Evaluation of the Validity of the Quality of Well-being Scale in Trinidad and Tobago

RD Hector[1], JP Anderson[2], RCP Paul[3], N Ponce[1], RD Hays[4], RE Weiss[1], RM Kaplan[1]

ABSTRACT

Both developing countries in the Caribbean and developed countries face resource allocation challenges. However, cost-effectiveness analysis instruments that may assist in allocation of resources have not been tested in Caribbean countries. Trinidad and Tobago is an advantageous location to test an instrument for potential use in the Caribbean. It has a single payer healthcare system and a literate population. Due to historical and current migration from other Caribbean countries, the population might be a fair representation of English-speaking Caribbean nations. We tested the validity of the Quality of Well-being Scale (QWB) on a sample of the non-institutionalized general population in Trinidad. The survey included reports of chronic conditions and items from the Trinidad and Tobago National Health Interview Survey. Data were analyzed using a multivariable regression model. One adult from each of 235 households consented to the interview. The results are consistent with results obtained in the United States of America. Being older, female, more chronic conditions and more symptoms/problems were significantly associated with lower mean QWB scores. These results suggest that the QWB with US-derived weights show evidence of validity in Trinidad and Tobago. Thus, health decision makers can use the QWB to compare the effects of different health conditions and health interventions. In addition, investigators can make cross-cultural comparisons of QWB scores for diseases or health conditions.

Evaluación de la Validez de la Calidad de la Escala de Bienestar en Trinidad y Tobago

RD Hector[1], JP Anderson[2], RCP Paul[3], N Ponce[1], RD Hays[4], RE Weiss[1], RM Kaplan[1]

RESUMEN

Tanto los países en vías de desarrollo en el Caribe como los países desarrollados, enfrentan desafíos de asignación de recursos. Sin embargo, en los países caribeños no se han probado instrumentos de análisis de costo-efectividad que pueden ayudar en la asignación de recursos. Trinidad-Tobago tiene una posición ventajosa en cuanto a la posibilidad de poner a prueba un instrumento de este tipo para su uso potencial en el Caribe. Trinidad-Tobago posee un sistema de salud de pagador único y una población instruida. Debido a la inmigración histórica y actual desde otros países caribeños, la población podría ser una buena representación justa de los países caribeños anglófonos. Nosotros probamos la validez de la Calidad de la Escala de Bienestar (CEB) en una muestra de la población general no institucionalizada, en Trinidad. El estudio incluyó informes de condiciones crónicas y aspectos de la Encuesta Nacional de Entrevistas de Salud de Trinidad y Tobago. Se analizaron los datos utilizando un modelo de regresión multivariable. Un adulto de cada una de las 235 casas, accedió a ser entrevistado Los resultados se corresponden con resultados obtenidos en los Estados Unidos de América. El tener más edad o ser mujer, el tener más condiciones crónicas y más problemas/síntomas, estuvieron significativamente asociados con una puntuación promedio de CEB más baja. Estos resultados sugieren que la CEB con pesos derivados de EE.UU. muestra evidencia de poseer validez en Trinidad y Tobago. De este modo, los responsables de tomar decisiones en políticas

From: [1]Department of Health Services, UCLA School of Public Health, Los Angeles CA 90025, [2]Health Care Sciences, Family and Preventive Medicine, UCSD, 9500 Gilman Drive, La Jolla, CA 92093–0622, [3]Ministry of Health, Trinidad and Tobago, Park Street, Port of Spain, Trinidad and Tobago WI, and [4]Department of Medicine, UCLA School of Medicine, Los Angeles, CA 90024-1772 and RAND Health Program, Santa Monica, CA 90407.

Correspondence: Dr RD Hector, Department of Health Services, UCLA School of Public Health, Box 951772, 31-253A CHS, Los Angeles, CA 90095-1772, USA, Fax: (310) 825 – 3317; e-mail: rhectori@ucla.edu.

de salud, pueden usar la CEB para comparar los efectos de las diferentes condiciones de salud y las intervenciones de salud. Además, los investigadores pueden hacer comparaciones entre culturas sobre la base de las puntuaciones de CEB en relación con las enfermedades y las condiciones de salud.

