EU-WISH INTERNATIONAL WORKSHOP & CONSORTIUM MEETING REPORT (ONLINE VERSION) | DUBLIN 2025

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Contributors	EU-WISH consortium

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List of abbreviations

AGES	Osterreichische Agentur Fur Gesundheit Und Ernahrungssicherheit GMBH (Austrian Agency for Health and Food Safety)
AHP	Analytical Hierarchy Process
AMELAG	Wastewater Monitoring for Epidemiological Situation Assessment
AMR	Antimicrobial Resistance
ANSES	French Agency for Food, Environmental and Occupational Health & Safety
ARG	Antibiotic Resistance Genes
AST	Antimicrobial Susceptibility Testing
AUTH	Aristotle University of Thessaloniki
BIOR	Institute of Food Safety, Animal Health and Environment
CCBs	Coordinating Competent Bodies
CING	The Cyprus Institute of Neurology and Genetics
CIPH	Hrvatski Zavod Za Javno Zdravstvo (Croatian Institute of Public Health)
CoViNet	Coronavirus Network
CPE	Carbapenemase-Producing Enterobacteriaceae
DEEP	Digital European Exchange Platform
ECDC	European Centre for Disease Prevention and Control
EEA	European Environment Agency
E. coli	*Escherichia coli*
EODY	Ethnikos Organismos Dimosias Ygeias (National Public Health Organization)
ERVISS	European Respiratory Virus Surveillance System

EUDA	European Union Drugs Agency
EU-JAMRAI2	European Joint Action on Antimicrobial Resistance and Healthcare-Associated Infections (Phase 2)
EUROMOMO	European Monitoring of Excess Mortality
EU-WISH	EU Wastewater Integrated Surveillance for Public Health
FWCs	Framework Contracts
GISRS	Global Influenza Surveillance and Response System
GLOWACON	Global Consortium for Wastewater and Environmental Surveillance for Public Health
GPEI	Global Polio Eradication Initiative
GPL	Global Polio Laboratory
H1N1	Influenza A virus subtype H1N1
HERA	Health Emergency Preparedness and Response Authority
HMPV	Human Metapneumovirus
HPIV	Human Parainfluenza Virus
HPSC	Health Protection Surveillance Centre
INSA	National Health Institute Doutor Ricardo Jorge
INSPIRE	Infrastructure for Spatial Information in the European Community
INTEX	International Event (used in case study)
IPD	Institut Pasteur de Dakar
IPSN	International Pathogen Surveillance Network
IPT	Institut Pasteur of Tunis
IRCCS	Istituto di Ricerche Farmacologiche Mario Negri (Mario Negri Institute for Pharmacological Research)
ISS	Istituto Superiore di Sanita (Italian National Institute of Health)
JRC	Joint Research Centre
LIST	Luxembourg Institute of Science and Technology

MCM	Medical Countermeasures
MHRA	Medicines and Healthcare products Regulatory Agency
MPHS-CY	Ministry of Health of the Republic of Cyprus
MS	Member States
MUI	Medical University Innsbruck
NIPH	Norwegian Institute of Public Health
NIVA	Norwegian Institute for Water Research
NKUA	National Kapodistrian University of Athens
NPEV	Non-Polio Enteroviruses
PCR	Polymerase Chain Reaction
PEFs	Polio Essential Facilities
PFAS	Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)
PHAC	Public Health Agency of Canada
PHPPs	Public Health Preparedness Plans
PMMoV	Pepper Mild Mottle Virus
Prof.	Professor
PV	Poliovirus
PVP	1-phenyl-2-(1-pyrrolidinyl)-1-pentanone
qPCR	Quantitative Polymerase Chain Reaction
RKI	Robert Koch Institute
RIVM	National Institute for Public Health and the Environment
RSV	Respiratory Syncytial Virus
RVs	Respiratory Viruses
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
SSI	Statens Serum Institut

