STIMULATING HEALTHCARE ORGANIZATIONAL IMPROVEMENT THROUGH PUBLIC REPORTING OF SMOKING CESSATION ADVICE RATES

BY

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DISSERTATION

Submitted in partial fulfillment of the requirements For the degree of Doctor of Philosophy in Community Health In the Graduate College of the University of Illinois at Urbana Champaign, 2010

Champaign, Illinois

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ABSTRACT

The purpose of this study was to evaluate a novel method of instituting quality improvement among hospitals in the area of smoking cessation through publicizing poor performance. Smoking cessation was used as an indicator due to its impact on the health of our population, evidence base and also because of availability of data. The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) specified “smoking cessation advice and counseling” as a process measure of the quality of care for acute myocardial infarction, congestive heart failure, and pneumonia in 2004. This measure includes patients who are given any sort of advice about stopping smoking while they are in the hospital. Nationally in 2005 few hospitals reached a goal of 100% compliance to the JCAHO smoking cessation measures. Failure of hospitals to comply with evidence based medicine is problematic and reflects poorly upon their image. With this in mind, in an effort to improve those rates, we proposed a novel study in which we randomized and informed California hospitals of their smoking cessation performance and offered to help them improve their advice rates. We also let the treatment hospitals know that we would publicize their performance in a year in local print media as incentive for the hospitals to improve. This component of the study is based on a broader application of protection motivation theory, emerging research on how the threat of public health quality reporting can stimulate improvement and the push-pull-capacity model of improvement. Over one year the control sites had a significantly higher increase in smoking cessation advice rates. The end adherence rate was 94% overall (compared to an initial rate of 88%). This study demonstrates a secular trend of improvement and the impact collection of JCAHO data has on hospital performance in all areas of care, likely via financial incentives.
To my Father, Mother and Sister
Acknowledgements

Many people contributed to my thesis and provided me with motivation and encouragement to continue striving towards my academic goals.

I would first like to thank Dr. C. Barr Taylor. Dr. Taylor has advised me for 10 years starting from undergraduate research at Stanford University, masters work at Dartmouth and finally on my doctoral work. It is Dr. Taylor’s innovative ways of thinking to bridge medicine, public health and research that motivate my career aspirations. I cannot thank him enough for all of his support over the years. Darby Cunning at Stanford University was another instrumental person in this research. I also am fortunate to have Dr. Reginald Alston chair my committee and motivate me locally. He never let me lose hope in my academic endeavors and went to great lengths to be an amazing chair. Dr. Notaro is a dear friend and mentor. From my first day in the department, he has been an ally and motivator. Finally on my committee, Dr. Juhee Kim has been a pleasure to work with and I admire her enthusiasm.

I also want to thank John T. Cullinan at the Joint Commission for providing me with the data used in this research. From the Medical Scholars Program, I want to thank Dr. Nora Few, Executive Assistant Dean, for all of her motivation and support.

Finally, I thank family who made all of this possible. My Father, Dr. Gauri C. Das reminded me of the importance of education and helped me through tough times with his words. My Mother, Chinmayee, reminded me of the importance of hard work, persistence and faith. My sister, Dr. Snigdha Das, is my best friend has always been a role model for my work and a continued support. Finally, Dr. Aravind Ramachandran has been a dear partner and support in the last couple years of my work.
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CHAPTER I

INTRODUCTION

Statement of Issue, Magnitude of Problem

According to the Centers for Disease Control (CDC), cigarette smoking is still the leading preventable cause of death in the United States and is responsible for roughly one out of every five deaths each year (Centers for Disease Control and Prevention, 2002; Centers for Disease Control and Prevention, 2005). Interestingly, it is estimated that more deaths are caused each year by tobacco use than by all deaths resulting from human immunodeficiency virus (HIV), illegal drug use, alcohol use, motor vehicle injuries, suicides, and murders combined (Centers for Disease Control and Prevention, 2002; McGinnis & Foege, 1993). Aside from mortality, The CDC’s Morbidity and Mortality Weekly Report (MMWR) states that approximately 440,000 people in the United States die of a smoking-attributable illness, resulting in 5.6 million years of potential life lost and $82 billion in lost productivity from smoking (Centers for Disease Control and Prevention, 2002). Furthermore, the CDC estimates that more than 8.6 million people in the United States have at least one serious illness caused by smoking, thereby making cigarette smoking a continued major reason for hospitalization (National Center for Chronic Disease Prevention and Health Promotion, 2008). Finally, for every person who
dies of a smoking attributable disease, there are 20 more people suffering with at least one serious smoking attributable illness.

As a result of the extensive health consequences of smoking, it has long been a national health issue in the United States. It is of such great interest that the Department of the Surgeon General has focused on the topic for over 50 years. The movement started in 1957 when Surgeon General Leroy E. Burney declared the official position of the U.S. Public Health Service: they determined that evidence pointed to a causal relationship between smoking and lung cancer. Soon after in 1961 the American Cancer Society, the American Heart Association, the National Tuberculosis Association, and the American Public Health Association voiced their concerns to President John F. Kennedy. As a result the Kennedy administration took an interest in the issue and in 1962 the then recently appointed Surgeon General Luther L. Terry announced that he would convene a committee of experts to conduct a comprehensive review of the scientific literature on the smoking issue. From 1962 to 1964 this committee reviewed more than 7,000 scientific articles with the help of over 150 consultants. They released a report: *Smoking and Health: Report of the Advisory Committee to the Surgeon General*. This report held cigarette smoking responsible for a 70 percent increase in the mortality rate of smokers over non-smokers, estimated that average smokers had a nine- to ten-fold risk of developing lung cancer compared to non-smokers (heavy smokers had at least a twenty fold risk) and named smoking as the most important cause of chronic bronchitis, pointing to a correlation between smoking and emphysema, and smoking and coronary heart disease. Prior to this in 1958, a Gallup Survey conducted found that only 44 percent of Americans believed smoking caused cancer; this rose to 78 percent by 1968. Another
major action occurred in 1965 when Congress required all cigarette packages distributed in the United States to carry a health warning. Finally in 1970 cigarette advertising on television and radio was banned (US National Library of Medicine, 2006). The public image of smoking is becoming more and more negative and the public expects health care communities to take action.

Since the 1964 report, 30 more reports on tobacco use have originated from the Surgeon General, with the most poignant and recent report in 2004. The 2004 Surgeon General’s report states that, “As in many areas of public health, there is a need to improve the dissemination, adoption, and implementation of effective, evidence-based interventions, and to continue to investigate new methods to prevent and reduce tobacco use.” (Centers for Disease Control and Prevention, 2005) There is a need for this research today at all levels of health. We have seen many public smoking bans and preventative measures. Unfortunately public health still lacks in implementation of effective, evidence based interventions to help current smokers quit, especially those who are severely addicted and smoking the most. Just as all of the historical developments discussed were at a national level, there needs to be a national approach using local frameworks. The setting of this framework can be in hospitals.

**Reasons for Smoking Cessation in the Hospital Setting**

*Better Outcomes:* National policy recommendations recognize the benefit of using hospitalization as a teachable moment for tobacco use cessation. While there are an abundance of outpatient smoking cessation services available, the prevalence of inpatient
programs is fairly limited; there is a gap between the availability of proven interventions (discussed later) for tobacco use cessation and their dissemination into the United States health care system. This is problematic for two reasons. First, smoking causes coronary heart disease (CHD), which is the second leading cause of death in the United States. Heart Disease is also the leading diagnosis of hospital inpatients in the United States (Hosp Health Netw, 2002). Cigarette smokers are two to four times more likely to develop coronary heart disease than nonsmokers, have double the risk of having a stroke and are more than 10 times as likely as nonsmokers to develop peripheral vascular disease. This is of great importance as cardiovascular related issues are the top reason for hospitalization in the United States (DeFrances & Hall, 2007). Since smoking causes illness, and those illnesses create the highest hospitalization rate, it is very important to reach inpatients who smoke. While the health circumstances are unfortunate, the large number of hospitalized smokers offers a perfect setting and situation for quitting, so that patients can exit the smoking-illness-hospitalization cycle.

**Figure 1: Smoking/Illness/Hospitalization Cycle**
Evidence shows that even a single comment from a physician increases the likelihood of one quitting smoking (Fiore, 2000).

Another reason that smoking cessation advice/counseling for inpatients is so important is because of the specialized setting of a hospital stay. During a hospital stay, a former smoker is a captive audience and does not have the option to smoke due to hospital smoking bans (Longo, Brownson, & Kruse, 1995). Furthermore, the patient may attribute their illness to smoking, heavily influencing their willingness to quit (Emmons & Goldstein, 1992; Munafo, Rigotti, Lancaster, Stead, & Murphy, 2001). The psychological impetus to intervene in the hospital combined with the health influences is more than enough reason to push for inpatient cessation programs.

**Economic Reasons:** Not only are there benefits of inpatient smoking cessation on health, but on economic levels as well. The total annual public and private health care expenditures caused by smoking was $96.7 billion in 2006, (not including the $4.98 billion in annual health care expenditures resulting from second-hand smoke). Lost productivity due to tobacco use exceeds $97 billion (Centers for Disease Control and Prevention, 2007). In terms of cost effectiveness, implementation of the Agency for Health Care Policy and Research (AHCPR) guidelines (that all physicians at least offer a simple statement that the patient quit smoking at all clinical encounters) would cost $6.3 billion to implement in its first year. However, society would gain 1.7 million new quitters at an average cost of $3779 per quitter, $2587 per life-year saved, and $1915 for every Quality Adjusted Life Year (QALY) saved. Compare this to treating mild hypertension ($11,300) or hypercholesterolemia ($65,511) for a single patient (Eddy, 1992). These findings show that smoking cessation interventions in the clinical setting
are extremely cost effective (Cromwell, Bartosch, Fiore, Hasselblad, & Baker, 1997). On a larger scale, smoking attributable expenditures are at $75,488 million, about 8% of total medical expenditures (Warner, Hodgson, & Carroll, 1999). Given that health care is a major topic in government spending, reducing tobacco related illness is important for the United States economy overall. Therefore, implementation of an effective intervention has significant economic advantages both on an individual, hospital and national level. The National Commission on Prevention Priorities recently reported that by implementing tobacco use screening and interventions into standards of care would save as many quality-adjusted life-years as closing existing gaps in the delivery of all other adult clinical preventive services recommended by the U.S. Preventive Services Task Force combined (M. V. Maciosek et al., 2006a; M. V. Maciosek et al., 2006b). In terms of quality improvement, implementation of guidelines increases productivity for hospitals and also ratings; it is also in the best interest of the hospital to offer smoking cessation advice.

Guideline requirements: Clearly smoking cessation programs in hospitals benefit patients, the hospital and health care. Continuing on the topic of a national setting for improvement, the most current national guidelines were issued by The Public Health Service in partnership with other organizations including the Robert Wood Johnson Foundation, the Agency for Healthcare Research and Quality and the Centers for Disease Control and Prevention. These evidence-based practice guidelines released in 2000 entitled Treating Tobacco Use and Dependence, recommend that every hospitalized patient identified as a smoker be offered tobacco dependence treatment. In an effort to increase adherence to guidelines, the National Committee for Quality Assurance (NCQA)
and Joint Commission on Accreditation of Healthcare Organizations (JCAHO) instituted
an expansion of performance measures for hospitalized (and other) patients, requiring
that the tobacco use of all patients admitted to the hospital be assessed and that patients
interested in quitting be offered tobacco use counseling and pharmacotherapy. The
United States Department of Health and Human Services and the Institute of Medicine
have also put forth guidelines and directions for instituting hospital cessation programs
(National Cancer Policy Board, Institute of Medicine and National Research Council,
1998). The Agency for Health Care Policy and Research (AHCPR) Smoking Cessation
Guideline Panel published recommendations that clinicians provide smoking cessation
services with pharmacotherapy at every clinical encounter with a patient. This
recommendation was based on a comprehensive and systematic literature review. Finally,
a Cochrane Review meta-analysis to determine the effectiveness of interventions for
smoking cessation in hospitalized patients found that intensive intervention (inpatient
contact plus follow-up for at least one month) was associated with a significantly higher
quit rate compared to control (Peto Odds Ratio 1.82) (Munafo et al., 2001) thereby
adding to the widespread base of support. The implementation of these guidelines could
have large effects on the reach and cessation rates of ill smokers in addition to hospital
quality.

**Example of a Successful Inpatient Smoking Cessation Program**

Of greatest interest to this study are JCAHO guidelines. The JCAHO guidelines
were developed in part because tobacco use cessation programs have been shown to be
effective. An example of a successful inpatient smoking cessation program that fully meets these guidelines is *Staying Free*; this program includes a strong message delivered by a physician, relapse prevention behavioral-counseling, access to NRT, and follow-up calls (Taylor et al., 1996). The *Staying Free* program is a part of this research study’s methods.

