The Influence of Health Care Utilization on Member Satisfaction

by

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CERTIFICATION OF APPROVAL

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ABSTRACT

Objective—This study examines the influence of utilization of health care services on satisfaction with health plan in a Medicaid managed care organization. This study explores this relationship for adults and for adult proxies surveyed on behalf of their children. In addition, this study examines the influence of expectations of health care on satisfaction with health plan.

Methods—Satisfaction scores from the Consumer Assessment of Health Plan Survey were linked with reciprocal claims data from a Medicaid managed care organization. Logistic regression analysis was used to determine predictors of dissatisfaction. Variables examined included age, race, gender, health status, length of time on health plan, enrollment, eligibility category, perceived barriers to health care, and utilization of health care services, including ambulatory visits, preventive visits, emergency room visits, hospitalizations, and the total number of contacts with the health care system.

Results—The total number of contacts an individual has with the health care system influenced the level of satisfaction with the health plan for adults. Greater than 14 contacts during the six-month study period was associated with greater satisfaction with the health plan. Utilization has no influence on satisfaction with health plan for adult proxies surveyed on behalf of their children. Race, age, health status, and perceived barriers to care were also associated with level of satisfaction. Persons encountering more perceived barriers to care were less likely to be satisfied with their health plan.

Conclusion—Utilization of health care services influences the level of satisfaction with health plan for adults in a Medicaid managed care organization. There is evidence that expectations of health care influence satisfaction with health plan.

BACKGROUND

Satisfaction

Satisfaction research is a field that has grown in size and interest in recent years.[1, 2, 3] There are several reasons for the current level of attention devoted to consumer, or patient, satisfaction. First, consumer or patient experience with health care has emerged as an important component of health care quality.[2] As a reflection of the experience of individuals interacting with the health care system, consumer ratings of health care provide information about how well health plans and clinicians meet the needs of the people they serve.[3] As several researchers have pointed out "patient satisfaction is an ultimate outcome of the delivery of health care services."[4] Second, consumer satisfaction has been shown to be positively associated with adherence to treatment,[2,5,6,7,8,9] better outcomes,[9,10,11] and continued enrollment with a particular provider or health plan.[2,4,9,11,12] Thus, improved satisfaction is associated with better health care. Third, satisfaction surveys are increasingly being used to compare the quality of health plans and providers from the consumers' perspective.[3] This movement is part of a general shift toward consumerism that is evident in all aspects of public service.[1] In addition, it allows enhanced consumer choice of health plans.[29] Using satisfaction as an outcome measure of health care provides a consumer perspective that contributes to a complete and balanced evaluation of the structure, process, and outcome of services.

Factors influencing Satisfaction

Consumer satisfaction is influenced by many factors. Characteristics of providers and the health care system have been shown to influence satisfaction. Provider behavior, availability of services, continuity of care, and service organization have all been associated with consumer satisfaction.[5,11,13,14,15] These elements are thus correlated with quality health care as satisfaction increases. Additionally, consumer characteristics also influence satisfaction. For example, women are generally more satisfied than men,[2,6,9,10,16,17] persons of higher socioeconomic status (SES) are generally less satisfied than persons of lower SES,[18] non-white persons are generally more satisfied than white,[1,13,17] sicker persons are generally less satisfied than healthier ones,[5] older persons are generally more satisfied than younger,[1,2,5,16,17] and persons who have been with a provider or plan for a long time are generally more satisfied than those who have been with a provider or a plan for a short time.[6, 18] Other individual characteristics have been shown to influence satisfaction including family size, marital status, and insurance status.[1, 13] Thus, satisfaction is a measure of care as well as a reflection of individual characteristics of the respondent, and, in order to accurately compare satisfaction scores with health care services, one must control for differences in individual characteristics.

Satisfaction Theory

Several authors have pointed out that although satisfaction is a term that is widely used, it is not a concept that is well understood, and that the lack of attention to the meaning of the construct "patient satisfaction" has been the greatest single flaw in patient satisfaction research.[1] One of the more widely recognized theories of

satisfaction research is "disconfirmation" or "discrepancy" theory. This theory proposes that satisfaction is the result of a comparison of one's expectations with one's experience; satisfaction results when expectations are met and dissatisfaction results when they are not.[7] This theory also suggests that there are several levels of expectations, including a desired, an expected and a minimum acceptable level, and that as one's expectations increase, one's satisfaction will decrease despite a stable level of quality.[1] It has been suggested that the reason there are differences in satisfaction based on gender, age, SES and other personal characteristics is because of differences in expectations about health care.

Other theories that have been used to explain satisfaction include "social equity theory" which argues that dissatisfaction is the result of a perception that others have received more than the individual, and "attribution theory" which suggests that dissatisfaction is the result of a belief that someone can be blamed for a negative experience.[7]

Most of the existing theories about satisfaction were developed in marketing research, and there is some evidence that these theories may not always apply to health care. For example, it has been shown that expectations have little effect on satisfaction with health care and that consumers have a tendency to express satisfaction no matter what care was received.[7, 19] Noting this observation, some researchers have argued that positive responses in satisfaction surveys of health care should not be interpreted as indicating that care was "good" but simply that nothing "extremely bad" happened. Along these lines, it has been suggested that research should focus on dissatisfaction with health care, rather than satisfaction, because dissatisfaction may be a marker for where problems are occurring.[1]

Satisfaction and Utilization

Utilization and patient satisfaction relate to one another in a complex relationship. It is important to note, for example, that the relationship is reciprocal, that both components can influence each other. To state this explicitly: use can influence satisfaction, and satisfaction can influence use.

In terms of the influence of satisfaction on use, satisfaction is viewed as an "input" in which the level of satisfaction impacts utilization. Although this relationship is multifaceted, it is logical that someone who is satisfied with the health care they have received is more likely to use health care in the future than someone who is not, assuming all other factors are equal. Conversely, someone who is dissatisfied with the health care they have received may be more likely to delay seeking health care or to use other available resources than someone who is satisfied with the health care they received. Of course, the relationship is complex and many other variables must be taken into consideration, especially perceived need for health care.

In terms of the influence of use on satisfaction, satisfaction can be viewed as an "outcome" in which the utilization of health care impacts satisfaction. This relationship is what many satisfaction studies attempt to understand—what impact does patient interaction with health care providers and systems have on patient satisfaction? Under this perspective, utilization of health services can be seen as a covariate, and one can ask how the number of contacts affects satisfaction.

Studies have examined the influence of utilization as a covariate on satisfaction, however, these studies have examined this relationship at the provider or clinic level; none have looked at the effect of utilization on satisfaction with health plan.[5,9,13,17,20] Some of these studies have found a positive relationship,[20] others have found a negative

relationship,[5] and some studies have found mixed results.[9,13,17] Most of these studies have relied on self-reported utilization that was collected simultaneously with measures of satisfaction. However, the relationship between utilization and satisfaction is complex, and further research is needed to examine the temporal relationship between satisfaction and utilization.[1] Of course, it is important to control for factors that influence the amount of health care used as well as satisfaction. For example, it is critical to adjust for age, gender and health status as all of these variables have been shown to influence satisfaction and health care utilization.[1,5,13]

Theoretically, there are at least two possible explanations for the influence of utilization on satisfaction. Either increased use provides more opportunities for negative experiences and thus more use will lead to greater dissatisfaction with the health care system; or, use enables the building of familiarity and shared expectations, thus resulting in greater satisfaction.

Evidence in favor of both hypotheses can be found. For example, it is well documented that sicker individuals use more health care services than healthy individuals, and that sicker individuals are also less satisfied with their health care than healthy individuals.[5,16,17] This lower level of satisfaction may be due in part to the need for greater numbers of interactions with the health care system. On the other hand, it has also been found that women use the health care system more frequently than men, yet women are generally more satisfied than men.[6,9,10] The greater satisfaction observed among women could in part be the result of greater familiarity with the system due to increased utilization. Also, it has been shown that longer lengths of time on a plan or with a provider are associated with greater levels of satisfaction;[18] this increased satisfaction may in part be the result of greater numbers of visits that have helped to

foster a greater sense of familiarity with the health care system or enabled the establishment of a stronger patient-physician relationship.

Goals of this Study

The main goal of this study is to examine the influence of utilization of health care services on satisfaction with health plan. By using retrospective claims data from a Medicaid managed care health plan merged with cross-sectional survey data, this study examines the influence of prior utilization of health care services on reported satisfaction with health plan. Given the previous comments that health care research should focus on dissatisfaction rather than satisfaction, this study will specifically look at predictors of low satisfaction, or dissatisfaction, instead of satisfaction. Low satisfaction will be referred to as dissatisfaction in this study, as has been done in other research.[18,27]

This study addresses several shortcomings in the current literature on patient satisfaction. First, most satisfaction research has involved a commercially insured population; thus, a study that explores the predictors of satisfaction among a Medicaid population is an important addition to the satisfaction literature.[10] The data used in this study were collected from enrollees of Oregon's Medicaid program, the Oregon Health Plan (OHP). There has been little published about satisfaction and utilization in the OHP or among Medicaid recipients more generally. Second, this study includes both adult respondents and parents or caregivers responding for their children, providing a unique opportunity to explore predictors of satisfaction in both populations. Third, this study hopes to address issues related to satisfaction theory, specifically whether disconfirmation theory applies to health care by looking for evidence that supports or refutes this hypothesis. Fourth, this study uses objective measures of health care

utilization which can be compared to more commonly used self-reported measures. Finally, because this study uses retrospective claims data, the temporal relationship between utilization and satisfaction can be examined.

Study Hypotheses

The current study illuminates the relationship between utilization and dissatisfaction by exploring this relationship in a population in which the temporality of the relationship is defined, namely, in which utilization prior to the assessment of satisfaction is measured from an independent source.

The null hypothesis for this study is that health care utilization will not significantly predict dissatisfaction after controlling for other factors believed to influence this relationship.

Variables that have been shown to influence the relationship between satisfaction and utilization include race, gender, age, health status, and length of time on health plan. Therefore, these variables are analyzed and controlled for in this study. In addition, given that differences in enrollment and eligibility category may influence the health care experience of individuals, these variables are also explored. These variables are controlled for using logistic regression multivariate analytical techniques.

In light of the theory that expectations influence satisfaction, a variable is developed that attempts to measure one aspect of expectations, namely access to health care services when needed, as perceived by survey respondents. The null hypothesis for this element of this study is that perceived access barriers will not predict dissatisfaction after controlling for other factors. This variable is also included as a control for the main hypothesis of this study.

METHODS

Study Population

The study population consists of a random sample of enrollees of *CareOregon*, a Medicaid-only managed care organization that serves Oregon Medicaid recipients. In Oregon traditional Medicaid has been replaced with the Oregon Health Plan (OHP), a Medicaid demonstration project that allows adults who earn up to 100 percent of the Federal Poverty Level (FPL) to qualify for coverage.

Data Sources

Table 1 provides an overview of the methods utilized for this study. In order to complete the analysis, data were linked from two existing sources. The first data file was the Consumer Assessment of Health Plans Survey (CAHPS), a nationally recognized instrument used to measure consumers' experience with their health care.[22] This survey is conducted on a biannual basis by the Oregon Office of Medical Assistance Programs (OMAP) among enrollees in the OHP in order to assess the quality of care provided to the state's Medicaid population, as a condition of Oregon's 1115 waiver approval process.

