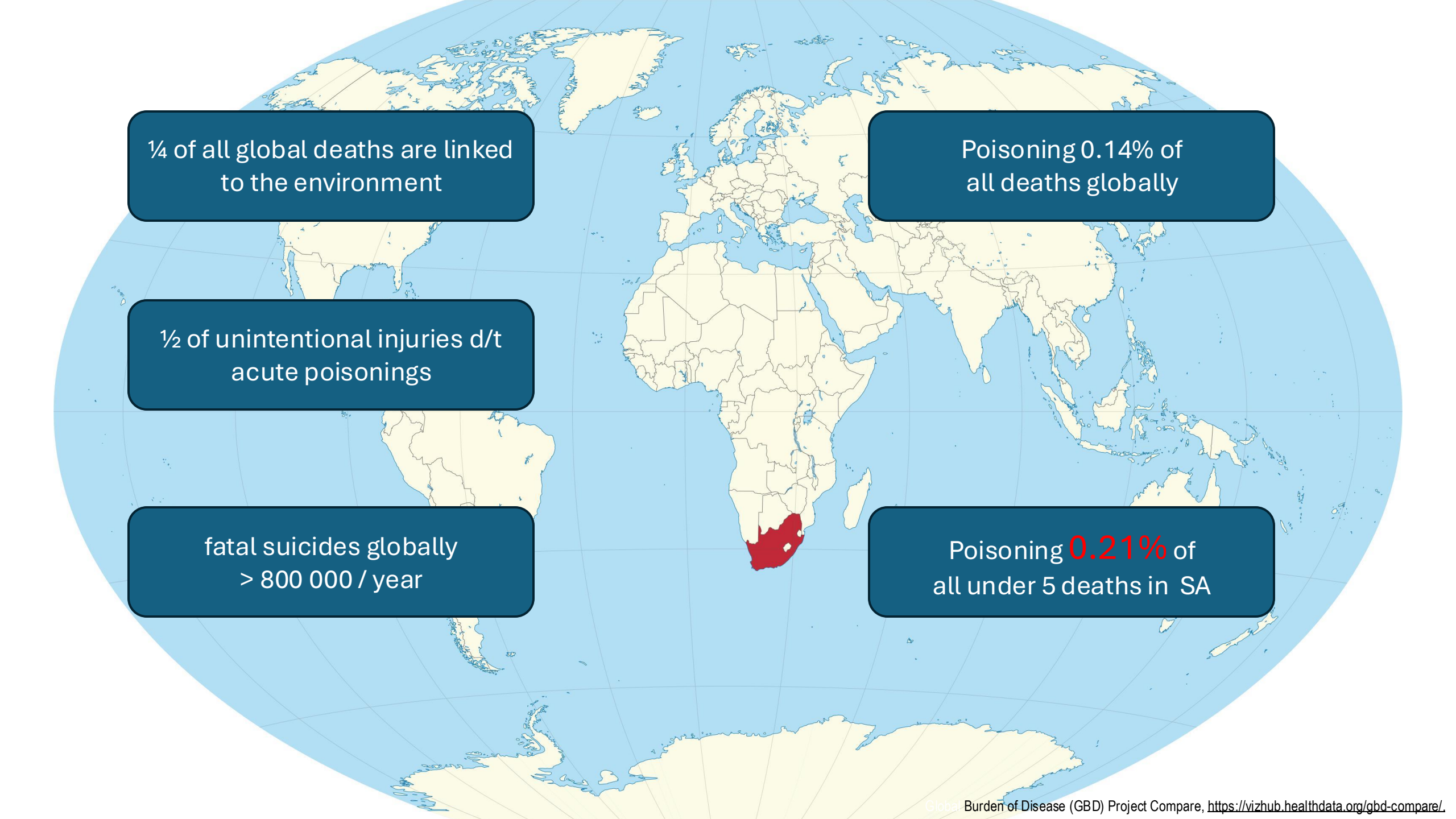




POISON PERILS

Emergency Management of
Paediatric Toxicology Cases



¼ of all global deaths are linked
to the environment

Poisoning 0.14% of
