### Supplementary table 1. The capacity score criteria of the two indicators for chemical events

Score	CE1: Mechanisms are established and functioning for detecting and responding to chemical events or emergencies	CE2: Enabling environment is in place for management of chemical events
No Capacity—1	No mechanism in place	National policies, plans or legislation for chemical event surveillance, alert and response do not exist
Limited Capacity—2	Guidelines or manuals on the surveillance, assessment and management of chemical events, intoxication and poisoning are available	National policies, plans or legislation for chemical event surveillance, alert and response exist
Developed Capacity—3	Surveillance is in place for chemical events, intoxication, and poisonings with laboratory capacity or access to laboratory capacity to confirm priority chemical events	A chemical event response plan is in place that defines roles and responsibilities of relevant agencies and considers all major hazard sites and facilities
Demonstrated Capacity—4	<ul> <li>Timely and systematic information exchange</li> <li>Functional mechanisms for between appropriate chemical units, coordination and collaboratio surveillance units and other relevant sectors</li> <li>about acute chemical events and potential involvement in chemical risks and their response</li> <li>Chemical risks and their response</li> </ul>	
Sustainable Capacity—5	Adequately resourced poison centre(s) are in place and the country has a demonstrated ability to respond to chemical emergencies at national, intermediate and primary public health levels	A chemical event response plan has been tested through occurrence of a real event or through Simulation Exercise and is updated as needed

Adopted from the Joint External Evaluation tool, third edition (2022)

#### Supplementary table 2. Contextual questions and technical questions for the two indicators regarding chemical events

#### **Contextual questions:**

- 1. Has a national chemicals profile or other assessment of chemical management been developed/updated in the past five years? If applicable, describe outcome/provide report?
- 2. Have chemical risks and health impacts (morbidity and mortality) been assessed for priority chemicals in the past five years?
- 3. Have there been any major chemical incidents in the past five years?
- 4. Are any international chemical conventions/agreements (e.g., Rotterdam-Stockholm-Basel Conventions, Minamata Convention on Mercury, or the International Labour Organization Convention 170 and 174) ratified/implemented?
- 5. Is the country working towards achieving sustainable development goals 3.9 and 12.4 (see also Strategic Approach to International Chemicals Management goal)?

#### Technical questions for CE1:

- 1. Are guidelines or manuals on the surveillance, assessment and management of chemical events, intoxication and poisoning available? Are these implemented? Are these updated after the events or follow-up exercises, or updated regularly?
- 2. Is there chemical incidents surveillance? Is there an authority/institute/agency with primary responsibility for chemicals management and surveillance/monitoring of chemical events? Is there an efficient information flow for surveillance/monitoring of chemical events? Is there surveillance of sentinel health events that may signal a hazardous chemical exposure? Is there environmental monitoring (water, air, soil, sediment) with regard to chemical hazards? Is there monitoring of consumer products (foodstuffs and goods) with regard to chemical hazards?
- 3. Are there procedures for health risk assessment in chemicals surveillance/monitoring to inform a chemical event response?
- 4. Is laboratory capacity available for systematic analysis?
- 5. Are current human resources sufficient to meet the needs for managing chemical events?
- 6. Are current financial resources sufficient to meet the needs for chemical safety?
- 7. Are reports of investigation of chemical events produced and disseminated?
- 8. Is there regular (i.e., weekly, monthly or yearly) feedback of data and response activities in chemicals surveillance/ monitoring?
- 9. Is there an inventory of reference health care facilities for the diagnoses and treatment of chemical poisoning cases?
- 10. Are there protocols/guidelines for case management with regard to chemical hazards?
- 11. Are there poison centre(s)? How do they function and ft into the health care system?

### Technical questions for CE2:

- 1. Is there a strategic plan to strengthen the assessment and management of chemicals (e.g., a national chemicals profile)? Is it up to date and implemented?
- 2. Does chemicals legislation provide comprehensive coverage? Some areas that may be covered by legislation not specific for chemicals should be considered.
- 3. Is there a national coordinating body/committee with regard to the assessment and management of chemicals and chemical events?
- 4. Is there a public health plan for chemical incidents/emergencies?
- 5. Does a public health plan for chemical incidents/emergencies consider the range of functions required in a crisis? Describe, if applicable.
- 6. Are there multisectoral/interdisciplinary coordination mechanisms with regard to chemical management? If applicable, describe mechanisms and indicate shortcomings.
- 7. In the event of a public health emergency of chemical origin, could a budget be mobilized to meet additional demands?
- 8. Is there an audit/evaluation system for exercises/responses?
- 9. Is there involvement in international chemical/toxicological networks (e.g., INTOX)?
- 10. Is there a chemical database or databank available at all times (e.g., INCHEM)?

