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Understanding Food Safety Information Needs: Using a National Information Service as a Research Tool

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ABSTRACT

In December 2002, a public information service was launched as a component of the Food Safety Network (FSN) at the University of Guelph. Its core activity was a national toll-free call center through which the Canadian public had direct access to food safety professionals. The call center received 3,764 inquiries from January 2003 through December 2005. Data were collected on call characteristics (day, time and call duration), caller demographics and themes of the inquiries. Analysis determined that inquiries came primarily from individuals identified as consumers and were largely focused on the themes of food storage, handling and preparation. Other prevalent themes were specific products and brands, food preservation, non-food safety topics and emerging issues. Callers obtained the call center's contact information from a variety of sources, including government, the media, and referrals by food and health professionals. Food safety questions posed by callers varied widely in terms of the topic of concern and the degree of complexity. By collecting data on client information needs, an information service can serve as a research tool, revealing information gaps and opportunities to develop or improve resources. This project provides a blueprint for other organizations seeking to engage the public through an information service.

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INTRODUCTION

For more than ten years, the Food Safety Network (FSN) operated at the University of Guelph in Guelph, Ontario, Canada under the direction of author Powell providing research, commentary, policy evaluation and public information on food safety issues from farm to fork. FSN began in 1995 with the creation and distribution of an electronic news service (19) and expanded to provide four daily electronic listservs, on-line resources, fact sheets, media outreach and extension activities. In December 2002, a public information service component was added to facilitate responses to inquiries.

Social surveys of the Canadian public had indicated that people were concerned about and placed importance on food safety (8, 13). At the same time, published research indicated a need to address the concerns of consumers and front-line food safety professionals about foodborne illness and provide basic food safety information (3, 17, 21). The Canadian federal government and other organizations maintained Web sites with resources on broadly-focused topics such as safe food handling in the home. However, they lacked an interactive capacity to allow individuals to submit questions and be provided with timely, evidence-based answers to food safety questions of personal or professional concern. The national food safety information service was established at FSN to address this information gap. While the service had its mandate to proactively and reactively provide food safety information, it also created a unique opportunity to collect and evaluate data on the front-of-mind food safety concerns of its clients, to better understand and address information needs.

A national toll-free call center was the core activity of the information service around which other, complementary activities were carried out, such as responding to e-mailed inquiries and contributing consumer-oriented information to the FSN Web site. This paper focuses primarily on the call center component during the first three years of its operation. It describes the core functions and staff skills that enabled the daily operations of the call center and facilitated responses to inquiries in a timely manner, offering a blueprint for other organizations seeking to engage the public through an information service.

It also describes how data were collected to determine the characteristics of the call center's clients and their food safety information needs in order to identify gaps in information provision and opportunities to develop or improve resources.

Establishing the information service

Information services with call center capacities have been established for various public health functions around the world. For example, the United Kingdom introduced National Health Service Direct (NHS Direct) in 1997 to provide 24-hour public access to nurse advisors via telephone (29). Similar telenursing services have been established in Sweden (9), Australia and New Zealand (23) and Canada (4). In Finland, the public can phone a national drug information center to speak with a pharmacist about medication-related concerns (26). In the United States, the Department of Agriculture (USDA) has operated the Meat and Poultry Hotline since 1985 (30); the hotline is staffed by food safety specialists who answer questions about safe storage, handling, and preparation of meat and poultry products and about the prevention of foodborne illness (27).

Taylor and Bain (25) identify three characteristics that are common to call centers:

- there are dedicated employees who focus entirely on serving customers;
- employees use telephones and computers simultaneously; and
- calls are processed and controlled by an automatic distribution system.

There may be the perception that call centers tend to be "mass production" entities where employees lack skill, have little knowledge and undertake repetitious and monotonous work (6). However, as illustrated in the aforementioned examples, call centers that are staffed by professionals with extensive service knowledge and skills tailored to the needs of the customer can play an important role in serving and addressing very specific concerns (10).

