Identifying Surveillance Site Locations in Iowa, USA using a Maximal Population Coverage Model

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**Background:** Influenza-like illness data is collected via an Influenza Sentinel Provider Surveillance Network at the state (Iowa, USA) level. Because participation is voluntary, locations of the sentinel providers may not reflect optimal geographic placement. The purpose of this study is to use a maximal coverage model (MCM) to determine the “best” locations for sentinel providers in Iowa.

**Methods:** We calculate the number of people within 20 miles of the Iowa Department of Public Health's (IDPH) existing 20 sentinel locations, as well as the incremental benefit of selecting additional sentinel locations from the 117 available candidate sites (different primary care clinic locations) using the MCM. We compare with using the MCM to select from 1 to 117 candidate sites *de novo*, again maximizing the number of people within 20 miles of a selected site. A web-based MCM calculator ([http://vinci.cs.uiowa.edu/~gcfairch/](http://vinci.cs.uiowa.edu/~gcfairch/)) was developed in order to help the IDPH select new candidate sites providing the greatest population coverage.

**Results:** The 20 existing IDPH sentinel locations cover 39% of the population. This same population coverage is achieved with just 6 sites chosen using the MCM; in comparison, using the MCM to select 20 sites *de novo* covers 66% of the population. The first location selected covers 15% of the population; the first two alone cover 23.5%. Additional locations provide more coverage but with diminishing marginal returns.

**Conclusions:** Given scarce public-health resources, MCMs can help surveillance efforts by prioritizing the recruitment of sentinel locations.