

# SANITATION IN THE PAN-EUROPEAN REGION

Meeting report

12–13 February 2019

Bonn, Germany



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## ABSTRACT

On 12 and 13 February 2019, 90 policymakers and experts from around the pan-European region came to Bonn for a workshop on sanitation under the Protocol on Water and Health. The workshop provided delegates with updates on the sanitation situation in the pan-European region from a health and environmental perspective, introduced them to a variety of tools and resources for improving sanitation in their countries, facilitated participant networking and sharing of experiences, promoted national target-setting under the Protocol and encouraged the delegates to articulate future needs for work within its framework. Among the topics discussed were sanitation safety planning, climate change, sanitation in rural areas and wastewater reuse.

### Keywords

ENVIRONMENT  
ENVIRONMENTAL HEALTH  
ENVIRONMENT AND PUBLIC HEALTH  
PUBLIC HEALTH  
RISK MANAGEMENT  
SANITATION  
WASTEWATER

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This meeting report was written by Misha Hoekstra.

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## Executive summary

### *Meeting scope and purpose*

Safe sanitation is necessary to protect human health and the water environment. Although the pan-European region<sup>1</sup> has high rates of sanitation coverage, it failed to meet the Millennium Development Goal target for access to improved sanitation. The sanitation targets of the Sustainable Development Goals (SDGs) of the [2030 Agenda for Sustainable Development](#) have a broader focus, embracing the entire sanitation cycle. SDG targets 6.2 and 6.3 explicitly call for safely managed sanitation services and for reducing the release of untreated wastewater into the environment. Adequate sanitation plays a key role in preventing antimicrobial resistance (AMR), as affirmed by the [WHO global action plan on AMR](#).

The [Protocol on Water and Health](#) to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes calls for providing everyone in the pan-European region with sanitation that will adequately protect human health and the environment. The Protocol programme of work places a clear focus on sanitation and its crosscutting character. It stipulates policy attention, technical efforts and an improved evidence base on the sanitation situation in the region.

The overall aim of the present workshop was to take stock of this situation from a health and environmental perspective and to identify challenges and opportunities for improvement. The workshop had the following **specific objectives**:

- establish the health and environment rationale for adequate, safely managed sanitation services;
- present the new [WHO guidelines on sanitation and health](#) and build capacity for sanitation safety plans (SSPs);
- disseminate and discuss the results of a sanitation scoping study for the pan-European region conducted under the Protocol;
- share experiences and good practices from across the region to address current sanitation challenges, including those related to small systems in rural areas, wastewater reuse and climate change;
- address the specific role of sanitation in tackling AMR and neglected tropical diseases, particularly soil-transmitted helminths (STHs);
- promote national target-setting on sanitation under the Protocol on Water and Health in accordance with the aspirations of SDG 6 and the 2017 [Declaration of the Sixth Ministerial Conference on Environment and Health](#) (the Ostrava Declaration); and
- formulate future needs for work under the Protocol to improve the sanitation situation in the pan-European region.

The **expected outcomes** of the workshop were an increased awareness and understanding among national policymakers of the relevance of adequate sanitation, as well as a strengthened commitment to improve sanitation by implementing the Protocol and thereby supporting the achievement of the SDGs and the Ostrava Declaration.

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<sup>1</sup> This publication uses the term pan-European region to refer to the Member States of the WHO European Region and Liechtenstein. The WHO European Region comprises the following 53 countries: Albania, Andorra, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Malta, Monaco, Montenegro, the Netherlands, North Macedonia, Norway, Poland, Portugal, the Republic of Moldova, Romania, the Russian Federation, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkey, Turkmenistan, Ukraine, the United Kingdom of Great Britain and Northern Ireland, and Uzbekistan.

The workshop was followed by a training event on the SSP approach on 14 February 2019.

### ***Meeting programme***

The meeting lasted for two days and consisted of an opening session, eight thematic sessions and a brief closing session.

- The [opening session](#) provided an overview of the workshop objectives, programme and methods.
- [Session 1](#) situated sanitation in the context of the SDGs and the Protocol and established the health and environment rationales for adequate, safely managed sanitation services.
- [Session 2](#) introduced delegates to the new WHO guidelines on sanitation and health, excreta flow diagrams and the SSP approach.
- [Session 3](#) examined current sanitation practices and challenges in the pan-European region, including challenges related to climate change.
- [Session 4](#) provided insight into several key aspects of sanitation system policy, financing and governance.
- [Session 5](#) focused on sanitation issues and solutions in rural areas, schools and healthcare facilities.
- [Session 6](#) presented a compendium of sanitation technologies, followed by a series of small group discussions on specific solutions, initiatives and tools related to the collection, treatment and disposal of human waste and wastewater in the region.
- [Session 7](#) looked at the downstream impacts of sanitation on helminth infections and on AMR.
- [Session 8](#) was devoted to the benefits and challenges of wastewater reuse and individual country experiences with it.
- [Session 9](#), the closing session, presented general conclusions from the workshop and some next steps for participants and the Protocol secretariat. These conclusions and next steps are reproduced immediately below.

### ***Conclusions***

During the closing session, the organizers presented the following **key conclusions** from the two-day workshop.

- Sanitation is a large, complex subject that is – and needs to be – high on the global and regional policy agenda.
- Major sanitation challenges for the pan-European region include bridging gaps in access to safely managed services, particularly in rural areas, and providing safe sanitation in schools, healthcare facilities, workplaces and public places.
- Improving sanitation confers major health and environmental benefits. The health benefits include fewer diarrhoeal infections, fewer STHs, less AMR, improved well-being, better healthcare and better educational outcomes. Environmental benefits include better protection of natural water ecosystems, in particular from the effects of eutrophication, littering and chemical pollution.
- In turn, improving sanitation requires up-to-date national standards and regulations. They should embrace risk-assessment and risk-management approaches (such as SSPs), cover

the entire sanitation chain, address both off-site and on-site sanitation and utilize internationally accepted terminology.

- Wastewater reuse requires careful attention to risks related to direct and indirect reuse. When coupled with a risk-based approach that protects health and the environment, wastewater reuse offers a sensible way to address increasing water scarcity by improving the supply of safe drinking-water and of safe food through irrigated agriculture.
- Existing national AMR action plans do not sufficiently address the role of sanitation in combating AMR.
- Climate change requires rethinking the design and operation of sanitation systems, both to mitigate climate change and to adapt to more frequent floods, droughts and torrential rains.
- To finance sanitation sustainably, all countries must contend with aging infrastructure and investment gaps by applying a life-cycle approach to costing and financing of sanitation services.
- Useful tools to improve sanitation include excreta flow diagrams, SSPs, technology selection tools (such as the [Compendium of sanitation systems and technologies](#)) and the new [WHO toolkit on water, sanitation and hygiene \(WASH\) and neglected tropical diseases](#).

### ***Next steps***

The workshop ended with suggestions for next steps to take under the Protocol, beginning with suggestions for workshop participants and other sanitation policymakers in the pan-European region:

- work to raise political awareness of the importance of safely managed sanitation;
- set national sanitation targets under the Protocol, taking into account emerging challenges and new developments;
- address sanitation achievements and gaps in the national summary reports under the Protocol's fourth reporting cycle, which were to be submitted in April 2019;<sup>2</sup>
- use the Protocol as a convening platform and forum for discussion and exchange within the region; and
- urge ministers of health and environment to participate in the upcoming fifth session of the Meeting of the Parties to the Protocol, which will be held in Belgrade on 19–21 November 2019.

To facilitate rational decision-making on sanitation in countries of the region, it was suggested that the following activities be supported under the Protocol:

- setting national sanitation standards based on the key principles in the new WHO sanitation guidelines;
- building national SSP capacity, perhaps in conjunction with water safety plan (WSP) capacity-building if a country wishes to pursue an integrated approach;
- educating local operators on how SSPs can improve their operations while providing better health and environmental protection;
- exchanging experiences on wastewater reuse policies and regulations that protect health and the environment, and on the application of risk-management approaches in reuse;
- embedding water, sanitation and hygiene as an integral part of national AMR action plans;

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<sup>2</sup> See [https://www.unecce.org/env/water/protocol\\_fourth\\_reporting\\_cycle.html](https://www.unecce.org/env/water/protocol_fourth_reporting_cycle.html).



- understanding and addressing the linkages between sanitation and climate change;
- making new sanitation technologies more broadly available;
- enabling households and small-scale operators to understand their options when buying or upgrading systems, and then helping them make the best choices; and
- arranging sustainable financing for safe and sustainable sanitation services.

## Резюме

### **Цели и задачи**

Для охраны здоровья людей и водной среды необходима безопасная санитария. Несмотря на то, что в Европейском регионе<sup>3</sup> показатели охвата санитарно-техническими средствами и сооружениями высоки, ему не удалось достичь целевого показателя по доступу к улучшенным санитарно-техническим средствам, предусмотренного в Целях тысячелетия в области развития. Задачи в отношении санитарии, вытекающие из Целей в области устойчивого развития (ЦУР), поставленных в [Повестке дня в области устойчивого развития на период до 2030 года](#), расширили сферу повышенного внимания на весь цикл услуг санитарии. Предусмотренные в ЦУР задачи 6.2 и 6.3 в положительно выраженной форме требуют обеспечения безопасно организованных услуг санитарии и уменьшения сбросов неочищенных сточных вод в окружающую среду. Соответствующая современным требованиям санитария играет ключевую роль в предупреждении развития устойчивости к противомикробным препаратам (УПП), что подтверждается в [Глобальном плане действий по борьбе с УПП](#).

