European Commission

CONCLUSIONS

SARS-CoV-2 Monitoring employing Sewers

From an EU Umbrella to a Sentinel System

3rd Town Hall Meeting

02 December 2020

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Context of the Event

The EU Umbrella Study

The European Commission has created a pan-European Umbrella Study to better understand the limitations and challenges of this approach. This includes the development of a roadmap for a systemic rollout of complementing ongoing national and regional surveillances in a unique approach. Upon suggestion from the Dutch Water Research Institute (KWR) and the Rheinisch-Westfälische Technische Hochschule (RWTH) and supported by EurEau and Water Europe, the European Commission's Joint Research Centre and the Directorate-General Environment with involvement of the Directorate-General Health and Food Safety set up a spontaneous research alliance and organised a study engaging directly with some 90 waste water treatment plants in Europe. The umbrella currently spreads out to 20 countries (Austria, Belgium, Bulgaria, Croatia, Cyprus, Estonia, Finland, Germany, Greece, Ireland, Italy, Latvia, Luxembourg, Malta, Poland, Portugal, Romania, Slovakia, Spain and Sweden), which decided to create an overlap with the EU study. Another 7 countries (Czech Republic, Denmark, France, Hungary, Israel, Slovenia and the UK) consider to join the second round of the Umbrella Study, scheduled for August 2020. While first results indicate the viability of the approach, they are currently being critically reviewed to develop a consensus on the use of generated datasets. In an inclusive and open approach critical topics and limitations are reviewed jointly with private and public entities which joined the initiative: CEDEX- Centro de Estudios y Experimentación de Obras Públicas (CEDEX), Eurecat – Technology Centre of Catalonia (Spain), the Helmholtz Centre for Environmental Research, NIREAS – The International Water Research Center, NORMAN Network, SUEZ, University of Thessaly and National Technical University of Athens (Greece) and the University of Exeter (UK) to name, but a few.

Event Summary

The Third Town Hall Meeting took place as WEBEX Web-Conference on December 2nd, 2020. It was organized by the European Commission (the Directorate-Generals JRC and ENV and involving SANTE).

This third Virtual Town Hall Event, among others, aimed at presenting an update on the state-of-play regarding the necessary dialogue between the water sector and the public health sector. The WHO Regional Office organized an expert consultation on this topic on 30 November 2020, and O. Schmoll provided a summary overview of its main findings. The main focus of the event was then on harmonized presentation of the state of play of selected initiatives from Austria, Estonia, Finland, Greece, Italy, Luxembourg, Portugal, Spain, Turkey and the Netherlands. Participants were invited to follow a structuring aid addressing the following issues:

- The partnership carrying out an activity including information on purpose, time line and funding sources
- Information on the methodology and sampling network
- A current update on the state-of-play
- The activities liaison with the Public Health Service
- An illustration how data are used and visualized
- Press and media coverage
- Scientific highlight and reference of relevant publications

The INNO4COV19 Project presented finance opportunities for proof of concept and innovations related to the environmental surveillances. An update on the Global Water Research Coalition Work was provided, too.

The meeting was accessible to the connected community without registration. It started at 14:00 (CET) until 17:45. A total of 270 attendees joined the gathering.

The recording of the meeting as well as the chat registration and presentations (as far as made available) are shared and can be accessed following this link:
https://jrcbox.jrc.ec.europa.eu/index.php/s/b4DZQwe52NVYiPE (password: SARS-CoV-2)

The material is made available for download until the 18th of February, 2021, data after which this link will expire and download is no longer possible. The material is owned by the respective institutions and explicit consent has to be asked for in case of further use.

Conclusions

EU Umbrella Study, State of Play and relevance with regard to Revision of the Urban Wastewater Treatment Directive

The importance of the work conducted and the need to channel the relevant outcome to the policy level was highlighted by M. Sponar (DHoU, ENV.C.2). A permanent surveillance system or "Sentinel System" will need some further discussion about the necessary financing to be provided. It is clear that information encoded in wastewater, has a significant potential not only from an epidemiological perspective as addressed here, but also with regard to numerous other application fields, any of which with a relationship to public health, e.g. use of pharmaceuticals, drugs-of-abuse or food additives, to name but a few. Accessing such information has become technically possible, but entails also a series of ethical considerations, which need to be addressed. In this regard it is also of pivotal importance to share the information in a language accessible to the non-expert and interested lay person.

