

## **Assessment Report on the Collaboration between Health Departments and Poison Centers**

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## Executive Summary

A survey team of representatives from the Council of State and Territorial Epidemiologists (CSTE) and the American Association of Poison Control Centers (AAPCC), with technical assistance from the Centers for Disease Control and Prevention (CDC), sought to characterize current relationships between health departments (DOHs) and poison centers (PCs) nationwide to identify factors that hinder or promote successful collaborations. The team designed and administered two surveys in 2012; the first was administered to all 50 state DOHs and six city DOHs. The second survey was administered to all 57 U.S. PCs. Fifty-four of 56 DOHs (96.4%) completed the assessment, and 46 of 57 PCs (80.7%) completed the assessment. CSTE staff analyzed the DOH data and wrote a final report. We summarize in this report the results of the PC survey and the results of an additional analysis of DOH and PC surveys that were matched by service area or jurisdiction. Survey questions elicited responses regarding PC infrastructure (e.g., hospital-affiliated, university-based), degree of interactivity between the PC and DOH, funding amount and origin (e.g., state, local), current activities, data-sharing capabilities, likelihood of collaboration, and perceived impediments to collaboration.

The results of the two analyses presented in this report illustrate the wide spectrum of collaboration and partnerships that exist between PCs and DOHs across the country. All PCs reported at least some collaborative activities with their respective DOHs. Most PC respondents indicated that they also work with both state and local DOHs. Interactivity between PCs and DOHs reported by PCs varied highly, ranging from minimal contact and communication to active membership in DOH-planning activities. PCs most frequently reported funding and personnel issues as impediments to increasing collaboration with DOHs.

When PCs and DOHs were linked by service area or jurisdiction, a lower likelihood of collaboration during a public health incident was associated with fewer collaborative services to DOHs and less state-

specific funding to PCs. PC-DOH groups that reported a lower likelihood of overall collaboration cited a lack of familiarity of PC data and its use in public health as a primary perceived impediment. PC-DOH groups that reported a high likelihood of collaboration identified information technology limitations as a primary perceived impediment.

In this report, we provide a national assessment and comprehensive characterization of current capacities for and perceptions of PC-DOH collaboration, and a baseline for evaluating and improving PC-DOH partnerships. Recognizing best practices and improved communication for both low and high levels of collaboration among PC-DOH groups may improve PC and DOH operations as well as the public health of the U.S. population.

## **Introduction**

The Pandemic and All-Hazards Preparedness Act Reauthorization of 2011 included regional United States (U.S.) poison centers (PCs) in situational awareness and biosurveillance priorities, highlighting the importance of state and local health department (DOH) collaboration with PCs.<sup>1</sup> The American Association of Poison Control Centers (AAPCC) is a professional organization that represents the interests of U.S. PCs that receive calls from the public and healthcare providers about potentially hazardous exposures. PC staff provide clinical guidance if the caller requests advice about a suspected or known chemical exposure or general information on the topic in question. In 2013, U.S. PCs received 3 million calls, 2.2 million of which involved a potentially hazardous exposure.<sup>2</sup> PCs collect information on these calls and provide vital information for public health activities, including public health surveillance and health communication and messaging.

The Centers for Disease Control and Prevention (CDC) created the Poison Center and Public Health Collaborations Community of Practice (CoP) in June 2010 as a platform for public health agencies and regional PCs to share ideas and interests and explore ways to enhance collaboration, especially regarding data sharing and surveillance.<sup>3</sup> CDC created a steering committee for the CoP, comprising representatives from PCs, state DOHs, and CDC, in 2012 to set objectives and provide guidance on the future direction for the CoP. The CoP steering committee perceived that collaboration between regional PCs and state and local health agencies in areas such as public health surveillance was quite variable and state and PC-dependent.

Recognizing the potential importance of collaboration between DOHs and PCs, the steering committee sought to characterize current relationships between DOHs and PCs nationwide. The primary objective of this activity was to identify factors that hinder or promote successful collaboration between PCs and DOHs. CSTE and AAPCC steering committee members worked together to design two surveys—one for

state, territorial, and local DOHs, and another for regional PCs. The team conducted three analyses on the results of the two surveys—one DOH-specific, one PC-specific, and one combining DOH and PC results. The surveys included the same general topic areas, but were tailored to their respective constituents. A report with the results of the DOH-specific survey analysis was posted online in July 2013.<sup>4</sup> This report summarizes the results of the PC-specific survey results, and the combined PC-DOH survey results.

## **Methods**

### **Survey development and administration**

A workgroup of CSTE and AAPCC steering committee members developed survey questions to assess current collaborations between PCs and DOHs. CSTE and AAPCC obtained outcome variables from questions written to elicit responses about PC infrastructure (e.g., hospital-affiliated, university-based); levels of interactivity between the PC and DOH (using an interactivity score); funding source (e.g., state, local) and amounts; current activities; data-sharing capabilities; likelihood of collaboration; and perceived impediments to collaboration. AAPCC administered the PC assessment via email to all PC managing directors using an online data collection tool hosted by Survey Monkey®. AAPCC collected PC survey responses from February 1 to February 28, 2012. CSTE used an adapted version of the PC assessment tool to conduct the survey for state epidemiologists. CSTE emailed the assessment tool to state epidemiologists in all 50 states, DOH representatives in Washington, DC, and the six most densely populated U.S. cities. CSTE collected survey responses for DOHs from May 1 to May 16, 2012. The results for the CSTE assessment are not presented in this report, but were used as a part of the assessment of PC- and DOH-matched questions and linked survey analysis.

