11th meeting of the WHO International Network of Drinking-water Regulators (RegNet)

13-14 and 20-21 July 2021
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**Abbreviations and acronyms**

ADERASA  Asociación de entes reguladores de agua potable y saneamiento de las Américas  
CWIS  Citywide Inclusive Sanitation  
DNACPN  Direction Nationale de l'Assainissement et du Contrôle des Pollutions et des Nuisances  
DWI  Drinking Water Inspectorate  
ENDWARE  European Network of Drinking Water Regulators  
ERAS  Ente Regulador de Agua y Saneamiento  
ESAWAS  Eastern and Southern Africa Water and Sanitation Regulators Association  
EU  European Union  
GLAAS  Global Analysis and Assessment of Sanitation and Drinking-Water  
IDB  Inter-American Development Bank  
ISO  International Organization for Standardization  
JMP  WHO/UNICEF Joint Monitoring Programme on Water Supply, Sanitation and Hygiene  
NWASCO  National Water Supply and Sanitation Council  
OSS  On-site sanitation system  
PFAS  Per- and polyfluoroalkyl substances  
RegNet  WHO International Network of Drinking-water and Sanitation Regulators  
SADC  Southern African Development Community  
SDGs  Sustainable Development Goals  
WASH  water, sanitation and hygiene  
WASREB  Water Services Regulatory Board  
WHO  World Health Organization  
WSRC  Water Sector Regulatory Council
**Summary and key outcomes**

This report summarizes the proceedings of a four-day virtual meeting of the World Health Organization (WHO) International Network of Drinking-water and Sanitation Regulators (RegNet). The meeting was held on 13-14 and 20-21 July 2021. The overall objectives of the meeting were to:

- Discuss regulatory challenges among members and share advice;
- Share challenges and good practice in regulating small water supplies, including:
  - use of data to inform and drive remedial action;
  - key needs for strengthening water quality surveillance;
- Present the WHO Guidelines on Sanitation and Health and share experience and good practice in:
  - regulatory options for different steps of the sanitation service chain;
  - developing regulations and treatment standards for wastewater effluent and faecal sludge; and
- Update on key WHO activities related to regulation of drinking-water and sanitation / wastewater services.

**Key discussion topics**

The key discussions and related follow-up activities are outlined below:

- *Increased focus on sanitation regulation*: the formal title of RegNet and terms of reference have been updated to include the new emphasis on sanitation/wastewater, although discussions of how to incorporate sanitation into meetings and discussions (i.e. having mixed or separated water and sanitation content and participants) did not reach consensus.
  - *Follow-up*: WHO is seeking participation of RegNet members in the development of wastewater treatment standards, including reviewing drafts and providing case studies. Interested members can contact Sophie Boisson.
  - *Follow up*: RegNet members with exclusive responsibility for drinking-water will identify and contact counterparts responsible for sanitation and link them with the WHO Secretariat for potential future membership in RegNet. The Secretariat will also follow up on topics related to onsite sanitation covered during the meeting.
• **Small and onsite water supply and sanitation systems:** WHO presented the ongoing revision of guidance for regulating small and onsite water supply systems. As the mandate of service providers expands to include areas beyond urban centers, the regulation and surveillance of small and onsite sanitation and drinking water systems will need to be incorporated into regulatory frameworks. Issues of enforcement (including incentives and barriers), cost recovery and localization of national regulations will need to be addressed.

  o **Capacity-building:** In countries where regulations have been established but implementation and enforcement is difficult, members identified a need for capacity-building guidance and tools. This includes capacity-building related to data collection for drinking-water quality monitoring.

  o **Follow-up:** RegNet members will share feedback on the provided draft section on using data to make decisions from the small systems guideline. Jennifer De France WHO will also send the updated guideline sections to RegNet members for feedback in due course.

  o **Data collection and use:** WHO presented ongoing investigations into field testing methods and lab strengthening initiatives. Surveillance of drinking water and wastewater management systems can be costly; it is a challenge to collect representative data using validated instruments and methods, especially in rural areas or for small systems. Translating monitoring data into policy recommendations is a challenge, although members have had success in using public pressure to incentivitize operator improvements.

• **Institutional landscapes:** As the regulatory landscape grows more complex, roles and responsibilities for service providers, regulators, and local authorities must be clearly defined. Members discussed challenges and lessons learned related to evolving institutional landscapes.

• **Resilience:** the WHO Secretariat presented current and draft WHO guidance for risk-based approaches to water, sanitation and hygiene (WASH) services; this guidance includes multi-barrier approaches to crises including climate change, conflict, and emerging crises.

• **Contaminants of concern:** RegNet members discussed their drinking-water quality priorities, including chemical contaminants. Contaminants including per- and polyfluoroalkyl substances (PFAS), pesticides, and micropollutants are increasingly detected in drinking water globally, but technological detection advances outpace
understanding of human health impacts, so regulators struggle to set public health standards and articulate the public health risks.

- **Other chemicals of concern**: ensuring drinking-water quality in small supplies was highlighted including issues with elevated arsenic, manganese and lead. WHO provided an update on the lead technical brief, which will be shared with RegNet members before finalizing.

RegNet members and the Secretariat can support the pursuit of access to safely managed services through:

- **Increased information exchange**: There is room for increased exchange between members and regional networks, including facilitating bilateral discussion, RegNet member access to publicly-available resources. The inclusion of sanitation in the RegNet mandate will require a balance between synergistic learning and burdens of membership and meeting attendance. Members requested a virtual hub with resources and member profiles to facilitate more frequent connections between members.
  - **Follow-up**: RegNet secretariat will explore options for promoting ongoing exchange among members, including a resource library and communication platform. In addition, the Secretariat will continue efforts to strengthen engagement with regional regulators’ networks, including convening joint training workshops; providing technical input to regional initiatives; as well as working with RegNet member countries to promote the establishment of regional regulators’ networks where there are currently none.

- **Capacity-building tools and guidance**: Ongoing and further expansion and revision of WHO guidance and tools especially related to small and onsite systems will be beneficial to RegNet members. Increased exchange between RegNet members and regional networks will facilitate resource sharing.
  - **Follow-up**: WHO called for members to share their own non-private resources and tools for incorporation into the resource library.

**Background**

RegNet was established in 2008 as a platform to share experiences and to promote best practice relating to the regulation of drinking-water quality. The network aims to promote public health protection by increasing access to safe drinking water through the continual improvement of
regulatory systems. The Water, Sanitation, Hygiene and Health unit at the WHO headquarters acts as Secretariat to RegNet and coordinates network activities. In 2019, the mandate of RegNet was expanded to include sanitation and wastewater management in addition to drinking water.

