TELEMEDICINE IN THE MEDIA: ATTRIBUTE AGENDA SETTING IN CALIFORNIA’S PRINT NEWS

Rikki Lee Roehrich
B.A. California State University, Sacramento 2006

THESIS

Submitted in partial satisfaction of the requirements for the degree of

MASTER OF ARTS

in

COMMUNICATION STUDIES

at

CALIFORNIA STATE UNIVERSITY, SACRAMENTO

SPRING
2010
Student:  Rikki Lee Roehrich

I certify that this student has met the requirements for format contained in the University format manual, and that this thesis is suitable for shelving in the Library and credit is to be awarded for the thesis.

__________________________, Graduate Coordinator
Mark Williams, Ph.D.  

Date

Department of Communication Studies
Abstract

of

TELEMEDICINE IN THE MEDIA: ATTRIBUTE AGENDA SETTING IN CALIFORNIA’S PRINT NEWS

by

Rikki Lee Roehrich

This study investigates California newspaper articles from a two year time period to identify the substantive and affective attributes that comprise print media coverage of telemedicine. A total of 206 descriptions were identified and a qualitative content analysis was conducted in order to determine the major attribute categories for descriptions of telemedicine. Seven categories were revealed, including descriptions of: the technologies used for telemedicine, the ability to provide access to medical services, details of implementation, the quality of medical care, financial aspects, the convenience of using telemedicine, and other descriptions. Of these, over half of the descriptions focused on the technology or access attributes of telemedicine. All descriptions were also quantitatively coded for the level of affect. A Chi square analysis revealed that while descriptions were predominantly positive across all of the articles, the urban-based news sources tended to discuss telemedicine in a more positive tone than rural-based sources. Through the emphasis of the access and technology attributes, there is support for the premise that these attributes may become the most salient attributes to the audience. As the tone is predominantly positive, additional research is necessary to determine if this may serve to prime the audience to accept telemedicine.

_______________________
Carmen Stitt, Ph.D., Committee Chair

_______________________
Date
ACKNOWLEDGEMENTS

There are many people who have contributed to this project that I would like to recognize for their assistance. My dedicated committee provided much guidance, motivation, and inspiration. Dr. Stitt, Dr. O’Connor, and Dr. Foss-Snowden, your efforts are very much appreciated.

Also, to my family and friends, I cannot thank you all enough for all of the support and patience you have shown me.
TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Acknowledgments</th>
<th>v</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Tables</td>
<td>viii</td>
</tr>
</tbody>
</table>

Chapter

1. INTRODUCTION ................................................................. 1
   Background and Statement of Problem .................................. 3
   Rationale ........................................................................... 7

2. A REVIEW OF THE LITERATURE ............................................. 10
   Telemedicine ................................................................. 10
   Agenda Setting and Attribute Agenda Setting ....................... 15
   Attribute Agenda Setting Effects (Priming) ......................... 18
   Attribute Agenda Setting and Health Care .......................... 21
   Attribute Tone .................................................................. 24
   Tone in Health Communication ....................................... 26

3. METHODOLOGY .................................................................. 28

4. ANALYSIS OF THE DATA .................................................... 32
   Artifact Selection .......................................................... 32
   Attribute Identification and Coding .................................. 33
   Tone Identification and Coding ....................................... 42

5. DISCUSSION, LIMITATIONS AND CONCLUSION ..................... 46
   Attribute Agenda Setting ................................................ 46
   Tone ............................................................................... 51
   Limitations ...................................................................... 53
   Implications for Future Research .................................... 55
   Concluding Remarks ..................................................... 57
LIST OF TABLES

Page

1. Frequency of Valence Determined for Rural and Urban News Sources .......... 45
Chapter 1

INTRODUCTION

American media perform many societal functions including educating people, raising consciousness for issues, and indirectly shaping public attitude for a wide variety of issues on a day-to-day basis (Bullock, Wyche, & Williams, 2001; Kim, Scheufele, & Shanahan, 2002). The media are also responsible for providing timely, fair, and balanced news which ultimately allows the public to make informed and educated decisions (Brunken, 2006). Newspaper articles, above other media sources, are a vital and trusted source of health related information for many people (Feeley & Vincent, 2007).

One emerging topic area appearing in newspapers is the use of advanced communication technologies for telemedicine applications. Telemedicine technologies have been increasingly used over the past two decades. This is especially true in the state of California which boasts one of the most extensive telemedicine networks in the world. Yet, fewer than three percent of Californians have participated in a telemedicine consult (Johnston & Solomon, 2008). Therefore, for many individuals in California, newspaper articles that describe and define the technology and applications may serve as their first exposure to telemedicine.

Telemedicine technologies were first implemented as a solution for disparities between medical care in urban and rural areas. Essentially, access to specialist physicians is highly concentrated in urban areas, with very few serving rural populations (Preston, 1995). The culmination of this is that those living in medically
underserved communities typically receive inferior medical care or have to travel great
distances to receive care, which can have dire implications for their health, especially in
instances requiring emergency care (Doheny-Farena et. al., 2003). Given this, the use of
telemedicine typically benefits rural populations in greater proportion than urban
populations.

In a traditional newspaper format where space is an issue, not all aspects of a
topic can be included. Furthermore, decisions are made about whom to quote and who
does not get quoted in an article (McCombs & Shaw, 1972). These choices culminate in
some issues being made more prominent in the media than others. This translates into
the same issues ultimately becoming more prominent to an audience (McCombs,
Llamas, Lopez-Escobar, & Rey, 1997). Agenda setting helps to explain how this
process takes place, in that attribute agenda setting shapes reality by determining what
issues the public believes are important and how they perceive those issues, thereby
affecting public opinion through priming (Brunken, 2006).

Priming is an extension of agenda setting theory. Whereas attribute agenda
setting determines how an issue or object is being defined or described in media,
priming is concerned with the consequences of agenda setting techniques (Weaver,
2007). Priming occurs when audience members rely on the objects or attributes that are
most salient to them at the time they make decisions (Kim et. al., 2002). Essentially, it
is biologically explained in that nodes within the brain become stimulated by data, and
once a node has been activated, or primed, it becomes more accessible when making
decisions or evaluations (Brewer, Graf, & Willnat, 2003). Evidence of priming, through
the identification of attributes shaping telemedicine in the media, can be found within newspaper articles.

This study analyzes print articles in California to determine which attributes of telemedicine are used to define or describe what telemedicine is to the audience. Further, these attributes will be quantitatively coded to determine if there is a difference in the affective tone used in rural and urban based news sources in California. This is imperative given that the benefits and costs associated with using telemedicine impact these populations differently. As such, the research questions for this study are:

RQ1: What are the most common attributes of telemedicine in print newspapers in California?

RQ2: In telemedicine newspaper articles, is there a difference in tone when discussing attributes between rural and urban print news sources in California?

**Background and Statement of Problem**

If one paid attention to mass media, including statements by politicians as well as the general public, one might quickly deduce that the health care system in the United States is currently in a state of crisis. Since health care reform legislation was introduced in Congress under the Obama administration late fall of 2009, health care reform has been one of the most closely followed news stories, even overshadowing recent economic concerns and stories (News Interest Index, 2009, August 6; News Interest Index, 2009, November 19).

Much of the rhetoric surrounding health care reform calls for increased digitization as one way by which to solve some of the ailments of the health care system.
However, this can lead to dramatic changes in the methods of health care delivery in this country. Ratzan (2009, p. 1) states that “In 2009, we have new hope for health as information and communication technologies have come of age, moving beyond experimentation to application to real world challenges.” Telemedicine programs that include real-time video connections between physicians and patients represent one method of increased digitization, and reflect one of the most drastic forms of the changing and evolving modalities of health care delivery.

This thesis seeks to analyze newspaper media coverage of telemedicine in order to gain insight into how an understanding of telemedicine programs, both in rural and urban California, is created through print news sources. As telemedicine programs historically benefit rural communities disproportionately (Bareiss, 2001), there is some support for the premise that coverage of this phenomenon may be different in rural versus urban news sources. In the 2006 elections, California’s voters earmarked $200 million for expansion of the state’s telemedicine programs (California Telemedicine & eHealth Center, 2009) indicating that telemedicine use is socially acceptable, if not advantageous for medically treating rural communities. This thesis is a historical analysis of media coverage leading up to the election in order to characterize how newspaper articles presented information about telemedicine. The analysis will focus on attributes of telemedicine found in the articles rather than public perceptions of telemedicine.

Telemedicine most commonly refers to the use of telecommunications technologies, including real-time videoconferencing and asynchronous store-and-
forward systems-to provide health care from a remote location (Johnston & Solomon, 2008). The use of telemedicine as an alternative to traditional medical consults has been embraced by the medical community, policy makers, and the media. As Bareiss (2001) articulated, “time and again, mass media seize upon new technologies as the harbinger of health, democracy, wealth, peace, universal education and other cultural ideals” (p. 350). As an emerging technology, and one that is most likely going to play a large part in the ongoing health care reform debate currently raging in this country, it is important to understand how telemedicine is being depicted in the news media. This is critical because depictions of telemedicine in news coverage have consequences for how people perceive the technology and its role in medical care (Bareiss, 2001). Potentially, these perceptions may lead to political and social support for drastic changes for standards in medical treatment.

The articles selected for this study will be subject to a qualitative content analysis, specifically focusing on what attributes of telemedicine are used to define and describe the phenomenon. Further, this study also seeks to quantitatively determine the affective tone of the attributes in order to further evaluate whether attributes of telemedicine are typically presented in a positive, negative or neutral tone. An unbalanced tone (e.g. articles using any one tone predominantly) could have strong implications for how individuals understand telemedicine as a health care modality. The quantitative results from both urban and rural areas will be compared against one another.
Agenda setting theory is a key component in gauging media influence. This theory finds its roots in the work of Walter Lippmann, who in 1922 believed that the mass media provided a connection between the events happening in the world and the images of these events in our minds (Rogers, Dearing, & Bregman, 1993). Agenda setting theory explains the transfer of salience of objects and their attributes through the media (McCombs & Shaw, 1993; Roberts, Wanta, & Dzwo, 2002). In this context, first level agenda setting salience is “the degree to which an issue is perceived as relatively important based on its relationship to other issues in the media” (Coleman & McCombs, 2007, p. 496).

Whereas first-level agenda setting is focused on issue salience among a broader picture of media stories, second-level agenda setting is concerned with attribute salience within the text. Attributes function as different aspects of a central theme, or frame (Lowry & Xie, 2007). While some scholars believe that second level agenda setting is tantamount to framing (see McCombs & Ghanem, 2001), not all agree with this. Some argue that the difference between the two theories is that framing begins from an explicit cognitive perspective while agenda setting does not (see Maher, 2001; Kosicki, 1993).

In addition to examining what attributes define telemedicine, the tone of the attributes will also be analyzed in this thesis study. News stories, similar to any symbolic message system, contain a tone, or affective component (Newhagen, 1994). In one study examining the relationship between emotional media messages and audience responses to those messages, researchers found that negative messages receive more
attention than positive ones. Furthermore, valence-functioning as a component of emotional experience-has the potential to affect memory within the audience (Bolls, Lang, & Potter, 2001). These findings support the premise that if attributes of telemedicine are generally depicted in a positive, negative, or neutral tone, there will be stronger implications in terms of how positively audience members view, and perhaps even accept, telemedicine as a potential form of medical treatment. For these reasons, studying the tone of attributes within newspaper articles on telemedicine is an additional component of understanding how these stories have the potential to impact audience perceptions of this phenomenon.

**Rationale**

The mass media shape attitudes and beliefs, act as agents of public education, and play a role in determining the policy agenda (Smith & Wakefield, 2006). While the debate about health care reform is played out in the mass media, the voters of the nation will be asked to make many choices about what type of care is acceptable, who pays for it, and who gets care in the near future. Therefore, an increased understanding of how digital health care modalities are presented to the public is crucial.

When discussing health communication, the power of the mass media to impact the general public is quite extensive. Health information conveyed through the media has the power to shape attitudes and beliefs, push forward public education, and play a role in changing policy (Smith & Wakefield, 2006). Telemedicine is a new concept within the field of medicine and often times, the media provide the first exposure to the
concept of using video and other advanced communication technologies to obtain health care.

The state of California frequently leads the country in technological innovations, and has shown strong voter support for the integration of these innovations in medical care. California was one of the first states to pass a law requiring that health care providers be reimbursed when using telemedicine technologies (Johnston & Solomon, 2008). Consequently, this has contributed to the proliferation and early adoption of innovative programs (Johnston & Solomon, 2008). The passage of Proposition 1D in California’s 2006 elections is historic in its huge impact on the use of advanced communication technologies in the medical field. This proposition allocated $200 million to the University of California for the creation of infrastructure, increasing medical enrollment, and the expansion of telemedicine services state-wide (California Telemedicine & eHealth Center, 2009). This will ultimately serve to further broaden the reach of telemedicine programs within California. Given that telemedicine programs have been growing within the last decade or so, and that the rate of growth has accelerated markedly in the last couple of years it seems likely that the use of telemedicine will continue to increase exponentially in the near future. Therefore, it is important to understand how media coverage may have contributed to perceptions of telemedicine within the public sphere as similar coverage may continue to be the first exposure to telemedicine for many people.

Newspaper content has been shown to be the primary resource for health news above all other media (Feeley & Vincent, 2007). Furthermore, newspaper stories often
times set the agenda for television news stories (Kim & McCombs, 2007). Therefore, examining newspaper articles could have implications for other media sources as well. While newspaper circulation rates are lower than they have been traditionally, readership of Internet news stories is increasing (Pew Research Center for People and the Press, 2008) meaning that stories generated by newspapers are still an integral part of how individuals get their information.

