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Achieving effective universal health coverage with equity: evidence from Chile

Patricia Frenz,[1]* Iris Delgado,[2] Jay S Kaufman[3] and Sam Harper[3]

[1]Escuela de Salud Pública Salvador Allende, Universidad de Chile, Independencia 939 Santiago, Chile, 8380453 [2]Centro de Epidemiología y Políticas de Salud, Facultad de Medicina, Universidad de Desarrollo, Santiago, Chile, 7710162 and [3]Department of Epidemiology, Biostatistics, and Occupational Health, McGill University, Montreal, Quebec, Canada H3A 1A2

*Corresponding author. Escuela de Salud Pública Salvador Allende, Facultad de Medicina, Universidad de Chile, Independencia 939, Independencia, Santiago 8380453, Chile. E-mail: pfrenz@med.uchile.cl

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Chile's 'health guarantees' approach to providing universal and equitable coverage for quality healthcare in a dual public–private health system has generated global interest. The programme, called AUGE, defines legally enforceable rights to explicit healthcare benefits for priority health conditions, which incrementally covered 56 problems representing 75% of the disease burden between 2005 and 2009. It was accompanied by other health reform measures to increase public financing and public sector planning to secure the guarantees nationwide, as well as the state's stewardship role. We analysed data from household surveys conducted before and after the AUGE reform to estimate changes in levels of unmet health need, defined as the lack of a healthcare visit for a health problem occurring in the last 30 days, by age, sex, income, education, health insurance, residence and ethnicity; fitting logistic regression models and using predictive margins. The overall prevalence of unmet health need was much lower in 2009 (17.6%, 95% CI: 16.5%, 18.6%) than in 2000 (30.0%, 95% CI: 28.3%, 31.7%). Differences by income and education extremes and rural–urban residence disappeared. In 2009, people who had been in treatment for a condition covered by AUGE in the past year had a lower adjusted prevalence of unmet need for their recent problem (11.7%, 95% CI: 10.5%, 13.2%) than who had not (21.0%, 95% CI: 19.6%, 22.4%). Despite limitations including cross-sectional and self-reported data, our findings suggest that the Chilean health system has become more equitable and responsive to need. While these changes cannot be directly attributed to AUGE, they were coincident with the AUGE reforms. However, healthcare equity concerns are still present, relating to quality of care, health system barriers and differential access for health conditions that are not covered by AUGE.

Keywords Healthcare reform, health inequalities, health systems research, Chile

KEY MESSAGES

- Chile's Universal Access with Explicit Guarantees program (AUGE) is one of the few practical applications of a social guarantees approach to realizing the right to health, based on enforceable rights and explicit benefits related universal healthcare for priority health conditions.
- Using 2000 and 2009 household survey data to compare different measures of healthcare inequalities, our findings suggest that the Chilean health system has become more equitable after AUGE and other reform measures were implemented: (1) across social groups there are manifestly lower levels of unmet need, defined as the lack of a healthcare visit for a health problem in the last 30 days, with flattening income and education gradients; (2) the percentage of

individuals who were not affiliated with any health subsystem substantially decreased and the public insurance share has increased; (3) higher proportions of individuals, especially low-income groups, obtained free healthcare; and (4) there were higher utilization rates for all types of services by lower income groups.

- However, there are persisting equity challenges that need to be addressed: differential access by gender, ethnicity and age-groups, concerns about adequacy and quality of care, health system barriers faced by the less well-off, possible displacement of non-AUGE problems to comply with guarantees, and the continued stratification of the public–private health system.

Introduction

Whether low- and middle-income countries (LMIC) with mixed health systems can meet health needs fairly, especially for disadvantaged social groups, is an important policy question for national and global healthcare initiatives (Gilson *et al.* 2007; Nishtar 2010; World Health Organization 2010). Chile's policy responses to expanding healthcare coverage have often been cited as models for other countries of the benefits of diverse health system approaches. Historically, Chile has quickly adopted new proposals from the international policy context, notably (1) social medicine with the creation of the country's National Health Service in 1952, whose development led to basic universal coverage by the 1960s; (2) neoliberal privatization under Pinochet's military dictatorship, which introduced private health insurance in 1981; and more recently (3) a right-based system of universal health guarantees for complex benefits, established by law in 2005 (Musgrove 1993; Unger *et al.* 2008; World Bank 2008). The health guarantees approach for expanding universal coverage with equity in its mixed health system is relevant for most LMIC, whose healthcare delivery arrangements have varying degrees of market provision.

As a result of the 1981 policy shift, the Chilean health system developed into a dual system of public and private health insurance and service provision, stratified by income and risk. The National Health Fund (FONASA) is a public social insurance system that operates within the logic of solidarity and universality; financed through mandatory 7% payroll deductions, co-payments and public budget transfers. FONASA is open to all and acts as the insurer of last resort for groups unable to afford private insurance, with an implicit reinsurance role since it picks up people who are priced out of the private system as their risk increases. FONASA currently covers over 80% of the population, concentrating on the indigent, lower-income workers and the elderly. FONASA provides access to public services in its institutional modality, often with waiting lists for specialist and complex benefits, and directly to private providers in the 'free choice' modality for affiliates who purchase vouchers. The private insurance system (ISAPRES) also captures mandatory payroll contributions, but its plans are individually contracted with prices and benefits determined by health risk, age and sex (Sapelli 2004; Sojo 2011).[1] Although legally mandated coverage was nearly universal, inequalities in access and healthcare utilization were well-documented (Pnud 1998; Vega 2001; Arteaga *et al.* 2002; Vega *et al.* 2003). Consequently, growing public dissatisfaction set in motion the health reform process in 2000 (Sandoval 2004).

The aim of the reform was to redesign the health system around the goal of improving population health and health equity. A key component was the definition of national health objectives to steer health and intersectorial action towards the new health priorities of an ageing population in a changing society. A new model of healthcare was proposed, focused on promotion, prevention and timely access to quality services at the appropriate level of care, with special emphasis on primary care (Sandoval 2004). To this end, the Health Authority Law was passed in 2004, which created regional public health authorities and an Undersecretary of Public Health in the Ministry of Health to strengthen public health functions and stewardship, separate from the Undersecretary of Healthcare Networks (Nancuante and Romero 2008).

The core of the reform was the national Explicit Health Guarantees Regime, known as AUGE by its Spanish acronym. The obligation to meet AUGE guarantees for universal access to timely, affordable and quality services was meant to leverage the system-wide transformations envisioned by the reform, relating to strengthened stewardship, healthcare organization, delivery functions, human resource development and managerial changes, particularly in FONASA. This entailed increased public financing, enabled through a Funding Law passed in 2003, which raised sales taxes (Nancuante and Romero 2008). However, the financing mechanism was a political compromise. The original design contemplated a solidarity fund, which would have pooled 3/7th (43%) of the mandatory health contributions from FONASA and ISAPRE affiliates to finance AUGE. The proposal was abandoned during the legislative discussion due to opposition from the right, who saw it as an expropriation, and from the center, concerned about the effects on the middle-class. For some analysts the failure to include this pooling mechanism crippled the equity and solidarity objectives of the reform, by maintaining the structural duality of the mixed health system (Zúñiga Fajuri 2007).

Nevertheless, AUGE is not a typical minimum health benefits package; rather, it aims to be a comprehensive system of legally enforceable rights to receive quality healthcare with maximum waiting times and limited co-payments for priority health conditions. Co-payment levels are fixed by law, maintaining free care for indigent and low-income families in FONASA and affordability for other groups. Accordingly, an annual maximum deductible set for the family, according to income and the number of AUGE conditions in treatment (MINSAL 2012).

Using an evidence-based approach as well as social preferences and feasibility criteria, the original design prioritized 56 health conditions, estimated to represent ~75% of the burden of disease.[2] (Vargas and Poblete 2008; Bitrán *et al.* 2010). Implementation was gradual, starting with guaranteed care for 25 conditions in 2005,[3] expanding to 40 in 2006, and reaching coverage for the full 56 priorities after July 2007 (see list in Table A1). Since 2010, 69 diseases or health conditions are included with plans to expand to 80 problems by July 2013 (Letelier and Bedregal 2006; MINSAL 2012, 2013).