In 2002, an opportunity arose for FSN to develop a national food safety information service for Canada. An experienced team of professionals was assembled from staff who had recently completed

a pilot project that offered a toll-free information service on food biotechnology topics. All members of the team had university degrees in fields related to food and health. The team had been trained in telephone and risk communication skills, since call center workers lack the advantage of face-to-face contact when interacting with the client. Published research has identified this lack of direct contact as a particularly difficult challenge in responding to questions about health-related issues (15, 18). Purc-Stephenson and Trasher (20) noted that the ability to facilitate conversation and listen to what was unsaid — a skill described as active listening — helped telenurses collect the information they required for telephone triage and advice. Active listening skills are generally gained through experience and reflection (1). Reflection can also enable call center workers in the development of empathy and sensitivity, which are important in helping and advising clients (11). Research from telehealth experiences indicates that it takes about 50 calls for a new staff member to feel relaxed and competent (28).

MATERIALS AND METHODS

Operations and infrastructure

An approximate full time equivalent (FTE) of 2.5 staff, provided through one full-time and up to four part-time staff, was dedicated to the FSN information service. The service functioned as an integral part of FSN, which allowed the staff to gain knowledge through interaction with other FSN members and assist with other FSN activities when time allowed. This integration also afforded flexibility to adjust to fluctuations in call center activity, providing information service staff access to additional resources to assist with calls when needed. The daily operations and supporting infrastructure for the service were funded through annual contributions from public, private and foundation sources. As financial support for marketing was not secured, promotion of the information service was carried out through other FSN activities, including the listservs and Web site, promotional giveaways (refrigerator magnets) and word of mouth.

Basic call center telephone functionality was provided for the information service through a multi-line phone protocol

TABLE 1. Call center protocols for addressing questions from callers

| Action | Description and Conditions |
|------------------------|---|
| (i) Answer | <ul style="list-style-type: none"> Respond to all general questions relating to food safety issues. Respond to questions about generic issues/products. Evidence-based, balanced⁴ information used to answer callers' questions. Information used to answer questions will be stored in a dedicated electronic database. If unsure of the answer, arrange to phone the caller back at the earliest convenient time, to allow staff time to research the issue. |
| (ii) Answer + Referral | <ul style="list-style-type: none"> Provide general information on the issue(s) in question. Refer caller to a previously established contact, such as a food/health professional, commodity group, manufacturer, etc., if questions asked are beyond the scope described in (i), above. If no appropriate contact is available for referral of the caller, arrangements will be made to phone the caller back at the earliest convenient time, so that staff may have the opportunity to locate/establish an appropriate contact for referring the caller. |

⁴Balanced: knowing all sides of the issue, and not offering personal opinions

system already available at the University of Guelph. Incoming phone calls on the toll-free phone line were answered directly by staff during weekday business hours. After-hours calls were forwarded to a voice mailbox and the calls returned within one business day. Phone messages could also be retrieved remotely from the mailbox, so that the incoming calls could easily be monitored and returned outside of regular business hours, particularly during times of foodborne illness outbreaks and other emerging issues.

Although a disclaimer¹ was read at the beginning of each call, staff were dedicated to providing responses to inquiries that were reliable and relevant. Information service staff responded directly to questions related to food safety and referred callers with inquiries on other topics, such as nutrition, to other information sources (Table 1). When researching food safety topics and responding to inquiries, staff sought out primary resources and evidence-based materials, such as peer-reviewed scientific literature and legislative/regulatory text on government Web sites. Staff also used information from federal and provincial regulatory agencies, international organizations including

the World Health Organization and the Food and Agriculture Organization of the United Nations, academia and recognized experts in the field, as well as other sources as appropriate. Information was identified and accessed through the use of on-line search engines and databases, Web sites, the University of Guelph library and FSN in-house hard copy resource files. In addition, information service staff monitored emerging research and public discourse through the FSN daily listservs that gathered information from journalistic and scientific sources around the world.

