


# National Antidote of Poisoning Distribution System: New Initiatives in Saudi Arabia

**Yousef Ahmed Alomi\*** , The Former General Manager of General Administration of Pharmaceutical Care, The Former Head, National Clinical Pharmacy and Pharmacy Practice, The Former Head, Pharmacy R & D Administration, Ministry of Health, Riyadh, SAUDI ARABIA.

**Amal Hassan Al-Najjar**, Drug and Poison Information Center, Security Forces Hospitals, Riyadh, SAUDI ARABIA.

**Saeed Jamaan Alghamdi**, Drug and Poison Information Center, Security Forces Hospitals, Riyadh, SAUDI ARABIA.

**Radi Abdullah Alattyh**, General Administration of Pharmaceutical Care, Ministry of Health, Riyadh, SAUDI ARABIA.

## Correspondence:

**Dr. Yousef Ahmed Alomi**, The Former General Manager of General Administration of Pharmaceutical Care, The Former Head, National Clinical pharmacy and pharmacy practice, The Former Head, Pharmacy R & D Administration, Ministry of Health, Riyadh, SAUDI ARABIA.

Phone no: +966504417712

E-mail: yalomi@gmail.com

Received: 22-01-2019;

Accepted: 29-03-2019

Copyright: © the author(s), publisher and licensee International Journal of Pharmacology and Clinical Sciences. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

This is an open access article distributed under the terms of the Creative Commons Attribution-Non-Commercial-ShareAlike 4.0 License

## Access this article online



[www.ijpcs.net](http://www.ijpcs.net)

DOI:  
10.5530/ijpcs.2019.8.24

## ABSTRACT

**Objective:** To declare the national antidote of poisoning distribution system as new initiatives in the Kingdom of Saudi Arabia. **Methods:** It is a new initiative project, the national antidote of poisoning distribution system. The project drove the antidote of poisoning distribution guidelines and the international business model, pharmacy project guidelines project management institution guidelines of a new project. The initiative project is written through project management professionals and consisted of several parts, including the initial phase, the planning phase, the execution phase and the monitoring and controlling phase. **Results:** The antidote of poisoning distribution system with a defined vision, mission and goals was initiated. The services had various advantages with clinical and economic impacts on patients and healthcare services as illustrated in the review. The extension of the project was assured by risk management elements description. Furthermore, the monitoring and controlling of the services was demonstrated. The conversion to operation project though closing project stage was revealed in the analysis. **Conclusion:** The national antidote of poisoning distribution system is new initiative project and is considered as a part of the management of poisoning. There are multiple locations of antidote distribution services suggested and it is highly required in the Kingdom of Saudi Arabia.

**Keywords:** National, Antidote, Poisoning, Distribution, System, Saudi Arabia.

## INTRODUCTION

'Antidote' refers to any agent used to chelate the toxin, enhance its eradication/elimination, counteract its effect or ameliorate future difficulties, rather than just a pure pharmacological antagonist. Furthermore, antidotes can be life-saving and can play a noteworthy role in the management of poisoned patients. Therefore, it is needed to stock a variety of antidotes in the hospital in case of a poison incident. The incidents of poisoning increased over the past several years in the Kingdom of Saudi.<sup>[1-4]</sup> That is including drug or chemical poisoning. The drug and poisoning centers play a significant role in the assistant of healthcare providers and public and prevent related morbidity and mortality.<sup>[5,6]</sup> Several studies showed the clinical outcome and economic impact of clinical pharmacists on drug poisoning.<sup>[4-6]</sup> The Ministry of Health had national drug formulary.<sup>[7]</sup> It included the list of antidotes for drug and chemical poisoning. The list is updated annually through corporate pharmacy and therapeutic committee at the MOH. The general administration of medical supply distributed the antidotes based on an annual requirement of hospitals and primary healthcare centers. Some healthcare institutions did not request any antidote and other requested over budgets. As a result, some hospitals did not contour the availability of antidote and others overstocked which lead to expired items due to non-utilization. The antidote project of the poisoning distribution system has not existed yet. Several studies conducted to explore the antidote

of poisoning with quality and quantity manner.<sup>[8-11]</sup> To the best of author's knowledge, there is no any publication about the antidote distribution system in Saudi Arabia or Gulf and Middle East countries. The goal of this review is to explore the national antidote of the poisoning distribution system at the Ministry of Health institutions in the Kingdom of Saudi Arabia.

## Method of Development the Project

This is a description of the national antidote of the poisoning distribution system. The program is designed for the hospital at the Ministry of Health in Saudi Arabia. The program is designed by a national committee from expert pharmacists at the general administration of pharmaceutical care at Ministry of Health included among the authors. Antidote analysis requirement across the Kingdom of Saudi Arabia. An antidote medications list is designed by the authors and national drug information center at the Ministry of Health. Antidote divided into three classes A, B, C. The list of drugs A that contained all drugs listed common or seldom used. Class B contained antidote commonly used, while class C contained the antidote high frequency used. The class A defined by (A) is Required to be immediately available in all MOH Hospitals within the Emergency Department, Critical Care Department and Pharmacy Department (Emergency Pharmacy and Inpatient Pharmacy) – and should be available in some of Primary Healthcare Centers (PHCs) available within 1 hour or more than 100 km from