SCORE	Sewage Chemical Information System
SOPs	Standard Operating Procedures
SUEN	Turkish Water Institute
SpF	Santé publique France (French National Public Health Agency)
SWG	Sustainability Working Group
TAG	Technical Advisory Group
THL	Finnish Institute for Health and Welfare
TOPSIS	Technique for Order Preference by Similarity to Ideal Solution
TU WIEN	Technische Universitaet Wien (Vienna University of Technology)
UBA	Federal Environmental Agency
UCY	University of Cyprus
UCD	University College Dublin
USAL	University of Salamanca
USC	University of Santiago de Compostela
UOA	University of Athens
UoC	University of Crete
UOI	University of Ioannina
UPatras	University of Patras
UTH	University of Thessaly
UWWTD	Urban Wastewater Treatment Directive
VDPV	Vaccine-Derived Poliovirus
WBE	Wastewater-Based Epidemiology
WBS	Wastewater-Based Surveillance
WBVR	Wageningen Bioveterinary Research
WES	Wastewater and Environmental Surveillance

WHO	World Health Organization
WGS	Whole Genome Sequencing
WP	Work Package
WVAL	Wastewater Viral Activity Level
WWS	Wastewater Surveillance
WWTP	Wastewater Treatment Plant

The EU-WISH International Workshop & Consortium Meeting at a glance

The **EU-WISH International Workshop & Consortium Meeting 2025**, held in **Dublin, Ireland**, from **9 to 11 September 2025**, marked a significant milestone in the Joint Action's effort to strengthen wastewater-based surveillance (WBS) as a core component of public health preparedness across the European Union. Organized by **University College Dublin (UCD)** and the **Statens Serum Institut (SSI)**, the event brought together a diverse community of experts, policymakers, laboratory specialists, public-health professionals, environmental authorities, and international partners. With representatives from **35 countries**, including several beyond the EU, the workshop demonstrated the growing importance of WBS as a global public-health tool and provided an invaluable platform for sharing progress, aligning strategies, and planning the next phase of EU-WISH.

The workshop took place at a pivotal moment for Europe. With the **Urban Wastewater Treatment Directive (Directive (EU) 2024/3019)** entering into force in January 2025, Member States now face new obligations relating to pathogen and chemical monitoring, antimicrobial resistance (AMR), comparability, and cross-sector coordination. EU-WISH is strategically positioned to support this transition by delivering guidance, tools, capacity-building activities, and harmonized approaches that can be adopted across national contexts. The Dublin workshop therefore served as both a scientific forum and a policy-oriented platform, enabling participants to link practical experience with legislative requirements and identify opportunities for enhanced collaboration.

Over three days, discussions were structured around complementary themes. **Day 1** focused on the scientific and technical aspects of WBS, particularly the prioritization of surveillance targets. **Day 2** explored how wastewater data can inform public-health decision-making, including challenges of integration, comparability, and cross-border coordination. **Day 3** provided space for work package collaboration, international partner contributions, and governance, culminating in the **General Assembly**.

This report refers to the "EU–International Workshop & Consortium Meeting 2025", the official title used for the three-day event organized in Dublin, Ireland. This name **reflects both** the **EU-WISH International Workshop** and the **EU-WISH Consortium Meeting (including the General Assembly)** held in Dublin. This report captures the workshop's collective insights, highlights areas of consensus, and documents the strategic direction agreed upon by EU-WISH partners as they work toward establishing sustainable, harmonized, and impactful wastewater-based surveillance systems across Europe.

1 EU-WISH International Workshop & Consortium Meeting | Day 1: Tuesday, 9 September

1.1. Welcome and opening statements

Day 1 opened with a series of welcoming remarks that set the tone for an intensive and collaborative workshop. **Professor Wim Meijer (UCD, Ireland)** and **Dr. Steen Ethelberg (SSI)** welcomed participants on behalf of the EU-WISH consortium. They were joined by **Professor Orla Feely**, President of University College Dublin, who highlighted UCD's longstanding engagement in environmental microbiology and its commitment to European collaboration.

