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DESIGN AND OPERATION OF A WEB-BASED
FOODBORNE ILLNESS SURVEILLANCE SYSTEM

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Stan Kaplowitz
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DESIGN AND OPERATION OF A WEB-BASED FOODBORNE ILLNESS SURVEILLANCE SYSTEM

By

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ABSTRACT

DESIGN AND OPERATION OF A WEB-BASED FOODBORNE ILLNESS SURVEILLANCE SYSTEM

By

Holly R. Wethington

This research focused on a method in which to improve foodborne disease surveillance using an online method. The RUsick2 web site enabled individuals who suspected their illness was food-related to visit the web site and report their illness. Local health departments could retrieve RUsick2 reports online by logging into the web site through a password access system. This enabled visitors to report their illness entirely online and allowed the local health departments to follow-up on reports as necessary.

Two populations used this web site: members of the public who believed they had a foodborne illness and local health department personnel in the environmental health divisions of health departments. This research concentrated on people that had come to the web site to report their illness and environmental health supervisors at local health departments.

It was found that web site visitors were willing to enter foodborne illness complaints online that were comparable to foodborne illness complaints gathered by the traditional telephone method. However, visitors represented a highly educated portion of the public, suggesting the web site was not capturing the entire online population. Local health department personnel responded to interviews and surveys, allowing for investigation of their attitudes and perceptions. Exploratory factor analysis was

conducted, which revealed three constructs essential to a local health department's decision to participate in the web site.

In summary, this exploratory research outlines the success and shortcomings of this novel web site.

To my parents, my husband, and my family and friends who have remained supportive throughout this process.

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KEY TO ABBREVIATIONS

LHD = Local Health Department

CDC = Centers for Disease Control and Prevention

IT = information technology

CHAPTER 1

INTRODUCTION

This research examined a novel method for US residents to report a suspected case of foodborne illness online, known as the RUsick2 Forum. Local health departments could choose to participate in the web site and view reports that came to the web site from their jurisdiction. Attitudes and behaviors of the two populations that utilized the web site, local health department personnel and web site visitors, were examined. This research concludes with a discussion of the RUsick2 Forum's successor, ReportFoodPoisoning.com.

The RUsick2 Forum was replaced with ReportFoodPoisoning.com because of feedback from web site visitors that the RUsick2 Forum was too long. Therefore, ReportFoodPoisoning.com was made to be much shorter than the RUsick2 Forum. It was believed that streamlining the data entry process would increase the proportion of web site visitors that completed the web site.

The vast majority of the research in this dissertation focuses on the experience of RUsick2 visitors and local health departments (LHDs) regarding the RUsick2 Forum. Any results gathered and presented from ReportFoodPoisoning.com are explicitly noted. This dissertation did not compare the two website to one another, but rather focused on the experience of the two populations (LHD personnel and web site visitors) who utilized the RUsick2 Forum.

Increased reporting of foodborne illnesses by the public is important to allow for investigation of such illnesses and the ability to learn from them so as to minimize the risk of similar outbreaks in the future.

Purpose of this study

The questions below are the five major questions answered in this dissertation. There were specific hypotheses, which are discussed in Chapter 2.

1) What is the quality of data being reported to the RUsick2 Forum? More specifically, how much data are web site visitors willing to enter into the Forum?
2) Are the RUsick2 reports worse, the same, or better in quality compared to traditional telephone reports gathered from local health departments (LHD)?
3) What kinds of people are coming to the web site?
4) What kind of experience do visitors have on the web site? Do they find it satisfying or frustrating?
5) What are the attitudes of LHD personnel regarding the web site?

Importance of these questions

By understanding web site visitors' and LHDs' experience, the web site can be improved to better fit the needs of these two populations.

a. It is important to know how much data RUsick2 visitors are willing to enter while they are at the web site. This will determine how much the web site assists LHDs in investigating cases of foodborne illness. Looking at the data entry patterns of RUsick2 visitors answered this question.
b. If the quality of the RUsick2 reports is better than LHD reports, then a strong argument can be made for LHDs to participate in the program and to recommend its use by residents in their area who have access to the Internet.

A comparison between RUsick2 reports and telephone reports gathered by LHDs was conducted to answer this question.

c. The results of a follow up survey answered several important questions regarding the visitor's experience and perception of the web site. Moreover, the survey results provided useful information concerning the type of individual utilizing the web site.

d. The experience of LHDs who have utilized the RUsick2 web site provides documentation concerning the web site's effectiveness. The personal interviews with various Michigan LHDs were beneficial in addressing concerns and questions LHD personnel might have.

e. The results of the LHD surveys offered valuable insight into whether or not the RUsick2 Forum is viewed as being a beneficial health department tool.

CHAPTER 2

LITERATURE REVIEW, PROJECT BACKGROUND, AND HYPOTHESES DEVELOPMENT

Impact of foodborne disease

"Food safety is a fundamental public health challenge that has become more, rather than less, challenging" (Lasky, 2002). There are multiple reasons contributing to the increased problem of foodborne disease in recent years. These include new and reemerging infectious food borne agents, increased use of commercial food services, new methods for producing and distributing food, changes in agricultural practices, Americans' dietary changes, the high turnover rate of food-service workers, and the growing number of people at high risk for severe or fatal foodborne diseases (Collins, 1997; National Research Council, 1998).

The organisms that cause foodborne illnesses are found throughout nature. It is mishandling and poor refrigeration that are responsible for most contamination (Collins, 1997). Mishandling can occur at any point from farm to table; either in processing, at supermarkets or restaurants, or in the home. Furthermore, some microbes have evolved and have become more resistant to food preparation and storage techniques (Collins, 1997).

Changes in the way food is produced and distributed have resulted in a new kind of outbreak (Tauxe, 1997). Where the conventional foodborne outbreak scenario typically followed a social event (e.g. a wedding) and was characterized by an acute and local outbreak with a high attack rate, the new outbreak scenario is more diffuse and widespread, involving many counties, states, or even nations. As described by Tauxe

(1997), the new scenario occurs when a contaminated food item is widely distributed. The result is a small outbreak in multiple locations versus a large outbreak in one or two locations. The outbreak is usually detected either through a chance concentration of cases in one location or where the pathogen causing the outbreak is atypical (Tauxe, 1997). Tracking food has become a challenge because foods are now distributed countrywide and world wide, whereas in the past they were grown, processed, and distributed locally (Lasky, 2002). In such outbreaks, investigation can require synchronized efforts of a large team to understand the extent of the outbreak, implicate a particular food, and verify the source of contamination. Often, no obvious food-handling mistake is found and contamination is the consequence of an event in the industrial chain of food production. Investigating, controlling, and preventing such outbreaks can have industry-wide implications (Tauxe, 1997).

Host susceptibility is another factor contributing to foodborne illness incidence. Certain sectors of the population are more likely to fall ill from a foodborne disease than others. Infants, children, the undernourished, and immunocompromised persons such as pregnant women, the elderly, and people with HIV/AIDS are especially vulnerable (Potter, Motarjemi, and Kaferstein., 1997; Doyle, Beuchat, and Montville, 1997). With a larger proportion of society reaching senior age and living longer in an immunocompromised state, the overall percentage of those falling into the high risk group is increasing. Lasky (2002) adds that the emergence of dangerous pathogens such as Campylobacter and *E. coli* O157: H7 has taken place at a time when the number of immunosuppressed persons in the population is on the rise.

The impact of all foodborne illnesses in the US alone is alarming and costly. According to Mead and colleagues (1999), there are an estimated 76 million illnesses, over 325,000 hospitalizations, and over 5,000 deaths annually from foodborne illnesses. The annual cost for these illnesses in the US is $23 billion, which accounts for both medical costs and missed work due to illness (Hedberg, MacDonald, and Shapiro, 1994 as cited in Jones and Gerber, 2001).

Tauxe (1997) explained that foodborne outbreaks are investigated for two primary reasons. The first is to pinpoint and control an ongoing source through emergency actions such as product recall or restaurant closure. The second reason is prevention of future outbreaks. Intervention in the middle of an outbreak usually depends on having enough quality epidemiologic data to act with confidence, without needing to wait for a laboratory test to confirm the pathogen. Good epidemiologic data, according to Tauxe (1997), is evidence of a clear statistical association with a specific exposure, biologic plausibility of the illness syndrome, the potential hazard of a particular food, and the logical consistency of distribution of the suspect food and cases.

Current system of reporting foodborne illnesses

One of the best ways to impede the spread of foodborne illnesses is through foodborne illness reporting, which can lead to prevention efforts and education. Over time, prevention efforts and education could reduce the cost of foodborne illnesses. There are essentially two avenues for a foodborne illness to be reported. One is by people suffering from a case of "food poisoning" (the lay term for foodborne illness) who decide to seek medical attention. The other is by individuals suffering food poisoning who do not seek medical attention, but still report their illness to their local health department

(LHD).

As Olsen, MacKinnon, Goulding, Bean, and Slutsker (2000) discussed, an initial system of reporting foodborne and waterborne diseases in the US originated over sixty years ago when state and territorial health officers suggested that cases of "enteric fever" be examined and reported. The purpose of investigating these cases was to gain information about the role of food, milk, and water in outbreaks of intestinal illness as the starting point for public health action (Olsen et al., 2000).

The current system of surveillance for foodborne and waterborne diseases in the US began in 1966. At the time, reports of enteric disease outbreaks were attributed to microbial or chemical contamination of food or water and were integrated into a yearly summary. The quality of these reports has since greatly increased, due to more involvement from state and federal epidemiologists in outbreak investigations (Olsen et al., 2000). Now called the Foodborne Disease Outbreak Surveillance System, the system evaluates data regarding foodborne disease outbreaks (Olsen et al., 2000). In the new structure, state and LHDs bear the major responsibility of locating and investigating foodborne disease outbreaks using a standard form to report to the Centers for Disease Control and Prevention (CDC) (Olsen et al., 2000).

Despite the large number of foodborne illness cases, only 8% result in the person seeking medical attention (Mead et al., 1999). There are two possible reasons for this low rate. They are 1) the time and cost of culturing and 2) the low perceived severity of the illness.

When a physician cares for a patient with a confirmed case of a foodborne illness, it is up to him or her to recommend the patient to a hospital or private lab for culturing.

After the culture is completed, it is the laboratory's or physician's responsibility for reporting the illness to the LHD. However, it is estimated that only 23% of those who seek medical attention are asked to submit a stool specimen (CD Summary, 1998). This low percentage is probably the result of the laboratory process being time consuming and costly. In addition, such laboratory services are increasingly less likely to be covered by health maintenance organizations. Without laboratory confirmation of the particular pathogen, the physician has nothing to report. Therefore, even though there are a large number of foodborne illnesses occurring in the US every year, only a small percentage are actually being entered into the national reporting system.

Individuals can also report their illness to their LHD without seeking medical attention. This is most typical when the symptoms are not perceived as severe enough to warrant medical attention. In this situation, LHDs receive complaints via telephone. In this case, an LHD employee will complete the proper foodborne illness investigation form, which consists of personal identifiers, symptoms, onset date and time of symptoms, a food history, food sources (where food is obtained, such as grocery stores and restaurants), and other exposures. The LHD employee will then encourage the individual to have a laboratory culture completed at the LHD laboratory. If performed, the results of the culture are then recorded and the LHD is required to report this to the state, which, in turn, reports to the CDC.

Limitations of the current system

Regardless of whether the individual seeks medical attention through a healthcare provider or contacts their health department directly, the process of laboratory confirmation is time consuming. Wilkins (unpub. data, 2000) surveyed Michigan hospital

and Clinical Laboratory Certified Approved laboratories and found a mean 35 day interval between symptom onset and completion of the case investigation form by the LHD (this survey reported a 91% response rate). If an individual seeks physician assistance and is asked to submit a stool specimen, the mean day interval is even greater. In such a scenario, the individual is often told to visit a hospital or private laboratory instead of the LHD laboratory. Wilkins (2000) found that 29% of laboratories were not reporting results to any LHD.

Whether through the physician or the LHD, the current system relies on laboratory confirmed cases. The CDC accepts only laboratory confirmed reports for inclusion in its national tabulations. According to Tauxe (1997), the CDC is the main risk-assessment agency for public health hazards and conducts primary national surveillance as well as the epidemic response. While the current system is tiered and well planned out, the estimated percentage of foodborne illnesses to be reported to the CDC is extremely low at about 1-2% (CD Summary, 1998).

As depicted in Figure 1, data collected through laboratory confirmation only represent the tip of the iceberg of foodborne illnesses (Potter et al., 1997). While a small percentage of cases is being examined at the county or state level, many more are being overlooked. If Mead and colleagues (1999) are correct and there are approximately 76 million cases of foodborne illness each year, it is clear that many foodborne illnesses are going undetected by the current system. It is a significant bias of the current system that we only know about laboratory confirmed cases, but little about non-laboratory confirmed cases. Having a better grasp on all cases would lead to improved prevention and education efforts and lessen the burden of foodborne illnesses in the US.

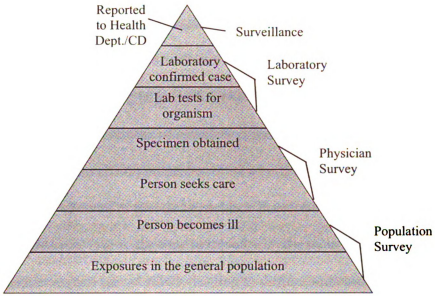


Figure 1. Burden of Illness Pyramid. [Date accessed July 2004]. Available at: http://www.cdc.gov/foodnet/surveys.htm.

The Burden of Illness pyramid shown in Figure 1 portrays how a case report flows through the current system. Several factors need to occur for each case to be considered an official report. The individual needs to be ill enough to seek medical attention, the physician needs to request a stool specimen, the individual must be willing to submit a specimen, the laboratory must perform the correct diagnostic procedure, and if positive, the physician needs to report the case to the LHD. The case would then be reported to the state health department and eventually to the CDC.

Given that only 1-2% of all cases of foodborne illness are reported, it is evident the vast majority are being overlooked. The Burden of Illness pyramid designed by the CDC displays a passive system, relying on laboratory confirmation. However, strides have been made in the previous decade to improve surveillance of foodborne illnesses. It can be difficult to develop an elaborate system of surveillance, mainly due to a lack of

reporting by the public. As Mead and colleagues (1999) stressed, underreporting is a major hindrance to the surveillance of foodborne illnesses.

The existing foodborne illness surveillance system provides a limited and relatively inexpensive net for tracing large-scale trends in foodborne diseases under surveillance and for detecting outbreaks of established pathogens in the US (Tauxe, 1997). Wagner and colleagues (2001) pointed out that sensitivity to small foodborne illness outbreaks may be of equal or greater importance than timeliness because of their sometimes slow progression. Due to the time involved with the mass distribution of goods, foodborne illnesses can spread slowly leading to diffuse outbreaks instead of local or regional outbreaks confined to a geographic area. The current system is not sensitive enough to diffuse outbreaks of common pathogens, provides little detail on sporadic cases, and is complicated to extend to include emerging pathogens. As such, with the existing surveillance system, the majority of foodborne illness cases lack an identified cause (Woteki et al., 2001). Tauxe (1997) stated that in the future changes in healthcare delivery may impinge on the way that diagnoses are made and reported, leading to artifactual changes in reported disease incidence.

In summarizing the current system of reporting foodborne illnesses, it is clear that several factors are leading to the low percentage of illnesses being reported. First, many individuals simply do not report their illness. This prohibits public health officials from having a firm grasp on the problem. Second, it is a timely process because it relies on laboratory confirmed surveillance. This inhibits prevention efforts all together because the outbreak is often over before the laboratory results are even obtained. Third, when individuals do communicate with their LHD, it is purely telephone based and individuals

receive little to no feedback regarding their illness (i.e., if they were part of an outbreak). Moreover, a telephone based system is time consuming in that LHD employees are expected to stay on the telephone with a reporting individual while the individual tries to remember their food history over the past 24-48 hours. Not only is this frustrating for both parties, but the reports filled in by LHD employees may not be as thorough as they could be (the individual cannot remember exactly what or where they ate over the course of the phone conversation). And lastly, there are a limited number of reports that one LHD can handle in the face of a large outbreak.

Overall, the current system has much room for improvement. As a result of this need, a group of researchers at Michigan State University, the University of Michigan, the Michigan Department of Agriculture, and the Michigan Department of Community Health joined forces to create the RUsick2 Foodborne Illness Forum. The RUsick2 Forum was launched in November 2002 and was operated at the National Food Safety and Toxicology Center at Michigan State University.

Description of the RUsick2 Forum

The RUsick2 program was a web site intended to improve foodborne disease surveillance, initially in a tri-county pilot area in Michigan which included Ingham County, Clinton County, and Eaton County. The web site allowed individuals with sudden onset vomiting and/or diarrhea who suspected their illness was food related to report their illness online. LHDs would then retrieve RUsick2 complaints electronically by logging into the forum via a password protected system. This enabled the visitor to report their illness entirely online and allowed the LHDs to follow up reports as necessary.

By means of advertising four times per week in the major local newspaper (The Lansing State Journal) from December 2002-2003, residents living in the pilot area were encouraged to report a suspected case of food poisoning online. The appropriate LHDs were informed of the web site and each was given a unique password to ensure they would be ready to accept any complaints that came in from residents in their county. However, since this was an online program, individuals from outside of the pilot area began entering data into the web site (it was not set up to exclude complaints from outside the pilot area. However, individuals were told this was being pilot tested in three specific counties and were encouraged to also notify their LHD). Due to traffic from visitors outside the pilot area, the decision was made to expand RUsick2 to a national program with efforts to notify local health departments nationwide whenever a complaint came in from their jurisdiction. The national program remained at the same web address and continued to be called the RUsick2 Forum. The developmental committee began accepting all reports and notifying relevant health departments both in and outside of Michigan about this web site. To keep the momentum of visitors coming to RUsick2, online advertising began on Google in April 2003, where people with sudden onset vomiting or diarrhea who believed these symptoms were from something they ate were asked to enter their information into the RUsick2 web site.

The RUsick2 Forum was available at www.RUsick2.msu.edu. Through a series of data entry pages, visitors were asked for onset time of illness, symptoms experienced, a four-day pre-illness food history, food sources, and other information regarding non-foodborne sources of common gastrointestinal illness. Potentially, there were seventeen screens visitors could view. Most screens were data input screens, but a few were output

screens which displayed other visitors' data (no personal identifiers were viewable by RUsick2 visitors). This was intended to motivate the complainant, which is something the traditional telephone based system lacks.

RUsick2 automatically issued an ID code to each visitor, allowing them repeat access to modify their data in the event they were able to recall more information concerning what food was consumed and/or where it was purchased. The CDC's "Standard Foodborne Questionnaire" and other foodborne questionnaires were used as a model in creating the Forum data input screens. The food list contained 54 food items, divided into the following categories: meats/poultry/fish, type of meat dish, dairy and eggs, raw fruit, raw vegetables, prepared fruit or vegetables, salad items/side dishes, grains and starches, and beverages. A section concerning non-food exposures was also incorporated to gather information regarding exposure to various animals, other individuals that were sick, patients in a healthcare setting, commercial food preparation, young children, private well water and swimming (lake/river or swimming pool).

The following list is a more detailed explanation of the web site page by page (see Appendix A for question wording). Questions that were required to continue onto the next page of the program have "required information" next to them and questions that could remain unanswered have "not required" next to them.

Data entry process by page:

1: Case ID assigned

2: Personal Characteristics (state (dropdown box), age (textbox), gender (radio button to select Male or Female) (required information)

3: County, city (both dropdown boxes and required information)

4: Symptoms (common foodborne illness symptoms were listed, visitors asked to choose all that apply; this question not required)

5: Identifiers (name, email address, phone: all textboxes) (not required)

6: Suspected Foods and Food Sources (option to enter suspected foods and food sources, could bypass if chose to; not required)

7: Suspected Food(s) (from the food history checklist; not required)

8: Suspected Food Source (s) (textboxes; not required)

9: Non-food Exposures (other exposures were listed, visitors asked to choose all that apply; not required)

10: Four Day Food History (checklist of foods; not required)

11: Food Sources (textboxes; not required)

12: Contact Information (last name, mailing address; asked for more detailed contact information than what was asked in number five above.) (textboxes; not required)

13: First Summary Report (tallies on other visitors who reported eating the same foods)

14: Source Matching (asked to match up which foods came from which food sources)

15: Match foods to food sources (not required)

16: Second Summary Report (can view reports)

17: Comparison Report (compare target period to comparison period)

Justification for order of questions shown above. The ordering of the pages on the web site was based on the CDC's Standard Foodborne Disease Case Questionnaire (CDC, 2003) along with input from local and state health department employees

collaborating in the development of the web site. After being assigned a case ID (i.e., a password which allowed visitors repeat access to the web site), visitors were then taken to a new page, and asked to enter their state, age, and gender. This information was required for two reasons. First, these data allowed local health departments using the web site to pinpoint exactly where the visitor lived and whether or not he or she might be in a high risk age group. Also, if a child was a minor, there were instructions for parents or guardians to complete the web site. Second, the web site offered reports at the end of the data entry pages, where visitors could see if there were others who became sick from eating the same foods around the same time period from the same food source. State of residence played a major role in determining the output reports. Gender was a required field so that subsequent data entry pages could be tailored to a male or female (e.g. what date did "she" become ill? or, what time of day did "he" first start experiencing symptoms?). County and city were then asked for, which was essential information for the LHDs and for the output reports.

On the following page, the visitor was asked what symptoms s/he had experienced. Also on this page the visitor was asked the onset date and time for the illness, and, whether or not they had sought medical attention. It is important to note that none of this information was required in order to continue answering questions on the web site. Next, identifiers such as first name, email address, and telephone number were requested. Likewise, none of this information was required to continue. These specific identifiers were requested up front so that local health departments could contact visitors who might fail to complete the entire form due to fatigue. Follow up calls could then be

conducted with individuals and determine whether or not they would like to report their illness over the phone.

Following the identifiers page were the suspected foods and food sources pages. These were also not required but were included in the event someone wished to report a specific food item or eatery they believed made them sick. Next, there was the non-food exposures section. On it were quick, radio buttons where individuals could check certain risk factors they came in contact with that may have made them sick. For example, exposures to petting zoos, small children, pets, patients in a healthcare setting, swimming, etc. were inquired about. This page was also not required to continue on to the next page.

While the first series of pages was important, the focal point of the web site was the food history page because it asked individuals to report what they could remember eating from the previous 4 days. A list of 54 food items was available for the visitors to check what they ate. This page was not required to move on to the next page.

Visitors were then asked for food sources, such as restaurants, grocery stores, or other places where they obtained food. Like the food history, answering questions on this page was not required.

Next, visitors were given the opportunity to match which food items came from which food source. This was not required.

Finally, after all the data were entered, the output reports displayed how many other people within the same geographic location (state, county, and city) reported eating the same food items and having the same non-food exposures as the individual reporting, within a given time period. Thus, this fulfilled one of the web site's main purposes of

allowing visitors to share and compare one another's data. Additionally, this was the motivation of getting people who believed they were ill because of a food item(s) to report their illness to the web site.

All of the questions on the web site served a purpose in investigating a foodborne illness. As a whole, they were necessary for the local health departments to gain enough data about each report to look for commonalities among reports.

The reason so many fields were not required to advance was to allow individuals to view upcoming fields. If the visitor was overwhelmed by certain pages on the web site (e.g. the food history page), they had the option to leave and return (through their issued password). The web site recorded where the visitor left off, and when the visitor logged in, the web site would begin at this place.

