

COVID-19's Effect on Calls to the Mississippi Poison Control Center

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Abstract

Background: The COVID-19 pandemic has the potential to alter human exposure patterns to potentially hazardous substances such as cleaning products and pharmaceuticals. *Purpose:* This research aims to characterize the effects of the COVID-19 pandemic on the types of calls received at the Mississippi Poison Control Center (MPCC) during the pandemic as compared to pre-pandemic years. *Methods:* We queried the Mississippi Poison Control Center Toxicall database for: total calls; calls related to bleach, disinfectants, and hand sanitizers; calls related to ivermectin exposures; calls related to hydroxychloroquine exposures; calls related to COVID-19; and suspected suicide calls. *Results:* During the COVID-19 pandemic, we observed increases in calls for exposures to disinfectants and cleaning products, hydroxychloroquine and ivermectin. However, no changes were seen in overall call volume or suspected suicide calls. *Conclusion:* In Mississippi, the COVID-19 pandemic was associated with spikes in exposures to disinfectants and cleaning products, hydroxychloroquine, and ivermectin.

Keywords: COVID-19, disinfectants, ivermectin, hydroxychloroquine, Mississippi

Introduction

Over the course of the pandemic, COVID-19 has resulted in spikes in the number of exposures and accidental poisonings. Increases in exposures to disinfectant products, hydroxychloroquine, and ivermectin have been reported by various sources. The off-label promotion of hydroxychloroquine and ivermectin by non-medical professionals and medical professionals through social media and other venues may have contributed to the increase in calls for human exposures to these medications. Other sources have reported an increase in suicidality, depression, and mental distress. Utilizing poison control data, this research characterizes the effects of the COVID-19 pandemic on exposure patterns in Mississippi.

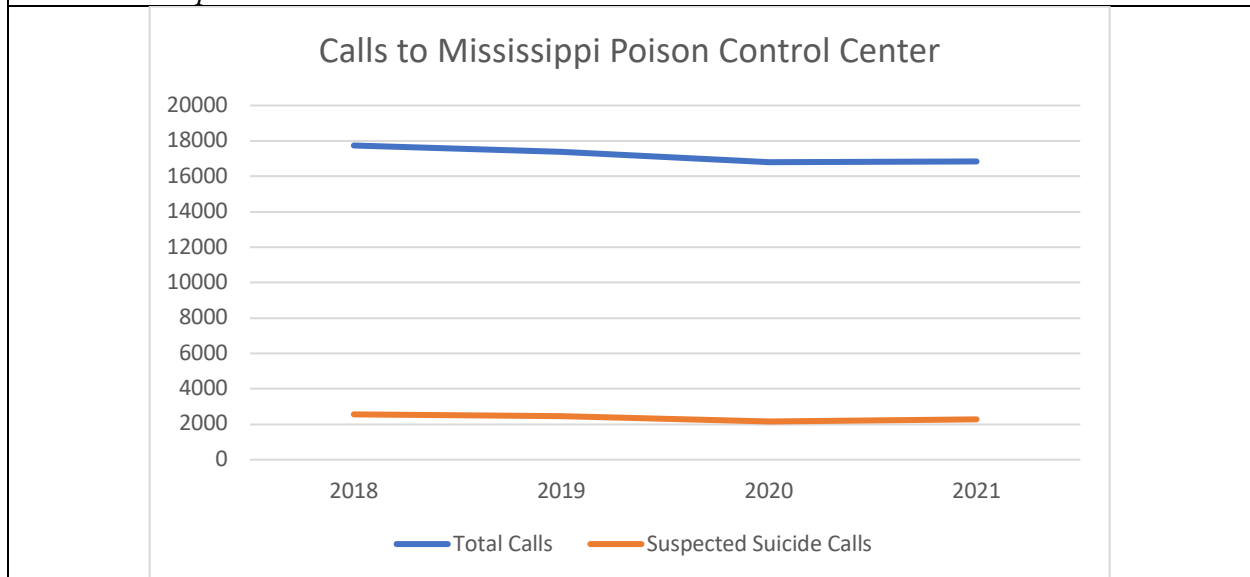
Methods

We queried the Mississippi Poison Control Center (MPCC) Toxicall database for: total calls; calls related to bleach, disinfectants, and hand sanitizers; calls related to ivermectin exposures; calls related to hydroxychloroquine exposures; calls related to COVID-19; and suspected suicide calls. We analyzed the calls related to bleach, disinfectant, and hand sanitizer during the months of April to September for the years from 2017 to 2021. For 2020 and 2021, the same exposure calls were also analyzed by quarters.