Further opening remarks were delivered by **Professor Mary Horgan**, Chief Medical Officer of Ireland, who emphasized Ireland's support for coordinated European public-health surveillance, and **Dr. Victor Aiyedun**, National Clinical Lead for Surveillance at Ireland's Health Protection Surveillance Centre (HPSC), who reflected on Ireland's operational experience with wastewater surveillance during the COVID-19 pandemic. **Dr. Anastasia Koutsolioutsou (HERA)** closed the opening session by underlining HERA's role in strengthening Europe's preparedness for cross-border health emergencies, including through medical countermeasures and environmental surveillance.

The combination of scientific, institutional, and policy perspectives provided momentum for a day focused on the **scientific and technical foundations** of wastewater-based surveillance.

1.2. Overview of Day 1

The first day of the workshop focused on the **prioritization of targets for wastewater surveillance**, an essential task for developing harmonized European frameworks. An overview presentation delivered by **Tarja Pitkänen (THL, Finland)** outlined the progress of EU-WISH Work Package 5 (WP5), focusing on the role of WBS in public health monitoring across Europe.

Prioritization activities centered on four thematic areas:

1. **Respiratory viruses and emerging pathogens**,
2. **Antimicrobial resistance (AMR)**,
3. **Poliovirus and non-polio enteroviruses (NPEVs)**, and
4. **Illicit drugs, chemical substances, and health-related biomarkers**.

These areas reflect both **current challenges in European public health** and **future needs** under the revised Urban Wastewater Treatment Directive. The prioritization approach builds on ongoing work within EU-WISH WPs, as well as international guidelines and national practices.

Also, the discussions in Day1 included the capacity of **EU-WISH to build a sustainable, collaborative training network for WBS**.

1.3. **Breakout Sessions: Scientific Prioritization Across Four Themes**

Five breakout sessions were organized concurrently, each focusing on one thematic area. The discussions were guided by predefined criteria, including public-health relevance, feasibility, integration potential, and sustainability of monitoring. Chairs and co-chairs from across Europe led the groups, ensuring multidisciplinary perspectives.

1.3.1 Respiratory virus and emerging pathogens

Chaired by **Maria Petala (AUTH, Greece)**, alongside co-chairs from RIVM, ISS, and other national institutes, this breakout session examined the landscape of respiratory-virus surveillance through wastewater.

Key priorities discussed included:

- The importance of early detection of **SARS-CoV-2**, **influenza**, **RSV**, and other emerging pathogens;
- The value of wastewater as a **population-wide, non-invasive monitoring tool**;
- Ensuring that prioritization criteria align with those developed earlier in EU-WISH, especially regarding **public-health impact**, **likelihood of emergence**, and **risk of international spread**;
- The importance of **sustainability of monitoring**, a criterion that has gained prominence in the post-pandemic period.

Participants also highlighted the need to maintain readiness for pathogens of unknown significance, noting the role of WBS in complementing clinical surveillance and offering early-warning signals.

1.3.2 Antimicrobial resistance (AMR)

Led by **Heike Schmitt (RIVM, Netherlands)**, the AMR breakout session explored the complexities of wastewater-based AMR monitoring.

Key messages included:

- The value of analyzing **panels of resistance genes** to monitor temporal trends;
- The increasing importance of **whole-genome sequencing** for characterizing bacterial isolates;
- The need for flexibility at national and regional levels to tailor priority lists to local contexts;
- The importance of harmonizing **sampling**, **logistics**, and **reporting frameworks** to achieve comparability across Europe.

Training needs for AMR testing were also identified, linking directly with WP4's mandate on capacity-building.

1.3.3 Chemical substances (non-infectious), illicit drugs and health related biomarkers

Chaired by **Teemu Gunnar (THL, Finland)** together with experts from Greece and Spain, this group discussed environmental determinants of health that can be monitored through wastewater, including:

- Priority chemical substances and pollutants;
- Community-level drug consumption markers;

- Ethical considerations in interpreting aggregated behavioral indicators;
- Biomarkers that may support population-level health monitoring.

This broad category stimulated debate about balancing public-health relevance with analytical feasibility, and avoiding unintended social or ethical consequences.

1.3.4 Poliovirus and non-polio enterovirus

This session, chaired by **Albert Bosch (UB, Spain)** addressed the ongoing relevance of environmental poliovirus surveillance given recent detections worldwide.

