

Enhancing Public Health Management of Chemical Incidents through Collaboration with Poison Centres: Case Studies Based Virtual Symposium

February 6, 13, 20, 2025

Summary Report

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Global Health Security Initiative Chemical Events Work
Group (GHSI-CEWG)

Table of Contents

Background.....	2
Objectives	2
Chemical Events Working Group.....	2
About the Symposium	3
Symposium Summary.....	4
Synthesis of Key Themes	4
Surveillance and Information Management.....	4
Preparedness and Training	4
Resource Optimization and Mobilization.....	5
Communication	5
Collaboration and Partnerships	5
Considerations from CEWG Symposium Steering Committee	6
Annex	8
Case-Specific Summary and Key Considerations (Successes, Gaps, and Opportunities for Improvements)	8

Background

Achieving global health security for chemical emergencies requires a multifaceted approach. Key strategies involve strengthening international collaboration, building core capacities, enhancing national preparedness, and advancing response and recovery efforts. Poison centres and public health entities are two critical stakeholders in the disaster management cycle of chemical incidents (i.e., Prevention, Preparedness, Detection and Alerting, Response, Recovery, Mitigation).

To address the growing need for interdisciplinary dialogue in response to complex global challenges arising from chemical disasters, the GHSI Chemical Events Working Group convened a virtual symposium. This event featured case studies highlighting international experiences and expertise from both a poison centre as well as a public health perspective. The event also featured keynote presentations and panel discussions that delved deeper into specific questions posed by international participants.

The following summary report of the symposium includes key themes identified from various case studies and best practices considerations from CEWG Symposium Steering Committee.

The full recording of the GHSI Symposium can be found on: <https://infopoison.ca/events>

Objectives

The symposium employed a format featuring multiple interactive sessions focused on presentations of case studies by experts in poison control, public health, healthcare delivery, and emergency management.

The objectives of the 2025 symposium, entitled *“Enhancing Public Health Management of Chemical Incidents through Collaboration with Poison Centres: Case Studies Based Virtual Symposium”* were as follow:

- To explore the experiences, capabilities, capacities, and lessons learned by poison centres and public health entities in responding to chemical incidents.
- To identify the value of collaboration between poison centres and public health entities in emergency management (including preparedness, vigilance, response, recovery, and mitigation) of chemical incidents.
- To share and discuss best practices and challenges associated with collaboration.

Chemical Events Working Group

The Chemical Events Working Group (CEWG) is a subgroup under the Global Health Security Initiative ([GHSI](#)). Delegations of the GHSI include Canada, France, Germany, Italy, Japan, Mexico, the United Kingdom, the United States, and the European Commission. The World Health Organization (WHO) serves as an observer. Its core mandate is to strengthen health preparedness

and the global response to threats from chemical, biological, radiological and nuclear substances, and pandemic influenza, to ensure the health and well-being of populations worldwide. The CEWG is a technical/scientific working group involved in the risk prioritization of chemicals, the identification of research needs and best practices in the area of medical countermeasures, as well as other cross-hazard projects such as early alerting and reporting.

About the Symposium

The GHSI 2025 symposium was a virtual event held free of charge, on February 6, 13, and 20, 2025. Each session ran from 14:00 to 18:00 UTC, accommodating, to the extent possible, international participants. The virtual format removed travel and associated financial barriers. The presentations were pre-recorded followed by live Q&A sessions. Questions not answered immediately were deferred to day 3's extended town hall session.

The CEWG gratefully acknowledges the National Collaborating Centre for Environmental Health ([NCCEH](#)) for their invaluable assistance in organizing the logistics and technological support for the symposium. As a member of the CEWG Symposium Steering Committee, NCCEH managed registrations, hosted the live webinars, and prepared final event materials for the website. Their ongoing communication, attention to detail, and adaptability were key to the event's success.

Symposium Summary

The symposium featured a diverse range of case studies addressing potential toxic exposure events of public health concern. Presentations covered topics including industrial accidents, incidents involving inhalation of toxic chemicals, exposures to drugs and toxins, as well as large-scale poisoning events. In addition, discussions highlighted the intersection of toxicology with drug regulation and policy considerations.

