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Measuring Population Experiences of Primary Care: Innovations in Primary Care Assessment in OECD and LAC countries

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Abstract

Countries in the region of the Latin America and the Caribbean (LAC) have made commitments to develop policy and health system-based approaches to combating these challenges. Key amongst these approaches is strengthening the primary health care (PHC) basis of national health systems. International evidence suggests that health systems based on a strong PHC orientation have better and more equitable health outcomes, can be more efficient, and can achieve higher user satisfaction than those whose health systems have only a weak PHC orientation. Nevertheless, very little data is available to measure and describe the degree to which health systems in LAC display such orientation. Primary care has specific, unique characteristics that may not be well-captured in overall health system assessment strategies. Measuring PC is complicated by the fact that in many countries there are multiple sub-systems of primary health care, particularly at the clinical level.

This study develops a composite measure of primary care experience, using the Commonwealth Fund's 2010 International Health Policy Survey (IHP), applied on eleven high income OECD countries, and based on user self-report. The multidimensional measure is composed of answers regarding specific primary care domains, including: accessibility, continuous care, coordination of care, and provider communication and cultural competence. The overall measure of primary care experience is tested and validated, including an exploration of population characteristics (e.g. sex, age, income, migration status, insurance type) that are associated with higher or lower assessments of the receipt of primary care. It explicitly assesses the influence of demographic, socioeconomic, health need, and health system variables, and includes important interaction terms between these variables. Based on the results, the measure's potential suitability for use in Latin America and the Caribbean is assessed. This includes commentary on possibilities for comparison between LAC and the OECD countries covered by the Commonwealth.

The results suggest that it is possible to develop a composite measure of user primary care experience based on survey data. In general, the primary care measure developed performed relatively well in terms of discriminating between people who have good versus poor experiences with their health system.

JEL Classification: I10, I18

Keywords: Primary Health Care, Health Services, Health Care Assessment

I. Introduction and background

Significant progress has been made in terms of improving health and human development in the Region of the Latin America and the Caribbean. Unfortunately, these trends occur in the context of an overall increase in many non-communicable diseases and the worsening of health inequalities. Countries in the region have made commitments to develop policy and health system-based approaches to combating these challenges. Key amongst these approaches is strengthening the primary care basis of national health systems (PAHO, 2007 p.2).

Strengthening the primary care component of national health systems will require attention to structural and operational needs (access, financial fairness, adequacy and sustainability of resources, political commitment, and development of systems that ensure high quality care). Systems-wide approaches are needed for achieving universal, integrated, comprehensive care.

International evidence suggests that health systems based on a strong PHC orientation have better and more equitable health outcomes, can be more efficient, and can achieve higher user satisfaction than those whose health systems have only a weak PHC orientation. (Friedberg et al, 2010; Starfield et al, 2005).

Regarding chronic diseases, in particular, primary care is believed to play an important role. This role includes coordination of primordial prevention. For example guaranteeing mothers' health and nutritional status during pregnancy, since conditions in utero may contribute to chronic disease risk among children (diabetes, hypertension, heart disease) later in life (Bousquet et al., 2011; Fuster et al, 2010; Blackwell et al, 1982). This also includes reinforcement of health promotion messages and strategies, such as those regarding smoking and other environmental approaches to reducing risk.

Primary care can also play a role in primary prevention of chronic disease. This includes provision of advice and support for physical activity, healthy diets, and non-smoking norms. Intersectorial actions involving schools, the community, and the workplace can also contribute to more effective prevention. At the clinical level, primary prevention includes promotion of regular screening for risk factors, and promotion of child and adult immunizations.

There is a very considerable role for primary care in secondary prevention through the monitoring of risk factors and complications, the provision of individual and group support for increasing physical activity, changing dietary habits, and quitting smoking; and the promotion of access to and strategies to increase adherence to medications (lipid-lowering, anti-hypertensive). Finally, primary care teams can play an essential role as people's "medical home" where provision of regular care takes place alongside coordination of specialist and diagnostic care and integration of health information.

Primary care also has a role to play in tertiary prevention, through rehabilitation and palliative care, coordination of specialist care, and ongoing monitoring of adherence to medications and complications.

However, accurate measurement of PHC characteristics is only one step for strengthening PHC-based health systems. The results of any data collection activity may be used to guide countries in the identification of best practices, variations in primary care, and areas that require additional improvement, as part as a broader process to assess the performance of the health system. Countries may choose to use survey results to establish baseline measures, to compare PHC performance between different sub-sectors or sub-national areas within a country, to compare PHC performance with other countries, to identify weak areas that require further in depth assessments, and as guidelines for policy development and investments oriented to strengthening primary health care services.

Measuring PHC characteristics can help strengthen PHC-based health systems. Results of survey can guide countries in best practices, variations in PC, and areas that need improvement. Countries may choose to use survey results to establish baseline measures, to compare PHC performance between different sub-sectors within a country, to compare PHC performance with other countries, to identify areas that require priority investments, and as guidelines for policy development oriented to strengthening primary health care services.

In spite of considerable evidence that countries with strong primary care tend to have lower overall costs and have healthier populations. Primary care is often a cornerstone of most health-care systems and measurement of its performance plays a critical part in ensuring that the

whole system works effectively, efficiently and for the benefits of patients (PAHO, 2007 p.373-4).

II. Primary Care and its impact in the region

The results of several literature reviews (Kruk et al 2010; Macinko et al 2009) show that there is little published data available on primary health care for most countries in Latin America and the Caribbean (with the possible exception of Brazil). For some smaller countries there is descriptive information only regarding the health system and very little or sometimes nothing about specific PHC characteristics. For other countries, there was often sufficient information about the health system in general but usually not much information was found for PHC services in particular.

Primary health care (in low- and middle-income countries of the Latin America and the Caribbean) has only rarely been evaluated in a consistent and reproducible way. For example, in the existing studies, exposure too primary care varied from simply residence within a geographic area in which the program or project was implemented, to the presence of a village health worker in a community, the use of specific health services, and in only a few cases, presence of integrated network of health and social services in the community.

Many (especially older) studies suffered from considerable methodological weaknesses (experimental or quasi-experimental designs, adequate control or comparison groups, statistical controls for individual or community-level confounders). As such, it is difficult to assess the extent to which observed changes in health outcomes can reasonably be attributed to policy and services changes.

There are also missing substantial descriptive and comparable data regarding national health system organization. There are several sources of data for all countries on basic health system characteristics such as whether the health system is centralized or not; healthcare coverage by main healthcare providers; which ministries or departments are responsible for which issues; and in some cases how insurance options were structured and who they covered. However, much of the information is out of date, was not compiled in order to be comparable across countries, and does not reflect contemporary health reforms.

- Financing. Data are generally available on main sources of healthcare funding; total expenditures on health and as % of GDP. However, much of this data at least 5 years old and there is no information on spending on primary care/PHC.
- Coverage. There was considerable data available on type of coverage options and policy prescriptions, but again, most data are older and lack details on characteristics of the population covered by different insurance types.
- Management. Almost no data were identified on management of health services or PC within countries.
- Primary Care Policy/Plan/Strategy. For the most part this was absent from any of the literature; only for the case of Brazil was a specific primary care policy, definition of primary care, and major strategy identified.
- PC Providers: No countries regularly provided data on "Total PC Physicians" or "PC Physicians/10,000 Inhabitants. Therefore, for most of low and middle-income countries, we do not know the size, composition, and distribution of the primary care workforce. This includes how generalists/family/community physicians are defined based on training, licensure, or function; what proportion of total physicians are generalists/family physicians; or how many are primary care nurses and community health workers.
- There is also little information available on the legal and regulatory framework defining PHC, such as policies for quality standards, the range of services provided, or the way medical records are stored and used.

This literature review process gives an additional rationale for the study. It confirmed the lack of data and evaluative information on PHC within the region. The literature review would normally serve as a validation process for the implementation of the survey, since it could be compared with information gathered through the survey to those found in the published articles and reports for each country. However, given the lack of secondary data or published reports, this validation process was not possible and is an important limitation to the study. For this reason, we analyze existing cross-national surveys from OECD countries as a way to understand and adapt approaches to assessing primary care experiences across different country contexts.

III. Data collection instrument: Combing the Commonwealth Fund Surveys and PCAT tools

Primary care has specific, unique characteristics that may not be well-captured in overall health system assessment strategies. Aspects such as accessibility are essential to PC's first contact function, but in many countries may be functionally independent of access to hospital and emergency care, payment mechanisms may differ by provider type.

Measuring PC is also complicated by the fact that in many countries there are multiple sub-systems of primary health care, particularly at the clinical level. This includes public sector providers, private sector providers, nongovernmental organizations, and additional public-sector services devoted to specific populations such as the military. Healthcare providers may work within and across these sub-systems and patients may consult multiple providers/systems (also true of specialty care). So, at least within the context of LAC countries, there is a need to be able to distinguish between PC-specific and other, shared elements of the health system. There is also a need to be able to collect information on the multiple PC sub-systems and to understand the way that people use different aspects of the healthcare systems for different needs. Representative population surveys are one way to capture this diversity, although it may be noted that for PC sub-systems serving smaller populations, where there are large geographic differences in the way PC is provided, oversampling of these subgroups may be necessary to be able to compare the performance of these multiple actors.

There are several tools that have been developed measure primary care. Malouin (2009) reviews the ability of these tools to capture essential elements of primary care as reflected in the concept of the medical home. In short, she finds that among the tools developed to assess population experiences of primary care, the Primary Care Assessment Tools (PCAT) are the most comprehensive, although they are not the shortest tool available. One advantage the tools is that they include measures of all essential primary care functions and allow for data collection to be consistent across source (primary care providers, primary care facilities, and users of primary care. Although the PCAT tool has been implemented and validated in several countries, there are no studies making international comparisons across population using the tool.