Discussion themes included:

- The need for sustained poliovirus surveillance within the WHO Polio Eradication framework;
- Harmonized laboratory and sampling protocols;
- Integration of WBS for poliovirus with national AFP surveillance systems;
- Opportunities to use WBS for the broader family of enteroviruses.

The session underscored the importance of WBS in maintaining vigilance against poliovirus re-emergence.

1.3.5 Building a sustainable training framework for EU-WISH: opportunities, needs and topic prioritization

The session, chaired by **José Antonio Baz Lomba (NIPH, Norway)** focused on building a sustainable, collaborative training network for EU-WISH. It presented a mapping of the current training ecosystem, identifying opportunities, gaps, overlaps, and bottlenecks. Key principles **emphasized open access, inclusivity, quality, coordination, and long-term sustainability**. Participants highlighted the need for clear ownership, regularly updated materials, and tailored formats aligned with user needs. Discussions covered priority training topics, normalization strategies, wastewater sampling and biobanking, data analysis and interpretation, and data modeling linked to epidemiological reporting.

1.4. Summary of insights and proposals from the day 1 breakout sessions to the plenary

The outcomes of the breakout sessions were briefly presented by the rapporteurs to all participants in the plenary right after the sessions finished.

For the **"Respiratory Viruses and Emerging Pathogens"** session, outcomes were structured into two parts. For respiratory viruses, participants confirmed that the criteria used for selection, scoring, and weighting were fully aligned with the ongoing EU-WISH prioritization work. Public-health impact and preparedness remained the primary drivers, with risk of significant health impact and likelihood of emergence consistently ranking highest. Sustainability of monitoring emerged as an additional priority for future exercises. For emerging pathogens, the prioritization process was reviewed, and consensus was reached on three main categories for evaluation—public-health relevance, added value of WBS, and feasibility—each supported by agreed sub-criteria. Participants also agreed that greater weight should be assigned to public-health relevance and added value than to feasibility. Across both topics, key needs included sustainable funding, adaptable surveillance design, appropriate resources, and strong governance mechanisms, including a formal cross-border communication framework.

In the **"Antimicrobial Resistance (AMR)"** session, participants broadly endorsed the proposed approach for WBS of AMR. They recommended testing panels of resistance genes, strengthening isolate characterization through whole-genome sequencing, and allowing regional flexibility while maintaining a common European baseline. Criteria for selecting wastewater treatment plants were discussed, as were steps toward developing shared SOPs. Training needs and collaboration with related initiatives, such as JAMRAI, were emphasized.

The session on **"Illicit Drugs, Chemicals, and Health-Related Biomarkers"** highlighted substantial expertise among participants and general consensus on priority substance groups. While some targets are ready for routine monitoring, others require additional research to assess feasibility. Participants called for flexible prioritization, continued EU-level cooperation, and strong engagement from countries with established national WBS programs. Collaboration with networks such as SCORE was identified as particularly valuable.
In the **"Poliovirus and Non-Polio Enteroviruses"** session, discussions focused on preparedness, coordination with WHO and ECDC, and the need to share sequences with the WHO GPL network. Participants stressed flexible sampling strategies tailored to local contexts and emphasized laboratory process controls. While views differed on specific enterovirus targets, VDPV surveillance remained a clear priority.

Finally, the session on the **"Training Framework for EU-WISH"** identified common needs across training categories, including open-access resources, multilingual materials, standardized evaluation mechanisms, and opportunities for scalability through partnerships with WHO, ECDC, universities, public-health institutes, and technical communities such as GitHub contributors. AI integration and clarification of ownership and visibility were also highlighted as areas requiring further attention.
Despite thematic differences, several common findings emerged:

- **WBS is recognized as a non-invasive, cost-effective, and scalable public-health tool**, supplementing clinical surveillance.
- Early detection and population-level insights were consistently emphasized.
- Structural constraints, including fragmented governance and divergent capacities across Member States, present challenges for harmonization.
- Ethical considerations — privacy, data protection, and non-stigmatization — must be embedded in prioritization.
- A clear need exists for **continuous evaluation, methodological updates**, and **capacity-building**.