Data collection and analysis

Call center activities were supported by an electronic database first created in MySQL (Version 3.23, MySQLAB, www.mysql.com/) by a third-party custom software designer and subsequently migrated to a PHP platform (Version 5.0, The PHP group, www.php.net/) in 2004. Data entry was carried out through a user-friendly interface that employed a mix of multiple-choice lists, drop-down menus and text boxes. Each staff member was assigned a unique log-in, so that data associated with an individual phone call was linked to the staff member who entered the data. As a

staff member logged in at the beginning of each call, the date and start time were automatically recorded. Using a series of tabulated input screens, information about the call, the presenting question asked, additional topics discussed, the tone of the conversation (positive, negative or neutral) and demographic information about the caller (for example, gender and province of caller) were recorded. Callers were also asked how they had learned of the information service and whether they had been referred from another organization. Callers were not required to provide any personal or identifying information, and contact information was collected only when the staff member arranged a follow-up call, or the caller requested that information be sent to him or her by mail or e-mail. When entering a question, the staff member assigned the question to one of 22 food safety themes, ranging from agriculture to food preparation, that had been determined in consultation with staff when the database was created. Previously entered food safety questions and corresponding answers could be searched by theme or keyword from the "Question" input screen and then selected for use in the current call, rather than

¹Disclaimer: We strive to make the information provided helpful and accurate, but make no representation regarding same, and disclaim liability arising out of errors or omissions, or use or non-use of, such information.

TABLE 2. Sources: Where callers obtained the FSN toll-free number, expressed as a percentage of the total number of calls

| Source | 2003 | 2004 | 2005 | Three-year Average |
|---------------------------|------|------|------|--------------------|
| Government | 13.9 | 21.2 | 20.5 | 18.0 |
| Food/health professionals | 2.0 | 25.4 | 27.1 | 19.6 |
| Repeat callers | 3.7 | 8.9 | 13.4 | 8.0 |
| Media | 17.4 | 0.5 | 0.0 | 7.4 |
| FSN Web site | 4.4 | 5.5 | 7.0 | 5.4 |
| Other sources | 2.0 | 2.4 | 2.3 | 2.2 |
| Unknown | 21.2 | 23.5 | 31.5 | 24.7 |

entering a new question/answer combination. Selecting “End Call” recorded the termination time of the call and closed all data entry screens associated with that call. Administrative functions allowed the database information associated with each call to be reopened if arrangements were made to phone the caller back, or edited if there had been errors or omissions in the original entry.

Data were collected for 36 consecutive months, from January 2003 through December 2005. Through a function of the database interface, monthly and annual reports were generated that provided simple descriptive statistical analysis, such as means, rankings and total numbers, as appropriate for the various types of data collected.

RESULTS

The call center received 1,574 calls in 2003, 1,168 calls in 2004 and 1,022 calls in 2005. French was the language of choice in about one per cent of the calls; English was used in the remainder of the calls. In general, more calls were received at the beginning of the week. The fewest calls were received consistently on Fridays. More than half of the calls in all three years were 2 to 5 minutes in length; less than 10 per cent lasted for 10 minutes or more. The call center received an average of 104.5 phone calls per month, although the number of calls spiked to 421 and 322 in September and October of 2003, respectively, because of the unexpected broadcast of the call center's toll-free number by media in the province of Nova Scotia following Hurricane Juan. Callers obtained the call

center's contact information from a variety of sources, including government, food and health professionals, the media (radio, television, magazines and newspapers) and the FSN Web site (Table 2).

The other statistics generated as part of the call center reports were used to determine who contacted the call center and to understand callers' food safety information needs. More than 80 percent of the people who phoned the call center were classified as consumers, as they were calling about food safety topics of personal, rather than professional, interest. Other top sectors included food and health professionals (for example, dietitians), industry (for example, food processing companies), media (for resources or to request interviews), and government personnel (Table 3). Callers were predominately female, averaging 79 per cent of the callers over the three years; this was not unexpected since, the moral responsibility for food, health and well-being of the family rests primarily with mothers in Canadian culture (22). The tone of the conversations was almost exclusively positive, with very few callers phoning to express anger or frustration.