A review of existing survey instruments stresses the importance of being able to capture data on processes (Attainment of PHC features (first contact access, longitudinality, comprehensiveness, coordination) and outputs (user satisfaction, preventive services received,

referrals made). Ideally, population survey results would be combined with data on inputs, for example, in multilevel models that would allow for ascertainment of the correlation between the type of PC provider, organization of healthcare networks and payment modalities with user experiences. However, linking PC organization and delivery with healthcare outcomes will require a different set of tools and analytic approaches that allow for following individual people over time and ideally linking administrative data with patient records.

Surveys of primary care users should collect data on the main primary care functions as well as aspects of the overall health system that allow PC to function more effectively. PC functions relevant to international comparisons include the following:

- **Accessibility** implies the absence of geographic, financial, organizational, socio-cultural, and gender-based barriers to care; thus a PHC-based health system must rationalize the location, operation and financing of all services at each level of the health system. In order to provide for population health needs, PHC services need to be accessible. Accessibility is one of the key variables of interest when assessing the effectiveness of any health intervention or system, for if people cannot access the service, they cannot benefit from it.
- **First contact** means that care is first sought from the primary care provider when a new health or medical need arises. The primary care provider serves as the usual entry point into the health care system for each new need for health services, except in the case of serious emergencies and either provides care directly or serves as a facilitator, directing patients to more appropriate sources of care at the appropriate time. In order to be considered as providing first contact care, the services must be accessible (a structural characteristic) and used by the population each time a new need or problem arises (a behavioral characteristic). Thus, this first contact role can be seen as a way to make the rest of the health system more efficient and effective.
- **Longitudinality** refers to the longitudinal use of a regular source of care over time, regardless of the presence or absence of disease or injury. PHC provides care that is focused on the person, rather than on a disease or organ (as is the case for specialists). It concentrates on the long-term relationship between an individual and a health provider or team of providers. Through this relationship, and the development of records and other information,

PHC providers gain in-depth qualitative knowledge about the individual, their family, and the community in which they live. The focus here is on the creation of a "medical" or "health care home" recognized by both the patient and the provider. Benefits of longitudinality include better problem and needs recognition, more accurate diagnosis, better concordance with treatment advice, fewer hospitalizations, lower overall costs, better prevention of some types of illnesses, increased satisfaction. Several factors are necessary for a sustained, person-focused relationship between PHC providers and the people they serve. These include: a focus on the whole person (not just current symptoms); provider's knowledge of the individual as a person; a demonstrated level of care and empathy on the part of the provider; patient trust in the provider; and patient participation in decision-making.

- **Coordination** is the linking of health care visits and services so that patients receive appropriate care for all their health problems, physical as well as mental. The essence of coordination is "the availability of information about prior and existing problems and services and the recognition of that information as it bears on needs for current care". When care cannot be provided directly, PHC must coordinate services received from other providers in order to assure longitudinal, integrated care over time.
- **Comprehensiveness** refers to the availability of a wide range of services in primary care and their appropriate provision across the entire spectrum of types of needs for all but the most uncommon problems in the population by a primary care provider. This includes services that promote and preserve health; prevent disease, injury, and dysfunction; and care of illness, disability, and discomfort as long as these needs are not too uncommon for the primary care practitioner to maintain competence in dealing with them (generally occurring in at least one to two thousand people per year.). In order to achieve the first contact function, primary care must have the ability to resolve the most common health problems in the population.
- **Family-centeredness** recognizes that the family is a major participant in the assessment and treatment of a *patient*. A family focus is the natural complement to a continuous or longitudinal approach to PHC, since "producing health for an individual – a child, a mother, or anyone else – is the task of an entire family health system". Thus, PHC organizes services in an integrated fashion, as opposed to disease-specific, and relates needs of family members to specific services as they age. Families have the right and responsibility to participate individually and collectively in determining and satisfying the health care needs of family

members. Family-centered care reflects an understanding of the nature, role, and impact of family members' health, illness, disability, or injury on the entire family and the impact of family structure, function, and dynamics, as well as family history of illnesses on both risks of ill health and promotion of health of family members.

- **Community orientation** refers to care that is delivered in the context of the community. In order to achieve the community and intersectorial dimensions, PHC must provide a range of health services and coordinate a range of services both within and outside the health sector that are aligned to community health and human development needs. In order for PHC to be accessible and serve as first contact, it must respond to local definitions of health and development needs. There are several aspects to a community orientation, including: Participation in identification of needs, planning, services delivery, and quality improvement initiatives; Community governance in management, spending and resource allocation, and evaluation; Community-based initiatives where the community is the unit of analysis, actions are based on locally-defined problems and solved through social participation; and community involvement in the development of culturally appropriate services (e.g. language, culture, ethnicity).
- **Health professional teams** include nurses and doctors, community health workers, managers, other health professionals, and support staff with right knowledge and skills mix, who observe ethical standards and treat all people with dignity and respect. This requires strategic planning and distribution, and training to maximize the contribution of team work to outcomes, and to health worker and user satisfaction.

One of the few cross country comparative surveys of primary care comes from the ongoing Commonwealth Fund surveys. Since 1998, these surveys collect data from representative samples of citizens in an increasing number of OECD countries in order to assess how well different systems perform on a number features (Schoen et al 2000; Blendon et al. 2001; Blendon et al. 2002; Blendon et al. 2003; Schoen et al 2004; Blendon et al 2004; Schoen et al 2005; Schoen et al 2006; Schoen et al 2007; Schoen et al 2008; Schoen et al 2009; Schoen et al 2010; Schoen et al 2011) . The studies are supplemented by surveys of adults with chronic health conditions, and surveys of primary care providers in the same countries. Most recently, the Commonwealth Fund performed a telephone survey, from March to June 2010, of adults ages

18 and older in Australia, Canada, France, Germany, the Netherlands, New Zealand, Norway, Sweden, Switzerland, the United Kingdom, and the United States. The survey included a total of final sample of over 19,000 individuals. Data were collected by Harris Interactive subcontractors and several national agencies.

Main components of the Commonwealth surveys have included affordability, access, insurance coverage and complexity, equity, and people's views on the overall health system. The surveys also allows for examination of a limited number of demographic and socioeconomic variables within each country, such as examination of differences between above and below average (median) income respondents, and assessing access to and use of services while controlling for important healthcare needs such as age and health status. Like the PCAT tools, the Commonwealth Fund surveys have also surveyed healthcare providers to gain additional information about the health system and the ability of healthcare providers to achieve the desired PC functions.

Major findings from the most recent (2010) Commonwealth Fund International Health Policy (IHP) population survey include:

- Among the countries studied, the United States stood out due to evidence of access problems because of costs, difficulty paying medical bills, insurance complexity, and disparities by income.
- The design of insurance benefits was associated with access, protection, and time spent on managing benefits, including income-related cost-sharing and limits on out-of-pocket spending to promote access and enable ability to pay
- Overall, primary care appeared to be weaker in U.S., Canada, and Sweden than in the other countries studied, while the German, Swiss, U.S., Dutch, and U.K. systems were able to provide more rapid access to specialists.

Given the visibility and policy relevance of the Commonwealth studies, this project has three specific aims:

1. to use the Commonwealth Fund population surveys to develop and test a measure of a country's overall primary care performance;

2. to explore the utility of such a measure in assessing cross-national differences as well as individual correlates of primary care experiences; and
3. to discuss the utility of the Commonwealth Fund IHP survey for assessing primary care performance in Latin America and the Caribbean.

IV. Methods

The first objective is to develop a composite measure of primary care experience. The measure will be developed using the Commonwealth Fund's 2010 International Health Policy Survey (IHP), based on user self-report. The multidimensional measured will be composed of answers regarding specific primary care domains, including: accessibility, continuous care, coordination of care, and provider communication and cultural competence.

Existing analyses of the IHP surveys have so far relied primarily on measures of specific components (e.g. coordination of care) and although such analyses are essential, they do not capture people's overall experience of primary care. This is important because some aspects of primary care such as accessibility may be enhanced within some countries, but at the cost of reducing longitudinality (by increasing use of multiple health providers, for example). Potential strengths of this approach would be the ability to document the psychometric properties of the measure and explore the possibility of decomposing the indicator into its component parts.

One potential challenge of this approach is that two important dimensions of primary care (first contact and comprehensiveness) are not explicitly contained within the survey (and these are areas that might be suggested for future iterations of the survey tool). In spite of this limitation, the proposed approach may be able to better capture the latent construct of "patient primary care experience" by using a latent variable approach. Further, this new measure can also be compared with existing ones (such as the patient-centered medical home).

Once the overall measure of primary care experience is developed, it will need to be tested and validated. This includes exploring population characteristics (e.g. sex, age, income, migration status, insurance type) are associated with higher or lower assessments of the receipt of primary care. It will explicitly assess the influence of demographic, socioeconomic, health need, and health system variables, and include important interaction terms between these variables.

Expected results include cross-national comparisons of rates, identification of the relative effect of different factors on reports of superior and inferior primary care, and use of predicted probabilities and marginal effects to identify non-linear trends as well as sub-population variation within different countries.

Finally, based on the results obtained above, the measure's potential suitability for use in Latin America and the Caribbean will be assessed. This includes commentary on possibilities for comparison between LAC and the OECD countries covered by the Commonwealth. Including, whether there is reason to believe that LAC would be so different from other countries that the instrument would not be valid there; and what would be relevant comparisons within the dimensions of PC that should be explored using LAC data?