The interactivity score was determined using the same methods as in the CSTE report.<sup>4</sup> We determined the interactivity score by responses to the question, ‘How would you classify the level of interactivity between your DOH and your PC(s)?’. The nine available response options characterized the level of phone and email contact, exchange of public health alerts, frequency of provided service, collaboration during disasters, and type and frequency of data access. Multiple responses were permitted, and we used a weighted summary score for this question. Of the nine available options, we scored responses indicating greater interaction (e.g., active membership on DOH planning or mitigation teams or committees) higher than responses indicating less interaction (e.g., minimal email and phone contact). We weighted responses between 1 and 4 points, and points were summed to provide a single score for each respondent. We reported responses by quartile, with scores of 1–7 points classified as low interactivity, 8–10 points as some interactivity, 11–13 points as moderate interactivity, and 14–19 points as high interactivity.

### **Linking of survey responses between PC and DOH assessments**

AAPCC and CSTE linked the completed surveys for the PC and DOH assessments by service area or jurisdiction. For example, the survey for the PC that services Georgia (Georgia Poison Center) was linked to the survey completed by the Georgia DOH. AAPCC and CSTE staff linked and de-identified the assessments and assigned a unique identifier for each service area or jurisdiction. Upon completion of the linkage and group identifications, AAPCC and CSTE deleted all identifying information and sent the survey data to CDC for analysis. Henceforth, PCs and DOHs linked by service area or jurisdiction will be referred to as a PC-DOH group. Any PC-DOH group for which a PC or DOH assessment had not been conducted was excluded from the linked analysis.

When multiple PCs and one DOH serviced the same jurisdiction, we averaged PC responses for numerical outcome variables in the linked analysis. For categorical questions, we reported the responses by the majority of PCs. We used the same process for when a single PC serviced more than one DOH.

### **Development of the linked collaboration score**

The collaboration score measured the perceived likelihood of collaboration within a PC-DOH group in the event of a public health incident. We determined the linked collaboration score based on the PC-DOH groups and the responses to two questions: ‘How likely would it be for your *DOH* to call your *PC* for discussion on a public health issue or threat?’ and ‘How likely would it be for your *PC* to call your *DOH* for discussion on a public health issue or threat?’ We designated each of the four Likert-scale responses by a numeric value; the ‘unlikely’ response was given a value of 1, ‘somewhat likely’ response a value of 2, ‘likely’ response a value of 3, and ‘very likely’ response a value of 4. We calculated the mean value of the PC and DOH responses as the collaboration score for each group. We categorized groups based on level of collaboration; average group collaboration scores of 0–2.5 were categorized as low levels of collaboration, scores of 2.5–3.5 as moderate levels of collaboration, and scores greater than 3.5 as high levels of collaboration. Note that we derived the collaboration score from the analysis of PC-DOH groups and is distinctly different from the interactivity score, which uses PCs as the unit of analysis.

### **Statistical analysis**

#### *PC assessment*

We conducted descriptive analyses on survey responses. Responses included the PC infrastructure arrangement, levels of interactivity between the PC and DOH (using an interactivity score), funding source (e.g., state, local) and amounts, current activities, data-sharing capabilities, likelihood of collaboration (measured by the linked collaboration score), and perceived impediments to collaboration.

### *Assessment of PC- and DOH-matched questions*

Many of the same questions were asked for both the PC and DOH assessments. Matched questions included the services and capacities provided to the DOH, mechanisms for data sharing, role of the PC, likelihood of PCs calling DOH and DOHs calling PC in the event of a public health incident, and impediments to PC and DOH collaboration. We conducted bivariate analyses on responses to matched questions stratified by respondent type (PC and DOH). We conducted Fisher exact tests and reported p-values on all stratified analyses because so few survey participants responded. For questions with multiple responses, we conducted statistical tests for each answer choice.

### *Linked analysis*

We linked assessments to groups and conducted descriptive analyses on group characteristics, including PC-DOH infrastructure, current capacities, real-time data sharing, program collaborations, and interactivity and collaboration scores. We stratified groups by collaboration-score category and analyzed by variables of interest. We conducted Fisher exact tests and reported p-values on all stratified analyses because so few survey participants responded. The criterion for our Type 1 error was relaxed (alpha value 0.10) because so few participants responded for this assessment. We conducted data cleaning and analysis using SAS 9.3 (SAS Institute Inc., Cary, NC, USA).

## **Results**

### **Overview of respondents**

Forty seven of the 57 PCs (82.5%) responded. One PC completed only two questions in the survey, so that PC was excluded from the analysis. Forty six PCs (80.7%) completed the assessment.