Meeting Proceedings

The 11th meeting of the network was attended by approximately 40 participants, including RegNet members, invited participants, and members of the WHO Secretariat. The meeting opened with a welcome from Bruce Gordon of WHO, followed by introductions from participants and the commencement of meeting presentations and discussions as outlined below.

Session 1: Updates since previous meeting

Session 1 focused on updates from members, regional regulators’ networks, and the Secretariat since the 2019 meeting.

Asociación de Entes Reguladores de Agua y Saneamiento de las Américas (ADERASA) – Mr. Oscar Pintos

ADERASA was established almost 20 years ago, and has 19 member states in Latin America and the Caribbean. All member states were affected by the COVID-19 pandemic. However, ADERASA was able to remain active since 2019, holding virtual workshops and establishing a partnership with the Inter-American Development Bank (IDB) and LisWater and regulators, RegWAS LAC. The partnership is aimed at strengthening public policy and regulation of water and sanitation services in the region.

Mr. Mohammad Al Hmaidi [Water Sector Regulatory Council (WSRC), Occupied Palestinian Territories] asked about policy impacts of ADERASA’s work. Mr. Pintos (ADERASA) replied that they are currently pursuing a benchmarking program, which will make comparisons within the region and globally; these findings will guide the development of regulatory policies. Another tool allows self-assessment by operators in addition to assessment by regulators.

Mr. Rachid Wahabi [Ministry of Health, Morocco] asked about the operations of ADERASA, specifically how meetings and membership are managed when each country has their own

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1 For further information regarding the specific goals and objectives of RegNet, as well as information pertaining to eligibility for membership, please refer to http://www.who.int/water_sanitation_health/dwq/TORRegNet.pdf?ua=1
regulations and structure. Mr. Pintos (ADERASA) answered that countries in Latin America have similar models of regulation, but implementation speed varies among countries. One of ADERASA’s goals is to encourage and assist countries in their progress of developing and implementing regulatory frameworks.

*European Network of Drinking Water Regulators (ENDWARE) – Ms. Susana Rodrigues*

A current focus area of ENDWARE is the recast and transposition of the Drinking Water Directive [(DWD) Directive (EU) 2020/2184] adopted by the European Parliament and the Council on 16 December 2020. Protocol on Water and Health links with the new DWD by giving a special focus on equitable access to water and sanitation, developing a water access toolbox to enable and assist local authorities in the identification of marginalized groups. This toolbox includes an equitable access score-card, which can be used to address access to water obligations under article 16 of the DWD.

Other ENDWARE topics include contaminants such as pesticides and PFAS, small-scale water supply systems, alternatives to chlorination (including oxidation with ozone, ultraviolet (UV) disinfection, or reverse osmosis), and non-revenue water.

*Eastern and Southern Africa Water and Sanitation (ESAWAS) Regulators Association – Mr. Kasenga Hara*

ESAWAS is a regional association with ten member countries focused on capacity building, information sharing, and regional regulatory cooperation.

ESAWAS is expanding the focus to non-sewered sanitation systems, including the development of tools such as guidelines for inclusive urban sanitation service provision, guidelines for tariff setting, and guidelines and tools for Citywide Inclusive Sanitation (CWIS) delivery.

*Presentation Themes*

- Regional regulators identified focus areas including: diversity of system types (e.g., small, non-sewered); guidance documents and tools for members; variability in implementation and enforcement among members.
- Partnerships between regional associations would facilitate bilateral dialogue, learning, and resource-sharing. For example, ESAWAS is interested in functional collaborations with ADERASA and the Southern African Development Community (SADC).
**Breakout Rooms and Discussion**

In order to facilitate discussion, the meeting was divided into seven breakout rooms with 3-4 participants each. In addition to reactions to the updates from regional regulator networks and the WHO Secretariat, discussion was focused on what members value about RegNet and would like to see from RegNet in the future.

The group agreed that value of RegNet is in the opportunities for cooperation and resource sharing; members may benefit from increased frequency of meetings and access to other members. This is especially important given the diversity of experience and progress of members; facilitating bilateral conversations between countries at similar stages would be beneficial.

The incorporation of sanitation into the RegNet mandate is appreciated by members, but Mr. Wahabi (Ministry of Health, Morocco) would like to consider the incorporation of hygiene, although Mr. Pintos (ADERASA) stated that regulators are often focused on service delivery. Group 2b agreed that a comprehensive health focus cannot entirely exclude hygiene.

**Session 2a: Regulating sanitation services**

This session presented the state of global sanitation and presented an overview of the WHO Guidelines on Sanitation and Health. The purpose of the session was to sensitize participants to regulatory aspects of the Guidelines, and illustrate, using a country case study establishment of mandates and responsibilities in regulation of sanitation services.

*Setting the scene and overview of the WHO Guidelines on Sanitation and Health with a focus on regulatory aspects –Kate Medlicott and Sophie Boisson*

Target 6.2 of the Sustainable Development Goals (SDGs) seeks to ensure adequate and equitable sanitation for all by 2030. A new initiative under the SDG 6 Global Acceleration Framework seeks to fast-track progress in achieving this goal\(^2\). There are five SDG6 accelerators with regulatory components: governance, financing, capacity development, data and information, and innovation. Although the role of the health sector in sanitation has declined, the risk management

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\(^2\) [https://www.unwater.org/publications/the-sdg-6-global-acceleration-framework/](https://www.unwater.org/publications/the-sdg-6-global-acceleration-framework/)
approach to sanitation service delivery requires health sector involvement for key functions outlined in recommendation 4 of the WHO Guidelines on Sanitation and Health.

Mr. Al Hmaidi (WSRC, Occupied Palestinian Territories) asked about the relationship between sanitation service delivery and political stability; a crisis situation compounds the difficulties in delivering service, including resource and time costs. Ms. Medlicott (WHO) responded that resilience-focused strategies such as the risk-based approach recommended in the Guidelines on Sanitation and Health allow for the consideration of risks such as political instability as well as climate and other risks.

Mr. Wahabi (Ministry of Health, Morocco) highlighted the changing role of the health sector in sanitation delivery, and asked if Ministries of Health should develop health-based regulations (such as effluent guidelines). Ms. Boisson (WHO) responded that health officials have a key role in ensuring that systems protect public health, and regulations such as effluent guidelines are in alignment with WHO recommendations.

An ongoing issue in Morocco is the discharge of industrial effluent into domestic sewage collection and treatment systems, causing treatment disruptions. Ms. Boisson (WHO) responded that the current Guidelines on Sanitation and Health focus on microbiological risk, but industrial effluent and associated chemical contaminants also need to be addressed. Ms. Medlicott (WHO) recommended that industrial discharges undergo pre-treatment to remove chemicals before discharge to sewer networks.