Internet Usage

An important concern that cannot be overlooked is the fact that not everyone has access to the Internet. Furthermore, those with access might not have the computer skills necessary to complete the RUsick2 Forum.

Madden (2003) reported that, as of August 2003, 65% of adult American men and 61% of adult American women used the Internet. Based on a 2005 survey, this has increased to 66% and 65% for men and women, respectively (Pew Internet Life Project, 2005). Eighty-seven percent of US Internet users reported having access at home and 48% said they had access at work as of August 2003. In addition, 66% of adults who use the Internet obtain health or medical information (Madden, 2003).

Internet users with a home computer can connect to the internet through a telephone line (referred to as dial-up) or a broadband connection (broadband can be a

digital subscriber line or cable connection). As of March 2006, the proportion of home users with DSL was 50% and the proportion of those using a cable modem was 41%, leaving the remaining 9% for dial-up (Horrigan, 2006). National averages in 2006 show that cable, at $41/month, is more expensive than DSL ($32/month) and dial-up ($18/month) (Horrigan, 2006).

Table 1 displays the findings from a recent Pew Internet & Life Survey on who is using broadband (DSL and cable users combined). It is clear more males than females are using broadband and the younger the age group, the higher rate of broadband access. The racial breakdown also shows that Whites and Hispanic access at an almost equal percentage while Blacks are somewhat lower. There is also a trend for educational attainment and income level in that those at a higher level have greater access to broadband in their home. Lastly, it is much more common for urban and suburban homes to have broadband compared to rural.

It has been found that those with less education, those with lower household incomes, and Americans age 65 and older are less likely to utilize broadband than those who are younger and have higher socio-economic status (Fox, 2005).

Table 1. Home Broadband Users as of 2006

2006 % of US population with Home Access to Broadband*	
Gender	
Male	45%
Female	38%
Age	
18-29	55%
30-49	50%
50-64	38%
65+	13%

Race/ethnicity	
White (not Hispanic)	42%
Black (not Hispanic)	31%
Hispanic (English speaking)	41%
Educational attainment	
Less than high school	17%
High school graduate	31%
Some college	47%
College +	62%
Household Income	
Under $30K	21%
$30K-$50K	43%
$50K-$75K	48%
Over $75K	68%
Community Type	
Urban	44%
Suburban	46%
Rural	25%

* Pew Internet Survey (Horrigan, 2006). n=1,562

Approximately 63% of those between the ages of 50-64 go online compared to only 26% of those over 65 going online (Pew Internet Life Project, 2005). This is problematic for this web site, because the older one is the more likely one is to be immunocompromised. Therefore, the web site will not be capturing this population unless there is someone to report to the web site on their behalf (e.g., spouse, child, or caretaker). The web site permitted a proxy to enter data if an individual was not able to do so or was a minor.

As evidenced by the above percentages, the majority of Americans are online. However, almost 30% of the US population does not currently use the Internet on a regular basis. Furthermore, an even smaller percentage of the elderly use the Internet, which is a group that is more vulnerable to foodborne disease. Since approximately 65-66% of the US adult population accesses the Internet and such a small percentage of the

elderly regularly use the Internet; a bias existed in those who visited the RUsick2 web site.

It is promising that 75% of adolescents are currently online, which suggests that the future percentage will be greater than the approximate 65-66% of adults who currently use the Internet. However, due to the high cost of the Internet service and the computer requirements, the 95% or greater usage that the telephone experienced might never be attained.

Email Research

This research included data collected via email surveys. Several of Dillman's (2000) principles for e-mail surveys were employed. One of his principles stressed the importance of individualizing the email contact. This was employed by emailing the potential respondent so that it did not appear as if the email was part of a listserv or mass email. Another principle emphasized by Dillman was that the cover letter needs to brief. This principle was followed in that there was a short paragraph explaining the purpose of the survey and asking the web site visitor to respond. In addition, the formatting of the questionnaire followed Dillman's suggestion to keep the column width to a minimum to prevent wrap around text. This was tested to see how the survey would appear in different email applications, but of course it was impossible to test every email application in existence. Furthermore, the first question of the survey was very simple so as not to deter responding. Dillman also suggested advising respondents to place an "X" inside the brackets to indicate an answer. In this research, respondents were advised to provide an "X", but there were not brackets next to each answer option (see Appendices A and B).

Theory and hypotheses pertaining to the RUsick2 Visitors

David Mechanic

Mechanic (1980) extensively researched the interaction between symptoms and an individual's psychological orientation, attitudes, and life experiences. He found that symptom reporting reflected a pattern of illness behavior formed by developmental experiences, actual occurrence of physical dysfunction, and the person's psychological state and general sense of well-being. Because of these findings, Mechanic (1980) suggested that developmental experiences are especially relevant in directing attention to inner experience and in forming an inclination to monitor the body. The extent that this actually occurs in adult life depends on the occurrence of illness, adverse life experience that result in psychophysiological changes, and personal stresses that reinforce a tendency toward self-attention and evaluation.

How much daily life is affected depends on the perceived severity of the symptoms being experienced (Mechanic, 1968). Thus, an individual experiencing the menacing symptoms of food poisoning will probably be more likely to report their illness than less threatening symptoms, such as nasal congestion. An item was included on the follow up survey regarding how much symptoms disrupted daily activities.

Erving Goffman

Goffman's front stage/ backstage distinction is also relevant in regards to Internet based reporting of symptoms. Most individuals want to present themselves as acceptable people, who are entitled to considerations and who are morally unblemished (Miller, 1995). Being ill with a foodborne illness threatens these perceptions due to the experience of socially unacceptable symptoms. It is not unusual for individuals to be embarrassed

because they are experiencing symptoms such as diarrhea and vomiting. The web site allows for transparency regarding symptoms, yet did not necessitate the visitor to relay their experience in a one-on-one conversation to a LHD employee. A follow up survey asked respondents whether they believed their level of anonymity online was greater or less using the Internet than a telephone call and whether they would be more likely to disclose more or less information when reporting online.

Data entry patterns and willingness to answer questions; Separation of Fatigue from Difficulty and/or Sensitivity

At each page of the web site, the visitor made the decision to continue or abandon the process and it was not uncommon for visitors to submit incomplete complaints. Where did they stop entering their data? Was it at a particular question? Understanding where visitors abandoned the site can help the design of future projects. This section discusses the data entry patterns and the visitors' willingness to answer questions.

There were different reasons for abandoning the web site. The visitor might have become fatigued and decided not to complete a report, certain questions might have been viewed as sensitive (e.g. personal contact information), or too difficult (e.g. the food history page). By creating a regression model that controls for fatigue, it was possible to statistically separate fatigue from sensitivity and difficulty. The regression line indicates the average decrease in responses (i.e., drop off) as a result of fatigue. If the proportion reaching a particular question falls below the fatigue line this indicates that the question has above average sensitivity or difficulty. If the proportion answering a question is above the fatigue line, then the question can be viewed as less sensitive or difficult. For example, certain questions would most likely fall above the regression line, such as

symptoms experienced, time of symptom onset, non-food exposures, and whether or not medical attention was sought. However, other questions most likely would be below the regression line, such as food history and matching food sources to food items. See Figure 2 for a hypothetical depiction. Note that any dot to the right of the regression line represents a question that is above the line (less sensitive). The opposite is true of questions on the left side of the line.

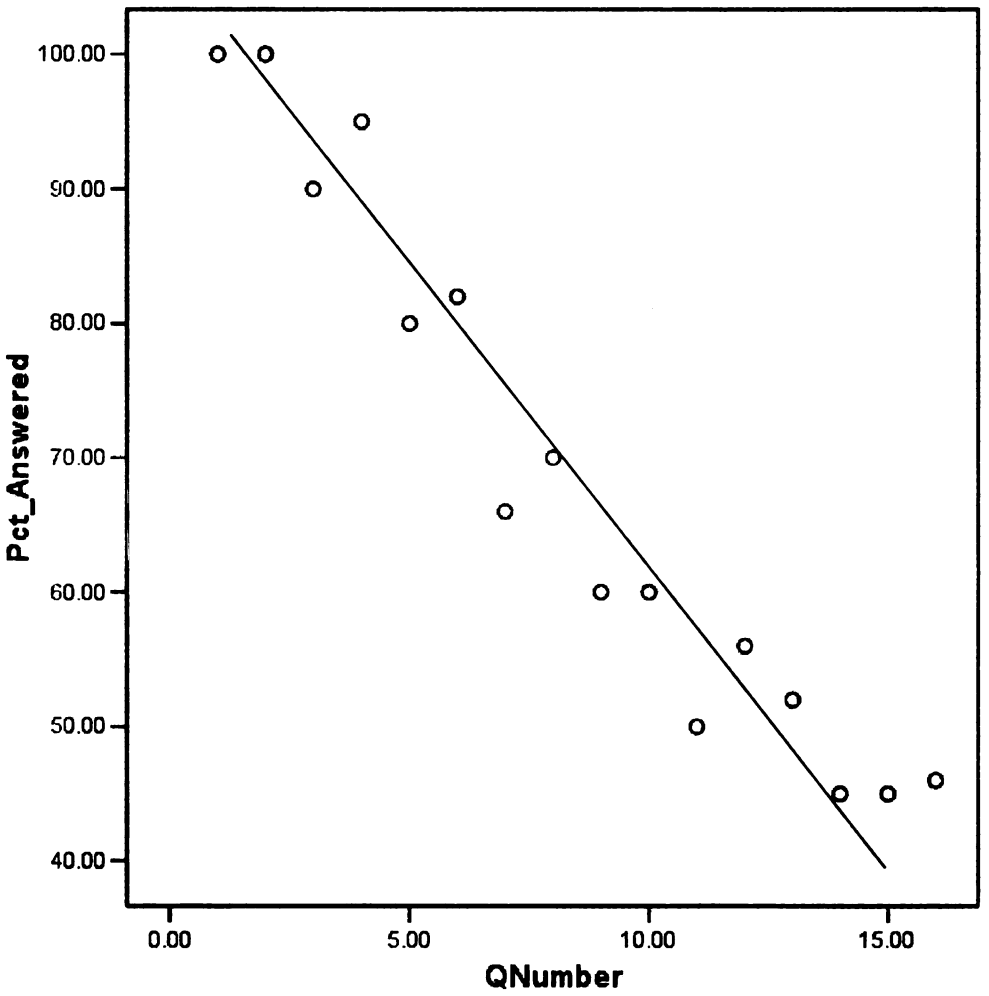


Figure 2. Hypothetical Separation of Fatigue from Difficulty and/or Sensitivity

In general, if web site visitors are not willing to answer specific questions on the web site (i.e., confidential information), then online reporting will not be as beneficial as telephone reporting because the LHDs have no way of contacting the visitors. But, if web site visitors are willing to answer many of the questions, such as what they ate, where they obtained their food, their symptoms, contact information and more, then the web site could be a time saving device for LHD personnel. Currently, LHD employees spend a considerable amount of time on the phone with people calling about their illness gathering the same data that are requested on the web site. If people answer these items on the web site, then the report is ready for LHDs to begin their investigation without having to spend time on the phone gathering a food history and other information from the individual.

Contact Information

It is believed that questions asking for contact information will have a larger drop-off due to individuals' unwillingness to disclose personal contact information. This is important to know because if individuals are not willing to leave any form of contact information, then it will be impossible for local health departments to follow up on the reports. Thus, it is hypothesized that questions asking for personal contact information (i.e., name, mailing address, telephone number, email address) will be answered at a rate that falls below the fatigue regression line (hypothesis 1).

Food History Page

It is believed that when visitors see the food history page, they will tend to abandon the web site more so than with other RUsick2 pages. This is because remembering a 3-4 day food history is very difficult. In addition, many visitors might be

coming to the web site to enter the last food item(s) they consumed because they believe this is what caused their illness. This is known as "last meal bias"[1] and often threatens gathering a sufficient food history. Thus, it is hypothesized that responses to questions asking for the food history will have a response rate that falls below the regression line (hypothesis 2).

This is one of the most important pages on the web site because the data on this page can help local health departments investigate possible sources of foodborne illness. It is important to know if visitors do not complete this page.

E-mail address

It is believed that the e-mail address will be the most commonly entered form of contact information because the web site is online. Madden (2003) found that 91% of Internet users participated in email. Therefore, those visiting the web site will probably have an email address and wish to receive correspondence in this manner. This is important to know because it will show the manner in which local health departments can most often correspond with RUsick2 visitors. Thus, it is hypothesized that e-mail address will be the most commonly entered form of contact information (hypothesis 3).

Gender

It is believed more women will create a report on the web site than men because females tend to express more concern over health related information than men (Lewis, Lewis, Lorimer, and Palmer, 1977). According to Lewis et al. (1977), women seek medical care at a ratio of 1.55 to 1 compared to men. More recent research has

[1] The phrase "last meal bias" results from reporters believing the most recently consumed meal is the cause of their illness. There is also the possibility of "restaurant bias," which occurs when reporters believe the unusual food or food prepared outside the home was the cause of their illness. For example, if an individual ate at a restaurant for lunch and at home for dinner and became sick that night, they would likely attribute the meal at lunch as the cause of their illness.

documented that online women sought health related information more often than online men (Madden, 2003). This is important to know because we can determine if this web site draws a similar profile of visitors to those who visit other health related web sites. Thus, it is hypothesized that a larger number of RUsick2 reports will be entered by females than males (hypothesis 4).

Number of Food Items and Food Sources

It is believed that those who complete the food history page will enter a more complete food history than what is currently obtained through telephone reports. This is because the visitor is under no time constraints or pressure to hurriedly remember what they ate. During traditional telephone reports, the reporting person is asked to recall what they ate for the past several meals. Having a LHD investigator on the other end of the line might cause the reporter to feel time pressure. For this same reason, I believe that those who enter food sources will enter more food sources than the amount telephone reports obtain. Unfortunately, there is no literature to support either of these claims.

This is important to know because local health departments can investigate foodborne illness complaints more efficiently if they do not need to wait on the telephone for an individual to remember his or her food history and where they obtained their food. Thus, it is hypothesized that the number of recently consumed food items entered on the web site will be greater than the number of such food items revealed in traditional telephone reports (hypothesis 5). It is also hypothesized that the number of food sources entered on the web site will be greater than the number of food sources given on traditional telephone reports (hypothesis 6).

Follow Up Survey

A follow up survey pertaining to RUsick2 visitors' experience on the web site was also administered. Survey items helped determine certain characteristics of RUsick2 visitors such as how much time they spend online on a weekly basis, how often they use the Internet for health-related information, and educational level. In addition, other questions assessed the expectations that visitors had when first coming to the web site, how difficult the web site was to understand, the amount of time they spent on the web site, how they found out about RUsick2, if they received a phone call from their LHD, and more.

The follow up survey was administered for nearly two and a half years (2002-2004, and 2005). Approximately two weeks after a visitor entered a complaint on the web site, an email was sent to the individual requesting them to complete the survey. The survey was included in the body of the email message and was returned by the respondent in the body of the email message.

The following two questions are based on the follow up surveys:
There might be a relationship between how easy it was for the respondent to enter data on the RUsick2 Forum and number of hours/week s/he spent on the Internet. It is important to see if there is such a relationship while controlling for gender, age, education, and metro/nonmetro residency. If there is a relationship, then it can be suggested that the number of hours per week spent online can facilitate data entry on the web site. (Question 1)

Furthermore, a relationship might exist between how understandable the reports were at the end and the number of hours/week spent on the Internet. If there is a relationship, then it can be suggested that the number of hours per week spent online can

aid in understanding reports offered at the end of the web site, controlling for gender, age, education, and metro/nonmetro residency (Question 2).

ReportFoodPoisoning.com Follow Up survey. The RUsick2 web site was revised in late 2004 and was re-opened in February 2005 as ReportFoodPoisoning.com (see Appendix B for the ReportFoodPoisoning.com web site). The decision to revise was to simplify and shorten the data entry process. The same questions remained, but the number of data entry pages decreased from seventeen to nine. At that point, a revised follow up survey for ReportFoodPosioning.com visitors was administered in the same manner as the original follow up survey. See Appendices D and E for the surveys. The surveys were very similar with the exception of five questions that were added to the ReportFoodPoisoning.com survey. The data from the two surveys were not combined; however, the results of the additional survey questions are presented.

Theory and Hypotheses Pertaining to Attitudes of Local Health Department Personnel towards the web site.

LHD employees' attitudes toward the web site will shape their likelihood of adopting the web site into their daily routine. By understanding the attitudes and beliefs of LHD personnel, it becomes possible to understand their behavior. According to Fishbein and Ajzen (1975), a person's set of beliefs about an entity leads to their overall tendency toward a positive or negative evaluation. The overall evaluative attitude in turn influences intentions to behave in positive or negative ways toward the object, and these intentions usually lead to behaviors toward the object. More concisely, Fishbein and Ajzen propose that beliefs about an object guide attitudes, which in turn, lead to behavioral intentions which are the most important influences on behavior. The

foundation of the theory of reasoned action (TRA) is to understand the relationship between attitudes and behavior (Glanz, Lewis, and Rimer, 1997).

There are two direct determinants of an individual's behavioral intention: his/her attitude toward performing the behavior and his/her subjective norm that is associated with that behavior. Attitude, in turn, is determined by the individual's beliefs about the likelihood of certain outcomes and attributes of performing the behavior weighted by evaluations of those outcomes. A person who strongly believes that a highly valued outcome will result from performing a behavior will have a positive attitude toward that behavior (Glanz et al., 1997). Nonetheless, an individual who has strong beliefs that negatively valued outcomes might result from a behavior will possess a negative attitude toward that behavior. Furthermore, it is important to remember subjective norms, which are determined by salient individuals that either approve or disapprove of a particular behavior (Glanz et al., 1997). TRA has been successful in predicting and explaining many health related behaviors in past research (Glanz et al., 1997).

Attitude Strength

Another important aspect of understanding the link between how attitudes affect behavior is attitude strength. Fazio, Powell, and Williams (1989) asserted that a strong attitude can best predict behavior. In the current research, it is important to interpret the attitude-behavior connection of reporting foodborne illnesses. Moreover, measuring attitude strength concerning the RUsick2 Forum can assist in future developments related to illness reporting by the public. For example, the findings of the current research might be generalizable to other health arenas concerning reporting of illnesses other than foodborne disease.

People with strong vested interest in a behavior are more likely to act on their attitudes than are people with little vested interest in a behavior (Ajzen, 1980). Crano (1995) described vested interest as the extent to which an attitude object is of personal relevance for the attitude holder, and highly vested attitudes are functionally related to behavior. LHD personnel would be affected by the implementation of this web site into their weekly job requirements, thus the issue of participation is hedonically relevant to them, and they should have relatively strong attitudes regarding it.

When a message is relevant, people are more likely to carefully process that information (Boninger et al., 1995). LHDs will view the website as relevant to their daily lives because it concerns how they conduct their responsibilities. Therefore, it is important to examine LHD employees' attitude towards the web site.

LHDs might have a negative evaluation towards the web site in that many may not want to change the current system because it has remained the same for several decades and they are comfortable using it. This web site has the potential to automate how they handle a portion of their foodborne illness complaints, which may result in some resistance because a new form of reporting could increase the number of reports LHD employees need to follow up on and investigate. It also has the potential to increase LHD employees' workload. Thus, LHDs may be hesitant to use the web site because they could be short-staffed. With budgetary issues as they are, this will probably continue. However, comparing the time spent on telephone reports to the time spent on electronic reports, the time will decrease dramatically with the latter. The report will already be partially complete and the LHD employee does not have to spend time completing the entire report themselves because the reporting individual will have completed much of

the necessary information. It is unlikely LHD employees feared this program would automate their job. It is necessary for an employee to complete the report just as it is necessary for an employee to examine the data to determine if the complaint is part of an outbreak.

Alternatively, some LHDs may believe the current system needs improvement and there might be a benefit to reporting online. These attitudes are relevant to the success of the web site because LHDs are the liaison between the general population and the state and national reporting system. If we are to increase reports of foodborne illness so that the national reporting system can have a better grasp on the illnesses occurring and allow for preventive efforts to occur, it is imperative to determine if LHDs are willing to use the web site.

Geographic location might also play a role in the willingness of LHDs to use this web site. For instance, the population size of a LHD's jurisdiction might affect attitudes in that those in less populated areas might not see the need to use the web site due to the small number of reports they must handle. Also, those in rural areas might believe that their residents do not have as much access to the Internet as those in metropolitan areas, thus will not spend the time or resources participating in the web site. The average educational level and income of a jurisdiction might also influence a LHDs attitude toward the web site. For instance, a LHD will probably not be willing to use the web site if their population has a lower than average income level because they might believe their residents will not take advantage of the website due to limited Internet access.

Rurality

The proportion of residents in rural areas might play a role in whether or not LHDs are willing to participate in the RUsick2 Forum. In order to take this into consideration, the rural-urban continuum codes developed by Economic Research Services (ERS) of the United States Department of Agriculture were utilized. This continuum "forms a classification scheme that distinguishes metropolitan (metro) counties by the population size of their metro area, and nonmetropolitan (nonmetro) counties by degree of urbanization and adjacency to a metro area or areas" (ERS, 2004). There is a nine-part county codification, where metro and nonmetro categories have been subdivided into three metro and six nonmetro groupings (ERS, 2004). For this research, each county in Michigan was classified as nonmetro or metro following the ERS's metro and nonmetro groupings. This is because participation in the web site might vary by metro versus nonmetro location. It is hypothesized that LHDs in nonmetro areas are more likely to believe they are adequately addressing the needs of residents in their jurisdiction concerning complaints of foodborne illnesses without using the web site than LHDs in metro areas (hypothesis 7).

Restatement of Hypotheses and Questions

Hypotheses

1: Questions that ask for personal contact information (such as name, mailing address, telephone number, email address) will be answered at a rate that falls below the fatigue line.

This hypothesis is based on the belief that web site visitors will be hesitant to answer sensitive questions.

2: Questions that ask for food history will have a response rate that falls below the fatigue line.

Remembering a food history is very difficult; therefore, it is believed that web site visitors will be less likely to complete this page.

3: E-mail address will be the most commonly entered form of contact information.

This is based on Madden's (2003) research that 91% of online visitors partake in email.

4: Of the RUsick2 reports, a larger number will be entered by females than males.

Lewis et al (1077) found that women seek medical care more often than men and Madden (2003) found that women seek health related information more often than men, therefore, it is hypothesized that women will enter more reports than men.

5: The number of recently consumed food items entered on the web site will be greater than the number of such food items revealed in traditional telephone reports.

This is hypothesized because there is no time pressure on electronic reports compared to the time pressure by local health department personnel during traditional telephone reporting.

6: The number of food sources entered on the web site will be greater than the number of food sources given on traditional telephone reports.

Like hypothesis five, this is hypothesized because there is no time pressure on electronic reports compared to the time pressure by local health department personnel during traditional telephone reporting.

7: LHDs in nonmetro areas are more likely to believe they are adequately addressing the needs of residents in their jurisdiction concerning complaints of foodborne illnesses without using the web site than LHDs in metro areas.

This hypothesis stems from the lower usage of the internet in rural areas compared to suburban and urban areas. LHDs will be aware of the proportion of their residents living in rural areas, which might affect their belief about adequately addressing their residents' needs using the internet.

Questions

1: Controlling for gender, age, education, and metro/nonmetro residency, we are testing the relationship between hours per week spent on the Internet and ease of data entry on the RUsick2 Forum.

This is tested because increased internet usage might help web site visitors navigate the web site.

2: We are also testing the relationship between hours spent per week on the Internet and understandability of reports at the end of the web site, controlling for gender, age, education, and metro/nonmetro residency.

