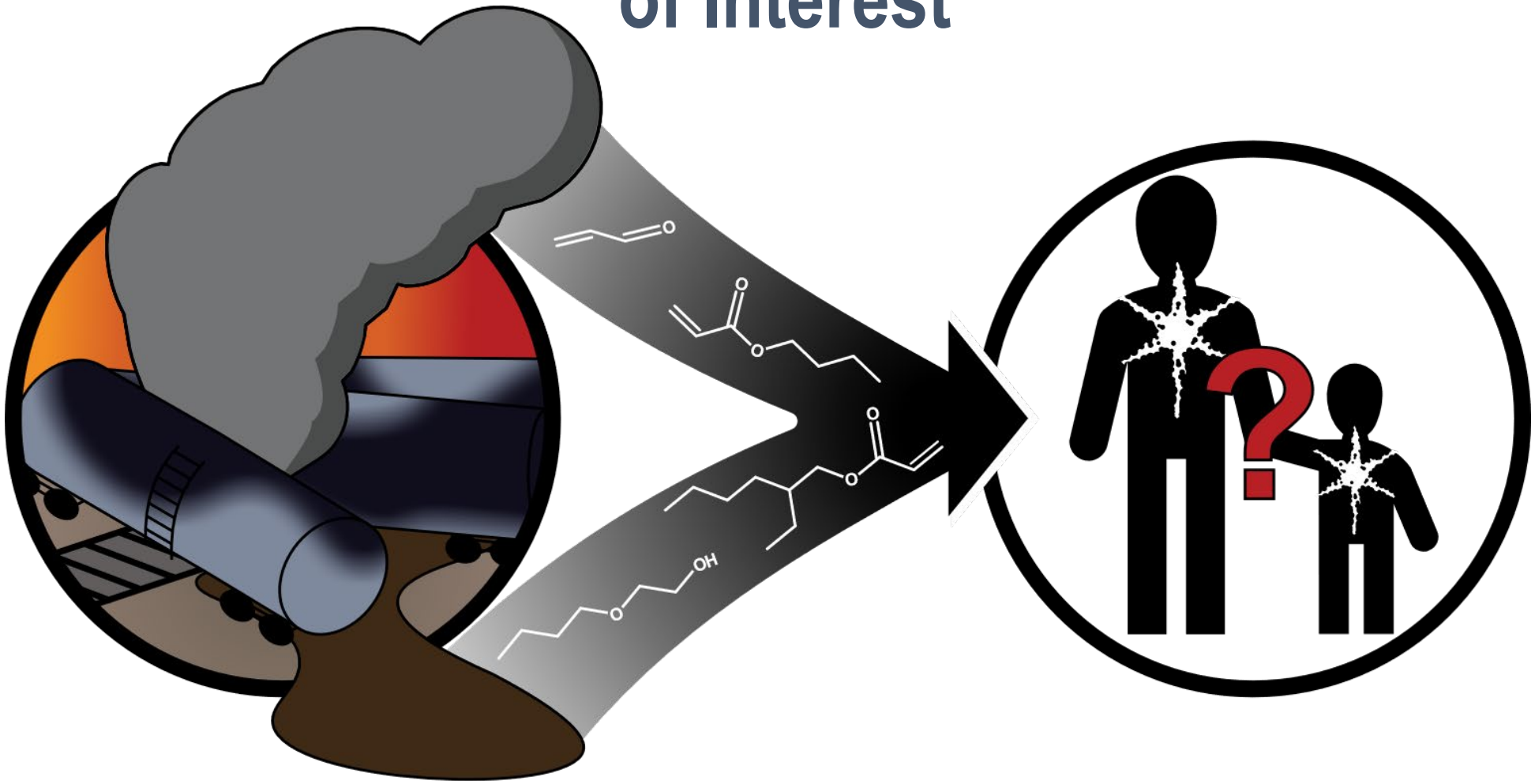
National Institute of Environmental Health Sciences
Your Environment. Your Health.