Country case study: defining mandates and responsibilities in regulation of sanitation services, Zambia – Peter Mutale

The National Water Supply and Sanitation Council (NWASCO) of Zambia regulates water and sanitation services, and recently developed frameworks for sanitation service provision and regulation. Mr. Mutale’s presentation covered the ongoing and historical role of NWASCO and detailed their current focus, the delineation of roles and responsibilities within the sanitation service delivery and regulation sector.

NWASCO works within a network of ministries, local authorities, and national agencies which develop policy guidance, issue licenses, and develop and enforce standards. However, these roles and responsibilities are not clearly delineated, and improved coordination between actors is
necessary. NWASCO aims to collect better data on existing service provision, including by private operators and community-based organizations. This will include geospatial (GIS) mapping and a comprehensive survey.

An expanded area of focus is onsite sanitation systems; urban onsite sanitation systems are not regulated, and NWASCO is developing tools, programs, and guidance to regulate and provide onsite sanitation systems.

Discussion

Mr. Al Hmaidi (WSRC, Occupied Palestinian Territories) raised a concern regarding limited enforcement capacity. He also requested a RegNet hub or resource center for exchange of materials, and noted that a sector-wide focus on prioritizing sanitation and wastewater management for reasons related only to public health, rather than including environmental health, may be limiting as reuse of treated effluent (including for groundwater recharge) is a priority in the Occupied Palestinian Territories. Mr. Al Hmaidi also discussed the presence of non-regulated small systems by non-governmental organizations (NGOs), and the challenges of ensuring that every resident receives the same treatment regardless of their service provider. NGOs in Zambia cannot do any work without supervision by the licensed local commercial utility. Mr. Mutale noted that the rules must be clear, but that the requirements guide cooperative relationships which lead to consensus-building.

Mr. Wahabi (Ministry of Health, Morocco) raised the need for sanitation metrics and targets: in Morocco, drinking water regulations have played a key role in public health, and sanitation services need similar standards. However, the institutional and financial capacity is lacking, which limits implementation ability and enforcement at the local level. He asked if it is the mandate of the health sector and officials to ensure compliance. Ms. Medlicott (WHO) responded that the Guidelines on Sanitation and Health do not assign responsibility to any specific ministry, but rather recommends the actions and advises flexibility in implementation and enforcement. Each country should decide how to delegate responsibility and authority within their own system.

Mr. Hara (NWASCO, Zambia / EASAWAS) stated that the mandates for onsite sanitation within Zambia are spread across multiple institutions, including the Ministry of Local Governments and
the Ministry of Health. He also discussed the importance of stakeholder engagement in delegation of roles and responsibilities, and noted that ESAWAS recently led a brainstorming session which allowed members to discuss their institutional landscape.

In the Occupied Palestinian Territories, there are issues of authority, such as when a young regulatory agency imposes licensing requirements in and on municipalities which were established hundreds of years ago. Mr. Mutale (NWASCO, Zambia) noted that clarity in requirements and laws is paramount; in Zambia, NWASCO, which started operating in 2000, established a requirement that any service provider must be licensed, but because of the clarity of the rule, there could be no argument.

**Session 2b: Regulating sanitation services: On-site sanitation systems**

Session 2b focused on regulatory tools and instruments for onsite sanitation systems, and included an overview of WHO tools and guidance and an illustrative case study on monitoring and inspection tools for onsite systems.

*Instruments and mechanisms to regulate onsite sanitation and overview of regulatory mechanisms – Sophie Boisson*

This presentation focused on the sanitation safety planning (SSP) approach recommended in the Guidelines on Sanitation and Health and its application in the implementation and regulation of onsite sanitation systems. The recommended SSP step-by-step approach is:

- Describe the system;
- Identify hazardous events, existing control measures, and exposure risks;
- Develop an improvement plan;
- Monitor control measures and verify performance; and
- Develop supporting programmes and review plans

The multi-barrier approach which is recommended by WHO includes and allows for risk assessment at each stage. WHO guidance also provides examples of legislation and regulation at each step in the approach, which is representative of the global variation in regulatory progress.

Discussions highlighted that drinking water safety planning (WSP) in Morocco is currently voluntary, but will be made mandatory next year. Mr. Wahabi (Ministry of Health, Morocco) inquired about ISO14000 standards, and if WHO guidelines are consistent with ISO standards,
which would give credibility to any country-specific regulations based on such. Ms. Medlicott (WHO) noted that WHO guidelines are generally consistent with ISO, although ISO standards are typically more detailed.

Mr. Al Hmaidi (WSRC, Occupied Palestinian Territories) asked if the WHO Sanitation and Health Guidelines include guidelines for treated effluent to be used for aquifer recharge, and Ms. Boisson (WHO) noted that the focus of the guidelines is public health, not specific environmental outcomes.

Country case study: National standards and guidelines for onsite systems, Ireland – Eimear O’Keeffe

Ms. O’Keeffe presented a case study of the institutional landscape and roles and responsibilities for monitoring onsite sanitation systems in Ireland, based on the 2013 National Inspection Plan. There are four components of Ireland’s regulatory system:

- Planning control and standards;
- Inspections;
- Registration and grants; and
- Complaints

The inspection component of the system was the focus of the presentation; the regulations mandate inspections of a minimum of 1,000 systems annually. Sites are selected using a risk-based approach and are chosen to be representative of the systems nationwide. The process allows for variances and remediation in the case of inspection failure. A major component of the system is public engagement; major campaigns focused on inspections, system operation, and remediation options have been successful.

Mr. Wahabi (Ministry of Health, Morocco) asked about the budget for Ireland’s inspection program, which is implemented by water and wastewater authorities throughout the country, and the budget is therefore shared. However, as Ms. Medlicott (WHO) noted, annual inspections of a representative 1,000 systems is not overly costly, and Ms. O’Keeffe [Environmental Protection Agency (EPA), Ireland] noted that the risk-based system allows for prioritization of areas of concern.
Mr. Christian Schaetti (Food Safety and Veterinary Office, Switzerland) asked about the proportion of households in Ireland relying on onsite sanitation systems, and Mr. Al Hmaidi (Occupied Palestinian Territories, WSRC) asked if the assumption is that onsite sanitation systems are septic systems. Ms. O’Keeffe (EPA, Ireland) responded that more than 90% of onsite sanitation systems in the country are septic, and noted that residents of rural areas rely primarily on onsite sanitation systems while denser areas provide municipal sewerage. Mr. Rick Johnston (WHO) commented that, according to estimates by the WHO/UNICEF Joint Monitoring Programme on Water Supply, Sanitation and Hygiene (JMP), approximately 25% of Ireland’s population relies on onsite sanitation systems, and that global growth in onsite sanitation is faster than growth in sewer connections.

