



# WATER & RISK

Dear Reader,

This newsletter is brought to you by a WHO Collaborating Centre. As a Collaborating Centre, we are part of a worldwide network of over 700 institutes and organisations from over 80 Member States supporting the World Health Organization in their work. WHO mandate is to provide guidance to Member States for informed policy on health matters. With respect to the evidence-base of such guidance, from the beginning on, the WHO has decided not to establish own research institutions, but to rely on independent institutions, such as research institutes, parts of universities or academies, which are designated by the Director-General. The Collaborating Centres are centers for expertise focusing on specific themes in the complex field of health, which range from nursing, occupational health, health technologies, communicable and non-communicable diseases, nutrition, outbreak management to mental health.

The WHO is encouraging the Collaborating Centres to develop working relations with other centres and national institutions recognized by WHO, in particular by setting up or joining collaborative networks. To do so, the Collaborating Centres need to exchange information on their work to keep colleagues informed and to become known by the public. In January 2017, the eight European Collaborating Centres working in the field of water have agreed to strengthen their network and increase their visibility. This is thus the first of two dedicated issues, which aims at reflecting this aspiration by collecting information on who the “water” Collaborating Centres are, where they can be found and what is their current focus of work.

The Centres that we present in this and the next issues are very active at the global and the regional level, in particular in the WHO European Region. Their work is not only focused on scientific research, but they support WHO also in capacity-building activities and in the development of guidelines. Most of the presented Centers also support the implementation of the Protocol on Water and Health. The Protocol is an international legal agreement, recognized as a tool to “strengthen national action towards progressively reaching regional and global commitments for WASH and health”, as laid out in the Compendium of possible actions to advance the implementation of the Ostrava Declaration by the Sixth Ministerial Conference on Environment and Health.

We hope that you enjoy reading the factsheets and we encourage our readers to visit the Collaborating Center websites and get in contact with their experts. And if you work on different health topics, I trust there is a Collaborating Centre out there which can address your needs. Using the online database for Collaborating Centres will help you find it.

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## DWI Drinking Water Inspectorate WHO CC for Drinking-water Safety

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The Drinking Water Inspectorate is a WHO collaborating center (CC) for Drinking-water Safety since 2010. Located in London, UK, the CC offers a variety of expertise and multifaceted projects that deal with all aspects of water quality, availability and/or accessibility and are targeted at policy makers and/or practitioners in WHO European Region. In particular, the main areas of work are:

- WHO Guidelines for Drinking-water quality
- Water safety planning approach to management of large and small scale community drinking water supplies
- Drinking-water quality regulation for universal coverage

Besides the main partners within the WHO, the CC counts on the joint work with other partners of relevance in the water field:

- University of Surrey, UK
- Umweltsbundesamt (UBA), Germany
- KWR, The Netherlands
- RIVM, The Netherlands
- Public Health England, UK

### What does a CC in practice?

The CCs support WHO in creating and collecting scientific evidence as well as disseminating it. The team of the CC for Drinking-water Safety, for example, has

recently concluded with success a strategic workshop on future priorities under the UNECE-WHO/Europe Protocol on Water and Health and two workshops on small-scale water supply systems and sanitation, among others.

### Strategic Workshop on Future Priorities under the Protocol on Water and Health

The CC contributed to the strategic workshop on the Protocol for Water and Health to inform and substantiate the development of the programme of work for 2017–2019 under the Protocol. The workshop was held in Geneva on 7-8 March 2016 and it was aimed at confirming the rationale and relevance of the current working areas and at identifying additional priorities and possible partnerships for implementation.

### Workshops on small-scale water supply systems and sanitation in Kyrgyzstan 2015 and Albania 2016

The national workshops (Bulan Sogottu, Kyrgyzstan, 21-22 September 2015; and Tirana, Albania, 28-29 September 2016) were targeted at policy-makers and authorities to enhance multiple sector sharing responsibility and address challenges of small-scale water supply and sanitation, towards improving management and public health surveillance. In particular, topics



Figure 1: The WHOCC team at DWI, in London, UK  
Source:DWI



covered legislation for public and private water supplies with consideration of the regulatory framework, governance, a demonstration of private water supply risk assessment and the benefits from implementing risk assessments.