Rapid Scoping Review of East Palestine Chemicals of Interest



Contributors and Disclosures

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    - ICF: Rebecca Gray, Rachel McGill, Ashley Peppriell, Wren Tracy, and Maricruz Zarco
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I am presenting as part of the team, and opinions stated are mine and do not represent those of the NIEHS or NC State University

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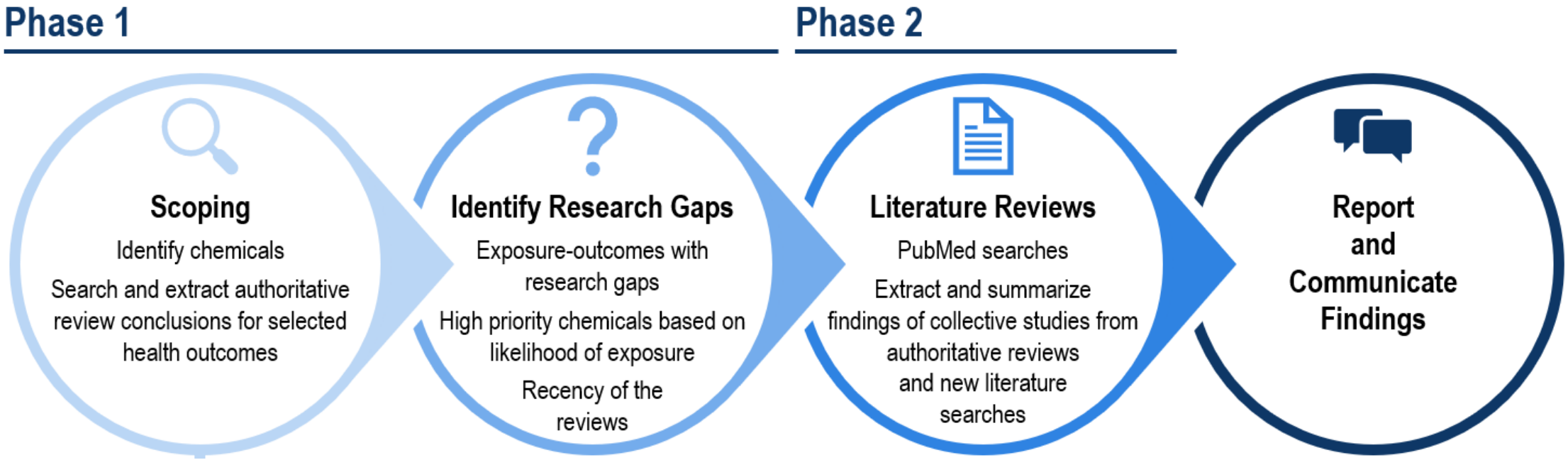
GOAL: To inform research on health effects and communication to affected communities, we conducted a phased scoping review of health hazard data for the East Palestine chemicals of interest.

AIMS:

- Identify and characterize known health effects for East Palestine chemicals of interest
- Identify and describe data gaps to inform future health assessments and research



Phase 1

Scoping

Identify chemicals

Search and extract authoritative review conclusions for selected health outcomes

Identify Chemicals

Highest Priority
Acrolein
Butyl Acrylate
2-Butoxyethanol (EGBE)
2-Ethylhexyl Acrylate

High Priority
Benzene
Hydrogen Chloride
Phosgene Gas
Vinyl Chloride

Moderate Priority
Diethylene Glycol
Dipropylene Glycol
Polypropylene Glycol
1,2 Propylene Glycol

