Poisoning Prevention, Treatment, and Detection as Public Health Investments

Assessing the Economic and Societal Value of the U.S. Poison Center Network

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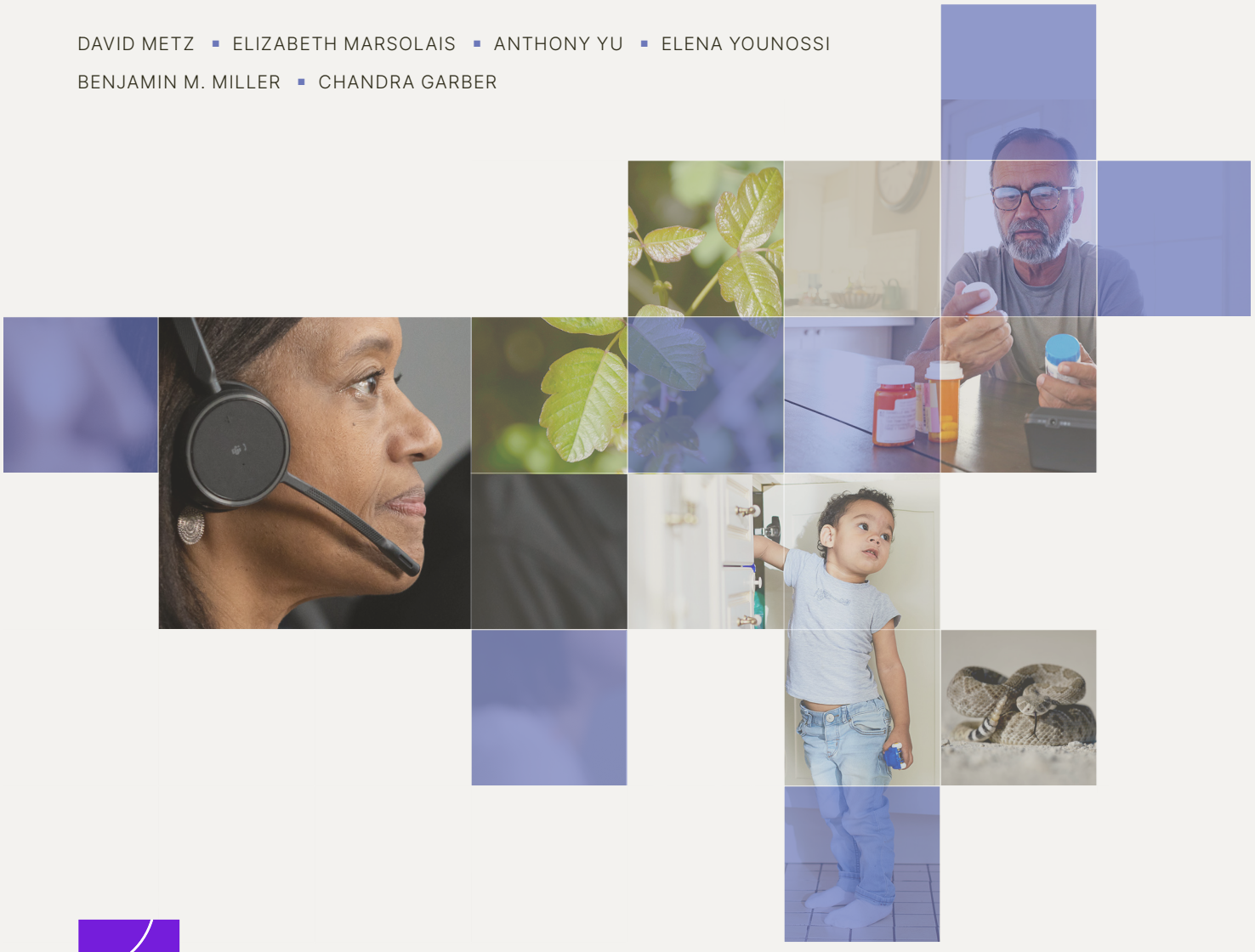

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About This Report

This report documents research and analysis conducted to evaluate the impact of the U.S. Poison Center Network. The Poison Center Network in the United States is composed of regional Poison Centers and their national accrediting organization, America's Poison Centers®. We assessed the economic and societal value of the Poison Center Network through a review of existing literature, a survey of the Poison Centers, and interviews with partner organizations, health care providers, and other stakeholders. Informed by the study findings, we calculated a return on investment for the tangible benefits of the Poison Center Network. More generally, we used a benefit-cost analysis framework to identify and monetize, to the extent feasible, both tangible and intangible returns to society for every dollar spent by Poison Centers to help prevent, treat, and manage poisonings and exposures.

This report may be of interest to policymakers, public health agencies and organizations, emergency response organizations, health care professionals, patient advocacy organizations, product manufacturers, and the public.

RAND Health

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Summary

The U.S. Poison Center Network provides a wide variety of services to the public, government entities, health care providers and institutions, product manufacturers, and public health organizations and researchers. The Poison Center Network in the United States is composed of regional Poison Centers and their national accrediting organization, America's Poison Centers®.[1] Regional Poison Centers serve every U.S. state and territory and provide free, confidential, expert advice for preventing and managing poison exposures 24 hours a day, seven days a week, through the national Poison Help line (1-800-222-1222). Funding for the Poison Center Network is provided by a wide array of sources, including federal, state, and local governments. America's Poison Centers hosts the website PoisonHelp.org, which provides online recommendations regarding poisons, medications, and potentially toxic products, as well as information on poison trends, prevention, and education. America's Poison Centers also maintains and provides access to the National Poison Data System® (NPDS), which offers near-real-time surveillance on reported poison exposures.

Issue

In 2024, America's Poison Centers asked RAND to analyze the value of the Poison Center Network. In presenting that analysis, this report expands on earlier studies on the value of Poison Centers. We add to this literature by updating estimates of previously identified benefits and expanding the scope of evaluated benefits to include Poison Center Network contributions to public health surveillance and education, which were previously identified as topics for future research. The report also describes changes in the operations and utilization of Poison Centers since 2011. Further, this report examines new modalities through which the public and health care providers can contact Poison Centers, including text messaging and online chat, which have been gradually introduced by individual Poison Centers since about 2020 and may continue to expand to additional Poison Centers over the next several years.

Approach

To assess the value of the Poison Center Network, we conducted a survey of individual Poison Centers from March to May 2025 to collect information on the scope and scale of services provided, operational costs, and sources of funding. We received responses representing 46 of the 53 accredited Poison Centers, an 87 percent response rate.

[1] The *Poison Center Network* refers to the combined capacity and organizational efforts of regional Poison Centers and America's Poison Centers, the national association that accredits Poison Centers in the United States.

We also conducted 12 individual and group interviews between April and August 2025. The participants included representatives from Poison Centers, patient advocacy organizations, government entities, product manufacturers, health care providers, and health care institutions. These interviews discussed how the participants interact with America's Poison Centers and the regional Poison Centers, if they collaborate in similar ways with other organizations, and the societal benefits provided by the Poison Center Network.

To describe and estimate the monetary value of the benefits provided by Poison Centers, we developed a logic model framework, mapping Poison Center inputs (i.e., resources and staff) to activities (i.e., essential and ancillary functions), outcomes, and impacts. We then used a benefit-cost analysis framework to estimate an overall return on investment. Specifically, we estimated the monetary value of societal benefits provided per dollar spent operating the Poison Center Network. We documented benefits using traditional financial measures (e.g., reduced health care costs) but also considered a wider variety of outcomes, including socioeconomic impacts (e.g., avoided productivity losses) for various stakeholders. However, the estimated return on investment includes only those benefits that could be monetized and therefore might not reflect the entire value of the benefits provided by the Poison Center Network.

Key Findings

Poison Center Network Activities

- The Poison Center Network, using NPDS, has taken on an expanded public health role, particularly in toxicosurveillance and emergency preparedness and response.
- At the same time, human exposure cases have declined only slightly, and overall case intensity has increased, evidenced by a greater proportion of cases originating from a health care facility or health care provider and a greater proportion of all cases involving more-severe outcomes.
- The ways stakeholders can interact with the Poison Centers are changing, with some Poison Centers offering text message and chat options for engagement in addition to telephone calls.
- The total number of Poison Center encounters has decreased since the early 2010s because of a large decline in information requests, possibly driven by the proliferation of alternative online information sources.
- Many Poison Centers are providing ancillary services on top of their essential functions—for example, legislative activities, telehealth delivery, specialty services (e.g., operating a rabies or COVID-19 hotline), and customized substance or product surveillance.

Poison Center Funding

- Funding for Poison Centers' essential functions has decreased in real dollar terms from $190.0 million in 2011 to $175.2 million in 2024 (both measured in 2024 dollars). Congressionally appropriated funding and some state funding sources have declined in real dollar terms because funding amounts have not been adjusted for inflation in more than a decade. Poison Centers have also seen decreases in state, local, and private funding.

- In-kind support from a host institution or other affiliate—usually a hospital or university providing facilities, utilities, information technology, human resources functions, or salaries—has also decreased.
- The expansion of Poison Centers' ancillary functions may be a response to financial pressures because of the rising costs of providing services to ensure that operational needs are met.

Value of the Poison Center Network

- We estimate that every $1 spent by Poison Centers on services generates $16.77 in benefits. Overall, we estimate that the Poison Center Network yields benefits totaling approximately $3.1 billion each year.[2]
- Applying different methods and assumptions, the estimated return on investment varied from approximately $13 for every $1 spent to approximately $29 for every $1 spent.

Overall, the Poison Centers provide significant returns to society for every dollar spent, including cost savings because of avoidable medical utilization, reduced patient length of stay, mortality risk reduction, and enhanced national public health surveillance.

[2] These calculations are based on costs and benefits that we were able to assess and monetize. However, it was not feasible to monetize all the impacts of Poison Centers, particularly those associated with the prevention of poison- and toxin-related health emergencies.

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Chapter 1

Introduction

Background

In 1953, the first poison control center was established at St. Luke's Hospital in Chicago, providing professional telephone advice to doctors and nurses and developing a standard data collection form, initially recording toxicological information on index cards (Botticelli and Pierpaoli, 1992; Burda and Burda, 1997). In 1958, the American Academy of Pediatrics founded the American Association of Poison Control Centers (AAPCC) to improve the standardization of data collection and coordination of poisoning cases. Pediatric poisoning calls accounted for most of the caseload of the early poison control centers, and many of the first poison control centers were hosted in children's hospitals and staffed by pediatricians.

By the 1970s, there were more than 600 poison control centers in the United States. However, there was significant variability in available resources and guidelines at these centers. In 1978, AAPCC established voluntary standards for certified regional Poison Centers.[3] In subsequent decades, the introduction of Poison Center accreditation standards led to the consolidation of many smaller centers into larger, accredited regional centers with 24-hour service and professionally trained staff. The proportion of cases dealing with children decreased with improvements in child-resistant containers, unique identifiers to help users identify medications, and regulatory oversight (Bragg, 2024; Dart, 2012).[4] At the same time, the scope and volume of cases expanded to include a broader suite of poison- and toxin-related health emergencies, including cases related to medications, supplements, illicit drugs, household and industrial chemicals, environmental toxins, plants, and venomous insects and animals (Arnold, Borger, and Nappe, 2023).

In 2000, the Poison Control Center Enhancement and Awareness Act (Pub. L. 106-174, 2000) funded grants to accredited Poison Centers via the Health Resources and Services Administration (HRSA), the establishment of the national toll-free Poison Help line, and a national media campaign to raise public awareness of the service. Congress has reauthorized these funds consistently since then, most recently through the Poison Control Centers Reauthorization Act of 2024 (Pub. L. 118-86, 2024), which extended funds for fiscal years 2025 through 2029.[5]

In 2022, AAPCC changed its name to America's Poison Centers®. As of October 2025, 53 accredited Poison Centers serve every U.S. state and territory. Poison Centers provide expert recommendations that are Health Insurance Portability and Accountability Act of 1996 (HIPAA)

[3] This report uses the term *Poison Centers* to refer to the 53 accredited Poison Centers in the United States.

[4] Poisoning fatalities among U.S. children under five years old dropped from more than 200 per year in 1972 to fewer than 50 per year between 1994 and 2020 (Bragg, 2024).

[5] The federal funds appropriated by Congress have remained the same in nominal dollar terms since 2010 (i.e., they have not been indexed to inflation). Thus, federal funding has decreased in real dollar terms over time.

compliant, confidential, and free for managing poison exposures 24 hours a day, seven days a week, through the national Poison Help line (1-800-222-1222) (Pub. L. 104-191, 1996). Poison Centers collectively managed 2,421,251 total encounters in 2023 (Gummin et al., 2024).[6] America's Poison Centers, the national accrediting organization, hosts the website PoisonHelp.org (undated), which provides online advice regarding poisons, medications, venomous exposures, and potentially toxic products, as well as information on poison trends, prevention, and education. America's Poison Centers also maintains and provides access to the National Poison Data System® (NPDS), a surveillance database of all poison exposures reported to Poison Centers nationwide (America's Poison Centers, undated-b).[7] Today, the Poison Center Network operates on the front lines of local, regional, and national health emergencies. Examples include the Deepwater Horizon oil spill; the East Palestine, Ohio, train derailment; natural disasters; and the ongoing nationwide fentanyl crisis.

Many studies have documented ways that Poison Centers can reduce U.S. health care spending and return savings that exceed the cost of operating the Poison Center Network. Some studies examine the costs and benefits for specific centers. Other studies examine the Poison Center Network broadly but do not reflect recent developments in Poison Centers' scope and funding.[8] This study provides an updated assessment of the value provided by the Poison Center Network as a whole.

About the Study

In 2024, America's Poison Centers asked RAND to analyze the value and impact of the Poison Center Network. This report uses a benefit-cost analysis (BCA) framework to estimate the ROI of Poison Center services. Specifically, we estimate the monetary value of societal benefits provided per dollar spent operating the Poison Center Network. We document benefits using traditional financial measures (e.g., reduced health care costs) but also consider a wider variety of outcomes, including socioeconomic impacts (e.g., avoided productivity losses), to different stakeholders. However, the estimated ROI includes only those benefits that could be monetized and therefore might not reflect the entire value of the benefits provided by the Poison Center Network.

In presenting that analysis, this report expands on earlier studies about the value of Poison Centers. It contributes to this literature by updating estimates of previously identified benefits and expanding the scope of evaluated benefits to include Poison Center Network contributions to public health surveillance and education, which were previously identified in a Lewin Group study as topics for future research (Lewin Group, 2012). We also describe changes in the operations and use of Poison Centers since 2011. Further, this report examines new modalities through which the public

[6] We follow Gummin et al. (2024) in defining *encounter* as "an exposed human or animal (Exposure case) or a request for information with no person or animal exposed to any foreign body, viral, bacterial, venom, chemical agent or commercial product (Information request)." Where that report collectively refers to both *exposures* and *information requests*, we use *encounter*. We treat *cases* and *exposures* as synonymous.

[7] NPDS includes information only on encounters reported to Poison Centers and PoisonHelp.org.

[8] For example, a 2012 study conducted by the Lewin Group estimated that Poison Centers save Americans more than $1.8 billion per year in avoidable medical costs and productivity losses, amounting to a return on investment (ROI) of $13.39 for every dollar spent (Lewin Group, 2012).

and health care providers can contact Poison Centers, including text messaging and online chat, which have been introduced recently and may continue to expand over the next several years.

Methodology

To assess the value of the Poison Center Network, we conducted a survey of Poison Centers in the United States from March to May 2025 to collect information on the scope and scale of services provided, operational costs, and sources of funding for the most recently completed fiscal year. We received responses representing 46 of the 53 Poison Centers, resulting in an 87 percent response rate.[9]

We also conducted 12 individual and group interviews between April and August 2025. The participants included representatives from the Poison Center Network, patient advocacy organizations, government entities, product manufacturers, and health care providers and institutions. The interviews discussed how the participants interact with America's Poison Centers and the regional Poison Centers, if they collaborate in similar ways with other organizations, and the societal benefits provided by the Poison Center Network. Additional information was gathered from academic and gray literature, NPDS data, statistics published by federal and state regulatory agencies, and Internal Revenue Service (IRS) Form 990 submissions.

To describe and estimate the monetary value of the benefits provided by Poison Centers, we developed a logic model framework, mapping Poison Center inputs (i.e., resources and staff) to activities (i.e., essential and ancillary functions), outcomes, and impacts. We then use a BCA framework to estimate an overall ROI.

Organization

This report presents the findings from RAND's study as follows:

- Chapter 2 provides an overview of the Poison Center Network and activities, operating costs, and sources of funding for Poison Centers.
- Chapter 3 identifies and describes impacts associated with the Poison Center Network, including treatment outcomes and health care utilization.
- Chapter 4 presents an ROI framework to evaluate the value of the Poison Center Network.

In addition, Appendix A provides a detailed description of the research methodology, Appendix B presents RAND's web-based survey of the Poison Centers, and Appendix C provides RAND's interview protocols.

[9] One respondent provided information on behalf of multiple Poison Centers. We did not include America's Poison Centers in this survey because it was designed to collect information on individual Poison Centers' financial information, encounters, modes of contact, and activities. Information about America's Poison Centers was gathered from other sources described in this section.

Chapter 2

Poison Center Network Overview, Activities, and Costs

Overview of the Poison Centers

The 53 Poison Centers across the United States serve as expert advisers on the prevention, management, and treatment of poison exposures as part of a national toxicosurveillance and public health surveillance system and as regional partners to federal, state, and local health agencies and organizations in emergency preparedness and response to natural and human-caused disasters. Encounters managed through the national Poison Help line involve either human or animal exposures to poisons or toxins or information requests (i.e., requests for information with no person or animal exposed to any poison or toxin) (Gummin et al., 2024). Poison Center case management involves follow-up calls to monitor case progress, provide ongoing treatment recommendations, and determine the medical outcome of each case. In addition, Poison Centers provide professional education and training to medical providers and educational programs for non–health care providers, such as community organizations and schools; conduct product safety research and collect data to monitor the safety and clinical effects of chemicals, drugs, toxins, venoms, foods, plants, medications, and more; and conduct public outreach and awareness campaigns to prevent poisonings.

Geographic Service Area

The entire United States receives service from the Poison Center Network. More-populous states, such as California, Florida, and Texas, have multiple regional Poison Centers covering different parts of the state. Meanwhile, 18 states and territories rely on service contracts provided by a specific Poison Center in a different state. Many states reference or establish Poison Centers in their state codes. Regional Poison Centers serve their populations with specialized expertise in local hazards (e.g., poisonous plants, venomous insects and animals, and naturally occurring toxins) and through relationships with state and local health departments, as well as cooperation and coordination with local emergency response organizations (e.g., 911 dispatch centers) (Spiller and Griffith, 2009). The national Poison Help line, introduced in 2001 and reauthorized in the Poison Control Centers Reauthorization Act of 2024 (Pub. L. 118-86, 2024), helps route calls to regional Poison Centers based on the caller's area code.[10] The accredited Poison Centers include independent nonprofit centers and centers associated with hospitals, universities, and health departments (generally colocated).

[10] The National Impact Study Workgroup members reported that the national Poison Help line can route people to the appropriate regional Poison Center in instances when the area code is from outside the state. The workgroup was composed of toxicological subject-matter experts who provided feedback throughout this study.

Functions

All accredited Poison Centers are required to perform the following *essential functions*:

- call center communications and infrastructure[11]
- call center staffing
- patient management
- quality management
- public education
- health care provider education
- data and surveillance
- leadership and management.