Apart from this, the CC has been working further on follow-up and new projects towards the universal accessibility to safe water and its adequate management. Here are the next major activities in plan.

### Development of a guidance document on risk-based surveillance of drinking-water quality.

DWI is part of a group developing a document outlining a risk-based water quality surveillance which incorporates the principles of surveillance and risk

management. This will cover the public health advantages, the use of critical control point monitoring and the regulatory framework required.

### Sub-regional workshop on small-scale water supply and sanitation to be held in Serbia

The sub-regional workshops will aim at enhancing capacity and provide guidance to policy- and decision-makers and other concerned actors to develop policies and measures to improve the situation of small-scale systems. DWI will provide speakers at a workshop in Serbia covering the legislative framework, water safety planning and governance in public and private supplies.

Find out more on [www.dwi.gov.uk/](http://www.dwi.gov.uk/)



## EAWAG

### Swiss Federal Institute of Aquatic Science and Technology WHO CC for Sanitation and Water in Developing Countries

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The Swiss Federal Institute of Aquatic Science and Technology is a WHO collaborating center (CC) for Sanitation and Water in Developing Countries since 2012. EAWAG is part of the ETH Domain in Switzerland. Most collaborating researchers are from the Department of Sanitation, Water and Solid Waste for Development (Sandec).

Located in Dübendorf, Switzerland, the CC offers a variety of expertise and multifaceted projects that deal with all aspects of water quality, availability and/or accessibility and are targeted at policy makers and/or practitioners throughout the global south. In particular, the main areas of work are:

- Gender and WAS
- Drinking Water Quality
- Urban Sanitation
- Capacity Building

Besides the main partners within the WHO – Maggie Montgomery (main contact person), Rick Johnston,

Jennifer DeFrance, and Kate Medlicott – the CC counts on the joint work with other partners of relevance in the water field:

- HELVETAS Swiss Intercooperation, Switzerland
- Terres des Hommes
- Oxfam
- GIZ, Germany
- AGUATUYA, Bolivia
- Polytechnic at University of Malawi, Malawi

### What does a CC in practice?

The CCs support WHO in creating and collecting scientific evidence as well as disseminating it. The team of the CC for Sanitation and Water in Developing Countries, for example, has recently concluded with success the launch of a Massive open online course and the development of national shit flow diagrams, among others.



Figure 2: Forum Chriesbach, the headquarter of EAWAG, located in the Empa-Eawag-Areal in Dübendorf, Canton Zürich, Switzerland. Source: EAWAG

### Massive Open Online Course (MOOC) series titled "Sanitation, Solid Waste and Water for Development."

The MOOC developed in collaboration with WHO is on household water treatment and safe storage (HWTS) in developing countries. It was launched the first time in April 2014 and was re-released with updated content in July 2015. A combined total of nearly 40,000 students registered for the courses since 2014, and over 3,000 students received a Statement of Accomplishment. The main target groups are students, researchers and practitioners in developing countries. Secondary target group are students and professionals in practice in high income countries, which would like to complement their studies with eLearning. The statistics from this first and second HWTS MOOC, respectively, show that 45% and 51% of the students were from developing countries. The following staff of WHO supported and were involved in different teaching modules: Rick Johnston, Maggie Montgomery and Kate Medicott. The CC will continue to offer their MOOC series, continuously available on Coursera under the title "Sanitation, Water and Solid Waste for Development", and has launched for the first-time a course on Fecal Sludge Management, started from 01 May 2017. More information is available here: <http://www.eawag.ch/en/department/sandec/e-learning/moocs/>

### Development of national Shit Flow Diagrams (SFD)

During 2015, the EWM group developed Shit Flow Diagrams (SFD) for Danang (Vietnam), Nonthaburi

(Thailand), Bignona (Senegal), Khulna (Bangladesh), Kampala (Uganda). The project included a methodological piece on how to conduct SFD assessments. The SFD reports were recently finalized. They are in close interest and connection to the ongoing discussion on how and what to monitor in urban areas regarding "safely managed excreta". The EWM group is currently continuing work on a methodology for making FSM decisions with a market driven approach. The method was field tested in Kampala, Uganda and Bignona, Senegal.

