



# **Thai Poison Control Center to Regional Preparedness of Poison management**

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**THAILAND**

# Poisoning & Toxicological Disasters

- Poisoning is one of the global health problems.
- In 2012, an estimated 193,460 people died from unintentional poisoning worldwide.
- 84% of these poisoned fatality cases occurred in low- and middle-income countries.
- Poisoning from chemicals, pesticides and venomous snakes are the important poisoning problems in the South East Asia region.
- Poisoning may turn to be Toxicological disasters.

# Poisoning & Toxicological Disasters

- Treatment of life threatening poisoning includes supportive care and specific treatment.
- Antidotes are the specific treatment and only treatment of choice for some kinds of poisoning.
- Antidote therapy reduces mortality rate, minimize disability, shorten clinical course or minimize the total expenditure of treatment.

# Poisoning & Toxicological Disasters

- The shortage of many antidotes is the global problem, where low- and middle-income countries suffer most.
- The nature of antidotes market is oligopoly, where production is limited.
- The unpredicted demand and lack of stockpiling result in lack of incentives by the pharmaceutical industry to produce adequate amount.

# Management of poisoning

## Common shortage of resources

- Knowledge & Experiences
- Information
- Antidotes



World Health Organization  
Regional Office for South-East Asia

## Poisons centres for public health and chemical safety

- Poisoning is a public health problem
- A poisons centre is a specialized unit that advises on, and assists with prevention, diagnosis and management of poisoning
- Many countries still lack a poisons centre
- WHO supports establishment and strengthening of poisons centres



# Ramathibodi Poison Center

- Established in 1996 under Queen Sirikit Medical Center, Faculty of Medicine Ramathibodi Hospital, Mahidol University
- One of 6 Excellent Centers of the Faculty
- Components:
  - Poison Information Center
  - Toxicological Laboratory Center
  - Poison Treatment Services



# Ramathibodi Poison Center



**Hotline 1367: 24 hour poison help line**

- Line ID: [poisrequest](#)
- Email address: [poisrequest@gmail.com](mailto:poisrequest@gmail.com)
- Facebook: Ramathibodi Poison Center
- Website: [www.ra.mahidol.ac.th/poisoncenter/](http://www.ra.mahidol.ac.th/poisoncenter/)  
[PoisonCenter.mahidol.ac.th](http://PoisonCenter.mahidol.ac.th)



# RAMATHIBODI POISON CENTER

## Surveillance

- Surveillance is a basic daily works
- Notify and collaborate with related agencies
  - Ministry of Public Health: Department of Disease Control, FDA
  - Office of Narcotic Control Board
  - Ministry of Agriculture and cooperative: Department of Agriculture



**Preparedness for  
Toxicological Incidents**



- **National Health Security Office (NHSO)**
- Thai Food and Drug Administration
- Ministry of Public Health
- **Ramathibodi Poison Center**
- Siriraj Poison Center
- Thai Society of Clinical Toxicology
- Queen Saovapha Memorial Institute, Thai Red Cross
- **Government Pharmaceutical Organization (GPO)**
- Thai Military Pharmaceutical Organization



# Ramathibodi Poison Center

## Preparedness for Toxicological incidents

- **Antidotes preparedness**
  - Thai National Antidote Project (Nationwide access to antidote)
  - Antidote networks
- **Capacity building**
  - Training
  - Poisoning Management Protocol



# Thai National Antidote Project (Nationwide access to antidote)

## New approaches

- The antidotes are belong to NHSO. Public hospitals are stock sites
- Antidote nationwide distribution system is response to the local epidemiology, urgency of need.
- A real-time update of number of stockpiling at national, regional and provincial level of antidotes and antivenom on the website.



# Thai National Antidote Project (Nationwide access to antidote)

## New approaches

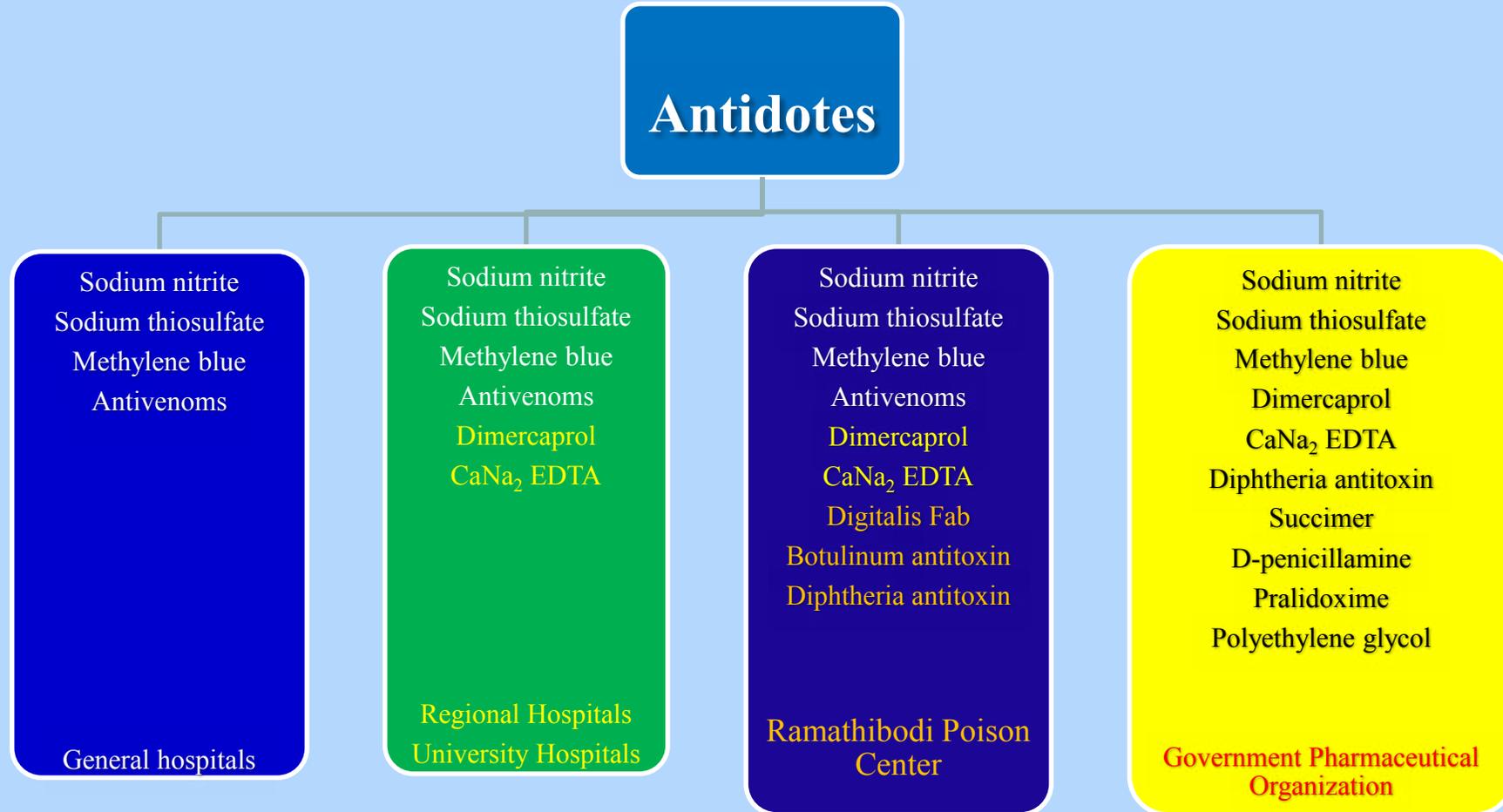
- Capacity building at all levels
- 24 h consultation service for the frontline health care personnel for the proper use antidote and antivenom.



