

# Des vaccins contre... l'infarctus et la démence

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## - Liens d'intérêt :

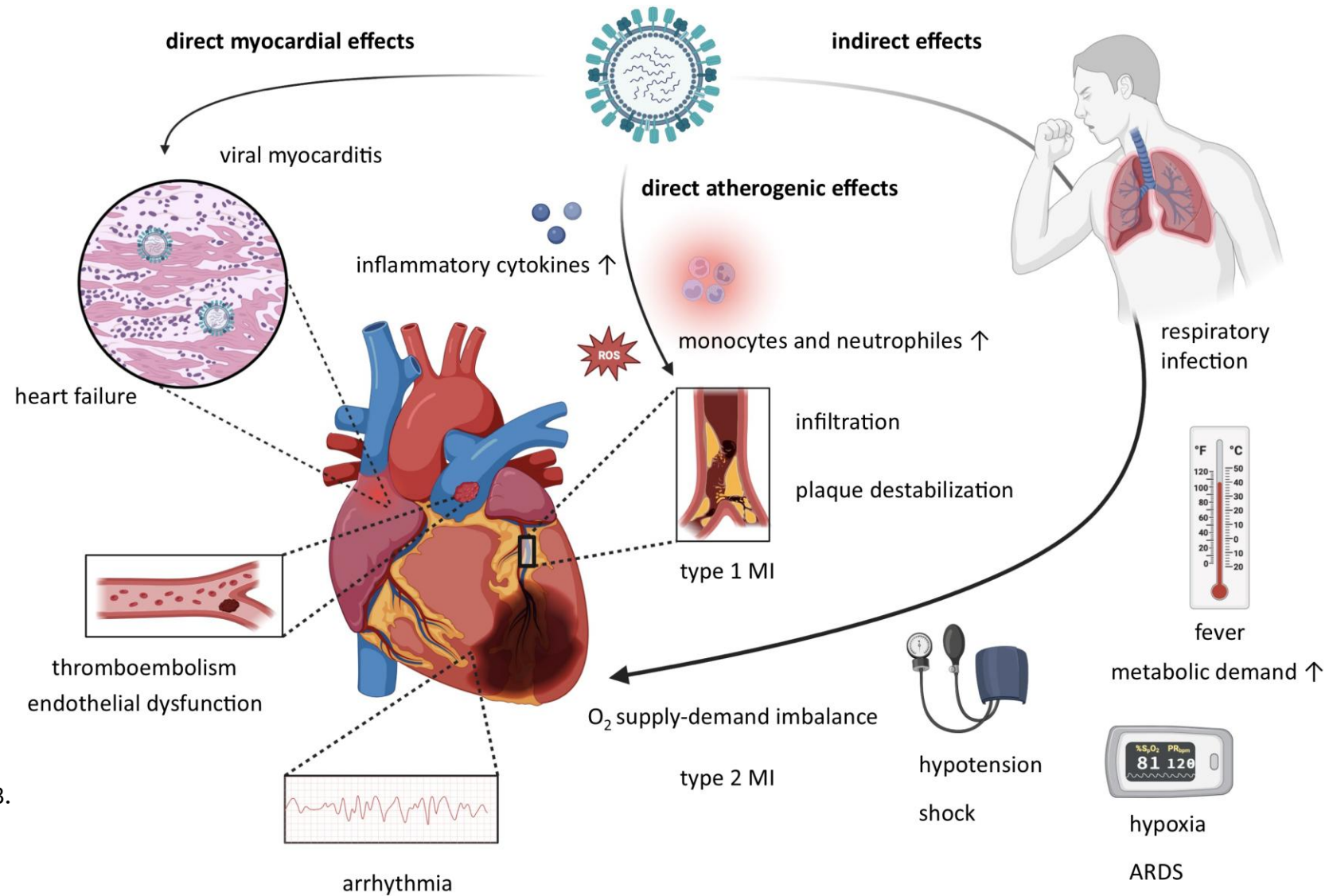
- Membre du groupe prévention vaccination de la SPILF et du Ginger
- Membre du Copil du I-REIVAC
- Investigateur principal essais vaccins académiques et industriels Sanofi Pasteur; GSK, MSD, Pfizer, Janssen, Moderna, Astra Zeneca....
- Membre du Global influenza Initiative
- ***Sans rémunération à titre personnel=***
  - Advisory Boards: Pfizer, Moderna, Janssen, Sanofi Pasteur, GSK, MSD, Sequirus....
  - Collaboration études précliniques (Sanofi Pasteur, Pfizer)
  - Congrès, journées scientifiques: Sanofi Pasteur; GSK, MSD, Pfizer, Moderna, Quiagen....

# Vision de la vaccination

- Réduction de l'infection, des complications infectieuses, hospitalisation, décès....
- Parmi les complications des infections, il y a aussi des complications non infectieuses: événements cardio-vasculaires, chutes, perte d'autonomie, confusion....notamment chez les seniors mais pas uniquement
- Ces complications sont en général plus craintes que les infections par les seniors
- De plus en plus de données portant sur l'impact des vaccins sur les complications non infectieuses



# Potential Mechanisms for Adverse Cardiovascular Events Associated With Respiratory Infections



ARDS, acute respiratory distress syndrome;  
MI, myocardial infarction.

Rademacher J, et al. Eur J Prev Cardiol. 2024;31:877-888.

# Evidence of the impact of infections on cardiovascular diseases

There is a double association

**Respiratory infections** in adults are associated with both **new-onset** and **exacerbation** of pre-existing **cardiovascular disease**



Respiratory infection



Cardiovascular events

**Pre-existing cardiovascular disease** is a risk factor for **severe Respiratory infections outcomes** in adults



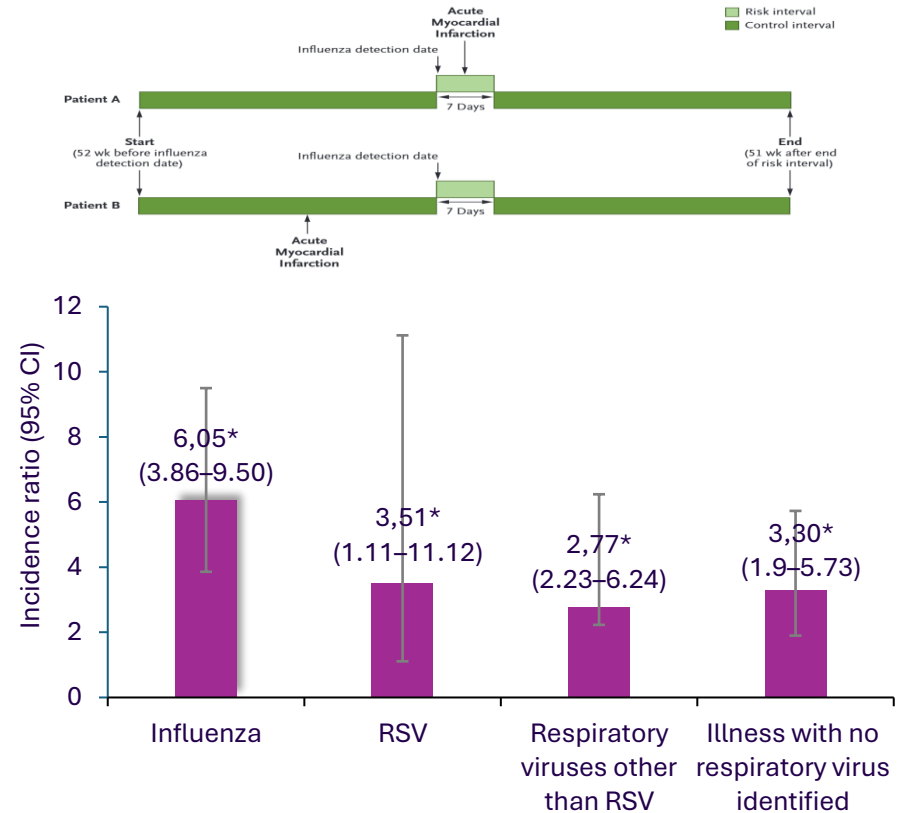
Cardiovascular disease



Severe Respiratory disease

Also observed for **zoster**

## Self-controlled case series methodology



Davidson JA, et al. Lancet Digit Health. 2021;3:e773-e783.; Ivey KS, et al. J Am Coll Cardiol 2018;71(14):1574-1583. 3;  
Arnold FW, et al. J Am Geriatr Soc. 2020;68(5):1007-1014.; Hessami A, et al. Am J Emerg Med. 2021;46:382-391.  
Woodruff RC, et al. JAMA Intern Med. 2024;184:602-611; Heidecker B, et al. Eur Heart J. 2025;ehaf384.

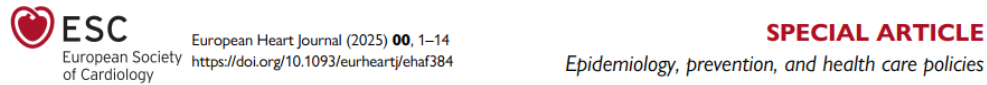
Also found with pneumococcal infections (X5) and zoster (X1.7)

Kwong JC, et al. N Engl J Med. 2018;378:345-353.

# Impact des vaccins sur les évènements cardiovasculaires

# Evidence of immunization as a new pillar of cardiovascular protection

Clinical guidance from cardiology societies clearly stated that:



## Vaccination as a new form of cardiovascular prevention: a European Society of Cardiology clinical consensus statement

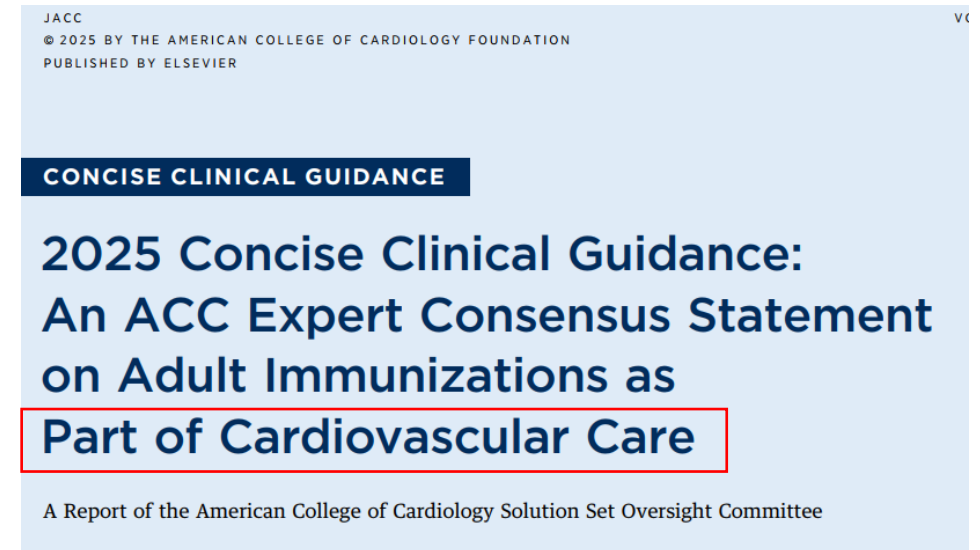
With the contribution of the European Association of Preventive Cardiology (EAPC), the Association for Acute CardioVascular Care (ACVC), and the Heart Failure Association (HFA) of the ESC

Bettina Heidecker <sup>1,2,3,\*</sup>, Peter Libby <sup>4</sup>, Vassilios S. Vassiliou <sup>5</sup>, François Roubille <sup>6</sup>, Orly Vardeny <sup>7</sup>, Christian Hassager <sup>8,9</sup>, Michael A. Gatzoulis <sup>10</sup>, Mamas A. Mamas <sup>11</sup>, Leslie T. Cooper <sup>12</sup>, Felix Schoenrath <sup>2,13</sup>, Marco Metra <sup>14</sup>, Offer Amir <sup>15</sup>, Scott D. Solomon <sup>16</sup>, Ulf Landmesser <sup>17,18</sup>, and Thomas F. Lüscher <sup>19,20,\*</sup>

For chronic cardiovascular disease, heart failure and coronary artery disease patients

Influenza vaccination  
COVID-19 vaccination  
Pneumococcal vaccination:  
Respiratory syncytial virus vaccination  
Zoster vaccination

Heidecker B, et al. Eur Heart J. 2025;ehaf384.



Heidenreich et al. J Am Coll Cardiol. 2025 Nov 25;86(21):2085-2098

## Adult Immunizations as Part of Cardiovascular Care: 2026 ACC Concise Clinical Guidance

A Report of the American College of Cardiology Solution Set Oversight Committee

**FIGURE 2** Evidence for Respiratory Vaccine Benefit

|                               | Reduced<br>Infection /<br>Pneumonia | Reduced<br>MI | Reduced<br>Stroke | Reduced<br>HF Events | Reduced<br>CV / All-<br>Cause<br>Mortality | Other<br>Cardiac<br>Benefit | Key Studies                                                                                                                                                                                    |
|-------------------------------|-------------------------------------|---------------|-------------------|----------------------|--------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Influenza<br>Annual           | ●                                   | ●             | ●                 | ●                    | ●                                          | ●                           | Udell et al., 2013; IAMI (Fröbert et al., 2021); DANFLU-2 (Johansen et al., 2025); FLUNITY-HD (Johansen et al., 2026); Liu et al., 2022 <sup>4,10,11,12,13</sup>                               |
| Pneumococcal<br>One-time      | ●                                   | ●             | ○                 | ○                    | ●                                          | ○                           | Diao et al., 2016; Bonten et al., 2015; AUSPICE (Hure et al., 2025) <sup>24,25,26</sup>                                                                                                        |
| COVID-19<br>Updated annually  | ●                                   | ●             | ●                 | ●                    | ●                                          | ●                           | Aggarwal et al., 2020; Pellicori et al., 2021; Sindet-Pedersen et al., 2023; Altman et al., 2023; Patone et al., 2022; Zisis et al., 2022; Al-Aly et al., 2022 <sup>30,32,34,35,36,37,38</sup> |
| RSV<br>One-time ≥50 y         | ●                                   | ●             | ●                 | ●                    | ●                                          | ●                           | Surie et al., 2025; Payne et al., 2024; DAN-RSV (Lassen et al., 2025); Wee et al., 2025 <sup>45,46,47,49</sup>                                                                                 |
| Zoster<br>2-dose series ≥50 y | ○                                   | ●             | ●                 | ●                    | ●                                          | ●                           | Helm et al., 2024; Yamaoka-Tojo et al., 2024; Lee et al., 2025; Rayens et al., 2025 <sup>1,2,51,54</sup>                                                                                       |

● RCT ● Meta-Analysis of RCTs ● Observational ○ Limited Evidence Identified

# Influenza vaccine

Evidence of the Influenza vaccine benefits on cardiovascular events exist for more than 20 years