Apart from this, the CC has been working further on follow-up and new projects towards the universal accessibility to safe water and its adequate management. Here are the next major activities in plan.

### Development of microbial testing and surveillance tools to inform monitoring, regulation and evidence based implementation of water safety interventions

The activity will focus on the development, implementation and use of water quality testing strategies for application in household surveys, ongoing verification monitoring of drinking-water supplies, and for targeted applications in events, such as cholera outbreaks and humanitarian emergencies. It will cover microbial contaminants, key chemical contaminants and other measures, for example, turbidity. In addition, it will link the use of such data to the measuring of water treatment and safe storage behaviour and to improvements in the development and ongoing promotion of evidence based hygiene behaviour change interventions. Lead of the project: Sara Marks, Regula Meierhofer.



### Contribution to guideline development, global monitoring and implementation for sanitation

The work will contribute to the first edition of the WHO sanitation guidelines through expert input, interpretation of systematic reviews and input on how to best disseminate and capacitate countries to implement the guidelines. It will also include inputs

to the technical working group on definitions and methods for monitoring safely managed sanitation at the national level, using an adapted excreta flow framework and harmonisation where possible with city level methodologies. Lead of the project: Christoph Lüthi and Linda Strande.

Find out more on [www.eawag.ch/en/department/sandec/](http://www.eawag.ch/en/department/sandec/)



Figure 3 : The WHOCC team from the Sandec department at EAWAG. Source: EAWAG

## KWR KWR Watercycle Research WHO CC on Water Quality and Health

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The KWR Watercycle Research Institute, Water Quality and Health Knowledge Group is a WHO collaborating center (CC) on Water Quality and Health since 2013.

Located in Nieuwegein, The Netherlands, the CC offers a variety of expertise and multifaceted projects that deal with all aspects of water quality, availability and/or accessibility and are targeted at policy makers and/or practitioners at the global level, with implementation at the national level and mainly in high-income countries. In particular, the main areas of work are:

- Water quality management with focus on microbial water quality, risk-based (microbial) monitoring and water safety plan approach
- Implementation of water quality guidelines and recommendations
- WHO Guidelines for Drinking-water quality
- WHO Scheme to Evaluate Household Water Treatment drinking water quality regulation
- Capacity Building

Besides the main partners within the WHO, the CC





Figure 4 : The KWR headquarter, located in Nieuwegein, in the Netherlands  
Source: KWR

counts on the joint work with other partners of relevance in the water field:

- Water and Health, Pty Ltd, Australia
- National Science Foundation (NSF), USA
- International Water Association (IWA), UK

### What does a CC in practice?

The CCs support WHO in creating and collecting scientific evidence as well as disseminating it. The team of the CC on Water Quality and Health, for example, has recently concluded with success a guidance document on quantitative microbial risk assessment and three workshops at the International Water Association conferences, among others.

### Quantitative microbial risk assessment: application for water safety management.

The CC contributed the guidance on quantitative microbial risk assessment (QMRA), in collaboration with international researchers. The WHO guidelines for drinking-water quality recommend a preventive, risk-based approach to water quality management from source to exposure. This publication provides guidance for consistent application of QMRA in the practice of drinking-water supply, wastewater reuse or water for recreation, thereby supporting the implementation of the WHO guidelines. Several workshops were organized at international water conferences (SIWW, IWA) to facilitate knowledge transfer.

### Support the implementation of WHO drinking water guidelines at the national level and policy development

The CC supported WHO for the work under the Protocol on Water & Health for the development of national policies on water quality, facilitating the implementation of the WHO guidelines. The CC as well

advised the European Commission on the current revision of the Drinking Water Directive. The work had particular emphasis on microbial water quality, risk-based (microbial) monitoring and water safety plan.