Mr. Massa Antoine Traore (National Directorate for Sanitation, Pollution, and Nuisance Control, Mali) asked about the logistics of scheduling and conducting on-site sanitation system (OSS) inspections in Ireland. Ms. O’Keeffe (EPA, Ireland) responded that the regulatory agency uses risk-based mapping based on groundwater, surface water, and soil types to identify risks and determine the number of inspections required within each region. She noted that not every system is inspected, and that the 1,000 inspections are intended to be representative.

**Session 3a: Regulating small water supply systems**

This session provided an update on the revision of the Guidelines for Small Drinking-water Supplies, and used a case study to discuss the use of data to inform and drive enforcement.

*Status update on revision of WHO Guidelines for Small Drinking-water Supplies, and key information gaps – Ms. Jennifer De France*

The WHO guidelines for small water supplies are currently being revised. Some key aspects to note relate to the definition of small supplies, service level disparities between urban and rural areas with the latter typically being served by small systems; and health disparities between small and large centrally managed systems. Definitions of small water supply systems vary in each country. WHO notes that such systems are often characterized small systems by a common set of managerial, operational, technical, staffing and/or financing challenges that impact their ability to deliver safe and adequate drinking-water. Surveillance and implementation and enforcement of regulations are lower in rural as opposed to urban areas, emphasizing the need for specific regulatory considerations for small systems. Revisions in the current guidelines
include expanded focus on a variety of system types, including community-managed boreholes and a focus on risk management in alignment with the Framework for Safe Drinking Water. The sanitary inspection tools have been updated to include fact and management advice sheets and sanitary inspection forms for an expanded range of technologies. The revised guidelines will also include greater emphasis on data use, to ensure that it is informing and driving improvement of these small systems.

Country case study: Management and use of data from small systems to inform and drive action, Bhutan – Chimmi Dorji

Mr Chimmi Dorji from the Ministry of Health in Bhutan presented a case study illustrating the need to use data to inform improvement of small systems. The presentation discussed the findings of two national water quality surveillance assessments in Bhutan, which found that the data collection and management systems are efficient and effective, and that surveillance officers are compliant with data collection mandates. They also found that water quality reports generated are accessible and clear, although the findings are insufficiently used to achieve water quality improvement. Data sharing and enforcement are lacking, so five proposed solutions, including improved advocacy, engagement, reporting, and capacity building, were developed. Mr. Dorji closed the presentation by asking fellow RegNet members for advice in fostering a culture of using assessment results to make and implement water quality improvements.

Mr. Johnston (WHO) highlighted that the case study shows that there are good mandates and systems for surveillance, but that some problems persist. Mr. Al Hmaidi discussed his experience in Occupied Palestinian Territories, where it was discovered that methods of sampling by service providers were not compliant with WHO guidance. A new format for monitoring, based on the collected data, is being piloted. All recommendations for policy are presented to the Cabinet.

Mr. Joselito Riego de Dios (Department of Health, the Philippines) spoke about the drinking water quality monitoring committee operating in Metropolitan Manila. The committee uses monitoring data to develop reports, findings of which are published in local newspapers and discussed with local health officers and policymakers. Potential improvements are discussed with and supported by local officials.

Mr. Alejo Molinari [Ente Regulador de Agua y Saneamiento (ERAS), Argentina] discussed the importance of benchmarking and sharing findings in the public domain. In Brazil, where a
regulator had a problem with small system operators providing water of very low quality, the publication of water quality data in newspapers forced operator quality improvements. He also discussed the challenges of small remote communities in Argentina, where the technical and financial capacity of small systems is often insufficient to adequately manage chemical contaminants such as arsenic.

Ms. Katherine Pond (University of Surrey, United Kingdom), in discussing her work with sanitary inspection forms, highlighted the discrepancy between those collecting data and decision-makers who use that data. She stressed the importance of explaining the purpose for data being collected.

Ms. O’Keeffe (EPA, Ireland) discussed the training and engagement strategy integral to Ireland’s OSS inspection program, including results communication and experience exchange between regulators, inspectors, and service providers.

Discussion

Mr. Johnston (WHO) posed two questions related to good practice examples or areas for improvement related to the use of data in the development of policy related to small systems. The questions were:

- Do you have any good practice examples or insights to share related to the use of data from small systems to inform and drive action (including formalized processes for data-based decisions)?
- What are one or two key focus areas for improving data use incrementally and within resource limitations?

Ms. Stephanie McFadyen (Health Canada) discussed an outbreak of *Escherichia coli* in a small Canadian system, which was caused by a lack of understanding of public health impacts of water quality monitoring data, which led to insufficient chlorine residual levels. Since the outbreak, operators are now required to be certified, ensuring that they understand the public health impacts of water quality monitoring data and how to react to such data.

In Portugal, as discussed by Ms. Helena Costa (ERSAR), small systems are regulated in the same way as larger systems. Each operator uses a national software which links health authorities and operators for immediate feedback following water quality monitoring results. Benchmarking and
other data are used to develop annual national reports which produce public pressure on service providers.

Ms. Laura Moss [Drinking Water Inspectorate (DWI), United Kingdom] noted that in England and Wales there has been a disconnect between monitoring and risk assessment. Despite the number of tools and training that have been developed / conducted for private supplies, improvements in water quality have been relatively slow.

Mr. Al Hmaidi (WSRC, Occupied Palestinian Territories) discussed the experience of Occupied Palestinian Territories, where the Ministry of Health conducts water quality and operational inspections. The goal is to incorporate self-inspection and regulator inspection into a program which compares operators over time, attempting to foster competition.

In Zambia, the regulations are based on WHO guidelines. Each district has a partner inspector working under the national mandate who is responsible for the trends in their own region.

Discussion themes included:

- Clear definition and understanding of the institutional landscape; specifically, roles and responsibilities and their legal foundations
- Using public engagement and transparency to incentivize operators to make service and quality improvements
- Development of capacity, including training programs, engagement, and intervention support

**Session 3b: Regulation of small water supply systems: water quality surveillance**

The purpose of session was to update on initiatives to strengthen water quality surveillance, including strengthening water quality laboratories and evaluation of field-based test kits for faecal contamination, and seek input on regulatory considerations.

