



KNOWLEDGE MANAGEMENT AND INFORMATION SHARING FOR THE SOUND MANAGEMENT OF INDUSTRIAL CHEMICALS

Gregory G. Bond, PhD, MPH, FACE

On behalf of the United Nations Environment Programme and the International
Council of Chemical Associations

[Third Meeting of the SAICM Intersessional Process](#)

Bangkok, Thailand

September 30, 2019



Project Objectives and Approach



Knowledge Sharing through SAICM

- SAICM Overarching Policy Strategy Objective B is on **knowledge and information** which has been a critical component of the SAICM 2020 goal.
- The overarching Policy Strategy states the objectives of the Strategic Approach with regard to knowledge and information are:
 - » To ensure that knowledge and information on chemicals and chemicals management are sufficient to enable chemicals to be adequately assessed and managed safely throughout their life cycle;
- The draft outline of the report was provided to SAICM stakeholders in May-June 2018 for comment and input. Stakeholders were also consulted on the first full draft of the report between 4 December 2018 to 7 February 2019.
- The draft report was presented to the third meeting of the OEWG as an information document. All stakeholders were invited to provide any final comments to the report by 15 April 2019.
- The Independent Evaluation of Strategic Approach states that SAICM stakeholders considered that the Strategic Approach has had the most success in delivering on the Knowledge and Information sharing objective.
- While stakeholders recognized the progress made in disseminating information at the national level, within some countries information and knowledge flows between national and local levels remain weak.



Project Objectives:

- Inventory and review publicly available EHS information sources on industrial chemicals at national, regional and global levels;
- Review the scope, applicability and accessibility of the EHS information provided by each source;
- Establish criteria for quality and review each source of information according to those criteria (e.g., scope of chemicals addressed; ease of access and use; breadth and depth and quality of the information, etc.); and
- Compare, to the extent possible, the availability of information at the launch of SAICM in 2006 with information available today to demonstrate the progress made since SAICM began; and
- Improve the understanding of the number of chemicals in commerce.



Definitions of Key Terms:

- **Publicly available** – accessible from the internet without financial charge.
- **EHS information** – include all data and knowledge (i.e., hazard, use/exposure, and risk) which are available to identify and assess chemical hazards and risks and to make risk management decisions.
- **Industrial chemicals**¹ -- chemicals produced and used in a wide range of applications, with a few exceptions (e.g., pesticides, pharmaceuticals, etc. see chapter 5 of full report).
- **“Chemicals in commerce”**² -- based on language taken from EU REACH and the US Toxic Substances Control Act (TSCA) -- Any organic or inorganic substance of a particular molecular identity, including any combination of these substances occurring in whole or in part as a result of a chemical reaction or occurring in nature, and any element or uncombined radical that has been manufactured or processed above 1 metric tonne per annum, anywhere in the world, during the past ten years.

¹many sources inventoried also included EHS information on pesticides and other chemicals considered to be “non-industrial”.

²this definition was employed principally to estimate the numbers of chemicals in commerce, and many sources inventoried also included EHS information on many “legacy” chemicals (e.g., no longer in commerce, environmental contaminants, etc.)



Search for Relevant EHS Information Sources

Step 1: search of the internet using specific terms: information on chemicals; toxicity information on chemicals, environmental information on chemicals; chemical risk information; and sources of information on chemicals;

Step 2: results of the search described in Step 1 identified several secondary sources (e.g., portals that provide links to multiple, third party owned and managed databases) which referenced additional potential primary information sources that were then individually investigated to determine if they should be included for analysis; and

Step 3: SAICM stakeholders were solicited by e-mail asking them to suggest any additional possible EHS information sources not previously identified in Steps 1 and 2 above.



Initial Results and Assessment



Initial Results

- More than 100 potential EHS information sources were identified.
- However, not all were included for analysis:
 - » some listed only chemical identity and no relevant EHS information;
 - » other sources provided information only on chemical substances that were considered out of scope for the study; and
 - » yet other sources provided information that was considered redundant with sources already included for analysis and were therefore excluded.
- Focused on the 41 largest and most comprehensive EHS databases and profiled each of them.