Synthesis of Key Themes

A consolidated overview of the key themes identified across multiple case studies discussed during the symposium is presented below. It serves as a high-level summary to inform broader discussion and strategic planning.

A more detailed, case-specific gap analysis is provided in the [Annex](#) to complement this synthesis and offer further insight into individual case study findings.

Surveillance and Information Management



Role of poison centres: Poison centres act as surveillance nodes by integrating toxicological expertise with public health data for near real-time monitoring.

Automated platforms: Building digital systems for chemical tracking improves efficiency in early detection and response.

Active detection systems: Chemical detection and monitoring technologies in industrial sites play a pivotal role in early incident recognition. However, passive surveillance (e.g., monitoring symptoms in populations) remains essential, as active systems may not perform reliably under all conditions.

Preparedness and Training



Emergency response plans: Development, maintenance and regular updating of plans are crucial to preparedness. Exercising these plans through **emergency response training exercises**, including simulation drills for healthcare providers, poison centres, public health officials, and first responders.

Hospital preparedness: Ensuring that hospitals are equipped and more proficient to handle mass casualties from chemical exposures is a critical component of emergency planning.

Post-incident studies: Epidemiological studies conducted after incidents provide insights into long-term impacts on affected populations and inform future preparedness efforts.

Resource Optimization and Mobilization



Rapid resource mobilization and access: Establishing strategies for deploying medical assets, specialized care, personnel, and surge capacity to support effective incident management. This is to allow timely and adequate support for impacted populations.

Emergency medication reserves and improving laboratory testing capabilities both enhance emergency preparedness, readiness, response, and recovery

Technological tools: Decision-support systems, modeling tools, and chemical databases can help to support an optimal response during emergencies.

Communication



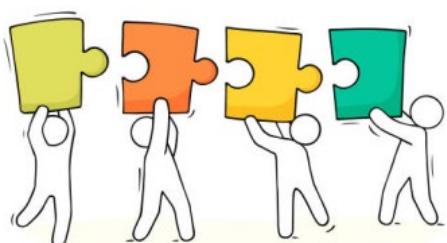
Rapid communication: Timely communication between poison centres, health departments, and other agencies (and other toxicovigilance disciplines and jurisdictions) is crucial for swift detection and incident management.

Risk communication: Simplifying complex scientific data for public understanding across all phases of an incident enhances clarity and alignment with

protective measures.

Public messaging: Coordinated messaging through diverse media channels helps reach a wide range of populations including vulnerable ones and minimizes public anxiety during emergencies.

Collaboration and Partnerships



Inter-disciplinary collaboration: Strengthening or establishing partnerships among poison centres, public health entities, first responders, hospitals, and law enforcement improves crisis response capabilities. Poison centres serve as critical hubs for accessing toxicological expertise and surveillance.

Global cooperation: In addition to local response efforts during an incident, international collaboration among poison centres and public health agencies is still

valuable in that it facilitates cross-border responses to chemical incidents and for sharing best practices.

Considerations from CEWG Symposium Steering Committee

Communication

To support detection and alerts, the majority of poison centres offer a 24/7 telephone service, issuing real-time alerts and responses. Poison Centres staff can share their expertise in **risk communication**, health promotion, **media communication** and the use of social media, which enhances the poison centre's capacity for toxicovigilance and prevention.

Communications should be coordinated among stakeholders, accurate, reliable, timely, and up-to-date, especially during response and recovery. Pre-scripted messaging can be drafted and agreed upon by stakeholders to enhance efficiency and coordination. All stakeholders/partners should agree on the key messages to avoid causing confusion.

Poison centres serve a bigger role than critical hubs for medical toxicological expertise and surveillance: (e.g., trusted and reliable information/data source 24/7/365, real time data (clinical, epidemiologic, syndromic) collection/analysis, rapid/nimble communications, triage, subject matter experts and subject matter experts referrals, real time research, dedicated line for a specific incident or multiple incidents).

[Crisis and emergency risk communication \(CERC\)](#) is a discipline to itself. The six principles of CERC for effective emergency and risk communication includes: “Be first, Be right, Be credible, Express empathy, Promote action, Show respect”.

