish and Catalan health care systems, including the universal coverage, the extension of primary care services and increased resources into the system. Acknowledging this, this study offers an additional explanation grounded on the balance of particular service inequalities as a consequence of the different patterns of care disclosed. Indeed, three distinct patterns emerged for primary, specialist and inpatient care, which allowed for a much better understanding of the underlying inequalities in health care.

The discussion has pointed to possible interpretations of the main findings, including the most renowned models of service utilisation and feasible ways in which these models may accomodate with the context and the findings.

Following the results and discussion chapters it has been argued there is room for policy intervention in the correction of inequalities. Ways to do so may vary from better addressing expenditure to the most disadvantaged groups, promoting awareness of health disturbance among the least privileged groups, increasing information about care seeking options, balance perceived costs and benefits from using the health care, and stress public health in general, preventive services, education, and any other social and economic policy that would target inequalities in health.

At the level of individuals and the population we should be ready to encourage their participation in the health care policy area as a means to enhance equity in the system. The room for participation is enormous, not only by means of public representation, consultation and voting but also by means of education in the use of health care services. Participation should not only be defended on the bases of expert knowledge but on democratic principles, too.

Equity is one more of the health care system objectives, and the study of equity in health care is a constant challenge, not only because it requires high doses of social solidarity but also as a consequence of an environment in constant change. Certainly, the needs of the population are in continuous redefinition as a result of changing life styles, environmental conditions, socioeconomic factors and epidemiological variables. Further, new medical and technological advances and services have to adapt to these changes. The pressure of limited resources and the concern for efficiency, together with the aspiration of providing effective good quality health care are two other key goals in modern health care systems. Despite there being well known trade-offs among these multiple objectives there should be room for policy responses addressing equity and efficiency at the same time.

The study in depth of the above mentioned different utilisation patterns may well disclose areas of inefficiencies at each level of provision either as a consequence of misuse, bad use or unjustified overuse. Intervention to enhance equity should address these different patterns both for the sake of equity and efficiency in the next Century's health care systems. In this respect, a stronger social and political commitment to health and health care will be needed.

Finally, this research has mentioned, although not explored in depth, the need for evaluation of policy initiatives, both when designed to tackle inequalities or when addressing organizational aspects and incentives in the system. The information provided by this research has aimed at helping policy-makers to do so.

Universalisation of care may be considered as a correct policy response to tackle inequalities at the broadest level, that is, the overall expenditure received by the different income, age and gender groups according to their respective needs. However, universalisation may at the same time be hiding the presence of different patterns of use of services according to these same socioeconomic and demographic variables. Within a given degree of overall equity in the system it is important to examine how is this equity achieved and whether it is consistent across different sectors. Results from this study point to the fact that although being slightly inequitable the system maintains different patterns of utilisation of the various types of care across age, gender, income groups and education levels. On balance, the system may be found equitable, or reasonably inequitable, but it hides a clear picture of different use for the same needs, for which further research is needed as regards their contributing factors and plausible responses.

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# ANNEX A.

# Logistic Regressions Models: Output I.

## A.1. Logistic regressions and primary care utilisation.

(PC-1) Dependent variable: PC
File: **Catalonia**
Variables in the model: Age, gender, hng, **sick**, income)
Method: Forcing all variable in.
Model: PC = f {age*, gender, hng, **sick**, income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: last category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 170,5009 | 3 | ,0000 | ,1185 |
| 0-16 | ,2871 | ,0889 | 10,4288 | 1 | ,0012 | ,0268 |
| 17-39 | -,5019 | ,0762 | 43,3611 | 1 | ,0000 | -,0594 |
| 40-59 | -,5873 | ,0746 | 61,9356 | 1 | ,0000 | -,0715 |
| GENDER | ,1607 | ,0481 | 11,1441 | 1 | ,0008 | ,0279 |
| HNG | ,7876 | ,0684 | 132,5068 | 1 | ,0000 | ,1055 |
| SICK | ,8817 | ,0599 | 216,3602 | 1 | ,0000 | ,1353 |
| INCOME | | | 14,3967 | 4 | ,0061 | ,0234 |
| INCOME(1) | ,2360 | ,0832 | 8,0436 | 1 | ,0046 | ,0227 |
| INCOME(2) | ,2214 | ,0766 | 8,3625 | 1 | ,0038 | ,0233 |
| INCOME(3) | ,0216 | ,0719 | ,0906 | 1 | ,7635 | ,0000 |
| INCOME(4) | ,0981 | ,0710 | 1,9109 | 1 | ,1669 | ,0000 |
| Constant | -,0671 | ,0945 | ,5041 | 1 | ,4777 | |

| Variable | Exp(B) | 95% CI for Exp(B) Lower | Upper |
|---|---|---|---|
| 0-16 | 1,3326 | 1,1195 | 1,5863 |
| 17-39 | ,6054 | ,5214 | ,7029 |
| 40-59 | ,5558 | ,4802 | ,6434 |
| GENDER | 1,1743 | 1,0686 | 1,2905 |
| HNG | 2,1981 | 1,9223 | 2,5136 |
| SICK | 2,4150 | 2,1473 | 2,7161 |
| INCOME(1) | 1,2662 | 1,0756 | 1,4905 |
| INCOME(2) | 1,2478 | 1,0739 | 1,4498 |
| INCOME(3) | 1,0219 | ,8876 | 1,1765 |
| INCOME(4) | 1,1031 | ,9598 | 1,2676 |

(PC-2) Dependent variable: PC

File: **Catalonia**

Variables in the model: Age, gender, hng, **acute, limcro,** income)

Method: Forcing all variable in.

Model: PC = f {age*, gender, hng, **acute, limcro,** income**}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 332,7874 | 3 | ,0000 | ,1670 |
| 0-16 | ,2932 | ,0889 | 10,8719 | 1 | ,0010 | ,0275 |
| 17-39 | -,8060 | ,0740 | 118,5511 | 1 | ,0000 | -,0997 |
| 40-59 | -,7785 | ,0741 | 110,2882 | 1 | ,0000 | -,0961 |
| GENDER | ,1719 | ,0477 | 12,9791 | 1 | ,0003 | ,0306 |
| HNG | ,7553 | ,0686 | 121,2003 | 1 | ,0000 | ,1009 |
| INCOME | | | 20,7900 | 4 | ,0003 | ,0330 |
| INCOME(1) | ,2825 | ,0827 | 11,6704 | 1 | ,0006 | ,0287 |
| INCOME(2) | ,2615 | ,0760 | 11,8516 | 1 | ,0006 | ,0290 |
| INCOME(3) | ,0248 | ,0711 | ,1213 | 1 | ,7277 | ,0000 |
| INCOME(4) | ,0930 | ,0701 | 1,7579 | 1 | ,1849 | ,0000 |
| ACUTE | ,7104 | ,1080 | 43,2376 | 1 | ,0000 | ,0593 |
| LIMCRO | ,9473 | ,1148 | 68,0503 | 1 | ,0000 | ,0751 |
| Constant | ,5265 | ,0841 | 39,2062 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | 1,3407 | 1,1263 | 1,5959 |
| 17-39 | ,4466 | ,3863 | ,5164 |
| 40-59 | ,4591 | ,3970 | ,5309 |
| GENDER | 1,1876 | 1,0815 | 1,3040 |
| HNG | 2,1283 | 1,8605 | 2,4347 |
| INCOME(1) | 1,3264 | 1,1280 | 1,5597 |
| INCOME(2) | 1,2989 | 1,1192 | 1,5074 |
| INCOME(3) | 1,0251 | ,8917 | 1,1785 |
| INCOME(4) | 1,0975 | ,9565 | 1,2592 |
| ACUTE | 2,0348 | 1,6465 | 2,5147 |
| LIMCRO | 2,5789 | 2,0591 | 3,2298 |

(PC-Male1) Dependent variable: PC
File: **Catalonia (MALE)**
Variables in the model: Age, hng, **sick,** income)
Method: Forcing all variable in.
Model: PC=f {age*, hng, **sick,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: last category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 95,1118 | 3 | ,0000 | ,1198 |
| 0-16 | ,2434 | ,1200 | 4,1174 | 1 | ,0424 | ,0185 |
| 17-39 | -,5672 | ,1032 | 30,2184 | 1 | ,0000 | -,0674 |
| 40-59 | -,6225 | ,1014 | 37,6893 | 1 | ,0000 | -,0758 |
| HNG | ,6102 | ,0953 | 40,9577 | 1 | ,0000 | ,0792 |
| INCOME | | | 5,7962 | 4 | ,2149 | ,0000 |
| INCOME(1) | ,1588 | ,1160 | 1,8727 | 1 | ,1712 | ,0000 |
| INCOME(2) | ,0612 | ,1030 | ,3527 | 1 | ,5526 | ,0000 |
| INCOME(3) | -,0705 | ,0959 | ,5404 | 1 | ,4623 | ,0000 |
| INCOME(4) | ,1144 | ,0940 | 1,4790 | 1 | ,2239 | ,0000 |
| SICK | ,8946 | ,0795 | 126,6201 | 1 | ,0000 | ,1417 |
| Constant | ,2218 | ,0718 | 9,5489 | 1 | ,0020 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | 1,2756 | 1,0083 | 1,6138 |
| 17-39 | ,5671 | ,4632 | ,6942 |
| 40-59 | ,5366 | ,4399 | ,6546 |
| HNG | 1,8407 | 1,5270 | 2,2189 |
| INCOME(1) | 1,1721 | ,9337 | 1,4714 |
| INCOME(2) | 1,0631 | ,8688 | 1,3008 |
| INCOME(3) | ,9319 | ,7722 | 1,1247 |
| INCOME(4) | 1,1211 | ,9324 | 1,3480 |
| SICK | 2,4465 | 2,0935 | 2,8590 |

(PC-Male2) Dependent variable: PC
File: **Catalonia** (MALE)
Variables in the model: Age, hng, **acute, limcro,** income)
Method: Forcing all variable in.
Model: PC = f {age*, hng, **acute, limcro,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 205,3215 | 3 | ,0000 | ,1792 |
| 0-16 | ,2183 | ,1201 | 3,3056 | 1 | ,0690 | ,0145 |
| 17-39 | -,9428 | ,0996 | 89,5546 | 1 | ,0000 | -,1188 |
| 40-59 | -,8697 | ,1003 | 75,1857 | 1 | ,0000 | -,1086 |
| HNG | ,6560 | ,0951 | 47,5336 | 1 | ,0000 | ,0856 |
| INCOME | | | 9,0471 | 4 | ,0599 | ,0130 |
| INCOME(1) | ,2481 | ,1155 | 4,6159 | 1 | ,0317 | ,0205 |
| INCOME(2) | ,1019 | ,1024 | ,9910 | 1 | ,3195 | ,0000 |
| INCOME(3) | -,0733 | ,0950 | ,5941 | 1 | ,4408 | ,0000 |
| INCOME(4) | ,0926 | ,0931 | ,9893 | 1 | ,3199 | ,0000 |
| ACUTE | ,8054 | ,1577 | 26,0691 | 1 | ,0000 | ,0623 |
| LIMCRO | 1,1144 | ,1798 | 38,4161 | 1 | ,0000 | ,0766 |
| Constant | ,8430 | ,0386 | 476,3099 | 1 | ,0000 | |

| Variable | Exp(B) | 95% CI for Exp(B) Lower | Upper |
|---|---|---|---|
| 0-16 | 1,2439 | ,9831 | 1,5739 |
| 17-39 | ,3895 | ,3204 | ,4735 |
| 40-59 | ,4191 | ,3443 | ,5101 |
| HNG | 1,9270 | 1,5992 | 2,3221 |
| INCOME(1) | 1,2817 | 1,0220 | 1,6073 |
| INCOME(2) | 1,1073 | ,9060 | 1,3532 |
| INCOME(3) | ,9294 | ,7714 | 1,1197 |
| INCOME(4) | 1,0971 | ,9140 | 1,3167 |
| ACUTE | 2,2376 | 1,6425 | 3,0482 |
| LIMCRO | 3,0478 | 2,1426 | 4,3354 |

(PC-Female1) Dependent variable: PC
File: **Catalonia** (FEMALE)
Variables in the model: Age, hng, **sick,** income)
Method: Forcing all variable in.
Model: PC = f {age*, hng, **sick,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: last category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 78,5510 | 3 | ,0000 | ,1152 |
| 0-16 | ,3484 | ,1329 | 6,8716 | 1 | ,0088 | ,0299 |
| 17-39 | -,4162 | ,1138 | 13,3830 | 1 | ,0003 | -,0457 |
| 40-59 | -,5651 | ,1108 | 26,0250 | 1 | ,0000 | -,0663 |
| HNG | ,9642 | ,0986 | 95,6718 | 1 | ,0000 | ,1310 |
| INCOME | | | 17,0846 | 4 | ,0019 | ,0408 |
| INCOME(1) | ,3327 | ,1206 | 7,6122 | 1 | ,0058 | ,0321 |
| INCOME(2) | ,4224 | ,1151 | 13,4780 | 1 | ,0002 | ,0458 |
| INCOME(3) | ,1444 | ,1088 | 1,7623 | 1 | ,1843 | ,0000 |
| INCOME(4) | ,0871 | ,1080 | ,6501 | 1 | ,4201 | ,0000 |
| SICK | ,8743 | ,0919 | 90,4714 | 1 | ,0000 | ,1273 |
| Constant | ,3390 | ,0848 | 15,9841 | 1 | ,0001 | |

| Variable | Exp(B) | 95% CI for Exp(B) Lower | Upper |
|---|---|---|---|
| 0-16 | 1,4168 | 1,0919 | 1,8383 |
| 17-39 | ,6596 | ,5277 | ,8243 |
| 40-59 | ,5683 | ,4574 | ,7061 |
| HNG | 2,6227 | 2,1619 | 3,1817 |
| INCOME(1) | 1,3947 | 1,1011 | 1,7665 |
| INCOME(2) | 1,5257 | 1,2176 | 1,9116 |
| INCOME(3) | 1,1553 | ,9335 | 1,4299 |
| INCOME(4) | 1,0910 | ,8829 | 1,3481 |
| SICK | 2,3971 | 2,0019 | 2,8703 |

