



## ORIGINAL ARTICLE

# The Vacinómetro<sup>®</sup> initiative: an eleven-year monitorization of influenza vaccination coverage rates among risk groups in Portugal



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## KEYWORDS

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**Abstract** Annual vaccination is fundamental for individual and group protection against seasonal influenza infection. International and Portuguese healthcare organizations have established influenza vaccination coverage rate (VCR) targets for risk groups, namely 75% in people  $\geq 65$  years old. The Vacinómetro<sup>®</sup> initiative has been monitoring influenza VCR among target risk groups in Portugal since 2009: Group 1,  $\geq 65$  years old; Group 2, patients with chronic conditions; Group 3, healthcare workers in direct contact with patients; and Group 4, 60–64 years old. Besides VCR, social-demographic and health-related variables have been evaluated. During the study period (2009/2010 – 2019/2020), the VCR increased in the 4 target risk groups: from 58.6% to 76.0% in Group 1 (reaching the WHO target); 33.3% to 72.0% in Group 2; 25.0% to 58.9% in Group 3; and 36.6% to 42.8% in Group 4. “Physician recommendation” was the main driver for vaccination whereas “lack of habit” was the main barrier to vaccination. Vacinómetro<sup>®</sup> data demonstrate that free-of-charge vaccination has a positive impact on VCR. The observed positive trends in influenza VCR demonstrate that public health measures implemented in Portugal to facilitate access to influenza vaccine result in increased vaccine uptake. Strategies to promote population literacy and the physician’s awareness should be continued and reinforced. Free-of-charge vaccination criteria extended to more risk groups would also contribute to higher influenza VCR in Portugal.

**Abbreviations:** WHO, World Health Organization; DGS, Direção-Geral da Saúde (Directorate-General of Health); HCWs, Healthcare Workers; ECDC, European Centre for Disease Prevention and Control; VCR, Vaccination Coverage Rate; EU, European Union; SPP, Sociedade Portuguesa de Pneumologia (Portuguese Society of Pneumology); APMGF, Associação Portuguesa de Medicina Geral e Familiar (Portuguese Association of General Practice and Family Medicine); NUTS, Nomenclatura das Unidades Territoriais para fins eStatísticos (Nomenclature of Territorial Units for Statistics); CATI, Computer-Assisted Telephone Interviewing; LVT, Lisboa e Vale do Tejo (Lisbon and Tagus Valley).

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## Introduction

Vaccination is the most effective measure to prevent influenza virus infection.<sup>1</sup> The World Health Organization (WHO) recommends the annual vaccination for the most vulnerable population groups.<sup>2</sup> In the European Union (EU), vaccination coverage rates (VCR) among risk groups is below the recommended levels.<sup>1,3,4</sup> The average VCR of elderly people in EU was 41.8% in 2007-2015, far behind the WHO target of 75%.<sup>5</sup> Low VCR rates are also reported in people with chronic illnesses (50.3%) and healthcare workers (HCWs) (25.7%). The low VCR rates in EU are attributed to several factors, namely: no confidence in the vaccine, low perceived need for vaccination, no recommendation from healthcare providers and, in some countries, out-of-pocket costs of vaccine.<sup>1</sup> In this context, it is critical to monitor VCR trends to evaluate the impact of public health policies. Vacinómetro® is an initiative promoted by the Portuguese Pneumology Society (SPP) and the Portuguese Association of General Practice and Family Medicine (APMGP)<sup>6,7</sup> to monitor the influenza VCR in Portugal since the 2009-2010 flu season. Here we report Vacinómetro® results until the 2019-2020 season.

## Methods

Vacinómetro® primary objective is to evaluate VCR in the four target groups defined by the Portuguese Directorate-General of Health (DGS)<sup>8</sup>: Group 1,  $\geq 65$  years old; Group 2, patients with chronic conditions; Group 3, HCWs in direct contact with patients; and Group 4, 60-64 years old. Data collection was based on annual phone surveys. Data was analysed using descriptive statistics. Chi-square test was used to

test the linear trend against the null hypothesis of no trend and the trend of each vaccination/no-vaccination motive along seasons. For further information, please refer to the Supplementary Information.

## Results

Vacinómetro® study sample increased from 200 subjects in 2009 to 2851 in 2020.<sup>6</sup> Overall, a total of 14832 questionnaires were collected. Fig. 1 summarizes the VCR evolution per target risk group over the years. There was an increasing trend for VCR in all target risk groups ( $p < 0.001$ ) – Table 1. There were no statistically significant differences in VCR according to gender (data not shown).

