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# Consumer Competencies and the Use of Comparative Quality Information

## It Isn't Just about Literacy

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While consumers are increasingly expected to use complex health care information to make informed decisions, it is unclear how many have the skills to do so. In this investigation we examine health literacy, numeracy, and patient activation, assessing the contribution of each to the comprehension of comparative health care performance reports and their use in making an informed choice. A convenience sample of 303 employed-age adults participated in the study. The findings indicate that numeracy skill is the strongest predictor of comprehension, followed by health literacy. Higher activation helps those low in literacy and numeracy compensate for their lower skills and achieve higher levels of comprehension. In addition, making good choices, when trade-offs are necessary, is related to activation separate from comprehension. This is important as many real-life choices involve trade-offs. Results indicate that choice is not just about literacy or comprehension, it also has to do with activation.

**Keywords:** *consumer choice; numeracy skill; literacy; consumer activation*

## Introduction

The direction of current health policy places a greater reliance on consumers to be part of the solution to health care cost and quality problems. By providing consumers

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with accurate and timely information, the expectation is that consumers will make more appropriate and cost-effective choices. Further, it is expected that these informed choices will result in lower costs and improved health outcomes. At the same time, coverage choices are becoming more complicated and varied, health delivery systems more complex, and evidence of provider quality and treatment efficacy more transparent. Consumers therefore require more knowledge and greater skill to take full advantage of new sources of information and to make appropriate choices.

While consumers are increasingly expected to use complex health care information to make informed decisions, it is unclear how many have the skills to do so. A national survey conducted in 2003 documented that low literacy is widespread in the United States (Kutner, Greenberg, and Baer 2006.) A growing literature has documented that health literacy skills, which encompass the ability to process and understand basic information needed to make appropriate health decisions, are strongly associated with health-related outcomes. Those with poor health literacy skills are less knowledgeable about health (Gazmararian et al. 2003; Williams et al. 1998a, 1998b), receive less preventive care (Scott et al. 2002), have worse chronic illness control (Schillinger et al. 2002), poorer physical and mental health function (Wolf, Gazmararian, and Baker 2005), and have higher emergency department and hospital utilization (Baker et al. 2002, 2004). It is estimated that low health literacy costs the health care system between \$30 billion and \$73 billion annually (Parker, Ratzan and Lurie 2003).

Other studies have identified numeracy skill (the ability to process basic probability and numerical concepts) as an important predictor of comprehension and use of health care information. Based on the International Literacy Survey, about 50% of Americans lack what are considered the minimal mathematical skills needed to make use of numbers embedded in printed materials (Kirsh et al. 2002). Lower numeracy has been shown to influence comprehension of important health information (Baker et al. 1999). Lower numeracy is a barrier to the comprehension of health risk statistics, often results in the overestimation of breast cancer risks, and reduces trust attached to medical data conveyed numerically rather than verbally (Weinfurt 2003; Black, Nease, and Tosteson 1995; Gurmankin, Baron, and Armstrong 2004; Sheridan and Pignone 2002). Little is known about how numeracy skill may affect understanding and use of numerical data presented about health care quality.

Thus, health literacy and numeracy appear to be critical barriers to the successful implementation of policies that rely on informed consumer choice. But are there other skills and competencies that consumers need to make informed choices?

## **New Contribution**

In a previous study, the relative contribution of health literacy and patient activation (taking an active role in managing one's own health and health care) was examined in relation to a number of health-related behaviors and health care choices (Greene et al. 2005). The findings indicate that patient activation and health literacy are distinct concepts, with only a moderately weak association. The two constructs

contribute differently to health, behavioral, and choice outcomes. In multivariate analysis, those with higher levels of patient activation were more likely to engage in healthy behaviors (e.g. exercise, low fat diet), consumeristic behaviors (such as looking up a doctors qualifications before choosing a physician), and had fewer hospital visits than those with lower activation levels. In contrast, respondents with higher literacy were more likely to be skilled at using comparative information for making health plan choices. For almost all the outcomes examined, both health literacy and patient activation were significant contributors. However, the degree to which they contributed depended on the nature of the outcome examined. The findings of Greene et al. (2005) indicate that other essential consumer competencies, beyond health literacy, may play a role in health care consumer behaviors. It is the purpose of this study to examine further the contribution of activation to informed decision making and the relationship between activation and health literacy.