all deaths globally

½ of unintentional injuries d/t
acute poisonings

fatal suicides globally
> 800 000 / year

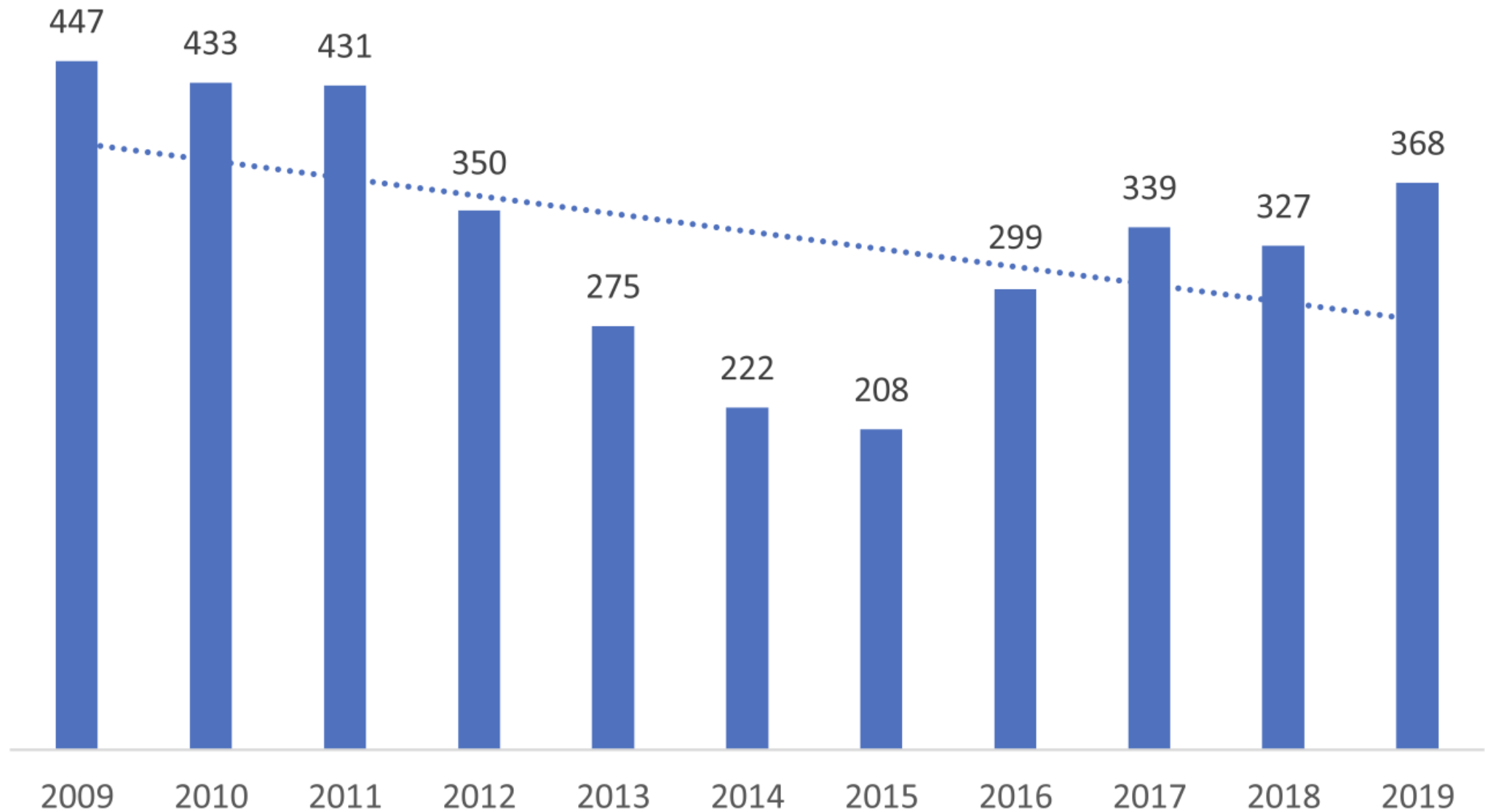
Poisoning **0.21%** of
all under 5 deaths in SA