There were differences in overall VCR according to country regions: *North*, 59.3%; *Alentejo*, 54.5%; *Centre*, 53.7%; *Algarve*, 51.6%; and *Lisbon and Tagus Valley (LVT)*, 45.1%. There was an increasing trend for VCR along the seasons in North, Centre, LVT, and Alentejo regions ( $p \leq 0.001$ ). The islands regions, Azores and Madeira, were included only in 2019-2020 season with reported VCR of 52.4% and 54.8%, respectively.

Reasons for vaccination/no vaccination were analysed in 2016-2020 – see supplementary tables 1 and 2. The main reason for vaccination in Groups 1, 2, and 4 was “physician recommendation” (66.3%) followed by “own initiative” (19.5%), both with statistically significant trends ( $p < 0.001$ ). Group 3 (HCWs) reported “part of a workplace initiative” as the main reason for vaccination (68.9%) with an increasing trend ( $p < 0.001$ ). Amongst the unvaccinated subjects, “lack of habit” (44.5%), “being healthy” (22.3%), and “never got the flu” (15.7%) were the primary reasons mentioned for no vaccination, all with statistically significant trends ( $p < 0.001$ ).

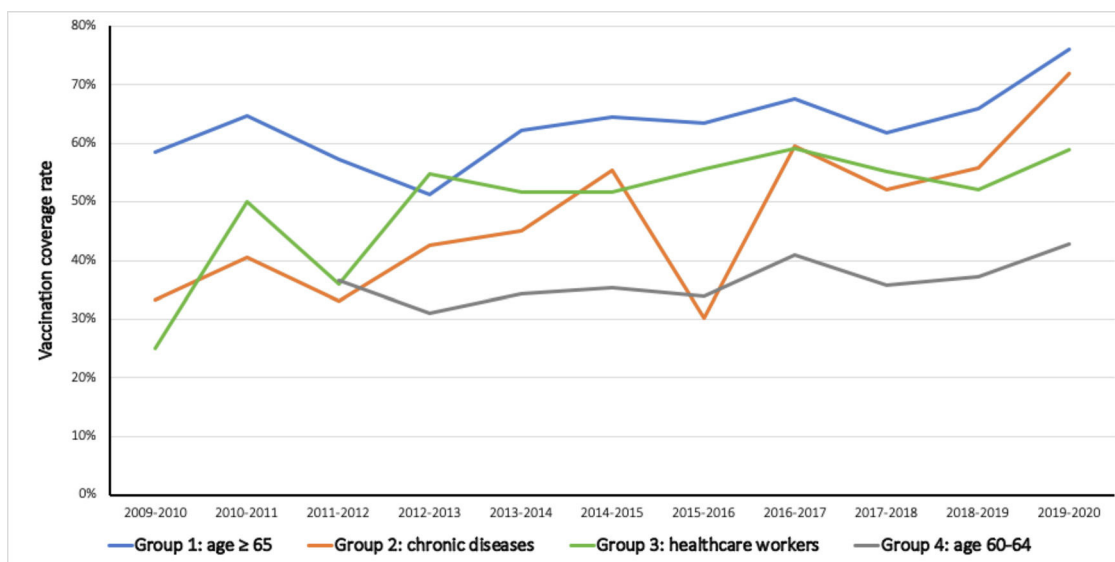


Fig. 1 Evolution of influenza vaccination coverage rates by risk group.