*Theoretical Model:* The theoretical model is a blend of social cognitive learning theory, transtheoretical stages of change, relapse prevention and nicotine dependence models (Taylor, Houston-Miller, Killen, & DeBusk, 1990; Taylor et al., 1996). From a social learning theory perspective (Bandura, 1977), an effective smoking cessation program should include information about the risks of smoking, the benefits of not smoking, the methods of stopping and realistic expectations of outcome, instruction from a credible authority (e.g., a physician, nurse or other health care professional) providing an unequivocal prescription to stop smoking or not resume smoking, and successful performance of the skills important to cope with the personal, behavioral, and environmental determinants of smoking. These skills include learning to resist urges to smoke in high-risk situations and using nonsmoking strategies to cope with them, returning to nonsmoking if relapse occurs, being able to identify changes in strength of confidence and identify coping strategies during these times, including social and family support.

The final theory involved in *Staying Free* is the well known transtheoretical model of change or rather, stages of change theory (Prochaska & DiClemente, 1983). This theory states that people are in different stages of readiness to change a health behavior; as a result, interventions must be tailored to deliver the full benefit. The stages
for smoking cessation are below. A smoker must go through the stages in Table 1 (often in a non linear fashion):

Table 1: Stages of Change Model in Smoking Cessation

<table>
<thead>
<tr>
<th>Pre contemplation</th>
<th>Contemplation</th>
<th>Preparation</th>
<th>Action</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>The smoker is not even considering quitting</td>
<td>The smoker is actively considering quitting</td>
<td>The smoker is preparing to quit in the next 30 days and is taking steps towards that</td>
<td>The individual is in successful cessation mode</td>
<td>Cessation has been maintained for 6 months.</td>
</tr>
</tbody>
</table>

The *Staying Free* program is most appropriate for those in the preparation stage where smokers are motivated to quit. For patients hospitalized in the contemplation stage, motivational interviewing is applied to move them into the next stage later or reduce the amount they smoke, but not the full intervention (Houston Miller & Taylor, 1995). To address smoking cessation advice in hospitals in general, hospitalized smokers are more likely to be in contemplation or preparation as a result of their illness and situation. Any form of the advice is helpful to move them through the stages of change, even if that advice is a single sentence.

*Success of Program:* Cessation rates with *Staying Free* patients hospitalized with a myocardial infarction were up to 70% at 1 year, compared with 45% to 53% among the nontreatment groups. Two follow up studies were also conducted and equally successful (Miller, Smith, DeBusk, Sobel, & Taylor, 1997; Taylor et al., 1990). A more recent implementation study produced quit rates of 26.3% (Taylor, Miller, Cameron, Fagans, & Das, 2005). Therefore, intense programs can be effective; their implementation is required. However, even simple systematic advice at the bedside is beneficial.
Evidence there is Room for Improvement

Despite all of the research, success, evidence and recommendations put forth, evidence shows that enough is not being done in the hospital setting. A meta-analysis of 33 studies from 1994 to 2006 found that 60% of inpatients in those studies had their smoking status assessed and only 42% of patients were advised to quit smoking. The gap in the performance AND delivery shows the need for hospital institutional action.

The most convincing proof of failure to meet evidence based guidelines is also provided by JCAHO (Joint Commission on Accreditation of Healthcare Organizations); it is one of the regulatory agencies mentioned in the last section. JCAHO recently examined their standardized performance measures from 2002 to 2004. They found that among the 18 measures studied, the most dramatic improvement was observed in the three measures of counseling for smoking cessation (Williams, Schmaltz, Morton, Koss, & Loeb, 2005). This was a promising indicator, but though there was improvement at individual hospital sites, there were still a large number of hospitals not meeting the 100% rate goal, a goal that is feasible. While clinical outcomes (like mortality) are difficult to control, process measures such as offering smoking cessation advice can be guaranteed to occur.

Furthermore, while an improvement can be noted, the absolute contact rates for smoking cessation advice and counseling are well below the evidence-based benchmark of 100% (American Hospital Association, 1991). In 2005, when the last official JCAHO report was published, United States hospitals fell short of that goal: 82% advice with acute myocardial infarction patients, 66% advice with heart failure patients, and 61% advice with pneumonia patients (Williams et al., 2005).
JCAHO findings are national and based on heavily research measures. In order to
develop their performance measures, JCAHO used a thorough process involving a
content specific technical expert panel, stakeholder input, rigorous testing and
development of precise technical specifications. All measures were submitted to the
National Quality Forum (NQF) for review and endorsement. The validity of the measures
and the accuracy of national collection strengthen the claim that hospitals are actually
falling short.

The JCAHO reports are not perfect though. The current conditions may be worse
than reported estimates in that there may be over reporting of rates. That is, with the
advent of electronic medical records, healthcare organizations may make it easy to check
a box that advice has been given. At the veterans administration hospitals for example,
there is a checkbox system on inpatient intake forms that must be checked for all smokers
indicating that smoking cessation advice has been given. As a result, the veterans’
administration hospitals have 100% advice rates on JCAHO surveys. This may inflate the
“progress” we see in smoking cessation advice rates.

Given the widespread health benefits of inpatient smoking cessation
advice/counseling, more needs to be done to create an even more dramatic change. One
reason for the low rates of contact may be that the clinician is unable to advise and
counsel all patients in need due to time constraints, or lack of a systematic
identification/treatment system in the hospital. Another issue may be that clinicians are
offering advice, but it is not documented. Other possible reasons for the lack of 100%
rates currently can be attributed to lack of funds to pay staff, lack of an administrative
advocate, and difficulty fitting the an actual program into provider goals/routines
(O'Loughlin, Renaud, Richard, Gomez, & Paradis, 1998). Policy changes, system changes and the need to address quality are added concerns in implementation of smoking cessation program (Hollis et al., 2000).

Finding a New Approach to Close the Gap

Regardless of the reason, there is a clear deficit in hospital quality as measured by an indicator as simple as smoking cessation advice. Over the last decade, the Institute of Medicine has recognized this and other indicators and noted that quality needs to be improved in health care in general. The Institute of Medicine released To Err is Human (1999) and Crossing the quality chasm (2001), landmark documents trying to answer the questions of how to ignite quality improvement. For example, the IOM created new rules to improve quality and safety, while driving market share to high-performing providers. One of these rules for transformed healthcare system was for there to be transparency of performance related information, including information to help patients select health plans, clinicians, and hospitals and participate in shared decision-making. This may be the solution to closing the quality gap in smoking cessation and will be the basis of this study.

Scope of this Research; Justification for Smoking Cessation Research in General

While health care in general needs improvement in all areas, smoking cessation is the focus of this study. As mentioned earlier, it has a huge impact on health, has proven
solutions and is relatively “easy” to meet guidelines. In addition to these reasons, smoking cessation is a quality indicator of interest because there is a need for renewal in smoking research. It was the “hot topic” of the public health research community during the 1990’s and prior to that. As was noted earlier, it was in the late 1950’s and in 1964 in particular that the Surgeon General, Luther Terry, issued the first Surgeon General’s Report on Smoking and Health. It is true that the research initiated over 40 years has led to significant reductions in smoking prevalence. This was so much the case that tobacco use reduction has been heralded as one of the top public health successes of all times (Centers for Disease Control and Prevention (CDC), 1999a; Centers for Disease Control and Prevention (CDC), 1999b).

More recently there has been a distinct shift in the focus of the health community as to what is appealing; obesity is the most fashionable topic today as the rising modern day epidemic. With 33% of men and 35% of women in the United States obese, the CDC attributes many diseases to obesity including hypertension, osteoarthritis, dyslipidemia, type II diabetes, coronary heart disease, stroke and so on. As a result of statistics and trends such as these, funding and interest has shifted to obesity. According to Healthy People 2010, two of the national health objectives are (1) to reduce the prevalence of overweight and obesity among adults to less than 15% and (2) to reduce the prevalence of obesity among children and adolescents to less than 5%.

Furthermore, many entities feel that smoking and smoking related illnesses are issues that have been resolved. Obesity researchers refer to the tobacco success as an issue of the past and a public health achievement to learn from (Byers & Sedjo, 2007; Daynard, 2003; Mercer et al., 2003). It has been argued that the health research
community has a (erroneous) tendency to only focus on one major health issue at a given
time while there should be more synergistic approaches (D. Yach, McKee, Lopez, &
Novotny, 2005a; D. Yach, McKee, Lopez, & Novotny, 2005b). It is true partially that the
base of research is well established for smoking cessation so that little methods research
is needed. It is also true that smoking reduction has advanced in the last forty years.
However the improvements are still not enough in the areas of program implementation
and helping current smokers quit.

Improvement is needed because smoking and tobacco use continues to be a major
national health issue. A recent MMWR indicated that in 2006, approximately 20.8% of
U.S. adults were current cigarette smokers. They noted that this rate had not changed
much since 2004, suggesting a stall in the previous 7-year (1997-2004) decline in
cigarette smoking among adults in the United States. The MMWR attributes the lack of a
decline in cigarette use during those years to less funding for comprehensive state
programs for tobacco control and prevention (decreased by 20.3% from 2002 to 2006)
(Centers for Disease Control and Prevention, 2002). Both the newest information about
the smoking decline stall and about those with smoking related conditions indicate that
the public health research focus shift is premature. To continue Healthy People 2010
included 27 tobacco related objectives, one of which was the goal of reducing adult
That time period has almost passed and the smoking rate is only at 20.8%, not to mention
stagnant. There needs to be more done now and there needs to be renewed interest in
smoking cessation research/implementation. A place where that improvement is still
seriously lacking is in the hospital setting (Centers for Disease Control and Prevention
Combining emerging concepts of quality improvement in reporting transparency with older, established methods of smoking cessation may help create new improvements and may serve as a model for other healthcare quality indicators. This study intends to advance smoking cessation research where it is needed most: Inpatient implementation.

A New Approach

The ultimate goal of this study was to encourage improvements by all hospitals in California to implement and evaluate their inpatient smoking cessation efforts. We did this by dividing all hospitals in the state into control and treatment regions, with treatment regions facing publicity of JCAHO smoking cessation data. The concept of randomizing a state’s hospitals is a new type of intervention. We are also utilizing public reporting quality data in a new way. Creation of JCAHO’s Quality Check helped to develop the database in this study. While there still is some JCAHO data processing to do in this study, prior to the development of this database one would have to manually download individual portable documents for each hospital and extract the data. This is an excellent research tool which should be utilized.

Next, the approach used in this intervention is quite novel: we inform hospitals of their performance and forthcoming publicity on the topic while offering a way to improve their performance. Quality improvement is at the forefront of organized healthcare and smoking cessation advice/counseling at the bedside is a core measure of inpatient quality. Not to mention research has led to a vast amount of evidenced based medicine guidelines
for it (Fiore, 2000). Optimistically we hope that hospitals are at least encouraging their providers to give brief advice to quit smoking at the bedside since that is the bare minimum proven to be effective in research (Center for the Advancement of Health, 2008). The intervention is meant to increase adoption of a specific smoking cessation methodology, increase provider training and hospital level practices that promote smoker identification and programs. A map of the activities and goals is in Figure 2.

**Figure 2: Model of change proposed in study**
Purpose, Research Questions and Hypotheses

The purpose of this study is to test a novel method to increase inpatient smoking cessation rates in California hospitals by presenting them with publicity of JCAHO performance data.

Research Question 1 will be part of the Intervention Study in the Methods chapter. Research Questions two and three will be a part of the Research Analysis of JCAHO Data section in the Methods chapter.

Research Question 1: Does the threat of public reporting of smoking cessation rates affect hospital performance in this area?
Hypothesis: When faced with public reporting of JCAHO smoking cessation rates in local media in a year, treatment hospitals will significantly improve their performance compared to control hospitals

Research Question 2: What factors affect a hospitals smoking cessation rates and change in those rates?
Hypothesis: This is an exploratory analysis intended to find what, if any, hospital characteristics are stronger in predicting improvement. Factors include bed size, length of stay, revenue and discharges.

Research Question 3: What effect does the existence of JCAHO performance measures have on Hospital Quality (as defined by those measures)? If there is an effect, what areas of care are most impacted?
Hypothesis 3a: Over a two year period, hospitals in California will demonstrate improvement in JCAHO smoking cessation advice rates.
Hypothesis 3b: Over a two year period, performance on all measures assessed by JCAHO will improve.

Hypothesis 3c: Hospitals will show greater improvements in performance for measures that assess process rather than outcome. (Smoking cessation advice is an example of a JCAHO process measure.)
CHAPTER 2

PRIOR RESEARCH

This chapter reviews literature on health care quality and public reporting as a means for improving quality.

**Conceptual and Theoretical Framework: Public Reporting and Berwick**

It was mentioned in the introduction that the IOM is emphasizing transparency and reporting of performance to move in a positive quality improvement direction. Dr. Berwick, an expert in health care change and quality improvement argues that quality improvement leads to change and systems resist change. Therefore, change requires some discomfort and tension (Berwick, 2002). Public reporting of performance data can be the stressful catalyst of that change. Public reporting does have the potential to improve health care quality through remediation where the provider improves in response (Werner & Asch, 2005).

