BETTER POLICIES FOR BETTER LIVES

OECD workshop on Managing Contaminants of Emerging Concern in Surface Waters: Scientific developments and cost-effective policy responses, 5 February 2018

Summary Note

Key messages

- Contaminants of emerging concern (CECs) comprise a vast array of contaminants that have only recently appeared in water, or that are of recent concern because they have been detected at concentrations significantly higher than expected, or their risk to human and environmental health may not be fully understood. Examples include pharmaceuticals, industrial and household chemicals, personal care products, pesticides, manufactured nanomaterials, microplastics, and their transformation products.
- CECs challenge both traditional policy regulations and existing wastewater treatment infrastructure that are not designed to remove them. There are high uncertainties due the diversity of contaminants, their sources and inputs, "unknown unknowns", the impact of combinations of chemicals, and the constant engineering of new chemicals.
- Current management of CECs in water is reactive (i.e. only after a problem is recognised), substance-per-substance and resource intensive. Current policies build on a scientific-testing-and-regulation paradigm, which is ill-adapted to deal with the uncertainties inherent to CECs.
- Prioritisation methods are part of the solution. They can build on alternative testing strategies which are more rapid, relevant and cost-effective (e.g. real-time *in-situ* monitoring, passive sampling, biomonitoring, effect-based monitoring, screening for unknowns, hotspot monitoring and utilising surrogate data). Advances in modelling can help identify and predict sources of contamination.
- A mix of source-directed measures and end-of-pipe measures are required to effectively deal with CECs across their life cycle – including chemical design, authorisation, manufacturing, prescription, use, collection and disposal (solid waste and wastewater). Options include water quality standards, extended producer responsibility, watch lists, wastewater treatment upgrades, environmental labelling schemes, precision medicine, green pharmacy and education campaigns.
- The Substitution Principle requires that CECs should, wherever possible, be replaced with alternatives which have a lower impact on the environment. Information on environmentally harmful pharmaceuticals and other CECs need to be developed and communicated to enable environmental considerations and use of the Substitution Principle in decision-making processes.
- Risk assessment, chemical vigilance, water safety plans, post-market monitoring and incidence reporting are necessary to identify and prevent contamination and adapt policy to new science.
- Publically available, quality-assured data is crucial. Science communication remains a challenge.
- Institutional coordination and stakeholder engagement is required to develop integrated policies, in what is currently a fragmented legislative and policy landscape. Coordination is required across sectors, between science and policy, and between various levels of government – transboundary, central and local. It is important for all stakeholders to start acting within their own field of influence.

*** Disclaimer: Please note that the information in this summary note derives from the workshop speaker presentations and participant discussions. This information has not been independently verified by the OECD nor agreed by all participants. The workshop was held under Chatham House Rule, thus, this summary note does not identify individual speakers. ***

Setting the scene

CECs are ubiquitous and uncertain

Contaminants of emerging concern (CECs) comprise a vast array of contaminants that have only recently appeared in water, or that are of recent concern because they have been detected at concentrations significantly higher than expected, and/or their risk to human and environmental health may not be fully understood. Examples include pharmaceuticals, industrial and household chemicals, personal care products, pesticides, manufactured nanomaterials, microplastics, and their transformation products.

CECs are ubiquitous and are causing a blanket of exposure with chronic, subtle impacts on human and environmental health. In a recent EU-level study, chemical contamination associated with chronic effects was found in 14 to 42% of investigated sites.

The number of CECs is continuously evolving as new chemical compounds are produced, and improvements in chemical analysis increase our understanding of the effects of current and past contaminants on human and environmental health. There are about 100,000 chemicals in use, but publically available poor quality data is only available for 1-5% of these. In addition, some 1000 new chemicals are developed every day and the number of exposure scenarios and potential for bioaccumulation or any number of cocktail effects (the impact of combinations of chemicals) are often unknown. At the same time, with better analysis, a higher number of substances are detected which results in a higher risk estimate.

The use of pharmaceuticals is growing - particularly as the population of OECD countries ages - which has implications for the quality of water resources. In **Germany**, individual use of medicine has increased significantly from 490 daily doses in 2009 to 569 daily doses in 2015 (2.6% growth rate). Self-medication is estimated to grow even faster. A forecast model combining the demographic ageing process with the dynamic per capita consumption, predicts an estimated 43% to 67% growth of pharmaceutical usage in Germany over the period 2015 to 2045.