Results

Total calls to the MPCC did not significantly change during the COVID-19 pandemic as compared to pre-pandemic levels (Figure 1). Suspected suicide calls also did not appreciably increase during the COVID-19 pandemic. Suspected suicide calls in children aged 10 to 18 slightly increased from 479 (2.75% of all calls) to 493 (2.93% of all calls) from April to December of 2020 as compared to the same period the previous year.

Figure 1
Total and Suspected Suicide Calls to MPCC



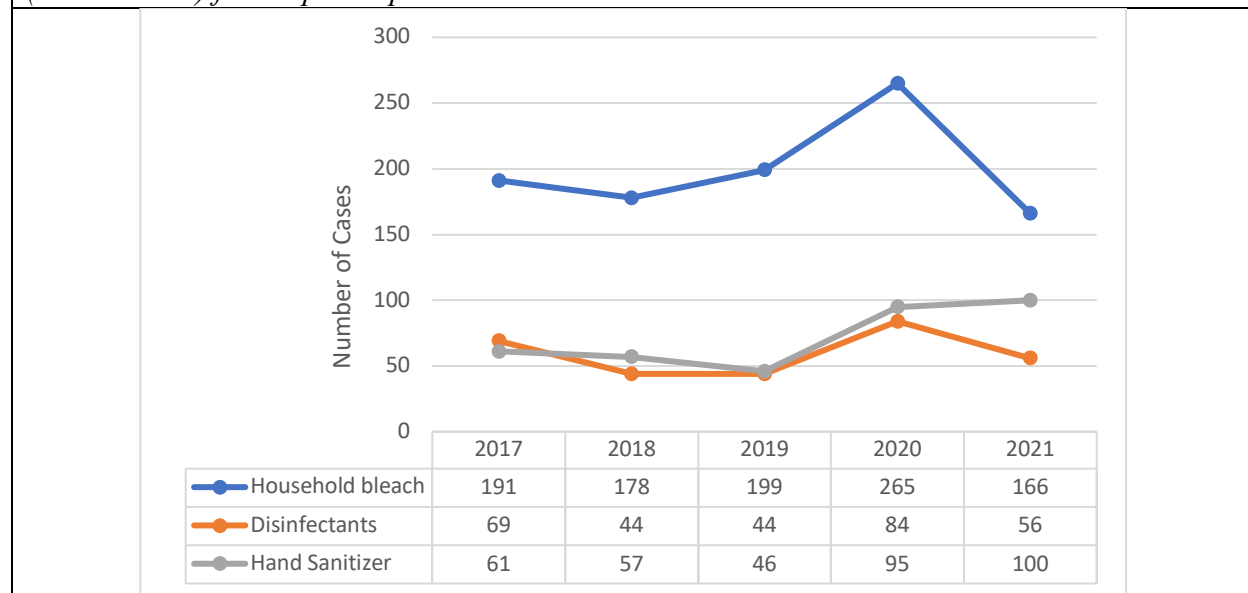
*2021 includes data through December 6, 2021

In 2020, MPCC received a total of 118 calls related to COVID-19. In 2021, 95 calls related to COVID-19 were received (Table 1). Of note, a phone call coded as related to COVID-19 could be an exposure to a medication or cleaning supply used to prevent or treat COVID-19, information calls, or calls related to a COVID-19 vaccine. In both years, most COVID-19 related calls were for human exposures. However, in 2020, the vast majority of exposures were to household bleach, disinfectants, and hand sanitizers, and in 2021 the most common exposure call was for ivermectin. Eight calls were received in 2020 for human exposures to methanol in hand sanitizers with no such calls for this type of exposure in 2021. Four calls were received in 2020 for exposure to chlorine gas or chloramine gas, both of which have the potential to cause acute respiratory failure and are produced by mixing bleach with acid or ammonia, respectively.