West Indian Med J 2008; 57 (2): 136

INTRODUCTION

Both rich and poor countries face resource allocation problems. Cost-effectiveness analysis (CEA) is a method that can facilitate healthcare resource allocation by evaluating outcomes and costs of interventions. Quality-adjusted life years (QALY) have become the most widely used measure to express outcomes in CEA (1). In 1993, the United States of America (USA) Public Health Service convened a Panel on Cost-Effectiveness in Health and Medicine to study the state of the field and make recommendations to improve the quality and comparability of studies. Their recommendations included use of several generic preference-based measures for conducting CEA. Among the most widely recommended were the Health Utilities Index (HUI), the EQ-5D (formerly called European Quality of Life or EuroQol) and the Quality of Well-being Scale (QWB) (2). When reporting on a respondent, each of these instruments produces a single number for his or her health-related quality of life (HRQL) at that point-in-time. The number is based on preference weights where 0 is the value for dead and 1.0 is for "optimal health". The preference weights are derived from judgments of health states by samples of the general population.

Rich countries use CEA as part of the decision-making process (1). Developing countries have fewer resources, making cost-effective interventions desirable. It is hoped CEA can be used as part of the decision-making processes here also. As a small developing country, Trinidad and Tobago imports medical technology and medical procedures from highly industrialized regions such as the USA, Canada and Western Europe. Since the country cannot afford the variety of interventions that are available, an instrument is required to evaluate the competing healthcare needs and treatment options.

We consider Trinidad and Tobago to be well suited for evaluating the generic preference-based measures because the government pays for all services with no charges to patients. Hence, there are few, if any, financial barriers to access. While some individuals may decide to go to other countries (Cuba, Canada or the USA) for some type of services, such decisions can be quite expensive – higher financial barriers. All in all, such decisions are too few to have a wide impact on access. Therefore, differences in health-related quality of life (HRQL) are unlikely to be the result of inability to pay. In addition, the population is familiar with responding to social and health surveys and response rates have been high in several studies.

METHODS

Study Setting

Trinidad and Tobago is an English-speaking country with a population of approximately 1.3 million at the 2000 census with approximately 40% Indo-Trinidadians, 40% Afro-Trinidadians and approximately 18% Mixed race. The remainder of the population is of European, Middle-Eastern, Chinese and Filipino descent**.** Afro-Trinidadians tend to reside in urban settings while Indo-Trinidadians are still largely rural-based. Tobago has a population of approximately 44 000. The Central Statistical Office of Trinidad and Tobago estimates the average life expectancy at 70 years. Approximately two thirds (68%) of the population is between 15 and 64 years. The literacy rate as of 1995 was 98% (3). The Ministry of Health of Trinidad and Tobago (MOH) is responsible for the health of the nation but focuses on policy matters as well as public health and prevention programmes. The country is divided into four autonomous regional health authorities (RHA) that deliver care. The MOH pays each RHA for health delivery and also allocates resources to public health and prevention.

Quality of Well-being Scale

Quality of well-being scale is a widely-applied measure in health outcomes research and combines preference-weighted measures of functioning with Symptoms/Problem Complexes (CPX, or Symptoms) to generate a point-in-time measure of Well-being (W), on a metric running from 1.0 (for asymptomatic full function) to 0.0 (for dead) along with points in between. Elements of the QWB have been widely published. Underlying the QWB is the concept that illnesses, conditions and injuries cause Symptoms which may lead to dysfunctions (here meaning functional limitations).

Dysfunction means being below the top step (Not Limited) on the Mobility (MOB), Physical Activity (PAC) or Social Activity (SAC) Scales. On a particular day, an individual's QWB score is therefore comprised of one Symptom weight and 3 dysfunction weights, any or all of which may be 0. There is a formula for calculating a daily QWB score:

(W = 1 – [CPX_wt + DYS_wt]), where DYS_wt = MOB_wt + PAC_wt + SAC_wt

To locate how "good" or how "bad" a particular situation is, probability populations rated QWB health situations to produce empirical preference weights. Preference weights provide the metric underlying all QWB scores. Without them, there would be no W on a 1.0 to 0.0 scale and no quality adjusted life years – just a collection Symptom and Scale-step frequencies.