CAHPS was developed by a consortium of health services researchers from Research Triangle Institute (RTI), RAND, and Harvard with funding from the Agency for Health Care Policy and Research (AHCPR). This survey instrument has received extensive reliability and validity testing.[23] The psychometric properties of CAHPS have been discussed in detail elsewhere.[3] CAHPS includes several general measures of satisfaction as well as questions that look specifically at aspects of care of interest to

Table 1: Methods Overview

Null Hypothesis:	Health care utilization will not significantly affect dissatisfaction with health plan after controlling for other factors that also influence this relationship.		
Study Design:	Cross Sectional		
Data Sources:	Survey data linked with health plan enrollment and claims data		
Variables:			
	Outcome variable: *(dependent)*		
	Dissatisfaction with health plan		
	Predictor variables: *(independent)*	Adult	Child
	Race	X	X
	Gender (Adult or Child)	X	X
	Proxy Gender (Gender of person completing survey on behalf of child)		X
	Age (Adult or Child)	X	X
	Proxy Age (Age of person completing survey on behalf of child)		X
	Health Status		
	General Health	X	X
	Down and Blue	X	
	Childhood Risk Questions		X
	Eligibility Category	X	
	Enrollment issues		
	Total Length of Time on Plan	X	X
	Geographic Region	X	X
	Barriers		
	Barriers experienced	X	X
	Health Plan barriers	X	X
	Utilization		
	Claims		
	Ambulatory visits	X	X
	ER visits	X	X
	Hospitalizations	X	X
	Preventive visits	X	X
	Total contacts	X	X
	Survey		
	Ambulatory visits	X	X
	ER visits	X	X
	Hospitalizations	X	X

Table 1: Overview of methods. All independent variables considered for analysis are listed under "Predictor Variables." The "X" under "Adult" and "Child" indicate a variable was used in the analysis for that group of respondents. Some variables were initially considered but excluded due to lack of variability, as explained in the text.

consumers. For example, CAHPS includes questions about access to care, promptness of care, the communication skills of providers, provision of prevention services, the helpfulness of office staff, and various dimensions of customer service. It also includes questions about health care utilization and health status.

The second source of data used in this analysis includes eligibility and claims information from *CareOregon*, a Medicaid managed care organization serving Oregon Medicaid recipients. These data are collected for administrative purposes and include information about health care service utilization. These data were linked using the respondent's unique OMAP identification code which was contained in each data file. The data link successfully matched 100 percent of survey respondents to the health plan's eligibility and claims database. Utilization data for the six months prior to the CAHPS survey were analyzed for this study.

The CAHPS survey was administered to a random sample of individuals enrolled in the OHP. Individuals were sampled in all health plans and geographic regions covered by the OHP. The sampling frame consisted of 1000 health plan members continuously enrolled in each participating health plan for a minimum of six months before September 1998. Continuous enrollment was defined as having no breaks in enrollment longer than 45 days. Of the 19,463 eligible OHP recipients randomly selected to participate in the study, 9,782 completed the survey, for an overall response rate of 50.26 percent.[24] A total of 534 surveys were completed by *CareOregon* enrollees, of which 235 were completed by adults and 299 were completed by adult proxies on the behalf of their child enrollee.[24] Surveys completed by proxies on the behalf of their children are referred to in the analysis as "child proxy" or "children's" surveys.

Variable Definitions: Dependent or Outcome Variable: Dissatisfaction

Dissatisfaction, the dependent variable in this study was constructed from an 11-point scale that captures respondents' overall ratings of their health plans. Specifically, respondents were asked: "We want to know your rating of all your experience with [your/your child's] health plan. Use any number on a scale from 0 to 10 where 0 is the worse health plan possible and 10 is the best health plan possible. How would you rate [your/your child's] health plan now?" This particular item was chosen from the various consumer ratings contained in the CAHPS survey for several reasons. First of all, this measure had the highest response rate of all potential measures of dissatisfaction, with 97.2 percent of all survey respondents answering this question. Other dissatisfaction measures were considered, including a global health care question and several composite measures that rate specific aspects of health care. However, response rates for these alternate measures were low. For example, the response rate for the global health care measure was 73.8 percent, and other measures had even lower response rates. Use of the global health plan measure permitted this analysis to include data from the majority of survey respondents. In addition, the global health plan measure has been found to be highly correlated with other more specific ratings.[3] In this data set, the correlation between global health plan and global health care was found to be 0.721 ($p < 0.0001$) using the Spearman's rho correlation coefficient measure. As such, the global health plan measure can be viewed as a measure of general health care satisfaction.

The overall mean for the plan rating was 8.19 (sd 2.37). For adults it was 7.77 (sd 2.50) and for child proxy it was 8.50 (sd 2.21). Because the responses to the 11-point rating scale were skewed toward the positive end of the scale, responses were

grouped into 3 categories to normalize the distribution as much as possible, as recommended by the CAHPS Survey and Reporting Kit.[26] In preliminary analyses, several different groupings were assessed, and the grouping that created the least skewed distribution was 0 to 7, 8 to 9 and 10, where 0 to 7 = low, 8 to 9 = medium, and 10 = high.

It should be noted that this item addresses patients' ratings of their experiences with health plans, not satisfaction. In this thesis, consistent with the practices adopted by others who have reported on enrollee dissatisfaction with health plan, respondents were categorized as being "dissatisfied" whose responses place them in the "low" rating category.[18,27]

Variable Definitions: Independent or Predictor Variables

The following is a description of the independent variables explored in this study.

Race was extracted from the health plan enrollment data. Individuals were characterized as "White," "Hispanic," or "Other." For the adult analysis, "Hispanic" and "Other" had to be combined into one category, "Other," due to small numbers. For the child analysis, "Hispanic" and "Other" were considered separately. Those for whom no information was available were labeled as "Missing."

Gender of enrollee was also taken from the health plan enrollment data. Respondents were categorized as "Male," or "Female" as indicated. This information was available for all respondents.

Gender of Proxy, or the gender of the person completing the survey on behalf of a child, was taken from the CAHPS survey. Respondents were categorized as "Male," "Female," or "Missing," as indicated.

Age of enrollee was calculated from a "Date of Birth" variable contained in the health plan enrollment data. Age was calculated based on age at the time of the survey and was used as a continuous variable.

Age of Proxy, or the age of the person completing the survey on behalf of a child, was taken from the CAHPS survey. Adults were asked to categorize their age as "<18", "18-24," "25-34," "35-44," "45-54," "55-64," "65-74," and "75+." For this analysis, these categories were initially grouped into three categories, "≤24," "25-34" and "35+," because very few proxy's were less than 18 or older than 44. During the multivariate analysis, it was discovered that the age of the child and the age of the proxy are correlated. The age of the child and the proxy age were each removed from the multivariate model one at a time and the models were analyzed. When the age of the child was removed from the model, it was discovered that proxies less than 35 years old had similar rates of dissatisfaction. Thus the proxy age was recoded as either less than 35 years old or 35 years and older. When entered into the model in this format, the age of the child and the age of the proxy contributed to the model in similar ways. The age of the proxy was selected for inclusion in the final model because proxies completed the survey.

Analysis of proxies shows that the vast majority of adults responding for children were women (88.3%) between the ages of 18 and 44 (86.5%) and 95 percent reported being the child's parent.

Health Status was contained in the CAHPS survey. Two measures were developed for adults and two for children. Adults and child proxies both answered the question "In general, how would you rate [your/your child's] overall health now?" Response categories included "Excellent," "Very Good," "Good," "Fair," and "Poor."

Respondents answering either "Fair" or "Poor" were categorized as having "Poor general health." Respondents answering "Excellent," "Very Good," or "Good" were categorized as having "Good general health." Respondents not answering the question were labeled as "Missing." This measure of health status is referred to as "Health Status—General" or "General Health Status" in this paper.

In addition to the general health status question, adult responders were asked whether they felt downhearted and blue in the last 4 weeks. Response categories were "All of time," "Most of the time," "A good bit of the time," "Some of the time," "A little of the time," and "None of the time." This question is taken from the SF-12 and has been show to be a reliable marker of mental health. Respondents indicating they felt downhearted and blue all, most, or a good bit of the time were categorized as being "More Down and Blue." Respondents indicating they felt downhearted and blue some, a little, or none of the time were labeled as being "Less Down and Blue." This measure of health status is referred to as the "Down and Blue Health Status Measure" in this paper. The two health status measures for adults were used independent of each other in this study. Thus, a respondent could be less down and blue but have poor general health, or any other combination of these two variables.

The two adult measures of health status were correlated, but not to a high degree (Spearman's rho Correlation Coefficient 0.32, $p < 0.0001$). Therefore, both variables were included in the initial analysis. In the multivariate analysis, however, it was discovered that despite the low degree of correlation, the variables interfered with one another. Therefore, only one of the variables was included in the final model. Because the General Health Status measure is more widely used, it was selected for

inclusion in the final model. Information about both measures of health status are included in the study for the reader's information.

In addition to the general health question, children were also categorized as being at high risk for having a poor health status if their proxy answered affirmatively to any of the four questions listed in **Table 2**. This method of identifying children as being at higher risk for illness has been used in studies of special needs children.[25]

Table 2: Questions Identifying Children At Higher Risk for Illness

1. Does your child have any kind of emotional, developmental, or behavior difficulty now for which he or she has received treatment or counseling?
2. Does your child have a health condition for which he or she has taken prescription medication for at least 3 months?
3. Does your child have a health condition or challenge now that has limited his or her ability to walk, run or play for at least 3 months?
4. Does your child have any other health condition or challenge that has lasted for at least 3 months, and for which he or she has seen a doctor or other health professional at least three times altogether.

Table 2: Questions used to identify children at higher risk for illness. Children were labeled as "High risk for illness" if any one of these questions was answered positively by their proxy. Children were labeled as "Normal risk for illness" if none of the questions were answered positively.

Parents of these higher risk children reported more trouble accessing health care services and were less satisfied with the health care their children received.[25] In this study, those children whose proxy answered any one of these four questions affirmatively were categorized as "High Risk" for poor health. Conversely, children whose proxy answered none of these questions affirmatively were categorized as being at "Normal risk" for poor health. This measure of health status is referred to as "Health Status—Childhood Risk Questions" in this study.

The two measures of health status for children were compared with one another and found to have a low but significant degree of correlation (Spearman's rho Correlation Coefficient 0.14, $p = 0.010$). Therefore, both variables were initially included in the analysis. In the multivariate analysis, however, the measures were found to interfere with each other and therefore only one of the two could be included in the final analysis. The general health status question was selected for inclusion because it is a more widely recognized measure of health status. Information about both health measures are included in the study for the reader's information.

Eligibility category is determined by OMAP at the time of enrollment and is contained in the *CareOregon* database. The most recent eligibility category as of October 1998 is used. Eligibility categories were grouped into three rollup categories, shown in **Table 3.**

These categories include: 1) Categorical Families or Children, 2) Categorical Old Age, Blind and Disabled, and 3) the OHP Expansion Group. The OHP Expansion Group represents adults who would not normally be eligible for Medicaid coverage under federal guidelines, but who are eligible under the Oregon Medicaid Demonstration Waiver. Eligibility was included in the analysis because socioeconomic status (SES) and access to health care have been shown to influence satisfaction and health care utilization, and although all subjects in this study are low SES by definition, the expansion group represents a different population by virtue of not having a link to a welfare cash assistance program or Medicaid previous to the OHP. Also, it has been previously shown that different eligibility categories represent different health care needs based on family size, age and health status. Because children are not

represented in the OHP expansion group, this variable was not included in the children's analysis.

Table 3: Eligibility Categories

1	Categorical Families or Children	Temporary Assistance for Needy Families (TANF) Pregnant Women and Children up to 170% of Federal Poverty Level (FPL) OHP Children between 6 and 18 up to 133% of FPL
2	Categorical Old Age, Blind, Disabled	Blind and Disabled General Assistance Old Age with and without Medicare
3	OHP Expansion Group	Adults and Childless Couples up to 100% FPL Families up to 100% FPL

Table 3: Rollup categories for eligibility categories from *CareOregon* eligibility data.

Enrollment—Since it has been shown that the length of time an individual has been with a plan or a provider can influence satisfaction, the total length of time a respondent had been with *CareOregon* was calculated and included in the analysis.