В [Протоколе по проблемам воды и здоровья](#) к Конвенции по охране и использованию трансграничных водотоков и международных озер содержится требование об охвате всех людей в Европейском регионе санитарно-профилактическими мероприятиями, которые обеспечивают достаточный уровень охраны здоровья человека и окружающей среды. В программе работы в соответствии с Протоколом сделан особый акцент на санитарии и подчеркивается ее значение для всех мероприятий и стратегий в этой программе. Программой предусматривается внимание к санитарии на уровне политики, принятие технических мер и улучшение доказательной базы, касающейся ситуации в регионе в области санитарии.

Общей целью семинара были обзор и оценка нынешнего положения дел с точки зрения здравоохранения и охраны окружающей среды и выявление трудностей и благоприятных возможностей для улучшения ситуации. В частности, перед семинаром ставились следующие **задачи**:

- сформулировать обоснование необходимости в адекватных и безопасно организованных услугах санитарии с точки зрения здравоохранения и охраны окружающей среды;
- представить новое [Руководство ВОЗ по обеспечению санитарии и охраны здоровья населения](#) и укрепить организационно-кадровый потенциал для разработки и реализации планов обеспечения безопасной санитарии (ПОБС);
- распространить и обсудить результаты исследования масштабов проблем санитарии в Европейском регионе, проведенного в соответствии с Протоколом;
- поделиться опытом и примерами надлежащей практики из стран региона по решению современных проблем санитарии, включая проблемы, касающиеся маломасштабных систем в сельских районах, повторного использования сточных вод и изменения климата;

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<sup>3</sup> В настоящей публикации используется термин "Европейский регион" для обозначения государств-членов в Европейском регионе ВОЗ и Лихтенштейна. В Европейский регион ВОЗ входят следующие 53 страны: Австрия, Азербайджан, Албания, Андорра, Армения, Беларусь, Бельгия, Болгария, Босния и Герцеговина, Великобритания, Венгрия, Германия, Греция, Грузия, Дания, Израиль, Ирландия, Исландия, Испания, Италия, Казахстан, Кипр, Кыргызстан, Латвия, Литва, Люксембург, Мальта, Монако, Нидерланды, Норвегия, Польша, Португалия, Республика Молдова, Российская Федерация, Румыния, Сан-Марино, Северная Македония, Сербия, Словакия, Словения, Таджикистан, Туркменистан, Турция, Узбекистан, Украина, Финляндия, Франция, Хорватия, Черногория, Чехия, Швейцария, Швеция, Эстония.

- рассмотреть особую роль санитарии в борьбе с УПП и забытыми тропическими болезнями, такими, в частности, как гельминтные инфекции, передаваемые через почву;
- содействовать установлению национальных целевых показателей по санитарии в соответствии с требованиями Протокола по проблемам воды и здоровья и задачами, выраженными в виде пожеланий в ЦУР 6 и сформулированными в [Декларации Шестой министерской конференции по окружающей среде и охране здоровья](#) (Оставской декларации);
- сформулировать будущие задачи для работы в соответствии с Протоколом над улучшением положения дел в области санитарии в Европейском регионе.

К **ожидаемым итогам** семинара относились повышение уровня осведомленности и понимания важности адекватной санитарии среди лиц, формирующих национальную политику, и укрепление их приверженности делу улучшения ситуации посредством осуществления мер по реализации положений Протокола, что одновременно способствует достижению ЦУР и выполнению обязательств, содержащихся в Оставской декларации. После семинара, 14 февраля 2019 г., были проведены практические занятия по изучению методики ПОБС.

### ***Программа семинара***

Семинар проходил в течение двух дней и включал заседание, посвященное открытию семинара, восемь тематических заседаний и короткое заключительное заседание.

- На [совещании, посвященном открытию](#), был сделан обзор задач, программы и методов работы семинара.
- На [заседании 1](#) была дана общая характеристика ситуации в контексте ЦУР и Протокола и сформулировано обоснование необходимости отвечающих современным требованиям и безопасно организованных услуг санитарии с точки зрения охраны здоровья населения и окружающей среды.
- На [заседании 2](#) участники были ознакомлены с разработанным ВОЗ новым "Руководством по обеспечению санитарии и охраны здоровья населения", блок-схемами потоков фекальных отходов и методикой планирования обеспечения безопасности санитарии (ПОБС).
- На [заседании 3](#) были рассмотрены примеры из современной практики в области санитарии и проблемы, возникающие в Европейском регионе, включая проблемы, связанные с изменением климата.
- [Заседание 4](#) дало возможность глубже вникнуть в несколько ключевых аспектов политики, финансирования и стратегического руководства, связанных с системами санитарии.
- На [заседании 5](#) главное внимание было уделено проблемам санитарии и их возможным решениям в сельских районах, в школах и медицинских учреждениях.
- На [заседании 6](#) был представлен сборник примеров технологий санитарии, после чего состоялась серия дискуссий в небольших группах по конкретным техническим решениям, инициативам и методикам, касающимся сбора, очистки и удаления отходов жизнедеятельности человеческого организма и сточных вод в регионе.
- На [заседании 7](#) было рассмотрено влияние санитарии на гельминтные инфекции и развитие УПП на последующих этапах цепочки причинно-следственных связей.

- [Заседание 8](#) было посвящено рассмотрению выгод и трудностей, связанных с повторным использованием сточных вод, и опыта отдельных стран в этой области.
- На заключительном [заседании 9](#) были представлены общие выводы семинара и некоторые следующие шаги, которые должны быть предприняты участниками и секретариатом Протокола. Эти выводы и следующие шаги приводятся ниже.

## **Выводы**

На заключительном заседании организаторы представили следующие **основные выводы** двухдневного семинара:

- Санитария – это большая, сложная тема, которая занимает – и должна занимать – важное место в стратегической повестке дня на глобальном и региональном уровне.
- Наиболее важные задачи для Европейского региона в области санитарии включают преодоление разрывов в доступе к безопасно организованным услугам, особенно в сельских районах, и обеспечение безопасных средств и сооружений санитарии в школах, медицинских учреждениях, на предприятиях и в организациях и в общественных местах.
- Улучшение санитарии приносит большую пользу для здоровья населения и для окружающей среды. Польза для здоровья заключается в уменьшении числа случаев диарейной инфекции, числа случаев геогельминтоза, в снижении распространенности УПП, в улучшении благополучия, повышении качества медико-санитарной помощи и в улучшении результатов учебы. Польза для окружающей среды включает улучшение охраны природных водных экосистем, в частности, их защиты от эвтрофикации, засорения и химического загрязнения.
- В свою очередь, улучшение состояния санитарии требует принятия современных национальных нормативов и правил. Они должны предусматривать применение методов оценки рисков и устранения или минимизации рисков (таких методик, как ПОБС), охватывать всю цепочку услуг санитарии, распространяться как на местные, так и на внешние системы санитарии, и в них должны использоваться термины, принятые в международных документах.
- При повторном использовании сточных вод требуется уделять особое внимание рискам, связанным с непосредственным и косвенным повторным использованием. В сочетании с подходом, основанным на анализе и минимизации рисков, который обеспечивает защиту здоровья населения и окружающей среды, повторное использование сточных вод представляет собой разумный способ преодоления растущей нехватки воды, поскольку при этом улучшается снабжение безопасной питьевой водой и безопасными пищевыми продуктами благодаря орошаемому земледелию.
- В принятых в странах планах действий по борьбе с УПП не уделяется достаточного внимания роли санитарии в борьбе с УПП.
- Изменение климата требует переосмысления проектирования и эксплуатации систем санитарии как в целях смягчения негативных последствий изменения климата, так и в целях адаптации ко все более частым наводнениям, засухам и проливным дождям.
- Для обеспечения устойчивого финансирования санитарии всем странам необходимо решать проблемы устаревающей инфраструктуры и дефицита инвестиций и для этого при калькулировании затрат на услуги санитарии и их финансировании применять подход, учитывающий полный жизненный цикл систем.

- К ценным пособиям по улучшению санитарии относятся блок-схемы потоков фекальных отходов, ПОБС, методики выбора технологии (такие как "[Сборник примеров систем и технологий санитарии](#)") и разработанное ВОЗ новое пособие "[WHO toolkit on water, sanitation and hygiene \(WASH\) and neglected tropical diseases](#)" ["Взаимодействие сектора WASH и сектора здравоохранения в борьбе с забытыми тропическими болезнями", на англ. языке].

