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**Research Report**



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## Towards the Inclusion of a Health Status Parameter in the Israeli Capitation Formula

Jack Hadley<sup>1,2</sup> Bruce Rosen<sup>2</sup> Amir Shmueli<sup>3,4</sup>

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<sup>1</sup> Georgetown University  
<sup>2</sup> JDC-Brookdale Institute, Health Policy Research Program  
<sup>3</sup> Hebrew University Braun School of Public Health  
<sup>4</sup> Gertner Institute for Epidemiology and Health Policy Research



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# **Abstract**

## **Introduction and Background**

It is now widely recognized that any health insurance system that pays health plans on the basis of capitation must address three major issues: the possibility of cream-skimming by health plans, underservice to enrollees, and the financial viability of participating health plans. Risk-adjusted capitation attempts to address these problems by incorporating measures of health risk into the formula or process for determining capitation rates.

In accordance with the National Health Insurance Law, each year the government of Israel distributes over NIS 20 billion among the nation's four competing health plans on the basis of a capitation formula. The formula has two main objectives:

- To reduce the incentives for the health plans to favor low-cost members over high-cost members.
- To distribute resources among the health plans in a way which is commensurate with the needs of the members.

The current formula takes into account only the number of members in each health plan and their age distribution. There is a broad consensus among disinterested parties that in distributing monies among the health plans it is desirable to also take into account the health status of the members. However, there is considerable debate in Israel on how to do so and, even more fundamentally, whether Israel has the data sources which would be needed to incorporate health status into the capitation formula.

The goal of this report is to present the results of analyses conducted during the first year of our project to explore various options for incorporating explicit measures of health into the allocation of national health insurance (NHI) moneys to the health plans in Israel. This report summarizes our analyses of the 1993 and 1997 Use of Health Services Surveys (UHSS) conducted by the Central Bureau of Statistics (CBS), and a 1997 survey of the elderly population, conducted jointly by the CBS and the JDC-Brookdale Institute, that includes questions on a broad variety of health measures, in order to assess the implications of alternative and multiple approaches to measuring health status.

In the project's second year, we extended our analyses of the general issue of risk adjustment by exploring the feasibility of using administrative data from both the Ministry of Health and the health plans.

## **Desirable Properties of a Risk-Adjustment Formula**

A useful formula for setting risk-adjusted capitation rates should meet several criteria. First, it should be able to identify and differentiate among people with systematically different health risks.

Second, the risk-adjustment methodology should have good face validity. Third, the formula should be relatively stable, both with respect to the method of construction and over time. Finally, the opportunities for fraud or manipulation should be either inherently low or relatively easy to prevent through accompanying policies.

## The Rationale for Using Survey Data

Using a national survey like the UHSS has several attractive features. First, administrative data systems are not sufficiently developed in Israel's health plans for the purpose of constructing health measures and assessing variations in medical service use. Second, survey data may be better suited for collecting information on underlying health states than administrative data, which are typically used to either pay for or keep track of medical services, or monitor people's eligibility for services. Third, the survey approach does not depend on cooperation and data from the health plans themselves. A fourth potential advantage of the survey approach in Israel is that with only four health plans, a modestly sized survey is able to obtain relatively precise information on the distribution of health states within individual health plans. Lastly, Israel's method of allocating its health budget only requires the risk-adjustment system to measure **relative** risks, not the **absolute levels** of medical costs associated with variations in underlying health states. This reduces considerably the need to have precise information on medical service use and costs, which are the strengths of most administrative data bases.

## Methodology

The capitation formulas were constructed by estimating OLS regression models that related age, health (measured by the presence of selected chronic conditions and, in the case of the Elderly Survey, functional status measures and self-assessed general health status as well), socio-economic status and other factors to an index of annual medical care use. The index is a weighted summary of medical service use reported by survey respondents, with the weights reflecting estimates of the unit cost of each type of service.

A variety of alternative models were evaluated in terms of face validity, variance explained by additional variables and predictive accuracy. The basic models were estimated using the 1993 UHSS and then replicated using the 1997 UHSS. The 1997 Elderly Survey was used to explore the additional benefits to be gained from the use of alternative health measures including: activity and functional limitations and general health status.

This paper does not address the issue of the reliability of self-reports of health status. It is restricted to an exploration of whether and how self-reported data on health status could be used to improve upon the existing Israeli capitation formula, *if such data are reliable*. It leaves to other studies and researchers the empirical assessment of the degree of reliability of self-reported health status, particularly in the Israeli context.