Of the 22 possible themes of presenting questions, six were most prevalent: food storage, handling and preparation, specific product or brand, preservation, non-food safety topics and emerging issues (Table 4). Food storage was the most common theme across all three years. Questions about preservation frequently focused on home canning and freezing, and so tended to trend higher during harvest times, in the late summer and early autumn months. Non-food safety topics, those that were related to food and health but not to food

safety, were redirected to an appropriate contact as outlined in Table 1. Examples of questions are provided in Table 4.

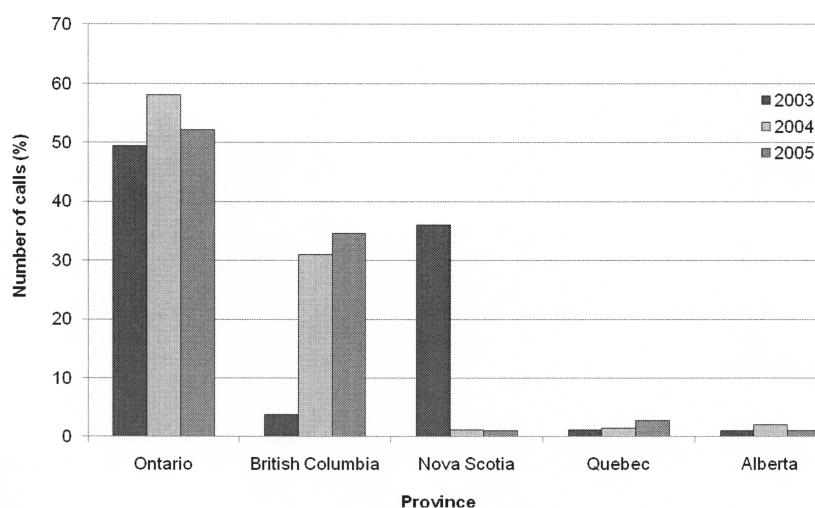
Presenting questions about emerging issues often reflected food safety stories reported in the media, but the number of calls and types of questions associated with a news story varied. For example, when the first case of bovine spongiform encephalopathy (BSE) was reported in a Canadian-born cow in May 2003², 13 of 14 presenting questions classified as emerging issues that month were on a range of BSE-related concerns. However, when the second case of BSE in Canada was reported in a dairy cow on December 30, 2004, only one caller phoned with a related question. Other media reports were associated with more prolonged periods in which related questions were received by the call center. For example, following news coverage of a study on the level of toxins in farmed salmon compared to wild salmon published in the journal *Science* on January 9, 2004 (12), questions related to this topic were received from January through August. At times, media reports of food safety issues led to calls from consumers who wanted further clarification. For example, on November 25, 2005, the Canadian Food Inspection Agency issued a recall of mung bean sprouts that were eventually associated with 650 cases of salmonellosis, but only two calls were received by the call center, including: *Are green beans okay?*

Following an initial presenting question, callers often asked additional questions and raised other topics of interest or concern. Top-ranked additional (secondary) topics of discussion were agriculture, regulatory issues, safety and health.

² Completed investigations of BSE in Canadian cattle are available on the Web site of the Canadian Food Inspection Agency (<http://www.inspection.gc.ca>).

TABLE 3. Caller profiles, expressed as a percentage of the total number of calls

| Caller Profile | 2003 | 2004 | 2005 | Three-year Average |
|---------------------------|------|------|------|--------------------|
| Consumers | 80.5 | 80.9 | 80.4 | 80.6 |
| Food/health professionals | 3.7 | 5.7 | 4.0 | 4.5 |
| Industry | 3.4 | 2.0 | 3.7 | 3.0 |
| Media | 2.9 | 2.5 | 1.8 | 2.4 |
| Government | 2.4 | 1.9 | 1.5 | 1.9 |
| Educators and students | 1.4 | 1.8 | 0.9 | 1.4 |
| Producers | 0.4 | 0.2 | 0.5 | 0.4 |
| Retail organizations | 0.8 | 0.9 | 0.5 | 0.7 |
| Other | 4.6 | 4.2 | 6.8 | 5.2 |

FIGURE 1. The five most prevalent Canadian provinces from which calls originated.