This is being tested because the increased internet experience might help web site visitors complete the web site.

CHAPTER 3

METHODOLOGY

Research Design and Data Collection

Four forms of data collection and analysis occurred. First, the data entry patterns of RUsick2 visitors were collected and analyzed, along with a sample of foodborne illness reports gathered from local health departments, to compare the quality of reports between the two methods. Second, a follow up questionnaire was administered to visitors who came to the web site to report their illness. Third, personal interviews were conducted with local health department personnel. And lastly, a survey was administered to local health department personnel. The data collected answer the nine aforementioned hypotheses. In addition, data were gathered from the LHD personnel survey to conduct a factor analysis, which will be described below.

Data Quality and Data Entry Patterns. What sort of data are RUsick2 visitors willing to input online? This is one of the five main questions this research is attempting to answer. Data entry patterns were collected directly from the web site to answer the first four hypotheses. Please see Appendix A to view how the questions appeared to the web site visitor

The following variables were made use of to answer the first four hypotheses:

Name: text box. This was recorded as yes/no. Thus, if a visitor entered anything in this text box, it was recorded as "yes" and if it remained empty, it was recorded as "no".

Mailing address: text box. This was recorded as yes/no following the same guidelines as above.

Telephone number: text box. This was recorded as yes/no following the same guidelines as above.

Email address: text box. This was recorded as yes/no following the same guidelines as above.

Food history: consisted of a listing of food items where the web site visitor checked which foods they consumed. If the visitor checked a food item, this was recorded as "yes"; if the visitor did not check any food items, this was recorded as "no."

Gender: dichotomous measure where 1=female and 2=male.

The second main question asked by this dissertation is how do the data visitors enter online compare to traditional telephone reports gathered by local health departments? By comparing RUsick2 reports to LHD reports, we can get an idea of data quality. We need to determine whether or not the RUsick2 reports are worse, the same, or exceeding in quality when compared to traditional telephone reports.

Data entered into the web site were analyzed and compared to traditional telephone reports by contacting local health departments; allowing for hypotheses five and six to be answered. The two main variables that were compared were number of food items and number of food sources reported, both continuously measured. Appendices A and B display what RUsick2 visitors were asked regarding food items and food sources. Appendix C is the standard form used by LHDs in Michigan when handling a case of foodborne illness reported by telephone.

The reason that we are only comparing these two variables is due to the Health Insurance Portability Act (HIPAA) of 1996 which states that covered entities cannot

release personally identifiable reports (Federal Register, 2003). HIPAA prevents local health departments, which are considered covered entities, from allowing a review of their foodborne illness complaints for the purpose of this research. Covered entities are not permitted to reveal confidential information such as names, addresses, telephone numbers, and symptoms experienced by those who complained of a foodborne illness to an individual not employed at that entity. However, local health departments were able to oblige with releasing data on the number of food items and number of food sources for a comparison to be drawn between data collected via the two methods.

Follow up Survey. The RUsick2 Follow up survey (Appendix D) was administered for nearly two years between 2002-2004. When RUsick2 was revised to ReportFoodPoisoning.com in 2005, the survey was updated to reflect the new web site name. When the survey was revised, five new questions were included on the survey. These five extra questions were included based on discussions from the proposal of this dissertation, which occurred in April 2005. When I discuss these five questions and present the results, I explicitly note those findings are from the ReportFoodPoisoning.com survey.

The additional five questions are below. The findings of these questions which are based only on ReportFoodPoisoning.com respondents are presented in Chapter 6.

1. How do you think the level of anonymity compares between online reporting versus telephone reporting?

2. Did your symptoms disrupt your daily life?

__Yes

__No

__Not Sure

3. Do you think you would disclose more or less information regarding your illness online versus the telephone?

___More

___Less

___Same

___Not Sure

4. Did you have any health concerns in the past year?

___ Yes (go to question 21)

___ No (go to question 22)

5. This past year, how often did you use the Internet to look for health information or medical advice regarding your health concerns?

___Everyday

___Several times a week

___Several times a month

___Every few months

___Less often

___ Don't Know

Furthermore, in Chapter 6, there is a comparison between the two samples (RUsick2 and ReportFoodPoisoning.com visitors) on the variables in the survey and a discussion on where they differ. Other than this comparison of which variables the respondents differ, no other presented results are a comparison between these samples.

Approximately two weeks after a visitor came to the web site, an email was sent to the individual, asking him/her to complete the survey. The survey was included in the body of the email message and was returned by the respondent in the body of an email

message. This survey provided the data to test hypotheses seven and eight, described below, via least squares regression.

Question 1 (testing RUsick2 follow-up survey respondents): There may be a relationship between how easy it was to enter data on the RUsick2 Forum and number of hours/week spent on the Internet, while controlling for gender, age, education, and metro/nonmetro residency. The operationalization of each variable follows.

Y = how easy was it to enter data on the RUsick2 Forum (item #5). This is a Likert scale. (1=extremely easy, 2=somewhat easy, 3=undecided, 4=somewhat difficult, 5=extremely difficult)

X_1= # hours/week spent on Internet (item #20). This is a continuous variable.

X_2 = age (through match with RUsick2 ID). This is a continuous variable.

X_3 = gender (through match with RUsick2 ID). This is a dichotomous variable (1=female, 2=male).

X_4 = education (item #22). This is an ordinal variable. (1=some high school, 2=high school, 3=some college, 4=college graduate, 5=postgraduate degree)

X_5 = metro/nonmetro residency (item #25). This is a dichotomous variable (1=nonmetro, 2=metro).

Question 2 (testing RUsick2 follow-up survey respondents) is the following What is the relationship between how understandable the reports were at the end and the number of hours/week spent on the Internet while controlling for gender, age, education, and metro/nonmetro residency?

The operationalization of each variable follows:

Y = how understandable the reports and tables were at the end of the RUsick2 forum (#6). This is a Likert scale. (1=extremely easy, 2=somewhat easy, 3=undecided, 4=somewhat difficult, 5=extremely difficult)

X_1= # hours/week spent on Internet (item #20). This is a continuous variable.

X_2 = age (through match with RUsick2 ID). This is a continuous variable.

X_3 = gender (through match with RUsick2 ID). This is a dichotomous variable (1=female, 2=male).

X_4 = education (item #22). This is an ordinal variable (1=some high school, 2=high school, 3=some college, 4=college graduate, 5=postgraduate degree).

X_5 = metro/nonmetro residency (item #25). This is a dichotomous variable (1=nonmetro, 2=metro).

In addition, univariate analyses were conducted on all variables in the follow up survey to allow for investigation of the distribution of each variable. The results are presented in tabular form. The ReportFoodPoisoning.com findings are presented separately and explicitly noted.

Local Health Department Personnel. The second population analyzed was employees [or personnel] of LHDs. Personnel of LHDs are the liaisons between the public and the national reporting system. If this group is resistant to online reporting, the web site will not succeed. Using personal interviews and surveys, I examined LHD attitudes and concerns about the RUsick2 web site. The goal was to improve the web site so that it is as user-friendly and effective as possible for LHDs to use via two methods: personal interviews and surveys.

Personal interviews. Ten interviews were conducted with local health department personnel via telephone (see Appendices C and D) during the summer of 2005. The sample was not random. All 45 local and district (comprised of more than one health department) health departments in Michigan comprised the sampling frame. The sampling frame was then divided into two groups, those that had a password and those that did not. From each of these two groups, the lists were divided into rural and urban based on ERS' metro/nonmetro classification described in Chapter 2. Interviews were made based on those who would grant one. The participating LHDs provided interviews when requested, meaning zero refused. Unfortunately, it was difficult to obtain interviews from non-participating LHDs; this was partially due to the fact that the interviewer did not have a specific name of whom to request an interview. This is unlike the participating LHDs, where we had personal names from their participation in the web site and previous communications regarding the web site. Seven non-participating LHDs refused and three obliged. In each group (participating and non-participating) there was one nonmetro health department. This is not surprising given that participating LHDs tended to be from more populated jurisdictions.

A student assistant interviewed representatives of various Michigan county health departments to minimize the respondents from providing socially desirable answers (Dillman, 2000). Departments interviewed include both departments that participated in RUsick2 and departments that did not. The purpose of the interviews was to assess the attitudes and subjective norms which might influence local health departments' decision to participate or not participate. Knowing why they chose to participate or not can help

modify the web site to meet their needs or increase education about the web site to LHDs in Michigan.

The qualitative description of the personal interviews is stratified by those participating and those not participating. Explanations are provided in the Discussion to distinguish responses between rural and urban LHDs.

LHD Surveys. The LHD survey was created on a web-based program, named Blank Slate, which allows for survey creation and data collection entirely online. The surveys were for all health departments in Michigan to respond to (see Appendices E and F). Personal email requests were made to LHDs to complete the survey online in April 2005. Reminder emails were sent out in May 2005. Even though the data were collected in 2005 after the web site transitioned to ReportFoodPoisoning.com, the respondents were asked about their RUsick2 experience with this project. Note that all participating LHDs that responded to the survey also participated in the RUSick2 Forum, therefore, they had a history with this project and were adept to answer each questions.

The LHD surveys allowed for hypothesis nine to be tested: LHDs in nonmetro areas are more likely to believe they are adequately addressing the needs of residents in their jurisdiction concerning complaints of foodborne illnesses without using the web site than LHDs in metro areas.

Obtaining approval for surveys and interviews

The RUsick2 web site received approval from Michigan State University's Institutional Review Board, the University Committee on Research Involving Human Subjects (UCRIHS), in Spring 2002. The follow-up survey received approval in Fall

2002. The local health department interviews and surveys received IRB approval in Spring of 2005. All UCRIHS protocol was followed as required.

CHAPTER 4

RESULTS OF DATA ENTRY PATTERNS ON RUSICK2

Data Entry Patterns of RUsick2 Visitors

Data for this analysis were restricted to reports entered from November 1, 2002 to September 30, 2004. Data were further restricted to only those reports that reached entry level 4 (the entry level in which symptoms and onset date/time are entered) or higher. Entry level indicates the last web site page where the visitor entered and submitted data. For example, a visitor who reached entry level 4 answered at least one question on that page and then hit submit. The visitor may have viewed the next entry level, but did not submit any data. A restriction was executed to exclude those persons who visited the web site, but did not continue far enough to create a foodborne illness complaint. There were 8,979 reports that reached entry level 1 (the entry level where the Case ID is assigned), and 7,202 (59%) met the inclusion criteria of reaching entry level 4 or higher. Figure 3 shows how many visitors continued from one page of the web site to the next.

Perhaps the 20% of visitors who reached Entry Level 5 (this level indicates the visitor would have entered his or her symptoms, onset date and time in Entry Level 4 and personal contact information in Entry Level 5), wanted to indicate that they were sick with an enteric disease but provided no food history data. For purposes of syndromic surveillance of foodborne disease, illness onset time and date and symptoms are still valuable. Visitors reaching levels 6 through 8 (at which suspected food sources were entered), wanted to identify the one food source or food item that they believed was responsible for their illness. It is likely that reports gathered via telephone resemble web site complaints that reached entry levels six through eight. In these cases, it is the

responsibility of local health department personnel to extract more lengthy food history data during their telephone call. The website was designed for this function.

The web site emphasized the importance of identifying all food sources and food items that were consumed from the four days before onset and was perhaps somewhat successful in coaxing these individuals to enter some additional food history data. The 53% of individuals who reached Level 10 of the input screens were prepared and able to provide a food history report along with information about nonfood exposures.

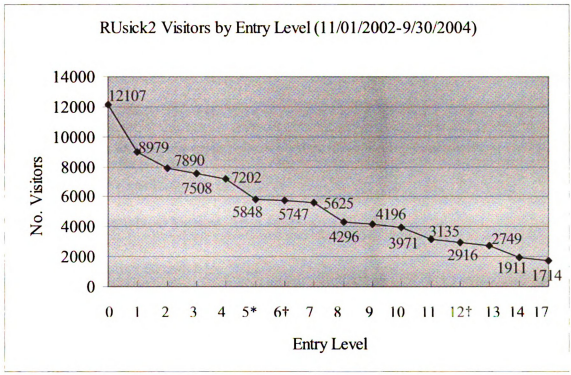


Figure 3. Number of Visitors by Entry Level.

Description of Each Entry Level:

1. Case ID assigned
2. Personal Characteristics (state, age, gender)
3. County, city
4. Symptoms and date onset
5. Identifiers (name, email, phone)
6. Suspected Foods and Food Sources

7. Suspected Food(s)
8. Suspected Food Source
9. Non-food Exposures
10. Four Day Food History
11. Food Sources
12. Contact Information (last name, address)
13. First Summary Report
14. Source Matching
15. Match foods to food sources (Optional-not shown)
16. Second Summary Report (Optional-not shown)
17. Comparison Report

* Entry Level 5 was sufficient to report to the LHD.
† Entry Level 6 was sufficient to report foods and food sources.
‡ Visitors that passed entry level 13 were providing optional data to see if other reports had been made regarding the same food source

The mean age of the sample was 35.5 years (SD=14.3years), 1,426 (18.1%) of the visitors were 50 years or older, and 430 (5.5%) were 60 years or older. Of the 7,202 reports that reached entry level four, 562 (7.8%) were from the three-county pilot area in central Michigan, 696 (9.7%) were from the state of Michigan but outside the three-county pilot area, and the majority, 5,944 (82.5%), were from outside the state of Michigan. This is most likely the result of this program being online; it cannot be restricted by geographical location. These data are displayed in Table 2.

Table 2. Descriptive Statistics for Data Entry Patterns Analysis

Variable	Statistic
Gender	
Female	4,294 (59.6%)
Male	2,908 (40.4%)
Mean age in years (SD)	35.5 (14.3)
Geographic location	
Pilot area	562 (7.8%)
Michigan	696 (9.7%)
Outside of Michigan	5,944 (82.5%)

Of the 6,588 respondents that answered which symptom they experienced first, diarrhea was the most commonly reported first symptom (3,647 (55.4%)) compared with those who reported vomiting (2,941 (44.6%)) as their first symptom. Nearly everyone, (7,048 (97.9%)) selected at least one symptom from the symptoms list. Only (1,047 (14.5%)) of the visitors had sought medical attention for their illness. Unfortunately, data are not available to draw a comparison between the web site reporters and telephone reporters.

Fatigue Line Findings. The fatigue line represents the average decrease in responses (i.e., drop off) as a result of fatigue as one progresses through the questions of the web site. This line shows the average drop-off one can expect as visitors progress through each question of the web site. Figure 4 displays the results. Two hypotheses (#1 and #2) were based upon this fatigue line.

Hypothesis 1: Questions that ask for personal contact information (such as name, mailing address, telephone number, email address) will have a drop-off that falls below the fatigue line.

This hypothesis was not supported as evidenced by the number 12 data point on Figure 4. See Figure 4 and Table 3.

Hypothesis 2: Responses to questions asking for the food history will have a response rate that falls below the fatigue line.

This hypothesis was not supported as the data point for question 16 shows. The percentage answering this question fell on the fatigue line. See Figure 4 and Table 3.

Figure 4. Fatigue Line Graph.

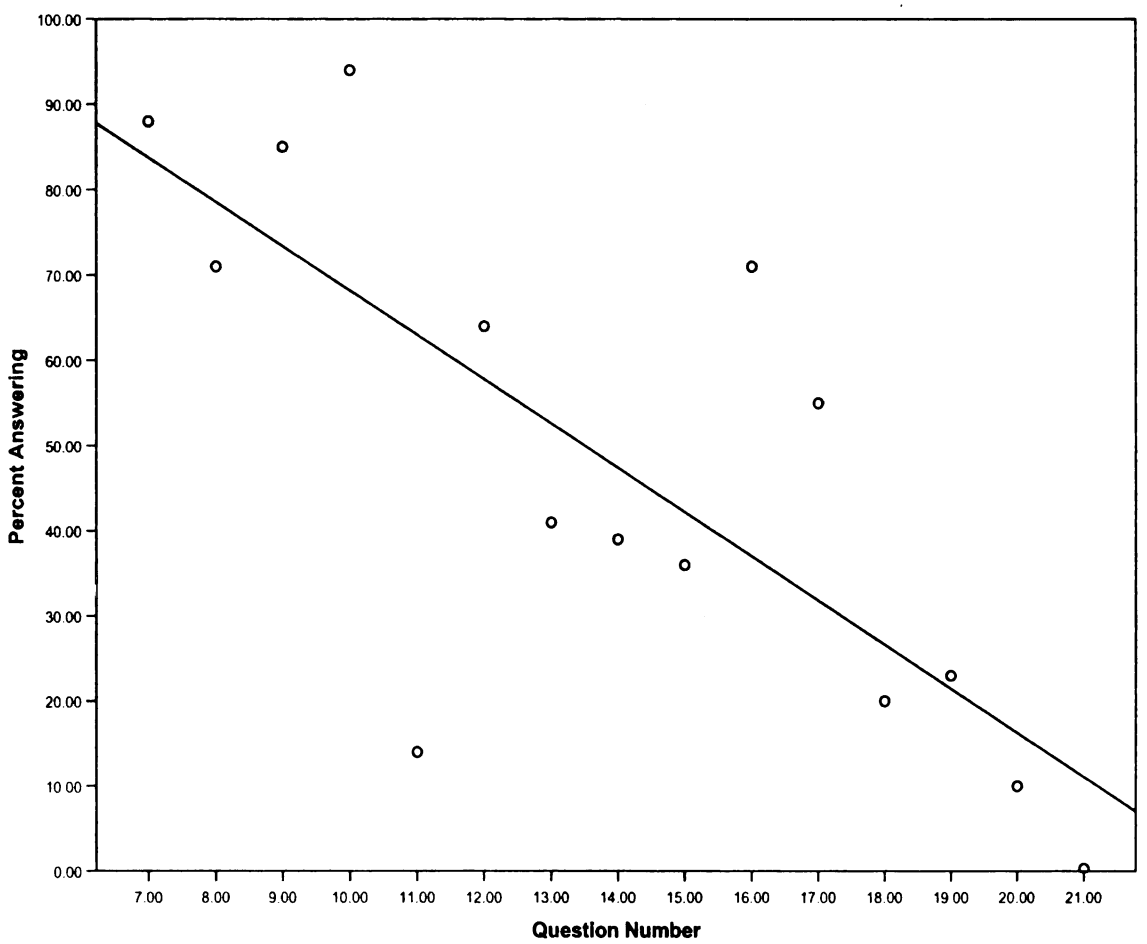


Table 3. The percentage of respondents answering each question that fell above, below, or on the fatigue line.

Question Number	Question	Is the percentage responding Above or Below the Regression Line?
1-6	State, Age, Gender, How many others ill, County, City	100% (needed to answer to continue)
7	First symptom	Above
8	Date of symptom onset	Below
9	Time of symptom onset	Above
10	Symptoms list	Above
11	If medical attention was sought	Below
12	Contact Information	Above
13	Suspected foods	Below
14	Suspected food source	Below
15	Non-food exposures	Below
16	Food history checklist	Above
17	Food source	Above
18	Match foods to food sources	Below
19	Viewed second summary report	Above
20	Viewed Case Report	Below
21	Viewed Line listing	Below

Hypothesis 3: Email address will be the most commonly entered form of contact information.

This hypothesis was supported. Nearly two thirds of visitors entered an email address, which was followed by 60% entering a telephone number, and 10% entering a mailing address. Overall, 67% of RUsick2 visitors entered at least one method for contacting them and 33% did not leave any form of contact information. Therefore, the majority of visitors were leaving some form of contact information.

The amount of contact information entered varied. Some reports were complete, with home address, phone number, and email address. However, many people entered only an email address. Table 4 presents the breakdown of the number of visitors who entered contact information. It is evident that visitors were more willing to leave a telephone number or email address than any other form of contact information. Two-thirds, 4,786 (67%), of all visitors left some form of contact information.

Table 4: RUsick2 Visitor Contact Information, n=7,191

Form of Contact Information:	Number (%)
Mailing Address	732 (10%)
Email Address	4662 (65%)
Any Telephone Number	4331 (60%)
Any Contact Information	4786 (67%)

Hypothesis 4: Of the RUsick2 reports, a larger number will be entered by females than males.

Of the 7,202 visitors that answered the question on gender, 4,294 (59.6%) were from females compared to 2,908 (40.4%) reports being from males (χ^2= 258.7, df=1, p<0.001). Thus, hypothesis 4 was supported.

Hypothesis 5: The number of food items entered on the web site will be greater than the number of food items given on traditional telephone reports.

At least one food item was entered by 5,319 (73.9%) of the visitors. The mean number of food items entered was 8.8 (SD=7.4). Compared to reports (n=87) from ten local health departments from around the U.S., this number exceeded the average number of food items reported on telephone reports, which was 4.4 food items (SD= 1.73). This difference was statistically significant (z statistic = 20.81, p<0.001) and supported hypothesis 5. A comparison was made between RUsick2 reports and LHDs from around the US because a large proportion of the RUsick2 sample was from outside the state. For those who entered at least one food item, approximately 17% were from the state of Michigan and approximately 83% resided outside the state of Michigan.

Hypothesis 6: The number of food sources entered on the web site will be greater than the number of food sources given on traditional telephone reports.

The number of visitors entering at least one food source was 4,142 (57.5%). RUsick2 reports had a mean of 1.7 food sources entered (SD=1.16) compared to a mean 1.65 food sources given on the local health department telephone reports. Thus,

hypothesis 6 was not supported in that the number of food sources reported by the two methods was very similar (z statistic= 0.49, p=0.31).

Discussion of Data Entry Patterns Results

The gender distribution of 59% female visitors and 41% male visitors, as shown in Table 2, is consistent with current Internet research indicating that women are more likely than men to utilize the Internet to search for health-related information (Madden, 2003). The mean age of 35.5 years, also shown in Table 2, is consistent with other research indicating that web users tend to be young (Madden, 2003). The younger cohort could, however, bias comparison between electronic reports and telephone reports in that an age difference might exist between the reporting mechanisms. Unfortunately, when reports from local health departments were obtained, neither the age of the reporter nor the age of the ill person was gathered. As a result, when we compare the electronic and telephone reports part of the difference may be a result of differences in age between those reporting illnesses.

The majority of visitors, 82.5%, did not live in Michigan, while nearly 17% did. See Table 2 for data. This is not surprising given there are no geographic boundaries when using a web site. This may also be an indication that the publicity was not reaching the public as widely as anticipated in the tri-county area *or* those who were reporting outside of Michigan were motivated reporters; individuals who really believed in reporting their illness.

Regarding the fatigue line results shown in Figure 4 and Table 3, there were some interesting results. Keep in mind that the fatigue line represented the expected drop off for a particular question taking into account its position in the questionnaire. If the

percentage of respondents who answered a particular question fell below the regression (fatigue) line, this indicated above average sensitivity or difficulty. If the drop off for a particular question fell above the fatigue line, then the question can be viewed as less sensitive or difficult.

As expected, many questions that requested easily remembered information were above the regression line; for example county, city, first symptom experienced, all symptoms experienced, and contact information. Moreover, some of the questions whose answers might be more difficult to remember fell below the regression line, such as date of symptom onset, suspected foods, suspected food source, non-food exposures (which include contact with animals, patients in a healthcare children, and more), matching foods eaten to food sources (when the visitor matches food items to the food source they came from, for example, ground beef from supermarket A), viewing the case report (an individual report summarizing the data entered), and viewing the line listing (a report that lists data from other web site visitors' report).

An interesting result was that the food history checklist was *above* the regression line as was the food source page. This was a very unexpected result, yet interpretation suggests caution. Only one food item needed to be checked for this question to be counted as completed. For example, if a web site visitor entered one food item, their individual data point would be above the regression line. The same holds true for food sources in that only one food source needed to be entered for this page to be considered completed. As figure 4 displays, the food source question was above the regression line.