General QWB Coding rules are as follows: a person may report none, one, or multiple Symptoms on any given day. Similarly, a person may report none, one, or multiple dysfunctions on any of the function scales for a given day. For calculation purposes, the one heaviest-weighted (Most Undesirable) Symptom for that individual day is included in the QWB calculation, along with the heaviest-weighted step on Mobility, Physical Activity and Social Activity. Where weights of two or more Symptoms or Scale steps are equal, the lowest-numbered Symptom or Scale step present is used.

Interviewers require training in use of QWB questions, follow-up probes and coding of information. Once training has been completed, duration of the interview is heavily influenced by the amount of QWB-relevant information the respondent has to report; an asymptomatic person with no dysfunction to report can easily complete the questionnaire in fewer than five minutes.

This study used the QWB to estimate HRQL in Trinidad and Tobago. The QWB was selected for several reasons. First, the population includes many healthy people and some instruments such as the EQ-5D have substantial ceiling effects (many respondents getting the highest possible score). The QWB also avoids floor effects where many respondents receive the lowest score possible for live respondents (4). This study examines the response patterns of the QWB with US weights in Trinidad and Tobago. If the response patterns are the same, the QWB might be used for CEA analysis in Trinidad and Tobago.

Most validated instruments based on the stimulus-response paradigm from psychology cannot be modified. However, since it is not based on these assumptions, the QWB requires appropriate changes in lists of examples for questions. We changed one mobility question to accommodate modes of public transportation employed in Trinidad and Tobago that are not prevalent in the US. The standard QWB Mobility 3 question is:

> MOB3. On which of the past 6 days, if any, did (you/. . .) use some form of public transportation such as bus, plane, train or trolley?
>
> This question was modified to:
>
> MOB3. On which of the past 6 days, if any, did (you/. . .) use some form of public transportation, such as a bus, maxi-taxi, route taxi, plane, train or trolley?

"Maxi-taxi" and "route taxi" were added.

Survey

We collected data to test the QWB and preference-elicitation procedures on a sample of the non-institutionalized general population in Port-of-Spain, the Borough of Chaguanas and San Fernando. These locations are the capital, a large rural Borough and the second city, respectively. The sampling method was probability proportional to size. In this way, we hoped to obtain a high yield and representative sample of these locations. The in-person household sample was drawn and data collected from February 2000 to July 2001. To obtain variables relevant to Trinidad and Tobago, questions (household composition, demographics, access to and utilization of health services) from the 1994 Trinidad and Tobago National Health Interview Survey (TT-NHIS) were used.

Data Collection

The interview included three parts: 1) reports of chronic conditions, 2) an adapted version of the TT-NHIS and the QWB, and 3) solicitation of QWB preferences. The QWB was administered to the adult and one child in the household. If there was more than one willing adult, the individual with the most recent birthday was chosen (5). The QWB can be used directly or by proxy. If the selected child was younger than twelve years of age, the adult responded for the child. Children aged 12–17 years could be interviewed in the presence and with the consent of the adult.

There were 13 interviewers in the field. The interviewers were three census takers, two public health inspectors and six levels of nurses including registered nurses, district nurses, district health visitors, research nurses and surveillance nurses. The interviewers from the health system were volunteers. Each RHA was represented among the interviewers that conducted interviews mostly in their RHA districts. The MOH hired the census takers for the project. They were paid a flat rate that did not depend on the number of interviews completed. This method was chosen to remove the incentive to rush through the interview. The census takers canvassed throughout the three locations. The health system workers were introduced to the project with a four and a half day workshop. The census takers received one day of training and shadowed an experienced interviewer for one day. If the interviewer did not meet anyone at home after four attempts, the interviewer left a "while you were out" note with a phone number to arrange a time for the interview. Each adult respondent signed a consent form approved by the MOH and San Diego State University Committee for the Protection of Human Subjects. The data entry staff from the MOH Directorate of Health Policy and Planning did the data entry. The supervisor of the data entry staff also supervised the interviewers. The data were entered and managed in Microsoft Access. Therefore the MOH did not have to procure software for this project.

