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Priorities for improving chemicals management in the WHO European Region—stakeholders' views

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Background: Prevention of the impact of chemicals on human health and the environment is an increasing focus of public health polices and policy makers. The World Health Organization European Centre for Environment and Health wanted to know what were stakeholders' priorities for improving chemicals management and prevention.

Methods: Semi-structured interviews were undertaken with 18 diverse stakeholders to answer this question. The interview questionnaire was developed using current WHO chemical meeting reports, the Evidence Implementation Model for Public Health Systems and categories of the theory of diffusion. Stakeholder views were attained on three main questions within the questionnaire. (i) *What* priority actions should be undertaken to minimize the negative impact of chemicals? (ii) *Who* needs to be more involved and what roles should they have? (iii) *How* can science and knowledge on chemicals and health be translated into policies more effectively and what are the greatest barriers to overcome? **Results:** Cross cutting issues, such as legislation strengthening and enforcement, further collection of information, capacity building, education and awareness raising were considered priorities. The responders had the same vision on roles and responsibilities of different stakeholders. The greatest barrier to adoption, implementation and enforcement of evidence-based policies reported was leadership and political commitment to chemical safety. **Conclusions:** Priorities raised differed depending on knowledge, professional background and type of stakeholder. Factors influencing priority identification at the national level include international and global context, availability of information, knowledge of the current situation and evidence-based good practice, and risks and priorities identified through national assessments.

Introduction

Prevention of the impact of chemicals on human health and the environment is an increasing focus of the international community and governments today. Since the United Nations Conference on the Human Development in 1972,¹ significant progress has been reached in phasing out hazardous chemicals.² However, actions are still needed to ensure chemical safety.^{3–9} Given the broad chemical safety agenda, prioritization of effective actions and allocation of resources is critical.^{4,10–12} International chemical safety policies provide a framework to implement evidence-based policy actions in countries. For example, the United Nations 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs) commit to 'substantially reduce the number of deaths and illnesses from hazardous chemicals' by 2030 (SDG 3.9), 'improve water quality by reducing pollution' by 2030 (SDG 6.3) and to 'achieve the environmentally sound management of chemicals and all wastes throughout their life cycle in order to minimize their adverse impacts on human health and the environment' by 2020 (SDG 12.4).^{6,13}

In preparation for the Sixth Ministerial Conference on Environment and Health in Ostrava, Czech Republic (June 2017), the World Health Organization (WHO) Regional Office for Europe organized a meeting with national and international experts to identify short- and medium-term actions to be implemented.¹⁴ As a

follow-up to this meeting, the WHO European Centre for Environment and Health (WHO ECEH) called for a consultation to investigate stakeholder views on the future development of chemical safety in the WHO European Region. As chemical safety management is multi-stakeholder in nature, WHO ECEH sought to gain a better understanding of the needs of a broad group of stakeholders.³ This included attaining deeper insights as to how international policy actions are interlinked with country specific priorities and how the diversity of national stakeholder views influences the chemical safety agenda on a national and European regional level. This stakeholder analysis contributed to the planning of the implementation of the commitments of the Ostrava Declaration on Environment and Health.^{15,16}

Methods

This is an explorative study using a qualitative design that combined interviews and discussions with key stakeholders in the field of chemical safety management in the WHO European Region. The questionnaire for the semi-structured interviews was developed by the lead author taking into account the outcomes of the WHO chemicals policy and programmes meeting (4–5 July 2016 in Bonn, Germany)¹⁴ and reviewed by the co-authors. The questionnaire was used to obtain stakeholder views on priority actions in the area of chemical safety in the European region.^{14,17} The Evidence

Implementation Model for Public Health Systems was utilized to formulate questions addressing key stakeholders involvement, knowledge transfer, and barriers and facilitators to the uptake of effective strategies.¹⁸ Furthermore, categories of the theory of diffusion were included.¹⁹ Three main questions were asked in the questionnaire:

- (1) *What* priority actions should be undertaken to minimize the negative impact of chemicals?
- (2) *Who* needs to be more involved and what roles should they have?
- (3) *How* can science and knowledge on chemicals and health be translated into policies more effectively and what are the greatest barriers to overcome?