In this investigation we examine health literacy, numeracy, and patient activation, assessing the contribution of each to the comprehension of comparative health care performance reports and their use in making an informed choice.

## Conceptual Framework

To be a competent health care consumer in the current environment, one must be able to understand health care information and be able to use that information in making choices. Comprehension is based, in large part, on the difficulty of the material and the skills the individual possesses, such as literacy and numeracy. However, in addition to skills, it is also a matter of motivation, or how much "effort" an individual is willing to exert to try to understand and make good choices. For example, for people who have a high level of literacy skills, such as busy professionals, motivation may play a larger role than skill level in determining comprehension of information. For them, it may be a matter of how much effort and attention they are willing to devote to try to extract meaning from the information. For those with moderate to low skills, both skills and motivation may play a role in comprehension. In these cases, higher motivation may actually compensate to some degree for lower skill levels.

Making a choice usually involves more than simply comprehending information. It may require the evaluation of several options, comparisons on multiple dimensions, making trade-offs, and synthesizing data. Thus, making an informed choice is likely to require both skill and motivation.

In this study we use a measure of patient activation as a proxy for "motivation." The patient activation measure (PAM) is a scale indicating the degree to which consumers take an active role in managing their health and health care (Hibbard et al. 2004). People who score high on this measure typically are more "in charge" of their health. The measure predicts a whole range of health-related behaviors (Hibbard et al. 2006). A longitudinal study shows that activation does change, and once changed, behaviors also change in the same direction (Hibbard et al. 2006). A person with a higher PAM score

is more likely to understand that her active involvement is critical to the state of her health. That is, motivation to engage in positive health actions is part of being activated.

In this study we examine the contributions of skills (health literacy and numeracy) and activation levels to the comprehension of comparative hospital performance information and to the choice of a hospital.

The research questions were as follows:

- How much do health literacy, numeracy, and patient activation each contribute to comprehension of comparative performance data?
- How much do health literacy, numeracy, and patient activation each contribute to the likelihood of choosing a high performing hospital when viewing comparative performance data?
- Does higher activation help those with lower skills (lower health literacy and/or numeracy) to comprehend more? Are they more likely to choose the highest performing hospital?
- What is the causal pathway that connects competencies (numeracy, literacy, and patient activation) with comprehension and choice?

## Methods

### Study Sample

A convenience sample of 303 employed-age adults (18 to 64 years; average age = 37) were recruited and paid for their participation in the study. Respondents were recruited using fliers posted in the community and advertisements in a local newspaper; recruitment efforts were focused in areas of the community known to have lower levels of education in order to ensure a broad range of numeric ability. Only 45% of the sample had health insurance and 74% had annual household incomes of less than \$20,000. Fifty-two percent of the sample were males. Forty-five percent of the sample had a high school degree or less and 55% had education beyond high school (trade school or college). Forty percent reported their health as very good or excellent. Twenty-four percent reported their health to be fair or poor.

### Design

The data used in this study were based on a larger study whose purpose was to determine how presentation of information affects comprehension and choices for consumers with different skills. In this study we combine four experiments (out of a total of eight in the original study) to assess comprehension and choices. Only those experiments in which a clear higher quality option was available were included. We were interested in how well skills and activation predicted comprehension and choices. For the purpose of this study, we were not interested in the influence of the different experimental conditions within each experiment and therefore adjusted the data by statistically removing

the effect of condition (the presentation approaches) on the outcomes. To do so, regressions of comprehension were conducted separately in each of the four experiments using condition as the independent variable. The residualized comprehension variables were summed to create a comprehension variable that controls for the information-presentation conditions. A similar set of analyses was conducted for choice.

Respondents were shown comparative hospital performance data and cost information. The four experiments varied in the number of hospitals that were compared (3 to 15 hospitals), the number of performance measures included (2 to 7), whether other types of data were presented along with the quality data (e.g., how many beds in each hospital), and the types of performance measures included. All the experiments used data displays that compared hospitals on both cost and quality information and all the information could be viewed on one page.