Collaboration and Partnerships

Understanding the complexity in detection and management of toxic exposures, local jurisdiction may not have the required expertise and therefore international reach back could be critical to a successful local or national intervention.

In an increasingly interconnected world, the global risks of chemical exposures, poisonings, and environmental toxicants present an urgent public health challenge. As the global community works to ensure all countries have access to a poison centre by 2030, it must be recognized that poison centres and toxicovigilance disciplines and jurisdictions are often siloed and not well connected with public health, regulatory and health security counterparts. There is currently no global system to facilitate the sharing of timely toxicological information, surveillance alerts, or best practices across borders. Building global cooperation and capacity opportunities would enhance early warning capabilities, support global responses, and strengthen national systems.

Resource Optimization and Mobilization

Poison Centres can act as a node for pre-incident awareness of a region's resources and coordinating mobilization of stockpiles during an incident (i.e. [Antidote Response Network](#)), which can improve access to medications needed to treat poisonings that are otherwise unavailable at the site at which they are needed.

Surveillance and Information Management

Information collected by poison centres can be shared with partners for action during response and recovery.

Preparedness and Training

A portion of training and exercises should involve joint, inter-agency participation of all emergency response partners.

Consideration should be given to ensure required toxicovigilance resources are identified in local, domestic and international emergency management plans.

Integrating poison centres into emergency preparedness and response planning is a critical yet often overlooked component of chemical incident management. Traditionally, poison centres are engaged only in the later stages of an event—typically when health effects begin to manifest. To enhance response effectiveness and ensure timely medical guidance, poison centres should be included from the outset of any chemical emergency planning and training. Their early involvement can provide valuable toxicological insight, support risk and exposure assessment, and improve coordination across health and emergency services.

Annex

Case-Specific Summary and Key Considerations (Successes, Gaps, and Opportunities for Improvements)

This section provides a detailed summary of each individual case study, outlining successes, gaps, needs, and opportunities for improvement as deliberated on Day 3 of the symposium. Presented in a neutral and objective manner, these considerations reflect the collective insights and expert discussions that emerged from the symposium.

Case Study 1: Harness the power of collaborating in the ammonia mass casualty incident

Speakers:

Irma R. Makalinao, Professor and Coordinator, CBRN Health Initiatives, University of the Philippines Manila

April B. Llaneta, Associate Professor and Chair, Department of Emergency Medicine, University of the Philippines and Philippine General Hospital

Summary

The 2021 ammonia mass casualty incident during the COVID-19 pandemic in Navotas, Philippines, involved an ammonia leak from an ice plant, causing dyspnea among some residents and resulting in two fatalities. The University of the Philippines National Poison Management Control Center (UP NPMCC) assisted with managing the exposure of 83 individuals. The on-duty toxicology fellow alerted the on-call consultant, and additional fellows were recalled for handling the patient load. Coordination between emergency department staff and the UP NPMCC ensured appropriate symptom management. The incident underscored the importance of timely alert and notification, and sharing of case-specific triage protocol with the Emergency Department team the referring hospitals. This is key to an effective coordination with relevant units and agencies, e.g., the UP NPMCC and the Philippine General Hospital emergency department, which co-managed the incident with the latter setting up an emergency decontamination area outside of the emergency department.

Successes

- UP NPMCC leadership and expertise: Provided specialized toxicology guidance and activated ammonia exposure protocols from its chemical emergency guidebook for a targeted, efficient response.
- Real-time hospital support: Offered triage guidance to multiple hospitals to accurately assess and categorize patients by severity.
- Strong partnerships leveraged: Collaborated with the Philippine Society of Clinical and Occupational Toxicology to address complex medical challenges jointly.
- Effective incident command at the Philippine General Hospital (PGH): Streamlined departmental roles, efficiently managing 96 ammonia patients alongside COVID-19 cases.
- Adaptive crisis management: Established outdoor decontamination zones to avoid emergency department overcrowding, implemented modified triage (red/yellow/green zones), and maintained coordination via hybrid communication tools (WhatsApp, Viber) despite COVID-19 bed shortages.

