

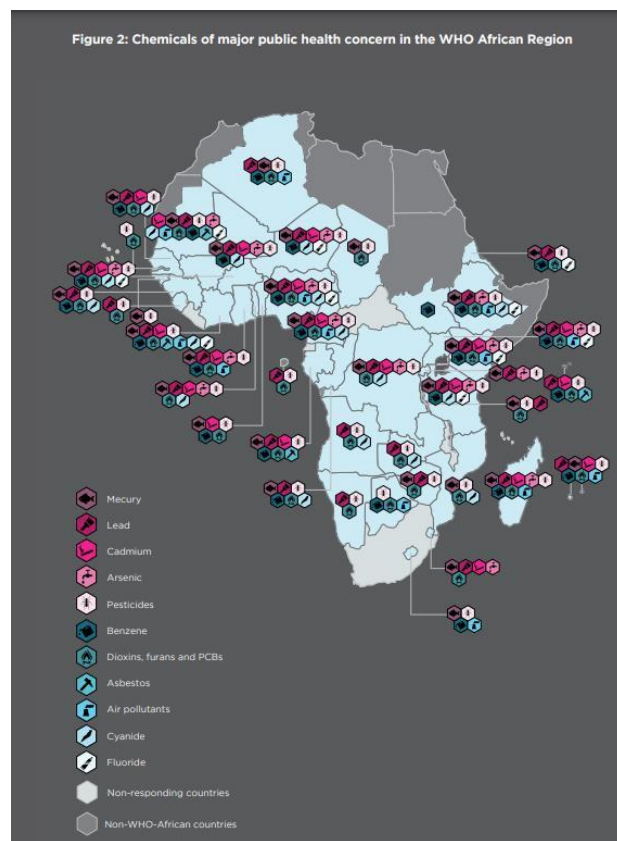


UK Health
Security
Agency

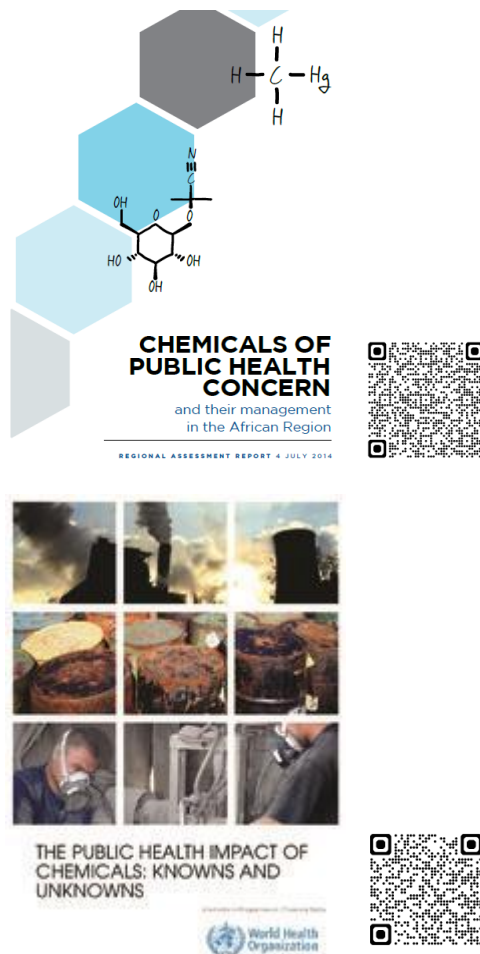
The role of laboratory network intelligence in strengthening preparedness and response for chemical events

Dr Haydn Cole, UK Health Security Agency

Chemical hazards and public health – what is the problem?



Source: World Health Organization. Regional Office for Africa (2015). Chemicals of public health concern in the African Region and their management: Regional Assessment Report. World Health Organization.



Chemicals of concern

Heavy metals – mercury, lead, cadmium, arsenic

Fluoride

Cyanide

Air pollutants

Hazardous pesticides

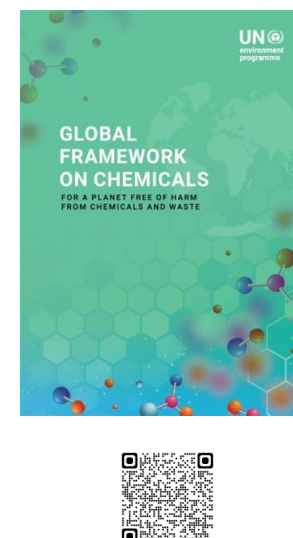
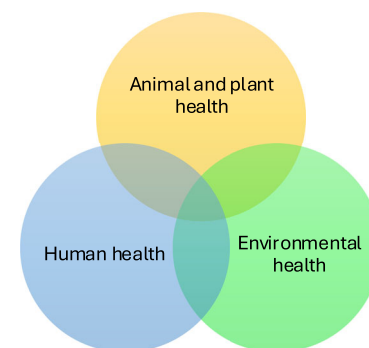
Persistent Organic Pollutants – dioxins & furans, PCBs

