Medical Xpress

Airport screening misses half of disease cases but could be improved

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Scientists have shown that airport screening for disease will often miss half or more of infected travellers, but can be improved by customizing to pathogens. The findings are published in the journal *eLife*.

One of the biggest barriers to success is the lack of honest reporting by passengers about their risk of exposure - if being honest could put them at risk of delay.

The researchers from the University of California, Los Angeles (UCLA) and the London School of Hygiene and Tropical Medicine have identified ways to make current screening as effective as possible and highlighted what needs to be done next to improve it further.

They present options for policy makers; for example whether resources would be better spent on arrival screening - which will reduce but not eliminate the cases, or on tracing and containing potential cases highlighted by airport questionnaires. They used a mathematical model to analyse screening for six viruses: SARS coronavirus, Ebola virus, Middle East respiratory syndrome coronavirus (MERS-CoV), Marburg virus, Influenza H1N1, and Influenza H7N9.

"We found that for diseases with a long incubation period such as Marburg and Ebola, taking passengers' temperature to test for fever is particularly ineffective at the start of an epidemic but does pick up more cases as it stabilises," says graduate student Katelyn Gostic from the Lloyd-Smith Lab at UCLA.

For the early phase of these disease epidemics, questionnaires are the most effective detection method.

"With diseases such as swine flu that take a shorter time to incubate, fever screening is the most effective method throughout an epidemic," she says.

Fever screening on arrival has been criticised for being particularly ineffective, but the scientists found it can catch cases missed at departure. Infrared non-contact thermometers will only ever pick up fevers at most 70% of the time. Also, symptoms of some diseases will progress during transit so can be easier to detect on arrival.

Understanding how each disease progresses can improve detection by making sure the right questions are asked in questionnaires. For example, exposure to a symptomatic patient is an established risk factor for contracting Ebola.

However, the researchers found that at best 25% of people honestly reported on exposure to influenza during the 2009 pandemic, and some might even have hidden symptoms by taking medication. This is the first time available information has been used to arrive at an estimated figure.

"Honest reporting can not only improve on-site detection but is essential to enable authorities to follow up with travellers who may have been exposed but have not yet developed symptoms," says Gostic.

"We need to find ways to incentivise better self-reporting."

More information: Effectiveness of traveller screening for emerging pathogens is shaped by epidemiology and natural history of infection, dx.doi.org/10.7554/eLife.05564

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