Some Poison Centers also perform *ancillary functions* that can generate revenue through contracts with state and local government or private industry. Such activities vary significantly across centers. Ancillary functions leverage existing expertise and capabilities to address public health needs that go beyond prevention, education, treatment, advice, and data collection and surveillance related to toxicology. Such functions include legislative activities, telehealth delivery, specialty services (e.g., operating a rabies or COVID-19 hotline), and customized substance or product surveillance (e.g., overdose detection mapping). In some cases, ancillary functions are similar to essential functions but are considered ancillary if they extend beyond traditional Poison Center services or are not directly related to toxicology. In the RAND survey, most Poison Centers reported performing one or more ancillary functions, although the types of services provided varied across individual Poison Centers. We discuss specific examples of essential and ancillary functions later in this chapter.

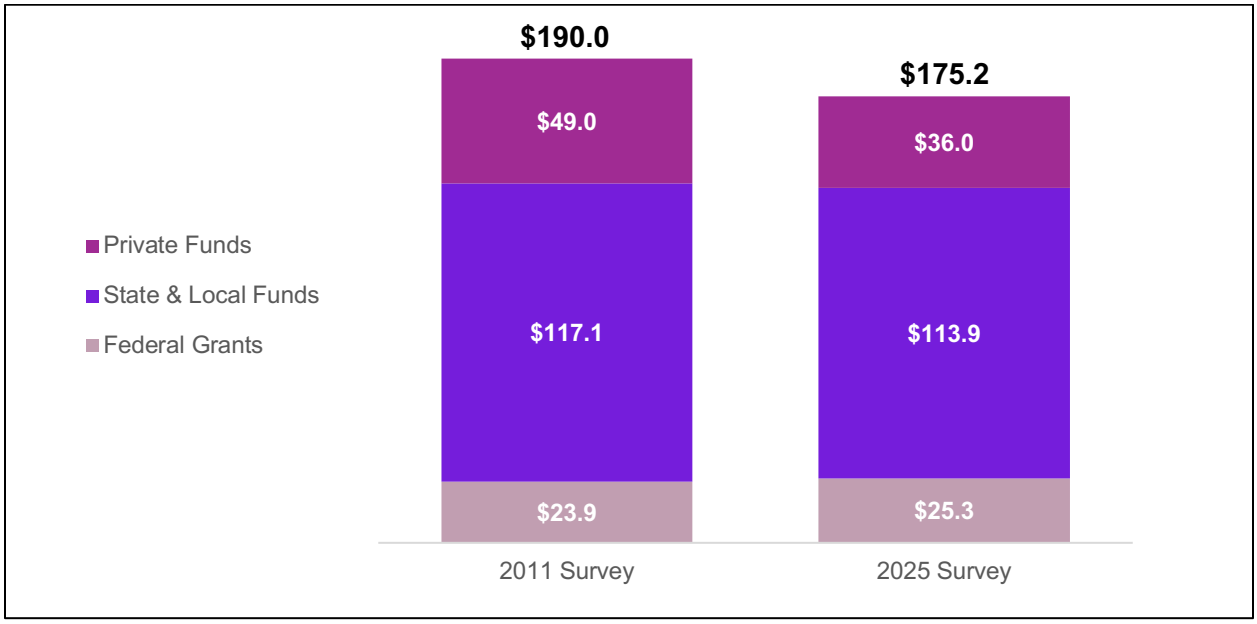
Sources of Funding

The RAND survey asked the Poison Centers about their sources of funding. A full list of the funding sources listed in the survey is provided in Appendix B. We grouped those sources into federal government, state and local government, and private funding. Figure 2.1 provides our estimates of funding for essential functions, by source, compared with data previously collected for America's Poison Centers in 2011 (those survey results are reported in Lewin Group, 2012).[12] In both surveys, values were imputed for all nonrespondents using national averages. For direct comparison, all values are reported in real 2024 dollars (i.e., accounting for inflation). Drawing on information reported in the RAND survey, we estimate that the aggregate funding for the Poison Centers' essential functions was approximately $175 million in 2024. As reported in the survey, approximately 65 percent of these funds came from state and local government sources; however, some of these funds originated from federal sources (e.g., state-administered block grants).

[11] *Call center* generally refers to the locations of accredited Poison Centers where Poison Center staff respond to cases via the national Poison Help line. Some Poison Centers also offer live online chat or text services.

[12] We did not include funding in the form of in-kind support provided by a host institution or other affiliate in these figures because Poison Centers generally did not have information on the monetary value of all subsidized support.

Figure 2.1. Poison Center Funding for Essential Functions, by Source (2024$ Millions)



SOURCES: Features data from the 2025 RAND survey of Poison Centers and the 2011 survey conducted for America's Poison Centers (reported in Lewin Group, 2012).
NOTE: Funding in both 2011 and 2025 surveys includes imputed values for nonrespondents. Both the 2011 and 2025 surveys collected information on funding for the most recently completed fiscal year. Sources of state and local funding include preparedness funds, Medicaid, state-administered block grants, and other state, city, and county funding. Sources of private funds include hospitals, host institutions, research, grants, donations, health insurers, HMOs, and other business funds.

Although identified as *state and local* funds, this category also includes state-administered block grants, Medicaid, and preparedness funds that originated from federal funding sources. Other federal sources include dedicated funding from HRSA. Based on the specific sources of funding reported for the most recently completed fiscal year in the RAND survey, we estimate that at least $58.9 million (33.6 percent) originated from the federal government, approximately $80.3 million (45.8 percent) originated from state and local governments, and $36.0 million (20.6 percent) originated from private sources. Results from the 2011 and 2025 surveys present a similar distribution of funding by source. The most notable change from 2011 to 2025 is a significant decrease in funding from private sources. It is feasible that change may be, in part, due to differences in how the surveys addressed funding for nonessential functions.[13]

HRSA funding, one of the primary sources of federal funding, and some state funding sources have seen no change in nominal dollar terms since approximately 2010 (i.e., funds allocated to the Poison Centers have not increased to offset higher operating costs because of inflation); therefore, funding has decreased in real dollar terms. Some Poison Centers have also faced state budget cuts over

[13] The 2025 RAND survey requested information about funding for nonessential functions, whereas the 2011 survey did not, as these activities were less prevalent at the time. If this change caused survey respondents to characterize more private funding as being associated with nonessential rather than essential functions, this may explain some of the change over time.

time. The expansion of Poison Centers' ancillary functions may be a response to growing financial pressure caused by the rising costs of providing services.

Subsidized Support

Although not shown in Figure 2.1, some Poison Centers reported that they receive subsidized support (e.g., through in-kind transfers) from a host institution or affiliate, usually a hospital or university, that partially offsets the operating costs of a Poison Center.[14] Such support is typically provided in the form of facilities, utilities, information technology, human resources functions, or salaries.

In the RAND survey, fewer than half of Poison Centers reported receiving a substantial amount of such support. Furthermore, Poison Centers reported receiving less subsidized support than they reported receiving in 2011.[15] For example, more than 40 percent of Poison Centers reported receiving subsidized facilities from a host institution in 2011, compared with approximately 25 percent of Poison Centers in 2025. Similarly, more than half of the Poison Centers reported that some salaries or stipends were covered by a host institution in 2011, versus just over 20 percent of Poison Centers in 2025. Some sources of federal and state funding have decreased in real dollar terms, and Poison Centers have also experienced a decline in subsidized support.

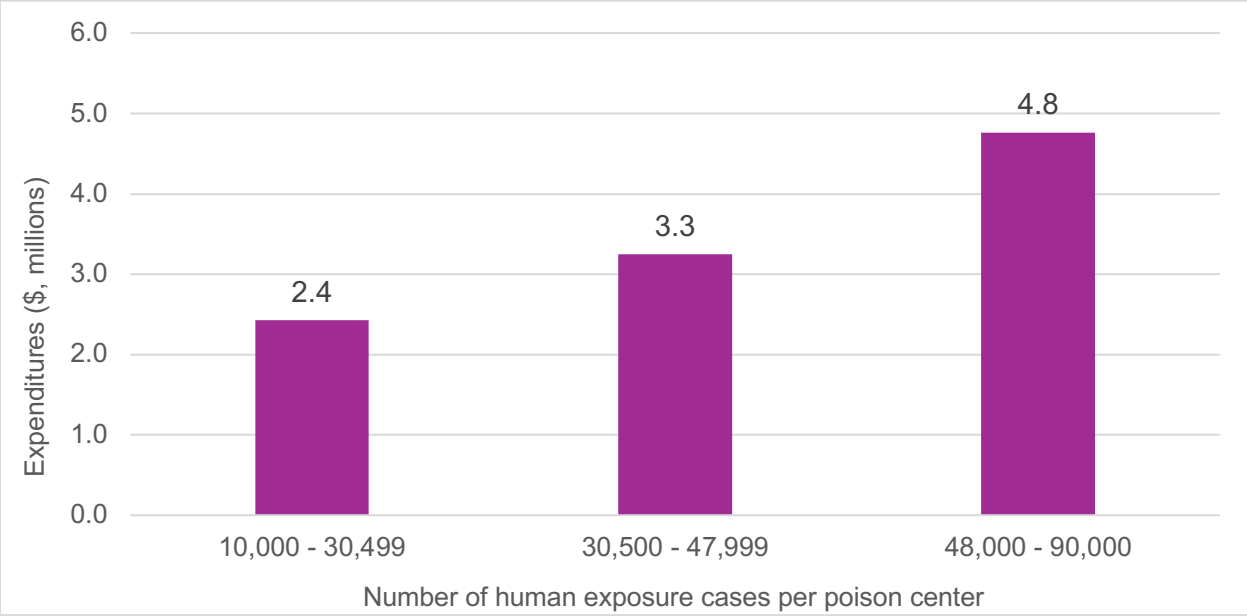
Expenditures

According to the RAND survey, the Poison Centers had average annual operating expenses ranging from approximately $1.2 million to $7.2 million, excluding in-kind contributions, with costs varying because of differences in the service area, number of cases managed, and scope of ancillary services provided. These figures may underestimate total operating expenses because some Poison Centers receive subsidized support that was not included in the data. Figure 2.2 reports average Poison Center expenditures by the tercile of the number of human exposure cases, as reported in the RAND survey. Each bar in the chart represents approximately one-third of the Poison Centers.

[14] Not all Poison Centers have a host institution. Two Poison Centers operate as independent nonprofit organizations.

[15] See questions 21 and 22 of the RAND survey, presented in Appendix B, which separately ask for information on expenditures for essential and ancillary functions. The 2011 survey asked Poison Centers a similar question, focused only on expenses for essential functions.

Figure 2.2. Average Poison Centers Expenditures, by Case Volume Tercile (2024$ Millions)



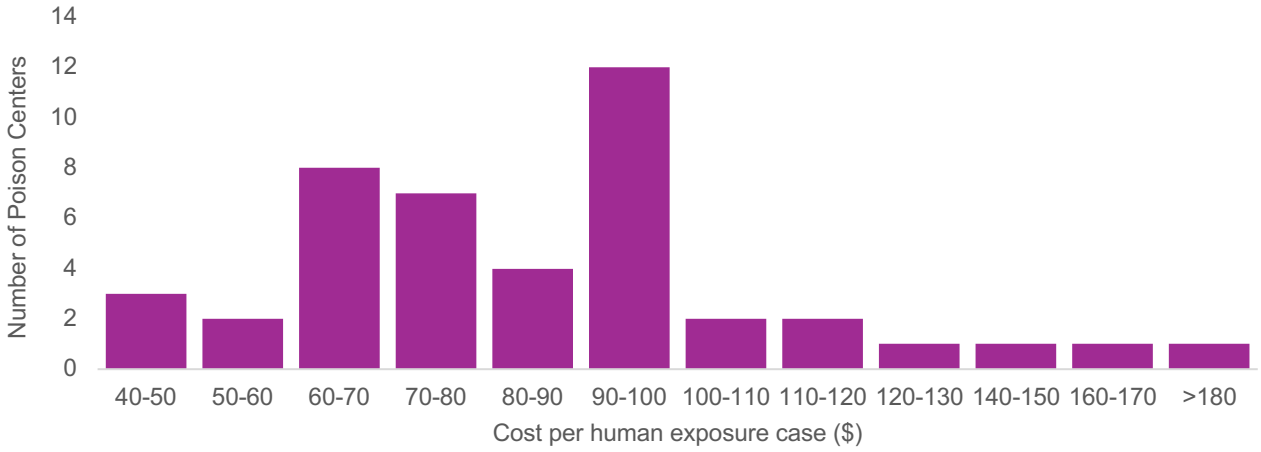
SOURCE: Features data from the 2025 RAND survey of Poison Centers.

Relative to 2011, total Poison Center expenditures decreased 3 percent in real dollar terms, which is consistent with the overall decrease in funding for essential functions and associated reductions in staffing levels over this period. Poison Centers reported that approximately 90 percent of overall expenditures (and staff hours) were dedicated to performing essential functions, primarily operating the national Poison Help line and patient management.

The average cost per human exposure case managed, which accounts for most Poison Center encounters, is a useful measure for comparing expenditures across Poison Centers. This metric is calculated as the number of human exposure cases per year divided by the total annual expenditures of a Poison Center. The national average cost per human exposure case was $85 in 2024, compared with about $79 in 2011 (measured in 2024 dollars). Although this estimate is similar in cost to a straightforward evaluation and management case handled by a physician's office based on the traditional Medicare reimbursement rate,[16] it is less than the average cost based on commercial insurance reimbursement rates in some states and significantly less than the average cost of an emergency department (ED) visit. Medicare is the federal health insurance program for people age 65 or older, as well as younger people with certain disabilities or conditions (e.g., end-stage renal disease), administered by the Centers for Medicare and Medicaid Services (CMS). Traditional Medicare, also known as Fee-for-Service Medicare, is directly administered by CMS, whereas Medicare Advantage plans are offered by private companies and paid for by CMS. Figure 2.3 reports the distribution of the average cost per human exposure case across Poison Centers as reported in the RAND survey.

[16] The national payment amount paid by the 2025 Medicare Physician Fee Schedule for a new patient office or other outpatient visit for 30–44 minutes (code 99203) was $109 (see CMS, 2024).

Figure 2.3. Average Cost per Human Exposure Case in 2024



SOURCE: Features data from the 2025 RAND survey of Poison Centers.

The Role of America's Poison Centers

The primary role of America's Poison Centers, as an organization, is the accreditation of Poison Centers and the certification of their staff, which are achieved through meeting certain criteria for inclusion under the umbrella of the organization, as well as coordination across the Poison Center Network and with national partner organizations. For example, America's Poison Centers administers the certification examination for Certified Specialists in Poison Information (CSPIs), generally registered nurses and pharmacists with training in toxicology. NPDS reports are available to federal, state, and local government partners, as well as industry contacts (e.g., product safety reports), through data licensing and use agreements.[17] The organization also provides member services to the Poison Centers.

Another role of America's Poison Centers is to implement nationwide initiatives. Examples of past initiatives include an educational campaign on proper medication storage and safety for seniors. The organization works to elevate the national visibility of the Poison Centers' work, including through national campaigns, such as National Poison Prevention Week, and unified branding to enhance visibility and awareness.[18] Information and resources are shared with individual Poison Centers to distribute in their service areas using their local infrastructure and contacts. Information and resources are also available on the website PoisonHelp.org, which is maintained by America's Poison Centers.

America's Poison Centers coordinates with federal agencies, shares information with Congress related to federal appropriations, and supports individual Poison Center partnerships with federal agencies. Finally, America's Poison Centers serves as a means for Poison Centers to inform learning and operational best practices through national meetings, share research, and improve collaboration through communication (e.g., email groups) and policy discussions. The organization has nearly 30

[17] Additional use cases for NPDS data are discussed in Chapter 3 of this report.

[18] The third week of March was designated as National Poison Prevention Week in 1961 (Pub. L. 87-319, 1961).

committees and work groups, with representation from different Poison Centers to coordinate on national issues.

Poison Center Activities and Costs

In this section, we take a closer look at the activities of the Poison Centers and related costs by function.

Essential Functions

The Poison Center Network has had a long-standing role in safeguarding the nation's public health through the management and treatment of poison exposures, toxicosurveillance, professional training and certification, and public outreach and education. More recently, Poison Centers have taken on an expanded role in emergency preparedness and response, participating in multiagency planning for natural and human-caused disasters, developing treatment guidelines for local hospitals during emergencies, and monitoring emerging public health threats.

Emergency Response Services

Poison Centers provide HIPAA-compliant, confidential, and free expert recommendations in more than 160 languages to patients and health care providers to manage poison- and toxin-related health emergencies, 24 hours a day, seven days a week, through the national Poison Help line (HRSA, undated; Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services, 2000). Poison Centers provide care for potential exposures managed on-site outside a health care facility or as toxicology consultants to health care providers. Poison Center staff follow up on suspected or known poisonings to advise on continuing care and collect additional data, including the effects of treatment. Poison Center directors reported during the workgroup that follow-up accounts for a significant proportion of their case management. The total number of encounters managed by the Poison Centers has averaged more than 3.3 million annually since 2000 (Gummin et al., 2024). Although the overall volume trended downward over time because the number of information requests decreased significantly, the typical exposure case severity increased.

Encounters are managed by health care professionals with specialized training in toxicology, including board-certified emergency physicians, toxicologists, clinical toxicologists, registered nurses, pharmacists, physicians, nurse practitioners, and physician assistants (Gummin et al., 2024). CSPIs provide health care professionals and the public with the latest guidance and recommendations and triage patients to receive the proper standard of care.

In 2023, NPDS recorded 2,421,251 Poison Center encounters.[19] Table 2.1 summarizes the distribution of encounters in 2023 by type (Gummin et al., 2024). Nearly 86 percent of encounters were human exposure cases.

[19] Poisonhelp.org cases are captured in NPDS but are not included in this estimate or in Table 2.1.

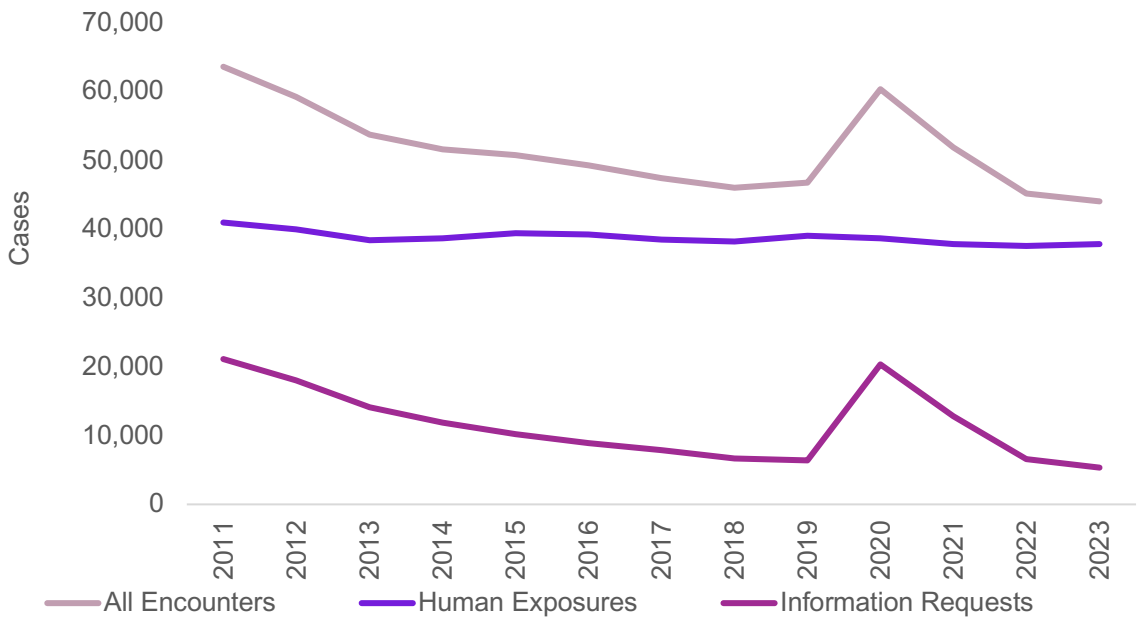
Table 2.1. Poison Center Encounters in 2023

Encounter Type	Number of Encounters	Percentage of Encounters
Human exposure	2,080,659	85.9
Human confirmed nonexposure	5,046	0.2
Information	293,663	12.1
Animal exposure	41,857	1.7
Animal confirmed nonexposure	26	0.001
Total	**2,421,251**	**100.0**

SOURCE: Features data from Gummin et al. (2024).
NOTE: A *human confirmed nonexposure* refers to an encounter in which the individual reaching out to a Poison Center clarifies that they were not exposed to a poison—e.g., all missing pills were found. Percentages might not precisely sum to 100 because of rounding.