# Antidote list (since 2015)

1. Sodium nitrite 3%
2. Sodium thiosulfate 25%
3. Methylene blue 1%
4. Dimercaprol (BAL)
5.  $\text{CaNa}_2$  EDTA
6. Succimer
7. Diphenhydramine
8. Botulinum antitoxin
9. Diphtheria antitoxin
10. Antivenom for Cobra
11. Antivenom for Malayan krait
12. Antivenom for Green pit viper
13. Antivenom for Malayan pit viper
14. Antivenom for Russell's viper
15. Polyvalent antivenom for neurotoxin
16. Polyvalent antivenom for hematotoxin

# Antidote distribution

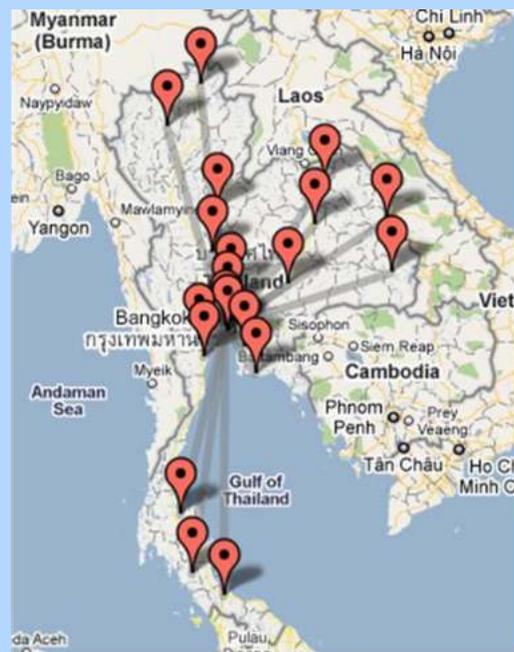




# Antidote distribution



Cyanide antidotes  
Methylene blue  
Antivenoms

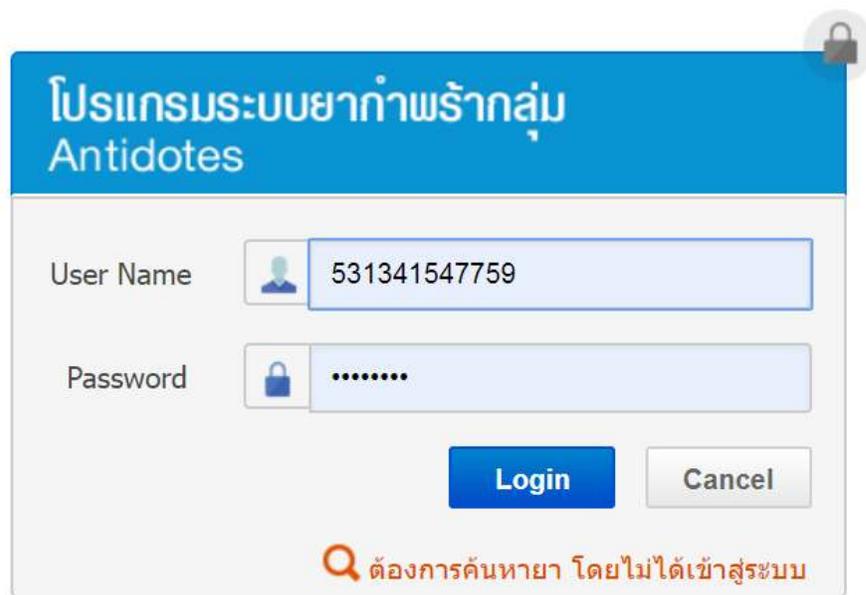


Dimercaptrol  
CaNa<sub>2</sub> EDTA



Botulinum antitoxin  
Dipteria Antitoxin  
Digitalis Fab

# Web-based for searching antidotes



โปรแกรมระบบยาทำพริากลุ่ม  
Antidotes

User Name

Password

ต้องการค้นหา โดยไม่ได้เข้าสู่ระบบ

# Web-based for searching antidotes

สปสข. ชื่อใช้งาน : จารุวรรณ ศรีอาภา หน่วยงาน: รพ.รามธิบดี มหาวิทยาลัยมหิดล (Profiles)