AUGE has been lauded as one of the few practical experiences of a social guarantees approach to realizing the right to health, but has also been criticized as a system of restrictive minimum standards that introduces disease-based discrimination (Sojo 2011; Zúñiga 2011).

In the last decade, studies from many countries have assessed equity in the delivery of healthcare by examining access to and use of health services by different social groups in relation to their level of need, commonly using data from national household surveys (O'Donnell *et al*. 2008). Most empirical research examines horizontal equity in utilization defined as equal amounts of services for equal levels of need (Van de Poel *et al.* 2012). The results have generally confirmed the inverse care law whereby the better-off tend to receive more and higher-quality healthcare, at least for specialist care, despite the worse-off having objectively greater health needs (Hanratty *et al.* 2007, Habicht *et al.* 2009; Somkotra 2010; Yiengprugsawan *et al.* 2010, 2011). Only a few studies have reported positive effects of specific policies to improve equity in health system coverage and the utilization of health services in LMIC (Souteyrand *et al.* 2008; Yiengprugsawan *et al.* 2010; Honda and Hanson 2012).

In the Chilean context, there has been little empirical research to monitor the effects of policy changes on health system equity goals (Jadue *et al.* 2004; Unger *et al.* 2008; Paraje and Vásquez 2012). To date AUGE's results on healthcare equity are debated with some evidence that horizontal equity has not improved (Paraje and Vásquez 2012). In this study we focus on differences in unmet need for healthcare by relevant social groups, as an indicator of healthcare inequality that reflects an equity approach based on assuring a minimum standard of care to address health needs, consistent with Chile's reform goals which did not modify the structural inequality of the income-stratified health system.[4] Using household survey data, we compare levels of unmet need across social groups and also look at income-related differences in utilization rates and distributions for health services in 2000, before the AUGE health reform, and in 2009, after guarantees for the full 56 conditions were inforce.

Methods

Data sources

Chile regularly carries out the National Socio-economic Characterization Survey (CASEN) to measure poverty levels and to estimate the coverage and effects of social programmes. The CASEN surveys are representative of non-institutionalized household residents at national and regional levels, excluding remote areas of the country (Oyarzún 2009). CASEN uses a multi-stage stratified cluster sample design by geographic area, where the final sampling unit is the household and reporting units are household members. The databases are publically accessible (www.ministeriodesarrollosocial.gob.cl/casen/) and include socio-demographic, education, health, housing, employment and income modules.

In this analysis, we primarily used the 2000 and 2009 CASEN datasets to assess changes in unmet need and healthcare utilization before and after AUGE was fully implemented. We also estimated unmet need for 2003, but were unable to do so for 2006 due to changes in the survey questions. In any case, these intermediate years correspond to the implementation period and our interest is in comparing the years before and after the reform was carried out. In 2000, the CASEN sample included 65 036 households from 286 municipalities, obtaining 252 748 observations for an expanded population of 15 112 659. The number of households was increased to 71 460 in 334 municipalities (from a total of 346) in 2009, resulting in 246 924 observations with an expanded population of 16 607 007 (MIDEPLAN 2000, 2009).

Procedures

The main study outcome relates to unmet need for healthcare, measured as not having a formal health system visit for a recent illness or accident, regardless of whether the person felt care was needed. The English translations of the relevant 2009 survey questions are: 'In the last 30 days, did you have any health problem?' and 'Did you have a healthcare visit or medical attention for that illness or accident?' The first question defines a specific healthcare need, while the second determines if the need was satisfied by the healthcare system. In the 2000 and 2003 surveys, the sequence of questions varies somewhat. The query about a recent health problem is followed by questions on whether the person obtained a consultation for the problem and, if so, where they consulted, including among the latter alternatives health system facilities, a pharmacy or alternative and traditional medicine. Despite the changes in the questions, the available information was sufficient to obtain an equivalent outcome measure for these 3 years.

A related question in the sequence identifies the main reason for not having any consultation for the recent health problem in 2000 and not having obtained formal healthcare for the problem in 2009. This difference in scope means that in 2000 the possible responses do not consider consultations in the pharmacy, traditional medicine or alternative medicine, but these options are potential reasons for not having received a formal healthcare visit in 2009. Additionally, the alternative 'I thought of seeking care, but I didn't have the money' was omitted as a possible reason for not obtaining a visit in 2009. Since these changes limit comparability between the 2 years, the distribution of responses and the differences by income quintile extremes for each year were analysed separately.

For people who did obtain healthcare, the question on whether out-of-pocket payment was required for the visit had identical alternatives relating to the formal healthcare system for both years, whose proportions were examined and compared.

Using the 2009 data, we also studied the proportion of unmet need for a recent problem in relation to prior treatment status for an AUGE covered condition, measured with the question: 'In the last 12 months have you been in treatment for any of the following [list of 21 health conditions]?' The list of AUGE disorders included is hypertension, acute respiratory infection, dental emergency, diabetes, depression, vision impairment, dental care, acute myocardial infarction, cataracts, conditions requiring orthesis or technical aids, pneumonia, chronic pulmonary obstructive disease, leukaemia, asthma, stomach cancer, cervical cancer, breast cancer, testicular cancer, prostate cancer, preventive gallbladder surgery and terminal chronic

kidney failure. Although the list comprises the 23 most prevalent AUGE problems, this underestimates the true treatment status for AUGE covered conditions because the question does not include all 56 priority conditions in force in 2009.[5] In a follow-up question, the survey asks whether the treatment was covered by AUGE, but this question was not analysed due to the large percentage of respondents who said they did not know (over 18%).

For both years, we examined use of health services by income decile based on responses to the question 'How many [general, specialist, emergency] visits or attentions did you receive in the last 3 months?' General visits included both general medical visits and controls and in 2009 specialist visits included mental health visits, which was not a separate category in 2000.

Statistical analysis

Considering the complex sampling design, the CASEN data were analysed using Stata version 12.1 applied survey data functions (StataCorp 2011). The analysis began with a descriptive comparison of proportions with 95% confidence intervals (CI) for categorical social and health characteristics for the 2000 and 2009 national populations. A bivariate analysis examined proportions of health needs variables and the unmet health need outcome for different social groups, at the population values for the other characteristics.

We fit multivariable logistic regression models to study the association of relevant social characteristics with the probability of an unmet health need for a recent health problem (last 30 days) for each year. The model adjusted for income quintiles, education level, ethnicity, type of health insurance, urban–rural residence, sex and age groups, reporting estimated odds ratios (OR) with 95% CIs. We used an appropriate goodness-of-fit test for application with complex sample survey data (Archer and Lemeshow 2006). We then calculated predictive margins and conditional marginal effects from the logistic regression coefficients to produce adjusted prevalences and adjusted prevalence differences for the probability of unmet health needs associated with combinations of social characteristics (Graubard and Korn 1999). Specifically by fixing the covariates at non-indigenous, FONASA users, age 65 or older, living in urban areas, and averaging over sex and education distributions, we used predictive margins to determine whether income was associated with unmet needs, comparing the predicted probabilities for 2000 and 2009.

A second model for unmet health needs for a recent health problem in 2009 added the covariable AUGE treatment (whether or not the person had been in treatment for any one of the listed AUGE conditions in the last 12 months). The adjusted prevalences of unmet need by AUGE treatment status and income quintiles, fixed at the means for other characteristics, were calculated and plotted using predictive margins estimates from the previously fit logistic regression model.

The slope index of inequality (SII) was estimated as a summary measure of total income inequality in unmet need (Pamuk 1985; Mackenbach *et al.* 1997; Singh-Manoux *et al.* 2010). In this study it represents the predicted difference in unmet need between the top and the bottom of the income distribution of the Chilean population for each year.

Finally, we looked at the reported use of general, specialist and emergency visits in the last 3 months by income decile, comparing both years. We constructed relative concentration curves of the cumulative percentage of service use by the cumulative percentage of the population ranked by household income and line charts for utilization rates.

Results

Table 1 summarizes social and health characteristics of the Chilean population for the respective years. In 2009 the population was older, more urban, with slightly higher education and less poverty than in 2000. In this period there was a substantial decrease in the population without health system coverage from around 10% to <4% and public health system (FONASA) affiliation rose from around 66% to 80%.

