Use of Interactive Voice Response Technology by Poison Centers during the H1N1 Outbreak

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Abbreviations:
TPCN = Texas Poison Center Network
IVR = interactive voice response
DSHS = Department of State Health Services
CSEC = Commission on State Emergency Communications

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Abstract

Introduction: Interactive voice response (IVR) technology may facilitate poison centers to handle increased call volumes that may occur during public health emergencies. On 28 April 2009, the Texas Poison Center Network (TPCN) added a H1N1 message in English and Spanish to its IVR system. This study tested whether IVR technology could be used to assist Texas poison centers during the H1N1 outbreak.

Methods: The distribution of callers who accessed the H1N1 message during 29 April–31 May 2009 was determined with respect to message language, subsequent caller action, and date of the call.

Results: The H1N1 message was accessed by 1,142 callers, of whom, 92.9% listened to the message in English, and 7.1% listened to the message in Spanish. After listening to the message, 33.3% hung up while 66.7% spoke to a poison center agent. The number of callers who accessed the message was highest on 29 April 2009 and then declined.

Conclusions: Interactive voice response technology can be used to assist poison centers to provide information and handle calls from the public during a public health emergency.

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Introduction

Interactive voice response (IVR) technology allows callers to retrieve information via touch-tone telephone, thereby reducing the need to speak with staff. Some US poison centers have utilized this technology to reduce the amount of time that poison center staff spend managing drug identifications.[1–4] Interactive voice response also may be used to assist poison centers handle the increased call volume that may occur during public health emergencies.[5] Factors that may affect the utility of automated answering systems include accessibility to poison center staff, expedient triage of emergency calls, and the ability to handle non-English-speaking callers.[6]

The Texas Poison Center Network (TPCN) consists of six poison centers that together service the entire state, a population of >20 million. The six Texas poison centers use the same telecommunications system to receive calls via a toll-free 1-800-number (1-800-222-1222). The TPCN telecommunications system includes IVR technology where callers first hear an automated message with options on how they can direct their call. The message is provided in both English and Spanish. Typically, the only option available is the selection of language. The IVR technology allows the message to be modified to provide callers with additional options and information. After listening to the message, the callers may elect to speak to poison center agents. These agents are pharmacists, nurses, or paramedics who are trained to handle potentially adverse exposures to a variety of substances. Most callers are able to speak with a poison center agent within 25 seconds.

On 24 April 2009, the Centers for Disease Control and Prevention and the media reported an outbreak of a novel swine influenza A (H1N1) virus infection in humans.[7–9] Anticipating that the TPCN might receive H1N1-related calls, on 27 April, a televideo conference was held involving the managers from the six Texas

poison centers and representatives from the Department of State Health Services (DSHS) and the Commission on State Emergency Communications (CSEC), the two state agencies that administer and fund the TPCN. During the meeting, it was decided that the TPCN-IVR system should be modified to provide an option for information on H1N1 to interested callers. A message consistent with the one put forth by state and federal health agencies was developed, and on 28 April, it was added to the IVR system. After the initial greeting, callers were presented with an option to listen to the H1N1 information. The callers could access the H1N1 message and either hang up or choose to speak with an agent. The message was provided both in English and Spanish. The message was as follows:

The following brief message will tell you what the influenza A (H1N1) or swine flu is, how it is spread, what the symptoms are, how to protect yourself, and what to do if you are sick. If you would like to end this message at any time and speak to a health care professional, please press 1. This flu is a respiratory virus. It was originally called swine flu because it had genes like those found in a flu virus that normally occurs in pigs. Further study has now showed that this current H1N1 flu also has genes found in flu viruses associated with birds and humans. This current H1N1 flu can be spread from person to person. You cannot get this flu from eating or preparing pork. This flu is thought to spread in the same way that regular flu is spread, which is through coughing or sneezing of people with the virus. It can be spread by touching something with flu viruses on it, like a tissue or a door knob, and then touching your mouth, eyes, or nose. You can protect yourself from the flu by washing your hands frequently. You should also avoid touching your eyes, nose, or mouth. Avoid getting close to people who are sick. Also, try to get plenty of sleep, exercise regularly, manage stress, drink plenty of fluids, and eat nutritious foods. Symptoms of the flu include fever, runny nose, cough, sore throat, body aches, headache, chills, and fatigue. Some people may also have diarrhea and vomiting. People may have only 1 or 2 symptoms or they may have many. People can infect others with the flu even before they show symptoms and they remain contagious for up to seven or more days after they become sick. If you have these symptoms and feel that you may have the H1N1 or swine flu, please press 1 to speak to a medical professional now. If you develop these symptoms at any other time, call your doctor. Your doctor can decide whether you need to be seen and can decide if you should be tested for H1N1 flu. Your doctor can also prescribe medications that can treat the flu. If you are sick, try to stay home as much as possible. Avoid being around other people because you can pass the illness to others. Cover your mouth and nose with a tissue when you cough or sneeze and then throw the tissue away. Then wash your hands with soap and water or use hand sanitizer. To determine if your local school district is closed or will be closing, please contact them directly. If you would like more information, you may go to the Texas Department of State Health Services Website at: www.texasflu.org or call 1-888-777-5320. Or, if you would like to speak to a healthcare professional now, press 1.

The DSHS also provided the poison centers with news releases and other materials and Website-links that contained information on what the agents should tell callers. The management of each poison center was responsible for disseminating this information to its agents.

The intent of this report was to evaluate the usefulness of the H1N1 IVR message by investigating the pattern of callers who accessed the message.

Methods

This retrospective study used data from two sources. Data from the primary data source, the IVR system, was provided by the CSEC. The secondary data source was the TPCN database, which is used to collect demographic and clinical information on all calls managed by agents; a record is entered into the TPCN database only when a caller speaks with an agent. One of the items entered into the TPCN database is the topic of or reason for the call.

The time period of interest was 29 April–31 May; 28 April was excluded because H1N1 message data for that date were not available. The distribution of H1N1 message calls were calculated with respect to the language selected and whether the caller hung up or chose to speak with an agent after listening to the call. The daily number of H1N1 IVR message calls and TPCN database H1N1-related records also were determined. No analyses of statistical significance were performed.

The DSHS Institutional Review Board considered this investigation exempt from review as it involves existing data, documents, and records and the subjects cannot be identified, directly or through identifiers linked to the subjects (§46.101(b)(4)).

Results

During 29 April–31 May, 1,142 callers accessed the H1N1 message; 380 (33.3%) callers accessed the IVR then hung up while 762 (66.7%) accessed the IVR then elected to speak to an agent. During the same time period, 161 H1N1-related calls were added to the TPCN database. Of the callers who accessed the H1N1 message, 1,061 (92.9%) listened to the message in English and 81 (7.1%) listened to the message in Spanish. Of the callers who accessed the message in English, 353 (33.3%) subsequently hung up without speaking to an agent; of the callers who accessed the message in Spanish, 27 (33.3%) subsequently hung up without speaking to an agent.

The number of H1N1 calls received by the TPCN during 24 April–31 May and the number of callers who accessed the IVR message during April 29–May 31 is in Figure 1. The TPCN had begun to receive H1N1-related calls on 24 April prior to the initiation of the H1N1 IVR message. The number of callers who accessed the H1N1 message was greatest on 29 April, the day after it was added to the IVR system, and declined over the next six days. On 05 May, there was a brief secondary peak in the number of callers who accessed the TPCN-IVR message.

Discussion

It has been suggested that poison centers may be able to use IVR technology to assist with calls during public health emergencies.[5] This study sought to demonstrate the utility of the IVR system used by Texas poison centers during the recent H1N1 outbreak.