## PC assessment

Table 1 provides an overview of PC assessment responses. Most PCs reported being part of a hospital-based system (n = 21; 45.7%) or an educational institution (n = 17; 37.0%). Only two (4.4%) respondents reported being part of the state or local government. All respondents reported collaboration or interactivity in some capacity with a state or local DOH, with most respondents collaborating with both state and local DOHs (n = 37; 80.4%). Interactivity varied widely among PC respondents; most PCs had some mechanism of automated or manual public health alerts with their DOH (n = 32; 69.6%); an interactivity score was calculated based on responses to this question. About one third of the PCs were categorized as highly interactive with their respective DOHs (n = 16; 34.8%). The current capacities and services varied widely amongst respondents. Most PCs provided chemical, biological, radiological, or nuclear terrorism preparedness support to their DOH (n = 34; 73.9%).

PC respondents were asked about funding from state and local DOHs. Most PC respondents reported receiving less than 25% of their operating budget from DOHs (n = 28; 93.3%). Most PCs received less than \$100,000 annually from DOHs (n = 24; 68.6%).

All PCs responded that the relationship between PC and DOHs needs to be strengthened. When PCs were asked whether they would be interested in a funding opportunity to enhance interaction between the state and local DOH, most responded they were 'very interested' (n = 43, 93.5%). For PC respondents that did not share data with their DOH (n = 13), the majority responded that they very likely would share data if all technological and financial limitations were removed (n = 7, 53.9%).

### **PC- and DOH-matched questions**

Both PCs and DOHs reported a wide range in the number of functions provided to DOHs by PCs (Table 2). There was no statistical difference between the reported number of functions reported by PCs and DOHs.

PCs reported that data are provided to DOHs upon request more often than DOHs (n = 32; 71.1% and n=19; 35.9%, respectively) (p = 0.001). PCs also reported that DOH staff used a Web portal to access PC data more often than DOHs (n = 14; 31.1% and n = 7; 13.2 % respectively) (p = 0.049).

When asked what impediments to collaboration existed between the PCs and DOHs, lack of dedicated funding and personnel was the most frequent answer for both PCs and DOHs (n = 28; 60.9% and n = 42; 79.3%, respectively). DOHs reported information technology limitations (n = 20, 37.7%) as impediments to collaboration more often than did PCs (n = 2, 4.4%) (p <0.001).

Both PCs and DOHs reported that PCs are useful to public health; most PCs and DOHs responded that the PC is indispensable or useful to the public health of their jurisdiction (n = 44; 95.6% and n = 50; 94.3%, respectively).

Most PCs and DOHs responded that the DOH would 'likely' or 'very likely' contact the PC to discuss a public health threat (Table 2). However, DOHs responded with a higher percentage of 'very likely' than did PCs (n = 33; 62.3% DOH vs n = 17; 37.0% PC) (p = 0.003).

Most PCs and DOHs also responded that the PC will 'likely' or 'very likely' contact the DOH to discuss a public health threat (Table 2).

### **Linked analysis: PC-DOH Groups**

Table 3 provides an overview of characteristics of linked PC-DOH groups. We linked a total of 35 groups, with most PCs linked to one DOH (n = 19; 54.3%). Two PCs and two DOHs were excluded from the analysis. Within the linked groups, almost half of the PCs provided real-time data to their DOH (n = 17; 48.6%). Eleven of the linked groups (31.5%) had a high level of collaboration, 17 (48.6%) had a medium level of collaboration, and 7 (20.0%) had a low level of collaboration.

Table 4 provides an overview of group characteristics stratified by collaboration score. Groups with lower mean-interactivity scores were associated with low collaboration scores (p = 0.063). Groups with low levels of collaboration had lower number of services and capacities provided by the PC to the DOH (p = 0.007). Additionally, low-level collaboration groups were also provided lower levels of funding from the state/local DOH for services and capacities than were their higher-level collaboration counterparts (p = 0.074).

We stratified the perceived impediments of PC-DOH groups by collaboration scores to determine whether different levels of collaboration yielded differing perceptions of the barriers to collaboration. Low-level collaborators were more likely to report “lack of familiarity with the data and how it may be used to support public health” as the perceived barrier than were medium- and high-level collaboration groups (p = 0.0914). High-level collaboration groups were more likely to report “information technology limitations between data management systems” as a perceived impediment to collaboration than were the lower-level collaboration groups (p = 0.0436). This finding suggests that perceptions of barriers to collaboration were tiered by how likely groups were to collaborate, with data familiarity as a dominant barrier for low-level collaboration groups and information technology limitations as a dominant barrier for high-level collaboration groups.

## Discussion

The overall project was intended as a national assessment of the current relationships among all 50 states, six most densely populated U.S. cities, and all 57 regional PCs. We asked the PCs significant questions about their collaboration with the DOH counterparts, including the current services provided and perceived barriers to collaboration, and had a high response rate for the assessment.

There were a few limitations to this study. Respondents of the survey may not have been the primary point of contact for PC-DOH collaborations, thus, results may not reflect the full scope of collaboration between PCs and DOHs.

Two measures—the interactivity score and collaboration score—were developed to evaluate the characteristics and collaboration aspects of PCs and DOHs. The degree to which these measures adequately represent what they purport to measure is unknown. We calculated the interactivity score using one question and the collaboration score using two questions on the survey. Due to inconsistencies in responses and limited interpretability of other survey questions related to interactivity and collaboration, we chose not to add other questions as a part of these measures, and thus construct validity may have been decreased for these scores.