ระบบยาแก้พิษกลุ่ม Antidotes  Home  Search  Stock  Inbox 4  Reverse 0  Pending 0  History  Follow 17291  Report

ค้นหาจากโรงพยาบาล (วัดด้วย รัดมี)

โรงพยาบาลที่ต้องการขอเบิก 10695 - รพ.พระพุทธบาท

Antidote	Antidote
ภายในรัดมี (กม.)	Botulinum Antitoxin Injection
จำนวน	Calcium Disodium edetate
	DIPHENHYDRAMINE 5 % 1 ML
	Digoxin specific antibody fragment
<input checked="" type="checkbox"/> ค้นหา	Dimercaprol
	Diphtheria antitoxin
	Esmolol Hydrochloride 100 mg /10 ml
	Glucagon
	Methylene blue
	Sodium nitrite
	Sodium thiosulfate
	Succimer
	เซรุ่มแก้พิษงูทะเล
	เซรุ่มแก้พิษงูทับสมิงคลา
	เซรุ่มแก้พิษงูระบบประสาท

# Web-based for searching antidotes

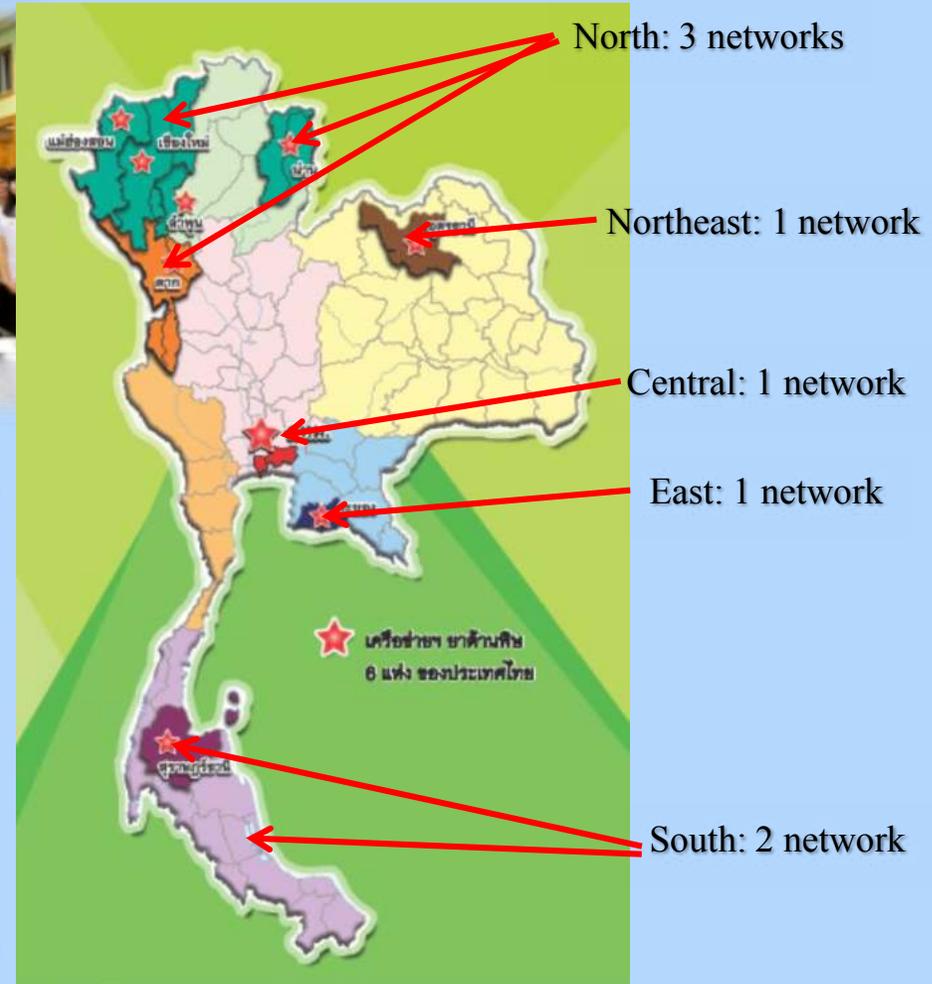
The screenshot shows a web-based application interface for searching antidotes. The top navigation bar includes links for Home, Search, Stock, Inbox (4), Reverse (0), Pending (0), History, Follow (17291), and Report. The main content area is titled "ค้นหาจากโรงพยาบาล (โรคภัย พิษ)" and displays a table of search results. The table has columns for "แพทย์หรือเภสัชกร", "เบอร์โทรศัพท์มือถือ", "ระยะห่าง", and "In Stock".

แพทย์หรือเภสัชกร	เบอร์โทรศัพท์มือถือ	ระยะห่าง	In Stock
รพ.สระบุรี - ตำบล ป่ากุ่ม อำเภอลำทะเมนชัย จังหวัด สระบุรี 18000	0897468066	24	11
รพ.ลำปาง - 3 ถนนเทศบาล 6 ค.บางแก้ว เมือง ลำปาง 14000		40	10
รพ.บ้านหมี่ - 139 บ้านหมี่ อำเภอเมือง สุพรรณบุรี 15110		46	10
รพ.พระนครศรีอยุธยา - 6 คู่งหลวง ประตูชัย อ.พระนครศรีอยุธยาพระนครศรีอยุธยา13000	0818039650	50	10
รพ.หนองปรือ - อ.เมือง หนองปรือ 26000	0814090718	64	10

Below the table is a map of Thailand with several red location markers indicating the locations of the hospitals listed in the table. The markers are concentrated in the central and eastern parts of the country, corresponding to the provinces mentioned in the search results.