(PC-Female2) Dependent variable: PC
File: **Catalonia** (FEMALE)
Variables in the model: Age, hng, **acute, limcro,** income)
Method: Forcing all variable in.
Model: PC = f {age*, hng, **acute, limcro,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: last category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 134,0799 | 3 | ,0000 | ,1531 |
| 0-16 | ,3861 | ,1329 | 8,4445 | 1 | ,0037 | ,0343 |
| 17-39 | -,6483 | ,1112 | 33,9730 | 1 | ,0000 | -,0765 |
| 40-59 | -,6905 | ,1105 | 39,0737 | 1 | ,0000 | -,0824 |
| HNG | ,8826 | ,0998 | 78,2475 | 1 | ,0000 | ,1181 |
| INCOME | | | 19,6915 | 4 | ,0006 | ,0463 |
| INCOME(1) | ,3504 | ,1197 | 8,5673 | 1 | ,0034 | ,0347 |
| INCOME(2) | ,4529 | ,1141 | 15,7618 | 1 | ,0001 | ,0502 |
| INCOME(3) | ,1501 | ,1077 | 1,9402 | 1 | ,1637 | ,0000 |
| INCOME(4) | ,0974 | ,1067 | ,8325 | 1 | ,3615 | ,0000 |
| ACUTE | ,6100 | ,1486 | 16,8428 | 1 | ,0000 | ,0521 |
| LIMCRO | ,8184 | ,1501 | 29,7109 | 1 | ,0000 | ,0712 |
| Constant | ,9810 | ,0423 | 537,1486 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | 1,4712 | 1,1339 | 1,9088 |
| 17-39 | ,5229 | ,4205 | ,6503 |
| 40-59 | ,5013 | ,4037 | ,6225 |
| HNG | 2,4172 | 1,9878 | 2,9392 |
| INCOME(1) | 1,4196 | 1,1227 | 1,7949 |
| INCOME(2) | 1,5729 | 1,2578 | 1,9671 |
| INCOME(3) | 1,1619 | ,9407 | 1,4351 |
| INCOME(4) | 1,1023 | ,8942 | 1,3588 |
| ACUTE | 1,8404 | 1,3753 | 2,4629 |
| LIMCRO | 2,2668 | 1,6890 | 3,0424 |

(PC-3) Dependent variable: PC
File: **Catalonia**
Variables in the model: Age, gender, hng, **acute, limcro,** income)
Method: Forcing all variable in.
Model: PC = f {age*, gender, hng, **acute, limcro,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: Next category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 332,7874 | 3 | ,0000 | ,1670 |
| 0-16 | 1,0992 | ,0734 | 224,3179 | 1 | ,0000 | ,1378 |
| 17-39 | -,0275 | ,0588 | ,2183 | 1 | ,6403 | ,0000 |
| 18-59 | -,7785 | ,0741 | 110,2882 | 1 | ,0000 | -,0961 |
| GENDER | ,1719 | ,0477 | 12,9791 | 1 | ,0003 | ,0306 |
| HNG | ,7553 | ,0686 | 121,2003 | 1 | ,0000 | ,1009 |
| ACUTE | ,7104 | ,1080 | 43,2376 | 1 | ,0000 | ,0593 |
| LIMCRO | ,9473 | ,1148 | 68,0503 | 1 | ,0000 | ,0751 |
| INCOME | | | 20,7900 | 4 | ,0003 | ,0330 |
| INCOME(1) | ,0210 | ,0830 | ,0637 | 1 | ,8007 | ,0000 |
| INCOME(2) | ,2367 | ,0762 | 9,6566 | 1 | ,0019 | ,0256 |
| INCOME(3) | -,0682 | ,0720 | ,8990 | 1 | ,3430 | ,0000 |
| INCOME(4) | ,0930 | ,0701 | 1,7579 | 1 | ,1849 | ,0000 |
| Constant | ,6588 | ,0744 | 78,4967 | 1 | ,0000 | |

| | | 99% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | 3,0017 | 2,4847 | 3,6263 |
| 17-39 | ,9729 | ,8362 | 1,1320 |
| 40-59 | ,4591 | ,3793 | ,5557 |
| GENDER | 1,1876 | 1,0502 | 1,3429 |
| HNG | 2,1283 | 1,7835 | 2,5397 |
| ACUTE | 2,0348 | 1,5405 | 2,6877 |
| LIMCRO | 2,5789 | 1,9185 | 3,4665 |
| INCOME(1) | 1,0212 | ,8245 | 1,2647 |
| INCOME(2) | 1,2671 | 1,0413 | 1,5418 |
| INCOME(3) | ,9340 | ,7760 | 1,1243 |
| INCOME(4) | 1,0975 | ,9161 | 1,3148 |

(PC-Male3) Dependent variable: PC
File: **Catalonia** (MALE)
Variables in the model: Age, gender, hng, **acute, limcro,** income)
Method: Forcing all variable in.
Model: PC = f {age*, gender, hng, **acute, limcro,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: next category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 205,3215 | 3 | ,0000 | ,1792 |
| 0-16 | 1,1611 | ,1010 | 132,2105 | 1 | ,0000 | ,1448 |
| 17-39 | -,0731 | ,0788 | ,8610 | 1 | ,3535 | ,0000 |
| 40-59 | -,8697 | ,1003 | 75,1857 | 1 | ,0000 | -,1086 |
| HNG | ,6560 | ,0951 | 47,5336 | 1 | ,0000 | ,0856 |
| ACUTE | ,8054 | ,1577 | 26,0691 | 1 | ,0000 | ,0623 |
| LIMCRO | 1,1144 | ,1798 | 38,4161 | 1 | ,0000 | ,0766 |
| INCOME | | | 9,0471 | 4 | ,0599 | ,0130 |
| INCOME(1) | ,1463 | ,1176 | 1,5470 | 1 | ,2136 | ,0000 |
| INCOME(2) | ,1752 | ,1035 | 2,8622 | 1 | ,0907 | ,0118 |
| INCOME(3) | -,1659 | ,0970 | 2,9219 | 1 | ,0874 | -,0122 |
| INCOME(4) | ,0926 | ,0931 | ,9893 | 1 | ,3199 | ,0000 |
| Constant | ,8430 | ,0386 | 476,3099 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | 3,1933 | 2,6199 | 3,8922 |
| 17-39 | ,9295 | ,7964 | 1,0847 |
| 40-59 | ,4191 | ,3443 | ,5101 |
| HNG | 1,9270 | 1,5992 | 2,3221 |
| ACUTE | 2,2376 | 1,6425 | 3,0482 |
| LIMCRO | 3,0478 | 2,1426 | 4,3354 |
| INCOME(1) | 1,1575 | ,9192 | 1,4575 |
| INCOME(2) | 1,1914 | ,9726 | 1,4595 |
| INCOME(3) | ,8471 | ,7004 | 1,0246 |
| INCOME(4) | 1,0971 | ,9140 | 1,3167 |

(PC-Female3) Dependent variable: PC
File: **Catalonia** (FEMALE)
Variables in the model: Age, gender, hng, **acute, limcro,** income)
Method: Forcing all variable in.
Model: PC = f {age*, gender, hng, **acute, limcro,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: next category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 134,0799 | 3 | ,0000 | ,1531 |
| 0-16 | 1,0344 | ,1071 | 93,3146 | 1 | ,0000 | ,1293 |
| 17-39 | ,0423 | ,0888 | ,2264 | 1 | ,6342 | ,0000 |
| 40-59 | -,6905 | ,1105 | 39,0737 | 1 | ,0000 | -,0824 |
| HNG | ,8826 | ,0998 | 78,2475 | 1 | ,0000 | ,1181 |
| ACUTE | ,6100 | ,1486 | 16,8428 | 1 | ,0000 | ,0521 |
| LIMCRO | ,8184 | ,1501 | 29,7109 | 1 | ,0000 | ,0712 |
| INCOME | | | 19,6915 | 4 | ,0006 | ,0463 |
| INCOME(1) | -,1026 | ,1187 | ,7470 | 1 | ,3874 | ,0000 |
| INCOME(2) | ,3029 | ,1132 | 7,1555 | 1 | ,0075 | ,0307 |
| INCOME(3) | ,0527 | ,1076 | ,2395 | 1 | ,6246 | ,0000 |
| INCOME(4) | ,0974 | ,1067 | ,8325 | 1 | ,3615 | ,0000 |
| Constant | ,9810 | ,0423 | 537,1486 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | 2,8133 | 2,2807 | 3,4702 |
| 17-39 | 1,0432 | ,8765 | 1,2415 |
| 40-59 | ,5013 | ,4037 | ,6225 |
| HNG | 2,4172 | 1,9878 | 2,9392 |
| ACUTE | 1,8404 | 1,3753 | 2,4629 |
| LIMCRO | 2,2668 | 1,6890 | 3,0424 |
| INCOME(1) | ,9025 | ,7152 | 1,1389 |
| INCOME(2) | 1,3537 | 1,0843 | 1,6901 |
| INCOME(3) | 1,0541 | ,8536 | 1,3017 |
| INCOME(4) | 1,1023 | ,8942 | 1,3588 |

## A.2. Logistic regressions and specialist care utilisation

(SC-1) Dependent variable: SpC
File: **Catalonia**
Variables in the model: Age, gender, hng, **sick,** income)
Method: Forcing all variable in.
Model: SpC = f {age*, gender, hng, **sick,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: last category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 232,6116 | 3 | ,0000 | ,1264 |
| 0-16 | -,6041 | ,0724 | 69,6504 | 1 | ,0000 | -,0690 |
| 17-39 | ,3933 | ,0646 | 37,0692 | 1 | ,0000 | ,0497 |
| 40-59 | ,1756 | ,0617 | 8,1034 | 1 | ,0044 | ,0207 |
| GENDER | ,6662 | ,0422 | 248,8401 | 1 | ,0000 | ,1319 |
| HNG | ,8185 | ,0536 | 233,2381 | 1 | ,0000 | ,1277 |
| SICK | ,8356 | ,0623 | 179,6912 | 1 | ,0000 | ,1119 |
| INCOME | | | 100,9246 | 4 | ,0000 | ,0809 |
| INCOME(1) | -,6660 | ,0725 | 84,3066 | 1 | ,0000 | -,0762 |
| INCOME(2) | -,5172 | ,0685 | 56,9699 | 1 | ,0000 | -,0622 |
| INCOME(3) | -,4450 | ,0669 | 44,2674 | 1 | ,0000 | -,0546 |
| INCOME(4) | -,2373 | ,0660 | 12,9331 | 1 | ,0003 | -,0278 |
| Constant | -1,7424 | ,0906 | 369,9866 | 1 | ,0000 | |

| Variable | Exp(B) | 95% CI for Exp(B) Lower | Upper |
|---|---|---|---|
| 0-16 | ,5466 | ,4743 | ,6299 |
| 17-39 | 1,4819 | 1,3057 | 1,6819 |
| 40-59 | 1,1920 | 1,0562 | 1,3452 |
| GENDER | 1,9469 | 1,7922 | 2,1149 |
| HNG | 2,2670 | 2,0410 | 2,5181 |
| SICK | 2,3062 | 2,0410 | 2,6059 |
| INCOME(1) | ,5138 | ,4457 | ,5923 |
| INCOME(2) | ,5962 | ,5212 | ,6819 |
| INCOME(3) | ,6408 | ,5621 | ,7306 |
| INCOME(4) | ,7888 | ,6931 | ,8977 |

(SC-2) Dependent variable: SpC
File: **Catalonia**
Variables in the model: Age, gender, hng, **acute, limcro,** income)
Method: Forcing all variable in.
Model: SpC = f {age*, gender, hng, **acute, limcro,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 133,5547 | 3 | ,0000 | ,0948 |
| 0-16 | -,5812 | ,0729 | 63,6424 | 1 | ,0000 | -,0659 |
| 17-39 | ,1400 | ,0632 | 4,9141 | 1 | ,0266 | ,0143 |
| 40-59 | ,0098 | ,0622 | ,0247 | 1 | ,8751 | ,0000 |
| GENDER | ,6407 | ,0423 | 229,5003 | 1 | ,0000 | ,1266 |
| HNG | ,7680 | ,0546 | 197,6993 | 1 | ,0000 | ,1174 |
| INCOME | | | 88,7887 | 4 | ,0000 | ,0755 |
| INCOME(1) | -,6253 | ,0726 | 74,2268 | 1 | ,0000 | -,0713 |
| INCOME(2) | -,4749 | ,0683 | 48,3356 | 1 | ,0000 | -,0571 |
| INCOME(3) | -,4320 | ,0665 | 42,1363 | 1 | ,0000 | -,0532 |
| INCOME(4) | -,2350 | ,0655 | 12,8581 | 1 | ,0003 | -,0277 |
| ACUTE | ,2466 | ,0763 | 10,4545 | 1 | ,0012 | ,0244 |
| LIMCRO | 1,0957 | ,0849 | 166,4971 | 1 | ,0000 | ,1077 |
| Constant | -1,1114 | ,0767 | 209,7579 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,5592 | ,4848 | ,6451 |
| 17-39 | 1,1503 | 1,0164 | 1,3019 |
| 40-59 | 1,0098 | ,8940 | 1,1407 |
| GENDER | 1,8979 | 1,7469 | 2,0619 |
| HNG | 2,1555 | 1,9367 | 2,3991 |
| INCOME(1) | ,5351 | ,4641 | ,6169 |
| INCOME(2) | ,6220 | ,5440 | ,7111 |
| INCOME(3) | ,6492 | ,5698 | ,7397 |
| INCOME(4) | ,7906 | ,6953 | ,8989 |
| ACUTE | 1,2796 | 1,1020 | 1,4859 |
| LIMCRO | 2,9912 | 2,5326 | 3,5328 |