_Evaluation of field-based test for faecal contamination – Rick Johnston_

UNICEF, in collaboration with WHO, has developed a Rapid Water Quality Testing project to catalyse the continuous improvement of existing portable water quality testing products, and the development of innovative new products which might allow more efficient, accurate, or low-cost testing of drinking water quality in the field. The field kit evaluation is in two parts: laboratory
testing against reference methods, that is being led by WHO, and field trials to be led by UNICEF. Mr Johnston presented an overview of the laboratory testing which is being conducted in two phases: using synthetic waters and laboratory strains of *Escherichia coli* (*E. coli*); and using natural waters and wild strains of *E. coli*. The field test kits under evaluation include both concentration and presence/absence tests. Results are mixed, especially under varying temperature conditions. This is an issue for members who anticipate inconsistent availability of incubation technology, which will be explored in subsequent phases of the evaluation.

*Overview of lab strengthening initiative and summary of efforts and findings to date – Knox Coleman*

WHO is seeking to strengthen capacities of water quality laboratories in various countries. The presentation outlined the proposed objectives of the lab strengthening initiative, and findings of lab capacity assessments in four countries. The initiative aims to develop guidance materials, trainings, and tools to address priority gaps identified in the capacity assessments. These gaps exist throughout the data collection and management process, and include sampling plans and tools, lab accreditation, data management and reporting, and the use of data for decision-making.

*Discussion*

Ms. De France (WHO) posed questions about members’ experiences, concerns, and goals related to field test kit use and implications for regulation.

Mr. Al Hmaidi (WSRC, Occupied Palestinian Territories) cautioned that systems for data management and use need to be developed before selecting test kit strategies; for example, mandates such as responsibility for data collection and follow-up, as well as enforcement of rules for non-compliant operators need to be established. He was also concerned about the place of field test kits within local laws. He proposed a field test hub which may allow for coordination and support of large numbers of service providers conducting water testing.

Mr. Richard Cheruiyot (WASREB, Kenya) also discussed enforcement challenges with large numbers of operators. In Kenya, portable test kits are allowed for routine surveillance if users comply with testing method standards, but some systems have capacity issues, including energy requirements for incubation. An ongoing challenge is how to maintain compliance in remote
areas. Mr. Johnston (WHO) noted that often, the same equipment is used in the lab and the field, but a more pressing issue is the presence of qualified and trained personnel conducting the tests.

In the Philippines, test kit use by operators is allowed for assessment, not regulatory, purposes only. Regulatory testing must be conducted in a certified laboratory.

In the Occupied Palestinian Territories, Kenya, and Argentina, the testing kits and standard methodologies for their use must be approved by external agencies such as the Bureau or Institute of Standards.

Mr. Pintos (ADERASA) discussed the overlapping mandates between the Ministry of Health and regulatory authority in the collection and use of water quality data, as well as a successful case of water testing in Paraguay. In this case, mobile laboratories were able to access remote areas where the operator’s capacity was insufficient to conduct field testing. He highlighted the solution as a potential intermediary between field kits and laboratory work.

In Switzerland, water quality monitoring is not strictly regulated; rather, operators typically self-regulate and are tested at least once in four years annually by the cantonal authorities.

Discussion themes included:

- Focus on validation of test results and methods of ensuring testing is conducted by trained personnel under proper guidance
- Considerations of field testing within broader institutional and regulatory landscape, including ensuring that their use is compliant with all laws
- Connection of field testing results to concrete action and public engagement

Session 4: Standards and monitoring approaches for sanitation/wastewater services

This session discussed the development / revision of sanitation and wastewater regulations, and monitoring approaches for such regulations.

*Outline of guidance document on setting treatment standards for wastewater and faecal sludge – Sophie Boisson*

In follow-up to discussions held at the 2019 RegNet meeting, WHO is developing guidance on developing national standards for wastewater and faecal sludge treatment, analogous to the
Developing drinking-water quality regulations and standards guide. The guiding principles of the document are “fit for purpose” treatment, achievability, risk-based approaches, flexibility, and communication. The guidance document includes suggestions for regulation development, targets, monitoring processes, and analytical requirements.

Ms. Boisson (WHO) sought feedback from RegNet members regarding the draft document itself as well as current issues related to treatment standards for liquid effluent and sludge.

Overview of EU review of wastewater directive – Ms. Trudy Higgins

This presentation covered the revision of the European Union’s urban wastewater treatment directive, which generally applies to systems which serve 2,000 people or more. The updated directive focuses on a risk-based approach and requires a universal minimum of secondary treatment, although large systems or those discharging to sensitive areas are required to remove nutrients. The directive includes minimum monitoring requirements and failure limits, although member states often impose their own stricter requirements.

Areas of potential improvement in the revision include focus on small and individual systems, sensitive areas, contaminants of emerging concern, nutrients, monitoring and reporting, and information sharing. Similarly, future areas of focus include stormwater, sludge management, and climate change-related issues such as energy use and greenhouse gas and methane emissions.

The directive is currently open for public comment, and policy proposals are expected to begin in autumn 2021. Policy measures will need to align with other legislation and fit within the existing governance and institutional frameworks.

Discussion

Mr. Jonas Naissem (WHO, Chad) discussed issues of mixed effluents being discharged into the two main rivers in Chad and the public health implication of these discharges. Regulations exist, but enforcement is challenging, and regulators would benefit from a resource exchange, especially in French.

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Mr. Al Hmaid (WSRC, Occupied Palestinian Territories) is working on the update to Occupied Palestinian Territories’ medical waste master plan, and discussed the impact of protracted crises on effluent and sludge treatment processes and standards. Ms. Medlicott (WHO) responded that the benefit of the multi-barrier approach is that public health is not reliant on the protection of one system element. In Occupied Palestinian Territories, where treated effluent is used for recharge and irrigation, the “treatment fit for purpose” approach allows for consideration of use case before designing treatment systems.

*Strengthening monitoring approaches for on-site sanitation systems – Mr. Rick Johnston*

The largest data gap within SDG reporting is related to onsite sanitation systems, so the JMP is focusing on expanding data collection and reporting to highlight inequalities in use of onsite sanitation systems within and between countries. This discussion covered challenges related to monitoring safely managed onsite sanitation systems. These challenges include monitoring along the collection and treatment chain, collecting statistics that are representative, assessing inequalities in exposure, and how to convert and combine data from varied sources.

Mr. Al Hmaid (WSRC, Occupied Palestinian Territories) asserted that it must be the combined mandate of regulators, service providers, and local authorities, as no single agency would be able to collect comprehensive data. Focusing data collection at the local level and aggregating on the regional and national level will allow for delegation of responsibility. In Serbia, authorities are attempting to coordinate communication channels between health and other local authorities to facilitate the shared mandate.

In Kenya, the policy shift to include both sewered and non-sewered faecal waste management options will include formalized onsite service provision, but until these service providers and programs are established, data collection is difficult. It is expected that service providers will collect most of the data which will be verified by the oversight authority. This is the model in Portugal, but regulators do not assume complete data reliability.