According to Berwick and colleagues’ framework for quality improvement, public reporting can lead to performance improvement through two pathways, which are interconnected by a provider’s motivation to maintain or increase market share (Berwick, 2002). These are shown in Figure 2.
Through selection, patients can compare publicly released performance data and reward higher performing providers by choosing them. Through the change (or quality improvement) pathway, performance data help providers identify areas in which they underperform and improve their performance (Marshall, Shekelle, Leatherman, & Brook, 2000). A third pathway of improvement has been proposed: concern for public image or reputation (Hibbard, Stockard, & Tusler, 2005a). It has been believed that the motivation to change is driven by a desire to protect public reputation or market share. Furthermore reports must be widely disseminated to the public and must be easily understandable so that the public report can actually motivate improvement. To further formalize the theory applied in this study, we refer to protection motivation theory.

**Protection Motivation Theory**
It was mentioned by Berwick that to produce change there must be discomfort. Protection Motivation Theory (PMT) developed by Rogers in 1975 is actually more of an individual health behavior theory but can be applied to Berwick’s school of thought. It is based on fear appeals and persuasive communication, with an emphasis on the cognitive processes mediating behavioral change. The theory was formalized by Rogers in 1983 based on the work of Lazarus (1966) and Leventhal (1970) (Rogers, 1983). It entails adaptive and maladaptive coping with a health threat as a result of two appraisal processes: threat appraisal and coping appraisal. An individual considers behavioral options to diminish the threat (Boer & Seydel, 1996). The responses can be either positive or negative or not present at all (negative). In the case of smoking cessation for example, a hospitalized patient may see a threat to their health. They may choose a maladaptive response like smoking more because they figure that they have already ruined their health. They may choose a positive adaptive strategy like choosing to quit in the hospital. Or they may do nothing at all (continue smoking) which is also negative.

There are four components of PMT that influence actions:

1) Perceived severity of the threat
2) Perceived probability the threat will actually occur
3) The efficacy of the positive preventive behavior
4) The perceived self efficacy that the individual can adhere to the recommendations.

In the smoking example, a patient may assess 1) the severity of lung cancer, 2) the chance that they will develop cancer, 3) the effect that quitting smoking will have on lung cancer and 4) their own efficacy to be smoke free.
Figure 4 summarizes the model in question.

Figure 4: Protection Motivation Theory: Source: Rogers, 1983

While PMT is designed for use to alter and study individual health behavior, it is also conceivable that PMT can be applied as a theory of organizational change, especially with hospitals today. (PMT has been used to study change of individual employee behavior in an organization, but not with the organization as the unit of study to date. (Welbourne, 1994)) Prior research cited earlier suggests a hospital may receive bad publicity, less profit, less shareholder interest and so on as a result of public reporting of their quality (if it is bad). As a result, that hospital would either choose act adaptive (make positive changes) or not act at all. (It is doubtful they would turn to maladaptive behavior). The four areas to consider are 1) the severity of the threat of public reporting, 2) the chance that public reporting will occur, 3) the usefulness quality improvement may have on this and 4) the chances that the organization will be able to implement such changes.
There needs to be motivation to change behavior. It has been thought that financial motivation works best. While JCAHO accreditation is not financial, per se, performance is related to perception and perception is related to financial gain. This is also a reason for the publicity portion of the proposal; by publicizing JCAHO scores, we anticipate that hospitals will want to be portrayed favorable since the public perception may change their client base. The concept of this motivation is based on fear of financial loss (Rubenstein & Pugh, 2006). Motivation can also be the awareness of public image in the Berwick model.

Motivation: The importance of partnerships and stakeholders

Partnerships are essential to progress and implementation of evidence based medicine. They need to be, “between members of the health services research community, such as research funding organizations, academic and educational organizations, and scientific journals. They also include partnerships between the health services research community and non research-centered organizations, such as those concerned with healthcare delivery, community interests, and policy,” as shown in Figure 5. We, the writers of this proposal, aim to provide the services of the Health Services Research Community affecting both hospitals and the public.
A way to promote change is to remind hospitals of their stakeholders. “Focusing on strategic aspects is important for several reasons. First, EBM is often promoted as a way to improve organizational performance, especially in the area of providing legitimate services and thus organizational effectiveness. For these reasons, an organization seeking to increase its credibility among stakeholders will be motivated to implement EBM (Hovmand & Gillespie, 2008). All of these influences/stakeholders motivate change.

To continue, the goals of improvement at different levels (patient, provider, system) are not independent. Linking them together, “arises from our conviction that healthcare will not realize its full potential unless change making becomes an intrinsic part of everyone’s job, every day, in all parts of the system. Defined in this way, improvement involves a substantial shift in our idea of the work of healthcare, a challenging task that can benefit from the use of a wide variety of tools and methods.” (Batalden & Davidoff, 2007) Quality Improvement is a way of thinking and this shift is setting the stage for projects such as the one set forth in this proposal.

JCAHO’s publication “From Frontline to Front Office” considers organizational competition as ways to start change. Health care leaders “are cognizant of their local and
regional competition, of the trend toward pay-for-performance reimbursement, and of the special requirements imposed by outside agencies such as the Joint Commission (www.jcaho.org), CMS (www.cms.hhs.gov), and the National Committee for Quality Assurance (www.ncqa.org). They are also scanning the environment for powerful emerging forces that will shape the industry such as the IOM (www.iom.edu) and their special reports on quality and safety, the coming avalanche of gold-standard quality metrics promulgated by the NQF (www.qualityforum.org), and the work of high-profile health care organizations such as the Institute for Healthcare Improvement (IHI; www.ihi.org).” The publication cites, a “diverse collection of accreditors, licensors, and regulators create an environment of rules, requirements, and measurements that exert a profound shaping effect on health care professionals and organizations.” (Joint Commission Resources, 2005)

In 2003 the Institute of Medicine noted a significant gap between evidence-based care and actual practice in hospitals; the report also mentioned the potential benefits for the nation’s health and burden if the gap is closed (Adams & Corrigan, 2003). Addressing Evidenced Based Medicine and improving health should be the first motivator of change. Another motivating factor for health care organizations to implement smoking cessation programs is the increase in the patient satisfaction. Studies have found a direct relationship between the intensity of smoking cessation services and patient satisfaction (Keller, Fiore, Curry, & Orleans, 2005).
Push-Pull-Capacity Model: All Encompassing Theory

Much of the change theory described thus far contributes to only one component of this study. A model which helps to unite the theories is the “Push-Pull-Capacity” model of organizational change. This model was developed by the Robert Wood Johnson Foundation and the Center for the Advancement of Health. Developed for tobacco cessation research, this theory asserts that the healthcare organization must want to change or at least be receptive (pull) while external influences need to help provide resources and incentive to improve (push). Before development of this theory, dissemination research focused mostly on push without acknowledging pull (the stakeholders) (C. T. Orleans, Gruman, & Anderson, 1999; C. T. Orleans, 2003)(Green et al., 2006). A graphical representation of the model is in Figure 6 (Curry, 2000). Using this diagram, we have the same goal of increasing the adoption, reach and impact of smoking cessation evidence based guidelines. The push is based on that evidence that there are proven inpatient smoking cessation programs (France, Glasgow, & Marcus, 2001; Rigotti, Munafo, Murphy, & Stead, 2003; Smith, Reilly, Miller, DeBusk, & Taylor, 2004). The market pull is portion of the model that had previously been ignored; it is the incentive to change. Using Berwick theory, public reporting and publicity is a pull for health care to change. Finally the capacity component is what we hope to help healthcare organizations develop: By offering free training to implement smoking cessation methods, we offer those resources to individually counsel organizations so that they can implement based on their infrastructure.
Flaws in Public Reporting Framework

There are a few flaws in the emerging conceptual framework of quality improvement and public reporting. First, currently the public rarely seeks performance data (Hibbard, Stockard, & Tusler, 2005a; Hibbard, Stockard, & Tusler, 2005b). This may be due to lack of interest or difficulty in understanding. Another issue is access. Our strategy intends to make the public easily aware of hospital performance by publishing the quality results in the local general newspapers. Few health consumers likely check sites such as a performance website, but do likely refer to their local newspaper on a daily basis. We also are utilizing JCAHO quality data, which is well researched and user friendly.

In a recent study critiquing public reporting as a means for change, the authors found three key elements for success in the realm of public reporting to enhance hospital
improvement. The first is the need to disseminate information. The second is the need for consistency and finally the third is for evaluation (Hibbard, Stockard, & Tusler, 2005a). Luckily the JCAHO performance reports are consistent and continually evaluated. What is lacking is dissemination. However with the easy accessibility of the reports online, dissemination has strong potential, especially if the public is made more aware through media.

Another reason previously cited for why processes and outcomes may be slow to change is the inability to switch providers because constraints related to insurance or travel (Schneider & Lieberman, 2001). While public reporting is available for the healthcare consumer, how likely is it that they will actually act upon the information they learn? An underlying assumption in the literature is that consumer choice is required for public reporting to stimulate quality improvement among plans and providers (Marshall et al., 2000). However, this is not necessarily needed. Consumer choice is important but public image has a large effect as well (Hibbard, Stockard, & Tusler, 2005b). While this is something to consider in designing a study that tries to measure the impact of public reporting, it is important to acknowledge the role that the healthcare organization has in the process. In this study it will be proposed that we assess hospital responses to public reporting, rather than the consumer response. While the consumer may face constraints in their health care choices, the hospitals should still try to improve already to increase performance and overall market share, perhaps as dictated by insurance. It is also thought that patients have interest in a hospital or provider recommended to them by their provider or close associates. As a result of this, quality and image do matter as they influence advice provided to patients.
Another problematic thought is that consumers are unaware of the differences in hospital quality. In a survey of consumers, 60% of respondents thought that hospitals do not differ in safety or quality (Berwick, James, & Coye, 2003). Consumers define quality medical care differently from experts and industry leaders; and most often attribute quality of care to access, cost, having a choice of physicians and position qualifications (Hibbard, Stockard, & Tusler, 2005b). Consumers need to be made more aware.

There is also confusion at the hospital level. In a study among several hospital administrators and leaders in California, it was found that they doubted publicly released comparative data because a belief that they lacked legitimacy. However the concept of public report did tend to lead to action. Furthermore it was found that what gets measured gets attention (Davies, 2001). Therefore in choosing a measure of interest, it must be legitimate and worthy. Health care administrators take JCAHO very seriously and based on all of the evidence, smoking cessation advice is a worthy measure.

The next flaw is that it has been argued that public reporting may be a destructive approach to improving quality, causing antagonism, removal of services and other consequences. Some suggest public reporting to providers only, but also comment that such an approach might warrant distrust from the public. The best strategy balances the dilemma of public reporting by allowing hospitals time to improve performance before public reports are easily accessible to the public. Referring to Figure 5, the antagonism is reduced by offering a partnership.

Finally there is also concern that little research has been done in this field. A major criticism in the literature is that little research actually examines the effect of public reporting on the delivery of healthcare. We hope to change this. The public release
of performance data has been proposed as a mechanism for improving quality of care via transparency and greater accountability of health care providers (Lansky, 2002). Prior to this decade, the role of public reporting on quality improvement was unclear. In 2000, Marshall, et al performed a systematic review on the use and impact of publicly released performance data and found that data were limited but that hospitals responded to data (Marshall et al., 2000). A similar 2001 systematic review concluded that publicly reported performance data did not meaningfully affect decision making, quality improvement activity, or competition (Schauffler & Mordavsky, 2001). The most recent review in 2008, included 45 articles published since 1986 that evaluated the impact of public reporting on quality. They found that evidence is scant, particularly about individual providers and practices that rigorous evaluation of many major public reporting systems is lacking but that overall evidence suggests that publicly releasing performance data stimulates quality improvement activity at the hospital level. Unfortunately the authors comment that most of the studies included in their review were small, limited in reliability and used the same non-national quality reporting measures (Fung, Lim, Mattke, Damberg, & Shekelle, 2008).

**Gap between evidence and implementation**

While there is a large evidence base and many recommendations surfacing in the literature, there is still a gap in the step of implementation of EBM. This was described in the introduction and will be expanded upon here. Translation has been emphasized by the IOM, yet scientists have been “slow to realize” methods to actually implement
(Rubenstein & Pugh, 2006). Initially, EBM was meant to help individual clinicians make better evidence-based decisions. Seeing the potential of this approach for closing the evidence–practice gap, various organizations including many specialty societies, the Cochrane collaboration and Agency for Healthcare Research and Quality (AHRQ) have also used EBM techniques to inform their audiences. The resultant products—systematic reviews and practice guidelines—are made available to a group of physicians to aid them in making evidenced-based decisions for their patients. More recently, the focus has shifted from the individual to the organization. This is likely due to the provider burden. While there are many individuals providing smoking cessation at the bedside, it may not be done systematically or completely. This is not a necessarily a reflection of the provider; they may have too many responsibilities and not enough time as a result of stringent healthcare. Ironically, it would be beneficial to these systems to provide counseling to patients to decrease costs in the future and make the physician encounter simpler; a patient that does not smoke has fewer comorbidities.) Therefore there is a conflict between physician burden caused by the organization and the organization needing this service as showing in Figure 7. For this reason, it would be best have a systematic built in method of smoking cessation advice, a formal program. Making smoking cessation a standardized measure is a mode of building it into the process.
The reason for lack of implementation has long been blamed on organizational factors and the potential for disruption. Improvement requires disruption and may initially result in decline in performance. “On the surface, it seems reasonable to expect better interventions to yield better performance. However, experience and theory show that this does not always happen. Effective implementation often demands changes in resource flows, processes, and sometimes values. When implementation disrupts the very features of an organization that made it successful, organizational performance can decline.” This is why hospitals may resist change (Joint Commission Resources, 2005) and any improvement efforts should allow a hospital to change at their own pace and within reasonable limits.
In order to properly mark quality improvement, measures are required (Nelson et al., 2000). Health care quality is difficult to measure. However, with the definition of “better practices,” organizations such as the AHRQ (Agency for Healthcare Research and Quality) find that quality improvement is now more tangible. Furthermore, they suggest that quality indicators can be divided into input counts (structure and process) and output (outcomes). Unfortunately measuring quality presents a whole new burden. As a result, the IOM and other national organizations set forth to find out how to better measure quality in hospitals (Institute of Medicine, 2000).