### **Следующие шаги**

В завершение семинара были озвучены предложения в отношении того, какие следующие шаги необходимо предпринять в рамках реализации положений Протокола, начиная с предложений, касающихся участников семинара и других лиц, формирующих политику в области санитарии в Европейском регионе:

- проводить работу по повышению политической осведомленности о важности безопасно организованной санитарии;
- установить национальные целевые показатели в области санитарии в соответствии с Протоколом, учитывая возникающие проблемы и последние события;
- осветить достижения и недостатки в области санитарии в национальных кратких докладах, которые должны были быть представлены в апреле 2019 г. в четвертом цикле отчетности в соответствии с Протоколом;<sup>4</sup>
- использовать Протокол в качестве платформы для организации сотрудничества и форума для дискуссий и обмена мнениями в регионе;
- призвать министров здравоохранения и министров окружающей среды принять участие в предстоящей Пятой сессии Совещания Сторон Протокола, которое состоится в Белграде 19–21 ноября 2019 г.

Для того, чтобы способствовать принятию рациональных решений в области санитарии в странах региона, было предложено оказывать поддержку следующим мероприятиям в рамках Протокола:

- установление национальных нормативов в области санитарии на основе главных принципов, содержащихся в новом руководстве ВОЗ по санитарии;
- укрепление организационно-кадрового потенциала для разработки и реализации национальных ПОБС, возможно, вместе с укреплением организационно-кадрового потенциала для разработки и осуществления планов обеспечения безопасности воды (ПОВВ), если страна пожелает применить комплексный подход;
- обучение местных операторов тому, как с помощью ПОВВ можно улучшить функционирование их систем и при этом повысить уровень защиты здоровья населения и окружающей среды;
- обмен опытом в разработке и применении стратегий и нормативных документов, касающихся повторного использования сточных вод и направленных на охрану здоровья населения и окружающей среды, а также в применении методов минимизации и устранения рисков при повторном использовании сточных вод;
- включение аспектов водоснабжения, санитарии и гигиены как неотъемлемых элементов в национальные планы действий по борьбе с УПП;
- достижение понимания взаимозависимости между состоянием санитарии и изменением климата и принятие мер с учетом этой взаимосвязи;
- расширение доступности новых технологий санитарии;

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<sup>4</sup> См. [https://www.unece.org/env/water/protocol\\_fourth\\_reporting\\_cycle.html](https://www.unece.org/env/water/protocol_fourth_reporting_cycle.html).

- создание условий для того, чтобы домашние хозяйства и операторы маломасштабных систем смогли понять имеющиеся у них варианты при покупке или модернизации своих систем, а затем предоставление им помощи в выборе наилучшего варианта;
- организация устойчивого финансирования безопасных и стабильных услуг санитарии.

## Introduction

This workshop was organized by the joint secretariat of the [Protocol on Water and Health](#) to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes: the United Nations Economic Commission for Europe (UNECE) and the WHO Regional Office for Europe. It took place on the United Nations Campus in Bonn, Germany, on 12–13 February 2019, with financial support from the governments of Germany and the Netherlands.

The 90 participants in the two-day meeting included a broad variety of people working with sanitation policy in 28 countries of the pan-European region, plus assorted technical experts and representatives from the European Commission, UNECE, the WHO Regional Office for Europe and assorted nongovernmental organizations. Georgy Pignastyy and Alexander Reshetov served as Russian interpreters and Misha Hoekstra as rapporteur. See [Annex 1](#) for a full list of participants and their affiliations and [Annex 2](#) for a programme listing all the workshop presentations and discussions.

During the meeting, participants were polled on relevant questions and invited to contribute to word clouds using a platform on [slido.com](#).

## Opening session. Welcome and opening

Oliver Schmoll, Programme Manager for Water and Climate at the WHO European Centre for Environment and Health, opened the meeting by welcoming participants to Bonn and provided an overview of the meeting's **background, objectives and expected outcome**.

He noted that the workshop was the first such meeting on sanitation under the programme of work for the Protocol on Water and Health. Although sanitation is not mentioned in the name of the Protocol, it is nonetheless a major focus of the instrument, and the Protocol calls for providing everyone in the pan-European region with sanitation that will adequately protect human health and the environment. The Protocol programme of work for 2017–2019 places a clear focus on sanitation and emphasizes its crosscutting character. It stipulates policy attention, technical efforts and an improved evidence base on the sanitation situation in the region.

Sanitation also figures prominently in global and regional policy agendas, in part to counter relative neglect in recent years, when debate on water, sanitation and hygiene (WASH) concentrated on water supply. The new targets of the United Nations Sustainable Development Goals (SDGs) provide an especially sturdy framework for action on sanitation, and SDG targets 6.2 and 6.3 explicitly call for safely managed sanitation services and a reduction in the release of untreated wastewater into the environment. Within the pan-European region, the 2017 [Declaration of the Sixth Ministerial Conference on Environment and Health](#) (the Ostrava Declaration) provides a key policy framework for action.

Another key resource for action on sanitation is the first [WHO guidelines on sanitation and health](#), which were launched in English in 2018 – and in Russian on the first day of the workshop.

Mr Schmoll concluded the session by outlining the workshop's key objectives:

- to take stock of the sanitation situation in the pan-European region from a health and environmental perspective;
- to strengthen participants' commitment to using the SDGs and the Ostrava Declaration to improve the situation;
- to facilitate participant networking and sharing of experiences; and
- to promote national target-setting under the Protocol and formulate future needs for work within its framework.

## Session 1. Setting the scene

The first thematic session established the health and environment rationales for adequate, safely managed sanitation services.

The session began by situating **sanitation in the context of the SDGs and the Protocol**. In the pan-European region, 14 people die every day from diarrhoeal diseases due to poor WASH, 36 million people lack access to basic sanitation services, and 328 000 still practise open defecation. Even in high-income countries, 30% of urban wastewater is released into the environment untreated. Two SDG targets address these issues directly.

SDG 6.2 Achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.

SDG 6.3 Improve water quality by reducing pollution, halve the proportion of untreated wastewater and increase recycling and safe reuse.

The SDGs are consistent with the Protocol on Water and Health, which is supported by and aligned with the Ostrava Declaration. To date, 26 countries in the pan-European region are Parties to the Protocol, and 14 more are signatories. Among other things, the Protocol calls for adequate sanitation that protects human health and the environment by reducing discharges that could harm water resources, safely using wastewater and sludge in agriculture and employing surveillance to effectively monitor sanitation systems and respond to disease outbreaks and other problems. Both the SDGs and the Protocol address the entire water and sanitation cycle, and both encourage countries to set their own targets. Under the Protocol, countries proceed from baseline analysis to target-setting, implementation, reviewing and reporting – a cycle they repeat every three years. The current Protocol programme of work is highlighting sanitation by focusing policy attention and technical efforts on it (including the present workshop), conducting a scoping study to identify regional needs and actions, scaling up the use of sanitation safety plans (SSPs), increasing wastewater reuse, helping wastewater operators develop climate resilience, strengthening WASH in school and healthcare settings and encouraging equitable access.

Participants then turned their attention to **the health case for sanitation**, which readers of the *BMJ* chose as the greatest medical advance since 1840. The movement for clean water and sanitation helped lead to the first public health act in England and a sustained drop in mortality rates. WHO was tasked with the promotion of better sanitation in its 1948 constitution. Globally, there are 280 000 deaths related to poor sanitation each year, and poor WASH is responsible for 57% of the diarrhoeal disease burden among young children. Risks to health decrease substantially as one proceeds up the sanitation ladder, from open defecation to safely managed services. Studies show at least a fivefold return on investment in sanitation. It is important to remember that in the absence of proper management, every part of the sanitation chain poses its own health hazards. Exposure can lead directly to faecal–oral infections (including cholera, dysentery, polio and typhoid), helminth infections and insect-borne diseases, as well as



contributing to long-term health issues (such as stunting or cognitive impairment), antimicrobial resistance (AMR) and broader social problems (including school absenteeism and poverty). Sanitation interventions significantly reduce health risks, though in some cases they need to be accompanied by interventions in other areas, such as hygiene or agricultural practices, to be effective.

**The environmental impacts of poorly managed sanitation** are also cause for great concern – because it negatively affects not only human health, but also natural water ecosystems, fisheries, agriculture, recreation and scenery. Sanitation services should be seen as part of a circular economy involving the recycling of water within the hydrologic cycle. The goal in treating wastewater is to make it the same quality as water found in nature. Although the biggest problem with wastewater is eutrophication, which severely limits the use of water bodies, solids, litter and chemicals are also of increasing concern. This state of affairs should be addressed by awareness-raising, better management of sewer networks and storm water, more effective and widespread wastewater treatment, cost-recovery initiatives, SSPs, staff training and system resilience. The establishment of specific chemical and microbiological thresholds, such as those laid out in the European Union (EU) urban wastewater treatment directive, is one critical step. Yet most national regulations do not address micropollutants, such as microplastics or pharmaceuticals (which contribute to AMR), and though technologies are getting better at removing these micropollutants, the best approach is to minimize contamination to begin with. Large river basins require a joint approach by many stakeholders, such as integrated water resource management or total water management.

## **Session 2. Normative guidance and tools**

In the second thematic session, delegates considered the new WHO sanitation guidelines, excreta flow diagrams and sanitation safety planning, including a case study of SSPs in Helsinki.