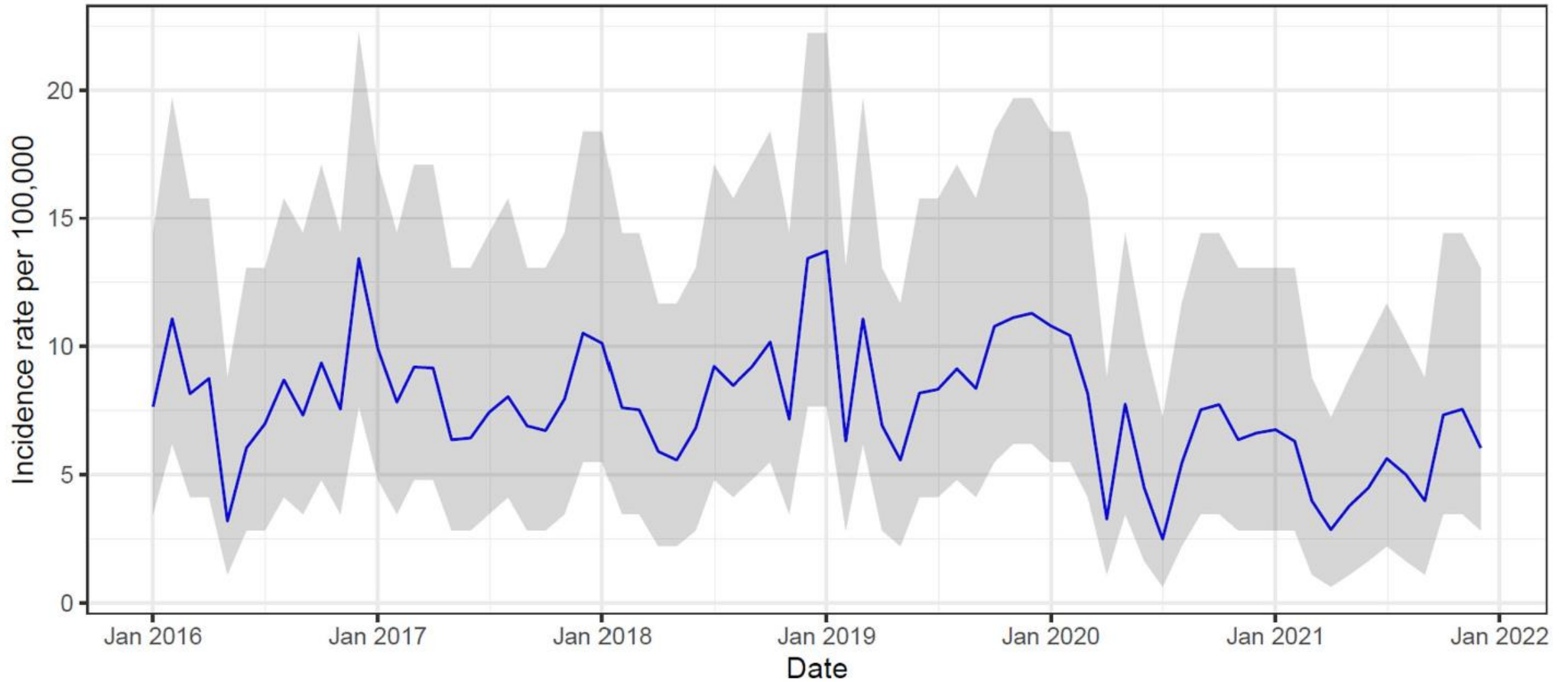
South African children face **twice** the likelihood
of dying from poisoning compared to global average

≥ 70 kids under 5 die d/t poison ingestion every year
at least 6 kids die every month

Paediatric poisoning incidents 2009 – 2017 RCWMCH



Paediatric poisoning admissions 2016 – 2021 CHBAH



What is Toxicology?

Toxicology is a **field of science** that helps us understand the harmful effects that chemicals, substances, or situations, can have on people, animals, and the environment.



↑ +BBB + ↑ CNS effects

smaller airways

RR higher

decompensate
easily

skin thinner

immature liver +
kidney function

higher
minute
volume

hypoglycaemia

↑ surface area

weight







WHAT'S YOUR
STORY

Things to ask - history

- Age - mobility? Crawling? Walking?
- What happened?
- What substance/chemical/medication?
- What dose?
 - How many tablets?
 - How much was taken?
 - Calculate toxic dose (if possible)
- What time?
- Vomited?

ONE PILL KILLS



1 **CALCIUM CHANNEL BLOCKERS**

Cause delayed onset bradycardia, hypotension, conduction defects. They can also block insulin secretion.