In creating PC-DOH groups, we combined survey responses among units of the same group to create one response for each question. When results were combined, some information may have been lost, and results may not accurately capture responses from multiple units.

The results of the assessment highlight the wide spectrum of collaboration that exists between PCs and DOHs across the country. All PCs reported at least some collaborative capacity with their respective DOHs, with most working with both state and local DOHs, despite that most PCs receive less than 25% of their funding from a state DOH arrangement. PCs reported varied levels of interactivity between their

facilities and DOHs, ranging from minimal contact and communication to active membership in DOH-planning activities.

Despite their differences in collaborative capacities, PCs unanimously responded that the relationship between PCs and DOHs needs to be strengthened nationally. Moreover, PCs responded favorably to the opportunity to receive funding towards enhancing collaborative capacities. Paired with the findings in the CSTE report, this assessment suggests that funding was the biggest perceived barrier to collaboration, and potential funding opportunities towards initiatives in bolstering collaboration would be well received by both PCs and DOHs<sup>4</sup>.

A comparison between responses from matched questions asked of PCs and DOHs illustrated the many similarities and differences in their perspectives to collaboration. In general, PCs and DOHs agreed on many of the matched questions, such as the number of services and capacities provided and that PCs are indispensable and important to public health. However, PCs and DOHs responded differently on how data are shared between partnerships. DOHs were less likely to respond as to having the availability of various data sharing mechanisms in the DOH assessment than PCs responded in the PC assessment. This may be due to the lack of familiarity amongst DOH respondents about the different mechanisms available to request or access PC data. To address this barrier, the CoP is preparing a guidance document that will describe the different ways DOHs can request or access PC data.

Poison centers were less likely than DOHs to respond that IT limitations were an impediment to collaboration. This may be due to the stringent data transmission requirements for PCs in their accreditation process. To become accredited by AAPCC, PCs must be able to electronically upload local data to the National Poison Data System (NPDS). Initiatives focused on improving the capacity for DOHs to receive, access, and analyze PC data might address DOH IT limitations regarding PC data.

It was important to link and analyze PC-DOH groups to further characterize PC-DOH partnerships. Low-level collaborators were more likely to have fewer services provided, lower state-specific funding, and lower interactivity score; these associations likely are interrelated. For example, reduced resources may be linked to fewer opportunities for program collaborations and fewer chances to interact during incidents. The finding that low-likelihood collaborators were more likely to indicate “lack of familiarity of PC data and its utility in public health” as a primary impediment, and high-likelihood collaborators were more likely to indicate “IT limitations” as a primary impediment suggest that perceived barriers to collaboration, aside from funding and staffing impediments, are tiered by their perceived likelihood to collaborate. Thus, PC-DOH groups with low collaborative capacity might benefit from improving communication between PCs and DOHs, whereas PC-DOH groups with high collaborative capacity might benefit from addressing data transmission, management, and analysis issues.

This national assessment provides a comprehensive characterization of PC and DOH collaborations, and highlights factors that might promote or hinder successful collaborations. Mutually beneficial partnerships between PCs and DOHs may improve public health outcomes for hazardous exposures — the ultimate goal for both entities.

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## Tables

**Table 1. Responses for the Poison Center (PC) Assessment**

<b>How would you classify the infrastructure arrangement under which your PC operates (e.g. your center is part of a hospital, university or free standing, etc.)?</b>	<b>N=46</b>	<b>%</b>
Hospital-based	21	45.7%
Educational institution (e.g. University-based)	17	37.0%
Operates as independent entity	4	8.7%
State or Local government	2	4.4%
Other	2	4.4%
<b>Does your PC collaborate or interface in any capacity with your state(s) or local health department(s) (DOH)?</b>	<b>N=46</b>	<b>%</b>
Yes, both state and local	37	80.4%
Yes, state	9	19.6%
<b>How would you classify the level of interactivity between your DOH and your PC?</b>	<b>N=46</b>	<b>%</b>
Automated/manual public health alerts from DOH to PC or PC to DOH	32	69.6%
Maintenance of medical/informational disaster support or surge capabilities	28	60.9%
Submit/provide PC data on a manual, as needed, or intermittently scheduled basis	28	60.9%
Periodic regular phone/email contact on public health issues	27	58.7%
Automated upload of PC data on real/near real time basis	22	47.8%

Intermittent service commitment (e.g. active service only when requested during public health emergencies; handle DOH calls only after hours, etc.)	21	45.7%
Ongoing, consistent services provided (e.g. handle DOH calls consistently; ongoing food poisoning, pesticide, rabies, etc. hotline for information, management and tracking)	20	43.5%
Active membership on DOH planning or mitigation teams or committees	17	37.0%
Minimal phone/email contact, sporadic as needed discussions on emergency public health issues/alerts only	14	30.4%
<b>Interactivity Score</b>	<b>N=46</b>	<b>%</b>
High (14-22)	16	34.8%
Moderate (11-13)	12	26.1%
Some (8-10)	8	17.4%
Low (1-7)	10	21.7%
<b>Indicate the current capacities/services that your PC provides to your DOH (any response).</b>	<b>N=46</b>	<b>%</b>
Chemical, Biological, Radiological, and Nuclear terrorism preparedness/support	34	73.9%
Natural disaster planning	29	63.0%
Disaster/surge capability/support	29	63.0%
Public health education	29	63.0%
Hazardous materials incidence reporting	28	60.9%
Food/waterborne disease calls	27	58.7%
Real time PC data transmission/upload	25	54.4%