Some potential challenges to the proposed analysis include the fact that there are only 11 countries in the sample. However, based on availability of data, analyses could be further divided into private insurance vs public system within each country to present greater variation in the types of health sub-systems in which different individuals seek and receive care. If formal multilevel models are found to not support the data analysis proposed, an alternative modeling approach would involve simply adding country-level dummy policy variables to the individual-level datasets and testing the significance, sign, and magnitude of variables representing the interactions between these country indicators and individuals' primary care scores.

V. Results

Measuring user primary care experience

The first section describes results of the strategy undertaken to determine the best way to capture users' primary care experience. There are four possible ways to measure this experience. The first (naïve approach) is to simply count the number of problems each user reports and to divide the resulting score into meaningful categories. The second is to use factor analysis to create a score based on the correlation among responses to the 15 questions and to use that score as a continuous variable or to divide it into groups (e.g. quintiles). The third technique combines both the first and second approaches to create categories from the factor analysis that correspond to more meaningful cutpoints based on the distribution of health problems. The last approach is to use a structural equation model (measurement model) to develop a more complete measure of

primary care experience, taking into account aspects such as patterns of missing data. (Note this last approach is not described in this report).

Table 1 describes the variables related to primary care experiences that are included in the study. The results show that within the Commonwealth Fund survey, there are 15 potential measures of primary care experience. Each of these is measured as a binary variable and some were re-coded in order to make all measures indicative of poor primary care. So, for example the survey's measure of heaving a regular doctor was reverse coded to capture those who report having no regular doctor. The table shows that the primary care domains of access and first contact care, coordination of care, longitudinality, and provider communications and cultural competence are present in the survey. The prevalence of each measure varies from a low of six percent reporting skipping a medical visit due to difficulties in transportation to 38 percent reporting they were unable to receive an appointment in two days or less with their primary care provider. The table also makes it clear that some important primary care characteristics such as comprehensiveness of care and family and community orientation are not present in the IHP survey. The absence of these important dimensions motivate the use of factor analysis or other latent variable techniques to measure the underlying concept of primary care experience in the absence of comprehensive measures.

Two measures of primary care experience were developed. The first is a simple count of the number of the 15 binary indicators that each person possesses. Table 2 presents the distribution of each country's population by number of primary care problems reported. One observation that is important to keep in mind is the large number of people in each country who report zero problems. This number ranges from a low of 15% in Sweden to a high of 49% in Switzerland. The next largest category involves those who report only one primary care problem. The average is about 27% in ranges from a low of 23% in Switzerland to a high of 30% in Germany. About 16% of the sample reports two problems. Nearly 20% report between three and five problems and about 9% of the population reports having six or more health problems. Both the United States in Sweden presents the highest population proportions in this latter category.

Table 3 presents results from a tetrachoric factor analysis of the 15 binary variables representing primary care experience. The results show that there is one main factor and potentially a second minor factor that could be scored. Table 4 shows how each of these factors

loads on the 15 primary care experience questions. All factors are positive and load highest on factor 1. For this reason only one factor has been extracted in order to create the primary care user experience score.

Table 5 shows the distribution of the primary care score by the number of primary care problems reported. Group 1 represents those who have no problems. Group 2 represents those with a mean of one problem. Group three represents those with an average of 1.5 problems, and so on until reaching group 6 which represents those with the very worst primary care experience and an average of nearly 9 reported problems.

Figure 1 shows Receiver Operator Characteristics (ROC) statistics comparing two measures of the primary care experience, the overall count representing numbers of problems and the primary care score. The statistic is calculated as a way to compare the ability of the different measures to predict the given outcome. The ROC curve plots sensitivity versus one minus specificity as the cutoff is varied—and calculates the area under it. A model with no predictive power would be the 45 degree line and the greater the predictive power, the larger the area under the curve. This area is often used as a measure of the predictive power. A model with no predictive power has area 0.5; a perfect model has area 1. From the figure is clear that both measures do a reasonably good job in determining who has reported receiving poor quality healthcare. The ROC area for the number of primary care problems is 0.833 while the figure for the primary care factor score is 0.859.

Characterizing user primary care experiences

This section presents results of analyses seeking to characterize the primary care measure in terms of individual demographic, health, and socioeconomic status variables needed to control for health care needs as well as enabling and predisposing factors and outcome measures assessing health system performance.

Table 6 presents information on individual characteristics. The mean age in the sample is about 40 years. About 51% of the sample is female. Slightly less than half of the sample has public as opposed to private health insurance. About one third of the sample has below median income within each country. About 15% report poor self-rated health. About a quarter have one chronic condition and nearly a third have to chronic conditions. And about 15% of the sample

reports being born outside the country in which they are currently being interviewed. One potential limitation of the IHP data set is the absence of information on educational attainment. Education has been posited as a fundamental cause of health inequalities and is important moderating factor in terms of healthcare usage. In future studies measures of educational attainment are recommended.

All analyses were undertaken using robust Poisson regression, due to the fact that most outcome variables had a population prevalence of 10% or above. All analyses take into account the complex sample design by calculating robust standard errors that are clustered by country and also include sample weights. Results in tables are exponentiated prevalence ratios and their 95% confidence intervals.

Table 7 shows factors associated with five specific health system performance measures. The first concerns people's confidence receiving effective healthcare. In this model women are less likely than men to report confidence receiving care and those in older ages are less confident than are those in the reference group of young adults. People with worse self-rated health and the uninsured also expressed less confidence in receiving effective care. There is a graded negative association between each category of poorer primary care experience and likelihood of reporting confidence receiving effective. The group representing those with the worst primary care experience are about 54% less likely than the group representing the best primary care experience to report confidence receiving effective care. This pattern is quite similar for those reporting confidence in being able to afford care. One difference in this outcome is the importance of those who are below median income. There is a similar negative relationship between the worst primary care experience and less confidence in being able to afford needed care.

The next column presents predictors of those who report out-of-pocket expenses over $1000. In this model people in worse health (measured by number of chronic conditions) were more likely to report greater out-of-pocket expenditures. People below the median income as well as those with public versus private insurance were less likely to report out-of-pocket expenditures over $1000. For this outcome, people with worse primary care experiences were up to 2.4 times more likely to report out-of-pocket expenditures over $1000 as compared to those people with the best primary care experience. The next column presents predictors of individuals

who believe that their health system requires major reforms. It is an overall indicator of satisfaction with the health system in general. Older age groups, those with poor self-rated health or two or more chronic conditions, the uninsured, and those with below median income were all more likely to stay that the health system requires a complete overhaul. Again, those reporting the worst primary care experiences were more likely to report dissatisfaction with the health system. The magnitude of the association increases in a dose response fashion from those with only one primary care problem to those in a category with the most primary care problems.

Finally, the final column presents results of the likelihood of reporting using the emergency room. This indicator is often used as a measure of lack of access to appropriate and timely primary care. The results show that people in worse health measured by the number of chronic conditions were more likely to use the emergency room while those in older age groups were actually less likely to use the emergency room than younger groups. As predicted, there is again a dose response relationship between worse primary care experience and greater likelihood of having used emergency room in the past year. People with the worst primary care experience as compared to people with the best primary care experience had about 2.6 higher likelihood of using emergency room.

Taken together, these five indicators of health system performance all show a consistent and predicted relationships between the measure of primary care performance and user assessment of health system characteristics. The consistency of this relationship, the dose response relationship observed between worse primary care experience and worse outcomes, and the magnitude of the association between worse primary care and each outcome suggest that the primary care measure is in fact capturing an important aspect of user experience, one that would unlikely be detected if analyses focused on simply one aspect of the 15 questions related to users primary care experience.

Table 8 presents results of Poisson regressions on outcomes related to healthcare quality. The first measure presents predictors of the likelihood that an individual has had their blood pressure checked in the past year. The results show that women, people with chronic health conditions, and those in older age groups are all more likely to have their blood pressure checked. The uninsured and those in public versus private insurance are slightly less likely to

affect their blood pressure checked. There is no relationship between blood pressure checks and primary care experience.

The next measure assesses the likelihood that a woman reports having had a cervical cancer screening in the past 3 years. Women between 25 and 49 years of age were more likely to have had such a screening. Women below the median income, women who are not native born, and those with public versus private insurance were all less likely to have had a screening. There is no relationship between primary care experience and cervical cancer screening.

The next measure assesses reporting of cholesterol check in the past five years. The results are nearly identical to those obtained from the measure of having had blood pressure checked in the past year. Again, there's no relationship with primary care experience.

The next question asked the interviewees if they had what they considered to be any type of medical error during the past year. People who are in worse health measured both by presence of chronic conditions and poor self-rated health report higher likelihood of having experienced a medical error. Older supposed to younger groups were less likely to report medical errors, as were foreign-born and uninsured individuals. Individuals reporting worse primary care experience were much more likely to report having experienced a medical error.

The final question relates to the interviewee reported having received poor quality medical care. For this measure those with poor self-rated health were more likely to report for quality care. Here, the relationship with a poor primary care experience is quite pronounced. Those in the worst as opposed to the best category report nearly 47 times higher prevalence of having received poor quality medical care.

Tables 7 and 8 discuss the relative effect of primary care experience and other covariates on each outcome of interest. Figures 2 through 10 present predicted population prevalence of each outcome stratified by self-rated health status and by user primary care experience. The graphs allow one to look at the entire range of variation across the entire primary care measure while simultaneously controlling for confounding factors.

