AN OVERVIEW:

LEGAL, ETHICAL AND RCCE CONSIDERATIONS IN WASTEWATER SURVEILLANCE
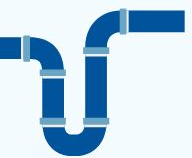
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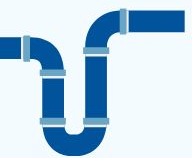
Urban settings: key considerations
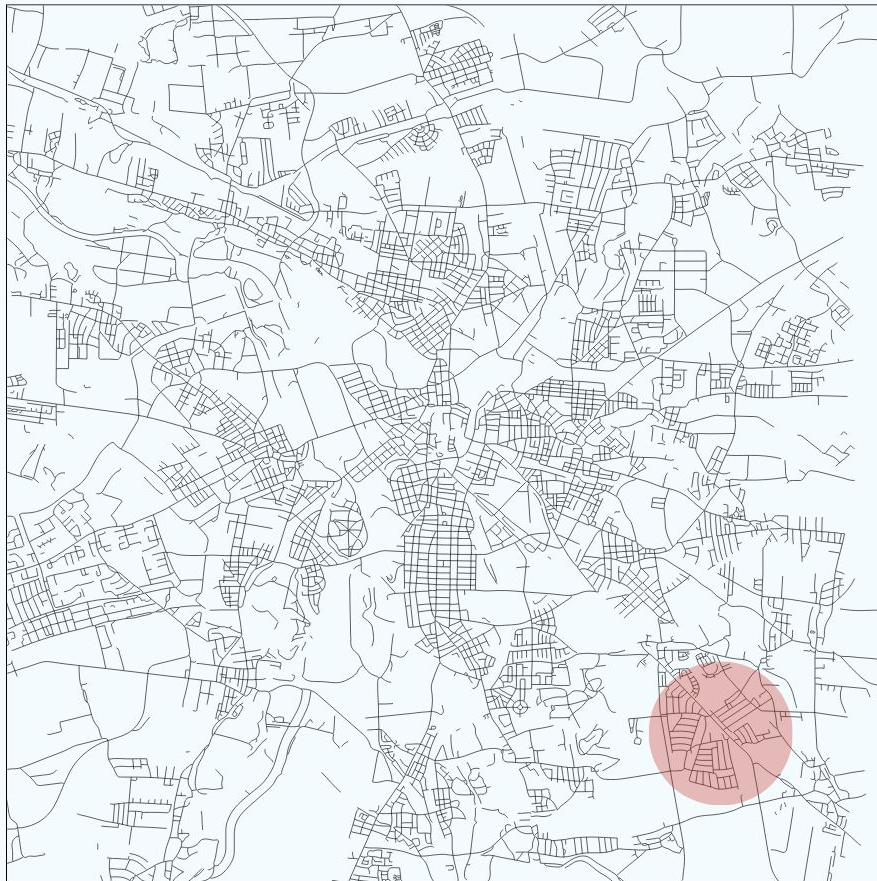
	Research (peacetime)	Routine surveillance (peacetime)	Emergency / outbreak
Privacy	Risk of re-identification in small-scale studies	Low risk, but increases with granular sampling	Privacy concerns if linked to enforcement or tracing
Consent	Ethics review may apply; no direct consent	No consent; usually not communicated	Consent bypassed under emergency powers
Data use	Unclear ownership; risk of publication without feedback	Unclear reuse rules; limited transparency	Rapid sharing; risk of misuse
Equity	Risk of extractive research; no local benefit	May target poorer areas; limited benefit sharing	Disproportionate impact on vulnerable groups
Legal frameworks	Covered by ethics boards, not specific laws	Patchy legal coverage; may fall under environmental law	May rely on emergency health laws without oversight