Two other enrollment variables were also considered. In order to be eligible for inclusion in the CAHPS survey, health plan members had to have been continuously enrolled for a minimum of 6 months with a single health plan. Continuous enrollment was defined as having no breaks in enrollment longer than 45 days. Given that relatively long enrollment breaks were permitted for inclusion in the CAHPS survey, enrollment patterns were examined to assure that differences did not contribute to variations observed in utilization. The variables examined included whether individuals were enrolled for the entire 6 months prior to the survey, whether respondents had any

breaks in enrollment, and, given the high rate of turnover within the OHP, whether or not an individual was still enrolled with the health plan at the time they received the survey.

Analysis of these additional variables found that 89.9 percent of all respondents (N=480) were enrolled with *CareOregon* during the first month of the survey and that 94.8 percent of all respondents (N=506) had no breaks in enrollment during the 6 month study period. Therefore, due to lack of variability, these measures were not included in further analysis. The results of the total length of time a respondent had been with *CareOregon* is reported in the Results section of this paper and is included in further analysis.

Geographic Region was taken from the CAHPS survey information. Respondents were categorized as being either from the Portland metropolitan area, from central Oregon, or from other regions of the state. No significant differences were found between respondents from central Oregon or from other regions of the state, and thus these two categories were combined. The analysis was conducted using a dichotomous variable of Portland metropolitan area and other.

Barriers is a measure developed to explore the effect of expectations on satisfaction. Eight questions were selected from the CAHPS survey which addressed potential problems with access to health care. Each barrier question was preceded by a screener question that assessed whether the service in question was used in the past six months. Persons answering the screener questions affirmatively, meaning that they used the health care service in question, were directed to answer the specific question about barriers to care. These questions are listed in **Table 4.**

Table 4: Barrier Questions

	Screener question:		Barrier question:
1.	*Did [you/your child] try to see [your/his or her] personal doctor or nurse?*	If "yes" →	How often did [you/your child] have to see someone else?
2.	*Did you or a doctor think [you/your child] needed to see a specialist?*	If "yes" →	How much of a problem, if any, was it to get a referral to a specialist that [you/your child] needed to see?
3.	*Did you call during regular office hours to get help or advice for [yourself/your child]?*	If "yes" →	When you called, how often did you get the help you needed?
4.	*Did you call outside of regular office hours for [yourself/your child]?*	If "yes" →	When you called, how often did you get the help you needed?
5.	*Did you make any appointments for regular or routine health care for [you/your child]?*	If "yes" →	How often did [you/your child] get your appointment for regular or routine health care as soon as you wanted?
6.	*Did [you/your child] have an illness or injury that needed care right away?*	If "yes" →	How often did [you/your child] get care as soon as you wanted?
7.	*How many times did you go to a doctor's office or clinic to get care for [yourself/your child]?*	If "1+" →	How much of a problem was it to get the care you needed?
8.	*How many times did you go to a doctor's office or clinic to get care for [yourself/your child]?*	If "1+" →	How much of a problem, if any, were delays in health care while you waited for approval from your health plan?

Table 4: Questions used to measure whether barriers were experienced by survey respondents. Screener questions, presented in the right hand column, were initially asked of respondents. If respondents indicated that they had used the health care service in question, they were then directed to answer the barrier question, presented on the left. Survey respondents were labeled according to the number of barriers they reported encountering: No barriers encountered, one barrier encountered, 2 or more barriers encountered, and no information provided.

Respondents were categorized into the following groups: 1) those who indicated no barriers to care, 2) those who reported encountering 1 barrier to care, 3) those who reported encountering 2 or more barriers to care, and 4) those for whom no information is available, either because they did not pass the screener questions or because of missing data.

A second barrier measure was developed to specifically look at problems related to the health plan. This measure was based on one of the eight access questions used in the first measure. Specifically, people were asked, "If you went to your clinic to get care, how much of a problem, if any, were delays in care while you waited for approval from your health plan?" Respondents were categorized as 1) those who reported no problems, 2) those who reported problems with health plan approval, and 3) those for whom no information is available. As above, someone can be in the final category either because they did not answer the barrier question or because they answered no to the screener question.

The two barrier measures were tested for degree of correlation. For adults, the correlation was not significant and so both measures were initially included in the multivariate analysis (Spearman's rho correlation coefficient -0.02, $p = 0.620$). For children, the degree of correlation was significant, but small (Spearman's rho correlation coefficient 0.38, $p < 0.0001$), and therefore both measures were initially included in the multivariate analysis for children. In the multivariate analysis of both adults and children, however, the two variables were found to correlate with each other and therefore one measure had to be removed. In both cases, the general barriers question was selected because it contains more information about barriers experienced than the health plan barrier question.

Utilization was measured from two sources: CAHPS survey data and *CareOregon* claims data.

The CAHPS survey provided three measures of health care service utilization, including the number of primary care provider (PCP) visits, emergency room (ER) visits, and the number of hospitalizations experienced by the respondent in the past 6 months. For purposes of this study, PCP visits from CAHPS were categorized into "0," "1-2," and "3+" visits, while ER visits and hospitalizations were each categorized into dichotomous (yes/no) variables.

Claims data from the *CareOregon* claims database were used as the primary measure of health care service utilization for this study. Because data were collected for administrative and billing purposes, claims records needed to be reconciled and interpreted in order to correctly count health care visits and contacts. Please see **Appendix A** for a more detailed description of the process used to count different health care visits and contacts for this study.

From claims data, five different measures were created, including Ambulatory Visits, ER Visits, Hospitalizations, Preventive Visits and a measure of Total Contacts with the health care system. Initially, Ambulatory Visits, ER Visits and Hospitalizations were developed to directly compare with the variables collected in the CAHPS survey. This was most easily done for ER Visits and Hospitalizations, however, due to the way Ambulatory Visits are recorded in claims data it is impossible to tell whether an ambulatory visit is with one's regular primary care provider or with a specialist, limiting the comparability with the survey data.

In addition to these measures, claims data provide information about many other interactions with the health care system. For example claims data include information

about preventive visits, physical therapy visits, nutrition counseling, pharmacy services, laboratory, radiology, and pathology services, and outpatient surgeries. None of this information is measured in the CAHPS survey. A measure of all contacts with the health care system was developed by aggregating all of the visit information available to determine whether the total number of contacts with the health care system relates to satisfaction with health plan. Since the satisfaction measure used in this study is satisfaction with health plan, it seems reasonable that health plan satisfaction might be related to the total number of services the health plan makes available to the individual or how often an individual utilizes these services. Thus, a measure of Total Contacts with the health care system was developed. This measure included a summation of all other measures previously mentioned plus any other contacts with the health care system.

In addition, a separate measure of preventive visits was developed, both for descriptive analysis as well as for inclusion in the multivariate analysis. Preventive visits included visits for annual exams, immunizations, mammography, and family planning services. We wanted to include preventive visits in the multivariate analysis because we thought they might influence satisfaction, with persons who have preventive visits being more likely to be satisfied with their health plan than those without preventive visits.

Ambulatory visits were measured as a continuous variable and were also categorized into "0," "1-2," and "3+" visits for purposes of comparison with the self-report PCP visit data. ER visits, Hospitalizations, and Preventive Visits were recorded as continuous variables and also as dichotomous (yes/no) variables. Total contacts were measured both as a continuous variable and as a categorical variable. Categories included "0," "1-3," "4-7," "8-13," and "14+" contacts with the health care system. All

measures were for the six months preceding the CAHPS survey. This time period was selected in order to coincide with the time period used in the CAHPS survey.

As with other variables with two or more measures, the utilization measures were tested for correlation. Ambulatory Visits and Total Contacts highly correlate with one another (Spearman's rho correlation coefficient 0.712, $p < 0.0001$ for adults, and 0.768, $p < 0.0001$ for children), therefore only one variable could be included in the multivariate model. Because the outcome variable for this study explores satisfaction at the health plan level, Total Contacts was preferred over Ambulatory Visits because it measures all contacts paid for by the health plan.

Because this study is testing whether the use of longitudinal data from a claims database will add to the understanding of the effect of utilization on satisfaction, claims measures were included in the multivariate models for both adults and children. Self-report measures were also included in the analysis. When applicable, variables were coded as both continuous and categorical and each coding was tested separately. The coding method that provided the best model fit was retained.

Analytical Approach

Descriptive characteristics The descriptive characteristics of respondents were calculated initially for all respondents as a single group. Because of the inclusion of both adults and children in the survey, descriptive characteristics were also calculated for each of these groups separately and the results were compared. Chi Square tests were used to test for significant differences between adults and children for categorical variables. One-way analysis of variance was used to test for significant differences in

continuous variables. Utilization data were also calculated and reported in a similar manner.

Utilization measures from self-report and claims data were also compared to one another using McNemar's test for paired samples. In addition, the claims records of all hospitalizations indicated by one source but not the other were hand reviewed to see if proof of a hospitalization could be found.

Univariate Logistic Regression Analyses Univariate logistic regression analyses were performed to look for significant associations between the level of satisfaction and the descriptive and utilization characteristics of the respondents. All previously mentioned variables were included in the univariate analysis except for those variables which were specifically noted as not being included. **Table 1** provides an overview of all of these variables.

Multivariate Logistic Regression Analyses Multivariate logistic regression analyses began by using all variables found to be associated with dissatisfaction in the univariate logistic regression analyses. The cut-off for inclusion in the multivariate model was defined as a $p \leq 0.25$, as recommended by Hosmer and Lemeshow.[28] A backward elimination procedure was used to select significant variables in the multivariate logistic regression model. Variables not entered into the analysis include those with a high degree of correlation, as previously discussed, those with small numbers for particular response choices, and those variables found to correlate with each other, also as previously discussed. Because the characteristics of the adult and child populations differed, separate models were developed for each population. The cut-off for significance in the multivariate model was set at 0.05. Variables not found to meet this

cut-off and variables not found to contribute to the model were removed. All of the statistical analysis was performed in SPSS version 10.1.

An interaction term was added to the adult model for health status and utilization. This variable was not significant ($p = 0.648$) and therefore was removed from the model.

RESULTS

Survey Respondents

A total of 534 *CareOregon* enrollees returned a CAHPS survey. All of these respondents were included in this study. 235 (44%) of respondents were adults and 299 (56%) were adult proxies who completed the survey on behalf of their enrolled child. This latter group is referred to as "child proxies" or "children" throughout this report. All respondents were identified in the *CareOregon* database and the information from both sources was successfully linked for 100 percent of cases. The *CareOregon* population at the time of the survey included 49 percent adults and 51 percent children, which is significantly different from the survey sample ($p = 0.020$). Thus, it appears that child proxies were more likely to have completed a survey than adults.