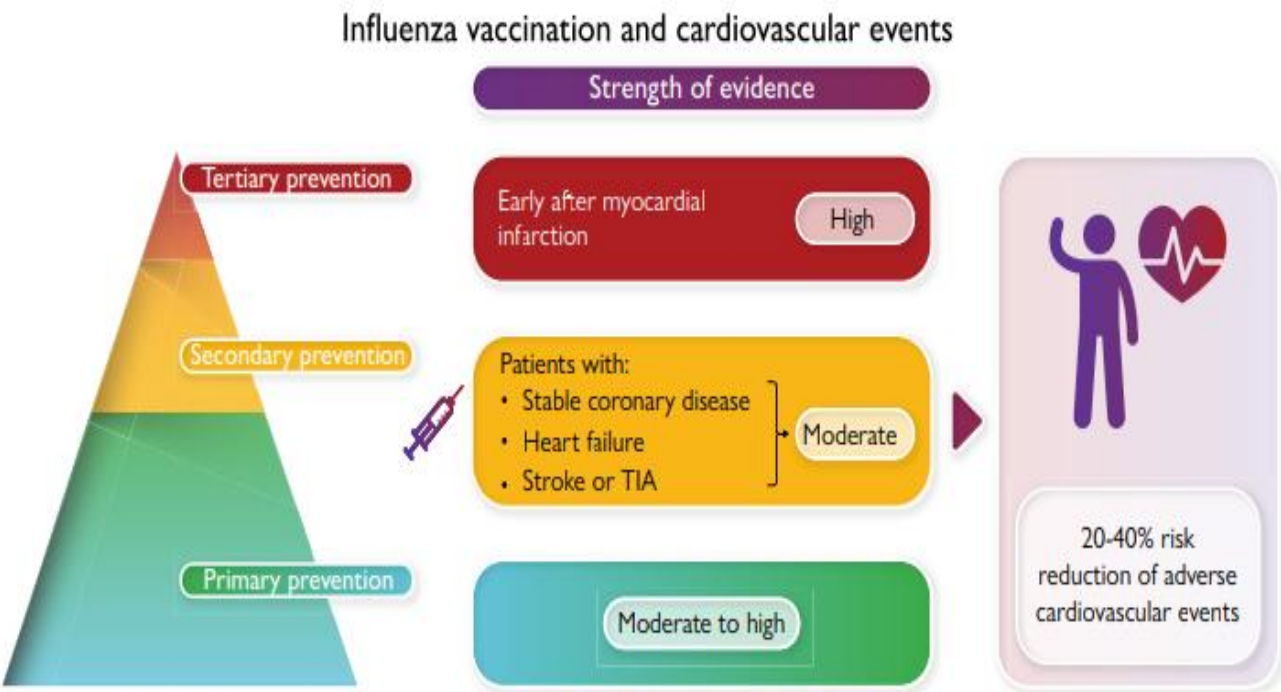


**Table 1** An overview of influenza vaccine cardiovascular outcome trials

|                  | INVESTED                                                                                     | IAMI                                                               | RC-IVVE                                              | DANFLU-1                                                                                                                     | DANFLU-2                                                                                                                                                               |
|------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Trial title      | Influenza Vaccine to Effectively Stop Cardio-Thoracic Events and Decompensated Heart Failure | Influenza Vaccination After Myocardial Infarction                  | Influenza Vaccine to Prevent Adverse Vascular Events | A Pragmatic Randomized Feasibility Trial of Influenza Vaccines                                                               | A Pragmatic Randomized Trial to Evaluate the Effectiveness of High-Dose Quadrivalent Influenza Vaccine vs Standard-Dose Quadrivalent Influenza Vaccine in Older Adults |
| Status           | Completed                                                                                    | Completed<br>Stopped early due to COVID-19 pandemic (underpowered) | Completed                                            | Completed                                                                                                                    | Recruiting                                                                                                                                                             |
| Participants     | 5260                                                                                         | 2571                                                               | 5129                                                 | 12 477                                                                                                                       | 339 700                                                                                                                                                                |
| Groups           | High dose vs standard dose influenza vaccine                                                 | Influenza vaccine vs placebo                                       | Influenza vaccine vs placebo                         | High-dose quadrivalent influenza vaccine (QIV-HD), standard-dose quadrivalent influenza vaccine (QIV-SD) (feasibility study) | High-dose quadrivalent influenza vaccine (QIV-HD), standard-dose quadrivalent influenza vaccine (QIV-SD)                                                               |
| Primary Endpoint | Time to first occurrence of all-cause death or cardiopulmonary hospitalization               | Composite endpoint of time to all-cause death, a new MI or stent   | Composite of CV death, non-fatal MI, non-fatal       | Feasibility and relative vaccine effectiveness high-dose flu vaccine                                                         | Primary outcome: Hospitalization for influenza or pneumonia                                                                                                            |

**In Chronic Coronary Disease and in Heart failure patients= IA**

|                 |                                                                                                                                                                                                                                   |                                                                                                                                                                                                        |                                                                     |                                                                                                                                                                                            |                                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Number of Sites | 190                                                                                                                                                                                                                               | 30                                                                                                                                                                                                     | 10                                                                  | Registry study, 1 main center                                                                                                                                                              | Registry                                                                                                |
| Results         | High-dose trivalent inactivated influenza vaccine vs standard-dose quadrivalent inactivated influenza vaccine did not significantly reduce all-cause mortality or cardiopulmonary hospitalizations in patients with high-risk CVD | Influenza vaccination early after MI or in high-risk CAD resulted in a lower risk of all-cause death, MI or stent thrombosis, and a lower risk of all-cause death and CV death at 12 months vs placebo | Prespecified co-primary outcomes were not statistically significant | Lower incidence of hospitalization for influenza or pneumonia and all-cause mortality in the QIV-HD group compared to the QIV-SD group (feasibility study, not powered to assess outcomes) | Recruiting                                                                                              |
| Reference       | Vardeny et al. <sup>44</sup>                                                                                                                                                                                                      | Fröbert et al. <sup>37</sup>                                                                                                                                                                           | Loeb et al. <sup>45</sup>                                           | Johansen et al. <sup>46</sup>                                                                                                                                                              | <a href="https://clinicaltrials.gov/study/NCT05517174">https://clinicaltrials.gov/study/NCT05517174</a> |
| Journal         | JAMA, 2021                                                                                                                                                                                                                        | Circulation, 2021                                                                                                                                                                                      | Lancet Global Health, 2022                                          | NEJM Evidence, 2023                                                                                                                                                                        | NA                                                                                                      |

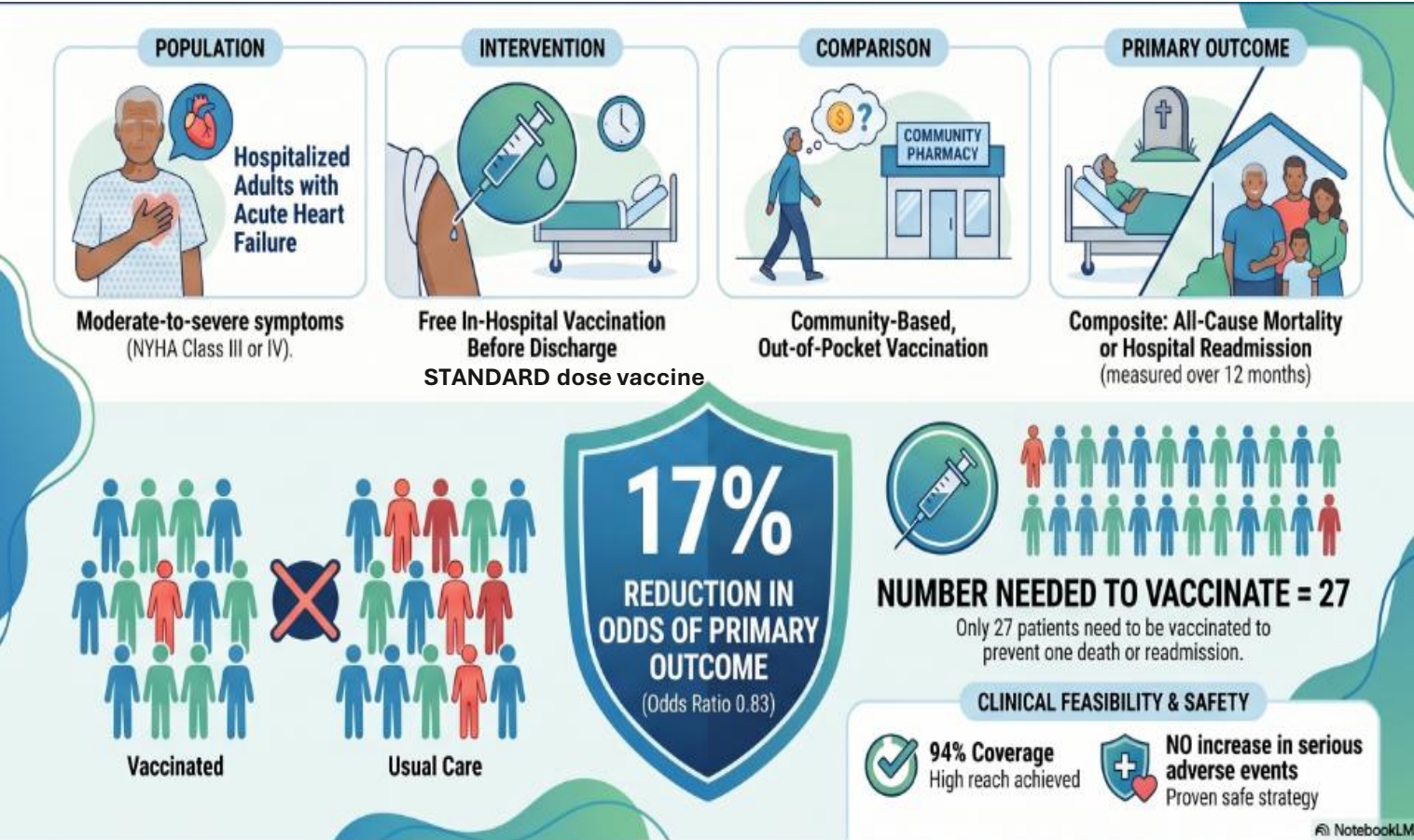
CAD, coronary artery disease; CV, cardiovascular; CVD, cardiovascular disease; MI, myocardial infarction. Modified from Behrouzi et al.<sup>34</sup>

Fröbert O, et al. Eur Heart J.2023;44:621-623.

Heidecker B, et al. Eur Heart J. 2025:ehaf384.

# Influenza vaccine

New, high level of evidence recently provided



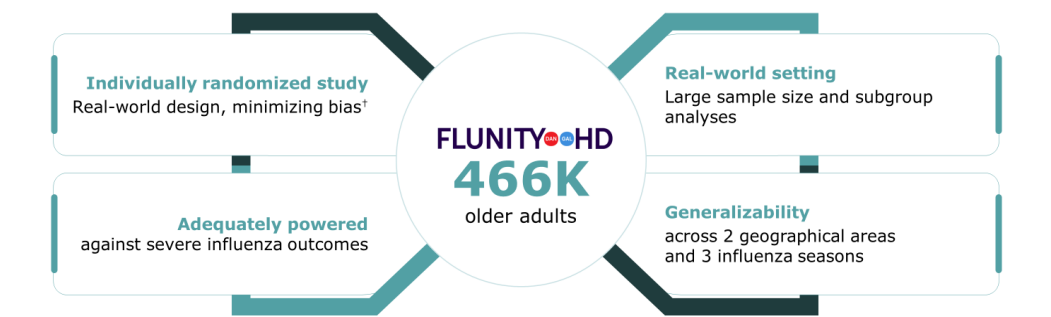
Influenza vaccination to improve outcomes for patients with acute heart failure (PANDA II): a multiregional, seasonal, hospital-based, cluster-randomised, controlled trial in China

Craig S Anderson\*, Chang Hua\*, Zhiyan Wang\*, Chi Wang\*, Chao Jiang\*, Rong Liu, Rong Han, Qiang Li, Sana Shan, Laurent Billot, C Raina Macintyre, Anushka Patel, Hongjia Zhang†, Changsheng Ma†, Jianzeng Dong†, Xin Du†

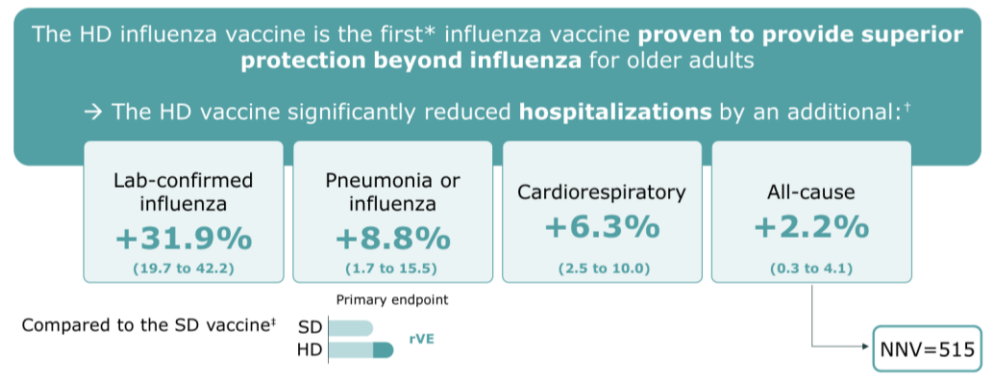
|                                                          | Influenza vaccination (n=3570) | Usual care (n=4201) | Effect size (95% CI)                           | p value                 | Adjusted p value* |
|----------------------------------------------------------|--------------------------------|---------------------|------------------------------------------------|-------------------------|-------------------|
| <b>Primary outcome</b>                                   |                                |                     |                                                |                         |                   |
| All-cause mortality or hospital readmission at 12 months | 1378/3342 (41.2%)              | 1843/3919 (47.0%)   | OR 0.83 (0.72 to 0.97); RR 0.90 (0.86 to 0.94) | OR: 0.019; RR: <0.0001† | ..                |
| Adjusted mortality or hospital admission at 12 months†   | 1243/3037 (40.9%)              | 1614/3487 (46.3%)   | OR 0.85 (0.72 to 0.99)                         | 0.042                   | ..                |
| Cluster level regression of primary outcome incidences‡  | 0.40 (0.11); n=77              | 0.46 (0.14); n=87   | -0.037 (-0.073 to -0.002)                      | 0.037                   | ..                |
| <b>Secondary outcomes</b>                                |                                |                     |                                                |                         |                   |
| All-cause mortality at 12 months                         | 335/3342 (10.0%)               | 500/3919 (12.8%)    | OR 0.76 (0.69 to 0.84)                         | <0.0001                 | 0.0005            |
| Hospital readmission at 12 months                        | 1182/3342 (35.4%)              | 1587/3919 (40.5%)   | OR 0.83 (0.70 to 0.99)                         | 0.037                   | 0.060             |
| All-cause mortality or hospitalisation at 6 months       | 1018/3449 (29.5%)              | 1393/4010 (34.7%)   | OR 0.84 (0.72 to 0.97)                         | 0.018                   | 0.053             |
| All-cause mortality at 6 months                          | 263/3449 (7.6%)                | 398/4010 (9.9%)     | OR 0.74 (0.61 to 0.90)                         | 0.0025                  | 0.010             |
| Hospital readmission at 6 months                         | 882/3449 (25.6%)               | 1213/4010 (30.2%)   | OR 0.83 (0.70 to 0.98)                         | 0.030                   | 0.060             |
| <b>Serious adverse events during follow-up</b>           |                                |                     |                                                |                         |                   |
| Events reported                                          | 2863                           | 4113                | ..                                             | ..                      | ..                |
| Patients with at least one event                         | 1809/3444 (52.5%)              | 2426/4110 (59.0%)   | OR 0.82 (0.70 to 0.96)                         | 0.013                   | ..                |
| Sites with at least one event§                           | 0.52 (0.14); n=77              | 0.58 (0.14); n=87   | -0.042 (-0.079 to -0.004)                      | 0.030                   | ..                |

# Influenza vaccine

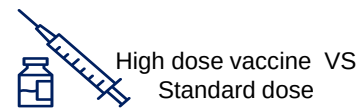
New, high level of evidence recently provided



The largest individually randomized influenza vaccine effectiveness study to date



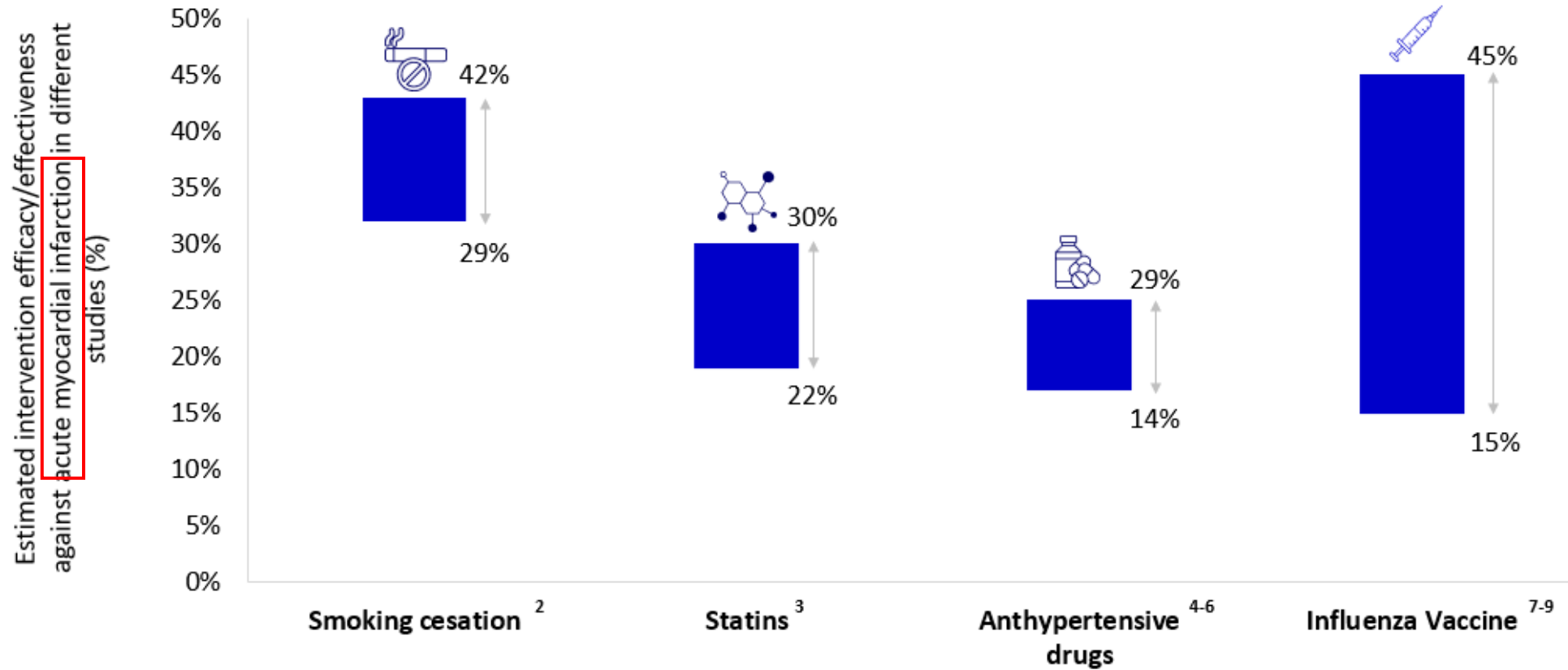
Johansen ND, et al. Lancet. 2025 Nov 22;406(10518):2425-2434.