Challenges and opportunities for improvements

- Strengthen regulations, infrastructure, and safety culture to reduce chemical disaster risks near urban areas.
- Develop centralized hazard mapping and enforce safety checks with improved operator training.
- Integrate public health and poison centers into emergency response frameworks.
- Standardize protocols, including age-specific guidelines, and expand cross-agency simulation exercises.
- Build responder capacity through PPE and emergency training; establish poison centre-led surveillance for early incident detection.

Case Study 2: Collaboration Between the Public Health Emergency Operation Centre and the Poison Control Section in Oman: An Example from EMRO

Speakers:

Ziad Kazzi, Professor, Department of Emergency Medicine, Emory University; Co-Director, Centre for Advanced Emergency Care; Director, International Toxicology Fellowship Program, Emory University; Assistant Medical Director, Georgia Poison Centre; Associate Medical Director, Southern Regional Disaster Response System, Emory University; Adjunct Professor, American University of Beirut, Lebanon; Vice President, American College of Medical Toxicology; Past President and Co-Director, MENATOX

Mohammad Al Busafi, Director, Emergency and Public Health Response Centre, Ministry of Health Oman; Consultant, Emergency Medicine, Royal Hospital Oman; Senior Lecturer, College of Medicine at Sultan Qaboos University, Oman

Badria Alhatali, Head, Poison Control Section, Department of Environmental and Occupational Health, National Centre for Disease Control and Prevention, Ministry of Health, Oman; Consultant, Emergency Medicine and Medical Toxicology, Royal Hospital, Oman; President, MENATOX

Summary

Dr. Al Busafi recounted an incident involving the release of chlorine gas in the industrial area of Sohar, Oman, in May of 2023. The Public Health Emergency Operations Centre (PHEOC) was alerted by an emergency department clinician in Sohar. This prompted the activation of local and regional emergency plans, mobilizing the public health emergency sector and the National Hazmat Team. The PHEOC sought guidance from the Oman Poison Control Centre. Due to the significant number of individuals affected (n=42), patients were dispersed across multiple hospitals, including private sector facilities, showcasing the integration of the private sector in the national emergency response. Collaborative efforts among response teams led to the identification of the chemical involved at the scene

Successes

- Effective inter-agency communication: Promptly established strong communication among the Public Health Emergency Operations Centre (PHEOC), Poison Control Section, and Sohar Hospital using pre-existing relationships.
- Swift clinical response: Clinical toxicology team quickly adjusted management strategies and optimized resource use.
- Timely PHEOC actions: Contributed significantly to the effective overall incident response and management.
- Key PHEOC roles: Activated and coordinated response, monitored situations in real time, managed resources, facilitated communication, implemented incident command, and liaised with poison control and healthcare facilities.
- Integrated national system: Oman's emergency management system involved government and private sectors, enabling resource sharing and complementary efforts.
- Poison Control Section contributions: Rapid exposure identification, guidance on PPE and decontamination, and close collaboration with public health emergency teams.

Challenges and opportunities for improvements

- Ensure 24/7 poison centre availability and improve decontamination protocols.

- Integrate the private sector into emergency response and emphasize post-incident monitoring and evaluation.
- Strengthen chemical emergency preparedness through a National Risk team, public-private collaboration, and readiness requirements in industrial zones.
- Involve poison centres early to support toxicodrome identification, decontamination planning, and hospital capacity assessment.
- Improve public communication strategies to raise awareness and guide symptom monitoring.
- Maintain strong collaboration between emergency responders, healthcare providers, and poison centers via established Ministry of Health protocols.

Case Study 3: Aconitine Outbreak Events (2022): Management and Lessons Learned from Canada

Speakers:

Emily Austin, Medical Director, Ontario Poison Centre; Emergency Medicine Physician, St. Michael's Hospital, Toronto, ON

David McVea, Public Health Physician, Environmental Health, British Columbia Centre for Disease Control / Drug and Poison Information Centre; Clinical Assistant Professor, School of Population and Public Health, University of British Columbia, BC

JinHee Kim, Public Health Physician Lead, Environmental and Occupational Health, Public Health Ontario

Richard Wootton, Team Leader, Chemical Emergency Management and Toxicovigilance Division, Health Canada

Wajid Ahmed, Associate Chief Medical Officer of Health, Office of the Chief Medical Officer of Health, Ministry of Health, Ontario

Summary

This case study reviews two aconite poisoning incidents in Canada in 2022. In February, two people in British Columbia experienced symptoms including oral numbness, vomiting, light-headedness, and cardiac irregularities following the consumption of a home-cooked chicken meal prepared with locally purchased sand ginger. In August, 12 people in Ontario were hospitalized after dining at a restaurant, with five needing intensive care. Symptoms included tongue numbness, paresthesia, nausea, vomiting, reduced consciousness, and elevated heart rates.