(SC-Male1) Dependent variable: SpC
File: **Catalonia (MALE)**
Variables in the model: Age, hng, **sick,** income)
Method: Forcing all variable in.
Model: SpC = f {age*, hng, **sick,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 23,2517 | 3 | ,0000 | ,0500 |
| 0-16 | -,4012 | ,0981 | 16,7356 | 1 | ,0000 | -,0462 |
| 17-39 | -,1100 | ,0903 | 1,4813 | 1 | ,2236 | ,0000 |
| 40-59 | -,3023 | ,0877 | 11,8922 | 1 | ,0006 | -,0379 |
| HNG | ,8952 | ,0764 | 137,2467 | 1 | ,0000 | ,1401 |
| INCOME | | | 36,1317 | 4 | ,0000 | ,0639 |
| INCOME(1) | -,5443 | ,1032 | 27,8405 | 1 | ,0000 | -,0612 |
| INCOME(2) | -,4100 | ,0954 | 18,4670 | 1 | ,0000 | -,0489 |
| INCOME(3) | -,4340 | ,0925 | 22,0344 | 1 | ,0000 | -,0539 |
| INCOME(4) | -,2504 | ,0892 | 7,8831 | 1 | ,0050 | -,0292 |
| SICK | ,8635 | ,0891 | 93,9621 | 1 | ,0000 | ,1155 |
| Constant | -1,4326 | ,0825 | 301,3069 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,6695 | ,5524 | ,8114 |
| 17-39 | ,8959 | ,7505 | 1,0694 |
| 40-59 | ,7391 | ,6224 | ,8777 |
| HNG | 2,4477 | 2,1073 | 2,8432 |
| INCOME(1) | ,5802 | ,4740 | ,7103 |
| INCOME(2) | ,6636 | ,5504 | ,8001 |
| INCOME(3) | ,6479 | ,5405 | ,7766 |
| INCOME(4) | ,7785 | ,6536 | ,9272 |
| SICK | 2,3715 | 1,9915 | 2,8239 |

(SC-Male2) Dependent variable: SpC
File: **Catalonia (MALE)**
Variables in the model: Age, hng, **acute, limcro,**income)
Method: Forcing all variable in.
Model: SpC=f {age*, hng, **acute, limcro,** income**}
being age*=[4 categories, 60 years-old or more as a reference]
being income**=[5 categories, top income level as reference group]
Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 45,2174 | 3 | ,0000 | ,0754 |
| 0-16 | -,4456 | ,0993 | 20,1489 | 1 | ,0000 | -,0513 |
| 17-39 | -,4749 | ,0889 | 28,5675 | 1 | ,0000 | -,0621 |
| 40-59 | -,5646 | ,0888 | 40,4577 | 1 | ,0000 | -,0747 |
| HNG | ,9031 | ,0776 | 135,4331 | 1 | ,0000 | ,1391 |
| INCOME | | | 30,3801 | 4 | ,0000 | ,0570 |
| INCOME(1) | -,4671 | ,1038 | 20,2662 | 1 | ,0000 | -,0515 |
| INCOME(2) | -,3822 | ,0962 | 15,7824 | 1 | ,0001 | -,0447 |
| INCOME(3) | -,4377 | ,0930 | 22,1604 | 1 | ,0000 | -,0541 |
| INCOME(4) | -,2686 | ,0898 | 8,9504 | 1 | ,0028 | -,0318 |
| ACUTE | ,3746 | ,1134 | 10,9161 | 1 | ,0010 | ,0360 |
| LIMCRO | 1,5006 | ,1376 | 118,9522 | 1 | ,0000 | ,1303 |
| Constant | -,8228 | ,0363 | 513,1626 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,6404 | ,5272 | ,7780 |
| 17-39 | ,6219 | ,5225 | ,7402 |
| 40-59 | ,5686 | ,4778 | ,6766 |
| HNG | 2,4673 | 2,1192 | 2,8726 |
| INCOME(1) | ,6268 | ,5115 | ,7682 |
| INCOME(2) | ,6824 | ,5651 | ,8240 |
| INCOME(3) | ,6455 | ,5380 | ,7746 |
| INCOME(4) | ,7645 | ,6412 | ,9115 |
| ACUTE | 1,4545 | 1,1646 | 1,8164 |
| LIMCRO | 4,4845 | 3,4245 | 5,8726 |

(SC-Female1) Dependent variable: SpC
File: **Catalonia (FEMALE)**
Variables in the model: Age, hng, **sick,** income)
Method: Forcing all variable in.
Model: SpC = f {age*, hng, **sick,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 356,7322 | 3 | ,0000 | ,2239 |
| 0-16 | -,8210 | ,1058 | 60,2008 | 1 | ,0000 | -,0912 |
| 17-39 | ,8665 | ,0945 | 84,0611 | 1 | ,0000 | ,1083 |
| 40-59 | ,6571 | ,0884 | 55,2530 | 1 | ,0000 | ,0872 |
| HNG | ,7819 | ,0766 | 104,2208 | 1 | ,0000 | ,1209 |
| INCOME | | | 80,7154 | 4 | ,0000 | ,1019 |
| INCOME(1) | -,8421 | ,1062 | 62,8501 | 1 | ,0000 | -,0933 |
| INCOME(2) | -,7604 | ,1030 | 54,5286 | 1 | ,0000 | -,0867 |
| INCOME(3) | -,5833 | ,1021 | 32,6023 | 1 | ,0000 | -,0661 |
| INCOME(4) | -,3065 | ,1036 | 8,7537 | 1 | ,0031 | -,0311 |
| SICK | ,7663 | ,0928 | 68,2526 | 1 | ,0000 | ,0973 |
| Constant | -,7355 | ,0853 | 74,3145 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,4400 | ,3576 | ,5414 |
| 17-39 | 2,3786 | 1,9764 | 2,8626 |
| 40-59 | 1,9291 | 1,6222 | 2,2940 |
| HNG | 2,1856 | 1,8810 | 2,5396 |
| INCOME(1) | ,4308 | ,3498 | ,5305 |
| INCOME(2) | ,4675 | ,3820 | ,5720 |
| INCOME(3) | ,5581 | ,4568 | ,6818 |
| INCOME(4) | ,7360 | ,6007 | ,9017 |
| SICK | 2,1518 | 1,7941 | 2,5808 |

(SC-Female2) Dependent variable: SpC

File: **Catalonia (FEMALE)**

Variables in the model: Age, hng, **acute, limcro,**income)

Method: Forcing all variable in.

Model: SpC = f {age*, hng, **acute, limcro,** income**}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 294,7977 | 3 | ,0000 | ,2032 |
| 0-16 | -,7589 | ,1062 | 51,0249 | 1 | ,0000 | -,0837 |
| 17-39 | ,7001 | ,0923 | 57,5518 | 1 | ,0000 | ,0891 |
| 40-59 | ,5645 | ,0888 | 40,3750 | 1 | ,0000 | ,0741 |
| HNG | ,6724 | ,0787 | 73,0394 | 1 | ,0000 | ,1008 |
| INCOME | | | 77,2513 | 4 | ,0000 | ,0995 |
| INCOME(1) | -,8270 | ,1062 | 60,6855 | 1 | ,0000 | -,0916 |
| INCOME(2) | -,7318 | ,1027 | 50,7192 | 1 | ,0000 | -,0834 |
| INCOME(3) | -,5723 | ,1020 | 31,5076 | 1 | ,0000 | -,0649 |
| INCOME(4) | -,2994 | ,1033 | 8,3995 | 1 | ,0038 | -,0302 |
| ACUTE | ,1592 | ,1043 | 2,3282 | 1 | ,1270 | ,0068 |
| LIMCRO | 1,0230 | ,1103 | 85,9770 | 1 | ,0000 | ,1096 |
| Constant | -,1688 | ,0377 | 20,0119 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,4682 | ,3802 | ,5766 |
| 17-39 | 2,0140 | 1,6808 | 2,4133 |
| 40-59 | 1,7585 | 1,4775 | 2,0930 |
| HNG | 1,9589 | 1,6789 | 2,2854 |
| INCOME(1) | ,4374 | ,3552 | ,5385 |
| INCOME(2) | ,4811 | ,3933 | ,5884 |
| INCOME(3) | ,5642 | ,4620 | ,6890 |
| INCOME(4) | ,7412 | ,6054 | ,9076 |
| ACUTE | 1,1726 | ,9557 | 1,4386 |
| LIMCRO | 2,7814 | 2,2406 | 3,4528 |

(SC-3) Dependent variable: SpC

File: **Catalonia**

Variables in the model: Age, gender, hng, **acute, limcro,** income)

Method: Forcing all variable in.

Model: SpC = f {age*, gender, hng, **acute, limcro,** income**}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

Reference category: Next category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 133,5547 | 3 | ,0000 | ,0948 |
| 0-16 | -,5812 | ,0729 | 63,6424 | 1 | ,0000 | -,0659 |
| 17-39 | ,1400 | ,0632 | 4,9141 | 1 | ,0266 | ,0143 |
| 40-59 | ,0098 | ,0622 | ,0247 | 1 | ,8751 | ,0000 |
| GENDER | ,6407 | ,0423 | 229,5003 | 1 | ,0000 | ,1266 |
| HNG | -,7680 | ,0546 | 197,6993 | 1 | ,0000 | -,1174 |
| ACUTE | -,2466 | ,0763 | 10,4545 | 1 | ,0012 | -,0244 |
| LIMCRO | -1,0957 | ,0849 | 166,4971 | 1 | ,0000 | -,1077 |
| INCOME | | | 88,7887 | 4 | ,0000 | ,0755 |
| INCOME(1) | -,6253 | ,0726 | 74,2268 | 1 | ,0000 | -,0713 |
| INCOME(2) | -,4749 | ,0683 | 48,3356 | 1 | ,0000 | -,0571 |
| INCOME(3) | -,4320 | ,0665 | 42,1363 | 1 | ,0000 | -,0532 |
| INCOME(4) | -,2350 | ,0655 | 12,8581 | 1 | ,0003 | -,0277 |
| Constant | ,5515 | ,0483 | 130,3638 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,5592 | ,4848 | ,6451 |
| 17-39 | 1,1503 | 1,0164 | 1,3019 |
| 40-59 | 1,0098 | ,8940 | 1,1407 |
| GENDER | 1,8979 | 1,7469 | 2,0619 |
| HNG | ,4639 | ,4168 | ,5163 |
| ACUTE | ,7815 | ,6730 | ,9075 |
| LIMCRO | ,3343 | ,2831 | ,3949 |
| INCOME(1) | ,5351 | ,4641 | ,6169 |
| INCOME(2) | ,6220 | ,5440 | ,7111 |
| INCOME(3) | ,6492 | ,5698 | ,7397 |
| INCOME(4) | ,7906 | ,6953 | ,8989 |

(SC-Male3) Dependent variable: SpC
File: **Catalonia (MALE)**
Variables in the model: Age, hng, **acute, limcro,**income)
Method: Forcing all variable in.
Model: SpC = f {age*, hng, **acute, limcro,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: Next category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 45,2174 | 3 | ,0000 | ,0754 |
| 0-16 | ,0293 | ,0901 | ,1059 | 1 | ,7449 | ,0000 |
| 17-39 | ,0896 | ,0813 | 1,2150 | 1 | ,2704 | ,0000 |
| 40-59 | -,5646 | ,0888 | 40,4577 | 1 | ,0000 | -,0747 |
| HNG | ,9031 | ,0776 | 135,4331 | 1 | ,0000 | ,1391 |
| ACUTE | ,3746 | ,1134 | 10,9161 | 1 | ,0010 | ,0360 |
| LIMCRO | 1,5006 | ,1376 | 118,9522 | 1 | ,0000 | ,1303 |
| INCOME | | | 30,3801 | 4 | ,0000 | ,0570 |
| INCOME(1) | -,0849 | ,1008 | ,7091 | 1 | ,3997 | ,0000 |
| INCOME(2) | ,0555 | ,0970 | ,3276 | 1 | ,5671 | ,0000 |
| INCOME(3) | -,1691 | ,0942 | 3,2220 | 1 | ,0727 | -,0133 |
| INCOME(4) | -,2686 | ,0898 | 8,9504 | 1 | ,0028 | -,0318 |
| Constant | -,8228 | ,0363 | 513,1626 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | 1,0297 | ,8631 | 1,2286 |
| 17-39 | 1,0938 | ,9326 | 1,2828 |
| 40-59 | ,5686 | ,4778 | ,6766 |
| HNG | 2,4673 | 2,1192 | 2,8726 |
| ACUTE | 1,4545 | 1,1646 | 1,8164 |
| LIMCRO | 4,4845 | 3,4245 | 5,8726 |
| INCOME(1) | ,9186 | ,7539 | 1,1193 |
| INCOME(2) | 1,0571 | ,8741 | 1,2783 |
| INCOME(3) | ,8444 | ,7020 | 1,0157 |
| INCOME(4) | ,7645 | ,6412 | ,9115 |

(SC-Female3) Dependent variable: SpC
File: **Catalonia (FEMALE)**
Variables in the model: Age, hng, **acute, limcro,**income)
Method: Forcing all variable in.
Model: SpC = f {age*, hng, **acute, limcro,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: Next category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 294,7977 | 3 | ,0000 | ,2032 |
| 0-16 | -1,4591 | ,0926 | 248,1905 | 1 | ,0000 | -,1876 |
| 17-39 | ,1356 | ,0851 | 2,5379 | 1 | ,1111 | ,0088 |
| 40-59 | ,5645 | ,0888 | 40,3750 | 1 | ,0000 | ,0741 |
| HNG | ,6724 | ,0787 | 73,0394 | 1 | ,0000 | ,1008 |
| ACUTE | ,1592 | ,1043 | 2,3282 | 1 | ,1270 | ,0068 |
| LIMCRO | 1,0230 | ,1103 | 85,9770 | 1 | ,0000 | ,1096 |
| INCOME | | | 77,2513 | 4 | ,0000 | ,0995 |
| INCOME(1) | -,0952 | ,0918 | 1,0764 | 1 | ,2995 | ,0000 |
| INCOME(2) | -,1595 | ,0953 | 2,8024 | 1 | ,0941 | -,0107 |
| INCOME(3) | -,2729 | ,0987 | 7,6494 | 1 | ,0057 | -,0284 |
| INCOME(4) | -,2994 | ,1033 | 8,3995 | 1 | ,0038 | -,0302 |
| Constant | -,1688 | ,0377 | 20,0119 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,2325 | ,1939 | ,2787 |
| 17-39 | 1,1453 | ,9692 | 1,3532 |
| 40-59 | 1,7585 | 1,4775 | 2,0930 |
| HNG | 1,9589 | 1,6789 | 2,2854 |
| ACUTE | 1,1726 | ,9557 | 1,4386 |
| LIMCRO | 2,7814 | 2,2406 | 3,4528 |
| INCOME(1) | ,9092 | ,7595 | 1,0884 |
| INCOME(2) | ,8526 | ,7074 | 1,0276 |
| INCOME(3) | ,7612 | ,6274 | ,9236 |
| INCOME(4) | ,7412 | ,6054 | ,9076 |