**Table 1** Influenza vaccination coverage rates by risk group.

Vaccination Season	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	p*
n vaccinated (%)	169	153	334	300	601	600	600	759	680	778	1162	<0.001
	58.6%	64.7%	57.2%	51.3%	62.2%	64.5%	63.5%	67.6%	61.8%	65.9%	76.0%	
	51.2% – 66.0%	57.1% – 72.3%	53.7% – 64.3%	45.6% – 57.0%	58.3% – 66.1%	60.7% – 68.3%	59.6% – 67.4%	64.3% – 70.9%	58.1% – 65.5%	62.6% – 69.2%	73.5% – 78.5%	
n vaccinated (%)	27	38	300	300	300	300	300	517	643	699	813	<0.001
	33.3%	40.5%	33.0%	42.7%	45.0%	55.3%	30.3%	59.6%	52.1%	55.8%	72.0%	
	15.5% – 51.1%	32.9% – 64.7%	27.7% – 38.3%	37.1% – 48.3%	39.4% – 50.6%	49.7% – 60.9%	25.1% – 35.5%	55.4% – 63.8%	48.2% – 56.0%	52.1% – 59.5%	68.9% – 75.1%	
n vaccinated (%)	4	10	312	300	300	300	300	313	306	344	705	<0.001
	25.0%	50.0%	35.9%	54.7%	51.7%	51.7%	55.7%	59.1%	55.2%	52.0%	58.9%	
	0.0% – 67.4%	19.0% – 81.0%	32.3% – 43.1%	49.1% – 60.3%	46.0% – 57.4%	46.0% – 57.4%	50.1% – 61.3%	53.7% – 64.5%	49.6% – 60.8%	46.7% – 57.3%	55.3% – 62.5%	
n vaccinated (%)			306	300	300	300	300	333	319	306	980	<0.001
			36.6%	31.0%	34.3%	35.3%	34.0%	41.0%	35.7%	37.3%	42.8%	
			31.2% – 42.0%	25.8% – 36.2%	30.9% – 41.7%	29.9% – 40.7%	28.6% – 39.4%	35.7% – 46.3%	30.4% – 41.0%	31.9% – 42.7%	40.1% – 46.3%	

CI, confidence interval; \* Chi-square test for trend.

Place for vaccine acquisition/administration was analysed from 2011. HCWs were vaccinated mostly free-of-charge in their work place (98.7%). Group 1 was mainly vaccinated at primary care centres, free-of-charge (83.7%), while Group 4 vaccines were mostly acquired with reimbursement at a pharmacy (57.3%). Across all study, vaccines acquired in pharmacies were mostly administered there.

In 2019-2020, pregnant women were analysed: 23.5% [95%CI = (20.1% – 6.9%)] of the 609 identified pregnant women were vaccinated, 50.3% of those for the first time and mainly due to “physician recommendation” (84.6%). Among unvaccinated pregnant women, “lack of physician recommendation” was the main reason for no vaccination (63.7%), yet 99.4% reported no intention of being vaccinated. Pregnant women were mostly vaccinated at primary care centres (46.9%).

### Discussion

Influenza VCR is an important indicator of assessing the success of health policies promoting influenza vaccination. According to Vacinómetro®, influenza VCR in Portugal has improved in all target risk groups. Of note, in 2019-2020, the UE target of 75% VCR for people ≥ 65 years old<sup>1,9</sup> was achieved in Portugal with a reported VCR of 76%. Indeed, Portugal has been recognized as one of the few EU countries with a positive VCR trend in the risk group of older people.<sup>3,10</sup> A positive trend was also observed among patients with chronic conditions (some of them entitled to free-of-charge vaccination), reaching a VCR maximum of 72.0%. In HCWs, VCR gradually approached 60%.

The lowest VCR was observed in people 60-64 years old, with a maximum VCR of 42.8%. Although vaccination is recommended in this age group, it is not recognized as a risk group and therefore is not eligible for free administration,<sup>8,9</sup> in contrast to ≥ 65 years old who are entitled to free vaccination since 2012. This highlights the importance of free-of-charge influenza vaccination to increase VCR among target risk groups.

Vacinómetro® data has revealed regional differences for VCR, particularly between the two most populated regions in Portugal – North (59.3% VCR) vs. LVT (45.1% VCR). This may result from subtle regional differences in access to vaccination and/or population awareness, which would be interesting to investigate in order to fine-tune public health policies.

Vacinómetro® has demonstrated that physicians have a key role in vaccination promotion, since both vaccinated and unvaccinated subjects affirmed that physician’s recommendation or lack of recommendation was a significant reason for their decision. This was particularly relevant among pregnant women, with an 84.6% recommendation rate. Since this group is eligible for free-of-charge vaccination since 2020, VCR will likely increase in the upcoming seasons.

Vacinómetro® has also provided insights on how to improve initiatives aiming to promote vaccination literacy and awareness, as among unvaccinated subjects, “being healthy”, “lack of opportunity”, and “lack of habit” are still referred as reasons for no vaccination.

In summary, Vacinómetro® has been demonstrated as an important tool to monitor influenza VCR in Portugal among

target risk groups. The observed VCR positive trends illustrate the success of health policies implemented in Portugal to promote and facilitate access to vaccines.

## Conflicts of Interest

MM and CG are Sanofi Pasteur employees and may hold shares. The remaining authors did not receive any financial support and have no conflicts of interest to declare for the execution of the study.

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