Pesticide surveillance/monitoring	25	54.4%
Substance abuse support/tracking	24	52.2%
Occupational health surveillance/monitoring	16	34.8%
Consultation/reporting for lab data	15	32.6%
Consults for air/soil/water safety/monitor	15	32.6%
Vaccine Information/Adverse drug events reporting	14	30.4%
Public health calls after hours	14	30.4%
Public health calls during day hours	13	28.3%
Reportable illness notification	13	28.3%
Commercial products adverse events reporting	12	26.1%
Health/Medical information calls	12	26.1%
Over the counter / Pharmacy medication adverse drug events	9	19.6%
Specific agent monitoring	7	15.2%
Product support	3	6.5%
Other	3	6.5%
<b>If you currently receive additional funding for services provided to your state(s)/local (or both) DOH, approximately what percentage of the PC's total operating budget is obtained through this arrangement?</b>	<b>N=30</b>	<b>%</b>
>50%	0	0.0%
25-50%	2	6.7%
<25%	28	93.3%
<b>What is the total (i.e., state(s), local or both) current level of funding obtained from services discussed in previous questions?</b>	<b>N=35</b>	<b>%</b>

0-50,000	13	37.1%
50,001-100,000	11	31.4%
100,001-200,000	5	14.3%
>200,000	6	17.1%
<b>Do you believe the relationship between PCs and DOHs need to be strengthened nationally?</b>	<b>N=46</b>	<b>%</b>
Yes	46	100.0%
<b>How interested would your PC be in a funding opportunity to enhance the interface with your state(s) or local DOH?</b>	<b>N=46</b>	<b>%</b>
Very interested	43	93.5%
Somewhat interested	2	4.4%
Not interested	1	2.2%
<b>If you do not share PC data with your state/local DOH AND all the technological and financial limitations/blocks were removed, how likely would you be to agree to data sharing for use in public health surveillance?</b>	<b>N=13</b>	<b>%</b>
Very likely	7	53.9%
Likely	4	30.8%
Somewhat likely	1	7.7%
Unlikely	1	7.7%

**Table 2. Responses to Matched Questions for Poison Center (PC) Assessment and Health Department (DOH) Assessment\***

<b>Number of capacities or services provided by PC to DOH</b>	<b>PC N=46</b>	<b>%</b>	<b>DOH N=53</b>	<b>%</b>	<b>P-value†</b>
0 to 1	3	6.5%	4	7.6%	0.561
2 to 4	8	17.4%	13	24.5%	
5 to 9	15	32.6%	19	35.9%	
10 to 14	13	28.3%	14	26.4%	
15 to 19	5	10.9%	1	1.9%	
20+	2	4.4%	2	3.8%	
<b>What mechanisms are in place that allow for data supply/sharing of PC data with your state(s)/local DOH? (check all that apply)</b>	<b>PC N=46</b>	<b>%</b>	<b>DOH N=53</b>	<b>%</b>	<b>P-value</b>
Data are provided by PC staff upon request of DOH staff, email or letter.	32	71.1%	19	35.9%	0.001
Online, internet based web service provides access to NPDS, which allows DOH staff to query/access/analyze their state specific PC data.	16	35.6%	14	26.4%	0.389
A proprietary application is utilized to upload PC data to a DOH server on a regular basis.	16	35.6%	13	24.5%	0.278
DOH staff utilize a web portal (not NPDS) or client-based application to access PC data stored on PC servers.	14	31.1%	7	13.2%	0.049

<b>Impediments to Collaboration Between your PC and your DOH?</b>	<b>PC N=46</b>	<b>%</b>	<b>DOH N=53</b>	<b>%</b>	<b>P-value</b>
Lack of dedicated funding/personnel	28	60.9%	42	79.3%	0.05
Lack of familiarity with the data and how it may be used to support public health	11	23.9%	12	22.6%	1
No central point of lead or point of contact	7	15.2%	7	13.2%	0.782
Political challenges including interpersonal challenges	5	10.9%	8	15.1%	0.568
Information technology limitations between data management systems	2	4.4%	20	37.7%	<0.0001
<b>How would you describe the role that your PC plays in state and local public health?</b>	<b>PC N=46</b>	<b>%</b>	<b>DOH N=53</b>	<b>%</b>	<b>P-value</b>
The PC is indispensable to the public health of my state/jurisdiction	22	47.8%	30	56.6%	0.626
The PC is useful to the public health of my state/jurisdiction	22	47.8%	20	37.7%	
The PC is neither helpful nor harmful to the public health of my state/jurisdiction	0	0.0%	0	0.0%	
I don't know if the PC is useful to the public health of my state/jurisdiction	2	4.4%	3	5.7%	
The PC does not participate in the public health of my state/jurisdiction	0	0.0%	0	0.0%	