Demographic Characteristics of Survey Respondents

Table 5 provides demographic information about the survey respondents. Of note are some of the significant differences between adults and children. Racial differences are prominent, with 71 percent of adult respondents of "White" race, compared to 36 percent of children. Also, of adult respondents only 7 percent are "Hispanic," while 48 percent of children are. Although these differences are dramatic, the *CareOregon* enrollee population is similarly distributed, with 54 percent "White" adults, 35 percent "White" children, 8 percent "Hispanic" adults, and 35 percent "Hispanic" children. The differences between the *CareOregon* total population and the survey sample are significant ($p < 0.0001$), with "White" adults and "Hispanic" children over-represented. **Table 6** presents this and other comparison information. Of note, the heavily Hispanic population among children reflects that many children of

Table 5: Characteristics of Adult and Child Plan Enrollee Survey Sample *

		Adult (N=235)	Child N=299
Race†	White	71.1 % *(167)*	36.1 % *(108)*
	Hispanic	7.7 % *(18)*	48.5 % *(145)*
	Other	11.1 % *(26)*	8.0 % *(24)*
	Missing	10.2 % *(24)*	7.4 % *(22)*
Gender†	Female	61.3 % *(144)*	42.5 % *(127)*
	Male	38.7 % *(91)*	57.5 % *(172)*
Age	Mean (years)	41.7 (sd 13.44)	7.7 (sd 4.14)
	Median	41.0	6.0
	Range	18 – 67	3 – 18
Eligibility†	Categorical Families or Children	21.3 % *(50)*	95.7 % *(286)*
	Cat. Old Age, Blind, Disabled	9.4 % *(22)*	3.7 % *(11)*
	Medicaid Expansion Group	69.4 % *(163)*	0.7 % *(2)*
Enrollment History	Total time on plan, mean	17.56 mo (sd 4.76)	17.11 mo (sd 4.50)
Geographic Region‡	Portland Metropolitan Area	86.4 % *(203)*	79.3 % *(237)*
	Other	13.6 % *(32)*	20.7 % *(62)*
Health Status			
General Health†	Good general health	59.5 % *(171)*	92.3 % *(276)*
	Poor general health	37.4 % *(88)*	7.0 % *(21)*
	Missing	2.6 % *(6)*	0.7 % *(2)*
Down and Blue	Less Down and Blue	72.7 % *(171)*	------
	More Down and Blue	25.1 % *(59)*	
	Missing	2.1 % *(5)*	
Childhood Health Risk	Normal risk	------	71.2 % *(213)*
	Increased risk		28.4 % *(85)*
	Missing		0.3 % *(1)*
Barriers			
All questions¶	No Barriers	48.9 % *(115)*	47.5 % *(142)*
	1 Barrier	16.6 % *(39)*	20.7 % *(62)*
	2+ Barriers	20.9 % *(49)*	11.4 % *(34)*
	No information	13.6 % *(32)*	20.4 % *(61)*
Health Plan†	No Barriers	55.3 % *(130)*	42.1 % *(126)*
	Yes Barriers	15.3 % *(36)*	9.7 % *(29)*
	No information	29.4 % *(69)*	48.2 % *(144)*

Table 5: Characteristics of adult and child enrollees. Child information is as reported by adult proxies.
*Please note: All percentages are column percentages.
† $p < 0.0001$ by Chi Square test of homogeneity for adult vs. child.
‡ $p = 0.026$ by Chi Square test of homogeneity for adult vs. child.
¶ $p = 0.006$ by Chi Square test of homogeneity for adult vs. child.

undocumented workers are U.S. citizens and therefore are eligible for the OHP, although their parents are not.

Gender differences are also prominent in the survey sample, with adults being more heavily female (61.3%) as compared to children (42.5%). The *CareOregon* population is more evenly distributed, with 58.5 percent of adults and 49.2 percent of children being female. The difference between the *CareOregon* and the survey sample is significant for children but not for adults ($p = 0.021$ and 0.397, respectively), showing that the survey over-represents proxies with male children.

Table 6: Demographic Comparison between the Survey Sample and the *CareOregon* Total Enrollee Population

		Adult		Child	
		Study Sample	*CareOregon* Population	Study Sample	*CareOregon* Population
Race†‡	White	71.1 %	54.0 %	36.1 %	35.2 %
	Hispanic	7.7 %	8.3 %	48.5 %	34.7 %
	Other	11.1 %	15.1 %	8.0 %	14.2 %
	Missing	10.2 %	22.6 %	7.4 %	15.9 %
Gender¶§	Female	61.3 %	58.5 %	42.5 %	49.2 %
	Male	38.7 %	41.5 %	57.5 %	50.8 %

Table 6: Comparison of demographic information for the survey populations and the *CareOregon* population.
† $p < 0.0001$ by Chi Square test of homogeneity for adult survey vs. *CareOregon* population.
‡ $p < 0.0001$ by Chi Square test of homogeneity for child survey vs. *CareOregon* population.
¶ $p = 0.397$ by Chi Square test of homogeneity for adult survey vs. *CareOregon* population.
§ $p = 0.021$ by Chi Square test of homogeneity for child survey vs. *CareOregon* population.

Eligibility categories were significantly different between adults and children, however, this finding was expected since the largest categorical expansion under Medicaid since 1990 has been children. What is somewhat surprising, is the discovery

that two of the child enrollees belong to the OHP Expansion Group eligibility category. Both of these enrollees were 18 years old at the time of the study, however, the surveys were completed by older adults on their behalf. Because the surveys were completed by adults on their behalf, these members were included in the analysis. Relative to the *CareOregon* population, adult survey respondents were significantly more likely to belong to the OHP expansion group ($p < 0.0001$).

The total lengths of time on the plan for both adults and children were surprisingly long. This may represent a selection bias in which persons who have been on the OHP for longer times were more likely to answer the CAHPS survey.

Another notable difference is found in health status. Only 59.5 percent of adults reported their general health status as good while 92.3 percent of children were reported to have good health status. The other measures of health status, the mental health measure and the childhood risk questions are not directly comparable, however, their differences were less dramatic, with approximately 70 percent of both adults and children in the more positive health status category.

Also, there are differences in reported barriers to care between adults and children. Child proxies were more likely to report a single barrier to care and were also more likely to have not provided information about barriers than adults who are more likely to report experiencing two or more barriers to care. Relative to barriers at the health plan level, adults reported significantly more barriers than child proxies, and child proxies were less likely to provide information about barriers.

Utilization of Health Care Services

Table 7 reports health care services utilization data as collected from both self-report and claims data. Adults use more health care services than children as noted by almost every measure of health care utilization examined. A comparison of the mean number of ambulatory and total contacts highlights the extent of this different. Adults had an average of three Ambulatory Visits during the study period while children had an average of 1.5 visits. For Total Contacts, adults averaged over 11 contacts with the health care system during the study period as compared to children who averaged almost 3.5 visits during the same time period.

The only measure that children prominently exceeded adults on was Preventive Visits; here, children were three times more likely to have evidence of a Preventive Visit than adults.

Also of note is that almost 20 percent of this population had at least one visit to the ER and 2 to 6 percent had hospitalizations. Thus, utilization of health care services was high in this sample.

Table 7 : Utilization Characteristics of Adult and Child Plan Enrollees Survey Sample*

		Adult (#235)	Child (#299)
Utilization—Claims			
Ambulatory Visits**	0	26.0 % *(61)*	35.1 % *(105)*
	1-2	29.8 % *(70)*	46.2 % *(138)*
	3+	44.3 % *(104)*	18.7 % *(56)*
	Mean number of visits †	3.00 vsts (sd 3.40)	1.50 vists (sd 1.87)
ER Visits	0	82.1 % *(193)*	81.6 % *(244)*
	1 or more	17.9 % *(42)*	18.4 % *(55)*
Hosp. Admt.‡	0	94.0 % *(221)*	97.7 % *(292)*
	1 or more	6.0 % *(14)*	2.3 % *(7)*
Preventive Visits**	0	89.4 % *(210)*	64.5 % *(193)*
	1 or more	10.6 % *(25)*	35.5 % *(106)*
Total Contacts**	0	10.2 % *(24)*	18.1 % *(54)*
	1-3	21.7 % *(51)*	47.5 % *(142)*
	4-7	19.6 % *(46)*	24.1 % *(72)*
	8-13	20.4 % *(48)*	8.7 % *(26)*
	14+	28.1 % *(66)*	1.7 % *(5)*
	Mean no. of contacts†	11.31 (sd 12.67)	3.42 (sd 4.10)
Utilization—Survey (self report)			
PCP Visits**	0	18.7 % *(44)*	29.8 % *(89)*
	1-2	28.1 % *(66)*	31.8 % *(95)*
	3+	44.6 % *(105)*	23.7 % *(71)*
	Missing	8.5 % *(20)*	14.7 % *(44)*
ER Visits	0	71.9 % *(169)*	77.3 % *(231)*
	1 or more	25.1 % *(59)*	21.7 % *(65)*
	Missing	3.0 % *(7)*	1.0 % *(3)*
Hosp. Admits**	0	88.5 % *(208)*	96.0 % *(287)*
	1 or more	10.6 % *(25)*	3.3 % *(10)*
	Missing	0.9 % *(2)*	0.7 % *(28)*

Table 7: Utilization of health care services by category and by source of data. All measures refer to the six months prior to the CAPHS survey. Child information is as reported by adult proxy. PCP stands for "primary care provider." "ER" stands for "Emergency Room."

*Please note: All percentages are column percentages.

** $p < 0.0001$ by Chi Square test of homogeneity for adult vs. child.

† $p < 0.0001$ by one-way analysis of variance for adult vs. child.

‡ $p = 0.033$ by Chi Square test of homogeneity for adult vs. child.

Utilization of Health Care Services

Table 8 provides a side-by-side comparison of the two measures of health care utilization used in this study. When comparing the ER and Hospitalization measures, self-report was consistently higher for both adult and child subgroups. Ambulatory visits appear to match well with PCP visits, except for persons reporting no visits. However, as previously mentioned, these measures may actually be less comparable due to definitional differences. Without a gold-standard, it is impossible to know which general utilization measure is more accurate, but it is most likely that both measures have limitations. Claims data, for example, may under report utilization due to administrative issues, whereas self-report is dependent on recall. Using McNemar's test for paired samples, all of the measures are significantly different from one another. **Appendix B** includes a more detailed comparison of these measures which suggest that self-reported utilization is subject to recall errors.

Table 8: Utilization Measure Comparison

Utilization—Adults		Claims	Self-Report
Ambulatory or PCP Visits†	0	26.0 % *(61)*	18.7 % *(44)*
	1-2	29.8 % *(70)*	28.1 % *(66)*
	3+	44.3 % *(104)*	44.6 % *(105)*
	Missing	--	8.5 % *(20)*
ER Visits†	0	82.1 % *(193)*	71.9 % *(169)*
	1 or more	17.9 % *(42)*	25.1 % *(59)*
	Missing		3.0 % *(7)*
Hosp. Admits†	0	94.0 % *(221)*	88.5 % *(208)*
	1 or more	6.0 % *(14)*	10.6 % *(25)*
	Missing		0.9 % *(2)*
Utilization—Children		**Claims**	**Self-Report**
Ambulatory or PCP Visits‡	0	35.1 % *(105)*	29.8 % *(89)*
	1-2	46.2 % *(138)*	31.8 % *(95)*
	3+	18.7 % *(56)*	23.7 % *(71)*
	Missing	--	14.7 % *(44)*
ER Visits†	0	81.6 % *(244)*	77.3 % *(231)*
	1 or more	18.4 % *(55)*	21.7 % *(65)*
	Missing		1.0 % *(3)*
Hosp. Admits†	0	97.7 % *(292)*	96.0 % *(287)*
	1 or more	2.3 % *(7)*	3.3 % *(10)*
	Missing		0.7 % *(2)*

Table 8: Comparison of utilization as measured by claims data and by self report. Test of significance performed using McNemar's test for paired data.
* Please note: All percentages are column percentages.
† $p < 0.0001$ for utilization as measured by claims vs. self-report.
‡ $p = 0.041$ for utilization as measured by claims vs. self-report.

Level of Satisfaction Overview

Table 9 presents the proportion of respondents with various reported levels of plan satisfaction. Of note, 29.8 percent of adults and 21.1 percent of child proxies reported low satisfaction, or dissatisfaction, with their health plan. Conversely, 68.1 percent of adults and 75.6 percent of child proxies reported medium or high satisfaction

with their health plan. The mean satisfaction scores are quite high and are presented in the table. Also note that 30.2 percent of adults gave a perfect score to their health plan and 50.5 percent of child proxies did likewise. These differences are significant (p = 0.025).

Table 9: Level of Satisfaction, Survey Respondents*

		Adult (N=235)	Child N=299
Level of Satisfaction			
Low Satisfaction†	(0-7)	29.8 % *(70)*	21.1 % *(63)*
Medium Satisfaction	(8-9)	37.9 % *(89)*	25.1 % *(75)*
High Satisfaction	(10)	30.2 % *(71)*	50.5 % *(151)*
Missing		2.1 % *(5)*	3.3 % *(10)*
Mean‡		7.77 (sd 2.50)	8.50 (sd 2.21)

Table 9: Level of satisfaction with health plan from CAPHS survey, where dissatisfaction equals low satisfaction (0-7). Child satisfaction is as reported by adult proxies.
* Please note all percentages are column percentages.
† p = 0.025 categorical by Chi Square test of homogeneity for adults vs. children.
‡ p < 0.0001 mean score by one-way analysis of variance for adults vs. children.

