Public Awareness Survey: the Maryland Poison Center and Mr. Yuk, 1981 and 1975

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Synopsis

A telephone survey of residents of metropolitan Baltimore was conducted in 1981 to assess awareness of the Maryland Poison Center and a program based on the Mr. Yuk poisoning warning symbol. The results of 280 telephone interviews are compared with a similar survey conducted 6 years earlier by the Maryland Poison Center.

When faced with a harmful exposure, the most common response in the 1981 survey (32.9 percent) was to call the poison center. That response was only the fourth most frequent answer (14.5 percent) in the 1975 survey. Calling a physician or taking the person to a physician was the most frequent response in 1975 (29.5 percent) but only the fourth most frequent in 1981 (15.0 percent).

Of the respondents who would call a poison center, 55.7 percent in the 1981 survey knew the center's telephone number or had ready access to it. Public awareness of Mr. Yuk remained at approximately 60 percent in both surveys. Persons familiar with the warning symbol in the latest survey were three times as likely to call the poison center as those who were not aware of it.

It is estimated that more than 3 million exposures to poisons occur annually in the United States (personal communication, Mark Fow, PhD, Food and Drug Administration, Division of Poison Control, 1982). Exposures to poisons occur by a variety of routes, including oral, topical, and inhalation, and may be accidental or intentional. In addition to morbidity, accidental poisonings result in approximately 5,000 deaths each year in the United States. (*1*).

When faced with exposure to poisons, people may follow a variety of courses of action. They may do nothing or administer a remedy at home. They may directly use the traditional health care system by calling or going to a physician's office or a hospital's emergency room, or they may alternatively contact a poison center. Poison centers have been established to answer questions involving poisoning from both the general public and health professionals. The centers provide immediate first aid instructions, make recommendations for further home treatment if appropriate, and refer patients to health care facilities when necessary.

During the fall of 1981 a telephone survey of residents of metropolitan Baltimore was conducted with the following objectives:

- to determine what action respondents would take if faced with a poisoning;
- to determine whether those who would call a poison center had ready access to its telephone number or, if not, how they would obtain it;
- to determine whether persons who would use the hospital for treatment in cases of poisoning had health insurance;
- to determine what proportion of those surveyed were familiar with the Mr. Yuk poison warning symbol and what proportion had seen a television commercial about the Maryland Poison Center; and
- to compare the results of this survey with a similar public awareness survey conducted 6 years earlier.

Methods

A structured interview form was patterned after one used in the survey completed in the fall of 1975, 8 months after the introduction of the Mr. Yuk program in Maryland (*2*). The 1981 survey asked additional questions to obtain information on health insurance coverage from respondents who indicated that they would use the emergency room in a case of poisoning. Residential telephone numbers were se-

Table 1. Action that would be taken after exposure to poison

Action	1981 first response[1]		1981 total responses[1]		1975 first response	
	Number	Percent	Number	Percent	Number	Percent
Call poison center[2]	92	32.9	101	29.5	29	14.5
Administer home remedy	57	20.4	68	19.9	48	24.0
Call or take person to hospital	48	17.1	71	20.8	33	16.5
Call or take person to physician[2]	42	15.0	57	16.7	59	29.5
Call ambulance	25	8.9	28	8.2	9	4.5
Do not know	10	3.6	11	3.2	11	5.5
Other	6	2.1	6	1.8	11	5.5
Total	280	100.0	342	100.1	200	100.0

[1] The difference between first responses and total responses for 1981 is not statistically significant ($P = 0.90$).

[2] Differences between 1981 and 1975 first responses were statistically significant at the $P < 0.001$ level.

lected randomly from the metropolitan Baltimore telephone directory through the use of a computerized random numbers generator. Unlisted phone numbers were not included. Surveyors were then recruited and trained to use the survey instrument.

Each surveyor was given a list of phone numbers and instructed to call them in the order listed. Surveyors identified themselves as calling from the University of Maryland. If the telephone was busy or was not answered, the interviewer was instructed to come back to it later and to continue until someone answered. Calls were made at various times of the day and various days of the week to maximize the chance of finding someone at home. The interview was conducted with an adult at the residence; additional demographic data on the respondents were not obtained. Responses to questions other than those that could be answered yes or no were recorded verbatim. Six interviewers participated in the study.

Results

A total of 397 residential telephone numbers were used to complete the survey. Of these, 73 had been disconnected, had been changed to an unpublished number, or were not answered after repeated calls. Of the 324 telephones that were answered, 280 respondents (86.4 percent) agreed to participate, and the remainder (13.6 percent) refused. The overall response rate was 70.0 percent (280 of 397), though some respondents did not answer all questions.