## Dependent Variables

### *Comprehension*

Respondents were asked to read the comparative data displays and answer three to four comprehension questions for each experiment. The comprehension questions assessed how well the respondent understood the information in the data display. The comprehension items asked respondents to report on information directly from the data display table. The items did not require the respondent to make inferences from the information. Therefore, comprehension items were used to generate a comprehension score (percent of correct responses). The 13 comprehension items are shown in appendix A.

### *Quality Choices*

In all four experiments respondents were asked to make a choice. In two of the experiments there was either one hospital that was clearly superior (in higher performance and lower cost), or there was at least one superior hospital within each cost stratum. Choosing the highest quality hospital or the highest quality hospital in any cost stratum was counted in the analysis as a "quality choice."<sup>1</sup> In two of the choices there was a trade-off to be made. In one case the highest performing hospital also was the most expensive. Respondents seeking the highest quality hospital would have to trade off higher cost for that choice. In the other experiment, respondents are told that they are choosing a hospital where they will be treated for congestive heart failure. They are given two performance measures to compare the hospitals on: death rate from congestive heart failure and overall patient satisfaction. Those choosing the hospital with the lower death rate for congestive heart failure would have to trade off lower overall patient satisfaction. However, since they are seeking treatment for congestive heart failure we assumed that the death rate was a more important indicator and that those making an informed choice would make that trade-off in their choice. Four choices (one from each experiment) are included in the dependent variable. Thus, respondents could have made from zero to four quality choices.

## Predictor Variables

### *Health Literacy*

A shortened form of the Test of Functional Health Literacy (TOFHLA) was used to assess health literacy (passage B only). This shortened form has been successfully used by other investigators to measure health literacy (Gazmararian et al. 1999).

### *Numeracy*

To assess numeracy skill, we used a 15-item measure that includes 11 items from a measure developed by Lipkus, Samsa, and Rimer (2001) plus four more difficult items focused on interpreting risk magnitude (Cronbach's alpha .83). The items assess people's ability to understand risk magnitudes, to calculate percentages, to convert proportions to percentages, and probabilities to proportions. An example question was: Which is a higher risk: 1 in 10, 1 in 100, or 1 in 1000? Scores on the numeracy measure ranged from 0 to 15, with a mean of 9.3.

### *Patient Activation*

The Patient Activation Measure (PAM) assesses knowledge, skill, and confidence for managing one's own health and health care. The 13-item measure was created using Rasch methodology (Smith 1996), and it is a unidimensional, interval level, Guttman-like measure (Hibbard et al. 2004, 2005). The measure is scored on a theoretical 0 to 100 scale. The measure has strong psychometric properties and is predictive of a wide range of health-related behaviors (Hibbard et al. 2004, 2005). Average patient activation score for the sample was 63.

## Findings

Table 1 shows the relationships between demographic factors and the main predictors of health literacy, numeracy, and patient activation. Not surprisingly, education is a strong predictor of numeracy; however, it is only a moderate to low predictor of patient activation and health literacy. The measures of health status are correlated with activation and numeracy, but not health literacy. Age is unrelated to the three predictor variables. Gender is unrelated to numeracy and activation in the sample when not controlling for any other factor. Gender is significantly related to health literacy, however, with women scoring slightly higher on health literacy than men.

The correlation between literacy and numeracy is relatively high ( $r = .51$ ;  $p < .001$ ), whereas the correlation between health literacy and patient activation is not significant in the bivariate relationship. The correlation between numeracy skill and activation is significant but low to moderate ( $r = .16$ ;  $p < .01$ ).