The session kicked off by outlining the key principles in the new [WHO guidelines on sanitation and health](#), which were launched in English in 2018 and in [Russian](#) during the workshop. These guidelines were developed to address the general lack of guidance on how to maximize the health gains from well-managed sanitation systems and help the health sector take a more active role in sanitation. They reflect a shift in focus from providing basic sanitation to managing the entire sanitation chain. Within WHO, the word *guidelines* refers to normative, evidence-based products; these guidelines also provide recommendations, good practices, implementation guidance and various technical resources. Targeted at sanitation actors both inside and outside the health sector, the guidelines articulate the sector's role in sanitation and seek to maximize the health benefits of sanitation interventions. There are four core recommendations, based on a thorough evidence review and extensive consultation with experts and end users:

1. provide universal access to safe toilets;
2. ensure the safety of the entire sanitation chain (including use of contextually appropriate technologies and local SSPs to drive improvement);
3. coordinate with other local services and interventions; and
4. increase health sector engagement in sanitation functions.

The implementation guidance utilizes normative definitions that complement international monitoring definitions, and it features a chapter on changing stakeholder behaviours. There is also a chapter on where more research is needed, plus a series of fact sheets for different kinds of

systems, with corresponding inspection forms that will be released soon. Countries were urged to go systematically through the recommendations in Chapter 2 in particular and compare them to their national situations.

Participants were then introduced to **excreta flow diagrams**, commonly referred to as “shit flow diagrams” (SFDs). SFDs provide an easily grasped visual representation of the entire sanitation chain, from defecation to release into the environment. Various arrows represent the proportion of the population whose excreta are safely and unsafely managed in each part of the chain. In this way, SFDs help to indicate where problems lie within the sanitation chain and where attention is most needed. An SFD consists of the diagram, a concise report describing the service delivery context, and a record of the underlying data. SFDs have proven to be an effective communication and advocacy tool for engaging a wide variety of sanitation stakeholders. They are particularly well suited to cities and other small jurisdictions. Separate diagrams can provide ready comparison of waste streams for different neighbourhoods or population groups, and show the effects of different sanitation interventions. SFDs can thereby help kick-start public discussion and gain political support for more sustainable sanitation. With good data, they also have potential as a monitoring tool. Although they have not been widely used in the pan-European region yet, numerous sites around the world have embraced SFDs. About 100 SFDs are available along with SFD tools at a dedicated website, [sfd.susana.org](http://sfd.susana.org), run by the Sustainable Sanitation Alliance (SuSanA).

Next the workshop attendees heard about SSPs and the **sanitation safety planning approach**. While SFDs are particularly effective in supporting an overall risk assessment of excreta streams in a given geographic or administrative area, they should not replace SSPs, which provide a detailed sanitation system assessment, spur coordinated action by many actors along the sanitation chain and enable effective management of risks over time. Risk assessment and management is central to sanitation safety planning, supporting achievement of SDGs 6.2 and 6.3 and leading to greater health gains. SSPs are based on hazard identification; risk assessment; the use of multiple barriers (technical, managerial and behavioural) to reduce risk; routine monitoring and review; and a commitment to incremental improvement. Sanitation safety planning consists of an iterated cycle of five steps:

1. describe the sanitation system
2. identify hazardous events and assess existing control measures and exposure risks
3. develop and implement an incremental improvement plan
4. monitor control measures and verify performance
5. develop supporting programmes and review plans.

WHO has produced [SSP manuals in eight languages](#), as well as other materials, such as [the introductory video](#) presented during the session. WHO also held a one-day SSP training for participants the day after the end of the workshop.

The experience of **implementing SSPs in the Helsinki area** is instructive. The local authority there manages the entire water and sanitation sector for an area with more than a million residents adjacent to a sensitive brackish water ecosystem in the Baltic Sea. Its two wastewater treatment plants are energy-neutral, generating energy from biogas, organic compost from sludge and heat from wastewater. The authority developed its own web-based health and environmental risk management tool. Developing risk assessments and defining control measures was time-consuming, and staff motivation was critical. The first SSP identified nearly 800 control measures, of which more than 600 were implemented; last year’s SSP identified 180 measures, so it is becoming easier. Implementation has been a lesson in systematic quality thinking. The web-based tool has undergone several iterations to make it more usable; to minimize errors, for

instance, the questions have all been reformulated so that a *yes* always indicates the presence of a risk. The authority uses training workshops to implement the SSPs and offers substantial financial bonuses to encourage implementation of control measures.

### **Session 3. Sanitation challenges in the pan-European region**

The third session examined current sanitation practices and challenges in the pan-European region. Following small group discussions, participants returned to the plenary to hear about overall sanitation trends and issues in the region, including the impacts of current practices and how climate change is expected to affect them.

At the start of the session, participants broke into six groups to give everyone a chance to discuss **the chief sanitation challenges in their countries**, how they are being addressed and what else could be done to improve the situation. A moderator from each group then summarized its discussion in plenary. The issues mentioned most often were inadequate or mismanaged funding, poor coverage in rural areas, out-of-date infrastructure, workforce shortages, and gaps in data that prevent national and local authorities from having an accurate picture of the state of their sanitation systems. Legislation, policy and guidance do not always address the full range of systems in use. In some countries, a significant proportion of wastewater is still being released directly into natural watercourses without treatment, while sludge is frequently not managed properly. Minority populations such as the Roma are often underserved, and particularly in Mediterranean countries, the sanitation needs posed by the large influx of migrants are not being addressed.

Recommendations included redoubling efforts to connect more people to sanitation systems, particularly in rural areas; encouraging the use of newer technologies, such as low-water toilets; and tailoring solutions to local conditions. Participants also urged countries to expand and improve the reuse of wastewater and sludge, do a better job of engaging operators and training them in safe management and invest in capacity-building. National and local authorities need to develop or revise action plans and targets, incorporate sanitation into disaster planning, plan for the impacts of climate change and extreme weather events, increase the energy efficiency of treatment plants and address emerging pollutants. It was suggested that countries consider utilizing tourism income to increase investment in rural sanitation, use information technology to improve monitoring, and make greater use of permits to increase compliance. Regionally, participants recommended better cross-border cooperation and the collection and assessment of best practices.

Due to their common history, countries in the eastern part of the region share many of the same problems, including a broad lack of financing that has led to large gaps in rural infrastructure; aging urban wastewater collection networks; and an over-reliance on mechanical treatment alone. Additional issues that the participants from this subregion identified include outdated standards, a need for terminology in Russian that is harmonized with international definitions, vague instructions for operators and poor institutional knowledge. These participants suggested that their countries update legislation and policies to align them with the Protocol on Water and Health, implement SSPs, increase their commitment to sanitation investment and improvement, and facilitate better cooperation among all sanitation stakeholders.

The session then turned its attention to a summary of **a sanitation scoping study** being conducted under the Protocol for the pan-European region. The scoping study aims to develop a

detailed overview of the sanitation situation in order to identify gaps and priorities for future action. It draws on existing databases, the scientific literature and grey literature, supplemented by a survey of 16 representative countries. The 2017 report from the WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) estimated that, using [its sanitation ladder definitions](#), two thirds of households in the pan-European region have access to safely managed sanitation services, yet the same is true for only one third of households in the subregion of eastern Europe and central Asia. The 2017 JMP report also discovered that urban households in the region are nearly twice as likely as rural households to have such access, and that high GDP per capita is also correlated with safely managed services. Sanitation laws vary considerably from country to country, and often they are not implemented. According to the countries responding to the scoping study survey, the greatest barrier to the reuse of wastewater and sludge is a lack of appropriate legislation, while the chief obstacle to wastewater collection and treatment is a lack of funding.

A review of scientific and grey literature provided a closer look at **research on the impact of sanitation practices** in the region. The review focused on the types of sanitation facilities and systems being used, the composition and fate of wastewater released into the environment, and wastewater reuse and recovery. Most of the contaminant studies in the pan-European region have investigated chemical contaminants, especially pharmaceuticals, personal care products and various emerging contaminants, while microbial studies are much more likely to investigate bacteria than viruses. Contaminant research is heavily concentrated in Spain and Italy. Among the implementation studies reviewed, there is little agreement about what constitutes tertiary or advanced wastewater treatment. Only 5% of the implementation research looked at on-site sanitation, even though 20% of the population in the region uses on-site facilities, and only 2% examined reuse applications. While disease outbreaks relating to sanitation are widely reported in the media, only 1% of the studies included in the review investigated such outbreaks.

The end of the session was devoted to **sanitation and climate change**. Climate change is increasing the frequency and intensity of extreme weather events, but its effects vary geographically. While the makeup of sanitation systems also varies throughout the region, each country needs to consider the effects of climate change and local weather conditions on three scales of operation that are present everywhere: the domestic scale (such as toilets), the conveyance scale (sewers and trucks) and the urban scale (wastewater and sludge treatment). Changes in precipitation patterns, rising sea levels and rising air and water temperatures are expected to increase flooding of sanitation systems and the environment, diminish water supplies and degrade water quality. The consequences for health include a rise in water- and vector-borne diseases, as well as conditions that result when existing systems become unsafe. Developing climate-resilient sanitation systems requires understanding the public health implications of poor infrastructure and increasingly uncertain weather, identifying critical improvements to make at each of the scales mentioned and identifying critical points in water and sanitation systems, both on and off site. In contrast to the domestic and urban infrastructure, the conveyance infrastructure – sewerage, pumping stations, roads and trucks – is much more extensive, dispersed and difficult to replace. While the linkages with water systems are particularly critical, planners also need to consider linkages of sanitation management with other sectors, such as energy and transport. Risk-mapping and the prioritization of interventions are essential to developing climate-resilient sanitation systems. It should also be noted that the sanitation sector has a role to play in not only adapting to climate change but mitigating it too, as different sanitation systems have different carbon footprints.