Urban settings: RCCE

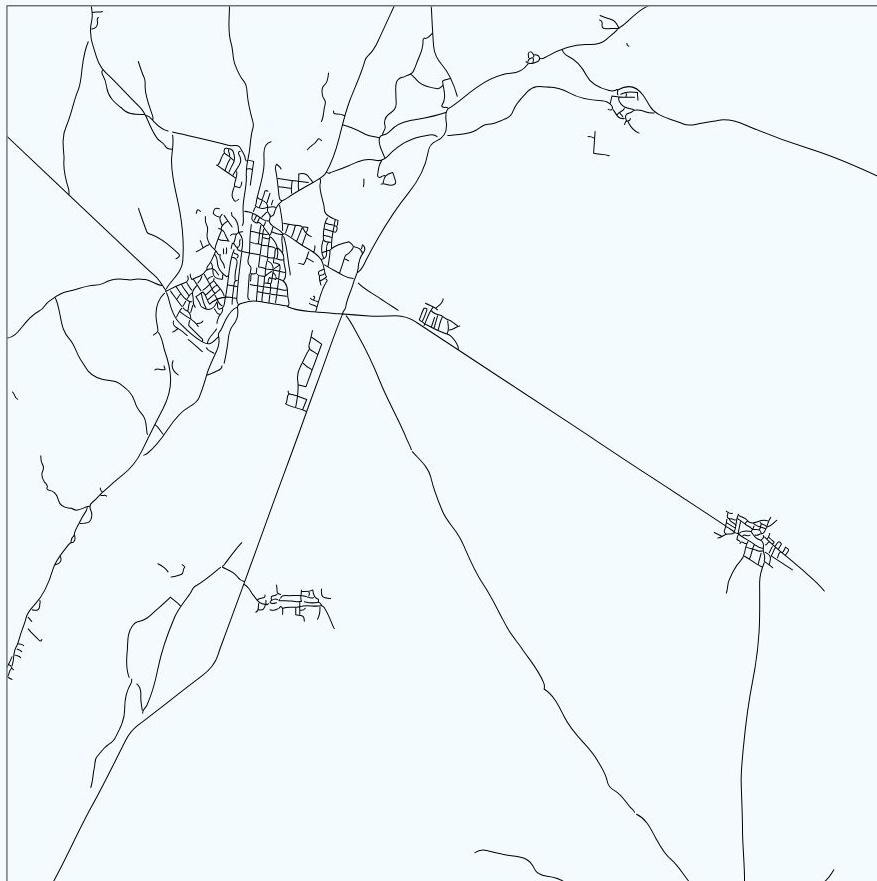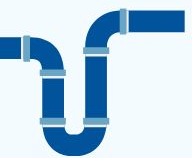| Strategy	Key actions
Communicating purpose and benefits	• Clear explanations that wastewater surveillance supports early detection and public health protection, not individual monitoring. • Emphasis on the value of early warning in preventing outbreaks and protecting public health.
Addressing privacy and data concerns	• Reassurance that data is anonymised and cannot identify individuals. • Transparency about how data will be used, who will have access, and what safeguards are in place.
Community engagement and trust	• Early involvement of local leaders, civil society organisations, and frontline workers in planning and implementation. • Direct engagement with affected or marginalised communities to listen and respond to specific concerns.
Culturally appropriate messaging	• Provision of multilingual and culturally relevant materials suited to the urban population. • Use of trusted messengers such as religious leaders, teachers, or community health workers to communicate key messages.
Public-facing reporting and feedback	• Regular sharing of results in accessible formats such as dashboards, posters, or local radio. • Clear, open channels for community questions, feedback, and concerns (e.g. WhatsApp lines, community forums).

Urban settings: Food for thought

- How do we ensure that wastewater surveillance in urban areas does not reinforce existing social or spatial inequalities?

- What safeguards should be in place to prevent the misuse of wastewater data, especially if it's shared across agencies or used for purposes beyond public health?

- Can residents of a neighbourhood or building meaningfully engage with or consent to wastewater surveillance? If not, what does ethical engagement look like?

