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*Global Health Security:*
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# Early Warning Systems: Stumbling Blocks Post-Pandemic

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## SYNOPSIS

*Countries will need to address challenges around risk perception gaps and warning fatigue in order to raise their early warning systems' effectiveness. Doing so will help them avoid strategic surprise from a future pandemic.*

## COMMENTARY

FOR MANY countries, COVID-19 has been a strategic surprise – an unanticipated event rendering existing planning assumptions ineffective. The consequences of this have been severe, as many countries have struggled to contain infections and save lives.

Despite what the speed and scale of COVID-19's impact suggest, pandemics are foreseeable, and countries have early warning systems to detect and respond to infectious disease outbreaks. Did these systems fail in the case of COVID-19? If they did not, what might explain the prevalence of strategic surprise?

### Failure to Detect or Failure to Respond?

Following the 2003 SARS epidemic, China invested in a sophisticated early warning system for infectious diseases. While some media reports claim this system failed in the case of COVID-19, the realities of identifying a novel infectious disease are complex. China's early warning system may have been hampered by its reliance on

case information obtained after diagnosis rather than analysis of pre-diagnosis risk factors.

Furthermore, despite mandated reporting for pneumonia with unknown causes, it is unclear why cases were not surfaced through the early warning system during the COVID-19 outbreak's initial phase.

In the United States, however, controversy arose over intelligence agencies' early warnings on COVID-19 apparently being ignored by President Trump. Media reports have also highlighted how the Trump administration cut funding for a pandemic early warning system in September 2019, just months before the COVID-19 outbreak.

The Trump administration has not been alone, however, in reallocating resources away from pandemic preparedness – this despite consistent warnings for more than a decade about the significant risk posed.

Questions of how much governments knew during the COVID-19 outbreak's early days are politically sensitive given the scale of the pandemic's impact. The World Health Organisation (WHO) has also been criticised for being slow to declare a Public Health Emergency of International Concern. While these issues are underpinned by the efficacy of early warning systems, little attention has been given to why these systems did not create sufficient strategic awareness.

**Stumbling Blocks**

The elephant in the room is that an early warning system's effectiveness is closely linked to how those operating it and responding to its output perceive risk. This is problematic as an individual's perception of risk is inherently subjective. Everyone – including experts – is affected by cognitive biases that can create a gap between evidence of risk and how it is perceived.

Risk perception gaps are important because they directly affect reaction time after a warning is communicated. Consider how Taiwan and Vietnam initially raised eyebrows when they implemented extensive control measures much earlier than other countries, but have since been praised for successfully containing COVID-19.

Easily-disseminated mis- and disinformation have also made it particularly challenging to address risk perception gaps related to COVID-19. WHO Director-General Tedros Adhanom Ghebreyesus highlighted the problem's severity when he remarked that "we're not just fighting an epidemic; we're fighting an infodemic."

This "infodemic" also comes at a time when some global leaders have shown open distrust in and disregard for expert opinion. For example, Brazil's president Jair Bolsonaro sparked outrage over a seemingly flippant response to his country's escalating spread of COVID-19.

Warning fatigue is another issue that early warning systems must also contend with. Consistently issued warnings for an event that does not happen, or happens with a smaller than expected impact can shape future risk assessments – a case of "crying wolf".

It is possible that the (mis)handling of previous pandemics affected risk perceptions of COVID-19. For example, the WHO was previously criticised for apparently overestimating the 2009 H1N1 pandemic's impact, and this may have in turn shaped its reaction to the COVID-19 outbreak.

**Prospects for Early Warning Systems**

Countries will likely apply lessons from epidemiological surveillance systems created during this pandemic to improve existing early warning systems or develop new ones. In particular, we can expect to see tighter integration with smart city infrastructure. South Korea's Epidemiological Investigation Support System, for example, is enabled by a common data platform originally developed in 2018 for the country's National Strategic Smart City R&D Programme.

This was complemented by apps monitoring inbound travellers and those under quarantine, as well as detailed disclosure of information related to infected individuals' movements.

However, technology-enabled surveillance comes with its own challenges. Concern is growing over potential surveillance creep, exemplified by China's use of digital health codes to control citizens' movements. Furthermore, the European Union's struggle to implement a region-wide contact tracing protocol has highlighted difficulties in finding a balance between respecting privacy and ensuring public safety.

**Need for Non-Invasive Methods**

To address this, countries may need to devote more attention to explore non-invasive data collection methods. Wastewater analysis has shown promise, and we may even see nationwide networks of sensors at public places to detect individuals with a fever, as well as those not wearing masks.

It will nevertheless take more than leaning on technology to build strategic awareness for the long term. Countries will need to invest in minimising decision-makers' risk perception gaps, and regional cooperation platforms are well-placed to enable this. The ASEAN Plus Three Summit on COVID-19 took an important step in this direction by resolving to strengthen the region's early warning system.

Regular interactions among officials through ASEAN meeting platforms and the shared experience of coping with this ongoing pandemic will also create more opportunities to narrow risk perception gaps.

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