Quality Assessment (Narrative only)

- » **Scope of Chemicals Addressed**
- » **Ease of Access and Use of Chemical Information**
- » **Breadth and Depth of EHS Information Available**
- » **Quality of the Underlying EHS Information**
- » **Procedures for Updating the Database with New Information**



Review of Information Portals



3 Different Categories of Information Sources

- **Information portals** that provide users the ability to simultaneously search multiple, third-party owned and managed EHS databases;
- **Single, primary sources** which provide **access to EHS information** on chemical substances; and
- **Single, primary sources** which provide access to **EHS-type regulatory decisions** made about chemical substances, but which do not provide any direct EHS information *per se*.

Separate tables were prepared to summarize the narrative descriptions of each of the three categories of databases.



Information Portals

- OECD's [eChemPortal](#)
- IPCS [INCHEM](#)
- California DTSC's [Chemical Information Tool](#)
- California DTSC's [Toxics Information Clearinghouse](#)
- ICCA's [GPS Chemical Portal](#)
- [ASEAN-Japan Chemical Safety Database](#)
- U.S. National Library of Medicine's [TOXNET](#)



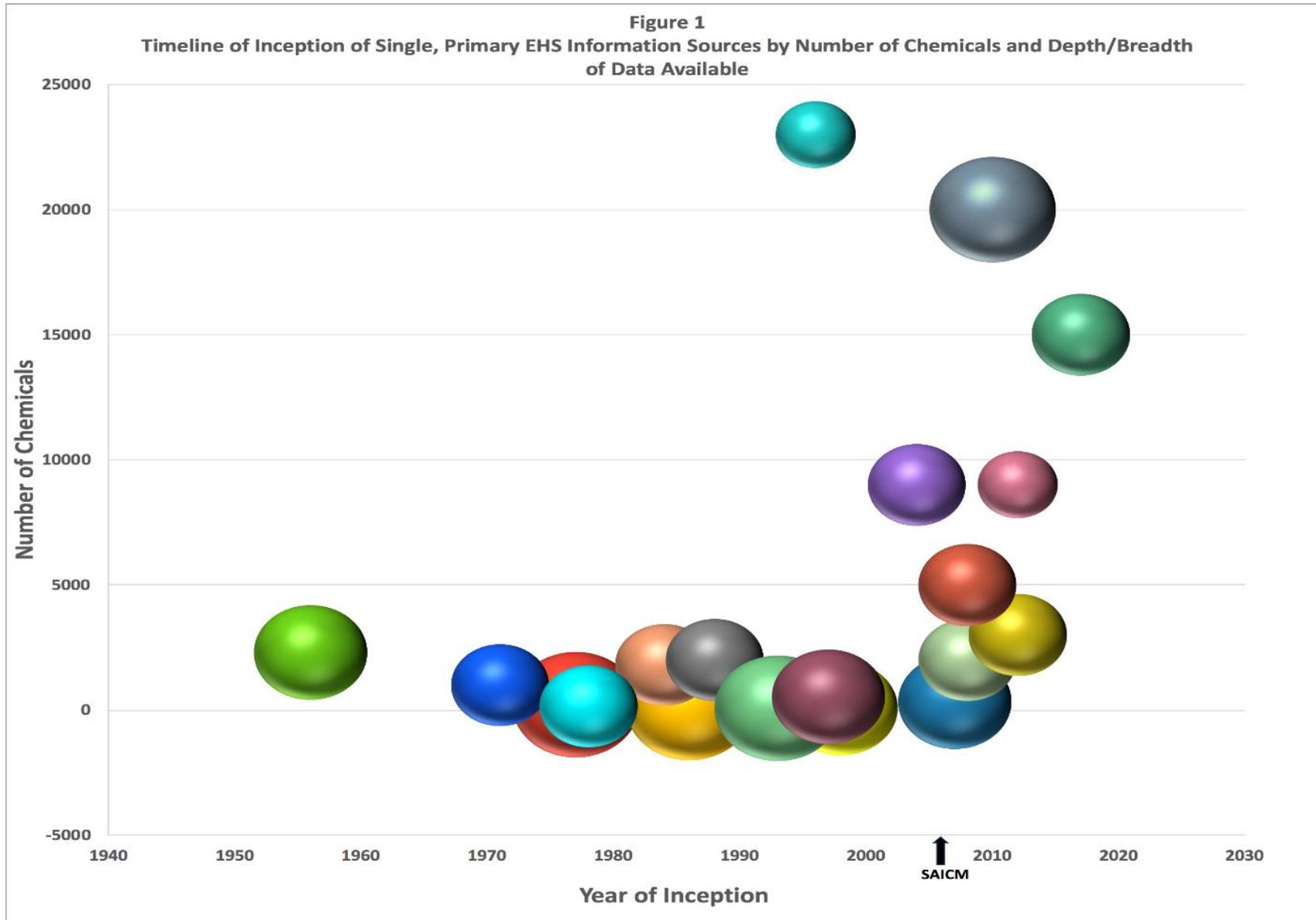
OECD's eChemPortal

- 34 primary data sources participating and more being added
 - » Geographic coverage (North America, Europe, Japan, Australia)
 - » Thirty-four data sources participate under Chemical Substance Search.
 - » Four data sources participate under Chemical Property Data Search.
 - » Two data sources participate under the GHS Search, eleven data sources have GHS classifications information.
 - » 683,840 substance records and 1,136,073 endpoint records available.
- Direct links to collections of chemical hazard and risk information prepared for government chemical programmes at national, regional and international levels are obtained.
- Detailed guidance and a video tutorial are available to assist with conducting searches.



Primary Sources of EHS Information

- 24 sources chosen for further profiling.
 - » Many are accessible from the information portals already reviewed.
 - » Most are from intergovernmental organizations or individual governmental agencies with regulatory authority
 - » Three are from NGOs (EWG, ChemSec, GoodGuide).
 - » Scopes of chemicals addressed differ markedly, but all include industrial chemicals in commerce. A few (e.g., EWG's Skin-Deep, GoodGuide) place focus on increased transparency of identity and hazards of chemicals used in consumer products and are intended in helping find less hazardous substitutes.
 - » Ease of access and quality of information are generally good, but some information sources are quite old and are not routinely updated so users need to exercise caution.
 - » Breadth and depth of EHS information available varies considerably by source.