Adapted from the Joint External Evaluation tool, third edition (2022) CE1: chemical event indicator1, CE2: chemical event indicator2

Supplementary table 3. Lists of key stakeholders and roles in chemical event management
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	Key stakeholders	Ministry	Key roles in chemical event management
1.	Department of	Ministry of	- Administrate the industrial business regulation and hazardous substances
	Industrial Work	Industry	based on the law and international agreement
			- Provide, support knowledge and related data of machinery, production,
			environment, safety, hazardous substances, energy and corporate social
			responsibility for industrial business development
2.	Pollution Control	Ministry of	- Control, prevent, reduce chemical pollution problems to ensure good
	Department	Natural Resources	environment using the environmental laws, regulations, and requirements.
		and Environment	- Share environmental pollution-related information and support in
			environmental management
3.	Department of	Ministry of	Develop national plan and related mechanisms for monitoring, early warning,
	Disaster Prevention	Interior	response and rescuing for victims subsequent to all kinds of disaster
	and Mitigation		including chemical emergency
4.	Defence Science and	Ministry of	Engage in the research and development of scientific and technological
	Technology	Defence	capabilities in order to enhance the combat readiness and national defence
	Department		capabilities of the military to ensure national security
5.	Department of		- Promotion, prevention and control of hazardous substances used in
	Health (Bangkok		Bangkok
	Metropolitan		<ul> <li>Preparedness and response to chemical events in Bangkok</li> </ul>
	Administration)		
6.	Ramathibodi Poison		- Provide consultation, diagnostic suggestions and treatment guidelines for
	Center		patients with chemical or drug toxicity
			- Surveillance of chemical substances related to occupational health and
			environment
			<ul> <li>Provide laboratory testing service for toxic or heavy metallic substances</li> </ul>
			including drug levels in the blood
7.	Siriraj Poison Control		- Provide consultation, diagnostic suggestions and treatment guidelines for
	Center		patients with toxicity from drugs or chemicals
			<ul> <li>Surveillance of chemical substances related to occupational health and</li> </ul>
			environment
			- Provide laboratory testing service for toxic or heavy metallic substances
			including monitoring drug levels in the blood
8.	Office of the	Ministry of Public	- Development of comprehensive system for public health emergency
	Permanent Secretary	Health	response including related plans, mechanisms, monitoring and evaluation
	Ministry of Public		- Development of resource management system for public health
	Health (by Division		emergencies
	of Public Health		- Development of communication and incident command system to connect
	Management)		among network partners at national, regional and local levels
0	Thai Food and Drug	Ministry of Dublic	Consumers' health protection by oncuring safety, quality and officiary of
9.	Administration	Health	consumable products including foods drugs psychotropic substances
	Administration	ilealti	narcotics medical devices volatile substances, cosmetics and hazardous
			substances available in Thailand
10	Dopartment of	Ministry of Public	Brouido acadomic and laboratory analysis convicos in chomicals or toxis
10.	Medical Sciences	Health	substances as the national reference laboratory
	Medical Sciences	ilealth	- Monitor, evaluate, communicate and manage risk in diseases and health
			hazards including chemical bazard
11	Department of	Ministry of Public	Provide knowledge research and development technical support on
11.	Medical Services	Health	treatment and rehabilitation guidelines for patients with chemical poisoning
17	Department of	Ministry of Public	Surveillance of chemical events, chemical event investigation including health
12.	Disease Control	Health	risk assessment, and chemical emergency preparedness and response

# Supplementary table 4. List of international agencies of the external evaluators

	International agencies	Number of evaluators
1	World Health Organization	11
2	United Nations International Children's Emergency Fund (UNICEF)	1
3	UN Food and Agriculture Organization	1
4	World Organization for Animal Health	1
5	International Atomic Energy Agency	1
6	Asian Development Bank	1
7	US Centers for Disease Control and Prevention	1
8	United Kingdom Health Security Agency (UKHSA)	1
9	Morocco Ministry of Health	1
10	Indonesia National Institute of Health Research and Development	1
11	Designated IHR State Party Expert for Canada	1
12	Harvard University	1
13	University of the Philippines	1
14	Independent technical writer and editor	1

# Supplementary table 5. Four main sectors of chemical incident surveillance and their roles and importance

	Sector	Roles and importance
1	Industrial sector	Industrial facilities must be inspected by the relevant authorities. Key activities include a review of hazard indicators, risk analysis, operational risk assessment, and inspection of hazardous material storage facilities. Qualified facilities must have a specific person responsible for determining the quantity and purpose of chemicals used, establishing preventive measures for chemical hazards, and minimizing the impacts of accidental chemical leaks. Such surveillance is regulated by relevant laws and regulations.
2	Environmental sector	The environment is periodically inspected. If chemicals are released into the environment, a monitoring program is established to determine the level of contamination and recommend prompt and appropriate actions. Information on environmental monitoring will be reported to the incident commander to determine appropriate measures to protect the public and the environment.
3	Consumer product sector	The Food and Drug Administration plays a crucial role in monitoring consumer products, such as food and goods. Post-marketing surveillance is carried out by regularly inspecting samples of products and checking them for compliance and quality.
4	Health Sector	Basic health data of at-risk populations, including workers, frontline rescuers, operational responders, and civilians exposed to certain chemicals, are collected, evaluated, and reported.