- Should different legal standards apply when wastewater surveillance is conducted during a health emergency versus in routine times?
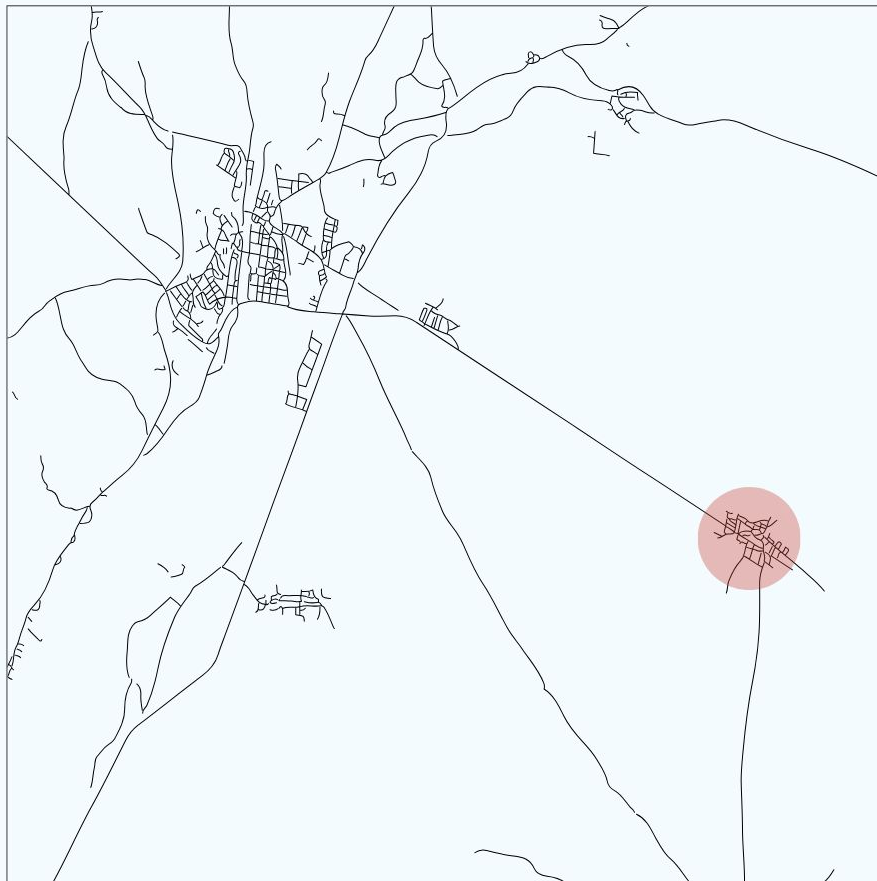
Rural settings: key considerations

	Research (peacetime)	Routine surveillance (peacetime)	Emergency / outbreak
Privacy	Risk of identifying individuals in small populations	Lower anonymity in village-scale sampling	Signals can quickly lead to targeted interventions
Consent	Ethics review may be required, but no direct consent	No consent or awareness, especially in remote areas	Consent bypassed; risk of coercive health measures
Data use	Unclear ownership; risk of data extraction	Data may not be shared back with communities	Rapid use of data without safeguards or explanation
Equity	Risk of focusing only on accessible or 'study-friendly' villages	May exclude remote or politically marginalised areas	Disproportionate targeting without equal support
Legal frameworks	Covered by ethics boards, not specific law	No dedicated legal frameworks; overlaps with environmental law	Emergency powers often unregulated in rural settings

Rural settings: RCCE

Strategy area	Key actions
Communicating purpose and benefits	• Clear messaging about why surveillance is being conducted and how it supports the health of the whole community. • Emphasis on early detection and the potential to prevent serious outbreaks before they spread.
Addressing privacy and data concerns	• Reassurance that individual identities are not recorded, and that the data reflects broader community trends. • Explanation of how the data will be used and who will have access to it.
Community engagement and trust	• Early engagement with village leaders, elders, and community health workers to support awareness and trust. • Use of community forums or local meetings to introduce the surveillance programme and gather input.
Culturally appropriate messaging	• Messaging delivered in local languages and formats that are sensitive to cultural norms and literacy levels. • Use of storytelling, visual aids, or local radio where relevant.
Public-facing reporting and feedback	• Reporting results in simplified formats that communities can understand and act upon. • Mechanisms for community feedback through local structures (e.g. health volunteers, community elders).