1.5. Wrap up and closing remarks of the first day

The day concluded with a wrap-up session chaired by **Pikka Jokelainen** and **Steen Ethelberg**. Participants contributed feedback through a **Slido evaluation**, providing real-time insights into the clarity, relevance, and usefulness of the sessions.

Following the formal closing, participants enjoyed a cultural program of **traditional Irish music and dance**. The evening offered an informal setting to strengthen connections and reflect on the day’s achievements.

2 EU-WISH International Workshop & Consortium Meeting | Day 2: Wednesday, 10 September

2.1. Welcome to workshop's second day

Day 2 shifted focus from technical prioritization toward the **operational, policy, and governance dimensions** of wastewater-based surveillance (WBS). While Day 1 addressed the "what" of WBS (which targets and why), Day 2 addressed the crucial question of **"how can wastewater data be meaningfully integrated into public-health decision-making?"** among other **strategical and ethical considerations.** Day 2 of the workshop opened with introductory remarks by **Steen Ethelberg** and **Pikka Jokelainen (SSI, Denmark)**, outlining the key themes:

- Integration of wastewater surveillance into national public-health systems,
- Development of indicators and actionable outputs,
- Harmonization across countries, and
- Strengthening cross-border collaboration.

The opening session included a series of presentations providing background for the breakout discussions:

- **WP2** shared updates on dashboards and communication tools under development and focused on how to effectively visualize and communicate WBS results to diverse audiences, made by **Veronik Hutse (Sciensano, Belgium)** and **Henry-Michel Cauchie (LIST, Luxembourg)**.
- **WP4** outlined progress in capacity building and sustainability planning and underlined the integration of sustainability into all WP4 activities, made by **Jose Antonio Baz Lomba (NIPH, Norway)**.
- **WP6** presented examples of data comparability challenges and proposed new approaches for interpretation and reporting, and explored insights gained so far and outlines future ambitions for improving comparability, made by **Steen Ethelberg (SSI, Denmark), Tarja Pitkänen (THL, Finland), Teemu Gunnar (THL, Finland)**, and **Hans-Peter Stüger (AGES, Austria)**.
- **International partners** — including **WHO**, **HERA**, **ECDC**, and **JRC** — shared perspectives on global and European integration of wastewater-based indicators:
    - **Kate Medlicott (WHO)** explored through her presentation the strategic role of Wastewater and Environmental Surveillance (WES) in strengthening global health preparedness and response
    - **Dr. Bernd Manfred Gawlik (European Commission – JRC)** shared key lessons learned from implementing and communicating WBS across Europe

These presentations laid the foundation for a day dedicated to **strategic implementation**.

2.2. Breakout Sessions: Four Pillars of Integration

As on Day 1, participants joined one of four breakout sessions, each focusing on a domain that influences the practical use of wastewater surveillance in public health. The sessions were designed to be interactive, with structured questions, subgroup work, and rapporteur-led consolidation.

Each breakout session focused on a central theme relevant to the implementation and sustainability of WBS:

1. **Integrating Wastewater Surveillance for Decision-Making (WP 6.3)** – examining how WBS data can be better used to inform public-health action, and identifying the technical, organizational, and political challenges that hinder integration.
2. **Value & Necessity of Wastewater Surveillance (WP 3.3)** – analyzing the contribution of WBS to national and EU preparedness plans, exploring barriers to its inclusion, and addressing ethical aspects related to health equity.
3. **Comparability of Wastewater Results Across European Countries (WP 6.2)** – discussing methodological diversity, standardization, data visualization, aggregation, and modeling as ways to improve comparability and build a coherent European picture.
4. **Designing Effective Sampling Strategies for Wastewater Surveillance Programs (WP 6.1)** – testing the draft guidance document on sampling strategies through practical case studies and evaluating its applicability to different WBS settings.

