



# Public health surveillance of chemical health threats: a literature scoping review

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## INTRODUCTION

The risks to health from unintentional chemical exposures is evident from unplanned incidents and resultant health impacts on mortality and morbidity. Surveillance of such incidents, exposures and health outcomes provides evidence for action and several countries have developed systems or provide best practice examples.

The aim of this study was to review the global tools, systems, and strategies currently available for the public health surveillance of chemical health threats, including incidents, exposures and health impacts. This study also aimed to highlight best practices and existing gaps in chemical public health surveillance.

## METHODS

A rapid review literature search was conducted to find articles and reports on public health surveillance of chemical incidents and/or exposures, and best practice examples of public health preparedness of chemical incidents and exposures. Three literature databases (Medline, Web of Science and Embase) were searched for articles published between 2000-2022 in English.

	Topic	Key words for search queries
1	Public health surveillance	Surveillance, detection, indicator-based, event-based, toxicsurveillance/toxicovigilance, syndromic, multi-hazard, international, European, capacity, 'environmental public health', chemical, tracking
	OR (inclusive)	
2	Public health preparedness	Poisons centres, environmental public health tracking, emerging public health threats, networks, planning, data review, 'watching brief', database, horizon scanning, Emergency Preparedness Resilience and Response (EPRR)
	AND	
3	Chemical incident	Chemical, chemical incident, chemical event, chemical release, chemical spill, chemical accident, industrial accident, chemical health threat, environmental, injury, death
	OR (inclusive)	
4	Chemical exposure	Chemical exposure, chemical injury, chemical-related illness, environmental, metals, heavy metals, gases, air water, land, contamination, environmental monitoring

Figure 1. Table of search terms used

## RESULTS

4,066 papers were identified by the search keywords and screened for relevance. Of the 505 accepted for full-text screening, 116 were included in the final review.

Five key themes were distinguished from the literature:

1. Industrial and occupational surveillance
2. Acute surveillance
3. Maternal and paediatric surveillance
4. Air and water pollution surveillance
5. System approaches.

Many of the studies were from the Americas, followed by Europe with minimal publications from or about chemical surveillance in Africa (2%), South America (0%) and Oceania (0%), highlighting the global inequalities in this field.