# Local networks for the antidote supply Up to 2018





# Ramathibodi Poison Center

## Preparedness for Toxicological incidents

- Antidotes preparedness
  - Thai National Antidote Project (Nationwide access to antidote)
  - Antidote networks
- Capacity building
  - Training
  - Poisoning Management Protocol



# Ramathibodi Poison Center

## Preparedness for Toxicological incidents

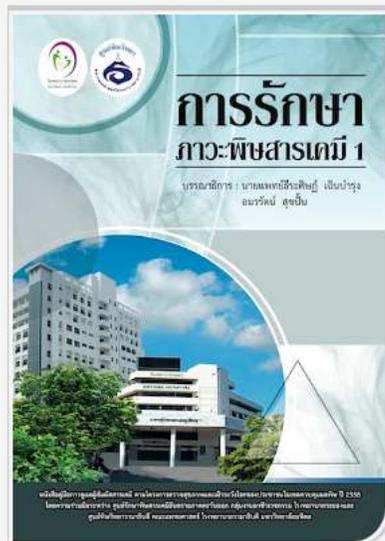
- Capacity Building: Training
  - Formal training
    - Resident: Internal Medicine, Emergency Medicine
    - Fellow: Clinical Pharmacology and Toxicology
  - Short course
    - **Antidote workshops**
    - Training for doctor and nurse in rural area
    - WHO sponsored fellowship



# Preparedness for Toxicological incidents

## Capacity building: Poisoning Management Protocol

### การรักษาภาวะพิษสารเคมี 1



#### เนื้อหาในฉบับนี้ :

- Acrylonitrile
- Ammonia
- Cesium-137
- Chlorine
- Cobalt-60
- Crude Oil
- Cyanide, Sodium cyanide, Potassium cyanide
- Hydrogen fluoride และ Hydrofluoric acid
- Hydrogen cyanide(HCN)
- Hydrogen sulfide
- Iodine -131
- Phenol
- Phosgene
- Simple asphyxiants
- Tear gas
- Toluene และ Xylene





# Table top exercise

## Situation: HCN leakage

(6 March 2017)





# Field exercise

## Situation: HCN leakage (9 March 2017)





# Field training After action review (9 March 2017)





## Roles of Ramathibodi Poison Center

- Provide consultation for diagnosis and management plan
- Confirm indications for treating with antidotes
- Search and communicate with the stock-site
- Collaborate to send the antidote to the patient
- Follow up and provide further suggestion
- Evaluate the outcome
- Assess and evaluate the overall outcome of the project

# Improving access to antidote and antivenom, Thailand

Bull World Health Organ 2018;96: | doi: <http://dx.doi.org/10.2471/BLT.18.217075>

Year	Antidotes		Antivenom		Total	
	Patients	Budgets* (USD)	Patients	Budgets* (USD)	Patients	Budgets* (USD)
2011	49	142,000			49	142,200
2012	106	422,000		2,233,357**	106	422,000
2013	402	407,000	964	651,393	1,366	1,058,393
2014	466	204,000	4,966	1,675,677	5,432	1,879,677
2015	191	252,000	6,234	1,114,286	6,425	1,366,286
2016	317	283,000	6,824	1,140,286	7,141	1,423,286
2017	269	223,000		1,450,690	6,917	1,673,690

60% of the previous budget

\*1 USD ≈ 35 Thai Baht

\*\* The average cost of annual national purchasing of antivenom



# Cyanide Poisoning in Pre and Post “Nationwide Assess to Antidote Project” Era

CLINICAL TOXICOLOGY, 2017  
<https://doi.org/10.1080/15563650.2017.1370098>



POISON CENTRE RESEARCH

OPEN ACCESS [Check for updates](#)

## Cyanide poisoning in Thailand before and after establishment of the National Antidote Project\*

Sahaphume Srisuma<sup>a,b</sup>, Aimon Pradoo<sup>a</sup>, Panee Rittilert<sup>a</sup>, Sunun Wongvisavakorn<sup>a</sup>, Achara Tongpoo<sup>a</sup>, Charuwan Sriapha<sup>a</sup>, Wannapa Krairojananan<sup>c</sup>, Netnapis Suchonwanich<sup>c</sup>, Sumana Khomvilai<sup>d</sup> and Winai Wananukul<sup>a,b</sup>

<sup>a</sup>Ramathibodi Poison Center, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok, Thailand; <sup>b</sup>Division of Clinical Pharmacology and Toxicology, Department of Medicine, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok, Thailand;

	Before the project (Jan 2007- Oct 2010)	Project (Nov 2000 – Dec 2015)
No. patients	130	213
No. severe cases	25	60
Mortality rate (severe cases only)	52.0%	28.3%



# Cyanide Poisoning in Pre and Post “Nationwide Assess to Antidote Project” Era

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<sup>a</sup>Ramathibodi Poison Center, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok, Thailand; <sup>b</sup>Division of Clinical

Factor	OR	95% CI	P value
Age $\geq$ 5 yr	1.64	0.50 – 5.43	0.41
Male	1.40	0.47 – 4.14	0.54
Suicidal intent	10.19	1.91 – 54.31	<0.01
Cyanide solution ingestion	1.93	0.63 – 5.92	0.25
Present of antidote project	0.24	0.07 – 0.79	0.02