2.2.1 Integrating wastewater surveillance for decision-making

The session was chaired by **Elisabetta Suffredini (ISS, Italy)** with co-chairs from Denmark and Greece and explored why WBS is still not fully utilized for public-health action, despite its demonstrated potential.

Discussion centered on:

- **Technical challenges** such as variation in sampling frequency, inconsistent laboratory protocols, and uncertainty in interpreting low-level detections;
- **Organizational challenges**, including unclear responsibilities, uneven national coordination, and gaps in communication between environmental and health sectors;
- **Political and institutional challenges**, such as limited visibility of WBS within surveillance frameworks, and the need for formal inclusion in preparedness plans.

Participants called for:

- Development of **clear, agreed indicators**,
- Standardized **reporting frameworks**,
- User-focused visualization tools, and
- Strengthened governance structures linking WBS to national risk assessments.

2.2.2 Value & necessity of wastewater-based surveillance

The session was chaired by **Evangelia Ntzani (UOI, Greece)** with co-chairs from Greece and German rapporteur addressed the fundamental question: *What value does WBS bring to public-health preparedness?* Three thematic areas emerged strongly:

Scientific and operational value

Participants highlighted:

- WBS as a **non-invasive**, **cost-effective**, and **scalable** method,

- Its ability to detect both symptomatic and asymptomatic infections,
- Its usefulness in early-warning systems.

Policy relevance and inclusion in PHPPs

Discussion noted that WBS often remains peripheral in national preparedness structures due to:

- Fragmented governance,
- Absence of legislative obligations, and
- Limited staff capacity for routine integration.

Ethics and equity

Participants emphasized that WBS must respect privacy protections, avoid misinterpretation of community behaviour, and consider equity in resource distribution. Despite thematic differences, groups converged on the need for **legal clarity**, **technical harmonization**, **political commitment**, and **strategic communication** to elevate WBS into an essential public-health tool.

2.2.3 Comparability of wastewater results across European countries

Chaired by **Hans Peter Stüger (AGES, Austria)** with co-chairs from Greece, this session focused on the persistent challenge of achieving comparability in WBS data across countries.

Key issues included:

- Heterogeneity in **sampling methods**,
- Differences in **concentration and extraction techniques**,
- Variability in **qPCR and sequencing workflows**,
- Lack of consistent **normalisation approaches**, and
- Discrepancies in **data interpretation** practices.

Participants examined multiple strategies, such as:

- **Method harmonization**,
- **Ring trials**,
- **Indicator-based approaches**,
- **Data aggregation strategies**, and
- Use of **mathematical modelling** to interpret noisy or incomplete datasets.

The session confirmed the need for sustained **interlaboratory collaboration**, support for countries with less capacity, and common EU-level guidance under WP7 and WP6.

2.2.4 Designing effective sampling strategies for WBS programs

Chaired by **Michalis Koureas (UTH, Greece)** with co-chairs from France and Belgium, this session used fictional but realistic case studies to test and refine a **draft guidance document** for sampling strategies.

Participants designed sampling plans for different surveillance scenarios, taking into account:

- Population size and distribution,
- Type of wastewater system,
- Surveillance objective (early warning vs. trend monitoring),
- Analytical capacity,
- Frequency and feasibility of sampling.

The session validated the usefulness of the methodology and highlighted opportunities for strengthening the guidance, especially in relation to mixed urban–rural settings, industrial wastewater, and operational constraints.

2.3. Summary of insights and proposals from the day 2 breakout sessions to the plenary

During the plenary session, rapporteurs presented the key findings from all four Day 2 breakout discussions.

The breakout session **"Integrating Wastewater Surveillance for Decision-Making"** highlighted the essential role of EU-WISH in strengthening the operational use of WBS across Europe. Participants emphasized the need for clear indicators, thresholds, and structured communication pathways to support timely public-health action. EU-WISH's contributions to developing triggers (Task 6.2), communication tools (WP2), and preparedness planning (WP3) were recognized as central to improving the utility and integration of WBS data. The session concluded that technical, Organizational, and political challenges remain, but EU-WISH is well positioned to support countries in embedding WBS into national decision-making processes.