Benzene and PAHs

Asbestos

Chemicals and One Health approach

- Chemicals (incl. waste) can affect all domains - humans, animals, environmental and ecosystem health
- OH Joint Plan 2022-2026
 - Action 6.3. Integrate environmental knowledge, data and evidence into OH decision-making
 - 6.3.1 Map interoperability between health, animal disease and environmental databases and information systems
 - 6.3.2 Establish linkages between disease databases and environmental databases to support risk modelling, shared information and informed/ science-based decision and policymaking



Background to project

- The International Health Regulations (IHR) 2005 require that nations can prevent detect and respond to chemical incidents of public health concern
- UKHSA working with regional partners to support IHR capacity
- A review and stakeholder input, incl. feedback from previous ECHO sessions on chemicals hazards, indicated:
 - a need for better understanding of both capacities and gaps to detect and respond to chemical hazards/threats across the continent
 - actions to capitalise on existing capabilities and develop these further where needed



ASLM ECHO webinar sessions June and July 2023 :

- general concepts of chemical hazards and public health
- detection for chemical hazards and public health - surveillance, analysis, and poisoning information.

Africa CDC, UKHSA, ASLM threat and detection mapping pilot assessment

Aim

To enhance understanding of detection (analysis and surveillance) capacity for improved identification and response to chemical hazards/threats of public health concern, thus reducing health impacts across the continent.

• Outputs

- Chemical analysis capacities mapped on GIS.
- Report summarising chemical threats and laboratory capacities, highlighting areas of need and actions for building capacity.

• Outcomes

- Understanding of chemical threats within the continent is enhanced.
- Understanding of analysis and detection capacity is enhanced.
- Understanding of chemical analysis and detection needs is enhanced
- Sharing of information to improve detection and response efficiency and effectiveness within the continent is enhanced.

Objectives of the pilot assessment

Assess laboratory capacity:

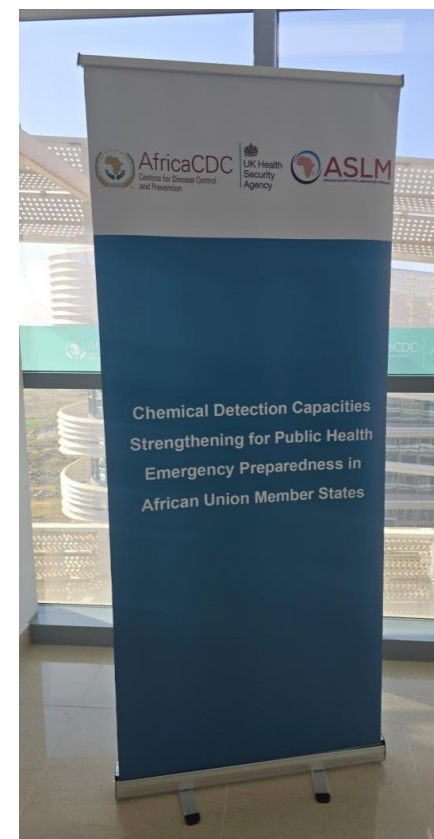
- Identify the capability of laboratories within Africa to detect chemical hazards and chemical events and identify gaps

Enhancing preparedness for chemical events:

- Identify capacity gaps for effective management of potential and actual chemical incidents of public health concern

Building sustainable laboratory networks:

- Establish long-term, sustainable networks to manage chemical risks and improve surveillance capabilities



Survey content overview

Threat Analysis/Chemical Risk Assessment Survey

- **Chemical Risk**
 - Sectors of concern
 - Chemical Sources
- **Chemical Management**
 - Number of chemicals dealing with
 - Regulations/protocols
 - Vulnerability Risk Assessment and Mapping (VRAM)
 - Specific incidents
 - Operational service for poisoning
 - Countermeasures