Taken together, an understanding of how media theories explain potential effects from content within articles on telemedicine will lead to a greater understanding of how this phenomenon is being presented to the public. In light of the findings from this study, implications relative to other attribute agenda setting and priming studies will be discussed. This is imperative given the mass media’s powerful role in conveying health related information.
Chapter 2
A REVIEW OF THE LITERATURE

This study examines specific elements of media agenda setting including the object attributes and tone used in describing telemedicine in both rural and urban California. First, a discussion of the history and evolution of telemedicine, including California’s uses of telemedicine, is presented. This will be followed with a theoretical discussion of first and second-level agenda setting and its distinction from priming, as well as a discussion on the application of these theories within health communication. Additionally, the role of affective tone in print news as well as implications related to memory when something is told in a positive tone versus a negative tone will be discussed. Affective tone and its implications within health communication will also be reviewed.

Telemedicine

Within the last several decades, there has been a fundamental shift in how the physician-patient interaction is occurring. Physician tasks, once completed in-person with a residual paper trail, are now being completed remotely with the assistance of computer-mediated communication tools. Physicians no longer write prescriptions on pads, but rather submit a request for pharmaceuticals electronically to the pharmacy of the patient’s choice. Additionally, the taking of a medical history, which used to be completed dyadically with an extended medical interview between patient and physician is now replaced with an electronic history, altering the communication by making the physician’s first action during an appointment being to go to the computer
to get ‘briefed’ about the patient rather than going to the patient for relevant information. These are just a few examples of how patient care and access to medical treatment are being changed through the adoption of digital technologies (Bauer, 2002).

The creation and implementation of digital technologies in the medical field has spawned many new terms including: ehealth, telehealth, telecompetence, teleconsultation, and telemedicine (Matusitz & Breen, 2007). The term telemedicine has evolved to the point where we now see subcategories for specific specialties that are offered through telemedicine, including telepsychiatry, teleradiology, telenursing, telehospice, teleophthalmology (Whitten & Sypher, 2006), teleoncology (Allen & Hayes, 1994), and teledermatology (Mort, May, & Williams, 2003) among others. The proliferation of these terms is parallel to the proliferation of the technology within the medical setting; as the technology has developed and evolved, so have the medical applications and specialties. Starting in 1959, the growth of telemedicine and its related services has been markedly rapid, with all fifty states having at least one telemedicine program by 2000 (Bashshur, Reardon, & Shannon, 2000).

The first telemedicine use occurred in 1959 when microwave television systems were used in a closed circuit setting to allow communication between the Nebraska Psychiatric Institute and Norfolk State Hospital for the purposes of training and research (Wittson & Benschoter, 1972). Despite the early interest in using these technologies for civilian medical applications in the United States, the programs were typically externally funded through government assistance. None of the projects lived past 1986, when funding for many of them was pulled (Whitten & Sypher, 2006).
Telemedicine resurged in the U.S. as a viable treatment alternative in the 1990s. During this period, a meteoric growth of telemedicine-related programs in the United States can be attributed to continued advancement of the technology itself as well as data compression methods, and lower costs for implementing the programs (Weinman, 2007). In 1990, there were only four active programs in the U.S., by 1998 there were 200 programs. Currently, telemedicine has proliferated to such an extent in this nation, with more programs continuously being added, that quantifying the actual number of active programs is difficult, if not impossible. (Whitten & Sypher, 2006). This trend shows no indication slowing down (Ratzan, 2009).

Within the state of California, the University of California, Davis was the first institution to implement a telemedicine program in 1992 with Kaiser Permanente following suit in 1994 (Johnston & Solomon, 2008). With the adoption of the Telemedicine Development Act of 1996, California’s Legislature displayed a commitment to expansion of telemedicine programs. Since that time, many grants and endowment funds have been allocated to further expansion of telemedicine programs (Johnston & Solomon, 2008). With the combined monetary resources from Proposition 1D and an additional $22 million from the Federal Communication Commission, development and expansion of a statewide telehealth network is currently in progress (Johnston & Solomon, 2008). This ensures that telemedicine as a health care modality is likely to become more common in California.

The use of telemedicine includes activities involving direct physician-patient contact or communication between physicians concerning a patient (Bareiss, 2003).
Defining what exactly telemedicine is has been a difficult task given the rapid rate of technological advancement and implementation of these technologies. As a result, the language used to define the parameters of telemedicine and its research has not been able to keep up thus far. There have been many different definitions asserted. On a basic level, all definitions provide for geographic separation of doctor and patient as well as a mediated context for communication to replace in-person interaction (Bareiss, 2003; Mort et. al., 2003; Roback & Herzog, 2003). A commonly cited definition of “the use of telecommunications technologies-primarily real-time videoconferencing and asynchronous store-and-forward systems-to provide health care remotely” (Johnston & Solomon, 2008, p. 3) will serve as the operational definition of telemedicine.

The impetus for telemedicine was initially to provide a solution to close the gap in medical disparities between rural populations and their urban counterparts. Specialist physicians are highly concentrated in urban areas, whereas in rural areas, there is often a deficiency, if not complete lack of, medical expertise (Preston, 1995). As a result, this can jeopardize the health of the approximately 28 million Americans who live in medically underserved communities (Mort et. al., 2003). This disparity can also have dire implications for rural residents. Doheny-Farena et. al. (2003) found that both rural adults and children die at nearly twice the rate of their urban counterparts from vehicular accidents, homicides, falls, and suicides due to a lack of immediate trauma care. Another recent study showed that over half of deaths from car accidents occur in rural areas despite the fact that only 25% of the population resides there (Latifi et. al.,
This translates into a mortality rate that is twice as high for rural populations (Gupta & Sao, 2010).

Telemedicine has been a proposed solution for these problems within the medical community. It is an endeavor that has raised great expectations among proponents as it offers the promise of a global clinic that has been revolutionized by new technologies. It is also a dimension where temporal and geographic barriers do not exist as obstacles in the patient’s quest for medical care (Mort et. al., 2003). Because of these perceived benefits, there has been a widespread and rapid move within the medical community to bring telemedicine to as many areas as possible as quickly as possible. Recent health care reform proposals may further accelerate the rate of adoption of telemedicine technologies. For example, Gupta and Sao (2010) call for telemedicine practices to be federally regulated opposed to the current state regulated scheme. This effort would increase the uniformity of telemedicine standards and encourage inter-state telemedicine programs, opening the door for expansion opportunities that are currently prohibited. Furthermore, Obama has indicated his intent to spend upwards of $50 billion in health information technology infrastructure, resulting in a fundamental change in the approach to health care at all levels as well as the role of digitized communication in the patient-physician relationship (Doarn & Merrell, 2009).

Taken together, these reforms in addition to many others promise to continue altering the medical landscape through increased digitization. It is likely that U.S. citizens will become much more familiar with the concept of telemedicine over the next
couple of years. For some, this exposure will initially happen in a medical setting. For many, media coverage of telemedicine will serve as their initial contact with it. Ultimately, the media has the potential to shape and influence perceptions concerning what telemedicine is and what effect its use will have on medical treatment practices for all. For these reasons, a better understanding of media coverage of telemedicine is imperative.

**Agenda Setting and Attribute Agenda Setting**

In 1922, Walter Lippmann argued that the media create a pseudoenvironment. That is, media provide a simplified recreation of the actual circumstances, from which consumers gain an understanding of the world. Though the term agenda setting is never used by Lippmann, his research paved the way for later theorists to expand upon the relationship between the media and individuals’ understanding of those topics covered by the media.

The actual term of ‘agenda setting’ was first used by McCombs and Shaw in a 1972 article where they refined Lippmann’s ideas and asserted that media consumers “learn not only about a given issue, but also how much importance to attach to that issue from the amount of information in a news story and its position” (p. 176). The driving idea behind this is that people learn what they know typically from the mass media itself or from interpersonal interactions with others who are equally influenced by the media. In turn, this process helps audiences to determine the relative importance of social issues (McCombs & Shaw, 1972). Essentially, topics and their attributes that are salient in the media are transferred to audiences (McCombs & Shaw, 1993; Roberts...
et. al., 2002). In this context, salience is “the degree to which an issue is perceived as relatively important based on its relationship to other issues in the media” (Coleman & McCombs, 2007, p. 496). The agenda can best be defined by Takeshita when he states that it is “objects accorded saliency in the media content or in people’s consciousness” (1997, p. 20).

Since agenda setting first appeared in the literature, it has been subject to a very rapid and continuing expansion of its theoretical perspective. The evolution of agenda setting theory has also demonstrated that the media act as gatekeepers. Essentially, media gatekeeping is “the process by which countless messages are reduced to the few we are offered in our daily newspapers and television programs” (Shoemaker, 1996, p. 79). Not all news that could potentially be news is ultimately covered and disseminated. Through journalists’ and editors’ selection in how to cover an issue as well as what topics they choose to cover, or what is deemed newsworthy, these gatekeepers can create a sense of community and promote social consensus (Shaw & Martin, 1992).

Over twenty years after the publication of their seminal article, McCombs and Shaw (1993) revisited the theory and asserted:

Agenda setting is considerably more than the classical assertion that the news tells us what to think about. The news also tells us how to think about it. Both the selection of objects for attention and the selection of frames for thinking about these objects are powerful agenda-setting roles…These perspectives direct attention toward certain attributes and away from others (p. 62).

Essentially, McCombs & Shaw (1993) argue that Bernard Cohen’s (1963) idea that the media may not tell us what to think, but are successful in telling us what to think about has been disproved. They state, “New research exploring the consequences of agenda
setting and media framing suggest that the media not only tell us what to think about, but also how to think about it, and, consequently, what to think.” (p. 65).

The assumption that media are a strong force for shaping public opinion (Kim et al., 2002) is perhaps one reason why agenda setting research has been so prolific. This power wielded by the media cannot be underestimated (Roberts et al., 2002) though it often is (Smith & Wakefield, 2006). Analysis of media content offers a way to explain how social change occurs in modern society (Rogers et al., 1993) by focusing the public’s attention on a key set of issues. This emphasis in long-term social change is another shift in the focus from traditional agenda setting research that studied short-term attitudinal effects. This has ultimately led to a greater understanding of the role of the media in society (Rogers et al., 1993) by acknowledging that the choices of the media in the consideration and presentation of different perspectives of social problems can have a very potent effect on society (Smith & Wakefield, 2006).

Second-level agenda setting, similar to priming, is considered an extension of agenda setting theory (Scheufele & Tewksbury, 2007). McCombs and Shaw (1972) initially theorized that agenda setting occurred when the mass media put more emphasis on certain issues or objects, through article placement and frequency of coverage, thereby making the issues more salient for the audience. Attribute agenda setting expands upon this premise to state that similar to the manner in which objects vary in salience, so do the attributes, which are “the properties and traits that fill out or detail the content of news stories and people’s thoughts” (McCombs & Ghanem, 2001, p. 72).
The relationship between objects and attributes is perhaps best articulated by Kim and McCombs when they state:

where the term object is used in the same sense that social psychologists refer to an attitude object, the thing toward which our attention is directed or toward which we have an attitude. Beyond this agenda of objects, there is another level of agenda setting to consider. Each object on the agenda has numerous attributes, those characteristics and properties that fill out the picture of each object. Just as objects vary in salience, so do the attributes of each object (2007, p. 300, italics in original)

Succinctly put, this means that in addition to telling the public what to think about, which is the primary premise of traditional agenda setting theory, attribute agenda setting states that the media dictate how to think about the issue (Kim et al., 2002) through the selection and promotion of certain object attributes at the expense of others.

Studies have illustrated that there is a high degree of correspondence between the issue attributes that are more prominent in the media and the agenda of attributes demonstrated among the audience members (Kim et al., 2002). Though they did not use the term attribute agenda setting, Weaver and his colleagues found a strong correlation between candidate attributes that are most prominent in the media and the descriptions assigned by voters that were most salient in the 1976 Presidential election (1981). This finding also held true for the 1995 Spanish regional and municipal elections (McCombs et al., 1997) and the 1994 Taipei mayoral election (King, 1997).

**Attribute Agenda Setting Effects (Priming)**

Priming is often considered another extension of the original agenda setting theory (Scheufele & Tewksbury, 2007) first outlined by McCombs and Shaw (1972). Iyengar and Kinder (1987) refer to priming as “changes in the standards that people use
to make political evaluations” (p. 63). More specifically, priming addresses the ‘impact of news coverage on the weight assigned to specific issues in making political judgments’ (Iyengar & Simon, 1993, p. 368).

The underlying assumption behind priming is that judgments and attitudes are directly correlated with the ease in which instances or associations can be recalled and are therefore more likely to be accessed when forming opinions (Scheufele & Tewksbury, 2007; Weaver, 2007). This relationship is most clearly stated in that:

By making some issues more salient in people’s mind (agenda setting), mass media can also shape the considerations that people take into account when making judgments about political candidates or issues (priming). (Scheufele & Tewksbury, 2007, p. 11).

More pointedly, priming is focused on the consequences of agenda setting for public opinion (Weaver, 2007). Priming offers a way to understand the relationship between media content and its influence on both short-term attitudes as well as long-term social change. This is a rich area for study for media effects scholarship.

Studies documenting the effects of attribute agenda setting on media consumers, or priming, can be traced back at least to a study by Weaver, McCombs, and Spellman (1975) in which they speculated that news coverage of Watergate would influence which issues would be used by the audience to evaluate the political actors. This speculation, though not verified in their study, was later supported when Iyengar and Kinder (1987) linked agenda setting found on television to evaluations of the U.S. president. Subsequent studies linking attribute agenda setting to priming effects include:

Though most literature on the topic of priming in the communication studies field is concerned with gauging public opinion as a result of exposure to media content (Domek, 2009), there is support for the biological process of priming. When areas, or nodes, of the brain are stimulated with data, those same areas become more likely to be used when making future judgments or evaluations. As one study claims, “when a node is activated in memory-or primed-it becomes more accessible and thus more likely to play a role in the formation of subsequent evaluations” (Brewer et. al., 2003, p. 494).