## A.3. Logistic regressions and inpatient care utilisation.

(IPC-1) Dependent variable: IP
File: **Catalonia**
Variables in the model: Age, gender, hng, **sick,** income)
Method: Forcing all variable in.
Model: IP = f {age*, gender, hng, **sick,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 33,9638 | 3 | ,0000 | ,0685 |
| 0-16 | -,5613 | ,1343 | 17,4611 | 1 | ,0000 | -,0509 |
| 17-39 | ,0362 | ,1041 | ,1208 | 1 | ,7281 | ,0000 |
| 40-59 | -,3480 | ,1015 | 11,7520 | 1 | ,0006 | -,0405 |
| GENDER | -,0717 | ,0727 | ,9738 | 1 | ,3237 | ,0000 |
| HNG | ,7944 | ,0829 | 91,7759 | 1 | ,0000 | ,1227 |
| SICK | ,6548 | ,1321 | 24,5566 | 1 | ,0000 | ,0615 |
| INCOME | | | 2,2242 | 4 | ,6946 | ,0000 |
| INCOME(1) | -,0594 | ,1227 | ,2343 | 1 | ,6284 | ,0000 |
| INCOME(2) | -,0900 | ,1202 | ,5602 | 1 | ,4542 | ,0000 |
| INCOME(3) | -,1703 | ,1221 | 1,9463 | 1 | ,1630 | ,0000 |
| INCOME(4) | -,0416 | ,1196 | ,1211 | 1 | ,7278 | ,0000 |
| Constant | -3,1077 | ,1735 | 320,6527 | 1 | ,0000 | |

| Variable | Exp(B) | 95% CI for Exp(B) Lower | Upper |
|---|---|---|---|
| 0-16 | ,5705 | ,4384 | ,7423 |
| 17-39 | 1,0369 | ,8455 | 1,2716 |
| 40-59 | ,7061 | ,5787 | ,8615 |
| GENDER | ,9308 | ,8071 | 1,0733 |
| HNG | 2,2132 | 1,8812 | 2,6038 |
| SICK | 1,9248 | 1,4856 | 2,4938 |
| INCOME(1) | ,9423 | ,7408 | 1,1986 |
| INCOME(2) | ,9140 | ,7221 | 1,1568 |
| INCOME(3) | ,8434 | ,6640 | 1,0714 |
| INCOME(4) | ,9592 | ,7587 | 1,2127 |

(IPC-2) Dependent variable: IP

File: **Catalonia**

Variables in the model: Age, gender, hng, **acute, limcro,** income)

Method: Forcing all variable in.

Model: IP = f {age*, gender, hng, **acute, limcro,** income**}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 38,6036 | 3 | ,0000 | ,0740 |
| 0-16 | -,5614 | ,1351 | 17,2762 | 1 | ,0000 | -,0506 |
| 17-39 | -,1763 | ,1048 | 2,8331 | 1 | ,0923 | -,0118 |
| 40-59 | -,5615 | ,1042 | 29,0564 | 1 | ,0000 | -,0674 |
| GENDER | -,2168 | ,0756 | 8,2196 | 1 | ,0041 | -,0323 |
| HNG | ,6160 | ,0870 | 50,1068 | 1 | ,0000 | ,0898 |
| INCOME | | | 2,2645 | 4 | ,6872 | ,0000 |
| INCOME(1) | -,0229 | ,1251 | ,0336 | 1 | ,8546 | ,0000 |
| INCOME(2) | -,0583 | ,1218 | ,2290 | 1 | ,6322 | ,0000 |
| INCOME(3) | -,1639 | ,1236 | 1,7598 | 1 | ,1847 | ,0000 |
| INCOME(4) | -,0317 | ,1210 | ,0687 | 1 | ,7932 | ,0000 |
| ACUTE | ,0942 | ,1088 | ,7502 | 1 | ,3864 | ,0000 |
| LIMCRO | 1,3492 | ,0961 | 196,9219 | 1 | ,0000 | ,1809 |
| Constant | -2,4936 | ,1366 | 333,1300 | 1 | ,0000 | |

| Variable | Exp(B) | 95% CI for Exp(B) Lower | Upper |
|---|---|---|---|
| 0-16 | ,5704 | ,4378 | ,7433 |
| 17-39 | ,8383 | ,6827 | 1,0294 |
| 40-59 | ,5704 | ,4651 | ,6996 |
| GENDER | ,8051 | ,6941 | ,9337 |
| HNG | 1,8514 | 1,5611 | 2,1957 |
| INCOME(1) | ,9773 | ,7649 | 1,2488 |
| INCOME(2) | ,9434 | ,7430 | 1,1978 |
| INCOME(3) | ,8488 | ,6662 | 1,0814 |
| INCOME(4) | ,9688 | ,7642 | 1,2281 |
| ACUTE | 1,0988 | ,8878 | 1,3600 |
| LIMCRO | 3,8545 | 3,1925 | 4,6538 |

(IPC-Male1) Dependent variable: IP
File: **Catalonia** (MALE)
Variables in the model: Age, hng, **sick,** income)
Method: Forcing all variable in.
Model: IP = f {age*, hng, **sick,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 10,5810 | 3 | ,0142 | ,0394 |
| 0-16 | -,3965 | ,1708 | 5,3922 | 1 | ,0202 | -,0339 |
| 17-39 | -,4328 | ,1555 | 7,7473 | 1 | ,0054 | -,0441 |
| 40-59 | -,3416 | ,1400 | 5,9500 | 1 | ,0147 | -,0366 |
| HNG | ,9160 | ,1156 | 62,7806 | 1 | ,0000 | ,1434 |
| INCOME | | | 3,8854 | 4 | ,4217 | ,0000 |
| INCOME(1) | ,0914 | ,1841 | ,2465 | 1 | ,6195 | ,0000 |
| INCOME(2) | ,2454 | ,1740 | 1,9874 | 1 | ,1586 | ,0000 |
| INCOME(3) | ,0934 | ,1787 | ,2730 | 1 | ,6014 | ,0000 |
| INCOME(4) | ,2759 | ,1726 | 2,5556 | 1 | ,1099 | ,0137 |
| SICK | 1,0273 | ,2167 | 22,4626 | 1 | ,0000 | ,0832 |
| Constant | -3,6266 | ,2062 | 309,3358 | 1 | ,0000 | |

| Variable | Exp(B) | 95% CI for Exp(B) Lower | Upper |
|---|---|---|---|
| 0-16 | ,6727 | ,4813 | ,9400 |
| 17-39 | ,6487 | ,4783 | ,8798 |
| 40-59 | ,7107 | ,5401 | ,9351 |
| HNG | 2,4992 | 1,9925 | 3,1348 |
| INCOME(1) | 1,0957 | ,7638 | 1,5719 |
| INCOME(2) | 1,2781 | ,9087 | 1,7976 |
| INCOME(3) | 1,0979 | ,7734 | 1,5584 |
| INCOME(4) | 1,3178 | ,9395 | 1,8483 |
| SICK | 2,7934 | 1,8266 | 4,2719 |

(IPC-Male2) Dependent variable: IP
File: **Catalonia** (MALE)
Variables in the model: Age, hng, **acute, limcro,** income)
Method: Forcing all variable in.
Model: IP = f {age*, hng, **acute, limcro,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 45,3205 | 3 | ,0000 | ,1154 |
| 0-16 | -,5609 | ,1746 | 10,3222 | 1 | ,0013 | -,0531 |
| 17-39 | -,9804 | ,1618 | 36,6967 | 1 | ,0000 | -,1084 |
| 40-59 | -,8203 | ,1506 | 29,6577 | 1 | ,0000 | -,0968 |
| HNG | ,8206 | ,1191 | 47,4479 | 1 | ,0000 | ,1240 |
| INCOME | | | 4,0428 | 4 | ,4002 | ,0000 |
| INCOME(1) | ,2594 | ,1892 | 1,8793 | 1 | ,1704 | ,0000 |
| INCOME(2) | ,3154 | ,1795 | 3,0887 | 1 | ,0788 | ,0192 |
| INCOME(3) | ,1422 | ,1836 | ,6004 | 1 | ,4384 | ,0000 |
| INCOME(4) | ,2865 | ,1786 | 2,5738 | 1 | ,1086 | ,0139 |
| ACUTE | ,1845 | ,1658 | 1,2380 | 1 | ,2659 | ,0000 |
| LIMCRO | 2,0223 | ,1536 | 173,2376 | 1 | ,0000 | ,2407 |
| Constant | -2,9647 | ,0739 | 1609,899 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,5707 | ,4053 | ,8035 |
| 17-39 | ,3752 | ,2732 | ,5152 |
| 40-59 | ,4403 | ,3277 | ,5915 |
| HNG | 2,2719 | 1,7988 | 2,8695 |
| INCOME(1) | 1,2961 | ,8945 | 1,8779 |
| INCOME(2) | 1,3709 | ,9643 | 1,9489 |
| INCOME(3) | 1,1528 | ,8045 | 1,6520 |
| INCOME(4) | 1,3318 | ,9385 | 1,8900 |
| ACUTE | 1,2026 | ,8689 | 1,6645 |
| LIMCRO | 7,5555 | 5,5909 | 10,2105 |

(IPC-Female1) Dependent variable: IP
File: **Catalonia** (FEMALE)
Variables in the model: Age, hng, **sick,** income)
Method: Forcing all variable in.
Model: IP = f {age*, hng, **sick,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
Reference category: last category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 51,2053 | 3 | ,0000 | ,1227 |
| 0-16 | -,7874 | ,2202 | 12,7869 | 1 | ,0003 | -,0599 |
| 17-39 | ,4417 | ,1472 | 8,9998 | 1 | ,0027 | ,0483 |
| 40-59 | -,2993 | ,1484 | 4,0659 | 1 | ,0438 | -,0262 |
| HNG | ,7224 | ,1194 | 36,5845 | 1 | ,0000 | ,1073 |
| INCOME | | | 11,6512 | 4 | ,0201 | ,0349 |
| INCOME(1) | -,1835 | ,1657 | 1,2265 | 1 | ,2681 | ,0000 |
| INCOME(2) | -,4573 | ,1698 | 7,2551 | 1 | ,0071 | -,0418 |
| INCOME(3) | -,4367 | ,1696 | 6,6303 | 1 | ,0100 | -,0393 |
| INCOME(4) | -,3861 | ,1700 | 5,1603 | 1 | ,0231 | -,0324 |
| SICK | ,2894 | ,1692 | 2,9246 | 1 | ,0872 | ,0175 |
| Constant | -3,0311 | ,1638 | 342,5501 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,4550 | ,2955 | ,7006 |
| 17-39 | 1,5553 | 1,1655 | 2,0755 |
| 40-59 | ,7413 | ,5542 | ,9917 |
| HNG | 2,0593 | 1,6295 | 2,6025 |
| INCOME(1) | ,8324 | ,6016 | 1,1517 |
| INCOME(2) | ,6330 | ,4538 | ,8829 |
| INCOME(3) | ,6462 | ,4634 | ,9010 |
| INCOME(4) | ,6797 | ,4871 | ,9484 |
| SICK | 1,3357 | ,9586 | 1,8611 |

(IPC-Female2) Dependent variable: IP
File: **Catalonia** (FEMALE)
Variables in the model: Age, hng, **acute, limcro,** income)
Method: Forcing all variable in.
Model: IP = f {age*, hng, **acute, limcro,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: last category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 50,2879 | 3 | ,0000 | ,1214 |
| 0-16 | -,7362 | ,2211 | 11,0871 | 1 | ,0009 | -,0550 |
| 17-39 | ,3934 | ,1482 | 7,0441 | 1 | ,0080 | ,0410 |
| 40-59 | -,4012 | ,1503 | 7,1218 | 1 | ,0076 | -,0413 |
| HNG | ,4591 | ,1267 | 13,1374 | 1 | ,0003 | ,0609 |
| INCOME | | | 12,2240 | 4 | ,0158 | ,0375 |
| INCOME(1) | -,1919 | ,1682 | 1,3012 | 1 | ,2540 | ,0000 |
| INCOME(2) | -,4732 | ,1718 | 7,5895 | 1 | ,0059 | -,0431 |
| INCOME(3) | -,4644 | ,1719 | 7,2972 | 1 | ,0069 | -,0420 |
| INCOME(4) | -,3852 | ,1716 | 5,0401 | 1 | ,0248 | -,0318 |
| ACUTE | ,0684 | ,1453 | ,2218 | 1 | ,6377 | ,0000 |
| LIMCRO | 1,1568 | ,1278 | 81,9296 | 1 | ,0000 | ,1631 |
| Constant | -2,9125 | ,0795 | 1342,672 | 1 | ,0000 | |

| Variable | Exp(B) | 95% CI for Exp(B) Lower | Upper |
|---|---|---|---|
| 0-16 | ,4789 | ,3105 | ,7387 |
| 17-39 | 1,4820 | 1,1084 | 1,9816 |
| 40-59 | ,6695 | ,4986 | ,8989 |
| HNG | 1,5826 | 1,2347 | 2,0286 |
| INCOME(1) | ,8254 | ,5936 | 1,1478 |
| INCOME(2) | ,6230 | ,4449 | ,8724 |
| INCOME(3) | ,6285 | ,4487 | ,8803 |
| INCOME(4) | ,6803 | ,4860 | ,9523 |
| ACUTE | 1,0708 | ,8055 | 1,4235 |
| LIMCRO | 3,1796 | 2,4751 | 4,0847 |