As shown in Figure 2.4, Poison Centers saw an overall decrease in the average number of encounters from 2011 to 2023. During the same period, the composition of encounters shifted in several notable ways. Excluding a brief spike during the COVID-19 pandemic, the number of information requests decreased significantly, likely because of the proliferation of alternative online information sources. During the same period, the number of human exposure cases reported to Poison Centers only slightly declined. Therefore, the *proportion* of encounters involving human exposures increased.

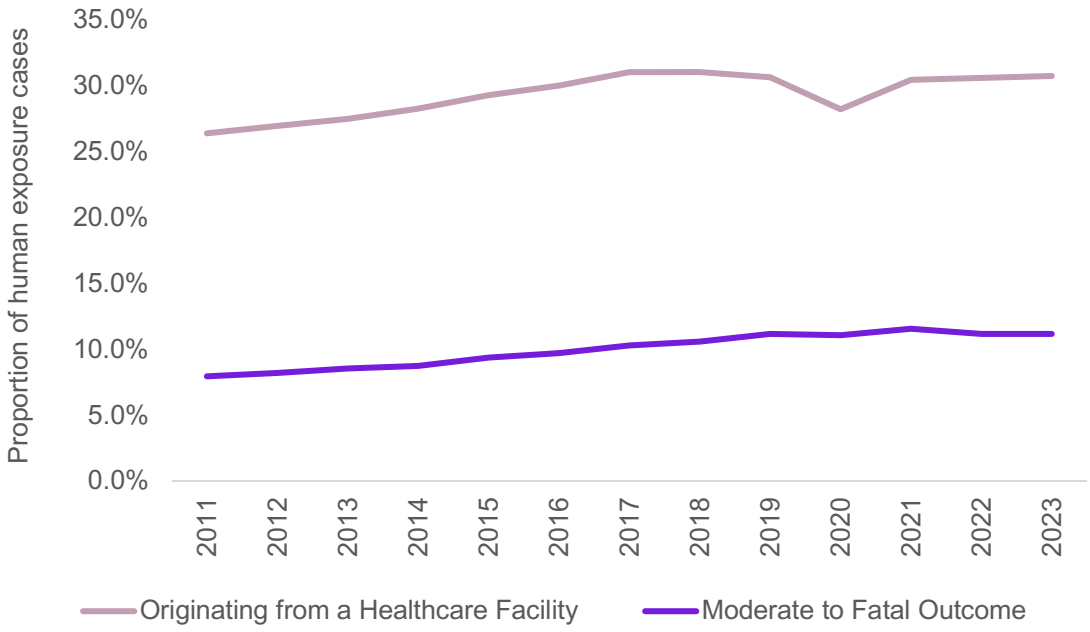
Figure 2.4. Average Number of Encounters per Poison Center, 2011 to 2023



SOURCE: Features data from the annual reports of NPDS for 2012–2024 (America's Poison Centers, undated-a).

In addition, as shown in Figure 2.5, the intensity of human exposure cases increased over time. First, a greater proportion of cases originated from a health care facility or health care provider—approximately 30 percent of exposure cases in 2023. Second, the percentage of cases associated with more-serious outcomes (i.e., moderate, major, or death) increased by 4.25 percent per year since 2000 (Gummin et al., 2024). These shifts suggest that Poison Centers are more often engaged in cases demanding significant time and resources. The causes of this shift toward more resource-intensive cases were not identified in the study and may present an opportunity for future research.

Figure 2.5. Proportion of Higher-Intensity Human Exposure Cases, 2011 to 2023



SOURCE: Features data from the annual reports of NPDS for 2012–2024 (America's Poison Centers, undated-a).
NOTE: Originations from a health care facility include individual health care providers. The proportion is equal to the sum of human exposure cases originating from a health care facility or health care provider divided by the sum of all human exposure cases.

Encounter Modality

In addition to operating the national Poison Help line, some Poison Centers have been introducing new modes of communication (i.e., live online chat and text messaging) since around 2020. Of the 46 accredited Poison Centers that responded to the RAND survey in the spring of 2025, seven reported offering text messaging or a live online chat with trained Poison Center staff, with approximately 3,500 encounters initiated through one of these methods in the most recent fiscal year, or slightly less than 1 percent of all encounters managed by those Poison Centers. Data suggest that there may be some differences in the characteristics of encounters using text messaging or an online chat. However, the sample size is too small to reach definitive conclusions about differences between these modes of communication. Further, if differences exist, it is difficult to separate differences

because of the nature of the mode of communication versus differences because of the experimental nature of these new modes of communication.[20]

Across all modes of communication, most encounters were human exposure cases that were managed on-site outside a health care facility (rather than information requests). However, relative to calls to Poison Centers, encounters initiated via online chat were slightly more likely to be informational, whereas encounters initiated via text were slightly more likely to be human exposure cases. The percentage of human exposure cases managed outside a health care facility was the same between cases initiated via call and via online chat but slightly lower for cases initiated via text messaging.

The average length of time to manage an encounter during the initial contact was slightly higher for those initiated via text (16.7 minutes) and via online chat (13.5 minutes) than those initiated via call (10.8 minutes). However, the average number of follow-ups for encounters originating via text or online chat was approximately half. Work group members suggested that encounters originating via text or online chat tend to take longer (e.g., owing to delays in response time or communication issues because of a lack of written clarity) or that exposure cases tend to be less severe and are less likely to be prioritized in triage. Although it is reasonable to assume that the most-complex cases are likely to originate via calls, there is evidence that complex cases also come in through alternate channels. Among the sample of nearly 3,500 encounters, 10.6 percent initiated via text and 13.5 percent initiated via online chat were transferred to a call. Additional information would need to be collected via NPDS to verify whether there are significant differences in the timing, characteristics, and outcomes of cases originating via text or online chat (e.g., because of the average patient age, average distance to a hospital or ED, type of substance or product). Currently, NPDS does not record whether an encounter originated via the national Poison Help line or another mode of communication. Table 2.2 provides a summary of encounter metrics for seven Poison Centers that offered text message or online chat services in 2024.

According to the RAND survey, in the next five years, another 26 Poison Centers plan to offer text message capabilities, and 35 Poison Centers plan to offer online chat capabilities. Therefore, if just 1 percent of encounters continued to originate via an alternative mode of communication, they could account for 15,000 to 20,000 encounters per year initiated by text or online chat. However, it is unclear whether these encounters would displace calls that patients would otherwise make or whether they would be new users who would not otherwise have called the national Poison Help line.

[20] For example, we were told that some Poison Centers did not offer these services for the entire year and that standardized data-tracking procedures for such modes of communication might not yet be well established.

Table 2.2. Snapshot of Encounters by Mode of Communication for Seven Poison Centers

Mode of Communication	Call (*n* = 7)	Text Message (*n* = 4)	Online Chat (*n* = 7)
Total encounters	428,718	1,081	2,405
Percentage of encounters involving a human exposure case	88.0	93.3	72.3
Percentage of cases managed on-site, not at a health care facility	83.2	72.4	82.4
Percentage of encounters transferred to a call	—	10.6	13.5
Average length (in minutes) of initial contact for human exposures cases	10.8	16.7	13.5
Average number of follow-ups	1.6	1.1	0.8

SOURCE: Features data from the 2025 RAND survey of Poison Centers.

Surveillance (the National Poison Data System)

The Poison Center Networks serves an integral role in toxicosurveillance in collaboration with federal government agencies, including the Centers for Disease Control and Prevention (CDC) and the Food and Drug Administration (FDA). NPDS is a public surveillance tool developed and owned by America's Poison Centers. America's Poison Centers has been sharing information and collaborating with federal government agencies to promote public health surveillance since 2000. The Poison Center Network performs data collection, management, maintenance, and licensing functions, with NPDS collecting a wide variety of deidentified data, including select demographics, reason for exposure, clinical effects, therapies, and outcomes from cases reported to all 53 Poison Centers. NPDS contains more than 81 million records dating back to 1985 (America's Poison Centers, undated-b). Cases are grouped across more than 1,100 generic *substance* categories.[21] Cases may be further classified into more than 480,000 *product* codes, which include brand-name medications, nondrug products, and infectious diseases. Case data are automatically uploaded from the Poison Centers to NPDS, with a median time of 4.9 minutes (Carpenter et al., 2020).

The information in NPDS provides public health agencies and organizations, emergency responders, researchers, manufacturers, and health care providers with near-real-time surveillance of emerging public health threats and incidents of public health significance (IPHSs), including but not limited to outbreaks, unintentional ingestions, drug overdoses, and natural and human-caused disasters (Wang et al., 2018). Poison Centers can request new substance codes to track emergent hazards, such as in response to regional disaster events or issues of national concern.[22] America's Poison Centers has a rapid coding committee that can establish new codes in NPDS on an expedited basis so that new cases can be tagged, generally within 24 hours. Leveraging NPDS and regional

[21] These are known as America's Poison Centers Generic Codes®.

[22] For example, in 2023 a Norfolk Southern freight train derailed in East Palestine, Ohio (near the Pennsylvania border). Twenty of the derailed cars contained hazardous materials, including vinyl chloride, ethylene glycol, ethylhexyl acrylate, butyl acrylate, and isobutylene. Several cars caught on fire, and some cars leaked contents into a stream that eventually empties into the Ohio River; see Environmental Protection Agency (2025).

Poison Center data, the Poison Center Network plays an expanding role in emergency preparedness and response. Dissemination through NPDS can also help inform product recalls and policy changes, such as product safety standards. NPDS is also used by researchers to analyze the clinical effects and outcomes associated with poison exposures and evaluate the effectiveness of antidotes and other treatments.

CDC uses NPDS for (1) enhanced national surveillance capabilities for public health threats, (2) early detection of an IPHS, and (3) enhanced situational awareness during suspected or emerging public health emergencies (Carpenter et al., 2020). Such emergencies include adolescent suicides, COVID-19, natural disasters (such as hurricanes), human-caused disasters (e.g., the Deepwater Horizon oil spill), and exposures to nonprescription fentanyl, laundry detergent pods, and e-cigarettes. Algorithms continuously monitor NPDS data and alert CDC of a potential IPHS when an anomaly is detected relative to thresholds based on historical data (Carpenter et al., 2020). Such anomalies may be based on case volume, the number of cases with a given clinical effect, or cases of high-priority exposures. CDC considers these activities essential and includes in its annual budget request NPDS funding for continued monitoring and support in the prevention of environmental health threats. Examples include the following:

- In 2010, 1,838 cases were reported to Poison Centers related to the Deepwater Horizon oil spill. Self-reported cases and symptoms, "including cough, nausea, headache, eye irritation, throat irritation, chest pain, dizziness, difficulty breathing, and rash," were used to monitor the severity of local health effects (CDC, 2024b). This information was shared with states to assist in their public health responses.
- During a single month in 2012, Poison Centers reported 485 pediatric cases nationwide involving exposures to detergent-filled laundry pods. CDC partnered with America's Poison Centers to investigate the public health threat, contributing to new research on health outcomes associated with ingestion of laundry detergent pods and a decision by the largest manufacturer in the United States to improve the lid safety features of its containers (CDC, 2024b).
- In April 2015, NPDS tracked 1,501 cases related to synthetic cannabinoids (e.g., synthetic marijuana, Spice, K2, Mr. Nice Guy, Skooby Snax, Black Magic, and Crazy Clown) (U.S. Department of Justice, Drug Enforcement Administration, 2024), a 330 percent increase from 349 cases in January 2015, and alerted scientists at CDC (Law et al., 2015). CDC launched an investigation, which was followed by significant media coverage and increased awareness of the hazards and risks of synthetic cannabinoid use.
- In March 2018, 100 carbon monoxide exposures were reported to three East Coast Poison Centers following nor'easter storm-related power outages, with nearly half of the cases caused by portable generator exhaust (Henretig et al., 2018). Between 2018 and 2020, there were more than 90 deaths per year associated with carbon monoxide emissions from portable generators and many more nonfatal poisonings (Topping, 2024).
- In 2019, CDC and America's Poison Centers worked with five Poison Centers to conduct follow-up surveys with callers reporting exposures to harmful algal blooms, the rapid growth of algae or cyanobacteria that can produce toxins that make people and animals sick. The most frequent source of exposure was bathing or swimming in contaminated water, generally

through skin contact or ingestion (CDC, 2024a). Few callers were aware of the risks associated with harmful algal blooms, highlighting the importance of public health messaging for toxicological hazards.

- In April 2020, CDC and America's Poison Centers found that Poison Centers received 45,550 cases regarding exposures to cleaners and disinfectants during the first three months of 2020, a 20 percent increase from the same period in 2019 (Chang et al., 2020). Likely contributing to the increase were increased public awareness and media coverage of the COVID-19 pandemic, the beginning of some state and local stay-at-home orders, and reports of shortages of cleaning and disinfection products leading to some consumer-hoarding behavior.
- Following the train derailment and hazardous material release in East Palestine, Ohio, on February 3, 2023, America's Poison Centers received more than 200 related exposure cases (National Academies of Sciences, Engineering, and Medicine, 2024). Many cases reported respiratory, neurological, and gastrointestinal symptoms. The Poison Centers in Columbus and Cincinnati, Ohio, and Pittsburgh, Pennsylvania, developed chemical fact sheets and public health notices to assist Poison Center staff, health care providers, and public health agencies in response. The incident suggested a need for expanded clinical guidance with updated research on management, diagnosis, and treatment recommendations for physicians responding to potential exposures.
- In 2024, America's Poison Centers began tracking reports of adverse health reactions following the consumption of Diamond Shruumz–brand products, which led to a collaborative investigation and response to exposures with CDC and the FDA (CDC, 2024b; Food and Drug Administration, 2024). Following the initial response, Poison Center staff published new research on the topic (Gartner et al., 2024).

Each year, NPDS's annual reports highlight events with public health significance ("emerging trends") and exposures of newly identified hazards ("snapshots") (America's Poison Centers, undated-a). The 2023 NPDS Annual Report highlighted recent trends in unregulated psychotropic products, including phenibut, tianeptine, kratom, and nitrous oxide, as well as a sudden increase in cases associated with pediatric water bead exposures (Gummin et al., 2024). Previous reports highlighted Poison Center responses to COVID-19, lung injuries from e-cigarettes, adolescent suicides, cannabinoids, and fentanyl (America's Poison Centers, undated-a).

In addition to public health agencies, industry partners can request reports from America's Poison Centers, which might include information on the number of cases involving specific substance codes (i.e., for individual products) or subcategories (i.e., for an entire market).[23] Some consumer product companies, through their customer service representatives, refer callers directly to the national Poison Help line when suspected exposures occur. In RAND-conducted interviews, privately owned companies that work with Poison Centers said that no other organizations exist that could provide these services, and it would be difficult otherwise to track suspected exposures associated with their products or the markets in which they sell.

[23] America's Poison Centers does not license product-level data for any company to a competitor, although it does allow for the sharing of insights at the category level.

Health Care Provider Training

Poison Centers provide professional training and education as part of their accreditation requirements. In the RAND survey, Poison Centers reported outreach and training activities with a wide variety of hospital employees, including ED managers, pharmacy managers, medical students, and residents. Individual Poison Centers reported offering continuing education programs for other medical professionals or serving as a toxicology training site for multiple health care provider programs in the state. Forty-one percent of Poison Centers reported offering continuing education certifications. For example, some Poison Centers provide continuing education to emergency medical services (EMS) personnel. Some Poison Centers offer bedside services, such as care provided by medical or toxicology students, residents, and fellows associated with Poison Centers. These services expand the workforce able to respond to poison- and toxin-related health emergencies. The literature suggests that the management of human exposure cases by a Poison Center–trained medical toxicologist can significantly improve the quality of care provided.

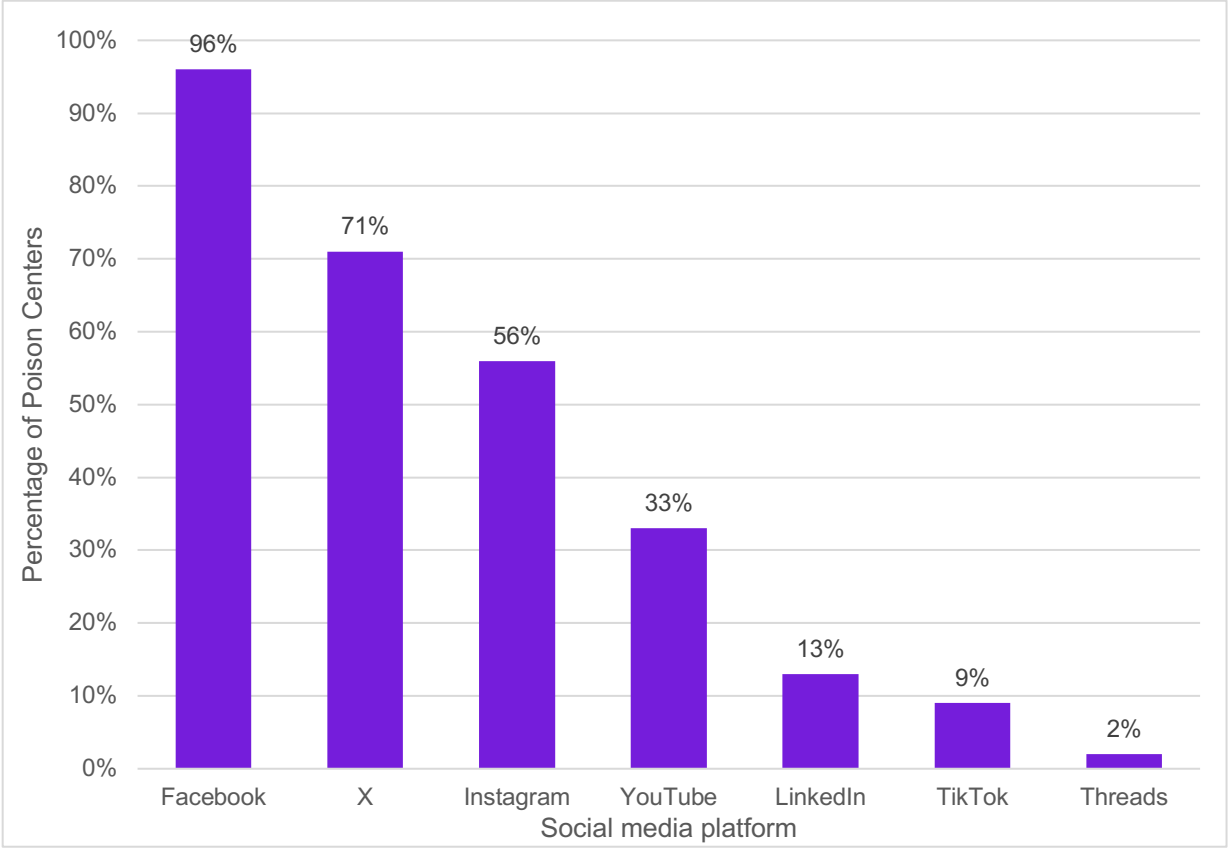
Public Education

Each Poison Center has dedicated personnel, often Certified Health Education Specialists®, who focus on education, public outreach, and awareness. Poison Centers educate the public on prevention topics and use outreach campaigns to increase awareness of Poison Centers as a free and widely available emergency resource. In addition to professional education and training for medical providers, Poison Centers offer educational support for non–health care providers, such as community organizations and schools. For example, in the RAND survey, a representative from one Poison Center reported issuing prescriber alerts when administering prescription opioid pain medication and providing patient education materials, and another Poison Center reported training high school staff across the state on administering naloxone to help combat the opioid overdose epidemic.