Univariate and Multivariate Logistic Regression Analyses

As previously mentioned, univariate logistic regression analyses were performed to examine associations between dissatisfaction and the predictor variables. These analyses were performed separately for adults and children. The cut-off for inclusion in the multivariate analysis is 0.25, as recommended by Hosmer and Lemershow.[28] The following section presents these results.

Adult Univariate Logistic Regression Results

Table 10 summarizes the univariate logistic regression results for adults. Thirteen variables reach the level of significance necessary for potential inclusion in the multivariate analysis ($p \leq 0.25$). These variables included Race ($p = 0.161$), Gender ($p = 0.229$), Age ($p = 0.016$), Eligibility Category ($p = 0.001$), Total Time on Plan ($p = 0.079$), General Health Status ($p = 0.141$), Down and Blue Health Status ($p = 0.072$), General Barriers ($p < 0.0001$), Barriers Related to Health Plan ($p = 0.001$), Ambulatory Visits from claims data measured continuously ($p = 0.145$), Preventive Visits from claims data ($p = 0.118$), Total Contacts from claims data measured categorically ($p = 0.087$) and continuously ($p = 0.030$), and Hospitalizations from survey data ($p = 0.118$). When variables were divided into more than two categories, only one of the categories needed to reach significance for the entire variable to be considered for inclusion in the multivariate analysis.

In general, there were few surprises in the univariate logistic regression findings. Whites were more dissatisfied, sicker persons were more dissatisfied, older persons were more satisfied, persons in the Medicaid expansion group were more satisfied than persons in the categorical eligibility groups, persons who were on the plan for shorter periods of time were more dissatisfied, persons who experienced barriers were more dissatisfied, and persons with more Ambulatory Visits or more Total Contacts were more likely to be satisfied than those with fewer visits.

Of note, women were more dissatisfied than men and persons with preventive visits were more dissatisfied than those without. However, the number of persons with preventive visits was small enough that this finding may be unstable. In addition, ER visits had no effect on satisfaction.

Table 10: Percent Dissatisfied by Respondent Characteristics for Adults

Characteristic:			% Dissatisfied (N)	P Value†
Race	White*		31.9 (52)	0.161
	Other		20.9 (9)	
Gender	Female*		33.3 (47)	0.229
	Male		25.8 (23)	
Age	Mean satisfied	42.85 years		0.016‡
	Mean dissatisfied	38.26 years		
Eligibility	Categorical Families or Children*		50.0 (25)	0.001
	Cat. Old Age, Blind, Disabled		36.4 (8)	
	Medicaid Expansion Group		23.4 (37)	
Enrollment History Total time on Plan	Mean satisfied	17.97 months		0.079‡
	Mean dissatisfied	16.85 months		
Geographic Region	Portland Metropolitan Area		29.5 (59)	0.426
	Other		36.7 (11)	
Health Status				
General	Good general health*		27.1 (38)	0.141
	Poor general health		36.5 (31)	
Down and Blue	Less Down and Blue*		26.5 (44)	0.072
	More Down and Blue		39.0 (23)	
Barriers				
General	No Barriers*		14.0 (16)	< 0.0001
	1 Barrier		27.0 (10)	
	2+ Barriers		64.6 (31)	
	No information		41.9 (13)	
Health Plan	No Barriers*		22.7 (29)	0.001
	Yes Barriers		54.3 (23)	
	No information		32.8 (28)	
Utilization—Claims				
Ambulatory Visits (cat.)	None*		32.2 (19)	0.674
	1-2		33.3 (23)	
	3+		27.5 (28)	
Ambulatory Visits (cont.)	Mean satisfied	3.65 visits		0.145‡
	Mean dissatisfied	2.53 visits		
ER Visits	None*		29.8 (56)	0.652
	1 or more		33.3 (14)	
Hosp. Admt.	None*		31.0 (67)	0.450
	1 or more		21.4 (3)	

(Continued)

(Table 10, continued from previous page)

Characteristic:			% Dissatisfied (N)	P Value†
Utilization—Claims				
Preventive Visits	None*		28.8 (59)	0.118
	1 or more		44.0 (11)	
Total Contacts (cat.)	None*		31.8 (7)	0.087
	1-3		35.3 (18)	
	4-7		35.6 (16)	
	8-13		38.3 (18)	
	14+		16.9 (11)	
Total Contacts (cont.)	Mean satisfied	13.28 visits		0.030‡
	Mean dissatisfied	9.04 visits		
Utilization—Survey (self report)				
PCP Visits	None*		32.6 (14)	0.677
	1-2		26.2 (17)	
	3+		32.0 (33)	
ER Visits	None*		28.7 (48)	0.368
	1 or more		35.1 (20)	
Hosp. Admits	None*		32.2 (66)	0.118
	1 or more		16.7 (4)	

Table 10: Percent of adults dissatisfied with health care according to respondent characteristics.
* Referent category.
† All p values are from Chi Square tests of independence, unless otherwise indicated.
‡ P value from one-way analysis of variance.

Adult Logistic Regression Multivariate Results: The Final Model

Table 11 reports the final multivariate logistic regression model for adults. The level of significance for inclusion in the final model was $p \leq 0.05$. Race and Age did not reach the 0.05 level of significance, however, because other studies have found these variables to be predictors of dissatisfaction, they were left in the model for adjustment purposes.

The final multivariate model for adults shows that General Health Status, General Barriers, and Total Contacts are associated with dissatisfaction with health plan in this study group.

- "Poor health status" is associated with a three fold increased odds of dissatisfaction as compared to those with a "Good health status" ($p = 0.004$).
- Encountering 1 barrier is associated with a three fold increased odds of dissatisfaction as compared to those who did not encounter any barriers ($p = 0.029$). Adults encountering 2 or more barriers have greater than an eleven fold increased odds of dissatisfaction when compared to those who did not encounter any barriers ($p < 0.0001$). Interestingly, adults who did not answer the barrier questions and adults who answered "no" to the screener questions have over a nine fold increased odds of dissatisfaction as compared to adults who reported not encountering any barriers to accessing health care ($p < 0.0001$).
- Adults with 14 or more contacts with the health care system in the previous six months were most satisfied with their health plan. Adults with one to thirteen contacts were almost four times as likely to be dissatisfied with their health plan ($p = 0.006$). Adults with no contacts with the health care system were two and a half times more

likely to be dissatisfied with their health plan than those with fourteen or more contacts, however this difference is not significant (p = 0.203).

Table 11: Predictors of Dissatisfaction in the Adult Survey Sample

Characteristic:		OR	95% CI†	P
Race	White	2.54	0.97 – 6.69	0.059
	Other*	1.00	--	--
Age¶	(years)	0.97	0.95 – 1.00	0.097
Health Status				
General	Good general health*	1.00	--	--
	Poor general health	3.44	1.50 – 7.92	0.004
Barriers				
General	No Barriers*	1.00	--	--
	1 Barrier	3.17	1.13 – 8.93	0.029
	2+ Barriers	11.34	4.53 – 28.41	< 0.0001
	No information	9.28	3.06 – 28.17	< 0.0001
Utilization—Claims				
Total Contacts	No Contacts	2.53	0.61 – 10.50	0.203
	1 – 13 contacts	3.80	1.47 – 9.81	0.006
	14 + contacts*	1.00	--	--

Table 11: Predictors of Dissatisfaction among Adult *CareOregon* Enrollee Survey Sample using logistic regression multivariate analysis. The model is adjusted for all variables shown.
* Referent category.
† The 95 percent confidence interval.
¶ The inverse of this odds ratio and confidence interval are 1.03 (OR) and 1.00 – 1.05 (95% CI).

Although Race and Age were also associated with dissatisfaction in the univariate logistic regression model, these variables were not significant in the final model. "White" race was associated with a two and a half fold increased odds of dissatisfaction relative to "Other" race (p = 0.059). For Age, every year increase in age represents a

three percent decrease in the odds of dissatisfaction (OR = 1.03, the inverse of 0.97; CI = 1.00 – 1.05; p = 0.097).

The final model accounted for 24 percent of the variation in the level of satisfaction variable, according to the Cox and Snell R squared value. This is a relatively high amount of variation explained compared to other studies.

Child Univariate Logistic Regression Results

Table 12 summarizes the univariate logistic regression results for child proxies. Eleven variables reach the level of significance necessary for potential inclusion in the multivariate analysis ($p \leq 0.25$). These variables include Race ($p < 0.0001$), Age ($p < 0.0001$), Age of Proxy ($p = 0.012$), Geographic Region ($p < 0.0001$), General Health Status ($p = 0.042$), Childhood Risk Questions Health Status ($p = 0.010$), General Barriers ($p = 0.045$), Health Plan Barriers ($p = 0.004$), Hospitalizations from claims data ($p = 0.172$), Preventive Visits from claims data ($p = 0.041$), PCP Visits from survey data ($p = 0.170$), and Hospitalizations from survey data ($p = 0.029$). As with adults, when variables were represented more than two categories, only one category needed to reach significance for the entire variable to be considered for inclusion in the multivariate analysis.

As with the adults, there were few surprises in the univariate logistic regression findings. Whites were more dissatisfied, sicker persons were more dissatisfied, persons who were on the plan for shorter periods of time were more dissatisfied, persons who experienced barriers were more dissatisfied, persons with hospitalizations were more dissatisfied, and persons with preventive visits were less dissatisfied.

Of note, older proxies were more dissatisfied than younger. Also, gender did not affect satisfaction, either of the child or of the proxy, and none of the claims utilization measures affected level of satisfaction. However, because the main hypothesis examines these variables, they were included in the initial multivariate analysis.

Table 12: Percent Dissatisfied by Respondent Characteristics for Children

Characteristic:			% Dissatisfied (N)	P Value†
Race	White*		36.8 (39)	< 0.0001
	Hispanic		10.8 (15)	
	Other		21.7 (5)	
Gender	Female*		24.0 (29)	0.449
	Male		20.2 (34)	
Gender Proxy	Female*		23.3 (55)	0.816
	Male		21.5 (7)	
Age	Mean satisfied	7.18 years		< 0.0001‡
	Mean dissatisfied	9.30 years		
Age Proxy	≤24 years*		14.8 (9)	0.012
	25 – 34 years		17.6 (21)	
	35+ years		31.7 (33)	
Enrollment History Total time on Plan	Mean satisfied	17.15 months		0.860‡
	Mean dissatisfied	17.03 months		
Geographic Region	Portland Metropolitan Area		17.3 (40)	< 0.0001
	Other		39.7 (23)	
Health Status General	Good health status*		20.5 (55)	0.042
	Poor health status		40.0 (8)	
Childhood Risk Questions	Normal risk*		17.9 (37)	0.010
	Increased risk		31.7 (26)	
Barriers General	No barriers*		20.7 (29)	0.045
	1 Barrier		20.0 (12)	
	2+ Barriers		40.6 (13)	
	No information		15.8 (9)	
Health Plan	No barriers*		20.5 (25)	0.004
	1+ Barriers		46.4 (13)	
	No information		18.0 (25)	
Utilization—Claims Ambulatory Visits (cat.)	None*		18.4 (18)	0.342
	1-2		25.5 (35)	
	3+		18.5 (10)	
Ambulatory Visits (cont.)	Mean satisfied	1.51 visits		0.875‡
	Mean dissatisfied	1.56 visits		

(Continued)

(Table 12, continued from previous page)

Characteristic:			% Dissatisfied (N)	P Value†
Utilization—Claims				
ER Visits	None*		22.1 (52)	0.778
	1 or more		20.4 (11)	
Hosp. Admt.	None*		21.3 (60)	0.172§
	1 or more		42.9 (3)	
Preventive Visits	None*		25.5 (47)	0.041
	1 or more		15.2 (16)	
Total Contacts (cat.)	None*		22.0 (11)	0.990
	1-3		22.5 (31)	
	4-7		19.7 (14)	
	8-13		24.0 (6)	
	14+		20.0 (1)	
Total Contacts (cont.)	Mean satisfied	3.53 visits		0.988‡
	Mean dissatisfied	3.54 visits		
Utilization—Survey (self report)				
PCP Visits	None*		14.9 (13)	0.170
	1-2		20.9 (19)	
	3+		27.1 (19)	
ER Visits	None*		22.0 (49)	0.966
	1 or more		22.2 (14)	
Hosp. Admits	None*		20.9 (58)	0.029§
	1 or more		50.0 (5)	

Table 12: Percent of child proxies dissatisfied with their health plan according to child enrollee and child proxy characteristics.
* Referent category.
† All p values are from Chi Square tests of independence, unless otherwise indicated.
‡ From one-way analysis of variance.
§ Small numbers complicate this measure.