(IPC-3) Dependent variable: IP
File: **Catalonia**
Variables in the model: Age, hng, **sick,** income)
Method: Forcing all variable in.
Model: IP = f {age*, hng, **sick,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: Next category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 38,6036 | 3 | ,0000 | ,0740 |
| 0-16 | -,3850 | ,1273 | 9,1530 | 1 | ,0025 | -,0346 |
| 17-39 | ,3851 | ,1050 | 13,4428 | 1 | ,0002 | ,0438 |
| 40-59 | -,5615 | ,1042 | 29,0564 | 1 | ,0000 | -,0674 |
| GENDER | -,2168 | ,0756 | 8,2196 | 1 | ,0041 | -,0323 |
| HNG | ,6160 | ,0870 | 50,1068 | 1 | ,0000 | ,0898 |
| ACUTE | ,0942 | ,1088 | ,7502 | 1 | ,3864 | ,0000 |
| LIMCRO | 1,3492 | ,0961 | 196,9219 | 1 | ,0000 | ,1809 |
| INCOME | | | 2,2645 | 4 | ,6872 | ,0000 |
| INCOME(1) | ,0354 | ,1094 | ,1045 | 1 | ,7465 | ,0000 |
| INCOME(2) | ,1056 | ,1178 | ,8036 | 1 | ,3700 | ,0000 |
| INCOME(3) | -,1322 | ,1215 | 1,1829 | 1 | ,2768 | ,0000 |
| INCOME(4) | -,0317 | ,1210 | ,0687 | 1 | ,7932 | ,0000 |
| Constant | -2,5489 | ,1176 | 469,4531 | 1 | ,0000 | |

| Variable | Exp(B) | 99% CI for Exp(B) Lower | Upper |
|---|---|---|---|
| 0-16 | ,6804 | ,4902 | ,9444 |
| 17-39 | 1,4698 | 1,1214 | 1,9265 |
| 40-59 | ,5704 | ,4362 | ,7459 |
| GENDER | ,8051 | ,6626 | ,9782 |
| HNG | 1,8514 | 1,4797 | 2,3166 |
| ACUTE | 1,0988 | ,8303 | 1,4543 |
| LIMCRO | 3,8545 | 3,0089 | 4,9377 |
| INCOME(1) | 1,0360 | ,7815 | 1,3733 |
| INCOME(2) | 1,1114 | ,8205 | 1,5055 |
| INCOME(3) | ,8762 | ,6407 | 1,1983 |
| INCOME(4) | ,9688 | ,7093 | 1,3231 |

(IPC-Male3) Dependent variable: IP
File: **Catalonia** (MALE)
Variables in the model: Age, hng, **sick,** income)
Method: Forcing all variable in.
Model: IP = f {age*, hng, **sick,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: Next category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 45,3205 | 3 | ,0000 | ,1154 |
| 0-16 | ,4195 | ,1821 | 5,3084 | 1 | ,0212 | ,0335 |
| 17-39 | -,1601 | ,1609 | ,9894 | 1 | ,3199 | ,0000 |
| 40-59 | -,8203 | ,1506 | 29,6577 | 1 | ,0000 | -,0968 |
| HNG | ,8206 | ,1191 | 47,4479 | 1 | ,0000 | ,1240 |
| ACUTE | ,1845 | ,1658 | 1,2380 | 1 | ,2659 | ,0000 |
| LIMCRO | 2,0223 | ,1536 | 173,2376 | 1 | ,0000 | ,2407 |
| INCOME | | | 4,0428 | 4 | ,4002 | ,0000 |
| INCOME(1) | -,0561 | ,1582 | ,1256 | 1 | ,7230 | ,0000 |
| INCOME(2) | ,1732 | ,1639 | 1,1165 | 1 | ,2907 | ,0000 |
| INCOME(3) | -,1443 | ,1698 | ,7222 | 1 | ,3954 | ,0000 |
| INCOME(4) | ,2865 | ,1786 | 2,5738 | 1 | ,1086 | ,0139 |
| Constant | -2,9647 | ,0739 | 1609,899 | 1 | ,0000 | |

| Variable | Exp(B) | 95% CI for Exp(B) Lower | Upper |
|---|---|---|---|
| 0-16 | 1,5212 | 1,0646 | 2,1734 |
| 17-39 | ,8521 | ,6216 | 1,1680 |
| 40-59 | ,4403 | ,3277 | ,5915 |
| HNG | 2,2719 | 1,7988 | 2,8695 |
| ACUTE | 1,2026 | ,8689 | 1,6645 |
| LIMCRO | 7,5555 | 5,5909 | 10,2105 |
| INCOME(1) | ,9455 | ,6933 | 1,2893 |
| INCOME(2) | 1,1891 | ,8624 | 1,6397 |
| INCOME(3) | ,8656 | ,6206 | 1,2074 |
| INCOME(4) | 1,3318 | ,9385 | 1,8900 |

(IPC-Female3) Dependent variable: IP
File: **Catalonia** (FEMALE)
Variables in the model: Age, hng, **sick,** income)
Method: Forcing all variable in.
Model: IP = f {age*, hng, **sick,** income**}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
Reference category: Next category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 50,2879 | 3 | ,0000 | ,1214 |
| 0-16 | -1,1296 | ,1997 | 31,9938 | 1 | ,0000 | -,0999 |
| 17-39 | ,7946 | ,1480 | 28,8321 | 1 | ,0000 | ,0945 |
| 40-59 | -,4012 | ,1503 | 7,1218 | 1 | ,0076 | -,0413 |
| HNG | ,4591 | ,1267 | 13,1374 | 1 | ,0003 | ,0609 |
| ACUTE | ,0684 | ,1453 | ,2218 | 1 | ,6377 | ,0000 |
| LIMCRO | 1,1568 | ,1278 | 81,9296 | 1 | ,0000 | ,1631 |
| INCOME | | | 12,2240 | 4 | ,0158 | ,0375 |
| INCOME(1) | ,2813 | ,1555 | 3,2746 | 1 | ,0704 | ,0206 |
| INCOME(2) | -,0089 | ,1730 | ,0026 | 1 | ,9592 | ,0000 |
| INCOME(3) | -,0792 | ,1786 | ,1966 | 1 | ,6575 | ,0000 |
| INCOME(4) | -,3852 | ,1716 | 5,0401 | 1 | ,0248 | -,0318 |
| Constant | -2,9125 | ,0795 | 1342,672 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,3232 | ,2185 | ,4780 |
| 17-39 | 2,2135 | 1,6562 | 2,9583 |
| 40-59 | ,6695 | ,4986 | ,8989 |
| HNG | 1,5826 | 1,2347 | 2,0286 |
| ACUTE | 1,0708 | ,8055 | 1,4235 |
| LIMCRO | 3,1796 | 2,4751 | 4,0847 |
| INCOME(1) | 1,3249 | ,9769 | 1,7969 |
| INCOME(2) | ,9912 | ,7061 | 1,3913 |
| INCOME(3) | ,9239 | ,6510 | 1,3111 |
| INCOME(4) | ,6803 | ,4860 | ,9523 |

# ANNEX B.

# Logistic Regressions Models: Output II.

## B.1. Logistic regressions and primary care utilisation.

Dependent variable: PC
File: **Catalonia**
Variables in the model: Age, gender, hng, acute, limcro, income, **education**)
Method: Forcing all variable in.
Model: PC = f {age*, gender, hng, acute, limcro, income**, **education*****}
being age* = [4 categories, 60 years-old or more as a reference]
being income** = [5 categories, top income level as reference group]
being education*** [4 categories, top university education as reference group]
Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 110,3324 | 3 | ,0000 | ,0990 |
| 0-16 | -,3233 | ,1024 | 9,9791 | 1 | ,0016 | -,0274 |
| 17-39 | -,6973 | ,0787 | 78,4171 | 1 | ,0000 | -,0848 |
| 40-59 | -,7315 | ,0771 | 89,9222 | 1 | ,0000 | -,0909 |
| GENDER | ,1698 | ,0496 | 11,7023 | 1 | ,0006 | ,0302 |
| HNG | ,7004 | ,0711 | 97,1481 | 1 | ,0000 | ,0946 |
| ACUTE | ,6955 | ,1138 | 37,3845 | 1 | ,0000 | ,0577 |
| LIMCRO | 1,0120 | ,1183 | 73,1448 | 1 | ,0000 | ,0818 |
| INCOME | | | 13,8503 | 4 | ,0078 | ,0234 |
| INCOME(1) | ,2383 | ,0902 | 6,9763 | 1 | ,0083 | ,0216 |
| INCOME(2) | ,1789 | ,0824 | 4,7108 | 1 | ,0300 | ,0160 |
| INCOME(3) | -,0295 | ,0772 | ,1458 | 1 | ,7026 | ,0000 |
| INCOME(4) | ,0779 | ,0743 | 1,1003 | 1 | ,2942 | ,0000 |
| EDUCATION | | | 24,1281 | 3 | ,0000 | ,0413 |
| EDUCATION(1) | ,6375 | ,1377 | 21,4377 | 1 | ,0000 | ,0427 |
| EDUCATION(2) | ,2975 | ,0919 | 10,4848 | 1 | ,0012 | ,0282 |
| EDUCATION(3) | ,1184 | ,1098 | 1,1630 | 1 | ,2808 | ,0000 |
| Constant | ,4723 | ,0841 | 31,5208 | 1 | ,0000 | |

| Variable | Exp(B) | 95% CI for Exp(B) Lower | Upper |
|---|---|---|---|
| 0-16 | ,7237 | ,5922 | ,8845 |
| 17-39 | ,4979 | ,4267 | ,5810 |
| 40-59 | ,4812 | ,4137 | ,5597 |
| GENDER | 1,1850 | 1,0752 | 1,3061 |
| HNG | 2,0145 | 1,7526 | 2,3155 |
| ACUTE | 2,0048 | 1,6041 | 2,5056 |
| LIMCRO | 2,7511 | 2,1817 | 3,4692 |
| INCOME(1) | 1,2690 | 1,0634 | 1,5144 |
| INCOME(2) | 1,1959 | 1,0175 | 1,4056 |
| INCOME(3) | ,9709 | ,8346 | 1,1296 |
| INCOME(4) | 1,0811 | ,9345 | 1,2506 |
| EDUCATION(1) | 1,8918 | 1,4443 | 2,4778 |
| EDUCATION(2) | 1,3465 | 1,1246 | 1,6122 |
| EDUCATION(3) | 1,1257 | ,9077 | 1,3961 |

Dependent variable: PC

File: **Catalonia** (MALE)

Variables in the model: Age, hng, acute, limcro, income, **education**)

Method: Forcing all variable in.

Model: PC = f {age*, hng, acute, limcro, income**, **education*****}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

being education*** [4 categories, top university education as reference group]

Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 84,2209 | 3 | ,0000 | ,1173 |
| 0-16 | -,4033 | ,1387 | 8,4544 | 1 | ,0036 | -,0337 |
| 17-39 | -,8611 | ,1040 | 68,5358 | 1 | ,0000 | -,1081 |
| 40-59 | -,8163 | ,1026 | 63,2502 | 1 | ,0000 | -,1038 |
| HNG | ,5766 | ,0973 | 35,1472 | 1 | ,0000 | ,0763 |
| ACUTE | ,7908 | ,1641 | 23,2372 | 1 | ,0000 | ,0611 |
| LIMCRO | 1,1549 | ,1797 | 41,2906 | 1 | ,0000 | ,0831 |
| INCOME | | | 7,6132 | 4 | ,1068 | ,0000 |
| INCOME(1) | ,1863 | ,1254 | 2,2087 | 1 | ,1372 | ,0061 |
| INCOME(2) | ,0359 | ,1114 | ,1038 | 1 | ,7473 | ,0000 |
| INCOME(3) | -,1099 | ,1028 | 1,1430 | 1 | ,2850 | ,0000 |
| INCOME(4) | ,0971 | ,0983 | ,9761 | 1 | ,3232 | ,0000 |
| EDUCATION | | | 13,2498 | 3 | ,0041 | ,0357 |
| EDUCATION(1) | ,6654 | ,1860 | 12,7964 | 1 | ,0003 | ,0436 |
| EDUCATION(2) | ,3217 | ,1212 | 7,0412 | 1 | ,0080 | ,0298 |
| EDUCATION(3) | ,2334 | ,1463 | 2,5446 | 1 | ,1107 | ,0098 |
| Constant | ,6703 | ,0601 | 124,1701 | 1 | ,0000 | |

| Variable | Exp(B) | 95% CI for Exp(B) Lower | Upper |
|---|---|---|---|
| 0-16 | ,6681 | ,5091 | ,8768 |
| 17-39 | ,4227 | ,3447 | ,5183 |
| 40-59 | ,4421 | ,3615 | ,5406 |
| HNG | 1,7800 | 1,4711 | 2,1538 |
| ACUTE | 2,2052 | 1,5989 | 3,0416 |
| LIMCRO | 3,1736 | 2,2313 | 4,5136 |
| INCOME(1) | 1,2048 | ,9423 | 1,5404 |
| INCOME(2) | 1,0365 | ,8332 | 1,2895 |
| INCOME(3) | ,8960 | ,7325 | 1,0959 |
| INCOME(4) | 1,1020 | ,9089 | 1,3362 |
| EDUCATION(1) | 1,9452 | 1,3509 | 2,8008 |
| EDUCATION(2) | 1,3795 | 1,0877 | 1,7495 |
| EDUCATION(3) | 1,2629 | ,9480 | 1,6823 |

Dependent variable: PC

File: **Catalonia** (FEMALE)

Variables in the model: Age, hng, **acute, limcro,** income, education)

Method: Forcing all variable in.