This is further supported by Price and Tewksbury (1997) when they state that “during message processing, salient attributes of a message activate certain ideas, which are thus more likely to be used in evaluations made in response to the message” (p. 486).

The distinction between attribute agenda setting and priming is further clarified by Kim et. al. (2002) in a seminal article in which the term ‘attribute priming’ is introduced. These theorists state that “attribute priming hypothesizes that certain issue attributes emphasized in the media will become significant dimensions of issue evaluation among the public” (2002, pp. 11-12). The relationship between attribute agenda setting and attribute priming effects is the focus of the Kim and McCombs (2007) study from which the current study is based upon. Their study first determines what the agenda is in the 2002 Texas elections through the identification of attributes, and then extends this finding to gauge the correlation between these attributes and public assigned attributes determined by telephone surveys (Kim & McCombs, 2007).
Though the current study contains no component to gauge priming effects in the audience, evidence of priming, or attribute agenda setting, can be determined through the method developed by Kim and McCombs (2007).

**Attribute Agenda Setting and Health Care**

Though primarily used to study political issues or candidates, the methods used in agenda setting studies can also be applied to demonstrate how non-political objects and their attributes are presented in the media, including institutions, brand names (McCombs & Ghanem, 2001), and advertisements (Jahng, 2009). Despite the fact that many agenda setting theorists question the applicability of the theory outside the political realm (Jahng, 2009), McCombs (2006) believes the theory will thrive even in new domains.

The general public often relies on the mass media as an integral source of health-related information (Feeley & Vincent, 2007) and due to its ability to serve as both a creator of or mediator for public concerns, the media can “promote health either directly, by altering individual behaviors, or indirectly, by changing the social environment” (Sato, 2003, p. 36). It has been noted that the construction of news stories and issues often reflects cultural norms and expectations (Smith & Wakefield, 2006), so one can expect that the media serve as a source for conveying health-related cultural norms and expectations as well, making health communication a viable and rich venue for agenda setting analysis (Qui & Cameron, 2006).

Though the breadth of knowledge concerning agenda setting as it applies to health communication is not nearly as exhaustive as that which applies the theory to
political communication, there are several studies worth noting. Pierce and his
colleagues (1987) were among the first to extend agenda setting to health
communication and found that the mass media play a role in attitude change among
smokers during an anti-smoking campaign. The impact of the media and its influence
on the public agenda has also been proven regarding health care reform (Hacker, 1996),
and AIDS policy (Backstrom & Robins, 1998). Additionally, media content has been
shown to have an impact on adolescent girls’ sexual knowledge and behavior (Brown &
Stern, 2002). One study, examining the effectiveness of media messages targeting
breast cancer in women, found that exposure to media content displayed a larger effect
even than interpersonal communication with one’s primary care provider (Ogata Jones,
Denham, & Springston, 2006). Taken together, these studies illustrate the value of
applying the traditionally politically oriented theory of agenda setting to mediated
health communication.

Attribute agenda setting has only recently been considered as a theory that
applies to health communication, and remains largely unexplored (Len-Rios & Qui,
2005). Attribute agenda setting as it occurs in clinical trial news coverage was recently
studied. The researchers found that while clinical trial information was not at the top of
the media’s agenda, how it was covered affected individuals’ intentions for participating
in clinical trials (Len-Rios & Qui, 2005). This study identified attributes of clinical
trials found in print news and gauged the affective tone as positive, negative, or neutral.
Through the distribution of a regional survey, the researchers were able to conclude that
exposure to national newspaper content negatively predicts audience intent to
participate in clinical trials. This finding coincides with their content analysis of news stories which concluded that the content was more negative than positive (Len-Rios & Qui, 2005). Taken as a whole, this provides support for the presence of attribute agenda setting effects in newspaper content that conveys health related information.

In another recent study, Jahng (2009, p. 2) sought to “expand the applicability of agenda setting theory from political issues to health communication issues” by studying the second-level agenda setting effects of public service announcements (PSAs) on teenage prescription drug abuse. This study found that, similar to attribute agenda setting in political advertisements, health PSAs can make certain attributes related to an identified health issue more salient than other attributes. This study confirms that as a result of attribute agenda setting, attribute priming has occurred in the audience (Jahng, 2009).

Taken together, these studies demonstrate that although second-level agenda setting has been predominantly used to analyze political content, it is a useful theory for analysis of health communication also. This thesis study intends to build upon the existing research in which attribute agenda setting is applied to health communication in an attempt to understand how the relatively new concept of telemedicine is defined and described in California print newspapers. In order to further this goal, the following research question is proposed:

RQ1: What are the most common attributes of telemedicine in print newspapers in California?
**Attribute Tone**

The term ‘affect’ is commonly used within scholarly work to describe emotions, moods and feelings (Batra & Ray, 1986). Kim and McCombs (2007) outline that when discussing attributes and subsequent priming effects within the audience, there is a distinction between substantive and affective aspects of attributes. They argue that it is not sufficient to analyze only the substantive content of attributes, but that the affective tone used to describe the objects is also integral in the process of describing how attribute priming occurs (Kim & McCombs, 2007) due to the fact that emotions influence individual information processing (Gardner, 1985). Whereas the substantive or cognitive attributes involve information about the issue, the affective attributes in media coverage involve mediated opinions about the issue, whether positive or negative (Hester & Gibson, 2003). While identification of attributes can greatly advance the understanding of how an object is described in the media, analysis of tone or valence of the attributes can also explain how stories influence audience members to think a certain way about the issue (Brunken, 2006).

As a profession, journalism promises objectivity through self regulation, yet media sources often slant coverage with impartiality, subjectivity, and partisanship (Brunken, 2006). McCombs and Ghanem (2001) note that news stories convey more than just facts in that they also convey feeling and tone. McCombs and Evatt (1995) found that positive coverage of an issue results in positive evaluation of that issue by the audience. This finding was reinforced by McCombs et. al. (1997) when they found
evidence that attribute agenda setting within news stories influenced candidate
descriptions given by voters.

Sheafer (2007) argues that both agenda setting and priming models are based on
strength or salience, but that further, both have an affective component which provides
direction. This is illustrated when stated:

Evaluative tone or affective attribute attached to the issue is part of the second-
level agenda setting. Second, these affective attributes that peoples attach to
issues further play an important role in the process of priming, on which they
have both indirect and direct impacts. Priming, therefore, carries with it an
affective component: It is a combination of message strength and direction.
Third, the political judgments of individuals are also directly influenced by
media-affective attributes (Sheafer, 2007, p. 21).

An explanation for the influence of affective attributes in agenda setting lies
partially in the fact that negative developments capture audience attention more so than
positive developments and tend to be more memorable (Newhagen, 1994). These
responses to negative information tend to be more differentiated and complex (Rozin
& Royzman, 2001) and elicit more causal attribution than positive messages (Bohner,
Bliss, Scharz, & Strack, 1988). On a basic level, this means that people pay more
attention to negative news and this plays a part in decision making for individuals
(Rozin & Royzman, 2001).

This is further documented by Bolls, Lang, and Potter (2001) when they use
facial electromyography as a physiological measure of listener responses to
advertisements to explore the effects of valence, or tone, on attention and memory. The
advertisements featured either a positive or negative emotional tone. After exposure to
the messages, participants were subjected to free recall and recognition memory tests
which demonstrated that negative messages receive more attention than positive ones (Bolls, Lang, & Potter, 2001). These physiological effects further culminate in the effect that positive coverage decreases the perceived issue importance (Schoenbach & Semetko, 1992).

Sheafer (2007) introduces the concept of affective priming as defined as the “evaluative component that is inseparable from priming” (p. 26). Essentially, the argument is that affect or tone is inherent in object attributes found in second-level agenda setting. Further, this affective component is transferred to the audience in addition to salience. It is not strictly the substantive attributes that become accessible within the audience’s minds, but also the affective component of the attributes.

**Tone in Health Communication**

Since the 1980s, the news media’s role in providing substantive health information has grown (Campos-Outcalt, 2004) and health news is frequently rated by audiences as a category of news that is of exceptional interest (Cooper & Roter, 2000). This increase in coverage leads to an increase in opportunities to experts to educate the public about health related concerns through the media (Cooper & Roter, 2000; Major, 2007). Similar to findings within general news topics the, role of affect in health communication has been shown to culminate in strong audience effects.

While there are many studies focusing on the role of affect and tone in interpersonal medical communication, there are few studies that document the role of affect or tone in health related news. Major (2007) found that affect played a large role in how individuals interpret and retain news information about obesity and lung cancer.
More specifically, this study indicated that the use of emotion-laden individual narratives regarding success and failure had a greater impact on audiences than more generalized stories (Major, 2007). In another study focused on the recall ability of Australian youth for news stories regarding mental illness, the researchers found that while few adolescents could recall a news story featuring mental illness, those most commonly recalled were stories featuring crime or violence (Morgan & Jorm, 2009). This furthers the premise that negative attributes have a more lasting impact on memory than positive ones, even in the realm of health communication in the media.

As affect or tone is inherent in attributes found in second-level agenda setting, and consequently, the affective component becomes accessible within the audiences’ minds (Sheafer, 2007), it is imperative to also gauge the affective attributes in addition to the substantive ones when analyzing telemedicine articles. This thesis further attempts to build upon existing research to explore the role of affective tone as it relates to attributes in telemedicine print articles. Given that telemedicine disproportionately benefits rural populations (Bareiss, 2001), it is important to understand if there is a difference in how affect is used in news stories for rural and urban areas. This may help to explain how political and social support for telemedicine use as well as patterns of adoption for the technology may differ in the respective geographical locations. As such, the following research question is proposed:

RQ2: In telemedicine newspaper articles, is there a difference in tone when discussing attributes between rural and urban print news sources in California?
METHODOLOGY

The method for this study borrowed heavily from a Kim and McCombs study (2007) and was modeled after another study (Domek, 2009), with several key differences. The following section details selected features of both studies that served as a model for the current research. It also documents the differences between them and the current study concerning substantive and affective attribute agenda setting in California print news articles on the topic of telemedicine.

In their study, Kim and McCombs (2007) account for both substantive and affective aspects of attributes while investigating the relationship between the “public’s attribute agenda for political candidates and the public’s opinions about these candidates” (p. 301). The researchers propose three hypotheses: (1) that the public’s attribute agenda for a political candidate reflects the media’s attribute agenda (defined to contain both the substantive and affective dimensions of the attributes), (2) that the affective tone of the attributes in the in the public’s mind for a candidate predicts opinions about the candidate, and (3) that the substantive and affective aspects of attributes emphasized in the media are significant elements in the public’s attitudinal judgments (p. 302).

In order to test their hypotheses, the researchers combine telephone interviews with a content analysis of the local daily newspaper, the Austin-American Statesman during the 2002 gubernatorial and senatorial elections. The content analysis was completed in which the unit of analysis was an assertion in an article that a candidate
possessed a particular attribute. Of the total 298 assertions, the coders identified 83 specific attributes that were collapsed into six major attribute categories. The researchers found that within this pool, the attributes that fell under personal qualifications and character were by far the most common major attribute category, so they further coded that into eleven specific attributes. Some examples of their identified categories include leadership, experience, competence, and communication skills (p. 304). Once categorized, all assertions about personal qualifications were further coded for tone (positive, negative, or neutral).

This identification of both substantive and affective attributes within the news stories served as a baseline to gauge the attribute agenda of the media. This was then compared to the attribute agenda of the public which was determined through telephone surveys using a random sample of individuals residing in the metropolitan Austin area. Of the major attributes initially observed by the researchers, personal qualifications and character also dominated the descriptions of candidates given by individuals surveyed. The results of the survey demonstrated that attributes salient in news coverage are also salient in voters’ minds, and that the affective tone of the attributes predicts voters’ attitudes toward candidates. Finally, this study also demonstrated that “attributes emphasized in the news media are significant elements for the public’s attitudinal judgment” (Kim & McCombs, 2007, p. 307).

While the focus of the Kim and McCombs (2007) study is of a political nature, they suggest that attributes and affective tone in news articles, including the subsequent link in public opinion, can be useful for understanding objects of a non-political nature
as well. Another study, which is also based upon the work of Kim and McCombs (2007), uses this methodology in order to search for evidence of attribute priming as it may occur in articles related to death penalty protocols in California (Domek, 2009).

The researcher used a sample of 12 articles describing the protocols and was able to found 55 descriptions, which served as the unit of analysis. Once coded, the descriptions were collapsed into 4 major categories which were (1) descriptions of the function or scope of the protocols, (2) descriptions indicating change from earlier process, (3) descriptions indicating that the procedures are put forth by the State of California, and (4) no description at all. The descriptions were further evaluated for value judgments about the protocols-whether positive, negative, or neutral-dependent upon the first person quoted within the article being identified as either a proponent or opponent of the death penalty. This study found no evidence of attribute priming in support or opposition of the death penalty protocols within the articles and also found that the language was neutral in tone (Domek, 2009).

While both of the aforementioned studies focus on attribute priming, the first step in the methodology is identifying attributes within the media as a function of second-level agenda setting, and coding of the affective tone of the attributes. In order to understand telemedicine representation in California’s print news, a similar content analysis and coding schema was employed here. The unit of analysis for this study was descriptions of telemedicine offered within the articles. As an integral part of how the concept of telemedicine is defined and described to the audience, quotes containing descriptions-including those given by supporters and opponents of the technology-were
included. Similar to Kim and McCombs (2007) and Domek (2009), these descriptions were qualitatively coded to determine how many unique descriptions of the protocols exist in the literature. A full explanation of the results of this coding is presented in the analysis section.