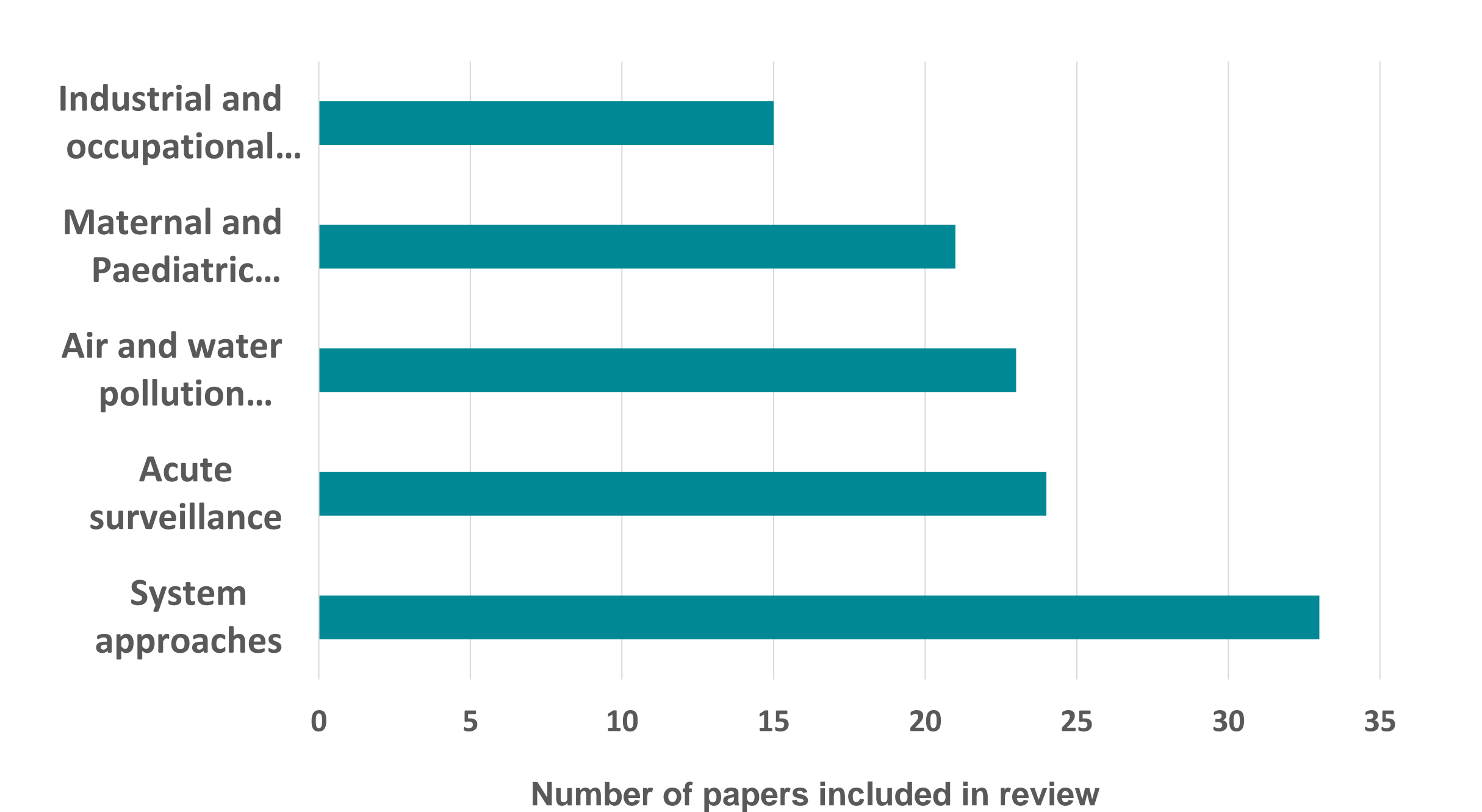


Figure 3. Proportion of literature included in review by theme

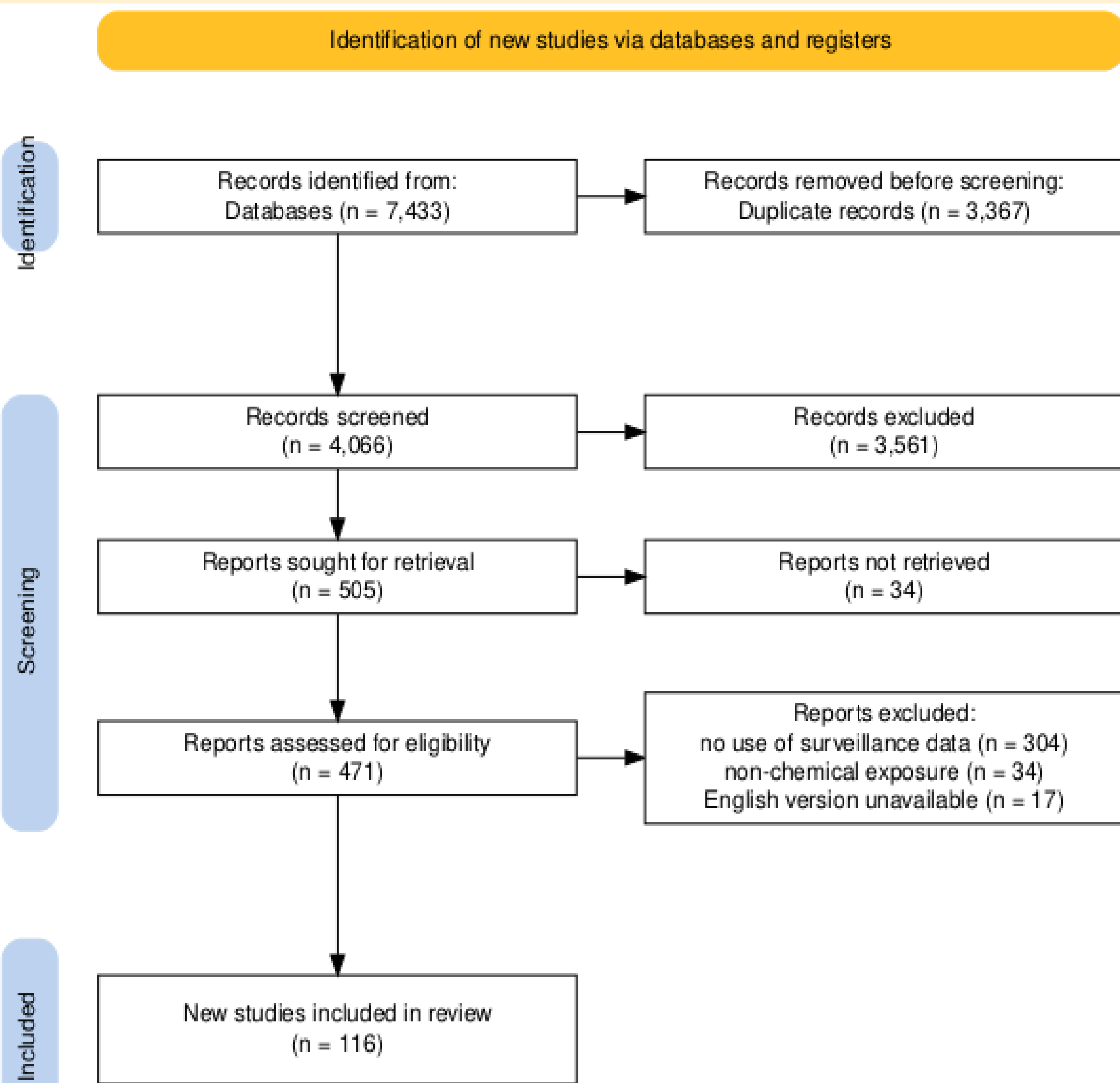


Figure 2. Flow chart of literature screening

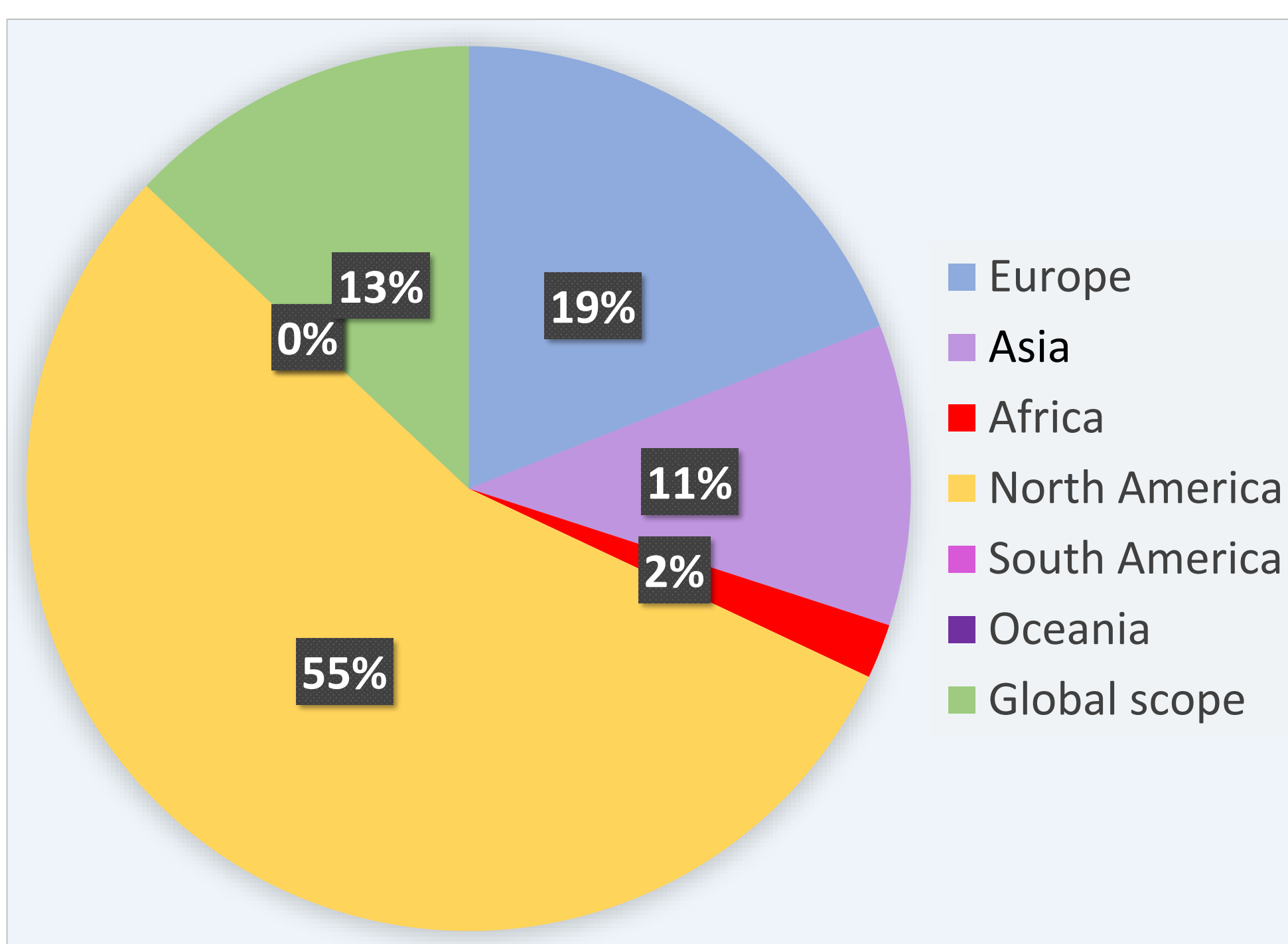


Figure 4. Proportion of studies reviewed by continent\*

\*0% of studies found were on/from South America or Oceania

## DISCUSSION

- The risk to health of unintentional chemical exposures and chemical incidents underscores the need for ongoing vigilance and coordinated efforts to protect public health and safety.
- It is recommended for future studies to publish examples of best practice for chemical health threats surveillance to share methods. Studies that formally evaluate chemical surveillance systems for public health to be conducted. Evaluation against a comparison of surveillance standards set could also be integral for future work. This work is being prepared for publication

## ACKNOWLEDGEMENTS

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