## Session 4. Sanitation policy, financing and governance

Session 4 provided insight into several aspects of sanitation policy, financing and governance. Topics included a global monitoring instrument from United Nations Water (UN-Water), sustainable financing, the EU directive addressing urban wastewater treatment, and a case study on updating sanitation regulations.

The UN-Water **Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS)**, led by WHO, helps countries to report on and prioritize their efforts to meet the SDG 6 targets, particularly the SDG 6a and 6b targets, by providing a situational analysis of national WASH policy frameworks, institutional arrangements, monitoring systems, human resources and financing. Within the pan-European region, 14 countries participated in the latest GLAAS cycle. A fifth of these countries do not yet recognize the right to adequate sanitation in their constitutions. While the majority of the countries have approved national sanitation policies, implementation is lagging, particularly for rural areas. Data indicate a major financing gap, but data on human resource needs for sanitation management is lacking. All 14 countries have a treatment standard for wastewater, though other standards, notably for on-site facilities and safe reuse, are less common. Only one country has an independent sanitary inspection body, and only two have formally adopted SSPs. Almost all the GLAAS participants have conducted a baseline analysis and have established some national targets.

Delegates then turned its attention to financing – specifically, **a framework for sustainable financing of sanitation services**. This framework is designed to help national and local governments institute more safely managed services by helping them determine what the desired services cost, who should pay for them and how much, and which financing mechanisms to use. The framework consists of setting targets, identifying the types of facilities in the sanitation chain that will achieve these targets, determining the life cycle costs of each facility, linking sources of financing to cost categories and compiling everything into an overall strategy. Once planners determine the combination of facilities they want, they can utilize [free online tools](#) from IRC to determine life cycle costs, covering capital expenditures, operations, maintenance, support and loan interest. Then they can explore financing options, generally some combination of tariffs, taxes, transfers and trade. WHO has developed [a tool for tracking national WASH financing \(TrackFin\)](#). To achieve their goals, financing strategies must balance affordability with sustainability. Capital costs of collective sanitation systems are typically financed by taxes and transfers, with some user contributions, while users general pay for household systems (tariffs), with some public subsidies. Blended finance – using public investment to reduce the risk of private investment – can help close funding gaps.

Participants also received a status update on **the EU's [Urban Waste Water Treatment Directive](#)** (UWWTD) (European Council Directive 91/271/EEC). Dating from 1991, the UWWTD addresses wastewater collection, treatment, monitoring and reporting. Together with other directives under the EU Water Framework Directive, the UWWTD has brought about major reductions in the levels of nitrogen, phosphorus and other pollutants in EU rivers and coastal waters. While overall compliance is high, one major area of exception is the implementation of more stringent treatment by newer member states. The EU has been evaluating the Directive to see how it might be improved in light of changes since 1991, including new laws and regulations, the SDGs, climate change, emerging pollutants such as microplastics and pharmaceuticals, infrastructural and digital innovations, and changing expectations from the citizenry. An evaluation report drawing on expert analysis and stakeholder consultation is scheduled for publication later in 2019.

Finally, the session heard about **how Tajikistan has worked to update its sanitation regulations**. The country faces considerable obstacles, including inadequate financial and human resources and a dearth of safely managed sanitation services, especially in rural areas. One of the biggest problems has been the absence of a regulatory framework. It has been adopting a multi-stakeholder approach to water and sanitation and implementing new regulations in both areas, utilizing the Protocol on Water and Health to assign responsibilities and align indicators with international guidelines, despite the fact that Tajikistan is not a party to the Protocol.

## **Session 5. Sanitation in specific settings**

This session focused on sanitation issues and solutions in rural areas, schools and healthcare facilities.

Participants heard first about **small-scale sanitation systems**. The United Nations has affirmed the right of all people to safely managed sanitation services, including the inhabitants of isolated rural areas, where most smaller systems are found. Yet more than 80% of national financing for water and sanitation goes to urban areas, with significantly more resources allocated to water than sanitation. As a result, rural wastewater often remains untreated, and the rural treatment plants that do exist frequently struggle to meet effluent standards. Given the strong linkages between safe drinking-water and safe sanitation practices, a holistic approach that embraces both water and sanitation is highly recommended. WHO and UNECE have developed a useful [policy and guidance document](#) for small-scale water supply and sanitation systems that includes 40 case studies from across the pan-European region. To develop an enabling environment for the safe management of these smaller systems, the document recommends that countries begin with baseline analysis and target-setting.

**The Republic of Moldova's efforts to improve rural sanitation** in the face of considerable challenges are instructive. Half the Moldovan population lives in rural areas, where more than three quarters of the inhabitants use pit toilets. When wastewater is generated, it is usually pretreated and infiltrated into the environment or infiltrated directly without treatment. The country has no organized collection, transportation or treatment of sludge in rural areas. Government authorities have limited experience with rural sanitation systems, and the only option that the sanitation sector and the general public are familiar with is the classic centralized sewerage system. In 2014, the government adopted a strategy that seeks to provide all Moldovans with adequate sanitation by 2028. To achieve this goal, the government has begun to encourage the development and implementation of decentralized and individual sanitation systems. Its efforts include establishing a support service for small operators; documenting alternative technologies such as septic tanks, urine-diverting dry toilets and constructed wetlands; and developing a general sanitation plan at the district level that includes technical and management solutions.

The session concluded with a look at **sanitation challenges in healthcare facilities and schools** of the region. SDG 6.2 calls for access to adequate and equitable sanitation for all, particularly for “those in vulnerable situations” – which certainly applies to healthcare facilities and schools. Regionally, the Ostrava Declaration and the Protocol both prioritize institutional WASH, though there is a dearth of evidence from the region. Adequate WASH not only enables health care facilities to provide quality care, but it also is crucial in reducing nosocomial infections, maternal and neonatal deaths and the spread of antibiotic-resistant pathogens. An evidence review concluded that current hospital and municipal wastewater treatment systems in the region do not remove pathogens sufficiently. Despite school WASH policies and guidelines being common, a

2016 report found that many students avoid using school WASH facilities, due in part to poor maintenance. Countries need to back up such policies with targets, enforcement plans, dedicated funding, high-quality surveillance and support for operations and maintenance. Guidelines, advocacy tools and practical guidance for these settings can be found on the WHO global and European websites.

The general discussion that followed focused on **the safety of small-scale sanitation systems**. Several participants underscored the fact that, contrary to popular belief, individual on-site systems can be just as safe as centralized sewerage systems, and in rural areas they are often the best choice. Because of the great number and variety of on-site systems, it is particularly important for governments to conduct a baseline survey and assessment of existing systems to determine how to best address environmental and health risks. If people are perfectly capable of choosing a washing machine on their own, why not an on-site sanitation system? To increase the uptake of safe on-site systems, it was suggested that end-users be provided with a catalogue describing their options in nontechnical terms in the local language, including information on the number of people who can safely use each system, start-up costs, operating costs, maintenance requirements, system lifespan and available support.

## **Session 6. World Café on collection, treatment and disposal solutions**

After an introduction to the *Compendium of sanitation systems and technologies*, Session 6 consisted of short presentations and group discussions of concrete collection, treatment and disposal solutions from the region.

The second edition of the [\*Compendium of sanitation systems and technologies\*](#) is a complimentary planning resource that is available in Arabic, English, French, Russian and Spanish. Published by the Swiss Federal Institute of Aquatic Science and Technology (EAWAG) the compendium divides the component elements of sanitation systems into five functional groups that cover the entire sanitation chain: user interface, collection/storage, conveyance, treatment and use/disposal. The first half of the compendium presents templates for nine system types, such as the single pit system, the biogas system and the sewerage system with urine diversion. Each template describes the contexts where the system is most appropriate and the various technologies it might involve; for example, a typical rural system might comprise a dry toilet, a simple pit and surface disposal. The second half of the compendium consists of detailed information sheets for the 57 different technologies used in the templates of the first half, including applications, technical specifications and the pros and cons of using each technology. The compendium provides planners with a comprehensive overview of the information needed to design or upgrade sanitation systems, enabling them to determine which technologies might serve their needs best based on the inputs and outputs for each stage, the compatibility of various components, existing infrastructure and services, operational and maintenance requirements, capacity needs and life cycle-costs. A companion compendium is being developed for drinking-water systems and technologies.

The remainder of the session was devoted to the **World Café**, in which attendees each chose two items from a menu of six presentations on particular solutions and tools being used to improve the collection, treatment and disposal of human waste and wastewater in the pan-European region. After breaking into small groups for two rounds of pitches and discussions in English

and/or Russian, the six presenters returned to the plenary to sum up the key insights and messages that emerged.