For the health need estimate, 14.4% (95% CI: 14.0%, 14.9%) of the population reported a health problem in the last 30 days in 2009, compared with 13.0% (95% CI: 12.6%, 13.3%) in 2000. In 2009, this change corresponds to ~200 000 more people with a reported health need. No significant income differences were observed in the reported levels of the recent health problem for either year. We had expected to find an income gradient since younger and older people, who usually have greater than average health needs, are concentrated in lower income quintiles. However, other studies have indicated that disadvantaged groups may underreport health problems, due to a tolerance for adversity, health expectations, cultural differences or lack of information (Sutton *et al.* 1999; Yiengprugsawan *et al.* 2007; Allin 2008). Another health need variable, self-assessed overall poor health (which is measured only for adults who are present at the time of the interview in 2000 and compared with the same subpopulation in 2009) showed a clear income gradient for both years. Therefore, we cannot dismiss the possibility of reporting bias and underestimation of need for lower-income groups using the recent health problem question, as compared with a more objective measure. Nonetheless, this issue is probably less important when the focus is on assessing change in two time periods.

About 15% (95% CI: 14.6%, 15.3%) of the 2009 population (37 341 of the sample representing 2 461 440 individuals in the population) reported that they had been in treatment for one of the 23 listed AUGE problems in the last 12 months. The group who reported treatment for an AUGE condition also identified a health problem in the previous 30 days in significantly higher proportion than those had not: 35.2% (95% CI: 34.0%, 36.4%) vs only 10.7% (95% CI: 10.3%, 11.2%). On the other hand, about one-third of the group with a recent health problem had also reported that they had been treated for one of the 23 AUGE conditions in the previous year, 36.6% (95% CI: 35.4%, 37.8%).

In relation to unmet need, there was a considerable drop in the estimated proportion who had not received formal health system services for their recent problem, from 30.0% (95% CI: 28.3%, 31.7%) in 2000 to 17.6% (95% CI: 16.5%, 18.6%) in 2009 (figure 1). Bivariate analyses of unmet need by sex, age group, ethnicity, urban–rural area, income, type of health insurance and AUGE status (treatment for a covered condition) are presented in Table 2.

Table 1 Proportions and 95% CI of socio-demographic and health characteristics of the Chilean population

Variable	2000	2009
Sample size[a]	252 748	246 924
Expanded population	15 112 659	16 607 007
Sex		
Women	0.510 (0.506, 0.513)	0.518 (0.515, 0.521)
Men	0.490 (0.487, 0.494)	0.482 (0.479, 0.485)
Age groups		
<15 years	0.274 (0.270, 0.277)	0.219 (0.215, 0.223)
15–29 years	0.247 (0.243, 0.250)	0.250 (0.246, 0.254)
30–44 years	0.227 (0.224, 0.231)	0.197 (0.194, 0.201)
45–64 years	0.175 (0.172, 0.178)	0.226 (0.222, 0.230)
65+ years	0.077 (0.075, 0.080)	0.108 (0.104, 0.111)
Ethnicity		
Non-indigenous	0.956 (0.953, 0.960)	0.931 (0.927, 0.934)
Indigenous	0.044 (0.040, 0.047)	0.069 (0.066, 0.073)
Zone of residence		
Urban	0.865 (0.862, 0.868)	0.872 (0.864, 0.881)
Rural	0.135 (0.132, 0.138)	0.128 (0.119, 0.136)
Poverty level		
Indigent	0.056 (0.052, 0.059)	0.037 (0.034, 0.040)
Poor, not indigent	0.146 (0.140, 0.153)	0.114 (0.108, 0.119)
Not poor	0.798 (0.790, 0.805)	0.849 (0.842, 0.855)
Education level[b]		
No schooling	0.058 (0.056 0.060)	0.056 (0.054 0.058)
Low	0.290 (0.284 0.297)	0.247 (0.242 0.253)
Middle	0.445 (0.439 0.451)	0.465 (0.459 0.471)
Superior	0.207 (0.200 0.215)	0.232 (0.223 0.240)
Health insurance system		
Public (FONASA)	0.658 (0.649, 0.667)	0.802 (0.792, 0.812)
Private (ISAPRES)	0.209 (0.200, 0.218)	0.133 (0.124, 0.142)
Other (Armed Forces)	0.035 (0.032, 0.039)	0.029 (0.026, 0.032)
None	0.097 (0.093, 0.101)	0.036 (0.033, 0.039)
Recent health problem (last 30 days)	0.130 (0.126, 0.133)	0.144 (0.140, 0.149)
Income quintile 1 (low)	0.127 (0.121, 0.132)	0.143 (0.136, 0.150)
Income quintile 2	0.127 (0.121, 0.133)	0.142 (0.135, 0.150)
Income quintile 3	0.142 (0.133, 0.151)	0.149 (0.142, 0.157)
Income quintile 4	0.135 (0.127, 0.143)	0.144 (0.135, 0.153)
Income quintile 5 (high)	0.119 (0.109, 0.130)	0.145 (0.133, 0.157)
Treatment for an AUGE problem in the past 12 months	–	0.149 (0.146, 0.153)
Poor self-assessed health[c]	0.070 (0.067, 0.073)	0.059 (0.055, 0.063)
Income quintile 1 (low)	0.089 (0.083, 0.095)	0.093 (0.086, 0.099)
Income quintile 2	0.087 (0.080, 0.094)	0.065 (0.059, 0.070)
Income quintile 3	0.079 (0.070, 0.088)	0.061 (0.055, 0.066)
Income quintile 4	0.062 (0.056, 0.068)	0.045 (0.039, 0.051)
Income quintile 5 (high)	0.029 (0.024, 0.034)	0.029 (0.021, 0.037)

[a]The CASEN observations have almost no missing values for any of these variables (≪1%).

[b]Only adults 15 years or older (2000 sample size = 180 941 with an expanded population = 10 871 251; 2009 sample size = 193 763 and expanded population = 12 976 277).

[c]Only includes respondents 15 years or older present in the household at the time of the interview (2000 sample size = 101 538 with an expanded population = 6 022 446; 2009 sample size = 118 459 and expanded population = 7 726 956).

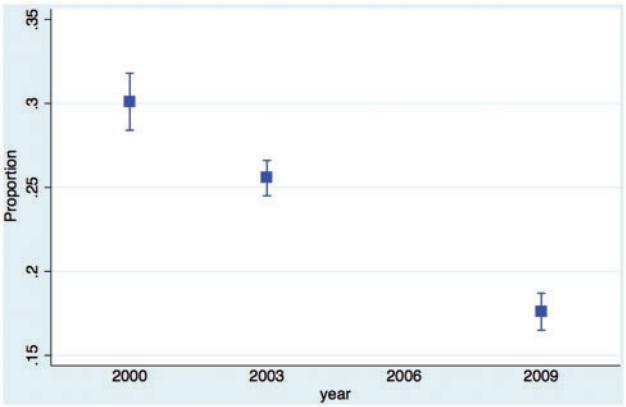

Figure 1 The proportion and 95% CI of unmet health need (people who reported having a health problem in the last 30 days but did not receive care in the formal health system for the problem) in 2000, 2003 and 2009. *Note*: For 2006, the CASEN questions do not allow the definition of a comparable unmet need outcome.

Table 3 reports the adjusted OR and 95% CI for the multivariable logistic regression models, comparing the disparities in unmet need across levels of the social group variables. In 2000 the adjusted odds of an individual whose household income was classified in the lowest quintile (1) of not receiving healthcare for a recent health problem were 1.42 greater than for an individual from the richest quintile (5). In this year, the increasing OR with decreasing education levels shows a gradient for unmet needs. Higher odds are also observed for indigenous groups, rural populations, men and for all age groups relative to children under 15 years. No difference was seen in the OR for ISAPRES or other health subsystem affiliates relative to FONASA users. However, not belonging to any health system was associated with a 2.50 greater adjusted odds of unmet need relative to a FONASA.

The same logistic model for 2009 shows a different picture regarding income and education; these variables do not predict whether healthcare was received for the recent health problem. In 2009 rural residents had lower adjusted odds of unmet needs than urban, a reversal of the 2000 situation. The difference between indigenous and non-indigenous groups also decreased. The differences across health subsystems are similar to 2000. However, the age group differences for those between 15 and 64 years did not improve and may even have worsened, which is consistent with a health and social policy focus that has continued to prioritize children and the elderly. When AUGE status was included in the 2009 model there was little change in the adjusted OR for unmet needs for a recent problem, although the estimates for all age groups relative to children under 15 increased. This result is consistent with the fact that some AUGE conditions have age restrictions favouring children and to lesser degree seniors.