Table 2 shows the bivariate relationship between the predictor variables and the outcomes of comprehension and quality choices. Numeracy skill is the strongest predictor of both comprehension and quality choices. Health literacy is also a strong

**Table 1**  
**Correlations between Demographic Characteristics and Predictor Variables**

Demographic Characteristics	Predictor Variables		
	Health Literacy	Numeracy	Activation
Age	.03	-.02	.09
Income	.03	.11	.12*
Self-rated health	.08	.24***	.38***
Education	.28***	.45***	.23***
SF8 Physical	.09	.26***	.23***
SF8 Mental	.03	.18**	.26***
Gender	-.13*	.08	-.11
Health literacy	1.0	.51***	.11
Numeracy	.51***	1.0	.16**

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

**Table 2**  
**Correlations between Predictor Variables and Outcome Variables**

Predictor Variables	Outcome Variables	
	Comprehension	Quality Choice
Health literacy	.59***	.30***
Numeracy	.66***	.35***
Activation	.20***	.25***
Comprehension	1.0	.51***

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

predictor of both comprehension and quality choices. Patient activation is only moderately predictive of comprehension and quality choices. As expected, comprehension is strongly correlated with quality choices.

Table 3 shows the contribution of patient activation to comprehension and quality choices. In this analysis we examine the contribution of activation to the outcomes for respondents whose skill levels are high versus those whose skill levels are low. It appears that activation plays a stronger role in outcomes when skills are low. Among those with low skills, those with higher activation levels score higher on comprehension than those with lower activation. This is true for both those with lower health literacy skills and for those with lower numeracy skills. For example, those with low health literacy and higher activation score 10 points higher on the comprehension measure than those with both low health literacy and low activation. Thus, activation improved comprehension five times more for those low in health literacy, compared to those high in health literacy. The same pattern is shown for numeracy. It appears that activation may compensate for lower skills. Possibly

**Table 3**  
**Proportion of Correct Responses on Comprehension Scale**

	Low Patient Activation***	High Patient Activation*
Low Health Literacy*	71.9% (n = 77)	81.6% (n = 55)
High Health Literacy	86.6% (n = 73)	88.2% (n = 88)
	Low Patient Activation***	High Patient Activation**
Low Numeracy*	67.7% (n = 75)	76.3% (n = 52)
High Numeracy	90.2% (n = 75)	90.7% (n = 91)
Proportion of high quality choices (out of four possible)		
	Low Patient Activation***	High Patient Activation
Low Health Literacy***	51.3% (n = 77)	70.0% (n = 55)
High Health Literacy*	68.5% (n = 73)	75.3% (n = 88)
	Low Patient Activation**	High Patient Activation**
Low Numeracy*	53.0% (n = 75)	66.8% (n = 52)
High Numeracy***	66.3% (n = 75)	77.0% (n = 88)

Note: Probabilities in column headings indicate the significance of the differences within that column. Probabilities in row headings indicate the significance of the differences within that row. The Patient Activation Measure was dichotomized using a median split for this analysis.  
 \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

because of a ceiling effect (high comprehension), activation has little effect among those with high skill.

A similar pattern is shown for quality choices, with activation helping those with lower skills to make more quality choices.

Using a multivariate approach, we further explore the relative contributions of health literacy, numeracy, and activation to comprehension and quality choices, while controlling for demographics. In the results shown in Table 4, it can be seen that numeracy makes an independent contribution to comprehension beyond that contributed by health literacy. This is also true, although to a lesser degree, for activation. A numeracy X activation interaction term introduced into the regression equation is also a significant predictor of comprehension. This confirms the results of the bivariate analysis, that is, lower skill is compensated for, to some extent, by higher activation. Use of a health literacy X activation interaction term yielded similar results to those shown in Table 4.

Since comprehension explains most of the variance in quality choices, the other predictor variables in Table 4 appear to contribute very little. Women and those higher in activation, however, make significantly more quality choices even after controlling for comprehension. Here the interaction term is not significant.