DISCUSSION

Although the majority of callers were classified as consumers, there were many others whose information needs were served by the FSN call center. Dietitians and other food and health professionals constituted 4.5 per cent of the call center's clients. In addition, close to one-fifth of callers were referred to the call center by food and health professionals. Hundreds of personnel from industry, media and government — organizations that may be typically considered as public information providers — contacted the call center for food safety information as well.

The sources from which callers learned of the FSN information service changed over the course of the three years. In 2003, more callers indicated they had obtained the toll-free number from media, including the media promotion following Hurricane Juan. In October 2003, British Columbia's Dial-A-Dietitian, a toll-free provincial nutrition information service, began to refer callers with food safety questions to the FSN call center; this contributed to the marked increase in referrals from food and health professionals in 2004 and 2005 (Table 2) and the concomitant increase in number of calls originating

from British Columbia (Fig. 1). There was an increase in the number of repeat callers over the years. Since promotion of the call center was not extensive, the majority of calls originated from province of Ontario, where FSN was located.

The food safety questions posed by callers varied widely in terms of the issue of concern raised and its degree of complexity. For example, a seemingly simple question about how to thaw a turkey can yield a variety of answers that may be confusing to a consumer trying to determine appropriate food safety practices. Lacroix et al. (16) reviewed both consumer publications from food safety advisory groups and the scientific literature, and found not only conflicting recommendations for thawing turkey but caveats attached to the various thawing methods as well. Anecdotally, call center clients were satisfied with receiving answers with caveats in response to their questions, since the staff member was able to explain how their specific circumstance would be affected by the caveat.

The motivation for callers to phone for food safety information also varied widely. In some cases, a caller's concern about the food they were about to prepare or eat had prompted them to call; there may have been something about the smell, appearance or other physical attribute that seemed unusual. In other cases, it was a concern raised by a media story that prompted the caller to phone. They may have been encouraged to call by a family member — spouse, parent, sibling or son/daughter — who had raised a concern. Some of the callers had been planning a task they carried out only occasionally, such as

TABLE 4. Six most prevalent themes of presenting questions over the three years

| Question Theme | Total Number of Calls Received | Examples of Questions |
|------------------------|--------------------------------|--|
| Food Storage | 1,396 | <ul style="list-style-type: none"> • There was a power outage / blackout and the food in the refrigerator was above 4°C for more than 2 hours. What can I keep? • Is it safe to consume canned goods that have frozen? • Can plastic margarine containers be used in freezing? Does the plastic leach into food? • Is opened commercial mayonnaise safe when stored at room temperature? |
| Handling / Preparation | 485 | <ul style="list-style-type: none"> • How should I thaw my turkey? • Is it safe to give a 7 month old infant homemade, unpasteurized carrot juice? I spoke with a dietitian who said that no unpasteurized juices should be given. • I received a whole fish from the food bank but the skin is slimy. Is it safe? |
| Specific Food or Brand | 318 | <ul style="list-style-type: none"> • What is the safety of game meat (deer, moose), particularly the liver? • Has there been research done in Canada on resveratrol, commercial name Protykin? • Do the red potatoes in the grocery store have a red dye added to them? |
| Preservation | 198 | <ul style="list-style-type: none"> • Is it safe to consume a home-canned meat and vegetable mixture that was processed in a boiling water canner? • Can I alter recipes for making jams? • Why did the pickled garlic turn blue? Is it still safe to eat? |
| Non-Food Safety | 135 | <ul style="list-style-type: none"> • I made buckwheat wax into candles and they won't burn. Why? • I am a diabetic and I need some information on carbohydrates and reading labels. • Can I substitute all purpose flour for cake and pastry flour in a recipe? |
| Emerging Issues | 73 | <ul style="list-style-type: none"> • Should I worry that the beef in my fridge is contaminated with mad cow disease? • What can you tell me about the study that says farmed salmon contains more toxins than wild salmon? • Do you have any information available on malachite green? |

cooking a turkey or canning tomatoes, and were concerned about ensuring that they did it correctly. Callers also phoned to ask about urban legends; for example:

A friend of a friend of mine told me that she had dropped some white flour on her jeans and that the flour had bleached them. This makes me worried about eating bleached white flour. Do you have any information?

