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Short communication

Early estimates of 2016/17 seasonal influenza vaccine effectiveness in primary care in France

Cécile Souty[a,*], Ana-Maria Vilcu[a], Lisandru Capai[a,b], Sylvie van der Werf[c,d], Martine Valette[e,f], Thierry Blanchon[a], Bruno Lina[e,f], Sylvie Behillil[c,d], Thomas Hanslik[a,g,h], Alessandra Falchi[b]

[a] Sorbonne Universités, UPMC Univ Paris 06, INSERM, Institut Pierre Louis d'épidémiologie et de Santé Publique (IPLESP UMRS 1136), F-75012, Paris, France
[b] EA7310, Université de Corse, Inserm, France
[c] Unité de Génétique Moléculaire des Virus à ARN, UMR 3569 CNRS, Université Paris Diderot SPC, Institut Pasteur, Paris, France
[d] CNR des Virus influenzae, Institut Pasteur, Paris, France
[e] Laboratoire de Virologie, CNR des virus influenza, Institut des Agents Infectieux, Groupement Hospitalier Nord des HCL, Lyon, France
[f] Laboratoire Virpath, CIRI Inserm U1111, CNRS 5308, ENS, UCBL, Faculté de Médecine LYON Est, Université de Lyon, Lyon, France
[g] AP-HP, Hôpital Ambroise Paré, service de médecine interne, Boulogne-Billancourt, France
[h] UFR des Sciences de la Santé Simone-Veil,Université Versailles Saint Quentin en Yvelines, Versailles, France

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ABSTRACT

Background: The ongoing 2016/17 influenza epidemic in France is characterized by the circulation of A(H3N2) viruses, known to cause more severe illness among at risk populations.
Objectives: The purpose of our study was to provide early influenza vaccine effectiveness (IVE) estimates for the ongoing influenza epidemic in France and compare these estimates over the six post-pandemic IVE.
Study design: We used clinical and virological data collected in primary care by the French *Sentinelles* network. IVE in preventing influenza infection was estimated by the test-negative design method. The screening method was used to estimate IVE in preventing medically-attended influenza-like illness among target groups (< 65 year with chronic diseases and ≥65 years) since 2010/11 influenza epidemic.
Results: Early IVE estimates in primary care against influenza A(H3N2) were 48% (95% confidence interval (CI): 22–66) overall and 39% (95% CI: −17 to 69) among elderly (aged 65 and older). In comparison to the last six epidemics, 2016/17 early IVE in preventing influenza-like illness among target groups showed VE estimates higher to those reported during the 2011/12 and 2014/15 epidemics.
Conclusions: The moderate 2016/17 IVE estimates were higher than those estimated during influenza A(H3N2) epidemics with vaccine mismatch.

1. Introduction

The 2016/17 ongoing influenza epidemic in France is characterized by the predominant circulation of A(H3N2) viruses (> 96%) [1,2]. Although the A(H3N2) viruses circulating in 2016/17 were well matched with the vaccine strain A/Hong Kong/4801/2014 [3], increased disease severity and mortality among the elderly was observed [1], similarly to the 2011/12 and 2014/15 influenza seasons marked by the circulation of antigenically drifted A(H3N2) viruses [4,5].

2. Objectives

In this context, we estimated early 2016/17 influenza vaccine effectiveness (IVE) in primary care against laboratory-confirmed A(H3N2) infection in France. We reported temporal dynamic of IVE in preventing influenza-like illness (ILI) among target groups for vaccination for the last six influenza epidemics, with particular focus on epidemic seasons marked by the circulation of A(H3N2).

3. Study design

As previously described [5,6], sentinel general practitioners (GPs) of the French *Sentinelles* network reported through the year ILI cases observed in their practice using the following definition: "sudden onset of fever > 39 °C (102 °F) with respiratory signs and myalgia" [7]. They collected simultaneously nasopharyngeal swabs along with clinical

* Corresponding author at: UMR_S 1136 Inserm-UPMC Institut Pierre Louis d'Epidémiologie et de Santé Publique Faculté de médecine Pierre et Marie Curie, site Saint Antoine 27 rue Chaligny, 75571 Paris Cedex 12 − France.
E-mail address: cecile.souty@upmc.fr (C. Souty).

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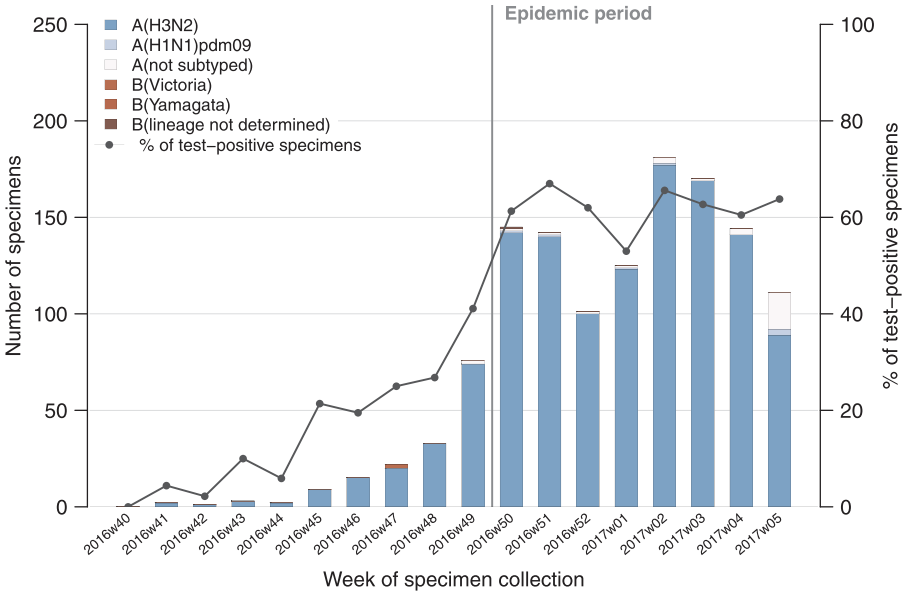