In Latin America, onsite sanitation services are private services which are not necessarily regulated in the same way as municipal wastewater, so the challenge is to develop a representative data collection system with established procedures.
In Zambia, data collection tools have been incorporated into the national census, but commercial utilities are also required to collect data for benchmarking systems. Mr. Mutale (NWASCO, Zambia) believes that the regulator should lead data collection initiatives to ensure consistent information gathering over time.

**Session 5: Emerging regulatory challenges**

This session was a roundtable which allowed RegNet members to share their experiences, including successes and ongoing challenges.

*Roundtable discussion of members’ regulatory challenges, issues emerging from the meeting sessions, and updates*

In Argentina, an ongoing challenge is to regulate small water and wastewater systems which have not historically been regulated. In order to achieve SDG targets, Argentina needs to improve peri-urban and rural services, but will not be able to do so with universal piped services. Their regulatory and legal systems have been designed for large urban centers and their infrastructure and frameworks need to evolve to better include onsite sanitation system provision and regulation.

In Switzerland, there is low use of onsite sanitation systems because the majority of households is connected to municipal sewerage. A major issue for drinking-water service providers is the presence of micropollutants and pesticides in drinking water, including per- and PFAS. Methodologies for measuring traces of pollutants are improving, but a challenge is how to establish regulatory limits in balance with financial and technical constraints. Translate the ever-stricter drinking-water regulation into practice; the question on traces of pesticide metabolites in drinking water has created much debate recently in relation to a popular initiative and showed a deep rift between the agricultural and environmental sectors. Because toxicological and epidemiological evidence is outpaced by analytical advances, it is currently difficult to estimate human health impacts of potential limits.

In Europe generally, the main challenges related to drinking water include pesticides; metabolites; PFAS; and endocrine disruptors, and the technological capacities of countries and their laboratories, specifically the feasibility of ongoing monitoring. Additionally, equitable access to water is an issue in Europe, including for people with housing insecurity and travelers
who migrate throughout countries and the continent. Because the issue involves other social authorities including housing authorities, water access needs to be solved as part of a larger program. European countries are also concerned about non-revenue water losses, and the reuse of treated wastewater effluent.

In Singapore generally, water and sanitation services are reliable and regulators do not have many challenges. However, the outlying islands have issues with micropollutants and because residents are not universally served with piped water, they require point of use treatment options. Throughout Singapore, a challenge is to manage public expectations, although public engagement allows for quick action by a responsive provider.

In Chad, there is a challenge of implementing existing regulations, especially related to enforcement. To achieve this in Zambia, regulators engaged with all stakeholders to develop a regulatory framework, identifying roles and responsibilities. This ensured clarity and increased the likelihood of enforcement, including ensuring that only licensed providers can participate in the sanitation chain.

Ongoing challenges in Zambia include the regulation of rural services, which involves regulators amending licenses of commercial utilities to include their rural mandate, although the inclusion of rural service provision makes utility cost recovery and water quality monitoring more difficult. Non-revenue water is another challenge in Zambia, where there is a national task force working to reduce levels below the current 50%. Zambia is also incorporating climate change resilience into project and program requirements, and is in the early stages of incorporating water reuse into their mandates.

Many of the ongoing water and wastewater issues in the Occupied Palestinian Territories are related to transboundary agreements, although they are now developing improved wastewater treatment and reuse regulations. The Occupied Palestinian Territories are also working to regulate desalination vendors. They are seeking guidance on conducting regulatory impact assessment and are struggling to meet performance-based support requirements for water quality testing. The country has a large database of indicators including those related to gender and would be happy to share with RegNet members.

In Canada, where drinking water regulation is a shared responsibility among different levels of government, the largest challenge is small systems. There is ongoing outreach related to private
well testing, but not many households conduct regular water quality testing. This is of concern due to emerging issues with contaminants such as arsenic, lead, manganese, PFAS, and fluoride.

In Madagascar, the ministry currently serves the role of a regulator while the regulatory agency is being formed. Regulations and standards for water and sanitation systems have been drafted, and a training program has been established.

Discussion themes:

- Sanitation: onsite and small systems, recharge and reuse
- Drinking water: equitable access, non-revenue water, chemical contaminants
- General: climate change, difficulties implementing and enforcing regulations

Ms. De France (WHO) noted that a key role of RegNet should be to shape WHO agenda, and many of the discussed challenges are included in the WHO work plan, including guidance which include the spectrum of onsite, small, and large drinking water and sanitation systems and related regulatory issues, as well as improved guidance on emerging contaminants and water reuse.

Session 6: Operation and function of RegNet

This session covered member priorities and goals for RegNet.

Discussion

The updated Terms of Reference have been shared with and commented on by RegNet members, and seek to better incorporate small water supply and wastewater and sanitation services, as well as acknowledge the human right to water.

Discussion topics:

- Members were divided on level of inclusion and overlap RegNet should facilitate between issues related to water and sanitation. Generally, countries which regulate and/or provide these services separately advocated for separation within RegNet as well, while others discussed synergies and overlaps in content and advocated for cohesion.
- RegNet coordinators discussed mapping membership to identify opportunities for cross-cutting learning while allowing deeper specific conversations. Members advocated for an online RegNet hub which includes member profiles and a resource and information center.
• More incorporation of capacity-building guidance and tools into the work plan would be helpful to members. Regional networks have often developed their own tools, and encouraging relationships within and between regional networks would be helpful to members.

• Other linkages, including stormwater management and economic regulation, were discussed.

The meeting closed with a discussion of future in-person meetings with supplemental virtual exchange, and a commitment from the WHO Secretariat members to work to improve resource exchange and access.
Appendix 1 – Agenda