### Results of Round I of the WHO International Scheme to Evaluate Household Water Treatment Technologies (HWT)

HWT technologies and use need to be adequate for sufficiently reducing pathogens to protect health by improving the quality of drinking-water and prevent waterborne diseases. The international scheme to evaluate HWT aims at assessing the microbiological performance of HWT technologies against WHO health-based criteria. KWR, jointly with NSF, conducted the evaluation for the report as one of the designated testing laboratories in February 2016. Evaluations were conducted according to the protocols agreed with WHO and in line with the WHO rules and guidelines.

### Capacity building activities: Joint WHO/IWA workshops at International Water Association conferences

The CC co-organized two workshops at the IWA Watermicro2015 conference in Lisbon, in September 2015, for capacity building on water- and WASH-related emerging health issues:

- WHO workshop on Ebola and WASH
- WHO workshop on antibiotic resistance in water

The workshops were organized in collaboration with WHO (Kate Medlicott, Jennifer De France, Sophie Boisson) and members of the Microbial Expert Group (Mark Sobsey, Ana Maria de Roda Husman). The CC also organized a workshop at the IWA World Water Congress in Brisbane in 2016, to support the spread and implementation of microbial risk assessment under the WHO drinking-water guidelines.



Apart from this, the CC has been working further on follow-up and new projects towards the universal accessibility to safe water and its adequate management. Here is one of the next major activities in plan.

### Round II of the WHO International Scheme to Evaluate Household Water Treatment Technologies (HWT)

KWR will continue its work on the evaluation microbiological performance of HWT technologies as one

of the designated testing laboratories. The evaluation, conducted according to the WHO International scheme, is important for ensuring adequate microbiological performance and correct use of the HWTs, towards ensuring the provision of safe drinking-water. Evaluation results will be used for the WHO Report Round II.

Find out more on [www.kwrwater.nl/en](http://www.kwrwater.nl/en)

## RIVM Dutch National Institute for Public Health and Environment WHOCC on Water Quality and Food Safety

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The Dutch National Institute for Public Health and Environment is a WHO collaborating center (CC) on Pathogens in Food and Water since 1977.



Figure 5 : The WHOCC focus on water quality and food safety  
Source: Thinkstock

- Microbial risk assessment (MRA)
- Control of microbial hazards in food and water to human health
- Food and waterborne disease burden estimation
- WHO guidelines for food and waterborne pathogens to human health
- Guidance development on Antimicrobial resistance in food and water
- Capacity building

Besides the main partners within the WHO, the CC counts on the joint work with other partners of relevance in the water field:

- UNESCO-IHE Institute for Water Education, The Netherlands
- Umweltbundesamt (UBA), Germany

### What does a CC in practice?

The CCs support WHO in creating and collecting scientific evidence as well as disseminating it. The team of the CC on Pathogens in Food and Water, for example, has recently concluded with success a Symposium on Water and Sanitation Safety Planning in Extreme Weather Events and the development of the QM-RASpot tool, among others.



## Bilthoven Symposium on Water and Sanitation Safety Planning in Extreme Weather Events

On April 6 and 7, 2017 the CC hosted a symposium on Water and Sanitation Safety (WSSP) Planning in Extreme Weather Events at RIVM in Bilthoven. The event was co-sponsored by the Netherlands Ministry of Infrastructure and the Environment, WHO Regional Office for Europe and the United Nations Economic Commission for Europe. With contributions from over 15 countries, mainly from the pan-European region, the event was meant to kick-off the work on safe management of water and sanitation systems within the 2017-2019 programme of work of the Protocol on Water and Health. The symposium included also topics like impacts from flooding and droughts, including health impacts, and integrated management solutions for climate adaptive water services. The potential linkage between the water safety plan and sanitation safety plan was interactively discussed, focusing on their potential to provide an integrated management strategy for climate adaptive water management. The presentations from the symposium can be found on the IWC website <http://www.iwcconferences.com/wssp-and-extreme-weather/> A symposium summary report will be made available on the RIVM WHO CC website. Contact: Lieke Friederichs ([lieke.friederichs@rivm.nl](mailto:lieke.friederichs@rivm.nl))