<b>How likely would it be for your state/local DOH to call your PC for discussion on a public health issue or threat?</b>	<b>PC N=46</b>	<b>%</b>	<b>DOH N=53</b>	<b>%</b>	<b>P-value</b>
Very Likely	17	37.0%	33	62.3%	0.003
Likely	12	26.1%	14	26.4%	
Somewhat Likely	11	23.9%	5	9.4%	
Unlikely	6	13.0%	0	0.0%	
Don't know	0	0.0%	1	1.9%	
<b>How likely would it be for your PC to call your DOH for discussion on a public health issue or threat?</b>	<b>PC N=46</b>	<b>%</b>	<b>DOH N=53</b>	<b>%</b>	<b>P-value</b>
Very Likely	26	56.5%	32	60.4%	0.29
Likely	17	37.0%	12	22.6%	
Somewhat Likely	3	6.5%	6	11.3%	
Unlikely	0	0.0%	1	1.9%	
Don't know	0	0.0%	2	3.8%	

NPDS = National Poison Data System

\*The Council of State and Territorial Epidemiologists (CSTE) presented the DOH survey results in the CSTE assessment report.<sup>4</sup>

†Fisher exact test

**Table 3. General Characteristics of Linked Poison Center (PC) – Health Department (DOH) Groups\***

<b>PC-DOH Infrastructure</b>	<b>N=35</b>	<b>%</b>
1 PC to 1 State	19	54.3%
Multiple PCs to one state	10	28.6%
1 PC to multiple states	6	17.1%
<b>Do you provide real time data to your DOH?</b>	<b>N=35</b>	<b>%</b>
No	18	51.4%
Yes	17	48.6%
<b>What is the total (i.e., state(s), local or both) current level of funding obtained from services provided to the DOH?</b>	<b>N=35</b>	<b>%</b>
\$0-50,000	12	34.3%
\$50,001-100,000	6	17.1%
\$100,001-200,000	7	20.0%
\$>200,000	6	17.1%
N/A	4	11.4%
<b>Which of the following DOH staff/programs communicate with and access the PC staff for information and data? (check all the apply)</b>	<b>N=35</b>	<b>%</b>
Preparedness	28	80.0%
Environmental health program	27	77.1%
Infectious disease program	26	74.3%
State Epidemiologist or designee	21	60.0%
Chemical disease surveillance	19	54.3%
Children/maternal health programs and Medical Services	4	11.4%

Immunization staff	1	2.9%
<b>How would you classify the level of interactivity between your DOH and PC?</b>	<b>N=35</b>	<b>%</b>
Low	11	31.4%
Some	9	25.7%
Moderate	8	22.9%
High	7	20.0%
<b>Collaboration Score</b>	<b>N=35</b>	<b>%</b>
Low	7	20.0%
Medium	17	48.6%
High	11	31.4%

\*The Council of State and Territorial Epidemiologists (CSTE) presented the DOH survey results in the CSTE assessment report.<sup>4</sup>

**Table 4. Characteristics of Linked Poison Center (PC) – Health Department (DOH) Groups Stratified by Collaboration Score\***

<b>PC-HD infrastructure</b>	<b>Low N=7</b>	<b>%</b>	<b>Medium N=17</b>	<b>%</b>	<b>High N=11</b>	<b>%</b>	<b>P- value†</b>
1 PCC to 1 State	4	57.1%	9	52.9%	6	54.6%	0.745
1 PCC to multiple states	0	0.0%	4	23.5%	2	18.2%	
Multiple PCs to one state	3	42.9%	4	23.5%	3	27.3%	
<b>Indicate the current capacities/services that your PC provides your DOH</b>	<b>Low N=7</b>	<b>%</b>	<b>Medium N=17</b>	<b>%</b>	<b>High N=11</b>	<b>%</b>	<b>P- value</b>
1-9 services	7	100.0%	7	41.2%	3	27.3%	0.007
10+ services	0	0.0%	10	58.8%	8	72.7%	
<b>Do you provide real time data to your DOH?</b>	<b>Low N=7</b>	<b>%</b>	<b>Medium N=17</b>	<b>%</b>	<b>High N=11</b>	<b>%</b>	<b>P- value</b>
Yes	3	42.9%	9	52.9%	5	45.5%	1
No	4	57.1%	8	47.1%	6	54.6%	
<b>What is the total (i.e., state(s), local or both) current level of funding obtained from services provided by the PC?</b>	<b>Low N=6</b>	<b>%</b>	<b>Medium N=15</b>	<b>%</b>	<b>High N=10</b>	<b>%</b>	<b>P- value</b>
0-100,000	6	100.0%	7	46.7%	5	50.0%	0.074
100,001+	0	0.0%	8	53.3%	5	50.0%	