the nearest hospital or PHCs. Class (B) is Required to be available in all MOH Hospitals within the within 1 hr or more than 100 km from the nearest hospital and PHCs within the pharmacy department (emergency pharmacy and inpatient pharmacy) - and some of PHCs away within 1 hour or more than 100 km. Class (C) These drugs are rarely used and can be held supra – regionally. It would be advisable to know in advance where you can obtain a supply that to be available in central hospitals of more than 200 beds or medical cities pharmacies and should be available with 8-hr-time. The classes A, B and C should be available in all hospitals  $\geq 200$  beds. The classes A and B should be available in all hospitals less than 200 beds or PHCs away more than 1 hour (100 km) from the hospital or any PHCs. The quantity of each antidote based on international studies and number of cases and antidote strength.<sup>[8-11]</sup> The three classes are distributed at the hospital and primary center. The maximum distance between each institution was not exceeding one traveling time that's equal to 100 km as explained in appendix A, B and C. The project was written in several parts that are included; the initial phase, planning phase, execution phase, monitoring and controlling aspect. Also, by using the international business model, pharmacy guidelines, project management institution guidelines for a new project.<sup>[12-15]</sup>

### Initiative Phase Assessment Needs

There are thousands of poisonous cases every year in the Kingdom of Saudi Arabia. Several publications existed about poisoning cases, the types and antidote used. The ministry of health has many antidotes for poisoning. However, there is not any system about antidote drug distribution. There is no national guidelines of antidote quantity and quality that should be kept at each hospital. There are not any guidelines about the maximum distance between each hospital had antidote stock.

### SWOT Analysis

The project used Strength, weakness, opportunity and threat analysis as follows; the strength of implementation this project to maintain 24/7 all antidotes for poisoning, to know the quality and quantity demand of antidote, to respond quickly to emergency cases of poisoning, save time and life by treating poisoning cases. The weakness of the project was the demand to update the antidote list with quality and quantity characteristics, update geographic distribution based on healthcare institutions. The opportunity points of the project were the implementation of quantitative standards in Saudi Arabia,

calculating the cost analysis of Antidote usages and to know the utilization pattern of the used of antidote. The threat points were change resistance behind training physicians and pharmacist about the project, the missing of manufacturing companies of antidotes.

### Market Analysis

Over the past several years the healthcare professional representatives found the geopolitical distribution system of the antidote of poisoning with a specific type of quality and demand quantity across the Kingdom of Saudi Arabia. Most the healthcare institutions had somehow a completed antidote list. Even the Gulf or Middle East countries.

### Planning Phase The Scope of the Project

The project deals with the type of antidote used for poisoning cases, the quality of the demanded antidotes among each hospital type and numbers of its bed (its capacity) the quantity required for each hospital calculated by its bed capacity and the distances estimated to be between hospitals or primary care center had antidote stock area.

### Vision, Missions, Goals

#### Vision

Availability 24/7 of quantity and quality antidote of all types of poisoning at healthcare institutions with a standard distance between them.

#### Mission

To distribute the antidote used for all types of poisoning cases to health care institution's according to their capacity with appropriate distance between healthcare institutions and determining the quality and quantity of antidote of poisoning.

#### Goal

To maintain the antidote of poisoning over 24/7 at appropriate time and distance, to maintain the quantity and quality of antidote of poisoning, to facilitate quick response to the emergency cases of poisoning and to keep the antidote of poisoning at an appropriate distance between healthcare institutions.

### Project Description

All the pharmacists should adhere to this policy as following:

- ✓ The general administration of pharmaceutical care should distribute the classified antidote lists and their geographic location to the hospitals and primary healthcare centers (Appendix D)

- ✓ The regional administration of pharmaceutical care should follow upon the distribution of the guidelines of the antidote and their lists through regular visits of locations.
- ✓ The pharmacist or pharmacy technicians should keep the stock of antidote over 24/7.
- ✓ The report on distributing and dispensing the antidotes for poisoning is required from the hospital or primary healthcare centers pharmacist.
- ✓ The pharmacist should send the quarterly report of antidote distribution, dispensing to the regional pharmacy administration.
- ✓ The regional pharmacy administration should quarterly report to the General Administration of Pharmaceutical Care (GAPC) at Ministry of Health.
- The GAPC should publish an annual report about the antidote distribution system and advantages and disadvantages and corrective actions.

### Plan Cost Management

The project should have enough budget-related according to the type of antidote, the quantity of the antidote per each institution, traveling expenses, determined by follow visits to the healthcare institutions, project manager and management team. The application design, the training and education courses for healthcare team members should be considered.

### Executing Phase Management Team

The central and peripheral education and training committees in each region and each hospital should be established. The stakeholder's team consisted of the hospital and primary care center, drug information center representatives and heads of regional drug information centers. The central committee consisted of general administration representatives of pharmaceutical care with assessment head, manager of the clinical pharmacy and national drug information center.

### Education and Training

The education and training for the healthcare team including physicians, nurses and pharmacist, the emergency staff for each healthcare institution in addition to any new healthcare staff joins the healthcare institutions. The education and training course should consist of all the project vision, mission and goals and procedures related issues.