The marginal associations between social group variables and unmet need can be understood by examining changes in the adjusted prevalences at specific values of the predictors. Table 4 shows adjusted prevalences and prevalence differences by social group categories between 2000 and 2009 for urban, non-indigenous women and men 65+ years of age from income quintile 2, who are FONASA users. Women with these characteristics had lower overall adjusted prevalences, 25% in 2000 and 11% in 2009, while men of this group were closer to the unadjusted prevalences at 29% and 14%, respectively, as shown in Table 2. Figure 2 graphs the prevalence of unmet health needs by income quintile for the 65+ urban, non-indigenous, FONASA population for 2 years, which highlights

Table 2 Proportions of unmet health needs (95% CI) by social and health groups

Variable	2000	2009
Population with recent problem		
Sample size	33 529	31 368
Expanded population	1 956 818	2 361 571
Overall unmet needs	0.300 (0.283, 0.317)	0.176 (0.165, 0.186)
Sex		
Women	0.287 (0.271, 0.304)	0.163 (0.150, 0.175)
Men	0.319 (0.297, 0.342)	0.195 (0.180, 0.210)
Age groups		
<15 years	0.207 (0.186, 0.229)	0.094 (0.073, 0.116)
15–29 years	0.349 (0.321, 0.379)	0.222 (0.193, 0.212)
30–44 years	0.379 (0.345, 0.416)	0.236 (0.210, 0.262)
45–64 years	0.314 (0.293, 0.337)	0.191 (0.174, 0.209)
65+ years	0.289 (0.267, 0.314)	0.132 (0.117, 0.146)
Ethnicity		
Non-indigenous	0.292 (0.274, 0.310)	0.172 (0.161, 0.183)
Indigenous	0.444 (0.40230.486)	0.220 (0.183, 0.257)
Zone of residence		
Urban	0.277 (0.257, 0.297)	0.177 (0.165, 0.189)
Rural	0.443 (0.403, 0.486)	0.163 (0.149, 0.177)
Income		
Quintile 1 (low)	0.354 (0.333, 0.377)	0.172 (0.157, 0.188)
Quintile 2	0.307 (0.285, 0.331)	0.172 (0.151, 0.193)
Quintile 3	0.289 (0.241, 0.344)	0.179 (0.161, 0.197)
Quintile 4	0.287 (0.257, 0.319)	0.176 (0.153, 0.198)
Quintile 5 (high)	0.236 (0.206, 0.270)	0.180 (0.149, 0.212)
Education level[a]		
No schooling	0.355 (0.329 0.383)	0.154 (0.118, 0.190)
Low	0.331 (0.315 0.348)	0.155 (0.142, 0.168)
Middle	0.288 (0.258 0.320)	0.185 (0.169, 0.200)
Higher	0.245 (0.215 0.279)	0.197 (0.171, 0.224)
Health insurance system		
Public (FONASA)	0.299 (0.284, 0.316)	0.171 (0.160, 0.183)
Private (ISAPRES)	0.236 (0.186, 0.295)	0.161 (0.128, 0.195)
Other (Armed Forces)	0.238 (0.171, 0.321)	0.171 (0.116, 0.226)
None	0.507 (0.464, 0.549)	0.376 (0.309, 0.443)
Treatment for an AUGE condition[b]		
Yes (AUGE)		0.117 (0.104, 0.131)
No (Not AUGE)		0.210 (0.196, 0.224)

[a]For children under 15 years, the education level of the head of household is used.

[b]Defined from the response to the question about treatment in the last 12 months for any one of 21 listed conditions (representing 23 disorders) that were covered by AUGE in 2009.

Table 3 Multivariable logistic regression models for unmet health needs for a recent health problem (past 30 days)

	2000 Model		2009 Model 1		2009 Model 2 with AUGE variable	
	OR (95% CI)	*P*	OR (95% CI)	*P*	OR (95% CI)	*P*
Income[a]						
Quintile 1(low)	1.42 (1.11,1.83)	0.005	1.09 (0.84,1.41)	0.534	1.12 (0.86,1.46)	0.403
Quintile 2	1.24 (0.97,1.58)	0.077	1.06 (0.82,1.37)	0.671	1.07 (0.82,1.39)	0.611
Quintile 3	1.23 (0.84,1.77)	0.274	1.07 (0.83,1.38)	0.596	1.11 (0.86,1.44)	0.414
Quintile 4	1.26 (0.95,1.63)	0.114	1.01 (0.77,1.31)	0.961	1.03 (0.79,1.35)	0.817
Education[b]						
No schooling	1.36 (1.08,1.72)	0.008	0.85 (0.55,1.29)	0.448	0.85 (0.56,1.32)	0.492
Low	1.27 (1.05,1.54)	0.016	0.79 (0.62,1.01)	0.065	0.81 (0.63,1.04)	0.096
Middle	1.09 (0.91, 1.31)	0.338	0.90 (0.73,1.10)	0.300	0.90 (0.73,1.41)	0.314
Indigenous	1.53 (1.29,1.82)	0.000	1.38 (1.11,1.72)	0.004	1.37(1.08,1.70)	0.008
Health system[c]						
ISAPRES	0.98 (0.71,1.34)	0.891	0.83 (0.63,1.10)	0.197	0.82 (0.62,1.08)	0.163
Other	0.94 (0.61,1.45)	0.769	0.99 (0.66,1.47)	0.954	0.97 (0.65, 1.46)	0.890
None	2.50 (2.07,3.00)	0.000	2.58 (1.96,3.41)	0.000	2.52 (1.92,3.30)	0.000
Rural	1.75 (1.57,1.95)	0.000	0.90(0.78, 1.03)	0.127	0.87 (0.75,1.01)	0.062
Male	1.26 (1.16,1.37)	0.000	1.32 (1.18,1.48)	0.000	1.27 (1.13,1.42)	0.000
Age[d]						
15–29	2.15 (1.84,2.51)	0.000	2.69 (2.01,3.60)	0.000	2.67 (1.99,3.58)	0.000
30–44	2.46 (2.15,2.82)	0.000	3.02 (2.25,4.07)	0.000	3.20 (2.38,4.31)	0.000
45–64	1.71 (1.48,1.98)	0.000	2.43 (1.83,3.27)	0.000	2.97 (2.23,3.94)	0.000
65+	1.53 (1.27,1.84)	0.000	1.59 (1.13, 2.23)	0.005	2.20 (1.57,3.01)	0.000
Not AUGE[e]					2.03 (1.74,2.38)	0.000
Intercept	0.14 (0.10,0.18)	0.000	0.09 (0.07,0.13)	0.000	0.05 (0.03,0.07)	0.000
Observations	33 032		31 001		30 686	
Goodness of fit[f]						
P	0.929		0.552		0.251	

[a]The richest income quintile 5 is the reference group.
[b]The highest education level (over 12 years) is the reference group. The head of household's education level is considered for children under 15 years.
[c]FONASA, the public health system is the reference group.
[d]Age <15 is the reference group.
[e]Not AUGE refers to a negative response to the question regarding treatment in the preceding 12 months for any of 23 conditions covered by AUGE. The reference is the group who responded affirmatively.
[f]Archer and Lemeshow (2006) method.

the striking drop in the level of unmet needs and the flattening of the income gradient in 2009.

The comparison of unmet need for a recent problem across income levels for people who reported treatment for an AUGE condition in the last 12 months (AUGE) vs those who had not (not-AUGE) is presented in Figure 3. As compared with the overall 2009 estimated prevalence of 17.6%, the adjusted prevalence of unmet health needs for a recent problem was around 11–12% for all income groups reporting treatment for an AUGE condition. For the not-AUGE population it was considerably higher, ~20–21% across income groups.