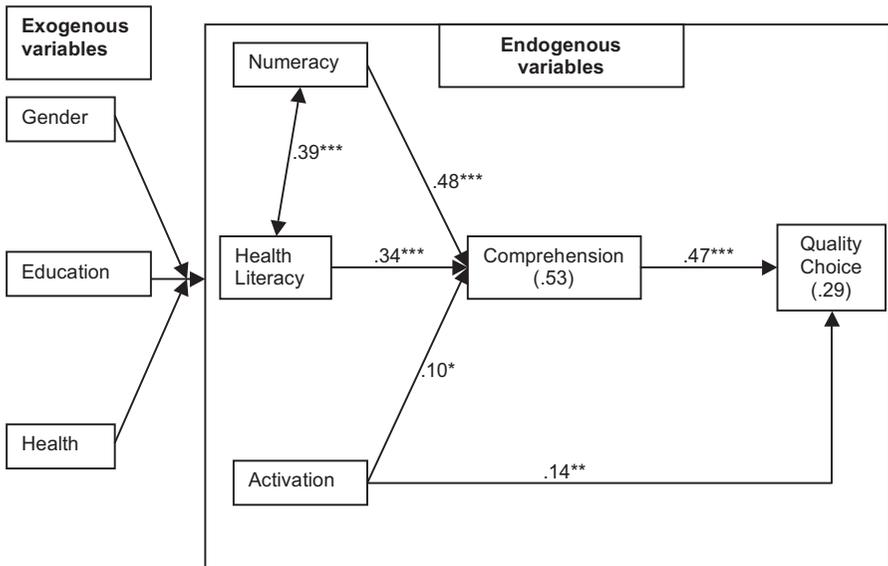
In Figure 1 we show the results of a path analysis that tested a hypothesized causal model: that numeracy, health literacy, and activation levels would contribute to comprehension levels, and that comprehension levels would in turn contribute to making quality choices. We were also interested in testing whether activation would have a direct effect on choices as well as an indirect effect through comprehension when

**Table 4**  
**Regression Equations**

Independent Variables	Dependent Variables (Beta Weights and Significance)	
	Comprehension	Quality Choice
Age	-.017	.090
Gender (male = 0, female = 1)	-.017	.106*
Education	.037	.003
Literacy	.310**	-.023
Numeracy	.467***	.032
Activation	.098*	.124*
Comprehension	N/A	.493***
Activation × Numeracy	*	NS
Activation × Health Literacy	**	NS

Note: Beta weights for interaction terms are unreliable and are not reported.

**Figure 1**  
**Four Quality Choices, a Test of the Hypothesized Causal Model**



tradeoffs are required. At each step in the path analysis, the relationship between two contiguous variables is assessed, while controlling for each preceding variable in the model. Gender, age, and self-rated health (antecedent variables or exogenous variables) were included in the model as control factors but their contributions are not shown. The analysis shows that each variable in the model is significantly related to the variable to its right, while controlling for all previous variables in the model. In this model, numeracy remains the strongest predictor of comprehension, followed by health literacy. Comprehension is the strongest predictor of quality choices. The model also shows that activation makes a significant independent contribution to quality choices, over and above the contribution it makes through comprehension.

Two additional path analyses were also examined (not shown): one where we used only the two quality choices where a trade-off to choose higher quality was required; and another where we used only the two quality choices where no trade-offs were required. In the analysis where trade-offs were required, the contribution of activation to quality choices was stronger ( $B = .18, p < .01$ ) than in the path analysis shown in Figure 1 (all four quality choices). However, in the path analysis with the trade-off choices, activation was no longer a significant contributor to comprehension. In the analysis with the two no trade-offs choices, activation was not a significant predictor of quality choices.

Thus, the results indicate that when trade-offs are required, those with greater activation are more willing to make a trade-off for higher quality hospitals.

The results of the analysis largely support the hypothesized causal pathway. However, it must be noted that the path model does not confirm the direction of the relationships or whether, in fact, the significant relationships are causal. That is, it is not possible to rule out alternative hypotheses when interpreting the findings from the path analysis.

## Discussion

It is well established that the simple provision of information is insufficient to stimulate informed decisions by consumers. It is less clear what is necessary for consumers to be able to effectively make use of information in health care choices. Until now policy and research has focused almost exclusively on health literacy deficits among consumers and on the design of information products and decision support tools to overcome those deficits. In this analysis we analyzed two further competencies that also contribute to the ability to comprehend comparative health information and to use it effectively in making choices. Numeracy, or the ability to process basic probability and numerical concepts, is related to health literacy, but makes an independent contribution to comprehension and choices. In this study, numeracy was a stronger predictor of these outcomes than health literacy.

Activation makes a significant contribution to these outcomes as well. Making good choices, when trade-offs are necessary, is related to activation separate from

comprehension. This is important as many, if not most, real-life choices involve trade-offs. Results indicate that choice is not just about literacy or comprehension, it also has to do with activation.