- The Village Waters project has brought together representatives from five countries to improve **the treatment of wastewater from scattered dwellings in the Baltic Sea region**. These scattered households are a major source of the diffuse nutrient loads in the Baltic Sea. The project developed a web-based app to help such households choose cost-effective, environmentally friendly wastewater treatment solutions. The group discussions revolved around ways that the tool could also be utilized by policymakers and how countries from other regions could adapt the tool for their own use.
- A second project is seeking to address problems with sanitation and water services by **improving municipal governance in Bosnia and Herzegovina**. At present, less than half the country is connected to public sanitation systems, and 90% of collected wastewater is released into the environment without treatment, while most public utilities are not financially sustainable. This project aims to improve municipal management systems and services in the environmental and economic services. Group participants brainstormed on how to increase the accountability of local authorities. Among the challenges are a gap between legislation and implementation, insufficient technical knowledge, lack of commitment to sustainability, and low prioritization of sanitation on the public sector agenda. Better data collection and guidelines on sanitation and health were suggested to help municipalities choose treatment solutions.
- In the face of increasing water scarcity over the past half century, **Greece developed a legal framework for wastewater reuse**. The goal has always been a balance between extending the range of permitted uses and setting quality requirements that safeguard public health. The groups discussed how to increase reuse even more, particularly whether to restrict public access to areas irrigated with wastewater or to allow all public access, which would require higher quality standards, complicate monitoring and cost more. Participants suggested framing wastewater reuse as a climate change adaptation strategy, finding ways to reduce reuse costs, and raising awareness, both in the general population and among farmers.
- The fourth presentation examined **public pressure to put WASH in schools on the political agenda in the Republic of Moldova**. Although the somewhat taboo topic had been neglected in the country's sanitation target-setting, the combined efforts of students, parents, the media, NGOs and school administrators provoked national debate on problems such as poorly managed outdoor pit toilets and a lack of handwashing facilities in schools. The government finally began allocating money to WASH in schools in 2019. Group participants agreed on the importance of user demands and civic engagement – and of monitoring how well authorities follow through on their promises and publicizing it.
- SuSanA provides international stakeholders with **a platform for knowledge exchange, networking and discussion on sustainable sanitation**. Although the alliance's platform has proven invaluable for its 350 partner organizations and 10 000 individual members, participants helped point out some ways that SuSanA could serve them even better: establish a chapter in the pan-European region, include more case materials from the region, hold meetings somewhere less expensive than Stockholm (or arrange participant subsidies), and organize national meetings. As if to underscore the alliance's networking potential, several participants began planning collaborations with each other on future sanitation events during the group discussions.
- The final presentation considered **sustainable solutions for managing wastewater in rural areas of eastern Europe and central Asia**, particularly areas with cold climates. It focused on three low-cost solutions that can help reduce inequitable access to safe sanitation: urine-diverting dry toilets, greywater treatment using sand and gravel filters,



and constructed wetlands. Participants discussed how to facilitate joint risk assessments by water and sanitation stakeholders, the importance of where wastewater ends up, developing local ownership of treatment systems, and the need to raise awareness among local stakeholders.

## Session 7. Specific aspects of sanitation and health

Session 7 looked at the downstream impacts of sanitation on helminth infections and AMR.

The first half of the session examined the interlinkages between **sanitation and helminths**, commonly known as parasitic worms – in particular soil-transmitted helminths (STHs), which infect 1.5 billion people worldwide, and *Schistosoma*. The four STHs of greatest concern are *Ascaris lumbricoides*, whipworms, hookworms and *Strongyloides stercoralis*. In the pan-European region, where more than 4 million children are in need of preventive chemotherapy, helminth infections are concentrated in central Asia and the Caucasus. STHs cannot be transmitted directly from person to person because their eggs need to spend at least three weeks in soil. Instead, STH transmission occurs primarily through exposure to infected faecal waste, which can occur in any part of the sanitation chain. Helminth prevalence can thus indicate where efforts to improve sanitation need to focus. Challenges posed by helminths include the expansion of favourable environments due to climate change, the persistence of eggs in the environment (up to 15 years), high rates of reinfection and the role of global travel in increasing helminth ranges. The focus of the public health response to these parasites is shifting from control to the interruption of transmission. Interruption requires coordinated intersectoral action by WASH stakeholders and the health sector, as highlighted in [a new WHO toolkit on WASH and neglected tropical diseases](#).

Participants then turned their attention to interlinkages between **sanitation and AMR**. In the EU alone, AMR is responsible for 2.5 million extra hospital days and 25 000 deaths every year. One key element of WHO's [Global action plan on antimicrobial resistance](#) is reducing the incidence of infections and subsequent antibiotic use, a goal that safely managed sanitation directly contributes to. In addition, since AMR follows the same pathways as microbial pathogens, safe sanitation also decreases the spread of resistant pathogens. Intriguingly, a global risk factor analysis found that inadequate sanitation is more strongly correlated with AMR than antibiotic use is. Although the impact of human waste on AMR in the environment can be quantified, large evidence gaps remain; there have been many more studies on safely managed sanitation than unsafely managed sanitation, on the removal of pharmaceuticals than of resistant microbes, and on treatment in the lab than in the field. A Dutch wastewater study found that overflows and areas with separated sewers played a significant role in the release of resistant *Escherichia coli* into the environment, while hospitals were responsible for less than 10%. Even though wastewater treatment plants can eliminate more than 99.99% of bacteria, swimmers are more likely to be exposed to resistant *E. coli* if the water where they swim includes treated wastewater.

The following **discussion** emphasized the importance of monitoring sanitation systems for AMR. Unfortunately, most national AMR action plans that were prepared in the follow-up to the global action plan have not really addressed the role of WASH, much less sanitation, in combating AMR – an oversight that participants were urged to rectify when their national plans are updated. These plans also present an excellent opportunity to advocate for more investment in better sanitation and for improved WASH in healthcare facilities.

## Session 8. Wastewater reuse

The last thematic session was devoted to the advantages and challenges of water reuse, including an in-depth examination of the particular experiences of Israel and Italy.

The session began with a general examination of **the opportunities and challenges of wastewater reuse**. SDG 6.3 specifies not only halving the proportion of wastewater that is untreated by 2030, but also “substantially increasing recycling and safe reuse” – an urgent priority as fresh water becomes more and more scarce. Reuse can be direct or indirect, planned or unplanned. The most common applications for wastewater reuse are agricultural irrigation, landscape irrigation and industrial processes. However, treated wastewater still poses numerous risks to the health of people who are exposed to it, including indirect exposure through the ingestion of contaminated plant-based food or groundwater. Contaminants include pathogens, organic chemicals and heavy metals. Effective reuse can be constrained by agronomic concerns (such as salinity or sodicity), acceptability, infrastructure, economic viability, legislation and management. Three overlapping approaches are employed to address reuse risks and constraints: fit-for-purpose reuse, in which the treatment system is designed to satisfy the water quality standards of a particular application; comprehensive risk management; and the use of multiple barriers to limit contamination and exposure.

Participants then heard about **wastewater reuse in Israel**, where 80% of all wastewater is reused in agriculture, landscaping and industry. Half of all wastewater undergoes tertiary treatment in order to reduce concentrations of 35 chemicals and faecal coliforms to satisfactory levels. When effluent fails to meet standards, it may still be utilized for crops such as cotton, where it poses little risk to human health. All wastewater treatment plants must be approved by the Ministry of Health, which also requires trials of any alternative treatment technologies. Industrial wastewater is monitored for 47 chemicals; if concentrations exceed allowable limits, a company must pay for municipal treatment, though of course the issue remains of what do about all the other chemicals that are not tested for. Farmers must obtain permits from the Ministry of Health and follow guidelines specifying which kinds of effluents and irrigation methods are permissible for each crop; the Ministry ensures that effluent is not used in the vicinity of wells or water pipes. Standards for public park irrigation are somewhat higher. Israeli studies have found no antibiotic-resistant bacteria and very low levels of pharmaceuticals being passed on through irrigation water.

The last part of the session was devoted to **wastewater reuse in Italy**, focusing on three SSP projects. In response to the 2017 drought, Rome developed a SSP to use treated wastewater to irrigate gardens, supply air-conditioning systems and operate fountains, as well as a water safety plan (WSP) to utilize water from the Tiber River as a new water supply. Milan also used a WSP/SSP approach to develop a framework environmental health risk assessment and explore its feasibility with an eye to future legislation, particularly with respect to irrigating crops with treated wastewater. Both projects developed assessment criteria and procedures for specific biological and chemical risks. The third initiative is Digital Water City, in which Milan and four other European cities are developing a series of solutions linking the digital and physical realms for the entire water value chain. Within the initiative, Milan is undertaking several activities in wastewater treatment and reuse, including deploying a network of sensors for real-time monitoring of *E. coli* and enterococcus contamination risks in a treatment plant, and developing a web platform that brings together an early warning system and data from 60 treatment plants.

In **discussion**, it was noted that while some wastewater often ends up in freshwater bodies that serve as sources of water supply, this phenomenon is rarely called wastewater reuse, due to

negative public perceptions. Yet despite such perceptions, treated wastewater can actually be cleaner than water from traditional sources.

## Session 9. Conclusions and next steps

In the closing session, the organizers presented some general conclusions from the workshop and some of the next steps to be taken.

The **conclusions** they presented were as follows.