Low Priority
Petroleum Lube Oil
Polyethylene
Polyvinyl Alcohol

Search Authoritative Sources

California EPA, OEHHA
Risk estimates and reports

CDC, ATSDR
Toxicological Profiles

ECHA
Risk Assessment Reports
Toxicological Summaries

US EPA
IRIS Assessments
CompTox Dashboard

Health Canada
Priority Substances List Assessment Reports

IARC
Monographs

NIOSH
Chemical Pocket Guides

National Toxicology Program
Website and reports

Extract Health Information

Health Hazard Conclusion

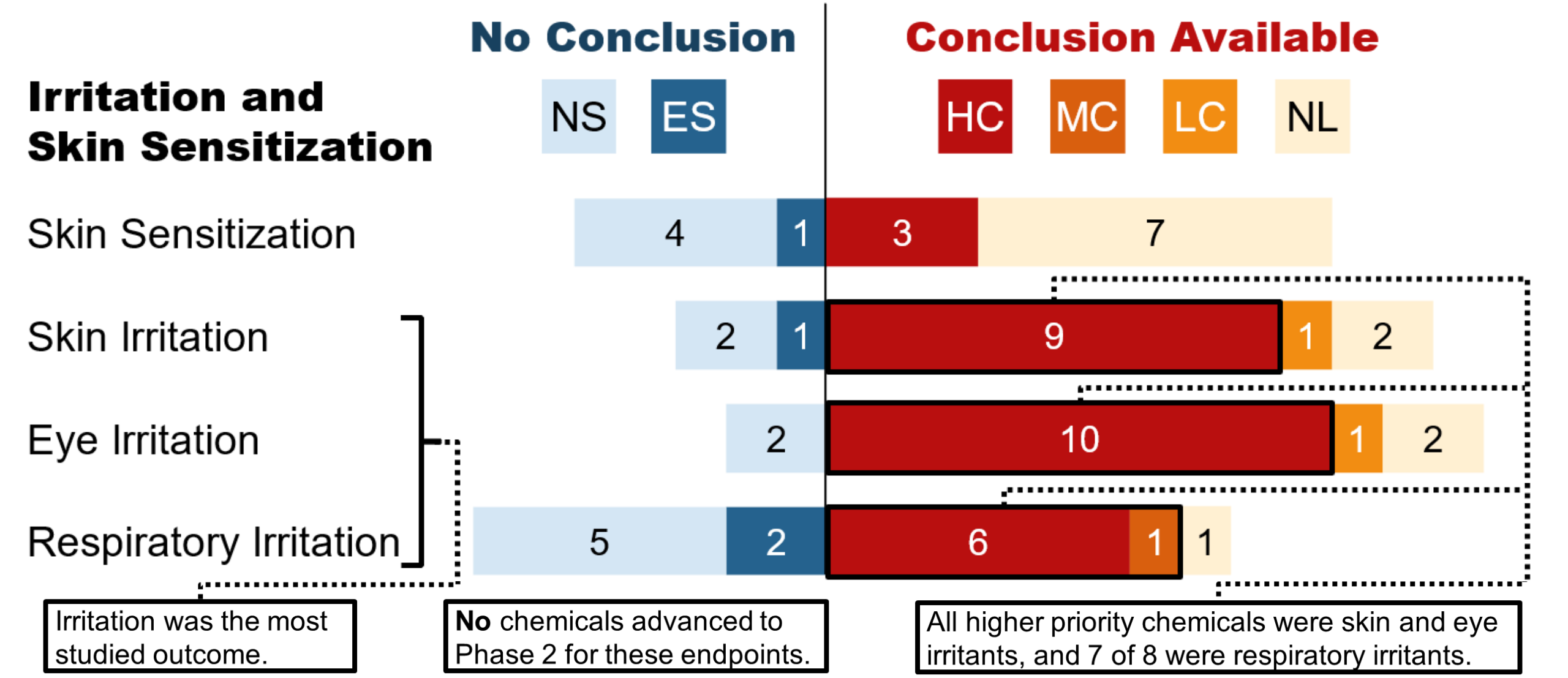
