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BACKGROUND AND OBJECTIVES:

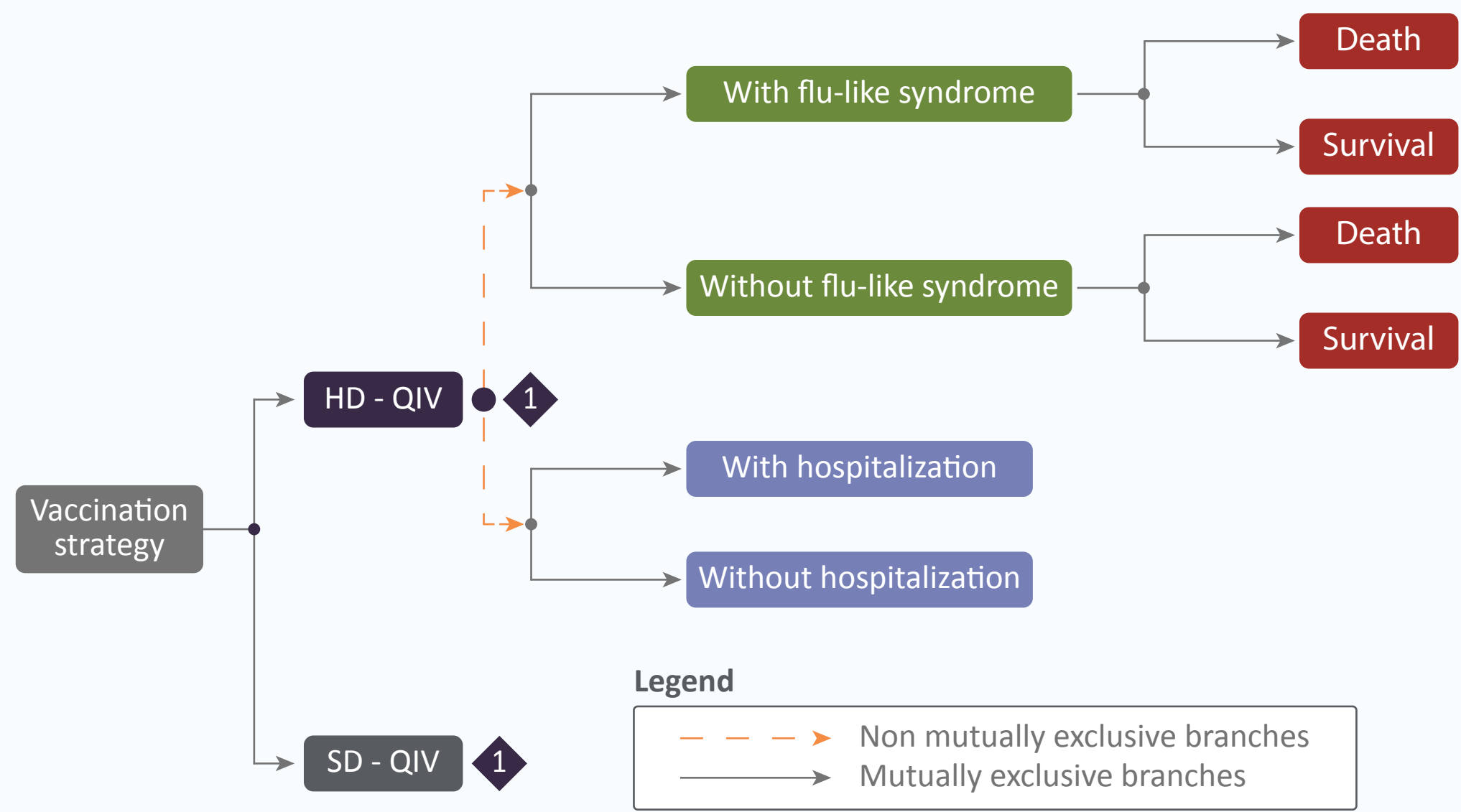
- Infection caused by influenza virus affects approximately 1,000 million individuals every year, resulting in 290,000 to 650,000 deaths globally [1,2].
- Certain groups have higher risk of developing severe complications due to influenza, namely pregnant woman, immunocompromised individuals, patients with comorbidities, children with less than 1 year of age and adults older than 65 years [3].
- In Portugal, the guidance published for the prevention of the 2019/2020 influenza season included two standard dose quadrivalent (SD-QIV) vaccines [4].
- Despite of the implemented vaccination strategy, flu is associated with high disease burden and healthcare resources use in Portugal.
- A high dose influenza vaccine (HD QIV, Efluelda, Sanofi Pasteur), which contains 60 µg of haemagglutinin (HA) antigen per strain (instead of 15 µg per strain for SD), generates higher antibody responses and greater effectiveness than SD influenza vaccines in adults older than 65 years.
- This study aims to assess the clinical impact and the consumption savings associated to influenza vaccination of the Portuguese elderly population with a high dose quadrivalent influenza vaccine (HD-QIV) vs. SD-QIV.