A complete questionnaire and subset questions for each theme are available in a corresponding WHO report.²⁰

Purposive sampling was used by WHO ECEH to invite the participation of stakeholders to ensure geographical representation of the WHO European Region. This included at least three countries from each of the WHO European Region, sub-regions (European Union Member States; Central Asia; Central (non-EU) and Eastern Europe), as well as, targeted European organizations, professionals affiliated with diverse key agencies and representatives of different stakeholder groups in chemicals management. A total of 18 stakeholders participated. The respondents were from ministries of health (2) and environment (2), institutes of public health (4), academics (3) industry associations (2) media (1) and non-governmental organizations (NGOs) (4) having experience in chemicals management at the national, EU, WHO European Region and global levels. Fewer stakeholders were attained from industry and media, as the focus of the WHO interviews was to contribute to Member States policy guidance and the decision-making planning process for the implementation of the commitments of the Ostrava Declaration on Environment and Health. All interviewees gave their informed consent for inclusion before they participated in the interviews and the study was conducted in accordance with the Declaration of Helsinki and WHO protocol.²¹ Confidentiality of interviews was communicated to the interviewee and agreed upon. All interviews were conducted using telephone or Skype by the first author in English or Russian (with the assistance of a Russian interpreter). The average interview duration was 30 min. The first interview conducted also served as a pilot test and adjustments were made to the questionnaire by the first author to increase clarity. Probing took place to obtain information about the professional role of each stakeholder interviewed, country context and views relating to chemical safety in their countries, and their values and beliefs were taken into consideration with respect to each question. Interviews were transcribed verbatim into a corresponding questionnaire template. Clarifications to the stakeholders' comments were attained by email when required. Content analysis of the interviews was undertaken to provide concise summaries of stakeholders' responses. Findings were grouped corresponding to the three interview themes, categorized based on interviewees' most frequent responses by key words and analyzed to create a final stakeholders analysis report.

Results

Data that were obtained from the 18 interviewees are presented on the three main questions within the interview questionnaire: (i) *What* priority actions should be undertaken to minimize the negative impact of chemicals? (ii) *Who* needs to be more involved and what roles should they have? (iii) *How* can science and knowledge on chemicals and health be translated into policies more effectively and what are the greatest barriers to overcome?

Priorities

Priority chemical safety actions identified by stakeholders interviewed were analyzed, grouped and reported below by the four stakeholder groupings of government, industry, academia and researchers and NGOs.

Governments priorities

Interviewees identified monitoring and control as the priority area, and adoption, implementation and enforcement of legislation. Despite the many laws and regulations that exist in the Member States, a framework for and commitment to their implementation and enforcement are not always in place nationally and should be urgently addressed. The most frequently cited hazardous substances by interviewees were endocrine disrupting chemicals (EDCs), pesticides as a priority in connection with monitoring and managing obsolete pesticides stockpiles and other priority groups of chemicals including heavy metals, such as mercury and asbestos.

Industry/private sector priorities

Interviewees stated the priority need for capacity and expertise necessary to ensure chemical safety requires facilitated enhancement and collaboration across all sectors. They stressed the need for more private sector and scientific involvement for information sharing in research and innovation. Programmes that support and encourage the implementation of the Responsible Care initiative should be promoted, as well as sharing of national experiences involving industry in chemicals management.

Academia and researchers priorities

Interviewees identified increased research in chemical safety as priority and specifically called for filling of data gaps through innovation, early identification of hazards and causes of harm, monitoring and control of hazardous substances, and establishing exposure limits and standards for vulnerable groups. They also highlighted the need for increased capacity of human and financial resources for research and innovation at the national, regional and local levels across various disciplines to support knowledge transfer.

NGOs priorities

A wide scope of priorities was proposed by NGOs, particularly reduction of air pollution followed by chemicals in food and water. They also stated the need for increased awareness of evidence-based strategies and targeted tools to enhance knowledge of stakeholders and society including decision-makers. NGO interviewees strongly expressed the public's right to transparency, including knowing what substances are contained in products and banning, removal and replacement of unsafe products in all Member States of the WHO European Region. Another priority identified was improvement of chemical management legislation, implementation and enforcement. As well, Member States should consider use of effective regulations and chemical instruments, such as improving classification and labelling through the *Globally Harmonized System of Classification and Labelling of Chemicals* (GHS) and the precautionary principle. They emphasized the need to address chemical safety issues in the wider context of environment and health and as an integral component of a comprehensive action plan on environment and health.