In 1999, following the Institute of Medicine’s (IOM) National Roundtable Discussions and the publication of Crossing the Quality Chasm (Institute of Medicine, 2001) healthcare quality grew to be of great interest. It became clear that the quality of health care is variable and often inadequate (Jencks, Huff, & Cuerdon, 2003). As a result, initiatives to measure quality data grew including those documented by JCAHO. Until recently, there was no national database of healthcare quality; the Centers for Medicare and Medicaid Services (CMS), the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), the American Hospital Association, and consumer groups such as the American Association of Retired Persons, initiated an effort now called the Hospital Quality Alliance (HQA). The initial database focused on acute myocardial infarction, congestive heart failure, and pneumonia. Data became available on the Internet in late 2003 for the CMS (at www.cms.hhs.gov) and in July 2004 for JCAHO (at www.qualitycheck.org).
A national landmark in hospital quality measurement occurred in 2002, when JCAHO implemented improved performance measures in their accreditation process for over 3000 hospitals. Furthermore, as part of the new accreditation process, JCAHO instituted “Quality Check” in 2004, a web-based resource that provides Hospital Quality Reports for the public and health care professionals. In Quality Check, hospitals’ results are compared to the results of all Joint Commission accredited hospitals using performance symbols; scores range from minus, check, plus and star. JCAHO specified “smoking cessation advice and counseling” as a process measure of the quality of care for acute myocardial infarction, congestive heart failure, and pneumonia. This measure includes patients who are given any sort of advice about stopping smoking while they are in the hospital. JCAHO reports the percent of eligible patients (smokers) receiving advice and/or counseling to quit smoking.

Useful Definitions and Acronyms

- **Benchmark**: Attribute or achievement that serves as a standard for other providers or institutions to emulate. According to JCAHO, the benchmark for smoking cessation advice is 100%.
- **CDC**: Centers for Disease Control is a federal agency in the Department of Health and Human Services; they investigate and try to control or prevent diseases.
- **Composite smoking cessation rate**: In this study we use a composite smoking cessation rate (see Figure 9) instead of individual measure set rates. Heart Attack,
Heart Failure and Pneumonia each have a smoking cessation score. We use a composite of this score in data reporting to make the report more straightforward.

- EBM: Evidence-Based Medicine refers to the portion of the practice of medicine that is based upon established scientific findings as derived from clinical research studies. EBM leads to the development of clinical guidelines, protocols, and care paths.

- Final Rate: The JCAHO smoking cessation advice rate for a hospital or region one year after letters were sent out in the intervention.

- GLM: Generalized Linear Model

- Individual Measures: Refers to individual measures used by JCAHO such as smoking cessation advice rate. This is not to be confused with “measure set.” Table 12 further clarifies this.

- Initial rate: The JCAHO smoking cessation advice rate for a hospital or region at the time letters are sent out in the intervention.

- IOM: The Institute of Medicine’s goal is to improve the nation’s health care. It was established in 1970 under the charter of the National Academy of Sciences. They provide independent, objective, evidence-based advice to policymakers, health professionals, the private sector, and the public. Their most notable publications are: *To Err is Human* (1999), and *Crossing the Quality Chasm* (2001).

- Measure Set: Refers to sets of quality measures JCAHO has in place. This study focuses on three sets: Heart Attack, Heart Failure and Pneumonia. This is not to be confused with “individual measures.” Table 12 further clarifies this.
• Quality Check: Quality Check is JCAHO’s search engine to locate health care organizations in the United States.
  
  http://www.qualitycheck.org/consumer/searchQCR.aspx

• Smoking Cessation Advice Rate: This is the measure used by JCAHO. In order to fulfill this, a provider must simply offer a sentence of advice to a smoker to quit smoking.
CHAPTER 3

RESEARCH METHODS

Overview of Methods

In order to address the issues presented in the introduction with the emerging frameworks from the previous chapter, methods described in this chapter were completed. The following is a brief summary of the methods and will be elaborated upon in the remainder of the chapter.

I. Intervention methods (Research Question 1): To affect change on the state level to motivate hospitals to be more aware of their smoking cessation rates and services
   A. Activity 1: Randomize all hospitals in California to treatment and control regions
   B. Activity 2: Inform treatment hospitals of their current JCAHO smoking cessation advice rates and researcher intention to publicize these rates in local media; offer smoking cessation training at cost to treatment (then control) hospitals
   C. Activity 3: Reassess smoking cessation rates to determine if the intervention had an effect
   D. Activity 4: Complete post analysis to determine predictors of greater improvement.

II. Research Analysis of JCAHO Data (Research Questions 2 and 3): Summarize JCAHO trends of smoking cessation rates in the context of other measures
A. Activity 1: Collect and organize JCAHO data on smoking cessation and all other measures in heart failure, heart attack and pneumonia care for all California hospitals

B. Activity 2: Collect and compile other baseline information on hospitals such as size, revenue and volume

C. Activity 3: Map trends of smoking cessation advice over two years to identify which hospitals are lacking and regress advice rates on hospital characteristics/areas

D. Activity 4: Comment on JCAHO data trends, where improvement is occurring and where it has most potential.

Intervention Study: Recruitment and Randomization

This purpose of this section was to test a novel method to increase inpatient smoking cessation rates in California hospitals by presenting them with publicity of JCAHO performance data. We began planning this portion of the study by dividing California into geographic regions and matching the regions on the basis of number of hospitals, population size, ethnic background, median income and percent smokers. A map of the regions is in Figure 8. We chose to divide the state into regions to simplify the study and also because the intended publicity of performance was going to be through regional print media. Divisions were based on natural borders and zoning from California Government websites. Once the zip codes for each region were established, we could use Census data to characterize each region (see results).
Once the regions were paired we randomized each member of the pair into a treatment and control group using a random number generator.

Intervention Study: Creation of the database

We constructed a JCAHO database of smoking cessation counseling/advice results for all hospitals in California in the areas of care of heart attack, heart failure and pneumonia. JCAHO quality reports are published quarterly on http://www.qualitycheck.org. The data are published with quarterly and yearly results, but there is a six month delay on release of information in order for JCAHO to compile results. Therefore data downloaded today may reflect hospital performance from 6 to 9
months ago. Information gathered from Quality Check for each hospital includes the number of patient records assessed and the percent counseled/given advice to quit smoking among the three diagnosis groups. If we refer to the sample data in Figure 9, we see for hospital A that JCAHO provides the proportion in each diagnosis group contacted and the number of eligible patients. From this information we calculated an overall advice rate by dividing the calculated total number of patients counseled by those that were eligible across the three diagnoses. So for hospital A, 47 contacted of 76 patients is 62% contacted.

<table>
<thead>
<tr>
<th>JCAHO DATA</th>
<th>OUR MANIPULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>Area</td>
</tr>
<tr>
<td>Hospital A</td>
<td>MI</td>
</tr>
<tr>
<td>Hospital A</td>
<td>HF</td>
</tr>
<tr>
<td>Hospital A</td>
<td>Pn</td>
</tr>
</tbody>
</table>

| Total Eligible= | 76 |
| Total Contact | 47 |
| Overall contact rate=Total Contact/Total Eligible | 0.62 |

**Figure 9: Calculation of Average Rate**

**Intervention Study: Research Procedures and Intervention**

*Treatment:* Those hospitals in the treatment regions were intervened upon in the following manner. We identified a few key individuals at each organization that would be concerned with quality, smoking cessation or overall hospital performance. Examples included the Chief Executive Officers, Medical Directors and the Chairman of the Board. We also identified a couple of other key individuals such as the Director of Health.
Promotion or Quality Improvement. Contact information was gathered by calling each hospital and extensive web searches. Using the data from Quality Check (previous section), a letter was constructed to notify the organizations of their performance in JCAHO’s Quality Check. The letter outlines the goals of our group in trying to improve smoking cessation services nationally. In addition, we supplied a graph with the organization’s performance in comparison to national averages. The letter closes with plans for publishing the region’s hospitals’ results in the local media. A copy of the letter is provided in Figure 10. Letters were sent to roughly 240 hospital administrators and/or health care staff in the treatment regions from Figure 8.
Figure 10: Sample letter sent to hospitals

When it becomes available towards the end of 2007, the Center will publish the July 2006 to June 2007 JCAHO adult smoking cessation advice and counseling results for hospitals in your region in the local media. We hope to make the public aware of how well their health care providers are meeting smoking cessation performance measures. We have not yet finalized how we will display the data in the local media, but a working model is shown below.

Among the key plus measures of which the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) publicly reports data are three measures that address hospitalized patients with heart failure, heart attack and pneumonia who were provided advice and/or counseling to quit smoking. The following graph shows what percent of eligible adult smokers were provided advice and/or counseling to quit smoking based on the most recent survey of health care providers in the Sacramento region.

The goal is to offer such advice to 100% of patients who were smoking before admission.

The Center for Excellence in Inpatient Tobacco Use Cessation publishes this information to educate consumers about the quality of their local health care providers.

To aid health care organizations in improving performance on these JCAHO performance measures, we are offering consultation and a training program intended to prepare health care professionals to define or improve bedside tobacco use cessation interventions. Information about the upcoming September 2006 training is enclosed.

If you have any questions, please contact Darby Clumingly at (650)725-5735 or clumingly@stanford.edu.

Sincerely,

C. Bart Taylor, MD
Professor of Psychiatry
Stanford University School of Medicine

Nancy Houston Miller, RN
Associate Director, Stanford Cardiac Rehabilitation Program
Stanford University School of Medicine

Endnotes:
1. (Contact 1)
2. (Contact 2)
Hospitals were also offered an opportunity to improve their smoking cessation contact values during the 12-month period between the initial letter and publication of latest JCAHO data in local print media. Training was available (at cost to cover materials) to instruct hospitals and provide resources to implement a hospital wide smoking cessation program. Attendees were given a copy of the recent book “Implementing an Inpatient Smoking Cessation Program” and access to our website as a continued resource. Examples of the training flyer and website screenshot are in Figure 11. The workshop training for health care professionals in *Staying Free* consists of both intervention methods and implementation methods. The six hour course includes: didactic information around smoking cessation and success of randomized controlled trials, and skill building directed at implementation of the *Staying Free* intervention that includes how to deliver an appropriate message, take a smoking history and provide behavioral counseling and pharmacotherapy, undertake telephone follow-up. Following the presentation of the didactic components (overview of smoking, implementation of *Staying Free* Intervention), health care professionals watch a videotape of a bedside counseling sessions conducted by the creators of *Staying Free*. Health care professionals role-play three scenarios in dyads. All trainees are given supporting materials in the form of check-off lists and scripts to help them master skills associated with counseling. Next, the training emphasizes implementation techniques that have been successful in the past. The final 30 minutes are devoted to responding to questions and issues that were not previously understood or addressed by the trainer. This training has been evaluated and shown efficacious (Cameron et al., 2002).
It was important to consider the issue of antagonism described in the previous chapter. While fear is essential to protection motivation theory, it is important that we maintain our roles as a partner and resource. This was one of the reasons for the delay in publicity; we wanted to offer help and not just a threat to improve. This is also why we offer training at cost and free resources on the website. The second reason for the delay is a method based reason: we were measuring the effect of the letter on hospital quality. There needed to be a 1 year lag to allow for improvement and at least 6 months worth of posting of post-letter data on QualityCheck.
Figure 11: Training materials and resources offered

STRAVING FOR EXCELLENCE:
Helping Hospitals Implement Tobacco Use Cessation
A training course for health care professionals and administrators

SEPTEMBER 8, 2006

STANFORD UNIVERSITY SCHOOL OF MEDICINE

Tentative Schedule of Events
Meeting Session
08:00-09:00 am  Program Administration and Management
09:00-10:00 am  Systems for Tobacco Use Identification and Documentation
10:00-10:30 am  Interventions: Components and Delivery Options
10:30-11:15 am  Break
11:15-11:45 am  Program Evaluation
11:45-12:15 pm  Program Promotion
12:15-1:15 pm  Lunch

Afternoon Session
1:15-3:15 pm  Case Consultation in meeting PCAHO and NCQA requirements
3:15-3:30 pm  Break
3:30-4:30 pm  Wrap-up and Evaluation

About the Presenters
Nancy Truex Miller, B.S.N., B.S.N., is the Associate Director of the Stanford/Cashier Rehabilitation Program and Adjunct Assistant Clinical Professor of the University of California, San Francisco, School of Nursing. For more than a decade, she has trained numerous health care professionals to carry out tobacco-cessation interventions and is the author of many articles and book chapters on smoking.