America's Poison Centers also partners with government agencies to encourage wider dissemination of public health data from trusted sources. For example, according to an interview participant, the One Pill Can Kill national campaign in partnership with the Drug Enforcement Administration sought to reduce fentanyl overdoses. Public education in tandem with training for health care providers can serve to improve the prevention of poison- and toxin-related emergencies. An interview participant shared that public education can also provide communities with information on Poison Center initiatives, such as safer medication storage. Interview participants offered differing assessments of the effectiveness of the Poison Center Network's public education efforts, with some stating that outreach primarily benefits individuals who have already opted into particular communications (e.g., signed up to an email distribution list) and others asserting that awareness campaigns were highly effective.

In addition, Poison Centers use their websites and social media to share public health information. This includes virtual or online education programs. Figure 2.6 shows that Poison Centers reported high levels of social media use, with the majority of Poison Centers maintaining accounts on Facebook, X, and Instagram.

Figure 2.6. Percentage of Poison Centers on Social Media, by Platform



SOURCE: Features data from the 2025 RAND survey of Poison Centers.

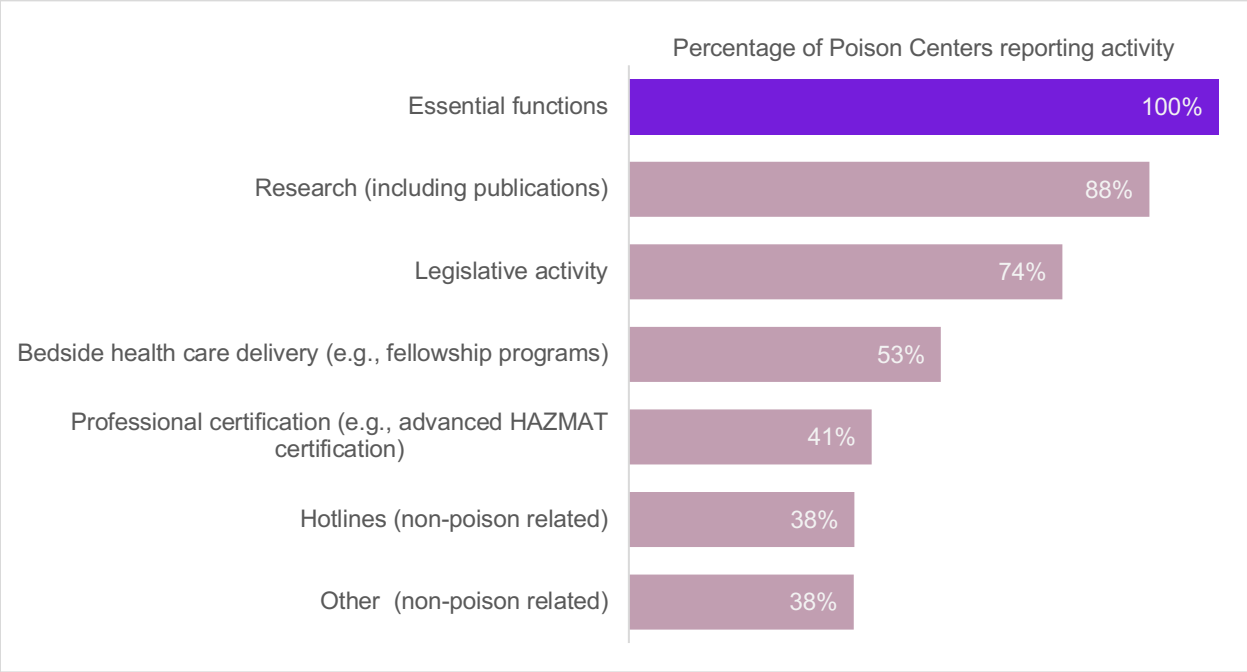
Ancillary Functions

Since 2010, the expansion into providing additional services, beyond the essential functions required for accreditation, may be driven by Poison Centers' need for additional revenue sources to ensure that operational needs are met. The RAND survey asked Poison Centers to list and describe ancillary functions they performed. Poison Centers provided a wide array of responses, such as national and regional data surveillance relating to nontraditional Poison Center services and case management outside more-traditional toxicological focus areas (e.g., veterinary advice, managing a state-funded rabies or COVID-19 hotline). Poison Centers reported working in emergency response and product surveillance in areas beyond essential services with state and local government agencies, industry, and community and public health organizations. Some Poison Centers also provide ancillary training on nontoxicological issues.

Poison Centers also leverage their existing knowledge and expertise on public health issues beyond their traditional toxicological focus area, including in such capabilities as research, patient management, and public health surveillance. Specific examples of ancillary functions reported in the RAND survey include operating state- and locally funded hotlines for COVID-19 and rabies

treatment and prevention. Figure 2.7 summarizes the ancillary functions Poison Centers reported undertaking.

Figure 2.7. Ancillary Functions Conducted by Poison Centers



SOURCE: Features data from the 2025 RAND survey of Poison Centers.
NOTE: "Other" includes surveillance and reporting activities not directly related to toxicology, website and social media management for nontraditional Poison Center services, after-hours call service for a local health jurisdiction, university health and wellness program support, funding for a rural hospital's patient transfer service, and industry or state or local government contracts. HAZMAT = hazardous materials.

Chapter 3

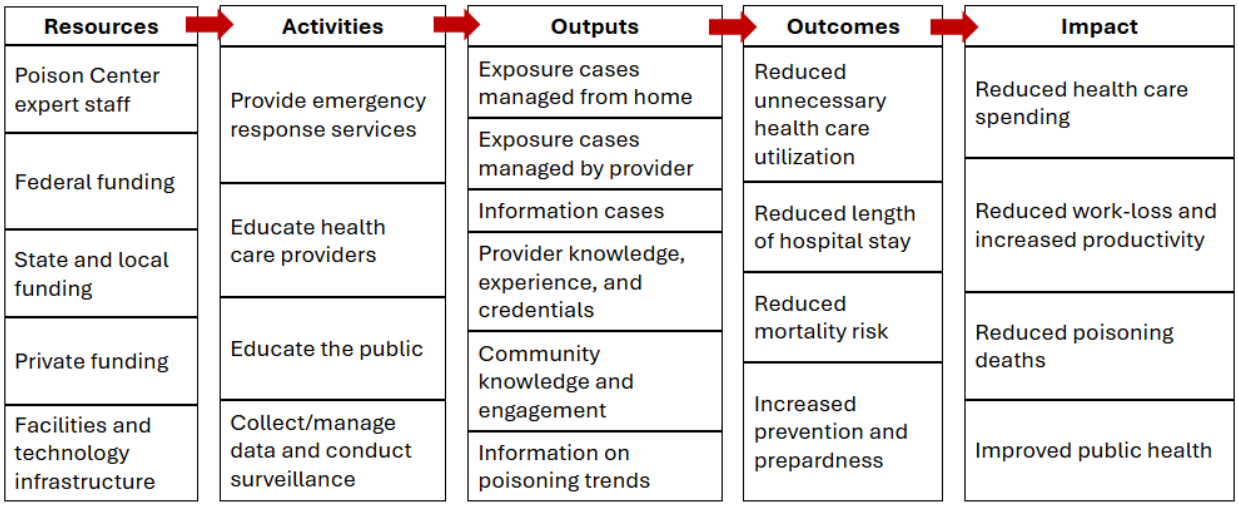
Benefits

To assess the current value of the Poison Centers, we first developed a logic model framework mapping Poison Center inputs (i.e., resources and staff) to activities (i.e., essential and ancillary functions) and to selected outcomes. The selected outcomes were informed by the published literature on the Poison Centers, the RAND survey, and interviews with stakeholders. Then, we estimated impacts associated with these outcomes using data from NPDS, public health organizations, white papers, and peer-reviewed research. We monetized these impacts, in dollar terms, whenever possible. However, it was not feasible to monetize all the impacts of Poison Centers, particularly those associated with the prevention of poison- and toxin-related health emergencies. The primary monetized impacts in this report included avoided health care costs, avoided productivity losses, and mortality risk reduction.

Logic Model Framework

We used a logic model framework to demonstrate the relationship between Poison Center activities and their public health impacts. A logic model provides a visual representation of how a program or organization is intended to work, illustrating the relationship between its resources, activities, outputs, outcomes, and *ultimate impact*, defined as a program's broader contribution to society (see Greenfield, Williams, and Eiseman, 2006; Greenfield, Shelton, and Balkovich, 2016; and W.K. Kellogg Foundation, 2004). As planning tools, logic models can provide a means of communicating with internal and external stakeholders and a framework for articulating and aligning operations, goals, and performance measures. The model represents a *theory of change* in a series of implicit, sequential "if-then" statements. If a program uses its resources effectively and executes its activities and outputs as intended, the outcomes and impacts described in the logic model should be realized. Figure 3.1 provides a simplified logic model of the Poison Center Network.

Figure 3.1. Logic Model of the Poison Center Network



The Elements of the Logic Model

In the logic model, the resources of the Poison Center Network support an array of activities that yield outputs, outcomes, and, eventually, impacts. The resources that support Poison Centers' activities consist of expert staff, access to facilities and technology infrastructure, and funding from federal, state and local, and private sources, as well as subsidized revenue from host institutions. We grouped Poison Center Network activities into four categories: (1) providing emergency response services, (2) educating health care providers, (3) educating the public, and (4) collecting data to conduct surveillance. Functions that aid in responding to patient and health care provider cases via Poison Centers' text message or online chat features were considered part of providing emergency response services.

Emergency response services, primarily provided through call center operations, include any activity in which an individual, institution, or health care provider interacts with a Poison Center, resulting in a case being recorded in NPDS. For individuals, Poison Centers provide treatment recommendations and/or triage to an appropriate health care facility. Health care providers may also contact Poison Centers when treating a potential exposure. Other interactions with Poison Centers include professional training and certification and public education. Education for health care providers is training provided to professionals, including medical and clinical toxicologists, CSPIs, medical students, residents, fellows, and faculty on primary treatment teams, conducted via outreach or formalized training programs. Within Poison Centers, health care providers engage in toxicology education and research, management of reported exposures, and professional certification or specialized training. Public education primarily occurs through outreach campaigns and community engagement. Data and surveillance include activities related to regional Poison Center data and NPDS; clinical effect, substance, or product monitoring on behalf of partners and other stakeholders; and extramural research.

The activities and outputs in the logic model translate into outcomes and, eventually, impacts through various direct and indirect mechanisms. Emergency response services can affect several

outcomes, including, but not limited to, the decision to use health care services, length of a hospital stay, and mortality risk. These more-immediate outcomes can, in turn, lead to avoided health care costs and avoided productivity losses. For example, providing guidance to manage a case on site (e.g., at home) rather than unnecessarily visiting the ED could avoid both health care costs and productive time spent in transit and waiting for treatment. Provider education can have similar effects on overall utilization, length of stay (LOS), and mortality. Increased Poison Center awareness would encourage health care providers to call a Poison Center for potential exposures. In addition, impacts are magnified because prior Poison Center training can improve the overall quality of care. Public education can improve prevention, awareness, emergency preparedness and response, which could lead to impacts on health care utilization, productivity, and public health. Lastly, data and surveillance efforts could contribute to similar outcomes and impacts as the other Poison Center activities. However, data and surveillance could have a more direct impact: Collaboration in monitoring with public health agencies could increase emergency preparedness and response and lead to product warnings or recalls, redesigns, and new product standards that prevent poison exposures (FDA, 2024). We discuss evidence for these potential outcomes and impacts in subsequent sections.

The Value of Outcomes and Impacts

Our mixed methods analysis of the value of the Poison Center Network focused on the following *outcomes*:

- health care utilization
- hospital LOS
- mortality risk
- prevention and preparedness.

Avoidable health care utilization occurs when cases could have been managed on-site outside a health care facility. *Reduced LOS* refers to fewer days spent in the hospital for inpatient admission. *Mortality risk reduction* refers to the lower likelihood of death because of poison- or toxin-related exposure. Finally, *prevention* and *preparedness* refer to lower overall poisoning and the ability to address poisoning outbreaks (e.g., product recall and redesigns).

To measure impact, we estimated changes in health care costs, the dollar value of productivity losses, and the dollar value associated with changes in mortality risk. Avoided utilization can reduce health care costs and increase productivity because patients do not spend time in transit or waiting. Similarly, reduced LOS also minimizes health care costs and lost productivity. Mortality risk, to the extent that Poison Centers play a role in that risk reduction, can be valued using estimates of willingness to pay (WTP) for small reductions in the probability of death because of a poison- or toxin-related exposure. Economists refer to this concept as the *value of a statistical life*. Measures for public health are challenging to quantify. Therefore, for these outcomes, we focused on providing qualitative evidence of the Poison Centers' impact. However, we also provide calculations of public health benefits based on WTP estimates.

Categories of Benefits Discussed in the RAND Survey and Interviews

We conducted a survey of Poison Centers and interviews with a wide variety of stakeholders who interact with America's Poison Centers or individual Poison Centers. We did this to improve our understanding of the benefits, even if we would not be able to monetize all of them in our analysis. Study participants identified Poison Center activities or their interactions with Poison Centers, as well as the benefits of interventions, as illustrated in the logic model. These discussions sought additional information on how stakeholders interact with the Poison Centers and what they perceived as the key benefits to themselves and their communities related to Poison Center activities. Interviewees from different organizations spoke about the surveillance and informational value of NPDS, with some asserting that it is the only database of its kind. Specifically, NPDS captures potential exposures that are not recorded in ED visits because some individuals never interact with another health care provider. NPDS was also reported to be used in developing products for industry, monitoring product safety, and serving as a critical data source in studies. In addition to NPDS, America's Poison Centers and individual Poison Centers were noted as sources of general education and information on toxicology, including as partners to other organizations and state and federal government agencies. Interviewees flagged that the expertise of Poison Center staff is a key resource for emergency and general medical providers. For health care providers working on cases with a Poison Center, Poison Center staff are a key resource in identifying potential toxins and determining treatment plans. These types of cases increased preparedness and peace of mind for providers and offered support for individual treatment plans.

Methodology for Estimating the Value of Benefits

To measure the annual benefits of Poison Centers, we combined statistics derived from NPDS, academic and gray literature, and statistics published by federal and state regulatory agencies. We monetize two types of outcomes: those with *static* impacts (e.g., avoided utilization) and *dynamic* impacts (e.g., reduced LOS and mortality risk reductions from the education of the health care provider).

For outcomes with static impacts, there are no additional effects except for those realized during the year. Estimation of the annual benefit V^{static} took the following form:

$$V^{static} = Statistic \times Effect \times CF_{Effect \rightarrow \$}.$$

The first component $Statistic$ is a Poison Center statistic, derived usually from NPDS, such as the total number of human exposure cases in 2023. $Effect$ is the effect of the Poison Center interaction on the nonmonetized outcome (e.g., the likelihood that the caller would have gone to the ED), derived from published studies or Poison Center data. Finally, $CF_{Effect \rightarrow \$}$ is the monetization factor used to measure outcomes in dollar terms (e.g., the average cost per ED visit).

For outcomes with benefits over time, there are potentially effects in future years. We calculated the present discounted value of the current and future annual flow of benefits from year $t = 0$ to $T-1$ using a social discount rate of r:

$$V^{dynamic} = \sum_{t=0}^{T-1} \frac{V^{static}}{(1+r)^t} = \frac{V^{static}(1+r)}{r}\left(1 - \frac{1}{(1+r)^T}\right).$$

For this analysis, we used a discount rate of 3 percent, which reflects the social rate of time preference, or the rate at which society discounts future benefits to their present value; see U.S. Office of Management and Budget (2003).

Unnecessary Health Care Utilization

Health Care Costs

One of the primary static benefits of the Poison Centers is the reduction in unnecessary health care utilization for reported exposures. Unnecessary health care utilization increases costs shared by taxpayers, hospitals, insurers, and the government. The emergency response services provided by Poison Centers can deter the use of high-cost care. Multiple studies have shown that, absent a Poison Center, many cases would have likely resulted in medical care utilization, such as calling an ambulance or visiting a physician, urgent care center, or ED, which in some cases could result in unnecessary hospitalization. These types of low-acuity cases are common. In 2023, nearly 1.4 million human exposure cases, 66 percent of all human exposure cases, were managed on-site outside a health care facility (Gummin et al., 2024). Public education can also help increase awareness of Poison Centers' services, which can help people avoid unnecessary health care utilization. Outreach campaigns encourage the use of Poison Centers' emergency response services in the event of potential exposures, avoiding health care utilization by deterring the use of expensive medical services, such as treatment in an ED. Interview findings supported this idea, with one interviewee noting that they refer callers to Poison Centers for help with medical questions because the interviewee's organization operates under restrictions that prevent them from offering medical advice and another interviewee noting that they refer their stakeholders to Poison Centers to "[allow] families to get important information without having to spend time in the ER [emergency room] [and help] reduce overcrowding to allow people to safely stay at home, which helps address this issue in the health care setting in a way that is still good."

Table 3.1 summarizes the annual health care costs avoided through Poison Centers interactions, by provider setting. We estimate that Poison Centers saved more than $1 billion in avoidable health care costs. For each medical provider setting, we rated the strength of evidence:

- **Moderate to strong:** Indicates that there have been multiple studies demonstrating benefits associated with a particular outcome.
- **Mixed:** Indicates that there were studies that document different impacts (e.g., a study finding that Poison Centers decreased costs and another finding no impact on costs).

- **Limited:** Indicates that there was not enough evidence in the published literature to conclude one way or another (e.g., only a single study examined the outcome). We excluded estimates based on these studies from our primary estimate of the value of Poison Centers.

Table 3.1. Annual Cost Savings from Avoidable Health Care Utilization, by Setting

Setting	Estimate (2024$ millions)	Strength of Evidence
ED	825	Moderate to strong
Ambulance	508	Moderate to strong
Urgent care center	20	Moderate to strong
Telehealth	40	Moderate to strong
Hospitalization	136	Mixed
Total	**1,528**	

NOTE: Estimates might not sum to the total because of rounding.

Emergency Department Utilization

Several studies have estimated the proportion of cases that would have resulted in an ED visit but for access to a Poison Center. As shown in Table 3.2, we used the average of the individual estimates across these sources to calculate that approximately 45 percent of cases managed on-site in a non–health care setting would have ended up in an ED visit without access to a Poison Center. Studies typically surveyed a sample of Poison Center callers on what actions they would have taken if the Poison Center was not available. The proportion of individuals who would have used an ED is the sum of those stating that they would have visited an ED and those stating that they would have dialed 911, likely summoning EMS (ambulance service), which is likely to have resulted in ED utilization.

We estimated the cost savings from avoided ED utilization by multiplying the number of exposure cases managed on-site (i.e., outside a health care facility) in 2023 with the proportion that would have resulted in ED utilization and estimates of the health care costs associated with *treat-and-release* ED visits. Combining these statistics, we estimated that Poison Centers saved $825 million in avoidable ED costs per year.