Roles of key stakeholders

Interviewees from all sectors (government, industry, academia and researchers, and NGOs) expressed their views on how to reach a whole-of-government, whole-of-society approach to improve chemicals management. Overall they collectively defined the roles of 'who is responsible' and 'who does what' to successfully address chemical safety as follows:

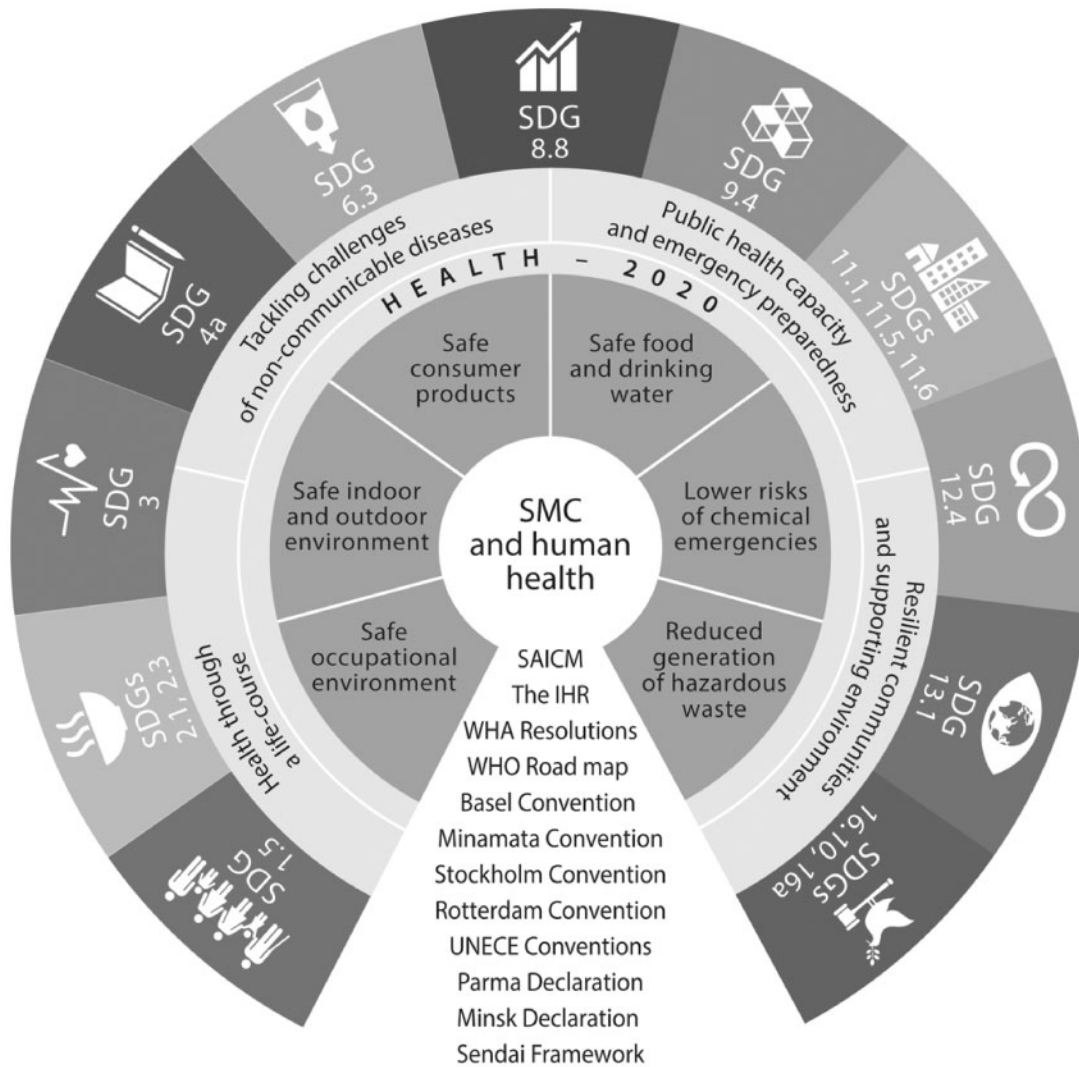


Figure 1 Sound management of chemicals and human health—WHO Europe¹³

Role of governments

At all levels of government (national, subnational, municipal) the interviews stated the need for greater involvement of senior policy-makers in raising the priority of and commitment to chemical safety action could be supported and enhanced through establishing inter-ministerial committees in all the WHO European Member States. They stressed chemical safety needs to be placed higher on the political agenda and in a more concrete way, rather than primarily administrative tasks. For example, policy actions need to be undertaken and designated budgets secured. Also, they identified the need for stronger links and shared action across the different government levels, and multisectoral and multidisciplinary approaches to coordinate the adoption, implementation and enforcement of evidence-based priority actions. The example of legislation and regulations aimed at identifying, monitoring, banning, restricting, limiting and replacing hazardous substances with safer alternatives was provided (i.e. asbestos).

In addition, the role of government is to balance the immediate financial and political demands or interests that chemicals appear to evoke and the impact of chemicals on population health.

Role of industry/private sector

The interviews emphasized that industry is an important stakeholder and has a key role in enhancing chemical safety through specialists, technical information and specific skills related to chemical safety that could be shared to build the capacity of diverse stakeholders.