<table>
<thead>
<tr>
<th>Tuesday 13 July (Day 1)</th>
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<tbody>
<tr>
<td><strong>20 min</strong></td>
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<tr>
<td>Opening and welcome of participants</td>
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<tr>
<td>Overview of RegNet</td>
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<td>Meeting objectives</td>
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<td>Housekeeping</td>
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<thead>
<tr>
<th><strong>55 min</strong></th>
<th><strong>Session 1. Updates since previous meeting</strong></th>
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<tr>
<td>Objective: Update on Secretariat + regional activities since the previous meeting</td>
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<tr>
<td>Lead: Bruce Gordon</td>
<td>WHO</td>
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<td>Update from Secretariat (10 min)</td>
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<tr>
<td>Q&amp;A (5 min)</td>
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<td>Updates from regional regulators’ networks</td>
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<tr>
<td>• Asociacion de Entes Reguladores de Agua y Saneamiento de Las Americas (ADERASA)</td>
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<td>• European Network of Drinking Water Regulators (ENDWARE)</td>
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<td>• Eastern and Southern Africa Water and Sanitation (ESAWAS) Regulators Association</td>
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<tr>
<td>Discussion (in groups) + summary (25 min)</td>
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<tr>
<td>Kate Medlicott</td>
<td>Jennifer De France</td>
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<tr>
<td>Oscar Pintos</td>
<td>ADERASA, ENRASS</td>
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<tr>
<td>Susana Rodrigues</td>
<td>ERSAR</td>
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<tr>
<td>Peter Mutale</td>
<td>ESAWAS, NWASCO</td>
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<td>Rick Johnston</td>
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<th><strong>10 min</strong></th>
<th><strong>Break</strong></th>
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<tr>
<th><strong>60 min</strong></th>
<th><strong>Session 2a: Regulating sanitation services</strong></th>
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<tr>
<td>Objective: Present key concepts of the WHO Guidelines on Sanitation &amp; Health; sensitize participants on regulatory aspects; and share experience in establishing mandates and responsibilities for sanitation regulation</td>
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<tr>
<td>Lead: Kate Medlicott</td>
<td>WHO</td>
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<tr>
<td>Introduction of sanitation sessions (5 min)</td>
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<tr>
<td>Setting the scene and overview of the WHO Guidelines on Sanitation and Health with a focus on regulatory aspects (20 min)</td>
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<td>Q&amp;A (10 min)</td>
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<td><strong>Country case study</strong>: defining mandates and responsibilities in regulation of sanitation services, Zambia (10 min)</td>
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<td>Discussion (15 min)</td>
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<tr>
<td>Kate Medlicott</td>
<td>WHO</td>
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<tr>
<td>Kate Medlicott &amp; Sophie Boisson</td>
<td>WHO</td>
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<tr>
<td>Peter Mutale</td>
<td>NWASCO</td>
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<tr>
<th><strong>5 min</strong></th>
<th><strong>Session summary and close</strong></th>
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<tr>
<td>Kate Medlicott</td>
<td>WHO</td>
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<tr>
<td>Time</td>
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<tr>
<td>5 min</td>
<td>Recap from Day 1, overview of Day 2</td>
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<tr>
<td>65 min</td>
<td>Session 2b: Regulating sanitation services: on-site sanitation systems</td>
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<td>Instruments and mechanisms to regulate onsite sanitation and overview of regulatory mechanisms (10 min)</td>
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<td>Country case study 2: Conveyance for onsite systems/occupational health and safety and technical standards (Senegal) (10 min presentation + 15 min discussion)</td>
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<tr>
<td>65 min</td>
<td>Session 3a: Regulating small water supply systems</td>
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<td>Status update on revision of WHO Guidelines for Small Drinking-water Supplies, and key information gaps (10 min)</td>
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<td>Discussion</td>
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<td>5 min</td>
<td>Session summary and close</td>
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### Tuesday 20 July (Day 3)

| 5 min | Recap from Days 1-2, overview of Day 3  
Joselito Riego De Dios | Department of Health, the Philippines |
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<tr>
<td>65 min</td>
<td><strong>Session 3b: Regulation of small water supply systems: water quality surveillance</strong></td>
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| | Objective: Update on efforts to strengthen water quality surveillance, including review of laboratory capacity gaps, and update on evaluation of field test kits  
Lead: Jennifer De France | WHO |
| | Overview of lab strengthening initiative and summary of efforts and findings to date (10 min)  
Evaluation of field-based test for faecal contamination (15 min)  
**Discussion** |
| | • Q1: What are your thoughts and experiences on the use of field test kits for regulatory purposes (e.g. in what circumstances, validation required)?  
• Q2: What should be considered when selecting a field test kit (e.g. cost, portability, resolution)?  
**Session summary and close (5 min)** |
| | Knox Coleman | WHO  
Rick Johnston | WHO |
| 10 min | Break |
| 65 min | **Session 4: Standards and monitoring approaches for sanitation / wastewater services** |
| | Objective: Discuss the development / review of sanitation / wastewater standards, and update on emerging approaches to strengthen monitoring of on-site sanitation systems  
Lead: Kate Medlicott | WHO |
| | **Part 1.** Developing / reviewing regulations and standards for sanitation wastewater  
• Outline of guidance document on setting treatment standards for wastewater and faecal sludge (10 min)  
• Overview of EU review of wastewater directive (5 min)  
• Discussion (15 min)  
**Part 2.** Strengthening monitoring approaches for on-site sanitation systems (35 min) |
| | Sophie Boisson | WHO  
Trudy Higgins, European Commission  
Rick Johnston | WHO |
| 5 min | **Session summary and close** |
| | Kate Medlicott | WHO |
### Wednesday 21 July (Day 4)

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<tr>
<th>Time</th>
<th>Activity</th>
<th>Speaker/Lead</th>
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| 5 min | Recap from Days 1-3, overview of Day 4  
Alejo Molinari ¦ Ente Regulador de Agua y Saneamiento (ERAS), Argentina |                                    |
| 65 min| **Session 5: Emerging regulatory challenges**  
Objective: Share experience and best in addressing emerging regulatory challenges among RegNet members  
Lead: Jennifer De France ¦ WHO |                                    |
|       | Roundtable discussion of members’ regulatory challenges, issues emerging from the meeting sessions, and updates on |                                    |
| 10 min| **Break**                                                                                     |                                    |
| 60 min| **Session 6: Operation and function of RegNet**  
Objective: Seek input and consensus on priorities of the network, including expansion and governance of the network  
Lead: Jennifer De France ¦ WHO ¦ WHO |                                    |
|       | Updated Terms of Reference, strategy, and proposed next steps  
**Discussion:**  
- Engagement with other actors working on regulation  
- Engagement with other regional networks  
- Governance of the Network, and value for members | Jennifer De France ¦ WHO |
| 10 min| **Meeting close and next steps**  
Jennifer De France ¦ WHO |                                    |
## Appendix 2 – List of participants