The TPCN began to receive H1N1-related calls on 24 April, immediately after the H1N1 outbreak had been

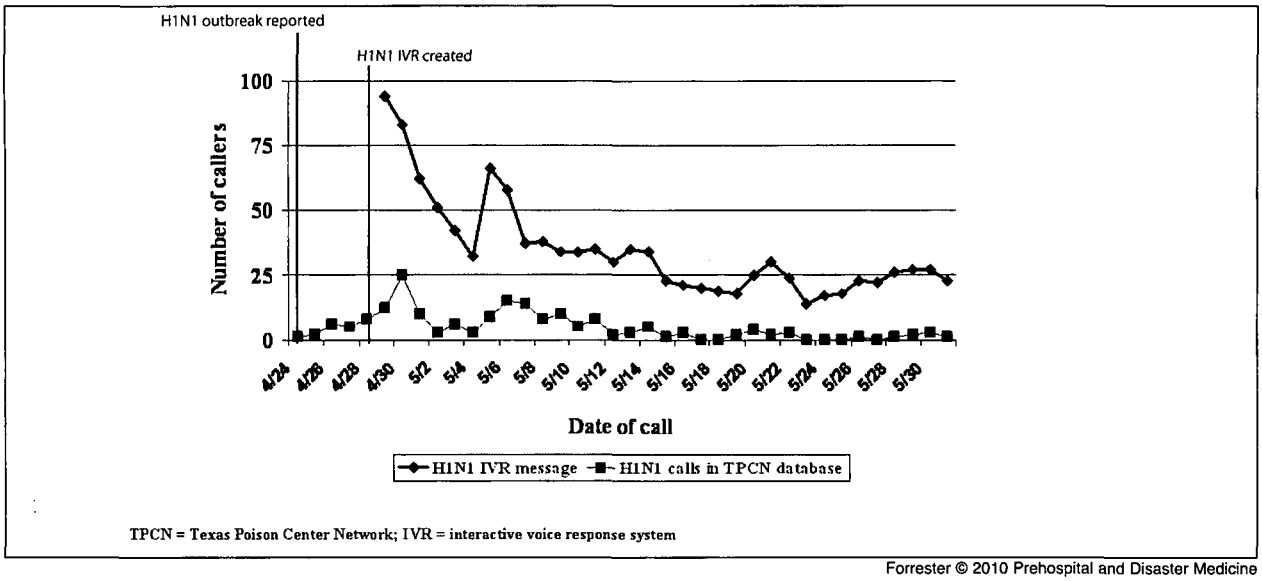

Figure 1—Callers accessing Texas Poison Center Network H1N1 message 24 April–31 May 2009

reported to the public. This is consistent with other studies that have reported that poison centers begin receiving calls either immediatley after an event has occurred or has been reported to the public.[10,11] During 24–28 April, prior to adding the H1N1-IVR message to the telecommunications system, the TPCN had received 22 H1N1-related calls.

On 28 April, four days after the initial media reports, the H1N1 message was added to the system; the availability of this information was not publicized. During the 33 days that the message was active, the numbers of callers who accessed it was highest on 29 April, near the start of the event. A secondary peak occurred on 05 May; this was likely due to referrals from the DSHS call center after-hours message. On 25 April, the DSHS set up a call center for people to call for information about H1N1; DSHS representatives were available from 07:00 to 19:00h. After 19:00h, an automated message instructed callers to call back during the hours of operation. On 05 May, the DSHS after-hours message was changed to add a referral to the TPCN for information. The four-day delay in activating the IVR message and the lack of public notification that the message was available likely affected the total number of calls received by the TPCN. Only those people who called the 1-800-number for the poison centers found out that the information was available through this source. Earlier activation and active promotion of the TPCN-IVR message likely would have resulted in a larger call volume. This is consistent with what was experienced by the DSHS call center, which during 27 April–30 April was receiving >1,000 calls per 12 hour shift; by 06 May, the number of calls had decreased to less than 20 per shift (personal communication; e-mail—DSHS Division of Prevention and Preparedness).

Of the 1,142 callers who accessed the H1N1-IVR message during the 33 days that it was active, 67% listened to the message and elected to speak with an agent. Since it is standard operating procedure for Texas Poison Center agents to record information on every call that they manage into the TPCN database, including the reasons for the call, one might conclude that the majority of the callers who listened to the message and then spoke with an agent should appear in the database. However, during the time that the message was active, only 161 calls had H1N1 listed as a reason for the call. It is possible that the majority of the callers who listened to the message before speaking with an agent called for reasons other than H1N1 and may have chosen to listen to the message either out of curiosity or by mistake. It is not possible at this time to verify this reason.