The EU Umbrella Study in this regard was an important step forward. It covered 25 countries and in both collaborative rounds a total of 174 samples were processed. 13 Countries participated in both round and the results obtained allowed to generate a first approach towards a simple "traffic light" system capturing significant changes in the viral load. Valuable information regarding the influence of weather conditions could also be obtained. Furthermore, for a limited sample of sample it was possible to intercompare analytical findings obtained in different laboratories on the same sample. The findings indicate a good agreement, but a more systematic proficiency testing is necessary and was announced at the meeting.

An important information obtained by the Umbrella Exercise was the information resulting from an EU Survey on operational costs. Based on the data submitted it was concluded that the annual running budget for the systematic surveillance of a wastewater treatment plant is estimated to 25000 € per year. The estimate was confirmed independently by other assessments.

The final report on the exercise is now being printed and will be made available for download shortly.

Outreaching to the Health Sector

The outreach to and involvement of the public health sector emerged as crucial element. Clarity is needed on how data from wastewater-based epidemiology can be integrated into other surveillance data and how decision making can rely on such information. In this regard the recent WHO expert consultation provided important insights (note that the report will be published soon by WHO):

- There is growing consensus that wastewater-based epidemiology can provided essential complimentary information regarding the spreading of the SARS-CoV-2 virus. The experience in several countries confirm the viability of the approach.
- Wastewater-based surveillance does *not* aim to replace clinical investigations, but delivers additional insights, e.g. the identification of relative trends. It is seen a secondary tool to detect the virus in absence of clinical trials, e.g. in low prevalence settings. It is to be expected

that the importance of waste-based surveillance will increase, when traditional testing starts to diminish.

- The early warning function of the approach in the alert phase of the pandemic has been recognized, including for sewer-sub-catchments. It appears also to be useful to spot re-surges in the tailing phase of the pandemic.
- The use of publicly accessible dashboards is seen to be an useful tool to engage with citizens and to stimulate a vigilance in adhering to public health advice.
- Since the health sector is the "end user" of information from wastewater surveillance, it should be in the lead/co-lead in setting up such systems. This applies to the design phase, the correlation with other data as well as the communication of their meaning to the general public. The health sector should therefore be involved from the very beginning.
- A closer link between the water/sanitation sector, the public health sector and the local municipal level is therefore of utmost importance from the very beginning.
- Data normalization and harmonization of protocols remain a challenge to be addressed.

The Green Deal Perspective

While much has been said about the need to properly treat wastewater and sewage prior to its reintroduction into the natural water cycle, it appears the notion of what we can get out of wastewater is barely developed. The present exercise shows that the information encoded as such is of immense value when it comes to better understand the processes ongoing in an urban dwelling. In addition to this there is the huge and still untapped potential in terms of resource and energy recovery from sewage. It appears that in many regards its crucial position at a key interlinkage within what is commonly called the Nexus between water, energy, food, ecosystems and health make sewage an element to be considered when it comes in addressing some of the related UN Sustainability Development Goals, also and in particular beyond the mere focus on SDG &, i.e. Clean water for all.

In many regards, the establishment of Sewer Sentinel System would allow to access what best can be described as "alternative and hidden" internet, i.e. a stream of information related to behaviour, decisions and actions of individual users of the sewer system. It requires a major effort in digitalization and de-codification of the data stored in wastewater, but would offer an important insight into the urban human habitat.

Not by chance, the wastewater-based epidemiology is explicitly recognized also by the EC Communication towards a European Health Union, as a tool to address and cope with emerging and future issues. The Communication can be accessed here: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0724&from=EN

Envisaged next actions

Organisation of a proficiency testing

The Dutch Water Research Institute KWR and the JRC are preparing a proficiency testing exercise to be launched in early 2021. The PT scheme aims at addressing pertinent questions of method

comparability and metrology as well as the necessary assessment of measurement uncertainty and validation. Further details follow.

Development of a Q&A Manual for operators and practitioners

The JRC in close collaboration with WHO envisages - with input from the selected experts – to develop and present a practical Q&A Manual to operators of wastewater treatment plants and sewer system illustrating standard operation procedures for sewer sentinels. The drafting process will involve representative from health authorities and the WHO as well as representatives of the European Water Sector. Interested experts and projects, who which to contribute to this process are invited to contact the JRC.