A visit to an ED would incur facility, physician, and ancillary costs, typically shared by patients and insurers (both public and private). We estimated that treat-and-release ED visits related to poisonings would incur an average cost of $1,336 per visit—$653 in facility costs, $314 in professional costs, and $369 in ancillary costs.

Table 3.2. Proportion of Callers Who Would Have Used Other Providers Absent the Poison Center Network

Source	Poison Center Location	ED[a]	EMS[b]	Telehealth[c]	Urgent Care[d]
Washington Health Alliance (2025)	Washington	0.22	0.08	0.20	0.08
Arizona Poison and Drug Information Center (2024b)	Arizona	0.37	0.06	0.20	0.07
Tak et al. (2017)	Utah	0.48	0.21	0.29	—
Bottei and Kalin (2013)	Iowa	0.41	0.04	0.43	0.06
Blizzard et al. (2008)	Undisclosed	0.33	0.12	0.35	—
LoVecchio et al. (2008)	Arizona	0.70	0.37	0.24	—
Bottei and Kalin (2004)	Iowa	0.68	0.04	—	0.07
Phillips et al. (1998)	California	0.58	0.55	0.26	—
Kearney et al. (1995)	California	0.25	0.04	0.26	—
Average		**0.45**	**0.17**	**0.28**	**0.07**

NOTE: A dash = not available.
[a] Participants reported that they would have visited an ED or health care provider or called 911.
[b] Participants reported that they would have called 911.
[c] Participants reported that they would have called another health care provider.
[d] Participants reported that they would have visited an urgent care center or a physician (when defined separately from visiting the ED).

We used 2022 estimates of facility costs for several poisoning-related diagnoses from the Agency for Healthcare Research and Quality's Healthcare Cost and Utilization Project (HCUP) (Agency for Healthcare Research and Quality, undated).[24] HCUP obtained facility *charges* for treat-and-release visits and estimated costs by adjusting them with facility-level cost-to-charge ratios. Except in the case of public health insurance (e.g., Medicare), provider charges typically represent a list price substantially higher than allowed amounts (i.e., costs), which are determined by provider-insurer negotiations. Taking the average costs across poisoning-related diagnoses and adjusting for inflation, we estimated that treat-and-release poisoning cases would cost insurers and patients, on average, $653.

For professional costs associated with ED evaluation and management services, we used data from Schwartz et al. (2023), which reported estimates of professional costs in the ED in 2021 for commercially insured cases. We estimated professional costs to be approximately $314 by adjusting values from Schwartz et al. (2023) for inflation and Poison Center caller insurer shares from Tak et al. (2017),[25] as well as differences in costs between commercial and government payers.[26]

[24] We examined costs for the following diagnoses (CCS-R) for 2022: drug induced or toxic related condition (INJ030), allergic reactions (INJ031), poisoning by drugs (INJ022), toxic effects (INJ023), and adverse effects of drugs (INJ028).

[25] We used the following payer shares throughout the report: 67 percent commercial, 6 percent Medicare, and 27 percent Medicaid, uninsured, or other, following data from Tak et al. (2017).

[26] Zuckerman, Skopec, and Aarons (2021) found that Medicaid prices were about 30 percent lower than Medicare rates. The Congressional Budget Office (2022) found that commercial rates were about 30 percent higher than Medicare rates. We

Above and beyond hospital charges or professional costs, clinicians in EDs will often bill for additional services, such as bloodwork and imaging. According to Schwartz et al. (2023), 54 percent of all ED visit costs are for nonevaluation and management costs. Since HCUP estimates already include hospital-based facility costs for itemized services, we calculated the additional costs by adjusting only the physician costs, yielding an estimate of $369 per visit.

Emergency Medical Services Utilization

We also estimated the cost savings from avoided EMS utilization by multiplying the number of exposure cases managed on-site outside a health care facility in 2023 by the proportion of cases that would have resulted in ambulance utilization and estimates of the costs of ambulance services. As shown in Table 3.2, several studies calculated the proportion of cases that would have dialed 911, likely summoning EMS and leading to ambulance utilization, if access to a Poison Center was not available. Estimates ranged between 4 and 55 percent of cases. Using the average of these studies, we estimated that without access to a Poison Center, 17 percent of cases would likely have resulted in ambulance utilization.

Ambulance costs often vary based on insurance, distance, and type of transport. Using commercial claims data from the Health Care Cost Institute (HCCI), Adler et al. (2023) estimated an average cost of $1,027 for a private ground ambulance (allowed amount for emergency advanced life support, level 1 ground ambulance transport). Adler et al. (2023) also estimated that Medicare would pay $494 in 2017 for an eight-mile trip.[27] Hargraves and Sarfo (2023) published HCCI data showing that, from 2012 to 2021, 52 percent of ground transports were for emergency advanced life support, and 27 percent were for level 1 or emergency basic life support. Accounting for the proportion of health care costs incurred by payer type, using an average estimated distance of 8.7 miles to the nearest hospital, and adjusting monetary values for inflation, we estimated that the average cost of ground transportation via ambulance is $1,307. Although more than 96 percent of transports are via ground ambulance, around 4 percent are via aircraft (Brown et al., 2020). Using HCCI data, Brown et al. (2020) found that, between 2014 and 2017, the average commercial plan–allowed amount for air ambulances was around $26,000. Turrini et al. (2021) estimated that the average cost to Medicaid was $5,246 per air ambulance trip in 2018. We adjusted these costs for inflation, payer shares, and differences in costs between Medicaid and Medicare to estimate that an air ambulance trip would cost $24,172.[28] Taking the average weighted by air and ground ambulance market shares, we calculated that each avoided EMS transport would save $2,187. Therefore, we estimated that the Poison Centers saved more than $500 million in unnecessary ambulance costs in 2024.

applied the Medicaid rate to costs from patients who were uninsured or did not have commercial, Medicare, or Medicaid insurance.

[27] In New York state, there are seven types of ground-ambulance fee categories: basic life support; emergency basic life support; advanced life support, level 1; emergency advanced life support, level 1; advanced life support, level 2; specialty care transport; and paramedic intercept.

[28] We assumed that Medicaid has 30 percent lower costs than Medicare (Congressional Budget Office, 2022).

Telehealth Utilization

As shown in Table 3.2, many studies found that individuals may seek to utilize telehealth options from health care providers if a Poison Center is unavailable. Averaging across these studies yielded an estimate of 28 percent of cases. Although there is relatively limited evidence on the cost of telemedicine, we used estimates from Ashwood et al. (2017) showing that the average cost of a telehealth visit in California, including follow-up calls, was around $104 (measured in 2024 dollars). Using these estimates, we found that Poison Centers helped individuals and insurers avoid approximately $40 million in telemedicine costs in 2024.

Urgent Care Center Utilization

As an alternative to the ED, individuals may seek treatment at an urgent care center or with a primary care physician. Urgent care centers tend to result in lower health care costs relative to an ED. However, using urgent care in lieu of calling a Poison Center also imposes societal costs. We estimated the cost savings from avoided urgent care utilization by multiplying the number of exposure cases managed on-site outside a health care facility in 2023 by the proportion of cases that would have resulted in urgent care utilization and estimates of the associated health care costs. As shown in Table 3.2, drawing on two recent surveys from Arizona and Washington (Washington Health Alliance, 2025; Arizona Poison and Drug Information Center, 2024b) and two older studies from Iowa (Bottei and Kalin, 2004, 2013), we estimated that 7 percent of cases would have visited an urgent care center or primary care provider.

There are only a handful of studies that provide information on urgent care costs. Ho et al. (2017) found that costs in Texas ranged between $160 and $170 during the period 2012 to 2015 for commercially insured patients. Mehrotra et al. (2009) found that costs in Minnesota ranged from $150 to $165 per visit in 2006. We adjusted these estimates to account for inflation and by the proportion of costs incurred by payer type to estimate that average urgent care costs would be around $209 per visit. Combining these statistics, we estimated that Poison Centers saved $20 million in annual avoidable urgent care costs.

Unnecessary Hospitalization

Poison Centers may also play a role in preventing unnecessary inpatient hospital stays. McDermott and Jiang (2020) found that, in 2017, 8.9 percent of medical costs associated with inpatient stays for nonobstetric stays were preventable. Similarly, Wood et al. (2022) estimated that preventable hospitalization rates across medical conditions averaged 7 to 8 percent between 2005 and 2017. The evidence regarding Poison Centers' effects on hospitalization rates overall is mixed. In a study of 12 states, Zaloshnja et al. (2006) found that one in every 43.3 calls to a Poison Center was associated with an avoided hospital admission. In California, Albertson et al. (2008) found that call frequency was not associated with a reduction in the number of hospitalizations related to poisonings.

Despite the mixed evidence, we calculated the value of Poison Centers' emergency response services in avoidable hospitalizations by extrapolating estimates of unnecessary inpatient admissions from an ED. In California, Coussens and Ly (2025) found that 19.4 percent of admissions from an ED were for less than 24 hours, relative to 41 percent of ED visits that led to an admission of any

length; this implies that around 8 percent of transfers from an ED resulted in an unnecessary hospitalization, consistent with findings in Wood et al. (2022). Similarly, Solberg et al. (2018) found that around 4 percent of visitors to the ED were unnecessarily admitted.

For a typical hospital stay, there are generally two types of costs: The hospital is paid a facility cost per diem, and practitioners are paid for follow-up care, testing, imaging, or monitoring. We used HCUP to obtain average facility costs per day for relevant poisoning diagnoses, estimating the average cost per day to be $3,117 (Agency for Healthcare Research and Quality, undated).[29] We then estimated physician costs for inpatient admission using the ratio of facility costs to total costs. Peterson et al. (2023) found that estimated facility costs would have to be increased by 21 percent and 19 percent for commercial and Medicaid payers, respectively, to account for physician costs. Using the distribution of costs incurred (by payer) across Poison Center cases, we estimated the average physician cost to be $633 per day, for a total of $3,750 per diem.

Applying the proportion of unnecessary hospitalizations from an ED to the number of callers who would have gone to the ED and the cost of an inpatient stay for a 24-hour stay, we estimated that Poison Centers saved between $130 and $140 million per year from unnecessary hospitalizations. Poison Centers may also have effects on treatment duration (e.g., LOS), which we quantify later in the report.

Productivity

Time spent in an ED, urgent care center, or hospital is time that could have been used for other productive purposes, such as labor, recreation, or education. Although there may be considerable variation across individuals, occupations, and age groups, we used average hourly labor costs as a proxy for the value of time. Therefore, assuming that only one individual is affected per case, we calculated productivity benefits by estimating lost output associated with time spent receiving unnecessary medical care or during transport. Table 3.3 reports our estimates of avoided productivity losses associated with health care utilization.

We assume that lost output is equivalent to $58 per hour, which is the average hourly wage multiplied by 1.61, the productivity-pay gap. According to the U.S. Bureau of Labor Statistics (BLS), in December 2024, the seasonally adjusted wage rate was $36 per hour (BLS, 2025). The *productivity-pay gap* refers to the divergence that has occurred since the late 1970s between overall economic productivity and the wages of typical workers in the United States. The Economic Policy Institute (2025) calculated the ratio of productivity to wages to be 1.61 in the fourth quarter of 2024. Productivity, which measures the output generated per hour of work, has continued to rise (increasing 86 percent from 1979 to 2025), but the hourly pay for approximately 80 percent of the U.S. workforce has grown significantly less (only 32 percent in the same period). Therefore, using average

[29] We obtained total discharges, average LOS, and average 2022 cost per stay for the following Medicare Severity Diagnosis Related Groups (MS-DRGs): 915 (allergic reaction with major complications or comorbidities [MCCs]), 916 (allergic reactions without MCC), 917 (poisoning and toxic effects of drugs with MCC), 918 (poisoning and toxic effects of drugs without MCC), 922 (other injury, poisoning, or toxic effect diagnosis with MCC), and 923 (other injury, poisoning, or toxic effect diagnosis without MCC). The average cost per stay is the sum of the total costs divided by the total number of days for these MS-DRGs.

wage rates would understate the productivity benefits associated with unnecessary health care utilization.

Table 3.3. Annual Productivity Benefit from Avoided Utilization, by Outcome Type

Setting	Estimate (2024$ millions)	Strength of Evidence
ED use	105	Moderate to strong
Hospitalization	17	Mixed
Urgent care center use	5	Moderate to strong
Transportation	23	Moderate to strong
Total	**150**	

NOTE: Estimates might not sum to the total because of rounding.

Emergency Department

The average ED visit for treat-and-release patients across multiple sources was approximately 3.0 hours. Specific findings come from Horwitz, Green, and Bradley (2010): 3.0 hours; Karaca, Wong, and Mutter (2012): 3.3 hours (196 minutes); and 2024 data from CMS (2025): a median of 2.6 hours for discharged patients in hospital-based emergency rooms. Combining the average length of visit with the number of expected ED visits in the absence of a Poison Center, we estimated that Poison Center activities generated benefits equivalent to 1.8 million labor hours, $65 million in wages, or $104 million in total output owing to avoidable ED utilization.

Urgent Care Centers

Although urgent care centers are not typical poisoning treatment locations, as shown in Table 3.2, several studies showed that callers would have gone to one or visited a primary care physician. Khairat et al. (2021) found that the average duration of an urgent care visit was 55 minutes, about two hours shorter than an ED visit. By multiplying the average visit length with the number of expected urgent care visits without Poison Centers and the productivity (hourly wage and productivity wage gap) associated with that total time, we estimated the annual productivity benefits from reduced urgent care visits to be approximately $5 million.

Unnecessary Hospitalizations

Because data on LOS for unnecessary hospitalizations are not available, we assumed that avoidable hospitalizations would have resulted in eight hours of lost productivity per case. Avoidable hospitalizations are, by definition, low risk; they would likely not have occurred had there been a Poison Center consultation—and then would have been managed outside a health care facility. By multiplying the expected number of unnecessary hospitalizations in the absence of a Poison Center with the value of eight hours of productivity, we found that Poison Centers' activities resulted in an additional $16 million in total output from avoided hospitalizations.

Transportation

Travel to an ED or urgent care center can also result in "lost" time (i.e., time that could be spent on productive activities, such as work), particularly in rural areas. For example, HCUP estimates that the average round-trip driving distance to a health care facility is 17 miles (Weiss, Pickens, and Roemer, 2011). The Federal Highway Administration (2006) found that commuters travel, on average, at speeds ranging from 27 miles per hour (mph) in large cities to 35 mph in smaller ones. At 31 mph, the average driving time to a health care facility would be about 0.56 hours. By calculating the number of avoided ED and urgent care center visits (excluding hospitalizations, which we assumed would occur via the ED), we assessed that Poison Centers collectively saved approximately 396,000 hours of lost driving time. Multiplying this value by the average hourly wage of $36 and the productivity-wage gap of 1.61 results in savings of approximately $23 million.

Length of Stay

This section estimates the benefits associated with a decrease in the average LOS for admitted patients in a health care setting.

Health Care Costs

Table 3.4 reports our estimates of avoided health care costs associated with decreased LOS because of Poison Center activities.

Table 3.4. Annual Reduced Health Care Costs Associated with Decreased Length of Stay

Activities	Estimate (2024$ millions)	Strength of Evidence
Exposure cases managed by Poison Centers	721	Mixed
Exposures not directly managed by Poison Centers	4	Mixed
Total	**725**	

NOTE: Estimates might not sum to the total because of rounding.

Exposure Cases Managed by Poison Centers

Evidence suggests that exposure cases managed by Poison Centers and their specially trained staff may reduce the average hospital LOS. Reductions in LOS may be attributable to increased efficiency. In stakeholder interviews, caregivers noted that the ability of health care providers to contact a Poison Center created efficiencies in writing treatment plans, offering providers a timely and dependable resource. As shown in Table 3.5, several studies demonstrated that hospitalizations in cases involving Poison Center treatment recommendations had a shorter average LOS. For this study, we used an

estimate calculated as the mean value of these studies, suggesting an average reduced LOS equivalent to 1.25 days.[30]

Table 3.5. Effects of Poison Center Interaction on Hospital Stays

Source	Poison Center Location	Change in LOS (days)	Percentage Change in Total Hospital Charges[a]
Arizona Poison and Drug Information Center (2024a)	Arizona	−0.90	−0.28
Farkas et al. (2022)	Wisconsin	−0.48	0.05
Friedman et al. (2014)	Illinois	−0.60	−0.10
Bunn et al. (2008)	Kentucky	−1.28	−0.30
Vassilev and Marcus (2007)	New Jersey	−3	—
Average		**−1.25**	**−0.16**

NOTE: A dash = not available.

[a] Hospital charges do not reflect true costs because of negotiated hospital-insurer rates. However, effects on charges may be proportional to changes to costs.

There is greater uncertainty in determining whether reduced LOS translated into reduced health care costs. Many of the studies that examine LOS also looked at impacts on hospital charges. These studies do not consider charges for physician and ancillary services (e.g., imaging and bloodwork) that might be rendered during the hospitalization, potentially understating total charges. However, hospital charges are typically higher than the actual cost, which is determined by hospital-insurer negotiations. Nevertheless, impacts on charges may be proportional to impacts on negotiated costs. In Illinois, Friedman et al. (2014) found that average hospital charges were on average $2,214, or 10 percent less per stay, when they involved Poison Center support. Similarly, in Kentucky, Bunn et al. (2008) found that cases with Poison Center treatment recommendations reduced average hospital charges by 30 percent. However, in Wisconsin, Farkas et al. (2022) found that hospital charges increased by 5 percent when a case had Poison Center treatment recommendations, although hospital charges were lower, on average, for children ages 0 to 6 for unintentional poisonings. Farkas et al. (2022) argued that this finding was consistent with the finding that more-severe cases were reported to Poison Centers.

Despite the mixed evidence, we calculated the average value of emergency response services provided by Poison Centers from reducing LOS by multiplying the number of cases hospitalized (admitted to noncritical care or critical care) as reported in NPDS in 2023, around 154,000, by the number of reduced inpatient days (1.25) and the average cost per day in a facility and physician costs paid by insurers and patients ($3,750). Our estimate was $721 million per year. About one-third of that benefit, around $240 million, would be attributable to pediatric patients, since they consist of approximately one-third of Poison Center cases. Given the mixed evidence on the benefits of reduced

[30] Parish et al. (2019) examined the effect of *clinical* toxicology services on LOS in intensive care units in Australia, finding an average reduction of 12 hours. This result generally aligns with estimates of LOS reductions of those U.S. cases receiving Poison Center treatment recommendations.

health care costs for adults, $240 million could serve as an alternative estimate of the value of the Poison Centers from reduced LOS.

Exposures Not Directly Managed by Poison Centers

Poison Centers educate and train providers—such as students (e.g., nursing, medical, and pharmacy), residents (medical and pharmacy), and fellows—on topics related to toxicology. Additionally, some Poison Centers collaborate with universities by developing curricula for students studying to become health care providers. To the extent that these educational activities encourage health care providers or their patients to utilize the Poison Centers, affecting bedside care delivery via emergency response services, such benefits are already captured in the calculations above. Our estimates above also account for when Poison Centers directly employ these staff (e.g., clinical toxicologists).

Provider training may provide *dynamic* impacts, benefiting all their current and future patients, even without direct Poison Center consultation. For example, a Poison Center–trained clinician could provide better care throughout their entire career. Our analysis focuses on medical toxicology fellowships based on the available evidence. Additional research is needed to further assess the extent to which toxicological training for other professionals reduces LOS without a direct Poison Center consultation.