Successes

- Strengthened public health and poison control collaboration: Improved multi-agency coordination and data sharing across Canada.
- Establishment of Toxicovigilance Canada: Created a 400+ member network (poison centres, labs, public health agencies, stakeholders) to enhance surveillance, early warning, and inter-agency collaboration.
- Canadian Surveillance System for Poison Information (CSSPI): Enabled national-level monitoring, detection, assessment, and response to toxicological threats across poison centres.
- Foodborne Illness Outbreak Response Protocol (FIORP): Enhanced multi-jurisdictional foodborne illness response through coordinated work among federal agencies and provincial/territorial partners.
- Improved data sharing: Integrated poison centres into public health surveillance; Health Canada epidemiologists now support poison centre data analysis.
- Knowledge translation and outreach: Partnerships with NGOs (e.g., Parachute, injury prevention centres, Canadian Pediatric Society) to improve public education and unify messaging.
- Expanded poison centre roles: Addressed broader issues like toxic drug overdoses; provided public health guidance on harm reduction and recovery.
- Balanced surveillance approach: Combined automated data systems with clinician-based "see something, say something" reporting to maintain human expertise in surveillance.

Challenges and opportunities for improvements

- Clarify and strengthen poison centres' dual role in clinical support and broader public health and integrate their expertise into formal public health protocols.

- Address resource constraints that limit data analysis, research, technology upgrades, and participation in public health initiatives.
- Raise the public and professional profile of poison centres to highlight their value, improve patient outcomes, and demonstrate cost-effectiveness.
- Formalize toxicovigilance through standardized frameworks, multi-agency training, and integration into emergency plans.
- Enhance surveillance systems via real-time data sharing, automated trend analysis, and broader monitoring to improve threat detection and response.
- Strengthen international collaboration for coordinated responses, shared data, and cross-border incident management.
- Expand poison centres' contributions to public health by supporting initiatives such as overdose prevention, injury prevention, and specialized toxicological guidance.

Case Study 4: Poison Centre-Public Health Collaborative in Thailand: Methanol Incident

Speakers:

Winai Wanrukul, Internist and Clinical Toxicologist, Ramathibodi Poison Centre; Faculty of Medicine Ramathibodi Hospital, Mahidol University, Thailand

Pairoj Surattanawanich, Deputy Director General, Department of Medical Services, Ministry of Public Health, Thailand

Bootsakorn Paisarnrodjanarat, Emergency Medicine Physician and Clinical Toxicologist, Nopparat Rajathanee Hospital, Thailand

Summary

This case study reviews the August 2024 methanol poisoning incident in Thailand and the response by the Ramathibodi Poison Centre, the Ministry of Public Health, and other agencies. Dr. Winai Wanrukul, a clinical toxicologist, Dr. Pairoj Surattanawanich, Deputy Director General of Medical Services, and Dr. Bootsakorn Paisarnrodjanarat shared insights on the response and lessons learned from the incident involving 44 people who consumed methanol-adulterated liquor, resulting in 10 fatalities despite rapid clinical intervention.

Successes

- Rapid Emergency Operations Centre (EOC) establishment: Ministry of Public Health quickly set up an EOC at Nopparat Rajathanee Hospital for centralized response coordination.
- Strong multi-agency collaboration: Enabled more effective and unified response efforts.
- Standardized treatment protocols: Ensured consistent patient care through uniform guidelines distributed to healthcare providers.
- Centralized patient monitoring: Implemented tracking system to optimize resource allocation and treatment coordination.
- Public awareness campaigns: Used media briefings, online platforms, and a self-assessment tool to inform and engage the public.
- Proactive resource allocation: Prepared nearby hospitals to accommodate additional patients.
- Public information hotline: Provided direct support for public questions and concerns.
- Effective law enforcement actions: Traced contaminated liquor to a Bangkok supplier, leading to criminal charges, license revocation, and closure of nearly 20 liquor stalls to prevent further harm.