## Implementation of the Services Risk Management

There are six types of risk management included budget risk, scope risks, personal risks, schedule risk, technical risks and quality risks. Most of the risks may be exposed to, will be budget, personal or schedule and quality risks. From the perspective of the budget risk, there is no available enough budget data to validate the project. The project may expose to personal risks which human resources of pharmacy, there is no enough qualified specialized pharmacist available to follow up the patients. Also, pharmacy staff did not receive education or training about the project or its implementation. The scope of risks may affect the project is the absence of training the of the pharmacy staff on the project, or its scope and functions or expanding the goals of training beyond the scope of the project, such as including all emergency medications or CPR medications. The project may be exposed to schedule risks with the delay in the inventory management. The project could be exposed to quality risks as non-qualified pharmacist are available and lack training on the quality pharmacy tools for antidote distribution system documentation or measurement or monitoring parameters. Other technical risks may be exposed to the project are the absence of electronic system for the antidote distributed lists that to be as a friendly used system.

## Planning Phase Monitoring and Controlling Phase Project Quality Management

The KPIs of the established project as a follow up measurement will be the availability of a continued program and the documentation of the outcomes and the impact of the program. For instance, number of antidote available at each health institution, the outcome of non-availability of antidote, physician satisfaction of antidote poisoning services. The cost analysis of non-availability of antidote, All of KPIs should regularly be checked to measure the impact of the project.<sup>[16,17]</sup>

## Closing of the Project

The Antidote of poisoning distribution project at MOH institution is an essential tool to prevent poisoning related mortality and morbidity in the Kingdom of Saudi Arabia. The annual report of the antidote of poisoning distribution should be done. Education and training courses to healthcare providers should be conducted regularly about updating on new antidote medications and poisoning regulation. Further, excess cost-wasting avoidance of the antidote of poisoning distribution in the future. Annual appreciation of the involved members of the project.

## ACKNOWLEDGEMENT

I want to thank all inventory management and medical supply pharmacists at all regions for their cooperation.


## CONFLICT OF INTEREST

None.

## ABBREVIATIONS

**KSA:** Kingdom of Saudi Arabia; **MOH:** Ministry of Health; **PTC:** Pharmacy and Therapeutic Committee; **RPCA:** Regional Pharmaceutical Care Administration; **GAPC:** General Pharmaceutical Care Administration; **CPR:** Cardiopulmonary Resuscitation; **KPIs:** Key Performance Indicators.

## ORCID ID

Yousef Ahmed Alomi  <https://orcid.org/0000-0003-1381-628X>

## REFERENCES

1. Saudi Ministry of Health. Kingdom of Saudi Arabia Annual Statistical Book. 2017. Available from: <http://www.moh.gov.sa/en/Ministry/Statistics/book/Documents/StatisticalBook-1436.pdf%0Ahttp://www.moh.gov.sa/ministry/statistics/book/pages/default.aspx>.
2. Saudi Ministry of Health. Kingdom of Saudi Arabia Statistical Year Book. 2016. Available from: <http://www.moh.gov.sa/en/Ministry/Statistics/book/Documents/StatisticalBook-1436.pdf%0Ahttp://www.moh.gov.sa/ministry/statistics/book/pages/default.aspx>.
3. Saudi Ministry of Health. Kingdom of Saudi Arabia

Statistical Book. 2015. Available from: <http://www.moh.gov.sa/en/Ministry/Statistics/book/Documents/StatisticalBook-1436.pdf%0Ahttp://www.moh.gov.sa/ministry/statistics/book/pages/default.aspx>.

4. Saddique A. Poisoning in Saudi Arabia: Ten-year experience in King Khaled University Hospital. *Ann Saudi Med.* 2001;21(1-2):88-91.
5. Alomi YA, Almdaiheem HY, Alarnous T, Alshurei S, Alsharafa A, Alzahrani T, *et al*. Cost-efficiency of national drug information center through ministry of health Hotline Calling Services (937) in Saudi Arabia: Application of a Mercian Model. *Value Heal.* 2015;18(7):A735.
6. Alomi YA. Cost-efficiency of clinical pharmacy services at ministry of health in Saudi Arabia application of American Model. *Value Heal.* 2016;19(7):A482-3.
7. Ministry of Health. Ministry of Health Formulary. Health Ministry of Health. 2012.
8. AlTamimi A, Malhis NK, Khojah NM, Manea SA, AlTamimi A, AlShammary SA. Antidote availability in Saudi Arabia hospitals in the Riyadh Province. *Basic Clin Pharmacol Toxicol.* 2018;122(2):288-92.
9. Fountain JS, Sly B, Holt A, MacDonell S. Availability of antidotes, antivenoms and antitoxins in New Zealand hospital pharmacies. *N Z Med J.* 2015;128(1411):23-33.
10. Thanacoody RHK, Aldridge G, Laing W, Dargan PI, Nash S, Thompson JP, *et al*. National audit of antidote stocking in acute hospitals in the UK. *Emerg Med J.* 2013;30(5):393-6.
11. Bailey G, Rehman B, Wind K, Wood D, Thanacoody R, Nash S, *et al*. Taking stock: UK national antidote availability increasing, but further improvements are required. *Eur J Hosp Pharm.* 2016;23(3):145-50.
12. McDonough R. Writing a business plan for a new pharmacy service. *The Dynamics of Pharmaceutical Care: Enriching Patients' Health.* 2010;23.
13. Harris IM, Baker E, Berry TM, Halloran MA, Lindauer K, Ragucci KR, *et al*. Developing a Business-Practice Model for Pharmacy Services in Ambulatory Settings. *Pharmacotherapy.* 2008;28(2):7e-34e.
14. Sachdev G. Sustainable business models: Systematic approach toward successful ambulatory care pharmacy practice. *Am J Heal Pharm.* 2014;71(16):1366-74.
15. PMBOK Guide. A guide to the project management body of knowledge. Sixth Edition. Project Management Institute, Inc. 2017.
16. Alomi YA, Alghamdi SJ, Alattyh RA. Strategic plan of general administration of pharmaceutical care at ministry of health in Saudi Arabia 2012 – 2022. *J Pharm Pharm Sci.* 2015;1(13):1-8.
17. Alomi Y. National pharmacy administration programs. *BAOJ Pharm Sci.* 2015;1(2):1-2.