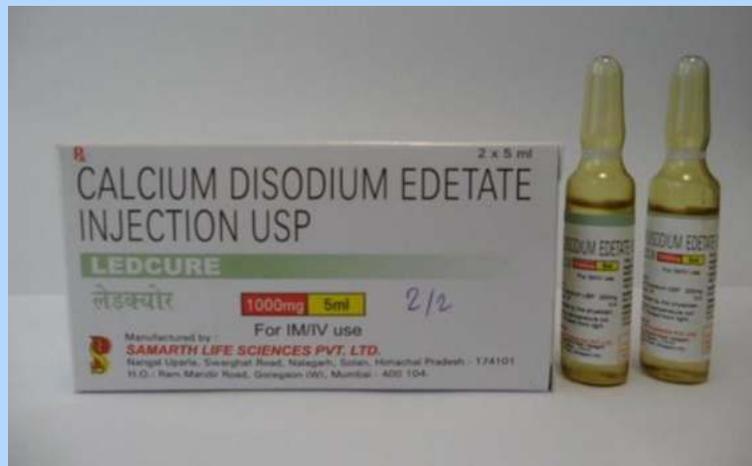
# Childhood Lead encephalopathy in Myanmar 2013



Condition on Admission



# Childhood Lead encephalopathy in Myanmar 2013



Condition on follow up

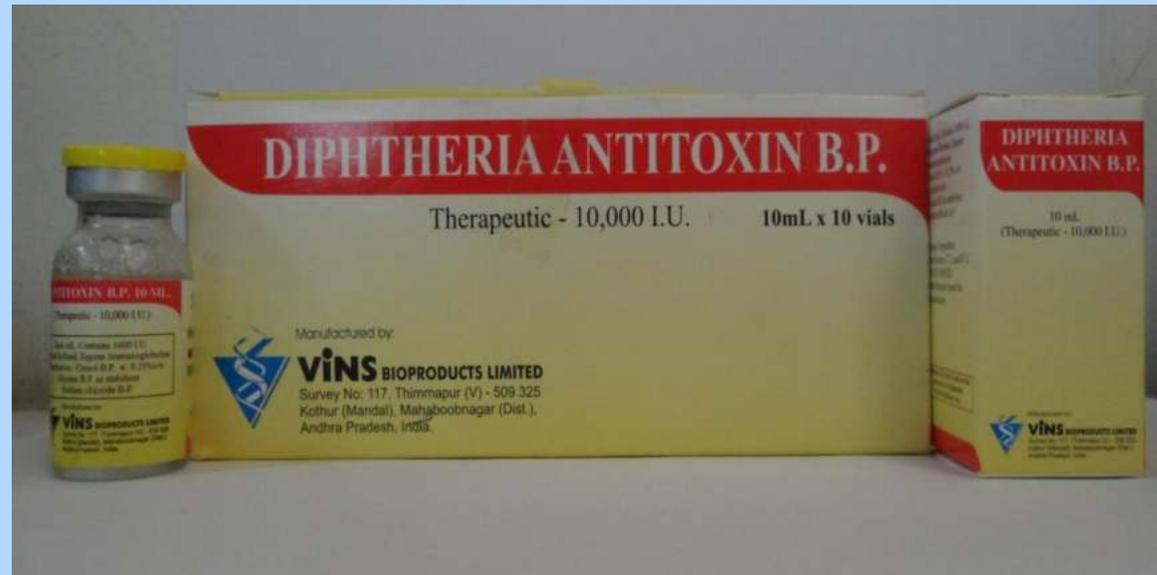


# Methylene blue to Taiwan





# Diphtheria antitoxin to Laos and Myanmar





# Botulism in Nigeria



**NIGERIA CENTRE FOR DISEASE CONTROL**  
Office of the National Coordinator/Chief Executive Officer

OUR REF: NCDC/HQ/ABI/04/V.1/163

DATE: 30<sup>th</sup> May 2018

Professor Winai Wananukul, M.D.  
Director, Ramathibodi Poison Center  
Deputy Director, Ramathibodi Hospital  
Faculty of Medicine Ramathibodi Hospital  
Mahidol University  
Bangkok, Thailand

## LETTER OF APPRECIATION

On behalf of the Nigeria Centre for Disease Control, I write to thank you for your support during our response to cases of foodborne botulism among a family in Abuja, Nigeria in January 2018.

The donation of four doses of tetravalent botulism antitoxin by your organisation within a short notice was very helpful and supported our response activities.

Once again, thank you for your support and we look forward to building a strong working relationship with your institute.

Please accept the assurance of my highest regards.

**Dr. Chikwe Ihekweazu**  
National Coordinator/Chief Executive Officer





# WHO General Director Visit

2<sup>nd</sup> February 2018



Dr. Tedros Adhanom Ghebreyesus  
World Health Organization General Director

# International Health Regulation: Chemical Emergencies

- WHO recently has been considering the development of stockpiling of essential medical products in response to radiation and chemical emergencies.
- According to International Health Regulation, emergency preparedness and response operation as well as capacity-building are needed for every member country.

# Balance between cost and benefit



# Antidote Preparedness for disaster

## Key components:

- Country's capacity
- International collaboration

# Regional Collaboration on Procurement, starting with Antidotes (August 2017)





**Informal expert consultation on coordinated procurement of antidotes in the South-East Asia Region**  
Summary Report  
12-13 February 2018, Ramathibodi Hospital, Bangkok, Thailand

**Background**

Ensuring access to antidotes is a health security issue that can reduce preventable deaths. In the WHO South-East Asia Region (SEAR) improving access to these life-saving medicines, which have potential risk of shortages, was identified as a concrete step by Member States of the 70<sup>th</sup> Regional Committee (Sept 2017). The National Antidote Project in Thailand is an example how efficient national public health systems can ensure the availability of antidotes and improve the clinical capacity for case management of poisonings.

An informal expert consultation was organized with experts from India, Maldives, Sri Lanka, Thailand and Timor-Leste to learn about country experiences and challenges, gaps faced when trying to ensure uninterrupted access to antidotes and discuss potential pathways for coordinated procurement of antidotes in the South-East Asia Region, with support and leadership from Thailand.