| n (%)                                                     | HD-IIV<br>(n = 233,311) | SD-IIV<br>(n = 233,009) | Crude rVE<br>(95% CI)     | P value | Number needed to<br>vaccinate (95% CI) |
|-----------------------------------------------------------|-------------------------|-------------------------|---------------------------|---------|----------------------------------------|
| Hospitalization for <b>any cardio-respiratory disease</b> | 4720 (2.02)             | 5033 (2.16)             | <b>6.3 (2.5 to 10.0)</b>  | 0.001   | 730 (463 to 1832)                      |
| Hospitalization for <b>any cardiovascular disease</b>     | 2692 (1.15)             | 2880 (1.24)             | <b>6.6 (1.6 to 11.5)</b>  | 0.010   | 1217 (706 to 5126)                     |
| Hospitalization for any respiratory disease               | 2139 (0.92)             | 2284 (0.98)             | <b>6.5 (0.7 to 11.9)</b>  | 0.027   | 1577 (860 to 13,703)                   |
| Hospitalization for <b>heart failure</b>                  | 267 (0.11)              | 339 (0.15)              | <b>21.3 (7.4 to 33.2)</b> | 0.003   | 3221 (2067 to 9308)                    |
| Hospitalization for <b>myocardial infarction</b>          | 369 (0.16)              | 346 (0.15)              | -6.5 (-23.7 to 8.3)       | 0.27    | NA                                     |
| Hospitalization for <b>atrial fibrillation</b>            | 812 (0.35)              | 856 (0.37)              | 5.3 (-4.4 to 14.0)        | 0.27    | NA                                     |
| Hospitalization for stroke                                | 545 (0.23)              | 574 (0.25)              | 5.2 (-6.8 to 15.8)        | 0.39    | NA                                     |
| <b>MACE</b>                                               | 1227 (0.53)             | 1240 (0.53)             | 1.2 (-7.0 to 8.8)         | 0.78    | NA                                     |
| MACE (alternate definition)                               | 1463 (0.63)             | 1537 (0.66)             | 4.9 (-2.2 to 11.6)        | 0.17    | NA                                     |
| Cardiovascular death                                      | 360 (0.15)              | 352 (0.15)              | -2.1 (-18.6 to 12.1)      | 0.79    | NA                                     |

Regardless of prior CVD

# Influenza vaccine MI



Percentages are derived from multiple sources, as there is no head-to-head comparison; CV, cardiovascular.

1. Heidecker B, et al. *Eur Heart J*. 2025;00:1–14; 2. Critchley J, Capewell S. *Cochrane Database Syst Rev* 2003;(4):CD003041 ; 3. Afilalo J, et al. *J Am Coll Cardiol*. 2008;51:37–45; 4. Yusuf S, et al. *Lancet*. 1992;340:1173–8. 5. Yusuf S, et al. *N Engl J Med*. 2000;342:145–53; 6. Ferrari R, et al. *Expert Rev Cardiovasc Ther*. 2007 Nov;5(6):1037-46; 7. Warren-Gash C, et al. *Lancet Infect Dis* 2009;9:601–10; 8. MacIntyre CR, et al. *Heart* 2013;99:1843–8 ; 9. Clayton T. *Heart*. 2005;91:1601–2. 10. Heidenreich PA, et al. *Journal of the American College of Cardiology*. 2025;86(21):2085-98.

# Influenza vaccine (HD) heart failure

## FLUNITY<sup>1</sup> HD

rVE for hospitalisation for heart failure (HF) for HD-IIV<sup>‡</sup> compared to SD-IIV<sup>‡</sup> among adults aged ≥65 years (n=466,320 patients<sup>§</sup>)

HD-IIV<sup>‡</sup>



rVE (95% CI)

21.3% ↓  
(7.4 to 33.2)

## DAPA-HF<sup>2</sup>

Hazard ratio for first HF hospitalisation with dapagliflozin compared with placebo among patients with NYHA class II–IV<sup>¶</sup> HF and LVEF ≤40% (n=4,744 patients)

Dapagliflozin



Hazard ratio (95% CI)

30% ↓  
(0.70 (0.59–0.83))

## PARADIGM-HF<sup>3</sup>

Hazard ratio for first hospitalisation for worsening HF with sacubitril/valsartan compared with enalapril among patients with NYHA class II–IV<sup>¶</sup> HF and LVEF ≤40% (n= 8,442 patients)

Sacubitril/  
valsartan



Hazard ratio (95% CI)

21.8% ↓  
(0.79 (0.71–0.89))

\*Regardless of HF history; <sup>‡</sup>Disclaimer: This is a **non-head-to-head, cross-study comparison**. Data are derived from independent studies with different designs, populations, and endpoints; <sup>§</sup>Fluzone<sup>®</sup> High-Dose Quadrivalent/Efluelda<sup>®</sup>/Efluelda Tetra<sup>®</sup> [Sanofi] containing 60 µg of haemagglutinin antigen per strain; <sup>¶</sup>Vaxigrip Tetra [Sanofi] in DANFLU-2; Influvac Tetra [Viatris] in GALFLU containing 15 µg of haemagglutinin per strain; <sup>§</sup>A history of CVD was present in 107 700 (23.1%) participants, of whom 54,061 (50.2%) were allocated to HD-IIV and 53,639 (49.8%) to SD-IIV; <sup>¶</sup>Click here to know more: [NYHA class II-IV](#)

CI: confidence interval; CV: cardiovascular; HF: heart failure; HD-IIV: high-dose inactivated influenza vaccine; LVEF: left ventricular ejection fraction; NYHA: New York Heart Association; SD-IIV, egg-based unadjuvanted standard-dose inactivated influenza vaccine; RRR: relative risk reduction; rVE: relative vaccine effectiveness

# COVID-19 vaccine

COVID-19 is associated with diverse cardiovascular event even now ,  
COVID-19 vaccination continue to reduce the risk of hospitalization and mortality  
Reduce the risk of acute myocardial infarction in nationwide studies

## Association Between Vaccination and Acute Myocardial Infarction and Ischemic Stroke After COVID-19 Infection

Population-based study from the Korean nationwide COVID-19 registry on infection and vaccination and the Korean National Health Insurance Service

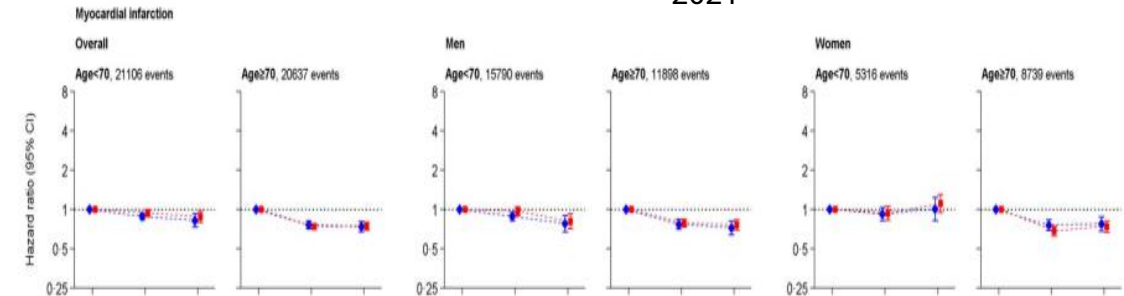
Table 2. Risk for Cardiovascular Events by Vaccination Status

|                             | No. of events               |                                | Incidence per 1 000 000 person-days |                  |                      |  | P value |
|-----------------------------|-----------------------------|--------------------------------|-------------------------------------|------------------|----------------------|--|---------|
|                             | Not vaccinated (n = 62 727) | Fully vaccinated (n = 168 310) | Not vaccinated                      | Fully vaccinated | Adjusted HR (95% CI) |  |         |
| Composite outcome           | 31                          | 74                             | 6.18                                | 5.49             | 0.42 (0.29-0.62)     |  | <.001   |
| Acute myocardial infarction | 8                           | 24                             | 1.60                                | 1.78             | 0.48 (0.25-0.94)     |  | .03     |
| Ischemic stroke             | 23                          | 50                             | 4.59                                | 3.71             | 0.40 (0.26-0.63)     |  | <.001   |
| Age, y                      |                             |                                |                                     |                  |                      |  |         |
| 40-64                       | 11                          | 22                             | 5.48                                | 3.39             | 0.38 (0.20-0.74)     |  | .004    |
| ≥65                         | 20                          | 51                             | 33.99                               | 12.42            | 0.41 (0.26-0.66)     |  | <.001   |

Kim YE, et al., JAMA. 2022 Sep 6;328(9):887-889.

Association of COVID-19 vaccines ChAdOx1 and BNT162b2 with major venous, arterial, or thrombocytopenic events: A population-based cohort study of 46 million adults in England

whole-population cohort study, adults living in England, from 8 December 2020 to 18 March 2021



-Risk of myocardial infarction >28 days post-vaccination with BNT162b2 among persons below 70 years of age [adjusted HR (aHR) 0.88; 95% CI: 0.80–0.97] and above 70 years of age (aHR 0.75; 95% CI: 0.70–0.80) compared with unvaccinated individuals.

- ChAdOx1-S (Aztazeneca) vaccination among persons below 70 years of age (aHR 0.83; 95% CI: 0.73–0.93) and above 70 years of age (aHR 0.74; 95% CI: 0.68–0.81) compared with unvaccinated individuals

# COVID-19 vaccine

Table 2. Estimated Vaccine Effectiveness on COVID-19–Associated Major Adverse Cardiovascular Events (MACEs), Risk Difference, and Absolute Risks at 8 Months in the COVID-19 Vaccine Group Compared to the No COVID-19 Vaccine Group During the 2024-2025 Season<sup>a</sup>

Miao Cai, PhD; Yan Xie, PhD; Ziyad Al-Aly, MD

| COVID-19–associated outcome       | Vaccine effectiveness, % <sup>b</sup> | Per 10 000 individuals (95% CI) |                          |                             |
|-----------------------------------|---------------------------------------|---------------------------------|--------------------------|-----------------------------|
|                                   |                                       | Risk difference <sup>c</sup>    | Risk in COVID-19 vaccine | Risk in no COVID-19 vaccine |
| MACE                              | 37.7 (18.2 to 54.9)                   | 2.04 (0.85 to 3.65)             | 3.37 (2.79 to 4.07)      | 5.43 (4.36 to 6.91)         |
| Cardiovascular death              | 57.9 (25.2 to 78.2)                   | 1.03 (0.31 to 2.12)             | 0.76 (0.51 to 1.16)      | 1.81 (1.19 to 2.86)         |
| Myocardial infarction             | 38.5 (4.3 to 62.3)                    | 0.79 (0.08 to 1.85)             | 1.27 (0.95 to 1.74)      | 2.09 (1.46 to 3.06)         |
| Stroke                            | 30.6 (−24.7 to 64.3)                  | 0.36 (−0.22 to 1.21)            | 0.85 (0.58 to 1.26)      | 1.23 (0.77 to 2.04)         |
| Hospitalization for heart failure | 41.9 (4.1 to 67.5)                    | 0.84 (0.06 to 2.07)             | 1.16 (0.83 to 1.61)      | 2.01 (1.36 to 3.29)         |

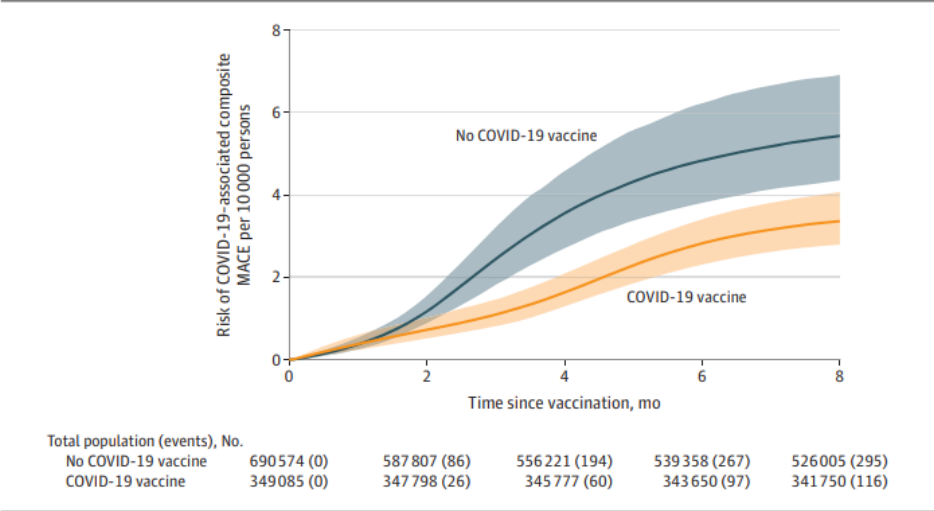
Confidence intervals were not adjusted for multiplicity and should not be interpreted as hypothesis tests.

<sup>a</sup> Models adjusted for both baseline characteristics through baseline inverse probability weights and inverse probability of censoring weight (using both baseline characteristics and time updated characteristics) adjusting for censoring due to COVID-19 vaccine during the follow-up in the no COVID-19 vaccine group.

<sup>b</sup> Vaccine effectiveness is defined as 1 minus the risk ratio (the risk in the COVID-19 vaccine group divided by the risk in the no COVID-19 vaccine group). The risk differences and risks were estimated per 10 000 persons at 8 months (240 days).

<sup>c</sup> Risk difference is measured as the risk in the no COVID-19 vaccine group minus the risk in the COVID-19 vaccine group.

Figure 1. Line Graph of Cumulative Risks of COVID-19–Associated Composite Major Adverse Cardiovascular Events (MACEs) During 8 Months of the 2024-2025 Vaccination Season