The reported reasons for not receiving healthcare for the recent health problem are summarized in Table 5. Since the questions and the possible alternatives are not comparable for 2000 and 2009, the results should be considered separately. In 2000, 27% of the group with unmet need (which does not include people who had consulted in the pharmacy or traditional/alternative specialists) responded that they did not seek care because they thought it was not necessary, with important differences by income quintile: 19% (95% CI: 16%, 22%) of quintile 1 and 34% (95% CI: 27%, 42%) of quintile 5. On the other hand, 16% (95% CI: 12%, 19%) of quintile 1 said that they had thought about consulting but did not have the money, as compared with 7% (95% CI: 4%, 9%) of quintile 5. The proportion of quintile 1 who reported that it was too hard to reach the health service, 10% (95% CI: 8%, 13%) almost doubled that of quintile 5 at 6% (95% CI: 3%, 9%). Three times as many in the lowest income quintile (1) said they sought healthcare but could not obtain an appointment 6% (95% CI: 3%, 8%) vs 2% (95% CI: 0%, 3%) for the richest (5).

In 2009, the relative proportion with unmet need who reported that they had done nothing about the problem

Table 4 Adjusted prevalences and prevalence differences of unmet needs for a recent health problem for fixed covariate patterns

	Women				Men			
	Adjusted prevalence		Adjusted prevalence difference		Adjusted prevalence		Adjusted prevalence difference	
	2000	2009	2000	2009	2000	2009	2000	2009
Overall[a]	0.25 (0.21,0.28)	0.11 (0.09, 0.13)			0.29(0.25,0.33)	0.14(0.12,0.17)		
Income quintile[b]								
1 (low)	0.27 (0.24,0.31)	0.11 (0.09,0.13)	0.06 (0.02,0.11)	0.01 (−0.02,0.03)	0.32 (0.28,0.36)	0.14 (0.12,0.17)	0.07 (0.02,0.12)	0.01 (−0.02,0.04)
2	0.25 (0.21,0.28)	0.11 (0.09,0.13)	0.04 (−0.00,0.08)	0.01 (−0.02,0.03)	0.29 (0.25,0.33)	0.14 (0.12,0.17)	0.04 (−0.00,0.09)	0.01 (−0.02,0.04)
3	0.24 (0.20,0.28)	0.11 (0.09,0.13)	0.04 (−0.02,0.10)	0.01 (−0.02,0.03)	0.29 (0.24,0.34)	0.14 (0.12,0.17)	0.04 (−0.03,0.11)	0.01 (−0.02,0.04)
4	0.25 (0.21,0.28)	0.11 (0.09,0.13)	0.04 (−0.01,0.08)	−0.00 (−0.02,0.03)	0.29 (0.25,0.33)	0.14 (0.11,0.16)	0.04 (−0.01,0.09)	0.00 (−0.03,0.03)
5 (high)	0.21 (0.16,0.25)	0.11 (0.08,0.13)	Reference	Reference	0.25 (0.20,0.30)	0.14 (0.10,0.17)	Reference	Reference
Education[c]								
No schooling	0.26 (0.22,0.30)	0.12 (0.08,0.16)	0.05 (0.02,0.09)	−0.02 (−0.06,0.03)	0.31 (0.26,0.35)	0.15 (0.10,0.20)	0.06 (0.02,0.11)	−0.02 (−0.08,0.03)
Low	0.25 (0.21,0.28)	0.11 (0.09,0.13)	0.04 (0.01,0.07)	−0.03 (−0.05,0.00)	0.29 (0.22,0.33)	0.14 (0.12,0.17)	0.05 (0.01,0.08)	−0.03 (−0.07,0.00)
Middle	0.22 (0.18,0.26)	0.12 (0.10,0.15)	0.01 (−0.02,0.04)	−0.01 (−0.04,0.01)	0.26 (0.22,0.30)	0.16 (0.13,0.19)	0.02 (−0.02,0.05)	−0.01 (−0.04,0.01)
High	0.20 (0.16,0.25)	0.14 (0.10,0.17)	Reference	Reference	0.25 (0.20,0.29)	0.17 (0.13,0.21)	Reference	Reference
Age group[d]								
0–14 years	0.18 (0.15,0.20)	0.07 (0.05,0.10)	Reference	Reference	0.21 (0.18,0.24)	0.09 (0.06,0.12)	Reference	Reference
15–29 years	0.32 (0.27,0.36)	0.17 (0.14,0.21)	0.14 (0.11,0.17)	0.10 (0.07,0.13)	0.37 (0.32,0.42)	0.22 (0.17,0.26)	0.15 (0.12,0.19)	0.12 (0.09,0.16)
30–45 years	0.35 (0.31,0.38)	0.19 (0.16,0.22)	0.17 (0.14,0.20)	0.12 (0.09,0.15)	0.40 (0.36,0.44)	0.24 (0.20,0.28)	0.19 (0.16,0.22)	0.14 (0.11,0.18)
45–64 years	0.27 (0.23,0.30)	0.16 (0.14,0.19)	0.09 (0.07,0.12)	0.09 (0.06,0.11)	0.32 (0.28,0.36)	0.20 (0.17,0.23)	0.10 (0.07,0.13)	0.11 (0.08,0.14)
65 years +	0.25 (0.21,0.28)	0.11 (0.09,0.13)	0.04 (0.04,0.10)	0.04 (0.01,0.06)	0.29 (0.25,0.33)	0.14 (0.12,0.17)	0.08 (0.04,0.12)	0.05 (0.02,0.08)
Ethnicity[e]								
Non-indigenous	0.25 (0.21,0.28)	0.11 (0.09,0.13)	Reference	Reference	0.29 (0.25,0.33)	0.14 (0.12,0.17)	Reference	Reference
Indigenous	0.33 (0.28,0.39)	0.15 (0.11,0.18)	0.09 (0.05,0.13)	0.04 (0.01,0.06)	0.39 (0.32,0.45)	0.18 (0.14,0.23)	0.10 (0.05,0.14)	0.04 (0.01,0.08)
Zone[f]								
Urban	0.25 (0.21,0.28)	0.11 (0.09,0.13)	Reference	Reference	0.29 (0.25,0.33)	0.14 (0.12,0.17)	Reference	Reference
Rural	0.36 (0.32,0.41)	0.10 (0.08,0.12)	0.12 (0.09,0.14)	−0.01 (−0.02,0.00)	0.42 (0.37,0.47)	0.13 (0.10,0.15)	0.13 (0.10,0.15)	−0.01 (−0.03, −0.00)
Health insurance[g]								
FONASA	0.25 (0.21,0.28)	0.11 (0.09,0.13)	Reference	Reference	0.29 (0.25,0.33)	0.14 (0.12,0.17)	Reference	Reference
ISAPRES	0.24 (0.18,0.30)	0.09 (0.07,0.12)	−0.00 (−0.06,0.05)	−0.02 (−0.04,0.01)	0.29 (0.22,0.36)	0.12 (0.08,0.16)	−0.00 (−0.07,0.06)	−0.02 (−0.05,0.01)
Other	0.23 (0.15,0.32)	0.11 (0.07,0.15)	−0.01 (−0.09,0.07)	0.00 (−0.04,0.04)	0.28 (0.19,0.37)	0.14 (0.09,0.19)	−0.01 (−0.10,0.07)	−0.00 (−0.05,0.05)
None	0.45 (0.38,0.51)	0.24 (0.18,0.30)	0.20 (0.16,0.25)	0.13 (0.08,0.19)	0.51 (0.44,0.57)	0.30 (0.23,0.37)	0.21 (0.17,0.26)	0.16 (0.11,0.23)

[a]Fixed at indicated sex, health system = FONASA, age group 65+, ethnicity = non-indigenous, zone = urban, income quintile = 2, education = middle.
[b]Fixed at health system = FONASA, age group = 65+, ethnicity = non-indigenous, zone = urban, education = middle.
[c]Fixed at health system = FONASA, age group = 65+, ethnicity = non-indigenous, zone = urban, income quintile = 2.
[d]Fixed at health system = FONASA, ethnicity = non-indigenous, zone = urban, income quintile = 2, education = middle.
[e]Fixed at health system = FONASA, age group = 65+, zone = urban, income quintile = 2, education = middle.
[f]Fixed at health system = FONASA, age group = 65+, ethnicity = non-indigenous, income quintile = 2, education = middle.
[g]Fixed at age group = 65+, ethnicity = non-indigenous, zone = urban, income quintile = 2, education = middle.