## Appendix A

(A) Required to be immediately available in all MOH Hospitals within the Emergency Department, Critical Care Department and Pharmacy Department (Emergency Pharmacy and Inpatient Pharmacy) – and should be available in some of PHCs away within 1 hour or more than 100 km from nearest hospital

Antidote	Toxin	Stock ER (Hospital, PHC)	Stock ICU (Hospital, PHC)	Stock ER Pharmacy (Hospital, PHC)	Stock In-Pharmacy (Hospital, PHC)
Antidote Acetylcysteine (NAC) 200 mg/ ml 10 ml/Ampoule	Toxin Acetaminophen poisoning	Two adults patient per 24 hours treatment = number of unit size 20 ampoules	Two adults patient per 24 hours treatment = number of unit size 20 ampoules	Two adults patient per 24 hours treatment = number of unit size 20 ampoules	12 adults patient per 24 hours treatment = number of unit size 120 ampoules
Activated charcoal 50-100g/container	Most poisons.	6 container of (100g/container) 12 container of (50g/container)	6 container of (100g/container) 12 container of (50g/container)	6 container of (100g/container) 12 container of (50g/container)	36 container of (100g/container) 72 container of (50g/container)
<b>Atropine</b> (0.1mL 10mL Prefilled syringe) Or (0.6mg/mL (10mL Ampoule) Or (0.4 mg/ml 5ml)	Organophosphate/Carbamates/insoluble poisoning and other cholinesterase inhibitors e.g., warfare agent Bradycardia induced by a variety of drugs.	12 ampoule of (0.4mg/ml) 4 ampoule of (0.6mg/ml)	12 ampoule of (0.4mg/ml) 4 ampoule of (0.6mg/ml)	12 ampoule of (0.4mg/ml) 4 ampoule of (0.6mg/ml)	72 ampoule of (0.4mg/ml) 24 ampoule of (0.6mg/ml)
<b>Antivenom (Polyvalent and bivalent) for Snakebite (1000 unit)</b>		20 ampoules/vials	20 ampoules/vials	20 ampoules/vials	120 ampoules/vials
<b>Anti-scorpion</b>	Scorpion envenomation	40 ampoules/vials	40 ampoules/vials	40 ampoules/vials	240 ampoules/vials
<b>Calcium Gluconate Powder 10% (10mL) IV ampoule.</b>	Hydrofluoric acid skin exposure burns less than 5% of body surface exposures to concentrations of less	1 ampoule	1 ampoule	1 ampoule	1 ampoule
<b>Carnitine (L-Carnitine) 200 mg/ ml (5ml)</b>	Hyperammonemia from valproic acid toxicity	20 ampoules	20 ampoules	20 ampoules	120 ampoules
<b>Cyanide Antidote Kit (Conventional)</b>	Cyanide poisoning Sodium nitroprusside, Bromates (thiosulfate only) Hydrogen sulfide (nitrites only)	1 kit This kit is designed to treat two adult patients	1 kit	1 kit	12 kits
<b>Cyanokit/ Hydroxycobalamin (5g/kit)</b>	Cyanide poisoning Smoke/Inhalation Victims (CO, H <sub>2</sub> S, HCN)	4 kits	4 kits	4 kits	24 kits
<b>Digoxin Immune FAB Digibind or Digifab® (400mg/vial)</b>	Digoxin poisoning; other cardioglycosides (eg, oleander, foxglove)	10 vials	10 vials	10 vials	100 vials

Continued...