Risk Estimates across Endpoints

Cancer

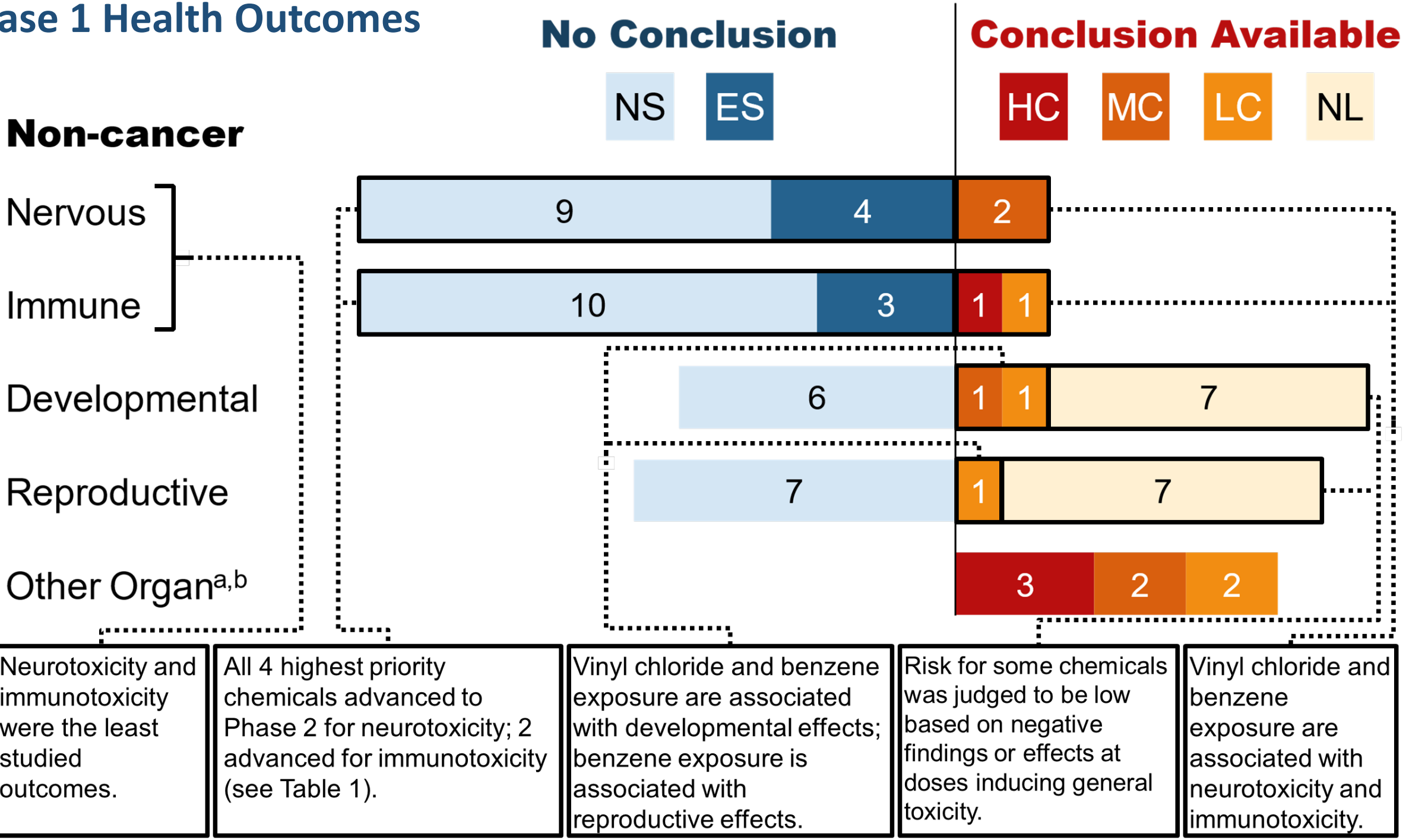
Noncancer
Developmental
Immune
Nervous
Reproductive
Other Organs

Irritants/Sensitizers
Eye Irritation
Respiratory Irritation
Skin Irritation
Skin Sensitization

No Conclusion		Conclusion Available					
NS	ES	NL	IE	LA	LC	MC	HC
No or Few Studies	Evidence Suggestive	Not Likely Risk	Inadequate Evidence	Limited Animal Evidence	Lower Confidence or Severity	Moderate Confidence or Severity	Higher Confidence or Severity