**Informal Consultation Objectives**

1. Discuss coordinated procurement focused on improving availability of lifesaving antidotes in the South-East Asia Region.
2. Understand how Thailand and other countries have improved availability of antidotes through improved procurement and distribution systems.
3. Discuss potential pathways for joint coordinated procurement of antidotes by interested countries with central organizational support by Thailand.
4. Agree on next steps for joint procurement of antidotes by interested countries and necessary approval processes to initiate participation.

**DECISIONS FROM THE MEETING**

**AIM:** To initiate a collaborative mechanism for coordinated procurement of antidotes in the South-East Asia Region with Thailand serving as a regional hub to supply agreed antidotes either on a regular or on emergency response basis.

**Criteria for selection of antidote**

- o Listed on current WHO Model Essential Medicine List and/or
- o countries' national essential medicines list, or when country is considering adding it to its national essential medicines list
- o Difficult to source (limited suppliers); commonly experienced shortages or at high risk for shortages

**Eight selected essential antidotes**

- o Activated Charcoal
- o Dimercaprol
- o Methylene blue
- o Penicillamine
- o Sodium calcium edetate
- o Sodium nitrite
- o Sodium thiosulfate
- o Succimer

**Key Partners**

**Beneficiaries**

- Populations of SEAR Member States

**Key stakeholders**

- National procurement agencies, poison centers and medicines regulatory agencies

**Leadership & coordination**

- Ramathibodi Poison Center (RPC), Faculty of Medicine, Ramathibodi Hospital, Mahidol University
- National Health Security Office (NHSO);
- Government Pharmaceutical Organization (GPO), Ministry of Public Health, Thailand

**Technical support**

- WHO Regional Office for South-East Asia



1

# Informal expert consultation on coordinated procurement of antidotes in the South-East Asia Region

12-13 Feb 2018, Ramathibodi Hospital



# Sharing: International collaboration



# International Collaboration



- International body  
(WHO, IPCS)
  - Country authorized agencies
  - Information
- Logistics and supply chain
  - Modes of transportation
  - Legal issues

# Initiation for Coordinated Antidotes Procurement in the South-East Asia region

Improving access to antidotes in the South-East Asia Region through iCAPS

**TARGETING SDG 3:  
GOOD HEALTH AND WELL-BEING**

- **SDG target 3.8:**  
Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all
- **SDG target 3.9:**  
By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water

Indicator 3.9.3: Mortality rate attributed to unintentional poisoning, soil, pollution and contamination.

**iCAPS**  
Initiative for  
Coordinated  
Antidotes  
Procurement in the  
South-East Asia Region

World Health Organization  
South-East Asia

NHSO  
National Health Security Office

# Principle of Collaboration

## **1. Builds on what exists**

Leverages the capacity and experience of the Thailand National Antidote Project

## **2. Starts with small but concrete steps**

Selected 8 initial antidotes to deliver via two coordinated pathways

## **3. Keeps collaboration voluntary**

All South East Asia Region Member States are invited to join and nominate focal points

## **4. Builds trust**

Encourages shared learning & transfer of knowledge between Thailand and countries

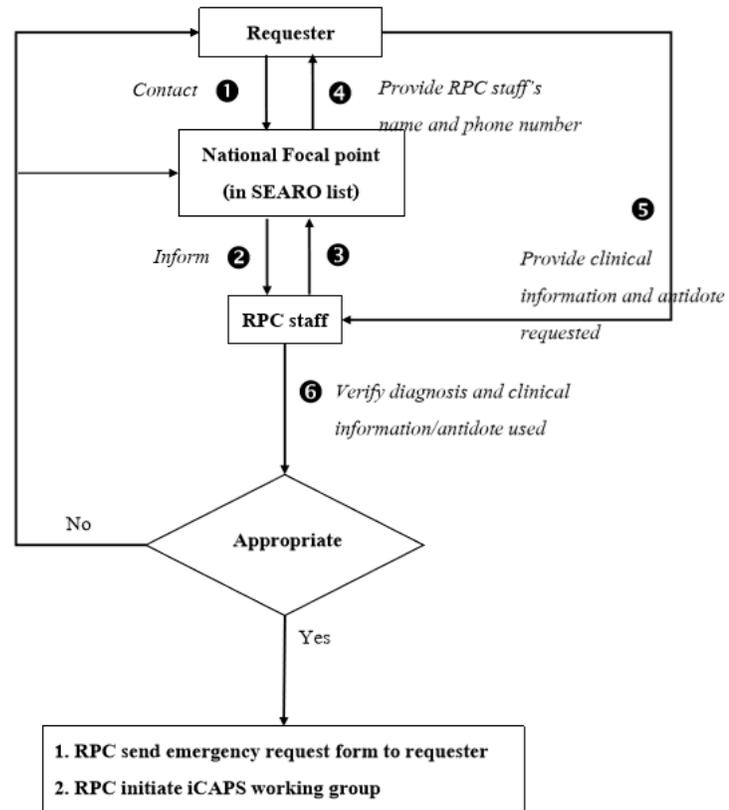
# Pathways of Collaboration

- Emergency Response
- Planned joint annual procurement

# Pathways of Collaboration

- Emergency Response
  - Thailand:
    - Ramathibodi Poison Center
    - National Health Security Office (NHSO)
    - Government Pharmaceutical Office (GPO)
  - WHO Country Representatives
  - South East Asia Regional Office