Innovative policy responses are required to overcome the knowledge gap

In light of this complexity, participants acknowledged there is a need to simplify, prioritise and identify substances of concern and improve the speed and quality of risk assessments and cost benefit analysis. Since CECs are ubiquitous, the goal is to strive towards a non-toxic environment - not a non-chemical environment.

A chemical-by-chemical assessment approach is not viable. Group-wise assessments and effect-based testing may provide an alternative to assessing every chemical for their 'known unknowns', such as their chemical structure, toxicology and ecotoxicology aspects. Modelling the source-to-effect chain can be an effective tool to identify and target sources of pollution.

There are many 'unknown unknowns' factors which need to be prepared for through measures such as chemical vigilance, post-market monitoring and incidence reporting. One possibility suggested was water system 'binning' to classify systems (wastewater streams, agriculture-dominated stream) to come up with groups of solutions.

Water utilities highlighted this is a time of uncertainty. It is often difficult to fulfil public expectations of complete absence of substances in water. There has been a change in paradigm for water utilities, moving from water quality monitoring from a health and legal point of view to a consumer point of view. The difference is that the latter is not always related to toxicological risk.

A number of efforts are being undertaken by water utilities to respond to CECs, including protecting water resources, and monitoring and researching CECs to assess water treatment options to reduce future risks.

Costs and benefits need to be taken into account while choosing treatment methods, as well as the risk that transformation does not always imply detoxification - while certain technologies may transform the parent compound, a new and more potent product can result.

What is being done? A range of national policy responses

Policy responses in state of flux

The current management of CEC pollution is primarily reactive i.e., it is in response to problems with water quality. Moreover, a substance-by-substance approach is used which is resource intensive and cannot keep up with rapidly evolving challenges.

To better integrate current and future pollutants emissions, their fate and potential adverse mixture effects, the EU is currently developing a strategy for a non-toxic environment based on a holistic and solutions-orientated approach.

In **Switzerland**, it is estimated that patient use (88%) is the main entry pathway for pharmaceutical residues to water, followed by inappropriate disposal (10%) and production (2%). For pharmaceutical companies in Switzerland, production wastewater must be tested for biodegradability. Wastewater that does not fulfil Swiss requirements must be pre-treated or incinerated.

In the **Netherlands**, a 2015 incident of pyrazole[1] in the River Meuse (an important drinking water source) triggered the development of a **water quality standard** (WQS) for pyrazole. The incident also led to the creation of a step-by-step action guide for stakeholders to safeguard public health and drinking water production from future CECs pollution events. In addition, the issuance of industrial permits was revised, mandating the inclusion of the potential effects of CECs on drinking water production.

It remains to be seen if WQS are a feasible option to address CECs more broadly given the number of chemicals and the time taken to develop WQS. Furthermore, existing WQS aim at the control of residual compounds, which are a necessary first step, but there is a need to account for the impact of a cocktail of chemicals that people are exposed to. There can also be a long time lag between the identification of a substance as having potentially negative impacts and the derivation of the associated WQS. In **Korea**, the results of a long-term monitoring programme (since 2007) are used as a basis to set and legalise water quality standards every five years.

Recognising that CECs may not be great candidates for classic regulation, the Ministry of Ecological and Solidarity Transition in **France** created a five-year programme with **financial incentives** (EUR 10 million) aimed at stimulating new innovative projects to manage CECs and empowering local stakeholders. The selected projects targeted domestic, industrial, diffuse and multiple sources of pollution and include solutions for better diagnostics, cost-efficient reduction of CECs and changes in practices of various types of stakeholders. While the exercise has shown that there is potential for innovation at the local level, communication of the benefits and replication at the national scale remain a challenge.

[1] In medicine, derivatives of pyrazoles are used for their analgesic, antinociceptive, anti-inflammatory, antipyretic, antiarrhythmic, tranquilizing, muscle relaxing, analeptic, anticonvulsant, monoamineoxidase inhibiting, antidiabetic, antifungal, and antibacterial activities. The pyrazole ring is also found within a variety of pesticides.

End of pipe measures

Most country responses to date have focussed on upgrading wastewater treatment plants. For example, the **Swedish Government** recognised the adverse effects of certain pharmaceuticals in the aquatic environment in a 2013 bill which mandates the evaluation of advanced technologies for the removal of pharmaceutical residues and other CECs by 2018. An extensive study by the Swedish EPA (2017) of over 450 wastewater treatment plants has confirmed that advanced treatment of pharmaceutical residues in wastewater is necessary given the potential long-term effects to the aquatic environment, anticipation of future regulations, a responsibility to consider the Precautionary Principal, and benefits of being a front runner.