Once the initial coding was completed, the distribution of valence descriptions, whether positive, negative, or neutral following the framework set up by Kim and McCombs (2007) was evaluated. This was done using a chi-square non-parametric statistical test in order to determine whether there was a difference in affective tone when comparing news articles originating in rural areas and those originating in urban areas. Taken together, the data from this is used to explain how the concept of telemedicine is being defined and described within California’s print news sources and to compare potential differences in affective attributes between rural and urban-based news sources. This is the first step in understanding audience impressions of telemedicine. Unlike Kim and McCombs (2007), this study contains no component to correlate the media and audience agenda, but takes the position embraced by Domek (2009) that it is first necessary to determine the type of descriptions being used by the media sources in order to determine whether or not there is reason to look for audience effects. As he states it, “if all the language is found to be strictly neutral, there would be no reason to continue with a follow up survey” (Domek, 2009, pp. 27-28). As outlined here, this method provides for a thorough content analysis of newspaper articles in order to determine attributes commonly associated with telemedicine in the media as well as potential differences in affective tone for rural and urban news stories.
Chapter 4

ANALYSIS OF THE DATA

Artifact Selection

The articles used for this study were published in California newspapers between November 7, 2004 and November 6, 2006. This provides for a two-year time period leading up to the passage of Proposition 1D on November 7, 2006. The articles were retrieved from California NewsBank on January 24, 2010 using the search terms ‘telemedicine’, ‘telehealth’, ‘e-health’, or ‘ehealth’. After eliminating duplicate articles and articles focused on a company named E-health, there was a pool of 13 articles. Those articles on the company E-health were focused on the financial state of the company and did not discuss whether or not the company provides telemedicine products or services, which is why they were not included in this study. Of these 13 articles, one featured a story on a medical program that was supported by a center that includes the word telemedicine in the title. This article did not discuss telemedicine in any way and was therefore, also discounted. Another article focused on a new wireless network, and only mentioned telemedicine once to illustrate that the network was similar to others used for telemedicine programs. This article was also removed from the sample because it offered no description of telemedicine.

This left 11 articles available for analysis. These articles come from eight different publications with the Business Press (Ontario) featuring two articles and the Press Enterprise (Riverside) containing three articles on telemedicine within the outlined time frame. Publications that featured a single article include the Sierra Star...
(Oakhurst), the Sacramento Bee, the Press Democrat (Santa Rosa), Redlands Daily Facts, The Sun (San Bernadino), and the Times-Standard (Eureka). Sentences that feature descriptions of telemedicine found within these articles will serve as the unit of analysis. The full articles used for analysis can be found as Appendices A, B, C, D, E, F, G, H, I, J, and K of this thesis.

**Attribute Identification and Coding**

Once the articles were initially selected, they were analyzed and 135 sentences that describe telemedicine were identified. This included statements that explained what telemedicine is, what it does, and what it means to those who use it. Those statements that discussed goals of a project, or a grant that funded a telemedicine program were discounted as they were considered descriptive of the overarching grant or project rather than descriptive of telemedicine itself. This was true with the exception of statements that clearly articulated how telemedicine affects the attainment of those goals. Similarly, statements that provided a description of a specific technology, without providing an explanation of its use for patient care were excluded. Some statements included several descriptions of telemedicine and were coded to reflect that. For example, the sentence “The electronic networks are an effort by the hospitals to improve patient care in rural areas” (Appendix B) describes telemedicine as both ‘electronic networks’ and as something that will ‘improve patient care in rural areas’. Both of these descriptions speak to different attributes of telemedicine and were analyzed separately.

As some sentences featured several descriptive elements, analyses revealed a total of 201 descriptions, with 106 unique descriptions. As Domek (2009) found only 15
unique descriptions from a total of 55 assertions and Kim and McCombs (2007) found 83 specific attributes from a total of 298 assertions, this study differs in the high amount of unique descriptions that were found. There are several reasons for this. First and foremost, the term telemedicine was not used uniformly within the articles. The term was sometimes transposed with other similar terms including telehealthcare (Appendix K) or it was reduced to being referred to by what technology or platform it is using to connect patients and doctors. Across the various articles, it was commonly referred to as an ‘electronic network’, ‘electronic ICU’ (Appendix B), ‘a small machine’, ‘a Telehealth machine’, equipment (Appendix C), a Mobile Telemedicine Vehicle (Appendix D; Appendix G), teleconferencing (Appendix F), videoconferencing (Appendix E), or simply ‘networks’ (Appendix J). These were coded as unique descriptions.

Similarly, if the level of detail varied in the descriptions, they were also coded as unique. For example, one article first described telemedicine as something that is using “a camera so sensitive it can read the fine print on the pill bottle” then later referred to it as a “set of display screens, a video camera and an alarm system” (Appendix B). Though there are similarities between the two descriptions, coding them as unique is in line with the caution to be sensitive to the nuances and specifics of the messages under study given by Kim and McCombs (2007). Though they may speak to the same attribute, they are effectively different definitions or descriptions of telemedicine and were coded as such. This stands true for many of the descriptions and contributes to the relatively high number of unique descriptions.
After identifying the 201 descriptions, they were coded by the author into seven distinct categories that serve to highlight the distinctions among these various descriptions. These categories were created by the author to distinguish between the various features of telemedicine that were highlighted in the news articles. These mutually exclusive attribute categories, as well as the definitions used to determine if a description fit this attribute are as follows:

**Descriptions of technologies used in telemedicine.** These descriptions highlighted any technology used in telemedicine. This could include hardware, software, network infrastructure, or vehicles that are used in providing telemedicine services. Descriptions that include the term ‘electronic’ or digital’ were also coded as highlighting the technology as they infer that computer-based technology is required.

**Descriptions of access to medical services through telemedicine.** The predominant theme of these descriptors was that they called attention to the ability of telemedicine to connect physicians and patients or provide care in situations where traditional health care modalities cannot. Any description that indicated the ability for physicians to communicate with another physician, specialist, or patient in the context that they previously could not communicate, or indicates that the communication is enhanced through telemedicine was coded under this attribute category. Descriptions that indicated or implied that telemedicine is or will bring medical care to an identified population, such as rural individuals or areas, were also coded as highlighting this attribute.
Descriptions of the quality of medical care provided when using telemedicine. These descriptions highlighted the ability of physicians or medical workers to deliver an increased standard of care to their patients or implied that the patients will have a greater level of satisfaction or better health outcomes as a result of telemedicine treatment. Statements that made reference to the ongoing monitoring of patient health through telemedicine were also included in this group. Also included were statements that indicate scenarios or circumstances in which telemedicine would not be used or would hinder patient care.

Descriptions of the implementation of telemedicine programs. These descriptions offered information about the testing or implementation of telemedicine technologies or programs. This included instances where dates of implementation or the geographical scope of the particular telemedicine service was described. Also, any description that indicated the telemedicine project was in a ‘trial’ phase or is a ‘prototype’ was included as a descriptor for this attribute.

Descriptions of the financial aspects of telemedicine. These descriptions made reference to the financial costs or expected cost savings through the use of telemedicine technologies.

Descriptions highlighting the convenience in using telemedicine. These descriptions referenced the nature of telemedicine as being something that is ‘easy to use’ or highlighted the perceived factors of patient convenience, such as decreased travel time when using telemedicine.
Other descriptions. This attribute category included descriptions of telemedicine that do not feature a particular characteristic. For instance, when it is described as ‘groundbreaking’ or ‘really interesting’ with no explanation of why the author or individual feels this way, the description was coded into this category. Also included here, were opinion-based statements about what telemedicine could become or could do that also did not feature a particular characteristic. An example of this would be the statement that it ‘likely will become more widespread in the future’.

Intercoder reliability was determined by using a second coder, an undergraduate Communications Studies student unaffiliated with this project. A random sample of 13% of the descriptors was used along with the seven attribute categories and their definitions. Once coded, Scott’s pi was calculated as outlined by Potter and Levine-Donnerstein (1999), and reflected a value of .62 when coding for the attributes.

Of these categories, ‘descriptions of the technologies used in telemedicine’ was found to be the most frequent type of description occurring a total of 62 times with 42 unique descriptions. This type of description accounts for 30.8% of the total number of descriptions of telemedicine. The high number of unique descriptions is in line with the variety of technologies used to facilitate telemedicine programs. Examples of this type of description include “a high-tech telecommunications and diagnostic network” (Appendix K) and “has a high-speed virtual private network satellite communications, high-speed Internet access and a wireless network” (Appendix H). The articles focused on many types of technologies, as telemedicine is not confined to one technology but sometimes requires an intricate system of networks, computers, cameras, microphones,
and other devices and other times requires something as simple as a personal computer with specific software. The articles analyzed discussed many types of technologies used for telemedicine; therefore the number of unique descriptions is relatively high.

It should be noted that four of the articles discussed a Mobile Telemedicine Vehicle. For these articles, any mention of the vehicle’s capabilities that did not directly address its ability to provide medical services were omitted from analysis. For example, a statement such as ‘the vehicle carries about 100 gallons of gas” was not counted as a descriptor of telemedicine, whereas the statement that “the vehicle body includes several computer workstations, staff quarters and a patient exam area which is connected to several high-resolution cameras” (Appendix I) was counted. The distinction here is that the first sentence does not define or describe telemedicine in any way, either within the sentence itself or the context of the article. It would be considered a descriptor of a technology, without being a descriptor of telemedicine. Because the second sentence makes the connection between a feature of the technology and its ability to provide patient care, it was included as a descriptor for telemedicine. Similarly, one other article (Appendix F) focused on the installation of a broadband network, but only made one statement concerning how it might be used to facilitate medical care, therefore only the one statement was coded as a descriptor of telemedicine. Other statements concerning the network were discounted.

Descriptions of access to medical care was found to be the second most frequent type descriptor with a total of 52 descriptions, or 25.9% of the total number of descriptions. Examples of descriptors that focused on access include statements such as
“a physician in a remote location can monitor a patient” (Appendix B) and “could reach victims in remote locations” (Appendix H). Of these descriptors, five unique descriptions occurred and address different aspects of access. The most frequent type of access discussed was the ability of a patient or population to have access to a nurse or general physician, and this type of description occurred a total of 15 times. The second unique description focused on access to a specialist or intensivist for a patient or primary care physician, and this occurred in 14 instances where access was described. Twelve descriptive statements focused on the ability to provide access specifically to rural populations. Providing access for emergency personnel or rescue workers was described 6 times. And finally, providing access to a particular patient was described 5 times. This final aspect of access was typically described within a quote from a doctor or medical worker.

Due to the nature of all of these types of statements to describe telemedicine as a venue for connecting an individual or entity in need of medical care with an individual or entity that can provide medical care, they were coded under the major attribute category of ‘descriptions of access to medical services through telemedicine’. These are the aspects of access that comprise the major attribute, or the unique descriptions that define telemedicine as something that provides access to medical services.

Descriptions of the quality of medical care when using telemedicine were the third most common type of descriptor, with a total of 37 descriptions across the articles; this accounts for 18.4% of the total descriptions. Of these descriptions, 26 were considered unique. As the ability to provide ongoing patient monitoring through the use
of telemedicine was cited twelve times, this was considered one unique description. For example, the statement “information is monitored every day” (Appendix K) and the statement that “(doctors and nurses) can monitor critically ill patients” (Appendix J) both highlight the monitoring function provided by telemedicine as an indicator of quality and were coded accordingly. Other examples of descriptors of the quality of medical care include “it’s more efficient, safer and more effective medicine” and “an effort by the hospitals to improve patient care” (Appendix B), and it “provides a way to keep their health in check” (Appendix C).

Descriptions of the implementation of telemedicine program or technology occurred a total of 16 times, comprising 8.0% of the total descriptions. This featured six unique descriptions. The majority of these descriptions, 11 of the 16, spoke to telemedicine being something that is being tested, in a prototype stage, on a trial bases or under development. Other examples of this attribute include “(the electronic ICU network) currently serves five Northern California hospitals from its San Francisco hub” and “(it) was completed in October” (Appendix B). Taken together, these statements all described the implementation of telemedicine and were classified under that major attribute category.

Descriptions of the financial aspects of telemedicine occurred a total of 10 times, or 5.0% of the total descriptions, with each instance being considered unique. The high number of unique descriptions relative to total descriptions is strongly tied to the use of many types of technologies for telemedicine. Just as there were many types of telemedicine technologies described, they varied accordingly in terms of financial costs.
Whereas, one article noted that the “each unit costs approximately $4,700” (Appendix K), another cited the cost of “$50 million electronic ICU network” (Appendix B). Each of these descriptors focused on the cost of telemedicine, but varied according to the respective technologies that are being used in achieving telemedicine, and were therefore coded as unique. Citing the costs of telemedicine occurred seven times. The other three instances in which the financial aspects of telemedicine was described indicated that there would be cost savings associated with using it. These include statements such as “(it) cuts down on costs” or indicate that there are inherent “financial benefits” (Appendix C). While the descriptors of the cost typically included a concrete amount, the descriptors of the financial benefits tended to be vague and nondescript. Both of these types of descriptors were coded as speaking to the attribute of the financial aspects of telemedicine.

There were a total of 10 descriptions that highlighted the convenience of using telemedicine, with three unique descriptions. This attribute accounts for 5.0% of the total descriptors. Seven of them were considered one unique description of addressing the issue of less patient travel and included statements such as “without having to leave their homes” (Appendix C) and “(patients) avoid long trips from home” (Appendix A). Two of the descriptions highlighted the nature of the equipment as happening “with the touch of a button” (Appendix C) or “you just push one button and they’re on” (Appendix B) and were coded as one unique description. The final unique description occurs in a patient quote when she states that she can talk to the physician “just like I
would on the telephone” (Appendix B). Taken together, these statements all indicate an inherent convenience factor in using telemedicine and fall under that major attribute.

There were 14 descriptions of telemedicine that do not speak to a particular attribute of telemedicine and were therefore coded as ‘other descriptions of telemedicine’. Each of these instances were unique and tended to be generalized statements that reflected that it would change healthcare, but did not illustrate how, such as “it will make a marked difference immediately” (Appendix A) or it “likely will take on more and more of a role in health care in the future” (Appendix C). Other examples include instances where it is described as “groundbreaking” (Appendix A), “really interesting” (Appendix B), and “(it has) such great potential” (Appendix C). These statements account for 7.0% of the total descriptions.