Table 1		
<i>Calls Coded as Related to COVID-19 in 2020 and 2021</i>		
Year	2020	2021
Total	118	95
Type of Call		
Information	16 (13.6%)	15 (15.8%)
Exposure	102 (86.4%)	80 (84.2%)
<i>Cleaning agents</i>	71 (69.6%)	11 (13.75%)
<i>Ivermectin</i>	0	30 (37.5%)
<i>Hydroxychloroquine</i>	14 (13.7%)	7 (8.75%)

Calls for exposures to household bleach, disinfectants, and hand sanitizers were higher in 2020, compared to the three years prior to the pandemic (Figure 2). A total of 444 calls for these exposures were fielded from April to September 2020. Comparatively, an average of 296 such calls during the same time were received for each of the three years prior to the pandemic. Calls for bleach exposures drastically decreased in 2021, while those for disinfectants and hand sanitizers remained essentially flat. In 2020 and 2021, calls for bleach and disinfectant exposures peaked in the second quarter of 2020 (April 1-June 30). This roughly corresponding to the onset of the pandemic and has subsequently declined (Figure 2). Calls for hand sanitizer exposures, however, did not demonstrate a similar peak at the onset of the pandemic. Instead, they demonstrated a roughly flat increase across the quarters of 2020 and 2021, when compared to pre-pandemic years.

Figure 2
Calls for Household Bleach, Disinfectant, and Hand Sanitizer Exposures Displayed by Year (2017 – 2021) from April-September



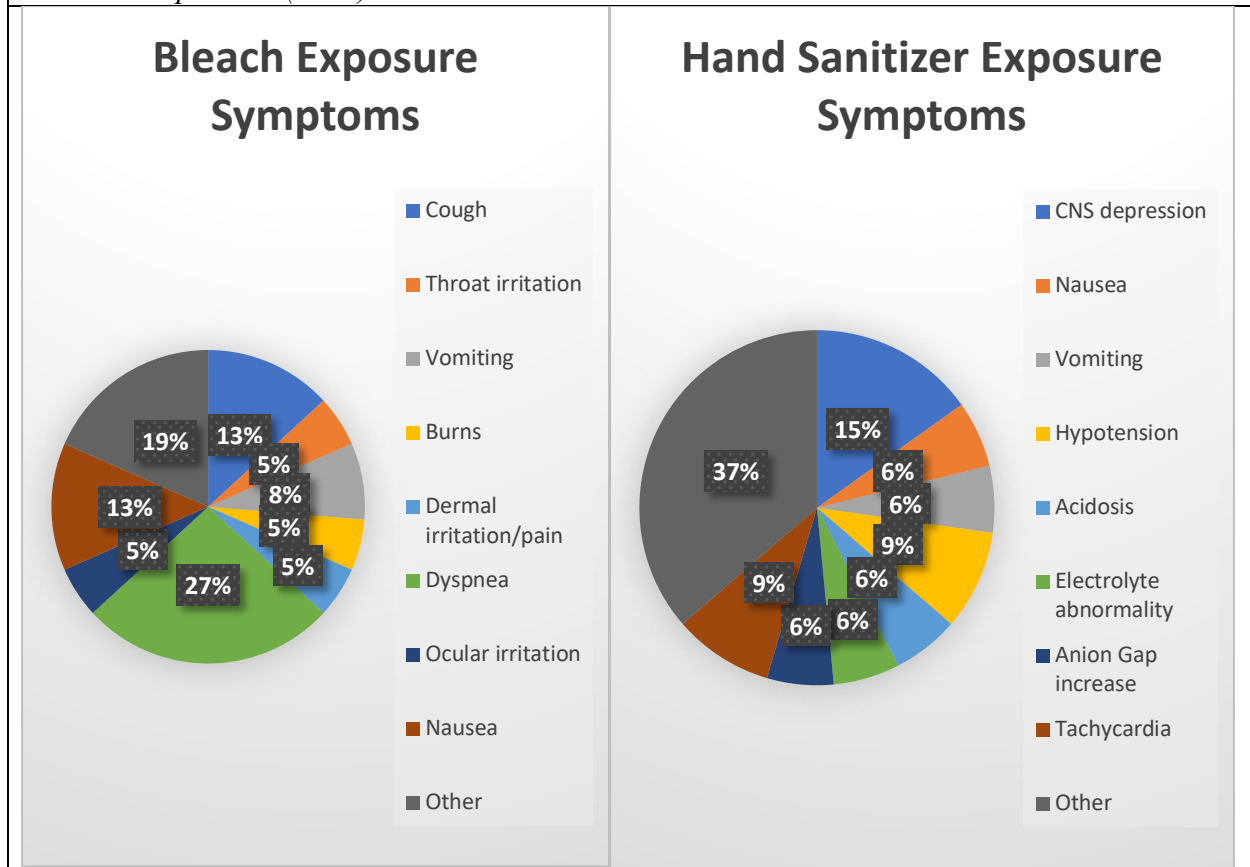
Calls for Household Bleach, Disinfectant, and Hand Sanitizer Exposures Displayed by Quarter (2020 & 2021)