Challenges and opportunities for improvements

- Develop comprehensive, multi-channel communication strategies to address language barriers and ensure effective outreach to all population segments.
- Enhance access to essential antidotes (e.g., Fomepizole) by streamlining processes, integrating them into national drug formularies, and establishing strategic stockpiles.
- Strengthen the authority of poison centres to ensure the consistent adoption and implementation of standardized treatment protocols across all healthcare facilities.
- Introduce rapid methanol testing capabilities within hospital settings to facilitate timely diagnosis and treatment.
- Enhance inter-agency coordination among poison centres, healthcare facilities, law enforcement, and public health authorities to improve overall response effectiveness.
- Implement targeted public awareness campaigns, particularly aimed at tourists and vulnerable populations, to increase understanding of methanol poisoning risks.

- Expand training initiatives for healthcare providers to improve recognition and management of methanol poisoning, including appropriate use of antidotes.
- Establish centralized data collection and reporting systems to improve surveillance and ensure comprehensive reporting of methanol poisoning incidents.

Case Study 5: Shedding light on DNP poisoning in the UK: Progress and challenges encountered

Speakers:

Raquel Duarte-Davidson, Head, Chemicals and Environmental Effects Department and Commissioner of the UK National Poisons Information Service, UK Health Security Agency (UKHSA)

Ruben Thanacoody, Director, Newcastle Unit of National Poisons Information Service (NPIS)

Summary

Dr. Thanacoody began with an introduction on the structure of the UK National Poisons Information Service (NPIS). The UK has established connections between poison centres and chemical incident response functions, including a commissioning service that ensures collaboration between chemical incident response personnel and the NPIS. The UK NPIS provides 24/7 telephone advice to healthcare professionals and maintains an online poisons information database. TOXBASE is the primary resource consulted by emergency departments for chemical incidents. Poison centres follow a protocol to handle chemical incident calls and pass information to the UK Health Security Agency's (UKHSA's) chemical response team. The UK incorporates toxicovigilance as a public health function, monitoring trends for various chemicals, such as carbon monoxide and pesticides.

This case study examines the resurgence of 2,4-Dinitrophenol (DNP) poisoning in the UK, its public health impact, and measures taken to address it. DNP is a highly toxic chemical used as a weight loss drug, posing significant risks of hyperthermia, multi-organ failure, and death.

Successes

- Effective multi-agency approach: Combined public health and legislative measures to manage DNP poisoning as a toxicological threat.
- Ongoing toxicovigilance: Poison centres identified DNP as a major public health issue through continuous monitoring.
- Strong inter-agency collaboration: UKHSA (UK Health Security Agency), Food Standards Agency, and the UK National Poisons Information Service (NPIS) worked together to develop a clear public health action plan and provide timely advice.
- Updated clinical guidance: Regularly revised clinical management advice ensures healthcare professionals have the most current information.
- Improved detection and response: Coordinated efforts enhanced detection, analysis, and response capabilities, strengthening overall public health protection.

Challenges and opportunities for improvements

- Enhance digital monitoring and takedown strategies to address persistent online availability of DNP despite legal restrictions.
- Implement targeted education and prevention programs for vulnerable, at-risk populations, particularly youth.
- Develop more agile regulatory frameworks for rapid response to emerging public health threats.
- Strengthen cross-agency collaboration as a model for future health threat responses.
- Advance toxicovigilance through automated early-warning systems for timely detection of toxic substances.
- Balance public communication to raise awareness of DNP risks without promoting use, especially on social media targeting youth.

- Foster ongoing international cooperation and enforcement to complement legislation and curb persistent online sales.