The symptoms list was also well above the regression line. This question was probably very easily answered because the symptoms of foodborne illness can be

disrupting of every day life. Web site visitors probably were well aware of the symptoms they experienced.

The data point for "if the visitor sought medical attention" is below the regression line (data point for question 11). This indicates that the question was less often answered. A possible reason for this is the visitor may have been contemplating whether or not to visit a healthcare provider and the responses did not capture this (the responses were yes or no). A response that should have been included is "Not Sure".

In general, the findings supported the hypothesis that more food items could be collected through the web site than by a telephone conversation with a sanitarian or public health nurse. Recalling one's food history is quite difficult for most people and makes the reporting of foodborne illnesses more challenging than reporting many other reportable diseases. The number of food items from web site reports was approximately double the number of food items from telephone reports; this could indicate the environment created by the web site allows for better recall of food items consumed.

The web site also asked if the visitor sought medical attention. It was found that nearly 15% of the web-based reporters sought medical attention. The web site visitors possibly did not perceive their symptoms as severe enough to warrant medical attention, yet felt their symptoms were severe enough to enter an electronic complaint, suggesting that on average, web site visitors were not seeking medical attention. This is consistent with the findings of others (Imhoff et al., 2004; Mead et al., 1999) in that individuals suffering from a foodborne illness usually do not seek health care. For example, Imhoff and colleagues found that 21% of people suffering from an acute episode of diarrhea made a health care visit as a result (Imhoff et al., 2004).

It is important to note that the website was designed for web site visitors to enter as much or as little data regarding their illness as they felt comfortable with. A website visitor who did not reach a more advanced level (e.g., level eight) does not equate to a "failure." Visitors that reached entry level four (where symptoms, onset date and time were entered) can provide valuable data for syndromic surveillance and should be viewed as successes of the website.

One limitation of these findings is the "quality" of reports received from local health departments for comparison. A sample of fifteen participating local health departments was solicited for reports from a specified time period, where 10 obliged (67% response rate). The reports received from these ten local health departments (n=88) may not have been a true random sample of the foodborne illness reports that were obtained by these LHDs. There are a couple of reasons why this may be true. First, in order to save time, the LHD may have reviewed reports that contained less information than a more complete foodborne illness report and provided us with limited information. Second, we requested reports from the previous two weeks from a certain date in May 2004. The two week time period request may have skewed results unbeknownst to us, due to a regional foodborne illness outbreak or some other event that could influence results for that particular time.

CHAPTER 5

RESULTS OF RUSICK2 VISITOR FOLLOW UP SURVEY

RUsick2 Visitor Follow Up Survey Results

The follow up survey was administered to RUsick2 visitors approximately two weeks after they came to the web site. The initial follow up survey was administered from November 2002 through November 2004. Not every individual that entered an email address was asked to complete a survey. Only those that entered either an onset date or symptom or some other form of data (a suspected food or food source) was asked to complete a questionnaire. The total number of email requests was 999; 72 emails were returned "undeliverable," 40 were returned incomplete (just a few questions answered), and 325 surveys were completed. This gives a completion rate of 36.5% (325/(999-72-40)).

The RUsick2 web site was closed in late 2004 to streamline the data entry process and was re-opened in February 2005 as ReportFoodPoisoning.com. At that point, a revised follow up survey for ReportFoodPoisoning.com visitors was administered in the same manner as the original follow up survey. The revised survey included an additional five questions that the original RUsick2 follow up survey did not. All analyses in this chapter are for RUsick2 follow up survey respondents only. See Chapter 6 for the presentation of results comparing RUsick2 respondents to ReportFoodPoisoning.com respondents and selected ReportFoodPoisoning.com findings.

Questions 1 and 2 and Univariate Results

Question 1. It is important to examine this question because, if it is, then spending more time online can facilitate data entry on the web site. In other words, those that spend more time on the Internet might find the data entry process less difficult than those whom spend less time online. This is tested via the following regression:

Controlling for other factors, those that spend more hours per week on the Internet will believe it was easy to enter data on the RUsick2 Forum. We test this by employing least squares regression. The dependent variable was how easy it was to enter data on the RUsick2 Forum and the independent variables were: number of hours/week spent on Internet, age, sex, education, and metro/nonmetro residency.

Y = how easy was it to enter data on the RUsick2 Forum (item #5)

X_1 = # hours/week spent on Internet (item #20 Appendix D)

X_2 = age (through match with RUsick2 ID)

X_3 = sex (through match with RUsick2 ID)

X_4 = education (item #22)

X_5 = Metro/nonmetro residency (item #25)

The coefficient of X1 indicates that as difficulty of data entry increased, hours spent online per week increased. This is unexpected; however, the beta was small and not significantly different from zero. The regression equation estimated was:

Y = 2.093 + (0.006) X1 + (-.003) X2 + (-0.078) X3 + (0.088) X4 + (-0.233) X5

The betas suggest that as difficulty of data entry increased, the age of the visitor decreased, the respondent was more likely female, and the respondent was more likely from a nonmetro county. Furthermore, as difficulty increased by one unit, the respondent's education decreased. However, none of the slope coefficients were statistically significant

Question 2 (testing RUsick2 follow-up survey respondents). There may be a relationship between how understandable the reports were at the end and the number of hours/week spent on the Internet while controlling for gender, age, education, and metro/nonmetro residency. If there is a relationship, then it can be suggested that the number of hours per week spent online can aid in understanding reports offered at the end of the web site, regardless of level of gender, age, education, or metro/nonmetro residency.

We test this by employing least squares regression. The dependent variable was how easy it was to enter data on the RUsick2 Forum) and the independent variables were: number of hours/week spent on Internet, age, sex, education, and metro/nonmetro residency).

Y = how understandable the reports and tables were at the end of the RUsick2 forum (item #6)

X_1= # hours/week spent on Internet (item #20)

X_2 = age (through match with RUsick2 ID)

X_3 = sex (through match with RUsick2 ID)

X_4 = education (item #22)

X_5 = Metro/nonmetro residency (item #25)

The coefficient of X1 was not significantly different from zero. The regression equation estimated was:

Y = 2.66 + (0.009) X1 + (-.003) X2 + (-0.020) X3 + (-0.036) X4 + (-0.229) X5

If the number of hours online per week (X1) increased, then the understandability of reports decreased. If age decreased, the respondent was female, if education decreased, or the respondent resided in a nonmetro area, then the understandability of reports decreased. It is unexpected that as age or education decrease, the understandability of reports also decreased. None of the slope coefficients were statistically significant.

Univariate Results

The proceeding section presents and discusses the results of each survey item. Several tables are provided to display the findings. See Appendix D for the entire survey.

Table 5. RUsick2 Visitor Follow-up Survey Results

How did you find out about the RUSick2 Forum? n=323	Frequency	Percentage
Newspaper advertisement (which ran from November 2003-November 2004)	21	6.5
Newspaper article.	13	4.0
Radio or television report.	4	1.2
Healthcare provider (either over the phone or at a doctor's office).	3	1.0

Pharmacy.	1	0.3
Word of mouth.	23	7.1
Google.	188	57.8
Other.†	70	21.5
What did you expect from the RUSick2 Forum? (Check all that apply) n=324	Frequency	Percentage*
I hoped to find out what caused my illness.	156	48.1
I expected the health department to do something about my illness.	54	16.7
I expected the food establishment that is responsible for my illness to do something.	41	12.7
I don't know.	48	14.8
Other. †	94	29.0
Did you exit the RUsick2 Forum before finishing it? n=324	Frequency	Percentage*
No, I finished all the data entry	252	77.5
I did not finish**.	72	22.2
Please check reasons for not finishing (Check all that apply): n=72		
I was just visiting the forum.	5	7
I was filling it out for someone else and did not know all their information.	11	15.3
It was too difficult.	4	5.6
It was too long.	30	41.7
Other†	30	41.7

*Greater than 100% because multiple answers could be selected
** "finishing" did not necessarily mean going to the last level of the website. In some respects, level 4 was "finishing" if it put the person in contact with their LHD.
† Major limitation of this survey was "specify" was not added next to Other. There is no data to further analyze.

How visitor found out about web site. As seen in Table 5 , there were numerous avenues one could take to reach the web site, but the majority, almost 58%, of web site visitors found out about the web site through Google.

Expectations of the web site (Table 5). The primary reason visitors came to the RUsick2 Forum was to figure out what caused their illness. Many (16.7%) hoped the health department would do something about their illness. Over three fourths of the visitors finished the data entry on the web site, while nearly one quarter left the web site before completing data entry. The primary reason for leaving the site before completion was the length of time the web site requires.

Food History (Table 6). To help remember a three or four day food history, many visitors utilized the assistance of friends and family (34.1%) or a calendar/personal planner (22.3%). After remembering what was eaten, visitors were then asked to enter this information into the web site. Individuals were asked how difficult data entry was, and nearly 78% stated it was "extremely easy" or "somewhat easy" to enter data into the web site. At the end of the RUsick2 Forum, tables comparing what the web site visitor reported to what previous web site visitors reported were made available so they could see if there were others in their geographical area that reported eating the same foods, from the same place, at around the same time period. When visitors were asked how easy these reports were to interpret, nearly 65% responded that these tables were "extremely

easy" or "somewhat easy" to understand. Nearly 25% were "undecided" and only 14% found the tables "somewhat difficult" or "extremely difficult" to understand.

Table 6. Food History Items.

What did you use to help you remember what and where you had eaten in the few days before your illness? (Check all that apply.) n=308	Frequency	Percentage*
Calendar/Personal Planner	68	22.3
Checkbook	7	2.3
Friends/Family	105	34.1
Credit card receipt	15	4.9
Memory	82	26.6
Other†	69	22.4
Once you remembered the foods you ate and where they came from, how hard was it to enter the data into the computer? n=318	Frequency	Percentage
Extremely easy.	97	30.5
Somewhat easy.	147	46.2
Undecided.	26	8.2
Somewhat difficult.	44	13.8
Extremely difficult.	4	1.3
How understandable were the reports and tables at the end? n=304	Frequency	Percentage
Extremely easy to understand.	67	22.0

Somewhat easy to understand.	128	42.1
Undecided.	67	22.0
Somewhat difficult to understand.	38	12.5
Extremely difficult to understand.	4	1.3

*Greater than 100% because multiple answers could be selected
† Major limitation of this survey was "specify" was not added next to Other. There is no data to further analyze.

Time spent on web site (Table 7). The average amount of time spent on the web site was about 31 minutes (SD=21.0). This time was broken down into a mean of 12.5 minutes for determining food history, a mean of approximately 15 minutes spent entering information into the web site, and an average of 7 minutes spent viewing the reports and tables at the end of the program.

Table 7. Time spent on web site.

How many minutes did it take to: n=279	Mean (minutes)	SD	Median	Range
Determine all the foods you had eaten in the 4 days?	12.52	10.11	10.0	0-60 minutes
Enter all of your information into the program?	14.7	10.7	10.0	2-90 minutes
Look at the various reports/tables at the end?	7.1	6.6	5.0	0-60 minutes
Total Minutes spent	30.9	21.0	25.0	1-120 minutes

on program				

Contacted by LHD (Table 8). The web site was set up so that LHDs could choose to participate. If a LHD chose to participate, they were issued a password and an email was sent to the LHD when a complaint came into the web site from their jurisdiction. When this occurred, it was the responsibility of the LHD to contact the visitor and follow up on the complaint. Only about 15% of visitors to the web site were contacted by their local health department after entering their complaint onto RUsick2. This is indicating that the web site was attracting visitors from locations that were not participating in the program.

Table 8. Contacted by LHD.

Did anyone from your local health department contact you as a result of the data you filed with RUsick2? n=320	Frequency	Percentage
Yes.	49	15.3
No.	269	84.1
I don't know.	2	0.6

Reports at the end of the web site (Table 9). Reports made available at the end of the web site summarized the number of other individuals who reported eating the same food item(s) within the same time period as the RUsick2 visitor. While no confidential information (i.e. names of RUsick2 visitors or names of food sources) was displayed, the reports provided a count and percentage for how many other RUsick2 visitors from the same geographic location (county and state) had entered a complaint with the same risk factors.

Even though reports were available at the end of the web site, visitors were not using the reports as a means to determine what caused their illness. This could be for a variety of reasons, but most likely is the result of not enough reports from their county to compare their report to. Alternatively, the visitors may have been coming to the website to "confirm" that their original suspicion was correct as evidenced by the findings of the following two questions, not to seek out a cause. After coming to the web site, entering a complaint, and viewing these reports, nearly 69% of RUsick2 visitors replied that they did not believe they were part of a cluster of people who became ill after sharing some form of common exposure. About 15% replied "don't know" to this question, and only 7% replied yes. Nearly 70% of the visitors suspected food from a restaurant as the source of their illness before coming to the web site.

Visitors were given the opportunity to view "reports" after entering their data into the web site. The reports tallied how many other people who resided in the same county and consumed the same foods around the same time. The follow up survey found that after entering a complaint into the web site, nearly 37% of visitors stated they were more certain that their original suspicion of being part of a cluster was correct, 18% stated they were less certain, and 10% replied they did not look at the RUSick2 reports at the end. Thirty-four percent replied "other" to this question; this high proportion is most likely indicating that these visitors did not expend time viewing these reports.

Table 9. Reports at the end of the web site.

After seeing the RUsick2 reports at the end, do you think that you were part of a cluster of people who all became ill after eating the same food item, drinking the same water or being exposed to some other common source? n=324	Frequency	Percentage
Yes	22	6.8
No	222	68.5
Don't know	49	15.1
Didn't finish report	12	3.7
Not answered	19	5.9
Before coming to the RUSick2 forum, what did you most strongly suspect as the source of your illness? n=324	Frequency	Percentage*
Food from a grocery – eaten at home or elsewhere.	68	20.9
Food from a restaurant.	226	69.8
Food from some type of party, meeting or event.	13	4.0
Something else.	23	7.1
After visiting the RUSick2 forum, how did your suspicions change? n=316	Frequency	Percentage
I didn't really look at any of the RUSick2 output	33	10.4
I'm less certain of what food made me sick.	57	18.0
I'm more certain that my original suspicion was correct.	118	37.3
Other†	108	34.2

*Greater than 100% because multiple answers could be selected

† Major limitation of this survey was "specify" was not added next to Other. There is no data to further analyze.

Confidentiality (Table 10). The follow up survey questioned visitors about the importance of confidentiality and food poisoning or the social embarrassment of diarrhea. Nearly 27% of respondents replied in the affirmative while approximately 52% responded no, stating they did not see keeping the fact that they had food poisoning confidential or they did not view having diarrhea as embarrassing.

Recommend (Table 10). About 60% stated they would recommend the web site to a family member or friend who believed they have a foodborne illness. About 30% replied "maybe" and nearly 10% replied "no."

Table 10. Confidentiality and Recommend Item Results.

Do you think most people care much about keeping confidentiality regarding the fact that they had diarrhea and suspect food poisoning (believed that they were ill from something they ate)? n=324	Frequency	Percentage
Yes	87	26.9
No	169	52.2
Don't know	28	8.6
Restaurant should be kept confidential	9	2.8
Not answered	22	6.8
Would you recommend the RUsick2 Forum to a family member or friend who is suffering from common foodborne illness symptoms such as vomiting or diarrhea? n=323	Frequency	Percentage

Yes.	194	60.1
No.	30	9.3
Maybe.	99	30.7

Return to Forum/Contact Health Department and Healthcare Provider (Table 11). Since passwords were issued to each new visitor, it was possible for users to return to the web site at a later date and edit their complaint. Even though this option existed, the vast majority, 81%, chose not to do so. Nearly 18% stated they did return.

Contacting LHD (Table 11). Nearly half of the visitors acknowledged they would not have called their local health department, while approximately 20% stated they would have. Almost one third of respondents replied "maybe," rendering it impossible to determine if they would have reported their illness if telephone were their only option. Nearly 92% of visitors had never reported a suspected case of foodborne illness in the past, while only 7% had.

Contacting a healthcare provider (Table 11). Two thirds of visitors did not talk to or visit a doctor about their illness while one third of respondents had talked with or visited their doctor.

Table 11. Return to Forum/Contact Health Department and Healthcare Provider

Did you return to the RUsick2 Forum a couple of days after filing your report to see if any new data had been entered? n=324	Frequency	Percentage
Yes.	59	18.2
No.	263	81.2

Maybe.	2	0.6
Would you have called your local health department about your illness if the RUsick2 Forum did not exist? n=322	Frequency	Percentage
Yes.	62	19.3
No.	159	49.4
Maybe.	101	31.4
In the past, have you ever called your local health department to report a suspected case of food poisoning? n=324	Frequency	Percentage
Yes.	24	7.4
No.	297	91.7
Maybe.	3	0.9
Did you talk to or visit your doctor about your illness? n=323	Frequency	Percentage
Yes.	107	33.1
No.	215	66.6
Maybe.	1	0.3

. *Internet for health information (Table 12).* Survey respondents were comfortable on the internet as evidenced by an average of almost 14 hours/week on the internet. They were also comfortable with using the internet for health information. When asked how often they used the Internet for information concerning health, approximately 54% of visitors answered "Always" or "Very Often", while nearly 37% said "sometimes." About 10% of respondents selected "rarely" or "never." Concerning where respondents were

accessing the web site, nearly three fourths used their home computer to access the web site, where one fourth used their work computer.

Table 12. Internet for Health Information.

About how many hours each WEEK do you spend on the Internet? n=319	Mean (hours) 13.7	SD 13.9	Median 10.0
How often do you use the Internet for information concerning your health? n=325		Frequency	Percentage
Always.		37	11.4
Very Often.		137	42.2
Sometimes.		118	36.3
Rarely.		31	9.5
Never.		2	0.6
Where was the computer that you used to access the RUsick2 Forum? n=322		Frequency	Percentage*
At home.		237	73.6
At work.		81	25.2
At a public place, i.e. library or school.		3	0.9
At a friend's or relative's.		3	0.9
Other.		2	0.6

*Greater than 100% because multiple answers could be selected

Education (Table 13). The breakdown of education attainment is displayed in table 13.

Table 13. Education.

What is the highest level of education you completed? n=319	Frequency	Percentage
Some High School.	2	0.6
High School.	19	6.0
Some College.	73	22.9
College.	116	36.4
Graduate school/Professional degree.	109	34.2
Sum	319	99.5

Suggestions. There was also an item asking respondents for suggestions regarding how to improve the web site. These responses are discussed in the Discussion section, but the results are displayed in Table 14.

Table 14. Results of RUsick2 Forum Follow Up Survey item requesting suggestions for improvement.

Do you have any suggestions about how data is entered into the RUsick2 Forum or anything else about the program? n= 324	Frequency	Percentage
Positive Evaluation		
Good format	9	2.8
Formatting Suggestions		
Questions should focus on helping people	1	0.3

determine the cause of illness		
Make more user-friendly	23	7.1
All questions should be on one webpage	3	0.9
Too many questions	22	6.8
No space to enter foods not on list; more details***	8	2.5
Allow user to put in own password	1	0.3
Reports shown to me not from my county	2	0.6
Should pre-populate fields with restaurants and sources	3	0.9
Wanted more information on microorganisms***	1	0.3
Abbreviations didn't make sense***	2	0.6
Town not on registry	2	0.6
Reports should be more clear and concise	4	1.2
Allow people to see if their area has reports before starting own report	2	0.6
Process Suggestions		
Give information to health departments and get call back from LHD***	5	1.5
Hard for those with slow modems	1	0.3
More people need to know about web site	3	0.9
Email acknowledgement of data and how data will be used	4	1.2
Health department called and asked exact same questions	1	0.3
Replied "no" to question.	48	14.8

No answer	175	53.8

***These issues have been addressed on new version of web site (ReportFoodPoisoning.com); further explained in Chapter 6.

Discussion

How visitor found out about web site. The most common manner that visitors learned of the web site was through an online advertisement on Google's web site. This was not surprising given RUsick2 was an online reporting system and the web site visitor needed access to a computer with an Internet connection.

Why visitor came to the web site. The primary reason visitors came to the web site was to try and determine the cause of their illness (nearly half of respondents selected this choice) and nearly 30% responded "other." Unfortunately, the survey did not ask for additional comments when an individual selected this option. Approximately 17% of individuals were reporting their illness hoping the health department would react. It was noticeable that many more individuals expected the web site to help them *determine* the cause of their illness rather than merely allowing them to *report* their illness to their health department.

Reports at the end of the web site. After coming to the web site, entering a complaint, and viewing the reports, nearly 69% of RUsick2 visitors replied that they did not believe they were part of a cluster of people who became ill after sharing some form of common exposure. Most of them were probably not part of an outbreak.
They could see for themselves that there was not anybody else reporting to have been made sick from this same source. This is probably due to the low level of participation; with so few reports coming in, it is unlikely that individuals could detect a cluster from the quality and quantity of data provided to them.

Suspicion regarding cause of illness. Regarding original suspicion of the cause of their illness, 34% replied "other" to this question, and a large percentage of those that replied "other" claimed their suspicions remained the same, indicating that their visit to the web site had no impact on their suspicion.

Contacting LHD. The web site appeared to be attracting a segment of the population that would not have called their local health department (or reported their illness). Nearly half of the visitors stated they would not have called their local health department. This indicates that online reporting can be a valuable addition to the current reporting system.

Contacting healthcare provider. One third of visitors to the web site talked to or visited a doctor about their illness, suggesting the illness was perceived as serious enough to warrant such an action. These results may seem contradictory to the data entry pattern results which stated only about 15% of visitors sought medical attention. However, these results are not as conflicting as they may first seem. First, it is important to remember that the data entry pattern results were taken directly from the web site while the follow-up survey results were from the visitors who chose to complete the survey. Thus, the follow-up survey respondents might have been more invested in their reporting experience (perhaps because they may have had more severe symptoms). Thus, the follow-up respondents may, in fact, have sought medical attention at a higher rate than those who visited the web site but did not complete a follow-up survey.

Second, personal conversations with local health department sanitarians and public health nurses unanimously pointed to the fact that the majority of people who report a foodborne illness do so when they are initially experiencing the symptoms. It is

possible that visitors to the web site were reporting their illness, but had not considered seeking medical attention or were waiting to see if their symptoms persisted before doing so. Medical attention may have been sought after the reporting experience, but before the follow-up survey was administered (web site visitors were asked to complete the follow up approximately two weeks after their visit).

Internet for health information. We expected that Internet habits would be one predictor as to whether or not one will report a suspected case of foodborne illness online. When asked how often they used the Internet for information concerning health, approximately 54% of visitors answered "Always" or "Very Often", while nearly 37% said "sometimes." Only about 10% of respondents selected rarely or never, which is not unexpected considering the web site and follow up survey required online access.

Education. The educational level of respondents suggests that the web site was capturing a highly educated sector of the population. The percentage of respondents who reported completing only high school was 6%, 23% had some college, 36% completed college, and 34% had completed a graduate or professional program. This was a much more educated sample than the US population. According to the US Census for 2004 (U.S. Census, 2004), approximately 32% of the population completed high school, 17% some college, 8% associate's degree, 18% college, and 10% post baccalaureate education.

Suggestions. There was an item asking respondents for suggestions regarding how the web site should operate. The responses varied, from positive evaluations to formatting suggestions, to process suggestions. There was a large non-response rate to this question.

Nearly 54% of respondents did not answer, and nearly 15% replied that they did not have any suggestions.