2 **TRICYCLIC ANTIDEPRESSANTS**

Block fast sodium channels leading to intraventricular conduction delay and seizures.



3 **CHLOROQUINES**

Cause cardiac arrhythmias (QRS widening) and cinchoism.



4 **OPIATES**

Cause coma and respiratory depression.



5 **SULFONYLUREAS**

Cause hypoglycaemia due to stimulation of insulin production.

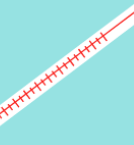
6 **BETA BLOCKERS**

Cause hypoglycemia due to blockage of glycogenolysis.



7 **THEOPHYLLINE**

Cause seizures and SVT.



8 **AMPHETAMINES**

Cause agitation, confusion, hyperthermia, and hypertension.



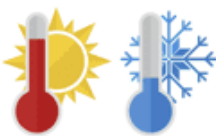
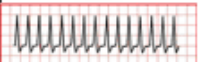
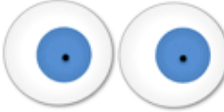
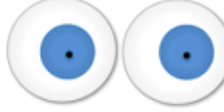
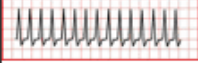
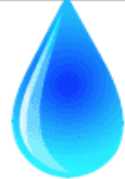


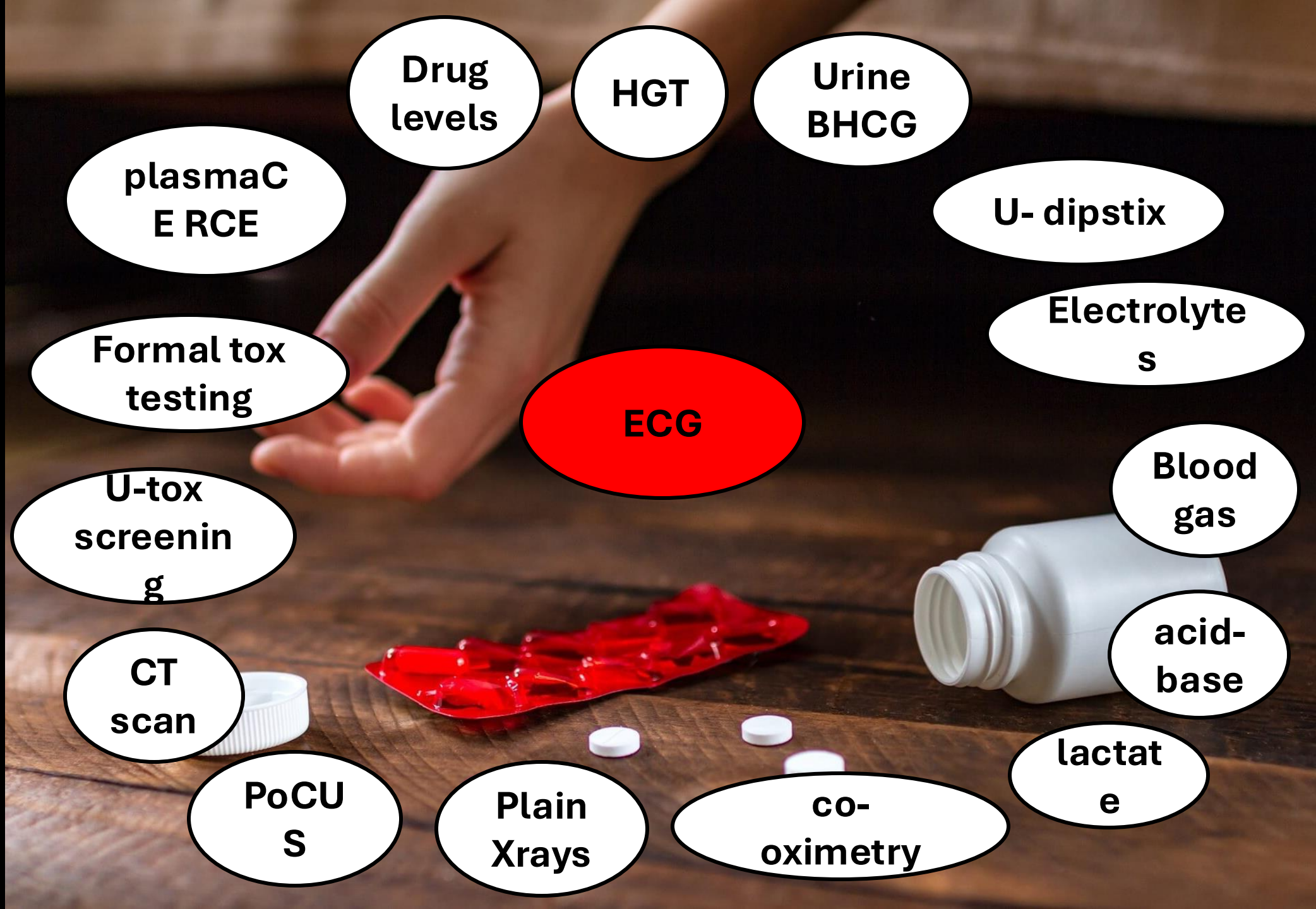
Management

What is a Toxidrome?

Toxic syndrome or **toxidrome**
is a constellation of
signs + symptoms caused by a
toxic substance / chemical

Toxidromes

	HR & BP 	Resp. 	Temperature 	Pupils 	Bowel Sounds 	Diaphoresis 
Anticholinergic Anticholinergics – Atropine, scopolamine, glycopyrrolate, benztropine, trihexyphenidyl Antihistamines – Chlorpheniramine, Cyproheptadine, Doxylamine, Hydroxyzine, Dimenhydrinate, Diphenhydramine, Meclizine, Promethazine	 	No change 		Dilated 		
Cholinergic Organic Phosphorous Compounds: Carbamates • Arecholine, Pilocarpine, Urecholine (Betanecol), Carbachol, Choline, Metacholine, Mushrooms	No change 	No change 	No change 	Pinpoint 		
Opioid Morphine • Codeine • Tramadol • Heroin • Meperidine • Diphenoxylate • Hydromorphone • Fentanyl • Methadone • Propoxyphene • Pentazocine • DXM • Oxycodone • Hydrocodone	 			Pinpoint 		
