Evaluation of ECDC Influenza-like illness (ILI) case definition to detect respiratory syncytial virus (RSV) infection through the Sentinel Influenza Surveillance System in Portugal, 2010–2018

Emma Sáez-López1,2, Pedro Pechirra1, Inês Costa1, Paula Cristóvão1, Ana Paula Rodrigues2, Raquel Guiomar2
1 Department of Infectious Diseases, National Health Institute Doutor Ricardo Jorge (Instituto Nacional de Saúde, INSA), Lisbon, Portugal. 2 European Public Health Microbiology Training (EUPHEM), European Centre for Disease Prevention and Control (ECDC), Stockholm, Sweden. *Department of Epidemiology, National Health Institute Doutor Ricardo Jorge (Instituto Nacional de Saúde, INSA), Lisbon, Portugal. Contact: emma.saezlo@gmail.com

1 INTRODUCTION

- Portuguese Sentinel Influenza Surveillance System
  - General Practitioners’ (GP) Sentinel Network
  - I-MOVE’s Euro EVA group
  - Emergency and Obstetric Departments
  - Portuguese Laboratory Network for the Diagnosis of Influenza Infection

- ECDC Case definitions
  - Acute Respiratory Infection (ARI)
  - Influenza-like Illness (ILI)
    - Sudden onset of symptoms,
    - At least one of the following three respiratory symptoms:
      - Cough
      - Sore throat
      - Shortness of breath
    - Sudden onset of symptoms,
    - At least one of the following three respiratory symptoms:
      - Cough
      - Sore throat
      - Shortness of breath

- Winter season
- Epidemiological, syndromic and laboratory data:
  - Influenza and other Respiratory Virus (RSV)

- PROBLEM:
  - No suitable definition → RSV underestimated worldwide. Global burden of RSV disease is not completely known. Vaccines in phase III are in trial.

2 OBJECTIVE

To evaluate the suitability of ARI, ILI and one respiratory symptom as case definitions to detect RSV infections in Portugal.

3 MATERIAL & METHODS

- Retrospective and observational cross-sectional study of 7085 cases (October 2010–May 2018)
- Clinical characteristics and RSV detection associated by bivariate and multinomial logistic regression.
- Accuracy for case definitions → sensitivity, specificity, receiver operating characteristic (ROC) curve and area under the ROC curve (AUC).

4 LIMITATIONS

- No many pediatric hospitals are included in the influenza surveillance system and most are outpatients.

5 RESULTS

- 7085 subjects
- 6523 (92%) included in the study
- RSV only
- Influenza only
- Other viruses
- Multiple viruses
- No viruses

> Demographic characteristics of RSV positive cases

<table>
<thead>
<tr>
<th>Age group</th>
<th>0-4 y</th>
<th>5-14 y</th>
<th>15-64 y</th>
<th>≥ 65 y</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSV + (n,%)</td>
<td>23 (13)</td>
<td>8 (4)</td>
<td>107 (58)</td>
<td>45 (25)</td>
</tr>
</tbody>
</table>

- Best predictors:
  - Sudden onset of symptoms
  - ≥2 respiratory symptoms
  - Fever or feverishness
  - Sore throat
  - Shortness of breath

- Observed frequencies higher than expected

> Clinical characteristics associated with laboratory-confirmed RSV infections → very different according to the age

<table>
<thead>
<tr>
<th>Clinical characteristics</th>
<th>RSV+ n, %</th>
<th>Crude OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sudden onset of symptoms</td>
<td>157 83</td>
<td>1.05</td>
<td>(0.72-1.54)</td>
</tr>
<tr>
<td>Fever or feverishness**</td>
<td>129 68</td>
<td>0.41</td>
<td>(0.29-0.58)</td>
</tr>
<tr>
<td>Malaise</td>
<td>186 84</td>
<td>0.65</td>
<td>(0.43-1)</td>
</tr>
<tr>
<td>Headache**</td>
<td>123 65</td>
<td>0.66</td>
<td>(0.49-0.9)</td>
</tr>
<tr>
<td>Myalgia**</td>
<td>138 73</td>
<td>0.38</td>
<td>(0.27-0.53)</td>
</tr>
<tr>
<td>Cough*</td>
<td>180 95</td>
<td>2.29</td>
<td>(1.17-4.69)</td>
</tr>
<tr>
<td>Sore throat</td>
<td>143 75</td>
<td>1.21</td>
<td>(0.85-1.72)</td>
</tr>
<tr>
<td>Shortness of breath**</td>
<td>74 39</td>
<td>2.14</td>
<td>(1.58-2.88)</td>
</tr>
</tbody>
</table>

- ILI case def.
  - Observed frequencies higher than expected

> Accuracy of case definitions for RSV detections

<table>
<thead>
<tr>
<th>RSV</th>
<th>ILI</th>
<th>ARI</th>
<th>Respiratory symptom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>81.1%</td>
<td>82.1%</td>
<td>99.5%</td>
</tr>
<tr>
<td>Specificity</td>
<td>21.1%</td>
<td>20.8%</td>
<td>3.1%</td>
</tr>
<tr>
<td>AUC*</td>
<td>0.51</td>
<td>0.51</td>
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<td>22.9%</td>
<td>4.1%</td>
</tr>
<tr>
<td>AUC*</td>
<td>0.52</td>
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<td>0.51</td>
</tr>
</tbody>
</table>

6 CONCLUSIONS & RECOMMENDATIONS

- RSV infections were highly significant among children <5 & adults≥65 y.o.
- ARI and ILI case definition were not suitable to detect RSV infections in Portugal.

- RSV disease burden: sensitive case definition → one respiratory symptom.
- In Portugal: more suitable RSV+Influenza surveillance system and define a sensitive case definition, BUT different case definition according to the age.