After agreeing to participate in the survey, respondents were asked "If you or someone in your family used or swallowed a drug or product in a way you thought would be harmful, what would you do?" In 59 responses (21 percent), the answer given included more than one action, such as "Give a home remedy and then call my doctor." Of the 59 responses with multiple actions, there were 2 actions in 54 responses and 3 actions in 5 responses. The first response given is compared with the total of all responses in table 1. The chi square test revealed that a significant difference did not exist between the first and total response groups in 1981 ($P = 0.90$). Based on this finding, further analyses were only made on the first responses. A statistically significant difference was seen between the 1975 and 1981 first responses ($P < 0.001$). Table 1 also gives the first responses from the 1975 survey for comparison purposes.

The largest percentile changes in the two surveys occurred in the "Call poison center" and "Call or take [the person] to physician" categories. The proportion that would call a poison center was approximately twice as high in 1981 as it was in 1975, and the proportion that would call or take the person to a physician in 1981 was approximately half the 1975 figures. The chi square test indicated that the difference between these figures for 1975 and 1981 was statistically significant ($P < 0.001$). Further analysis revealed that for responses to all questions only differences in the "Call a poison center" and "Call or take [the person] to physician" categories were significant at the $P < 0.001$ level. The Yates correction for continuity was used for this and subsequent 2×2 comparisons.

Respondents who would call the poison center were queried where they would obtain its telephone number. As table 2 indicates, more than half of the respondents had the poison center telephone number immediately available to them. Many persons had either a Mr. Yuk sticker or a Maryland Poison Center telephone sticker, both of which list the

Table 2. How respondents would obtain telephone number of the poison center, 1981 and 1975[1]

Method	Percent	
	1981[2]	1975[2]
Know telephone number[3]	55.7	29.2
Telephone book	20.4	29.2
Call operator	19.3	37.5
Other	4.5	4.2

[1] A statistically significant difference was not observed between the 1975 and 1981 responses ($P > 0.10$).
[2] Number of respondents for 1981 was 88 and for 1975 was 24.
[3] Includes persons who had the center's telephone number on their telephone or in their personal directory.

Table 3. Numbers of respondents aware of Mr. Yuk and actions they would take in cases of poisoning

Action	Aware of Mr. Yuk		
	Yes[1]	No[1]	Total
Call poison center	74	18	92
Administer home remedy	27	30	57
Call or take person to hospital	22	25	47
Call or take person to physician	20	20	40
Call ambulance	9	15	24
Do not know	4	6	10
Other	2	4	6
Total	158	118	276

[1] Statistically significant at the $P < 0.001$ level.

center's telephone number. All other persons would probably have obtained the center's number too, because it is listed in both the emergency section and white pages of all telephone books in Maryland, and it is in the emergency numbers listing of all telephone operators. A statistically significant difference between the 1975 and 1981 responses to this question was not observed with the chi square test.

The Mr. Yuk symbol was introduced in Maryland during 1975, approximately 8 months before the last public awareness survey. In both the 1975 and 1981 surveys, respondents were asked whether they knew who Mr. Yuk was and what he was for. If respondents claimed to know who Mr. Yuk was but gave an incorrect description, they were scored as not being aware. In 1981, 57.2 percent of those queried were aware of Mr. Yuk, compared with 65.2 percent in 1975. However, the apparent decrease in awareness is not significant ($P = 0.18$), suggesting that public awareness did not change between 1975 and 1981. Because public awareness of the Mr. Yuk symbol was presumably zero before its introduction in Maryland in early 1975, these data suggest that public awareness peaked at approximately 60 percent within 8 months of the symbol's introduction and did not significantly change over the next 6 years.

It is, however, possible that a more intensive effort to increase public awareness might have been more successful. Because public service spots on television are a major part of the public awareness program of the Maryland Poison Center, the absence of an increase in public awareness may be related to a decrease in viewership of the center's television spots. In the 1981 survey, only 46.7 percent of the respondents had seen one of the center's television spots, compared with 57.8 percent in the 1975 survey. The chi square test revealed that this decline was statistically significant at the $P < 0.05$ level. This suggests that fewer people were being exposed to the center's spots than in 1975.

Because health insurance coverage may influence the likelihood of utilizing the emergency room for poisoning cases, information on health insurance was obtained from respondents who indicated they would use the emergency room as their first action. These data were not obtained from the other respondents. Sixty-one of the 66 respondents (92.4 percent) for whom the information was obtained had health insurance that would pay for the emergency room visit. Of those persons with health insurance, 40 out of 60 for whom information was available were covered by one company, Blue Cross-Blue Shield.

Table 3 cross-tabulates the action a person would take with his or her awareness of the Mr. Yuk symbol. The table can be examined from two viewpoints. The values in horizontal rows indicate awareness of Mr. Yuk by the types of action that would be taken in a case of poisoning, and the vertical values allow comparison of awareness between action groups. For example, persons who would call the poison center were approximately twice as likely to be aware of Mr. Yuk as those who would take other actions; 74 of 92 persons (80.4 percent) would call a poison center and 27 of 57 (47.4 percent) would administer a home remedy. Similarly, those persons who were aware of Mr. Yuk were three times as likely to call a poison center as those who were not aware (74 of 158 persons or 46.8 percent versus 18 of 118 persons or 15.3 percent). In the other action groups, higher proportions were unaware of Mr. Yuk than were aware. Overall, differences seen in this table were statistically significant according to the chi square test ($P < 0.001$).