Poison Centers provide substantial support for medical toxicology fellowships, which are offered to doctors who have completed a residency. The American Council for Graduate Medical Education (2023) requires that medical toxicology programs be in close proximity to a Poison Center and provide educational experiences in a regional Poison Center. Wax and Donovan (2000) surveyed 147 current and former fellows, finding that fellows spent on average 46 percent of their clinical time during fellowships providing Poison Center consultations. Fellows spend about 55 percent of their time acting in a clinical setting, 22 percent conducting research, 17 percent teaching, and 5 percent doing coursework. Therefore, approximately 25 percent of the medical toxicology fellowship was spent in Poison Centers.

There have been several studies on the effects of being treated by a trained medical toxicologist, as opposed to a general physician, including reduced LOS and health care costs. In the published literature, LOS reductions ranged from 0.3 to 1.5 days, with an average of 0.7 days (Curry et al., 2015; King et al., 2019; Wax et al., 2025).

There are around 200,000 hospitalizations for poisonings each year and 35,100 emergency medicine physicians in the United States, according to HCUP data and the BLS, suggesting that emergency medicine physicians treated an average of 6.7 inpatient poisoning cases per year (Agency for Healthcare Research and Quality, undated; BLS, 2024).[31] The training provided by the Poison Centers to medical toxicologists can be tied to those providers' ability to reduce the average LOS for poisoning cases by 4.7 days per year, saving about $18,000 in health care costs. Over a 30-year professional career, a trained medical toxicologist would save approximately 141 patient care days, valued at $350,000, using a discount rate of 3 percent. We assumed that the value attributable to

[31] According to HCUP, there were 141,000 and 93,000 hospitalizations for MS-DRG 917 and MS-DRG 918 in 2022, respectively.

Poison Centers is equivalent to the proportion of medical training spent at Poison Centers, or approximately 25 percent, yielding an estimate of $88,000 for each medical toxicology fellow. Poison Centers graduate between 37 and 54 medical toxicology fellows per year (Pizon et al., 2023), or 49 on average, with 91 percent remaining in clinical practice (Wax and Donovan, 2000). Therefore, the total annual benefit owing to reduced LOS associated with medical toxicology training is approximately $4 million.

Productivity

We calculated the productivity benefit by estimating the value of time associated with the reduced LOS because of a Poison Center consultation or from a Poison Center–trained provider without direct Poison Center consultation. The average hospitalization involving a Poison Center consultation reduced the average LOS by 1.25 days. In 2023, nearly 154,000 cases reported to NPDS were for patients admitted to a critical care or noncritical care unit (Gummin et al., 2024). Combining the reduced LOS with the number of hospitalizations, we estimated that Poison Center activities save approximately 1.5 million labor hours, $55 million in wages, and $88 million in total output because of reduced LOS per year. The implied productivity benefit from reduced LOS because of treatment by a Poison Center–trained medical toxicologist amounted to $0.5 million.

Table 3.6. Annual Productivity Benefit Associated with Decreased Length of Stay

Outputs	Estimate (2024$ millions)	Strength of Evidence
Exposure cases managed by Poison Centers	88	Moderate to strong
Exposures not directly managed by Poison Centers	0.5	Moderate to strong
Total	**89**	

Mortality Risk

We estimated the value of mortality risk reductions associated with the Poison Centers. It is particularly challenging to quantify impacts associated with functions contributing to the prevention of poison- and toxin-related health emergencies. For example, there is limited evidence on the impact of emergency response services and public education on mortality rates.

Table 3.7. Annual Benefit Associated with Decreased Mortality Risk

Outputs	Estimate (2024$ millions)	Strength of Evidence
Exposure cases managed by Poison Centers	—	Limited
Exposures not directly managed by Poison Centers	574	Moderate to strong
Total	**574**	

NOTE: A dash = not available.

Exposure Cases Managed by Poison Centers

The benefits to providers from consultations with Poison Centers and associated downstream health care outcomes, such as reduced mortality risk, were raised during several interviews conducted for this study. One medical provider noted, "in [an] informatics-driven age, you really just need someone to be accompanying you and reassuring you." Another provider shared an example in which Poison Center support helped successfully manage an uncommon exposure, noting, "I don't think I've ever had a conversation that wasn't helpful in some way. . . . I don't know what I would do if they weren't available. I would frankly be scared."

We did not calculate the direct impact of Poison Center emergency response services on mortality because there is limited evidence on the effect of Poison Center consultation on mortality rates. A lone paper, Farkas et al. (2022), did not find a statistically significant relationship between Poison Center intervention and patient mortality rates; however, mortality was not the primary focus of the study, the estimate was imprecise, and the population sample was limited to a single state.

Exposures Not Directly Managed by Poison Centers

Analogous to the previous discussion regarding reductions in the average LOS, Poison Center–trained providers have the potential to reduce the mortality risk of all current and future patients without directly consulting Poison Centers.

Two studies examined the effects of being treated by a medical toxicologist on mortality. Within the same health system, Curry et al. (2015) found that being treated by a medical toxicologist decreased mortality rates by 8 percentage points for hospitalizations for patients with an MCC. Wax et al. (2025) found that in pediatric intensive care units, treatment by a medical toxicologist at any time during the hospitalization reduced the likelihood of death by 61 percent. Given an overall mortality rate of 2.45 percent, the reduction associated with treatment by a medical toxicologist is 1.48 percentage points. Therefore, we estimated that treatment by a trained medical toxicologist would reduce mortality rates by 4.8 percentage points for hospitalizations involving an MCC.

According to HCUP, there were approximately 141,000 hospitalizations because of poison- or toxin-related exposures involving an MCC in 2022 (Agency for Healthcare Research and Quality, undated).[32] With about 35,100 emergency medicine physicians in the United States, we estimated that doctors manage an average of 4.2 inpatient poisoning-related cases involving an MCC each year. Using this estimate, medical toxicologists save, on average, one life every five years, or about 0.2 lives per year. Using the mean estimate of the value of a statistical life year of $13.4 million (Kearsley, 2025), we valued this impact at approximately $2.5 million per year. Over a 30-year career, a medical toxicologist would save approximately 5.6 lives, valued at $49 million in present-value terms using a discount rate of 3 percent. Following the same approach as described regarding the provider education benefits associated with health care costs, we estimated an average mortality risk reduction attributable to Poison Centers equivalent to $13 million for each medical toxicology fellow. Therefore, we estimated the total annual benefit of Poison Centers associated with reduced mortality risk to be $574 million.

[32] The data are based on cases with a MS-DRG of 917.

The magnitude and significance of this benefit have likely grown over time. According HCUP data, the proportion of hospitalizations with poisoning and toxic effects with an MCC nearly doubled between 2011 and 2022 (Agency for Healthcare Research and Quality, undated). In 2011, just over 30 percent of hospitalizations with poisoning and toxic effects had an MCC, compared with over 60 percent in 2022.

Preparedness and Prevention

The final outcomes we analyzed were preparedness and prevention, which have positive impacts on overall public health. Poison Centers play a key role in emergency response and preparedness. State public health officials told us that some Poison Centers work with and share data with public health agencies on hazardous materials incidents, gastrointestinal illness reporting, epidemic illness reporting, after-hours public health calls, terrorism preparedness, and other issues (Sutter et al., 2010). Poison Centers can also enhance preparedness through providing public outreach and education on public health threats, such as carbon monoxide poisoning from generators and other hazards during natural disasters. Various stakeholders can use NPDS data to identify emerging trends of concern and develop messaging to the public to reduce the likelihood of poison-related exposures or improve exposure management. For example, Hickey, Mycyk, and Wahl (2012) found that overdose guidelines for unintentional beta-blocker ingestions reduced ED referrals by 16 percentage points. Similarly, a 2007 outbreak of foodborne salmonella infections caused by contaminated peanut butter led Poison Centers to develop recorded public service telephone messages for citizens seeking information on salmonella-related illnesses (Sutter et al., 2010). In interviews, public health officials emphasized the role of Poison Centers and NPDS in public health surveillance of emerging hazards, with one interviewee noting that, because of NPDS, "we picked them [hazards] up early, so they didn't become a problem."

Surveillance activities have led to product recalls that target the source of concern, potentially preventing future poison exposures. For example, in June 2024, the FDA began investigating reports of severe illnesses from NPDS linked to Diamond Shruumz–brand chocolate bars, cones, and gummies (FDA, 2024). These reports led to a nationwide recall at the end of the month by the product's distributor. Similarly, cases of botulism reported to Poison Centers led to a voluntary recall of carrot juice products in 2006 (Brown et al., 2010).

Individual Poison Center data and NPDS are heavily cited in extramural research, which may have additional benefits for public health. For this study, we sought to quantify the reach of the Poison Center Network's research and surveillance functions with regard to medical and scientific publications. We conducted a literature review of articles in the National Library of Medicine (undated) as of November 2024. After conducting a manual review for relevancy and to exclude international studies, we found that 343 article abstracts referenced NPDS between 2011 and 2024. A total of 673 abstracts referenced Poison Center activities or data, or about 48 publications per year. We described search terms and methodology in Appendix A.

The interview discussions provided qualitative support for the value of the Poison Center Network, with multiple interviewees noting that NPDS is a unique source of surveillance data in several aspects: It is updated on a near-real-time basis and includes information on cases occurring

outside hospitals and EDs, providing the only national database of its kind. Multiple interviewees reported relying on NPDS to support a wide variety of functions, including public health and disaster surveillance, research, and product stewardship. One interviewee who spoke to Poison Center's surveillance capabilities noted that Poison Centers are the "kind of secret sauce of disaster management." Other interviewees noted that Poison Centers and NPDS represent a unique perspective as a data source, since the Poison Centers "interact directly with the American public," which means that NPDS data reflect issues of present interest and concern to the public, while another interviewee noted that they partner with Poison Centers to receive access to NPDS because it allows them to have "data that we cannot get anywhere else."

However, it is challenging to measure (in dollar terms) the incremental value of prevention and preparedness because of the limited data on poisonings that did not occur and a lack of appropriate comparison groups. Therefore, our primary estimate of the value of the Poison Center Network does not attempt to quantify these benefits. One way to monetize these activities would be to estimate society's WTP for prevention. However, we identified only one study in the past 30 years that directly estimated WTP for services provided by America's Poison Centers. WTP measures estimate the value of outcomes, including intangible benefits (e.g., awareness and prevention) or those that are more difficult to measure (e.g., avoided poison-related exposures and better overall quality of care for all, not just those affected by poisoning). Using contingent valuation (i.e., surveys), Phillips et al. (1997) estimated that households in the general population were willing to pay approximately $4.87 (95 percent confidence interval: $3.42–$6.32) per month measured in 2024 dollars. If each of the 132 million households in the United States were willing to pay $3.42 per month, the lower end of the range, the annualized WTP would be equivalent to $5.4 billion. Subtracting the health care costs and productivity benefits from our estimates above would yield an incremental benefit of $2.4 billion associated with prevention outcomes that are not otherwise included in our monetized benefit estimates. In the next chapter, we calculate the ROI with and without this figure, reflecting greater uncertainty in monetizing certain impacts, particularly those associated with prevention. There remain substantial gaps in understanding the overall societal value of the Poison Center Network beyond those stakeholders who interact directly with individual Poison Centers.

Overall Benefits Calculation

Table 3.8 shows the estimated monetized benefits for each of the outcomes discussed above. We estimated that Poison Centers generate around $3.1 billion in benefits each year. Of that total, most of the returns to society come from avoidable health care utilization or reduced LOS, which account for approximately 80 percent of all benefits. The remaining 20 percent comes from mortality risk reduction.

Table 3.8. Total Estimated Annual Poison Center Benefits

Outcome and Impact	Estimate (2024$ millions)	Percentage of Total
Avoided health care utilization: health care costs	1,528	50
Avoided health care utilization: productivity	150	5
LOS: health care costs	725	24
LOS: productivity	89	3
Mortality risk	574	19
Total	**3,066**	**100**

NOTE: Estimates might not sum to the total because of rounding.

Discussion of the Mode of Poison Center Interaction

Some of the benefits attributable to the Poison Centers in this report are indirect, such as mortality risk reductions via medical toxicology training, and cannot be attributed to a particular mode of contact. Nevertheless, to allocate benefits according to mode of communication, we could attribute all Poison Center benefits to encounters originating via call, text message, or online chat. The RAND survey showed that most Poison Center encounters originate via phone call. In the previous fiscal year that we assessed, prior to the recent expansion of Poison Center chat tools across the country, the regional Poison Centers that offered multiple modes of communication reported that less than 1 percent of all encounters originated via text message or online chat. These results suggest that only a small percentage of the benefits attributable to the Poison Centers occur through these channels; however, this could increase as more Poison Centers offer these services and stakeholders become more aware of them as an alternative resource. It is unclear whether these modes of communication will displace calls to the national Poison Help line. Furthermore, encounters initiated via text message or online chat may be less resource intensive to manage, on average, if a greater proportion are information requests rather than potential exposures or if those cases are less likely to have severe medical outcomes.

Limitations to the Calculation of Benefits

Our analysis is subject to several limitations. Some of these would be likely to either increase or decrease the overall magnitude of the benefits estimated. To account for uncertainty inherent in many of the individual parameter estimates from the published literature and as a sensitivity analysis, we consider the impact of different analytical choices on the estimated benefits and costs associated with Poison Center activities. Specifically, using different individual parameter estimates would change the calculated ROI. We report and discuss these values in Chapter 4. The potential limitations of this study are as follows:

- Our calculation of health care cost savings for unnecessary hospitalizations assumes that hospitalizations would have only lasted 24 hours, the minimum inpatient LOS. It is possible that the LOS would be closer to the average for all poison exposures (three to five days), which factors in more-serious cases.
- The productivity benefit calculation assumed that the productivity of only one individual is affected per case, which may underestimate potential impacts. For example, multiple family members or caregivers may assist in driving the patient to the ED. In the case of pediatric exposures, there could be longer-term productivity losses because of school absence for the child.
- Our overall ROI estimate is calculated only from impacts that we could monetize, potentially omitting additional benefits to society that could not be monetized. For example, because of limited evidence, our study did not consider quality-of-life benefits (e.g., reduced comorbidities) from Poison Center consultation. Similarly, we did not consider congestion effects. If providers are capacity constrained and Poison Centers reduced unnecessary health care utilization, higher-risk patients could receive more-timely and more-effective care. The potential value of these benefits can be measured using WTP estimates. However, we did not include them in our main estimate because few supporting studies have been published, and the available WTP estimate, which is from the mid-1990s (Phillips et al., 1997), is likely outdated. There have been numerous policy changes to health care access and utilization since the mid-1990s (e.g., the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 [Pub. L. 108-173, 2003] and the Affordable Care Act of 2010 [Pub. L. 111-148, 2010]), which expanded insurance access, plausibly reducing the WTP for Poison Center services. Including the WTP estimates in our main calculation would have substantially increased the estimated benefits of Poison Centers. We recognize that the actual value of peace of mind provided by Poison Centers, independent of the direct benefits of their services, may be nonzero, but we are unable to produce monetized estimates.
- Because our basic valuation approach is multiplicative, the benefits calculated are highly sensitive to individual parameter choices. The Lewin Group study, for example, used a LOS reduction of 3.0 days per stay, compared with 1.25 days per stay in this report (Lewin Group, 2012). Using 3.0 days rather than 1.25 days would increase the total annual benefit to more than $4 billion. In the subsequent sensitivity analyses, we show how using a 3.0-day LOS reduction would affect the benefit-cost ratio.
- We chose to quantify the benefits of Poison Centers across several outcomes for which findings in the literature were mixed (i.e., different studies found both positive and negative impacts). For example, the magnitude and direction of impacts of Poison Center activities on health care costs associated with reduced LOS differ across studies. In addition, the benefits associated with medical toxicology training assumed that, absent a Poison Center encounter, medical toxicologists would not be able to provide as great a reduction in mortality risk; this could be a strong assumption.
- Most studies did not address selection bias. For example, if Poison Centers are consulted for lower acuity cases in hospitals, then LOS could be shorter for those cases that contact Poison Centers than cases that do not. Studies such as Farkas et al. (2022) typically reported mean

differences without attempting to adjust for such bias. Estimates from Friedman et al. (2014) and Bunn et al. (2008) did adjust for patients' observable characteristics. To interpret these effects as causal requires assuming that, conditional on observable characteristics, cases were randomly assigned to contact or not contact poison centers; this is a strong assumption.

- Published studies on what callers would have done in lieu of Poison Centers relied on surveys rather than actual choices. The validity of survey-based studies has been widely debated (see Carson, 2012; Hausman, 2012). The main concern is that surveys might not predict real behavior. Studies have found evidence that stated-preference experiments can partially predict behavior (Quaife et al., 2018)—but also that they might generate larger WTP estimates than field experiments (Loomis, 2011).
- Many published studies used in our calculations were written by authors affiliated with associations with a stake in the results of this study. Although these studies represent the best available information on specific parameters, the risk of potential or perceived conflicts of interest remains.

Chapter 4

The Benefit-Cost Ratio and the Implied Return on Investment

Findings

Since the mid-1990s, several BCAs have been conducted to assess the value of the Poison Centers. For example, Miller and Lestina (1997) estimated that every $1 spent on Poison Center services saved $6.50 in medical care payments. Blizzard et al. (2008) estimated a benefit-cost ratio of 7.67 (with a 95 percent confidence interval from 6.83 to 8.50) for a single regional Poison Center. LoVecchio et al. (2008) found that for every $1 of *state funding* received, Poison Centers generated $36 in health care cost savings; this larger ROI estimate is due to the level of state funding not originating from a federal source accounting for less than half of all Poison Center revenue. The Lewin Group study calculated an ROI of $13.39 for every $1 invested in the Poison Center Network (Lewin Group, 2012). Tak et al. (2017) estimated that, because of the Utah Poison Control Center, $22.3 to $32.8 million in unnecessary health care charges (measured in 2024 dollars) in the state were avoided. If we apply the average Poison Center expenses reported in the RAND survey (approximately $3.45 million), the benefit-cost ratio would be between 6 and 10.

Table 4.1 reports our primary estimates of the monetarized benefits of the Poison Center Network, its reported operating expenses, and the resulting benefit-cost ratio. We found that the Poison Center Network generated approximately $3.1 billion in benefits, with operating expenses of approximately $183 million in 2024, excluding subsidized support. These values imply a benefit-cost ratio of 16.77; in other words, every $1 spent by Poison Centers generates an ROI of $16.77. Our primary estimate relies on reported operating expenses because of differences in the way Poison Centers recorded revenues from all their services, which made it difficult to compare between centers and extrapolate to account for centers that provided incomplete information. The value of Poison Center activities outside emergency response services is difficult to monetize, even with the results of the RAND survey. Therefore, when a Poison Center engages in community outreach or any other activity that produces benefits not reflected in aggregate NPDS statistics, our ROI estimate would understate the total benefits to society and the benefit-cost ratio.

Table 4.1. Annual Benefits and Costs of the Poison Center Network (2024$ Millions)

Statistic	U.S. Total
Total benefit of Poison Center activities	$3,066
Total expenditures	$183
Benefit-cost ratio (benefit/expenditures)	16.77

NOTE: Total expenditures might not sum to the total because of adjustments for nonresponse. For all estimates, nonresponses are assumed to have operating expenses equivalent to the national average or regional average, respectively.

