Key messages:

- Contact tracing needs an appropriate backward investigation to be more effective.
- New digital tools as 'Freeze the measles' could improve preparedness and management of outbreaks.

'Freeze the measles': how to improve backward tracing with a new digital tool

Alessandro Daole

A Daole[1], S Giorgi[2], L Bonaldo[1], G Cruschelli[1], G Spagnolo[3], A Gallo[2], C Rizzo[1]

[1]Department of Translational Research and New Surgical and Medical Technologies, University of Pisa, Pisa, Italy

[2]Unità Funzionale Igiene Pubblica e Nutrizione, Azienda USL Toscana Nord Ovest, Pisa, Italy

[3]ISTI, CNR, Pisa, Italy
Contact: aledaole@icloud.com

Background: A measles outbreak occurred in Tuscany, between January and April 2024. There were 37 cases (Incidence: 40,5 per million) with 32 cases (24 confirmed) in the Health District of Pisa. Even if bidirectional tracing showed a better effectiveness in pandemics, there aren't ready-to-use standardized tools for backward tracing.

Methods: Pisa Public Health Unit created a digital tool based on a spreadsheet and called "Freeze the measles" which records measles cases and the locations where they passed through (hotspots). These were uploaded on a cloud shared with all the tracers. Hotspots have an expiry date of 21 days. Hotspots and home address case were plotted on a digital map. In a new investigation, tracers could find out if the case visited some hotspots before getting sick and check the distance between home address and hotspots, reducing recall bias. Every case was interviewed about 21 days before rash onset (backward) and plus or minus 4 days of rash onset (forward). The tool matched data to identify contacts and exposure.

Results: Since the index case wasn't found, the first 5 unrelated cases were considered index cases for this outbreak. Second and third wave involved 17 cases. The tool allows to find an epidemiological link for 16 of them, while 1 case remained unrelated. A superspreader was identified with 12 secondary cases occurred at hospital emergency room (7), at a near home minimarket (4) and in a large furniture store (1). In second and third waves, tool was able to link 94% of cases. 2 additional cases were imported. When the last hotspot became frozen without new cases occurring, the outbreak was considered ended. The outbreak lasted 33 days.

Conclusions: The "Freeze the measles" tool allows to identify transmission chains through an interactive map built on cases and their mobility.