Case Study 6: Mathiesen Molypac major chemical incident (1985)

Speakers:

Juan Carlos Rios Bustamante, Toxicologist and Executive Director, Poison Centre and the Chemical Emergency Centre (CITUC); Associate Professor, Department of Clinical Laboratories, Faculty of Medicine, Pontificia Universidad Católica de Chile; President, Toxicology Society of Chile; Past President, International Emergency Chemical Centres Alliance (IECA)

Guido Martinez Reyes, Emergency Coordinator, Environmental Health Department, Healthy Public Policies and Promotion Division, Undersecretariat of Public Health, Ministry of Health, Chile

Daniel Eduardo Rebolledo Fuentes, Research Project Coordinator, CITUC, University of Chile

Patricio Andres Medel Jara, Research Project Coordinator, CITUC, University of Chile

Summary

The Mathiesen Molypac chemical fire of December 1985 in Santiago, Chile, exposed significant deficiencies in chemical safety regulations and emergency response protocols. This catastrophic event at a chemical storage facility produced a toxic smoke plume visible for 20 kilometers, raising substantial public health and environmental concerns. The fire burned for 10 hours, involving a dangerous mix of agrochemicals, solvents, and other hazardous substances, resulting in one fatality and multiple injuries, including chemical burns and respiratory issues among firefighters.

Successes

- Strengthened chemical safety regulations: Enhanced control of hazardous substances through mandatory storage reporting, biannual inventory declarations, and adoption of the Globally Harmonized System for classification and labeling.
- Established national emergency tracking: Launched an online database in 2016 to track emergency events.
- Creation of Chemical Emergency Centre (CEC): Founded in 2000, modeled on US poison control systems, to maintain safety data sheets, provide specialized training, and support emergency responders.
- Enhanced role of CITUC (Poison Centre and the Chemical Emergency Centre): Formally recognized as the National Reference Centre for Chemical Emergencies in 2009, now central to toxicology, risk assessment, and emergency response.
- Increased public and professional engagement: Annual calls to CITUC rose to approximately 35,000, reflecting greater reliance on its expertise.
- Overall commitment to safety and preparedness: Comprehensive improvements demonstrate Chile's dedication to chemical safety, emergency readiness, and public awareness.

Challenges and opportunities for improvements

- Challenges include lack of comprehensive chemical inventories, limited large-scale emergency preparedness, absence of standard operating procedures, inadequate real-time air quality monitoring, insufficient responder training and coordination, lack of chemical fire management guidance, and missing collaboration between poison centres and emergency teams.
- Opportunities involve enhancing safety measures and emergency protocols, improving stakeholder coordination, enforcing strict safety compliance, expanding real-time air quality monitoring, automating

poison centre surveillance, increasing emergency training frequency, strengthening poison centres' role in risk assessments, conducting regular simulation exercises, developing automated emergency tracking platforms, and bolstering international collaboration with Latin American and global poison centres.

Case Study 7: Coagulopathy Associated with Brodifacoum Poisoning in Florida Residents—December 2021

Speakers:

Alvin C. Bronstein, President, America's Poison Centres; Chair, NPDS Development Group; Assistant Medical Director, Louisiana Poison Centre

Justin Arnold, Medical Director, Florida Poison Information Centre Tampa; Associate Professor, University of South Florida

Prakash Mulay, Chemical Surveillance Epidemiologist, Bureau of Epidemiology, Florida Department of Health

Summary

Dr. Bronstein provided a brief historical account of the US Poison Centres beginning with the first centre established in Chicago in 1953. Currently, there are 54 poison centres across the United States and its territories, all operating continuously throughout the year with medical professionals trained in toxicology. In 2024, the National Poison Data System (NPDS) functions were established as a centralized, web-based system, recording over 2.4 million encounters. The NPDS provides near real-time case data updates for surveillance and reporting purposes.

Drs. Arnold and Mulay presented a case study that involved an outbreak of coagulopathy (bleeding disorder) linked to brodifacoum-contaminated synthetic cannabinoids in Florida. Brodifacoum, a tasteless, odorless pesticide, can cause hemorrhages and death by depleting Vitamin K. The event took place from December 2021 for several months, with 52 cases with 4 fatalities among synthetic cannabinoid users, mostly affecting vulnerable populations. Patients required high-dose vitamin K treatment for recovery.