Survey content overview

Chemical Detection Mapping Survey

- **Laboratory Profile**
 - Location, Long/Lat
 - Contacts
 - Accreditation
 - Lab type and clients
 - Governance
- **Laboratory Infrastructure**
 - Supply chain
 - Capacity and operating level
 - Electronic systems (incl. Inventory)
 - Transport and storage
 - Information and communication systems
 - Workforce and training
- **Laboratory Equipment**
 - Sample prep
 - Equipment lists
 - Matrices
 - Maintenance and finance
- **Laboratory Analysis**
 - Chemicals lists
 - Matrices
 - Detection limits
- **Laboratory Health, Safety, Security**
 - Legislation, policy and guidance
 - Risk assessments
 - Security
- **Laboratory Networks**
 - Membership
 - Information sharing
 - Inventory sharing
 - Involvement in surveillance
 - Involvement in incident response
- **Laboratory Chemical Waste Management**
 - Risk assessment
 - Systems, policies and guidance

A One Health approach to system strengthening

Pilot countries were tasked to identify a minimum of three key national laboratories with chemical analysis capability representing different sectors, with a suggested prioritisation of public health, animal health and environmental laboratories (to reflect a One Health approach).

An annex was provided with examples of public sector organisations where chemical analysis capacity may be found.



Appendix 1 Example organisations involved in chemicals management.

Organisation	Potential role	Potential analysis
Ministry of Health	Primary care, public health, ambulance service and medical facilities, laboratories, toxicology.	Laboratory, mobile, biological (human), toxicology, food / consumer products
Public Health Institute	Public health preparedness, response and recovery, emergency management, regulation, research, surveillance.	Laboratory, mobile, biological (human), toxicology, environmental, food / consumer products
Environmental Health	Solid waste management, food hygiene and safety, health & safety inspections, public education, regulation, pollution control.	Laboratory, mobile, biological (human), environmental,
Ministry of Environment	Environmental management and regulation, pollution control, industrial regulation, environmental protection, surveillance.	Laboratory, mobile, environmental
Food and Drug Authority	Food safety, pharmaceutical safety, consumer product safety, surveillance.	Laboratory, mobile, biological (animal, human), toxicology, environmental, food / consumer products
Water Authority	Water quality, water supply, water regulation, water management, surveillance.	Laboratory, mobile, environmental
Animal Health	Disease in animals and animal health, preparedness, response, surveillance, research	Laboratory, mobile, biological (animal), toxicology, environmental, food / consumer products
Ministry of Agriculture	Agricultural regulation, pesticides and fertiliser management, environmental control measures, food security, animal health.	Laboratory, mobile, biological (animal), toxicology, environmental, food / consumer products
Ministry of Industry / Investment	Industrial regulation, trade and investment regulation, product regulation, maritime, science and innovation.	Laboratory, mobile, environmental, food / consumer products
Ministry of Mines	Exploration and extraction of mineral resources, trade, investment,	Laboratory, mobile, environmental, food / consumer products



Why is the spatial element important?

The collection of location data was a key element of the pilot.

ASLM integrated this mandatory question and location function into the electronic survey to support participating laboratories provide this.

The scope of the pilot meant that most pilot labs were in capital cities, therefore the full value of collection and interpretation of spatial information will be more fully realised following further assessment



So, why is the spatial element important?

Efficient testing through knowledge of nearby suitable labs – in the event of incidents and for risk awareness

Reduces transport time and sample storage challenges – improving quality and response.

Improved national and regional networking opportunities.

Improved utilisation of both national and regional response capabilities.

Supports strategic decisions on where future investment or capability development may be required.

Facilitates mutual aid and regional support.

Improves understanding of dependencies on transport networks, couriers, infrastructure, and referral pathways.

Combining hazard profiles with laboratory location data can identify areas where analytical services may not align with chemical risks, such as industrial clusters, ports, chemical manufacturing sites, or major transport hubs.

Where lab capacity is geographically clustered countries and regions are more vulnerable to local disruptions such as power outage, infrastructure failures and extreme weather events.

Supports informed decisions on sample prioritisation, transport arrangements, and resource deployment.

Current status

- Pilot study complete
- Establishment of Africa CDC Continental Chemical Detection Steering Committee
- Integration of chemical analysis capacities into LabMap version 3 (via Africa CDC / ASLM review workshop in Ghana) for sustainability.
- Action planning from pilot findings:
 - additional countries to complete updated questionnaire
 - develop training and guidance
 - support laboratory accreditation and networking initiatives



Any questions?