Model: PC = f {age*, hng, **acute, limcro,** income**, education***}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

being education*** [4 categories, top university education as reference group]

Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 34,4281 | 3 | ,0000 | ,0761 |
| 0-16 | -,2126 | ,1524 | 1,9473 | 1 | ,1629 | ,0000 |
| 17-39 | -,4864 | ,1215 | 16,0188 | 1 | ,0001 | -,0534 |
| 40-59 | -,6422 | ,1174 | 29,9158 | 1 | ,0000 | -,0754 |
| HNG | ,8548 | ,1048 | 66,5721 | 1 | ,0000 | ,1147 |
| ACUTE | ,5882 | ,1584 | 13,7843 | 1 | ,0002 | ,0490 |
| LIMCRO | ,8888 | ,1581 | 31,5944 | 1 | ,0000 | ,0776 |
| INCOME | | | 12,9777 | 4 | ,0114 | ,0318 |
| INCOME(1) | ,3167 | ,1310 | 5,8477 | 1 | ,0156 | ,0280 |
| INCOME(2) | ,3528 | ,1235 | 8,1625 | 1 | ,0043 | ,0354 |
| INCOME(3) | ,0694 | ,1175 | ,3484 | 1 | ,5550 | ,0000 |
| INCOME(4) | ,0540 | ,1137 | ,2253 | 1 | ,6350 | ,0000 |
| EDUCATION | | | 14,2060 | 3 | ,0026 | ,0409 |
| EDUCATION(1) | ,6459 | ,2067 | 9,7628 | 1 | ,0018 | ,0398 |
| EDUCATION(2) | ,2892 | ,1421 | 4,1432 | 1 | ,0418 | ,0209 |
| EDUCATION(3) | -,0170 | ,1668 | ,0104 | 1 | ,9188 | ,0000 |
| Constant | ,7634 | ,0660 | 133,6548 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,8085 | ,5998 | 1,0898 |
| 17-39 | ,6148 | ,4845 | ,7802 |
| 40-59 | ,5261 | ,4180 | ,6623 |
| HNG | 2,3509 | 1,9145 | 2,8868 |
| ACUTE | 1,8007 | 1,3201 | 2,4564 |
| LIMCRO | 2,4321 | 1,7840 | 3,3157 |
| INCOME(1) | 1,3726 | 1,0619 | 1,7743 |
| INCOME(2) | 1,4230 | 1,1171 | 1,8126 |
| INCOME(3) | 1,0718 | ,8513 | 1,3494 |
| INCOME(4) | 1,0555 | ,8446 | 1,3190 |
| EDUCATION(1) | 1,9076 | 1,2722 | 2,8605 |
| EDUCATION(2) | 1,3354 | 1,0108 | 1,7643 |
| EDUCATION(3) | ,9831 | ,7090 | 1,3632 |

## B.2. Logistic regressions and specialist care utilisation.

Dependent variable: ESP

File: **Catalonia**

Variables in the model: Age, gender, hng, acute, limcro, income, **education**)

Method: Forcing all variable in.

Model: ESP = f {age*, gender, hng, acute, limcro, income**, **education*****}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

being education*** [4 categories, top university education as reference group]

Reference category: last category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 49,2570 | 3 | ,0000 | ,0591 |
| 0-16 | -,5432 | ,0933 | 33,9027 | 1 | ,0000 | -,0508 |
| 17-39 | ,0481 | ,0682 | ,4974 | 1 | ,4807 | ,0000 |
| 40-59 | -,0408 | ,0655 | ,3874 | 1 | ,5337 | ,0000 |
| GENDER | ,7714 | ,0454 | 288,9875 | 1 | ,0000 | ,1523 |
| HNG | ,7948 | ,0581 | 187,2432 | 1 | ,0000 | ,1224 |
| ACUTE | ,2555 | ,0847 | 9,0894 | 1 | ,0026 | ,0239 |
| LIMCRO | 1,1115 | ,0904 | 151,2258 | 1 | ,0000 | ,1098 |
| INCOME | | | 48,3953 | 4 | ,0000 | ,0572 |
| INCOME(1) | -,5422 | ,0816 | 44,1854 | 1 | ,0000 | -,0584 |
| INCOME(2) | -,3894 | ,0768 | 25,6760 | 1 | ,0000 | -,0438 |
| INCOME(3) | -,3578 | ,0745 | 23,0602 | 1 | ,0000 | -,0413 |
| INCOME(4) | -,2286 | ,0719 | 10,1140 | 1 | ,0015 | -,0256 |
| EDUCATION | | | 22,7157 | 3 | ,0000 | ,0368 |
| EDUCATION(1) | -,5631 | ,1187 | 22,4928 | 1 | ,0000 | -,0407 |
| EDUCATION(2) | -,3215 | ,0913 | 12,4032 | 1 | ,0004 | -,0290 |
| EDUCATION(3) | -,3085 | ,1095 | 7,9345 | 1 | ,0049 | -,0219 |
| Constant | -1,6007 | ,0790 | 410,1617 | 1 | ,0000 | |

| Variable | Exp(B) | 95% CI for Exp(B) Lower | Upper |
|---|---|---|---|
| 0-16 | ,5809 | ,4838 | ,6974 |
| 17-39 | 1,0493 | ,9179 | 1,1995 |
| 40-59 | ,9600 | ,8443 | 1,0916 |
| GENDER | 2,1628 | 1,9788 | 2,3640 |
| HNG | 2,2141 | 1,9758 | 2,4810 |
| ACUTE | 1,2911 | 1,0935 | 1,5243 |
| LIMCRO | 3,0391 | 2,5457 | 3,6281 |
| INCOME(1) | ,5815 | ,4955 | ,6823 |
| INCOME(2) | ,6775 | ,5828 | ,7876 |
| INCOME(3) | ,6992 | ,6042 | ,8091 |
| INCOME(4) | ,7956 | ,6910 | ,9160 |
| EDUCATION(1) | ,5694 | ,4512 | ,7186 |
| EDUCATION(2) | ,7251 | ,6063 | ,8671 |
| EDUCATION(3) | ,7345 | ,5926 | ,9104 |

Dependent variable: ESP

File: **Catalonia** (MALES)

Variables in the model: Age, hng, acute, limcro, income, **education**)

Method: Forcing all variable in.

Model: ESP = f {age*, hng, acute, limcro, income**, **education*****}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

being education*** [4 categories, top university education as reference group]

Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 47,6836 | 3 | ,0000 | ,0825 |
| 0-16 | -,4038 | ,1281 | 9,9283 | 1 | ,0016 | -,0360 |
| 17-39 | -,5171 | ,0942 | 30,1446 | 1 | ,0000 | -,0678 |
| 40-59 | -,6091 | ,0918 | 44,0002 | 1 | ,0000 | -,0828 |
| HNG | ,9313 | ,0813 | 131,2413 | 1 | ,0000 | ,1453 |
| ACUTE | ,3325 | ,1245 | 7,1397 | 1 | ,0075 | ,0290 |
| LIMCRO | 1,5478 | ,1410 | 120,5672 | 1 | ,0000 | ,1392 |
| INCOME | | | 16,3155 | 4 | ,0026 | ,0369 |
| INCOME(1) | -,3986 | ,1169 | 11,6324 | 1 | ,0006 | -,0397 |
| INCOME(2) | -,3290 | ,1084 | 9,2061 | 1 | ,0024 | -,0343 |
| INCOME(3) | -,3601 | ,1035 | 12,1146 | 1 | ,0005 | -,0406 |
| INCOME(4) | -,2379 | ,0981 | 5,8817 | 1 | ,0153 | -,0252 |
| EDUCATION | | | 5,3323 | 3 | ,1490 | ,0000 |
| EDUCATION(1) | -,2484 | ,1640 | 2,2949 | 1 | ,1298 | -,0069 |
| EDUCATION(2) | -,2635 | ,1221 | 4,6518 | 1 | ,0310 | -,0208 |
| EDUCATION(3) | -,1214 | ,1484 | ,6692 | 1 | ,4133 | ,0000 |
| Constant | -,7396 | ,0565 | 171,4116 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,6678 | ,5195 | ,8585 |
| 17-39 | ,5963 | ,4958 | ,7171 |
| 40-59 | ,5438 | ,4543 | ,6511 |
| HNG | 2,5377 | 2,1639 | 2,9760 |
| ACUTE | 1,3945 | 1,0927 | 1,7797 |
| LIMCRO | 4,7013 | 3,5664 | 6,1973 |
| INCOME(1) | ,6713 | ,5338 | ,8440 |
| INCOME(2) | ,7196 | ,5819 | ,8900 |
| INCOME(3) | ,6976 | ,5695 | ,8544 |
| INCOME(4) | ,7883 | ,6504 | ,9554 |
| EDUCATION(1) | ,7801 | ,5657 | 1,0757 |
| EDUCATION(2) | ,7684 | ,6048 | ,9762 |
| EDUCATION(3) | ,8857 | ,6622 | 1,1846 |

Dependent variable: ESP

File: **Catalonia** (FEMALE)

Variables in the model: Age, hng, acute, limcro, income, **education**)

Method: Forcing all variable in.

Model: ESP = f {age*, hng, acute, limcro, income**, **education*****}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

being education*** [4 categories, top university education as reference group]

Reference category: last category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 139,8844 | 3 | ,0000 | ,1508 |
| 0-16 | -,6547 | ,1337 | 23,9872 | 1 | ,0000 | -,0611 |
| 17-39 | ,5990 | ,1012 | 35,0586 | 1 | ,0000 | ,0749 |
| 40-59 | ,5587 | ,0948 | 34,7488 | 1 | ,0000 | ,0746 |
| HNG | ,6962 | ,0845 | 67,9294 | 1 | ,0000 | ,1058 |
| ACUTE | ,2097 | ,1174 | 3,1936 | 1 | ,0739 | ,0142 |
| LIMCRO | ,9954 | ,1195 | 69,3823 | 1 | ,0000 | ,1070 |
| INCOME | | | 42,9733 | 4 | ,0000 | ,0771 |
| INCOME(1) | -,7186 | ,1194 | 36,2176 | 1 | ,0000 | -,0762 |
| INCOME(2) | -,6329 | ,1159 | 29,8237 | 1 | ,0000 | -,0687 |
| INCOME(3) | -,5206 | ,1153 | 20,4003 | 1 | ,0000 | -,0559 |
| INCOME(4) | -,3314 | ,1145 | 8,3786 | 1 | ,0038 | -,0329 |
| EDUCATION | | | 25,2101 | 3 | ,0000 | ,0571 |
| EDUCATION(1) | -,8636 | ,1866 | 21,4235 | 1 | ,0000 | -,0574 |
| EDUCATION(2) | -,4653 | ,1561 | 8,8895 | 1 | ,0029 | -,0342 |
| EDUCATION(3) | -,5743 | ,1803 | 10,1459 | 1 | ,0014 | -,0372 |
| Constant | -,0980 | ,0622 | 2,4849 | 1 | ,1149 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,5196 | ,3999 | ,6752 |
| 17-39 | 1,8203 | 1,4929 | 2,2195 |
| 40-59 | 1,7484 | 1,4520 | 2,1053 |
| HNG | 2,0062 | 1,7000 | 2,3674 |
| ACUTE | 1,2333 | ,9799 | 1,5523 |
| LIMCRO | 2,7059 | 2,1409 | 3,4201 |
| INCOME(1) | ,4874 | ,3857 | ,6160 |
| INCOME(2) | ,5310 | ,4231 | ,6665 |
| INCOME(3) | ,5942 | ,4740 | ,7448 |
| INCOME(4) | ,7179 | ,5737 | ,8985 |
| EDUCATION(1) | ,4216 | ,2925 | ,6078 |
| EDUCATION(2) | ,6280 | ,4625 | ,8526 |
| EDUCATION(3) | ,5631 | ,3954 | ,8018 |

## B.3. Logistic regressions and inpatient care utilisation.

Dependent variable: IP

File: **Catalonia**

Variables in the model: Age, gender, hng, acute, limcro, income, **education)**

Method: Forcing all variable in.

Model: IP = f {age*, gender, hng, acute, limcro, income**, **education*****}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

being education*** [4 categories, top university education as reference group]

Reference category: last category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 44,8213 | 3 | ,0000 | ,0864 |
| 0-16 | -1,0391 | ,2108 | 24,3030 | 1 | ,0000 | -,0655 |
| 17-39 | -,1869 | ,1129 | 2,7384 | 1 | ,0980 | -,0119 |
| 40-59 | -,5712 | ,1094 | 27,2717 | 1 | ,0000 | -,0697 |
| GENDER | -,1624 | ,0810 | 4,0243 | 1 | ,0448 | -,0197 |
| HNG | ,5852 | ,0919 | 40,5661 | 1 | ,0000 | ,0861 |
| ACUTE | ,0966 | ,1179 | ,6716 | 1 | ,4125 | ,0000 |
| LIMCRO | 1,4305 | ,1007 | 201,7565 | 1 | ,0000 | ,1959 |
| INCOME | | | 1,2714 | 4 | ,8662 | ,0000 |
| INCOME(1) | ,0108 | ,1417 | ,0058 | 1 | ,9394 | ,0000 |
| INCOME(2) | -,0051 | ,1370 | ,0014 | 1 | ,9704 | ,0000 |
| INCOME(3) | -,1102 | ,1382 | ,6361 | 1 | ,4251 | ,0000 |
| INCOME(4) | -,0614 | ,1340 | ,2104 | 1 | ,6465 | ,0000 |
| EDUCATION | | | 3,9363 | 3 | ,2684 | ,0000 |
| EDUCATION(1) | -,1963 | ,1921 | 1,0442 | 1 | ,3068 | ,0000 |
| EDUCATION(2) | -,2670 | ,1569 | 2,8956 | 1 | ,0888 | -,0131 |
| EDUCATION(3) | -,3443 | ,1956 | 3,0980 | 1 | ,0784 | -,0145 |
| Constant | -2,7117 | ,1397 | 376,8787 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,3538 | ,2341 | ,5347 |
| 17-39 | ,8296 | ,6648 | 1,0351 |
| 40-59 | ,5648 | ,4558 | ,6999 |
| GENDER | ,8501 | ,7253 | ,9963 |
| HNG | 1,7954 | 1,4995 | 2,1496 |
| ACUTE | 1,1015 | ,8742 | 1,3878 |
| LIMCRO | 4,1808 | 3,4319 | 5,0932 |
| INCOME(1) | 1,0108 | ,7657 | 1,3345 |
| INCOME(2) | ,9949 | ,7606 | 1,3014 |
| INCOME(3) | ,8956 | ,6831 | 1,1743 |
| INCOME(4) | ,9404 | ,7232 | 1,2228 |
| EDUCATION(1) | ,8218 | ,5640 | 1,1974 |
| EDUCATION(2) | ,7657 | ,5630 | 1,0414 |
| EDUCATION(3) | ,7087 | ,4830 | 1,0399 |

Dependent variable: IP

File: **Catalonia** (MALES)

Variables in the model: Age, hng, acute, limcro, income, **education**)

Method: Forcing all variable in.