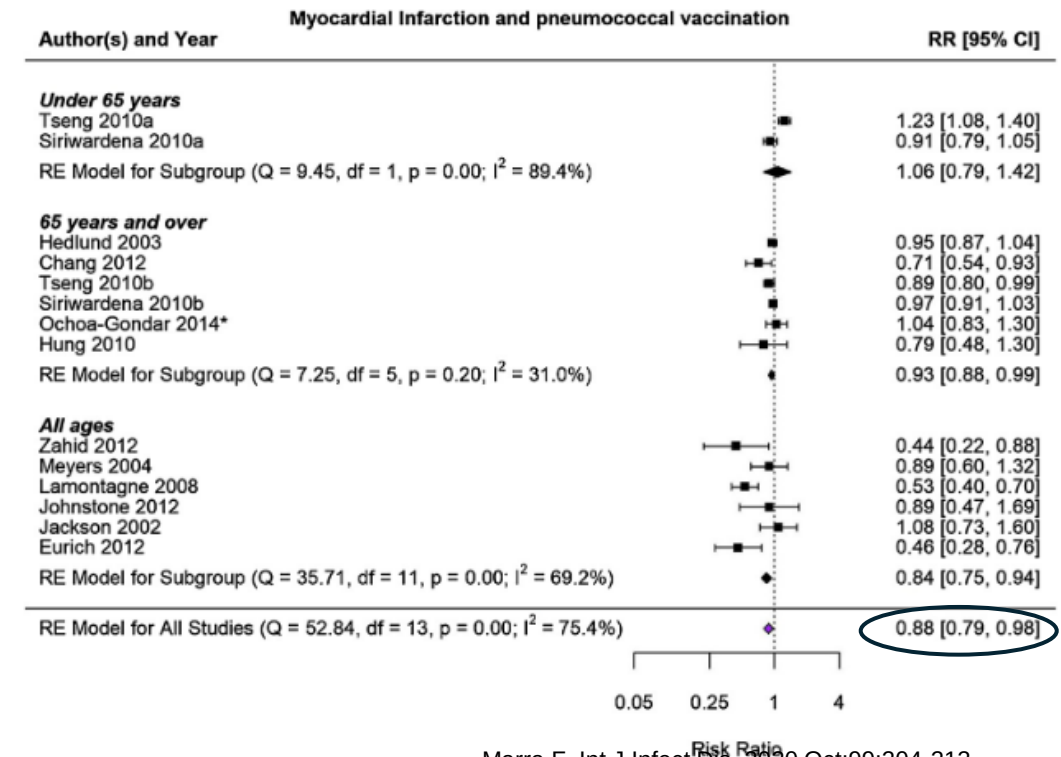
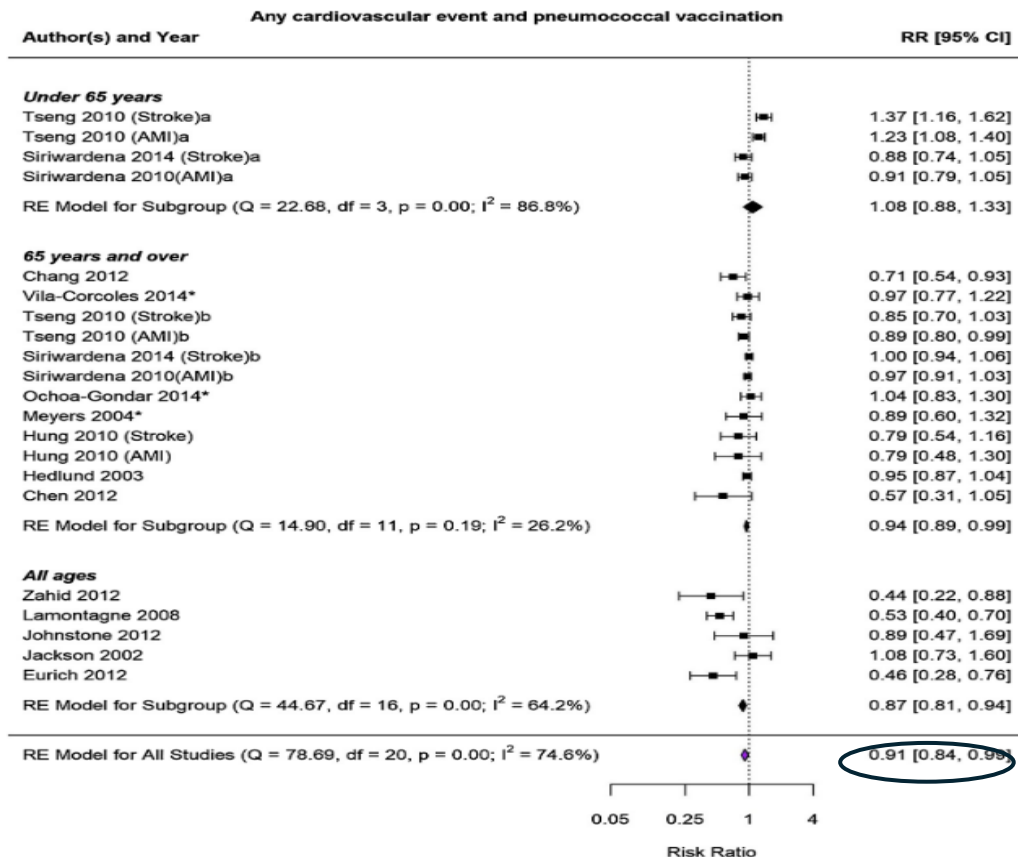


The composite MACE outcome was defined as the first occurrence of any of the 4 COVID-19–associated outcomes (cardiovascular death, myocardial infarction, stroke, or hospitalization for heart failure). The COVID-19 vaccine group received same-day coadministration of the 2024-2025 COVID-19 vaccine and the 2024-2025 seasonal influenza vaccine; the no COVID-19 vaccine group received only the 2024-2025 seasonal influenza vaccine.

# Pneumococcus vaccine

Beyond impact on hospitalization and mortality, pneumococcal vaccination shows benefits on CV outcomes

Evidence come from meta-analysis of 14 cohort studies and 4 cases control studies with PPSV 23



Marra F, Int J Infect Dis. 2020 Oct;99:204-213.

# Pneumococcus vaccine

Beyond impact on hospitalization and mortality, pneumococcal vaccination shows benefits on CV outcomes

Evidence come from RCT, primary prevention

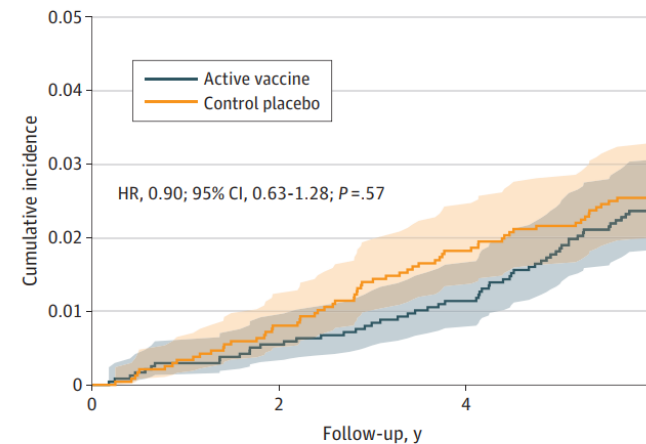
Table 2. Australian Study for the Prevention Through Immunization of Cardiovascular Events (AUSPICE) Primary Composite Outcome and Individual Outcomes by Treatment Allocation With Corresponding Hazard Ratios (HRs)

| Outcome                                                                                 | No.               |                    | HR (95% CI)      | P value |
|-----------------------------------------------------------------------------------------|-------------------|--------------------|------------------|---------|
|                                                                                         | Active (n = 2366) | Control (n = 2357) |                  |         |
| Primary outcome                                                                         |                   |                    |                  |         |
| Fatal and nonfatal cardiac events (I20.0, I21)                                          | 50                | 58                 | 0.85 (0.59-1.29) | .42     |
| Fatal and nonfatal stroke events (I63)                                                  | 11                | 6                  | 1.83 (0.68-4.94) | .23     |
| Total adverse cardiovascular events                                                     | 58                | 64                 | 0.90 (0.63-1.28) | .57     |
| All-cause mortality                                                                     | 26                | 24                 | 1.08 (0.62-1.88) | .79     |
| Sensitivity analysis                                                                    |                   |                    |                  |         |
| Fatal and nonfatal cardiac events plus additional cardiac events (I22-I25)              | 115               | 106                | 1.08 (0.83-1.43) | .55     |
| Fatal and nonfatal stroke events plus additional stroke events (I61, I64-I69, I74, H34) | 18                | 15                 | 1.20 (0.60-2.37) | .61     |
| Total composite (primary + additional events)                                           | 130               | 120                | 1.08 (0.84-1.39) | .54     |
| Revascularization procedures                                                            |                   |                    |                  |         |
| Cardiac procedures (angiography/angioplasty/bypass)                                     | 131               | 108                | 1.21 (0.96-1.56) | .14     |
| Cerebral procedures (endarterectomy/embolectomy)                                        | 3                 | 1                  | NA <sup>a</sup>  | NA      |
| Total revascularization procedures                                                      | 133               | 108                | 1.23 (0.96-1.59) | .11     |

JAMA Cardiology | Original Investigation

## Prevention of Adverse Cardiovascular Events Using the 23-Valent Pneumococcal Polysaccharide Vaccine A Randomized Clinical Trial

Figure 2. Cumulative Incidence Function Plots



Plots for Australian Study for the Prevention Through Immunization of Cardiovascular Events (AUSPICE) primary outcome (composite of fatal and nonfatal cardiac and cerebral events), including CIs, are arranged by treatment allocation.

Participants: **adults 55 to 60 years of age** at baseline in 2016 to 2017, with **at least 2 risk factors (obesity, hypertension, or hypercholesterolemia)** for cardiovascular disease (CVD) but **no prior CVD** event or indication for early pneumococcal vaccination

**Under powered**

# Pneumococcus vaccine

Beyond impact on hospitalization and mortality, pneumococcal vaccination shows benefits on CV outcomes

Evidence come from open label RCT, PPSV 23

## Aims and background

Pneumococcal vaccination rates are alarmingly low among HF patients

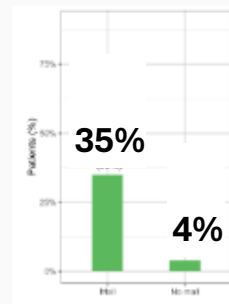
- Evaluate the impact of an incentive letter campaign
- Identify characteristics of patients and GPs associated with greater receptiveness to incentive letter

## Methods

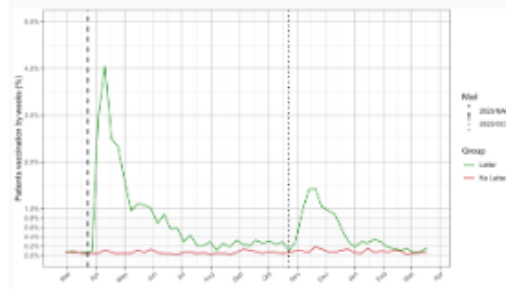
- Design** — Open label RCT, two arms (1:1)
- Population** — GPs and theirs related patients with chronic HF
- Intervention** — GPs and their patients received two vaccination incentive letters  
The control group was only observed
- Data** — French health insurance database

## Results

Vaccination rate at one year



Trends in vaccinations by mail group



Vaccination rate increased with male patients, female GP, previous influenza vaccination but decreased in younger (<70 years) and older patient age (>85 years).

**Conclusion:** Mail-in promotion at large scale in patients with HF is effective to increase the pneumococcal vaccination coverage.

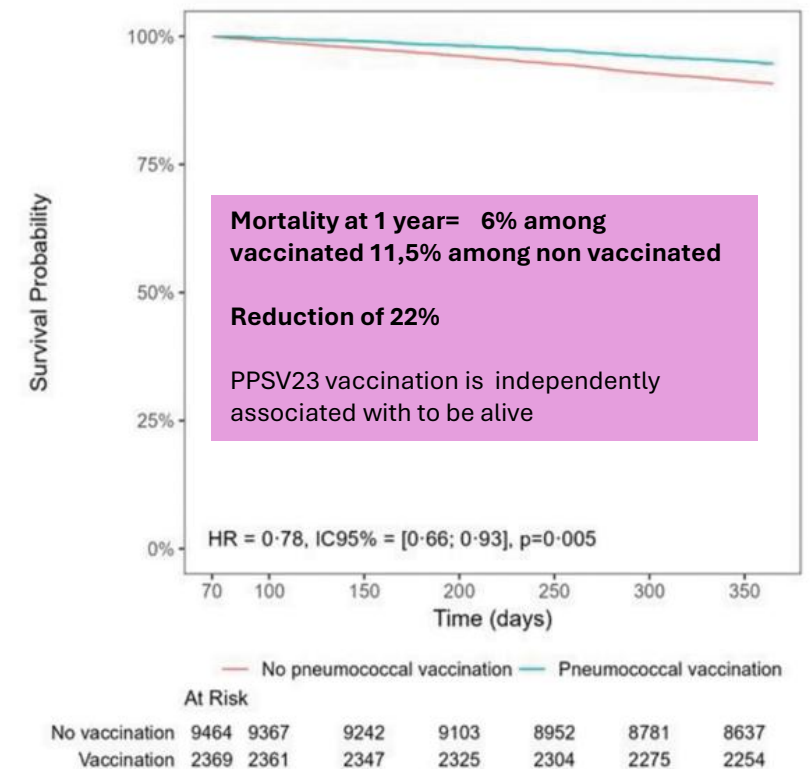
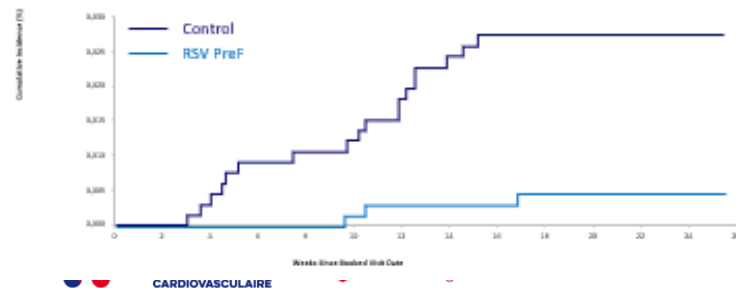
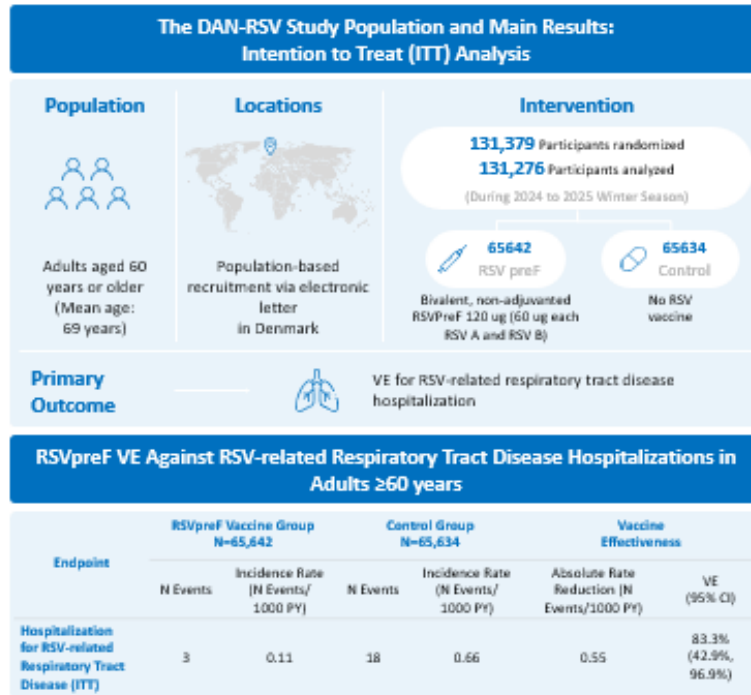


Fig. 1 Simon-Makuch plot of survival of overall survival for vaccination status (conditioned at time = 70 days).

# RSV vaccine

RSV is associated with an important burden in adults, increase risk of CV events,  
Now there are 3 new, highly effective vaccines available



| <div>Endpoint</div> <div></div>               | RSVpreF Vaccine Group |                                    | Control Group |                                    | Vaccine Effectiveness                      |                      | P-Value |
|---------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------|---------------|------------------------------------|--------------------------------------------|----------------------|---------|
|                                                                                                                                 | N Events              | Incidence Rate (N Events/ 1000 PY) | N Events      | Incidence Rate (N Events/ 1000 PY) | Absolute Rate Reduction (N Events/1000 PY) | VE (95% CI)          |         |
| Secondary Objectives                                                                                                            |                       |                                    |               |                                    |                                            |                      |         |
| Hospitalization for RSV-related Lower Respiratory Tract Disease                                                                 | 1                     | 0.04                               | 12            | 0.44                               | 0.40                                       | 91.7% (43.7%, 99.8%) | 0.009   |
| RSV-related Hospitalizations (ICD-10 Coded)                                                                                     | 1                     | 0.04                               | 8             | 0.29                               | 0.25                                       | 87.5% (6.8%, 99.7%)  |         |
| RSV-related Cardio-respiratory Disease Hospitalization                                                                          | 3                     | 0.11                               | 19            | 0.70                               | 0.59                                       | 84.2% (46.4%, 97.0%) |         |
| All-cause Respiratory Tract Disease Hospitalization                                                                             | 284                   | 10.42                              | 335           | 12.29                              | 1.87                                       | 15.2% (0.5%, 27.9%)  | 0.04    |
| All-cause Lower Respiratory Tract Disease Hospitalization <sup>9</sup>                                                          | 236                   | 8.65                               | 298           | 10.92                              | 2.27                                       | 20.8% (5.8%, 33.6%)  |         |
| All-cause Cardio-respiratory Hospitalization                                                                                    | 715                   | 26.32                              | 794           | 29.22                              | 2.90                                       | 9.9% (0.3%, 18.7%)   |         |
| Overall, absolute rate reductions for all-cause are greater than for RSV-related, suggesting that RSV disease is under-detected |                       |                                    |               |                                    |                                            |                      |         |