Hypotheses

Based on previous findings, we hypothesized that QWB scores would be higher for males than females (6), younger persons (7), those with a smaller number of symptoms/problems and those with fewer chronic conditions reported (8). In addition, we hypothesized that race and city of residence would not be statistically significantly associated with QWB scores because these variables were not as highly correlated with access as they were in other countries (9–11). Because not all interviewers had medical training, we examined the time to complete the QWB portion of the

interview to determine whether a medical background had an effect. The QWB probes on health symptoms/problems but does not require medical judgments by the interviewer. We hypothesized that an interviewer's medical background (or lack thereof) was not related to the time taken to administer the QWB.

Analysis

The analyses were based on the adult from each household. For the QWB portion of the interview, Chi-square was used to examine difference in the median time to completion and t-test was used to examine the difference in mean QWB score for interviewers by medical training status. In Tobago, 98 households were selected and only 16 were completed. Hence, data from Tobago were not included.

We used ordinary least squares, a multivariable regression model, to obtain the QWB scores of each independent variable controlling for the others. The QWB score was the dependent variable. The age parameter estimate was scaled for 10-year change. The explanatory variables for the first model only included demographics. The second model added the number of chronic conditions as an indicator vari able for 0 (reference), 1, 2, 3 and 4 or more. The third model added the number of symptoms/problems as an indicator variable from 0 (reference) to 7 or more. For race, we grouped four White Trinidadians and three Chinese Trinidadians with 123 Indo-Trinidadians. These groups are socio-economically similar.

RESULTS

The sample included 235 adult respondents. Persons without medical training obtained 146 (62%) of all interviews. The mean QWB scores were not significantly different by health training status. The means (SD) were 0.773 (0.130) and 0.760 (.130) for interviewers with and without medical training, respectively. The t-value was -0.78 with p-value of 0.44. Also, the individual interviewer did not have an effect on QWB score ($F_{12, 222} = 1.4$, P = 0.18). The time to complete the QWB portion of the interview ranged from five to almost 35 minutes. Time to complete the QWB portion was obtained on 223 (95%) of the respondents with a mean (SD) of 10 (± 6) minutes. There were significant differences in time to complete the QWB portion by interviewers with and those without a medical background. Interviewers with no medical training obtained 137 (61%) of the interviews. For these interviewers, the mean (SD) interview time was 8 (± 4) minutes and the median and mode were both five minutes. The interviewers with medical training had a mean (SD) of 14 (± 6) minutes with a median of 14 minutes and mode of 10 minutes. These median completion times differed significantly ($\chi^2_{trend} = 35.58$, df = 11, $p < 0.0001$).

The average age (SD) was 46 (± 17) years. There were equal numbers of men and women and similar percentages of Afro-Trinidadians (40%) and Indo-Trinidadians (38%) in the sample. Mixed Trinidadians accounted for 21% of the sample. Approximately one third of the sample came from each of the three locations. San Fernando had the highest percentage (37%) followed by Port-of-Spain (34%) and Chaguanas (29%).

The mean (SD) QWB was 0.765 (0.130). Men tended to have higher QWB scores than women (t = -2.17, df = 233, $p = 0.03$). The differences in QWB scores were not statistically significant by race or city of residence. Most of the respondents reported no chronic conditions (64%) with a QWB mean (SD) score of 0.813 (0.116) and a few reported four or more chronic conditions (3%) and mean (SD) score of 0.581 (0.118). The difference was significant ($p < 0.01$). Eleven per cent of the respondents reported no symptoms/problems in the past 6 days. Most had 2 (23%) and a few had 7 or more (6%). QWB scores were related to number of chronic conditions and symptoms/problems. Persons that reported no chronic conditions had the highest average (0.979) and those with 7 or more had the lowest (0.590) ($p < 0.01$) [Table 1].