Antidote	Toxin	Stock ER (Hospital, PHC)	Stock ICU (Hospital, PHC)	Stock ER Pharmacy (Hospital, PHC)	Stock In-Pharmacy (Hospital, PHC)
<b>Fomepizole ???</b> (1gm/ ml) 1.5 ml/vial	Ethylene glycol and methanol toxicity	2 vials	2 vials	2 vials	12 vials
<b>Flumazenil ???</b> (100 mcg/ml (5 ml) 0.5mg/ampoule	Benzodiazepine overdose	12 ampoule	12 ampoule	12 ampoule	72 ampoules
<b>Glucagon</b> (Off label) (1mg vial or prefilled syringe)	Beta blocker overdose CCB overdose Hypoglycemic agents over dose	30 vials/prefilled syringe	30 vials/prefilled syringe	30 vials/prefilled syringe	180 vials/prefilled syringe
<b>100%O2 and Hyperbaric oxygen (HBO)</b>	Carbon monoxide (CO) Cyanide (CN)poisoning Hydrogen sulfide (H2S) Carbon tetrachloride (CCl4) High methemoglobinemia				
<b>Methylene Blue 100 g/amp.</b>	Methemoglobinemia	1 ampoule	1 ampoule	1 ampoule	2 ampoule
<b>Methionine</b>	Paracetamol poisoning	Older studies evaluated therapies such as methionine, but these treatments were limited by adverse effects and play no role in current management			
<b>Naloxone/Narcan</b> (0.4mg/1ml)	Opioid overdose	76 ampules	76 ampules	76 ampules	456 ampoules
<b>Physostigmine</b> (2mg/amp)	Anticholinergic poisoning, especially anti-muscarinic delirium	( 6 doses) 24 ampoules	24 ampoules	24 ampoules	144 ampoules
<b>Protamine Sulphate</b>	Anticoagulant effects of unfractionated heparin(UFH)and for some of the effects of low molecular-weight heparin (LMWH)	2 ampoules 1% 50mg/ 5ml	2 ampoules 1% 50mg/ 5ml	2 ampoules 1% 50mg/ 5ml	12 ampoules 1% 50mg/ 5ml
<b>Pyridoxine (VitaminB6)</b> <b>Off-label</b>	Isoniazid(INH) poisoning hydrazine and derivatives and ethyleneglycol over doses	20 tablet 50mg	20 tablet 50mg	20 tablet 50mg	20 tablet 50mg
<b>Sodium Bicarbonate</b> <b>1mEq/ml 8.4% (50mL)</b> <b>Prefilled syringe.</b>	Cardio toxicity of xenobiotics that block Na channels (TCA) Enhance the alcohols Treatment of rhabdomyolysis elimination of weak acids (salicylate, Phenobarb ,Methotrexate) Correct life-threatening acidosis generate dfromtoxic	16 Prefilled syringe	16 Prefilled syringe	16 Prefilled syringe	96 Prefilled syringe
<b>Thiamine Hydrochloride</b> <b>100mg tablet</b> <b>100mg ampoule</b>	Every potential alcoholic Prevent and treat Wernicke encephalopathy	20 tablet 20 ampoules	20 tablet 20 ampoules	20 tablet 20 ampoules	120 tablet 120 ampoule

## Appendix B

Class (B) should available hospital and PHCs within Pharmacy Department (Emergency Pharmacy and Inpatient Pharmacy)			
Antidote	Toxin	Stock ER Pharmacy (Hospital, PHC)	Stock In-Pharmacy (Hospital, PHC)
		Two adults patient/ 24 hours treatment = number of unit size	Four adults patient/ 24 hours treatment = number of unit size
<b>Cholestyramine</b> Gm/ Packet	Chlorinated hydrocarbons- Digitoxin Amiodarone- Oral anticoagulants -NSAIDs-Thiazide diuretics B-blockers- Oral hypoglycemic	6	12
<b>High dose insulin euglycemic therapy</b> 100 I.U./ ml (10 ml)	Severe calcium channel blocker poisoning Severe beta-blocker poisoning	4	8
<b>Cyproheptadine**</b> Syrup: 2 mg/5 mL (10 mL, 473 mL) Oral tab : 4mg	Serotonin syndrome caused by: - Monoamine oxidase inhibitors - Selective serotonin reuptake inhibitors	34 tab (1 box 50 tab) 1 bottle (2mg/5ml/473ml) 34 bottle (2mg/5ml)/10ml	68 tab (2 box) 2 bottle (2mg/5ml/473ml) 68 bottle (2mg/5ml)/10ml
<b>Dantrolene</b> 20 mg / Vial	Hyperthermia from (malignant hyperthermia, neuroleptic malignant syndrome, serotonin syndrome, cocaine and amphetamines)	60	120
<b>Deferoxamine</b> 500 mg/ vial	Iron poisoning	16	32
<b>Deferiprone</b> 500 mg tablet		22 (1 box 28 tab)	44 (2 box)
<b>Dicobaltdetate**</b> 300mg Injection	Cyanide toxicity	6	12
<b>Intravenous lipid emulsion (Intralipid)</b> 20 % 250 ml Glass Bottle or Plastic Bag	Lipophilic cardiotoxic agents (Local anesthetics and possibly other cardiotoxins e.g., CCB, bupropion, cocaine, BB, TCA)	26	52
<b>Fomepizole</b> (1Gm/ ml) 1.5 ml	Methanol toxicity Ethylene glycol toxicity	5	10
<b>Leucovorin (Folinic Acid) and Folic Acid</b> 15 mg Tablet 50 mg / 5ml Ampoule or Vial	Folic acid antagonist (e.g. Methotrexate, trimethoprim) Methanol toxicity	167 2 (1 box)	336 4 (1 box)
<b>Mesna</b> 400 mg ampoule	Reduction of urothelial toxicity in antineoplastic therapy (Cyclophosphamide)	10	20
<b>Octreotide acetate/ Sandostatin*</b> 100 Mcg Ampoule	Hypoglycaemia induced by sulphonylureas and quinine	8	16
<b>VitaminK1 (phytonadione, phylloquinone)</b>  10 mg Tablet 10 mg Ampoule 2 mg Ampoule	Warfarin and super warfarin rodenticide	4 (1 box)  4	8 (1 box)  8