Figure 2 shows the likelihood of reporting confidence in receiving the most effective care. For both people in better health and those who report fair or poor health status, nearly 80%

of the population with no primary care problems reports confidence. This proportion decreases along the primary care score and reaches about 40% among those with the worst primary care experience, holding all else constant (at their means).

Figure 3 shows the likelihood of reporting confidence in one's ability to afford care. It shows a very similar relationship to that reported in the previous figure. It varies from a high of over 80% of the population with no problems, to about half that value 40% among those with the worst primary care experience. There is little difference in prevalence among those in worse health status.

Figure 4 presents the likelihood of having had out-of-pocket expenditures over $1000. Here, the gradient with primary care experience is less pronounced than the last two figures. Nevertheless, those with the worst primary care experience have nearly doubled prevalence of reporting significant out-of-pocket expenditures as compared to those with the best primary care experience.

Figure 5 shows the relationship between emergency room use and primary care experience. Again it shows the gradual but graded relationship between worse primary care experience in higher likelihood of having use the emergency room. While only about 10% of the sample reporting no primary care problems reports having used emergency room, this proportion increases to about 20% among those reporting the worst primary care experiences.

Figure 6, 7, and 8 all show the likelihood of having received recommended tests. They also all show first that the prevalence of such tests are at around 80% amongst all groups. Second, there's a slightly higher prevalence of tests among those in poor health. Third, there appears to be no relationship between receiving such tests and one's overall primary care experience.

Figure 9 presents population prevalence of reporting having experienced any medical error. Here, there is a graded relationship with primary care experiences, whereby those with the worst primary care experiences have between 2 to 4 times higher prevalence of reporting medical errors as compared to those reporting no primary care problems.

Figure 10 shows the relationship between the proportion of the population reporting having received poor quality care and primary care experiences. Among those in the first three categories of the primary care measure, the prevalence of receiving poor quality care is extremely low. In the last two categories of primary care experience, representing people who reports four or more primary care problems the likelihood of reporting having received for quality care increases dramatically. These provinces are each higher among those in poor health as opposed to those in good health.

VI. Discussion

This study has shown that it is possible to develop a composite measure of user primary care experience based on survey data. In general, the primary care measure developed performed relatively well in terms of discriminating between people who have good versus poor experiences and health system.

There are several potential lessons learned from this experience that may be relevant when developing population surveys to measure primary care in Latin America and the Caribbean.

First, assessing user experiences of aspects of primary care including access, first contact care, longitudinal care, comprehensive care, coordination of care, and provider characteristics are both feasible and potentially very powerful indicators of the strength of the primary care orientation of the country's health system. However, the measures used in this study were limited in the extent to which they were able to measure all the major features of primary care. For this reason, it is recommended to include measures of comprehensiveness as well as family and community orientation to survey modules in order to capture the full scope of primary care.

Second, the results of the ROC tests suggested that while the primary care factor score is generally superior, there is not necessarily a great loss of information by using the more intuitive measure representing categories of numbers of primary care problems. In fact, this latter approach may have greater appeal for health policymakers since both its construction and interpretation are straightforward. Although the results presented here use the primary care score,

sensitivity analyses suggest that nearly all of the results obtained here would be equivalent have they been calculated using the more simple measure.

Third, the primary care measure appeared to work well in predicting overall evaluations of the effectiveness, affordability, appropriateness, and overall quality of the health system in general. However, the measure was not able to differentiate between people who have received preventive care in the form of several screening tests recommended for most adults. It is certainly possible, given the diversity in health system studies and the different role of primary care versus specialist providers in each health system, that the receipt of preventive care in this context may not be a good measure of the quality of primary care in the country. This may also be associated with relatively high rates of screening in the current sample.

Fourth, given the diversity and fragmentation of most health systems in the countries of the Americas, it will be important to assure additional stratifying variables in surveys in order to be able to assess sub system and potentially subnational variations in primary care quality and effectiveness.

Fifth, in order to be able to affect change in the way that primary care is organized finance and delivered in many countries it will be important to have buy-in from healthcare providers and managers. This suggests the strategy undertaken by the Commonwealth foundation of conducting surveys of both individuals were users of health systems and providers and managers working in health systems can be a very powerful approach to generate evidence on where health systems are most effective and where there may be gaps.

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Table 1: PC domains, and survey variables

PC domain*	Variable present in Commonwealth Fund 2010 IHP Survey	Population proportion (95% ci)
First contact/access	Had problem but had to skip/delay medical visit	0.0928 0.0873,0.0982
First contact/Access	Unable to receive apnt in two days	0.3795 0.3708,0.3882
Access	Had problem but skipped/delayed needed test	0.0897 0.0843,0.0952
Access	Skipped/delayed filling needed prescription	0.0962 0.0905,0.1019
Access	Skipped medical visit due to transportation	0.0615 0.0570,0.0661
Access/Coordination	Long delay in getting diagnosis (specialist)	0.165 0.1580,0.1719
Coordination	Test results/records not available	0.1088 0.1029,0.1148
Coordination	Received conflicting information from doctors	0.1955 0.1879,0.2031
Coordination	Doctor ordered unnecessary test	0.1053 0.0994,0.1112
Longitudinality	Your doctor knows your medical history problem	0.1277 0.1210,0.1344
Longitudinality	No regular doctor	0.2334 0.2258,0.2411
Provider	Doctor allows you to ask questions	0.1211 0.1144,0.1278
Provider	Visit lasts enough time	0.1384 0.1314,0.1454
Provider	Doctor involves you in decisions about your care	0.1568 0.1496,0.1640
Provider	Doctor explains your problems sufficiently	0.0987 0.0927,0.1048

Source: Calculated by the author based on data from Schoen et all 2010.
Note: the domains of comprehensiveness, family and community orientation are not represented in the survey.

Table 2: Distribution of population proportion by numbers of primary care problems (out of 15) and country

	Australia	Canada	New Zealand	United Kingdom	United States	Germany	Nether-lands	France	Norway	Sweden	Switzer-land	Total
None	28.12	21.25	43.15	33.15	24.27	23.14	44.54	23.51	23.79	15.49	49.68	27.73
1	26.61	29.12	23.93	29.56	23.52	30.55	27.54	28.35	28.08	29.20	23.67	27.26
2	14.83	18.54	11.56	18.84	13.22	22.61	13.67	19.74	14.96	16.99	12.56	16.16
3-5	20.46	21.81	15.52	14.36	22.40	18.38	11.92	22.85	22.05	26.40	11.68	19.98
6-9	7.64	7.78	4.85	3.75	12.85	4.56	1.92	5.34	9.73	10.26	2.37	7.32
10+	2.35	1.50	0.99	0.34	3.74	0.76	0.41	0.20	1.39	1.66	0.03	1.55
Total	100	100	100	100	100	100	100	100	100	100	100	100

Source: Calculated by the author based on data from Schoen et all 2010.

Table 3: Results of Tetrachoric factor analysis of 15 primary care variables

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	5.6674	3.7321	0.7454	0.7454
Factor2	1.9353	1.3313	0.2546	1.0000
Factor3	0.6040	0.4612	0.0794	1.0794
Factor4	0.1428	0.0344	0.0188	1.0982
Factor5	0.1084	0.0787	0.0143	1.1125
Factor6	0.0297	0.0300	0.0039	1.1164
Factor7	-0.0003	0.0329	0.0000	1.1164
Factor8	-0.0332	0.0018	-0.0044	1.1120
Factor9	-0.0350	0.0193	-0.0046	1.1074
Factor10	-0.0543	0.0269	-0.0071	1.1003
Factor11	-0.0812	0.0474	-0.0107	1.0896
Factor12	-0.1285	0.0198	-0.0169	1.0727
Factor13	-0.1483	0.0117	-0.0195	1.0532
Factor14	-0.1600	0.0843	-0.0210	1.0321
Factor15	-0.2443	.	-0.0321	1.0000

Source: Calculated by the author based on data from Schoen et all 2010.

Table 4: PC domains, survey variables, and factor loadings (pattern matrix)

Variable	Factor 1	Factor 2	Uniqueness
Had problem but had to skip/delay medical visit	0.6228	0.5096	0.3525
Unable to receive apnt in two days	0.3782	0.0042	0.8569
Had problem but had to skip/delay needed medical test	0.6448	0.5352	0.2979
Had to skip/delay filling prescription for needed medications	0.6383	0.4681	0.3734
Had to skip needed medical visit due to transportation	0.5463	0.3248	0.5961
Had a medical problem, but too long to get diagnosis/specialist	0.5995	0.2398	0.583
Test results/records not available	0.5499	0.184	0.6638
Received conflicting information from different doctors	0.5585	0.1801	0.6557
Doctor ordered unnecessary test	0.5071	0.1896	0.7069
Your doctor knows about your medical history problem	0.6783	-0.3844	0.3922
No regular doctor	0.2968	-0.2369	0.8558
Doctor allows you to ask questions	0.7513	-0.439	0.2428
Visit lasts enough time	0.734	-0.4152	0.2888
Doctor involves you in decisions about your care	0.7421	-0.4184	0.2742
Doctor Explains your problems sufficiently	0.7628	-0.4009	0.2574