Model: IP = f {age*,hng, acute, limcro, income**, **education*****}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

being education*** [4 categories, top university education as reference group]

Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 46,3606 | 3 | ,0000 | ,1249 |
| 0-16 | -1,1475 | ,2729 | 17,6871 | 1 | ,0000 | -,0779 |
| 17-39 | -1,0147 | ,1730 | 34,3914 | 1 | ,0000 | -,1119 |
| 40-59 | -,8036 | ,1555 | 26,7182 | 1 | ,0000 | -,0978 |
| HNG | ,8262 | ,1252 | 43,5514 | 1 | ,0000 | ,1268 |
| ACUTE | ,1130 | ,1812 | ,3891 | 1 | ,5328 | ,0000 |
| LIMCRO | 2,1462 | ,1598 | 180,3010 | 1 | ,0000 | ,2626 |
| INCOME | | | 3,8000 | 4 | ,4337 | ,0000 |
| INCOME(1) | ,3282 | ,2198 | 2,2291 | 1 | ,1354 | ,0094 |
| INCOME(2) | ,4004 | ,2078 | 3,7119 | 1 | ,0540 | ,0257 |
| INCOME(3) | ,2618 | ,2087 | 1,5727 | 1 | ,2098 | ,0000 |
| INCOME(4) | ,2720 | ,2033 | 1,7904 | 1 | ,1809 | ,0000 |
| EDUCATION | | | ,0780 | 3 | ,9943 | ,0000 |
| EDUCATION(1) | ,0127 | ,2966 | ,0018 | 1 | ,9658 | ,0000 |
| EDUCATION(2) | -,0120 | ,2530 | ,0023 | 1 | ,9621 | ,0000 |
| EDUCATION(3) | ,0449 | ,3140 | ,0204 | 1 | ,8863 | ,0000 |
| Constant | -3,1241 | ,1185 | 694,8359 | 1 | ,0000 | |

| | | 95% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,3174 | ,1859 | ,5419 |
| 17-39 | ,3625 | ,2583 | ,5089 |
| 40-59 | ,4477 | ,3301 | ,6072 |
| HNG | 2,2847 | 1,7875 | 2,9201 |
| ACUTE | 1,1197 | ,7850 | 1,5970 |
| LIMCRO | 8,5525 | 6,2523 | 11,6989 |
| INCOME(1) | 1,3884 | ,9025 | 2,1360 |
| INCOME(2) | 1,4924 | ,9931 | 2,2428 |
| INCOME(3) | 1,2992 | ,8630 | 1,9560 |
| INCOME(4) | 1,3126 | ,8812 | 1,9551 |
| EDUCATION(1) | 1,0128 | ,5663 | 1,8114 |
| EDUCATION(2) | ,9881 | ,6018 | 1,6222 |
| EDUCATION(3) | 1,0459 | ,5653 | 1,9352 |

Dependent variable: IP

File: **Catalonia** (FEMALES)

Variables in the model: Age, gender, hng, acute, limcro, income, **education**)

Method: Forcing all variable in.

Model: IP = f {age*, gender, hng, acute, limcro, income**, **education*****}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

being education*** [4 categories, top university education as reference group]

Reference category: last category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 44,2103 | 3 | ,0000 | ,1209 |
| 0-16 | -1,1311 | ,3511 | 10,3813 | 1 | ,0013 | -,0566 |
| 17-39 | ,4473 | ,1647 | 7,3787 | 1 | ,0066 | ,0454 |
| 40-59 | -,3936 | ,1622 | 5,8863 | 1 | ,0153 | -,0386 |
| HNG | ,3910 | ,1350 | 8,3916 | 1 | ,0038 | ,0494 |
| ACUTE | ,0992 | ,1574 | ,3975 | 1 | ,5284 | ,0000 |
| LIMCRO | 1,2131 | ,1356 | 79,9805 | 1 | ,0000 | ,1727 |
| INCOME | | | 11,2663 | 4 | ,0237 | ,0353 |
| INCOME(1) | -,1773 | ,1872 | ,8977 | 1 | ,3434 | ,0000 |
| INCOME(2) | -,4585 | ,1896 | 5,8464 | 1 | ,0156 | -,0384 |
| INCOME(3) | -,4967 | ,1920 | 6,6971 | 1 | ,0097 | -,0424 |
| INCOME(4) | -,4316 | ,1864 | 5,3617 | 1 | ,0206 | -,0359 |
| EDUCATION | | | 6,2948 | 3 | ,0981 | ,0106 |
| EDUCATION(1) | -,1118 | ,2618 | ,1823 | 1 | ,6694 | ,0000 |
| EDUCATION(2) | -,3364 | ,2082 | 2,6109 | 1 | ,1061 | -,0153 |
| EDUCATION(3) | -,5357 | ,2585 | 4,2936 | 1 | ,0383 | -,0296 |
| Constant | -2,9753 | ,1233 | 582,2031 | 1 | ,0000 | |

| Variable | Exp(B) | 95% CI for Exp(B) Lower | Upper |
|---|---|---|---|
| 0-16 | ,3227 | ,1622 | ,6421 |
| 17-39 | 1,5640 | 1,1326 | 2,1598 |
| 40-59 | ,6746 | ,4908 | ,9271 |
| HNG | 1,4784 | 1,1348 | 1,9261 |
| ACUTE | 1,1043 | ,8112 | 1,5032 |
| LIMCRO | 3,3640 | 2,5786 | 4,3885 |
| INCOME(1) | ,8375 | ,5803 | 1,2086 |
| INCOME(2) | ,6322 | ,4360 | ,9168 |
| INCOME(3) | ,6085 | ,4177 | ,8865 |
| INCOME(4) | ,6495 | ,4508 | ,9359 |
| EDUCATION(1) | ,8942 | ,5353 | 1,4938 |
| EDUCATION(2) | ,7143 | ,4750 | 1,0743 |
| EDUCATION(3) | ,5853 | ,3526 | ,9714 |

# ANNEX C.

# Logistic Regressions Models: Output III.

## C.1. Logistic regressions and primary care utilisation.

Dependent variable: PC

File: **Catalonia**

Variables in the model: Age, gender, **hng**, income)

Method: Forcing all variable in.

Model: PC = f {age*, gender, **hng,** income**}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

Reference category: last category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 310,5162 | 3 | ,0000 | ,1612 |
| 0-16 | ,3328 | ,0884 | 14,1831 | 1 | ,0002 | ,0322 |
| 17-39 | -,7401 | ,0733 | 101,8810 | 1 | ,0000 | -,0923 |
| 40-59 | -,7167 | ,0734 | 95,3808 | 1 | ,0000 | -,0893 |
| GENDER | ,2048 | ,0474 | 18,6806 | 1 | ,0000 | ,0377 |
| HNG | ,9354 | ,0671 | 194,4035 | 1 | ,0000 | ,1282 |
| INCOME | | | 22,1623 | 4 | ,0002 | ,0348 |
| INCOME(1) | ,2946 | ,0821 | 12,8750 | 1 | ,0003 | ,0305 |
| INCOME(2) | ,2660 | ,0754 | 12,4469 | 1 | ,0004 | ,0299 |
| INCOME(3) | ,0292 | ,0706 | ,1708 | 1 | ,6794 | ,0000 |
| INCOME(4) | ,0931 | ,0696 | 1,7875 | 1 | ,1812 | ,0000 |
| Constant | ,6833 | ,0738 | 85,7204 | 1 | ,0000 | |

| | | 99% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | 1,3948 | 1,1109 | 1,7513 |
| 17-39 | ,4771 | ,3950 | ,5763 |
| 40-59 | ,4884 | ,4043 | ,5900 |
| GENDER | 1,2273 | 1,0863 | 1,3866 |
| HNG | 2,5482 | 2,1438 | 3,0288 |
| INCOME(1) | 1,3425 | 1,0867 | 1,6587 |
| INCOME(2) | 1,3047 | 1,0744 | 1,5844 |
| INCOME(3) | 1,0296 | ,8584 | 1,2349 |
| INCOME(4) | 1,0976 | ,9174 | 1,3132 |

Dependent variable: PC

File: **Catalonia** (MALE)

Variables in the model: Age, **hng**, income)

Method: Forcing all variable in.

Model: PC = f {age*, hng, income**}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 187,7954 | 3 | ,0000 | ,1711 |
| 0-16 | ,2802 | ,1192 | 5,5240 | 1 | ,0188 | ,0238 |
| 17-39 | -,8481 | ,0985 | 74,1694 | 1 | ,0000 | -,1078 |
| 40-59 | -,7849 | ,0992 | 62,6112 | 1 | ,0000 | -,0988 |
| HNG | ,7738 | ,0935 | 68,4759 | 1 | ,0000 | ,1035 |
| INCOME | | | 9,2651 | 4 | ,0548 | ,0143 |
| INCOME(1) | ,2485 | ,1145 | 4,7141 | 1 | ,0299 | ,0209 |
| INCOME(2) | ,1080 | ,1013 | 1,1357 | 1 | ,2866 | ,0000 |
| INCOME(3) | -,0705 | ,0941 | ,5617 | 1 | ,4536 | ,0000 |
| INCOME(4) | ,0983 | ,0922 | 1,1380 | 1 | ,2861 | ,0000 |
| Constant | ,9160 | ,0378 | 587,8108 | 1 | ,0000 | |

| | | 99% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | 1,3234 | ,9735 | 1,7991 |
| 17-39 | ,4282 | ,3323 | ,5519 |
| 40-59 | ,4562 | ,3533 | ,5890 |
| HNG | 2,1680 | 1,7039 | 2,7585 |
| INCOME(1) | 1,2821 | ,9547 | 1,7217 |
| INCOME(2) | 1,1140 | ,8581 | 1,4462 |
| INCOME(3) | ,9319 | ,7314 | 1,1875 |
| INCOME(4) | 1,1033 | ,8702 | 1,3989 |

Dependent variable: PC

File: **Catalonia** (FEMALE)

Variables in the model: Age, **hng,** income)

Method: Forcing all variable in.

Model: PC = f {age*, **hng,** income**}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

Reference category: last category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 128,0093 | 3 | ,0000 | ,1495 |
| 0-16 | ,4042 | ,1321 | 9,3684 | 1 | ,0022 | ,0367 |
| 17-39 | -,6086 | ,1103 | 30,4350 | 1 | ,0000 | -,0722 |
| 40-59 | -,6549 | ,1095 | 35,7813 | 1 | ,0000 | -,0786 |
| HNG | 1,1019 | ,0966 | 130,0513 | 1 | ,0000 | ,1531 |
| INCOME | | | 21,1164 | 4 | ,0003 | ,0490 |
| INCOME(1) | ,3680 | ,1190 | 9,5566 | 1 | ,0020 | ,0372 |
| INCOME(2) | ,4605 | ,1135 | 16,4726 | 1 | ,0000 | ,0515 |
| INCOME(3) | ,1578 | ,1071 | 2,1720 | 1 | ,1405 | ,0056 |
| INCOME(4) | ,0930 | ,1062 | ,7675 | 1 | ,3810 | ,0000 |
| Constant | 1,0519 | ,0414 | 644,6805 | 1 | ,0000 | |

| | | 99% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | 1,4981 | 1,0661 | 2,1051 |
| 17-39 | ,5441 | ,4095 | ,7229 |
| 40-59 | ,5195 | ,3918 | ,6887 |
| HNG | 3,0099 | 2,3467 | 3,8604 |
| INCOME(1) | 1,4448 | 1,0633 | 1,9632 |
| INCOME(2) | 1,5849 | 1,1832 | 2,1230 |
| INCOME(3) | 1,1710 | ,8887 | 1,5429 |
| INCOME(4) | 1,0975 | ,8349 | 1,4426 |

## C.2. Logistic regressions and specialist care utilisation.

Dependent variable: SC

File: **Catalonia**

Variables in the model: Age, gender, **hng**, income)

Method: Forcing all variable in.

Model: PC=f {age*, gender, **hng**, income**}

being age* =[4 categories, 60 years-old or more as a reference]

being income** =[5 categories, top income level as reference group]

Reference category: last category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 144,6887 | 3 | ,0000 | ,0989 |
| 0-16 | -,5488 | ,0721 | 57,9431 | 1 | ,0000 | -,0628 |
| 17-39 | ,1936 | ,0624 | 9,6178 | 1 | ,0019 | ,0232 |
| 40-59 | ,0820 | ,0611 | 1,8040 | 1 | ,1792 | ,0000 |
| GENDER | ,6891 | ,0418 | 271,2331 | 1 | ,0000 | ,1377 |
| HNG | ,9251 | ,0527 | 307,6862 | 1 | ,0000 | ,1468 |
| INCOME | | | 85,4810 | 4 | ,0000 | ,0739 |
| INCOME(1) | -,6066 | ,0718 | 71,3574 | 1 | ,0000 | -,0699 |
| INCOME(2) | -,4627 | ,0676 | 46,8032 | 1 | ,0000 | -,0562 |
| INCOME(3) | -,4225 | ,0660 | 41,0368 | 1 | ,0000 | -,0524 |
| INCOME(4) | -,2297 | ,0650 | 12,4712 | 1 | ,0004 | -,0272 |
| Constant | -1,4651 | ,0675 | 470,7505 | 1 | ,0000 | |

| | | 99% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,5776 | ,4797 | ,6955 |
| 17-39 | 1,2136 | 1,0333 | 1,4254 |
| 40-59 | 1,0855 | ,9275 | 1,2705 |
| GENDER | 1,9919 | 1,7884 | 2,2185 |
| HNG | 2,5221 | 2,2018 | 2,8891 |
| INCOME(1) | ,5452 | ,4531 | ,6560 |
| INCOME(2) | ,6296 | ,5289 | ,7494 |
| INCOME(3) | ,6554 | ,5530 | ,7768 |
| INCOME(4) | ,7948 | ,6722 | ,9397 |

Dependent variable: SC

File: **Catalonia** (MALE)

Variables in the model: Age, **hng,** income)

Method: Forcing all variable in.