C. Barr Taylor, M.D., is a Professor of Psychiatry and Behavioral Sciences in the Department of Psychiatry at Stanford University School of Medicine, where he has published numerous studies on smoking and tobacco use cessation. He has trained hundreds of health care professionals in tobacco-cessation methods.

Training Details
Location of training: Room 2209, Department of Psychiatry and Behavioral Sciences, 401 Quarry Road, Stanford, CA 94305-3522.

There is a minimal fee of $50.00 to cover the cost of training materials. This includes the recently published book Implementing an Inpatient Smoking Cessation Program, by Patricia M. Smith and C. Barr Taylor. To order the book or apply for the workshop, please go to our website: http://www.stanford.edu and click on “Center for Excellence for Inpatient Tobacco Use Cessation”, or contact Eryl Cuming at 415-725-3735, dcunning@stanford.edu.
Control group: No effort was made to contact the control groups. However, after the project, given funding, we hope to offer the training to all control hospitals at cost as well.

Intervention Advertisements: About one year after the letters were sent, a widespread publication was selected in each of the treatment regions. A news release was constructed and posted, consisting of a brief explanation of JCAHO’s quality measures, their goal of 100% contact for tobacco use cessation counseling/advice and the percent (with n) of eligible patients provided with smoking cessation advice/counseling in the local hospitals. Media outlets were determined by web searches for the most popular local newspaper in each region. An example is shown in Figure 13.

Figure 12: Sample Advertisement

Among the twenty plus measures of which the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) publicly reports data are three measures that address hospitalized patients with heart failure, heart attack and pneumonia who were provided advice and/or counseling to quit smoking. The following graph shows what percent of eligible adult smokers were provided advice and/or counseling to quit smoking based on the most recent survey of health care providers in the Sacramento region.

The goal is to offer such advice to 100% of patients who were smoking before admission.
We aimed to have this advertisement appear as a health awareness ad for the local community, stakeholders and hospital.

**Intervention Study: Construction of the follow-up database**

The database was updated to reflect follow up data from Quality Check. Because of the 6 month lag, we could construct the database 18 months after the letters were sent. This way we gave the hospitals had a total of one year to improve. This was all done with the cooperation of JCAHO; they have been instrumental in providing us with all of their archived data. The raw data was processed and transformed to reflect composite smoking cessation rates (Figure 9), change rates from the initial time period, intervention groups and region. We also added in data from the American Hospital Database on bed size, length of stay, revenue and discharges.

**Intervention Study: Data Analysis**

Specific data analysis will be described in the results section. In general though, we compared initial JCAHO scores to final scores. We then assessed whether the change varied by intervention group. Finally we modeled change in scores by hospital characteristics to determine if there are any successful predictors. If this novel method of change has an effect, it can be applied to other areas of healthcare. If it does not work, we can reevaluate it as a quality improvement tool.
Research Analysis of JCAHO Data: Purpose

Quality improvement is still an emerging field in healthcare research. While there is an abundance of data, we still do not have evidence where improvements are occurring. There are a number of studies that have shown that hospital quality is improving overall, but specific information about the measures is not yet published. Aside from the cited 2004 paper, little has been done with JCAHO QualityCheck. Using smoking cessation as a point of comparison, we seek to map JCAHO quality measures over the time period of the intervention time (for consistency).

Research Analysis of JCAHO Data: Research Procedures

The intended methods were as follows: We first compiled data over two years in quarterly form from the JCAHO website for all California hospitals. This data includes JCAHO contact rates for all individual measures in the three measure sets (heart attack, heart failure and pneumonia). In addition to the JCAHO data, we also gathered other information from the American Hospital Database that includes organization bedsize, revenue, length of stay and discharges.

Analysis will be further described in the results sections. In general we aimed to look at JCAHO trends as a result of reporting and also comment on what determines more quality improvement. More specifically, we sought to analyze and report the following:

- Descriptive information to characterize overall quality rates.
- Model rates and trends by initial rate, bedsize, discharges, length of stay and revenue

The goal of the analysis was to anticipate which sets of measures, individual measures and hospital characteristics show improvement and which are in most need of improvement.
CHAPTER 4

RESULTS

Intervention Study: Initial Pairing of Regions

The characteristics of the pairs of region can be seen in Table 2. The regions were first made using geographical boundaries. Once each region was defined, their composite population and area statistics were compiled using census data. A spreadsheet was used to detect differences between every combination of regions and the pairing with the smallest differences was chosen. The last two pairs of regions are problematic because they are so few hospitals. Complete JCAHO data at the initiation of the study was not available on all hospitals so regions that have fewer hospitals had more of a chance of being excluded from comparison for insufficient data. Also, these sparsely populated areas may have hospitals not yet equipped with the technology/infrastructure for complete JCAHO data collection, so the possibility of missing data is even higher.
<table>
<thead>
<tr>
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<th>Region</th>
<th>Region Population Total</th>
<th>% Urban</th>
<th>% White</th>
<th>% Hispanic</th>
<th>% Black</th>
<th>% Asian</th>
<th>% Other</th>
<th>% Male</th>
<th>Average Med Age</th>
<th>Average Households</th>
<th>% Below Poverty</th>
<th>Average Med Income</th>
<th>% Smokers</th>
<th># Hospitals</th>
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<td>9</td>
<td>7</td>
<td>49</td>
<td>34.3667</td>
<td>118811</td>
<td>12</td>
<td>44737.7</td>
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<td>517406</td>
<td>14</td>
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<td>20</td>
<td>38</td>
</tr>
<tr>
<td>D</td>
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<td>89</td>
<td>66</td>
<td>37</td>
<td>4</td>
<td>4</td>
<td>20</td>
<td>51</td>
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<td>115026.8</td>
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<td>45823.2</td>
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<td>28</td>
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<tr>
<td></td>
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<td>56</td>
<td>46</td>
<td>5</td>
<td>6</td>
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<td>51</td>
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<td>467723</td>
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<td>85</td>
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<td>6</td>
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<td>35854.8</td>
<td>16</td>
<td>33294.6</td>
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<td>14</td>
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<tr>
<td></td>
<td>N San Joaquin</td>
<td>1221149</td>
<td>89</td>
<td>62</td>
<td>34</td>
<td>5</td>
<td>8</td>
<td>18</td>
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<td>130196.67</td>
<td>16</td>
<td>38387</td>
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<td>19</td>
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<td>F</td>
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<td>81257</td>
<td>46</td>
<td>84</td>
<td>10</td>
<td>2</td>
<td>2</td>
<td>3</td>
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<td>40.4</td>
<td>10503.333</td>
<td>17</td>
<td>29871.3</td>
<td>20</td>
<td>5</td>
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<td>North Coast</td>
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<td>84</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>50</td>
<td>40.625</td>
<td>28516.25</td>
<td>15</td>
<td>31756.3</td>
<td>20</td>
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<td>G</td>
<td>Sierra Nevada</td>
<td>150240</td>
<td>46</td>
<td>90</td>
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<td>2</td>
<td>1</td>
<td>2</td>
<td>53</td>
<td>41.4</td>
<td>14259.75</td>
<td>10</td>
<td>40032.5</td>
<td>18</td>
<td>8</td>
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<tr>
<td></td>
<td>Nevada Border</td>
<td>179291</td>
<td>37</td>
<td>88</td>
<td>9</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>52</td>
<td>41.6</td>
<td>10024</td>
<td>11</td>
<td>39783</td>
<td>18</td>
<td>9</td>
</tr>
</tbody>
</table>
Intervention Study: Response to Intervention

Among the intervention hospitals contacted (115 total), 3 hospitals registered and 1 other hospital heard about the workshops and requested attendance. Participants were highly satisfied with the course. The initial feedback suggested that we need to focus the training more on helping with program implementation and not on providing counseling unless requested as a separate workshop.

Intervention Study: Improvement at Each Hospital

Data for the quarter that the letters were sent out will be referred to as “Initial Rate” and data after one year, as specified in the letter will be referred to as “Final Rate.” (These are actually Quarter 3 of 2006 and 2007 respectively.) The reason these dates were used was because we wanted to measure the effect of the intervention. All hospitals received their letters in mid 2006; therefore this is the initial rate.

To determine if there was an improvement at each individual site in California, a paired t test using initial and final rates, for all hospitals, then for control and intervention hospitals was completed. The results are in Table 3 and only include hospitals with data at both time points.

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean Initial Rate (sd)</th>
<th>Mean Final Rate (sd)</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>All (n=245)</td>
<td>88% (18%)</td>
<td>94% (11%)</td>
<td>6.11</td>
<td>244</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Control (n=139)</td>
<td>86% (19%)</td>
<td>94% (12%)</td>
<td>5.91</td>
<td>138</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Intervention (n=106)</td>
<td>90% (14%)</td>
<td>94% (11%)</td>
<td>2.56</td>
<td>105</td>
<td>P=0.012</td>
</tr>
</tbody>
</table>
There is a statistically significant difference between initial and final rates for all hospitals and by treatment group. The effect is slightly less for the intervention group, likely because their initial rates were so high, so there was less room for improvement.

**Intervention Study: Improvement by Treatment Group**

We had difference data available on 139 control hospitals and 106 treatment region hospitals as shown in Table 3. Table 4 summarizes the baseline and follow-up JCAHO data. Note that the smoking cessation rate reflected is the composite across heart attack, heart failure and pneumonia care. For Pair G, there was insufficient data and too few hospitals to present a comparison. All analyses were completed at the $\alpha=0.05$ level using SPSS software. These comparisons were done using independent paired t tests. (The following assumptions were tested and met: groups were approximately of the same size, observations were independent. Because the initial rates were not of comparable mean and variance, we focus on change in rates through this analysis.)
<table>
<thead>
<tr>
<th>Pair</th>
<th>N available</th>
<th>Mean rate (sd)</th>
<th>N available</th>
<th>Mean rate (sd)</th>
<th>Significant Difference?</th>
<th>N available</th>
<th>Mean rate (sd)</th>
<th>N available</th>
<th>Mean rate (sd)</th>
<th>Significant Difference?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair A</td>
<td>67</td>
<td>83% (21%)</td>
<td>53</td>
<td>90% (15%)</td>
<td>0.038*</td>
<td>66</td>
<td>10% (2%)</td>
<td>51</td>
<td>4% (1%)</td>
<td>0.083</td>
</tr>
<tr>
<td>Pair B</td>
<td>28</td>
<td>86% (24%)</td>
<td>19</td>
<td>91% (14%)</td>
<td>0.326</td>
<td>26</td>
<td>16% (11%)</td>
<td>17</td>
<td>4% (18%)</td>
<td>0.951</td>
</tr>
<tr>
<td>Pair C</td>
<td>23</td>
<td>88% (15%)</td>
<td>16</td>
<td>94% (12%)</td>
<td>0.212</td>
<td>23</td>
<td>7% (11%)</td>
<td>15</td>
<td>6% (11%)</td>
<td>0.765</td>
</tr>
<tr>
<td>Pair D</td>
<td>17</td>
<td>81% (27%)</td>
<td>11</td>
<td>87% (13%)</td>
<td>0.443</td>
<td>16</td>
<td>12% (27%)</td>
<td>9</td>
<td>0% (21%)</td>
<td>0.217</td>
</tr>
<tr>
<td>Pair E</td>
<td>5</td>
<td>97% (4%)</td>
<td>12</td>
<td>92% (10%)</td>
<td>0.119</td>
<td>5</td>
<td>0% (4%)</td>
<td>12</td>
<td>6% (9%)</td>
<td>0.070</td>
</tr>
<tr>
<td>Pair F</td>
<td>2</td>
<td>80% (10%)</td>
<td>3</td>
<td>89% (19%)</td>
<td>0.558</td>
<td>2</td>
<td>12% (21%)</td>
<td>2</td>
<td>-3% (5%)</td>
<td>0.486</td>
</tr>
<tr>
<td>Pair G</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>All pairs</td>
<td>143</td>
<td>84% (21%)</td>
<td>115</td>
<td>90% (14%)</td>
<td>0.012*</td>
<td>139</td>
<td>8% (17%)</td>
<td>106</td>
<td>4% (16%)</td>
<td>0.047*</td>
</tr>
</tbody>
</table>

* p<0.05%
The baseline smoking cessation advice data were not comparable for the intervention and control hospitals based on the sixth column of the last row of Table 4 \( t(250)=-2.53, p=0.012 \). However, when separated by region pairs, it is apparent that the difference is mainly attributable to Pair A \( p=0.038 \). While we tried to initially match regions based on several characteristics in Table 2 the smoking cessation baseline data were not available until 6 months after randomization due to the lag in JCAHO data. The baseline differences are problematic since the control hospitals had a significantly lower initial rate. Therefore in order to account for the baseline dissimilarities, we used the change in cessation advice rates as the outcome measure (right columns). There were no significant differences between the intervention and control hospitals in comparing the change in cessation rates on a region by region basis, but in combining the regions there was a significant difference in change values \( t(243)=2.00, p=0.047 \). An ANOVA was also completed to test the effect of region and the interaction term of region and intervention; here were no significant differences in change. Interestingly the direction of the significance is such that the control hospitals improved more in rates than the treatment hospitals (8% improvement versus 4% improvement). It is important to note control hospitals had lower initial rates. Since rates max out at 100%, the control hospitals had more room to improve. Therefore, the following analysis was completed.