Similarly, in **Switzerland**, the Waters Protection Act was revised in 2014, mandating the upgrade of 100 wastewater treatment plants to remove selected CECs. Despite having higher estimated costs than preventative source-directed measures, the end-of-pipe approach was selected because it is more predictable, measurable and feasible, and received support from industry, business, farmers, the research community and international actors.

Factors to consider when prioritising wastewater treatment upgrades include: the amount of pharmaceutical substances and other persistent pollutants released into receiving waters; the water recharge rate and dilution capacity of receiving waters; the sensitivity and type of the receiving environment; and the influence on drinking water intake points. Obstacles include technical barriers, such as those related to site specific conditions, and the significant investment costs.

For example, in **Switzerland**, the total investment cost to upgrade the 100 wastewater treatment plants was estimated to be around USD 1 billion, plus an additional USD 115 million/year for operation and maintenance costs. The majority of the capital costs (75%) have been covered by the national budget. The remaining investment, operation and maintenance costs are covered by municipalities and a new (2016) federal sewage tax of EUR 9/person/year. In the **United Kingdom**, The UK Chemicals Investigation Programme estimates that the cost of implementing wastewater treatment upgrades to remove pharmaceuticals is GBP 27-31 billion over 20 years.

Reduction at source

Reduction at source is not straightforward, particularly for pharmaceuticals which are manufactured and marketed to produce some good: improving human health. They cannot be readily banned.

Preventive measures to reduce diffuse pollution and illegal discharges of CECs are required. For instance, the **United Kingdom** Chemical Investigation Programme – a GBP 165 million programme led by a group of water utilities and environmental regulating bodies – have found that wastewater treatment plants are not always the main pollution source of some chemicals; catchment studies have shown that water quality upstream of wastewater treatment plants is often poor.

Participants discussed how **public collection schemes** of unused pharmaceuticals can minimise substances in water flows. It is estimated that 10-50% of prescription medications are not taken as per the doctors' orders; some of this waste is disposed of via the toilet therefore offering zero therapeutic benefit and only resulting in water pollution. Pharmaceuticals In the Environment (PIE) is an example of European industry cooperation. The EcoPharmacoStewardship (EPS) programme takes a life-cycle approach, including an extended environmental risk assessment concept for pharmaceuticals; effluent management; a research project on intelligent assessment and prioritisation of pharmaceuticals in the environment (iPiE); and an awareness and outreach campaign for correct disposal of unused medicines in Europe.

Personalised Healthcare or precision medicine can reduce patient pharmaceutical usage. Personalised healthcare can prevent, diagnose and treat patients more quickly and effectively. Medicines are better

targeted to patients' needs and their response to treatment, as opposed to one-size-fits-all medicines. This can result in fewer unnecessary treatments, a reduction in medications for side-effects and more optimised use of resources.

Green pharmacy has the potential to replace environmentally-problematic pharmaceuticals with more benign and biodegradable active substances. Green pharmacy is expected to bring positive environmental results in the medium-term (2020s onwards). Barriers delaying immediate progress include:

- A high stability of active substances is generally desired for pharmacological reasons
- Integrating environmental criteria in drug research and development has been difficult to realise because of narrow considerations regarding toxicity, efficacy, specificity and side effects
- Time pressures in an internationally competitive field.

There are opportunities to influence and change consumer behaviour and product markets. For example, in France, **media coverage** of the potential negative impacts of parabens in cosmetics drove a shift to paraben-free products, even though the science on the impacts was inconclusive.

Some participants highlighted the important role of **medical practitioners and chemists** in influencing and changing citizen's behaviour. In **France,** an advertising campaign by the Ministry of Health conveyed the message that health professionals should prescribe antibiotics only when necessary. To avoid waste, there have been trials with French pharmacies to deliver exact dosage of medicine required rather than standard universal packaging. In the **Netherlands**, the Ministry of Health is working on promoting a shorter prescription of medication to avoid non-use; however delivering medicines more frequently over shorter timeframes is expected to increase cost for chemists.

New opportunities with advances in analytical methods and risk assessment

Monitoring

Monitoring efforts have largely focused on chemical monitoring using the spot sampling approach[2] followed by laboratory chemical analysis. There are four disadvantages with this approach: 1) it is costly (manpower/transport), 2) it provides a 'snapshot' only of the pollution situation at the instant and location of sampling, 3) it may not be representative of conditions where concentrations of pollutants fluctuate or are not homogeneous, and 4) there can be issues with detection limits when low volume samples are collected.