Presenting questions about emerging issues often reflected food safety stories reported in the media, but it was not possible for information service staff to anticipate the number of calls or types of questions that a news story would prompt. As the volume of calls and topics of questions change, sometimes rapidly, a call center's operating capacity must adapt quickly, while staff must be prepared to address the evolving needs of those who call. Betts et al. (2) noted that call centers

must maintain short response times to client inquiries despite the large fluctuations in demand that they may experience over relatively short periods of time. This places great emphasis on capacity management practices within call center operations. For the FSN call center, integration with a larger organization was very beneficial in this regard. During periods of high demand, additional resources were immediately accessible. The experience of the FSN information service following

Hurricane Juan illustrates why a nimble organizational structure and resourceful staff are essential in a rapidly changing situation in order to ensure that clients' needs continue to be met. When the hurricane made landfall in the Halifax region of Nova Scotia on September 29, 2003, causing power outages across the region, the FSN call center received about 300 phone inquiries about hurricane-related food safety issues in the two-day period of September 29–30. The sudden increase in calls demonstrates the speed at which a crisis situation can provoke public concern and the need for information providers to anticipate and plan for sudden surges in demand in order to meet the needs of their clients as well as possible. Since the FSN information service employed several part-time staff, work schedules could be easily and quickly adjusted to accommodate extended operating hours, including evenings and weekends. To address the sudden influx of calls, information service staff also drew on the resources in other areas of FSN to help with the increased workload. A fact sheet and key messages on food safety during power outages, prepared when Ontario was affected by the extensive power blackout in North America on August 14, 2003³, were available, saving valuable staff time on information research and development. In the days following the hurricane, the number of questions about what perishable food to discard decreased, while questions requiring referrals increased, such as when garbage collection would resume (so that people could dispose of their discarded food) and requests for support from those on fixed or limited incomes who could not afford to replace their discarded food. Thus, as the situation evolved, staff ensured that resource materials were kept up to date, and new information and contacts were identified as needed.

The broad range of topics and variations in types and depth of information sought by callers often required staff to research the topic, evaluate the available information and synthesize a response tailored to the needs of the individual. Critical evaluation of available information was a vital staff skill, in order to differentiate between evidence-based information, traditional practice recommendations (not always evidence-based) and personal opinion. Evaluation should include the credentials of the author(s), the date of publication, the rigor of the research on which the information was based, and

the type of publication in which the information was published — for example, peer-reviewed academic journal versus personal Web site (7). When responding to inquiries, staff should convey to the client the strength of evidence on which the response is based as one of the caveats when providing the information.

This type of call center work is complex and knowledge intensive. Staff had varying employment experiences and academic training prior to joining the information service, and often drew on the expertise of each other when preparing a response on a complex food safety issue. Although the information service staff worked together as a team, it was imperative that each staff member be able to work independently, assess and make decisions about a caller's information needs and prepare appropriate responses. Food safety information accessible to staff through the call center database could not replace the knowledge and competence of a staff member but was complementary, and supported the response preparation and dissemination process.

Callers may present with many challenges such as homelessness, mental health issues, speech impediments and language barriers. One caller phoned the call center regularly, mainly because he lived alone and was lonely. Asking open questions and active listening were critical tools that staff members used to establish credibility and rapport with callers and to effectively discern their information needs. Risk communication research points to trust as a key principle in effective risk communication. The level of trust that an individual has in the source of information affects their acceptance of the message about food safety (14). Listening and caring are also key components of risk communication; information providers must listen to, as well as acknowledge and respect, the fears, anxieties and uncertainties of others. When people have concerns, they want to know that you care before they will be receptive to your message (5).