**Intervention Study: Comparing Initial and Final Rates by Mean Cohorts**

Another analysis was done to measure the change in hospitals at or below the mean baseline advice rates and those above separately. The results are shown in Table 5.
Table 5: Rates by Mean Cohort

<table>
<thead>
<tr>
<th></th>
<th>Initial Advice rate % (sd)</th>
<th>Final Advice rate % (sd)</th>
<th>Significant difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>All hospitals (n=245)</td>
<td>88% (17%)</td>
<td>94% (11%)</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Hospitals at or below mean baseline rate (n=68)</td>
<td>65% (18%)</td>
<td>89% (16%)</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Hospitals above mean baseline rate (n=177)</td>
<td>96% (5%)</td>
<td>96% (1%)</td>
<td>P=.803</td>
</tr>
</tbody>
</table>

Hospitals at or below the initial rate average had a significant change in rates, while hospitals who were higher performing initially did not improve at all. This demonstrates the logical finding that hospitals with more room to improve did in fact improve more than those already performing well (one sided t test also had p<0.001).

Intervention Study: Changes by Area of Care

It was also of interest to assess whether the changes in rates by intervention were different for the three areas of care. Table 6 summarizes this information.

Table 6: Rates by Area of Care and Treatment

<table>
<thead>
<tr>
<th>Area</th>
<th>Control Mean rate (sd)</th>
<th>Intervention Mean rate (sd)</th>
<th>Significant Difference?</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Areas</td>
<td>8% (17%)</td>
<td>4% (16%)</td>
<td>0.047</td>
</tr>
<tr>
<td>Heart Attack</td>
<td>4% (11%)</td>
<td>3% (15%)</td>
<td>0.853</td>
</tr>
<tr>
<td>Heart Failure</td>
<td>5% (17%)</td>
<td>2% (17%)</td>
<td>0.141</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>12% (22%)</td>
<td>7% (21%)</td>
<td>0.125</td>
</tr>
</tbody>
</table>

While the composite rate difference was significant based on treatment, there were no differences in individual areas of care.
Intervention Study: Hospitals Participating in the Training

Four hospitals elected to participate in the training. Due to the small number, their descriptive rate data will be provided in Table 7:

Table 7: Descriptive Data of Participating Hospitals

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Initial Rate</th>
<th>Final Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMO</td>
<td>77%</td>
<td>93%</td>
</tr>
<tr>
<td>Private Hospital</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Private Hospital</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>University Hospital</td>
<td>90%</td>
<td>96%</td>
</tr>
</tbody>
</table>

Due to small sample size, statistical comparisons were not made among participating hospitals.

Intervention Study and Research Analysis of JCAHO Data: Regression of change based on other hospital characteristics

The American Hospital Database (AHD) contains valid data on staffed beds, discharges, patient days and total revenue for 159 hospitals in California. Using this information and also the initial baseline advice rates and intervention category, multiple regression was conducted to predict change in scores. (Assumptions of linearity, normally distributed errors, and uncorrelated errors were checked and met. There was some evidence of colinearity of AHD data.) The means, standard deviations and inter correlations are in Table 8.
Table 8: Correlations for Hospital Characteristics and Change in Rates

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Patients Eligible for Advice at Baseline</th>
<th>Composite Baseline Rate</th>
<th>Intervention?</th>
<th>Stuffed Beds (x100)</th>
<th>Total Discharges (x 1000)</th>
<th>Patient Days (x 10,000)</th>
<th>Gross Patient Revenue (x 100,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in rate</td>
<td>0.04</td>
<td>0.16</td>
<td>-0.07</td>
<td>-0.78**</td>
<td>-0.13*</td>
<td>-0.17*</td>
<td>-0.07</td>
<td>-0.24*</td>
<td>-0.13*</td>
</tr>
<tr>
<td>Patients Eligible for Advice at Baseline</td>
<td>27.26</td>
<td>19.46</td>
<td>-</td>
<td>0.13*</td>
<td>0.12</td>
<td>0.55**</td>
<td>0.58**</td>
<td>-.12</td>
<td>0.40**</td>
</tr>
<tr>
<td>Composite Baseline Rate</td>
<td>0.89</td>
<td>0.16</td>
<td>-</td>
<td>0.06</td>
<td>0.13</td>
<td>0.14*</td>
<td>-.04</td>
<td>0.20**</td>
<td></td>
</tr>
<tr>
<td>Intervention?</td>
<td>0.40</td>
<td>0.49</td>
<td>-</td>
<td>0.00</td>
<td>-0.05</td>
<td>0.12</td>
<td>0.13*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staffed Beds (x100)</td>
<td>2.79</td>
<td>1.63</td>
<td>-</td>
<td>0.00</td>
<td>0.14*</td>
<td>0.88**</td>
<td>0.14*</td>
<td>0.77**</td>
<td></td>
</tr>
<tr>
<td>Total Discharges (x 1000)</td>
<td>12.49</td>
<td>8.17</td>
<td>-</td>
<td>0.00</td>
<td>-0.14*</td>
<td>0.79**</td>
<td>-</td>
<td>0.81**</td>
<td></td>
</tr>
<tr>
<td>Average length of stay</td>
<td>5.92</td>
<td>4.04</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Gross Patient Revenue (x 100,000)</td>
<td>9.78</td>
<td>9.20</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

*p<0.05; **p<0.01
The combination of variables significantly predicted the change in rates $F(7, 151)=49.56$, $p<0.011$. The adjusted $R$ squared is 0.68 indicating that over 2/3 of the variance in the change in rates was explained by the model. The beta weights in Table 9 indicate that the strongest predictors of the change in rates were the composite baseline rate and total discharges.

Table 9: Coefficients for Hospital Characteristics in predicting change

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>Std. Error</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients Eligible for Advice at Baseline</td>
<td>0.001</td>
<td>0.00</td>
<td>0.05</td>
</tr>
<tr>
<td>Composite Baseline Rate</td>
<td>-0.807</td>
<td>0.05</td>
<td>-0.80**</td>
</tr>
<tr>
<td>Intervention?</td>
<td>-0.022</td>
<td>0.02</td>
<td>-0.07</td>
</tr>
<tr>
<td>Staffed Beds (x 100)</td>
<td>-0.021</td>
<td>0.01</td>
<td>-0.22</td>
</tr>
<tr>
<td>Total Discharges (x 1000)</td>
<td>0.002</td>
<td>0.00</td>
<td>0.08</td>
</tr>
<tr>
<td>Average length of stay</td>
<td>-0.008</td>
<td>0.00</td>
<td>-0.21**</td>
</tr>
<tr>
<td>Gross Patient Revenue (x 100,000)</td>
<td>0.002</td>
<td>0.00</td>
<td>0.11</td>
</tr>
</tbody>
</table>

*<0.05; **p<0.01

Research Analysis of JCAHO Data: All JCAHO Measures in Heart Attack, Heart Failure and Pneumonia

The repeated measure ANOVA of the quarterly rates for the two years included in the main analysis was completed with a Greenhouse-Geissner correction to assess if there was a difference in rates over time by measure set and individual measures. This is similar to the JCAHO study in 2005 (Williams et al., 2005). (The following assumptions were tested: independence of observations, normality and sphericity. The last assumption was violated, warranting use of Greenhouse-Geissner corrections.) Between subjects comparison of the trends were based on measure sets and individual measures listings. We also used hospital characteristics to create models and divided each measure into two
groups. For example, for staffed beds, we made two categories: those below the mean number of bed and those above. Splitting the groups into two helped to make logical comparisons, especially in the graphs below. Splitting them further would run the risk of multiple comparisons and false results.

Results indicated that rates changed over the 8 quarter period, in general, by measure set, by individual measure and by hospital characteristics. These results are reflected in Table 10:
Table 10: Repeated GLM ANOVA statistics

<table>
<thead>
<tr>
<th>Between Subjects</th>
<th>F value</th>
<th>p value</th>
<th>Significant Linear trend?</th>
</tr>
</thead>
<tbody>
<tr>
<td>None (Overall rates)</td>
<td>F(5.06, 16873.96)= 250</td>
<td>P&lt;0.001</td>
<td>F(1, 3334)=728.44; p&lt;0.001</td>
</tr>
<tr>
<td>Measure Set</td>
<td>F(14, 3320)= 165</td>
<td>P&lt;0.001</td>
<td>F(2, 3332)= 58.55; p&lt;0.001</td>
</tr>
<tr>
<td>Individual Measure</td>
<td>F(2, 3332)= 134</td>
<td>P&lt;0.001</td>
<td>F(14, 3332)= 44.52; p&lt;0.001</td>
</tr>
<tr>
<td>Staffed Beds (2 categories: above and below average)</td>
<td>F(1, 2508)= 13.65</td>
<td>P&lt;0.001</td>
<td>F(1, 2508)= 4.37; p=0.037</td>
</tr>
<tr>
<td>Total Discharges (2 categories: above and below average)</td>
<td>F(1, 2508)= 24</td>
<td>P&lt;0.001</td>
<td>F(1, 2508)= 6.52; p=0.11</td>
</tr>
<tr>
<td>Length of Stay (2 categories: above and below average)</td>
<td>F(1, 2508)= 30</td>
<td>P&lt;0.001</td>
<td>F(1, 2508)= 0.59; p=0.44</td>
</tr>
<tr>
<td>Gross Patient Revenue (2 categories: above and below average)</td>
<td>F(1, 2222)= 52</td>
<td>P&lt;0.001</td>
<td>F(1, 2222)= 6.59; p=0.01</td>
</tr>
</tbody>
</table>
The mean and standard deviation of the 8 quarter values (all measures, first row in Table 10) are in Table 11.

Table 11: Means and SDs of all rates

<table>
<thead>
<tr>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1ActualRate2006</td>
<td>85% 20%</td>
</tr>
<tr>
<td>Q2ActualRate2006</td>
<td>87% 19%</td>
</tr>
<tr>
<td>Q3ActualRate2006</td>
<td>88% 18%</td>
</tr>
<tr>
<td>Q4ActualRate2006</td>
<td>89% 16%</td>
</tr>
<tr>
<td>Q1ActualRate2007</td>
<td>90% 15%</td>
</tr>
<tr>
<td>Q2ActualRate2007</td>
<td>91% 14%</td>
</tr>
<tr>
<td>Q3ActualRate2007</td>
<td>92% 14%</td>
</tr>
<tr>
<td>Q4ActualRate2007</td>
<td>93% 13%</td>
</tr>
</tbody>
</table>

The estimated marginal mean graphs are shown in Figures 13 to 16. The Individual Measures were split up so that detail could be observed.

Figure 13: Means of all rates over 2 years

![Estimated Marginal Means of Quarter](image)

There is a significant linear trend of improvement through the 8 quarters studied.

Figure 14 shows all individual measures collected over two years for all hospitals in California.
Figure 14: Means by measure over 2 years

The chart above is split below into Figures 15 and 16 for easier readability.
Figure 15: Means by measure over 2 years

Estimated Marginal Means of Individual Measures (Higher with Smoking Cessation)
The smoking cessation advice rate has a steady increase in rates from about 88% to 94% over two years. Other measures such as oxygen assessment are steady as they have less room to improve. Overall though, all measures in Figure 15 show an upward trend. Figure 16 shows the lower half of the measures from Figure 14.
Figure 16: Means by measure over 2 years

Estimated Marginal Means of Individual Measures (Lower values)

- Pneumococcal vaccination
- Discharge instructions
- Pharmacologic therapy resolved within 30 minutes of hospital arrival
- Initial antibiotic selection for CAP in immunocompetent pediatric ICU patient
The lower performing measures show much more variability in improvement.

In Figure 17 composite rates in the three areas of care (heart failure, heart attack and pneumonia) are shown.

As provided in Figure 17, heart failure has the most improvement from 80% to about 90%. It is also the lowest performer initially.

For all of the hospital characteristic charts in Figure 18, we see differences by category. Large hospitals, those with more discharges, higher revenue and shorter lengths of stay have higher JCAHO quality rates. In all cases though, there is improvement from the first to the second year.
Figure 18: Mean rates by characteristics over 2 years
Finally, to reflect back on the intervention, the rates were plotted for intervention and control hospitals separately in Figure 19. A clearly secular trend is observed in both the control and intervention groups.