Sympathomimetic Caffeine, cocaine, amphetamines, methamphetamines, Ritalin, LSD, Theophylline, MDMA	 			Dilated 		
Sedative-Hypnotic anti-anxiety agents, muscle relaxants, antiepileptics and preanesthetic medications – Barbituates – Benzodiazepines	 			No change 		



PSS: Poison Severity Score

Severity Grades

NONE (0):	No symptoms or signs related to poisoning
MINOR (1):	Mild, transient and spontaneously resolving symptoms
MODERATE (2):	Pronounced or prolonged symptoms
SEVERE (3):	Severe or life-threatening symptoms
FATAL (4):	Death

Valid + reliable score to measure the severity of poisoning + toxicity progression in poisoned children presenting to ED

Management

- Supportive care
- Do NOT induce emesis
- Activated charcoal
- Advanced care
- Specific antidote (*if* indicated)
- Manage the toxidrome
- MDAC
- Whole bowel irrigation
- Dialysis / haemoperfusion
- ECMO



Antidotes -

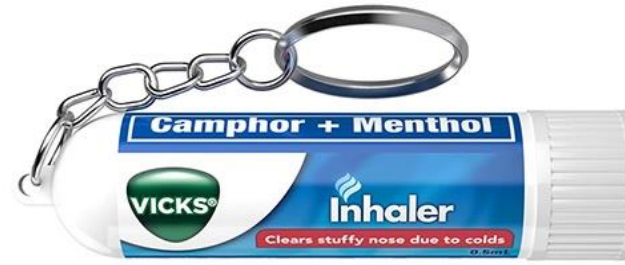
only if indicated!

MEDICATION REVERSAL AGENTS	
MEDICATION	REVERSAL AGENT
Acetaminophen	N-acetylcysteine (mucomyst)
Anticholinesterases	Atropine
Anticholinergic agents	Physostigmine
Anticoagulants	Vitamin K / Protamine
Benzodiazepines	Flumazenil (romazicon)
Beta-Blockers	Glucagon
Calcium channel blockers	Glucagon
Cyclophosphamide	Mesna
Digoxin, digitoxin	Digoxin immune Fab (digibind)
Doxorubicin	Dexrazoxane
Fluorouracil	Leucovorin calcium
Heparin	Protamine sulfate
Iron	Deferoxamine (desferal)
Isoniazid	Pyridoxine
Methotrexate	Leucovorin calcium
Opiates	Naloxone (narcane) Nalmefene (revex)
Tricyclic antidepressants	Sodium bicarbonate, physostigmine
Warfarin	Phytonadione (vitamin K)

Caution with flumazenil
lowers the seizure threshold
do NOT use flumazenil
with polypharmacy ODs
– worse outcomes!