The results of this research were not representative of the food safety needs of the Canadian population, as the callers constituted a self-selected group of individuals who knew about or were referred to the service. However, the collection of call center data provided a means to gather information on issues of public concern and the people who actively seek information on those issues. The data analysis, conducted on a monthly and annual

basis, was used to inform activities of the information service and other FSN activities, such as the development of Web site materials and identifying opportunities for further research. The topics of fact sheets (two-page summaries of information on food safety issues, written in plain language and posted to the FSN Web site for public consumption) were often derived from issues raised by callers. Using evidence-based information and framed in a question-and-answer format, fact sheets were prepared on topics such as food safety during power outages, sprouts, food labels, "best before" dates, raw milk, animal cloning and Mad Cow Disease (BSE). Also, in recognition of the increasing use of the internet by people searching for information and the limitations of a national telephone service, an administrative function was added in 2004 that allowed the selection and direct posting of questions and answers from the call center database to the public information section of the FSN Web site. In turn, people phoned the call center for additional information on a topic they had read about on the FSN Web site; in 2005, seven per cent of callers indicated that they had obtained the call center's phone number from the FSN Web site. Over time, it also became evident that some segments of the public had unique food safety concerns and were appreciative of information that was tailored to address these concerns. For example, guidance for pregnant women on topics such as listeriosis and mercury in fish were included in the corresponding fact sheets and entered into the call center database so that staff could refer to the information during a phone call. Staff also undertook research projects to gain a better understanding of information needs with which they were less familiar, such as the food safety issues of people facing food insecurity and food bank users.

By tracking who phoned the call center and how they had learned of the FSN information service, the role of other food and health professionals in communicating information to the public — and the benefit of establishing contacts with these communicators — became apparent. For example, in an informal arrangement with a home canning and food preservation hotline, FSN staff could refer callers requesting home canning recipes to the hotline, while hotline callers with food safety questions were referred to FSN. A working relationship was also created with a group that offered advice on food handling and preparation in the home

³ Information on the blackout is available in the report by the U.S.–Canada Power System Outage Task Force (<https://reports.energy.gov/>).

through a toll-free line to consumers in the province of Alberta, to share information, and to extend business hours and offer live direct response to callers who phoned later in the day, particularly from western parts of Canada. The conviction that sharing knowledge and experiences about public information provision with other food and health communicators would help to improve communication across related food and health disciplines eventually led FSN to hold a communicators' conference and to launch an on-line e-community to facilitate the sharing of research and other information among food safety practitioners in 2006.

Ultimately, providing an information service requires preparation for the unexpected. The volume of calls may increase dramatically without warning. Media reports may prompt callers to phone, or not. Seemingly simple questions can lead to complex responses, or evidence-based information to offer in response to a question may not be available. Regardless of the challenges, call center clients expect — and deserve — to have their questions answered as quickly, accurately and completely as possible.

CONCLUSIONS

This project provides a framework and basic operations guide for engaging the public through a call center. A call center may provide a medium through which to disseminate information, listen to and advise callers, or refer callers to other organizations for further assistance. There are common elements to a call center: human and information resources, telephone technology and financial support for operations (24). However, the knowledge and skills of call center staff and the types of services that they offer are the primary differentiating factors between 'mass production' types of hotlines and professional information service providers. In the case of the FSN information service, the public was provided access to professionals in food and health who were assembled to address a gap in information provision on food safety issues.

Standardized operating procedures, such as inquiry response protocols, helped to define the responsibilities of the information service staff and the scope of the topics they are required to address. Tracking who uses a public information service and their information needs through data collection can provide insights on the clients who use the service and feedback

to staff on the value of their work. Criteria of interest in this research were call characteristics, demographic data, and the theme of the primary (presenting) question. This information, stored in a database along with past questions and answers, helped staff to respond quickly and consistently to incoming inquiries.

By collecting data on client information needs, an information service can serve as a research tool. Questions posed by clients can reveal gaps in the information available, areas that need improvement, and opportunities to develop new resource materials and to link with other information providers to better serve clients' needs. In the FSN information service, staff learned that food safety concerns are not simple; they are complex and influenced by the beliefs, culture and practices of the individual.

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