



# GLOWACON

## *CONCEPTUAL FRAMEWORK*

**Towards the establishment of  
a Global Wastewater and  
Environmental Surveillance  
System for Public Health**

## BACKGROUND

**Wastewater and environmental surveillance (WES)** refers to a systematic approach for monitoring and analysing wastewater, as well as environmental samples such as surface water, sewage, and sludge, to detect and track the presence of pathogens, pollutants, contaminants, or other indicators of public health and environmental risks. WES involves collecting samples from various sources within a community, a geographical area, or strategic locations, followed by laboratory analysis to identify and quantify specific substances or microorganisms of interest. By integrating data from human, animal, and environmental sources, WES provides valuable insights into disease transmission and spreading dynamics, environmental contamination, and potential health risks to both humans, plants and animals, fully substantiating the **One Health approach**.

**WES sentinel systems** are anticipated to provide an increasingly valuable source of information to inform public health decision-making and target interventions. In particular, WES can provide **early warning** of emerging pathogens or other risks and has the potential to give advance warning of the global spread of newly emerging or re-emerging pathogens of concern as well as other issues of emerging concern for public health, such as novel drugs of abuse, other chemicals, antimicrobial resistance (AMR). Yet, there is a clear need to move away from project-based activities towards a more systematic programming and consequently to develop a **sustainable and aligned path for WES** by integrating community WES to the national surveillance schemes and globally.

## MISSION

The **global consortium for wastewater and environmental surveillance for public health (GLOWACON)** is a wide collaborative and inter-sectorial network of partners aiming to stimulate collaboration and innovation in the field of WES, and to promote the **institutionalisation of WES** as a routine activity within public health systems and institutions for monitoring health threats of emerging concern and other relevant use cases.

One of the targets for the consortium is the creation of a **global (supranational) sentinel system** for epidemic outbreaks – a voluntary network that promotes data sharing for early threat detection, prevention and real-time monitoring supporting public health decision-making in the best sense of pandemic preparedness. The voluntary sentinel system will build on existing activities carried out at local, national and regional levels and will be governed by a mechanism defined and agreed among participating stakeholders.

## PRINCIPLES

The consortium promotes trust, equity and shared responsibility; therefore, membership will be voluntary, but **inclusive**, geographically broad and open to a diversity of entities. Consortium interactions will be **collaborative, cooperative, transparent and accountable**, enabling all members to derive tangible benefits from their participation. GLOWACON respects the autonomy of participating countries and stakeholders, works in full respect of relevant legislations, and promotes ethical and scientific standards in all activities and decision-making processes.

## OBJECTIVES

The objectives of GLOWACON are as follows:

1. Create and maintain a global network for the implementation of WES.
2. Lead the community of practice as a connector between the sectors of public health, water and related research and academia.
3. Stimulate partnerships between the public and private stakeholders to support the development and deployment of innovation for WES.
4. Support the application of WES to health threats of emerging concern.
5. Share and align methods, protocols and innovations in WES and support the implementation of benchmarks and/or standards.
6. Facilitate and establish data and information exchange as well as joint analysis in the field of WES.
7. Identify and promote global research and development needs in the field of WES.
8. Inform and engage with the general public about WES and promote its use for public health decision-making.
9. Engage resource partners for sustained funding for WES.

## APPROACH

GLOWACON will approach its objectives by:

1. Making relevant documents and related tools such as recommendations, best use cases, data models, IT platforms, scientific publications and technical references available as a global good.
2. Members mutually supporting each other in the successful implementation of WES and access to funding support.
3. Sharing data, exchanging information, in a safe data management environment following the FAIR principles while respecting data protection requirements.
4. Building working groups to develop relevant areas of work.
5. Joint publications, reports and related collaborative activities, in particular in the domains of training, capacity building, intercomparison and proof-of-concept studies.,
6. Communication and advocacy materials, ensuring engagement from the specialist to the interested layperson.
7. Convening and participating in international conferences and workshops.

## ***Consortium set-up and cross-cutting aspects***

### **Governance and coordination**

The governance of the consortium will provide both **leadership and a coordinated operational structure**, with operational groups that collect, develop and communicate evidence and scientific insights to advance GLOWACON's objectives. Key to the success is a commitment to ensure representation from a diversity of perspectives, geographies and income levels. Administrative support is needed to make the consortium operational.

### **Strategy setting**

The consortium will develop a global, **multi-year strategy** to inform strategic activities to build a globally integrated WES network, including key transport hubs and community-based WES. The strategy will be implemented through annual roadmaps that will include specific deliverables agreed by the consortium.

### **Communications, policy, and advocacy**

The consortium aims to engage a broad range of stakeholders through regular, structured multilateral initiatives to ensure **open and constructive communication** between the relevant sectors. Dedicated channels and tools will be established to facilitate internal communication as well as to raise awareness on WES and its value amongst policymakers and public health professionals, but also the general public.

### **Funding, fundraising, and sustainability**

**No fee** will be required to participate in the global consortium for wastewater and environmental surveillance, and activities should be to a maximum self-funded. **GLOWACON does not provide budget** to finance projects, but serves as a tool to identify funding gaps and opportunities and consequently, informs funders to facilitate **targeted investments** towards impactful initiatives globally, avoiding duplication and maximising synergies among existing and planned WES activities.



## Global sentinel system and technical workstreams

### Consolidated technical guidance

The consortium shall agree on **priority health threats of emerging concern likely to be sources of future epidemics**, and as supported by scientific evidence and practices. It will also support the development of **protocols and best practices in sampling strategies, sampling methods, storage, transportation and detection/quantification** for different use cases, as well as the development and validation of adaptable and cost-effective innovations. GLOWACON will also address guidance for basic laboratory infrastructure and quality systems needed.

Particular attention will be paid to effective **governance approaches** for WES that ensure suitable use cases, ethical data sharing, interpretation and harmonisation. In addition, the combination of **targeted** (e.g., quantitative PCR, amplicon sequencing, GC-MS, LC-MS), **semi-targeted and untargeted approaches** (e.g., metagenomic sequencing or non-target screening) will be supported and further developed.

### Data analytics, modelling, sharing and interoperability

The consortium members will build **robust analytics as well as harmonised approaches for data collection, integration, and analysis and interpretation**. GLOWACON will also facilitate sharing of best-in-class methodologies for data modelling and interpretation as well as build agreement on data quality standards.

GLOWACON will facilitate data sharing, possibly by establishing a **repository of data** or a network of existing dashboards, respecting data confidentiality and personal data protection, especially for information from metagenomic sequencing. Best practices should also be developed for the **integration of clinical data** (and other forms of surveillance data) with WES data to strengthen assessment and public health decision-making.

### Training and capacity building

The consortium shall build on its members' capacities and organise **specialised training activities** for the exchange of best practices among researchers, implementers and policymakers with the aim to support public health impact assessment and decision-making. GLOWACON will advocate for global activities, such as academic master's programmes, doctoral programmes, train the trainee approach, integration and collaboration with existing training programmes.

### Research and innovation

The consortium will identify gaps and priorities for research and development (R&D) across all aspects of WES and will develop and continuously update an **innovation roadmap**. The consortium will build connections with research organisations, innovators, industry and implementers to develop, validate and implement new tools and methods for WES. The consortium will gather information on existing funding instruments as well as map the ongoing research and innovation projects.