Fig. 1. Number of positive influenza-like illness patients swabbed by sentinel physicians who tested positive for at least one influenza virus by types/subtypes and proportion of laboratory confirmed influenza patients swabbed by week, French *Sentinelles* surveillance network, 3 October 2016–5 February 2017 (n = 2513).

information in a randomized sample of their ILI patients during the influenza surveillance period. Clinical information concerns at least: date of consultation, age, sex, vaccine status for current seasonal influenza trivalent vaccine (all brands), time since vaccination (more or less than 2 weeks), presence of risk factors (chronic illness). Influenza virus typing and influenza A subtyping were conducted using real-time RT-PCR assays by the French National Influenza Reference Center (CNR, Paris and Lyon) and the laboratory of Virology at the University of Corsica.

All nasopharyngeal specimens collected between 3rd October 2016 (2016w40) and 5th February 2017 (2017w05) (Fig. 1) were included in the Test-negative design (TND) study [8,9]. IVE were estimated as 1–(odds ratio) x 100 obtained using multivariable logistic regression models with influenza virological result as outcome and vaccination status as main effect, while adjusting for age (eight groups), time of onset of symptoms, presence of a chronic disease and sex. Patients recruited outside the virus circulation period as defined by the ECDC protocol were excluded [10].

IVE in preventing medically attended ILI in target groups was estimated by the screening method [5,11] for the ongoing epidemic and over the 2010/11 to 2015/16 epidemics (http://www.sentiweb.fr [12]). Proportions of vaccinated cases were computed among ILI cases reported during the epidemic periods. The proportion of vaccinated subjects among the reference population was obtained from administrative sources [13]. IVE estimates were stratified according to age (< 65 years with chronic disease; ≥65 years) [14].

Patients with missing values for any of the variables included in the analysis were excluded, as well as children under six months who are not given the vaccine. Vaccines were considered as potentially effective if administrated at least 2 weeks prior to the symptoms onset. Patients whose vaccination occurred < 2 weeks prior to symptoms onset were considered as not vaccinated.

4. Results

In France, estimated ILI incidence exceeded the epidemic threshold in 2016w50 (12th to 18th December 2016), peaked on 2017w03 (16th to 22th January 2017) and decreased afterwards. Between 2016w50 and 2017w05, sentinel GPs reported 8655 ILI cases. Since 2016w40, among the 2513 swabbed patients, 1281 (51.0%) were positive for at least one influenza virus of which 1240 (96.8%) were A(H3N2) (Fig. 1).

A total of 2088 swabbed patients (1135 A(H3N2) cases and 953 controls) were eligible for inclusion in the TND study (Table 1).

Table 1
Characteristics of controls and influenza A(H3N2) cases included in the early 2016/17 season influenza vaccine effectiveness analysis, French Sentinelles network, 2nd November 2016 − 4th February 2017 (n = 2088).

	Controls	Influenza A(H3N2) cases
	(n = 953)	(n = 1135)
	n (%)	n (%)
Age group (years)[a]		
—0 − 4	324 (34.0)	187 (16.5)
5–14	121 (12.7)	246 (21.7)
15–64	449 (47.1)	601 (53.0)
≥65	59 (6.2)	101 (8.9)
Females	471 (49.4)	540 (47.6)
Risk group[b]	158 (16.6)	206 (18.1)
Vaccinated with seasonal trivalent vaccine	75 (7.9)	87 (7.1)
Interval onset to swab (days)		
0 − 1	552 (40.6)	661 (58.2)
2–4	350 (36.7)	432 (38.1)
5–7	51 (5.3)	42 (3.7)
Mean	1.6[c]	1.5[c]
Symptoms onset (month)		
Nov 2016	232 (24.3)	66 (5.8)
Dec 2016	325 (34.1)	441 (38.9)
Jan 2017	387 (40.6)	623 (54.9)
Fev 2017	9 (0.9)	5 (0.4)

[a] Since influenza vaccines are not given to children under 6 months old they were excluded from the study.
[b] Age ≥65 y or with chronic condition targeted by the vaccine recommandations in France.
[c] Average interval between onset to swab (in days).

Adjusted IVE estimates against A(H3N2) were 48% (95% confidence interval (CI): 22–66) among the overall population, 34% (95% CI: −6 to 60) among all target groups and 35% (95% CI −23 to 66) among elderly (aged ≥65 y) (Table 2).

Early 2016/17 IVE in preventing ILI was estimated 54% among all target groups (95% CI: 47–60) and 47% among elderly (95% CI: 38–55) (Table 2). The dynamic of estimated IVE in preventing ILI for the six last influenza epidemics is reported in Fig. 2.

5. Discussion

For the overall population consulting in primary care, our early