The analysis conducted here reveals that coverage of telemedicine tends to fall within seven major attribute categories. Though necessarily different from the attributes Kim and McCombs (2007) identified, stemming from the difference in the nature of the object selected for study, these attribute descriptors include, in descending order, technologies used in telemedicine, access to medical services through telemedicine, quality of medical care provided when using telemedicine, implementation of telemedicine programs, financial aspects of telemedicine, and convenience in using telemedicine. Fourteen descriptions were categorized as ‘other descriptions’.

**Tone Identification and Coding**

Another consideration of this thesis was to compare tone of descriptors between rural and urban newspaper articles. After the descriptive statements were coded for
attribute identification, they were then coded as being positive, negative or neutral. The definitions for tone categories were created \textit{a priori}. Those statements that were considered positive were marked by an indication of approval, optimism, or enthusiasm for telemedicine programs or its perceived benefits. An example of a positive statement would be “Beatty said the devices are especially helpful to those who live in outlying areas and can’t easily get to the doctor’s office” (Appendix C). This statement includes the phrase ‘especially helpful’ indicating that the individual is enthusiastic and optimistic about the benefits of using telemedicine technologies.

Statements that were coded as negative were marked by features of hostility, withdrawal, or pessimism that hinder or oppose constructive treatment or development of telemedicine programs. An example of a negatively coded statement would be “The Army is not testing the telemedicine truck for replication and use in war zones and the army research acquisition and technology centers do not plan to fund development of similar vehicles at other hospitals, she said” (Appendix H). This statement highlights the non-development of the telemedicine technology that is being discussed in the article, the Mobile Telemedicine Vehicle. Because it indicates withdrawal from the use of telemedicine, it was therefore coded as negative.

Those statements that were coded as neutral showed no characteristics that indicated an optimistic or pessimistic preference for the implementation or use of telemedicine. An example of a neutral description would be “All of the data is delivered electronically to the nurse and can be shared with the doctor” (Appendix C). As the
author gives no indication whether this is good or bad, nor shows an apparent indication of optimism or pessimism, the statement was coded as neutral.

Of the 135 statements that were coded for valence, 84 were coded as positive, 46 were coded as neutral, and 5 were coded as negative. A second coder was also used for the coding of affect in order to determine the level of intercoder reliability. After coding a 20% sample of the statements, the Scott’s pi calculation (Potter & Levine-Donnerstein, 1999) for intercoder reliability here was .54.

To compare the valence between rural and urban news sources, the newspaper sources were identified as being urban if they were listed in the directory of the Urbanized Area Outline Map, produced by the U.S. Census Bureau as determined by the 2000 census (U.S. Census Bureau, 2002). This identified four of the eight news sources as being urban. The urban news sources included the Sacramento Bee, the Press Democrat (Santa Rosa), the Press Enterprise (Riverside), and The Sun (San Bernadino). As the Press Enterprise featured three articles on telemedicine during the selected time frame, the total number of urban-based articles for analysis was six. The remaining news sources were classified as rural and include the Business Press (Ontario), the Sierra Star (Oakhurst), the Redlands Daily Facts, and the Times-Standard (Eureka). As the Business Press featured two articles on the topic of telemedicine during the defined time frame, there were five rural-based articles for analysis.

Once the sources were distinguished as being rural or urban, the frequency distribution for tone was determined. This is reported in Table 1.
Table 1

*Frequency of Valence Determined for Rural and Urban News Sources*

<table>
<thead>
<tr>
<th></th>
<th>Urban</th>
<th>Rural</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral Count</td>
<td>26</td>
<td>20</td>
<td>46</td>
</tr>
<tr>
<td>% Within Valence</td>
<td>56.5</td>
<td>43.5</td>
<td>100</td>
</tr>
<tr>
<td>% Within Class</td>
<td>28.9</td>
<td>44.4</td>
<td>34.1</td>
</tr>
<tr>
<td>% of Total</td>
<td>19.3</td>
<td>14.8</td>
<td>34.1</td>
</tr>
<tr>
<td>Negative Count</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>% Within Valence</td>
<td>80.0</td>
<td>20.0</td>
<td>100</td>
</tr>
<tr>
<td>% Within Class</td>
<td>4.4</td>
<td>2.2</td>
<td>3.7</td>
</tr>
<tr>
<td>% of Total</td>
<td>3.0</td>
<td>0.7</td>
<td>3.7</td>
</tr>
<tr>
<td>Positive Count</td>
<td>60</td>
<td>24</td>
<td>84</td>
</tr>
<tr>
<td>% Within Valence</td>
<td>71.4</td>
<td>28.6</td>
<td>100</td>
</tr>
<tr>
<td>% Within Class</td>
<td>66.7</td>
<td>53.3</td>
<td>62.2</td>
</tr>
<tr>
<td>% of Total</td>
<td>44.4</td>
<td>17.8</td>
<td>62.2</td>
</tr>
<tr>
<td>Total Count</td>
<td>90</td>
<td>45</td>
<td>135</td>
</tr>
<tr>
<td>% Within Valence</td>
<td>67.4</td>
<td>32.6</td>
<td>100</td>
</tr>
<tr>
<td>% Within Class</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>% of Total</td>
<td>66.7</td>
<td>33.3</td>
<td>100</td>
</tr>
</tbody>
</table>

A Chi-Square analysis of this data indicates that descriptive statements about telemedicine originating in urban news sources reflected more positivity than those originating in rural locations. This finding is statistically significant ($\chi^2 = 69.378$, $df = 2$, $p < .05$).
Chapter 5

DISCUSSION, LIMITATIONS, AND CONCLUSIONS

The objectives of this study were to twofold. First, this study sought to determine what attributes make up print media content in California’s news. A qualitative content analysis revealed that all but 14 of 201 total descriptions fell into 6 distinct attribute categories. Second, this study sought to determine if there was a difference in affect when comparing content originating from rural and urban locations. The content analysis indicated that urban sources use more positive affect when describing telemedicine; this finding was statistically significant.

Attribute Agenda Setting

Attribute agenda setting suggests that the media can successfully make various aspects of an issue more or less accessible within the brain, and therefore prime which pieces of information people will use when they are making decisions (Kim et. al., 2002).

The first research question in this study asks what attributes, or aspects of telemedicine comprise print coverage and a thorough analysis has revealed seven major attribute categories. Of these attributes, descriptions of the technology used for telemedicine and descriptions of access to medical care through telemedicine receive the most attention, collectively accounting for over 55% of the total number of descriptions. Thus, the majority of articles about telemedicine in this study focused on technology and how telemedicine might facilitate access to medical care and treatment.
Descriptions focusing on the technology used in telemedicine were the most frequent type of description offered. It is not surprising that there is an emphasis on the technology, as this is a large component of what makes telemedicine novel, and therefore newsworthy. However, some scholars that have previously studied telemedicine have voiced concern that when telemedicine is strictly defined in terms of the technology necessary for connection, these definitions may detract from the capabilities of telemedicine to restructure the entire landscape of medical care (Bashshur, Reardon & Shannon, 2000; Whitten & Sypher, 2006). This essentially means that when the definition is strictly limited to what it is in terms of equipment, there may be a tendency to forget what it does in terms of delivering health care, or the potential for telemedicine to have implications in physician-patient relationships. Though there were many other attributes identified within this analysis, the frequency with which the technology was described-almost double the frequency in which quality of medical care was mentioned—is notable.

Access to medical care was the second most common descriptive attribute and is consistent with the stated goals of many telemedicine programs; a goal being to deliver medical care to the underserved and rural populations where care is often limited (Mort et. al., 2003). As this goal of achieving access or improving access is explicit and inherent in most telemedicine programs, it is not surprising that this feature is commonly used to describe it. So here, the goals and priorities of telemedicine are properly reflected in the media.
Descriptions that addressed the quality of health care provided through the use of telemedicine programs accounted for slightly less than 20% of the total descriptions. This category included statements that spoke to concrete or tangible health outcomes as well as generalized statements that indicated or speculated a change would occur. These descriptions tended to focus on the increased quality as a function of access to medical care. Essentially, telemedicine provides care in geographic areas that typically lack either specialty medical care or, in some instances, even general medical care. Telemedicine is the venue for providing an increased level of care in the articles. The common theme that emerged in these statements is that descriptors of the quality of medical care were almost always juxtaposed with a reference to quality when there is no access to medical care. Essentially, the message was that this type of care is better than having no care. Telemedicine was rarely referred to in comparison to seeing a physician in person. Though this typically involves travel and is considered inconvenient for many rural populations, it is still an alternative to the use of telemedicine that was not represented in the articles. When discussing the quality of medical care when using telemedicine, it seems that the predominant message is that it is better than no care at all.

Another interesting finding is the lack of descriptions that suggested that the quality of communication may be affected through telemedicine. Turner, Thomas, and Reinsch (2004) note that “the introduction of virtual health care has significant communication implications” (p. 6). It reduces what was once a mode of interaction that provided for very rich face-to-face communication into one that has a dramatically reduced level of context. Essentially, the “nature of the (usually) specialist physician-
patient encounter is changed from one of human to one of electronic contact and information exchange” (Bashshur, Reardon & Shannon, 2000, p. 618). In this virtual realm, which requires new patterns of medical practice, physicians have far fewer verbal and nonverbal cues from which to base their assessments on (Turner, Thomas, & Reinsch, 2004). Any mention of the potential for telemedicine to be correlated to this type of change in the communication process was noticeably absent from the articles analyzed.

Descriptions focused on the implementation of telemedicine programs, descriptions highlighting the convenience of using telemedicine, and the financial aspects of telemedicine tended to be secondary concerns within many of the articles. These attributes typically were found toward the end of the articles and were briefly mentioned with little elaboration. Though these attributes taken together only comprise 18% of all the descriptions, 8% for implementation and 5% for both convenience and financial, it should be noted that almost all articles included one description that fell the implementation and the financial categories. Only three of the 11 articles completely omitted any information about implementation and four omitted information of a financial nature. Whereas these two types of descriptions were found across many articles, descriptions highlighting the convenience of using telemedicine were clustered within four of the articles.

The category of ‘other descriptions’ is especially interesting. There were 14 descriptions that did not particularly highlight an attribute of telemedicine, yet contributed to the overall description of it. This is equal to the number of descriptors for
implementation, and more than both the convenience and financial attributes as both of those categories only contained 10 descriptions. The majority of these statements were opinion-based and were ultimately coded as positive when assessed for valence. As this category of ‘other descriptions’ was not present in either Domek’s (2009) study or the Kim and McCombs study (2007), it should be noted that some second-level agenda-setting researchers do not include “hardly mentioned attributes” (Kim et. al., 2002) when studying object attributes. As this thesis functions as the first study exploring attributes of telemedicine found in print media, the researcher felt compelled to identify all attributes, even those hardly mentioned. Essentially, in order to identify themes that bonded the major attributes categories together, it was first necessary to identify all descriptors. Only by identifying all descriptors were the attributes able to be objectively identified. After analysis and identification of the attributes, these 14 were left with no apparent characteristics that tie them together or tie them to other attribute categories. This category of other descriptions functioned as a place for those statements that did not fit the themes or rubrics outlined for the major attribute categories. They would most likely be considered ‘hardly mentioned attributes’ in future second level agenda setting studies, and may not be included for analysis.

The order of the prescribed object attributes offers information on how the media set the agenda for the issue of telemedicine. In this case, the attributes of technology and access to medical care are especially pronounced, and combined they account for more descriptions than the total for the other five attribute categories. This means that the descriptions of technology and access are the most salient in the media,
and therefore, have the potential to become the most salient, and therefore accessible, attributes for individuals when they consider telemedicine. This also means that the attributes that are less salient in the media, and potentially less salient for individuals, are those that address quality of medical care, implementation, financial information, and the convenience when using telemedicine.

**Tone**

The second research question in this study sought to determine whether there was a difference in affect for rural and urban news sources when covering telemedicine. The analysis showed that the tone of descriptive statements about telemedicine was predominantly positive across both urban and rural news sources. Of the 135 statements coded, a total of 84 were positive in valence, 46 were neutral, and five were negative. Furthermore, comparisons of rural and urban sources indicate that the print news stories originating from urban areas tended to exhibit a greater level of positivity than those originating from rural sources (see Table 1). It should also be noted that descriptions coded as negative did not often specify whether it was the author’s opinion that telemedicine would be a bad thing or would have a negative impact on medical care. Most commonly, the negative statements were instances in which telemedicine was referred to as the less preferable treatment method as opposed to something else. This is in contrast to some of the positive statements that explicitly indicate the sentiment that telemedicine is a good thing or will lead to positive health outcomes.

In his cultural studies analysis of media coverage of telemedicine in South Dakota, Bareiss (2001) found that the overall tone is positive, and noted that this is
often reflected in quotations used in the articles as well. He goes on to state that
“telemedicine is already framed as a sure-fire method of providing health care” (p. 344).
The degree to which it is described in a positive light in the current study would support
the idea that the media may be priming the audience to accept telemedicine technology
unquestioningly. Though this study contains no component to gauge priming effects on
the audience, it has established that the language used to describe telemedicine is not
predominantly neutral.

Also interesting is the finding that descriptions originating in urban areas are
more positive than those originating in rural areas. It was informally reasoned within
this study that due to the tendency for rural populations to disproportionately benefit
from telemedicine programs, media coverage may reflect a greater level of positivity
when describing it. The results of this analysis indicate the opposite; that coverage
seems to be more positive in urban areas.