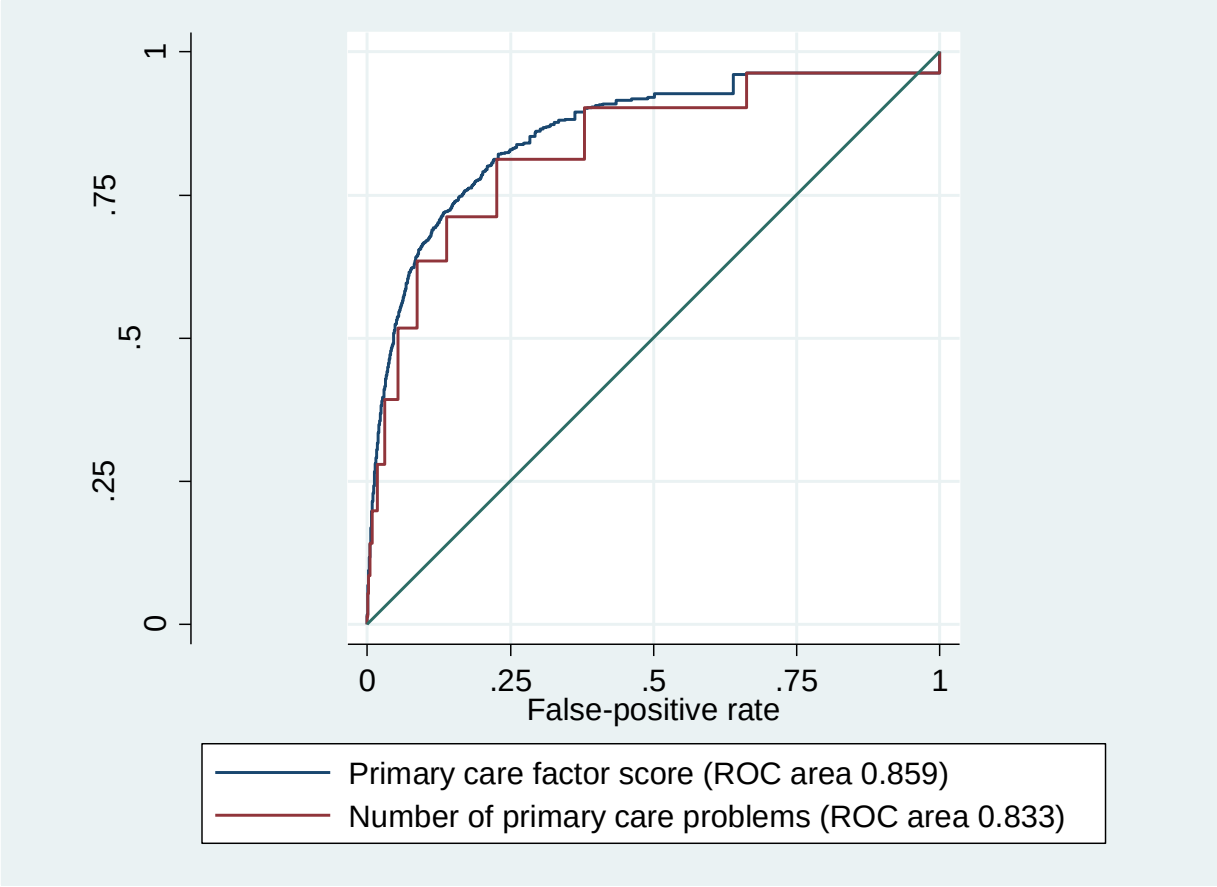
Source: Calculated by the author based on data from Schoen et all 2010.
Note: the domains of comprehensiveness, family and community orientation are not represented in the survey.

Table 5: Distribution of primary care score, by number of problems (out of 15)

PC score	Mean number of problems	se	95% ci (low)	95% ci (high)
Group 1	0	n/a		
Group 2	1.06	0.01	1.05	1.07
Group 3	1.43	0.01	1.41	1.46
Group 4	2.70	0.02	2.67	2.74
Group 5	4.94	0.03	4.87	5.01
Group 6	8.80	0.10	8.60	9.00

Source: Calculated by the author based on data from Schoen et all 2010.

Figure 1: Report of receiving poor quality healthcare: receiver operator characteristics comparing primary care factor score versus number of primary care problems



Source: Calculated by the author based on data from Schoen et all 2010.

Table 6: Individual characteristics and health system assessment variables

Variable	**Proportion (95% CI)**
Age (mean years)	48.35 (48.02, 48.68)
Sex (female versus male)	51.51 (50.60, 52.41)
Public health insurance (versus private)	45.81 (44.96, 46.66)
No health insurance (versus private, US only)	1.58 (1.36, 1.83) total sample 12.25 (10.59, 14.12) within US
Income (below country median income)	33.22 (32.38, 34.07)
Poor self-rated health	14.55 (13.92, 15.20)
One chronic condition (versus none)	25.97 (25.19, 26.77)
Two or more chronic (versus none)	32.07 (31.27, 32.89)
Foreign born (versus native born)	15.54 (14.89, 16,21)

Source: Calculated by the author based on data from Schoen et all 2010.

Table 7: Primary care score and overall health system performance measures

	Confidence receiving effective care	Confidence in affording care	Out of pocket expenses >$1000	System requires major reform	Emergency room use
Female	0.96* (0.93,0.99)	0.93*** (0.90,0.97)	1.04 (0.95,1.15)	0.99 (0.86,1.14)	1 (0.91,1.10)
1 chronic condition (v none)	0.99 (0.96,1.01)	0.98 (0.95,1.01)	1.2*** (1.12,1.29)	0.96 (0.84,1.10)	1.26*** (1.12,1.41)
≥2 conditions (v none)	1 (0.97,1.03)	0.97 (0.92,1.02)	1.56*** (1.36,1.78)	1.15* (1.02,1.31)	1.42** (1.13,1.77)
25-34 (v 18-24 years)	0.98 (0.92,1.03)	0.97 (0.91,1.04)	1.26 (0.85,1.85)	1.52 (0.89,2.62)	0.84 (0.65,1.08)
35-49	0.95* (0.91,0.99)	0.93* (0.87,1.00)	1.36 (0.95,1.95)	2.02** (1.31,3.12)	0.54*** (0.44,0.68)
50-64	0.91*** (0.87,0.96)	0.92* (0.86,0.99)	1.41 (1.00,1.98)	2.59*** (1.85,3.64)	0.46*** (0.35,0.59)
65+	0.95* (0.91,0.99)	0.98 (0.92,1.05)	1.12 (0.76,1.65)	2.65*** (1.80,3.91)	0.4*** (0.32,0.51)
Poor SRH (v good/very good)	0.91*** (0.87,0.96)	0.93* (0.87,0.99)	1.08 (0.86,1.35)	1.22* (1.01,1.48)	1.11 (0.98,1.26)
< median income	0.97 (0.95,1.00)	0.85*** (0.81,0.90)	0.81* (0.68,0.97)	1.28** (1.10,1.49)	1.09 (0.96,1.24)
Not native born	1.01 (0.98,1.05)	0.98 (0.93,1.03)	0.99 (0.78,1.26)	0.86* (0.75,0.98)	0.92 (0.64,1.33)

Uninsured (v private)	0.6*** (0.57,0.64)	0.34*** (0.31,0.37)	1.21 (0.81,1.82)	1.92*** (1.47,2.49)	1.14 (0.83,1.56)
Public insurance (v private)	0.99 (0.96,1.02)	0.95 (0.88,1.03)	0.58** (0.40,0.83)	0.82 (0.65,1.04)	1.02 (0.82,1.26)
PC 2 (versus best)	0.95*** (0.92,0.97)	0.93*** (0.90,0.95)	1 (0.79,1.27)	1.22 (0.93,1.59)	1.29** (1.09,1.54)
PC 3	0.92*** (0.89,0.94)	0.88*** (0.85,0.92)	1.3** (1.11,1.53)	1.57*** (1.42,1.75)	1.3* (1.06,1.59)
PC 4	0.82*** (0.80,0.85)	0.8*** (0.74,0.86)	1.47*** (1.20,1.80)	1.82*** (1.62,2.03)	1.7*** (1.38,2.10)
PC 5	0.66*** 0.61,0.70	0.62*** 0.55,0.70	1.75*** 1.37,2.23	2.74*** 2.04,3.69	2.04*** 1.60,2.60
PC 6 (worst)	0.46*** (0.40,0.52)	0.48*** (0.37,0.61)	2.37*** (1.71,3.29)	4.78*** (3.61,6.34)	2.58*** (1.84,3.61)
N	14146	14027	12090	14121	14058

Source: Calculated by the author based on data from Schoen et all 2010.
Note: Results are prevalence ratios and 95% CIs from Poisson regression analysis, controlling for sample design and weights.