New methods are emerging. These emerging monitoring technologies may be overtaking the capacity of governments to react and put adequate responses in place.

Real-time *in-situ* monitoring can reduce delays and avoid missing the peak of pollution events. **Passive (diffuse) sampling** can effectively concentrate pollutants compared to spot sampling and provide time-weighted-average and equilibrium concentrations over the deployment time (rather than a snapshot at one moment). **Biomonitoring** and effect-based monitoring can indicate which, when and where compounds should be monitored. For example, in the Netherlands, passive sampling is used in combination with *in situ*, *in vivo* and *in vitro* bioassays to assess the impacts of wastewater discharge on water quality. The relationship between specific properties of water organisms and their sensitivity to chemical and ecological stressors are also analysed.

[2] A spot sample is a discrete sample taken at one point in time and location (also commonly referred to as grab sampling).

Effect-based monitoring (e.g. based on adverse outcome pathways) provides an alternative to traditional animal toxicology testing. It aims to better screen and protect upstream toxic phases of disruption (especially triggered by Endocrine Disrupting Compounds) and avoid any toxicity later. Effect-based monitoring is more relevant to human health and contributes to integrated chemical and water management - getting chemicals safe early on, saves costs later. The testing strategy is more rapid, efficient and cost-effective than traditional animal toxicology testing, and takes into account aggregate mixture-effects of chemicals irrespective of the presence of possibly unknown chemicals (including by-products or metabolites of chemical compounds), or variability in the mixture composition.

Water experts have developed **collaborative projects** to assess and implement integrated monitoring strategies, including methodological projects to identify the toxic pathways induced by water chemicals and their mixtures, and demonstrative projects to apply innovative bioanalytical monitoring approaches to conventional and new water treatment processes, such as advanced oxidation, membrane processes, and the management of aquifer recharge.

From monitoring to taking action

The monitoring of CECs raised the question of how to respond in a timely manner and take preventive action. The above monitoring approaches can inform **risk assessment and management** of CECs in water, including water safety plans and water quality standards.

Water safety plans are required in the proposed revision of the EU Drinking Water Directorate. They can help meet regulatory requirements for water safety and security by providing:

- A risk-based approach built on cutting-edge bio analytics (chemical and effect-based);
- Benchmarking CECs occurrence and chemical exposure assessment to drive risk management; and
- Better design abatement options to safeguard human health, such as source protection and treatment options.

Some participants recognised that risk assessment methods need to be improved to ensure that emerging CECs are considered, particularly those that are not adequately covered by existing regulation. **Decision support systems** (DSS) - guidance, procedure and analysis tools - can be used to support decision-making. For example, the development of a risk index for water quality monitoring.

Addressing data gaps

Participants agreed that challenges remain in harmonising **data** types and forms, and sharing of information. Open source, good quality databases, efforts to link databases to toxicity and exposure, and greater collaboration between stakeholders are called for in this regard.

Approaches that provide information on trends and future projections are needed. **Surrogate data** (both from satellite data and *in-situ* sensor data) has the potential to identify trends and patterns, as well as reducing monitoring demands. Modelling can also be a part of the solution.

Modelling can be a useful starting point to understand and discuss the source and effects of CECs with stakeholders, from which cost-effective solutions can be developed in coordination. Modelling aquatic risks of CECs can take into account the sources (e.g. agriculture, domestic, industry) from which emissions derive. The fate of substances, and the exposure and effects on human and ecosystems can also be derived. However, there are a number of uncertainties in modelling which require more research.

Governments do not always have the evidence required to develop legislation. Thus **information sharing** from industry, academia and NGOs with governments is important for bringing chemical safety and water quality problems to the attention of policy makers. Data also needs to be shared within government

departments and across borders. For example, the Rhine Action Programme has an ongoing conversation on what data needs to be made available.

Policy instruments can encourage free availability and sharing of data and provide markets for new technologies. High-level legal frameworks like the EU Water Framework Directive have been driving action and investment in monitoring and treatment of water quality.

Aligning chemical safety policy with water quality policy

The **European Union** has over 100 pieces of chemical-related legislation for food and product safety, and to protect workers, human health and the environment. However, no legislation is dedicated specifically to CECs. Ecological standards in the EU cover a limited number of chemicals (there are standards for only 45 compounds). Furthermore, ecological standards are aimed at individual compounds, and not at mixtures of compounds. New ecological standards for additional compounds could not be agreed upon so a watch list for voluntary monitoring in surface water was developed (another is being established for groundwater).