- Sanitation is a large, complex subject that is – and needs to be – high on the global and regional policy agenda.
- Major sanitation challenges for the pan-European region include bridging gaps in access to safely managed services, particularly in rural areas, and providing safe sanitation in schools, healthcare facilities, workplaces and public places.
- Improving sanitation confers major health and environmental benefits. The health benefits include fewer diarrhoeal infections, fewer STHs, less AMR, improved well-being, better healthcare and better educational outcomes. Environmental benefits include better protection of natural water ecosystems, in particular from the effects of eutrophication, littering and chemical pollution.
- In turn, improving sanitation requires up-to-date national standards and regulations. They should embrace risk-assessment and risk-management approaches (such as SSPs), cover the entire sanitation chain, address both off-site and on-site sanitation and utilize internationally accepted terminology.
- Wastewater reuse requires careful attention to risks related to direct and indirect reuse. When coupled with a risk-based approach that protects health and the environment, wastewater reuse offers a sensible way to address increasing water scarcity by improving the supply of safe drinking-water and of safe food through irrigated agriculture.
- Existing national AMR action plans do not sufficiently address the role of sanitation in combating AMR.
- Climate change requires rethinking the design and operation of sanitation systems, both to mitigate climate change and to adapt to more frequent floods, droughts and torrential rains.
- To finance sanitation sustainably, all countries must contend with aging infrastructure and investment gaps by applying a life-cycle approach to costing and financing of sanitation services.
- Useful tools to improve sanitation include SFDs, SSPs, technology selection tools (such as the [Compendium of sanitation systems and technologies](#)) and the new [WHO toolkit on WASH and neglected tropical diseases](#).

The workshop ended with suggestions for **next steps** to take under the Protocol, beginning with suggestions for workshop participants and other sanitation policymakers in the pan-European region:

- work to raise political awareness of the importance of safely managed sanitation;
- set national sanitation targets under the Protocol, taking into account emerging challenges and new developments;

- address sanitation achievements and gaps in the national summary reports under the Protocol's fourth reporting cycle, which were to be submitted in April 2019;<sup>5</sup>
- use the Protocol as a convening platform and forum for discussion and exchange within the region; and
- urge ministers of health and environment to participate in the upcoming fifth session of the Meeting of the Parties to the Protocol, which will be held in Belgrade on 19–21 November 2019.

To facilitate rational decision-making on sanitation in countries of the region, it was suggested that the following activities be supported under the Protocol:

- setting national sanitation standards based on the key principles in the new WHO sanitation guidelines;
- building national SSP capacity, perhaps in conjunction with WSP capacity-building if a country wishes to pursue an integrated approach;
- educating local operators on how SSPs can improve their operations while providing better health and environmental protection;
- exchanging experiences on wastewater reuse policies and regulations that protect health and the environment, and on the application of risk-management approaches in reuse;
- embedding water, sanitation and hygiene as an integral part of national AMR action plans;
- understanding and addressing the linkages between sanitation and climate change;
- making new sanitation technologies more broadly available;
- enabling households and small-scale operators to understand their options when buying or upgrading systems, and then helping them make the best choices; and
- arranging sustainable financing for safe and sustainable sanitation services.

Oliver Schmoll closed the meeting by thanking all the participants for their thoughtful contributions and challenging them to be ambassadors for better sanitation in their own countries.

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<sup>5</sup> See [https://www.unecce.org/env/water/protocol\\_fourth\\_reporting\\_cycle.html](https://www.unecce.org/env/water/protocol_fourth_reporting_cycle.html).

## **Annex 1. List of participants**

### **Albania**

Miska, Zhaneta  
Ministry of Health and Social Protection

### **Armenia**

Papoyan, Arayik  
National Center of Disease Control and Prevention of the Ministry of Health  
Department of Environmental Hygiene

### **Azerbaijan**

Gurbanova, Gunel  
Ministry of Ecology and Natural Resources

Taghizade, Leylakhanim  
Republican Hygiene and Epidemiology Centre  
Communal Hygiene Department

### **Belarus**

Drazdova, Alena  
Republican Unitary Enterprise "Scientific-Practical Centre of Hygiene"  
Ministry of Health

### **Bosnia and Herzegovina**

Basevic, Gorana  
Ministry of Foreign Trade and Economic Relations  
Department for Water Resources

Rudić Grujić, Vesna  
Public Health Institute, Republic of Srpska

Vicanovic, Jelena  
Public Institution "Waters of Srpska"

### **Bulgaria**

Atanasov, Ivo  
Ministry of Health

Valkova, Katalina  
Ministry of Health

**Croatia**

Simić, Milica

Ministry of Environment and Energy

Ujević Bošnjak, Magdalena

Croatian Institute of Public Health

**Finland**

Graan, Marina

Helsinki Region Environmental Services Authority

Laitinen, Jyrki

Finnish Environment Institute SYKE

**Georgia**

Gabriadze, Nana

National Center for Disease Control and Public Health

Environmental Health Division

Mindorashvili, Alexander

Ministry of Environmental Protection and Agriculture

Department of Environment and Climate Change

**Germany**

Helmecke, Manuela

German Environment Agency

Panesar, Arne

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

Energy, Water, Transport

Rickert, Bettina

German Environment Agency

Schlenk, Jan

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

Sector Programme Sustainable Sanitation

Zügner, Verena

German Environment Agency

**Greece**

Karaouli, Vasiliki

Ministry of Health

**Israel**

Weinberg, David

Ministry of Health  
Environmental Health

**Italy**

Achene, Laura  
Istituto Superiore di Sanità  
Environment and Health

Bignami, Francesco  
Istituto Superiore di Sanità  
Environment and Health

Murtas, Susanna  
Istituto Superiore di Sanità  
Environment and Health

Nigro Di Gregorio, Federica  
Istituto Superiore di Sanità  
Environment and Health

**Kazakhstan**

Elshibaeva, Zaure  
Ministry of Health

**Kyrgyzstan**

Raimkulova, Asel  
The State Agency on Environment Protection and Forestry  
Department of Ecological Expertise and Management of Natural Resources

Saryeva, Gulnara  
State Sanitary and Epidemiological Surveillance  
Department of Disease Prevention

**Lithuania**

Sliachtic, Natalja  
Ministry of Health  
Center for Health Education and Diseases Prevention

**Montenegro**

Bajic, Borko  
Institute of Public Health  
Environmental Ecology

Didanovic, Snezana  
Ministry of Sustainable Development and Tourism

## Division for Utility Development

### **Netherlands**

Friederichs, Lieke  
National Institute for Public Health and the Environment  
Environmental Department

Kruijtzer, Ariane  
Ministry of Infrastructure and Water  
Water Department

Schmitt, Heike  
National Institute for Public Health and the Environment  
Environmental Department

Van Dokkum, Ronald  
Ministry of Infrastructure and Water Management

Van Driezum, Inge  
National Institute for Public Health and the Environment  
Centre for Sustainability Environment and Health

### **North Macedonia**

Dimoska Zajkov, Ljupka  
Ministry of Environment and Physical Planning  
Water Department

Kochubovski, Mihail  
Institute of Public Health  
Environmental Health

### **Norway**

Hansen, Rita Vigdis  
Norwegian Environment Agency  
Industry and Marine Environment Department

### **Portugal**

Costa, Helena  
The Water and Waste Services Regulation Authority (ERSAR)

### **Republic of Moldova**

Pinzaru, Iurie  
National Public Health Agency

### **Romania**

Drapa, Ana  
National Administration "Apele Române"  
International Cooperation Office



Marchidan, Elvira  
National Administration “Apele Române”  
River Basin Management Plan  
Neagu Carmen  
Ministry of Waters and Forests  
Water Resources Management Directorate

**Serbia**

Filipovic Dusic, Biljana  
Ministry of Environmental Protection

Jovanovic, Dragana  
Institute of Public Health  
Department of Drinking and Bathing Water Quality  
Center for Hygiene and Human Ecology

Stojanovic, Zoran  
Environmental Protection Agency  
National Laboratory

**Switzerland**

Piers de Raveschoot, Stephanie  
Swiss Agency for Development and Cooperation  
Global Programme Water

**Tajikistan**

Maskaev, Abdulkadyrkhon  
Committee of Environmental Protection under the Government of the Republic of Tajikistan  
State Control and Use of Flora and Fauna

**Ukraine**

Rudenko, Iryna  
Ministry of Health  
Public Health Department

**Uzbekistan**

Bakiev, Nazrulislom  
Ministry of Foreign Affairs  
Division of Water and Ecology

Mirshina, Olga  
Ministry of Health  
Republican Center of State Sanitary-Epidemiological Surveillance

## **European Commission**

Rosenstock, Nele-Frederike  
DG Environment  
Belgium

## **Nongovernmental organizations**

Anakhasyan, Emma  
Armenian Women for Health and Healthy Environment  
Armenia

Andronic, Corina  
Skat Foundation Moldova Water Supply and Sanitation  
Republic of Moldova

Dokovska Spirovska, Natasha  
Journalists for Human Rights  
North Macedonia

Dzamukashvili, George  
National Water Partnership of Georgia  
Georgia

Iskrev, Diana  
Earth Forever  
Bulgaria

Mihaylova, Bistra  
Women Engage for a Common Future  
Germany

Musabaeva, Kasiet  
Vodnoe Partnerstvo  
Kyrgyzstan

Tkabladze, Melano  
CENN-Caucasus Environmental Nongovernmental Network  
Georgia