The primary result of this analysis is the while the tone used when describing
telemedicine in print news is overwhelmingly positive, it seems to be more positive in
urban-based news sources. Previous research has demonstrated that valence-as a
component of emotional experience-has the potential to affect memory within the
audience and that negative messages receive more attention than positive ones (Bolls,
Lang, & Potter, 2001). Therefore, since the tone of the articles for telemedicine tended
to be positive, this may have an impact on how memorable these articles are to the
audience.
If the articles are indeed still memorable for audience members, the fact that the object of telemedicine is predominantly presented with a positive valence, may cause priming effects within the audience. Essentially, this coverage may lead to an increased willingness to accept telemedicine as a method of treatment. It may also increase the likelihood that individuals would express political support for subsequent state or federally funded telemedicine programs. Though additional studies would be necessary to establish this, the fact that print media seem to be presenting telemedicine in a positive light indicates that priming studies would be a worthwhile endeavor.

Limitations

There are several shortcomings in this study that should be noted. While establishing intercoder reliability, the Scott’s pi calculations indicate that coding for both the attribute categories and valence, .62 and .54 respectively, reflected reliability estimates less than .70. Despite the fact that there are no hard and fast rules concerning a reliability threshold, .70 is a commonly accepted cut-point. Scott’s pi is a conservative measure of intercoder reliability because it takes into account the possibility of chance agreement of coders (Potter & Levine-Donnerstein, 1999). So the true reliability rating may be higher. One explanation for the low reliability ratings could be the time constraints for this project. It is possible that this contributed to inadequate coder training. This could also be combined with a general unfamiliarity of the topic being studied, telemedicine, by the second coder. In general, familiarity with telemedicine, as well as traditional care models, may have an especially pronounced impact when coding for valence as the inherent benefits and drawbacks to using telemedicine may not be
obvious to someone who knows little about it. Therefore, statements that explain these goals could be considered neutral by someone intimately familiar with telemedicine but may be coded as being positive or negative by an individual with less knowledge of telemedicine. While gathering additional coding samples to establish a stronger level of intercoder reliability would be ideal, the resources available to the researcher for this current project may make that infeasible.

Another notable shortcoming of this study was the unanticipated, but relatively small sample of viable articles for analysis. Given that the public often relies on the mass media as an integral source of health-related information (Feeley & Vincent, 2007), and that the time period for analysis spanned two years, the researcher expected to find more articles discussing telemedicine in the state of California than the eleven that were ultimately identified. This expectation of a greater number of articles hinges on the profound impact that the passage or non-passage of Proposition 1D would have for telemedicine programs. This Proposition sought to, and ultimately did, allocate $200 million to the UC system for expansion of telemedicine services (California Telemedicine & eHealth Center, 2009). There was an expectation that, leading up to the 2006 elections; this would serve as the impetus for increased coverage of telemedicine itself. It would appear that if there was indeed an increase in coverage, it was minimal at best.

Given this, these eleven articles used in this study still offered a total of 201 unique descriptions which inevitably spoke to the attributes of telemedicine that were
featured in the print media. While it cannot be known if a larger sample size would yield different results, the limited sample size of this study should be noted.

**Implications for Future Research**

The results of this study offer several interesting avenues for additional research. As stated in previously, it was reasoned that in order for a study to gauge priming effects within an audience to be considered, it would first be necessary to determine if the valence for the descriptors was unbalanced. As this current study establishes that descriptors of telemedicine are overwhelmingly positive in California print news, and reinforces Bareiss’s (2001) finding of the same in South Dakota’s news coverage, a priming study would be worthwhile in determining how these affective attributes are being conveyed to the audience, and what audience impressions and understandings of telemedicine actually are.

It would be interesting to create a survey for a sample of California residents to gauge their level of media exposure to telemedicine as well as their impressions of telemedicine. The driving question here is whether or not the substantive and affective attributes identified here are actually the attributes that are salient in the public’s mind. Further, a comparison of rural and urban populations in regard to how positive they view telemedicine could also be interesting. This is a natural extension of second-level agenda setting research, and would be a very valuable study for determining actual attitudes toward telemedicine, as well as determining the level of impact the media may have on these attitudes.
In regard to perceptions concerning the impact of telemedicine use and quality of medical care, an additional study comparing attitudes of those who have used telemedicine and those who have not would also contribute to our understanding of telemedicine. As quality was one of the lesser mentioned attributes, it would be interesting to determine how individuals feel this impacts their medical care. This could also be done through disseminating surveys or through focus groups.

This study also found that the descriptions of telemedicine in articles originating in urban locations tended to be more positive than those in rural locations. As telemedicine disproportionately benefits rural populations (Bareiss, 2001), this finding is of significant interest to the researcher. Additional studies focused on affect in both urban and rural coverage of telemedicine would be helpful in understanding if this is an anomaly within the sample generated for this study, which is a possibility given the small sample size, or if urban-based coverage truly is more positive with regard to telemedicine. Given that this is the first study comparing tone of telemedicine newspaper articles between rural and urban areas, future research addressing this phenomenon would be fruitful.

As this study serves as one of the first to analyze how telemedicine is being shaped and defined by the media, additional studies may be necessary in order to glean a better understanding. As there were several descriptions of telemedicine that did not call attention to a particular attribute, but rather offered opinionated or speculative information, it would be especially interesting to examine how this phenomenon is being rhetorically constructed in the media. Bareiss (2001) notes that “time and again,
mass media seize upon new technologies as the harbinger of health, democracy, wealth, peace, universal education and other cultural ideals” (p. 350). A rhetorical analysis could indicate whether coverage of telemedicine is constructed in line with Bariess’s (2001) observations for technology.

**Concluding Remarks**

Due to the novelty of telemedicine, it stands to reason that the media may provide the first exposure to this method of health care for many individuals. Because of the media’s ability to shape and define an object, or essentially dictate how one thinks about it (McCombs & Shaw, 1993) an understanding of how agenda setting functions in relation to coverage of telemedicine is critical. As the increased digitization of health care in the U.S. continues, the need to better understand the media’s role in covering this topic will similarly become more pressing. Attribute agenda setting accounts for both the substantive and affective attributes of telemedicine. This study shows that the substantive attributes of technology and access overshadow the attributes of quality of health care, implementation, financial information, and convenience in telemedicine coverage. It also determines that coverage of telemedicine is predominantly positive, and even more positive in urban areas than in rural areas. This leaves many questions unanswered. Most importantly, the question of whether these attributes, both substantive and affective, are being conveyed to the audience through priming. These questions will need to be addressed.

It should also be reiterated that the purpose of this study was never to make a qualitative judgment about telemedicine itself as a method for delivering health care.
While there exists many studies that document the medical benefits or detriments with using telemedicine, particularly in the absence of any immediate trauma or specialty care (Gupta & Sao, 2010; Latifi et. al, 2007), the researcher does not question whether this is ultimately beneficial or detrimental to health care. This question is very much outside the purview of this study. This study only seeks to garner a better understanding of how it is being shaped in California’s print media.

Print media content comes with the expectation of impartiality and objectivity. These are high expectations sometimes. Prior to conducting this study, anecdotal observations were made that coverage of telemedicine seemed to reflect a positive bias. This spoke to the cautions of Jacques Ellul (1962, p. 412) in that, “It cannot be maintained that technical progress is in itself either good or bad. In the evolution of Technique, contradictory elements are always indissolubly connected.” Ellul further posits that when studying the relationship between technology, or technique, and culture “pernicious effects are inseparable from favorable effects; and every technique implies unforeseeable effects” (1962, p. 412). This idea that technology is not value neutral, but rather, has both positive and negative effects surely applies to telemedicine technologies, as it does with all others. Yet, there appeared to be no mention of negative effects within the coverage, which is how the idea for this study came to be.

So while this thesis was born from Ellul, it pays homage to media effects theorist Marshall McLuhan, who stated that “Man is a tool-making animal, whether in speech or in writing or in radio, has long been engaged in extending one or another of his sense organs in such a manner as to disturb all of his other senses and faculties” (as
cited in McLuhan & Zingrone, 1995, p. 100). While many studies can speak to medical outcomes when using telemedicine, it has been well documented that there is a complete lack of empirical analysis on the impact of this technology on the communicative process (Turner et. al., 2004; Zuiderent, Winthereik, & Berg, 2003). This is true to the extent that some researchers feel that we don’t even currently have the tools necessary for gauging the impact it has on patient-physician communication (Mirel, Barton, & Ackerman, 2008).

In the *Gutenberg Galaxy*, McLuhan (1962) also wrote “The theme of this book is not that there is anything good or bad about print but that unconsciousness of the effect of any force is a disaster, especially a force that we have made ourselves”. Since writing this, McLuhan’s quote has been applied to a seemingly never-ending list of the latest, greatest, and most cutting-edge technologies. Similar to that end, the theme of this study is not that there is anything good or bad about telemedicine, or coverage of it for that matter. It if accomplishes anything, it is the hopes of this researcher that it has simply raised consciousness concerning how one comes to understanding telemedicine, and called attention to those areas in which there remains much to still be known.
The California Public Employees' Retirement System unveiled a groundbreaking telemedicine program Tuesday for nearly 90,000 CalPERS members in rural communities.

Starting Jan. 1, CalPERS' rural basic health plan members can see medical specialists through a high-tech telecommunications and diagnostic network and avoid long trips from home.

CalPERS will become the first employer in the state to offer full telemedicine coverage.

"This will address a lot of the issues and problems in the rural areas," said George Diehr, chairman of the CalPERS Health Benefits Committee.

"It will make a marked difference immediately. It's broadening the scope of the doctors," said Steven Scott of Blue Cross of California, which is running the pilot program for the giant $190 billion retirement fund.

Blue Cross has about 60 telemedicine sites covering rural locales such as Lassen, Del Norte and Imperial counties.

Blue Cross officials said surveys indicate some rural residents now travel as long as seven hours one way to visit a specialist, and appointments often aren't available for weeks or months.

Under the CalPERS program, patients and their primary doctor will have access to specialists from UC Davis, Cedars-Sinai Medical Center and other groups. The medical specialties include dermatology, psychiatry, cardiology and pediatric neurology.
Watchful Eye on Patients: Remote Cameras, Networks Improve Care by Having Continuous Access to Specialists

*The Press Democrat*
March 26, 2006
Author: CAROL BENFELL

When Elaine Jacob was wheeled into the intensive care unit at Sutter Medical Center following surgery, she was too groggy to pay attention to a video camera perched high on the wall opposite her bed.

But the Sea Ranch woman awoke abruptly to the brave new world of telemedicine when the thing swiveled toward her, beeped and introduced itself as a doctor.

What began next was a conversation between a patient in Santa Rosa and a critical care specialist 70 miles away who was monitoring her vital signs and observing her through a camera so sensitive it can read the fine print on a pill bottle.

``It was really interesting,'' Jacob said last week while recovering from surgery. ``I could talk to him just like I would on the telephone."

Telemedicine -- where a physician in a remote location can monitor a patient electronically and take an active part in her care -- has come of age in Sonoma County.

Larger hospitals have or will have electronic intensive care units, with night-long monitoring by a critical care specialist, called an intensivist. Smaller hospitals are linking with UC Davis for access to specialists on demand.

The electronic networks are an effort by the hospitals to improve patient care in rural areas, where specialists are frequently in short supply. The electronic ICUs mean regular monitoring by a physician all night long, rather than a single visit in the evening when a doctor usually makes his last rounds.

``It's more efficient, safer and more effective medicine,'' said intensivist Jim Gude, director of Sutter Medical Center's electronic ICU.

Electronic hub

Sutter Medical Center linked up in August to Sutter Health's $50 million electronic ICU network, which currently serves five Northern California hospitals from its San Francisco hub. Gude was the doctor on duty in San Francisco when Jacob came into the
intensive care unit in Santa Rosa.

He monitored her progress from the eighth floor of the Bank of America building with a set of display screens, a video camera and an alarm system that lights up if a patient's oxygen, blood pressure, blood chemistry or other levels deviate from certain parameters.

The electronic ICU allows Sutter's night nurses to reach an intensivist immediately if something seems wrong. The intensivist also can call the nurses if he sees something amiss.

"You just push one button and they're on," said Melissa Nagle, an ICU nurse at Sutter.

"We had a patient who developed a rapid heart rhythm. The doctor in San Francisco saw it as soon as we did. He connected to the patient's history and ordered drugs based on the rhythm and vital signs in less than three minutes," Nagle said.

The rapid response can be life-preserving.

Studies at Johns Hopkins Medical Institutions in Baltimore, which led the way in electronic intensive care units in the 1990s, showed the monitoring reduced patient deaths from nearly 13 percent to just over 9 percent, and shortened ICU stays by almost a day.

"We can intervene quickly and correct a situation before it's fatal," Gude said. "By giving people better care, they get out of the unit faster and with fewer complications."

St. Joseph's Health System, which operates Santa Rosa Memorial and Petaluma Valley hospitals will launch its $5 million electronic ICU network comparable to Sutter's within a year.

The network will be based in Memorial's administrative offices on Challenger Way in Santa Rosa, and it will be able to monitor all 14 hospitals in the St. Joseph's chain, said Gary Greensweig, St. Joseph's chief medical officer.

'Better health' all night

"It means better health in the middle of the night," Greensweig said. "Santa Rosa Memorial Hospital has particularly sick patients because of our trauma program, open heart program and renal transplant program. Those very fragile patients will benefit most."
Kaiser Permanente is not considering an electronic ICU because -- unlike Sutter and Memorial -- it has a critical care specialist at the hospital during the night, said Kaiser spokesman Carl Campbell.

While Sutter and Memorial will spend millions of dollars to bring telemedicine to their intensive care units, Healdsburg District Hospital will bring some of the same services to its Pediatric Emergency Room without spending a dime.

Link with UC Davis

A link with UC Davis, completed in October, allows Healdsburg's emergency room doctors to reach pediatric specialists and subspecialists within minutes. The university is picking up the tab through its federal research grants.

``The idea is if a sick, acutely ill or injured child comes into the emergency department, they can page us," said physician Jim Marcin, director of the pediatric telemedicine program at UC Davis.

``We can see the patient and the monitors, talk to the parents, talk to the doctor, and move the camera around and help the emergency room physician with that child," Marcin said.

It makes good medical sense to centralize this kind of highly specialized care, Marcin said.