## Appendix C

Class (C) Should be available in central hospitals <b>more than 200 beds</b> or medical cities pharmacies and <b>should be available with 8 hours</b>		
Antidote	Toxin	Stock In-Pharmacy (Hospital, PHC)
		Two adults patient/ 24 hours treatment = number of unit size
<b>BAL</b> <b>(Dimercaprol)</b> 100 mg/mL (3 mL)	Heavy metal poisoning In lead encephalopathy: It is used only with conjunction of calcium EDTA therapy.	14-22
<b>DMSA</b> <b>(Succimer)</b> Capsule 100 mg	Heavy metal poisoning (Arsenic, Lead, Mercury)	30 (2 box)
<b>EDTA-Calcium</b> 1g/Amp injection	Heavy metal poisoning (Lead toxicity, Zinc salts)	6
<b>Penicillamine</b> 250 mg Tablet or Capsule	Heavy metal poisoning (Lead, copper and arsenic)	12 (1 box)
<b>Pralidoxime</b> 1 - 6 Gm Vial or Ampoule	Cholinesterase Inhibitor poisoning (organophosphate or “nervegas”)	14
<b>Prussian Blue /Radiogardase</b> 500 mg Cap	Dirty bomb agents: radioactive cesium and thallium and non-radioactive thallium	70

## Appendix D

## Riyadh Region

Name of Hospital	Bed Capacity	A	B	C	Name of primary health care center	A	B	C
Al-Emam Abdulrahman Al Faisal Hospital	280				Mabayad			
Rehption Hospital	260				Shwy			
Al Qowayeyah General Hospital	200				hafr aleitsh			
Al Zalfi General Hospital	200				Qaraen			
Maternity and Children hospital- alkharaaj	200				Umm jadir			
Wadi Al Dawasir Hospital	150				Umm talih			
Afeef Hospital	130				Alhasa			
Al Aflaaj Hospital	120				Sibha'			
Huraymala General Hospital	100				Wadi Ussail			
Hotat Sdair General Hospital	85				Helban			
Ramaah General Hospital	50				Al-Khaserah			
Wathilan General Hospital	50				Almaezilia			
Rowaidah Alard General Hospital	50				Umm salam			
Saajer General Hospital	50				Alraqamia			
Al Rayn General Hospital	50				Harirat alhasa			
Prince Salman General Hospital - Ad-dalam	50				Al-Rabwah			
Tameer General Hospital	50				Darawish			
Nafi general Hospital	50				Alnamis			
Durmaa General Hospital	50				Assalhiya			
Al Hareeqe General Hospital	50				Sayha			
Bjadya Hospital	50				Umm salim			
Al Artawiyah hospital	50				Al-Rajihya			
					Abu ramal			
					Alhamaja			
					Alhidar			
					Aleijlia			
					Umm arta			
					Algharaba			
					Al-Shawaten			
					Alhawmiat			
					Mashdhuba			

## Makkah Mukarramah Region

Name of Hospital	Bed Capacity	A	B	C	Name of primary health care center	A	B	C
Al Noor Specialist Hospital	500				Mudrika			
King Faisal hospital	300				Rihat			
King Abdulaziz Hospital	300				Hurat Alsharae			
Maternity and Children hospital	300				Alruwda			
Heraa General Hospital	270				Khulais			
Iben Senaa hospital	100				Alqueur			
Ajyaad General Hospital	52				Alqafif			
Alkamel Hospital	50							
Khulais General Hospital	50							



## Jeddah Region

Name of Hospital	Bed Capacity	A	B	C	Name of primary health care center	A	B	C
King Fahad Hospital	744				Hijr			
King Abdullah medical center	500				Marakha			
King Abdulaziz Hospital and Oncology Center	436				Bani Mazid			
East Jeddah Hospital	300							
Maternity and Children Hospital	254							
Al Amal Mental Health Complex	210							
Mental Health Hospital	125							
Rabigh General Hospital	120							
Al Aziziyah Maternity and Children Hospital	100							
Al Thaghr Hospital	100							
Adham Hospital	100							
Ophthalmology Hospital	85							
King Saud Hospital	80							
Allayth Hospital	50							

## Taif Region

Name of Hospital	Bed Capacity	A	B	C
King Faisal Medical Complex	500			
King Abdulaziz Hospital	500			
Mental Health Hospital	500			
OB GYN MEDICAL HOSPITAL	300			
Chest Diseases Hospital	150			
Children's Hospital	100			
Um El Dom Hospital	50			
King Saud Hospital	50			
Zalim Hospital	50			
Al Muwaih Hospital	50			
Qiyah Hospital	50			
Ranyah Hospital	50			
Terbah Hospital	50			
Al Khormah Hospital	50			
Maysaan Hospital	50			
Al Quorai Hospital-Bani Malek	50			
Al Sahn Hospital	50			
Qiyah Bil-Harith General Hospital	50			