Model: PC = f {age*, **hng**, income**}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 26,4949 | 3 | ,0000 | ,0545 |
| 0-16 | -,3605 | ,0978 | 13,5816 | 1 | ,0002 | -,0410 |
| 17-39 | -,3429 | ,0871 | 15,4912 | 1 | ,0001 | -,0442 |
| 40-59 | -,4222 | ,0867 | 23,7124 | 1 | ,0000 | -,0561 |
| HNG | 1,0094 | ,0754 | 179,0463 | 1 | ,0000 | ,1603 |
| INCOME | | | 30,1067 | 4 | ,0000 | ,0566 |
| INCOME(1) | -,4708 | ,1024 | 21,1457 | 1 | ,0000 | -,0527 |
| INCOME(2) | -,3616 | ,0943 | 14,6906 | 1 | ,0001 | -,0429 |
| INCOME(3) | -,4196 | ,0912 | 21,1650 | 1 | ,0000 | -,0527 |
| INCOME(4) | -,2503 | ,0879 | 8,1070 | 1 | ,0044 | -,0298 |
| Constant | -,7296 | ,0348 | 440,4630 | 1 | ,0000 | |

| | | 99% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,6973 | ,5420 | ,8972 |
| 17-39 | ,7097 | ,5671 | ,8883 |
| 40-59 | ,6556 | ,5244 | ,8197 |
| HNG | 2,7439 | 2,2593 | 3,3324 |
| INCOME(1) | ,6245 | ,4798 | ,8130 |
| INCOME(2) | ,6966 | ,5463 | ,8882 |
| INCOME(3) | ,6573 | ,5197 | ,8314 |
| INCOME(4) | ,7786 | ,6209 | ,9764 |

Dependent variable: SC

File: **Catalonia** (FEMALE)

Variables in the model: Age, **hng**, income)

Method: Forcing all variable in.

Model: PC = f {age*, **hng**, income**}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

Reference category: last category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 305,9775 | 3 | ,0000 | ,2071 |
| 0-16 | -,7606 | ,1051 | 52,3995 | 1 | ,0000 | -,0849 |
| 17-39 | ,7038 | ,0913 | 59,4462 | 1 | ,0000 | ,0906 |
| 40-59 | ,5903 | ,0875 | 45,5411 | 1 | ,0000 | ,0789 |
| HNG | ,8735 | ,0752 | 134,8707 | 1 | ,0000 | ,1378 |
| INCOME | | | 72,9189 | 4 | ,0000 | ,0963 |
| INCOME(1) | -,7956 | ,1052 | 57,2011 | 1 | ,0000 | -,0888 |
| INCOME(2) | -,7094 | ,1019 | 48,4763 | 1 | ,0000 | -,0815 |
| INCOME(3) | -,5565 | ,1012 | 30,2461 | 1 | ,0000 | -,0635 |
| INCOME(4) | -,2939 | ,1028 | 8,1803 | 1 | ,0042 | -,0297 |
| Constant | -,0991 | ,0367 | 7,2778 | 1 | ,0070 | |

| | | 99% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,4674 | ,3566 | ,6127 |
| 17-39 | 2,0215 | 1,5979 | 2,5574 |
| 40-59 | 1,8046 | 1,4405 | 2,2606 |
| HNG | 2,3953 | 1,9734 | 2,9073 |
| INCOME(1) | ,4513 | ,3442 | ,5918 |
| INCOME(2) | ,4920 | ,3784 | ,6396 |
| INCOME(3) | ,5732 | ,4417 | ,7439 |
| INCOME(4) | ,7453 | ,5720 | ,9712 |

## C.3. Logistic regressions and inpatient care utilisation.

Dependent variable: IP

File: **Catalonia**

Variables in the model: Age, gender, **hng**, income)

Method: Forcing all variable in.

Model: PC = f {age*, gender, **hng**, income**}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 27,3158 | 3 | ,0000 | ,0598 |
| 0-16 | -,5189 | ,1344 | 14,9154 | 1 | ,0001 | -,0466 |
| 17-39 | -,0797 | ,1030 | ,5983 | 1 | ,4392 | ,0000 |
| 40-59 | -,3952 | ,1016 | 15,1396 | 1 | ,0001 | -,0470 |
| GENDER | -,0527 | ,0726 | ,5264 | 1 | ,4681 | ,0000 |
| HNG | ,8739 | ,0825 | 112,2747 | 1 | ,0000 | ,1360 |
| INCOME | | | 2,0831 | 4 | ,7205 | ,0000 |
| INCOME(1) | -,0297 | ,1229 | ,0585 | 1 | ,8089 | ,0000 |
| INCOME(2) | -,0616 | ,1201 | ,2629 | 1 | ,6081 | ,0000 |
| INCOME(3) | -,1590 | ,1218 | 1,7047 | 1 | ,1917 | ,0000 |
| INCOME(4) | -,0382 | ,1194 | ,1023 | 1 | ,7491 | ,0000 |
| Constant | -2,6559 | ,1167 | 517,7620 | 1 | ,0000 | |

| | | 99% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,5952 | ,4210 | ,8413 |
| 17-39 | ,9234 | ,7082 | 1,2040 |
| 40-59 | ,6736 | ,5185 | ,8750 |
| GENDER | ,9487 | ,7868 | 1,1438 |
| HNG | 2,3962 | 1,9376 | 2,9634 |
| INCOME(1) | ,9707 | ,7073 | 1,3322 |
| INCOME(2) | ,9403 | ,6901 | 1,2811 |
| INCOME(3) | ,8530 | ,6233 | 1,1673 |
| INCOME(4) | ,9625 | ,7078 | 1,3090 |

Dependent variable: IP

File: **Catalonia** (MALE)

Variables in the model: Age, hng, income)

Method: Forcing all variable in.

Model: PC = f {age*, hng, income**}

being age* = [4 categories, 60 years-old or more as a reference]

being income** = [5 categories, top income level as reference group]

Reference category: last category

------------------- Variables in the Equation -------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 19,1544 | 3 | ,0003 | ,0667 |
| 0-16 | -,3534 | ,1711 | 4,2685 | 1 | ,0388 | -,0277 |
| 17-39 | -,6367 | ,1536 | 17,1909 | 1 | ,0000 | -,0717 |
| 40-59 | -,4368 | ,1401 | 9,7244 | 1 | ,0018 | -,0511 |
| HNG | 1,0253 | ,1153 | 79,0336 | 1 | ,0000 | ,1615 |
| INCOME | | | 3,9169 | 4 | ,4174 | ,0000 |
| INCOME(1) | ,1419 | ,1844 | ,5920 | 1 | ,4416 | ,0000 |
| INCOME(2) | ,2793 | ,1739 | 2,5802 | 1 | ,1082 | ,0140 |
| INCOME(3) | ,1012 | ,1782 | ,3226 | 1 | ,5701 | ,0000 |
| INCOME(4) | ,2689 | ,1720 | 2,4448 | 1 | ,1179 | ,0123 |
| Constant | -2,7534 | ,0677 | 1655,873 | 1 | ,0000 | |

| Variable | Exp(B) | 99% CI for Exp(B) Lower | Upper |
|---|---|---|---|
| 0-16 | ,7023 | ,4520 | 1,0911 |
| 17-39 | ,5290 | ,3562 | ,7857 |
| 40-59 | ,6461 | ,4504 | ,9268 |
| HNG | 2,7880 | 2,0714 | 3,7524 |
| INCOME(1) | 1,1525 | ,7166 | 1,8533 |
| INCOME(2) | 1,3222 | ,8449 | 2,0692 |
| INCOME(3) | 1,1065 | ,6993 | 1,7508 |
| INCOME(4) | 1,3086 | ,8402 | 2,0380 |

Dependent variable: IP

File: **Catalonia** (FEMALE)

Variables in the model: Age, **hng**, income)

Method: Forcing all variable in.

Model: PC – f {age*, **hng**, income**}

being age* – [4 categories, 60 years-old or more as a reference]

being income** – [5 categories, top income level as reference group]

Reference category: last category

------------------ Variables in the Equation ------------------

| Variable | B | S.E. | Wald | df | Sig | R |
|---|---|---|---|---|---|---|
| AGE | | | 48,1025 | 3 | ,0000 | ,1184 |
| 0-16 | -,7617 | ,2199 | 12,0016 | 1 | ,0005 | -,0577 |
| 17-39 | ,3993 | ,1459 | 7,4937 | 1 | ,0062 | ,0428 |
| 40-59 | -,3134 | ,1484 | 4,4585 | 1 | ,0347 | -,0286 |
| HNG | ,7629 | ,1179 | 41,9039 | 1 | ,0000 | ,1153 |
| INCOME | | | 11,3462 | 4 | ,0229 | ,0334 |
| INCOME(1) | -,1715 | ,1656 | 1,0728 | 1 | ,3003 | ,0000 |
| INCOME(2) | -,4436 | ,1696 | 6,8418 | 1 | ,0089 | -,0401 |
| INCOME(3) | -,4293 | ,1694 | 6,4185 | 1 | ,0113 | -,0384 |
| INCOME(4) | -,3815 | ,1698 | 5,0469 | 1 | ,0247 | -,0318 |
| Constant | -2,7875 | ,0765 | 1328,656 | 1 | ,0000 | |

| | | 99% CI for Exp(B) | |
|---|---|---|---|
| Variable | Exp(B) | Lower | Upper |
| 0-16 | ,4669 | ,2650 | ,8225 |
| 17-39 | 1,4909 | 1,0239 | 2,1708 |
| 40-59 | ,7310 | ,4988 | 1,0713 |
| HNG | 2,1445 | 1,5830 | 2,9052 |
| INCOME(1) | ,8424 | ,5499 | 1,2905 |
| INCOME(2) | ,6417 | ,4146 | ,9933 |
| INCOME(3) | ,6510 | ,4208 | 1,0072 |
| INCOME(4) | ,6828 | ,4409 | 1,0575 |

## ANNEX D.

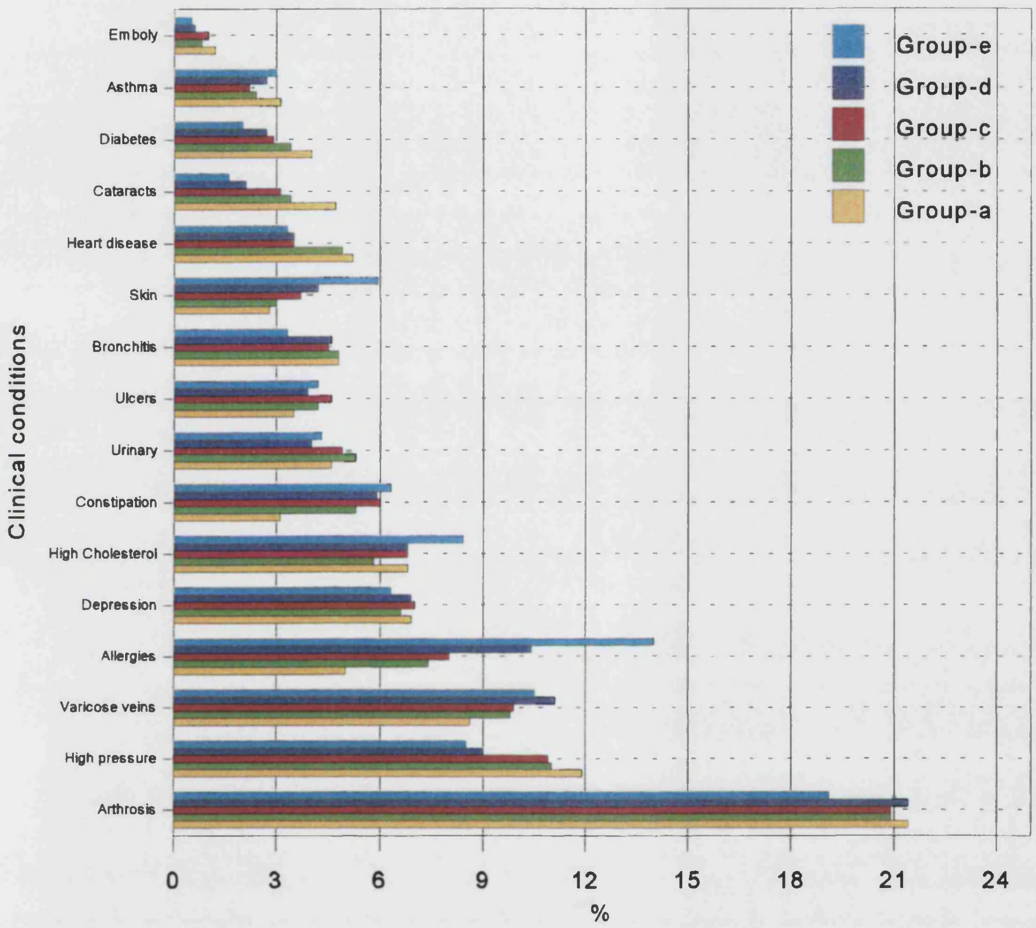
# Gender and Age Distribution and Income Level in Catalonia

| | TOTAL | MALE | FEMALE |
|---|---|---|---|
| Income 1 | | | |
| 0-16 | 11.3 | 51.3 | 48.7 |
| 17-39 | 14.2 | 46.9 | 53.1 |
| 40-59 | 17.9 | 38.0 | 62.0 |
| 60 or over | 56.6 | 38.5 | 61.5 |
| Income 2 | | | |
| 0-16 | 16.4 | 47.9 | 52.1 |
| 17-39 | 22.8 | 45.9 | 54.1 |
| 40-59 | 25.2 | 46.5 | 53.5 |
| 60 or over | 35.6 | 52.3 | 47.7 |
| Income 3 | | | |
| 0-16 | 20.6 | 50.2 | 49.8 |
| 17-39 | 31.9 | 51.2 | 48.8 |
| 40-59 | 26.2 | 49.2 | 50.8 |
| 60 or over | 21.3 | 54.9 | 45.1 |
| Income 4 | | | |
| 0-16 | 21.0 | 53.8 | 46.2 |
| 17-39 | 38.0 | 51.3 | 48.7 |
| 40-59 | 29.6 | 58.4 | 41.6 |
| 60 or over | 11.4 | 56.8 | 43.2 |
| Income 5 | | | |
| 0-16 | 21.6 | 50.6 | 49.4 |
| 17-39 | 42.5 | 55.5 | 44.5 |
| 40-59 | 29.2 | 62.3 | 37.7 |
| 60 or over | 6.7 | 61.3 | 38.7 |

Source: Catalan Health Survey (ESCA), 1996.

# ANNEX E.

## Chronic Clinical Conditions and Income Level in Catalonia.




Source: Catalan Health Survey (ESCA), 1996.