``You can't have a pediatric cardiologist on every street corner. He or she would see only one patient a month," Marcin said. "Because we get a lot of volume, we get good at it."

Palm Drive Hospital currently links with UC Davis on a trial basis for pharmaceutical consultations, and Sonoma Valley Hospital is planning a video link for access to specialists. UC Davis provides electronic consultations on a variety of subjects to more than 100 rural hospitals and clinics.
APPENDIX C

Health Care: Machine Offers Direct Connection to Treatment

The Press-Enterprise
March 27, 2006
Author: Jacquie Paul

A small machine on John Kemp's desk is helping him stay out of the emergency room in spite of his chronic health problems.

With the touch of a button on his Telehealth machine, the 57-year-old Beaumont man is connected through phone lines to a nurse who can listen to his heart, monitor his oxygen and glucose levels, and even check his weight. She also can talk with him and look at him through the machine's small video screen.

For Kemp and 14 others in Riverside and San Bernardino counties, the machine provides a way to keep their health in check without having to leave their homes. The Visiting Nurse Association of Inland Counties hopes others will warm up to the machine.

The organization has 60 Telehealth machines available, but most are sitting unused. For some, it's a matter of money. The machines are available to Medicare patients already receiving home health services. Some private insurance companies, but not all, have embraced them.

Another obstacle is the reluctance of some seniors to use technology. "I see such great potential for it," said Sharon Beattie, director of clinical programs for the Visiting Nurse Association. "If they can stay in their home longer, it's a plus for them. It's a plus for the health care system."

LESS HOSPITAL TIME

The Visiting Nurse Association of the Inland Counties first received the Telehealth machines about five years ago through a federal grant. The majority of the machines are used by seniors who need regular health monitoring.

Nurses call from stations in Yucca Valley, Palm Desert and Victorville to guide patients as they use the blood pressure cuff, stethoscope, scale and other devices connected to the machine.

There is a camera patients can use to show the nurse something they are concerned
about.

All of the data is delivered electronically to the nurse and can be shared with a doctor.

"To some people it means a lot of security," said nurse Jane Blumenthal, who uses the machine to check on Kemp and other patients. "They know there's somebody out there keeping an eye on them."

Beattie said the devices are especially helpful to those who live in outlying areas and can't easily get to the doctor's office.

For Kemp, the machine has meant fewer trips to Kaiser Permanente Medical Center in Fontana. That's crucial because he can only drive limited distances.

The retired bus driver suffers from congestive heart failure and diabetes, and has had a stroke. He has lingering pain from when a lightning bolt struck him several years ago while he was driving a bus. He takes 26 medications.

"I used to go to the hospital three to four times a month," he said. "I don't like to go. If I'm having a problem, I can call them up."

Kemp regularly sees a doctor, and a caretaker helps him during the day. But the small machine in his room provides an extra level of security. It recently may have saved his life.

Kemp connected with Blumenthal just as he normally does. The data seemed normal, but looking at the television screen, she could tell something was not quite right.

Kemp's speech was slurred and he couldn't lift his arm. She called a doctor right away. Kemp had suffered a transient ischemic attack, reduced blood flow in the brain that could be a warning sign of a stroke.

Kemp said he didn't notice his symptoms. If Blumenthal hadn't alerted Kemp's doctor, who called and told him to go the hospital, he likely wouldn't have sought treatment.

A TREND FOR THE FUTURE

Technology likely will take on more and more of a role in health care in the future, particularly for those who are homebound, experts said.

Developing ways to use technology to help seniors was a key topic at last
December's White House Conference on Aging. Ray Mastalish, deputy director for senior programs at the Riverside County Office on Aging led a California delegation to the conference and was impressed with what he saw. Devices such as the Telehealth machine will help seniors live happier lives, he said.

"It not only cuts down on costs, but it keeps people where they want to be. That's staying at home as long as possible," Mastalish said.

Use of the equipment likely will become more widespread in the future as insurance carriers recognize the financial benefits and those already comfortable with using computers become older, said Russ Bodoff, executive director of the Washington, D.C.-based Center for Aging Services Technologies.

"All of our studies show there is a dramatic change in the way baby boomers look at the need for technology as they age," Bodoff said.

TELEHEALTH

The Visiting Nurse Association of the Inland Counties offers home health monitoring devices for patients who need regular health assessments but may not be able to easily get to a doctor's office.

COST: Costs range from $100 to $250 per month depending on the level of monitoring needed. Medicare will cover costs if the machine is used as part of a home health plan that also includes home visits by a nurse. Some private insurance carriers also pay. Charitable funds also may be available to pay for the service.
Loma Linda University Medical Center will unveil its latest technology in disaster preparedness this afternoon. The Mobile Telemedicine Vehicle is a critical center on a Mercedes-Benz chasis. It will have off road capabilities to respond to patients who don't have access to hospitals or medical care.

The MTV is not to be confused with an ambulance.

Via satellite systems, it can relay medical information such as x-rays, vital statistics, and live video to the medical center where it can then be transferred to a specialist for consultation.

A Yamaha all-terrain vehicle is housed inside the MTV and can be deployed to access areas that can only be reached by smaller vehicles. It can also scout the terrain and communicate back to the MTV.

"The concept is to take a vehicle that can go anywhere," said Dr. Jeff Grange, director of emergency medical services for the medical center, in a press release. "When a disaster happens and infrastructure is destroyed, the MTV is put into action to get to patients who would otherwise be unable to get to the hospital. It is not for transporting patients, but rather taking the expertise of a tertiary care center like Loma Linda to patients themselves."
EUREKA -- Health care and political leaders gathered Friday to celebrate the grand opening of the Telehealth and Visiting Specialist Center.

The center, part of the Open Door Community Health Centers, uses teleconferencing to provide health care as well as meetings and training opportunities. The idea is that videoconferencing allows a specialist in Eureka and a primary care doctor in a more remote area to both talk to the same patient simultaneously.

The center is currently connected to Humboldt, Del Norte, Siskiyou, Trinity, Lake and Mendocino counties, and plans to reach more in the near future, said Open Door Community Health Centers Executive Director Herrmann Spetzler. He said the clinics have been “dabbling” with telemedicine for 10 years but nothing this comprehensive has existed locally until now.

Assemblywoman Patty Berg, state Sen. Wesley Chesbro, Eureka Mayor Peter LaVallee and Humboldt County Supervisors John Woolley and Bonnie Neely spoke at the event.

As Berg spoke at a podium, Spetzler noted that attendees in the crowded room could move to one of the exam rooms and see her by videoconference if they wished. After the speakers, visitors wandered the building testing out the technology.

Barb Johnson, executive director of the California Telemedicine and eHealth Center, said she believed the center will play a pivotal role in the community. Her organization provided funding for the telehealth center, as did the county Headwaters Fund.
The 21st century technology of seamless teleconferencing, doctors checking on patients and virtual classrooms is all limited by how much data you can stuff through the wires that run to your home.

Loma Linda, in a pioneering move, became the first municipality to seek to eliminate the limits as part of the building code. Communities and businesses around the nation are taking note.

The city hosted a two-day conference this week, bringing together 29 municipalities and about 100 attendees to display the backbone of a telecommunications-connected community.

The conference attracted staff from cities such as Boise, Idaho, and Surprise, Ariz., hoping to take home ideas to develop a wired community.

Two years ago, Loma Linda approved a law requiring all newly constructed homes and heavily remodeled ones to be wired with fiber optics.

The wiring, along with a control panel added about $3,000 to the cost of each home. City officials hoped the cost would be a pittance compared to the benefit of planning a potentially cutting-edge community.

The conference represents part of that payoff. James Hettrick, director of information systems for Loma Linda and a chief architect of the technology initiative, said the recognition offers a small city a higher profile in the region and the nation.

"It gives us a seat at a table that a community like ours usually could not join," said Hettrick.

Hettrick said the city is in talks with technology companies interested in tapping into the fiber-backbone to make Loma Linda a test audience for services and equipment that conventional wiring can't support.

The city, home to Loma Linda University & Medical Center, is also a likely
laboratory for telemedicine - aspects of which are already in planning and preparing to roll out, Hettrick said.

Michael Render, principal of Tulsa, Okla.-based RVA Research, which tracks technology nationwide, said fewer than 500,000 homes, or one half of 1 percent, are wired to the level of every new home in Loma Linda. Though telecommunications seemed to grow at light speed, Render said it's actually been hindered by the slow growth of broadband.

"Even your standard commercial Web sites today are at best crude because of capability issues," Render said. New possibilities in video and interactivity are held back by the fact that most people couldn't access the services.

Steven S. Ross, editor of Broadband Properties Magazine, a trade publication based in Rosenberg, Texas, said Loma Linda offered a unique set of circumstances that made its ground-breaking law possible. With a highly educated population and eager city officials, Loma Linda had the right people to make the investment a priority. Those factors dovetailed with soaring property values that took the sting out of the extra cost, Ross said.

So far, no other cities are following the example of mandatory fiber connections. Some, like Surprise, a Phoenix suburb of 96,000, are promoting the initiative but say they're likely to stop short of forcing it on builders via local ordinances.

Loma Linda's work promises to embolden other small cities who realize they don't need big metropolitan resources to make a splash, Hettrick said.

"Cities look at themselves and say, `We'll never be Seattle,'" Hettrick said. "Now they can see Loma Linda doing it."
APPENDIX G

Medical Services Hit Road, or Off It

The Press-Enterprise
April 17, 2006
Author: Darrell R. Santschi

The moment Dr. Jeff Grange got behind the wheel of Loma Linda University Medical Center's newest vehicle, he was impressed.

"It's like driving a big fire truck," the emergency-room physician said. "It can go almost anywhere."

At 30 feet long, 9 feet wide and powered in four of its six wheels, the prototype Mobile Telemedicine Vehicle, or MTV, is designed to go where doctors like Grange cannot go. And when it cannot go far enough, its three-member crew need only crank down a platform from the "garage" built onto its back end and ride off on a 630cc Yamaha all-terrain Grizzly.

But that's only part of what makes the vehicle special. Affixed to its Mercedes-Benz chassis is a compartment that is part motor home, part examination room. There, technicians can talk on a variety of sophisticated radios, take X-rays, suture wounds and even hook up the patient by satellite television with doctors at the medical center.

The $500,000 vehicle and its $500,000 worth of high-tech gear is being financed in part by the U.S. Army, which is studying its feasibility as part of the military's Hurricane Katrina-inspired role as a disaster-response agency.

"During Hurricane Katrina, they had hundreds and thousands of people in the Superdome, yet they didn't have the medical support they needed," says Brett McPherson, emergency medical services manager at the Loma Linda medical center and its Center for Prehospital Care.

"This (vehicle) could potentially have taken that to them," he said. "If we have a disaster here, we could dispatch this vehicle and (connect patients) with all the specialty services that Loma Linda provides."

Even with an emergency-room physician aboard, Grange said, specialists at the medical center could be consulted via the 42-inch flat-screen television monitor on the front wall of the cabin.
"If you think about it, we have more natural disasters here in Southern California," says McPherson. "We have floods, mudslides, earthquakes, fires - like the (2003) Old Fire, when they didn't have the medical support and things they needed."

Patients with major injuries would not be treated at the MTV, Grange said. They would be evacuated, perhaps by helicopter, directly to a hospital. "We don't want to slow them down," he said.

The MTV project was largely the brainchild of Grange and a program he runs that is aimed at improving care before a patient is hospitalized, said McPherson. Help with the funding came from U.S. Rep. Jerry Lewis, R-Redlands.

If the Army likes what it sees over the next year, Grange said, it may order several of the vehicles to be positioned across the country. The prototype will remain at Loma Linda.

The compartment was built onto the chassis in Germany by UNICAT, which uses a variation of the basic design to construct everything from mine-worker carriers to plush all-terrain motor homes for Arab oil barons. It was shipped to Loma Linda in February with a host of high-tech accessories.

A wall-mounted video camera collects images in the examination room, but technicians have a battery-operated hand-held camera for close-ups. A video camera also can be mounted on the all-terrain quad. Antennae and a roof-mounted satellite dish provide a wireless network for laptop computers. A bank of radio receivers inside can provide remote connections with police, ambulances and firefighters.

"A lot of times, in major disasters the communications infrastructure is interrupted," Grange said. "This (vehicle) has a cache of radios that can move - and wherever this goes, we can hand out radios to the police or the ambulance crews."

"Because we have satellite communications, we don't have just simple satellite phones," he said. "In Katrina, even the satellite phones were unusable sometimes because so many people were calling. We can use other satellites and bandwidth so we don't have those restrictions."

The vehicle can sleep two people in bunks near the rear and a table and seating in the front can be converted to a third bed. There is a toilet, shower, microwave oven and two refrigerators inside.

A gas-powered generator can keep the vehicle going for four days without restocking. The 100-gallon diesel tank for powering the engine gives the vehicle a 1,000-mile range.
The testing is not so much for the vehicle itself, Grange said. He is sure it will work. But technicians want to know how the accessories work in real-world conditions and what equipment should be added.

Some small-scale testing already is under way, Grange said, with the first big test to be in a month or so when he finds a public event that a large number of people are expected to attend. Later this summer, he hopes to use it during an auto race at the California Speedway in Fontana.

The acid test could come during fire season.

"Currently, if somebody at a fire gets a big cut on their hand, the whole crew has to go down to the fire camp," Grange said. "They would then have to travel who knows how far to get to an emergency room, where they'd wait for who knows how long to be seen, to get an x-ray and then get sutured up.

"Imagine this vehicle at the fire camp. Whoever gets hurt comes down to the camp. He is seen in the vehicle. The nurse practitioner shoots the X-ray, sends it back and immediately the physician at Loma Linda can look at it and see that there's nothing broken. Then he tells the nurse practitioner to just suture it up and let the firefighter get back to the fight."