Another limitation is that it is not known whether the addition of the H1N1 message made it more difficult for individuals calling about exposures other than H1N1 to reach agents. However, the rate of abandoned calls (where the caller hung up before speaking to an agent) did not increase while the H1N1 IVR was in effect. Moreover, the kinds of questions the callers addressed to the agents are unknown.

Conclusions

Interactive Voice Response technology can be used to assist poison centers provide information and handle calls from the public during a public health emergency. The potential surge of calls that can occur during the first few days of an event supports the need to activate the IVR early and that the availability of the information should be made public. Procedures also should be in place so that poison centers quickly can coordinate with state and federal health agencies on the development of an appropriate message.

While the number of calls received by the poison centers during this event was not of sufficient magnitude to overload the system, a large number of people who listened to the message still elected to speak with an agent. Early activation and public notification could result in a larger call volume that could overload the system. Since overloading the system could affect the ability of the centers to provide essential services, continuity of operations plans should be developed to ensure that essential services continue to be provided even while responding to an emergency event. Poison centers typically handle many different types of calls, and prioritizing those calls during a public health emergency could help to ensure that high priority calls are handled appropriately. For instance, human exposure calls may be considered essential while pill identification calls may not. An IVR message could be used to refer callers with pill identification calls to their local pharmacy.

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Editorial Comments—Use of Interactive Voice Response Technology by Poison Centers during the H1N1 Outbreak

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The authors describe the proactive response of the Texas Poison Center Network to an anticipated increase in calls received during the onset of the novel H1N1 pandemic in the spring of 2009. Using interactive voice response technology, callers were given an option to hear pre-recorded risk communication information, either in English or Spanish, about H1N1 influenza. The information was developed and consistent with messages from the Texas State Health Department and federal health authorities. Although there were initial and secondary peaks, the network fielded an average of 35 H1N1-related calls/day during the 33 days the program was operational, and 2/3 of these requested to speak directly with a consultant. Nonetheless, that number did not interfere with the routine function of handling poison center calls.

The study raises some interesting considerations and principles for risk communication during a sustained communicable disease emergency. First, the public will access many different sources for guidance. During the spring of 2009, communities experienced increased numbers of calls to physicians, clinics, public health departments, and, as this report demonstrates, some resources that might not be thought of as customary points of contact: poison control centers. During the pandemic, health departments and schools/universities provided widely distributed H1N1 information via their Websites, and social networking media also were utilized in an attempt to reach all segments of the public. Websites provided algorithms for individual use in an attempt to help callers self-triage and make informed decisions concerning whether to stay home with analgesics, antipyretics, and hydration; to seek medical consultation at either an outpatient clinic; or, with more serious symptoms or a higher risk profile (e.g., pregnancy, very young children, co-morbidities), in an emergency department.

Second, there must be consistency and clarity of the information being provided. Different sources should not provide contradictory information, and guidance must be unambiguous and linguistically appropriate to reach the educational and language capabilities of the target population.

Third, risk communication must be timely and accessible. In the experience described here, the poison center network launched its program on 28 April 2009, but this availability was not initially publicized. Only if someone happened to call the toll-free number for the Texas Poison Center Network did s/he learn about the availability of the recorded message concerning H1N1. The use of this service was made more accessible one week later when the Department of State Health Services added a referral to the Poison Center number for after hours callers seeking H1N1 information. The management of information a public health emergency is a critical component of cooperative interagency management, and justifies activating a joint information center early and throughout the course of the emergency. In this way, relevant participating agencies can share messaging strategies, design and activate risk communication outreach programs, and engage local/regional media outlets in order to provide a cohesive set of messages via a wide array of technology.

In every crisis, the public and responders need accurate and consistent direction in order to mitigate adverse outcomes. The creative use of what might seem atypical but pre-existing networks such as the one described in this paper, broadens the risk communication possibilities.