A small percentage, fewer than 3%, replied that the web site had a good format. However, approximately 7% stated the web site was not user friendly and another 7% replied there were too many questions. Almost 3% wanted a place to enter foods not on the food item list to give more details, such as a field where they could enter text. This issue was addressed by the inclusion of text boxes on the RUsick2 Forum, which are still available for visitors to enter more details if they wish on ReportFoodPoisoning.com. There were several other formatting suggestions that a small number of respondents provided. Among them were 1) all the questions should be on one page; 2) the visitor should be allowed to create their own password (making it easier to remember), and 3) the web site should allow visitors to check their geographic area for other illness reports before beginning their own report. One individual wanted information on microorganisms. Because of this suggestion, information on common foodborne diseases was added to the "More Information" section of the web site.

Regarding process, 1.5% wanted the information that they submitted to go directly to their local health department and to receive a telephone call from their local health department. This was probably the result of web site visitors desiring confirmation that someone was viewing their report; that it was not just being reported to a web site. Understandably, if individuals are going to invest the time to enter their complaint online, they probably want some form of follow up conducted by their health department. From the outset, local health departments could request a password and use this password to log into the web site and view reports from their jurisdiction. However, this issue was

better addressed to a certain extent in ReportFoodPoisoning.com. Now, when a visitor files a complaint, the local health department is always notified via email. This notification states a new illness complaint has come in from their jurisdiction and that they may retrieve the complaint from the web site. However, the report cannot be automatically sent through email because the reports contain confidential information regarding the web site visitor and any food service establishments they may have entered. Email servers do not have the necessary level of security to transmit confidential information (personal communication, Dezeeuw 2004). When a local health department is notified of a complaint and they log onto the web site to view that complaint, an email is automatically sent to the web site visitor stating that their local health department has access to their report. This is the most efficient means of addressing this concern. It is up to the local health department to retrieve the complaint and follow up on it. This is not the primary reason ReportFoodPoisoning.com was created, but was just one improvement upon RUsick2.

This, however, does not address the fact that many visitors to the web site come and enter a complaint, only to have it not viewed by their non-participating local health department. It is not feasible for this project, with its current funding, to contact and persuade every health department in the country to participate (although it has the capacity). Therefore, when people from a non-participating county visit the web site, they are told that their health department is not participating in the web site. They can then choose to continue the online report so they have their food history organized for when they do call their local health department (which is strongly encouraged) or they can

choose to abandon their report altogether. In any case they are still strongly encouraged to telephone their local health department.

CHAPTER 6

RESULTS OF COMPARISON OF RUSICK2 FOLLOW UP SURVEY RESPONDENTS TO REPORTFOODPOISONING.COM FOLLOW UP SURVEY RESPONDENTS

The purpose of this chapter is twofold. First, I briefly describe how the two samples (RUsick2 survey respondents and ReportFoodPoisoning.com survey respondents) differed on their responses to their respective follow up survey. I do not provide a side by side comparison for the identical survey items because this was not a research question. However, knowing if the two samples responded similarly is crucial for applicability purposes considering the ReportFoodPoisoning.com web site is now the functioning web site. Therefore, if we can see that RUsick2 visitors are essentially the same as ReportFoodPoisoning.com visitors, then we can suggest the findings from RUsick2 visitors apply to ReportFoodPoisoning.com visitors.

The second purpose of this chapter is to present the results of the five questions that were asked only of ReportFoodPoisoning.com visitors. Remember that the ReportFoodPoisoning.com survey included an additional five questions that the original RUsick2 follow up survey did not. The additional five questions are below.

1. How do you think the level of anonymity compares between online reporting versus telephone reporting? (free form)

2. Did your symptoms disrupt your daily life?

__Yes

__No

__Not Sure

3. Do you think you would disclose more or less information regarding your illness online versus the telephone?

___More

___Less

___Same

___Not Sure

4. Did you have any health concerns in the past year?

___ Yes (go to question 21)

___ No (go to question 22)

5. This past year, how often did you use the Internet to look for health information or medical advice regarding your health concerns?

___Everyday

___Several times a week

___Several times a month

___Every few months

___Less often

___ Don't Know

An email was sent to the web site visitor approximately two weeks after he/she visited the web site in 2005. The email contained the questionnaire and brief instructions explaining how to respond and submit the survey. See appendix E. A much smaller sample of illness complaints was garnered from the newer version of the web site (n=38) for a response rate of 45.8% (38/83).

RUsick2 vs. ReportFoodPoisoning.com Survey Respondents

The RUsick2 (n=325) and ReportFoodPoisoning.com respondents (n=38) were not significantly different on any of the following fourteen variables:

1. exiting the web site before finishing,
2. what was used (e.g., calendar, receipts, family/friends) to help remember the food history,
3. how difficult it was to enter data into the computer,
4. number of minutes spent on the web site,
5. number of hours per week spent on the Internet,
6. concerns about confidentiality,
7. suspected cause of illness,
8. if they would recommend the web site to another individual,
9. if they returned to the web site,
10. if they ever called their LHD to report a foodborne illness,
11. if they talked to or visited a physician about the illness they were reporting,
12. how often they use the Internet for health information,
13. where the computer was located, and
14. level of education.

Out of 20 variables total, chi-square tests showed the ReportFoodPoisoning.com (RFP) and RUsick2 respondents differed significantly ($p < .05$) on the following six variables:

1. how they found out about the web site,
2. their expectations of the web site,

3. how they remembered their food history,
4. if their LHD contacted them or not,
5. if they would have called their LHD if the web site did not exist, and
6. how difficult the web site was.

When using sample proportions for comparison, the two samples differed significantly ($p < .05$) on the following four variables. See Table 15 for results.

1. how they found out about the web site,
2. their expectations of the web site,
3. how they remembered their food history, and
4. if they would have called their LHD if the web site did not exist.

Table 15. Comparisons between RUsick2 Survey and ReportFoodPoisoning.com Survey

Variable	Proportion (RUsick2) a)	Proportion (ReportFood-Poisoning.com) b)	Difference in Proportion = (a - b)	Upper limit of 95% CI	Lower limit of 95% CI
Gender (female)	0.60	0.64	-0.04	0.21	-0.12
Age					
<25	0.17	0.13	0.04	0.08	-0.15
25-50	0.66	0.71	-0.05	0.20	-0.10
51+	0.17	0.16	0.01	0.11	-0.14
How visitor found out:					
News advertise-ment*	0.06	0	0.07	-0.04	-0.09
Newspaper article*	0.04	0	0.04	-0.02	-0.06
Radio/tv ad	0.01	0	0.01	-0.00016	-0.02
Healthcare prov-ider	0.01	0.03	-0.02	0.07	-0.03
Pharmacy	0.003	0	0.003	0.003	-0.01
Word of mouth*	0.07	0	0.07	-0.04	-0.10

Google*	0.58	0.79	-0.21	0.35	0.07
Other	0.22	0.18	0.04	0.09	-0.17
Expectations from web site:					
Find out cause of Illness*	0.48	0.24	0.24	-0.09	-0.39
Expect LHD to do something	0.17	0.26	-0.09	0.14	-0.06
Expect food establishment to do something	0.14	0.18	-0.04	0.17	-0.08
I don't know	0.15	0.11	0.04	0.06	-0.15
Other	0.29	0.21	0.08	0.06	-0.22
Did visitor exit early?	0.22	0.30	-0.08	0.23	-0.08
How did visitor remember food history?					
Calendar	0.22	0.21	0.009	0.13	-0.15
Check	0.02	0.03	-0.01	0.06	-0.04
Friend/family	0.34	0.37	-0.03	0.19	-0.13
Credit card	0.05	0.03	0.02	0.03	-0.08
Other	0.22	0.34	-0.12	0.28	-0.04
Memory*	0.27	0.03	0.24	-0.17	-0.31
Did LHD contact visitor?					
Yes	0.15	0.22	-0.07	0.20	-0.07
No	0.84	0.72	0.12	0.03	-0.27
Don't know	0.006	0.06	-0.05	0.12	-0.02
Would visitor recommend the web site?					
Yes	0.60	0.55	0.05	0.11	-0.22
No	0.09	0.13	-0.04	0.15	-0.07
Maybe	0.31	0.33	-0.02	0.18	-0.13
Did visitor return to web site?					
Yes	0.18	0.16	0.02	0.10	-0.15
No	0.81	0.84	-0.03	0.15	-0.10
Would the visitor have called the LHD if the web site did not exist?					
Yes*	0.19	0.42	-0.23	0.39	0.06
No*	0.49	0.26	0.23	-0.08	-0.38

Maybe	0.31	0.32	-0.006	0.16	-0.15
Has visitor ever reported a case of foodborne illness to the LHD?					
Yes	0.07	0.08	-0.005	0.10	-0.09
No	0.92	0.92	-0.004	0.09	-0.09
Did visitor talk to healthcare provider?					
Yes	0.33	0.37	-0.04	0.20	-0.12
No	0.67	0.63	0.03	0.13	-0.20
How many days lapsed from when the follow up survey was sent and when it was returned?					
0	0.72	0.61	0.12	0.05	-0.28
1	0.13	0.18	-0.05	0.18	-0.08
2 or more	0.14	0.21	-0.07	0.20	-0.07
How difficult was entering data on the web site?					
Easy	0.77	0.71	0.06	0.09	-0.21
Neutral	0.08	0.05	0.03	0.05	-0.11
Hard	0.15	0.24	-0.09	0.23	-0.05
How many minutes did visitor spend remembering food history?					
<15	0.67	0.72	-0.05	0.20	-0.10
15-30	0.31	0.25	0.06	0.09	-0.21
>30	0.08	0.03	0.05	0.01	-0.11
How many minutes did visitor spend entering data?					
<15	0.52	0.48	0.04	0.13	-0.21
15-30	0.43	0.48	-0.05	0.22	-0.12
>30	0.08	0.03	0.05	0.02	-0.11
How often does visitor seek medical information online?					
Always/Very Often	0.54	0.51	0.02	0.15	-0.19
Sometimes	0.36	0.35	0.01	0.15	-0.17

Rarely/Never	0.10	0.14	-0.03	0.15	-0.08
How many hours per week does visitor spend on internet?					
≤20	0.86	0.81	0.05	0.08	-0.18
>20	0.14	0.19	-0.05	0.18	-0.08
Where was computer located? (dichotomized)					
Home	0.74	0.78	-0.04	0.18	-0.10
Elsewhere	0.26	0.22	0.04	0.10	-0.18
Level of education (dichotomized)					
<college	0.30	0.31	-0.01	0.17	-0.14
≥college	0.71	0.70	0.01	0.14	-0.16

*Since the 95% CI did not include 0, there was a significant difference between the RUsick2 and ReportFoodPoisoning.com results.

Many of these differences can be explained when one is cognizant that the new version of the web site was not marketed in print the way the RUsick2 web site was in central Michigan for the first year. Visitors to ReportFoodPoisoning.com were coming to the web site to prepare their foodborne illness complaint, not to see if others were sick from eating the same food from the same food source around the same time period as RUsick2 visitors were. This can explain why there was a difference for how the visitors found out about the web site and what their expectations of the web site were.

When asked if they would have called their LHD to report their illness if the web site did not exist, a greater proportion, nearly double, of ReportFoodPoisoning.com visitors replied yes to this question than RUsick2 visitors. This suggests the ReportFoodPoisnong.com visitors were more motivated to report their illness than RUsick2 visitors.

Regarding the difference in whether the LHD contacted the person who reported an illness or not, LHDs were contacting RFP visitors more frequently than RUsick2 visitors. This could be the result of two years' worth of efforts to contact LHDs as reports came into the web site; over time more health departments are going to become aware of the program and sign up for a password. Interestingly, RFP is not reaching out to the target population as much as one would hope given that a much higher percentage (42%) of RFP respondents replied that they would have called their LHD if the web site did not exist, whereas 19% of RUsick2 replied in this manner. Regarding how difficult it was to enter data into the web site, RFP respondents found it easier than RUsick2 respondents. The other 15 variables, which included age, educational level, and Internet habits, were showed no statistically significant difference between groups.

Unique ReportFoodPoisoning.com Survey Question Results

Visitors from both web sites, RUsick2 and RUsick2's successor, ReportFoodPoisoning.com, were given a follow up survey. There were five questions on the ReportFoodPoisoning.com survey that were not on the RUsick2 survey. This section presents and discusses the results of these questions. See Table 16 for results.

Impact on daily life. Regarding the impact of symptoms on daily life, 95% of ReportFoodPoisoning.com respondents, replied that their illness did disrupt their daily lives. This is consistent with the belief that the symptoms were driving the visitor to the web site initially. (the RUsick2 Follow Up Survey did not include this item)

Regarding disclosure of information, 26% of ReportFoodPoisoning.com respondents replied that they would disclose more information online versus the

telephone, while 50% replied they would disclose the same amount. About 13% responded they would disclose less. Of the 38 who answered this question, 29 (76%) would give as much or more information online as over the telephone. The 95% CI for this proportion is from .62 to 0.90.

Anonymity. Reporting online allows one to be more anonymous than telephone reporting. About 26% of respondents believed online reporting was more anonymous than telephone reporting, while 21% believed it was the same and 16% were not sure if there was a difference in level of anonymity between the two. About 10% of respondents to this question stated that the telephone was more secure. However, I believe these 10%, or a portion of this 10%, possibly misinterpreted this question to be related to Internet security and not the concept of anonymity. Therefore, it is impossible to truly know the perceptions of this group.

The ReportFoodPoisoning.com respondents (RUsick2 Follow Up Survey respondents were not asked this question) were asked an additional question regarding whether they had health concerns in the past year and if so, how often did they used the Internet to look up health information or medical advice *within the past year.* Of this smaller sample, 42% reported they had used the Internet several times per month for health concerns and 39% replied every few months, thus the majority, 81%, of the sample are experienced Internet users. This is helpful to know when considering potential target populations when advertising the web site.

Table 16. Unique ReportFoodPoisoning.com Questions

The following 5 questions were asked only of the ReportFoodPoisoning.com respondents		
Did symptoms disrupt daily life n=38	Frequency	Percentage
Yes	36	94.7
No	1	2.6
Not sure	1	2.6
Would you disclose more less information regarding your illness online versus the telephone? n=38	Frequency	Percentage
More	10	26.3
Less	5	13.2
Same	19	50.0
Not sure	4	10.5
How do you think the level of anonymity compares between online reporting versus telephone reporting? n=38	Frequency	Percentage
Online more anonymous	10	26.3
Not answered	9	23.7
Same	8	21.1
Don't know	6	15.8
More vulnerable online; telephone more secure	4	10.5
"don't care"	1	2.6
Did you have any health concerns in the past year? n=38	Frequency	Percentage

Yes	20	52.6
No	18	47.4
How often did you use the Internet to look for health information or medical advice regarding your health concerns in the past year? n=26	Frequency	Percentage
Several times per week	1	3.8
Several times per month	11	42.3
Every few months	10	38.5
Less often	4	15.4

CHAPTER 7

RESULTS FROM TELEPHONE INTERVIEW AND PERSONAL SURVEY OF LHD PERSONNEL

LHD Telephone Interview Results

The complete telephone interview guides for local health departments are available in Appendices C and D. Two versions of the interview existed because the interviews were conducted with participating and non-participating local health departments. A total of ten telephone interviews occurred in the summer of 2005, where seven were with participating LHDs (6 metro, 1 nonmetro) and three were with non-participating health departments (2 metro, 1 nonmetro). A larger number was able to be conducted with participating health departments because we had contact information on whom to ask for to participate in the interview. Seven non-participating health departments declined to be interviewed or did not know whom to refer the interviewer to.

These interviews allowed the local health departments to give personal viewpoints on why they chose to participate or not participate in the web site. The respondents were local health department personnel who handle reports of foodborne illnesses as part of their usual workload. They may or may not have been involved in the decision to participate in the web site. It is imperative to survey individuals in this position, because these are the people who undertake the additional workload the web site might cause.

Participating Local Health Department Telephone Interview Results

This next section describes the responses to each question. It is followed by interview results from non-participating LHDs and then an overall discussion.

There were several reasons why local health departments decided to participate. According to the interviewees they include: 1) the public might use it; 2) it is another avenue for foodborne illness complaints (three of seven stated this); 3) the health department is not open on Saturday or Sunday, but the web site allows for reports anytime; 4) "my health department was chosen [by MSU researchers]"; 5) reporting should happen at the local level, not the state level; 6) [the web site] is easy; and lastly, 7) it [the web site] would give information faster to LHDs.

Except for one LHD, all participating health departments believed they were adequately addressing the needs of residents in their jurisdiction concerning reporting of foodborne illnesses without participating in the web site. However, several added that even though they were participating in the web site, the web site was underutilized and reporting could be further increased if more residents knew about the program. In addition, one health department added that the web site allowed for reporting during off hours, which allows them to further address reporting of foodborne illness complaints. The single health department that stated they were not adequately addressing the needs of foodborne illness reports in their area commented that even though they were participating in the web site, they continue to inadequately meet the need because reporting remains extremely low.

When asked if they believed they could handle an increase in the number of reports of foodborne illness, whether the reports are through the web site or the traditional telephone method, four of seven respondents said they believed they could. One stated that other areas of their work would suffer, but they could still manage to handle the workload. In addition, one respondent explained that they could handle an

increase, and that the web site only gives minimal information. This respondent was most likely insinuating that they still need to follow up on the online reports and that this can take time.

Information technology (IT) issues regarding their health department were then inquired about on the survey. All seven respondents stated that they did not believe their health department had IT issues or problems that would be a barrier to using the program.

Regarding whether residents in their jurisdiction might have IT problems that would be a barrier to using the web site, three of seven responded "no" to this question. Two of seven stated "possibly" and the remaining two stated "yes" to this question. Of the two respondents who stated "yes", one was located at a rural health department and commented that many residents do not have access to the Internet. The second respondent that stated "yes" clarified that while a large portion of the residents in their jurisdiction were college students and, thus, would not encounter IT barriers, another segment of their population was low income, and this portion of the population would have IT barriers. This same respondent stated that only the upper middle class was being captured by the program.

When asked whether their health department was "not better addressing", "somewhat better addressing", "much better addressing", or "very much better addressing" the needs of residents in their jurisdiction by signing up the for the web site, three of seven respondents stated they were "not better addressing" the needs of their residents and four of seven responded that they were "somewhat better addressing" the needs of residents in their jurisdiction.

Respondents working at LHDs were also asked whether offering the web site to residents in their jurisdiction had "no benefit", "a small benefit", "a medium benefit" or "a large benefit" to the public health of the community. Four stated it was "a small benefit" to the public health of the community, two stated medium, and one stated that it could be a large benefit to the public health of the community.

Regarding whether the web site was a "small", "moderate", or "large" burden to their workload, four of seven respondents stated it was "no" burden and three of seven stated it was a "small" burden.

When asked to clarify their response to the question about the web site being a burden, one respondent stated that the web site was a tool and helpful while information was still fresh in the reporter's mind. However, this same person also commented that the web site was problematic in that it did not ask for a 72 hour food history, thereby preventing calculation of an incubation period. Another respondent stated the web site added to their daily job responsibilities; another stated there was a time lag between when the reporter visits the web site and when they could follow up; another stated "it's our job," and another stated it can be a burden because it took time to download the complaints from the web site.

Regarding how much time the web site necessitated on a daily basis, all seven respondents stated it did not take much time. When asked about how many minutes per day they spend on the web site, two reported "none," one reported about five minutes per day, two reported about 15-20 minutes per day, and two stated they only go to the web site when they receive an email from the program notifying them of a complaint from their jurisdiction.

The remaining question asked about how easy or difficult the web site was to use. Five of seven respondents stated the web site was easy to use, one reported it was not easy because it was not "specific" enough, and one reported it was moderately easy.

Non-Participating Local Health Department Telephone Interview Results

Two of the three non-participating health departments were true non-participants, meaning they had never signed up for a password to receive complaints reported to the web site from their jurisdiction. One of the non-participating health departments signed up for a password early on in the project, but made the choice not to continue participating because of few reports coming in from their jurisdiction. Therefore, I considered this health department as not participating.

When asked why they decided not to participate in the web site, one stated they did not know about it and did not want to go looking for information regarding the web site. A second non-participating health department stated "it does not help because it is not compatible." It is unclear as to what the respondent meant by this statement and, unfortunately, the interviewer did not ask for any clarification.

All three respondents stated that they believed that without using the web site they were adequately addressing the needs of residents in their jurisdiction concerning complaints of foodborne illnesses.

When asked if they and their colleagues could handle an increase in the number of reports of foodborne illnesses (whether the reports are through the web site or the traditional method), two of three health departments stated they could. One respondent replied "no" to this question and elaborated that they were understaffed and over budget and therefore could not afford more staff.

Regarding health department IT issues or problems that could possibly be a barrier to using the web site, one respondent replied "yes" and that these would be medium-sized problems because the web site was not user-friendly (this health department is nonmetro). Another respondent stated their health department would not have IT barriers. The third respondent also replied they would not have IT problems, but that the "data is [*sic*] incompatible." This respondent was probably referring to the way in which the web site complaints were displayed, which differed from the form for telephone complaints.

IT barriers would be a problem for two out of three non-participating health departments. One respondent simply stated "yes", as a large portion of their population was inner-city and low-income. A second respondent, from a rural health department, also stated "yes" because most of their residents do not use the Internet and since it was a rural area, there was only dial-up available. The third respondent stated that their residents probably fall at about the national average for Internet usage.

When asked whether their health department could "not better address", "somewhat better address", "much better address", or "very much better address" the needs of residents in their jurisdiction by signing up for the web site, two of three stated they could somewhat better address the needs of their residents. The third respondent, from a rural health department, answered "don't know."

Regarding the level of public health benefit their community could have by offering the web site to residents, two of three replied there would be a medium benefit, and the third, the respondent representing a rural health department, stated "small to medium."

Regarding how much of a burden participation in the web site would be to the respondent and their colleagues, one responded that it would be a small burden and that they remembered problems when the web site first began; the second respondent stated there would be a moderate burden and that the data would need to be in a compatible format, and the third respondent stated "don't know;" this respondent simply did not know enough about the web site to further expound.

Discussion of LHD telephone interviews

Many LHD personnel believe that more residents needed to know about the web site in order for LHDs to take advantage of its capabilities. It is becoming clear that LHD personnel were not planning to promote the web site as a venue for reporting foodborne illness. This is especially true because LHDs believed, for the most part, that they were already adequately addressing the needs of complainants of foodborne illness in their jurisdiction, and did not need to sign up for the web site. Interestingly, however, four of seven responded that they were better addressing the needs of residents by signing up for the web site. The same proportion of respondents believed this was a small benefit to the public health of a community. Thus, LHDs are viewing the web site as a positive addition to their service to the community, albeit a small one.

IT barriers do not seem to be a hindrance to participating LHDs' ability to use the web site in the workplace. However, it was mentioned by a rural respondent that residents might have IT barriers in that a smaller percentage have Internet access at home than in suburban and urban areas. Furthermore, it was brought up that those of lower SES tend not to have access to the Internet in the same proportion as those of higher SES. Therefore, while LHDs were not facing IT barriers, some residents were.

The web site did not seem to be posing a severe time burden on those staff who were participating. The maximum amount of time reported was 15-20 minutes per day. The majority (80%) stated that the web site was either "no burden" or a "small burden" to their daily workload. In addition, the web site did not seem to be difficult to use.

Regarding non-participating LHDs, all believed that they were addressing the needs of foodborne illness complaints in their jurisdiction without signing up for the web site. This is similar to participating LHDs in that six of seven believed they were addressing foodborne illness complaints adequately.