Child Proxy Multivariate Logistic Regression Results: The Final Model

Table 13 reports the final multivariate model for child proxies. The level of significance for inclusion in the final model was $p < 0.05$. General Health Status and Preventive visits do not reach the 0.05 significance level. Because General Health Status has been found to be a predictor of level of satisfaction in other studies, it was left in the model as a control variable. Preventive Visits were also left in the model, despite not meeting the level of significance. This was done to adjust for the possibility that preventive visits might affect rates of dissatisfaction and also because this measure was the most significant of the utilization measures examined in this study.

The final multivariate model for child proxies shows that Race, Proxy Age, and General Barriers were associated with dissatisfaction with health plan for this study group.

- "White" race is associated with a four fold increased odds of dissatisfaction as compared to "Hispanic" race ($p < 0.0001$). "Other" race is not significantly different than "Hispanic" race ($p = 0.519$).
- Proxy respondents 35 years old or older had a two fold increased odds of dissatisfaction as compared with proxy respondents less than 35 years old ($p = 0.027$).
- Proxy's who reported encountering 2 or more barriers had a three fold increased odds of dissatisfaction as compared to those who did not encounter barriers ($p = 0.029$).

Table 13: Predictors of Dissatisfaction in the Child Proxy Survey Sample

Characteristic:		OR	95% CI†	P
Race	White	4.07	1.92 – 8.62	< 0.0001
	Hispanic*	1.00	--	--
	Other	1.51	0.43 – 5.28	0.519
Age Proxy	< 35 years old*	1.00	--	--
	≥ 35 years old	2.15	1.10 – 4.22	0.027
Health Status				
General	Good*	1.00	--	--
	Poor	2.66	0.82 – 8.62	0.103
Barriers				
General	No barriers*	1.00	--	--
	1 barrier	0.99	0.43 – 2.30	0.983
	2+ Barriers	2.99	1.13 – 7.92	0.029
	No information	0.78	0.31 – 1.97	0.601
Utilization				
Preventive	No Preventive Visits	1.85	0.82 – 8.62	0.103
Visits (Claims)	1 or more*	1.00	--	--

Table 13: This table presents the final multivariate model for child *CareOregon* enrollee survey respondents.
* = Referent category.
† The 95 percent confidence interval.

General Health Status and Preventive Visits were also associated with dissatisfaction, although these variables were not significant. "Poor" General Health Status was predictive of a two-fold increased odds of dissatisfaction (p = 0.103), and not having a preventive visit was associated with a two-fold increased odds of dissatisfaction (p = 0.103).

This final model explained 14 percent of the total variation observed in the level of satisfaction variable according to the Cox and Snell R Squared value.

DISCUSSION

The Main Hypothesis: The Influence of Utilization on Patient Satisfaction with Health Plan

In terms of the main hypothesis of this study, how prior utilization of health care services influences dissatisfaction with health plan when utilization is measured from an independent, retrospective source, this analysis found that utilization influences dissatisfaction for adults but not for child proxies.

For adults, persons having fourteen or more Total Contacts with the health care system were the most satisfied with their health plan. Persons with one to thirteen Total Contacts were more dissatisfied (OR = 3.80, p = 0.006). And persons with no contact during the study period were also more likely to be dissatisfied, though this difference was not significant (OR = 2.53, p = 0.203). Thus, for adults the relationship between utilization and satisfaction appears to be curvilinear, with initial contacts resulting in greater odds of dissatisfaction, but as more contacts accrue, contacts become protective of dissatisfaction.

If we assume that disconfirmation theory applies to this relationship, this finding suggests that for those individuals with little experience with their providers or plan, there may be a mismatch between expectations and experience, but for those with a high level of utilization expectations and experience begin to align. However, an alternative explanation is that it is not "Contacts" that are protective; but individual subgroup differences that explain the observed differences.

In contrast to adults, utilization of health care services had no significant effect on dissatisfaction with health plan for child proxies. The possible exception to this

finding is Preventive Visits, which appear to be protective against dissatisfaction, although this measure did not reach the conventional level of significance. This finding suggests that for child proxies the type of visit may be more important than a general measure of all utilization contacts.

Several variables included in this study may explain the different findings in the adult and child proxy respondent groups. First is the difference in utilization patterns between adults and children. As noted above, for adults fourteen or more contacts with the health care system during a six month period was associated with the highest level of reported satisfaction. Since very few of the child proxies in this study achieved this high level of utilization, it is not possible to test this relationship between level of utilization and satisfaction. In addition, it is possible that the use of proxies in the case of children obscured the observed relationship between utilization and satisfaction found among adult respondents reporting on their own experience of care. For example, a proxy's report may be influenced most strongly by his or her own personal contact with the health care system or health status as opposed to, or in addition to, that of his or her child. Since this study did not include cognitive testing, more work is needed to clarify this relationship in the case of proxy reports.

Additional Predictors of Dissatisfaction among Oregon Health Plan Enrollees

This study explored additional predictors of dissatisfaction among a sample of the Oregon Medicaid population, both for adult respondents and for adults acting as proxies on behalf of child enrollees. We found that, in addition to levels of utilization, race, age, health status, and perceived barriers were significant predictors of dissatisfaction.

Race—White race was found to be predictive of dissatisfaction among child proxies, a finding which has been confirmed in many other studies.[13,17] Among children for whom their race/ethnicity was reported, being of Hispanic race is more protective against dissatisfaction than "Other," although this difference is not significant ($p = 0.52$). The mechanism by which race contributes to dissatisfaction is not known, although it is possible that this finding is tapping into differences in expectations about health care. It may be that we are observing high levels of gratitude among parents for whom their child's health care coverage is a benefit that they do not personally experience. For adults, White race is predictive of dissatisfaction, though this variable does not achieve the conventional level of significance. Lack of variability and small numbers of non-whites may have contributed to this finding.

Age—Age of proxy is predictive of dissatisfaction with older proxies being more dissatisfied than younger. As mentioned previously, Proxy Age and Child Age interfered with each other in the final model, most likely due to older adults having older children. Therefore, the age of the child was also associated with dissatisfaction, with older children being more likely to be among the dissatisfied group. It may be that parents are relatively satisfied with the care their children receive while they are young and receiving a comprehensive range of preventive services, however, as children age and receive fewer preventive visits, we may be observing a linear relationship between age and satisfaction with satisfaction declining as age of parent increases.

It is not clear why older proxies experience greater dissatisfaction. At first this finding appears to be in contrast with the usual finding for adults, that is the younger adults tend to be less satisfied. It may be that older children, pre-pubescent and adolescents bring new challenges to parents that are less amenable to the interventions

of health professionals. Previous research has found that older adults (age 60+) generally report higher levels of satisfaction and the *CareOregon* sample contained very few older adults. Therefore, the more homogenous age distribution of this sample may be masking the effects of age as an explanatory variable.

Health Status—This study found that poor health status was associated with dissatisfaction among adults but not for children. The relationship between poor health status and low satisfaction has been observed in previous satisfaction studies.[5] The causal path is unknown, although it has been suggested that individuals in poor health are generally less positive because of their illness. This study adds to our knowledge about how illness may contribute to level of satisfaction by demonstrating that increasing numbers of health care contacts may initially lead to dissatisfaction, but as the numbers of overall contacts increases beyond a certain level of intensity, satisfaction actually increases to an extremely high level.

For child proxies, the health status of the child was not a significant predictor of dissatisfaction, though the trend was for proxies with sicker children to be more dissatisfied. The lack of significance may be in part due to the small number of children with poor health status. It would also be interesting to know the health status of the proxies because it is possible that the health status of the proxy may be a more important predictor of their level of satisfaction than the health status of their child.

Barriers—The study found that persons who reported experiencing barriers to care were more likely to be dissatisfied with their health plan than those reporting no barriers. This finding applied to both adults and to child proxies, though there were some interesting differences between adults and child proxies relative to this variable. First, adults' level of dissatisfaction increased in an additive fashion as the number of

barriers encountered increased. For child proxies, the experience of barriers was only predictive of dissatisfaction when two or more barriers were encountered.

It appears that child proxies are more tolerant of the barriers they face in gaining timely access to the health care system than adults. This finding may be influenced by the heavy concentration of Hispanic children in this sample and the "gratefulness" factor mentioned earlier.

It is important to remember that this variable was included in the model in order to look for evidence that disconfirmation theory may apply to health care. More specifically, it was included as a measure of the expectation that individuals have about access to health care and whether these expectations are related to level of satisfaction with one's health plan. The finding that persons who reported experiencing barriers that prevented them from accessing the medical care they sought were more dissatisfied with their health plan than those who did not report barriers, supports the hypothesis that expectations about timely access to needed services do influence level of satisfaction in a demonstrable way. This finding supports the application of disconfirmation theory to health care.

Utilization Patterns in the Study Sample

It is worth noting that the adults in this study sample used a lot of health care. Adults averaged three ambulatory visits in a six month period and children averaged one and a half visits during this same time frame. The Total Contacts averages were even higher. Further, almost 20 percent of the sample had been to the emergency room in the last six months, and between three and ten percent had been hospitalized. These

rates are high, and raise questions about the possible bias in the study sample. They also raise questions about whether the findings in this study can be generalized to other populations, and if so, what populations.

It is interesting to note that in contrast with other health care services, preventive services appear to be significantly under utilized in this sample. Only ten percent of adults and 35 percent of children had record of a preventive visit in the last 6 months. However, these figures may be underestimates of the true number of preventive services received for several reasons. First, this measure looks only at a six month window. If most people receive preventive services on an annual basis, this study would at best capture 50 percent of all preventive visits. In addition, coding practices also encourage an under-representation of preventive services in claims data. Providers have a tendency to code visits as ambulatory instead of preventive if a preventive service was provided on the same day as an ambulatory visit. However, in spite of these caveats, preventive visits are still quite low. It has been found in other studies that Medicaid recipients are less likely to receive preventive services than their commercial counterparts.[30] Thus, this finding suggests the need to further explore this issue in future research with a Medicaid population.

Variables Not found to Contribute to the Model

Several variables were not found to contribute to the model, despite evidence from other studies that suggested that they would. For example, length of time on plan did not contribute to the level of satisfaction in this study. The average length of time on the plan was fairly long for all survey respondents, and, therefore, it is possible that there was not enough variation in this measure to contribute to the model. In addition,

gender did not contribute to the model as expected for adult respondents. Third, eligibility category, which was included as marker for SES and health care access in this study, did not contribute to the final model. Our hypothesis was that OHP expansion group, between 60-100% of FPL and not formerly covered under Medicaid before the implementation of the OHP might be more grateful for coverage. In the univariate logistic regression analysis, this group was significantly different from those categorically eligible in terms of satisfaction level. However, in the multivariate analysis, after controlling for age, race, health status, barriers and utilization, the variable was no longer significant. A disproportionately large percentage of the adult respondents in this sample belonged to the OHP expansion group eligibility category, therefore, it is possible that eligibility category fell out of the model due to their overrepresentation in the sample.