Our ROI estimate is most directly comparable to one from the Lewin Group (Lewin Group, 2012). Unlike other studies, which tend to focus on health care cost savings for specific Poison Centers, the Lewin Group study and this report looked at the overall value of the Poison Center Network, inclusive of Poison Center and association activities. There are a few notable differences in methodology between the two studies. First, we estimated impacts, measured in dollar terms, for a wider variety of Poison Center activities. For example, we monetized the benefits associated with mortality risk reduction because of health care provider education. The inclusion of additional categories of activities increased the monetized benefits of the Poison Centers relative to the Lewin Group study. Second, we considered additional studies that have been published since 2012. In one case, the Lewin Group study relied on estimates from one study that suggested that Poison Centers reduced the average hospital LOS by 3.0 days, whereas the average estimate across several studies was 1.25 days; using the latter figure reduced our estimated benefits by approximately $1 billion (Lewin Group, 2012).

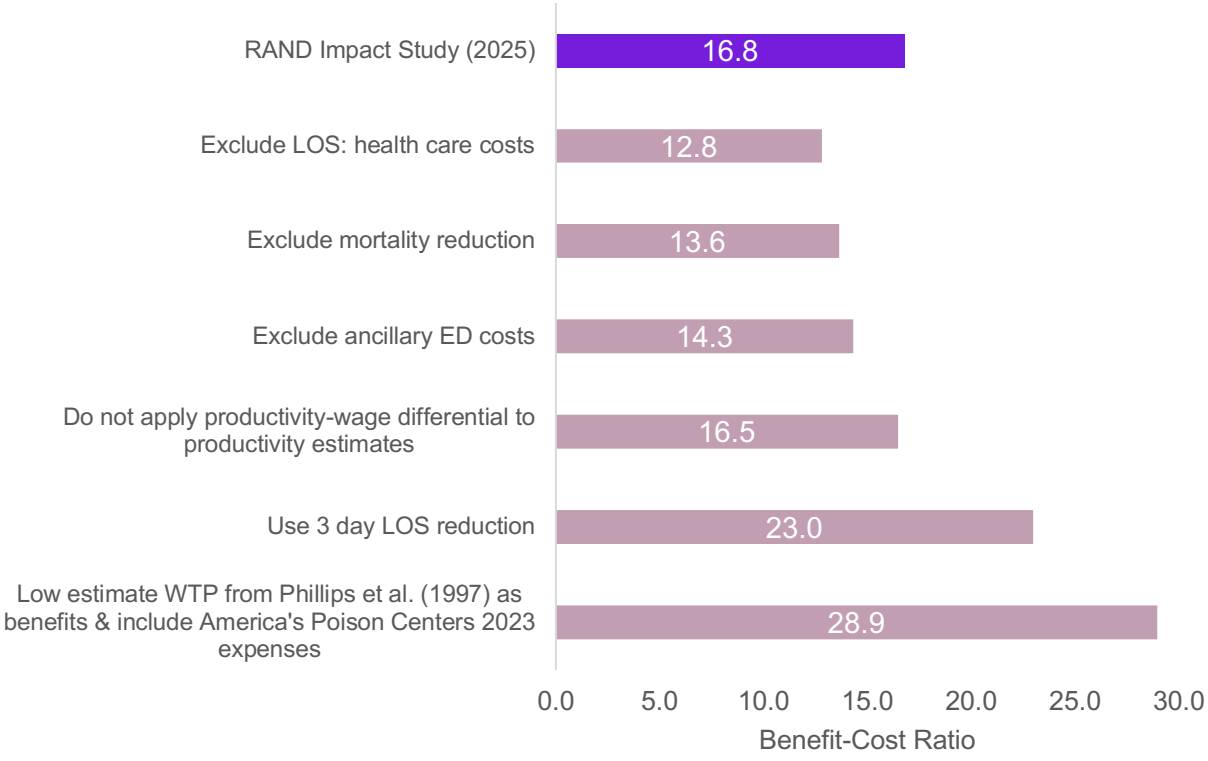
A limitation of both the 2011 survey informing the Lewin Group study (2012) and the RAND survey is that respondents were unable to quantify the amount of subsidized support they received from a host institution or other affiliate. Therefore, reported expenditures may be lower than the total amount of funding received, which, if included in the ROI calculations, would increase the denominator and reduce the overall ROI estimate.

Sensitivity Analyses of the Benefit-Cost Ratio

We considered several sensitivity analyses to see how the calculated benefit-cost ratio would change under different sets of assumptions. As shown in Figure 4.1, we used the primary estimate of 16.77 as a reference point (i.e., $16.77 in benefits for every $1 spent) and calculated how the ROI would change relative to that value using different methodological approaches or different parameter values. For example, excluding the reduction in health care costs from the LOS reduces the benefit-cost ratio by about 4. Excluding the incremental mortality risk reduction from Poison Center–trained medical toxicology fellowships (similar in effect to increasing the discount rate to infinity) lowers the benefit-cost ratio by approximately 3. Excluding additional ED costs (e.g., for labs and tests) would lower the benefit-cost ratio by approximately 2. Choosing to not apply the productivity wage gap to productivity benefits would lower the benefit-cost ratio by a trivial amount. However, using a reduced hospital LOS estimate of 3.0 days would yield a higher benefit-cost ratio of approximately 23.0. Using the lower bound of the WTP estimate from Phillips et al. (1997) as the total benefit in the numerator

and including the 2023 expenses from America's Poison Centers ($4.6 million from its 2023 Form 990 filing [America's Poison Centers, 2024]) in the denominator would almost double the benefit-cost ratio to 29. These sensitivity analyses, in which the implied ROI varied from approximately $13 for every $1 spent to approximately $29 for every $1 spent, show that our estimate of the value of the Poison Center Network is not an outlier. Several sensitivity analyses, especially those pertaining to WTP estimates, illustrate potential knowledge gaps for further research.

Figure 4.1. Sensitivity Analyses of Benefit-Cost Ratio



Chapter 5

Conclusion

The Poison Center Network provides the public and health care professionals with HIPAA-compliant, confidential, and free expert medical recommendations on the management and treatment of poison- and toxin-related exposures. It also serves as a key part of the nation's toxicosurveillance and public health surveillance system through NPDS. In these roles, the Poison Center Network collectively serves on the front lines of local and regional health emergencies, such as the Deepwater Horizon oil spill; the East Palestine, Ohio, train derailment; and natural disasters, as well as nationwide emergencies, such as the fentanyl crisis. Other Poison Center essential functions include providing professional education to health care providers; conducting product safety research, such as identifying systemic, unanticipated abuse or misuse of laundry detergent pods or e-cigarettes; collecting data that can help monitor the safety and clinical effects of chemicals, drugs, and medications; and offering toxicology education to non–health care providers, such as community organizations and schools.

This report provides an independent evaluation of the value of the Poison Center Network. RAND assessed the value and impact of the Poison Center Network through a review of existing literature, a survey of the Poison Centers, and interviews with partner organizations, health care providers, and other stakeholders. Finally, we conducted a BCA to estimate the overall ROI for Poison Centers.

Key Findings

Poison Center Network Activities

- The Poison Center Network, using NPDS, has taken on an expanded public health role, particularly in toxicosurveillance and emergency preparedness and response.
- At the same time, human exposure cases have declined only slightly while overall case intensity has increased, evidenced by a greater proportion of cases originating from a health care facility or health care provider and a greater proportion of all cases involving more-severe outcomes.
- The ways stakeholders can interact with the Poison Centers are changing, with some Poison Centers offering text message and online chat options for engagement in addition to telephone calls.
- The total number of Poison Center encounters has decreased since the early 2010s because of a large decline in information requests, possibly driven by the proliferation of alternative online information sources.

- Many Poison Centers are providing additional ancillary services on top of their essential functions—for example, legislative activities, telehealth delivery, specialty services (e.g., operating a rabies or COVID-19 hotline), and customized substance or product surveillance.

Poison Center Funding

- Funding for Poison Centers' essential functions has decreased in real dollar terms from $190.0 million in 2011 to $175.2 million in 2024 (both measured in 2024 dollars). Congressionally appropriated funding and some state funding sources have declined in real dollar terms because funding amounts have not been adjusted for inflation in more than a decade. Poison Centers have also seen decreases in state, local, and private funding.
- In-kind support from a host institution or other affiliate—usually a hospital or university providing facilities, utilities, information technology services, human resources functions, or salaries—has also decreased.
- The expansion of Poison Centers' ancillary functions may be a response to financial pressures because of the rising costs of providing services to ensure that operational needs are met.

Value of the Poison Center Network

- We estimated that every $1 spent by Poison Centers on services generates an estimated $16.77 in benefits. Overall, we estimated that the Poison Center Network yields benefits totaling approximately $3.1 billion each year.[33]
- Applying different methods and assumptions, we estimated that the ROI varied from approximately $13 for every $1 spent to approximately $29 for every $1 spent.

Overall, Poison Centers provide significant returns to society for every $1 spent, including cost savings owing to avoidable medical utilization, reduced patient LOS, mortality risk reduction, and enhanced national public health surveillance.

[33] These calculations are based on costs and benefits that we were able to assess and monetize. However, it was not feasible to monetize all the impacts of Poison Centers, particularly those associated with the prevention of poison- and toxin-related health emergencies.

Appendix A

Methodology

This appendix provides additional details on the methodology used to support the 2025 RAND survey of Poison Centers and interviews conducted as part of this study. This appendix also discusses several of the data sources used to inform the BCA.

Survey Methods

To collect data to inform the national impact study of the Poison Center Network, our study team developed and administered a survey to individual Poison Centers.[34] This appendix describes the development and administration of this survey.

Survey Development

To develop an initial draft survey, we reviewed the published literature on the functions and benefits associated with Poison Centers, reviewed a prior survey administered that informed the Lewin Group study (Lewin Group, 2012), and sought input from America's Poison Centers and the National Impact Study Workgroup. The literature review informed how we linked specific activities (i.e., functions or services) to the benefits attributable to Poison Centers. These insights then informed the survey development to ensure that appropriate data were collected to inform the BCA. We ensured that the survey would generate results compatible with the earlier survey to identify trends over time. Some questions from the previous survey administered in 2011 were also included in the 2025 RAND survey. Since 2011, Poison Centers have undergone significant changes, including the closure of some centers and the consolidation of these service areas into regional Poison Centers and the addition of text messaging and online chat as modes of communication with trained specialists in toxicology. We developed survey questions to gather information on changes in service areas and the use of text messaging and online chat resources.

Between November 2024 and March 2025, we shared early drafts of the survey with the National Impact Study Workgroup and asked members of the workgroup to test the functionality of the online survey tool. America's Poison Centers and the workgroup provided valuable recommendations on the text of the survey to clarify terminology and ensure that the survey reflected the wide variety of activities conducted by Poison Centers. As part of the survey development process, the survey also underwent an internal RAND review by an expert in survey methodology. Their feedback was incorporated into the final survey.

[34] Details on how we collected data on America's Poison Centers to inform the study are described in Chapter 2.

Survey Sample

RAND administered the survey to Poison Centers that were open for the most recently completed fiscal year and remained open and accredited at the time of survey close. For this reason, two Poison Centers were excluded from the survey. America's Poison Centers identified appropriate points of contact at every Poison Center for survey distribution. A survey invitation was sent to the managing director, executive director, director, or equivalent at each of the 53 Poison Centers. These directors were instructed to complete the survey with input from their colleagues, as the survey was designed to collect a single response from each Poison Center.

Survey Administration

The survey was administered from March 10, 2025, through May 9, 2025, via RAND's SelectSurvey platform. SelectSurvey is an online platform that allows for the development, administration, and analysis of online surveys. We sent all survey participants a link to the survey that allowed them to update their responses through the end of the survey period. Periodic reminders were sent to respondents who had not completed the survey through May 6, 2025. The responses covered approximately 87 percent of Poison Centers.

We maintained a survey-specific email address to respond to questions from Poison Centers about the survey. Over the survey administration period, we responded to questions received from Poison Centers via phone or email about the survey.

Interview Methods

We sought to interview a wide variety of stakeholders who interact with America's Poison Centers and individual Poison Centers. Individual interviewees were independently selected by our team. The potential interviewees were drawn both from our research into experts in these areas and from a list of suggested interviewees provided by America's Poison Centers and the National Impact Study Workgroup. The final potential interviewee list included a variety of individuals representing multiple types of organizations:

- **Government representatives:** Federal, state, and local governments all interact with Poison Centers in a variety of ways. We identified and requested interviews with individuals at various levels of government who interact with the Poison Center Network in differing capacities.
- **Health care providers:** Health care providers can receive training from or call individual Poison Centers to receive support in treating toxicological cases. We identified and requested interviews with health care providers to learn about the impact of Poison Centers in their provision of care to patients experiencing poisoning incidents.
- **Researchers:** Some researchers at universities and health care institutions contract with individual Poison Centers or America's Poison Centers for access to NPDS data, which these researchers analyze and publish in various studies. We identified and requested interviews with individuals who used NPDS data in their research.

- **Industry:** Some private companies contract with the Poison Center Network for various purposes, including access to NPDS data and serving as a help line if a product is accidentally ingested. We identified and requested interviews with individuals at private companies to learn about any interactions they have with the Poison Center Network.
- **Patient advocates:** Individuals contact Poison Centers on their own behalf or on behalf of others and potentially manage exposures on their own at home. Additionally, patient advocacy groups may partner with the Poison Center Network to raise awareness of poisoning risks to help prevent potential poisoning incidents. We identified and sought to interview a variety of patient advocacy groups to learn how they interact with the Poison Center Network to help patients prevent or respond to poisoning incidents.

Our study team held interviews via Microsoft Teams, running from April through August 2025, totaling 12 meetings. These discussions were 30 minutes to one hour in duration and were conducted by one or two facilitators and a notetaker. Verbal consent to participate in the study was obtained at the beginning of each discussion, although the meetings were not recorded to protect participant privacy.

Interview protocols were written by our research team based on the overall study design. Protocols were reviewed and approved by RAND's institutional review board. Participants were grouped into the following categories: industry, patient advocates, government representatives, or health care providers. Each of these categories had a specific discussion protocol with tailored questions relevant to their experience with the Poison Center Network and knowledge areas. The purpose of the questions was to determine how individuals and organizations interacted with the Poison Center Network, if they interacted similarly with other organizations, and the value of services provided by the Poison Center Network.

Participants were recruited via email. Following the interview, the notetaker edited the written notes for typos and removed personally identifying information. Each participant was assigned a random identification number, noted in a file accessible only to the research team in case clarification or follow-up was required. A qualitative analysis of these interviews was conducted using Microsoft Excel. We drafted numeric codes describing topics or themes discussed in the interviews prior to the start of the analysis. Two team members conducting the interviews independently coded notes taken during each session to identify responses relating to these broad topics or themes. Any differences were resolved by review and mutual agreement between the coders. The findings are described throughout this report.

Data Sources

Data used in the BCA came from several sources. Our benefits calculation primarily relied on statistics provided by NPDS (e.g., the number of cases originating from health care providers) and published peer-reviewed literature (e.g., the likelihood callers would have gone to the ED absent Poison Centers). Some data were supplemented via documentation sent to us by individual Poison Centers and by America's Poison Centers, which included annual reports and the ROI documentation (e.g., Arizona Poison and Drug Information Center, 2024a). Information on revenues and expenses was gathered from the RAND survey.

Literature Review

We performed a search of the National Library of Medicine (PubMed) on November 3, 2024, with the following steps:

1. searched PubMed with these search terms: (((“national poison data system”)) OR (“NPDS”) OR “poison center”) AND (“Poison”)
2. restricted publication dates to 2011 to the present
3. excluded international articles and articles in which poison control was only motivation
4. screened abstracts with “NPDS,” “National Poison Data System,” or “poison center” as keywords
5. screened abstracts with “NPDS” or “National Poison Data System” as keywords.

Steps 1 and 2 resulted in 1,437 articles. Step 3 removed 76 studies. Step 4 resulted in 673 articles. Step 5 resulted in 343 articles.

Appendix B

Survey Questions

Informed Consent

1. RAND, a nonprofit institution that helps improve policy and decisionmaking through research and analysis, has been asked by America's Poison Centers to conduct a national impact study of the Poison Center network across the United States. The goal of the study is to analyze and describe the value Poison Centers provide to society.

   We are requesting your participation in the survey as a leader of one of the Poison Control Centers. You may decline to participate or exit the survey at any time with no penalty. The survey responses are not for attribution.

   Survey responses will only be used for the purposes of the study per our contract. Aggregate findings from the survey may be reported as part of our study, but the responses of individual centers will not be directly reported.

   You will not be personally identified in this study. We do not anticipate any personal benefit to you from participating in this study. We will not ask for sensitive information, such as patient financial, identifying, or medical information. We anticipate there to be a low or minimal risk to you from participating in this study. Those risks could involve leaks of information that could identify you or your organization via inference if there were a breach of confidentiality. We will take steps to minimize this risk, such as de-identifying the survey results when sharing the final survey data with America's Poison Centers. America's Poison Centers will coordinate with the study team to send reminder follow-up emails to survey participants, so the study team will share a list of which Poison Centers require a reminder follow-up email. All survey data possessed by RAND will be destroyed after completion of the study.

   If you have questions about your rights as a research participant or need to report a research-related injury or concern, you can contact RAND's Human Subjects Protection Committee toll-free at (866) 697-5620 or by emailing hspcinfo@rand.org. When you contact the Committee, please reference Study # 2024-N0700. You may contact the project leader, David Metz (dmetz@rand.org), with any questions about the study.

   If you consent to complete the survey, please continue on to the next page. If you do not consent to complete the survey, please exit the survey. Thank you for your time.

Details About Your Poison Center

The following questions request information about your Poison Center. If serving multiple states, please respond for your entire service area. The survey will skip pages that are not applicable based on

your responses. If you need to make a comment box larger, you can do so by dragging the bottom right corner of that comment box. Please complete all questions for the most recently completed fiscal year.

If you wish to complete the survey in more than one sitting, you can click the "Save" button below to save your progress and come back to the survey at another time.

Please reach out to PoisonSurvey@rand.org with any questions.

2. Which Poison Center are you completing the survey for?
3. Has your Poison Center's service area significantly changed since 2010? Please answer "no" if your Poison Center's services area changed only at the county- or ZIP code-level.
4. Date last fiscal year ended.
5. What percentage of all cases originate from a non-residential healthcare facility? For example, a doctor calling from the emergency room. The value must be between 0 and 100, inclusive.
6. If your data tracking processes allow, please estimate the average time (in minutes) spent on follow-ups per case, including notetaking. Please note that this question includes follow-up calls made in response to cases that were initiated via call, text (with a live person), or chat (online with a live person).
7. Does your Poison Center maintain a public website? If so, please share the link below.
8. If your Poison Center maintains a public website, does your Poison Center track the following information? Your Poison Center's Educator may have access to this information. If this is not applicable for your Poison Center, please enter "No" for all options.

		Is this tracked by your Poison Center?
Website Visits	N/A	Y
Use of website (e.g., what pages visitors view)	N/A	Y
Downloads from website	N/A	Y

9. If your Poison Center tracks usage information from the public website, please describe how your Poison Center tracks and uses this information.
10. If your Poison Center currently maintains social media profiles, please list the social media platform, user name/profile link, and number of followers for each.
11. Does your Poison Center provide individuals (e.g., callers, hospitals, etc.) who use Poison Center services with opportunities to provide feedback?
12. If your Poison Center allows users to provide feedback, please share how your Poison Center uses this feedback to assess the impact of programs or inform decision making.

Details About Your Poison Center's Service Area Changes

The following questions request information about how your Poison Center's service area has changed since 2010. If serving multiple states, please respond for your entire service area. Please do not include information about changes to your Poison Center's services area that are only at the

county- or ZIP code-level. The survey will skip pages that are not applicable based on your responses. If you need to make a comment box larger, you can do so by dragging the bottom right corner of that comment box.

Click Save to come back and finish another time.