Environmental

- Organophosphates / carbamates
- Hydrocarbons (solvents)
- Camphor / naphthalene
- Detergents – acids / alkalis
- Toxic alcohols
- Carbon monoxide





23
kids
die

food contaminated by “street” pesticides



aldicarb

terbufos

turbifos



HHPs - Highly Hazardous Pesticides

	Acrolein	Calcium arsenate	Dichlobenil	Formetanate	Oxadiazon
	Alachlor	Camptochlor (CLC)	Dichlorprop	Furfural	Oxamyl
			Dichlorvos	Gamma - BHC (Lindane)	Oxyfluorfen
Total = 222 of 2688 (1-8)			Diclofop-methyl	Glufosinate	Paraquat dichloride
1-methylcyclopropene		Captan	Didecylmethylammonium chloride (DDAC)	Glufosinate-ammonium	Parathion-methyl
1,3-dichloropropene		Carbaryl	Dieldrin	Halosulfuron-methyl	Penconazole
		Carbendazim	Difenoconazole	Heptachlor	Pendimethalin
		Carbofuran	Difethialone	Hexachlorobenzene	Permethrin
		Carbosulfan	Dimethoate	Imazalil	Phorate
		Chlorantraniliprole	Dimethomorph	Imidacloprid	Phosphamidon
		Chlordane	Dinoseb	Indoxacarb	Phosphorous containing formulations
		Chlordimeform	Diocetyl and its compounds	Ioxynil	Picoxystrobin
		Chlorfenapyr	Diquat, including diquat dibromide	Ipconazole	Pirimicarb
		Chlorfenvinphos	Diuron	Iprodione	Prochloraz
		Chlorobenzilate	DNOC and salts	Iprovalicarb	Propargite
		Chloroform	Empenthrin	Isoxaflutole	Propham
			Endosulfan	Kepone	Propiconazole
		Chloropicrin	Endrin	Kresoxim-methyl	Propineb
		Chlorothalonil	Epoxiconazole	Lambda-cyhalothrin	Propineb (containing polymeric zinc propylenebis (dithiocarbamate))
		Chlorotoluron	Epoxiconazole & Thiophanate-methyl	Leptophos	Propisochlor
		Chlorpropham	EPTC	Lindane (Gamma-BHC)	Propoxur
			Ethalfuralin	Linuron	Pymetrozine
		Chlorpyrifos	Ethoprophos	Malathion	Pyridazine-3,6-diol
		Chlothianidin	Ethoxysulfuron	Mancozeb	Pyridazine-3,6-diol
		Chorate	Ethylene dibromide	Maneb	Quinalphos
		Chromium trioxide	Ethylene oxide	MCPA (dimethylamine salt)	Quinoxifen
		Coumatetralyl	Fenamidone	MCPA (potassium salt)	Quinoxifen
		Creosote	Fenamiphos	MCPB (sodium salt)	Quixalofop-P-tefuryl
			Fenbuconazole	Meptyldinocap	Simazine
		Cyanamide	Fenbutatin oxide	Mercury and compounds	Simazine
		Cyfluthrin	Fenthion	Metam-potassium	Spirodiclofen
		Beta-cyfluthrin	Fentin hydroxide	Metam-sodium	Sulfuramid
		BHC (mixture of various isomers)	Fenitrothion	Methamidophos	Sulfuramid
		Bifenthrin	Ferbam	Methidathion	Tebuconazole
			Fipronil	Methomyl	Tefluthrin
			Flocoumafen	Methyl bromide	Terbufos
		DDT (except gov for malaria)	Fluazifop-butyl	Methyl bromide	Tetraconazole
		Deltamethrin	Flufenoxuron	Metribuzin	Thiabendazole
		Demeton-S-methyl	Flumioxazin	Mevinphos	Thiacloprid
		Desmedipham	Fluorochloridone	Mineral oil (hydrotreated light paraffinic)	Thiamethoxam
		Diazinon	Fluramone	Monocrotophos	Thiodicarb
		Dibromochloropropane	Flusilazole	N-methyl-2-pyrrolidone (Novaluron)	Thiophanate-methyl
		Dibutyltin and its compounds	Folpet	NAD; 2-(1-naphthyl)acetamide	Thiram
				Nonylphenol and Nonylphenol ethoxylates (NPEs)	Thiram + Thiabendazole+Metalaxyl-M
				Octhilinone	Topramezone
				Omethoate	Triadimenol
				Oryzalin	Triasulfuron