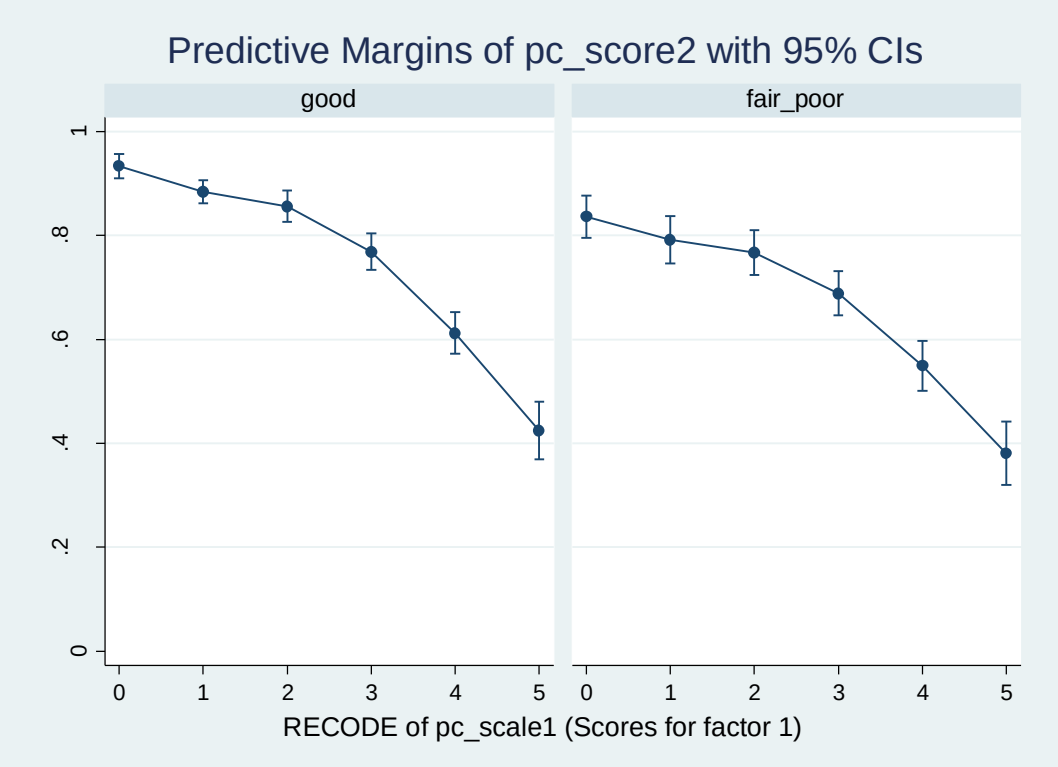
Table 8: Primary care score and quality measures

	Blood pressure check (past year)	Cervical cancer check (< 3 years)	Cholesterol check (< 5 years)	Any medical error	Received poor quality care
Female	1.04*** (1.02,1.06)		0.97 (0.92,1.03)	1.03 (0.90,1.17)	1 (0.85,1.18)
1 chronic condition (v none)	1.13** (1.05,1.22)	1.02 (0.98,1.07)	1.14*** (1.09,1.21)	1.8*** (1.53,2.13)	0.87 (0.69,1.10)
≥2 conditions	1.23*** (1.13,1.34)	1 (0.94,1.07)	1.28*** (1.19,1.37)	2.15*** (1.86,2.49)	0.79 (0.61,1.02)
25-34 (v 18-24 years)	1.12** (1.05,1.20)	1.29*** (1.13,1.46)	1.43*** (1.22,1.69)	0.97 (0.68,1.38)	1.25 (0.94,1.65)
35-49	1.18*** (1.08,1.29)	1.28*** (1.12,1.47)	1.81*** (1.59,2.06)	0.79 (0.56,1.12)	1.16 (0.78,1.70)
50-64	1.23*** (1.12,1.34)	1.14 (1.00,1.31)	1.97*** (1.72,2.26)	0.59*** (0.46,0.76)	0.9 (0.64,1.25)
65+	1.28*** (1.16,1.41)	0.94 (0.80,1.10)	2.02*** (1.79,2.29)	0.55** (0.37,0.81)	1 (0.67,1.49)
Poor SRH (v good/very good)	0.99 (0.96,1.02)	0.93 (0.84,1.03)	0.97 (0.93,1.00)	1.61*** (1.31,1.97)	1.72*** (1.39,2.12)
< median income	1.01 (0.98,1.04)	0.94* (0.89,0.99)	0.97 (0.94,1.00)	1 (0.87,1.14)	0.97 (0.85,1.11)
Not native born	0.99 0.94,1.04	0.92** 0.87,0.98	1.03 0.98,1.09	0.75* 0.59,0.97	1.02 0.87,1.20
Uninsured (v private)	0.89*** (0.84,0.94)	0.97 (0.87,1.07)	0.95 (0.88,1.03)	0.64*** (0.54,0.75)	0.8** (0.69,0.92)

Public insurance (v private)	0.92* 0.86,0.99	0.93** 0.88,0.98	0.93* 0.87,1.00	0.88 0.70,1.09	0.96 0.85,1.09
PC 2 (versus best)	0.99 (0.96,1.02)	1.02 (0.97,1.08)	1 (0.95,1.06)	1.16 (0.91,1.47)	1.75 (0.82,3.74)
PC 3	1.03 (1.00,1.06)	1.01 (0.97,1.05)	1 (0.95,1.05)	1.96*** (1.32,2.93)	2.39*** (1.51,3.78)
PC 4	1.02 (0.97,1.06)	1.02 (0.97,1.07)	0.98 (0.94,1.02)	2.92*** (2.00,4.25)	5.39*** (2.78,10.46)
PC 5	1.02 (0.96,1.08)	1.01 (0.94,1.09)	0.96 (0.88,1.05)	4.58*** (3.09,6.79)	16.78*** (9.53,29.53)
PC 6 (worst)	1.04 0.98,1.11	0.9 0.81,1.01	0.93 0.86,1.02	6.21*** 4.17,9.23	47.22*** 27.32,81.62
N	14220	6678	13907	14242	14083

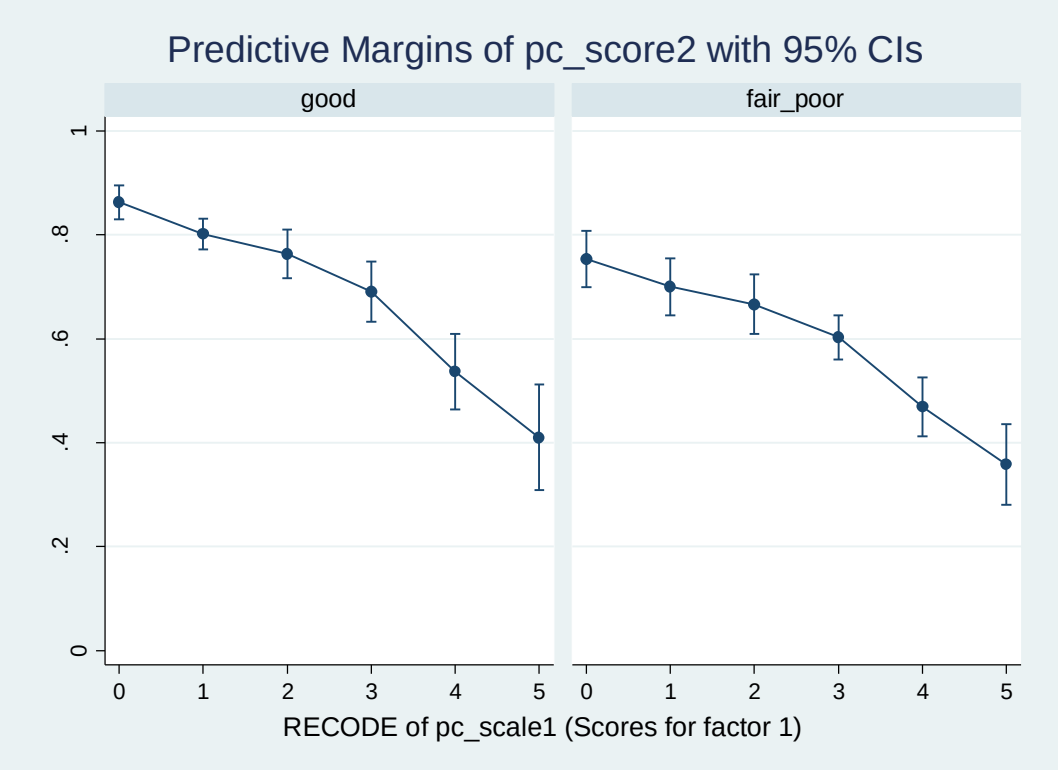
Source: Calculated by the author based on data from Schoen et all 2010.
Note: Results are prevalence ratios and 95% CIs from Poisson regression analysis, controlling for sample design and weights.

Figure 2: confidence in receiving the most effective care, by pc score



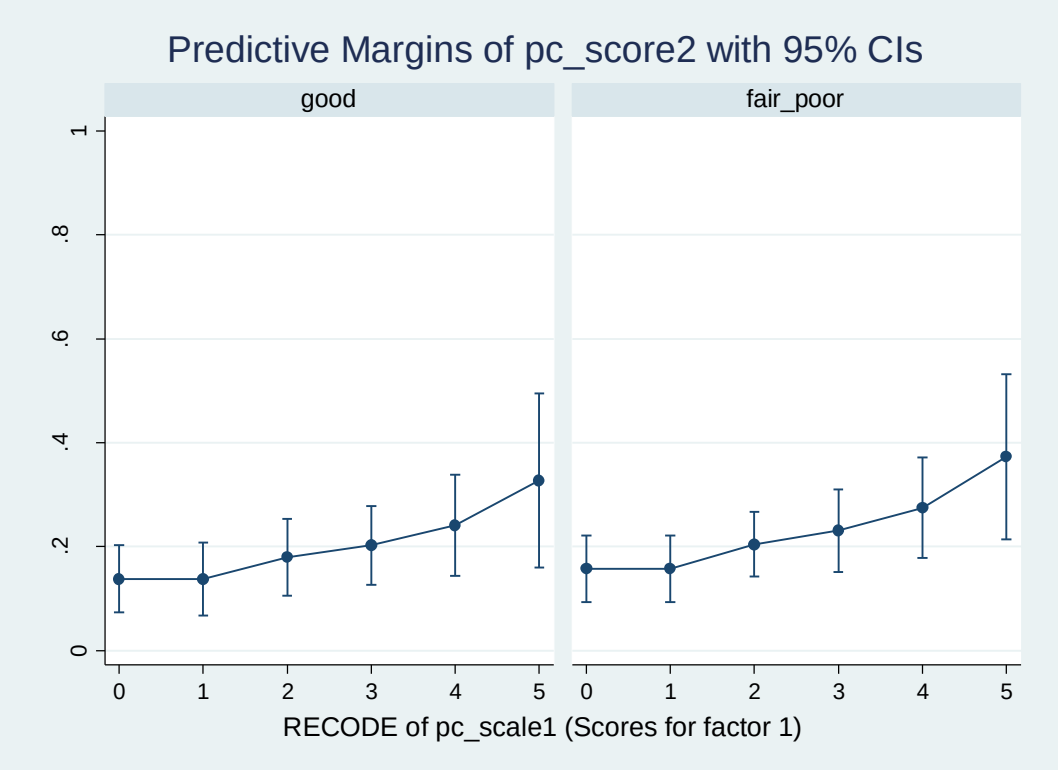
Source: Calculated by the author based on data from Schoen et all 2010.
Note: Predicted probabilities (population proportion) from robust Poisson regression adjusted for age, sex, insurance, health conditions, native born, including design effect and sample weights