Figure 19: Mean rates by Intervention Group
CHAPTER 5

DISCUSSION

In this section, we restate each research question/hypothesis and reflect on the results as they relate to those areas. The chapter closes with general comments and future directions.

Research Question 1 Restated

Research Question 1: Does the threat of public reporting of smoking cessation rates affect hospital performance in this area?

Hypothesis 1: When faced with public reporting of JCAHO smoking cessation rates in local media in a year, treatment hospitals will significantly improve their performance compared to control hospitals

Intervention Design and Broad Outcomes

During the initial design of the intervention, it was uncertain if the process would actually occur. The concept of randomizing a state’s hospitals seemed to be a lofty effort.
However, gathering data on the hospitals and using the concept of regions made the notion more tangible. In addition, the creation of JCAHO’s Quality Check with their continued support helped to develop the database in this study. While there was still a sizeable amount of data processing to complete, prior to the development of this database one would have to manually download individual portable documents for each hospital and extract the data.

Next, the approach used in this intervention was quite novel: we informed hospitals of their performance and forthcoming publicity on the topic while offering a way to improve their performance. We were surprised to observe the complacency most hospitals had (in that they did not respond to our letter and training). Quality improvement is at the forefront of organized healthcare and smoking cessation advice/counseling at the bedside is a core measure of inpatient quality. Not to mention research has led to a vast amount of evidenced based medicine guidelines for it (Cromwell et al., 1997; National Cancer Policy Board, Institute of Medicine and National Research Council, 1998). Perhaps the hospitals were overwhelmed with other measures in the core set that are easily changed or considered more “clinical.” Implementation of a smoking cessation program may not have seemed feasible. Optimistically we hope that hospitals are at least encouraging their providers to give brief advice to quit smoking at the bedside since that is the bare minimum proven to be effective in research. It is also possible that high performers did not feel the need to improve or respond to the letter because they observed that they were above the mean.
In considering how to match regions, we first considered using JCAHO baseline data. However, this was not done since the data were only available six months after the start of the study. Also in 2005 when the study process was initiated, JCAHO rates were in major flux. More specifically the data collection tools may not have been in place at hospitals and therefore JCAHO surveys were sparse. As an alternative to individual matching, we used region characteristics with the assumption that JCAHO baseline rates would be comparable among regions with comparable populations, hospitals and economic resources. These variables used to match are shown in Table 2. However despite the efforts to match, we observed baseline differences between matched regions during the follow up analysis.

To correct for these baseline differences, we used change scores. As shown in Table 4, there was a significant difference in change scores when comparing intervention and control hospitals. Furthermore, the control hospitals increased their cessation rate by 8% and the intervention hospitals by 4%; interestingly, this was a significant conclusion in the direction opposite to our hypothesis. However, the fact that control hospitals had a lower cessation counseling/advice rate initially is a factor. The next table (5) shows that those hospitals that had lower initial smoking cessation advice/counseling rates had a much larger increase (24 percent point increase) versus those with higher initial baseline rates (0 percent point increase). This is intuitive in that those that are much lower performers have more room to improve. Improvement rates are likely approaching a ceiling.
While hypothesis one was incorrect, we demonstrated that there is overall improvement in performance across hospital regions and times. Referring to the table of paired comparisons (Table 3), where we compared each hospitals initial rate to their final rate, we see significant improvement in rates across the board. Hospitals in California (and likely nationally) are all reaching higher rates in smoking cessation. This demonstrates the potency of collection of JCAHO measures (discussed in more detail later).

**Hospital Participation**

Four hospitals participated in the training (with a few sending more than one representative). These included two private hospitals, a University hospital and an HMO. (The University hospital had already completed the training before but wanted extra training.) The HMO had change in rates from 77% to 93%. Interestingly, by separating out all of the same HMO from all of the data, we find that at the initial time, only 5 of 26 hospitals had 100% smoking cessation rates. One year later, 17 of 26 hospitals had 100% smoking cessation rates. This may be indicative that the HMO is aggressively trying to improve their quality ratings; in California their marketing and image are being heavily publicized. They are also implementing universal EMR systems which are known to increase identification/contact of smokers. Therefore, this particular group which had a low starting rate may have had more funds and administrative support to attend training.

The two private hospital systems were already high performing at initiation of the study with 100% rates (though in our initial letter with their older data, they were not at
100%). We cannot comment on whether the training had an effect beyond 100% rates (such as increasing the volume of patients counseled or offering better quality advice). Regardless, their attendance to training showed commitment to improvement. Finally the University Hospital was local to training and has a smoking cessation program in place already. Their attendance to the training may have helped to produce a few more interventionists or tighten their system.

**Design Limitations and Other Effects of the Intervention**

It was mentioned in the initial time period of the study, JCAHO data were sparse. More specifically, at that time, most hospitals had not yet differentiated their areas of care into heart attack, heart failure and pneumonia. The large amount of missing data was problematic for the research design used. Some treatment hospitals received letters with only one of the three areas of care having data. The “threat” of reporting may have been weak given we did not even have complete data. Now hospitals are becoming more aware of JCAHO data demands; the aforementioned barrier of data unavailability is becoming less apparent. JCAHO is now mandating hospitals to comply with Quality Check. Electronic medical records will help to increase data availability as well. Now that data collection is improving, hospitals are able to better “check off” when measures are fulfilled. This may reflect a false improvement where clinicians can quickly mark process measures as once. It was already noted that the VA hospitals has used an electronic check system for years. Almost all VA hospitals have been reporting 100% rates since creation of Quality Check. For example, the 2004 JCAHO quality report for
the VA included in Staying Free disseminations studies reported a 100% rate for smoking cessation advice/counseling. However in an independent audit as part of our study we found that, only 4.2% of all smokers on medical inpatient units in Hospital A were actually enrolled in the Staying Free program, the only smoking cessation program offered to inpatients. There is a large, unexplained gap between the JCAHO reported rates of advice/counseling and the actual enrollment in the only program available. Given its ease of completion, the electronic “check” may be misleading--giving the impression that all patients received an “intervention” when it is unlikely that such was the case.

On the other hand the near 100% rates may be real. This may reflect that with measurement, quality improves. However, the nature of the rate is that it approaches a maximum of 100%. The ceiling of improvement can confound results. Change in rates is more pronounced for initially lower performing regions. Therefore trends cannot be linear but they may approach asymptotes. Due to uncertainty of the final trends, linearity was assumed in the analysis.

Also the fact that we used regions and not individual hospitals in pairing the randomized units caused extra variation in the data. It may have been that two hospitals in a region were so different from one another that the average rate of cessation was not a true indication of their values. However, it would have been difficult to match each hospital perfectly as well since the number of variables to consider that could affect the outcome are numerous (beds, patient population, location, geography, providers, revenue, etc).

Another issue with the data is the fact that Pair A is so varied (large standard deviations in the group). This group has the largest weight in the analysis. If the region is
too large so that hospitals in San Francisco Bay Area are not at all comparable to Southland 1, then the pairing may be invalid. Finally, Pair G could not be included at all, again due to insufficient data from JCAHO. It may have been wiser to use less geography to construct regions and more predefined algorithms. For example, using a few measures of hospitals characteristics, in addition to urban/city/rural setting we could have matched each individual hospital to another, regardless of geography.

The timing may have been problematic as well. One year may not have been sufficient to implement a program to be reflected in JCAHO Quality Check. Even if a program did improve their smoking cessation services, documentation may not be in place in a year or there may be no formal referral process to impact the rates significantly. Those that attended training did so 3 months after receipt of the letter. Actual implementation/improvement after training would take at least a year.

Another barrier to our efforts is lack of site resources for training to difficulty in fully implementing a program. For the latter concern, our training sessions provide case consultation to hospitals so they can best achieve desired results with personalized guidance. As for the former concern, we had established a website at http://bml.stanford.edu/center to offer the hospitals free resources to provide Staying Free. We also provided selected “consultation” through an updated “FAQ and Ask the Expert” page on the site. The final barrier was lack of hospital interest. Given the multitude of requirements and demands on hospitals today, our “threat” of publicity may not be of importance. This is crucial to recognize, since we are evaluating this new method.
A hidden productive step in this intervention process is promotion of JCAHO Quality Check. By publicizing their measures in local media, we help to make the public more aware of their existence. This is useful for the quality effect because the consumer becomes more educated and empowered about their healthcare providers. Even if the community does not access the data, having it made public can help improve quality as hospitals become more aware of their transparency.

This transparency presents threats to hospitals. For example, there is the threat that the hospital may be in an advertisement. If they perform poorly, that impacts image. If they are listed as having insufficient JCAHO data, that also reflects poorly upon the hospital as it demonstrates they may not have the infrastructure to produce compete JCAHO data, or that they are not active in quality assessment. This threat of publicity relates to Protection Motivation Theory.

**Review of the Theoretical Models**

Protection motivation theory (described in Chapter 2) had four components (Boer & Seydel, 1996; Rogers, 1983). The first was the perceived severity of the threat. It is possible that the letter sent to the hospital CEOs and administrators was not a high priority or very threatening or even read; this may have led to a low response rate. The threat of publishing their quality data may not have been as dreadful as other threats facing hospitals now. The second component is the perceived possibility that the threat will occur. In order to reinforce this, we should have sent reminder letters to the administrators. An even more bold approach would have been to try to contact each
recipient by phone to follow up and ask if they have any questions. The efficacy of positive preventative behavior is component three. Given that there was only a year to improve, a healthcare organization may not have perceived there was enough time to implement a positive change that would have been efficacious. This and shortage of resources lend to decreased self efficacy of adherence to a plan (component 4).

The Berwick theory of change states that it requires discomfort and tension (Berwick, 2002). Furthermore it states that publicly reported data can lead to improvement through patient selection or assisting in provider change. It was intended that our intervention would function at both levels. First, the letter (public reporting) would help hospitals identify an area of improvement where change can occur: smoking cessation advice. Second, patients would observe public reports and this would affect selection. This intervention likely had less effect on the patient since prior research has shown that the patient is not as interested in public reporting of hospital quality data when compared to hospitals. Finally, Hibbard et al (2005) suggested that Berwick integrate a third component of how public reporting affects change: public image. This study was intended to directly influence public image of a hospital through the intervention. On a larger scale, it appears the existence of JCAHO data affects hospitals’ perception of public image. The secular increase in smoking cessation performance (and all other measure performance) demonstrates that hospitals are responding to JCAHO publication of data. First they are likely implementing better methods of collecting JCAHO performance data. Next, they are hopefully implementing means to better adhere to the measures. The motivation behind these changes is partly influenced by image:
JCAHO scores are part of a hospital’s image and in order to profit, run and attract patients/staff, the hospital needs to preserve that image.

The stronger motivation is financial. Based on the enactment of the Social Security Amendments of 1965, hospitals with Joint Commission accreditation were deemed to meet the Medicare hospital conditions of participation. This is important because for a health care organization to participate in and receive payment from the Medicare or Medicaid programs, it must meet the eligibility requirements for program participation, including a certification of compliance with the conditions of participation, or standards, set forth in federal regulations. This certification is based on a survey conducted by a state agency on behalf of the Centers for Medicare & Medicaid Services (CMS) or through use of JCAHO accreditation. In addition to the CMS funding incentives already in place, there is a prospect for Pay for Performance models. In mid 2007, the CMS prepared and submitted a proposal to Congress outlining its draft plan for a new program of financial incentives tied to hospital performance.

It involved a value-based purchasing (VBP) strategy to reward providers for meeting measures of healthcare quality. The root of this was in 2005 when The Deficit Reduction Act (DRA) of 2005 authorized CMS to develop a VBP plan for Medicare hospital services beginning in 2009. Since the development of the initial plan in 2007, the Senate Finance Committee has been revising the plan for implementation. Hospitals are aware of the prospect of a pay for performance model in which there are benchmarks sets and extra incentives for high performers. Because CMS works with JCAHO measures, hospitals are inclined on their own to improve on those measures (U.S. Department of Health and Human Services, 1997).
The final theory presented was the push-pull-capacity model (Curry, 2000). Hospital administrators and providers are aware of the push of inpatient smoking cessation research success. Our letter intended to offer more of a push of evidence of success in programming through free training. The market pull is the same pull described by Berwick: public reporting and publicity through JCAHO and our advertisement also fueled by federal money. Finally we helped to increase capacity by offering free training to implement smoking cessation methods based on their infrastructure. It was predicted that the combination of these three factors would lead to measured change. While the intervention had no effect, JCAHO performance measures as related to Centers for Medicare & Medicaid Services funding on their own may contribute to the push and pull. The scientific push is the fact that JCAHO acknowledges smoking cessation to be important enough to be a core measure in accreditation for funding. The pull is that JCAHO measures have credibility in the healthcare market in conjunction with CMS.

Research Question 2 Restated

Research Question 2: What factors affect a hospital's smoking cessation rates and change in those rates?

Hypothesis: This is an exploratory analysis intended to find what, if any, hospital characteristics are stronger in predicting improvement. Factors include bed size, length of stay, revenue and discharges.