SA total HHP's - 222

Partially banned - 16

Fully Banned - 30

SA HHPs still legally in use - 192

SA HHPs legally in use without any ban - 176

WHO 1a & 1b for ban in SA by June 2024 - 4

SA & EU HHP's Banned - 8



Cholinergic toxidrome



Broncho-rrhoea/-constriction

Bradycardia

Apnoea

Graying / dimming of vision

Pupillary constriction

Urination

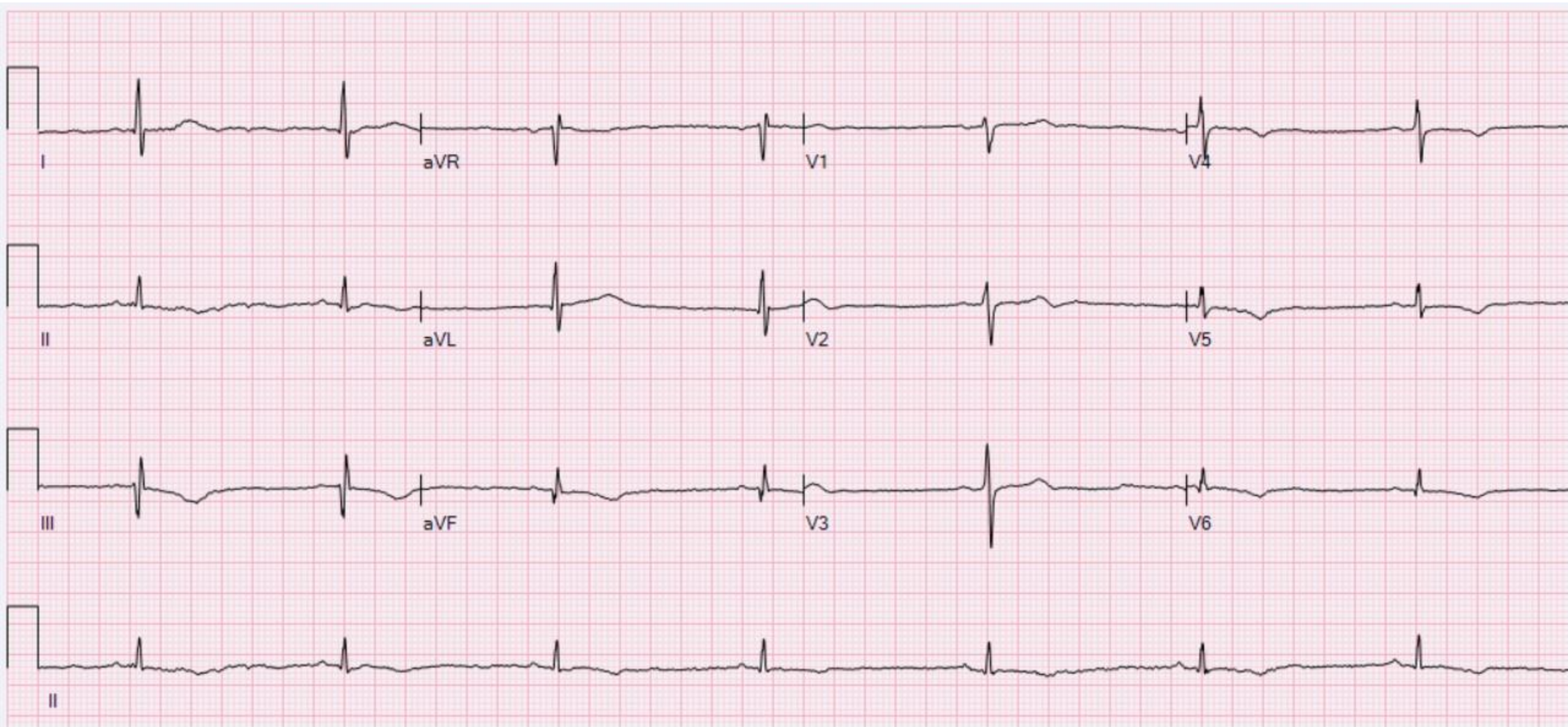
Diaphoresis

Defaecation

Lacrimation

Emesis

Seizures + sweating



NOTIFIABLE MEDICAL CONDITIONS (NMC) CASE DEFINITIONS FLIPCHART

May 2025, category 1: Immediate reporting telephonically followed by written or electronic notification within 24hrs of diagnosing a case

AGRICULTURAL OR STOCK REMEDY POISONING

Disease epidemiology	Who must notify	Clinical case definition (Suspected case)	Probable case definition	Confirmed case definition
A pesticide (e.g. an agricultural or stock remedy) is any chemical substance, or mixture of substances, intended to kill, repel, or control forms of plant or animal life considered to be pests, or to regulate plant growth. Pesticides include herbicides, insecticides, fungicides, rodenticides, repellents. Pesticides are potentially toxic to humans and the environment, and can have both acute and chronic health effects, depending on the quantity and ways in which a person is exposed. Some pesticides can remain in soil and water for years. The toxicity of a pesticide depends on its function, formulation and the route of exposure (i.e. ingestion, inhalation, or direct contact through the skin or eyes). Pesticide poisoning can be classified as occupational, if exposure occurs while at work, or non-occupational, which includes exposure at home as well as all cases involving suicide or self-harming behaviour.	The health care provider making the clinical diagnosis for a suspected, probable or confirmed case. Clinicians should not wait for laboratory confirmation before notifying.	Must satisfy ONE criterion in EACH category listed below: Pesticide exposure - Report of acute pesticide exposure, from a patient or witness Health effects - Health care provider documenting ≥ 2 new post-exposure symptoms Cause-effect relationship The health effects must: - Not be associated with any other likely explanation AND - Occur within a reasonable