# Emergency Response Pathways

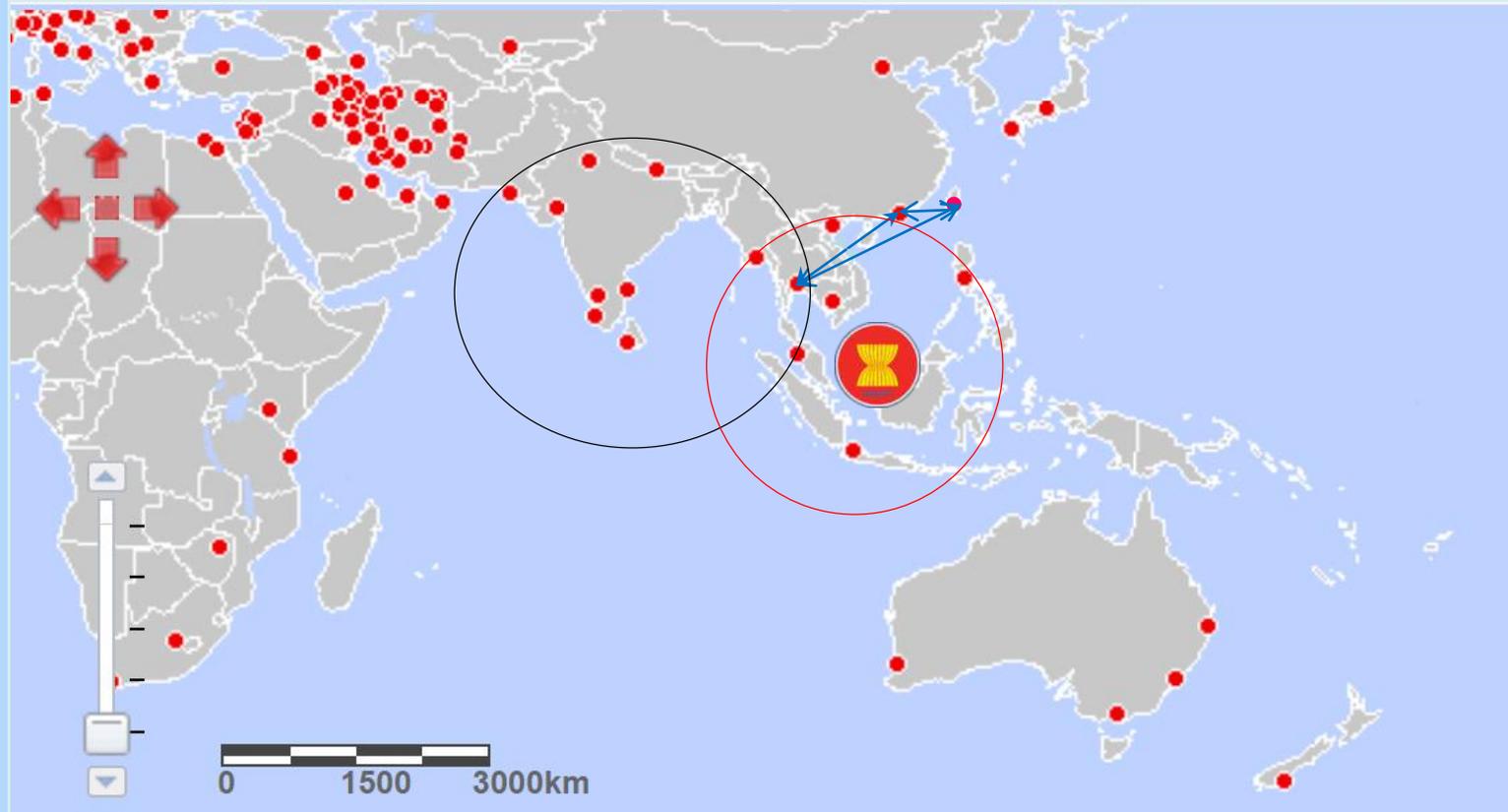


# Pathways of collaboration

- Emergency Response
  - Thailand:
    - Ramathibodi Poison Center
    - National Health Security Office (NHSO)
    - Government Pharmaceutical Office (GPO)
  - WHO Country Representatives
  - SEARO
- Planned joint annual procurement
  - Well planned, annual order procured by NHSO & GPO, base on annual contact



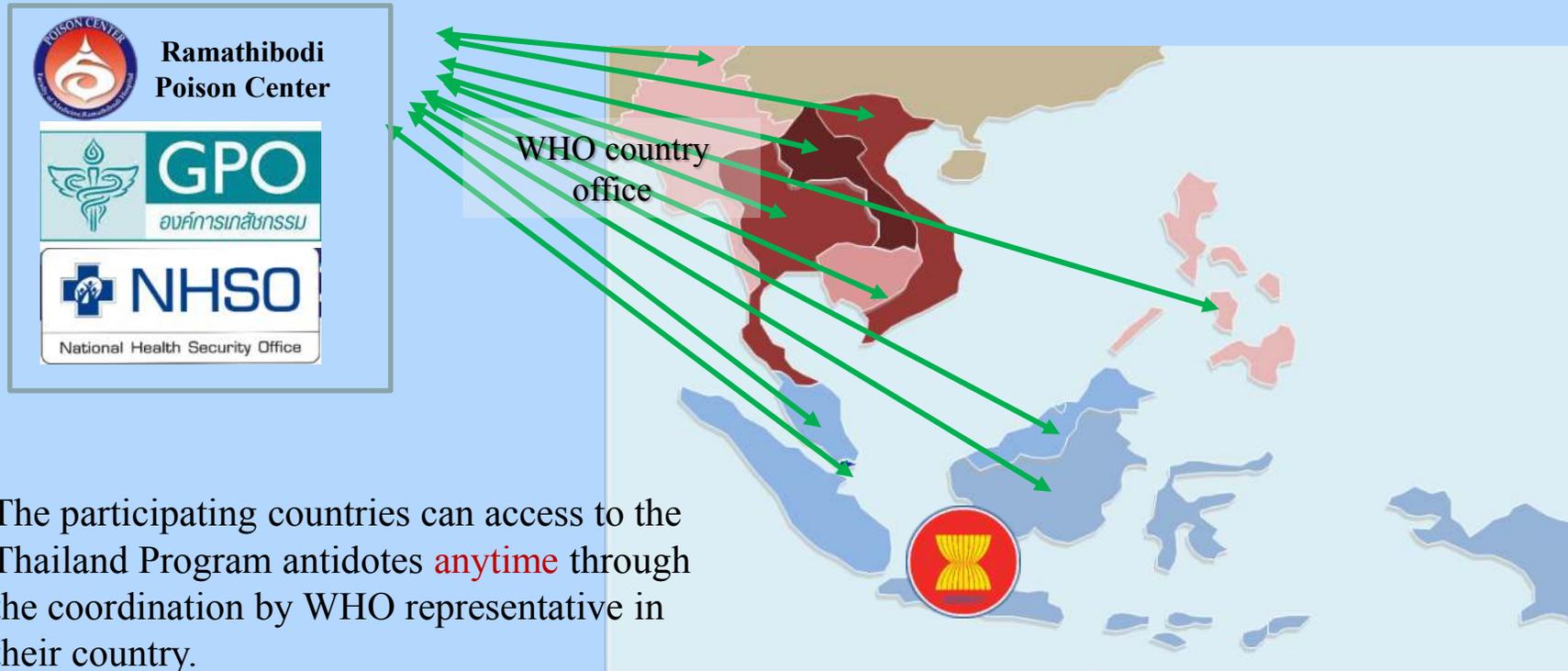
# Preparedness for Poison Management Network