An EU strategic approach to pharmaceuticals in the environment aims to address the policy gap and is to be adopted by end May 2018. It looks at possible policy options covering the whole life-cycle of pharmaceuticals. Exploratory work on effect-based testing is ongoing under the common implementation strategy for the EU Water Framework Directive. Using grouping approaches to prevent existence of CECs or to avoid regrettable substitution is another area where work is being undertaken. The use of more predictive assessments (e.g. quantitative structure–activity relationship models[3]) is encouraged to try to assess substances in groups - whether based on toxicity or on use.

Participants acknowledged that there is a need to **align chemical authorisation and water quality policies**. Most OECD countries regulate chemicals according to one use only (e.g. industrial, agricultural, household use). However, chemicals may have multiple uses, risks and impacts. By separating by use, risk is assessed in silos and the ability to make comprehensive decisions is lost. Further thinking on the risk assessment framework, including grouping risks based on chemical characteristics (e.g. toxicity, mobility, persistence) and receptors (e.g. groundwater, surface water, drinking water) is needed to predict, identify and mitigate future emerging CECs.

One participant highlighted that water quality standards need to protect the right water bodies with the right level of protection. In North East **France**, a new regulation mandated that groundwater quality needs to be compatible with drinking water standards. The need to comply with this regulation brought stakeholders to the table from different policy communities. This is an example where the policy promoted the dialogue, rather than other way round.

Extended producer responsibility (EPR) may be an option worth exploring for reducing CECs pollution at all levels of the chain, from production to waste and wastewater. Instead of consumers being responsible for the cost of waste management, producers, to some extent, become responsible.

The **exchange of data and information** between sectors is crucial – the occurrence of chemicals in water bodies needs to be shared with the chemical sector, and chemical hazard and exposure data needs to be shared with the water quality sector. The EU Information Platform for Chemical Monitoring (ICHEM) has been developed to fill the knowledge gap on chemical exposure and its burden on health and the

[3] Quantitative structure–activity relationship models (QSARs) are regression or classification models designed to find relationships between chemical structure (or structural-related properties) and biological activity (or target property) of studied compounds. It enables the linking of a chemical structure to a chemical property (e.g., water solubility) or biological activity, including toxicity (e.g., fish acute mortality).

environment. It acts as an access point for searching, accessing and retrieving chemical occurrence data collected and managed in Europe.

Participants noted that **institutional coordination**, at multiple scales and across sectors, is required to develop integrated policies, in what is currently a fractured legislative and policy landscape. Coordination is required across sectors, between science and policy, and between various levels of government – transboundary, central and local. Guidelines and WQS are often developed at the national level, but are implemented at the local level. There may be a case for agreed WQS between transboundary countries. However, participants acknowledged that it takes time to establish a cross-sector policy dialogue, both nationally and especially internationally.

In the **Netherlands**, a **holistic "chain approach"** is being used to address the issue of pharmaceutical residues in water. The two main drivers for action were ecological water quality and the production of safe drinking water. The process started in 2016 with an analysis of the whole pharmaceutical chain and the stakeholders concerned. A set of 17 possible measures were identified and evaluated throughout the pharmaceutical chain: 'development and authorisation', 'prescription and use', and 'waste and wastewater treatment'. Measures at both the source and end-of-pipe are seen as complementary and to be undertaken in parallel. The 'chain approach' has raised awareness and brought together the Ministry of Infrastructure and the Environment, the Ministry of Health, Wealth and Transport, regional authorities, and stakeholders from the water, environment and health sectors, including the pharmaceutical industry, doctors, hospitals, pharmacies and water utilities.

Transboundary and regional issues

Some countries mentioned the need for **transboundary cooperation** in shared water basins. Since the cost of action can be high, particularly for wastewater treatment, this can raise the question of who should act and who should pay. In the **Rhine River basin**, it was agreed that every country would take action at their level and pay for their action. In the **Baltic Sea** region, an EU regional strategy for hazardous substances facilitated a policy network and stakeholder dialogue to reduce water pollution, including pharmaceuticals, and share information. A status report on pharmaceuticals in the Baltic Sea region provides a baseline and identifies monitoring gaps - which are now being addressed.

Developing economies face distinctive challenges where access to, and the level of, wastewater treatment is comparatively low to OECD member countries. A hotspot-based approach can target technological and policy solutions to where pollution is greatest. Where products are made in developing countries, but consumed in OECD countries, OECD countries may play a role in encouraging more environmentally-friendly manufacturing practices.