time period after exposure	Must satisfy ONE criterion in EACH category listed below: Pesticide exposure - If criterion as for a Suspected case, must have Health effects criterion as for Confirmed case OR - If criterion as for a Confirmed case, may have Health effects criterion as for Suspected case Health effects - If criterion as for a Suspected case, must have Pesticide exposure criterion as for Confirmed case OR - If criterion as for a Confirmed case, may have Pesticide exposure criterion as for Suspected case Cause-effect relationship The health effects must: - be characteristic of the pesticide AND	Must satisfy ONE criterion in EACH category listed below: Pesticide exposure - Observation of residue/odour by health care provider OR - Clinical response to treatment or antidote (e.g. atropine) OR clinical description by a health care provider of ≥ 2 post-exposure health effects (at least 1 of which is a sign) characteristic for the pesticide OR - Laboratory test demonstrating physiologic response to pesticide (e.g. prolonged clotting or pseudocholinesterase level below normal laboratory range) Health effects - Health care provider documenting ≥ 2 characteristic signs OR - Health care provider documenting ≥ 3 new post-exposure characteristic symptoms OR

Welcome to AfriTox

Your first stop for **POISONS INFORMATION**. Supported by the Red Cross Children's Hospital.

Not every accidental ingestion of a toxic substance needs emergency treatment in hospital. AfriTox is a uniquely South African poisons information database which gives doctors immediate information about how to manage poisonings.

AfriTox is for everybody



Saving Lives



Social Responsibility



Support



Access

What to do when poisoned?



- Do not give milk or force vomiting
- Rinse mouth with water
- Wash poison off the skin and rinse eyes with water
- **Call 0861 555 777** any time, day or night, every day of the year

Produced by: environmentalhealth@uct.ac.za



Division of Environmental Health
School of Public Health and Family Medicine
Isikolo Samqiso 'Yokuntu kunye Namayacca Osapho
Departement Openbare Gesondheid en Huisartskunde
UNIVERSITY OF CAPE TOWN



CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD



Western Cape
Government
Health

PREVENTION
IS BETTER THAN
CURE!