Table 1: Unadjusted QWB scores by demographics, chronic disease and symptoms/problems

Variable	Freq	%	Mean	sd
Overall sample	235	100	0.765	0.130
Gender				
Female*	117	50	0.747	0.131
Male	118	50	0.783	0.126
Race				
African	95	40	0.769	0.121
Indian	90	38	0.777	0.132
Mixed	50	21	0.737	0.140
City of residence				
Port of Spain	79	34	0.743	0.120
Chaguanas	69	29	0.780	0.126
San Fernando	87	37	0.773	0.139
Chronic Conditions†				
0	151	64	0.813	0.116
1	47	20	0.707	0.101
2	21	9	0.687	0.093
3	10	4	0.592	0.090
$4	6	3	0.581	0.118
Symptoms/Problems†				
0	25	11	0.979	0.037
1	49	21	0.841	0.060
2	53	23	0.768	0.081
3	42	18	0.731	0.091
4	23	10	0.684	0.104
5	16	7	0.688	0.083
6	12	5	0.597	0.088
$7	15	6	0.590	0.087

*$p < 0.05$
†$p < 0.01$
Note: Percentages do not always add up to 100% due to rounding error.

Two factors were statistically significant ($p < 0.05$) in the multivariate linear regression model. The mean (95% CI) showed males had higher QWB scores (0.770, 95% CI 0.756,

0.784) than females (0.760, 95% CI 0.747, 0.774) and persons that reported more chronic diseases had lower QWB scores than persons that reported fewer (zero chronic diseases: 0.717, 95% CI 0.691, 0.743; 4 or more chronic diseases: 0.641, 95% 0.612, 0.669). Race and where the respondent lived were not statistically significant (Table 2).

Table 2: Least square means QWB scores and 95% CL for 235 adults in Trinidad

Variables	LS Mean	95% CI	
Age (46 years)	0.765	(0.752,	0.778)
Gender*			
Female	0.760	(0.747,	0.774)
Male	0.770	(0.756,	0.784)
Race			
African	0.771	(0.757,	0.785)
Indian	0.771	(0.755,	0.787)
Mixed	0.741	(0.726,	0.756)
City of Residence			
Port of Spain	0.739	(0.723,	0.755)
San Fernando	0.783	(0.769,	0.798)
Chaguanas	0.775	(0.760,	0.790)
Chronic Disease *			
0	0.717	(0.691,	0.743)
1	0.687	(0.663,	0.711)
2	0.671	(0.647,	0.696)
3	0.662	(0.638,	0.687)
4 or more	0.641	(0.612,	0.669)

* $p < 0.05$

DISCUSSION

This project is the first test of the QWB in Trinidad, an English-speaking and developing country with a high rate of literacy. The results were representative of Port-of-Spain, the capital city located in the north, Chaguanas, a rural centre located in central area and San Fernando, a rural town located in the south. The sample included urban and suburban households in Port-of-Spain and rural households in Chaguanas and San Fernando. The three locations are on the west coast of the island where the vast majority of the population is found.

The results were consistent with the findings of previous studies (12) using the QWB in US samples. QWB scores were lower among those who were older, female, had more chronic conditions and more symptoms/problems.

In this study, we used the preference weights derived for the USA (13). They seem to perform adequately in Trinidad and Tobago (Table 2). The decrease in physical health status with increasing age is well documented (14). The gender differences in health show women have lower HRQL yet paradoxically greater longevity (6). Explanations offered suggest that because women use more healthcare services than men, they might be more open to telling an interviewer about their health problems (15). In addition to supporting the general findings that women are more open to talking to interviewers and using preventive care, some investigators suggested that biology (sex) and culture (gender) are too thoroughly intermingled for cross-sectional, interview-based studies to explain the differences (16).