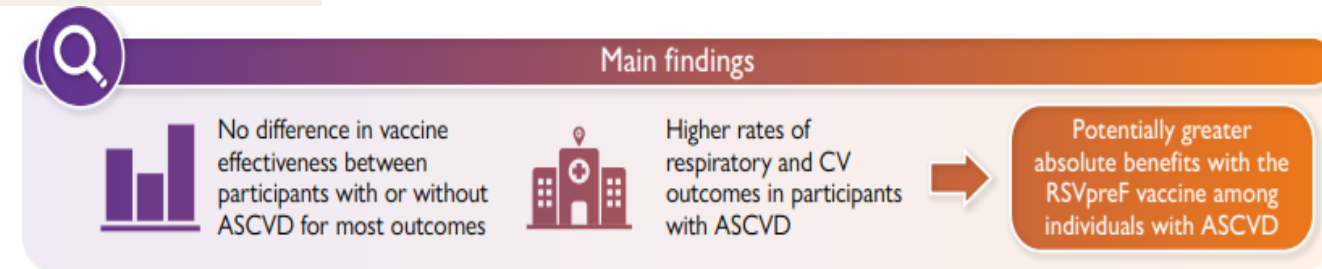
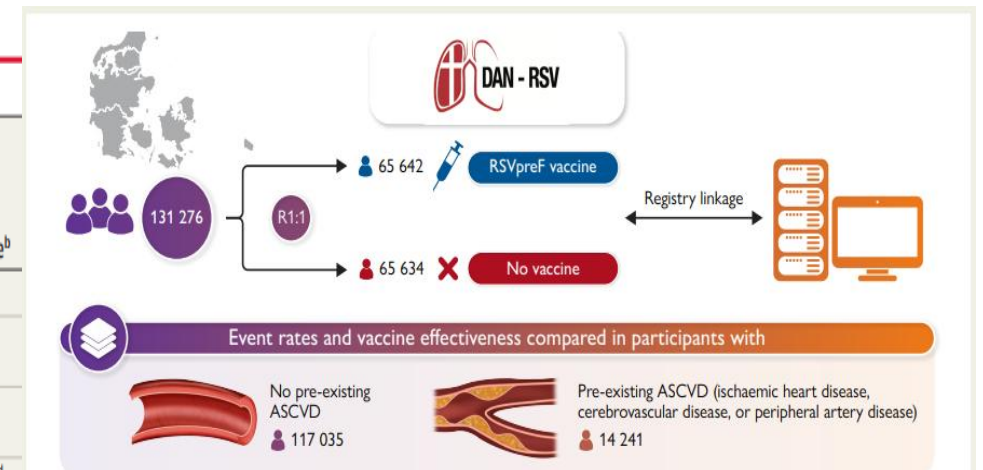
# RSV vaccine

RSV is associated with an important burden in adults, increase risk of CV outcomes, 3 new vaccines, highly effective

## Data from DAN-RSV trial

Table 2. Vaccine Effectiveness Against Cardiovascular Outcomes in the Overall Population

| End points                                              | RSVpreF vaccine                       |                           |                                                 | No vaccine                            |                           |                                                 | Vaccine effectiveness                                           |                                      |                      |
|---------------------------------------------------------|---------------------------------------|---------------------------|-------------------------------------------------|---------------------------------------|---------------------------|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------|----------------------|
|                                                         | No. of events/<br>No. of participants | Total<br>follow-up,<br>PY | Incidence rate,<br>No. of events<br>per 1000 PY | No. of events/<br>No. of participants | Total<br>follow-up,<br>PY | Incidence rate,<br>No. of events<br>per 1000 PY | Absolute rate reduction<br>per 1000 PY<br>(95% CI) <sup>a</sup> | Vaccine effectiveness, %<br>(95% CI) | P value <sup>b</sup> |
| <b>Secondary outcomes<sup>c</sup></b>                   |                                       |                           |                                                 |                                       |                           |                                                 |                                                                 |                                      |                      |
| All-cause cardiorespiratory hospitalization             | 715/65 642                            | 27 167                    | 26.32                                           | 794/65 634                            | 27 171                    | 29.22                                           | 2.90 (0.10 to 5.71)                                             | 9.9 (0.3 to 18.7)                    | .04                  |
| All-cause respiratory hospitalization                   | 284/65 642                            | 27 257                    | 10.42                                           | 335/65 634                            | 27 268                    | 12.29                                           | 1.87 (0.08 to 3.65)                                             | 15.2 (0.5 to 27.9)                   | .04                  |
| RSV-related cardiorespiratory hospitalization           | 3/65 642                              | 27 320                    | 0.11                                            | 19/65 634                             | 27 330                    | 0.70                                            | 0.59 (0.25 to 0.92)                                             | 84.2 (46.4 to 97.0)                  | <.001 <sup>d</sup>   |
| <b>Exploratory outcomes</b>                             |                                       |                           |                                                 |                                       |                           |                                                 |                                                                 |                                      |                      |
| All-cause cardiovascular hospitalization                | 447/65 642                            | 27 228                    | 16.42                                           | 483/65 634                            | 27 233                    | 17.74                                           | 1.32 (−0.88 to 3.52)                                            | −7.8 (−15.5 to 0.0)                  | .08                  |
| Heart failure hospitalization                           | 45/65 642                             | 27 312                    | 1.65                                            | 43/65 634                             | 27 326                    | 1.57                                            | −0.08 (−0.74 to 0.58)                                           | −4.8 (−10.5 to 0.8)                  | .45                  |
| Myocardial infarction                                   | 54/65 642                             | 27 310                    | 1.98                                            | 55/65 634                             | 27 323                    | 2.01                                            | 0.03 (−0.71 to 0.77)                                            | −1.5 (−5.2 to 2.2)                   | .92                  |
| Stroke hospitalization                                  | 83/65 642                             | 27 305                    | 3.04                                            | 103/65 634                            | 27 312                    | 3.77                                            | 0.73 (−0.25 to 1.71)                                            | −20.3 (−29.5 to −11.1)               | .002                 |
| Atrial fibrillation (any hospital contact) <sup>e</sup> | 1150/65 642                           | 27 063                    | 42.49                                           | 1124/65 634                           | 27 086                    | 41.50                                           | −0.99 (−4.45 to 2.47)                                           | −2.3 (−6.8 to 2.2)                   | .32                  |



ASCVD, atherosclerotic cardiovascular disease; CV, cardiovascular; R, randomization; RSVpreF, bivalent RSV prefusion F protein-based

Pareek M, et al. *European Heart Journal*.

# Zoster vaccine

Zoster is associated with a higher risk of CV events, Recombinant zoster and live Zoster vaccines are associated with a lower risk of CV events in large retrospective cohorts studies (~20%)

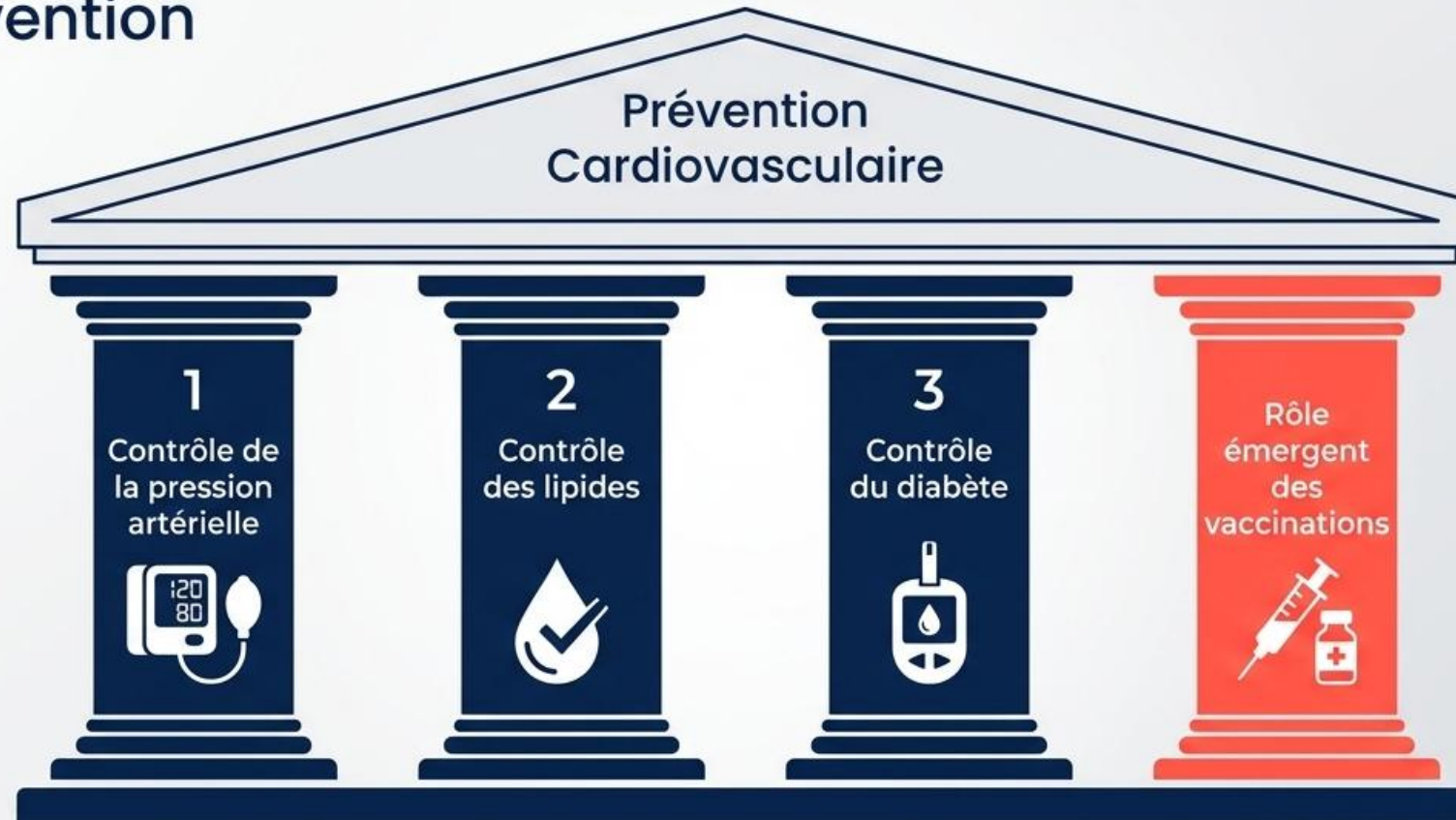
- Using the TriNetX network, a propensity matched analysis compared 7657 recipients of the recombinant vaccine with an equal number of unvaccinated individuals. At three years of follow-up, vaccinated individuals had a lower risk of acute myocardial infarction (RR 0.73, 95% CI 0.5-0.96; p<0.05)
- In a retrospective cohort study using the Optum Labs Data Warehouse. Adults aged ≥50 years with HZ diagnosed between 1 January 2018 and 31 March 2023 were included. Patients that received RZV alone have a reduced the CVD risk of 21% (95% confidence interval, 6%–33%)
- Insurance data from Korea, shown that live zoster vaccination was associated with lower risks of overall cardiovascular events [HR 0.77, 95% confidence interval (CI) 0.76-0.78], particularly major adverse cardiovascular events [0.74 (0.71-0.77)], heart failure [0.74 (0.70-0.77)], cerebrovascular disorders [0.76 (0.74-0.78)], ischaemic heart disease [0.78 (0.76-0.80)], thrombotic disorders [0.78 (0.74-0.83)], and dysrhythmia [0.79 (0.77-0.81)].

Helm MF, et al., J Drugs Dermatol. 2023 Dec 1;22(12):1178-1182.  
Xu X, et al., J Infect Dis. 2025 Aug 14;232(2):465-473.  
Lee S, et al., Eur Heart J. 2025 Aug 8;46(30):2991-3002.

Retrospective cohort study, Propensity score matching, USA, diabetic patients

|                                                                  | Exposure group |              | Comparison |              |                     |         |
|------------------------------------------------------------------|----------------|--------------|------------|--------------|---------------------|---------|
|                                                                  | n              | No. of event | n          | No. of event | HR (95% CI)         | P value |
| Any HZ vaccine versus no HZ vaccine (model 1 matched population) |                |              |            |              |                     |         |
| MACE                                                             | 45958          | 3474         | 45958      | 4060         | 0.76 (0.72 to 0.79) | <0.001  |
| Coronary artery disease                                          | 45958          | 1902         | 45958      | 2331         | 0.73 (0.69 to 0.78) | <0.001  |
| Stroke                                                           | 45958          | 1863         | 45958      | 2116         | 0.79 (0.74 to 0.84) | <0.001  |
| All-cause mortality                                              | 45958          | 2793         | 45958      | 4794         | 0.54 (0.52 to 0.57) | <0.001  |
| Shingrix versus no HZ vaccine (model 2 matched population)       |                |              |            |              |                     |         |
| MACE                                                             | 14142          | 858          | 14142      | 1294         | 0.84 (0.76 to 0.91) | <0.001  |
| Coronary artery disease                                          | 14142          | 468          | 14142      | 770          | 0.78 (0.69 to 0.88) | <0.001  |
| Stroke                                                           | 14142          | 445          | 14142      | 650          | 0.87 (0.77 to 0.99) | 0.035   |
| All-cause mortality                                              | 14142          | 569          | 14142      | 1561         | 0.53 (0.48 to 0.58) | <0.001  |
| Zostavax versus no HZ vaccine (model 3 matched population)       |                |              |            |              |                     |         |
| MACE                                                             | 11285          | 1674         | 11285      | 1030         | 0.81 (0.75 to 0.88) | <0.001  |
| Coronary artery disease                                          | 11285          | 910          | 11285      | 616          | 0.72 (0.65 to 0.80) | <0.001  |
| Stroke                                                           | 11285          | 952          | 11285      | 530          | 0.90 (0.81 to 1.01) | 0.065   |
| All-cause mortality                                              | 11285          | 1496         | 11285      | 1203         | 0.58 (0.53 to 0.62) | <0.001  |
| Shingrix versus Zostavax (model 4 matched population)            |                |              |            |              |                     |         |
| MACE                                                             | 10505          | 615          | 10505      | 1574         | 1.09 (0.98 to 1.21) | 0.104   |
| Coronary artery disease                                          | 10505          | 335          | 10505      | 859          | 1.16 (1.01 to 1.34) | 0.036   |
| Stroke                                                           | 10505          | 310          | 10505      | 900          | 0.96 (0.83 to 1.11) | 0.582   |
| All-cause mortality                                              | 10505          | 378          | 10505      | 1400         | 0.99 (0.87 to 1.12) | 0.824   |

# Le nouveau paradigme : la vaccination comme 4ème pilier de la prévention



Au-delà de la prévention stricte de l'infection, les vaccins exercent un effet protecteur profond sur le risque cardiovasculaire global.

# Impact des vaccins sur la démence

# Vaccin grippe

- Réduction risque de démence:

- Vaccin antigrippal
- Aucun RCT, 8 études de cohorte ~ 10 000 000 sujets
- Dans la population à risque de démence

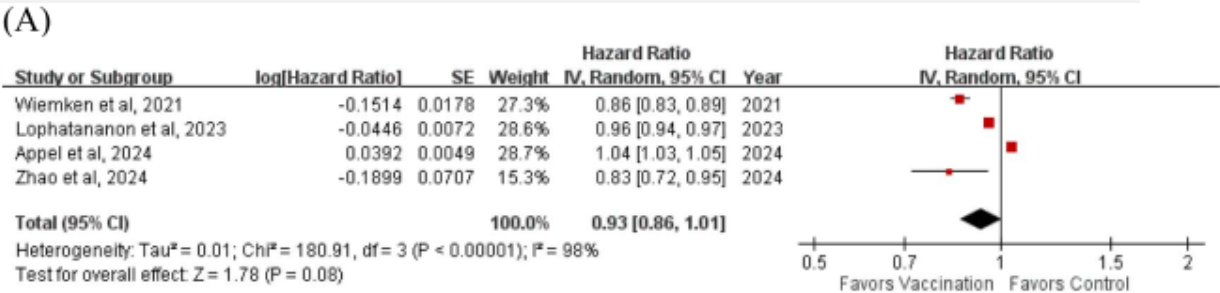
JOURNAL ARTICLE

**Influenza vaccination and risk of dementia: a systematic review and meta-analysis** [Get access >](#)

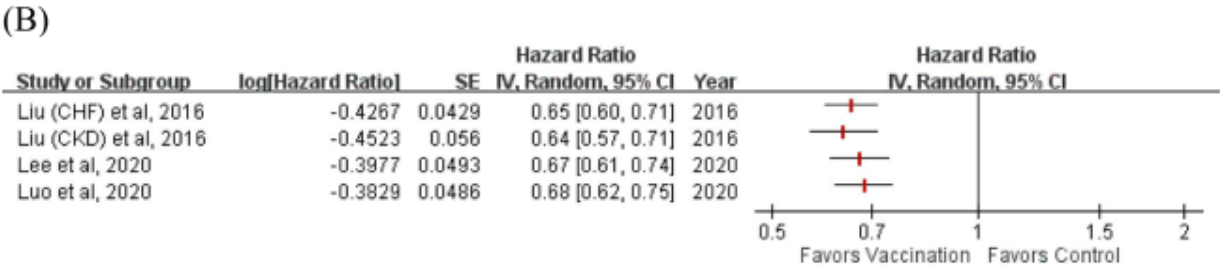
Wen-Kang Yang, Shih-Chieh Shao, Chia-Chao Liu, Ching-Chi Chi

Age and Ageing, Volume 54, Issue 7, July 2025, afaf169,  
<https://doi.org/10.1093/ageing/afaf169>

Published: 02 July 2025    [Article history](#)



Toute la population incluse  
HR 0.93; 95% CI 0.86–1.01



Sujets avec facteurs de  
risque de démence      « Effet dose »

Figure 1. Risk of dementia in subjects receiving influenza vaccination. (A) Overall population, (B) high-risk populations for dementia. CI, confidence interval; CHF, congestive heart failure; CKD, chronic kidney disease; SE, standard error.