## Key Findings

The study explores the pros and cons of various models specifications for analyzing the relationship between age, health status and health service utilization. The study also demonstrates how data from those surveys can be used to develop capitation formulas which do the following:

1. Have good face validity;
2. Do a better job of explaining variation in health service utilization than do formulas based on age alone;
3. Are relatively stable, both with respect to method of construction, and over time;
4. Can, to some extent, identify and differentiate among people with systematically different health risks.

As such, the basic methodology of using survey data to estimate a regression model appears to be a feasible method of incorporating health status into the capitation formula. The results are plausible, stable, and not overly disruptive of the existing distribution of payments. In particular:

1. The regression methodology applied to the 1993 survey data replicates the current age-specific capitation weights very well; the average difference between the current and estimated weights is only four percent.
2. Adding variables for six specific chronic conditions doubles the variation explained by age alone, from 4.6 to 9.1 percent; further addition of socioeconomic and geographic variables does not increase the variance explained significantly.
3. Applying the same methodology to the 1997 UHSS produced similar results.
4. Analysis of the 1997 Elderly Survey indicates that adding information about functional and activity limitations significantly adds to the variance explained, increasing the R-squared by almost 30 percent, from 0.073 to 0.094. General health status questions also increase the variance explained, but only by another percentage point.
5. Models based on age variables alone have the poorest ability to predict use in repeated, randomly drawn, alternative samples; adding chronic condition and functional/activity limitation variables improves predictive accuracy.
6. Collapsing individual measures of some chronic conditions and activity/functional limitations into counts of conditions and limitations produces the greatest face validity.
7. Including chronic conditions in the model substantially reduces a health plan's potential loss from enrolling a person with a chronic condition and the potential gain from enrolling a person with no chronic conditions.
8. Simulations of the distributional consequences of adding health measures to the capitation formula suggest that 1-2 percent of total payments would be reallocated, depending on whether only chronic conditions or functional/activity limitation variables are in the formula.

The much higher levels of use associated with particular chronic conditions (heart disease, stroke, cancer, diabetes) suggest that these people may be at substantial liability for both cream-skimming strategies and possible underprovision of services by financially-pressed health plans or provider

units within a health plan. Thus, adding health measures to the capitation formula should help protect vulnerable people (those with selected chronic conditions) from constraints on their access to services.

Although the socio-economic and geographic variables at our disposal added little to the explanatory ability of the models, it should be noted that the information available, especially at the geographic level, is quite limited. Developing better measures of access (distance, travel time) to various types of providers and variations in provider costs across geographic areas should be a priority for further research.

## **Limitations and Outstanding Issues**

The study found that formulas based on the 1993 and 1997 surveys were limited somewhat by the fact that those surveys did not include sufficient detail on key components of health service utilization. In addition, those surveys, did not include questions on functional and activity limitations and self-assessed general health status. Analysis of the 1997 Elderly Survey demonstrated that those variables can contribute significantly to the explanatory power of a capitation formula. As a result of the early dissemination of this finding, the year 2000 round of the Health Survey was refined and expanded to include more detailed questions on health service utilization as well as questions on functional and activity limitations.

One of the main objections to the use of survey data as the basis for including health status in the capitation formula is that respondents' self-reports of health status may not be sufficiently reliable. Reliable data on health status are needed both to calculate the health status-health care expenditure relationship, and to estimate the distribution of health states across health plans. However, some respondents may be unaware of their health status (e.g., they may not be aware that they have diabetes or other chronic conditions), while others may purposely choose not to report certain conditions which carry a stigma or otherwise make them feel uncomfortable in an interview situation. Moreover, once health plans know that patients' self-reports of health status will be used to determine health plan revenues, the health plans could have an incentive to try to influence those self-reports.

This paper does not address the issue of the reliability of self-reports of health status. Instead, it explores whether and how self-reported data on health status could be used to improve upon the existing Israeli capitation formula, if such data were reliable. It leaves to other studies and researchers the empirical assessment of the degree of reliability of self-reported health status, particularly in the Israeli context.

Another concern which is sometimes raised is that health status is a multi-dimensional concept, while survey data cannot (or, usually does not) capture all the relevant dimensions. We consider this to be less of a problem than the reliability issue noted above. First of all, we note that in this paper we explored the relationship between health expenditures and several dimensions of health status (self-assessed general health status, functional ability, and chronic disease prevalence) and that the

2001 Health Survey will include data on all three of these dimensions. Second, we contend that even if available data sets cover only some of the dimensions of health status (e.g. functional ability but not chronic disease prevalence), making use of the existing health status data is likely to lead to a fairer and more efficient capitation formula than would ignoring the existing data. At the same time, if data on additional, important dimensions are lacking in current data sets, efforts should be undertaken to add those dimensions to subsequent rounds of data collection.