Figure 3: confidence in ability to afford care by pc score and self-rated health status



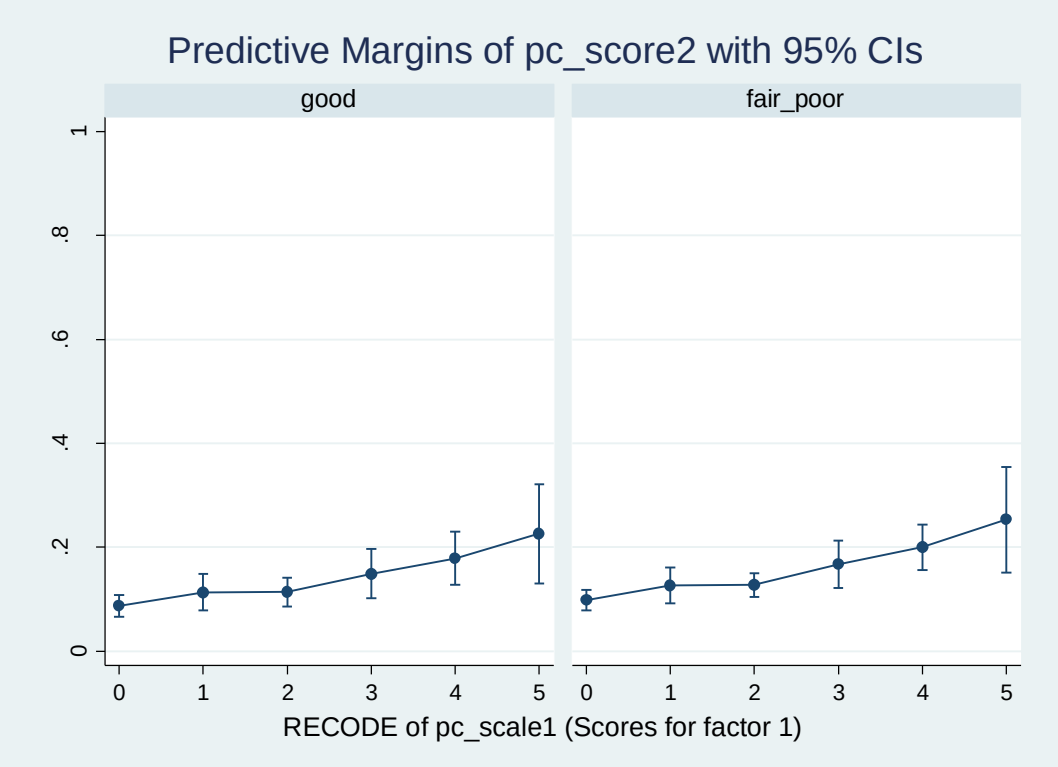
Source: Calculated by the author based on data from Schoen et all 2010.
Note: Predicted probabilities (population proportion) from robust Poisson regression adjusted for age, sex, insurance, health conditions, native born, including design effect and sample weights

Figure 4: Predicted prevalence of out of pocket expenses > $US1000, by PC score and self-rated health status



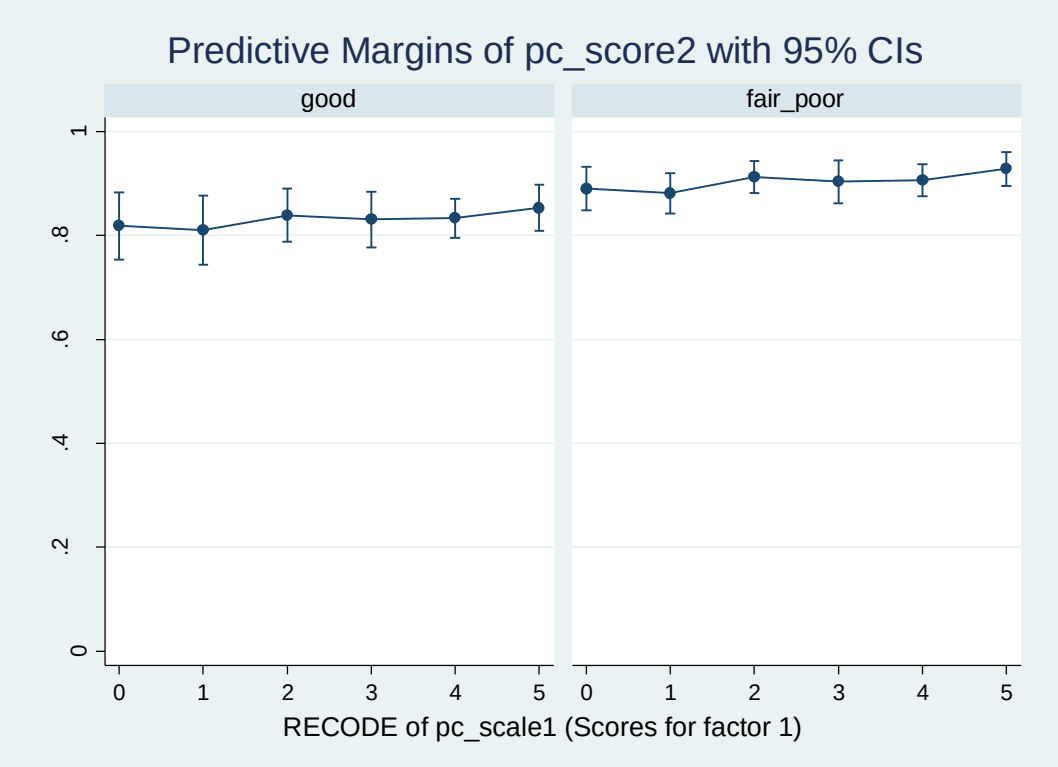
Source: Calculated by the author based on data from Schoen et all 2010.
Note: Predicted probabilities (population proportion) from robust Poisson regression adjusted for age, sex, insurance, health conditions, native born, including design effect and sample weights

Figure 5: Emergency room use, by pc score and health status



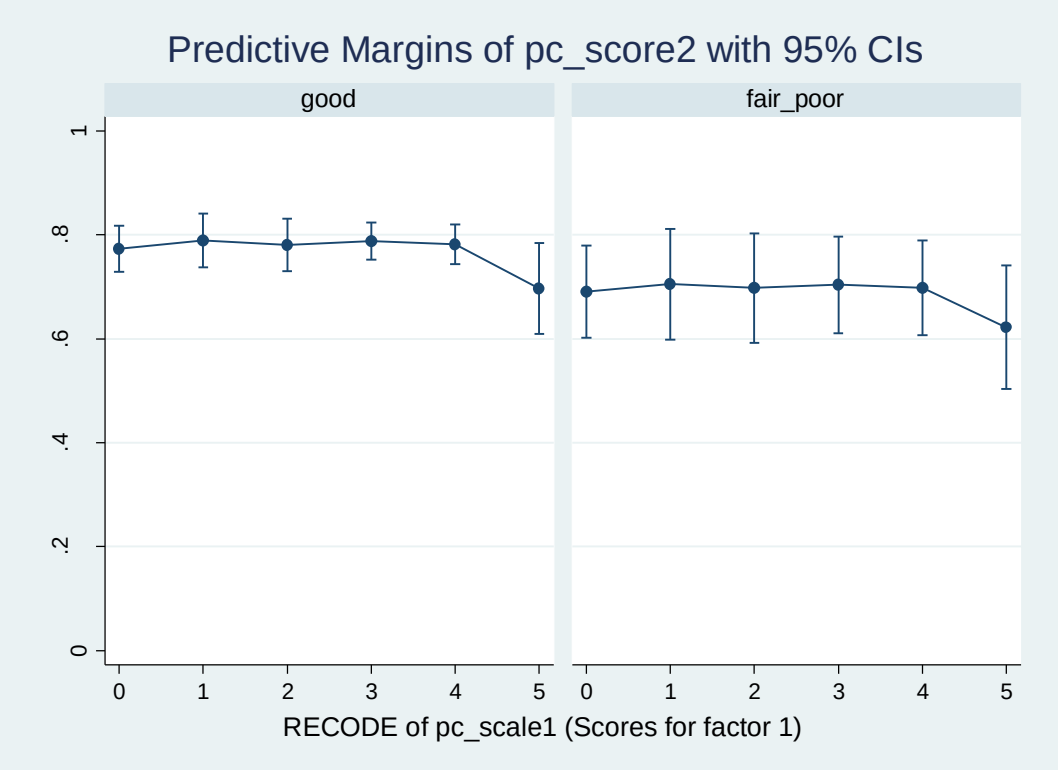
Source: Calculated by the author based on data from Schoen et all 2010.
Note: Predicted probabilities (population proportion) from robust Poisson regression adjusted for age, sex, insurance, health conditions, native born, including design effect and sample weights