## Al Qunfudah Region

Name of Hospital	Bed Capacity	A	B	C
Al Qunfudah General Hospital	150			
South Al Qunfudah General Hospital	100			
Thriban Hospital	50			
Namirah Hospital	50			
AlMozaylif Hospital	50			

## Madinah Monawarah Region

Name of Hospital	Bed Capacity	A	B	C	Name of primary health care center	A	B	C
Maternity and Children Hospital	500				Abu shakir			
King Fahad Hospital	423				Alasyhr			
Yanbu General Hospital	300				Aldaliea			
Uhod Hospital	261				Aldamiria			
Mental Health Hospital	200				Alfaqaali			
Dar Al - Naqahah Hospital	150				Aghashia			
Medical Rehaplitation Hospital	141				Alhamija			
Prince Abdul Muhsin Alola Hospital	128				Alhijria			
Al Ansaar general Hospital	100				Alhim			
Miqat General Hospital	65				Aljadida			
Pilgrims City Hospital	50				Aljyasir			
Badr General Hospital	50				Almuhajir			
Al Mahd Hospital	50				Almuramia			
Al Hanakiya Hospital	50				Almusijid			
Khaybar general Hospital	50				Alsaila			
Al Eis General Hospital	50				Alwird			
Al Hammah General Hospital	50				Amira			
Yanbu Al Nakeel General Hospital	50				Biir alarak			
Al-Haso General Hospital	50				Eadan			
Abu Raka General Hospital	50				Eaqilat tharab			
Wadi Fara General Hospital	50				Eshr			
					Hadhah			
					Hazra			
					Jabal Radwaa			
					Nabat			
					Tarabu			

## Eastern Region

Name of Hospital	Bed Capacity	A	B	C
Maternity and Children Hospital	430			
Dammam Medical Complex	423			
Al Quateef Central Hospital	400			
Amal Complex for Mental Health	345			
Jubail General Hospital	250			
Al-Khafji General Hospital	100			
Al-Dhahran General Hospital	100			
Al Naeriyah Hospital	100			
Prince Sultan Hospital-'Areerah	50			
Ank General Hospital	50			
Ras Tanura General Hospital	50			
Al Qariya Al Ulya General Hospital	50			
Abqaiq General Hospital	50			
Safwa General Hospital	50			
Al-Rafee'ah General Hospital	50			
Prince Sultan Hospital-Melija	50			
Salwa Hospital	50			
Al-Bathaa Hospital	50			

## Alhasa Region

Name of Hospital	Bed Capacity	A	B	C	Name of primary health care center	A	B	C
King Fahd Hospital	503				Aldahu			
Maternity and Children Hospital	450				Alkhana			
Prince Saud Bin Galloway Hospital	300				Alssalimia			
King Faisal Hospital	300				Altawila			
Mental Health Hospital	100				Anbak			
Al Jabr Eye and ENT Hospital	100				Dhaeblutun			
Al Afaleq Hospital for Primary Care	80				Fadila			
Prince Sultan Cardiac Center	72				Harid			
Al Jafar Hospital	50				Kharis			
Madinet Al-Oyoun Hospital	50				Wasaye			
					Yabrin			

## Hafr Al Batin Region

Name of Hospital	Bed Capacity	A	B	C	Name of primary health care center	A	B	C
medical supply	500				Al-Hairaa			
King Khalid general Hospital	250				Al-Khobayra			
Hafr Albatan Central Hospital	200				Al-Nazeem			
Maternity and Children hospital	200				Alraqei			
Al Quaysooma Hospital	50				Alsaeira			
Dar Al - Naqahah Hospital	50				Alsaydawi			
Mental Health Hospital	50				Am eshr			
Al Saeera Hospital	50				Hijrat alnnayifia			
					Maerij alsawban			
					Munakh			
					Samuda			

## Qassim Region

Name of Hospital	Bed Capacity	A	B	C	Name of primary health care center	A	B	C
Braidah Central Hospital	400				Aleaqir			
King Saud Hospital	400				Aljirdhawia			
King Fahd Specialist Hospital	340				Allaghfia			
Maternity and Children Hospital	300				Al-Mudarraaj			
Al Rass General Hospital	300				Al-Nemriah			
Mental Health Hospital	200				Alnaqra			
Al Midhnab General Hospital	140				Alqaeia			
Al Bakriyya General Hospital	140				Alsameuria			
Al Badayi General Hospital	140				Alzaahiria			
Alshifa Hospital	50				Bidayie aldabtan			
Ouyoon Aljowaa Hospital	50				Bqiea' aljanubia			
Riyad Alkhorbaraa General Hospital	50				Dalee' Rashid			
					Duriya			
					Earifjan sahuq			
					Faydat nawman			
					Kahala			
					Mahiir altaramus			
					Masaka			
					Rafayie allahib			
					Salam			
					Sheri			