Regression of change based on other hospital characteristics
The regression model in Table 7 built to predict change in rates produced interesting results. Change was significant correlated independently to initial rate, intervention, beds, average length of stay and revenue. Controlling for each variable, in the actual regression model, composite baseline rate was significant as was length of stay. We discuss the latter finding first. Length of stay was inversely related to change in rate. That is, hospitals where patients stay shorter periods had greater increases in smoking cessation rates. This is counterintuitive since longer stays usually indicate more opportunities for advice. On the other hand, more efficient hospitals may have more efficient advice methods as well. In a future study or in future training outreach efforts it may be useful to target hospitals with longer stays since it appears that those are lower-performing and because smoking cessation advice may have a bigger impact with patients who stay in the hospital longer.

The second more interesting and meaningful variable is composite baseline rate. This was also negative, indicating that hospitals with lower baseline rates had greater increases in advice rates. This reaffirms prior conclusions that using JCAHO rates in this type of a study are difficult because eventually all hospitals reach 100%. In fact, given the linear curve estimated using all measures in Table 11, California hospitals in theory would reach 100% quality rates across the board by the last quarter of 2009. Clearly the non linear tendency of this data, driven by the maximum possible value is an issue.

Regression Limitations
The main concerns related to research question two are with data. Fortunately the data that we analyzed were public. Therefore little or no IRB approval is required. On the other hand, this public data presented a wealth of information. While this was useful, it may have also been a bit overwhelming. It was important to predefine variables of interest, limit analyses to California and select specific procedures to prevent making multiple comparisons.

A second point of concern in this section relates to data availability. Because of missing JCAHO data and even more patchy American Hospital Database information, the number of points used to build this regression model was less than desired. Data from other sources on hospital characteristics could have filled the gaps. However, because each source has their own definitions of revenue and discharges, it was decided to not add inconsistent information. More complete data on hospital characteristics may have helped produce more meaningful results. In addition to the regression analysis this problem and concern also applies to the GLM section below.

**Research Question 3 Restated**

Research Question 3: What effect does the existence of JCAHO performance measures have on Hospital Quality (as defined by those measures)? If there is an effect, what areas of care are most impacted?

Hypothesis 3a: Over a two year period, hospitals in California will demonstrate improvement in JCAHO smoking cessation advice rates.
Hypothesis 3b: Over a two year period, performance on all measures assessed by JCAHO will improve.

Hypothesis 3c: Hospitals will show greater improvements in performance for measures that assess process rather than outcome. (Smoking cessation advice is an example of a JCAHO process measure.)

**Design Considerations**

In Table 10, we present the Generalized Linear Model ANOVA to examine how performance rates change with hospital characteristics. The decision to divide the hospital characteristics into two categories for the generalized linear models was to make a simple model that did not make too many comparisons. The first point is for understandability; by dividing variable into two groups such as low revenue and high revenue, we can easily observe a trend if any are present and not struggle to make a conclusion. Second, if too many divisions are made, the degrees of freedom increases and the chance for type II error increases. The last statistical note is the use of Greenhouse-Geissner corrections, recommended based on the sphericity assumptions of the repeated measures model; this helps to reduce errors due to inequality of variances.

The first graph in this section (Figure 13) has no between subjects’ considerations and shows a significantly linear increase in all measures of quality over the 8 quarters. Again, the linearity in the next year may be less obvious since we asymptotically approach 100%. However, it is important to note again the secular trend of improvement in California hospitals. Having quality measures in place and collecting data improves
quality since those elements relate to funding. It may be that hospitals are better
documenting information through electronic medical records now in place. On the other
hand, the quality goals for accreditation from JCAHO may help to encourage provider
adherence to implementation of evidence based activities. Finally, the increased
awareness from hospitals that their data is made public may also help to increase rates.

Referring to Figures 14-16 with individual measures, among all the measures
shown, smoking cessation had the most steady improvement. This echoes the findings in
the original JCAHO data report (Williams et al., 2005). Again we see the problems of
measures that are high initially; they do not improve much. Looking specifically at
individual measures, we can make some conclusions. Oxygen assessment is consistently
high; this is likely due to the fact that it is a vital on most charts. That is, it is recorded
just as blood pressure, heart rate and temperature are recorded. Also no service is given
here; just a measurement is taken, so 100% rates should already be in place. The next top
three lines are in the area of medication given. This is a bit more difficult since action
must actually be taken to fulfill these requirements, but for heart patients, aspirin and beta
blockers have also been in place for a while. Factors such as blood cultures for
pneumonia may have seasonal variation, lending to the jagged curve. Based on the load
of pneumonia patients, caregivers may be more or less burdened and more or less
cognizant of the importance of blood cultures. Hospital advisories also affect culture
requests.

The lower performing measures in Figure 16 have a couple of promising steady
increases including discharge instructions and pneumococcal vaccines. While discharge
instructions should be universal in care, an item like pneumococcal vaccination for
pneumonia patients may be increasingly popular. Guidelines for this are changing currently and hospitals may also hesitate for universal vaccination due to shortages. (It would be interesting to follow infection measures for 2009 during emergence of H1N1.)

When separating quality ratings by area of care (Figure 17), we see heart attack care as having the highest initial and final rate with heart failure at the bottom. Table 12 displays a list of measures in each measure set from the JCAHO website (Joint Commission on Accreditation of Healthcare Organizations, ).

### Table 12: Individual Measures in Measure Sets

<table>
<thead>
<tr>
<th>Heart Attack Care:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• ACE inhibitor or ARB for LVSD</td>
</tr>
<tr>
<td>• Adult smoking cessation advice/counseling</td>
</tr>
<tr>
<td>• Aspirin at Arrival</td>
</tr>
<tr>
<td>• Aspirin prescribed at discharge</td>
</tr>
<tr>
<td>• Beta blocker at arrival</td>
</tr>
<tr>
<td>• Beta blocker prescribed at discharge</td>
</tr>
<tr>
<td>• Inpatient mortality</td>
</tr>
<tr>
<td>• PCI Received Within 120 Minutes of Hospital Arrival</td>
</tr>
<tr>
<td>• Thrombolytic Agent Received Within 30 Minutes of Hospital Arrival</td>
</tr>
<tr>
<td>• Time to PCI</td>
</tr>
<tr>
<td>• Time to thrombolysis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Heart Failure Care:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• ACE inhibitor or ARB for LVSD</td>
</tr>
<tr>
<td>• Adult smoking cessation advice/counseling</td>
</tr>
<tr>
<td>• Discharge Instructions</td>
</tr>
<tr>
<td>• LVF assessment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pneumonia:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Adult smoking cessation advice/counseling</td>
</tr>
<tr>
<td>• Antibiotic timing</td>
</tr>
<tr>
<td>• Blood cultures for pneumonia patients admitted through the Emergency Department</td>
</tr>
<tr>
<td>• Blood cultures for pneumonia patients in intensive care units</td>
</tr>
<tr>
<td>• Initial Antibiotic Received Within 8 Hours of Hospital Arrival</td>
</tr>
<tr>
<td>• Initial Antibiotic Received Within 4 Hours of Hospital Arrival</td>
</tr>
<tr>
<td>• Initial Antibiotic Selection for CAP in Immunocompetent – ICU Patient</td>
</tr>
<tr>
<td>• Initial Antibiotic Selection for CAP in Immunocompetent – Non ICU Patient</td>
</tr>
<tr>
<td>• Influenza Vaccination</td>
</tr>
<tr>
<td>• Oxygenation assessment</td>
</tr>
<tr>
<td>• Pneumococcal vaccination</td>
</tr>
</tbody>
</table>
Heart failure care, the lowest performer, has the least amount of indicators to fulfill. It would seem that hospitals are able have higher quality rates when there are less requirements demanded of them. Also heart failure had the most room to improve. Heart attack measures include 4 on admission and discharge drugs which may make fulfilling those easier since they are linked.

Next, the hospital characteristic graphs in Figures 18 show distinct differences in quality trends. Larger hospitals and those with higher revenue have higher initial and final quality rates. It is reasonable to assume that in California, hospitals that are larger with more resources have a more vested in interest in maintaining higher quality initially. The less equipped hospitals are following, but still are behind. Quality improvement initiatives need to focus on helping disadvantaged hospitals meet guidelines. In smoking cessation for example, where a service is required, less staffed hospitals may not have the resources to devote to this. Vaccinations are another prime example where there may be limits on availability.

Final Comments on Public Reporting, Responses and Quality Measures

To begin to summarize some of the major concerns of the intervention design, we note that it is questionable if patients will change their healthcare providers based on this type of data. While the individual patient may not have this option, insurance companies, work places and larger payers can respond to quality information. “Pay for performance” is a concept that will also seek out quality information JCAHO notes. Finally with notion
of universal healthcare on the horizon, the patient may have more control over their health and these measures may affect insurance providers. (We hope that these measures are not lost in efforts are not lost in future efforts to reach more patients with national healthcare plans, and that instead they are enhanced.) Even if the data have no effect, quality in hospital care becomes even more important as the reach of patients is even greater. There also remains the question of whether patients will also access JCAHO quality data.

In terms of the sub benchmark rates of smoking cessation advice in hospitals, it is important to note that this is disheartening. The evidence has been long standing that smoking cessation is important anytime a health provider encounters a smoker. Just a sentence is required to initiate change. No treatment, equipment or follow up is needed to meet this guideline (Lancaster & Stead, 2004). The fact that 100% of smokers are not yet receiving that simple advice may seem to not be a great reflection on hospitals. It is our hope that documentation is to blame for this and not a harsh reality about priorities in medical care delivery. What is admirable is the improvement noted in this study in just one year. If this improvement continues, then we will see near 100% advice benchmarks met soon.

JCAHO only uses a process measure where advice can be as simple as one sentence given to the patient at the bedside and can also vary (DeFrances & Hall, 2007). Ultimately outcome measures need to be tracked to effectively assess conditions. However, given the laxity of the current process measure, hospitals can hopefully 100% rates. More and more studies find that JCAHO processes can not yet be linked to outcome (Griffith, Knutzen, & Alexander, 2002). (Interestingly in JCAHO
documentation, they note that their current emphasis is on process and not outcomes of care (Joint Commission on Accreditation of Healthcare Organizations, 2008)).

Earlier it was mentioned that rates will soon approach this asymptote. How does this affect research studies such as these? Results become less meaningful, as was apparent in the previous chapter. In order to produce meaningful data, JCAHO should adopt a policy of creating outcome measures. In smoking cessation advice, the outcome is obvious: success at say, six months. Other measures are more useless without outcomes. For example, left ventricular function assessment is not of any use if action is not taken on that assessment. The patient’s response relies on the assessment, timing, action, follow up and so on. A better measure would take into account the goal of the assessment.

Impact of Findings: Audience and dissemination of research

The first audience was the directors and administrators of hospitals. They were contacted in the intervention process and will hopefully remain aware of the results and JCAHO data. We know that this is almost guaranteed as a result of funding threats/incentives. The second audience was the health care consumer population in the treatment regions who were provided information about their hospitals' performance on this measure through local media. The third "audience," and from a patient centered care perspective the most important one, will be those individuals who are hospitalized for heart attack, heart failure and pneumonia care and used tobacco before admission. Hopefully by stimulating change the patients will be provided with better care. A fourth
audience will be policy makers, JCAHO and other groups and individuals who might find the strategy useful, should it be effective. In addition to this group, we anticipate those involved in health care quality improvement will be interested in the method used. Other possible groups include those that study social marketing.

**Future Goals and Directions**

In the initial design of this study we planned to pilot the intervention in California, then expand efforts to the entire country. A sample randomization map of US regions is shown in Figure 22. In order to complete such a study, it would also be more useful to have matched hospitals and regions on a more detailed basis. A real effect or change may be more apparent if the period of analysis is longer than 1 year. Because of the initial findings of this methodology, it would be better to focus on other efforts.
For example, it would be useful to assess the assessment process. A study in which hospitals track outcome measures in addition to smoking cessation advice rates could be designed. For those patients in the JCAHO survey, follow up through EMR could assess smoking status after 6 months. This could be piloted in select JCAHO hospitals and compared to control hospitals to assess whether adding an outcome to a process measure increases adherence to the process measure.

Next, a major finding in this paper was that the act of data collection/public reporting alone lead to improvement on the hospital end. A future study could help determine how patients (the consumer) respond. Mass publication of JCAHO data availability could be done and randomized surveys of patients and healthcare staff would reveal the public impact of JCAHO data presence.
As healthcare changes in our country, the consumer is becoming more aware of high quality versus low quality care. Right now is an ideal time to publicize JCAHO data to patients, to empower them and hopefully motivate hospitals to reach 100% quality rates.

**Concluding Remarks**

While we did not demonstrate efficacy of a new intervention, we did show that recording/publicizing quality rates to the public and to health care organizations affects change both indirectly (image) and directly (financially); furthermore this helped to demonstrate the impact JCAHO has on quality. While the drive to improve is likely financial, there is a potential for image to play a part. Regardless of the cause, for the sake of the health of our nation, it is reassuring to know that smoking cessation advice rates and other quality measures are on the rise.
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