Barriers to action and how to overcome them

Barriers to action identified in the *2017 OECD Questionnaire on Contaminants of Emerging Concern in Freshwaters* include:

- The high costs involved and limited resources.
- Knowledge-related barriers, such as insufficient evidence (high uncertainty) and absence of a systematic approach for risk assessment.
- Legislative barriers, including a lack of: frameworks to develop legislation, flexibility of legislation, and control over internet purchases.
- Regulatory boundaries to apply the precautionary principle.
- Resistance from industry.

Some participants suggested that one way of dealing with the uncertainties surrounding CECs is to follow the **Precautionary Principle**; to mitigate potential environmental and human risks despite a lack of certainty. However, there is an "uncertainty paradox" in that current policies build on a scientific-testing-and-regulation paradigm, which is ill-adapted to deal with the uncertainties inherent to CECs.

In a 2013-14 survey of 209 state and non-state actors participating in policy-making on CECs in France, Netherlands, Switzerland and Germany, there was widespread support for precautionary, source-directed policies from national and regional/local governments, academia, water associations and environmental associations. However, there was resistance from industry and agricultural associations for such policies. There was general support for voluntary and regulatory instruments. Economic instruments showed higher rejection rates.

A number of key concerns were raised by participants including: legislative-regulatory frameworks, transparency and availability of data, costs and benefits (as well as distribution of costs) and how to combine hotspot approaches with broader national level approaches.

The lack of **data and evidence for policy development** was acknowledged by participants as a major challenge. Data on chemical use, volumes, hazard and exposure is critical for regulators but is often missing. A mechanism to inform countries which data to collect and how to prioritise substances to monitor would be helpful. Tools are available to generate new data and accelerate data collection. Access and better use of existing data could be improved.

Some participants suggested that the **Substitution Principle** and the identification and development of safer substitutes for hazardous chemicals merit further exploration. The substitution principle in this context requires that CECs should, wherever possible, be replaced with alternatives which have a lower impact on the environment (i.e. hazardous chemicals should be systematically substituted by less hazardous alternatives or preferably alternatives for which no hazards can be identified).

One participant highlighted that pharmaceuticals are not differentiated by their environmental impacts when government subsidies for public health medicines are determined, or when medical practitioners prescribe medications to patients. Information on environmentally harmful chemicals, products and pharmaceuticals need to be developed and communicated to enable environmental considerations and the use of the Substitution Principle in decision-making processes.

Cost-benefit analyses can inform decisions around which policies (source-directed or end-of-pipe) and technologies to use for reducing CECs, and where to prioritise implementation. Some participants noted that the challenge for policy agencies is to quantify the benefits of action with limited information; a major limitation of cost-benefit analysis is estimating the value of benefits as well as the cost of business-as-usual in the absence of firm science. Informing and consulting with health, chemical safety and environmental professionals and stakeholders are important in this regard. A stated preference survey conducted by UK Chemicals Investigation Programme found the benefit value of improving compliance with the environmental quality standard for heavy metals from 90% to 95-100% was approximately GBP 73-114 per household per year. For legacy and emerging flame retardants, the value of benefits from a 30-50% reduction over 20-30 years was estimated at around GBP 107-168 per household per year. However, scaling such valuations to actual scenarios has been a challenge and gaps in the methodology remain. For instance, respondents to the stated preference survey did not distinguish clearly and consistently between different scales of improvement.

Background information and Next steps

The *OECD Workshop on Managing Contaminants of Emerging Concern in Surface Waters* was dedicated to bringing together the chemical safety and the water quality policy communities to discuss common issues and how to address them. Over 70 participants attended including delegates of the Joint Meeting of the Chemicals Committee and the Working Party on Chemicals, Pesticides and Biotechnology (JM), delegates of the Working Party on Biodiversity, Water and Ecosystems (WPBWE), members of the Business and Industry Advisory Committee, and representatives from water utilities, the pharmaceutical industry, academia, IGOs and NGOs.

The agenda, speaker presentations and a list of participants from the workshop are available on the OECD Water webpage.

Key messages of the workshop will inform an OECD report on policies to manage CECs. Draft versions of the report, including preliminary policy recommendations, will be circulated for comment to delegates of the JM and WPBWE and workshop participants. The final report will be released at the end of 2018. As agreed by WPBWE and JM delegates, the report will focus on policies to manage pharmaceuticals in surface water.