<b>Which of the following DOH staff/programs communicate with and access the PC staff for information and data? (check all the apply)</b>	<b>Low N=7</b>	<b>%</b>	<b>Medium N=17</b>	<b>%</b>	<b>High N=11</b>	<b>%</b>	<b>P- value</b>
Infectious disease program	4	57.1%	12	70.6%	10	90.9%	0.308
Environmental health program	5	71.4%	13	76.5%	9	81.8%	1
Chemical disease surveillance	2	28.6%	9	52.9%	8	72.7%	0.218
Preparedness	4	57.1%	14	82.4%	10	90.9%	0.252
Immunization staff	0	0.0%	1	5.9%	0	0.0%	1
State Epidemiologist or designee	4	57.1%	10	58.8%	7	63.6%	1
Children/maternal health programs and Medical Services	2	28.6%	2	11.8%	0	0.0%	0.223
<b>Interactivity Score</b>	<b>Low N=7</b>	<b>%</b>	<b>Medium N=17</b>	<b>%</b>	<b>High N=11</b>	<b>%</b>	<b>P- value</b>
Low-Some	5	71.4%	12	70.6%	3	27.3%	0.063
Moderate-high	2	28.6%	5	29.4%	8	72.7%	
<b>What are the impediments to collaboration between your PC and your DOH?</b>	<b>Low N=7</b>	<b>%</b>	<b>Medium N=17</b>	<b>%</b>	<b>High N=11</b>	<b>%</b>	<b>P- value</b>
Lack of dedicated funding/personnel	4	57.1%	13	76.5%	10	90.9%	0.2586
Lack of familiarity with the data and how it may be used to support public health	4	57.1%	2	11.8%	2	18.2%	0.0914

Political challenges including interpersonal challenges	3	42.9%	2	11.8%	1	9.1%	0.2075
Information technology limitations between data management systems	2	28.6%	4	23.5%	8	72.7%	0.0436
No central point of lead or point of contact	1	14.3%	1	5.9%	0	0.0a%	0.4571

\*The Council of State and Territorial Epidemiologists (CSTE) presented the DOH survey results in the CSTE assessment report.<sup>4</sup>

†Fisher exact test

## Appendix. Survey for Poison Centers on Collaboration with

### Public Health

#### 1) Respondent information

Name: \_\_\_\_\_

Title: \_\_\_\_\_

State(s)/Territories covered: \_\_\_\_\_

My State is covered by multiple poison centers

Poison Center: \_\_\_\_\_

ID number \_\_\_\_\_

#### 2) How would you classify the infrastructure arrangement under which your poison center operates (e.g. your center is part of a hospital, university or free standing, etc.)?

A. State government: Department of Health or equivalent agency

B. State government other than Department of Health (e.g., Department of Education, Agriculture, Emergency Services, etc.)

Specify: \_\_\_\_\_

C. Local government (i.e., city or county) – Health Department

D. Local government (i.e. city or county) other than Health Department

Specify: \_\_\_\_\_

- E. Educational institution (e.g. University based)
- F. Hospital based
- G. Operates as independent entity
- H. Other (Specify): \_\_\_\_\_

3) Does your poison center collaborate or interface **in any capacity** with your state(s) or local health department(s)?

- A.  Yes, state *(Please skip to question # 6)*
- B.  Yes, local *(Please skip to question # 6)*
- C.  Yes, both state and local *(Please skip to question # 6)*
- D.  No *(Please go on to question # 4)*

**Question's 4-5 are for respondents answering "NO" to question # 3**

4) If your poison center does not collaborate/interface at all with your state(s)/local health department, what are the reasons/impediments you believe are interfering with your establishing such an interface?

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5) If your poison center does not interface at all with your state(s)/local health department, how willing would you be to establish a working relationship?

- A. We are not interested
- B. Somewhat willing
- C. Willing
- D. Very willing

Reasons for "WE ARE NOT INTERESTED" or any hesitation in establishing a working relationship:

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**Respondents answering "NO" to question #3 please skip to #15**

- 6) How would you classify the level of interactivity between your poison center and the state(s)/local (or both) health department (check all that apply)
- A. Minimal phone/email contact, sporadic PRN discussions on emergency public health issues/alerts only
  - B. Periodic regular phone/email contact on public health issues
  - C. Automated/manual public health alerts from DOH to PC or PC to DOH
  - D. Intermittent service commitment (e.g. active service only when requested during public health emergencies; handle DOH calls only after hours, etc.)
  - E. Ongoing, consistent services provided (e.g. handle DOH calls consistently; ongoing food poisoning, pesticide, rabies, etc. hotline for information, management and tracking)
  - F. Maintenance of medical/informational disaster support or surge capabilities
  - G. Submit/provide PC data on a manual, as needed, or intermittently scheduled basis
  - H. Automated upload of PC data on real/near real time basis
  - I. Active membership on DOH planning or mitigation teams or committees

- 7) Indicate the current capacities in which your poison center provides service (through collaborations and/or interfaces) to your state(s)/local (or both) health department. Also indicate if you receive additional funding for that service, either currently or in the past.

