

Effective integrated management requires surveillance systems designed for early detection rather than only proof of disease freedom. Expert-guided design for OsHV-1 highlights that observational (farmer-based) surveillance, when carefully structured and combined with targeted active sampling and strong industry-government partnerships, can greatly enhance system sensitivity and confidence in disease freedom, whereas active testing alone is unlikely to detect outbreaks in time. Farmer reporting is central to such systems; behavioural studies in France show that financial compensation, awareness of reporting objectives, and participatory education strongly influence whether and how quickly farmers notify unexplained mortalities, directly affecting early-warning performance. New molecular and environmental tools expand early-warning capacity. Suites of droplet digital PCR assays enable high-resolution, simultaneous quantification of multiple oyster-relevant pathogens in farm-proximal waters, revealing spatiotemporal hotspots where mortality risk increases and allowing farmers to adjust practices as pathogen loads rise. In parallel, temperature-based outlooks and spatial risk maps that integrate sea-temperature thresholds, turbidity and terrestrial inputs can guide targeted surveillance and proactive management of marine diseases, illustrating how environmental monitoring can be coupled with aquaculture health systems as oceans warm.

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