Influenza vaccine effectiveness 2010-11 in Portugal obtained by two methods: results from the EuroEVA study

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BACKGROUND Every year the influenza vaccine is reformulated, so estimating the influenza vaccine effectiveness (VE) every season and in an early stage is important to support public health decisions. Since 2008, Portugal has been participating with the EuroEVA study in the I-MOVE (Influenza Monitoring Vaccine Effectiveness in Europe), financed by ECDC and coordinated by Epiconcept, which main objective is to estimate seasonal and pandemic vaccine effectiveness during and after the influenza season. In this context, we used two methods to estimate VE for the 2010-11 seasonal influenza vaccine, both in the elderly and in all age groups.

TEST NEGATIVE DESIGN (TND)

METHODS

General Design

A case-control approach was used, where laboratory confirmed influenza cases (ILI+) were compared to laboratory negative influenza ILI patients (ILI-).

On a weekly basis, each GP selected systematically ILI patients using the EU ILI case definition.

Sample of GP's

Systematic selection
Each GP has different starting day of the week – from Monday to Thursday

2 ILI cases with less then 65 years

All ILI cases with 65 years and above

Data collection by the GP

1. Standardized questionnaire: data on confounding factors and effect modifiers;
2. Nasopharyngeal swab

Laboratory analysis
(RT-PCR / Culture)

CONTROLS (ILI-)
(negative for any influenza virus)

CASES (ILI+)
(positive for any influenza virus)

FIGURE 1.DESIGN AND RECRUITMENT FLOW PROCESS

Vaccination status

Individuals vaccinated more than 14 days before disease onset.

Statistical analysis

VE was estimated as one minus the odds ratio of being vaccinated in cases versus controls adjusted for confounders by logistic regression.

RESULTS

In this season, 2010-2011, the seasonal vaccine coverage in **Controls** was significantly higher (17.4%) than in **All Influenza** cases (ILI+) (4.2%) (Figure 3).

The crude vaccine effectiveness estimate was 79.7%, with statistical significance (Table 1).

After the adjustment for confounders, via non conditional logistic regression, the VE estimates decreased to 59% with no statistical significance and presenting a very low precision.

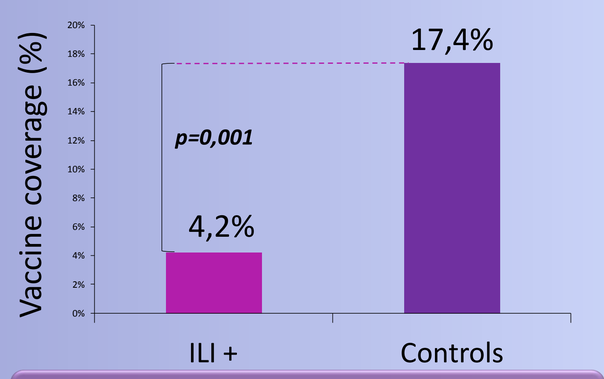

FIGURE 3. VACCINE COVERAGE IN CASES (ILI+) AND CONTROLS (ILI-)

TABLE 1. CRUDE AND ADJUSTED SEASONAL 2010-11 VACCINE EFFECTIVENESS AGAINST INFLUENZA

Crude		Adjusted*	
VE	**CI95%**	**VE**	**CI95%**
79.7	44.2-93.6	59.0	-61.8 – 89.6

* Data used in the estimates from week 45 till week 11; VE estimates adjusted for age group, pandemic and seasonal vaccine 2009-10, any chronic disease, target group and month of onset;

SCREENING METHOD

METHODS

General Design

The 2010-11 seasonal vaccine coverage (VC) was compared between a sample of ILI cases positive for influenza with the vaccine coverage estimated in the general population. Vaccine coverage in the population was obtained from a population based sample **(ECOS sample),** that corresponds to 3208 individuals.

ECOS sample

A sample of 1074 households stratified by region (homogeneous allocation)
selected from a dual sample frame- random digit dialing

Mobile phones (n=445)

Landline phones (n=629)

Data collection by CATI (Computer Assisted Telephone interview)

•Standardized questionnaire: one respondent by household (proxy for the rest of the household members). Information on the vaccine status, ILI symptoms manifested from September to the interview and presence of chronic conditions.

Data analysis
Vaccine coverage estimates weighted by sex and age of the Portuguese population

VC CASES (ILI +)
(positive for any influenza virus)

VC COMMUNITY CONTROLS

FIGURE 2. DESIGN AND RECRUITMENT FLOW PROCESS

Vaccination status

Individuals vaccinated more than 14 days before disease onset.

Statistical analysis

VE was estimated by comparing the proportion of cases vaccinated to the vaccine coverage in the source population using the Orenstein formula and the Farrington method to adjust for confounders.

RESULTS

Considering the Screening method, the vaccine coverage in controls (from the community) was higher than the coverage in **ILI+** cases (Table 2).

Crude 2010-11 seasonal VE estimate was 79.4% (CI95% 53-91) (Table 3).

After adjustment, the VE estimates decreased to 64% (CI95% 17-84), all results statistically significant.

TABLE 2. VACCINE COVERAGE ON CASES ILI+ AND COMMUNITY CONTROL, BY AGE GROUP AND PRESENCE OF A CHRONIC CONDITION

	Community control	ILI + (v/n)
All	17.5	4.2 (6/143)
0-64 yrs	10.8	2.9 (4/139)
≥65 yrs	48.3	50.0 (2/4)
No chronic	9.7	2.4 (3/127)
Any chronic	33.0	18.8 (3/16)

v – nr of vaccinated; n – nr of cases

TABLE 3. CRUDE AND ADJUSTED 2010-11 VACCINE EFFECTIVENESS AGAINST ILI+, BY AGE GROUP AND PRESENCE OF A CHRONIC CONDITION

	Crude		Adjusted*	
	VE (%)	CI95%	VE (%)	CI95%
All	79.4	53.4-90.9	63.9	16.9-84.3
0-64 yrs	87.2	65.3-95.2	71.3	22.4-89.4
65 + yrs**				
No chronic	77.5	29.3-92.8	64.2	18.7-91.8
Any chronic**				

* Adjusted for confounding (age group and presence of chronic diseases) using the Farrington method
** Not computed due to small sample size

CONCLUSIONS **VE point estimates obtained by the two methods were very similar and an explanation for this consistency could be the fact that the seasonal vaccine coverage estimates between ILI- (17.4%) and the population based telephone survey (17.5%) were also very close. Nevertheless, and due to small sample size, our study was unable to estimate VE for specific seasonal vaccine target groups. Further efforts should be done to increase sample size, mainly in the elderly population.**

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