METHODS:

Cost-effectiveness model

- A decision tree model with a one-year time horizon (Figure 1), developed by Syneos, was used to compare the disease burden of influenza in adults aged 65 years or older with HD-QIV vs. SD-QIV.
- The model allows to predict influenza cases, influenza-related general practitioner (GP) visits, emergency room (ER) visits, hospitalizations, and influenza-related deaths.

Figure 1. Simplified structure of the decision tree model.



HD-QIV, high dose quadrivalent influenza vaccine; SD-QIV, standard dose quadrivalent influenza vaccine.

Clinical data

- The attack rate of influenza associated to each vaccination strategy is based on that of an unvaccinated cohort, the coverage rate, and the efficacy of each vaccine.
- Relative efficacy of HD-QIV vs. SD-QIV was assumed to be like the 24,2% relative efficacy of HD trivalent influenza vaccine vs. SD trivalent influenza vaccine observed in FIM12 randomized clinical trial [5].
- The relative efficacy in hospitalization prevention of HD-QIV vs. SD-QIV was considered to be 17,8% for influenza cases, 24,3% for respiratory complications and 18,2% for cardiorespiratory complications, based on the meta-analysis [6].
- A coverage rate of 65% was assumed, based on data from the European Center of Disease Control (ECDC) [7].

Resource use

- The proportion of influenza cases leading to an ER or GP visit was based on official Portuguese data: 0.039 ER visits and 0.091 GP visits per case [8,9].
- The probability of a hospitalization due to influenza and related complications was based on the Burden of Acute Respiratory Infections (BARI) study (Table 1) [10]. Two definitions of related complication were used: respiratory and cardiorespiratory hospitalizations (possibly attributable to influenza).

Table 1. BARI study: hospitalization rate by age group and influenza, respiratory complications or cardiorespiratory complications.

Age group	Hospitalization rate (per 100,000 inhabitants)
Influenza	
65 - 74 years	30.72
75+ years	79.58
Respiratory complications	
65 - 74 years	670.82
75+ years	2,749.29
Cardiorespiratory complications	
65 - 74 years	1,831.17
75+ years	5,530.88

BARI, Burden of Acute Respiratory Infections.

RESULTS:

Base-case scenario

- Compared to SD-QIV, the estimated reduction caused by HD-QIV in flu cases and flu-related deaths was 13,461 (12%) and 378 (12%), respectively (Table 2).

- HD-QIV allows a reduction of 1,229 GP appointments and 532 ER visits. Concerning hospitalizations, influenza-related ones are reduced by 121 (10%), while those related to respiratory and cardiorespiratory complications are decreased by 5,112 (14%) and 8,755 (11%), respectively (Table 2).

Table 2. Base-case scenario: consequences of vaccination of individuals with 65 years or more.

	HD-QIV	SD-QIV	Incremental
Flu cases (n)	97,627	111,087	-13,461
GP visits (n)	8,912	10,140	-1,229
ER visits (n)	3,855	4,387	-532
Hospitalizations (n)			
All cardiorespiratory complications	71,245	80,001	-8,755
Only respiratory complications	31,954	37,066	-5,112
Only influenza related	1,079	1,200	-121
Flu-related deaths (n)	2,739	3,117	-378

ER, emergency room; GP, general practitioner; HD-QIV, high dose quadrivalent influenza vaccine; QIV-SD, standard dose quadrivalent influenza vaccine.

Sensitivity analyses

- Deterministic sensitivity analyses showed that the results were sensitive to relative efficacy estimates of HD-QIV and mortality caused by influenza.

Limitations:

- Despite the most robust available has been used to inform the model, the high variability of influenza burden from season to season may impact the results.
- In the post-COVID some of these epidemiological inputs may change, but this could be evaluated only once the pandemic period is finished.

CONCLUSIONS:

A switch to HD-QIV seasonal vaccination in the elderly Portuguese population would contribute to reach public health objectives, reducing excess mortality and the consumption of healthcare resources.

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