Measuring Utilization

One of the strengths of this study was the availability of claims data as a measure of health care utilization. Few other studies have used retrospective claims data to evaluate this question. Studies looking at the accuracy of self-reported utilization have found that this information is affected by recall and, therefore, is not always accurate.[11] Claims data also have limitations. For example, they are limited to information about services for which the health plan was billed. Any services obtained outside of the system will not be included. However, given that the people represented in this database are Medicaid recipients, it seemed likely that most services would be obtained through their health plan. Another advantage of claims data is that the date of service is well defined, and thus it is possible to know with relative certainty when a

service was provided. Another advantage of claims data is the availability of information about all health care services utilized, not just provider visits in different settings. In this study, this additional information was used to create a measure of "Total Contacts" with the health care system, a measure that might be difficult to ask study subjects to measure unless it were done prospectively. In addition, because claims data are collected for administrative purposes, the data must be audited in order to correctly count encounters. This process can be time consuming and is dependent on the definitions developed to measure any particular type of service or encounter with the system.

Limitations

This study has several limitations. First of all, the study sample is relatively small, especially after being divided into two sub-groups. Larger studies are needed to confirm the findings of this study.

In addition, although this study attempted to look for evidence that disconfirmation theory applies to health care, the variables used were not created specifically for this purpose. Therefore, these findings are preliminary and suggest that further research is needed to better understand the relationship between expectations and experience.

Another limitation is that utilization was measured only for a six month period. It would also be interesting to look at different, perhaps longer, time periods to see what impact a broader utilization profile would have on the observed findings. Studies looking into this question would be a valuable addition to the literature.

This study also simplified the utilization-satisfaction relationship by only studying one aspect of this relationship. However, in order to more definitively answer this question studies are needed which measure utilization and satisfaction at several points in time and analyze the results for changes over time.

Concluding Observations

This study found that overall health care utilization did influence the level of satisfaction for adults, though not for child proxies, with low levels of health care utilization resulting in greater levels of dissatisfaction, and higher levels of utilization resulting in greater levels of satisfaction. This finding suggests that the relationship between utilization and satisfaction may not be linear. Satisfaction studies of adults should be adjusted for level of utilization, especially when comparing health plans whose members have different utilization behaviors. It does not support the need for this adjustment in studies of child proxies.

This study also provides some data that suggests that disconfirmation theory may apply to health care, though further work is needed to confirm these findings.

Implications for Medicaid Managed Care

The findings of this study have several important implications for Medicaid managed care. First, this study demonstrates that relevant information can be learned about a managed care population by merging self-reports of experience with health care with claims data. This study demonstrates only one use of such data, however, for companies interested in addressing the needs of their members, this process represents a method of uncovering population needs that otherwise might not have been recognized.

Next, this study finds that the member factors that influence satisfaction in commercial populations also influence satisfaction in Medicaid populations. Race, for example, accounts for significant differences in satisfaction. Similarly, eligibility may influence one's experience of health care and satisfaction. The mechanism by which these influences occur is unknown, but Medicaid managed care organizations, especially ones that serve diverse populations, need to be aware of them and address them when appropriate.

Finally, as this study shows, heavy health care utilizers have different experiences of health care than others. Future research is needed to determine the operative factors and, if possible, to apply any findings to the appropriate populations.

REFERENCES

1. Sitzia J, Wood N. Patient Satisfaction: A Review of Issues and Concepts. *Social Science Medicine*. 1997;45(12):1829-1843.

2. Aharony L, Strasser S. Patient Satisfaction: What We Know About and What We Still Need to Explore. *Medical Care Review*. Spring 1993;50(1):49-79.

3. Hays RD, Shaul JA, *et al*. Psychometric Properties of the CAHPS 1.0 Survey Measures. *Medical Care*. 1999;37(3):MS22-MS31.

4. Marquis MS, Davies AR, Ware JE. Patient Satisfaction and Change in Medical Care Provider: A Longitudinal Study. *Medical Care*. August 1983;21(8):821-829.

5. Linn MW, Linn BS, Stein SR. Satisfaction With Ambulatory care and Compliance in Older Patients. *Medical Care*. June 1982;20(6):606-614.

6. Lochman JE. Factors Related to Patients' Satisfaction with their Medical Care. *Journal of Community Health*. Winter 1983. 9(2):91-109.

7. Newsome PRH, Wright GH. A Review of Patient Satisfaction: 1. Concepts of Satisfaction. *British Medical Journal*. February 27, 1999;186(4):161-165.

8. Hall JA, Feldstein M, *et al*. Older Patients' Health Status and Satisfaction With Medical Care in an HMO Population. *Medical Care*. March 1990;28(3):261-270.

9. Pasco GC. Patient Satisfaction in Primary Health Care: A Literature Review and Analysis. *Evaluation and Program Planning*. 1983;6:185-210.

10. Hall JA, Dornan MC. Meta-analysis of Satisfaction with Medical Care: Description of Research Domain and Analysis of Overall Satisfaction Levels. *Social Science Medicine*. 1988;27(6):637-644.

11. Gross DA, Zyzanski SJ, *et al*. Patient Satisfaction with Time Spent with Their Physician. *Journal of Family Practice*. August 1998;47(2):133-137.

12. Ware JE, Davies AR. Behavioral Consequences of Consumer Dissatisfaction with Medical Care. *Evaluation and Program Planning*. 1983;6:291-297.

13. Zastowny TR, Roghmann KJ, Cafferata GL. Patient Satisfaction and the Use of Health Services. *Medical Care*. July 1989;27(7):705-723.

14. Allen HM, Darling H, *et al*. The Employee Health Care Value Survey: Round One. *Health Affairs*. Fall 1994:25-41.

15. Comstock LM, Hooper EM, *et al.* Physician Behaviors That Correlate With Patient Satisfaction. *Journal of Medical Education*. February 1982;57:105-112.

16. Cleary PD, McNeil BJ. Patient Satisfaction as an Indicator of Quality Care. *Inquiry*. Spring 1988, 25:25-36.

17. Tucker JL, Kelley VA. The Influence of Patient Sociodemographic Characteristics on Patient Satisfaction. *Military Medicine*. January 2000. 165:72-76.

18. Carlson MJ, Blustein J, *et al.* Socioeconomic Status and Dissatisfaction Among HMO Enrollees. *Medical Care.* 2000;38(5):508-516.

19. Linder-Pelz S. Toward a Theory of Patient Satisfaction. *Social Science Medicine.* 1982;16:577-582.

20. Soh G. Patient Satisfaction with Physician Care. *Hawaii Medical Journal*. April 1991;50(4):149-152.

21. Zaslavsky AM, Beaulieu ND, *et al.* Dimensions of Consumer-Assessed Quality of Medicare Managed-Care Health Plans. *Medical Care*. 2000;38(2):162-174.

22. Crofton C, *et al.* Forward. *Medical Care*. 1999;37:MS1-MS9.

23. Harris-Kojetin LD, *et al.* The Use of Cognitive Testing to Develop and Evaluate CAHPS 1.0 core survey items. *Medical Care*. 1999;37:MS10-MS21.

24. Macro International Inc. 1998-1999 Medicaid Consumer Satisfaction Survey: Oregon CAHPS Survey Report. Unpublished data. June 29, 1999.

25. Hanes P. *et al.* OHP Parent Satisfaction Survey. Unpublished data. March, 1998.

26. CAHPS 1.0 survey and reporting kit. Rockville, MD: Agency for Health Care Policy and Research; 1998.

27. Gawande AA. *et al.* Does dissatisfaction with health plans stem from having no choices? *Health Affairs*. 1998;17:184-194.

28. Hosmer DW, Lemeshow S. Applied Logistic Regression. John Wiley & Sons, Inc., New York, 1989.

29. Hanes P. *et al.* Oregon Consumer Scorecard Project Final Report. Department of Health and Human Services. Report #282-93-0036. Agency for Health Care Policy and Research; 1996.

30. Nolan PA. Primary Prevention with the Poor: Structural Conflicts between the Health and Welfare Systems. *Journal of Health & Social Policy*. 1989;1(1):99-103.

APPENDIX A:

This appendix provides a detailed explanation of the method used to count health care service utilization from the *CareOregon* claims data.

Each claim record contains information about the service provided for which the insurance company is billed. This information includes what service was provided, who provided it, to whom it was provided, when it was provided, why it was provided, the cost for the service, and occasionally where it was provided.

Numeric codes are used to designate what procedure was performed. Current Procedural Terminology (CPT) codes are a nationally recognized system for coding and billing health care services. These codes indicate specific health care services and are used by most providers and insurance companies across the nation. **Table A1** provides an overview of the general CPT code categories. Level I codes are used nationally and include Evaluation and Management (E&M) codes which specify history taking and physical examination services. E&M codes often specify the general location in which a service was provided, for example, whether it was in a hospital, an emergency room (ER), a clinic or another setting. Health Care Financing Administration Common Procedure Coding System, or HCPC codes, are designated at the state level for procedures not listed in the Level I CPT codes. The Level II codes are designed to allow states flexibility and many of these codes are used to designate title grant programs, such as the Women, Infants, and Children (WIC) program, and family planning programs. HCPC codes always start with a letter whereas CPT codes consist of a five-digit number. Thus, from one of these codes it is possible to tell with some level of precision what service was provided.

In addition to CPT codes, Revenue codes are another coding system used to designate the general location in which a service was provided, whether it was a hospital, an ER, or a clinic. Revenue codes are intended for use in conjunction with CPT codes, however, Revenue codes are not used regularly. On occasion, hospitals and ERs will use Revenue codes instead of CPT codes.

Table A1: Overview of Current Procedural Terminology (CPT) Codes

Category:	Code:
Level I codes:	
1. Evaluation & Management Codes (E&M)	99201 – 99499
2. Anesthesia Codes	00100 – 01999
3. Surgery Codes	10120 – 69436
4. Radiology Codes	70110 – 77430
5. Pathology and Laboratory Codes	80049 – 89051
6. Medicine Codes	90700 – 99195
Level II codes	
1. HCPCS	A0000 – Z9999

Table A1: Overview of Current Procedural Terminology (CPT) from the American Medical Association.

For purposes of this thesis, all *CareOregon* claims for the survey respondents were identified and limited to the six months immediately prior to the survey. This time period was selected in order to coincide with the recall period used in the CAHPS survey.

Duplicate records were removed and the remaining records were examined for the presence of the CPT codes listed in **Table A2**. The majority of these codes are CPT E&M code which specify the location in which a service was provided. HCPC codes designating Family Planning services were also included. Records found to have one of these specified codes were labeled according to the groupings in **Table A2** as either "Ambulatory Visits," " Preventive Visits," "ER Visits," "Hospitalizations," "Other Visits" or "Unsure."

Table A2: Standard CPT Evaluation and Management (E&M) codes for various provider visit types[†]

Ambulatory Visits	New Patient	99201 – 99205
	Established Patient	99211 – 99215
	Office Consult	99241 – 99245
	Prolonged Office Visit	99354 – 99359
Preventive Visits	New Patient	99381 – 99387
	Established Patient	99391 – 99397
	Counseling only	99401 – 99429
ER Visits	ER Care	99281 – 99285
Hospitalizations	Hospital Admission	99221 – 99223
	Hospital Subsequent Care	99231 – 99236
	Hospital Discharge	99238 – 99239
	Hospital Consultation	99251 – 99255, 99261 – 99263
	Hospitalized Neonate	99295 – 99298
	Normal Newborn care	99431 – 99440
Other Activities	Nursing Home Care	99301 – 99333
	Home Visit	99341 – 99350
Unsure	Observation Status	99217 – 99220 (ER or Hosp)
	Confirmation Consultation	99271 – 99275 (Any setting)
	Critical Care	99288 (ER or Hosp)
	Critical Care	99291 – 99292 (Any setting)
	Other unlisted service	99499
	Family Planning grant	FPSxx (prev or amb)

Table A2: This table provides a list of the standard Current Procedural Terminology (CPT) codes initially used to identify visit types in the *CareOregon* claims data.