<table>
<thead>
<tr>
<th>Name</th>
<th>Country</th>
<th>Title</th>
<th>Institution</th>
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<tbody>
<tr>
<td><strong>RegNet members</strong></td>
<td></td>
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</tr>
<tr>
<td>Alejo Molinari</td>
<td>Argentina</td>
<td>Benchmarking Manager</td>
<td>Ente Regulator de Agua y Saneamieto (ERAS)</td>
</tr>
<tr>
<td>Oscar Pintos</td>
<td>Argentina</td>
<td>President</td>
<td>Ente Regulator de Servicios Sanitarios de Sante Fe (ENRESS) Asociación de entes reguladores de agua potable y saneamiento de las Américas (ADERASA)</td>
</tr>
<tr>
<td>Stephanie McFadyen</td>
<td>Canada</td>
<td>Manager</td>
<td>Health Canada, Water Quality Division</td>
</tr>
<tr>
<td>Laura Moss</td>
<td>United Kingdom</td>
<td>Deputy Chief Inspector</td>
<td>Drinking Water Inspectorate</td>
</tr>
<tr>
<td>Michelle Minihan</td>
<td>Ireland</td>
<td>Senior Inspector, Drinking Water</td>
<td>Environmental Protection Agency</td>
</tr>
<tr>
<td>Eimear O'Keeffe</td>
<td>Ireland</td>
<td>Inspector</td>
<td>Environmental Protection Agency</td>
</tr>
<tr>
<td>Richard Cheruiyot</td>
<td>Kenya</td>
<td>Director, Monitoring and Enforcement</td>
<td>Water Services Regulatory Board (WASREB)</td>
</tr>
<tr>
<td>Fatima Olga</td>
<td>Madagascar</td>
<td>Directeur de la Cellule de Bonne Gouvernance</td>
<td>Ministère de l'Eau, de l'Assainissement et de l'Hygiène</td>
</tr>
<tr>
<td>Damassa Bouare</td>
<td>Mali</td>
<td>Deputy Director</td>
<td>National Directorate of Hydraulics</td>
</tr>
<tr>
<td>Massa Antoine Traore</td>
<td>Mali</td>
<td>Sanitation Regional Director</td>
<td>Direction Nationale de l'Assainissement et du Contrôle des Pollutions et des Nuisances (DNACPN)</td>
</tr>
<tr>
<td>Rachid Wahabi</td>
<td>Morocco</td>
<td>Chief of Environmental Health Division</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>Mahamat Saleh</td>
<td>Niger</td>
<td>Cadre</td>
<td>Ministère de l’Hydraulique Urbaine et Rural</td>
</tr>
<tr>
<td>Mohammad Al Hmaidi</td>
<td>Occupied Palestinian Territories</td>
<td>Chief Executive Officer</td>
<td>Water Sector Regulatory Council</td>
</tr>
<tr>
<td>Joselito Riego de Dios</td>
<td>Philippines</td>
<td>Chief Health Program Officer</td>
<td>Department of Health</td>
</tr>
<tr>
<td>Helena Costa</td>
<td>Portugal</td>
<td>Senior Technician</td>
<td>Entidade Reguladora dos Serviços de Águas e Resíduos (ERSAR)</td>
</tr>
<tr>
<td>Name</td>
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<td>Position</td>
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<tr>
<td>Susana Rodrigues</td>
<td>Portugal</td>
<td>Head of Quality Department</td>
<td>Entidade Reguladora dos Serviços de Águas e Resíduos (ERSAR)</td>
</tr>
<tr>
<td>Christian Schaetti</td>
<td>Switzerland</td>
<td>Scientific Officer</td>
<td>European Network of Drinking Water Regulators (ENDWARE)</td>
</tr>
<tr>
<td>Chun How Chan</td>
<td>Singapore</td>
<td>Senior Manager</td>
<td>Singapore Food Agency</td>
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<tr>
<td>Pranav Joshi</td>
<td>Singapore</td>
<td>Senior Assistant Director</td>
<td>Singapore Food Agency</td>
</tr>
<tr>
<td>Peter Mutale</td>
<td>Zambia</td>
<td>Chief Inspector</td>
<td>National Water Supply and Sanitation Council (NWASCO)</td>
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**Invited participants**

<table>
<thead>
<tr>
<th>Name</th>
<th>Country</th>
<th>Position</th>
<th>Organization</th>
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<tbody>
<tr>
<td>Chimmi Dorji</td>
<td>Bhutan</td>
<td>Water Quality Specialist</td>
<td>Public Health Laboratory</td>
</tr>
<tr>
<td>Anne Vezina</td>
<td>Canada</td>
<td>Risk Assessment Specialist</td>
<td>Health Canada</td>
</tr>
<tr>
<td>Trudy Higgins</td>
<td>Europe Union</td>
<td>Directorate General for Environment</td>
<td>European Commission</td>
</tr>
<tr>
<td>Bettina Rickert</td>
<td>Germany</td>
<td>Research Scientist</td>
<td>Environment Agency</td>
</tr>
<tr>
<td>Jo Herschan</td>
<td>United Kingdom</td>
<td>Graduate Student</td>
<td>University of Surrey</td>
</tr>
<tr>
<td>Katherine Pond</td>
<td>United Kingdom</td>
<td>Professor</td>
<td>University of Surrey</td>
</tr>
<tr>
<td>Catherine McManus</td>
<td>United States of America</td>
<td>Rapporteur; Graduate Student</td>
<td>University of North Carolina</td>
</tr>
<tr>
<td>Kasenga Hara</td>
<td>Zambia</td>
<td>Senior Inspector; Executive Secretary</td>
<td>National Water Supply and Sanitation Council (NWASCO)</td>
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**WHO Secretariat**

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<tr>
<th>Name</th>
<th>Country</th>
<th>Position</th>
<th>Organization</th>
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<tbody>
<tr>
<td>Jonas Naissem</td>
<td>Chad</td>
<td>National Professional Officer</td>
<td>World Health Organization Country Office</td>
</tr>
<tr>
<td>Guy Mbayo</td>
<td>Republic of Congo</td>
<td>Technical Officer</td>
<td>World Health Organization Regional Office for Africa</td>
</tr>
<tr>
<td>Sory Ibrahima Bouare</td>
<td>Mali</td>
<td>National Professional Officer</td>
<td>World Health Organization Country Office</td>
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<tr>
<td>Mariama Baissa</td>
<td>Niger</td>
<td>National Professional Officer</td>
<td>World Health Organization Country Office</td>
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<tr>
<td>Didier Allely</td>
<td>Switzerland</td>
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<td>World Health Organization Headquarters</td>
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<tr>
<td>Knox Coleman</td>
<td>Switzerland</td>
<td>Consultant</td>
<td>World Health Organization Headquarters</td>
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<tr>
<td>Jennifer De France</td>
<td>Switzerland</td>
<td>Team Lead, Drinking-water safety and quality</td>
<td>World Health Organization Headquarters</td>
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<tr>
<td>Bruce Gordon</td>
<td>Switzerland</td>
<td>Unit Head</td>
<td>World Health Organization Headquarters</td>
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<tr>
<td>Rick Johnston</td>
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<td>Technical Officer</td>
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<tr>
<td>Batsirai Majuru</td>
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<td>Team Lead, Sanitation and Wastewater</td>
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