### QMRAspot

RIVM has developed an interactive user-friendly computational tool, QMRAspot, to analyse and conduct Quantitative Microbial Risk Assessment (QMRA) for drinking-water produced from surface water. In order to demonstrate the safety of the drinking-water, Dutch drinking-water companies must conduct a QMRA every four years for the so-called index pathogens: enterovirus, Campylobacter, Cryptosporidium and Giardia. The health-based target in the assessment is set at a risk of infection of less than one per ten thousand persons per year (95-percentile). QMRAspot enables the user to collect raw data in the proper format and to automate the process of QMRA. Although developed for the Netherlands, QMRAspot can be applied by drinking-water companies, researchers and policy-makers worldwide. A QMRA for any



Figure 6 : The QMRAspot is a tool for Quantitative Microbial Risk Assessment (QMRA) of drinking-water produced from surface water

Source: RIVM

other waterborne pathogen can be conducted as well using the raw data and/or the parameter values. More information on and downloads of QMRAspot can be found here: [http://www.rivm.nl/en/Topics/W/WHO\\_Collaborating\\_Centre\\_Risk\\_Assessment\\_of\\_Pathogens\\_in\\_Food\\_and\\_Water/Tools/QMRAspot](http://www.rivm.nl/en/Topics/W/WHO_Collaborating_Centre_Risk_Assessment_of_Pathogens_in_Food_and_Water/Tools/QMRAspot). Contact: Jack Schijven ([jack.schijven@rivm.nl](mailto:jack.schijven@rivm.nl))

Apart from this, the CC has been working further on follow-up and new projects towards the universal accessibility to safe water and its adequate management. Here are the next major activities in plan.

### Water Safety Planning capacity building in Ethiopia- Source to Tap and Back (S2TAB)

The project S2TAB started after the Federal Ministry of Water, Irrigation and Energy (FMoWIE) in Ethiopia had created the enabling environment for climate-resilient water safety plans (CR-WSPs), publishing a strategic framework and guidelines for implementation. S2TAB is a public-private partnership between Ethiopian and Dutch partners for improved financial and environmental sustainability of the water services in the metropolitan region of Addis Ababa and Adama, two of the largest cities in Ethiopia. The overall goal is to secure water availability and improve the quality and sustainability of water and sanitation services. RIVM will support the implementation of CR-WSPs and improve the water quality monitoring at two drinking-water companies. Furthermore, RIVM is building capacity in the detection of pathogens in water at the national level, with the Ethiopian Public Health Institute. This project is an example of the capacity building work that the CC is supporting worldwide, providing of a WHO trained WSP trainer with expertise in monitoring and testing environmental microbiology in the field and laboratory. The CC is planning to increase the number of trainers for this type of capacity building work within the institute.

Contact: Harold van den Berg ([harold.van.den.berg@rivm.nl](mailto:harold.van.den.berg@rivm.nl))

### Project WHO AGISAR Tricycle

One of the roles of the CC is to assist WHO in raising awareness, strengthening knowledge, and developing and implementing guidance on antimicrobial resistance. The WHO AGISAR Tricycle project is one of the currently ongoing projects in this thematic areas, with a One Health approach is.

Circulation of antibiotic-resistant bacteria in humans, food, and the environment and the resulting exposure of human beings to these may be significant, yet global information on exposure is scarce. Furthermore, a harmonized protocol to detect Extended Spectrum Beta-Lactamase (ESBL)-producing bacteria, specifically, is lacking.