13. Please do not include information about changes to your Poison Center's services area that are only at the county- or ZIP code-level. The value must be between 2010 and 2025, inclusive.
14. Please describe how your Poison Center's service area has changed since 2010. Please do not include information about changes to your Poison Center's services area that are only at the county- or ZIP code-level.
15. Why did your Poison Center's service area change? Please do not include information about changes to your Poison Center's services area that are only at the county- or ZIP code-level.

Your Poison Center's Revenue

The following section asks for information about your Poison Center's revenue for the most recently completed fiscal year. If serving multiple states, please respond for your entire service area. If you need to make a comment box larger, you can do so by dragging the bottom right corner of that comment box. Please complete all questions for the most recently completed fiscal year.

Click Save to come back and finish another time.

16. Please enter the total revenue from your Poison Center's core services for the most recently completed fiscal year. Please only enter each source of revenue in one row of the matrix below. Please see the definitions included in the email you received with the survey the definition of core services.

    [Respondents were asked to provide the actual $ received, $ amount of subsidized support, and total amount for each of the revenue sources listed below:]

    a. Federal (exclude state- administered block grants and Medicaid funding and the dollars HRSA pays for your 1-800-222-1222 number service)
    b. Federal (The dollars HRSA pays for your 1-800-222-1222 number service)
    c. Preparedness Funds (any source: federal, state, city, etc.)
    d. Medicaid—Federal portion
    e. Medicaid—State portion
    f. Medicaid—Unknown federal/state distribution
    g. State-Administered Federal Block Grant
    h. State Funding: Line-item appropriation (exclude funding through university)
    i. State Funding: Through state-funded university
    j. State Funding: Total amount of indirect support the university provides
    k. State Funding: Telephone surcharge
    l. State Funding: 911 fees
    m. State Funding: License fees
    n. State Funding: Other
    o. City Funding

p. County Funding
q. Hospital Funding (other than host institution): Member hospital network
r. Hospital Funding (other than host institution): Other contributions/fees from area hospitals
s. Host Institution: Host hospital (include direct support, exclude state-funded university hospital)
t. Host Institution: Host hospital (the total amount of indirect support the host institution provides)
u. Host Institution: Other host institution (include direct support)
v. Host Institution: Other host institution (the total amount of indirect support the host institution provides)
w. Research Dollars Grants/Donations: Children's Miracle
x. Network
y. Grants/Donations: Community Service Organizations
z. Grants/Donations: Corporations
aa. Grants/Donations: Events
bb. Grants/Donations: Foundations
cc. Grants/Donations: Individuals
dd. Grants/Donations: United Way (federated campaigns)
ee. Health Insurers/HMOs (exclude HMO hospitals)
ff. Other Business Sources (e.g., portion of industry contract funding used to provide poison control services to your community)
gg. Other (e.g., use of Poison Center funds held in reserve)

17. If you reported that your Poison Center receives revenue from "Other" sources in Question 16, please describe below.
18. For the portion of your Poison Center's funding not used to provide core services to your services area, please enter the total revenue received from other business sources for the most recently completed fiscal year.

Your Poison Center's Expenses

The following questions request information about the expenses paid by your Poison Center in the most recently completed fiscal year. If serving multiple states, please respond for your entire service area. The survey will skip pages that are not applicable based on your responses.

Click Save to come back and finish another time.

19. Please enter your Poison Center's total expenses for the most recently completed fiscal year.

Expenses and Activities Conducted by Your Poison Center

The following questions request information about the activities undertaken by your Poison Center in the most recently completed fiscal year. If serving multiple states, please respond for your

entire service area. The survey will skip pages that are not applicable based on your responses. If you need to make a comment box larger, you can do so by dragging the bottom right corner of that comment box.

Click Save to come back and finish another time.

20. Please complete the matrix below with information on your Poison Center's expenses for core services for the most recently completed fiscal year.
    [Respondents were asked to provide the actual dollar amount, subsidized dollar amount (if known), subsidized with an amount that cannot be determined, and total amount.]
    a. Personnel (include medical director and fringe benefits)
    b. Databases/References (include all computerized databases [e.g., Micromedex, Toxicall/Dotlab] and text resources)
    c. Telephone Line Charges (e.g., 1-800-222-1222#, administrative numbers) (include text and online chat)
    d. Education/Outreach Materials
    e. Travel
    f. Rent
    g. All Other Expenses
    h. Not Captured Above
    i. Total
21. For each of the activities listed below, please record the expenses and hours allocated to that activity in the most recently completed fiscal year.
    [Respondents were asked to provide the following information for each activity below: whether the activity was conducted in the most recent fiscal year, Poison Center expenses for this activity, Poison Center hours spent conducting this activity, amount of monetary support provided for this activity outside of the Poison Center budget, and whether the activity is also covered by nonmonetary/in-kind contributions.]
    a. Call Center Communications and Infrastructure
    b. Call Center Staffing
        i. Patient Management
        i. Quality Management
        ii. Public Education
        iii. Health Care
        iv. Provider
        v. Education
        vi. Data and Surveillance
        vii. Leadership and Management
    c. Professional Certification (excluding CSPI, ABAT, Med Tox Certifications)
    d. Research (including publications, journal responsibilities, institutional review board commitments, and publication-specific data entry and gather)
        i. Bedside Health Care Delivery (including Fellow salaries)

e. Telehealth
    i. Health Care Delivery (related to non-toxicology consultations)
    ii. Legislative Activity
    iii. Hot lines (related to non-traditional Poison Center services)
    iv. Public Outreach (related to non-traditional Poison Center services)
    v. Data Surveillance and Reporting (related to non-traditional Poison Center services)
f. Other

22. If you responded that your Poison Center conducts "Other" activities in Question 21, please describe the activity and associated expenses below.
23. Please briefly describe up to three activities that you think provide the greatest value to your service area.

Activities Conducted by Your Poison Center

The following questions request information about the activities undertaken by your Poison Center in the most recently completed fiscal year. If serving multiple states, please respond for your entire service area. The survey will skip pages that are not applicable based on your responses. If you need to make a comment box larger, you can do so by dragging the bottom right corner of that comment box.

Click Save to come back and finish another time.

24. If you would like, please tell us about a special or one-off activity conducted by your Poison Center. This activity could be from Question 21 or another activity. The activity does not need to have been conducted during the most recent fiscal year. If you have multiple or detailed examples that you would like to share, we would love to speak with you outside of this survey! Question 48 on the last page of the survey will allow you to volunteer for follow-up discussions.
25. How many hospitals did your Poison Center work with for activities outside of clinical consultations, such as educational outreach? Please do not include information related to clinical calls to hospitals. Please count hospitals that are part of a system as separate hospitals.
26. If you have any reflections on the most important benefits of your Poison Center's work conducting educational outreach to health care providers, please feel free to share those here. Please do not include information related to clinical calls to health care providers. If you have lengthy or detailed insights that you would like to share, we would love to speak with you outside of this survey! Question 48 on the last page of the survey will allow you to volunteer for follow-up discussions.

Calls

The following questions request information about the calls your Poison Center responds to. Please provide information for the most recently completed fiscal year. If your Poison Center also uses text (with a live person) or online chat (online with a live person) to respond to cases, those

communication methods with be asked about separately. If serving multiple states, please respond for your entire service area. The survey will skip pages that are not applicable based on your responses. Please complete all questions for the most recently completed fiscal year.

Click Save to come back and finish another time.

27. How many cases reported via calls did your Poison Center manage in the most recently completed fiscal year?

    [For each case type, respondents were asked to provide the total number of cases.]

    a. Information
    b. Human exposure (excluding confirmed non-exposures)
    c. Human confirmed non-exposure
    d. Nonhuman exposure (exclude confirmed non-exposures)
    e. Nonhuman confirmed non-exposure

28. For all exposure cases, what is the average length of time (in minutes) spent handling initial calls, in minutes? Include all time spent on the initial call, including notetaking.
29. For only those exposure cases initially reported using a call, what is the average number of follow ups?
30. What percentage of cases originated via call were managed at home (excluding calls that came from a non-residential healthcare facility)? The value must be between 0 and 100, inclusive.
31. Does your Poison Center offer services via text (with a live person)?
32. Does your Poison Center plan to offer text (with a live person) in the next five years?

Texts (with a Live Person)

The following questions request information about the texts your Poison Center responds to via a live person. Please provide information for the most recently completed fiscal year. If your Poison Center also uses online chat (online with a live person) to respond to cases, that communication method with be asked about separately. If serving multiple states, please respond for your entire service area. The survey will skip pages that are not applicable based on your responses. Please complete all questions for the most recently completed fiscal year.

Click Save to come back and finish another time.

33. How many cases reported via text did your Poison Center manage in the most recently completed fiscal year?

    [For each case type, respondents were asked to provide the total number of cases]

    a. Information
    b. Human exposure (excluding confirmed non-exposures)
    c. Human confirmed non-exposure
    d. Nonhuman exposure (exclude confirmed non-exposures)
    e. Nonhuman confirmed non-exposure

34. What is the average amount of time (in minutes) spent handling text cases? Include all time spent on the initial text, including notetaking.

35. For all exposure cases, what is the average amount of time (in minutes) spent handling an initial text conversation?
36. What is the percentage of initial text encounters that is transferred to a call? If you do not have this information, please provide an estimate. The value must be between 0 and 100, inclusive.
37. What percentage of cases originated via text were managed at home (excluding calls that came from a non-residential healthcare facility)? The value must be between 0 and 100, inclusive.
38. What is the average number of follow ups for an exposure case using text?

Your Poison Center's Use of Chat (Online with a Live Person)

If serving multiple states, please respond for your entire service area. The survey will skip pages that are not applicable based on your responses.

Click Save to come back and finish another time.

39. Does your Poison Center offer services via chat (online with a live person)?
40. Does your Poison Center plan to offer chat (online with a live person) in the next five years?

Chat (Online with a Live Person)

The following questions request information about the chats your Poison Center responds to online via a live person. Please provide information for the most recently completed fiscal year. If serving multiple states, please respond for your entire service area. The survey will skip pages that are not applicable based on your responses. Please complete all questions for the most recently completed fiscal year.

Click Save to come back and finish another time.

41. How many cases reported via chat did your Poison Center manage in the most recently completed fiscal year?
    [For each case type, respondents were asked to provide the total number of cases]
    a. Information
    b. Human exposure (excluding confirmed non-exposures)
    c. Human confirmed non-exposure
    d. Nonhuman exposure (exclude confirmed non-exposures)
    e. Nonhuman confirmed non-exposure
42. For all exposure cases, what is the average amount of time (in minutes) spent handling an initial chat conversation? Include all time spent on the initial chat conversation, including notetaking.
43. What is the number of chats that initiate a case, for all case types?
44. What is the percentage of initial chat encounters that is transferred to a call? If you do not have this information, please provide an estimate. The value must be between 0 and 100, inclusive.

45. What percentage of cases originated via chat were managed at home (excluding calls that came from a non-residential healthcare facility)? The value must be between 0 and 100, inclusive.
46. What is the average number of follow ups for an exposure case using chat?

Survey Wrap-Up

The following questions are optional and request additional information about reports or documentation your Poison Center may have available. If serving multiple states, please respond for your entire service area. The survey will skip pages that are not applicable based on your responses. If you need to make a comment box larger, you can do so by dragging the bottom right corner of that comment box.

Click Save to come back and finish another time.

47. Thank you for completing the survey! We may need to reach out for follow up questions and clarification. Below, please provide the name and contact information for someone we can reach out to with any follow up questions. This does not need to be the person who completed the survey.
48. Would you like to volunteer for a follow-up discussion? If you select "Yes," RAND may reach out to the person whose contact information is provided in the question above. Not all Poison Centers who volunteer may be selected to participate in a follow-up discussion.
49. Does your Poison Center have an annual report?
50. If your Poison Center has an annual report, please share a link below or email a copy of the most recent annual report to PoisonSurvey@rand.org. This question is asking about an annual report other than the AACR for accreditation.
51. Has your Poison Center conducted a return on investment (ROI) study?
52. If your Poison Center has a return on investment study, please share a link below or email a copy of the return on investment study to PoisonSurvey@rand.org.
53. If you would like to receive an email with your responses to this survey, please enter an email address below. This does not need to be email address of the person who completed the survey.

Appendix C

Interview Protocol

Background

RAND, a nonprofit institution that helps improve policy and decisionmaking through research and analysis, has been asked by America's Poison Centers to conduct a national impact study of accredited Poison Centers in the United States. The goal of the study is to identify and describe the societal value and benefits of the Poison Center network. The information we are collecting is intended to be broadly representative of the types and quality of services provided by the Poison Centers and America's Poison Centers, rather than the services provided to any specific individual.

We are reaching out to your organization because of your experience in collaboratively working with the Poison Centers or because your members or stakeholders use services provided by the centers or America's Poison Centers. Your participation in this discussion is entirely voluntary. Your participation in this discussion will last for approximately one hour. You may refrain from answering any question or choose to end the discussion at any time with no penalty or consequence. For subsequent analysis, we will be taking notes during the discussion to ensure we are accurately capturing your comments, which will be stored securely and kept confidential.

We do not anticipate any risks from your participation in this research and this discussion is not for attribution. We may use anonymized quotes from this discussion as part of our study. Despite using anonymous quotes and de-identifying any notes of this meeting, there is still a possibility that you could be identified through inference. You will not be personally identified in the study, and we will not report any sensitive information, such as medical history. If you have questions about your rights as a research participant or need to report a research-related injury or concern, you can contact RAND's Human Subjects Protection Committee toll-free at (866) 697-5620 or by emailing hspcinfo@rand.org. When you contact the Committee, please reference Study # 2024-N0700. You may contact the project leader, David Metz (dmetz@rand.org), with any questions about the study.

Are you willing to participate in this discussion? (If yes, proceed.)

For Patient Advocacy Organizations

1. Please describe your role and your organization.
2. Why does your organization (or your organization's members) engage with Poison Centers and/or America's Poison Centers?
    a. I.e. what does working with Poison Centers allow you to do, or help you do?
    b. Is your organization (or your organization's members) being provided with a support service, information, or something else?
    c. If yes, what do you do with this support/information?

d. Who benefits from you being able to do that? (and how do they benefit?)

3. How does your organization (or your organization's members) engage with Poison Centers and/or America's Poison Centers?
    a. Which Poison Center(s) has your organization interacted with?
    b. How long has your organization interacted with them?
    c. Are these one-off engagements or is there some form of longer-term relationship, either informal or contractual?
4. How does your organization use the service/information/other provided by Poison Center(s) (or by America's Poison Centers)?
    a. Can you describe some examples of how Poison Center(s) (or America's Poison Center) have affected your organization's ability to serve patients?
    b. Are there related services/information/other that your organization does not currently receive, but are considering requesting or would benefit from having provided?
5. How do patients use the service/information/other provided by Poison Center(s) (or by America's Poison Centers)?
    a. Can you describe some examples of how Poison Center(s) (or America's Poison Center) have affected patient's experiences or health outcomes?
    b. Are there related services/information/other that patients do not currently receive, but are considering requesting or would benefit from having provided?
6. What would the impact be to your organization if Poison Centers and/or America's Poison Centers were not available?
    a. Are any alternatives available?
7. What would the impact be to patients if Poison Centers and/or America's Poison Centers were not available?
    a. Are any alternatives available?
8. Are there any additional questions that we should have asked but did not?

For Government Entities/Strategic Partners

1. Please describe your role and your organization.
2. Why does your organization engage with America's Poison Centers or individual Poison Center(s)?
    a. I.e. what does working with Poison Centers allow you to do, or help you do?
    b. Is your organization (or your organization's members) being provided with a support service, information, or something else?
    c. What do you do with this support/information?
    d. Who benefits from you being able to do that? (and how do they benefit?)

3. How does your organization engage with America's Poison Centers or individual Poison Center(s)?
    a. Does your organization provide funding to America's Poison Centers or individual Poison Center(s)?
    b. Which Poison Center(s) has your organization interacted with?
    c. How long has your organization interacted with America's Poison Centers or individual Poison Center(s)?
    d. Are these one-off engagements or is there some form of longer-term relationship, either informal or contractual?
    e. Was the formation of this relationship driven by a particular need?
4. Do you also engage with other similar groups?
5. What would the impact be to your organization if Poison Centers and/or America's Poison Centers were not available?
    a. Are any alternatives available?
6. What would the impact be to the stakeholders you serve (general public or otherwise) if Poison Centers and/or America's Poison Centers were not available?
    a. Are any alternatives available?
7. Does your organization provide any guidance to public or non-public stakeholders about reaching out to a Poison Center?
8. Are there any additional questions that we should have asked but did not?

For Health Care Professionals

1. What type of practitioner are you? What type of facility do you work in?
2. How often do you contact a Poison Center for a patient consultation?
3. Can you describe the process of seeking a patient consultation?
4. Have you or has anyone in your organization attended an educational session hosted by a Poison Center or received educational materials from a Poison Center?
5. Are there other ways in which you or your colleagues have engaged with Poison Centers?
6. Can you provide examples of the role of the Poison Centers in impacting medical treatments or patient outcomes?
7. Are there any additional questions that we should have asked but did not?

For Industry Organizations

1. Please briefly describe your role and organization.
    a. Does your organization engage with America's Poison Centers or individual Poison Center(s)?

2. How does your organization engage with America's Poison Centers or individual Poison Center(s)?
    a. Does your organization contract with a poison control center or America's Poison Centers for any services?
    b. Could you please describe the nature of these contracts?
        i. What services/information is being provided?
        ii. Over what time period?
        iii. Can you give a rough sense of the size of these contracts?
    c. Are these ad-hoc/one-off contracts, or is there some form of longer-term relationship?
    d. Which Poison Center(s) has your organization interacted with?
    e. How long has your organization interacted with America's Poison Centers or individual Poison Center(s)? Do you still work with them today?
3. Why does your organization engage with America's Poison Centers or individual Poison Center(s)?
        a. What factors led your organization to contract with the Poison Center, as opposed to alternative approaches (*e.g. performing the work internally or contracting with a different organization*)?
        b. What does your organization do with the support/information provided by Poison Centers?
        c. Who benefits from you being able to do that? How do they benefit?
        d. Has contracting with the Poison Center saved your organization time or money? Or provided some other benefit?
4. Are there any memorable examples of situations in which the Poison Center provided significant value to your organization?
5. Does your organization also engage with other similar groups?
6. Does your organization anticipate continuing to work with Poison Centers?
7. Are there ways in which Poison Centers could provide addition value to your organization, industry, customers, or others?
8. What would the impact be to your organization if Poison Centers and/or America's Poison Centers were not available?
    a. Are any alternatives available?
9. What would the impact be to the customers you serve if Poison Centers and/or America's Poison Centers were not available?
    a. Are any alternatives available?
10. Are you aware of any other organizations—particularly in private industry—that also interact with Poison Centers?
11. Are there any additional questions that we should have asked but did not?

Abbreviations

AACR	Annual Accreditation Compliance Report
AAPCC	American Association of Poison Control Centers
ABAT	American Board of Applied Toxicology
BCA	benefit-cost analysis
BLS	U.S. Bureau of Labor Statistics
CDC	Centers for Disease Control and Prevention
CMS	Centers for Medicare and Medicaid Services
COVID-19	coronavirus disease 2019
CSPI	Certified Specialist in Poison Information
ED	emergency department
EMS	emergency medical services
FDA	Food and Drug Administration
HCCI	Health Care Cost Institute
HCUP	Healthcare Cost and Utilization Project
HIPAA	Health Insurance Portability and Accountability Act of 1996
HRSA	Health Resources and Services Administration
IPHS	incident of public health significance
LOS	length of stay
MCC	major complication or comorbidity
MS-DRG	Medicare Severity Diagnosis Related Group
NPDS	National Poison Data System
ROI	return on investment
WTP	willingness to pay

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