Concerning IT issues, non-participating LHDs seemed to differ from participating LHDs in that one in three believed the web site was not user-friendly, another stated that the data were incompatible. Thus two in three believed there would be technology problems, whereas zero of seven participating LHDs believed there would be technology problems. Non-participating LHDs believed there would also be IT barriers for residents in their jurisdiction.

Two of three believed they could somewhat better address the needs of their community and two believed there could be a medium benefit to their community by increasing reports of foodborne illness. Furthermore, two of three did not believe the web site added a large burden to their workload. Perhaps non-participating LHDs believed there was more that could be done regarding foodborne illnesses, but that the web site may not have been the best manner in which to do so given the IT barriers many in their community faced.

Local health department personal survey

Response rate: There are a total of 45 district or individual health departments in Michigan. A district health department is comprised of more than one health department. For example, the Barry-Eaton District Health Department is comprised of Barry and Eaton counties. See the Michigan Association for Local Public Health (MALPH) web site (www.MALPH.org) for a listing of all health departments in Michigan and a breakdown of the district health departments. Fifteen Michigan health departments were participating in the web site and all 15 responded to the questionnaire, shown in Appendix H. An additional 36 health departments that were not participants in the web site also responded. This questionnaire is shown in Appendix I. Given the small sample sizes, a decision was made to combine these two samples, both answered nearly identical questionnaires, into one sample, for a final sample size of 51. All results reported herein, except for Hypothesis 7, are for this combined dataset.

Hypothesis 7 results. It is hypothesized that LHDs in nonmetro areas will be more likely to believe they are adequately addressing the needs of residents in their jurisdiction concerning complaints of foodborne illnesses without using the web site than LHDs in metro areas

This hypothesis was not supported. The phi coefficient was calculated for the two variables: nonmetro/metro and adequately addressing the needs/not adequately addressing the needs (this variable needed to be dichotomized by collapsing the Likert responses). The phi coefficient for the total combined sample was -0.22 ($p=0.18$), and for those participating (phi = -0.33, $p=0.25$) and those not participating (phi = -0.13, $p=0.52$). The phi correlation suggests that there is a tendency for LHDs in nonmetro areas to be more likely to believe they do not need the web site to adequately address the needs of

residents in their jurisdiction than LHDs in metro areas. This holds true for the combined sample and when separating by those participating and those not participating. However, it is not statistically significant.

Factor Analysis Results

Exploratory Factor Analysis. A factor analysis was conducted to organize the many survey variables into underlying factors. Ideally, the factor analysis will show patterns of correlations among the variables in the survey that are believed to reflect the underlying processes affecting the behavior of LHD personnel. Table 17 displays the factor loadings for each variable after oblimin rotation and table 18 presents the matrix of correlations among the observed variables.

Table 17. Factor Loadings.

	Factor		
	1	2	3
My staff has been able to handle complaints of foodborne illness from the web site	.771	-.290	-.187
My LHD can positively impact the health of the public in our jurisdiction by increasing the opportunity for people to report foodborne illness complaints	.462	-.774	-.414
We were adequately addressing the needs of residents in our jurisdiction concerning complaints of foodborne illnesses before using the web site	-.056	.507	.177
We are better addressing the needs of residents in our jurisdiction concerning complaints of foodborne illnesses after signing up for the web site	.900	-.468	.009
Using the web site in my jurisdiction has been beneficial to the public health of the community	.870	-.301	.132
The web site is a burden to my current staff	-.325	.376	.326
The decision to sign up for the web site depended on if other LHDs in my area were using the web site	-.029	.170	.540
The decision to sign up for the web site depended on whether my employees wanted to use the web site.	.011	.137	.733
There is a benefit to online reporting of foodborne illnesses	.573	-.849	-.254
Index of following question: Why might there be a benefit to online reporting of foodborne illnesses? (Check all that apply) [ONLINE BT INDEX]* 1) Online reporting can save the staff time by not having to wait for individuals to remember their food	-.522	.682	-.129

history over the phone. 2) Online reporting can gather hundreds of reports simultaneously (in the event of a large outbreak or bioterrorist event) 3) Online reporting is not limited to the times the health department is open			

Extraction Method: Maximum Likelihood.
Rotation Method: Oblimin with Kaiser Normalization.
* Respondents checked each item if they agreed with it. The scores were then added for a range of 0-3, depending on how many, if any, were checked. The index was then multiplied by -1 so that a lower number indicated greater benefit. See Appendix H, question 14 and Appendix I, question 13.

Table 18 Correlation Matrix.

	HAN	IMP	ADE	BA	BL	BU	OHD	EMP	BT	ONLINE BT INDEX
HAN	1.00	0.37	0.04	0.66	0.66	-0.36	-0.15	-0.11	0.44	-0.39
IMP	0.37	1.00	-0.40	0.50	0.31	-0.45	-0.20	-0.29	0.70	-0.51
ADE	0.04	-0.40	1.00	-0.10	-0.07	0.13	0.01	0.19	-0.41	0.25
BA	0.66	0.50	-0.10	1.00	0.80	-0.40	0.07	0.04	0.59	-0.52
BL	0.66	0.31	-0.07	0.80	1.00	-0.08	0.01	0.12	0.46	-0.47
BU	-0.36	-0.45	0.13	-0.40	-0.08	1.00	-0.01	0.20	-0.36	0.19
OHD	-0.15	-0.20	0.01	0.07	0.01	-0.01	1.00	0.41	-0.29	-0.09
EMP	-0.11	-0.29	0.19	0.04	0.12	0.20	0.41	1.00	-0.12	-0.12
BT	0.44	0.70	-0.41	0.59	0.46	-0.36	-0.29	-0.12	1.00	-0.65
ON-LINE BT IND.	-0.39	-0.51	0.25	-0.52	-0.47	0.19	-0.09	-0.12	-0.65	1.00

This analysis revealed three factors with eigenvalues greater than 1. The eigenvalue for the first factor was 3.99. The factor was named "usefulness of the web site to public health" and loaded high on the following three variables:

1) My staff has been able to handle complaints of foodborne illness from the web site [HAN],

2) We are better addressing the needs of residents in our jurisdiction concerning complaints of foodborne illnesses after signing up for the web site [BA],

3) Using the web site in my jurisdiction has been beneficial to the public health of the community [BL].

The second factor was named "costs and benefits of online reporting for LHD employees." the eigenvalue was 1.74. This factor was measured by the following five variables:

1) My LHD can positively impact the health of the public in our jurisdiction by increasing the opportunity for people to report foodborne illness complaints [IMP],

2) We were adequately addressing the needs of residents in our jurisdiction concerning complaints of foodborne illnesses before using the web site [ADE], and

3) The web site is a burden to my current staff [BU].

4) There is a benefit to online reporting of foodborne illnesses [BT], and

5) Why might there be a benefit to online reporting of foodborne illnesses? (Check all that apply) [ONLINE BT INDEX]

1) Online reporting can save the staff time by not having to wait for individuals to remember their food history over the phone.

2) Online reporting can gather hundreds of reports simultaneously (in the event of a large outbreak or bioterrorist event)

3) Online reporting is not limited to the times the health department is open.

The third and final factor, "influence of others", was measured by two variables:

1) The decision to sign up for the web site depended on if other LHDs in my area were

using the web site [OHD] and, 2) the decision to sign up for the web site depended on whether my employees wanted to use the web site [EMP]; the eigenvalue was 1.23.

The data approximately fit these theoretically distinct factors. For the first factor, usefulness of web site to public health, all three loadings were fairly high (0.77-0.90). One may have expected the variable, "My LHD can positively impact the health of the public on our jurisdiction by increasing the opportunity for people to report foodborne illness complaints" to have loaded highly on this factor instead of the second factor. Perhaps this variable loaded higher on the second factor, costs and benefits of the web site for LHDs, because the item still pertains to a LHD's response to the web site and was not a general item pertaining to the usefulness of the web site to public health.

The second factor, costs and benefits of the web site for LHDs, was comprised of five variables with loadings ranging from $|0.38\text{-}0.85|$. We would have expected the variable "My LHD can positively impact the health of the public in our jurisdiction by increasing the opportunity for people to report foodborne illness complaints" to have loaded more highly on the first factor than the second. This is an unexpected result. Perhaps the LHDs employees who responded believed that participation in the web site was a "cost".

Furthermore, two of the variables for that we expected to load highly on the second factor had lower than expected loadings of 0.38 and 0.50.. However, neither of these variables loaded higher on either of the other two factors. The variable that loaded very low on this factor, "The web site is a burden to my current staff," did not load highly on any construct, meaning it is not correlated highly with any factor. The correlation matrix reveals mostly low correlations for this variable, except for one modest correlation

(r = -0.45) with the variable "my LHD can positively impact the health of the public in our jurisdiction by increasing the opportunity for people to report foodborne illness complaints." This is expected; the more a LHD believes the web site is a burden, the less likely they are to believe it can have a positive impact on public health. The lack of this variable loading highly on any construct could be an indication that this was a poorly worded item.

The final construct, influence of others, had two variables that loaded highly on it. One of the variables, "The decision to sign up for the web site depended on if other LHDs in my area were using the web site," had a loading somewhat low at 0.54. Considering this construct is the most reasonable construct for this variable to fall into, one might have expected this loading to be higher.

Discussion of local health department personal survey

The three constructs presented here, 1) usefulness of the web site to public health, 2) costs and benefits of online reporting for LHD employees, and 3) the influence of others are vital issues relating to a LHD's decision to participate in the web site. These constructs represent pros and cons to the web site ranging from better serving the public to increasing reports of foodborne illness to the burden of personnel issues. The three variables loading on the first factor, use of the web site, concerned the LHDs' experience with the web site to date: LHD believed the web site helped serve the residents in their jurisdiction.

Concerning the second factor's variables, the actual benefits of the web site were questioned. LHDs' did not believe the web site was offering a benefit to their community. In addition, LHDs believed they were adequately handling foodborne illness complaints

without using the web site and there was not much benefit to online reporting of foodborne illnesses. However, the web site was not viewed as a burden to LHD staff.

Lastly, the third factor displayed the influence other LHDs had on whether or not a LHD decided to participate in the web site and the influence employees had on the decision. This is understandable in that one LHD does not want to be the only health department declining participation in the web site; if surrounding LHDs are participating, that can sway a LHD to participate. Also, the impact of the employees affects the decision. Employees were the persons most affected by participation, as their daily workload could increase.

Overall, the factors revealed three critical concepts of LHDs perception involved in deciding whether or not to participate in the web site. They were 1) how to better serve the public, 2) the administrative realities of participating in the web site, and 3) the influence of significant individuals

CHAPTER 8

SUMMARY, DISCUSSION AND IMPLICATIONS

Summary of the four analyses (data entry patterns, web site visitor follow-up survey, LHD telephone interviews, and LHD personal survey)

This research is unique in that it explored several aspects of an online foodborne illness reporting system. This dissertation sought to answer five major questions using four analyses:

1) What is the quality of data reported to this web site?
2) Are the RUsick2 reports worse, the same, or exceeding in quality compared to traditional telephone reports?
3) What kinds of people are coming to the web site?
4) What is the experience web site visitors have on the web site?
5) What are the attitudes of local health department (LHD) personnel regarding the web site?

The first two questions, what is the quality of data reported to the web site and how do the RUsick2 reports compare to traditional telephone reports, were answered in Chapter 4. It is clear the data that are reported to the web site are of respectable quality in that 74% of visitors beginning a report enter at least a food item and 67% will enter some form of contact information. This allows LHD personnel to make contact with the individual while having at least a start of a food history. Many respondents were providing detailed food histories, which is the fundamental component of a foodborne illness complaint.

Concerning how the web site complaints compare to telephone reports, two very important questions were compared between LHD reports and web site reports: how does the number of food items compare and how does the number of food sources reported compare. As expected, the mean number of food items reported on the web site was nearly double the number of food items from the telephone reports. However, the contrary to expectations, the mean number of food sources reported was nearly the same. Based on these two findings, it is accurate to say web site reports were of better quality concerning food history compared to telephone reports, but matched the quality of telephone reports concerning the number of food sources.

Some may be curious as to whether the web-based approach should replace the telephone approach. It has been previously demonstrated that the web-based method of reporting a suspected case of foodborne illness can lead to more reporting of foodborne illnesses. During the first seventeen weeks of the web site, November 2002-February 2003, (which included Clinton, Eaton, and Ingham counties) the number of reports gathered from the web site was compared to the number of reports gathered from these counties for the years 1999-2001. Table 19 shows the RUSick2 foodborne complaints reported from the three pilot counties during the first 17 weeks of the Forum's operation. The weekly average number of foodborne disease complaints reported to the state of Michigan during the corresponding weeks of 2001 is shown in Table 20. If reporting had continued at the same rate as the previous year, approximately 18 reports would have been expected during the 17 week period. However, 101 reports were received during the first 17 weeks of operation, which represents almost a six-fold increase in reporting (Wethington and Bartlett, 2004).

Table 19. Michigan Department of Agriculture Telephone Reports by County, Month and Year

County	Year	January	February	November	December
Ingham	2000	9	4	4	3
	2001	1	2	0	4
Clinton	2000	0	0	0	0
	2001	0	0	0	0
Eaton	2000	1	2	3	1
	2001	4	4	1	2
Total		15	12	8	10
Number of weeks per month		4.42	4.00	4.29	4.42
'00-'01 Average # phone Reports per week		1.70	1.50	0.93	1.13

Table 20. Number of RUsick2 Visits by County, Month and Year

County	Year	November	December	January	February
Ingham	2002	15	13	--	--
	2003	--	--	25	9
Clinton	2002	0	1	--	--
	2003	--	--	1	3
Eaton	2002	7	7	--	--
	2003	--	--	12	3
Total		22	21	38	12
Number of weeks per month		4.29	4.42	4.42	4.00
Average Number of RUsick2 Visits per week		5.13	4.75	8.60	3.00

While the number of reports increased with the electronic reporting system, I do not believe the web-based system should supersede the telephone based system. This would alienate those without access to the internet who wish to report their illness. This leads into the third and fourth questions this dissertation attempted to answer.

Questions 3 ask what kinds of people are coming to the web site) First, the type of person coming to the web site is from a highly educated segment of society. Thirty-six percent of web site visitors reported completing college and 34% completed a graduate or professional program. These are much higher than national averages, where 18% report completing college and 10% report completing some form of post baccalaureate education. Over half of the web site visitors frequent the Internet for health information. This is no surprise given this is an online health tool. The follow up survey also queried whether or not the visitor would have telephoned their local health department if the web site did not exist. It is clear that the web site is reaching out to those who would not have called their health department. Nearly half of the visitors stated they would not have called their local health department, while approximately 20% stated they would have. Given the web site is capturing a segment of the population that would not have notified their local health department, it is useful to have both avenues available for residents to report foodborne illnesses. In addition, the web site visitors were novice foodborne illness reporters as nearly 92% of visitors had never reported a suspected case of foodborne illness in the past.

Question 4 asks what is the experience of the web site visitor? The experience of the web site visitor undoubtedly varied. It depended greatly on what the web site visitor

expected from the outset. The follow up survey included a few items to assess experience such as how difficult it was to enter information into the web site, how understandable the web site was, and whether or not they would recommend the web site. It was a reassuring finding that nearly 78% stated it was extremely or somewhat easy to enter data into the web site and nearly 65% responded that the results tables (given in the web site) were extremely or somewhat easy to understand. Another encouraging finding is approximately 60% stated they would recommend the web site to a family member or friend who believes they have a foodborne illness.

The last major question on this research agenda was the attitudes of LHD personnel towards the web site. This group is one of the most essential groups to please because they are the liaisons between the reporting system and the reporters. It is essential for the web site to fit their needs and expectations in order for them to utilize its capabilities. The telephone interviews allowed for an understanding of the LHDs' viewpoints. Several findings were revealed such as 1) LHDs believed the web site needed more advertising, 2) the web site was helping them better address the needs of their residents, 3) IT barriers were not an issue for the most part (other than the rural LHD that stated their residents did not have Internet access the way those residing in an urban or suburban area do), 4) the web site was not a time burden, and 5) the web site was a public health service.

The first major finding, that LHDs believed the web site needed more advertising, shows that LHDs are supportive of the concept, but did not have the desire, or more likely, the time and financial support to advertise the web site. Therefore, the web site will need to be advertised through other means. The second finding, the web site was

helping LHDs better address the needs of their residents, shows that LHDs (at least those participating) believed the web site was assisting in their public service to their community. This is important because if LHDs believe they are better serving their community, they are more likely to continue using the web site.

It was also found, for the most part, that LHDs did not perceive IT barriers for the residents in their area (other than the rural LHD which stated their residents did not have access the way those residing in an urban or suburban area do). This remains an issue for LHDs in rural areas and LHDs serving low-income populations. The fourth finding, that the web site was not a time burden, is an essential result because LHDs often believe the web site will drastically increase their workload. In this research, that was not the case. And the last major finding regarding LHDs, that the web site was viewed as a useful public health service, shows that LHDs do indeed wish to improve their public health service, and the web site is one means of doing so. Overall, these are important findings, because the web site is a dynamic program that continues to evolve to meet the needs of those who use it.

The factor analysis of the LHD survey suggested three constructs, usefulness of the web site to public health, benefits of online reporting, and personnel issues regarding the web site, that are playing a role in LHDs' decision to participate in the web site. Knowing these constructs makes it possible to keep these issues in mind as the web site evolves to further meet the needs of LHDs. These are pertinent issues noted by LHDs, therefore, they should be remembered when changes are being made to the web site.

The purpose of this research was exploratory and I believe the initial five questions were answered adequately. More research needs to be conducted on RUsick2's

successor, ReportFoodPoisoning.com to investigate whether these same issues remain for web site visitors and for LHD personnel using the web site.

Limitations

A major limitation of this research is the nonrandom sampling upon which the data are based. For example, the follow-up survey was based on those visitors who chose to complete it, where the response rate, at approximately 35%, was much lower than ideal. This is slightly lower than the 43% email response rate found by Couper et al (1999). There could be biases when one considers the higher educational level and presumably the necessary patience and willingness to participate in this research, especially when no incentive was offered.

Similarly, the local health department data were gathered by local health department personnel that were kind enough to take the time to complete the interview or survey. This could bias the results in that many of these individuals knew me and were familiar with this project, which may have led to socially desirable responses. However, means were taken to prevent this, such as a student assistant conducting the telephone interviews and a brief explanation on the LHD survey stating their responses would remain anonymous.

ReportFoodPoisoning.com

ReportFoodPoisoning.com is RUsick2's successor. The RUsick2 web site was redesigned in order to maximize its utility. The new web site was launched in February 2005 and includes nearly all of the RUsick2 pages. One of the primary reasons RUsick2 was redesigned and renamed was to minimize the complexity of the web site. RUsick2 had seventeen data input screens. The new web site lessened this number to nine input

screens. By deleting several pages, the aim was to not make visitors feel overwhelmed and prevent them from abandoning the web site. One section that was deleted was the output section at the end, which displayed counts and percentages of how many other web site visitors from the same county and state reported similar symptoms and food items on the same time. Very few RUsick2 visitors were reaching this stage of the web site and the table was fairly complex. Since this section was removed, the web site was no longer a venue to "see if others were sick, too," therefore, it needed to be renamed.

ReportFoodPoisoning.com, while easier for the web site visitor, has more advanced capabilities for local health departments that decide to use it. It features a line listing, an automatically completed Michigan foodborne illness investigation form, and searching capabilities to detect outbreaks.

While ReportFoodPoisoning.com does not turn away visitors from outside the state of Michigan, it is being piloted throughout Michigan by encouraging local health departments to sign up for the web site. The Michigan Departments of Community Health and Agriculture are involved in this outreach, along with the National Food Safety & Toxicology Center at MSU. Signing up for the web site is optional and while local health departments are encouraged to use it, it is not mandated. Hopefully, Michigan's experience will serve as a model for other states to show that an online foodborne illness program can be successful in increasing the number of foodborne illness complaints and facilitating the daily responsibilities of local health departments. The findings reported from RUsick2 are most likely applicable to ReportFoodPoisoning.com for the local health department population.

At this point in time, 24 health departments in Michigan are participating in the web site. This is a combination of individual county and district health departments throughout the state, representing a substantial geographic area in Michigan to capture foodborne illness complaints. If used properly, ReportFoodPoisoning.com is sensitive enough to detect significant increases in foodborne illness complaints, allowing for a quicker public health awareness and response to such outbreaks.

Implications for Local Health Department Personnel

The findings of this study have several implications for LHD personnel. The first being much of their workload can be made electronic. This would allow for advanced searching capabilities to detect small and medium sized foodborne illness outbreaks that might otherwise go undetected. If widely utilized this allows for a better estimate and understanding of foodborne illnesses. These are clear benefits of online reporting of foodborne illnesses.

A second implication of this research was discovered in the LHD survey, where LHDs responded that they viewed the web site as a means to increase public health service to their community. Hopefully, this will carry over into a larger number of LHDs signing up for the web site, thus, maximizing its capabilities.

LHDs also recognize the importance of employee attitudes when deciding to sign up for the web site. For instance, if a LHD has many employees resistant to change, then either the LHD supervisor (who would like to participate) or the individual representing the web site can address these issues when promoting and explaining the web site.

A final implication of this web site for LHDs is that people who believe they are suffering from a foodborne illness are willing to enter their information online. While the

reports may not be 100% complete, they are frequently of good quality and consist of enough data to begin a foodborne illness complaint. Even if the LHD needs to make a follow up phone call to the reporter, much of the needed information is already available and time can be saved. However, it is important to remember the characteristics of the individuals reporting, which are typically higher educated than the general population. In counties with a large number of computer adept residents, this web site is a viable addition to public health service.

Conclusion

In conclusion, this research examined two populations who used this web site: members of the public who believe they have food poisoning and local health department personnel in the environmental health division of health departments. More specifically, this investigation concentrated on people that had come to the web site to report their illness and environmental health supervisors at local health departments.

It was found that web site visitors were willing to enter enough data online comparable to traditional telephone reports. However, visitors represented a highly educated portion of the population, suggesting the web site is not capturing the entire online population. The web site was recently redesigned to streamline the process, out of concern it was too difficult.

Local health department personnel provided responses to interviews and surveys, allowing for their attitudes and perceptions to be investigated. Factor analysis revealed three constructs essential to a local health department's decision to participate in the web site: increased public health service (consisting of three items), cost and benefits of online reporting for LHD employees (consisting of five items), and influence of others

(consisting of two items). As the web site continues to be improved to meet the needs of LHDs, it will remain imperative to keep these three issues in mind.

Appendix A. RUsick2 Foodborne Disease Forum Web site Pages

First-time User Disease Report (pg. 1)

Your Case ID is:	ANIPT

Are you:

- (•) The person who was sick
- ( ) Filing this report for another person who was sick

Next Page

Jump to another page

Personal Characteristics (pg. 2)
Case ID: ANIPT

State of residence: Michigan

Age (in years): 22

Gender: (•) Male ( ) Female

How many other people (that you know of) were also sick with the same symptoms at the same time? 0

(Note: A separate record is needed for each ill person.)

Next Page

Jump to another page

Residence Information (pg. 3)
Case ID: ANIPT

County of residence: Ingham

City of residence: East Lansing

Next Page

Jump to another page

Symptoms (pg. 4)
Case ID: ANIPT

The onset of most foodborne diseases is defined by the onset of vomiting or diarrhea. Which of these symptoms occurred first?

☐ Vomiting

☐ Diarrhea

What was the date on which it first occurred?

September 18 2006

What time of day?

1 AM

Did you have any of the following symptoms?

