

Laboratory preparedness for pandemic influenza: *Estimating the potential magnitude of diagnostic demand through trends in respiratory illness.*

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OBJECTIVE

To estimate diagnostic demand in case of pandemic threat using trends in respiratory syndromes (as input for a laboratory preparedness program).

BACKGROUND

In case of pandemic or avian influenza threat there can be a brief phase (at the early WHO pandemic preparedness levels), in which the influenza diagnostic need is increased and cannot be denied. Diagnostics will need to be performed in order to identify the first (imported) cases with the new pandemic strain within the background noise of normal seasonal respiratory morbidity. In the case of pandemic threat many individuals with any respiratory symptoms might be suspect cases and potentially eligible for influenza diagnostic testing. Insight into the baseline numbers of individuals with respiratory symptoms in the population is therefore necessary as part of the laboratory preparedness for an influenza pandemic. Background levels of respiratory syndromes can help provide estimates of the potential magnitude of laboratory demand. These estimates can be used to guide the planning of the diagnostic throughput required in this stage of a pandemic threat.

METHODS

Medical registration data for hospitalized patients (severe respiratory syndrome) and for patients seeking care from general physicians (general respiratory syndrome) were retrospectively (2001-2005) analyzed to determine trends in expected numbers of patients with respiratory disease.

Respiratory hospitalizations were defined using the CDC syndrome grouping of ICD9 codes as a guidance. The hospital discharge and secondary diagnoses (coded in ICD-9) were obtained from the Dutch national medical registration of hospitals (covering the total population of 16 million).

A broad syndrome of respiratory complaints and symptoms registered by physicians (which were coded in ICPC) was assessed (ranging for example from cough complaints to pneumonia). Data is available from a sentinel system of Dutch general practi-

tioners, coverage: 2% or approximately 350,000 individuals).

RESULTS

Depending on the season, the estimated monthly incidence of severe (hospital) respiratory syndrome varied between 19 and 73 per 100,000 and general (GP) respiratory syndrome varied between 860 and 3,700 per 100,000. Therefore, on the total population, the estimated diagnostic demand ranged from 3,000-11,500 patients per month (fig.1) for severe respiratory disease of suspected infectious etiology, which could be handled by the two designated central reference laboratories. For the (milder) general respiratory disease syndrome, however, the predicted demand based on historic trends would range from 140.000 to 600.000 cases per month (population size 16.3 million).

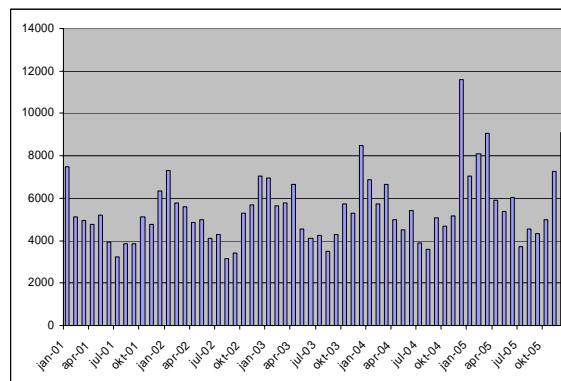


Fig.1. Monthly counts of respiratory hospitalizations (2001-2005)

CONCLUSIONS

Laboratory preparedness is of importance for detecting early/imported cases and for targeted prophylaxis administration. From respiratory syndrome analysis, we conclude that if illness in the community caused by a new pandemic influenza virus cannot be distinguished from other respiratory diseases, the demand for diagnostics will exceed the capacity of the medical microbiological laboratories in The Netherlands. This demonstrates the need for preparing algorithms for triage for laboratory diagnosis of suspected human avian flu cases.