In the **"Value & Necessity of Wastewater Surveillance"** session, there was strong consensus on the value of WBS as a non-invasive, cost-effective, population-level surveillance tool. Participants underscored the importance of standardization, cross-sector coordination, and systematic use of WBS information to inform policy. Concerns were raised about fragmented governance and the lack of harmonized legal frameworks. While groups differed in how strongly they emphasized communication, innovation, and digital applications, all acknowledged the importance of ethics, privacy, and transparency. The discussions reaffirmed that full institutionalization of WBS requires legal clarity, technical harmonization, political commitment, and strategic communication.

The session on **"Comparability of WBS Results Across Europe"** identified comparability as a continuum rather than a binary outcome. Differences in analytical methods, environmental conditions, and data presentation currently hinder direct comparisons. Proposed approaches included using relative levels, baselines, harmonized trend calculations, and ring trials. Participants also referenced ERVISS, EUROMOMO, and EUDA as potential models. Knowledge exchange and the development of standardized protocols were encouraged to support meaningful cross-country interpretation.

Finally, the session on **"Designing Effective Sampling Strategies for WBS Programs"** validated the adaptability of the EU-WISH sampling framework. Participants appreciated its structured and flexible design but proposed improvements, including better integration of financial considerations, clearer guidance for chemical and illicit-drug targets, and more detail on sampling frequency and site selection. These insights will inform refinement of the framework and future EU-WISH guidelines.

2.4. Aggregation and actionability of results - the case of Germany's national WBS program

Alexander Schattschneider (RKI, Germany) presented Germany's **AMELAG** program (2022–2025), a nationwide WBS system coordinated by RKI and UBA. Monitoring SARS-CoV-2, influenza, and RSV across more than 50 treatment plants, the program reflects Germany's complex federal structure. A key challenge is administrative: multiple authorities, laboratories, and WWTP operators operate under different mandates, requiring individually negotiated contracts. From around 170 possible sites, only 43 formal agreements were concluded through RKI, demonstrating the bureaucratic effort required for national coordination. Differences between Germany's 16 states further complicate harmonization. AMELAG therefore developed **technical guidelines** rather than binding standards. Data validation uses methods such as LOESS smoothing, allowing consistency despite decentralization. The program illustrates both the strengths and inefficiencies of federal governance.

2.5. Comparing results across Europe - the future steps

In a joint presentation, **SSI, THL, and AGES** experts outlined progress and future steps toward improving comparability of WBS results across Europe. Although harmonization was not an original EU-WISH objective, it has become essential for meaningful cross-country interpretation. WPs 5, 6, and 7 are developing shared best practices covering sampling, concentration, PCR/sequencing, and data adjustment. For non-infectious targets, networks such as **SCORE** and tools like **EUDA** already support partial harmonization. A U.S. case study demonstrated how comparison is possible without uniform methods by using indicators like the **Wastewater Viral Activity Level (WVAL)**. EU-WISH Task 6.2 is advancing similar statistical workflows to allow comparison of trends, variability, and standardized values. Work will continue with stakeholders to refine documentation and comparison tools.

2.6. Organizing cross-border WBS in Europe

This part of the workshop featured **HERA** and **ECDC**, highlighting Europe's evolving strategy for cross-border wastewater surveillance. **Anastasia Koutsolioutsou (HERA)** outlined HERA's mission to enhance preparedness and access to medical countermeasures, supported by a €6 billion budget. WBS plays a growing role in early detection, particularly at transport hubs. HERA is operationalizing an **EU Wastewater Sentinel System**, launched in 2025, covering 37 sites monitoring pathogens and pollutants. Strategic investments include €32 million for sampling and analysis. **Maximilian Riess (ECDC)** then presented ECDC's concept for integrating WBS into EU/EEA infectious-disease surveillance under Directive (EU) 2024/3019. The framework includes coordinated national structures, harmonization, quality assessments, and pilot projects on respiratory viruses and poliovirus. The also **ECDC Crowd** was introduced, which supports participatory evidence gathering.