Successes

- Rapid detection and communication: Prompt notification to Florida Department of Health enabled immediate investigation and quick identification of the outbreak and its cause.
- Effective multi-stakeholder collaboration: Strong cooperation among healthcare providers, Florida Department of Health, Florida Poison Information Center Tampa, labs, pharmaceutical companies, and law enforcement supported case identification and treatment.
- Public awareness efforts: Issued press release to inform the public, aiding case identification and connection to care.
- Use of surveillance systems: Syndromic surveillance database monitored poison center, emergency department, and urgent care center data to detect new cases.
- Adapted treatment protocols: Leveraged lessons from the 2018 incident to manage this outbreak effectively.
- Pharmaceutical support: Private company donated vitamin K1 tablets, enabling treatment for all 52 patients.
- Support for uninsured patients: Enrolled 12 uninsured patients into a local managed healthcare program to ensure access to treatment.
- Laboratory collaboration: Partnered with private lab to lower testing costs and reduce turnaround time for brodifacoum testing. Utilized toxicology specific labs (private and DEA Tox) to identify synthetic cannabinoids and brodifacoum.

Challenges and opportunities for improvements

- Demographic challenges included a high proportion of unhoused patients (29%), uninsured individuals (65%), and 40% lost to follow-up, complicating consistent care and monitoring.
- Treatment adherence issues affected approximately 40% of patients, negatively impacting outcomes.
- The outbreak emphasized the need for sustainable emergency medication access, including establishing a national reserve of high-dose vitamin K and formalizing partnerships with pharmaceutical companies for donations.
- Strengthening laboratory testing and surveillance is critical, with emphasis on maintaining ties to specialized toxicology labs and expanding public testing capabilities without legal barriers.
- Reinforcing long-term patient follow-up through improved coordination with community clinics and social services is necessary to reduce complications and fatalities.
- Enhanced collaboration and timely data sharing between law enforcement and health agencies are vital for identifying and removing contaminated drugs, improving outbreak response effectiveness.

Case Study 8: Paralytic Shellfish Poisoning (PSP) Outbreak

Speakers:

Robert G. Hendrickson, Professor of Emergency Medicine, Program Director of the Medical Toxicology Fellowship, Medical Director of the Oregon Poison Centre, School of Medicine, Oregon Health & Science University

Terran Gilbreath, Applied Epidemiology Fellow, Council of State and Territorial Epidemiologists

Summary

The May 2024 Paralytic Shellfish Poison (PSP) outbreak was the largest recorded outbreak of PSP in Oregon. It occurred along the Oregon coast when 42 cases were reported over a 15-day period. Of these, 3 cases were confirmed via toxin testing, and 39 presumptive case diagnoses were made based on symptoms and exposure history. Patients ranged in age from 11 to 76 years. The outbreak was driven by unusually high concentrations of saxitoxin, a potent neurotoxin produced by dinoflagellates and accumulated in shellfish.

Successes

- Rapid outbreak identification: Oregon Poison Centre quickly recognized the outbreak across multiple hospitals, enabling immediate public health action.
- Strong interagency collaboration: Established relationships facilitated efficient coordination and clear public health communication.
- Swift public health measures: Rapid issuance of advisories and prompt closure of beaches to shellfish harvesting.
- Enhanced case detection: Online survey identified 10 additional cases, improving understanding of the outbreak.
- Comprehensive public education: Provided information on PSP symptoms, prevention, and management; data shared with local and state agencies.
- Multilingual, multi-channel outreach: Health advisories issued to community organizations, public media campaigns, beach signage, and translated information sheets distributed through healthcare providers.

Challenges and opportunities for improvements

- The outbreak coincided with a long weekend, increasing shellfish harvesting and exposure risk.
- Limited local hospital toxin testing capabilities necessitated reliance on state or specialized labs; routine testing intervals allowed toxin accumulation and ongoing exposure.
- Low public awareness of PSP in Oregon contributed to delayed medical help-seeking due to unrecognized symptoms.
- Communication challenges included predominantly English warning signs, limited multilingual options, and poor cellular service reducing QR code effectiveness in rural areas.
- Effective coordination among multiple agencies was critical for managing shellfish harvesting closures and reopening.