Phase 1 Health Outcomes

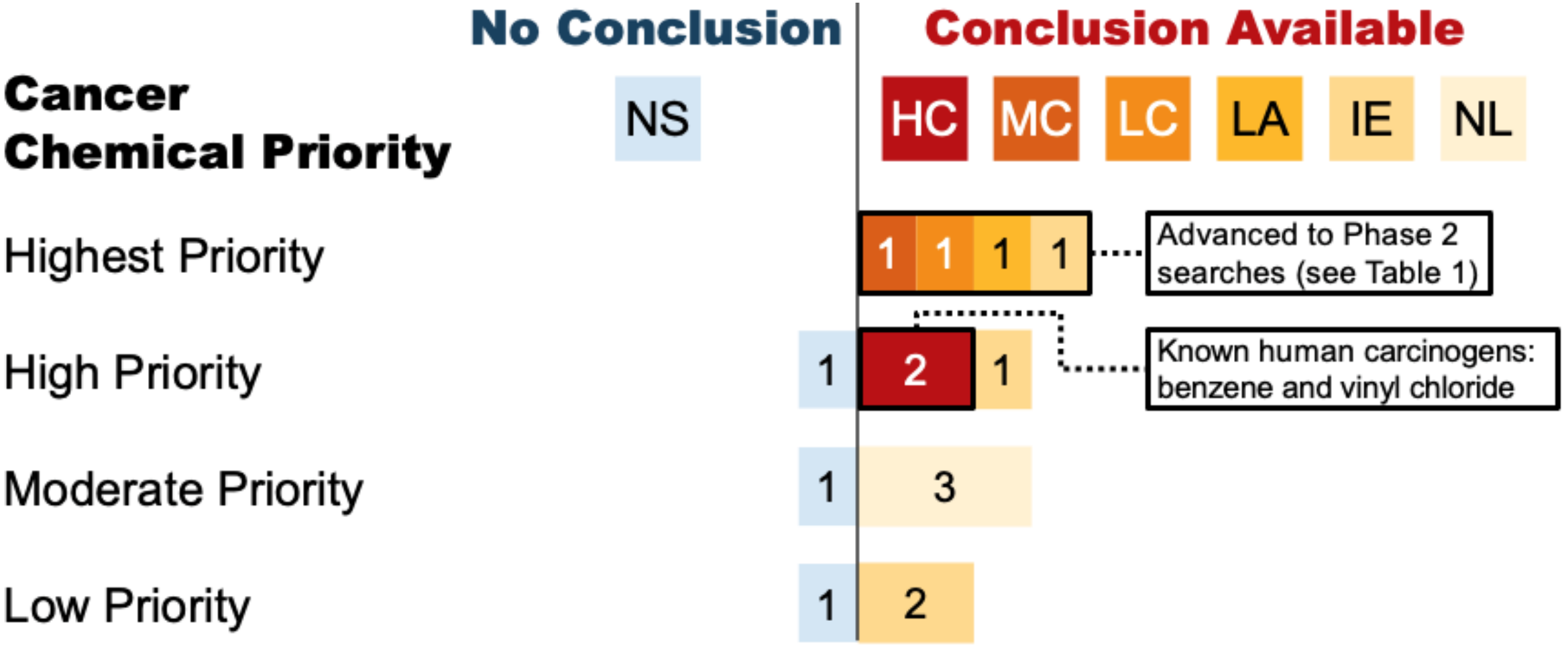


Phase 2 Literature Searches: 7 Chemical x Non-Cancer Outcome Pairs

Chemical-Outcome Category	Phase 1 Authoritative Source Conclusions	Search Results[a]	References Included in Summary[b]	Evidence Gap Summary
Acrolein-Nervous	No conclusions: Suggestive evidence	8/226	8 reviews	**A systematic review** may be warranted of human, animal, and mechanistic studies of exogenous acrolein exposures. In reviews, acrolein was associated with effects including stroke, Alzheimer's disease, and Parkinson's disease.
2-butoxyethanol-Immune	No conclusions: Suggestive evidence	10/151	1 human	**Additional studies** focusing on functional immunotoxicity are needed. Some animal studies reported effects to immune response (e.g., mixed lymphocyte, lymphoproliferative, and autoimmune responses).
2-butoxyethanol-Nervous	No conclusions: Suggestive evidence	1/112	1 animal	**Additional studies** designed to assess neurological effects are needed. Animal studies (n = 3) reported coordination and equilibrium impacts. Comas, reflex disruption, and impeded verbal function observed in case reports in humans.
Butyl acrylate-Hepatic	No conclusion: Suggestive evidence	0/19	0	**Research gap remains**
Butyl acrylate-Immune	No conclusions: Few studies Skin sensitization: Category 1	5/92	0	**Research gap remains** for immune endpoints other than skin sensitization. The 5 identified studies reported on skin sensitization only (considered as a separate category).
Butyl acrylate-Nervous	No conclusions: Few studies	0/97	0	**Research gap remains**
2-ethylhexyl acrylate-Nervous	No conclusions: Few studies	0/9	0	**Research gap remains**

[a]Relevant/total number of studies
[b]Includes Phase 1 authoritative reviews and studies identified in the Phase 2 literature searches.