## Aseer Region

Name of Hospital	Bed Capacity	A	B	C
Asir Central Hospital	500			
Khamees Mushait Hospital	200			
Maternity and Children Hospital Abha	200			
Al-Khamis Maternity and Children Hospital	200			
Mahael General Hospital	150			
Abha General Hospital	100			
Mental Health Hospital	100			
Suraat Ubaidah Hospital	100			
Dhahran al Janoub General Hospital	100			
Ballasmer Hospital	100			
Al Namaas Hospital	100			
Al Mojaradah Hospital	100			
Uhod Rafeedah Hospital	100			
Maternity and Children Hospital Bialmuhala	100			
Tanomeh Hospital	50			
Hospital Blhamr	50			
Al Harejah General Hospital	50			
Al Mada Hospital	50			
Al-Furshah Hospital	50			
Al Qahmah Hospital	50			
Rijaal Alma Hospital	50			
152 Al Barak Hospital	50	Inter		
Maternity and Children Hospital Khamees	50			

## Bishah Region

Name of Hospital	Bed Capacity	A	B	C
King Abdullah Hospital	300			
Tathleeth General Hospital	100			
Recovery and Mental Health Hospital	100			
Maternity and Children Hospital	100			
Sabt Al Alaya General Hospital	50			
Al Bashaer General Hospital	50			
Tabalah General Hospital	50			
Wadi Turj Hospital	50			

## Tabouk Region

Name of Hospital	Bed Capacity	A	B	C
King Fahad Specialized Hospital	500			
King Khalid Hospital	250			
Al Wajh Hospital	200			
Al Amal Mental Health Complex	200			
Diba Hospital	100			
Omloj General Hospital	100			
Taymaa General Hospital	100			
Maternity and Children Hospital	100			
Hakl Hospital	100			
Albad General Hospital	50			
Duba Hospital	50			
AlHoraa Hospital in Omloj	50			
Ashwaq Hospital	50			

## Hail Region

Name of Hospital	Bed Capacity	A	B	C	Name of primary health care center	A	B	C
king Khalid Hospital	280				Al Ghazaleh			
Hail General Hospital	245				Al Salimy			
Maternity and Child Hospital	135				Al'ajfar			
Mental Health Hospital	85				Aleamuayir and Almarir			
Al Salimy Hospital	50				Alhiania			
Alhaet General Hospital	50				almuhafir			
Baqaa General Hospital	50				Alnamarat and Almisear			
Sameeraa Hospital	50				Alraqab			
Al-Shanan Hospital	50				Alruwda			
Al Shamly Hospital	50				Al-Shanan			
Moquawaque Hospital	50				Al-Zubeira			
Al Ghazaleh Hospital	50				Jaba			
					Sameeraa			
					Turba			

## Northern Borders Region

Name of Hospital	Bed Capacity	A	B	C	Name of primary health care center	A	B	C
Arar Central Hospital	300				Liyana			
Maternity and Children Hospital	300				Alhibas			
Tareef General Hospital	200				Lawqa			
Prince Abdulaziz Bin MUSAAD Hospital	100				Alqaysuma			
Mental Health Hospital	100				Huzam aljalamid			
Rfhaa Central Hospital	100				Zahua			
Convalescent and Medical Rehabilitation Hospital	50							
Shoba Nassab Hospital	50							
Al Owaiqelah Hospital	50							

## Jazan Region

Name of Hospital	Bed Capacity	A	B	C
Al Mawsim Hospital	50			
Al Tawaal General Hospital	50			
Ahad Al Mosaraha Hospital	50			
Al Khubba General Hospital	50			
Al Aardah hospital	50			
Bani Malik General Hospital	50			
Fefa General Hospital	50			

## Najran Region

Name of Hospital	Bed Capacity	A	B	C	Name of primary health care center	A	B	C
King Khalid Hospital	300				Tamani			
Al Shorfa Hospital	200				Almankhalaa			
Najran General Hospital	150							
Sharoorah General Hospital	100							
Habonna General Hospital	70							
Kbash Hospital	50							
Badr Al-Janoub Hospital	50							
Yadmah Hospital	50							
Thar Hospital	50							

## Al Bahah Region

Name of Hospital	Bed Capacity	A	B	C
King Fahad Hospital	320			
Al Mokhwaah General Hospital	70			
Quolowah General Hospital	50			
MandaQ General Hospital	50			
Al-Akeek General Hospital	50			
Al Qwayceyah General Hospital	50			

## Al Jouf Region

Name of Hospital	Bed Capacity	A	B	C
king Abudlaziz Hospital	300			
Tabarjal General Hospital	200			
Prince Abdul Rahman Al - Sudairy Hospital	200			
Maternity and Children Hospital	100			
Domat Al Jandal General Hospital	100			
Abu Ajram Hospital	50			
Mental Health Hospital	50			
Swair General Hospital	50			
Maygow General Hospital	50			

## Qurayyat Region

Name of Hospital	Bed Capacity	A	B	C	Name of primary health care center	A	B	C
Gurayat General Hospital	300				Al-Isawyia			
Mental Health Hospital	100				Eayan alhiwas			
Al-Isawyia Hospital	50				Hasida			
King Faisal Hospital	50				Qalyb Khader			
Al-Hadithah General Hospital	50							