# Démence, zona et vaccin

**Le Monde**

SCIENCES • MÉDECINE

Un vaccin contre le zona réduirait de 20 % le risque de démence, selon une étude américaine

**The New York Times**

## *Shingles Vaccine Can Decrease Risk of Dementia, Study Finds*

A growing body of research suggests that preventing the viral infection can help stave off cognitive decline.

NEWS

 Check for updates

The BMJ

Cite this as: [BMJ 2025;389:r722](#)

<http://doi.org/10.1136/bmj.r722>

Published: 09 April 2025

## Shingles vaccine may help cut dementia risk, study suggests

Gareth Iacobucci

 Le Monde.fr

### Un vaccin contre le zona réduirait de 20 % le risque de démence, selon une étude américaine

Alors que des travaux ont montré le lien probable entre ce virus de la famille de l'herpès et la survenue de la démence, en France,...

Il y a 5 jours



 France Info

### Se faire vacciner contre le zona peut réduire le risque de démence, confirment des scientifiques américains

S'appuyant sur une méthodologie sérieuse, ils viennent de publier les résultats de leur étude dans la revue "Nature".

Il y a 4 jours



 Ouest-France

### Le vaccin contre le zona pourrait réduire le risque de démence, selon une nouvelle étude

Il y a 4 jours

 Sciences et Avenir

### Le vaccin contre le zona protègerait bien contre la démence selon une nouvelle étude

Il y a 1 semaine

 TF1 Info

### Cet effet secondaire inattendu du vaccin contre le zona dans la prévention contre la démence

[VIDÉO]  Un vaccin contre le zona pourrait également protéger notre cerveau contre la démence. Cette découverte a été réalisée par une...

Il y a 6 jours



 Le Figaro Santé

### Vacciner contre le zona pourrait réduire le risque d'Alzheimer et d'autres démences

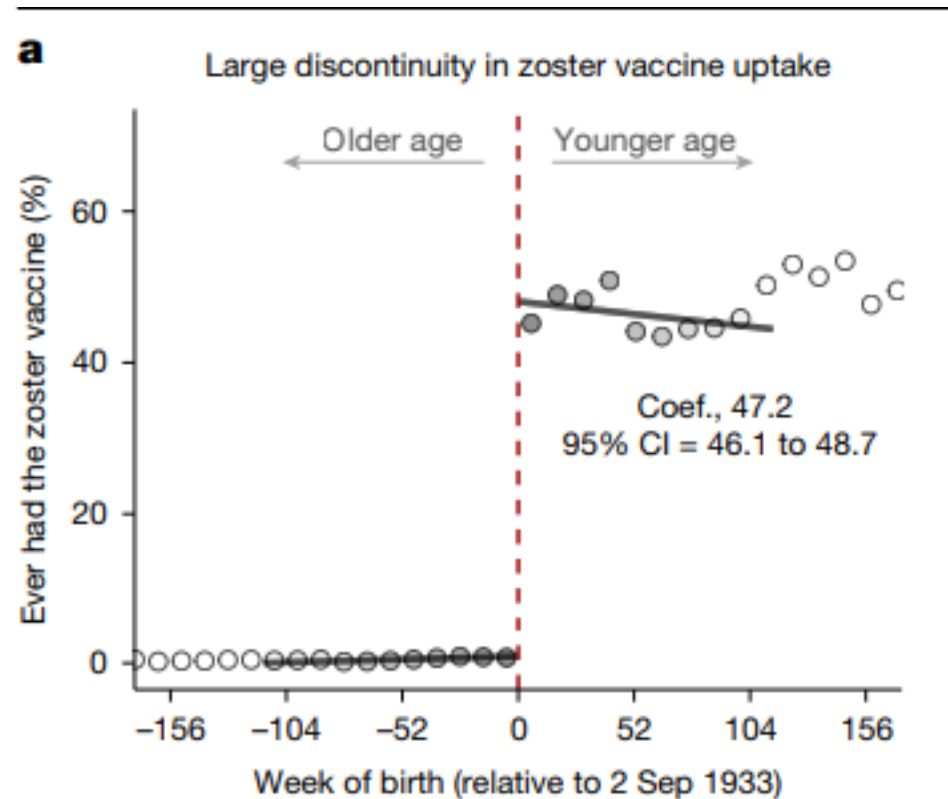
Il y a 1 semaine

# Une occasion unique

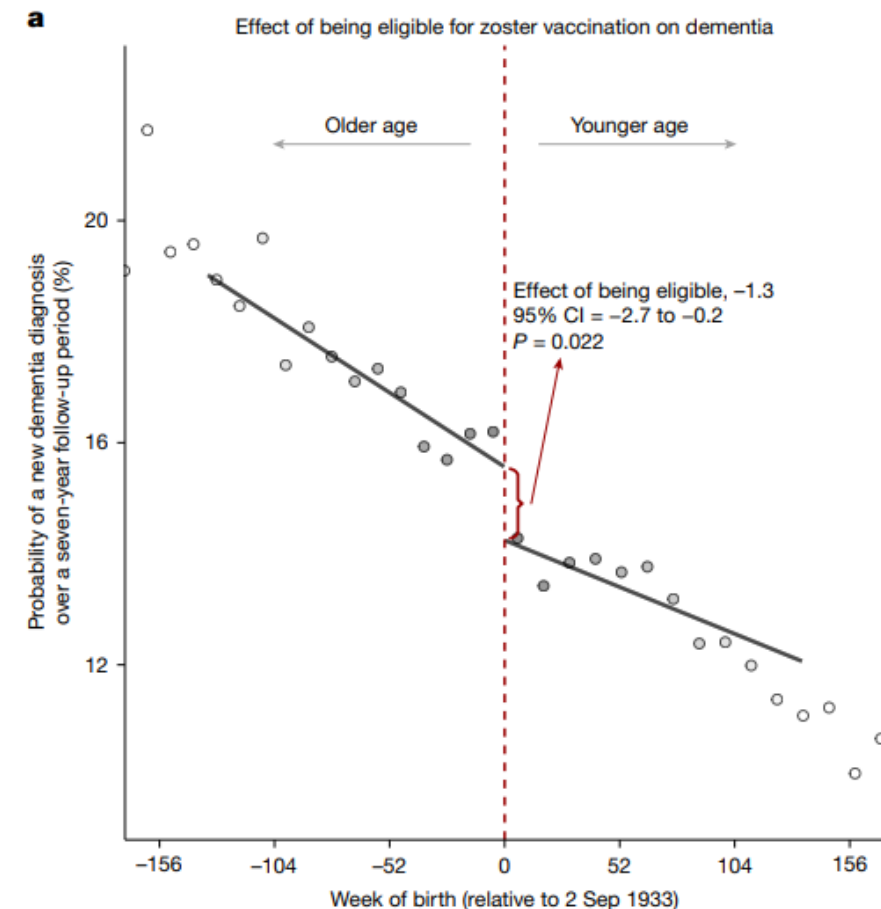
Eyting *et al.* Nature 2025

**1<sup>er</sup> septembre 2013 : introduction vaccination anti-zona (LVZ)**  
**« quasi-randomisation »**

**P\_ Pays de Galle, n = 282 541 - Follow up = 7 ans**  
**I\_ être éligible à la vaccination anti zona n=190 004**  
**84 071 (29.8%) ont reçu la vaccination**  
**C\_ être né avant le 2/9/1933 n= 92 537**  
**O\_ survenue d'une démence**



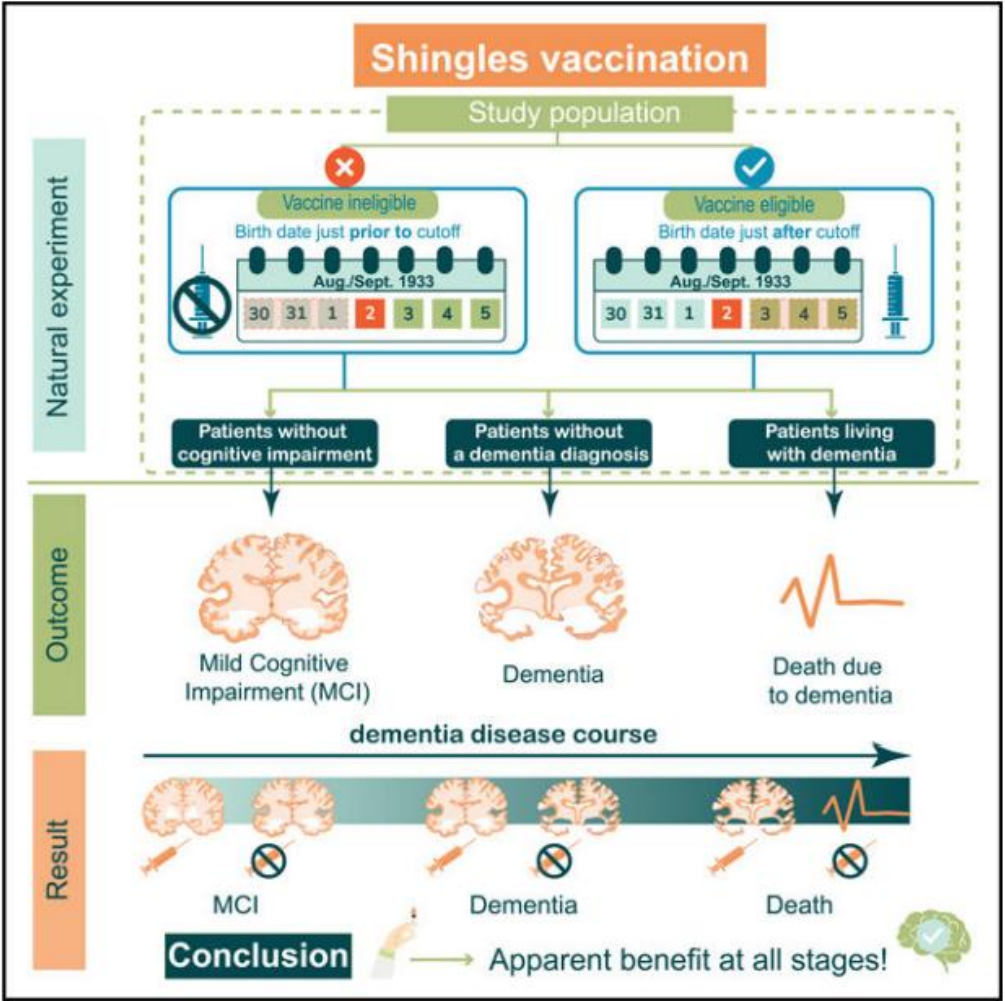
**Proportion de personnes vaccinées contre le zona**



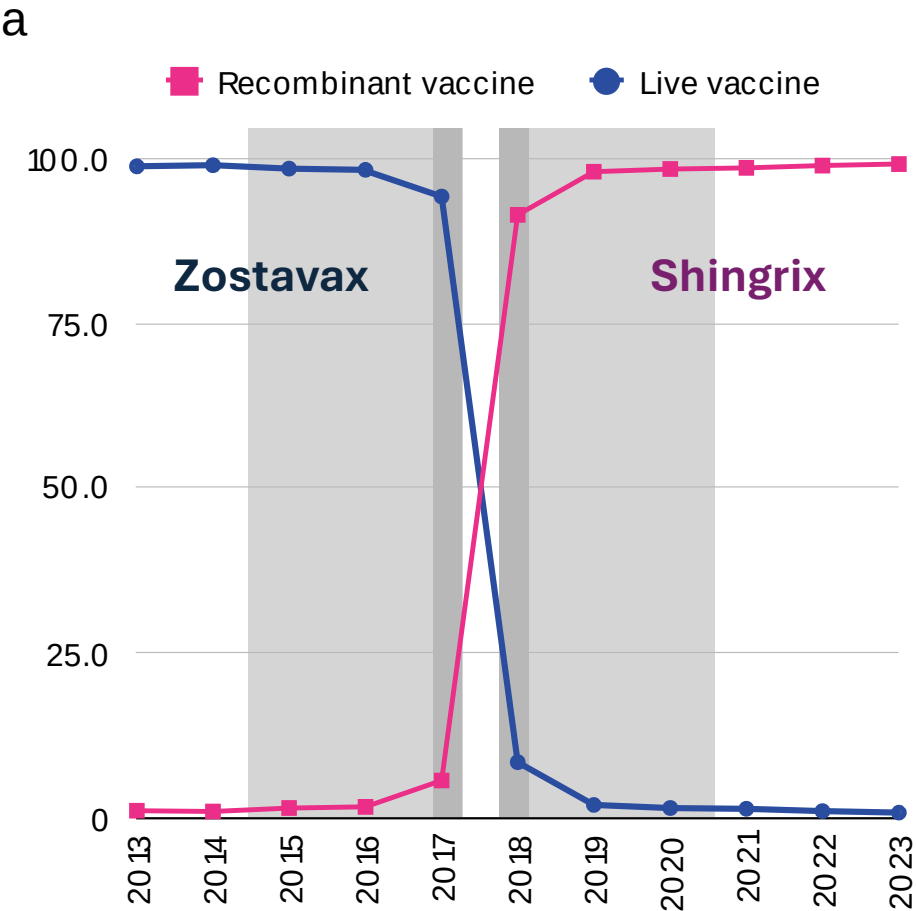
**Réduction du risque de démence**  
**Plus important chez les femmes+++**

The effect of shingles vaccination at different stages of the dementia disease course

Min Xie<sup>1,2</sup>, Markus Eytting<sup>2,3,4</sup>, Christian Bommer<sup>2</sup>, Haroon Ahmed<sup>5</sup>, Pascal Geldsetzer<sup>2,6,7,8,9,\*</sup>

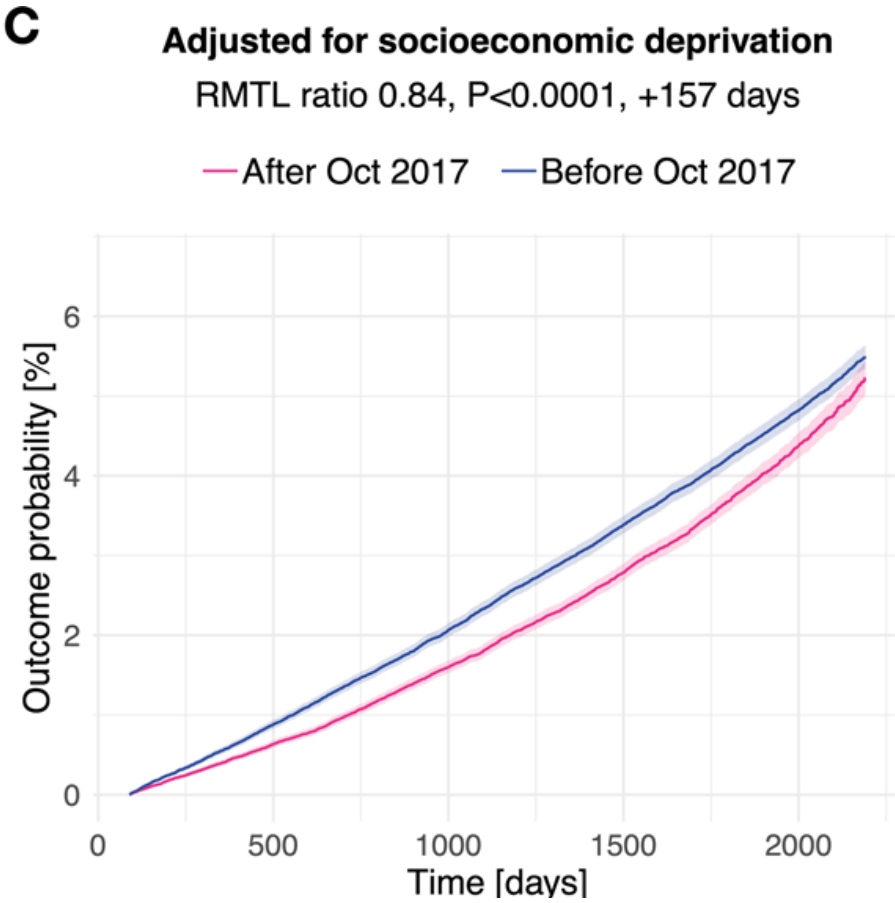


# SHINGRIX et risque de démence



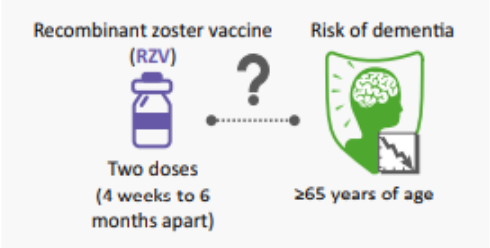
Score de propension avec 60 covariables d'ajustement