The main objectives of this project are (I) to produce a protocol for detection of ESBL-E.coli in different matrices such as human feces and wastewater, (II) to train







Figure 7 : The WHO CC on Pathogens in Food and Water is part of the WHO collaborating centers hosted at RIVM  
Source: RIVM

personnel from piloting countries throughout the different WHO regions, and (III) set-up such integrated surveillance to obtain the first global ESBL-EC results. Other interested member states can follow the same protocol and compare their results with others. Contact: Heike Schmitt (heike.schmitt@rivm.nl)

### Harmonising water and food safety guidelines and guidance documents

In June (June 21-23) the CC co-hosted a session of the Joint FAO/WHO Expert Meetings on Microbiological Risk Assessment (JEMRA) on water quality management in the food-processing industry. The numerous water-quality related guidelines and guidance documents that have been prepared by the WHO in the last five decades provide a rich body of knowledge on water-quality parameters and risk-management options for critical control points in different settings, including sanitary surveys, water safety planning and QMRA. At the same time, a number of Codex Alimentaris standards have been prepared that provide guidance on water quality management in specific food

processing sub-sectors, as well as guidance documents on MRA including the aspect of water management both for process water and for water as ingredient. The purpose of the June meeting was to discuss whether the Codex and WHO water documents could be further harmonized with regard to water-quality management and to formulate the way to improve the applicability of the water guidelines for the food industry. The CC has been invited to co-organize this meeting for its unique position as centre of expertise on both water and food related risk management research. Contact: Lieke Friederichs (lieke.friederichs@rivm.nl)

Find out more on [www.rivm.nl/en](http://www.rivm.nl/en)



EUROPE

## Events on Water, Health and Risk Communication

### October

#### 14th International Water Association (IWA) Specialist Conference on Watershed and River Basin Management

9–11 October  
Skukuza Camp, Kruger National Park, South Africa  
<http://www.rbm2017.com/index.php/home>

#### WRE Conference and Exhibition on Innovations in Water Reuse

9 – 10 October  
Bruges, Belgium  
<http://www.water-reuse.eu/wreconference>

#### UNC Water and Health Conference: Where Science Meets Policy,

16–20 October  
Chapel Hill, NC, USA  
<http://waterinstitute.unc.edu/conferences/waterand-health2017/>

#### The Task Force meeting on the Water-Food-Energy-Ecosystem Nexus (18 October 2017), Salle V, Palais des Nations, Geneva, Switzerland

18 October  
Geneva, Switzerland  
<http://www.unece.org/index.php?id=43626>

#### 14th International IWA Conference on Sustainable Solutions for Small Water and Wastewater Treatment Systems (S2Small2017)

22–26 October  
Nantes, France  
<http://s2small2017.org/>

#### International Summit „Water and Climate: Meeting of the Great Rivers of the World“

23–25 October  
Rome, Italy  
<http://www.unece.org/index.php?id=46483>

### November

#### Amsterdam International Water Week

30 October – 3 November  
Amsterdam, The Netherlands  
<http://internationalwaterweek.com/>

#### IWA Water and Development Congress & Exhibition 2017

13–16 November  
Buenos Aires, Argentina  
<http://www.waterdevelopmentcongress.org/>

#### Tenth meeting of the Working Group on Water and Health

15–16 November  
Geneva, Switzerland  
<http://www.unece.org/index.php?id=43631>

#### World Toilet Summit 2017

20–21 November  
Melbourne, Australia  
[http://www.awa.asn.au/AWA\\_MBRR/Events\\_Content/World\\_Toilet\\_Summit\\_2017.aspx](http://www.awa.asn.au/AWA_MBRR/Events_Content/World_Toilet_Summit_2017.aspx)

### December

#### 4th Global Water Operators' Partnerships Congress, Leave No Operator Behind

4–5 December  
Barcelona, Spain  
<http://www.gwopa.org/en/congress>

#### 9th meeting of the Task Force on Water and Climate

13 December  
Salle XII, Palais des Nations, Geneva, Switzerland  
<http://www.unece.org/index.php?id=43636>

### Young Water Professional conferences:

#### Congresso IWA YWP Spain

16–18 November  
Bilbao, Spain  
<http://ywp-spain.es/>

#### International Young Water Professional Conference

10–13 December  
Cape Town, South Africa  
<http://iwaywpcconference.org/>

#### 10th Eastern European IWA YWP Conference

07–12 May 2018  
Zagreb, Croatia  
<http://www.iwa-network.org/wp-content/uploads/2017/08/Call-29.08.2017.pdf>

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