Records without one of these specified codes were examined for the date on which the service was provided. If a record without a specified code occurred on the same day as another record with a specified code, the record with the unspecified code was excluded from future calculations. The reasoning for this exclusion was that the unspecified procedures were likely to be the result of the specified procedure and therefore should be considered part of the specified procedure visit.

[†] From: The American Medical Association. CPT 2001: Current Procedural Terminology. AMA Press, Chicago, IL. 2001.

For example, if someone has a physical and blood work is drawn as part of that visit, the blood work is part of the provider visit and should not be counted as a separate visit. Both the visit and the blood work appear in the claims record, though only the visit should be counted.

If a record without a specified code occurred on a unique day, the record was labeled as being an "Other Activity."

"Unsure" records were manually examined and recoded into one of the other categories using any clues provided by the record. "Other Activity" records were further examined according to the following:

Many laboratory and pathology services have delayed dates of service. For example, pap smears are billed according to the day they are read by the pathologist, not the date they were collected. Also, many labs are billed according to the day they were analyzed in the laboratory, not the day they were drawn. In addition, many radiology procedures are billed according to the day they are read by the radiologist and not the day the exam was performed. Thus, an x-ray taken in an office as part of an office visit will have a record in the claims database usually 1-2 days after it was taken, reflecting the date it is read by the radiologist. Also, cultures are billed according to the day the culture is finished and not the day on which it is submitted. Thus, all "Other Activity" records with laboratory, pathology and radiology services were excluded from further counts if they occurred 1-2 days after a specified service. Cultures, pap smears, and biopsy results were excluded unless they occurred more than 10 days after a specified service.

In addition, it became clear from the claims database that ophthalmologists do not use E&M codes for office visits; instead they use the procedure code for eye exams.

These codes, then, were added to the list of "Ambulatory visits" codes. Also, it was discovered that births are not billed using E&M codes. Instead the appropriate CPT code for the birth is used. Birth CPT codes, therefore, were added to the list of codes counted as "Hospitalizations."

Also, there were some records without CPT codes. The majority of these records were discovered to be pharmacy claims. These records were designated "Pharmacy" visits.

A hand full of records without CPT or HCPC codes were not pharmacy claims. These records were usually paired with a Revenue code and were almost exclusively hospitalizations or ER visits. Thus, in the case of a missing CPT code, a Revenue code could be used to designate a hospitalization or ER visit. Each of these records was manually examined.

In addition, if records with specified codes occurred on the same date, these records were reviewed, and if the activities appeared to be unrelated, each one was counted separately. For example, if someone had an ambulatory visit for a physical and later in the day had an ER visit for a bone fracture, each visit was counted separately. If the records appeared to be related, then the higher acuity visit was counted. For example, if someone was seen in the office for an asthma attack and then seen in the ER also for an asthma attack, then only the ER visit was counted. If the person was then admitted to the hospital, only the hospitalization was counted, but the person was also marked as having had an emergency room visit in the dichotomous variable only. This procedure probably resulted in some undercounting of visits, however, this situation occurred rarely.

As discussed in the body of this paper, preventive services were infrequently found. This may be partially due to a coding issues whereby providers often code as "ambulatory visits" visits that include both preventive and non-preventive services. Services such as mammograms and immunizations were included in the counts of preventive visits for this analysis.

Using this procedure, the measures described in the text were created. **Table A3** provides a full list of all CPT, HCPC and Revenue codes used for each of these variables. Please note that codes initially labeled as "Unsure" in previous tables may appear in this table more than once because specific records may have been counted towards different categories.

Table A3: Codes used to Designate Various Health Care Service Utilizations in this Study

Ambulatory Visits		
CPT Codes	New Patient	99201 – 99205
	Established Patient	99211 – 99215
	Office Consult	99241 – 99245
	Prolonged Office Visit	99354 – 99359
	Other Misc. Procedures	10120 – 90862
	Ophthalmologic services	92002 – 92015
HCPC Codes	Family Planning Grant	FPS14 – FPS16
Rev Codes	Clinic service	510
Preventive Visits		
CPT Codes	New Patient	99381 – 99387
	Established Patient	99391 – 99397
	Counseling only	99401 – 99429
	Immunizations	90707 – 90782
	Mammogram	76091 – 76092
HCPC Codes	Family Planning Services	FPS13 – FPS16
ER Visits		
CPT Codes	ER Care	99281 – 99285
Rev Codes	Rome Charges	450, 981
Hospitalizations		
CPT Codes	Hospital Admission	99221 – 99223
	Hospital Subsequent Care	99231 – 99236
	Hospital Discharge	99238 – 99239
	Hospital Consultation	99251 – 99255, 99261 – 99263
	Hospitalized Neonate	99295 – 99298
	Normal Newborn care	99431 – 99440
	Obstetrical Delivery	59400 – 59410
	Observation Status	99218
	Critical Care	99291
	Surgical Repair of Fracture	27814
Rev Codes	Room Charges	11x, 12x, 13x, 14x, 15x, 17x, 20x, 21x, 22x, 72x
Other Activities		
CPT Codes	Nursing Home Care	99301 – 99333
	Home Visit	99341 – 99350
	Radiology Services	70551 – 77336
	Lab and path services	80048 – 88141
	Medicine services	90780 – 99218
	Other Miscellaneous Proc.	15829 – 67875
	Chemical Dependency Tx.	BA310 – BA385
	Psychotherapy	90804 – 90815
	Physical Therapy	97001 – 97550

Table A3: The list of final Current Procedural Terminology (CPT) codes used to define each type of visit or other health care utilization activity in this study.

APPENDIX B

Comparison of Self-report and Claims data

Table 8, found in the body of this report, provides a comparison of the utilization measures collected from claims data and from the CAHPS survey. As previously stated, it appears that it is more likely for claims reports to be lower than self-report. Of note, other authors have found a tendency for self-report to underreport visits.[‡]

Table B1 provides another view of this data, using two-by-two tables and providing correlation coefficients. Looking at adults only, for ER visits, Spearman's rho correlation coefficient is 0.54 ($p < 0.0001$), for Hospitalizations it is 0.44 ($p < 0.0001$), and for Ambulatory Visits, it is 0.40 ($p < 0.0001$). Thus, although the measures significantly correlate with each other, they agree only 40 to 54 percent of the time. Notice that for ER visits and hospitalizations it is more common for people to report a visit that is not found in claims data than it is for a visit to be found in claims data but not reported by the individual. However, both types of miss-matches occur. The data are more difficult to interpret for Ambulatory visits. However, it is clear that many disagreements occur.

These figures raise questions about the accuracy of each reporting method and whether or not it is possible to tell which one is better. For example, these data may be evidence that the *CareOregon* database does not capture all health care visits or it may be evidence that respondents tend to over-report visits.

[‡] Lorig KR. *et al.* Evidence Suggesting that Chronic Disease Self-Management Programs Can Improve Health Status while Reducing Hospitalization. *Medical Care.* 1999;37(1):5-14.

Without a gold-standard it is not possible to completely answer this question, however, I elected to review all hospitalizations in the study to see if any further data could be gleaned from this situation. The information that follows suggests that self-report data may be affected by recall-bias, however, further study is needed to confirm this finding.

Table B1 : Utilization Comparison, Adults

		ER Visit Claims	
ER Visit Survey	No ER visits	1+ ER visits	
No ER visits	160	9	
1+ ER visits	28	31	
Survey Hospitalizations		**Hospitalizations Claims**	
	No Hospitalizations	1+ Hospitalizations	
No Hosps.	203	5	
1+ Hosps.	16	9	
		Ambulatory Visits Claims	
PCP Visits Survey	No Visits	1-2 visits	3+ visits
No Visits	25	11	8
1-2 Visits	14	28	24
3+ Visits	13	27	65

Table B1: Utilization comparison for adults using two-by-two tables.

Of the 530 survey respondents who answered the question about whether or not they had been hospitalized, 488 of the records agreed that no hospitalizations occurred (92.1%), 14 records agreed at least one hospitalization occurred (2.6%), and 28 records did not agree (5.3%), with 21 persons reporting hospitalizations that were not found in claims and 7 persons denied hospitalizations that were found in claims. **Table B2** presents an overview of this information.

Table B2: Utilization Comparison, Hospitalizations for All Survey Respondents

Survey Hospitalizations	Hospitalizations Claims		
	No Hospitalizations	1+ Hospitalizations	Total
No Hosps.	488	7	495
1+ Hosps.	21	14	35
Total	509	21	530

Table B2: Compares utilization as reported by self-report and claims data.

For each of the 28 records in which the survey and claims data disagreed, the raw claims data were reviewed for evidence of the correct categorization. The results of this analysis are outlined in **Table B3**. As shown, all but one of the cases in which claims reported a hospitalization not confirmed by the individual, the claims record is quite clear that a hospitalization occurred. In most cases, the claims record showed that the person had been in the hospital for several days or that they had delivered a baby. The one claim-reported hospitalization that is not clearly a hospitalization is for a delivery that may have occurred at home.

Looking next at the self-reported hospitalizations that were not found in the claims report, the claims data show that several of these individuals clearly have an ER visit or a day surgery, however, there is no clear evidence of a hospital admission. Other members have no evidence of any of these events, however, they have medical problems that could have caused a hospitalization at some point. One person, for example, was clearly pregnant though the records does not include evidence of a delivery. In each of these cases, it seems possible that these individuals were hospitalized either right before or right after this time period. Another possibility is that they had admissions for which *CareOregon* was not billed, however, this scenario seems unlikely given that these individuals should not have another form of medical insurance.

Table B3: Detailed Comparison of Hospitalizations

Member ID	Hospitalization reported by:	Evidence Favors:	Comments:
1xxxxxxx	Survey	Claims	ER visit, no hospitalization
2xxxxxxx	Claims	Claims	Definite hospitalization
3xxxxxxx	Survey	Claims	No evidence of admit, but pregnant
4xxxxxxx	Survey	Claims	ER visit, no hospitalization
5xxxxxxx	Survey	Claims	Asthma, no hospitalization
6xxxxxxx	Survey	Claims	ER Visits, day surgery, no hospitalization
7xxxxxxx	Survey	Claims	ER visit, no hospitalization
8xxxxxxx	Survey	Claims	Asthma, no hospitalization
9xxxxxxx	Survey	Claims	Multiple medical problems, no hospitalizations
10xxxxxx	Survey	Claims	Multiple office and medical problems, no admissions
11xxxxxx	Survey	Claims	Multiple ER visits, mult. medical problems. No admits
12xxxxxx	Survey	Claims	Only one visit claim, ambulatory
13xxxxxx	Survey	Claims	Day surgery, no hospital admits
14xxxxxx	Survey	Claims	Day surgery, no hospital admits
15xxxxxx	Survey	Claims	ER visit, no hospitalizations
16xxxxxx	Survey	Claims	Multiple med problems, no admits
17xxxxxx	Survey	Claims	Day surgery, no hospital admits
18xxxxxx	Claims	Claims	Definite hospitalization
19xxxxxx	Claims	Claims	Definite hospitalization
20xxxxxx	Survey	Claims	Cancer in situ, biopsy done
21xxxxxx	Claims	Claims	Obstetrical Delivery
22xxxxxx	Claims	?	Obstetrical delivery, but may have been a home birth
23xxxxxx	Survey	Claims	Multiple medical problems, no admissions
24xxxxxx	Survey	Claims	Multiple medical problems, no admissions
25xxxxxx	Survey	Claims	No visit claims
26xxxxxx	Claims	Claims	Obstetrical Delivery
27xxxxxx	Claims	Claims	Definite hospitalization
28xxxxxx	Survey	Claims	ER visit, no hospitalization

Table B4: Results of a detailed claims review of all hospitalizations either reported by the CAHPS survey (Survey) or found in claims data (Claims).

Therefore, there is ample evidence that sometimes when people report hospitalizations they have confused ER visits and day surgeries with hospitalizations and that sometimes people forget to report hospitalizations that clearly happened to them. Both of these observations support the accuracy of claims records over self-report for purposes of the analysis in this study.