However, they stressed that industry needs to enhance transparency and innovation in materials and technology, increase the use of green chemistry and use safer alternatives to replace hazardous chemicals. Examples given to initiate win-win situations with industry included establishing joint actions and ways of collaborating, such as structured agreements, memoranda of understanding and public/private partnerships. Interviewees also raised the development of a fund for independent research in chemical safety with financial support from industry for agreed upon priority areas.

Role of academia and researches

According to the interviews, opinion research must be independent, forward thinking and focus on safer innovation and design. They stated the need for knowledge translation from research results towards informative and educational tools and resources to support science to policy communications. Concise, plain-language summaries tailored to target audiences including decision-makers would assist in this process.

Role of NGOs

The interviewees stated that NGOs could enhance collaboration to raise greater awareness on chemical safety, call for the adoption, implementation and enforcement of good practice and share victims' stories. For example, sharing human bio-monitoring case studies and advocating for the removal of, bans on and promoting of, safer alternatives to harmful chemical products was raised.

Role of intergovernmental organizations

According to the interviews performed, intergovernmental organizations need to strengthen their role in communicating knowledge about evidence-based good practices in chemical safety more widely and to support development, adoption and enforcement of chemical safety evidence-based policies and programmes.

Concepts on how science and knowledge on chemicals and health can be translated into policies more effectively and which barriers are the greatest to overcome

Stakeholders interviewed agreed that transferring and translating knowledge into policy as a difficult and complex process, which requires an understanding of the system dynamics including needed targets, stakeholders involved and the factors and stages influencing the entire process. Concepts discussed and stakeholders' views shared to support knowledge transfer included: (i) having a clear, time-bound target from the start of the process; (ii) ensuring that all key stakeholders were engaged early in the process, that their views and roles towards shared aims were defined, and that there was mutual respect for the collaborative work to be carried out; (iii) raising awareness about research evidence and creating educational tools and resources for specific target audiences to support the transfer of knowledge into policy; and (iv) reviewing and addressing barriers to and facilitators of the translation of evidence into policy needed to be addressed on an on-going basis to facilitate policy development.

The lack of leadership and political commitment was considered to be the major barrier by the majority of those interviewed. This was not only for adopting evidence-based chemical safety policy, legislation and regulation but also and more importantly at the moment, for implementing and enforcing these policies. Overall, there were diverse views as to how to effectively implement evidence-based policies for chemical safety. The views depended on individual stakeholder knowledge, professional background, experience, beliefs and preferences.

Discussion

The views stated by the interviewees as a whole supported and corresponded to international policy frameworks and priorities to increase chemical safety adopted by the United Nations, WHO and the Strategic Approach to International Chemicals Management (SAICM) policy frameworks (figure 1).^{13,22–26} Cross cutting issues, such as legislation strengthening and enforcement, further collection of information, capacity building, education and awareness raising were considered priorities by all interviewees. Many interviewees shared that the knowledge and technical skills required to implement evidence-based policies are lacking, indicating a need for more capacity building among key stakeholders. However, national context and settings influenced interviewees' views in terms of the group of chemicals and specific areas of concern.²⁷ For example, interviewees from the countries of Central Asia and Caucasus most commonly reported the collection and safe disposal of mercury-containing bulbs, and the sound management and removal of pesticide stockpiles; they also stated the need for assistance in data monitoring, awareness campaigns and uptake of good practice; while Western European countries focused on reduction of EDCs, air pollution management and early identification of hazardous chemicals. These responses mirror the level of legislation and institutional structure, and established policies in the respondents' countries.¹⁴ Furthermore, these correspond to actions addressed in international policies,^{15,16,28–30} which confirm the important role international policies play to support priority action adoption and implementation for chemical safety within nations and regions.²⁷

To ensure national priorities are reflected in international policy frameworks, it is essential that national chemical safety assessments are readily available, shared and effectively communicated at the national and international levels.^{5,31} Stakeholders from national governments, industry, academics, non-governmental and intergovernmental organizations have key roles to play in chemical safety management.³ Within this study the interviewees agreed on the roles and responsibilities of the key stakeholders. However, each stakeholder carries their own levels of awareness and knowledge of chemical safety issues in addition to their professional and personal values, perspectives and interests.^{27,32,33} Therefore, wider distribution and sharing of chemical safety knowledge, perspectives, expertise and experience by all key stakeholders, including the public is essential.³⁴ Science to policy communication is also critical. Here, academics can provide support to enhance knowledge translation.¹⁸ As well, common knowledge of agreed facts by all stakeholders is also an important foundation for information and determining priority needs.³⁵

Analyses of the national priorities identified through the interviews echoed the need by all stakeholders for consistent use of standardized tools developed by international organizations.^{36–39} Such tools create a basis for collecting information needed to identify and implement priority actions.^{18,36–39} Furthermore, agreement of the overall aims and associated measurable targets by all stakeholders is critical for attaining a high level of stakeholder commitment,¹⁸ in particular that of senior policy-makers.