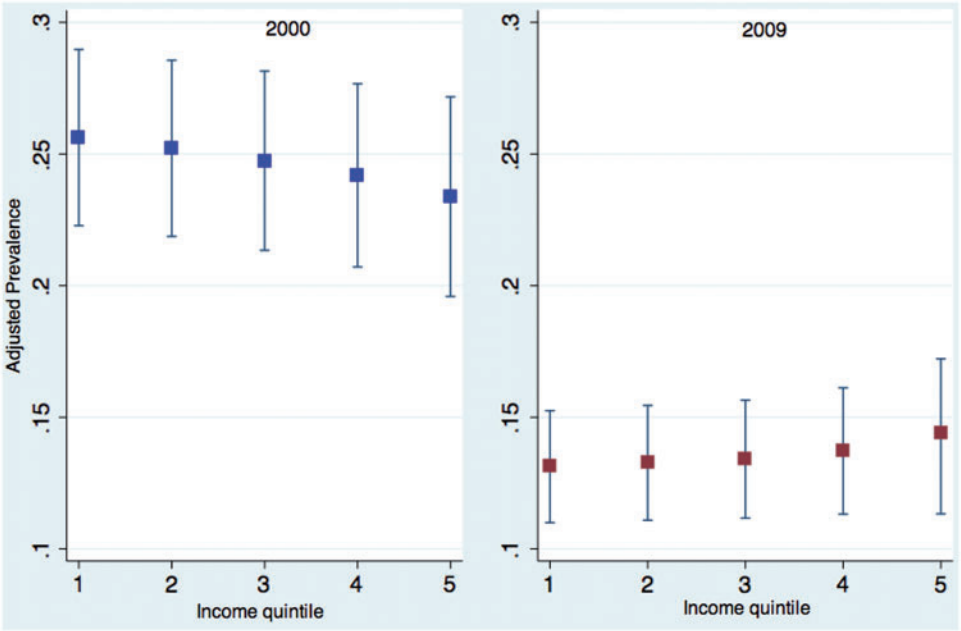

Figure 2 Adjusted prevalence and 95% CI of unmet health need for FONASA users 65 years and older, by household income quintile (1 = lowest) in 2000 and 2009. Fixed at age group 65+, FONASA, urban, non-indigenous and adjusted by sex and education.

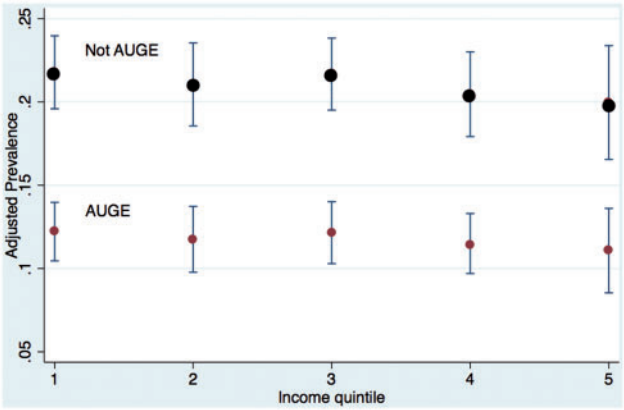

Figure 3 Adjusted prevalence and 95% CI of unmet need, by AUGE condition status (reported treatment for a condition covered by AUGE in the last 12 months) and household income quintile (1 = lowest) in 2009. *Note*: The AUGE group reported having been in treatment in the last 12 months for a covered condition. *Adjusted by age group, sex, education, health insurer, residence and ethnicity.

because they thought it was not necessary was around 40%, with a non-significant difference between extreme income groups. Nor were there significant income differences in the estimated proportions who reported that they had used home remedies, self-medicated, gone to the pharmacy or taken their regular medication. However, a significantly greater proportion of the lowest income quintile (1) with unmet need reported that health system barriers, such as not obtaining an appointment or having to wait, were the main reasons for not getting care (14% as compared with <2% of the highest income quintile).

In the 2009 analysis we compared the reasons for unmet needs by the response to treatment for an AUGE covered condition in the past year. There were no substantial differences in the reasons for not obtaining care for the recent health problem between those who had been treated for a guaranteed condition in the past year and those who had not. For example, 38% (95% CI: 31%, 45%) of the group with an unmet recent need who had been treated for an AUGE condition responded that they had done nothing about the recent health problem because they thought it was not necessary, which was not significantly different from the proportion of those who had not declared such treatment (not AUGE), which was 41% (95% CI: 36%, 45%). In relation to health system barriers as the main reasons for not obtaining care, the proportions were also similar for both AUGE and not AUGE groups.

Table 5 also presents the population estimates for the question relating to payment for the healthcare visit by the group whose recent health problem was attended. A larger proportion reported free care with no user fees in 2009, than in 2000.

The SII measure showed an absolute difference of unmet needs by income of 12.4% (95% CI: 8.1%; 16.7%), which was reduced to −1.0% (95% CI: −4.4%; 2.5%) in 2009, which means that income differences were not distinguishable from 0 in 2009. This indicator is consistent with the results of the logistic regression model, but it should be noted that the upper bound of the 95% CI is 2.5%. Therefore, a small positive income difference cannot be ruled out, although it still is well below the lower limit of 8·1% for 2000.

Figure 4 presents the relative concentration curves and rates by income decile of the reported number of general health, specialist and emergency care visits in the 3-month period prior to the interview for 2000 and 2009. The distribution of general visits for both years is close to the line of equality; however, utilization rates were higher for all income groups in 2009, especially for the lowest and highest deciles. For specialist care

Table 5 Total proportions (95% CI) and low vs high income quintile proportions for out-of-pocket payments for people with a recent problem who received healthcare and the reasons why people with a unmet did not obtain care

	2000		2009	
	Total proportion (95% CI)	Low vs high quintile	Total proportions (95% CI)	Low vs high quintile
Did you have to pay for the visit received for the recent problem?[A]				
Yes, FONASA C or D co-pay[a]	0.051 (0.044,0.057)	0.033 vs 0.035	0.073 (0.065,0.081)	0.035 vs 0.077*
Yes, FONASA voucher[b]	0.106 (0.088,0.124)	0.034 vs 0.127*	0.097 (0.088,0.106)	0.043 vs 0.149*
Yes, ISAPRE co-pay	0.160 (0.145,0.176)	0.021 vs 0.389*	0.082 (0.071,0.093)	0.009 vs 0.275*
Yes, 100%	0.066 (0.059,0.074)	0.028 vs 0.143*	0.064 (0.056,0.071)	0.029 vs 0.122*
No, free FONASA A or B[c]	0.411 (0.393,0.429)	0.698 vs 0.095*	0.549 (0.533,0.566)	0.800 vs 0.210*
No, free FONASA primary care[d]	0.104 (0.094,0.115)	0.137 vs 0.030*	0.068 (0.061,0.075)	0.052 vs 0.059
No, ISAPRE full coverage	0.019 (0.014,0.023)	0.004 vs 0.058*	0.013 (0.008,0.019)	0.004 vs 0.026*
Other	0.075 (0.066,0.084)	0.043 vs 0.112*	0.033 (0.028,0.039)	0.015 vs 0.064*
Doesn't know or remember	0.007 (0.005,0.009)	0.003 vs 0.013*	0.019 (0.016,0.023)	0.014 vs 0.018
Why didn't you receive care for recent health problem?[B]				
Didn't think it was necessary	0.266 (0.239,0.293)	0.188 vs 0.345*	0.400 (0.363,0.438)	0.427 vs 0.493
Self-medication or pharmacy[e]	0.445 (0.418,0.472)	0.478 vs 0.499	0.346 (0.314,0.378)	0.272 vs 0.347
Used alternative/traditional medicine[f]	–		0.027 (0.018,0.036)	0.033 vs 0.027
Didn't have the money[g]	0.144 (0.106,0.183)	0.158 vs 0.065*	–	
Too far or too hard to get there	0.093 (0.077,0.109)	0.107 vs 0.059*	0.110 (0.083,0.136)	0.111 vs 0.112
Couldn't get an appointment	0.038 (0.029,0.047)	0.061 vs 0.020*	0.073 (0.056,0.089)	0.104 vs 0.006*
Waiting for future appointment date[h]	–		0.030 (0.021,0.040)	0.038 vs 0.013
Didn't use my appointment	0.006 (0.003,0.009)	0.002 vs 0.010	0.014 (0.009,0,019)	0.015 vs 0.001*
No response	0.008 (0.006,0.010)	0.006 vs 0.002	–	

A: Of the group with a recent health problem, the proportion who received healthcare was 70% in 2000 ($n = 21\,478$ representing an expanded population of 1 361 961) and 82% in 2009 ($n = 25\,944$ representing 1 908 812).