SYMPTOM	Yes	No
Nausea	☐	☐
Vomiting	☐	☐
Diarrhea	☐	☐
Bloody Diarrhea	☐	☐
Abdominal Cramps	☐	☐
Fever	☐	☐
Chills	☐	☐

Headache	☐	☐
Body Aches	☐	☐
Constipation	☐	☐
Sore Throat	☐	☐
Runny or Congested Nose	☐	☐
Coughing	☐	☐
Difficulty Swallowing or Breathing	☐	☐
Difficulty Speaking	☐	☐
Numbness, Paralysis, or Delerium	☐	☐

Have you sought medical attention for these symptoms?

☐ Yes ☐ No

Next Page

Jump to another page

Identifiers (pg. 5)
Case ID: ANIPT

Please provide the following identification so that your local and state health departments will be able to contact you if you are part of a suspected outbreak being investigated.

> Names, phone numbers, and e-mail addresses will not be shared with anyone other than your health department.

First Name _____

E-mail address _____

Daytime Phone Number _____ nnn-nnn-nnnn

Suspected Foods and Food Sources (pg. 6)
Case ID: ANIPT

Please enter the foods and food sources that you suspect made you sick.

☐ Enter suspected food items

☐ Enter suspected food sources

☐ Continue without entering suspected foods or suspected food sources.

Next Page

Jump to another page

Suspected Foods (pg. 7)
Case ID: ANIPT

Indicate food items that you suspect made you sick. Enter main ingredients. For example, 'beef and cheese burrito' should be entered as ground beef and cheese.

A. MEAT/POULTRY/FISH	
Beef	☐
Chicken	☐
Fish	☐
Lamb	☐
Pork	☐
Shellfish	☐
Turkey	☐
Other Meat/Poultry/Fish	☐
B. TYPE OF MEAT DISH	
Chicken/tuna/meat salad	☐
Commercial casserole or hot dish	☐
Deli or ready to eat meat	☐

Ground beef/hamburger	☐
Homemade casserole or hot dish	☐
Hot dogs/sausage	☐
Meat sandwich	☐
C. DAIRY AND EGGS	
Cheese	☐
Eggs – Cooked	☐
Eggs -- Raw or partially cooked	☐
Ice Cream	☐
Milk	☐
Non-pasteurized Dairy Products	☐
Other Dairy Foods (yogurt, sour cream, etc.)	☐
D. FRUIT- EATEN RAW	
Citrus Fruit	☐
Exotic Fruit (kiwi, mango, etc)	☐
Grapes	☐
Melons	☐
Raspberries	☐
Other Berries	☐
Other Fruits	☐
E. VEGETABLES- EATEN RAW	
Alfalfa or Bean Sprouts	☐
Cucumbers	☐
Lettuce/Mixed Salad	☐
Mushrooms	☐
Tomatoes	☐
Other Fresh Uncooked Vegetables	☐
F. PREPARED FRUIT OR VEGETABLES	
Canned Fruit	☐
Canned Vegetables	☐

Cooked Fresh Vegetables	☐
Dried Fruit	☐
Frozen Fruit	☐
Frozen Vegetables	☐
G. SALAD ITEMS/SIDE DISHES	
Cole Slaw	☐
Dips/Dressings/Sauces	☐
Potato or Macaroni Salad	☐
Other Salad Items	☐
Other Side Dishes	☐
H. GRAINS AND STARCHES	
Baked Desserts (cake, cookies, etc.)	☐
Beans	☐
Bread	☐
Cereals	☐
Pasta	☐
Potatoes	☐
Rice	☐
Other Grains and Starches	☐
Other Sweets	☐
I. BEVERAGES	
Apple Juice or Cider	☐
Private Well Water	☐
Water Drank while Swimming	☐
Other Fruit Juice	☐

Remember, you are only saying what you ate before your illness onset. You are not making any claims about what specifically made you sick.

Next Page

Jump to another page

Suspected Food Sources (pg. 8)
Case ID: ANIPT

Make a list of your suspected food sources (restaurants, grocery stores, etc.).

Keep adding suspected food sources (one at a time and in any order)

Source type:

- ☐ Store (grocery, convenience, etc.)
- ☐ Restaurant
- ☐ Other source

Submit

Jump to another page

Non-food Exposures (pg. 9)
Case ID: ANIPT

During the **four** days prior to the illness (**Thursday, July 10** thru **Sunday, July 13**), did you have any exposure to the following?

EXPOSURE	Yes	No
Cats	☐	☐
Dogs	☐	☐
Livestock (cattle, sheep, pigs, goats)	☐	☐
Pet or wild birds	☐	☐
Pet rodents (gerbils, hamsters, etc.) or rabbits	☐	☐
Poultry	☐	☐
Reptiles (snakes, turtles, lizards, etc.)	☐	☐
Wild rodents (house mice, rats, etc.)	☐	☐
Zoo or petting zoo animals	☐	☐
A person with your same symptoms	☐	☐
Patient in a healthcare setting	☐	☐
Preparing foods for sale to others	☐	☐
Preschool or young children	☐	☐

Swimming in a lake or river	☐	☐
Swimming in a swimming pool	☐	☐
Travel to Canada	☐	☐
Travel to Mexico	☐	☐
Travel outside the U.S., Canada, or Mexico	☐	☐

Next Page

Jump to another page

Four Day Food History (pg. 10)
Case ID: ANIPT

- For the most part enter ingredients, not recipes. For example, 'Martha's Homemade Lasagna' should be entered as ground beef, pasta, cheese, and tomatoes.
- Foods rarely associated with foodborne illness are not listed; so don't expect to find a box for every kind of food.

Click the box to the right of each food you ate on July 11-14, 2003.

A. MEAT/POULTRY/FISH	Foods Eaten: Friday thru Monday
Beef	☐
Chicken	☐
Fish	☐
Lamb	☐
Pork	☐
Shellfish	☐
Turkey	☐
Other Meat/Poultry/Fish	☐

B. TYPE OF MEAT DISH	Foods Eaten: Friday thru

	Monday
Chicken/tuna/meat salad	☐
Commercial casserole or hot dish	☐
Deli or ready to eat meat	☐
Ground beef/hamburger	☐
Homemade casserole or hot dish	☐
Hot dogs/sausage	☐
Meat sandwich	☐

C. DAIRY AND EGGS	Foods Eaten: Friday thru Monday
Cheese	☐
Eggs -- Cooked	☐
Eggs -- Raw or partially cooked	
Ice Cream	☐
Milk	☐
Non-pasteurized Dairy Products	☐
Other Dairy Foods (yogurt, sour cream, etc.)	☐

D. FRUIT- EATEN RAW	Foods Eaten: Friday thru Monday
Citrus Fruit	☐
Exotic Fruit (kiwi, mango, etc)	☐
Grapes	☐
Melons	☐
Raspberries	☐
Other Berries	☐
Other Fruits	☐

E. VEGETABLES- EATEN RAW	Foods Eaten: Friday thru Monday
Alfalfa or Bean Sprouts	☐

Cucumbers	☐
Lettuce/Mixed Salad	☐
Mushrooms	☐
Tomatoes	☐
Other Fresh Uncooked Vegetables	☐

F. PREPARED FRUIT OR VEGETABLES	Foods Eaten: Friday thru Monday
Canned Fruit	☐
Canned Vegetables	☐
Cooked Fresh Vegetables	☐
Dried Fruit	☐
Frozen Fruit	☐
Frozen Vegetables	☐

G. SALAD ITEMS/SIDE DISHES	Foods Eaten: Friday thru Monday
Cole Slaw	☐
Dips/Dressings/Sauces	☐
Potato or Macaroni Salad	☐
Other Salad Items	☐
Other Side Dishes	☐

H. GRAINS AND STARCHES	Foods Eaten: Friday thru Monday
Baked Desserts (cake, cookies, etc.)	☐
Beans	☐
Bread	☐
Cereals	☐
Pasta	☐
Potatoes	☐
Rice	☐

Other Grains and Starches	☐
Other Sweets	☐

I. BEVERAGES	Foods Eaten: Friday thru Monday
Apple Juice or Cider	☐
Private Well Water	☐
Water Drank while Swimming	☐
Other Fruit Juice	☐

Remember, you are only saying what you ate before your illness onset. You are not making any claims about what specifically made you sick.

Next Page

Jump to another page

Food Sources (pg. 11)
Case ID: ANIPT

Make a list of your food sources (restaurants, grocery stores, etc.) for Friday, July 11, 2003 thru Monday, July 14, 2003.

Keep adding food sources (one at a time and in any order) until your list includes everywhere you obtained food eaten during these four days.

☐ **Enter/add a new food source (grocery store, restaurant, etc.)**

Submit

Jump to another page

Add a Food Source
Case ID: ANIPT

Source ☐ Store (grocery, convenience, etc.)

type: ☐ Restaurant
☐ Other source

Source name:

Source street:

Source city: East Lansing

Submit

Jump to another page

Contact Information (pg. 12)
Case ID: ANIPT

Please make sure that your name and E-mail address are correct. Data on this entire page will NOT be shared with other Forum users. (**Official Disclaimer**, and **Privacy Policy** and **Informed Consent**). Data on this page may be given to your local health department if they request it.

First Name

E-mail address

Phone Number nnn-nnn-nnnn

The information in the following green section is optional. However, your data may have to be disregarded by the Forum Moderator if it is unclear and you cannot be contacted for verification. If you are part of an outbreak, you will want your local health department to be able to contact you.

Middle Name Last Name

Evening Phone Number

Street Address

Address Line 2

Zip Code

Next Page

Jump to another page

First Summary Report (tallies on other visitors who reported eating the same foods) (pg. 13)

Not shown—only data entry pages included in this appendix.

Source Matching (pg. 14)
Case ID: ANIPT

Please select one of the two options regarding how to proceed:

☐ Take me to the food sources matching page. (Recommended)

☐ I can't remember which foods came from which sources. Skip the food sources matching page.

Match foods to food sources (pg. 15)
Case ID: ANIPT

The foods you ate on Friday, July 11 thru Monday, July 14, 2003 are indicated by a shaded background. Click the dropdown box to the right of each food you ate to indicate the source.

- Unknown means that you ate the food but the sources is unknown.
- You can add more foods that you may have forgotten by simply changing the sources selected on the dropdown box.

A. MEAT/POULTRY/FISH	Foods Eaten: Friday thru Monday
Beef	
Chicken	
Fish	
Lamb	
Pork	
Shellfish	
Turkey	
Other Meat/Poultry/Fish	
B. TYPE OF MEAT DISH	Foods Eaten: Friday thru Monday
Chicken/tuna/meat salad	
Commercial casserole or hot dish	
Deli or ready to eat meat	
Ground beef/hamburger	
Homemade casserole or hot dish	
Hot dogs/sausage	
Meat sandwich	
C. DAIRY AND EGGS	Foods Eaten: Friday thru Monday
Cheese	
Eggs -- Cooked	
Eggs -- Raw or partially cooked	
Ice Cream	
Milk	
Non-pasteurized Dairy Products	
Other Dairy Foods (yogurt, sour cream, etc.)	
D. FRUIT- EATEN RAW	Foods Eaten: Friday thru Monday
Citrus Fruit	
Exotic Fruit (kiwi, mango, etc)	

Grapes	
Melons	
Raspberries	
Other Berries	
Other Fruits	
E. VEGETABLES- EATEN RAW	Foods Eaten: Friday thru Monday
Alfalfa or Bean Sprouts	
Cucumbers	
Lettuce/Mixed Salad	
Mushrooms	
Tomatoes	
Other Fresh Uncooked Vegetables	
F. PREPARED FRUIT OR VEGETABLES	Foods Eaten: Friday thru Monday
Canned Fruit	
Canned Vegetables	
Cooked Fresh Vegetables	
Dried Fruit	
Frozen Fruit	
Frozen Vegetables	
G. SALAD ITEMS/SIDE DISHES	Foods Eaten: Friday thru Monday
Cole Slaw	
Dips/Dressings/Sauces	
Potato or Macaroni Salad	
Other Salad Items	
Other Side Dishes	
H. GRAINS AND STARCHES	Foods Eaten: Friday thru Monday
Baked Desserts (cake, cookies, etc.)	
Beans	

Bread	
Cereals	
Pasta	
Potatoes	
Rice	
Other Grains and Starches	
Other Sweets	
I. BEVERAGES	Foods Eaten: Friday thru Monday
Apple Juice or Cider	
Private Well Water	
Water Drank while Swimming	
Other Fruit Juice	

Next Page

Jump to another page

Second Summary Report

Not shown – only data entry pages shown in this appendix.

Thank you!

You may wish to revisit www.RUsick2.msu.edu in a few days to see if additional data has been entered by other Forum visitors of if you remember something else that you did or ate. You will need your ID Code <ANIPT> to re-enter this site as a 'Returning User'.

The following is a list of all the data you entered. You should print this out for your records. Your local health department has access to this data and they may contact you if, for example, you are part of a cluster of cases that were all exposed to the same food source, water, or other factor.

General Information (Only your health dept. sees the blue, underlined, and italicized data.)

ID Code: ANIPT
Age: 32
Gender: Female
Ill Person: Yes
Medical Attention: No
Others Ill: No
County: Ingham
State: MI
First Name: Test
Last Name: Test
Address: 123 Test St.
Address Line Two:
City: Lansing
Postal Code: 48849
Daytime Phone: 517-333-3333
Evening Phone:
E-mail Address: test@msu.edu
Initial Report Date: July 14, 2003
Finished Report Date: July 14, 2003

Symptoms

Onset Symptom: Vomiting
Onset Date: July 14, 2003
Onset Time: 3:00pm
Symptoms: Vomiting, Nausea, Diarrhea

Food Sources

GR on CO in Acme, MI (Store) (Grocery on Coolidge)

Food History

7/14/2003

Beef from (Store) Grocery on Coolidge in Acme, MI

Non-food Exposures

Dogs
Cats

End

Appendix B. ReportFoodPoisoning.com Web site Pages

First-time User Disease Report (pg. 1 of 9)

Your Case ID is:	EYHAQLIO

Are you:

- ◉ The person who was sick
- ○ Filing this report for another person who was sick

Next Page

Jump to another page

Personal Characteristics (pg. 2 of 9)
Case ID: EYHAQLIO

State of residence: Michigan

Age (in years): 22

Gender: ◉ Male ○ Female

How many other people (that you know of) were also sick with the same symptoms at the same time? 0

(Note: A separate record is needed for each ill person.)

Next Page

Jump to another page

Residence Information (pg. 3 of 9)
Case ID: EYHAQLIO

County of residence: Ingham

City of residence: East Lansing

Next Page

Jump to another page

Symptoms (pg. 4 of 9)
Case ID: EYHAQLIO

The onset of most foodborne diseases is defined by the onset of vomiting or diarrhea. Which of these symptoms occurred first?

☐ Vomiting

☐ Diarrhea

What was the date on which it first occurred?

September 18 2006

What time of day?

1 AM

Did you have any of the following symptoms?

SYMPTOM	Yes	No
Nausea	☐	☐
Vomiting	☐	☐
Diarrhea	☐	☐
Bloody Diarrhea	☐	☐
Abdominal Cramps	☐	☐
Fever	☐	☐
Chills	☐	☐

Headache	☐	☐
Body Aches	☐	☐
Constipation	☐	☐
Sore Throat	☐	☐
Runny or Congested Nose	☐	☐
Coughing	☐	☐
Difficulty Swallowing or Breathing	☐	☐
Difficulty Speaking	☐	☐
Numbness, Paralysis, or Delerium	☐	☐

Have you sought medical attention for these symptoms?

☐ Yes ☐ No

Next Page

Jump to another page

Contact Information (pg. 5 of 9)
Case ID: EYHAQLIO

Your data will NOT knowingly be shared with anyone other than your local health department. At 12 minutes after the next hour, an E-mail will be sent to your health department notifying them that your report has been entered in the database. They may view your data with their password. Most local health departments operate between the hours of 8:00am-5:00pm, Monday-Friday.

Information regarding confidentiality.

First Name

Last Name

Daytime Phone Number nnn-nnn-nnnn

Evening Phone Number nnn-nnn-nnnn

Street Address

Address Line 2

Zip Code

E-Mail address

Would you like an E-mail sent to your E-mail address after your health department has viewed this data?

☉ Yes

☐ No

Next Page

Jump to another page

Non-food exposures (pg. 6 of 9)
Case ID: EYHAQLIO

During the **four** days prior to the illness (**Friday, September 15** thru **Monday, September 18**), did you have any exposure to the following

EXPOSURE	Yes	No
Cats	☐	☉
Dogs	☐	☉
Livestock (cattle, sheep, pigs, goats)	☐	☉
Pet or wild birds	☐	☉
Pet rodents (gerbils, hamsters, etc.) or rabbits	☐	☉
Poultry	☐	☉
Reptiles (snakes, turtles, lizards, etc.)	☐	☉
Wild rodents (house mice, rats, etc.)	☐	☉
Zoo or petting zoo animals	☐	☉
A person with your same symptoms	☐	☉
Patient in a healthcare setting	☐	☉

Preparing foods for sale to others	☐	☐
Preschool or young children	☐	☐
Swimming in a lake or river	☐	☐
Swimming in a swimming pool	☐	☐
Travel to Canada	☐	☐
Travel to Mexico	☐	☐
Travel outside the U.S., Canada, or Mexico	☐	☐

Next Page

Jump to another page

Four day food history (pg. 7 of 9)
Case ID: EYHAQLIO

Indicate what foods you ate from **Friday, September 15 thru Monday, September 18**. Enter main ingredients. For example, 'beef and cheese burrito' should be entered as ground beef and cheese.

How am I supposed to remember what I ate?
Remember what you did, and then recall where you were and what you ate. Seek out those people who were with you on the days in question. Start talking about what you did that day, and pretty soon you will recall where (and what) you ate. This takes a while, and is nothing you can do while you're on the phone with your health department. Look at your appointment calendar, check book and credit card receipts.

A complete 4-day food history is necessary because the cause of most food poisoning is something eaten a few days before becoming ill.

A. POPULAR MAIN COURSES	Foods Eaten: Friday thru Monday
Casserole or hot dish	☐
Chicken/tuna/meat salad	☐
Deli or Submarine Sandwich	☐
Pasta meal (spaghetti, lasagna, etc.)	☐

Pizza	☐
B. MEAT/POULTRY/FISH	Foods Eaten: Friday thru Monday
Chicken	☐
Fish	☐
Ground Beef/Hamburger	☐
Hot dogs or sausage	☐
Shellfish	☐
Turkey	☐
Other Beef	☐
Other Meat/Poultry/Seafood	☐
Other Pork	☐
C. DAIRY AND EGGS	Foods Eaten: Friday thru Monday
Cheese	☐
Eggs (Raw, Partially, or Fully Cooked)	☐
Ice Cream	☐
Milk	☐
Non-pasteurized Dairy Products	☐
Other Dairy Foods (yogurt, sour cream, etc.)	☐
D. FRUIT- EATEN RAW	Foods Eaten: Friday thru Monday
Citrus Fruit	☐
Grapes	☐
Melons	☐
Raspberries	☐
Other Berries	☐
Other Fruits	☐
E. VEGETABLES- EATEN RAW	Foods Eaten: Friday thru

	Monday
Alfalfa or Bean Sprouts	☐
Lettuce/Mixed Salad	☐
Mushrooms	☐
Tomatoes	☐
Other Fresh Uncooked Vegetables	☐
F. PREPARED FRUIT OR VEGETABLES	Foods Eaten: Friday thru Monday
Canned Fruit	☐
Canned Vegetables	☐
Cooked Fresh Vegetables	☐
Frozen Vegetables	☐
Other Prepared Fruit or Vegetables	☐
G. SALAD ITEMS/SIDE DISHES	Foods Eaten: Friday thru Monday
Cole Slaw	☐
Dips/Dressings/Sauces	☐
Potato or Macaroni Salad	☐
Other Salad Items	☐
Other Side Dishes	☐
H. GRAINS AND STARCHES	Foods Eaten: Friday thru Monday
Baked Desserts (cake, cookies, etc.)	☐
Beans	☐
Bread	☐
Cereals	☐
Pasta	☐
Potatoes	☐
Rice	☐

Other Grains and Starches	☐
Other Sweets	☐
I. BEVERAGES	Foods Eaten: Friday thru Monday
Apple Juice or Cider	☐
Private Well Water	☐
Water Drank while Swimming	☐
Other Fruit Juice	☐

Next Page

Jump to another page

Food Sources (pg. 8 of 9)
Case ID: EYHAQLIO

Make a list of your food sources (restaurants, grocery stores, etc.) for **Friday, September 15, 2006** thru **Monday, September 18, 2006**.

Keep adding food sources (one at a time and in any order) until your list includes everywhere you obtained food eaten during these four days.

☐ **Enter/add a new food source (grocery store, restaurant, etc.)**

Submit

Jump to another page

Add a Food Source
Case ID: EYHAQLIO

Source type:
- Store (grocery, convenience, etc.)
- Restaurant
- Other source

Source name:

Source street:

Source city: East Lansing

Submit

Jump to another page

Match Foods to Sources (pg. 9 of 9)
Case ID: EYHAQLIO

Check any food sources that are known. **(Friday, September 15 thru Monday, September 18)**

To add or remove food items or food sources, click the desired button.

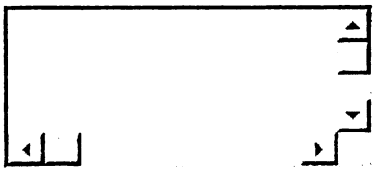
Foods | Sources

In the boxes below, you may supply a more detailed explanation of foods eaten and dates of particular meals. For example, indicate that the 'beef and cheese' you ate was a burrito on Tuesday. What food do you most highly suspect of making you sick?

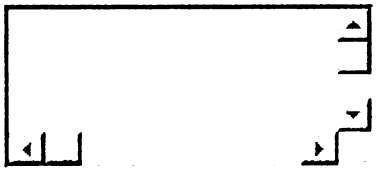
Additional comments for Friday, September 15

Additional comments for Saturday, September 16

Additional comments for Sunday, September 17



Additional comments for Monday, September 18



Remember, you are only saying what you ate before your illness onset. You are not making any claims about what specifically made you sick.

Next Page

Jump to another page

Report of a Foodborne Illness 9/18/2006
www.ReportFoodPoisoning.com
National Food Safety and Toxicology Center
Michigan State University, E. Lansing, MI 48824

1. Print a copy of this page for your records.
2. An E-mail notice will be sent to your health department at 12 minutes after the next hour.
3. You can use your ID Code as a 'Returning User' to modify your data or check to see if your health department has looked at your data.