Knowledge of best practices available was an important factor influencing the identification of priorities. For example, the majority of interviews stressed the need for strengthening national chemical legislation and full implementation of the European Union regulation REACH (Registration Evaluation, Authorization and Restriction of Chemicals). Currently, REACH is considered to be the most advanced legislation for reduction of the negative impact of chemicals on human health and the environment, resulting in a decrease in social and economic costs.⁴⁰ More countries from the WHO Europe geographical regions of Central Asia, Central and Eastern Europe and Caucasus could adapt and adopt good practices like REACH to inform their national chemical policy development and implementation, particularly in relation to the reduction of hazardous chemical products.⁴⁰ Policy actions to improve chemical management would be best supported with clear messages of evidence-based good practices as part of awareness campaigns. These campaigns should also include information on who is responsible for what,³⁴ as confirmed by the stakeholders interviewed in this survey. As well, actions should be supported at the regional and global levels to ensure wide circulation of case studies and assessment of effectiveness of different risk reduction measures.^{18,31}

This study is an explorative view of 18 key stakeholders in chemical safety management insights of priorities for the chemical safety agenda of the WHO European region, but is not representative of the whole Region. However, a large and diverse variety of interviews were performed from various sectors, and individuals and organizations with representation at the national, EU and WHO European Region levels. Interviews were performed until saturation was achieved, based on no new themes being identified by the stakeholders.

Conclusions

The priorities identified by all key stakeholders in the European region on chemical safety included: legislation strengthening and enforcement, further collection of information, capacity building, education and awareness raising. The priorities stated by the interviewees as a whole supported and corresponded to international policy frameworks and priorities to increase chemical safety adopted by the United Nations, WHO and SAICM policy frameworks (figure 1). The priorities raised differed depending on national and regional context, knowledge, professional background and type of

stakeholder (government, industry/private sector, academic or NGO). Understanding of roles and responsibilities of different stakeholders was agreed upon by all stakeholders. Factors influencing priority identification at the national level include: international and global context, knowledge on the current situation and the risks identified through national assessment, mostly in the frameworks of international legal and voluntary agreements, knowledge of good practice in the field of chemicals management and other areas related to human health and environmental factors.

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Conflicts of interest: None declared.

Key points

- Priorities identified in the European region on chemical safety included: legislation strengthening and enforcement, further collection of information, capacity building, education and awareness raising.
- Priorities as a whole supported and corresponded to international policy frameworks and priorities to increase chemical safety adopted by the United Nations, World Health Organization and Strategic Approach to International Chemicals Management policy frameworks.
- Priorities raised differed depending on national and regional context, knowledge, professional background and type of stakeholder (government, industry/private sector, academic or non-governmental organization).
- Factors influencing priority identification at the national level include: international and global context, knowledge on the current situation and the risks identified through national assessment.

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Wood dust exposure and risks of nasopharyngeal carcinoma: a meta-analysis

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Background: Wood dust has been confirmed as one kind of human carcinogen. However, there are inconsistent study results of exploring the relationship of exposure to wood dust and occurrence of nasopharyngeal cancer (NPC). For a greater clarification, the authors systemically reviewed the relevant published articles on the relationship of exposure to wood dust and occurrence of NPC. And meta-analysis was conducted. **Methods:** The databases of PubMed, U.S. National Library of Medicine (MEDLINE), Embase and Science Direct were searched for the relevant publications. And Newcastle-Ottawa scale was employed for judging the quality of articles. Random-effect model was utilized for meta-analysis. **Results:** Among a total of 583 retrieved items, 10 case-control studies and 1 cohort study were selected. The ratio of maximal/minimal exposure concentration of wood dust yielded a pooled odd ratio (OR) of 2.18 (95% CI = 1.62–2.93, $P = 0.063$) with a moderate heterogeneity (I^2 : 43.0%; $P = 0.001$). And subgroup analysis was performed for such factors as exposure status, exposure population and geographic region. No publishing bias was noted. Exposing to a high concentration of wood dust was positively proportional to occurring risk of NPC. **Conclusion:** It hints at the contributing effect of wood dust upon NPC. For eliminating the effects of other confounding factors, larger prospective cohort studies are required for further elucidating the relationship of exposure to wood dust and occurrence of NPC.

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