B: Of the group with a recent health problem, the proportion who did not receive healthcare (unmet need) was 30% in 2000 ($n = 11\,904$ representing 580 745 in the population) and 18% in 2009 ($n = 4966$ representing 414 812). However, in 2000 the reasons are only reported for $n = 11\,249$ observations since people who received care in the pharmacy or traditional/alternative medicine were not asked the question.

[a]C and D are higher income FONASA groups with 10% and 20% co-pays in public establishments and ceilings for AUGE care.

[b]FONASA groups B, C and D can purchase ''Free Choice'' vouchers to obtain care with private providers.

[c]FONASA group A and B, indigent and low income groups have no co-pays in public establishments.

[d]Public Primary Care Centers have no user fees for FONASA. Milk for infants and other public health goods are also free for ISAPRE users.

[e]In 2000 the alternative is limited to home remedies or self-medication, since consulting in a pharmacy is included as an option in a prior question on where the person with a recent problem consulted. About 16% of people said they had consulted at a pharmacy.

[f]In 2000, the reasons for not consulting did not include the use of alternative or traditional medicine. However, it does appear as an option in the question where the person with a recent problem consulted. Less than 1% of those with a recent problem said they obtained care with a specialist in alternative or traditional medicine.

[g]This alternative was eliminated in the 2009 CASEN questionnaire.

[h]In 2009, the alternatives also include appointments for future dates (I have an appointment but it hasn't occurred yet).

*Test for difference in proportions between lowest and highest quintile $P < 0.05$.

the pro-rich distribution persisted between 2000 and 2009, although it was marginally less unequal. The comparison of utilization rates for specialist visits shows a small increase for deciles 1 and 2, large increases for deciles 9 and 10 and a decrease for deciles 7 and 8. The distribution of emergency care is pro-poor in both years, but more so in 2009, with a large increment in the rates for deciles 1–3 and little change for middle income groups.

Discussion

The Chilean case is especially interesting for developing countries because of the country's good health indicators and relatively low per capita health spending. In 2009, life expectancy reached 78.2 years, close to the Organisation for Economic Co-operation and Development (OECD) average of 79.5 years. For that year infant mortality was 7.9 deaths per 1000 live births, which was above the OECD average, but lower than that of countries with similar gross national products such as Argentina. In relation to total per capita health spending, adjusted for purchasing power parity, in 2009 Chile's average of 1186 US dollars was almost three times below the OECD average, with a much lower proportion of public expenditure. Furthermore, relative income inequalities, as captured by a Gini index over 0.50, are profound in Chile. In this context, evidence that specific policies may contribute to greater health system equity is especially relevant (OECD 2011).

Although our findings are consistent with the equity objectives of Chile's health guarantees reform, the cross-sectional

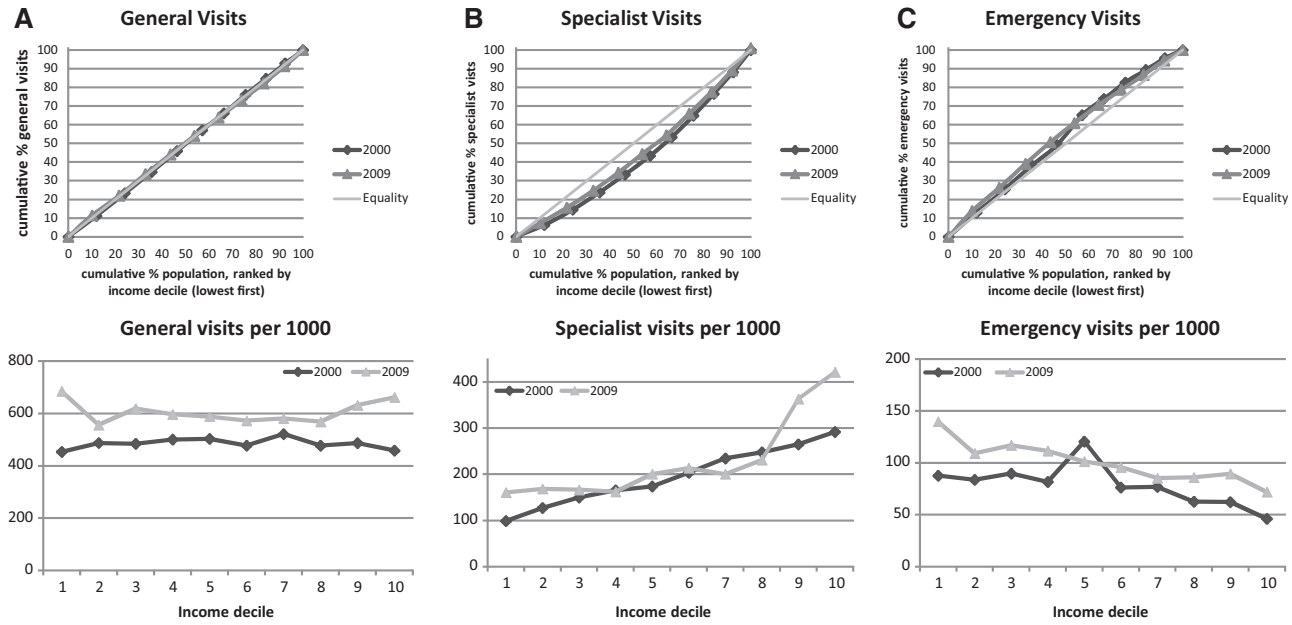

Figure 4 Concentration curves and utilization rates of health services received in the last 3 months by income decile in 2000 and 2009. Series A: Cumulative distribution of general medical visits and utilization rates per 1000 by income decile (1 = lowest). Series B: Cumulative distribution of specialist visits and utilization rates per 1000 by income decile (1 = lowest). Series C: Cumulative distribution of emergency visits and utilization rates per 1000 by income decile (1 = lowest).

design of the CASEN surveys only provides a snapshot of the situation for each survey year and limits any formal conclusions about the causal impact of AUGE. Our study does not directly demonstrate the effectiveness of AUGE or other health reform changes on healthcare equity. We could not control for other determinants of access such as greater economic prosperity or the contribution of other social policies, including the conditional cash transfer programme, Chile Solidario, implemented in 2002, which promotes health system affiliation and the use of preventive health programmes by poor families. Additionally, the limitations of the 2009 survey questions relating to the AUGE programme result in an underestimation of the proportion of the population who had been in treatment for an AUGE condition in the past year and we are unable to determine if they were effectively covered by the programme. There may also be other issues of comparability not fully addressed due to changes in the sampling design and modifications of the questionnaires. Despite these limitations, we believe that the CASEN data provide the best available information to monitor inequalities in health service access and utilization over time in Chile, since they cover the entire population, including groups without insurance and people who have not contacted the health system, in contrast to health registers, which are restricted to affiliated users.

Our main indicator, unmet need for a recent health problem, examines the proportion of people with a health problem in the last 30 days who received a healthcare visit by social characteristics, defining equity as the lack of variation across social groups. We found important differential levels of unmet need for a recent health problem across social groups in 2000, which were attenuated in 2009. In 2000, lacking health insurance and being an adult showed the strongest effect on unmet need, followed by rural residence, and indigenous ethnicity. Moreover, adjusted prevalences of unmet need decreased as income and educational levels increased. In 2009, the level of unmet need was much lower than in 2000 for all social groups. Furthermore, the income and education gradients for unmet need disappeared, which is consistent with the AUGE system's goals of universal, equitable access. The overall drop in unmet needs and the flattening of the income gradient are consistent with sizeable increases in the use of general practitioner and emergency visits across income groups, and the discrete improvement in specialist use for the lowest income deciles.