- USEPA's [ACToR database](#) is unique and distinct because it is focused on helping users predict toxicity for a chemical that lacks test data. Should accelerate filling information gaps in the future.
- [ECHA's CHEM](#) is the largest and most comprehensive of them.





ECHA's CHEM

- Participating database in OECD's eChemPortal.
- Data from registration dossiers submitted to ECHA
- As of 10 August 2019, it contained 22,378 unique substances and EHS information from 95,908 registration dossiers.
- Easy to search and detailed search guidance is available.
- Substantial hazard, use/exposure, risk information available for chemicals produced or imported above 1000 metric tonnes/year, somewhat less so for lower volume substances, and substances below 10 metric tonnes/year have reduced information requirements.
- Registrants are responsible for the quality of the underlying information submitted to ECHA; however, ECHA can require them to do additional testing, submit more information or even redo safety assessments and implement additional risk management.
- Ownership of the underlying data by registrants and Confidential Business Information claims may restrict access to and use of some EHS information.



Primary Sources of EHS-Type Regulatory Decisions

- Key decisions, when combined with the regulatory criteria used to make those decisions, may provide valuable insights on chemicals.
- Ten such databases were profiled (ECHA, Canada, California, USEPA, South Korea, Australia, New Zealand and China).
- Each can be easily searched, although the Chinese IECSC may be accessible only via regulatory services consulting firms.
- Canada's [Categorization Results database](#) (accessible directly or via OECD's eChemPortal) may be especially relevant because it presents regulatory decisions on all 23,000 chemicals identified as being on their market when their new chemicals review program was launched.



Canada's Chemical Categorization Results Database

In 2006, all 23,000 substances were categorized as to:

- 1) inherently toxic to humans or to the environment and that might be persistent and/or bioaccumulative; or
- 2) presented the greatest potential for human exposure; or
- 3) considered a priority for assessment based on other health concerns.

Approximately 4,300 met the criteria for further attention; but nearly 19,000 other substances were judged to not require further action,



Identifying the Number of Chemicals in Commerce



Uncertain Number of Chemicals in Global Commerce

A number of factors contribute to the uncertainty in the estimates of the numbers of chemicals, including:

- a lack of chemical inventories for many countries in the world;
- uncertain and variable definitions of industrial chemicals in commerce (i.e., different scopes);
- varying volume thresholds for reporting;
- uncertainty as to whether or not listed chemicals are actually currently on the market; and
- and lack of reporting or misreporting to government authorities.