Phase 1 Cancer Outcomes



HC = known human carcinogen; MC = probably carcinogenic to humans; LC = possibly carcinogenic to humans; LA = limited animal evidence; IE = inadequate evidence; NL = not likely a risk.

Phase 2 Literature Searches: Four Chemical x Cancer Pairs

Chemical-Outcome Category	Phase 1 Authoritative Source Conclusions	Search Results[a]	References Included in Summary[b]	Evidence Gap Summary
Acrolein-Cancer	Probably carcinogenic to humans (Group 2A): Inadequate human evidence	0/183	0	**Research gap remains** for human cancer studies.
2-ethylhexyl acrylate-Cancer	Possibly carcinogenic to humans (Group 2B): Inadequate human evidence	0/6	0	**Research gap remains** for human cancer studies.
2-butoxyethanol-Cancer	Not classifiable (Group 3): Limited evidence in experimental animals	1/35	1 human	**Research gap remains** for primary cancer studies in animals and humans. Identified nested case-control study reported a positive exposure-response for exposure and CNS cancer in two out of three workplace sites.
Butyl acrylate-Cancer	Not classifiable (Group 3): Inadequate human, animal evidence	1/65	0	**Research gap remains**. The relevant study identified from our search was summarized in the 1999 IARC Monograph and was not summarized.

[a]Relevant/total number of studies

[b]Includes Phase 1 authoritative reviews and studies identified in the Phase 2 literature searches.

Phase 1 and 2 PFAS Results

Chemical	Phase 1 Authoritative Source Results: Conclusions	Phase 1 Authoritative Source Results: No Conclusions	EPA Search Results | Phase 2 Search Results[a]	Evidence Gap Summary
6:2 FTSHA	*Higher confidence*: Irritation (eye) *Moderate confidence*: Presumed developmental, presumed reproductive *Lower confidence*: Skin sensitization *Not likely a risk*: Irritation (skin)	*No or few studies*: Cancer, nervous, immune, irritation (respiratory)	0 | NA	**Research gaps remain**
6:2 FTSAS	None	*No or few studies*: Cancer, nervous, immune, developmental, reproductive, skin sensitization irritation (eye, skin, and respiratory)	0 | NA	**Research gaps remain**
6:2 FTSA	*Higher confidence*: Irritation (eye, skin) *Not likely a risk*: Developmental, reproductive, skin sensitization	*No or few studies*: Cancer, nervous, immune, irritation (respiratory)	7 | 45[b]	**Research gaps remain**
6:2 FTSA-PrB	*Not likely a risk*: Skin sensitization, irritation (skin)	*Evidence suggestive*: Irritation (eye) *No or few studies*: Cancer, nervous, immune, developmental, reproductive, irritation (respiratory)	0 | NA	**Research gaps remain**
6:2 FTNO	*Not likely a risk*: Nervous, developmental, reproductive, hematological, skin sensitization, irritation (eye, skin)	*Evidence suggestive*: Cardiovascular *No or few studies*: Cancer, immune, irritation (respiratory)	NA | 0	**Research gaps remain**

[a]Results from either recent EPA literature searches or, if no results, Phase 2 searches.
[b]7 relevant studies reported in a systematic review. Phase 2 searches identified publications post-dating EPA's most recent search.

Advanced to Phase 2 searches

Review Limitations

Phase 1

- Heterogeneity in the reporting of the authoritative reviews
  - Lack of harmonized language
  - Conclusions are not always clear and consistent across sources
  - Hazard vs. risk – we focused on hazard
- May not include unpublished data

Phase 2 summaries

- We did not conduct a systematic review that considers biases and the informativeness of the studies

Conclusion

Our report identified known and needed health outcomes and related activities for 20 chemicals released from the East Palestine train derailment, which can help inform disaster research and communicate uncertainties to affected communities

https://www.niehs.nih.gov/research/atniehs/dtt/strategic-plan/responsive/emerging/index.cfm