McPherson termed the vehicle amazing. "You can take physicians to the scene without actually putting a physician in the vehicle."
Vehicle Takes Emergency Medical Response to Next Level

The Business Press-California
April 17, 2006
Author: Darla Martin Tucker

An all-terrain vehicle with satellite communications and "smart" maps from a Redlands firm may serve as a prototype for emergency transportation, said Loma Linda University Medical Center officials.

"It's a prototype because it's the first of its type. We have to test it and see how it works," said Jeff Grange, director of emergency medical services at the medical center.

The medical center displayed its $500,000 rescue truck April 7. The vehicle is the result of a Pentagon-funded project called Discoveries, an acronym for "demonstrating innovative solutions to care for others via electronic real-time information and emergency services."

The U.S. Army Medical Research Acquisition Activity agency in 2003 awarded a cooperative agreement grant of $3.32 million to Loma Linda University Medical Center for the multifaceted discoveries project. The program is funded through March 2007.

It consists of four phases aimed at researching emergency response practices to find more efficient ways of treating patients and testing drugs and devices. The emergency vehicle, in development the past three years, is a component of phase three, which involves creation of a telemedicine command center.

In conjunction with satellite and wireless vendors Orbital and Wireless One, the medical center designed the truck's teleconferencing and electronic data transmission capabilities.

The medical center is paying Environmental Systems Research Institute Inc. in Redlands $250,000 to $300,000 from the award to develop a "smart" map in the mobile telemedicine vehicle that tracks activity at hospitals and public safety agencies and to create mapping systems in the command center under development.

The medical center paid Unicat in Germany between $400,000 and $500,000 of the grant amount to design the truck's cabin, which was built with layers of fiberglass. That price tag includes a Mercedes-Benz engine and Unimog chassis and with an elevated suspension that enables the truck to travel over rocky or flooded terrain.
Unicat builds all-terrain expedition, rally and event vehicles. For instance, it built the Nike event vehicle and a vehicle for the Rallye Paris-Dakar race. The Loma Linda disaster response vehicle appeared on its Web site. While the federal government owns the vehicle, "it will likely stay with Loma Linda University Medical Center at the conclusion of the project," said Lori DeBernardis, director of marketing and public affairs for the U.S. Army Telemedicine & Advanced Technology Research Center in Frederick, Md.

The medical center "is the only tertiary care facility within a large area" and the telemedicine vehicle could reach victims in remote locations or potentially be used to deal with mass-casualty incidents, DeBernardis said.

Loma Linda University Medical Center is the only hospital in Inyo, Mono, Riverside and San Bernardino counties with a level-one trauma center and children's hospital, Grange said. "Part of our mission is to get this expertise out during a disaster," through the telemedicine vehicle, he said.

The red, white and blue "mobile telemedicine emergency and disaster response truck" is emblazoned with the Loma Linda University Medical Center's name and logo.

Loma Linda medical center conceived the Discoveries project and submitted a proposal to the Army for funding, DeBernardis said.

"The project was funded because it has the potential to lead to development of new technologies to improve Army medicine on the battlefield," she said.

The Army is not testing the telemedicine truck for replication and use in war zones and the army research acquisition and technology centers do not plan to fund development of similar vehicles at other hospitals, she said.

In the aftermath of earthquakes, landslides or other disasters, the vehicle functions like a traveling emergency room. Medical personnel will drive the truck to victims' locations following directives of local public safety or federal agencies.

The truck has high-speed virtual private network satellite communications, high-speed Internet access and a wireless network. Medical personnel will use teleconferencing software, cameras, computer-connected stethoscopes and equipment to transmit patients' vital signs, X-rays and other data by satellite link to physicians at Loma Linda University Medical Center.

Doctors in Loma Linda, appearing on a flat-panel video screen above the patient advise medical personnel on the scene. Portable computers and the truck's wireless network will allow medical workers to assess dozens of patients outside the truck and
communicate with medical center physicians.

The doctors will determine whether patients need hospital care or can be treated and released.

Its fuel tank holds 100 gallons on which it can travel 1,000 miles.

The telemedicine truck holds within its belly, a Yamaha all-terrain vehicle on which rescuers can ride to aid trapped victims unreachable by the truck and to scout terrain ahead of the vehicle.

The truck has six satellite-linked emergency radios by which truck operators can monitor and speak with emergency personnel in helicopters, ambulances and other vehicles.

The university wanted such a vehicle because of the region's susceptibility to earthquakes, mudslides, wildfires and other disasters. "We have probably more disasters than any place in the country," Grange said to a gathering of officials April 7.

"It's not if we're going to have a disaster, it's when," he said. The university will transport the vehicle to other areas of the country hit by calamity. The vehicle could have been used to aid victims of Hurricane Katrina in New Orleans, he said.

The hospital plans to begin testing the telemedicine vehicle at motor sports events and other public venues over the next couple of months.

"Our next goal is to talk to FEMA to see if they can use it," Grange said.

Expanding ER care

"This is just a window on a much larger project," B. Lyn Behrens, president and chief executive officer of Loma Linda University Adventist Health Sciences Center said during the unveiling ceremony for the telemedicine vehicle.

The Discoveries project aims to expand emergency medical services throughout the region using cyber data transmission and emergency medical geographic information systems mapping software from ESRI that track activity at hospitals and public safety agencies. Phase one involved creation of a center for emergency care, which opened a year ago to conduct research and educate emergency workers.

Phase two is developing a data collection system and database of emergency practices and hospital records.
APPENDIX I

LLUMC Testing Emergency-Response Vehicle

*The Sun*
April 20, 2006
Author: Juliane Ngan

Over the next few months, Loma Linda University Medical Center will be testing its new Mobile Telemedicine Emergency and Disaster Response vehicle at various mass gatherings, such as NASCAR races and during spring break at Lake Havasu.

At an April 7 ceremony near the LLU campus mall, the mobile telemedicine vehicle was unveiled, as an essential component of the Discovering Innovative Solutions to Care for Others Via Electronic Real-time Information and Emergency Services (DISCOVERIES) project.

The one-of-a-kind, off-road vehicle was built by UNICAT of Germany on a Mercedes-Benz chassis with six wheels and is expected to be able to be used in any environment in the event of an emergency or disaster.

According to Jeff Grange, the director of emergency medical services at LLUMC, the vehicle was purchased through a grant provided by the office of Rep. Jerry Lewis, R-Redlands, and the U.S. Army.

Grange said after studying research on the 1995 Kobe earthquake and tsunami disasters, they found disruptions in the infrastructure created the most problems for rescue vehicles.

"The only ones able to get through were off-road vehicles and motorcycles," Grange said.

The vehicle also carries a Yamaha all-terrain vehicle which could be deployed to smaller areas the larger vehicle was unable to access.

"We have more disasters here than anywhere in the world," said Grange.

With a high occurrence of mudslides, floods, earthquakes and forest fires, Southern California was the perfect place to use such a vehicle, Grange said.

Testing the vehicle at mass gatherings before a disaster occurs, will enable staff to refine the vehicle before it is tested in real emergency situations, said Grange.
"You have to take whatever the plan is and test it so when you have a disaster, its ready," Grange said. "It's too late to plan a response once a disaster occurs."

When the vehicle is deployed to a disaster area, about three staff members from the hospital would be on board to provide basic medical procedures on minor injuries.

The vehicle carries about 100 gallons of gas, which would take it about 1,000 miles. Without spare generators, the vehicle could run on its own power for about six to eight hours. The vehicle could be submerged in up to four feet of water, administrators announced during the ceremony.

"We're not intending on doing any surgery, but we could get someone splinted, sutured up, give them prescriptions and certain medications," Grange said. "Mild to moderately injured patients in a disaster tend to be what we have the greatest number of."

The rig itself, without the cargo compartment, cost an estimated $500,000, Thomas Ritter, CEO of UNICAT, said before the ceremony.

Ritter explained that UNICAT engineers began working on the vehicle in 2004 in Germany. In December, it was shipped to the United States, and local engineers installed all the equipment within the body of the vehicle, including top-of-the-line computer and GPS systems, camera and satellite systems. Grange said the most exciting part of the vehicle is the integration of it's many features.

"It's basically the ultimate off-road expedition vehicle combining technology, telemedicine and communications," Grange said.

The vehicle body includes several computer workstations, staff quarters and a patient exam area which is connected to several high-resolution cameras. The cameras broadcast images back to the LLUMC via satellite were physicians would examine the images and suggest what the next course of action should be.

Ron Holk, a paramedic liaison nurse for the Center for Prehospital Care, says he hopes to be one of the individuals that goes out with the vehicle when it is sent out.

"Any deployment would be a challenge," Holk said.

Jeff Bender, director of the Center for Prehospital Care, said the vehicle would make a good addition to the services the medical center provides as a whole.

"It's important to the medical center and helps us fulfill the mission of the
institution -- serving the community, even in times of disaster," he said.

FYI:

The Discoveries Project at the Loma Linda University Medical Center will improve "prehospital care, education and research in the Inland Empire," according to a press release.

The project is funded by the Telemedicine and Advanced Technology Research Center, with work conducted in four main project areas.

The first task was to create a center for prehospital care, education and research, with the Center for Prehospital Care already established at the LLUMC as a "centralized resource point" for the region's emergency medical service providers.

The second task was to develop and implement an integrated prehospital and hospital data collection system for an EMS and telemedicine test bed, which is being accomplished with an electronic data collection process which the Discoveries project introduced July.

The third task is to create a regional emergency telemedicine command center and network, which would be applied to EMS and disaster response environments. Administrators are working toward this goal with the unveiling and testing of its new Mobile Telemedicine Emergency & Disaster Response vehicle.

Task four is to conduct further research and seek publication for several different aspects of the project, for example, the use of telemedicine in nursing homes.
Map Maker Lands L.A. Police Contract

The Business Press-California
October 9, 2006
Author: Darla Martin Tucker

The Los Angeles Police Department has selected a Redlands maker of geographic information systems mapping software to provide Web-based crime maps and data to 6,300 police computers.

Environmental Systems Research Institute Inc. will provide geographic information systems applications for a three-tier system known as a computer analysis mapping system.

The first tier uses ESRI's ArcIMS software. The program provides Web-based access to crime maps, arrest locations, recovered vehicles, traffic accidents, citations and other information.

The second tier will enable police analysts to create maps on desktop computers showing crime densities, link stolen and recovered vehicle data and perform other research.

The third tier brings geographic information system capabilities to the CompStat inspection process, an ESRI release said.

"In the last decade, the use of GIS has become vital to the overall effectiveness of law enforcement," Rudy Pichardo, Los Angeles Police Department detective, said the release. "We had plenty of demands put on our current crime analysis system that were beyond its current capabilities."

The Redlands Police Department has been using ESRI software since 1994, said Chief Jim Bueermann. "I can't imagine us policing without it. It's such an integral part of how we visualize tremendous amounts of data, where crimes are occurring, where calls are occurring," he said.

The mapping system replaces old methods of sticking pins on wall maps and sifting through stacks of documents to track crime. With the geographic information system mapping software, officers can determine where to patrol based on congregations of dots on computer maps showing "hot spots," or areas where crimes occur, Bueermann said.
For example, computer maps displaying locations of alcohol-related traffic accidents helps officers know where to patrol for drunk drivers.

The ESRI mapping system draws 1,000-foot circles around schools to help officers determine when a drug dealer is violating laws that prohibit sales to children.

The department offers ESRI-based crime mapping data on its Web site. "I believe people have a right to know where crime is occurring in their community," Bueermann said.

Hospital broadband on tap

The Federal Communications Commission on Sept. 26 adopted a pilot program that will fund 85% of costs to public and nonprofit hospitals for building broadband networks to serve rural areas.

The networks will connect hospitals to Internet2, a national pipeline that links research, academic and health care facilities. Hospitals will use the broadband pipe to send medical information to health facilities in underserved and rural areas.

The White House Office of Management and Budget must approve the pilot funding program before it can accept applications, a release from the American Hospital Association said. Rural health care funds will supply money for network construction and design studies and costs for sending data over the pipeline.

The rural health care program reduces telecommunications and Internet costs for rural hospitals. The program draws from monies collected through the Universal Service Fund. The universal fund is fed by fees on consumer phone bills.

"Specifically, the pilot program will provide funding to support the construction of state or regional broadband networks and services provided over those networks. These networks will be designed to bring the benefits of innovative telehealth and, in particular, telemedicine services to those areas of the country where the need for those benefits is most acute," the order said.

Using video feeds over broadband, doctors and nurses can monitor critically ill patients at multiple locations around the clock. A single medical professional can administer services to more than 100 patients.
John C. Fremont Staff Trains on Latest Home Health Equipment

*The Oakhurst Sierra Star*

November 1, 2006

Author: Unnamed

Last month, the nursing staff of John C. Fremont Home Health and Hospice received training in using the newest technology in home health care ---Home Telehealth. The equipment we chose is by Viterion, a subsidiary of Bayer Company. Kellie Meade, from Viterion said, "Telehealthcare enables you to monitor, evaluate and educate your acute and chronically ill patients between regularly scheduled nurse visits. Clinical information is monitored every day while the patient stays in the comfort of their home. It does not replace nurse visits, but enables you to manage your patient visits more effectively. The goal is to lower hospitalizations, improve the activities of daily life, and improve the overall health of your patients through daily monitoring."

The district received a $40,000 grant from the California Consumer Protection Fund, made available from Verizon Wireless Communications, to be used specifically to expand technological advancements and awareness in rural communities. JCF Home Health has received the first $20,000 and purchased four Viteron 100 telehealthcare units. Each unit costs approximately $4,700, the accessories are an additional cost. In 2007, the remaining $20,000 will fund the purchase of four additional units. The District is seeking other grants to enable the purchase of additional telehealth equipment.

"Beginning now through December, we'll be in our pilot program stage, as we and our patients learn and become proficient in using the telehealth equipment. We'll start with four units for use in patients homes, and by January we'll go live," said Cindy Kincade, Home Health administrative director.
REFERENCES