Rural settings: Food for thought

- How can we engage rural communities in wastewater surveillance when there is limited infrastructure and low familiarity with public health data collection?

- What additional ethical considerations arise when the population size is so small that individuals or households could be inferred from the data?

- Who should have the responsibility for communicating surveillance findings in rural areas, and how can that be done in ways that promote trust and minimise harm?

- Are existing emergency powers sufficient and appropriate for rural public health interventions triggered by wastewater data?

International ports of entry: key considerations

Issue	Research use (peacetime)	Routine surveillance (peacetime)	Emergency / outbreak
Privacy	Limited risk; aggregated data but potential reputational concerns	Aggregated data, but signals may be linked to specific flights or vessels	Risk of heightened scrutiny of certain nationalities or transport routes
Consent	Typically waived; may require ethics approval	No individual consent; minimal public awareness	Consent not sought; data may be used to justify rapid action
Data use	Data often stays within research institutions	May be shared with port authorities or national agencies	Risk of premature or reactive policy decisions based on early signals
Equity	Focus may be on high-volume routes; smaller carriers underrepresented	May disproportionately target certain ports or routes	Potential for discriminatory screening or restrictions
Legal frameworks	Covered by research ethics and transport regulations	Varies by country; often fragmented legal authority	IHR (2005) may apply

International ports of entry: RCCE

Strategy area	Key actions
Transparency about surveillance	• Clear signage or online information about ongoing wastewater monitoring at ports (e.g. similar to thermal screening signs). • Simple, non-alarmist explanations that surveillance is anonymous and aims to support early detection.
Inter-agency coordination	• Alignment between airport/seaport authorities, customs, and public health officials on how results are interpreted and communicated. • Pre-agreed protocols for responding to positive signals to avoid inconsistent or ad hoc measures.
Public-facing communication	• Brief, multilingual materials (e.g. posters, in-flight announcements, websites) explaining what wastewater surveillance is and why it's done. • Communication designed to inform without stigmatising specific flights or countries.
Media and diplomatic engagement	• Proactive, accurate communication with media to prevent speculation or misreporting. • Coordination with foreign missions if surveillance results may raise diplomatic or cross-border concerns.
Feedback and accountability mechanisms	• Internal channels for airport or port staff to raise concerns or confusion about public messaging. • Mechanisms for post-response review if wastewater data triggers broader public health action.

International ports of entry: Food for thought

- Who should have the authority to interpret and act on wastewater data collected at international borders?

- Should passengers or the public be informed that their waste is being used for surveillance purposes, even if the data is anonymised?

- How can wastewater findings be communicated in ways that support public health goals without fuelling stigma, fear, or unjustified travel restrictions?

- To what extent should environmental surveillance at ports fall under the scope of international instruments like the International Health Regulations?

Existing frameworks

International frameworks
- WHO Wastewater and Environmental Surveillance (WES) Guidance (launched Feb 2025)
- Convention on Biological Diversity; Nagoya Protocol
- PIP Framework
- International Health Regulations
- WHO Guidelines on Ethical Issues in Public Health Surveillance (2017)
- Global Polio Eradication Initiative (GPEI) Field Guidance for Environmental Surveillance (2023)

United States
- Public Health Service Act (PHSA)
- Pandemic and All-Hazards Preparedness and Response Act (PAHPARA) – draft
- National Wastewater Surveillance System (NWSS)

Singapore
- Environmental Public Health Act (EPHA)
- Infectious Diseases Act (IDA)
- COVID-19 (Temporary Measures) Act