P\_Patients aged 65+ Pays de Galle  
I\_SHINGRIX (n= 103 837)  
C\_ZOSTAVAX (n= 103 837)  
O\_incidence de démence (follow up 6 ans)  
T\_between November 2017 and October 2020  
between October 2014 and September 2017

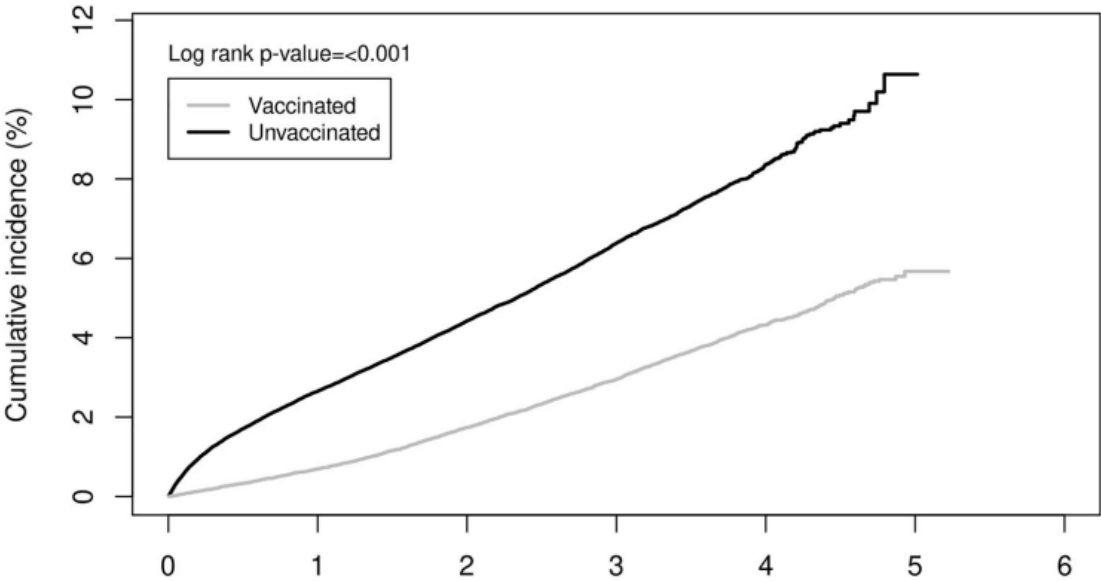


# Vaccin zona

Association between vaccination with two doses of RZV and reduction in risk of all-cause dementia in adults aged ≥65 years of age at KPSC



| Dementia                        | Incidence per 1000 person-years (95% CI) |                        |   | aHR (95% CI) <sup>a</sup> |
|---------------------------------|------------------------------------------|------------------------|---|---------------------------|
|                                 | Vaccinated                               | Unvaccinated           |   |                           |
| Overall                         | 10.74 (10.32–11.18)                      | 23.04 (22.61–23.48)    | ◆ | 0.49 (0.46–0.51)          |
| Dementia subtype                |                                          |                        |   |                           |
| Alzheimer's disease             | 3.17 (2.95–3.42)                         | 5.74 (5.53–5.95)       | ◆ | 0.48 (0.44–0.53)          |
| Vascular dementia               | 1.04 (0.91–1.18)                         | 2.33 (2.20–2.47)       | ◆ | 0.45 (0.39–0.53)          |
| Age at index date, years        |                                          |                        |   |                           |
| 65–69 <sup>b</sup>              | 2.59 (2.25–2.99)                         | 4.42 (4.10–4.76)       | ◆ | 0.53 (0.44–0.64)          |
| 70–79                           | 8.85 (8.33–9.40)                         | 17.90 (17.38–18.43)    | ◆ | 0.49 (0.45–0.53)          |
| ≥80 <sup>c</sup>                | 34.33 (32.44–36.34)                      | 83.35 (81.21–85.56)    | ◆ | 0.48 (0.45–0.52)          |
| Sex                             |                                          |                        |   |                           |
| Female                          | 10.07 (9.54–10.62)                       | 23.82 (23.25–24.40)    | ◆ | 0.45 (0.42–0.48)          |
| Male                            | 11.68 (11.01–12.39)                      | 21.98 (21.33–22.64)    | ◆ | 0.55 (0.51–0.59)          |
| Race/Ethnicity, n (%)           |                                          |                        |   |                           |
| Non-Hispanic White              | 11.08 (10.54–11.64)                      | 25.10 (24.52–25.69)    | ◆ | 0.46 (0.43–0.48)          |
| Non-Hispanic Black <sup>d</sup> | 14.58 (12.38–17.16)                      | 28.96 (26.87–31.21)    | ◆ | 0.49 (0.40–0.60)          |
| Hispanic <sup>e</sup>           | 10.53 (9.50–11.66)                       | 20.63 (19.66–21.65)    | ◆ | 0.55 (0.48–0.63)          |
| Non-Hispanic Asian <sup>f</sup> | 9.04 (8.11–10.07)                        | 17.98 (17.03–18.97)    | ◆ | 0.51 (0.44–0.58)          |
| ZVL status                      |                                          |                        |   |                           |
| No <sup>g</sup>                 | 9.94 (9.25–10.70)                        | 19.80 (19.17–20.45)    | ◆ | 0.51 (0.47–0.56)          |
| Yes                             | 11.12 (10.60–11.66)                      | 25.15 (24.57–25.73)    | ◆ | 0.46 (0.43–0.49)          |
| MCI status                      |                                          |                        |   |                           |
| No                              | 9.53 (9.14–9.95)                         | 20.16 (19.76–20.57)    | ◆ | 0.48 (0.46–0.51)          |
| Yes <sup>h</sup>                | 99.00 (88.39–110.87)                     | 219.86 (208.31–232.06) | ◆ | 0.53 (0.47–0.61)          |



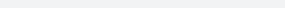
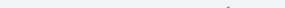
## Vaccinated

|                      | 65,800 | 62,888 | 59,888 | 47,928 | 17,053 | 151   | 0     |
|----------------------|--------|--------|--------|--------|--------|-------|-------|
| Number at risk       |        |        |        |        |        |       |       |
| Cumulative events    | 0      | 449    | 1,096  | 1,784  | 2,294  | 2,401 | 2,401 |
| Cumulative incidence | 0      | 0.7    | 1.74   | 2.95   | 4.32   | 5.67  | 5.67  |

## Unvaccinated

|                      | 263,200 | 176,826 | 125,601 | 53,513 | 7,928  | 1      | 0      |
|----------------------|---------|---------|---------|--------|--------|--------|--------|
| Number at risk       |         |         |         |        |        |        |        |
| Cumulative events    | 0       | 5,729   | 8,505   | 10,304 | 10,930 | 10,983 | 10,983 |
| Cumulative incidence | 0       | 2.65    | 4.42    | 6.38   | 8.36   | 10.64  | 10.64  |

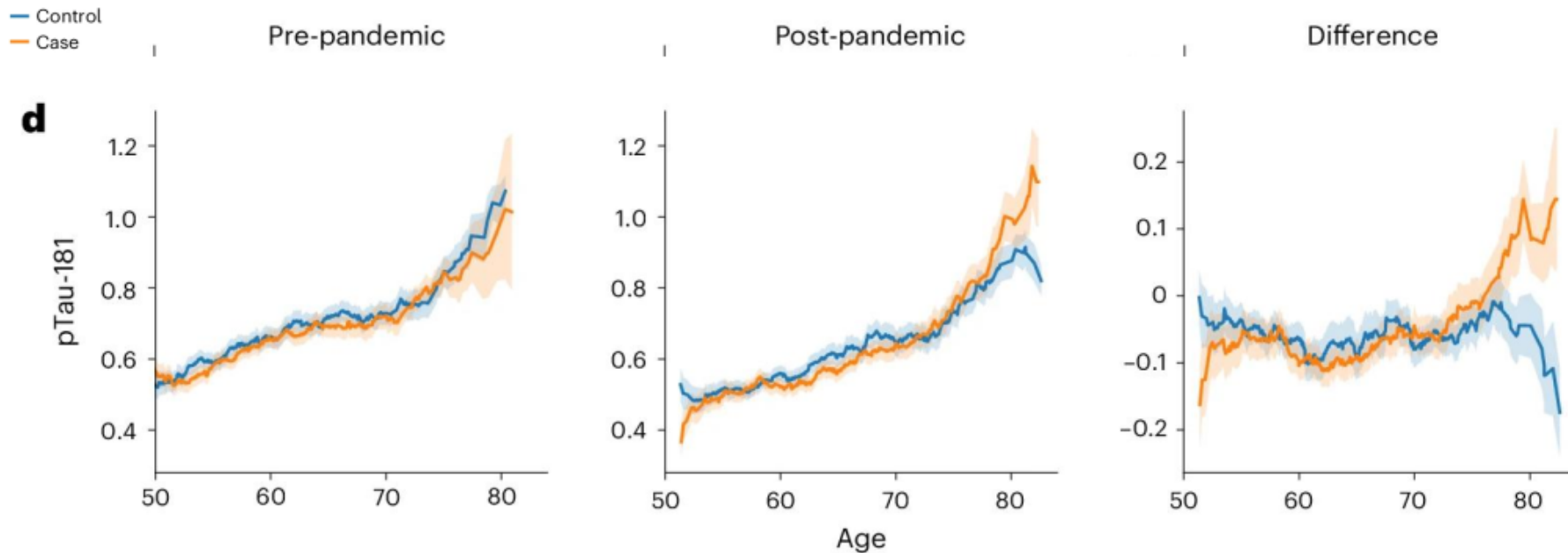
Cumulative incidence of dementia among two-dose RZV-vaccinated versus unvaccinated individuals. RZV recombinant zoster vaccine.

|                      | Incidence per 1000 person-years (95% CI) |                     | aHR (95% CI) <sup>a</sup>                                                             |                  |
|----------------------|------------------------------------------|---------------------|---------------------------------------------------------------------------------------|------------------|
| Dementia             | RZV-Vaccinated                           | Comparison Group    |                                                                                       |                  |
| RZV Comparison Group |                                          |                     |                                                                                       |                  |
| Unvaccinated         | 10.74 (10.32–11.18)                      | 23.04 (22.61–23.48) |  | 0.49 (0.46–0.51) |
| Tdap                 |                                          | 18.09 (17.44–18.77) |  | 0.73 (0.67–0.79) |

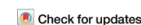
# Hypothesis 1: vaccines prevent infections, and infections cause inflammation that can damage the brain

Example: people who had previously contracted COVID-19 showed increased levels of blood biomarkers linked to amyloid build-up in the brain, which is linked to Alzheimer's disease

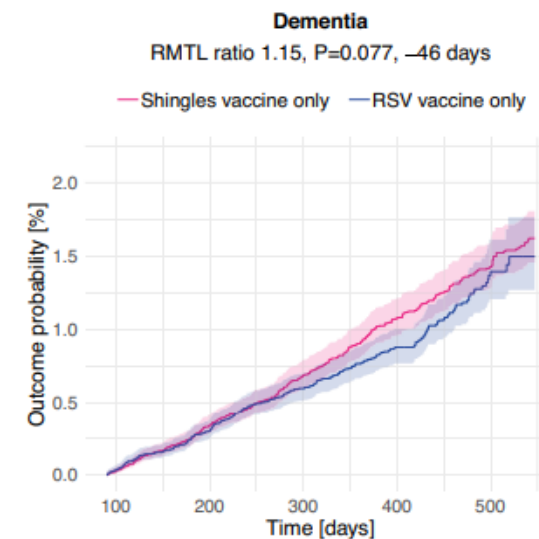
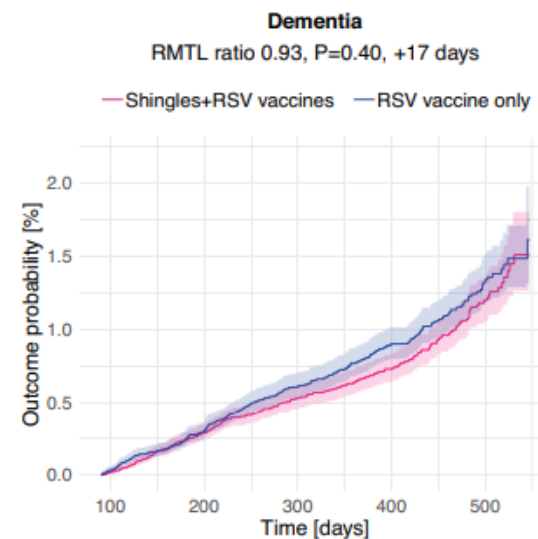
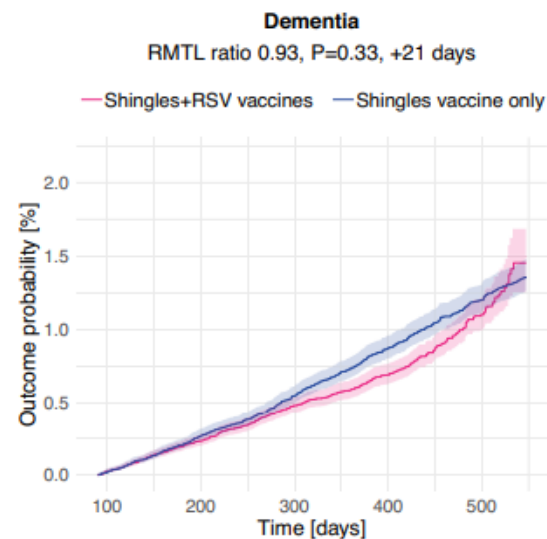
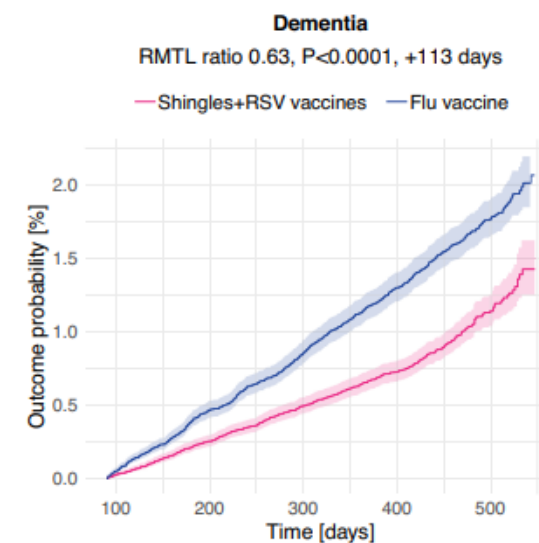
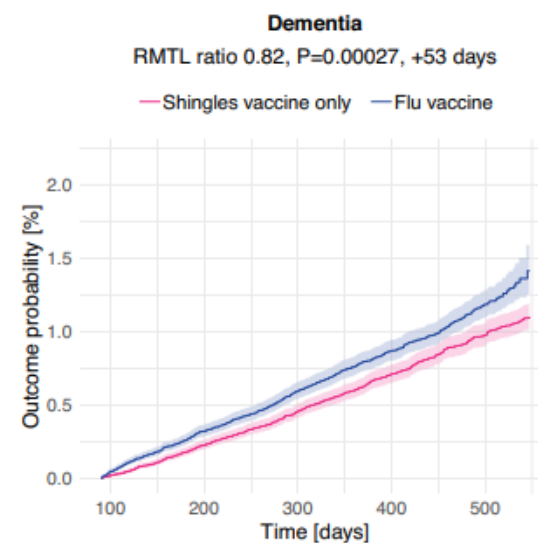
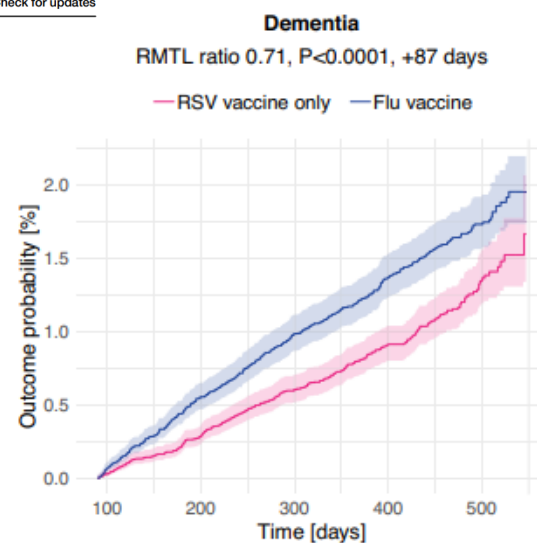
## Plasma proteomic evidence for increased $\beta$ -amyloid pathology after SARS-CoV-2 infection



# Lower risk of dementia with AS01-adjuvanted vaccination against shingles and respiratory syncytial virus infections



Maxime Taquet<sup>1,2</sup>✉, John A. Todd<sup>3</sup> & Paul J. Harrison<sup>1,2</sup>✉

