

The Burden of Seasonal Respiratory Pathogens on a New National Telehealth System

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Objective

We compared weekly laboratory reports for a number of seasonal respiratory pathogens with telehealth calls (NHS 111) to assess the burden of seasonal pathogens on this syndromic surveillance system and investigate any potential for providing additional early warning of seasonal outbreaks.

Introduction

Seasonal rises in respiratory illnesses are a major burden on primary care services. Public Health England (PHE), in collaboration with NHS 111, coordinate a national surveillance system based upon the daily calls received at the NHS 111 telehealth service. Daily calls are categorized according to the clinical ‘pathway’ used by the call handler to assess the presenting complaints of the caller e.g. cold/flu, diarrhoea, rash.

Methods

Multiple linear regression models were used to identify significant contributions from respiratory pathogens to seasonal variation in NHS 111 calls for respiratory symptoms, including cold/flu, cough, difficulty breathing and sore throat. Children under 5, aged 5-14 and adults 65+ were examined separately and time lags of up to four weeks introduced in the models to investigate any potential early warning provided.

Results

Respiratory pathogens explained over 47% of the variation in calls for cold/flu, cough and difficulty breathing. The most sensitive signal for influenza virus was NHS 111 cold/flu calls; whilst for RSV the most sensitive signal was cough calls. The models illustrated that NHS 111 calls for cold/flu and cough peaked a week before the specimen date of laboratory reports for RSV and influenza.

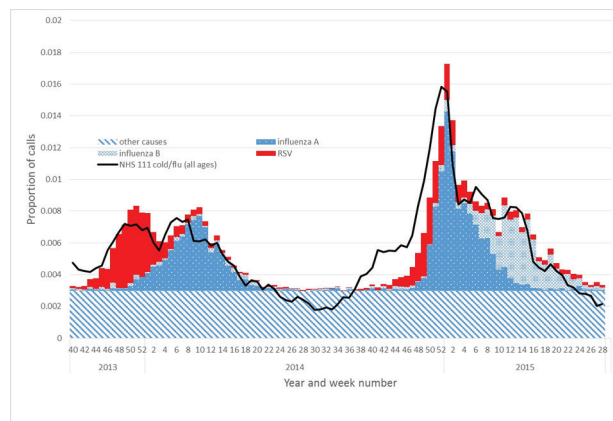
Conclusions

Daily surveillance of NHS 111 telephone calls can provide early warning of seasonal rises in influenza and RSV compared with traditional laboratory surveillance methods.

Selected regression models

| Syndrome | Cold/Flu | | | | Cough | | | | Difficulty breathing | | | | Sore throat |
|-----------------------------------|--|------|------|------|-------|------|------|------|----------------------|------|------|-----|-------------|
| Age (years) | <5 | 5-14 | >64 | All | <5 | >64 | All | <5 | >64 | All | All | All | |
| Adjusted R square (%) | 75.5 | 67.3 | 83.0 | 88.8 | 86.3 | 86.8 | 88.8 | 82.0 | 79.7 | 83.2 | 72.3 | | |
| | Percentage of calls due to significantly correlated pathogen | | | | | | | | | | | | |
| Coronavirus | 8 | | | | | | | | | | | | |
| Human metapneumovirus (HMPV) | | | | | | 6 | | | 1 | | | 8 | |
| Influenza A | 14 | 30 | 15 | 24 | 12 | 9 | 12 | 3 | 2 | 4 | | | |
| Influenza B | 7 | 12 | 6 | 10 | 4 | | 5 | | | | | 4 | |
| Parainfluenza | | | | | 12 | 13 | | 8 | 3 | 6 | | | |
| Respiratory syncytial virus (RSV) | 12 | 15 | 24 | 14 | 21 | 21 | 22 | 15 | 6 | 10 | | | |
| Rhinovirus | | | 18 | | | | | | | | | | |
| Invasive streptococcus pneumoniae | | | | | | | | | | | | 5 | |

Where significant positive correlations with pathogens were found the estimated burden of calls due to the pathogen are shown (Sept 2013 - July 2015).



Proportion of NHS 111 cold/flu calls. Stacked bars show proportion due to specific pathogens under regression model.

Keywords

Syndromic surveillance; Respiratory; Regression

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