	<b>Provide Currently</b>	<b>Funded in</b>	
	<b>Service</b>	<b>Funded Past</b>	
<b>1. Health/Medical information calls</b> _____	_____	_____	_____
Specify (AIDS, other medical conditions): _____			
Service provided to: <input type="checkbox"/> State(s) <input type="checkbox"/> Local <input type="checkbox"/> Both			
<b>2. Vaccine Information/ADE reporting</b> _____	_____	_____	_____
Service provided to: <input type="checkbox"/> State(s) <input type="checkbox"/> Local <input type="checkbox"/> Both			
<b>3. Rabies Information/advice calls</b> _____	_____	_____	_____
Service provided to: <input type="checkbox"/> State(s) <input type="checkbox"/> Local <input type="checkbox"/> Both			
<b>4. Reportable illness notification</b> _____	_____	_____	_____
Service provided to: <input type="checkbox"/> State(s) <input type="checkbox"/> Local <input type="checkbox"/> Both			
<b>5. OTC/Rx Medication ADE</b> _____	_____	_____	_____
Service provided to: <input type="checkbox"/> State(s) <input type="checkbox"/> Local <input type="checkbox"/> Both			
<b>6. Commercial product adverse effects</b> _____	_____	_____	_____
Service provided to: <input type="checkbox"/> State(s) <input type="checkbox"/> Local <input type="checkbox"/> Both			
<b>7. Hazardous materials incidents</b> _____	_____	_____	_____

Service provided to:     State(s)     Local     Both

**8. Product support (e.g. button battery line)** \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**9. Public health calls after hours** \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**10. Public health calls during day hours** \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**11. Real time PCC data transmission/upload** \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**12. Consultation/reporting for lab data** \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**13. Consults for air/soil/water safety/monitor** \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**14. Natural disaster planning** \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**15. Disaster/surge capability/support** \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**16. Food/waterborne disease calls** \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**17. CBRN terrorism preparedness/support** \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**18. Substance abuse support/tracking** \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**19. Occup. health surveillance/monitoring** \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**20. Public health education** \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**21. Pesticide surveillance/monitoring** \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**22. Specific agent monitoring** \_\_\_\_\_

Specify (lead, CO, arsenic, etc.): \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**23. Other:** \_\_\_\_\_

Specify: \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**24. Other:** \_\_\_\_\_

Specify: \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**25. Other:** \_\_\_\_\_

Specify: \_\_\_\_\_

Service provided to:     State(s)     Local     Both

**26. Other:** \_\_\_\_\_

Specify: \_\_\_\_\_

Service provided to:     State(s)     Local     Both

- 8) If you currently receive additional funding for services provided to your state(s)/local (or both) health department, approximately what percentage of the poison center's total operating budget is obtained through this arrangement?
- A. N/A
  - B. <25%
  - C. 25-50%
  - D. 51 - 75%
  - E. >75%
- 9) What is the total (i.e., state(s), local or both) current level of funding obtained from services discussed in questions 6-7 (answers are optional, but much appreciated):
- \$ \_\_\_\_\_
- 10) What mechanisms do you use to supply/share poison center data with your state(s)/local (or both) health department? Check all that apply.
- A. We do not supply/share poison center data
  - B. NPDS "Web Service" is used to allow DOH staff to query/access/analyze our poison center data
  - C. A proprietary application is utilized to upload our poison center data to a DOH server on a regular basis.
  - D. The DOH staff utilize a web portal (not NPDS) or client-based application to access our poison center data stored on poison center servers

- E. DOH staff have access to/utilize NPDS reports, queries and anomalies to analyze our poison center data
- F. Data is provided by poison center staff upon request of DOH staff

11) How likely would it be for your state/local health department to call your poison center for discussion on a public health issue or threat?

- A. Would never happen
- B. Unlikely
- C. Somewhat likely
- D. Likely
- E. Very likely

Reasons for "NEVER HAPPEN/UNLIKELY" or any hesitation in opening a discussion:

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12) How likely would it be for your poison center to call your state(s)/local health department for discussion on a public health issue or threat?

- A. Would never happen
- B. Unlikely
- C. Somewhat likely
- D. Likely
- E. Very likely

Reasons for "NEVER HAPPEN/UNLIKELY" or any hesitation in opening a discussion:

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13) What do you see as impediments to establishing, maintaining, or expanding your poison center's interface with your state(s)/local health department?

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14) How would you describe the role that your poison center plays in state and local public health? (Indicate one)

- A. The poison center is indispensable to the public health of my state
- B. The poison center is useful to the public health of my state
- C. The poison center is neither helpful nor harmful to the public health of my state
- D. I don't know if the poison center is useful to the public health of my state
- E. The poison center does not participate in the public health of my state

15) If you DO NOT SHARE poison center data with your state/local department of health AND all the technological and financial limitations/blocks were removed, how likely would you be to agree to data sharing for use in public health surveillance

- A. We are not interested
- B. Unlikely
- C. Somewhat likely
- D. Likely
- E. Very likely

Explanation for "WE ARE NOT INTERESTED/UNLIKELY" or any hesitation in sharing data:

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16) Do you believe the relationship between poison centers and health departments need to be strengthened nationally?

- A. Yes
- B. No
- C. Don't know

17) How interested would your poison center be in a funding opportunity to enhance the interface with your state(s) or local health department?

- A. Not interested
- B. Somewhat interested
- C. Very interested

18) If you answered "*interested*" to question # 17, how would you use this funding opportunity to increase the level of interactivity with your state(s) or local health department?

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19) Other than direct additional funding for clinical services already provided by your poison center, what other services or funded service opportunities could your health department provide to your poison center that you would consider beneficial. Some examples might include: epidemiology subject matter expertise, personnel, opportunity to provide additional services for additional funding such as needle stick injury or rabies calls after hours, etc....)

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20) If there is any additional information you believe is relevant to the discussion of poison center-health department interface, or to your specific situation, we offer the following space to provide additional feedback.

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