## **Recommendations**

1. It appears that the best strategy for collecting information about health is a combination of specific questions about the presence of chronic conditions and limitations in functional and daily activities.
2. The large variations in expected use associated with specific chronic conditions suggest that it is important to measure chronic conditions explicitly and this is possible using survey methodology.
3. In looking toward the future, consideration should be given to the feasibility of developing an administrative system by which the health plans identify people who have selected and/or multiple chronic conditions.
4. More effort should be made to measure service use as accurately as possible.
5. More research is needed on developing the weights for combining the use of individual services into an index of overall service use.
6. The problem of exclusion of the institutionalized population from CBS surveys needs to be addressed.
7. The CBS survey should be expanded to include additional question on health status and service use.

# Table of Contents

## I. Introduction

- A. The Importance of Risk Adjustment
- B. Israel's National Health Insurance System
- C. The Next Challenge: Adjusting for Health Status
- D. Desirable Properties of a Risk-Adjustment Formula
- E. The Choice of Risk-Adjusters from among the Set of Affecting Factors
- F. The Rationale for Using Survey Data

## II. Background and Literature Review

- A. Overview
- B. Survey Data
- C. The Experience of the Netherlands

## III. The Underlying Theoretical Model and Its Empirical Specification

- A. The Factors Affecting Observed Medical Care Cost
- B. Needs Versus Utilization

## IV. Survey Data Sources

- A. The 1993 and 1997 Use of Health Services Survey
- B. The 1997 Elderly Survey

## V. Statistical Methods

- A. Variables
- B. Empirical Estimation
- C. Model Evaluation
- D. Simulations of Redistributive Effects

## VI. Results

- A. Tabular Comparisons – The Distribution of Health Risks
- B. Model Specification – The 1993 UHSS
- C. Replicating the Model – The 1997 UHSS
- D. Exploration of Alternative Health Measures – The 1997 Elderly Survey (ES)

## VII. Implementation of the Risk-Adjustment Formula: From Regression Coefficients to Capitation Weights

- A. Multi-Dimensional Rate Table or Simple Additive Formula?
- B. The Source of Information for Periodic Updates of Distribution of Health States and Ages;
- C. Phase-in Period
- D. Opportunities for Manipulation

## VIII. Limitations and Outstanding Issues

## IX. Conclusions and Implications

## References

## Appendix – Background and Literature Review

## List of Tables

Table 1: Average Length of Stay, by Ward, Gender and Age

Table 2: Cost Weights Used to Construct Index of Medical Care Use

Table 3: People with Selected Chronic Conditions, by Survey and Age Group

Table 4: People with Strength, Mobility, and ADL Limitations, 1997 ES

Table 5: Doctors Per Population and Distance to the Nearest Hospital, by Area

Table 6: Index of Service Use, by Age and Chronic Conditions, 1993

Table 7: Age Distribution, by Health Plan and Year

Table 8: People with Chronic Conditions, by Health Plan and Year

Table 9: Means of Independent Variables, by Health Plan, 1993 UHSS

Table 10: Coefficient Estimates of Alternative Models, 1993 UHSS

Table 11: Comparison of Estimated and Actual Age Weights

Table 12: Simulations of Predicted Payment and Distributional Effects, by Health Plan

Table 13: Assessment of Models' Predictive Power, Five Random Half-Samples

Table 13a: Average Under/Overestimate of Use, by Condition and Sample

Table 14: Comparison of 1993 and 1997 Models

Table 14a: Simulation of Predicted Payments and Distributional Effects, by Health Plan, 1997

Table 15: Coefficient Estimates from 1997 ES Models

Table 16: Estimates of Alternative Models, 1997 ES

Table 17: Distribution of People by Numbers of Chronic Conditions and Limitations

Table 18: Distributional Effects of Alternative Models, 1997 Elderly Survey

Table 19: Assessment of Models' Predictive Power, 1997 Elderly Survey, Five Random Half-Samples

Table 20: Current and Health - Adjusted Capitation Formula

## List of Charts

Chart 1: Market Shares of Israeli Health Plans, 1994

Chart 2: Members Over Age 65, 1994

Chart 3: Average Monthly Income of Sick Fund Members, 1994

Chart 4: Current Capitation Formula: The Age Weights

Chart 5: Growth in Number of Members, 1991-94

Chart 6: Growth in Number of Members, 1994-97

Chart 7: Age-Adjusted per Capita Spending, 1992 and 1996

Chart 8: Age-Adjusted Percentage of Members Suffering from at Least One Chronic Illness