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## INTRODUCTION

Swift and accurate identification of influenza-like illness (ILI) using a reliable case definition for surveillance can reduce epidemic-related mortality, morbidity and economic burden.

The impact depends on the **virus subtype**, **age group** and **vaccination status**.

In this study we took advantage of the Portuguese Influenza Surveillance Systems (ISS) database to assess and compare the performance of the two main case definitions used in Portugal: the European Centre for Disease Prevention and Control (ECDC) ILI case definition and the International Classification of Primary Care (ICPC) R80 code.

On a second phase, we studied the **clinical factors** associated with the **laboratory confirmed diagnosis** of influenza.

Table 1. Differences between case definitions

ECDC ILI	ICPC R80
Sudden onset of symptoms	Myalgia
<b>And</b> at least one of the following:	<b>And</b> Cough
<ul style="list-style-type: none"> <li>Fever or feverishness</li> <li>Malaise</li> <li>Headache</li> <li>Myalgia</li> </ul>	<b>And</b> Sore throat
<b>And</b> at least one of the following:	<b>And</b> at least <b>three</b> of the following:
<ul style="list-style-type: none"> <li>Cough</li> <li>Sore throat</li> <li>Shortness of breath</li> </ul>	<ul style="list-style-type: none"> <li>Sudden onset of symptoms</li> <li>Fever or feverishness</li> <li>Malaise</li> <li>Close contact with infected people or during epidemic</li> </ul>

## METHODS

We conducted a retrospective, observational cross-sectional study using the ISS database of 6,616 cases with individual **clinical symptoms** of both case definitions, **vaccination status** and a **nasopharyngeal swab** result with virus subtype collected between October 2010 and April 2017.

The performance of both case definitions were assessed by their **sensitivity**, **specificity** and area under the receiver operating characteristic curve (AUC). We tested the association between a positive result for influenza and sex, vaccination status and clinical symptoms stratified by age group using multiple logistic regression.

A 0.05 significance level was accepted, statistical analysis was performed with STATA v14.0.

## RESULTS

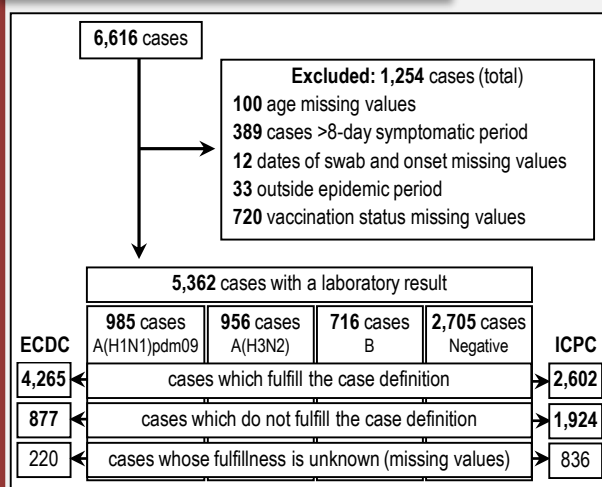


Fig 1. Flow diagram. ECDC: European Centre for Disease Prevention and Control. ICPC: International Classification of Primary Care.

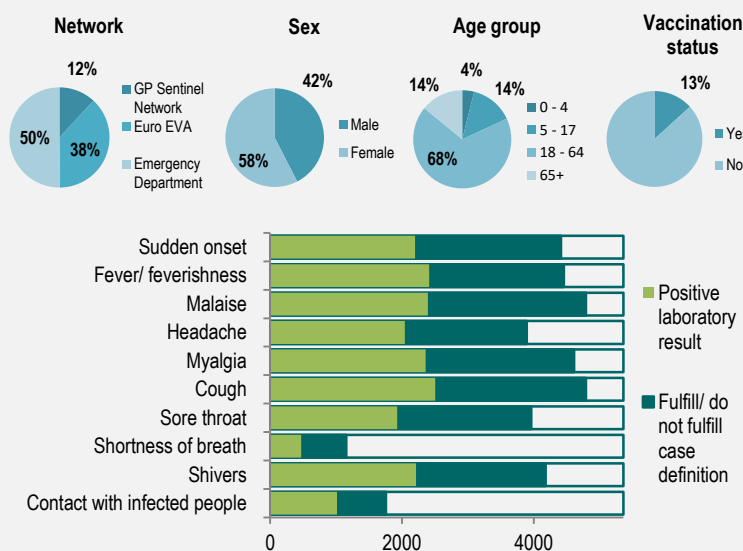


Fig 2. Cases with positive laboratory results by network, sex, age, vaccination status, clinical symptoms and case definition, Portuguese Influenza Surveillance System, 2010-2017.

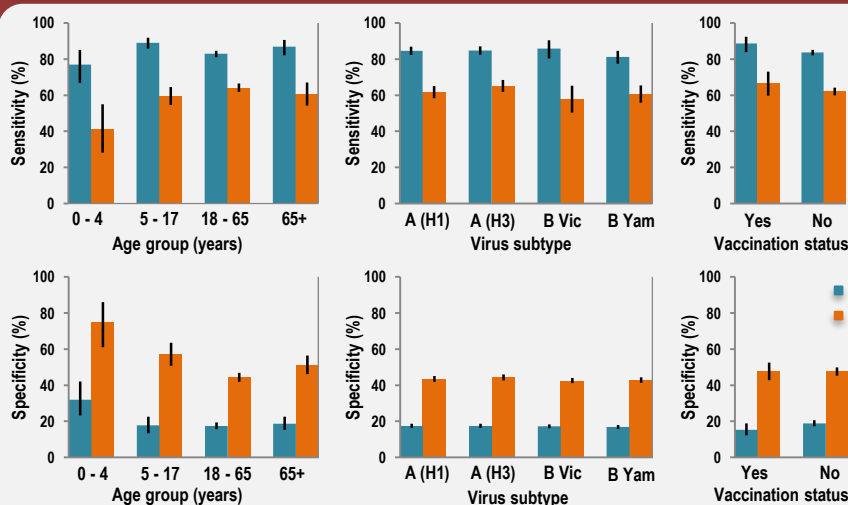


Fig 3. Sensitivity and specificity of ECDC ILI (blue) and ICPC R80 code (orange) case definitions, stratified by age group, virus subtype and vaccination status, Portuguese Influenza Surveillance System, 2010-2017.

Table 2. Area under the receiver operating characteristic curve (AUC) of ECDC ILI case definition and ICPC R80 code

Case definition	ECDC ILI % (95% CI)	ICPC R80 % (95% CI)
AUC	0.512 (0.502-0.522)	0.551 (0.536-0.565)

• No significant difference between the AUC of both case definitions.

• No significant association between **sex** and influenza positive laboratory result.

• Being **vaccinated** was associated with influenza positive laboratory result (OR 0.44; 95%CI 0.37-0.51)

• **Clinical symptoms** significantly most associated with influenza positive laboratory result were:

- fever/ feverishness (OR 4.16; 95%CI 3.38-5.12)
- cough (OR 3.17; 95%CI 2.57-3.90)
- shivers (OR 1.98; 95%CI 1.71-2.28)

## CONCLUSION

In the current effort to halt epidemic-related mortality, morbidity and economic burden, we suggest using the **most sensitive case definition** complemented with a **specific laboratory test** since epidemiological and clinical criteria per se are not accurate enough to predict influenza infection.

## ACKNOWLEDGEMENTS

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