Discussion

Haddon and Baker summarized strategies for preventing injuries that apply to a wide variety of situations, including poisoning (*3*). First, the highest priority should be given to those measures that reduce injury. Second, the strategies should address the "pre-event phase," the "event phase," and the "postevent phase." Third, preference should be given to passive measures, that is, measures that protect automatically, such as air bags in automobiles. Overall, the effectiveness of the measures in preventing injury should be emphasized, and a balanced approach using a combination of strategies should be considered.

Data collected in our survey reflect both the pre-event phase (preventing the exposure from occurring) and the postevent phase (providing appropriate care to minimize morbidity and mortality). This survey demonstrated that approximately 6 of every 10 respondents could appropriately describe Mr. Yuk and his purpose. In comparing the 1975 and 1981 surveys it appears that the general public learns about a new symbol such as Mr. Yuk rapidly and that with a continuing public education program the level of awareness stays the same. A more intensive program of public education would be expected to increase awareness.

Mr. Yuk was designed as a poison warning symbol for preschool children. However, the effectiveness of warning symbols as a poisoning deterrent to children has been questioned (*4,5*). Our survey demonstrated an indirect benefit of the symbol, because Mr. Yuk appears to increase awareness of the poison center's existence and telephone number. Persons who were aware of Mr. Yuk were far more likely to indicate that they would utilize the poison center than those who would not. This is not any unexpected finding, because promotion of both the poison center and Mr. Yuk are linked. However, it is difficult to evaluate whether increased awareness of Mr. Yuk increases utilization of the poison center or vice versa. The exact relationship between awareness of Mr. Yuk and actual calls to the poison center is unclear because the volume of calls to the center increased dramatically during the 6 years between surveys, while awareness of Mr. Yuk remained unchanged. It does, however, appear that a poison warning symbol such as Mr. Yuk can be learned and recognized by the majority of the population. Although designed primarily as a pre-event strategy, poison warning symbols may play a major role in the postevent phase.

The postevent phase of poisoning should counter the damage already done, prevent further damage from occurring, and rehabilitate the patient. There is a variety of responses to the exposure to a potentially toxic agent. The survey's question addressing what action would be taken was aimed at determining which of the choices a respondent would make. "Call a poison center" was the most common response in the 1981 survey and accounted for approximately one-third of all responses to the question. The percentage of respondents who gave this as their answer is more than double that in the prior survey.

As a result, this response moved from the fourth most common answer in 1975 to first in 1981. It is interesting that the 127 percent increase in the number of respondents who said they would call a poison center directly paralleled the 131 percent increase in exposure calls at the Maryland Poison Center from 1975 to 1981. This increase occurred when the population of the State of Maryland increased by approximately 2 percent and the population of children under age 5, those at highest risk of being poisoned, decreased by 12.8 percent. This is important evidence that what people said they would do in a poisoning emergency reflects what is actually occurring. While a significant increase in the "Call poison center" response and decrease in the "Call or take [person] to physician" response were noted, there was no difference in the "Call or take to hospital" category. This clearly indicates a need for additional public education emphasizing the importance of calling the poison center instead of calling or going to an emergency room.

Because 81.3 percent of all exposure calls the Maryland Poison Center received during 1981 did not require treatment outside the home, utilization of emergency service by consumers directly is inappropriate in the majority of cases. In addition to producing further overcrowding of emergency treatment facilities, inappropriate use of these services is quite costly. Because more than 90 percent of the patients who stated that they would utilize an emergency room directly as the primary source of care for poisoning had health insurance, it appears that there is not a financial incentive for them to do otherwise. In addition, it appears that the financial burden falls most heavily on the insurance companies directly and eventually on all persons who pay premiums. It seems reasonable that insurance companies should consider supporting poison centers as a mechanism for both preventing poisonings and lowering costs by keeping patients from going to the emergency room unnecessarily. Although this survey only asked about the health insurance of

those respondents who indicated that they would go to a hospital, in retrospect this information might also have been useful to evaluate the effect of health insurance on each of the individual responses. These data were not obtained in this study, but could be considered in future surveys of this type.

In conclusion, it appears that residents of metropolitan Baltimore were far more likely in 1981 to utilize the poison center if faced with a poisoning than they had been in 1975. This increase is supported by a similar increase in the number of poison exposure calls received by the Maryland Poison Center during the same period. In addition, there is a relationship between utilization of the poison center and awareness of Mr. Yuk. Promotion of the Mr. Yuk symbol, a pre-event strategy, may have a positive postevent impact as well.

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