Estimating Numbers of Chemicals in Global Commerce -- Methodology

- The starting points for estimates included:
 - » US Toxic Substances Control Act (TSCA) Inventory Update.
 - » Registrations under the EU REACH program;
 - » Canada's Domestic Substances List.
 - » Japan chemical inventory.
 - » China chemical inventory.
- Collectively, these 5 nations/regions account for nearly 75% of annual chemical sales globally and greater than 90% of total, annual global chemical-related research and development spending (Cefic, 2019).
- To address the many inherent uncertainties, lower and upper bound estimates were calculated by making worst case and best case assumptions.



Estimating Numbers of Chemicals in Global Commerce -- Results

- Resulting current estimates of numbers of chemicals in commerce globally ranged between **40,000** and **60,000**.
- Reliable volume data are only available from US EPA, ECHA CHEM and Japan.
- Combining their data and assuming **60% overlap** in chemical identity between all of them, a figure found when comparing **US EPA, Government of Canada and EU REACH data**, yielded an estimate of approximately **6000 chemicals** that account for greater than **99% of the total volume** produced globally.



Assessing and Utilizing the ICCA and UN Environment Collaborative Analysis



Limitations of the Report:

- No central repository of EHS information on chemicals currently exists which is a barrier to advancing collective understanding of gaps in information;
- gaps in EHS knowledge for lower production volume chemicals persist;
- Confidential Business Information (CBI) claims for some chemicals can limit the information available to the general public; and
- a lack of information on uses and exposures to chemicals in developing countries is especially challenging.



How to use the Report?

By:

- providing ready access to EHS information on a wide range of industrial chemicals in commerce for use in implementation of the **UN Globally Harmonized System of classifying and labelling chemicals**;
- facilitating the **development of strategies for gathering local use and exposure** information critical for conducting risk assessments and prioritizing chemicals for further risk management;
- providing easy access to the **most comprehensive EHS information that is available on chemicals of interest** allowing **identification of missing data for prioritized action** to fulfil them; and
- assisting **discussions on specific chemicals and chemical classes identified as concerns to SAICM** (e.g., brominated flame retardants, perfluorinated chemicals, and others).



Major Conclusions

- There are a **large number of publicly available sources of EHS information on chemicals in commerce**, and many of them address a broader scope of chemicals that are found in the environment, regardless of whether or not they remain in commerce.
- In particular, **OECD's eChemPortal, EHCA's CHEM and Canada's Categorization Results databases** can play a helpful role in any chemicals information search strategy.
- There are an estimated **40,000 to 60,000** industrial chemicals in commerce globally, and approximately **6,000** of those account for **more than 99% of the total volume** of industrial chemicals in commerce globally.
- There exists **EHS information to support varying degrees of screening level hazard and risk assessment for the majority of the highest production volume chemicals**.



Major Conclusions (cont.)

- However, **gaps exist** in our EHS knowledge of **lower volume chemicals**, and of **uses and exposures, particularly in developing countries**.
- There are several **reasons to be optimistic** that going forward information gaps can be closed at an accelerated rate:
 - » **recently adopted legislation in multiple regions and countries** that requires manufacturers and importers to collect and publicly report hazard, use, exposure and risk information on their chemicals;
 - » increasing **focus on safe substitution and greener chemistry**; and
 - » the **advent and acceptance of new tools and methods** (e.g., read across, computational toxicology, etc.).



Question for Stakeholders

What is needed/what needs improvement in terms of accessibility and content of chemical safety information for helping stakeholders to meet SAICM objectives?



Additional References

- Full Report
http://saicm.org/Portals/12/Documents/EPI/Knowledge_Information_Sharing_Study_UNEP_ICCA.pdf
- Infographic <https://www.icca-chem.org/chemicalsincommerce/>
- Policy Brief
http://www.saicm.org/Portals/12/Documents/saicmtxts/SAICMpolicybrief_KnowledgeInfoSharing.pdf
- ChemicalWatch blog
<https://chemicalwatch.com/78728/guest-column-myths-around-sharing-of-ehs-information-on-chemicals>



Further Reading

- Judson R et al., 2009. The toxicity data landscape for environmental chemicals. Environ Health Perspect. 117(5): 685– 695. Google Scholar <https://ehp.niehs.nih.gov/doi/full/10.1289/ehp.0800168>
- Egeghy PP, et al. 2012. The exposure data landscape for manufactured chemicals. Sci Total Environ. 414:159-66. Google Scholar <https://www.ncbi.nlm.nih.gov/pubmed/22104386>