The differences in the proportions of unmet need for a recent health problem by AUGE status is striking: people who had been in treatment for a listed AUGE condition in the last year presented almost half the level of unmet need with no difference by income level. With the available information we cannot know if the recent problem was related to the AUGE condition or not. If the problem was related, the difference in unmet needs may signify the AUGE system's facilitated access or improved delivery arrangements. However, it may also denote an unobserved capacity of these individuals to access and manoeuver through the health system. On the other hand, it is of concern that the people who had not reported treatment for one of the AUGE conditions made up almost two-thirds of those with a recent health problem in 2009 and they clearly have greater levels of unmet need. While it can be argued that the people with prior treatment for an AUGE condition may have had a more serious recent health problem, this cannot be confirmed with these data. To the contrary, there is no difference in the proportions with unattended recent problems who thought healthcare was not necessary. Therefore, we are cautious in concluding that this finding suggests an improvement in healthcare equity, as we cannot dismiss that the higher

unmet need for the group who did not report a listed condition was the consequence of shifting efforts towards the AUGE problems, especially considering the legal, organizational and financial incentives.

The importance of the public health system in achieving improved healthcare equity in Chile is reaffirmed by our findings. In this 9-year period of relative economic prosperity, public sector affiliation increased from 66% to 80%, due only in part to population ageing. Clearly efforts were made to facilitate enrolment in FONASA, as is also shown by the drop in the percentage of the population without health system affiliation. The growing public share probably also reflects continued cream-skimming by the private sector, despite greater regulation. The increase in public system affiliation also suggests progress in improving public healthcare networks, related to increased public financing and organizational changes made to ensure compliance with the AUGE guarantees. Greater use of free health services in the public health system by lower income groups, facilitated by improved opportunity of attention, has presumably contributed to lower levels of unmet need.

This study fills in some of the gaps in knowledge about inequalities in healthcare use in Chile by examining unmet need as well as income-related utilization. Previous work by Paraje and Vásquez (2012) focused on income-related horizontal inequity in the utilization of different types of services, pre- and post-reform. Our findings on utilization confirm the existence of income-related inequalities in service use, with little change before and after the AUGE reform. These results are not surprising given that the objective of the reform was to insure minimum conditions of access and quality of care to meet the health needs of the whole population, but did not change the fact that the capacity to pay relates to greater amounts of services. Our indicator of unmet need for a recent health problem is a better measure of Chile's minimum standards approach to health equity than the more egalitarian horizontal inequity index. In fact, the series of questions we used to build the indicator were introduced in 2000 to monitor the equity impact of the reform, but they have not been used for this purpose previously (Jadue *et al.* 2004).

In addition to manifestly lower levels of unmet need in 2009 across the social gradient, other findings also suggest that the Chilean health system has become more equitable since 2000: the substantial decrease in the percentage of individuals who were not affiliated with any health subsystem, the higher proportions of people who did not pay for care and higher utilization rates for all types of services by the lowest income groups. While these changes were coincident with the health reforms carried out after 2000, one cannot directly attribute them to AUGE. Beyond the notable AUGE health guarantees system, the Chilean health reform bolstered public health insurance and provision, as well as extending government involvement in financing and regulation, accompanied by other social policy innovations, aimed at greater inclusiveness of the poor. All of these policies had explicit equity objectives, related to providing minimum standards of care. Nevertheless, Bitrán *et al.* (2010), analysing before and after data from health system registers and other information sources, did link the sizeable improvements they found in access to care and treatment outcomes for six guaranteed chronic diseases to AUGE, based on the magnitude of the changes.

Our analysis also identifies many issues related to health system equity that still need to be addressed in Chile, including differential access by gender, ethnicity and by age-group. One concern is about adequacy and quality of care, since specialist care continues to be concentrated in wealthier groups, which is consistent with findings in other contexts with close to universal coverage (Hanratty *et al.* 2007). In addition, a substantially greater proportion of the poorest individuals reported that health system barriers had impeded access to care for their recent health problem. Furthermore, the possible displacement of people with health needs whose problem is not AUGE must be addressed. More fundamentally, greater integration of the dual health system around principles of solidarity and justice is imperative.

Our study on Chile's experience adds crucial information to the policy debate on universal coverage and equity in mixed health systems in several ways. First, we add to the understanding of healthcare equity goals in mixed systems with minimum standards objectives, by examining changes in unmet need across social groups and income-related inequalities in utilization before and after the reform. Second, countries need to understand the equity of existing arrangements to plan changes, which need to be monitored to track progress and to identify critical challenges. In Chile's case, as AUGE expands and new policies are implemented there is growing awareness of the importance of monitoring and evaluation and efforts are underway to improve information and capacities, as evidenced by recent studies. Finally, the Chilean reform confirms the importance of strong public sector intervention in regulation, financing and service provision for moving towards universal access with equity.

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Conflict of interest

None declared.

Endnotes

[1] The private system pricing scheme based on tables of factors is currently under review in the face of successful legal challenges, based on infringement of the right to health.

[2] Many of the guaranteed priorities have age restrictions, which reduce the overall estimate of the burden of disease covered by the AUGE system. For example, integral dental care is provided for just two ages, 6-year-old children and 60-year-old adults, and hip replacement surgery covers adults who are 65 years and older. People outside these age groups still obtain care in the health system, but subject to waiting lists and higher co-payments. See Table A1 for the complete list of conditions and age restrictions.

[3] Prior to the legal mandate, pilot programs in FONASA were implemented, beginning with guarantees for congenital cardiopathy, cervical cancer and chronic kidney failure in August 2002.

[4] Other commonly used health inequality indicators represent an egalitarian perspective of equity. Examples are the concentration index and the horizontal inequity index for utilization of services, which is based on the principal of equal use for equal need.

[5] Diabetes includes type 1 and 2 and dental care covers integral treatment for two age groups (6 and 60 years).

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Table A1 Health conditions with healthcare guarantees under AUGE in 2009

(1) Chronic terminal kidney failure
(2) Operable congenital cardiopathy
(3) Cervical cancer
(4) Palliative care and pain relief for terminal cancer
(5) Acute myocardial infarction
(6) Type 1 Diabetes
(7) Type 2 Diabetes
(8) Breast cancer
(9) Spinal dysraphias
(10) Scoliosis needing surgery (<25 years)
(11) Cataracts
(12) Hip replacement for arthosis with severe functional limitation (≥ 65 years)
(13) Cleft palate (born after July 1, 2005)
(14) Childhood cancer (<15)
(15) Schizophrenia (fist symptoms after July 1, 2005)
(16) Testicular cancer
(17) Lymphoma
(18) HIV/AIDS
(19) Upper and lower respiratory infection (<5 years)
(20) Community-acquired pneumonia susceptible to ambulatory care (≥65 years)
(21) Primary arterial hypertension (≥15)
(22) Epilepsy susceptible to treatment in primary care (<15 years)
(23) Integral dental care (6 year-old children)
(24) Prematurity
(25) Alterations of impulse generation and conduction that require pacemaker
(26) Cholecystectomy (symptomatic 35–49 years)
(27) Stomach cancer
(28) Prostate cancer
(29) Vision impairment (≥65 years years)
(30) Strabismus (<9 years)
(31) Diabetic retinopathy
(32) Non-traumatic retinal detachment
(33) Haemophilia
(34) Depression (≥15 years)
(35) Prostate hyperplasia needing surgery
(36) Othesis and technical aids (≥65 years)
(37) Stroke (≥15 years)
(38) Chronic obstructive pulmonary disease (ambulatory treatment)
(39) Moderate and severe asthma (<15 years)
(40) Neonatal respiratory distress syndrome
(41) Medical treatment for mild and moderate hip and/or knee arthosis (≥55 years)
(42) Subarachnoidal haemorrhage secondary to rupture of cerebral aneurysms
(43) Primary central nervous system tumors needing surgery
(44) Herniated lumbar nucleus pulposus needing surgery
(45) Leukaemia
(46) Dental emergencies (ambulatory)
(47) Integral dental care (60 year-old adults)
(48) Severe multiple trauma
(49) Moderate or severe cranial trauma (emergency care)
(50) Severe ocular trauma
(51) Cystic fibrosis
(52) Rheumatoide arthritis
(53) Harmful use and dependence on alcohol and drugs (<20 years)
(54) Labour analgesia
(55) Major burns
(56) Bilateral hearing loss needing a hearing aid (≥65 years)

Source: Law Decree 44. Ministry of Health and Ministry of Finance. January 9, 2007.