The city of residence was not significantly related to QWB score. Within each city, there are wealthy areas and poor areas that would demonstrate the gradient of economic status and health. However, the probability sample in each city is likely to contain persons across the social and economic strata. No city had markedly more young or wealthy populations than the others. In the USA, race/ethnicity is associated with socio-economic status and health outcomes. African Americans are consistently more negatively affected by disparities (17–19). In this study, race was not significantly related to QWB score.

Interviewers without medical training completed the QWB portion of the interview in a shorter time than those with medical training. Respondents may have spent more time relating details of their conditions when the interviewer was a nurse than otherwise. Nevertheless, these findings suggest that a medical background is not required to successfully administer the interview. In countries where highly skilled nurses or medically trained individuals are in short supply (20, 21) it is important to be able to employ clerk-level individuals that are not as integral to the operation of the healthcare system. One well-known characteristic of developing countries is the relatively large population of young persons available for employment.

Several limitations were present in this study. Firstly, the probability sample covered three locations rather than the entire country. Therefore, the results pertain to these locations. However, a probability sample is not required to test the validity of the QWB (22, 23). In addition, the QWB was originally tested on probability sample from San Diego and applied throughout the USA (12). Secondly, the large number of interviewers added a substantial amount of complexity to a project of this size. The extra complexity was needed to find the lowest level of medical training to successfully administer the QWB in Trinidad. Using clerk-level interviewers could be important for developing Caribbean countries. These workers are well educated and in relatively good supply. They can be used in various healthcare facilities to administer the QWB to patients. Finally, a long workshop added significant cost to the project. The workshop exposed a significant number of healthcare system staff to the QWB that may have secondary benefits if the RHAs deploy the QWB in their facilities. The relatively short training of the census takers indicates that a weeklong workshop is not needed.

In summary, both developing and developed countries have similar pressures to use healthcare resources wisely. This project shows that a HRQL measure can be successfully used in Trinidad and Tobago. As a practical matter, the results of the study are sufficient for decision-makers to deploy the QWB. However, it is of scientific interest to explore the

valuation of health states for comparison with valuations in the USA.

ACKNOWLEDGEMENTS

The authors would like to thank persons that assisted and encouraged us in accomplishing this project. Professor Henry S Fraser explained the importance of the project to Barbados and the region. Dr Eugene Tull, provided mentorship advice, support and arranged the meeting with Professor Fraser. David Thomas of the Central Statistical Office in Trinidad and Tobago provided the sampling frame even while preparing for the national census. James Hospedales and his colleagues at the Caribbean Epidemiology Centre provided important insight on early results. Martin Riley of the Health Sector Reform Programme of Trinidad and Tobago was unstinting with clerical and computer resources. United States of America Ambassador Dr Roy L Austin provided important discussions that helped with understanding the project in historical and sociological terms for the country and Caribbean. Dr Rawle Edwards (deceased) brought this project under the auspices of the Ministry of Health when it was in its embryonic stages. Many persons in the healthcare system volunteered evenings, weekends and even vacation time to conduct face-to-face interviews throughout Trinidad. Others made time while running a short-staffed office to help overcome computer and logistic challenges. We gratefully acknowledge the efforts of these persons and the interviewees of Trinidad and Tobago who also gave generously of their time:

Cheryl Wallace, Edith Welch, Varuna Sankar-Smith, Clarabelle Ali, Judith Gittens, Jacqui Gregoire, Arlene Bynoe-Maillard, Kevin Chankersingh, Pirmal Harrisaran, Gloria Gaskin, Cynthia Roberts, Ada Guevara, Christopher Saith, Neil Rampersad, Daisy Rattan, Jennifer Joseph, Dularchand Latchman and Margaret Wright.

The Fulbright Scholarship supported Richard Hector in Trinidad and Tobago. The Minority International Research Training program sponsored the visit to Barbados for the meeting with Professor Fraser. The PAHO/WHO sponsored the 4.5 day workshop to train the interviewers. The Central Statistical Office (CSO) of Trinidad and Tobago supplied the sampling frame. The Public Affairs Section, United States Embassy in Trinidad and Tobago assisted with government-level details that made the project possible. The Ministry of Health of Trinidad and Tobago provided computer and clerical support and the subvention for the three CSO interviewers.