Figure 6: Blood pressure screening in past year, by pc score and health status



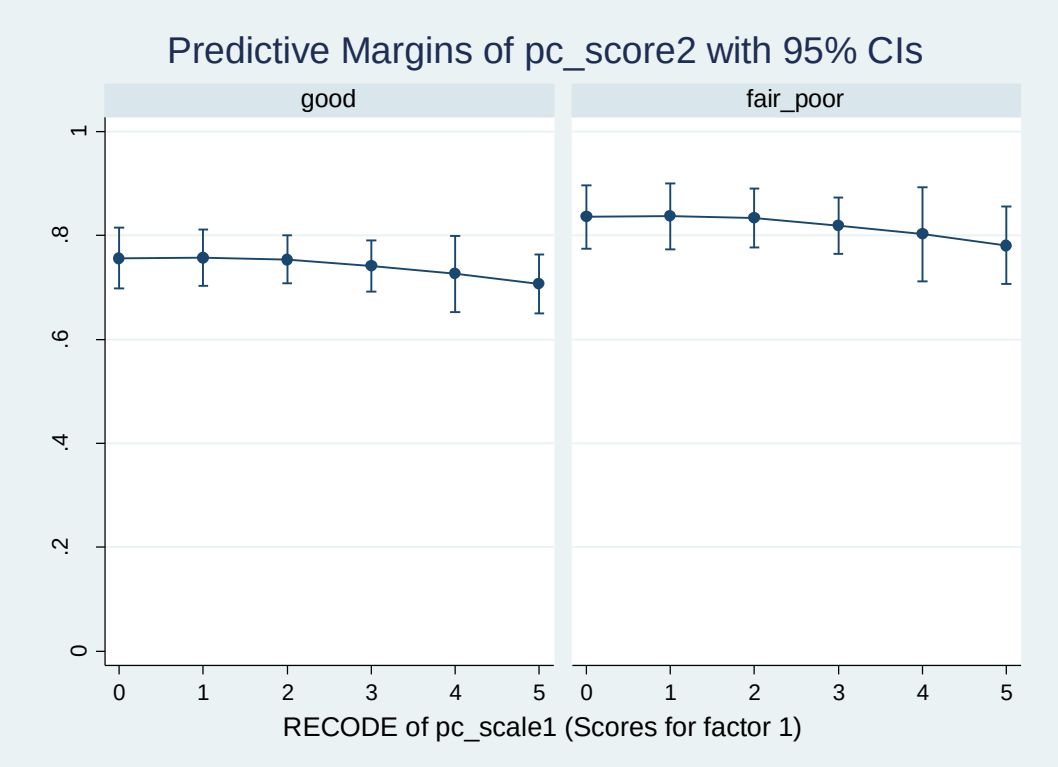
Source: Calculated by the author based on data from Schoen et all 2010.
Note: Predicted probabilities (population proportion) from robust Poisson regression adjusted for age, sex, insurance, health conditions, native born, including design effect and sample weights

Figure 7: Cervical cancer screening (women only) in past 3 years, by pc score and health status



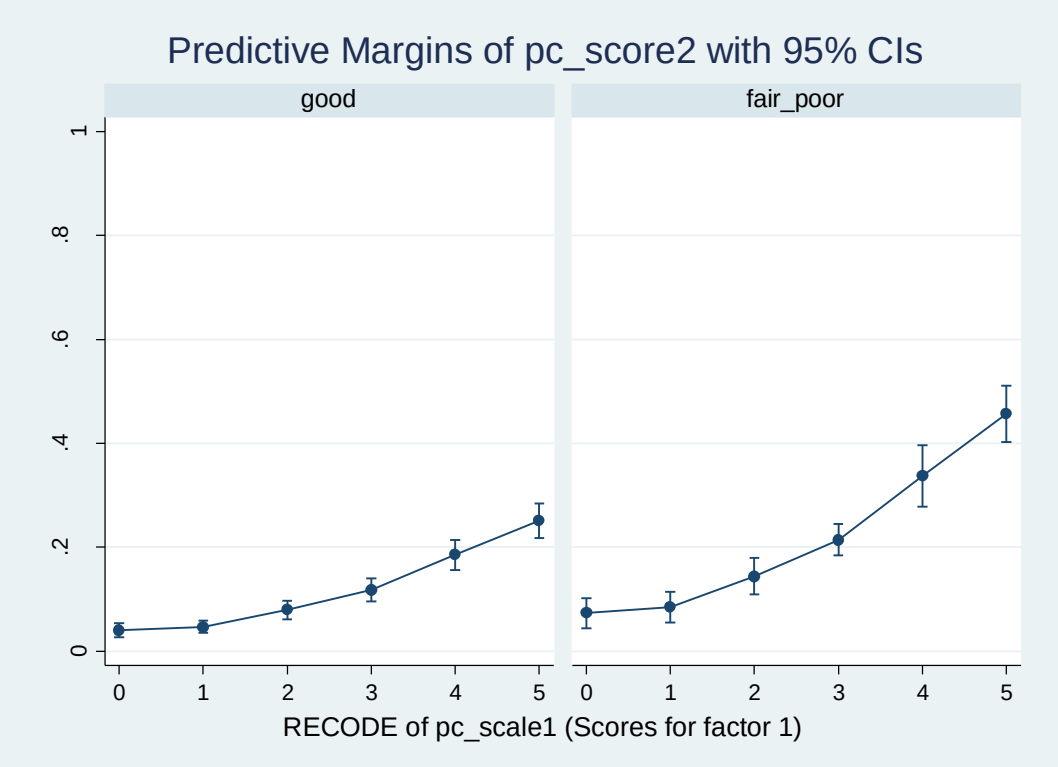
Source: Calculated by the author based on data from Schoen et all 2010.
Note: Predicted probabilities (population proportion) from robust Poisson regression adjusted for age, sex, insurance, health conditions, native born, including design effect and sample weights

Figure 8: Cholesterol screening (past 3 years), by pc score and health status



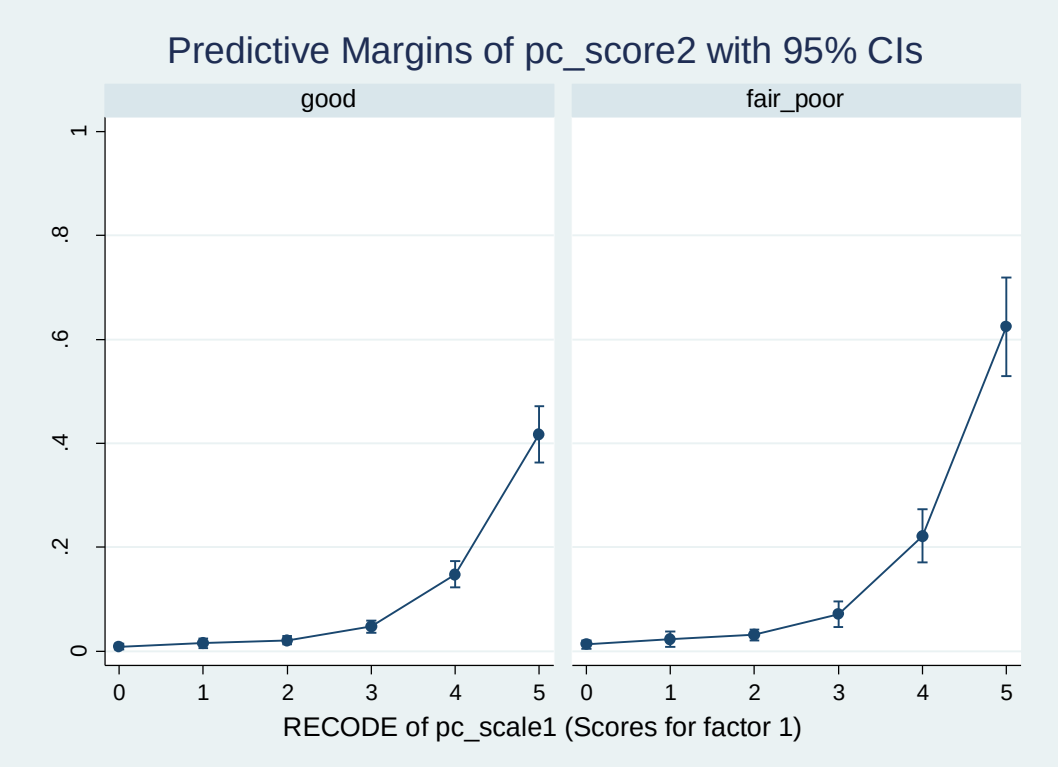
Source: Calculated by the author based on data from Schoen et all 2010.
Note: Predicted probabilities (population proportion) from robust Poisson regression adjusted for age, sex, insurance, health conditions, native born, including design effect and sample weights

Figure 9: Report of medical error, by pc score and health status



Source: Calculated by the author based on data from Schoen et all 2010.
Note: Predicted probabilities (population proportion) from robust Poisson regression adjusted for age, sex, insurance, health conditions, native born, including design effect and sample weights

Figure 10: Report of receipt of poor quality care, by pc score and health status



Source: Calculated by the author based on data from Schoen et all 2010.
Note: Predicted probabilities (population proportion) from robust Poisson regression adjusted for age, sex, insurance, health conditions, native born, including design effect and sample weights