2.6.1 Preparedness and Medical Countermeasures

Anastasia Koutsolioutsou (HERA) presented the role of the **Health Emergency Preparedness and Response Authority**, established in 2021 with a budget of €6 billion (2022–2027). HERA's mission includes:

- Strengthening Europe's ability to detect and respond to cross-border health threats,
- Ensuring access to **medical countermeasures** (MCMs),
- Supporting R&D, manufacturing, stockpiling, and intelligence gathering.

Wastewater surveillance was framed as a **critical complement** to HERA's mission through early detection of emerging risks.

2.6.2 Integrating WBS in EU/EEA Infectious-Disease Surveillance

Maximilian Riess (ECDC) outlined ECDC's concept for integrating wastewater data into EU-level surveillance, emphasizing strong alignment with the revised **Urban Wastewater Treatment Directive (rUWWTD)**, which requires:

- National coordination mechanisms,
- Routine WBS for selected pathogens,
- Data reporting obligations, including AMR,
- Strengthened collaboration between environmental and health authorities.

The session confirmed broad support for deeper ECDC–EU-WISH collaboration.

2.7. Wrap up and closing remarks of the second day

The second day concluded with a **closing session**, led by **Steen Ethelberg (SSI, Denmark)** and **Pikka Jokelainen (SSI, Denmark)** together with **Maria Stamou (EODY, Greece)**. The session was conducted in a **hybrid format**, allowing both in-person and remote participants to join the discussion. The focus was on **wrapping up the day's discussions**, summarizing the key messages from the breakout sessions, and highlighting the next steps for the project's work packages. The coordinators thanked all participants for their active engagement and constructive contributions throughout the day, acknowledging the collaborative spirit that continues to drive the EU-WISH initiative forward.

3 EU-WISH International Workshop & Consortium Meeting and EU-WISH General Assembly | Day 3: Thursday, 11 September

3.1. Thursday plenary joint WP session

Day 3 brought together the threads of Days 1 and 2, focusing on consolidation, planning, and governance.

Morning plenary sessions provided updates on global wastewater surveillance initiatives, followed by WP meetings where teams refined deliverables, shared methodological progress, and planned activities for the months ahead. Following the plenary, participants were invited to visit stands hosted by the different Work Packages.

Participants freely **mingled between tables and rooms**, engaging with WP teams, asking questions, and discussing next steps. This informal exchange strengthened cross-WP cooperation and highlighted the interdependencies between scientific, technical, communication, and governance tasks.

Participants highlighted the need for continued focus on:

- Sustainability and long-term financing,
- Data comparability and harmonization,
- Governance models across countries, and
- Integration of WBS into broader One Health frameworks.

3.2. EU-WISH General Assembly 2025

The **EU-WISH General Assembly 2025** took place on **11 September 2025** at the conclusion of the International Workshop in Dublin. The meeting brought together **representatives from 25 participating countries**, including national public health agencies, research institutions, and environmental authorities, reaffirming the broad European participation and commitment to the Joint Action. The General Assembly was **chaired by Pikka Jokelainen (SSI, Denmark)**, with minutes recorded by **Lene Wulff Krogsgaard (SSI, Denmark)** and **Marc Bennedbæk (SSI, Denmark)**. The General Assembly is the **formal decision-making body of EU-WISH.** The GA concluded with a reaffirmation of the consortium's commitment and shared responsibility to ensure the effective use of resources, active participation of all partners, and long-term sustainability of wastewater-based surveillance across Europe.

3.3. GLOWACON Presentation

On parallel with the GA, the **GLOWACON initiative** presented its global capacity-building work in wastewater and environmental surveillance. The presentation covered:

- The **consortium structure built on four working groups** (Technical Guidance, Data Analytics, Training & Capacity Building, Research & Innovation),
- Training modules **covering sampling, data analysis, emergency response, biomarkers, privacy, innovation, and policy engagement**,
- **Regional meetings** held in Singapore, Addis Ababa, and Panama,
- Strong **overlap and complementarity with the objectives of EU-WISH**, especially in WP4.

GLOWACON and EU-WISH **will continue to collaborate** on joint workshops, training materials, and global WES strategies.