Sewer Sentinels looking beyond

Urban wastewater is a direct result of human activities in an urban environment and the occurrence and levels of microbiological, chemical and physical pollutants mirror this. The use of encoded information in treated and untreated wastewater is also the basis for quantitative risk management approaches in the management of the wastewater treatment process and the benchmarking of technologies used in this. The Global Sewage Initiative, the use of sewers for polio monitoring, but also the EU-wide snapshot exercises, the latter being organised by the JRC in support to the Water Acquis proof this systemic viability of this approach. The refit exercise of the Urban Waste Water Treatment Directive offers an opportunity to look at a pan European Sewer Sentinel System and what it could deliver beyond the current pandemic crisis.

This work aims also in developing a different perception of sewers and sewage treatment as integral organs of human settlements thus underpinning the zero-pollution objective set out by the European Recovery Plan and the European Green Deal.

The EC is currently exploring to develop and propose the deployment of a systemic Sentinel Mechanisms which based on the information encoded in the pollution load reaching wastewater treatment, facing the challenging task of its removal AND reclamation of water, resources and energy. This activity will be linked also closely to the various work streams being developed under the remits of UNEP's World Water Quality Alliance (WWQA).

Agenda of the Meeting

14.00	**Starting with a conclusion - Final Results of the EU Feasibility Assessment** *Michel SPONAR, Trudy HIGGINS, Bernd Manfred GAWLIK, Simona TAVAZZI, European Commission* *Gertjan MEDEMA, KWR Water Research Institute*
14.10	**Dialogue with the Public Health Sector – A first feedback** *Oliver SCHMOLL, Kate MEDLICOTT, World Health Organization*
14:20	**The Coron-A Project and the Vienna Case Study** *Norbert KREUZINGER, Technical University of Vienna*
14:30	**SARS-CoV-2 Monitoring in the Region of TYROL** *Herbert OBERACHER, Medical University of Innsbruck*
14:40	**The Estonian Reference Project** *Tanel TENSON, University of Tartu*
14:50	**Wastewater-based surveillance of SARS-CoV-2 supports national and regional responses against COVID-19 in Finland** *Tarja PITKÄNEN, Finnish Institute for Health and Welfare, Finland*
15:00	**Surveillance of SARS-CoV-2 in a Mega WWTP: The Athens Case Study** *Nikos THOMAIDIES, University of Athens*
15:10	**Environmental Surveillance on SARS-CoV-2: The ongoing Italian National Project** *Giuseppina LA ROSA, Lucia BONADONNA, Luca LUCENTINI, Italian National Institute of Health*
15:20	**Translation of sewer-based SARS-CoV-2 monitoring data into an effective indicator for governmental action: Luxembourg's case study** *Henry-Michel CAUCHIE, Luxembourg Institute of Sciences and Technology*
15:30	**COVIDETECT – Aligning SARS-CoV-2 indicators towards ab early warning system based on wastewater** *Nuno BRÔCO, Águas de Portugal*
15:40	☺ ***Your body is your buddy (BREAK)*** ☺

Agenda of the Meeting (Part 2)

15:50	**COVIDBENS: A wastewater early warning system in A Coruña, Spain** *Margarita POZA DOMÍNGUEZ, Universidade da Coruña*
16:00	**The Catalan Surveillance Network of SARS-CoV-2 in Sewage** *Laura GUERRERO, Institut Català de Recerca de l'Aigua*
16:10	**Routine wastewater surveillance in Turkey to Covid-19 outbreak** *Bilge ALPASLAN KOCAMEMI, Marmara University*

16:20	**INNO4COV19: Boosting Innovation for COVID-19 Diagnostic, Prevention and Surveillance** *Paula GALVÃO, International Iberian Nanotechnology Laboratory*
16:30	**Building a national sewage surveillance program in the Netherlands and beyond** *Ana Maria DE RODA HUSMAN, National Institute for Health and Environment*
16:40	**Global Water Research Coalition activities to advance wastewater surveillance of COVID-19** *Gertjan MEDEMA, KWR Water Research Institute*
16:50	**The way forward** *Trudy HIGGINS, Bernd Manfred GAWLIK, Simona TAVAZZI, European Commission* *Gertjan MEDEMA, KWR Water Research Institute*
17:00	**End of Meeting**