Tsvietkova, Hanna  
MAMA-86  
Ukraine

## **Technical experts**

Maletskyi, Zakhar  
Norwegian University of Life Sciences  
Faculty of Sciences and Technology  
Norway

Percovs, Aleksejs  
University of Latvia  
Faculty of Geography and Earth Sciences  
Latvia

Peter, Maryna  
University of Applied Sciences Northwestern Switzerland  
Eawag Institute for Copreneurship  
Switzerland

Ratnaweera, Harsha  
Norwegian University of Life Sciences  
Faculty of Sciences and Technology  
Norway

Rechenburg, Andrea  
University of Bonn  
WHO Collaborating Centre  
Germany

Smits, Stef  
IRC Consult  
Netherlands

Urtāne, Loreta  
University of Latvia  
Faculty of Geography and Earth Sciences  
Latvia

Velleman, Yael  
Schistosomiasis Control Initiative  
United Kingdom of Great Britain and Northern Ireland

Zakaria, Fiona  
University of Leeds  
School of Civil Engineering  
United Kingdom of Great Britain and Northern Ireland

## **United Nations Economic Commission for Europe**

Bernardini, Francesca  
Environment Division  
Joint Secretariat of the Protocol on Water and Health  
Switzerland

Nikiforova, Nataliya  
Environment Division  
Joint Secretariat of the Protocol on Water and Health  
Switzerland

## **World Health Organization**

Diener, Arnt  
WHO European Centre for Environment and Health  
Water and Climate Programme  
Germany

Grossi, Valentina  
WHO European Centre for Environment and Health  
Water and Climate Programme  
Germany

Kalandarov, Safo  
WHO Country Office  
Tajikistan

Kendrovski, Vladimir  
WHO European Centre for Environment and Health  
Water and Climate Programme  
Germany

Medlicott, Kate  
Public Health, Environment and Social Determinants of Health Department  
Water, Sanitation, Hygiene and Health  
Switzerland

Schmoll, Oliver  
WHO European Centre for Environment and Health  
Water and Climate Programme  
Germany

Shinee, Enkhtsetseg  
WHO European Centre for Environment and Health  
Water and Climate Programme  
Germany

## **Secretariat**

Baumann, Philip  
WHO European Centre for Environment and Health  
Germany

Palii, Cristina  
WHO European Centre for Environment and Health  
Water and Climate Programme  
Germany

Rhein, Andrea  
WHO European Centre for Environment and Health  
Water and Climate Programme  
Germany

Schmiege, Dennis  
University of Bonn  
Center for Development Research (ZEF)  
Germany

**Rapporteur**

Hoekstra, Misha

**Interpreters**

Pignastyy, Georgy

Reshetov, Alexander

## Annex 2. Meeting programme

### TUESDAY, 12 FEBRUARY 2019

09:15-10:00      **Registration and welcome refreshments**

10:00-10:20      **Welcome and opening**

Opening remarks (*Oliver Schmoll, Acting Head of Office, WHO European Center for Environment and Health*)

Introduction to the objectives, programme and methods of the workshop (*Oliver Schmoll, WHO European Center for Environment and Health*)

10:20-11:30      **Session 1: Setting the scene**

*Session objectives:* Establish the health and environment rationale for adequate and safely managed sanitation services

*Moderator:* Biljana Filipovic

Sanitation in the context of the Protocol on Water and Health and the 2030 Agenda for Sustainable Development (*Francesca Bernardini, UNECE*)

Making the health case for sanitation (*Oliver Schmoll, WHO European Center for Environment and Health*)

Impacts on the environment of poorly managed sanitation (*Jyrki Laitinen, Finnish Environment Institute, Finland*)

Discussion and conclusions

11:30-13:00      **Session 2: Normative guidance on sanitation and tools**

*Session objectives:* Launch of the Russian version of the new WHO Guidelines on Sanitation and Health and introduction to the sanitation safety planning approach

*Moderator:* Bettina Rickert

Introduction of key principles of the new WHO Guidelines on Sanitation and Health (*Kate Medlicott, WHO*)

How faecal-waste-flow diagrams can help us to achieve inclusive sanitation for all (*Arne Panesar, GIZ*)

Introduction to the SSP approach (*Kate Medlicott, WHO*)

Implementation and experiences of SSPs in Helsinki (*Marina Graan, Helsinki Region Environmental Services Authority, Finland*)

Discussion and conclusions

13:00-14:15      **Lunch break**

14:15-16:15      **Session 3: Sanitation challenges in the pan-European region**

*Session objectives:* Disseminate and discuss the results of the sanitation scoping study for the pan-European region conducted under the Protocol on Water and Health

*Moderator:* Francesca Bernardini

Group work on main sanitation challenges in the pan-European region: sharing experiences and identifying areas for action

Status, trends and challenges of sanitation situation in the pan-European region (*Harsha Ratnaweera, WHO/UNECE consultant*)

Impacts of current sanitation practices in the pan-European region (*Lieke Friederichs, National Institute for Public Health and the Environment, Netherlands*)

Climate change and sanitation (*Fiona Zakaria, University of Leeds, United Kingdom*)

Discussion and conclusions

16:15-16:45 **Afternoon break**

16:45-18:00 **Session 4: Sanitation policies, institutional framework and financing**

*Session objectives:* Provide updates on policy developments and institutional and financial aspects

*Moderator:* Ronald van Dokkum

Updates on sanitation governance aspects from UN-Water GLAAS (*Enkhtsetseg Shinee, WHO Regional Office for Europe*)

Sustainable financing of sanitation systems (*Stef Smits, IRC, Netherlands*)

Current status on the European Union Urban Waste Water Treatment Directive (*Nele-Frederike Rosenstock, European Commission*)

Case example from Tajikistan on updating sanitation regulations (*Abdulkadyrkhon Maskaev, Committee of Environmental Protection, Tajikistan*)

Discussion and conclusions

## WEDNESDAY, 13 FEBRUARY 2019

09:00-09:15 Reflections and conclusions from Day 1 and overview of Day 2

09:15-10:15 **Session 5: Sanitation in specific settings**

*Session objectives:* Address sanitation issues and solutions in small-scale systems in rural areas and in schools

*Moderator:* Dragana Jovanovic

Considerations for small-scale sanitation (*Bettina Rickert, German Environment Agency, Germany, and Dragana Jovanovic, Institute of Public Health, Serbia*)

Challenges and solutions for rural sanitation in the Republic of Moldova (*Corina Andronic, ApaSan Swiss Water and Sanitation Project, Republic of Moldova*)

Common sanitation challenges in schools and healthcare facilities in the pan-European region (*Valentina Grossi, WHO Regional Office for Europe*)

Discussion and conclusions

10:15-10:45 **Morning break**

10:45-12:45 **Session 6: World Café on collection, treatment and disposal solutions**

*Session objectives:* Bring participants together to discuss technical sanitation solutions

*Moderator:* Nataliya Nikiforova

Compendium of sanitation systems and technologies (*Maryna Peter, Swiss Federal Institute of Aquatic Science and Technology, Switzerland*)

World Café

Introduction to the World Café

World Café presentations and discussions

Feedback to plenary

12:45-14:00 **Lunch break**

14:00-14:45	<p><b>Session 7: Specific sanitation and health aspects</b></p> <p><i>Session objectives:</i> Share experiences on downstream impacts of sanitation on AMR and helminth infections</p> <p><i>Moderator:</i> Alena Drazdova</p> <p>Interlinkages between sanitation and helminth infections (<i>Yael Velleman, Schistosomiasis Control Initiative</i>)</p> <p>Interlinkages between sanitation and AMR (<i>Heike Schmitt, National Institute for Public Health and the Environment, Netherlands</i>)</p> <p>Discussion and conclusions</p>
14:45-16:00	<p><b>Session 8: Wastewater reuse</b></p> <p><i>Session objectives:</i> Address the water reuse agenda and share country experiences, given its growing relevance in the pan-European context</p> <p><i>Moderator:</i> Jelena Vicanovic</p> <p>Opportunities and challenges of water reuse (<i>Manuela Helmecke, German Environment Agency, Germany</i>)</p> <p>Experiences with wastewater reuse from Israel (<i>David Weinberg, Ministry of Health, Israel</i>)</p> <p>The pioneering experience of water reuse and sanitation safety plans in Italy (<i>Laura Achene, National Institute of Health, Italy</i>)</p> <p>Discussion and conclusions</p>
16:00-16:30	<b>Afternoon break</b>
16:30-17:30	<p><b>Session 9: Conclusions from the workshop and next steps</b></p> <p><i>Moderator:</i> Oliver Schmoll and Nataliya Nikiforova</p>
17:30	Closure of the workshop





## The WHO Regional Office for Europe

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

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United Kingdom  
Uzbekistan

### World Health Organization Regional Office for Europe

UN City, Marmorvej 51, DK-2100 Copenhagen Ø, Denmark

Tel: +45 45 33 70 00 Fax: +45 45 33 70 01

Email: [eurocontact@who.int](mailto:eurocontact@who.int)

Website: [www.euro.who.int](http://www.euro.who.int)