Activation levels indicate the degree to which individuals take an active role in managing their health and health care. Those who are more activated are likely to understand the consequences of their own choices on their health and may be more motivated to make high quality choices and to value quality over other factors.

What does this all mean in terms of stimulating informed consumer choices? Once people have awareness of and access to information, at least three factors are at play in determining the use of that information. First, the nature of the information itself is a significant factor: how it is presented, how complex it is, and how salient it is to the user. Second, the skill level of the user, including literacy and numeracy skills, are important determinants of whether the information is understood and whether it is weighted in a choice. The third key factor is the motivation level of the user. Of those three factors, the ones most mutable are the design of the information product and the motivation level of the user. Skill levels are harder to change in the short term. If information products are well designed they can actually help in two ways. By reducing the effort required to use them, lower-skilled users are more likely to use the information. Information products that require less effort to use may also increase some users' motivation to use them (Payne, Bettman, and Johnson 1993).

The findings showed that those who are more activated are better able to understand and use comparative information, even when they have lower skill levels. That is, activation may help compensate for numeracy and literacy skill deficits. If activation is indeed a proxy for motivation, as we assumed here, it is possible that by helping consumers to better understand what is at stake when they make health care choices, their motivation to comprehend and use that information will be increased.

To date, the main focus on consumer competencies for making health care choices has been on health literacy. While health literacy is an important determinant of use of information, it does not tell the whole story, and in fact is not even the most predictive of the three competency areas explored in this study. Efforts to support informed patient choices will be more successful if they focus on addressing patients' numeracy and literacy skills, and activation levels, than if they only focus on addressing health literacy.

The expectations for consumers to be informed about and engaged in managing their health and health care are growing. For consumers to cope in this new environment, they will need an expanded set of competencies. The competencies associated with understanding and using information include health literacy, numeracy, and patient activation. This is a wider array of competencies than has been considered and supported in the past. However, attention to supporting these competencies or helping consumers to manage when they have limited competencies will be necessary if consumers are going to be able to make appropriate choices.

## Appendix A: Comprehension Tasks

### Task 1: Hospital Choice

Indicators	Hospital X	Hospital Y	Hospital Z
Your out-of-pocket costs	\$	\$\$\$	\$\$
Number of general care beds	550	231	180
Rated quality of hospital food (higher is better)	4.1	1.1	2.0
% of time guidelines for heart attack care are followed	82%	92%	87%
% of time guidelines for pneu monia care are followed	60%	89%	78%
Number of visiting hours per day	11	6	8
Number of Registered Nurses per 100 patients	18	38	29
Patient references available	Limited	Limited	Limited
Has computer system to prevent medication errors	No	Yes	Limited

### Comprehension

1. Which hospital is most expensive for you?  
Hospital X   Hospital Y   Hospital Z
2. Which hospital is most likely to follow the guidelines for heart attack care?  
Hospital X   Hospital Y   Hospital Z
3. Which hospital has the least Registered Nurses per 100 patients?

### Task 2: Hospital Choice

	Cost	Overall Patient Satisfaction	Death Rate for Heart Failure Patients
Hospital E	\$\$\$	68	1.4%
Hospital H	\$\$\$	76	4.1%
Hospital B	\$\$\$	81	4.8%
Hospital J	\$\$\$	87	5.3%
Hospital K	\$\$\$	90	6.1%
Hospital D	\$\$	71	3.9%
Hospital F	\$\$	78	4.4%
Hospital I	\$\$	85	4.9%
Hospital N	\$\$	90	6.1%
Hospital G	\$\$	94	6.6%
Hospital M	\$	88	5.2%
Hospital A	\$	91	6.4%
Hospital C	\$	95	7.3%
Hospital O	\$	96	8.9%
Hospital L	\$	98	9.6%

**Comprehension**

1. Which hospital has the highest death rate for patients being treated for heart failure?  
A B C D E F G H I J K L M N O
2. Which hospital has the lowest patient satisfaction with the hospital?  
A B C D E F G H I J K L M N O
3. If you need to go to the hospital, is it better to choose one with a low number for its death rate or a high number?  
Low number is better    High number is better
4. If you need to go to the hospital, is it better to choose one with a low number for patient satisfaction or a high number?  
Low number is better    High number is better