	October 1 – December 31, 2019	January 1, 2020 – March 31, 2020	April 1 – June 30, 2020	July 1 – September 30, 2020	October 1 – December 31, 2020	January 1, 2021 – March 31, 2021	April 1, 2021 – June 30, 2021
Household bleach	70	108	146	119	93	81	81
Disinfectants	27	27	45	37	32	22	22
Hand sanitizer	37	43	39	56	40	60	39

*2021 data includes through December 6, 2021

The severity of adverse health effects from exposure to household bleach, disinfectants, and hand sanitizers during the pandemic was somewhat more severe than during the pre-pandemic period. In 2019, 12 of the 199 (6.0%) household bleach exposures resulted in moderate or major adverse health outcomes, where 19 of the 265 (7.2%) exposures reported in 2020 were related to household bleach. Similarly, in 2019, 3 of the 46 (6.5%) hand sanitizer exposures resulted in moderate or major adverse health outcomes compared to 9 of the 95 (9.5%) exposures reported in 2020. Of note, one hand sanitizer exposure in the study resulted in death secondary to suspected methanol poisoning, which is highly unusual. See Figure 3 for moderate and severe adverse human health effects after household bleach and hand sanitizer exposure in 2020.

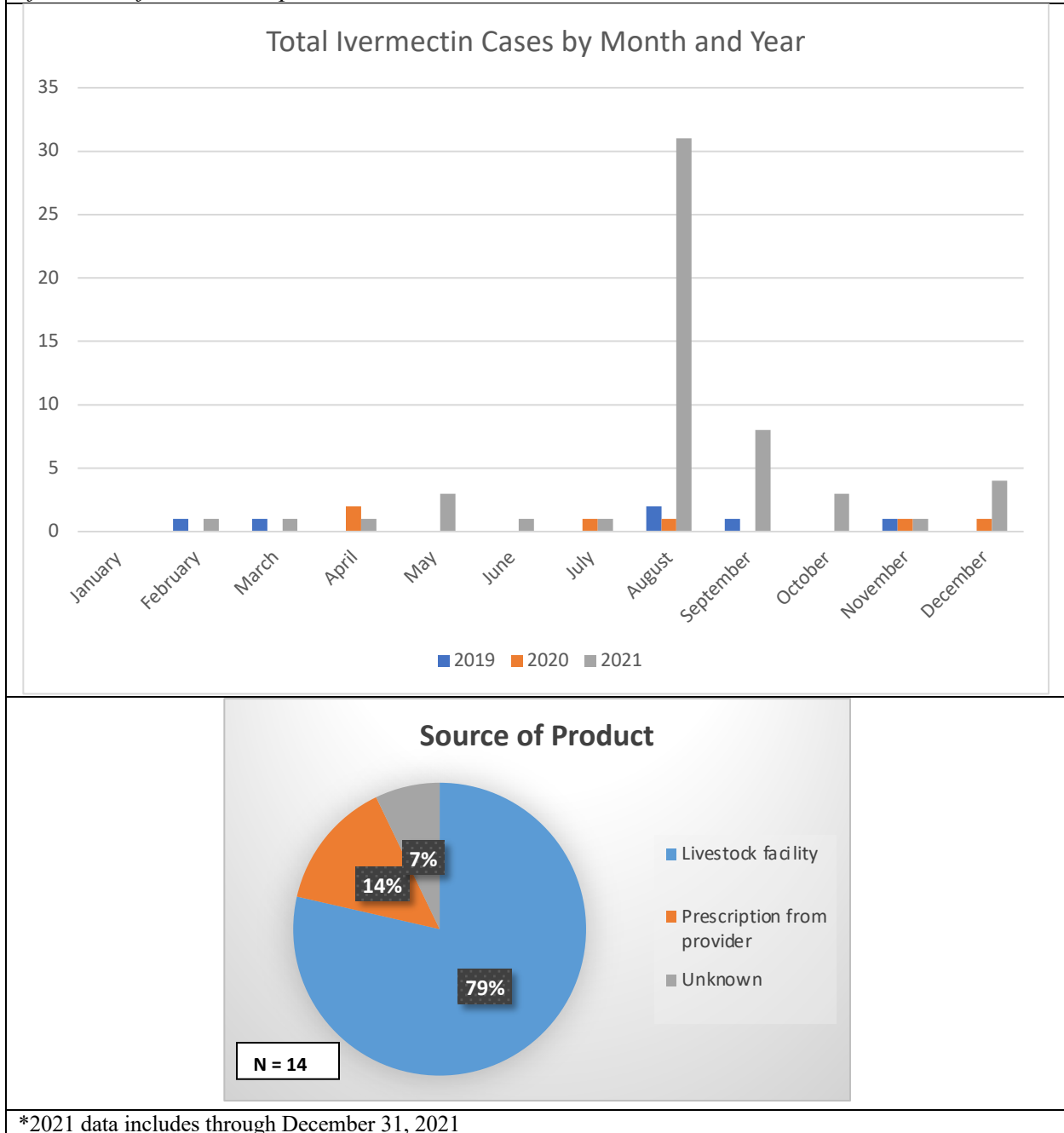
Figure 3
Moderate and Severe Adverse Health Outcomes Reported After Household Bleach and Hand Sanitizer Exposures (2020)



Calls related to hydroxychloroquine also increased during the pandemic, with 16 calls received in 2020, 14 of which were coded as related to COVID-19. This is compared to an average annual call volume of 5.33 calls/year for that medication over the three years preceding the pandemic. Interestingly, only 7 calls for hydroxychloroquine exposure were received in 2021, a rate similar to pre-pandemic levels.

In August 2021, during the peak of the Mississippi delta variant, the MPCC noted a sharp uptick in calls for ivermectin exposure (Figure 4). During the first weeks in August, a total of 14 initial human exposure calls were received. The typical volume for this type of exposure is less than one call per month. Of note, 11 of the 14 (78.5%) initial exposures were to livestock preparations of ivermectin rather than pharmaceutical preparations. A total of 31 calls, including 19 human exposure cases, were received in August relating to ivermectin for the use in the prevention and treatment of COVID-19. Two calls were received in August 2021 for exposure to both ivermectin and hydroxychloroquine, both in adults, and one of whom experienced moderate adverse human health effects.

Figure 4
Ivermectin Cases (Information and Exposure) by Month and Year for 2019-2021 and Sources of Product for Initial Exposures



Discussion

Overall, we did not see a significant change in the total call volume to the MPCC associated with the COVID-19 pandemic. The number of calls generated by COVID-19-related exposures and requests for information numbered in the hundreds on an annual basis and was insufficient to significantly increase overall volume. Additional calls generated by COVID-19 may have been

The Effects of the COVID-19

offset by a decrease in calls related to the effect of shelter-in-place or lockdown orders on economic, occupational, and recreational activities.