Click below to:
Jump to another page
Exit and log out

Report of a Foodborne Illness 9/18/2006

ID Code: EYHAQLIO
Age: 22
Gender: Male

Ill Person? Yes
Medical Attention? No
Others Ill: 0
County: Ingham
State: MI
First Name:
Last Name:
Address:
Address Line Two:
City: East Lansing
Postal Code:
Daytime Phone:
Evening Phone:
E-mail Address:
Initial Report Date: 9/18/2006 3:55:49 PM

SYMPTOMS
Onset Symptom:
Onset Date: 9/18/2006
Onset Time: 1:00 AM
Symptoms: Diarrhea

FOOD SOURCES
Test on Test in East Lansing, MI (Store)

FOOD HISTORY

Day 1 Notes:
Day 2 Notes:
Day 3 Notes:
Day 4 Notes:

NON-FOOD EXPOSURES

Click below to:
Jump to another page
Exit and log out

Appendix C. Michigan Department of Community Gastrointestinal Illness Case Investigation Form

Gastrointestinal Illness Case Investigation Form

Michigan Department of Community Health

Suspect Confirmed Pathogen

Patient Information				
Patient ID	*RFP ID*	*First*	*Last*	*Middle*
Street Address				
City	*County*	*State*	Zip	
Home Phone #	*Other phone*	Ext	Cell phone	
Medications taken for illness		Allergies or other medical condition		
Parent/Guardian (required if pt under 18)				
First	Last		Middle	
Investigation/complaint ID	Part of an outbreak ? Yes No Unknown	Outbreak Name	Date/Time Receipt initial rpt *mm/dd/yyyy* *am pm*	
Investigation Status New Active Completed Superseded Cancelled		Case Status Confirmed Not ill Probable Suspect Unknown		
Patient Status Inpatient Outpatient Died	Diagnosis	Lab	*Onset*	Incubation hrs/ days

	Date	Diagnosis	*Date/ Time* 12:00 *am pm*	

Demographics

Sex *Male Female* Unknown	Date of Birth *mm/dd/yyyy*		Age Units *Days Months Years*

Race
Caucasian African American Native American/Alaska Native
Hawaiian/Pacific Islander
Asian Unknown Other

Ethnicity Hispanic/Latino Non-Hispanic/Latino Unknown	Worksite/ School	Occupations/School grade

Physician/Hospital Referral Information

Person providing referral

First	Last	Phone	Ext	Email

Primary Physician

First	Last	Phone	Ext	Email

Street Address	City	County	State	Zip

Name of LHD person receiving report	Title	Referred to in LHD or MDCH:

Patient Hospitalized Yes No Unknown	Hospital Name	City	Hospital Record #

Admission Date mm/dd/yyyy	Discharge Date mm/dd/yyyy	Days Hospitalized	Patient Died *Yes No Unknown*

Onset Date/Time	Date/Time Recovery	Suspected Incubation Period
8/12/2006 12:00 *am* *pm*	am pm	Hours Days Weeks Months

Epidemiologic Information			
Symptoms (Check all that apply) No Symptoms Abdominal Cramps Body Ache Diarrhea Diarrhea w/blood Chills Fatigue Headache Nausea Vomiting Blurred Vision Tingling Sore Throat Constipation Coughing Runny or Congested Nose Difficulty Swallowing or Breathing Difficulty Speaking Numbness, Paralysis or Delerium			
Fever? *Yes* *No* Unknown	If Yes, specify highest fever	Scale ☐ F ☐ C	Other Symptoms? Yes No Specify:

Specimen	Date Collected	Test Result	Test Name	Laboratory Name
Blood				
Stool				
Urine				
Other				

High Risk Potential Yes No Unknown	If Yes, *(Check all that apply)* Contact w/confirmed case Contact w/suspect case Daycare Attendee Food Handler Direct Pt. Care Worker Resident of Institutional Facility Day Care Worker Animal Handler Other Name and Location of Day Care attended

Travel (in/out state or international) in the past month? *Yes* *No* Unknown	*If Yes, Location and Date*
Swimming in past month? *Yes* *No* Unknown	*If Yes, Location and Date*

Drinking Water Source	
Home: Municipal Well Bottled Other	Work: Municipal

	Well Bottled Other

Contact Information List all contact with concurrent or similar illness (list additional information in comments section)
Pets or Animal Contacts in the 2 weeks prior to onset: Cats

Name of Contact	Onset	Address & Phone	Relation	

Food Purchase Information
List all places where the patient purchased grocery items in the 2 weeks prior to illness onset: (Include: Grocery Stores, Markets, Produce Stands, Convenience Stores, Home Delivery

Date of Purchase *mm/dd/yyy*	*Name of Facility*	*Location or address*	*Foods purchased*-be specific

Non-Home Consumption History
List any other food and beverages consumed OUTSIDE the home in the 2 weeks prior to illness onset-(Include: Carry Out, Events, Fast Foods, Parties, Restaurants, Travel or

Work-Related Meals)

Date of Consumption *mm/dd/yyy*	*Name of Facility/Event*	*Food/beverages consumed*	*Address of facility/event*
	Restaurant #1		
	Restaurant #2		
	Restaurant #3		

3 Day Food History

List all foods/beverages consumed 3 days prior to illness onset: (prompt for typical foods if unable to recall)

Day of Onset / Date 8/12/2006

Meal/Time	Food/Beverages Consumed	Facility Name & Location	Meal Companions
Breakfast Time am pm			
Lunch Time am pm			
Dinner Time am pm			
Other/Snacks Time			

am pm			

Other Information			
1 Day prior to Onset / Date 8/11/2006			
Meal/Time	Food/Beverages Consumed	Facility Name & Location	Meal Companions
Breakfast Time am pm			
Lunch Time am pm			
Dinner Time am pm			
Other/Snacks Time am pm			
2 Days prior to Onset / Date 8/10/2006			
Meal/Time	Food/Beverages Consumed	Facility Name & Location	Meal Companions
Breakfast Time am pm			
Lunch Time am pm			
Dinner Time am pm			
Other/Snacks Time am pm			

Local 1 (extra data field for LHD use)	Local 2 (extra data field for LHD use)

Name of Person Interviewed	Relationship to Patient	Date of Interview *mm/dd/yyyy*

Subm	Date	Health	Phone #

itted by:		Department	

Ext

Appendix D. RUsick2 Forum Follow-Up Questionnaire

First, we would like to thank you for taking the time to visit the RUsick2 Forum. The following questionnaire is short and will provide us with the ability to improve the RUsick2 Forum to make it easier for other visitors to understand. Your email address and name will NOT be linked in any way to this survey because your specific survey will receive a numerical coding that will NOT be able to be traced to you.

Please take 5 minutes to fill out this questionnaire to help a student complete her graduate work at MSU. Hit "Reply" on your email and you will be able to complete the survey by typing an "x" to the multiple choice responses or entering text for the free form questions. Thank you very much for your time and assistance.

1. How did you find out about the RUSick2 Forum?

__ Newspaper advertisement.
__ Newspaper article.
__ Radio or television report.
__ Healthcare provider (either over the phone or at a doctor's office).
__ Pharmacy.
__ Word of mouth.
__ Google.
__ Magazine article.
__ Other.

2. What did you expect from the RUSick2 Forum? (Check all that apply)

__ I hoped to find out what caused my illness.
__ I expected the health department to do something about my illness.
__ I expected the food establishment that is responsible for my illness to do something.
__ I don't know.
__ Other.

3. Did you exit the RUsick2 Forum before finishing it?

___ No, I finished all the data entry

___ I did not finish. Please check reasons for not finishing (Check all that apply):

__ I was just visiting the forum.

__ I was filling it out for someone else and did not know all their information.

__ It was too difficult.

__ It was too long.

__ Other (please specify):

4. What did you use to help you remember what and where you had eaten in the few days before your illness? (Check all that apply.)

__ Calendar/Personal Planner

__ Checkbook

__ Friends/Family

__ Credit card receipt

__ Other (please specify)

5. Once you remembered the foods you ate and where they came from, how hard was it to enter the data into the computer?

__ Extremely easy.

__ Somewhat easy.

__ Undecided.

__ Somewhat difficult.

__ Extremely difficult.

6. How understandable were the reports and tables at the end?

__ Extremely easy to understand.

__ Somewhat easy to understand.

__ Undecided.

__ Somewhat difficult to understand.

__ Extremely difficult to understand.

7. How many minutes did it take to:

Determine all the foods you had eaten in the 4 days? ____ # of Minutes

Enter all of your information into the program? ____ # of Minutes

Look at the various reports/tables at the end? ____ # of Minutes

8. Did anyone from your local health department contact you as a result of the data you filed with RUsick2?

__ Yes.

__ No.

__ I don't know.

9. Do you think most people care much about keeping confidentiality regarding the fact that they had diarrhea and are suspicious of food poisoning? Write in the space provided.

10. After seeing the RUsick2 reports at the end, do you think that you were part of a cluster of people who all became ill after eating the same food item, drinking the same water or being exposed to some other common source? Write in the space provided.

11. Before coming to the RUSick2 forum, what did you most strongly suspect as the source of your illness?

__ Food from a grocery – eaten at home or elsewhere.

__ Food from a restaurant.

__ Food from some type of party, meeting or event.

__ Something else.

12. After visiting the RUSick2 forum, how did your suspicions change?

__ I didn't really look at any of the RUSick2 output

__ I'm less certain of what food made me sick.

__ I'm more certain that my original suspicion was correct.

__ Other

13. Would you recommend the RUsick2 Forum to a family member or friend who is suffering from common foodborne illness symptoms such as vomiting or diarrhea?

__ Yes.

__ No.

__ Maybe.

14. Did you return to the RUsick2 Forum a couple of days after filing your report to see if any new data had been entered?

__ Yes.

__ No.

__ Maybe.

15. Do you have any suggestions about how data is entered into the RUsick2 Forum or anything else about the program? Write in the space provided.

16. Would you have called your local health department about your illness if the RUsick2 Forum did not exist?

__ Yes.

__ No.

__ Maybe.

17. In the past, have you ever called your local health department to report a suspected case of food poisoning?

__ Yes.

__ No.

__ Maybe.

18. Did you talk to or visit your doctor about your illness?

__ Yes.

__ No.

__ Maybe.

19. How often do you use the Internet for information concerning your health?

__ Always.

__ Very Often.

__ Sometimes.

__ Rarely.

__ Never.

20. About how many hours each WEEK do you spend on the internet?

__ # of Hours per week

21. Where was the computer that you used to access the RUsick2 Forum?

__ At home.

__ At work.

__ At a public place, i.e. library or school.

__ At a friend's or relative's.

__ Other.

22. What is the highest level of education you completed?

__ Some High School.

__ High School.

__ Some College.

__ College.

__ Graduate school/Professional degree.

23. What is your zip code?

Thank you once again for your time. If you would like to go back to the RUsick2 Forum, it is at www.RUsick2.msu.edu. You will need your Case ID to log into the Forum.

Appendix E. ReportFoodPoisoning.com Follow-Up Questionnaire

First, we would like to thank you for taking the time to visit www.ReportFoodPoisoning.com. The following questionnaire is short and will provide us with the ability to improve the web site to make it easier for other visitors to understand. Your email address and name will NOT be linked in any way to this survey because your specific survey will receive a numerical coding that will NOT be able to be traced to you.

Please take 5 minutes to fill out this questionnaire to help a student complete her graduate work at MSU. Hit "Reply" on your email and you will be able to complete the survey by typing an "x" to the multiple choice responses or entering text for the free form questions. Thank you very much for your time and assistance.

1. How did you find out about www.ReportFoodPoisoning.com?

__ Newspaper advertisement.
__ Newspaper article.
__ Radio or television report.
__ Healthcare provider (either over the phone or at a doctor's office).
__ Pharmacy.
__ Word of mouth.
__ Google.
__ Magazine article.
__ Other.

2. What did you expect from www.ReportFoodPoisoning.com? (Check all that apply)

__ I hoped to find out what caused my illness.
__ I expected the health department to do something about my illness.
__ I expected the food establishment that is responsible for my illness to do something.
__ I don't know.
__ Other.

3. Did you exit www.ReportFoodPoisoning.com before finishing it?

___ No, I finished all the data entry

___ I did not finish. Please check reasons for not finishing (Check all that apply):

__ I was just visiting the forum.

__ I was filling it out for someone else and did not know all their information.

__ It was too difficult.

__ It was too long.

__ Other (please specify):

4. What did you use to help you remember what and where you had eaten in the few days before your illness? (Check all that apply.)

__ Calendar/Personal Planner

__ Checkbook

__ Friends/Family

__ Credit card receipt

__ Other (please specify)

5. Once you remembered the foods you ate and where they came from, how hard was it to enter the data into the computer?

__ Extremely easy.

__ Somewhat easy.

__ Undecided.

__ Somewhat difficult.

__ Extremely difficult.

6. How understandable were the reports and tables at the end?

__ Extremely easy to understand.

__ Somewhat easy to understand.

__ Undecided.

__ Somewhat difficult to understand.

__ Extremely difficult to understand.

7. How many minutes did it take to:

Determine all the foods you had eaten in the 4 days? ____ # of Minutes

Enter all of your information into the program? ____ # of Minutes

Look at the various reports/tables at the end? ____ # of Minutes

8. Did anyone from your local health department contact you as a result of the data you filed with www.ReportFoodPoisoning.com?

__ Yes.

__ No.

__ I don't know.

9. Do you think most people care much about keeping confidentiality regarding the fact that they had diarrhea and are suspicious of food poisoning? Write in the space provided.

10. Would you recommend www.ReportFoodPoisoning.com to a family member or friend who is suffering from common foodborne illness symptoms such as vomiting or diarrhea?

__ Yes.

__ No.

__ Maybe.

11. Did you return to www.ReportFoodPoisoning.com a couple of days after filing your report to see whether or not any new data had been entered?

__ Yes.

__ No.

__ Maybe.

12. Do you have any suggestions about how data is entered into www.ReportFoodPoisoning.com or anything else about the program? Write in the space provided.

13. Would you have called your local health department about your illness if www.ReportFoodPoisoning.com did not exist?

__ Yes.

__ No.

__ Maybe.

14. In the past, have you ever called your local health department to report a suspected case of food poisoning?

__ Yes.

__ No.

__ Maybe.

15. Did your symptoms disrupt your daily life?

__Yes

__No

__Not Sure

16. Do you think you would disclose more or less information regarding your illness online versus the telephone?

___More

___Less

___Same

___Not Sure

17. How do you think the level of anonymity compares between online reporting versus telephone reporting?

18. Did you talk to or visit your doctor about your illness?

__ Yes.

__ No.

__ Maybe.

19. How often do you use the Internet for information concerning your health?

__ Always.

__ Very Often.

__ Sometimes.

__ Rarely.

__ Never.

20. Did you have any health concerns in the past year?

___ Yes (go to question 21)

___ No (go to question 22)

21. This past year, how often did you use the Internet to look for health information or medical advice regarding your health concerns?

___Everyday

___Several times a week

___Several times a month

___Every few months

___Less often

___ Don't Know

22. About how many hours each WEEK do you spend on the Internet?

__ # of Hours per week

23. Where was the computer that you used to access www.ReportFoodPoisoning.com?

__ At home.

__ At work.

__ At a public place, i.e. library or school.

__ At a friend's or relative's.

__ Other.

24. What is the highest level of education you completed?

__ Some High School.

__ High School.

__ Some College

__ College.

__ Graduate school/Professional degree.

25. What is your zip code?

Appendix F. Interview Guide for Local Health Department Staff Members in Michigan
(Participating)

Read Informed Consent:

Your participation in this research project is entirely voluntary. You indicate your voluntary agreement by participating in the interview. The purpose of the interview is to understand from your perspective the value of reporting foodborne illnesses online. This interview will last approximately 10 minutes. You may discontinue your participation at any time, without penalty by ending the call. All personal identifying information will be kept confidential.

(If they have any questions about IRB rules or participation in the survey, they can contact: Holly Wethington at ffmod@cvm.msu.edu 517/432-3100 ext.128 or the UCRIHS office: 246 Administration Building. Chair - Peter Vasilenko, Ph.D. (517) 355-2180 ucrihs@msu.edu.)

1. Why did you decide to participate in the web site?

2. Do you believe your health department was adequately addressing the needs of residents in your jurisdiction concerning complaints of foodborne illnesses without using the web site?

3. Do you believe you and your colleagues could handle an increase in the number of reports of foodborne illnesses, regardless if the reports are through the web site or the traditional method?

4. Do you think your health department has information technology (IT) issues or IT problems that could be a barrier to using the program?

5. Do you think IT problems are small, medium, or large problems?

6. Do you think citizens in your jurisdiction have IT barriers such as lack of Internet access that would prevent them from using the web site?

7. Do you believe your HD is better addressing, is somewhat better addressing, is much better addressing, or is very much better addressing the needs of residents in your jurisdiction by signing up for the web site?

8. Do you believe offering the web site to residents in your jurisdiction has no benefit, has a small benefit, has a medium benefit, or has a large benefit to the public health of the community?

9. Do you believe participation in this web site is a burden, is a small burden, is a moderate burden, or is a large burden to you and your colleagues?

10. Why did you respond the way you did to the last question?

11. Does the web site take up much time from you or your colleagues?

12. About how many minutes per day to you spend on the web site?

13. In your experience, have you found the web site easy or difficult to use?

Thank you for taking the time to talk with me. Your responses are very useful to this research...

Appendix G. Interview Guide for Local Health Department Staff Members in Michigan
(NOT Participating)

Read Informed Consent:

Your participation in this research project is entirely voluntary. You indicate your voluntary agreement by participating in the interview. The purpose of the interview is to understand from your perspective the value of reporting foodborne illnesses online. This interview will last approximately 10 minutes. You may discontinue your participation at any time, without penalty by ending the call. All personal identifying information will be kept confidential.

(If they have any questions about IRB rules or participation in the survey, they can contact: Holly Wethington at ffmod@cvm.msu.edu 517/432-3100 ext.128 or the UCRIHS office: 246 Administration Building. Chair - Peter Vasilenko, Ph.D. (517) 355-2180 ucrihs@msu.edu.)

1. Why did you decide to not participate in the web site?

2. Do you believe your health department is adequately addressing the needs of residents in your jurisdiction concerning complaints of foodborne illnesses without using the web site?

3. Do you believe you and your colleagues could handle an increase in the number of reports of foodborne illnesses, regardless if the reports are through the web site or the traditional method?

4. Do you think your health department has information technology (IT) issues or IT problems that could be a barrier to using the program?

5. Do you think IT problems would be small, medium, or large problems?

6. Do you think citizens in your jurisdiction would have IT barriers such as lack of Internet access that would prevent them from using the web site?

7. Do you believe your HD could not better address, somewhat better address, much better address, or very much better address the needs of residents in your jurisdiction by signing up for the web site?

8. Do you believe offering the web site to residents in your jurisdiction would have no benefit, a small benefit, a medium benefit, or large benefit to the public health of the community?

9. Do you believe participation in this web site would not be a burden, be a small burden, be a moderate burden, or be a large burden to you and your colleagues?

10. Why did you respond the way you did to the last question?

Thank you for taking the time to talk with me. Your responses are very useful to this research...

Appendix H. Survey for Environmental Health Division Supervisors already signed up for RUsick2

1) My staff has been able handle complaints of foodborne illness from RUsick2. [HAN]
   __Strongly Agree __Agree __Disagree __Strongly Disagree
2) I believe my LHD can positively impact the health of the public in our jurisdiction by increasing the opportunity for people to report foodborne illness complaints. [IMP]
   __Strongly Agree __Agree __Disagree __Strongly Disagree
3) I believe we were adequately addressing the needs of residents in our jurisdiction concerning complaints of foodborne illnesses before using RUsick2. [ADE]
   __Strongly Agree __Agree __Disagree __Strongly Disagree
4) Why did you reply the way you did to question 3?

5) I believe we are better addressing the needs of residents in our jurisdiction concerning complaints of foodborne illnesses after signing up for RUsick2. [BA]
   __Strongly Agree __Agree __Disagree __Strongly Disagree
6) Why did you reply the way you did to question 5?

7) I believe using RUsick2 in my jurisdiction has been beneficial to the public health of the community. [BL]
   __Strongly Agree __Agree __Disagree __Strongly Disagree
8) Why has using RUSick2 in your jurisdiction been beneficial or not been beneficial to the public health of the community?

9) I believe RUsick2 is a burden to my current staff. [BU]
   __Strongly Agree __Agree __Disagree __Strongly Disagree
10) Why did you reply the way you did to question 9?

11) My decision to sign up for RUsick2 depended on if other LHDs in my area were using the web site. [OHD]
   __Strongly Agree __Agree __Disagree __Strongly Disagree

12) My decision to sign up for RUsick2 depended on whether my employees wanted to use the web site. [EMP]

__Strongly Agree __Agree __Disagree __Strongly Disagree

13) Overall, I believe there is a benefit to online reporting of foodborne illnesses. [BT]

__Strongly Agree __Agree __Disagree __Strongly Disagree

14) Why might there be a benefit to online reporting of foodborne illnesses? (Check all that apply) [ONLINE BT INDEX]

__ Online reporting can save the staff time by not having to wait for individuals to remember their food history over the phone.

__ Online reporting can gather hundreds of reports simultaneously (in the event of a large outbreak or bioterrorist event)

__ Online reporting is not limited to the times the health department is open.

__ Other. (Please specify)

15. I work at _(insert name of health dept here)___ health department.
16. I have been working in public health for _____ number of years.
17. I currently am a Registered Sanitarian
    a. Yes
    b. No
18. I have obtained a(n): (Circle highest level of education you have completed)
    a. High School Diploma
    b. Associate's Degree
    c. Bachelor's Degree
    d. Master's Degree
    e. Doctoral Degree
19. I intend to continue to use the web site to increase foodborne illness reports from my jurisdiction.
    a. Yes
    b. No
    c. Not Sure

20. Please feel free to write any thoughts, concerns, or comments about the RUsick2 web site here.

Appendix I. Survey for Environmental Health Division Supervisors (not participating in RUsick2)

1.I believe my staff could handle an increase in the number of reports of foodborne illnesses, regardless if the reports are through RUsick2 or the traditional method. [HAN]

__Strongly Agree __Agree __Disagree __Strongly Disagree

2.I believe my LHD can positively impact the health of the public in our jurisdiction by increasing the opportunity for people to report foodborne illness complaints. [IMP]

__Strongly Agree __Agree __Disagree __Strongly Disagree

3.I believe we are adequately addressing the needs of residents in our jurisdiction concerning complaints of foodborne illnesses without using RUsick2. [ADE]

__Strongly Agree __Agree __Disagree __Strongly Disagree

4.Why did you reply the way you did to question 3?

5.I believe we could better address the needs of residents in our jurisdiction concerning complaints of foodborne illnesses by signing up for RUsick2. [BA]

__Strongly Agree __Agree __Disagree __Strongly Disagree

6.Why did you reply the way you did to question 5?

7.I believe offering the web site to residents in our jurisdiction would be beneficial to the public health of the community. [BL]

__Strongly Agree __Agree __Disagree __Strongly Disagree

8.I believe this web site would be a burden to my current staff. [BU]

__Strongly Agree __Agree __Disagree __Strongly Disagree

9.Why did you reply the way you did to question 8?

10. My decision to use the web site depends on if other LHDs in my area are using the web site. [OHD]

__Strongly Agree __Agree __Disagree __Strongly Disagree

11. My decision to use the web site depends on whether my employees want to use the web site. [EMP]

__Strongly Agree __Agree __Disagree __Strongly Disagree

12. Overall, I believe there is a benefit to online reporting of foodborne illnesses. [BT]

__Strongly Agree __Agree __Disagree __Strongly Disagree

13. Why might there be a benefit to online reporting of foodborne illnesses? (Check all that apply) [ONLINE BT INDEX]

__ Online reporting can save the staff time by not having to wait for individuals to remember their food history over the phone

__ Online reporting can gather hundreds of reports simultaneously (in the event of a large outbreak or bioterrorist event)

__ Online reporting is not limited to the times the health department is open.

__ Other. (Please specify)

14. I work at _(insert name of health dept here)___ health department.

15. I have been working in public health for _____ number of years.

16. I currently am a Registered Sanitarian

a. Yes
b. No

17. I have obtained a(n): (Circle highest level of education you have completed)

a. High School Diploma
b. Associate's Degree
c. Bachelor's Degree
d. Master's Degree
e. Doctoral Degree

18. I intend to use the web site to increase foodborne illness reports from my jurisdiction.

a. Yes
b. No
c. Not Sure

19. Please feel free to write any thoughts, concerns, or comments about the web site here.

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