Task 3: Hospital Report Card

	Costs	Care Good or Excellent	Pain Controlled	Doctors Communicated	Nurses Very Caring	Rooms Very Clean	Treated with Respect	Understood Info
Hospital B	\$	58	64	59	69	55	69	67
Hospital C	\$\$\$	77	74	80	65	63	79	70
Hospital D	\$\$\$	80	80	88	71	66	76	77
Hospital E	\$	50	51	52	62	58	57	60
Hospital H	\$	50	55	51	67	60	59	62
Hospital P	\$\$\$	85	91	88	79	80	89	87
Hospital R	\$\$	70	76	77	71	66	66	70
Hospital S	\$\$	69	72	73	70	63	76	63
Hospital V	\$	66	62	70	62	60	71	61

**Comprehension**

1. Which hospital has the highest percent of patients who said their pain was adequately controlled? (Circle one letter)  
B C D E H P R S V
2. Which hospital has the highest out of pocket costs and has the highest percent of patients who said they were provided information that was understandable? (Circle one letter)  
B C D E H P R S V

Task 4: Quality Scaling

	Number of Patients per RN	Your Out-of-Pocket Cost
Hospital A	38	\$\$\$
Hospital B	36	\$\$\$\$
Hospital C	32	\$\$\$\$
Hospital D	38	\$\$\$\$
Hospital E	24	\$\$
Hospital F	37	\$\$\$\$
Hospital G	19	\$\$\$\$
Hospital H	20	\$
Hospital I	18	\$
Hospital J	21	\$\$
Hospital K	24	\$
Hospital L	23	\$\$\$\$
Hospital M	26	\$
Hospital N	24	\$\$\$
Hospital O	17	\$\$

**Comprehension**

- Which hospital has the greatest number of patients per registered nurse? Circle one letter.  
A B C D E F G H I J K L M N O
- If cost were less important to you, which hospital would be your best choice? Circle one letter.  
A B C D E F G H I J K L M N O
- If cost were extremely important to you and you could afford very little, which hospital would be your best choice? Circle one letter.  
A B C D E F G H I J K L M N O
- In thinking about the number of patients per registered nurse, is it better for a hospital to have a greater number of patients per registered nurse or a smaller number?  
Smaller number is better Greater number is better

**Note**

1. While most consumers will only have two levels of cost sharing related to hospital choice—in network and out of network—a growing number of consumers face different types of cost sharing (paying out of their HSA or HRA as well as copays), and must attend to both cost sharing and overall costs.