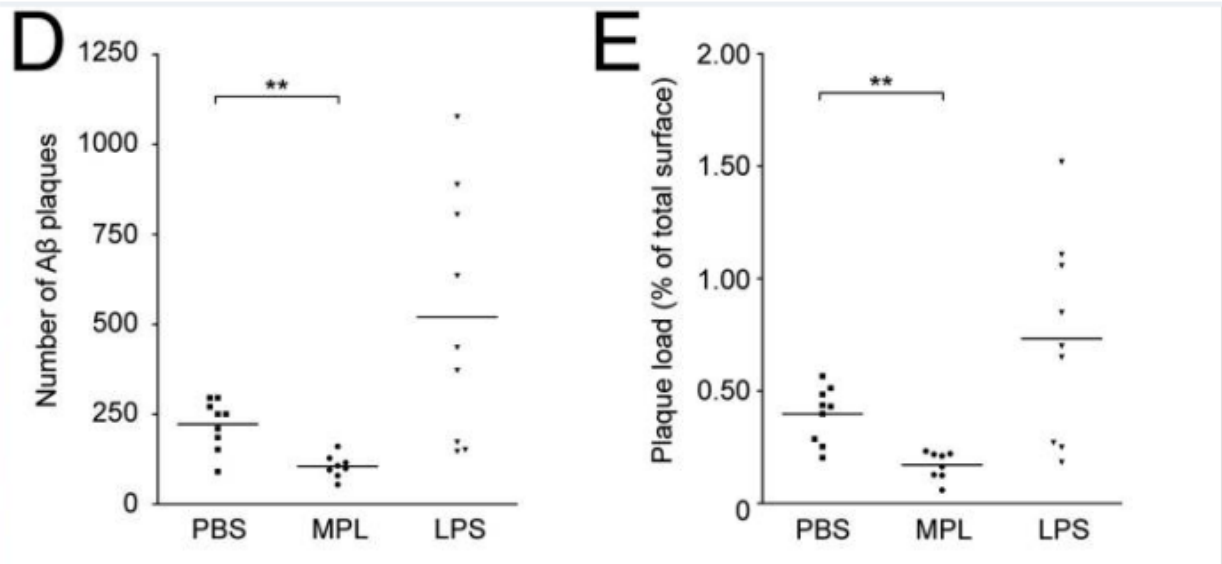
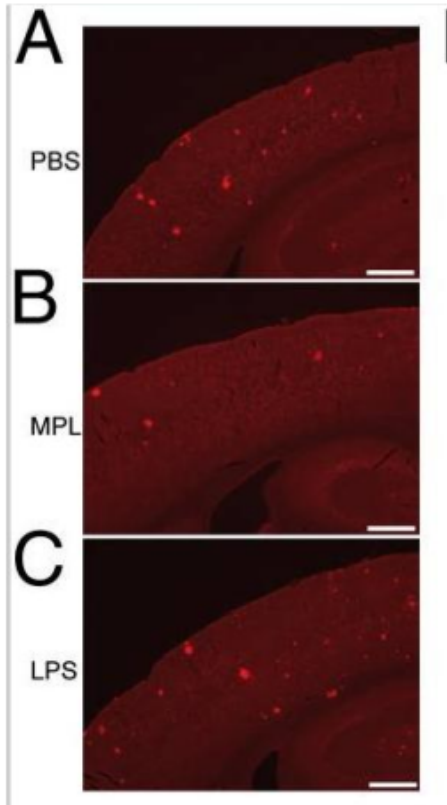


# Hypothesis 2: vaccines can have broader effects on the immune system beyond protection against a single pathogen

Example: AS01 might protect against dementia via specific immunological pathways

AS01 is a family of liposome-based vaccine Adjuvant Systems containing two immunostimulants: 3-O-desacyl-4'-monophosphoryl lipid A (MPL, TLR4 activator) and the saponin QS-21 (a purified plant extract derived from *Quillaja saponaria*)

TLR4 stimulation with MPL has been shown to improve Alzheimer's disease pathology in mice



APP/PS1 are double transgenic mice expressing a chimeric mouse/human amyloid precursor protein (Mo/HuAPP695swe) and a mutant human presenilin 1 (PS1-dE9)

# Infection, vaccination and risk of dementia: a proposed immunological model

Justin Devine<sup>1</sup>, Bart Jacobs<sup>2</sup>, Isabel Leroux-Roels<sup>2</sup>,  
Geert Leroux-Roels<sup>2</sup> and Robbert van der Most<sup>3\*</sup>

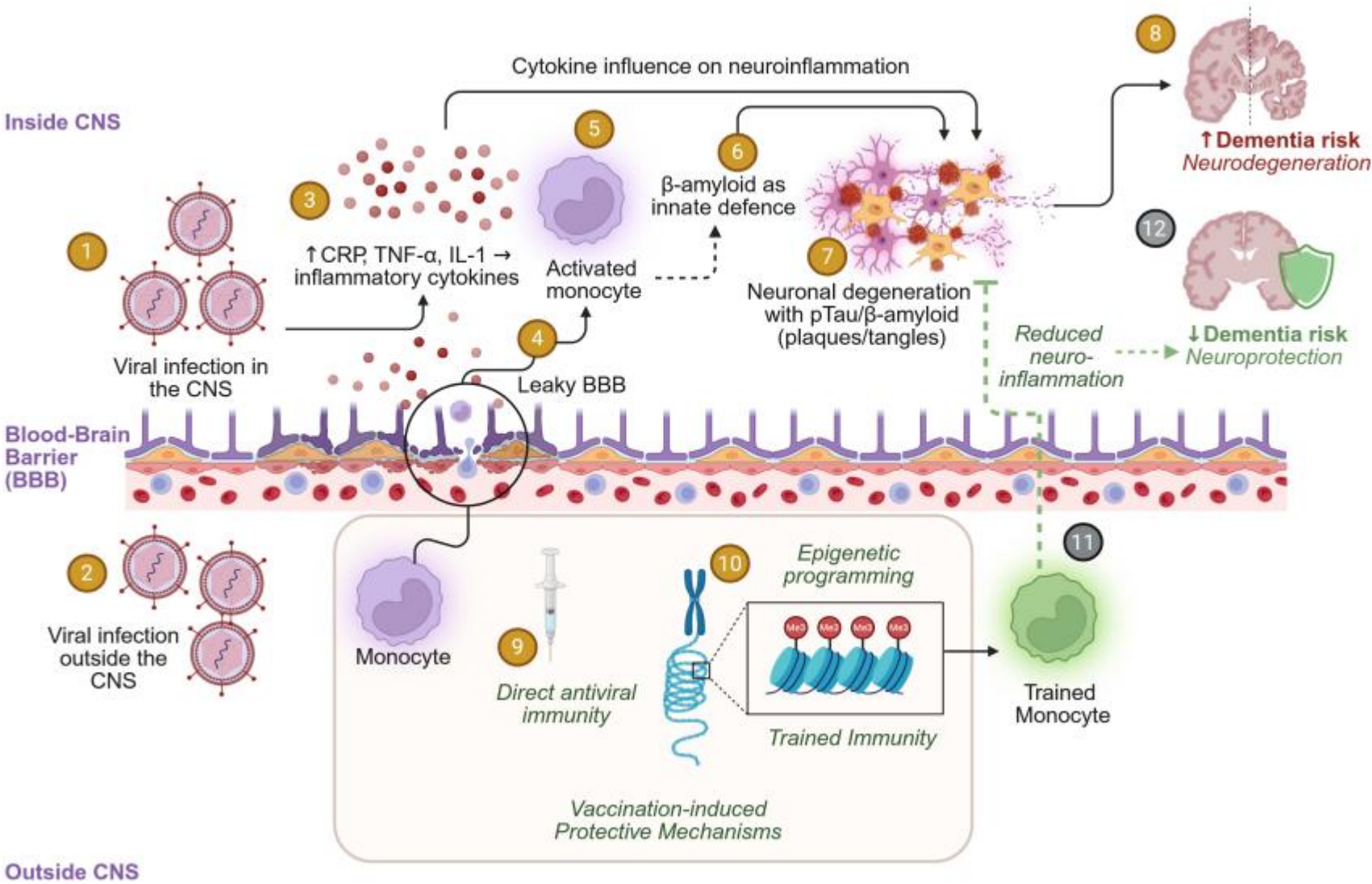
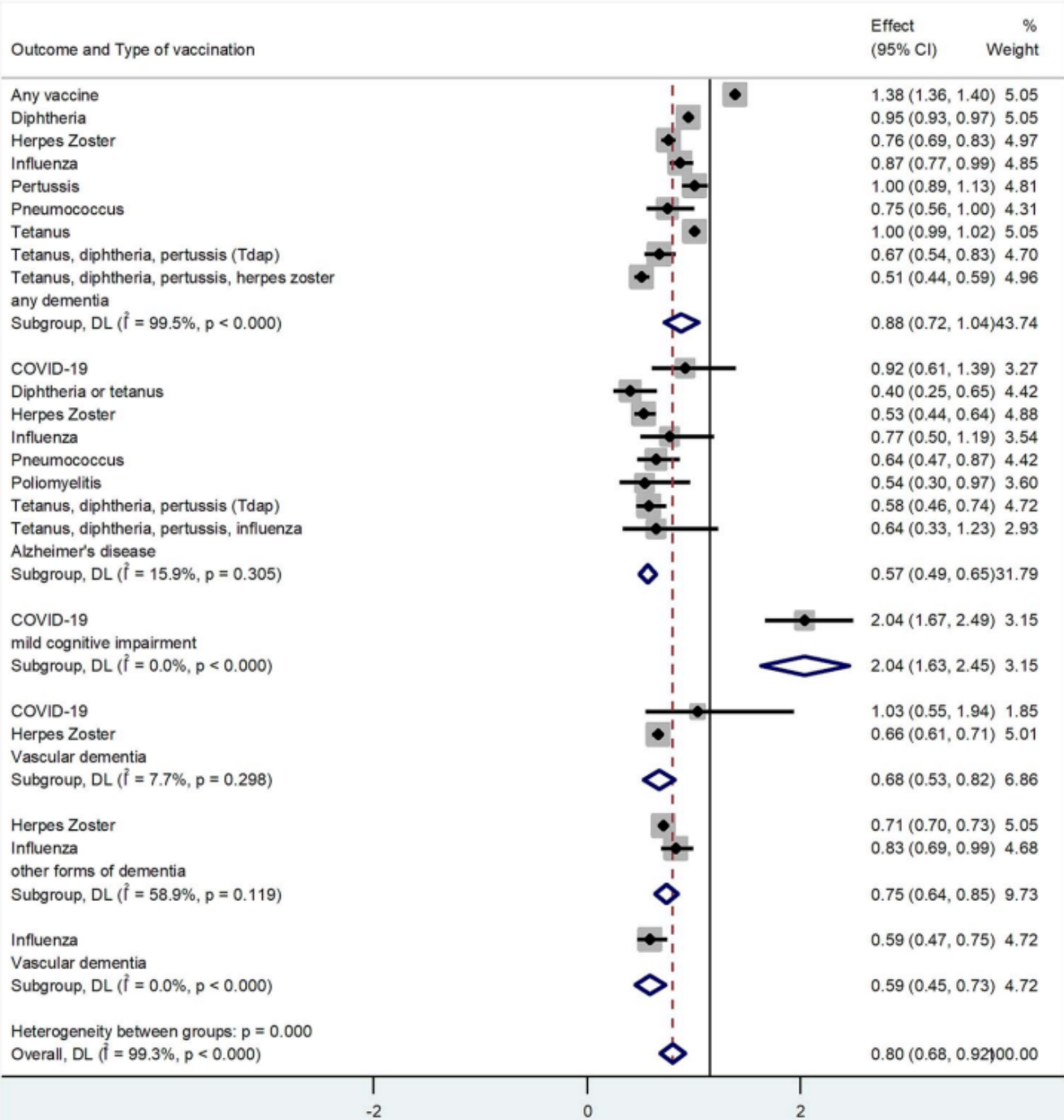


FIGURE 1

SYSTEMATIC REVIEW

Association between vaccinations and risk of dementia: a systematic review and meta-analysis

STEFANIA MAGGI<sup>1</sup> , TAMÀS FULÖP<sup>2</sup>, ELDA DE VITA<sup>3</sup>, FEDERICA LIMONGI<sup>1</sup>, DAMIANO PIZZOL<sup>4</sup>, FRANCESCO DI GENNARO<sup>3</sup>, NICOLA VERONESE<sup>5,6</sup> 



NOTE: Weights and between-subgroup heterogeneity test are from random-effects model

# Au total,

- Vacciner ce n'est pas juste diminuer les risques d'infection...
- Effets vont bien au-delà...
- Pas assez mis en avant....urgent à l'heure du vieillissement de la population
- Exemple des cardiologues à suivre!
- Chaque rencontre compte
- Besoin de poursuivre les études pour mesurer les effets et mieux comprendre

**Table 2** The ranking of pathologies from the most frightening to the least frightening

| Pathology                            | Worry level    |        |        |        |        |        |        |        |        |        |        |
|--------------------------------------|----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                      | All, N = 3,331 |        |        |        |        |        |        |        |        |        |        |
|                                      | 1              | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | 11     |
| Stroke                               | 43,39%         | 26,62% | 13,91% | 6,96%  | 3,80%  | 2,03%  | 0,93%  | 0,86%  | 0,57%  | 0,38%  | 0,11%  |
| brain attack                         | 20,42%         | 15,68% | 19,25% | 18,70% | 10,97% | 5,84%  | 4,36%  | 2,40%  | 1,06%  | 0,57%  | 0,61%  |
| Cancer                               | 17,97%         | 14,75% | 12,59% | 11,82% | 11,74% | 8,20%  | 6,11%  | 5,01%  | 3,47%  | 3,16%  | 4,93%  |
| Dementia                             | 7,02%          | 17,93% | 19,58% | 16,53% | 12,40% | 9,02%  | 5,96%  | 3,78%  | 2,30%  | 1,56%  | 2,10%  |
| Myocardial infarction (heart attack) | 3,51%          | 5,74%  | 7,42%  | 8,84%  | 9,99%  | 13,60% | 14,28% | 12,39% | 9,39%  | 8,21%  | 6,77%  |
| Persistent pain                      | 3,30%          | 11,12% | 15,10% | 17,76% | 19,13% | 13,97% | 8,16%  | 5,69%  | 2,49%  | 1,75%  | 1,19%  |
| Heart disease                        | 1,74%          | 3,99%  | 4,52%  | 5,00%  | 6,73%  | 11,12% | 14,57% | 14,26% | 12,44% | 11,98% | 13,69% |
| To fall, to fracture                 | 1,24%          | 1,75%  | 4,37%  | 7,61%  | 14,05% | 18,92% | 19,12% | 14,90% | 8,93%  | 6,12%  | 3,94%  |
| Pneumonia (lung infections)          | 0,89%          | 1,18%  | 1,86%  | 3,44%  | 5,45%  | 8,65%  | 11,44% | 13,70% | 20,47% | 20,08% | 14,07% |
| COVID-19                             | 0,43%          | 0,75%  | 0,65%  | 1,49%  | 2,78%  | 4,14%  | 6,78%  | 12,95% | 20,58% | 27,15% | 22,78% |
| Influenza                            | 0,11%          | 0,50%  | 0,75%  | 1,85%  | 2,96%  | 4,51%  | 8,27%  | 14,07% | 18,32% | 19,05% | 29,82% |
| Shingles                             |                |        |        |        |        |        |        |        |        |        |        |



Original article

‘Healthy ageing’ messaging in vaccine promotion among older adults: evaluation of vaccine intention in a survey using a social marketing methodology

Alexandra Addario <sup>a,b,c,d,e,f,\*</sup>, Boris Chapoton <sup>g</sup>, Thomas Célarier <sup>a,h</sup>, Nathalie Barth <sup>a</sup>, Bienvenu Bongue <sup>f,i,j</sup>, Gaëtan Gavazzi <sup>a,d,k</sup>, Elisabeth Botelho-Nevers <sup>b,c,e,l</sup>

# Vaccination : êtes-vous à jour?

## 2025 calendrier simplifié des vaccinations 65 ans et plus

|                | Personnes de 65 ans et plus                        |                        |                |        |             |
|----------------|----------------------------------------------------|------------------------|----------------|--------|-------------|
|                | 65 ans                                             | 75 ans                 | 80 ans         | 85 ans | 95 ans et + |
| DTP-Coqueluche | 1 dose                                             | 1 dose                 |                | 1 dose | 1 dose      |
| Pneumocoque    | PCV21 1 dose                                       |                        |                |        |             |
| Grippe         | vaccin HD or Adj 1 dose par an                     |                        |                |        |             |
| Covid-19       | 1 dose par an                                      |                        | 2 doses par an |        |             |
| Zona           | vaccin recombinant 2 doses (à 2 mois d'intervalle) |                        |                |        |             |
| VRS            | 1 dose pour certaines maladies chroniques          | 1 des 3 vaccins 1 dose |                |        |             |