REFERENCES

1. Gold MR, Stevenson D, Fryback DG. HALYS and QALYS and DALYS, Oh my: similarities and differences in summary measures of population Health. Annu Rev Public Health 2002; **23:** 115–34.
2. Gold MR, Siegel J, Russell L, Weinstein M. Cost-Effectiveness in Health and Medicine. New York: Oxford University Press; 1996.
3. The Central Statistical Office of Trinidad and Tobago (CSO). In. Port of Spain; 2005.
4. Fryback DG, Lawrence WF, Martin PA, Klein R, Klein BE. Predicting Quality of Well-being scores from the SF-36: results from the Beaver Dam Health Outcomes Study. Med Decis Making 1997; **17:** 1–9.
5. Lavrakas P, Merkle D. The Last-Birthday Selection Method and Within-Unit Coverage Problems. Proceedings of the Survey Section, American Statistical Association 1993: 1107–12.
6. Kaplan RM, Erickson P. Gender differences in quality-adjusted survival using a Health-Utilities Index. Am J Prev Medicine 2000; **18:** 77–82.
7. Kaplan R, Rosen P. The Quality of Well-Being Scale: Overview and Applications. In: DeAngelis J, Frolich N, editors. Patient-Focused Care in the Hospital. New York: Faulkner and Gray Inc Health Information Center; 1995, 363–385.
8. Kaplan RM, Bush JW, Berry CC. Health status: types of validity and the index of well-being. Health Serv Res 1976; **11:** 478–507.
9. Doescher MP, Saver BG, Fiscella K, Franks P. Racial/ethnic inequities in continuity and site of care: location, location, location. Health Serv Res 2001; **36:** 78–89.
10. Duchon LM, Andrulis DP, Reid HM. Measuring progress in meeting healthy people goals for low birth weight and infant mortality among the 100 largest cities and their suburbs. J Urban Health 2004; **81:** 323–39.
11. Dyer O. Disparities in health widen between rich and poor in England. BMJ 2005; **331:** 419.
12. Kaplan R, Anderson J. A general health Policy Model: Update and Applications. Health Serv Res 1988; **23:** 203–35.
13. Bush J, Chen M, Patrick D, Blischke W. Linear Models of Social Preferences for Constructing a Health Status Index. National Technical Information Service 1973; PB 235 155: 1–30.
14. Leibowitz AA. The demand for health and health concerns after 30 years. J Health Econ 2004; **23:** 663–71.
15. Smith JP, Kington R. Demographic and economic correlates of health in old age. Demography 1997; **34:** 159–70.
16. Kandrack MA, Grant KR, Segall A. Gender differences in health related behaviour: some unanswered questions. Soc Sci Med 1991; **32:** 579–90.
17. Fiscella K, Franks P, Gold MR, Clancy CM. Inequality in quality: addressing socioeconomic, racial, and ethnic disparities in health care. JAMA 2000; **283:** 2579–84.
18. Kennedy EM. The role of the federal government in eliminating health disparities. Health Aff (Millwood) 2005; **24:** 452–8.
19. Shavers VL, Brown M, Klabunde CN, Potosky AL, Davis W, Moul J et al. Race/ethnicity and the intensity of medical monitoring under 'watchful waiting' for prostate cancer. Med Care 2004; **42:** 239–50.
20. Nullis-Kapp C. Efforts under way to stem "brain drain" of doctors and nurses. Bull World Health Organ 2005; **83:** 84–5.
21. Ross SJ, Polsky D, Sochalski J. Nursing shortages and international nurse migration. Int Nurs Rev 2005; **52:** 253–62.
22. Balaban D, Sagi P, Goldfarb N, Nettler S. Weights for scoring the quality of well-being instrument among rheumatoid arthritics: a comparison to general population weights. Med Care 1986; **24:** 973–80.
23. Hays RD, Siu AL, Keeler E, Marshall GN, Kaplan RM, Simmons S, et al. Long-term care residents' preferences for health states on the quality of well-being scale. Med Decis Making 1996; **16:** 254–61.