## References

- Baker, D.W., M.V. Williams, R.M. Parker, J.A. Gazmararian, and J. Nurss. 1999. Development of a brief test to measure functional health literacy. *Patient Education and Counseling* 38 (1):33–42.
- Baker, D.W., J.A. Gazmararian, M.V. Williams, T. Scott, R.M. Parker, D. Green, J. Ren, and J. Peel. 2002. Functional health literacy and the risk of hospital admission among Medicare managed care enrollees. *American Journal of Public Health* 92 (8):1278–1283.
- Baker, D.W., J.A. Gazmararian, M.V. Williams, T. Scott, R.M. Parker, D. Green, J. Ren, and J. Peel. 2004. Health literacy and use of outpatient physician services by Medicare managed care enrollees. *Journal of General Internal Medicine* 19 (3):215–220.
- Black, W.C., R.F. Nease, and A.N. Tosteson. 1995. Perceptions of breast cancer risk and screening effectiveness in women younger than 50 years of age. *Journal of the National Cancer Institute* 87 (10): 720–731.
- Gazmararian, J.A., D.W. Baker, M.V. Williams, R.M. Parker, T.L. Scott, D.C. Green, S.N. Fehrenbach, J. Ren, and J.P. Koplan. 1999. Health literacy among Medicare enrollees in a managed care organization. *Journal of the American Medical Association* 281 (6):545–551.
- Gazmararian, J.A., M.V. Williams, J. Peel, and D.W. Baker. 2003. Health literacy and knowledge of chronic disease. *Patient Education and Counseling* 51 (3):267–275.
- Greene, J., J.H. Hibbard, and M. Tusler. 2005. How much do health literacy and patient activation contribute to older adults' ability to manage their health? *AARP Public Policy Institute Report 2005-05*. [http://assets.aarp.org/rgcenter/health/2005\\_05\\_literacy.pdf](http://assets.aarp.org/rgcenter/health/2005_05_literacy.pdf). Accessed April 10, 2007.
- Gurmankin, A.D., J. Baron, and K. Armstrong. 2004. The effect of numerical statements of risk on trust and comfort with hypothetical physician risk communication. *Medical Decision Making* 24, (3):265–271.
- Hibbard, J.H., E.R. Mahoney, R. Stock, and M. Tusler. 2006. Do increases in patient activation result in improved self-management behaviors? *Health Services Research* (Online Early Articles). <http://www.blackwell-synergy.com/doi/abs/10.1111/j.1475-6773.2006.00669.x>. Accessed April 10, 2007.
- Hibbard, J.H., J. Stockard, E.R. Mahoney, and M. Tusler. 2004. Development of the Patient Activation Measure (PAM): Conceptualizing and measuring activation in patients and consumers. *Health Services Research* 39 (4) Pt 1: 1005–1026.
- Hibbard, J.H., E.R. Mahoney, J. Stockard, and M. Tusler. 2005. Development and testing of a short form of the Patient Activation Measure. *Health Services Research* 40 (6):1918–1930.
- Kirsch, I., A. Jungeblut, L. Jenkins, and A. Kolstad. 2002. *Adult literacy in America: A first look at the findings of the National Adult Literacy Survey*. Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.
- Kutner, M., E. Greenberg, and J. Baer. 2006. *A first look at the literacy of America's adults in the 21st century*. Washington, DC: National Center for Education Statistics. <http://nces.ed.gov/pubsearch/pubinfo.asp?pubid=2006470>. Accessed April 10, 2007.
- Lipkus, I.M., G. Samsa, and B. K. Rimer. 2001. General performance on a numeracy scale among highly educated samples. *Medical Decision Making* 21 (1):37–44.
- Parker, R.M., S.C. Ratzan, and N. Lurie. 2003. Health literacy: A policy challenge for advancing high-quality health care. *Health Affairs* 22 (4):147–153.
- Payne, J.W., J.R. Bettman, and E.J. Johnson. 1993. *The adaptive decision maker*. New York: Cambridge University Press.
- Schillinger, D., K. Grumbach, J. Piette, F. Wang, D. Osmond, C. Daher, J. Palacios, G.D. Sullivan, and A.B. Bindman. 2002. Association of health literacy with diabetes outcomes. *Journal of the American Medical Association* 288 (4):475–482.

- Scott, T.L., J.A. Gazmararian, M.V. Williams, and D.W. Baker. 2002. Health literacy and preventive health care use among Medicare enrollees in a managed care organization. *Medical Care* 40 (5):395–404.
- Sheridan, S.L., and M. Pignone. 2002. Numeracy and the medical student's ability to interpret data. *Effective Clinical Practice* 5 (1):35–40.
- Smith, R.M. 1996. Polytomous mean-square fit statistics. *Rasch Measurement Transactions* 10:516–517.
- Weinfurt, K.P. 2003. Outcomes research related to patient decision making in oncology. *Clinical Therapeutics* 25 (2):671–683.
- Williams, M.V., D.W. Baker, E.G. Honig, T.M. Lee, and A. Nowlan. 1998a. Inadequate literacy is a barrier to asthma knowledge and self-care. *Chest* 114 (4):1008–1015.
- Williams, M.V., D.W. Baker, R.M. Parker, and J.R. Nurss. 1998b. Relationship of functional health literacy to patients' knowledge of their chronic disease: A study of patients with hypertension and diabetes. *Archives of Internal Medicine* 158 (2):166–172.
- Wolf, M.S., J.A. Gazmararian, and D.W. Baker. 2005. Health literacy and functional health status among older adults. *Archives of Internal Medicine* 165:1946–1952.