# Pathway 1: Emergency Response

(Adapted from the Ramathibodi Poison Center-WHO SEAR Member States initiative 2017)

The Thailand Antidote Programme



The participating countries can access to the Thailand Program antidotes **anytime** through the coordination by WHO representative in their country.

Ramathibodi Poison Center, NHSO & GPO will work together to verify the need & then sent the antidote that country; the country will pay the cost in a later phase.

# Pathway 2: Planned joint annual procurement

(Adapted from the Ramathibodi Poison Center-WHO SEAR Member States initiative 2017)

The pharmaceutical industry



2

Collective bargaining of price & quantity



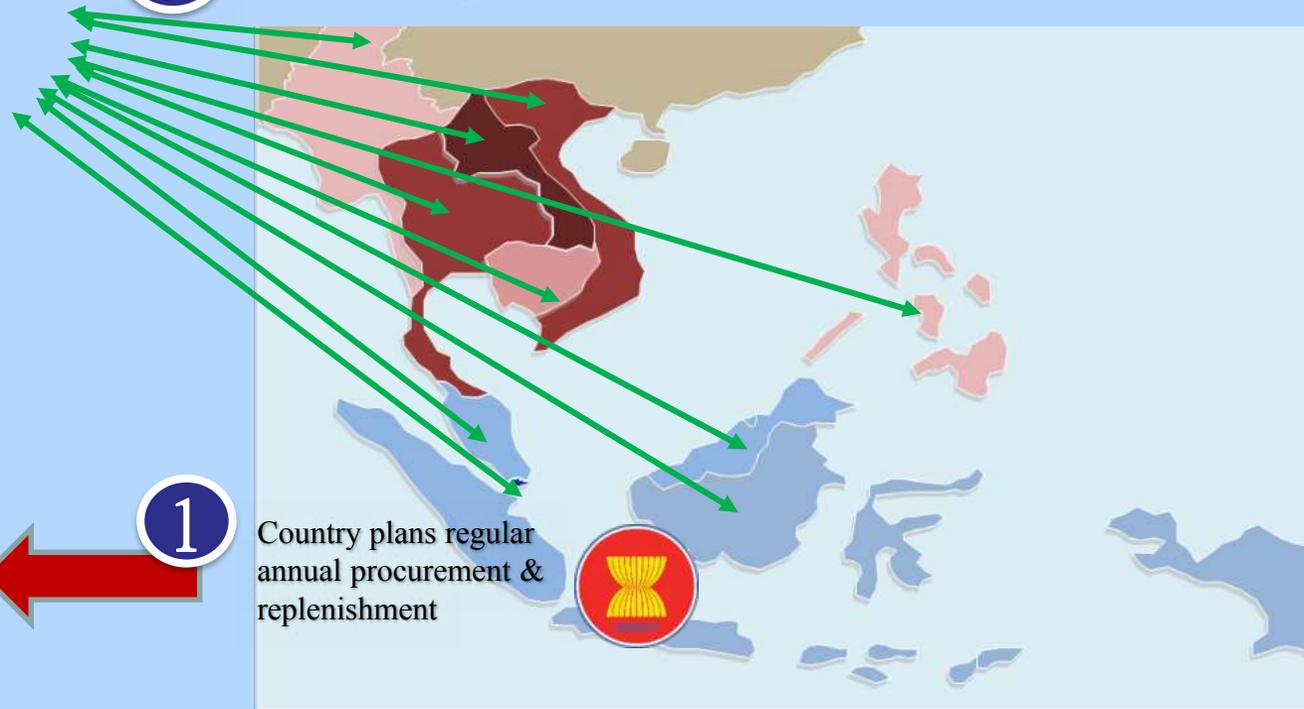
List of antidotes, antitoxins & antivenins

1



3

Individual participating country procures medical products through their own mechanisms



Country plans regular annual procurement & replenishment

# Proposed actions for ASEAN Foreign Ministerial Meeting considerations

- To endorse the decision to implement the innovation on **Improve access to antidotes, antitoxin and antivenom for life-threatening poisoning by ASEAN Member States** by a voluntary basis at the ASEAN Health Ministers' Meeting forum in August 2019 in Seam Reap
- To **reflect the ASEAN commitments on enhancement the availability of antidotes, antitoxin and antivenom to ASEAN countries**, a paragraph on this innovation will be added in the statement of the ASEAN Health Ministers' Meeting

# Expected outcomes

Through effective management of purchasing and stockpiling among ASEAN countries,

There will be a better **clinical outcome of the severe cases and cost savings from minimum wastage due to expiry of the antidotes and antivenom.**



Separated we can't, together we can