Several studies have reported an increase in psychological distress, depression, and suicidality associated with the COVID-19 pandemic in both adolescent and adult populations (Carison, 2021; Every-Palmer, 2020; Fitzpatrick, 2020; Fountoulakis, 2021; Gesi, 2021). We found no increase in calls to the MPCC for suspected suicide in adults and a minimal increase in the adolescent population. Only suspected suicidal exposures or ingestions are reported to the MPCC. However, suicidality that does not involve a suicide attempt or in which the attempt is through a method other than self-poisoning is not captured by our data. Therefore, the lack of an increase in calls related to suspected suicide is likely due to limitations of MPCC data. Suicidal patients may not call the MPCC for advice or seek medical assistance following an ingestion. Completed suicides, including those by self-poisoning, may not be reported to the MPCC.

Calls for exposure to household bleach, disinfectants, and hand sanitizer increased during the COVID-19 pandemic, particularly at the outset of the pandemic. The increase in exposure calls parallels the period of the pandemic when alarm about COVID-19 caused a large increase in purchases of sanitizing products and when the importance of airborne versus fomite transmission was not yet understood. The decrease in overall calls and COVID-19 calls related to sanitizer products from 2020 to 2021 is remarkable and may reflect decreased use of such agents. The decreased use may be due to a greater understanding of limited fomite transmission of the disease or pandemic fatigue.

In June and May 2020, an epidemic of methanol poisoning due to ingestion of hand sanitizers was reported in Arizona and New Mexico. This prompted FDA alerts on avoidance of contaminated hand sanitizer products (FDA, 2020; Yip, 2020). That epidemic resulted in fifteen cases of poisoning and four deaths. Hand sanitizers are regulated by the FDA as an over-the-counter drug and methanol is disallowed as an ingredient, yet was found in some imported products. The MPCC fielded eight calls and one death due to methanol exposure during that same period. An increase in the severity of adverse health effects due to sanitizing product exposure during the pandemic as compared to pre-pandemic. Calls related to chlorine gas and chloramine gas exposure may reflect the use of such products by persons who do not typically handle them or simultaneous use of multiple cleaning products (e.g., bleach & ammonia) due to alarm about COVID.

MPCC call volume related to hydroxychloroquine and ivermectin exposure sharply increased during the COVID-19 pandemic. Both medications were promoted on social media and elsewhere as effective preventive or therapeutic agents for COVID-19 despite announcements by the CDC and FDA that neither medication should be used for that purpose. As an agricultural state, access to concentrated livestock formulations of ivermectin in Mississippi was a particular concern, and such formulations accounted for 79% of calls for ivermectin exposure in August 2021. The Mississippi State Department of Health in conjunction with the MPCC issued a Health Alert Network Alert on August 20, 2021, warning against the use of livestock formulations of ivermectin (MSDH 2021). The University of Mississippi Medical Center posted an article to Facebook on August 23, 2021, warning against the use of ivermectin, particularly livestock preparations, to prevent or treat COVID-19. This post prompted 733 comments, many of them

accusing the University of malfeasance (UMMC 2021). In 2021, exposure to ivermectin was the most frequent cause for a COVID-19 related call to MPCC. Mississippi is the eighth highest state for Internet searches for ivermectin. Searches dramatically peaked in August 2021, coinciding with MPCC call data and the MSDH health alert (Google Trends 2021).

Limitations

Our study is subject to several limitations. MPCC data is limited by the voluntary nature of reporting poisonings or exposures. Persons with exposures may not call the MPCC if they experience no or minimal symptoms. They may also prefer to seek medical advice from their primary physician, local emergency department, or urgent care rather than call the MPCC. Poisonings are a reportable disease in the state of Mississippi and must be reported by healthcare providers to the MPCC within one week of diagnosis; therefore, persons with exposures who present to a local healthcare provider may be captured through mandatory reporting. However, such reporting does not always occur, so some poisonings may still be missed.

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