

Vaccinations contre le VRS le point de vue du gériatre

Pr Olivier Hanon
Hôpital Broca, Paris

Journée Nationale du groupe vaccination – prévention de la SPILF
14/05/24

Liens d'intérêt

- Novartis, Boehringer-Ingelheim, Bayer, BMS, GSK, Pfizer, HAC pharma, Astra-Zeneca, Servier, Vifor, Eisai, Sanofi, Lilly

Espérance de vie à la naissance ?



En 2050, espérance de vie d'une **femme** à la naissance = **90,4 ans**

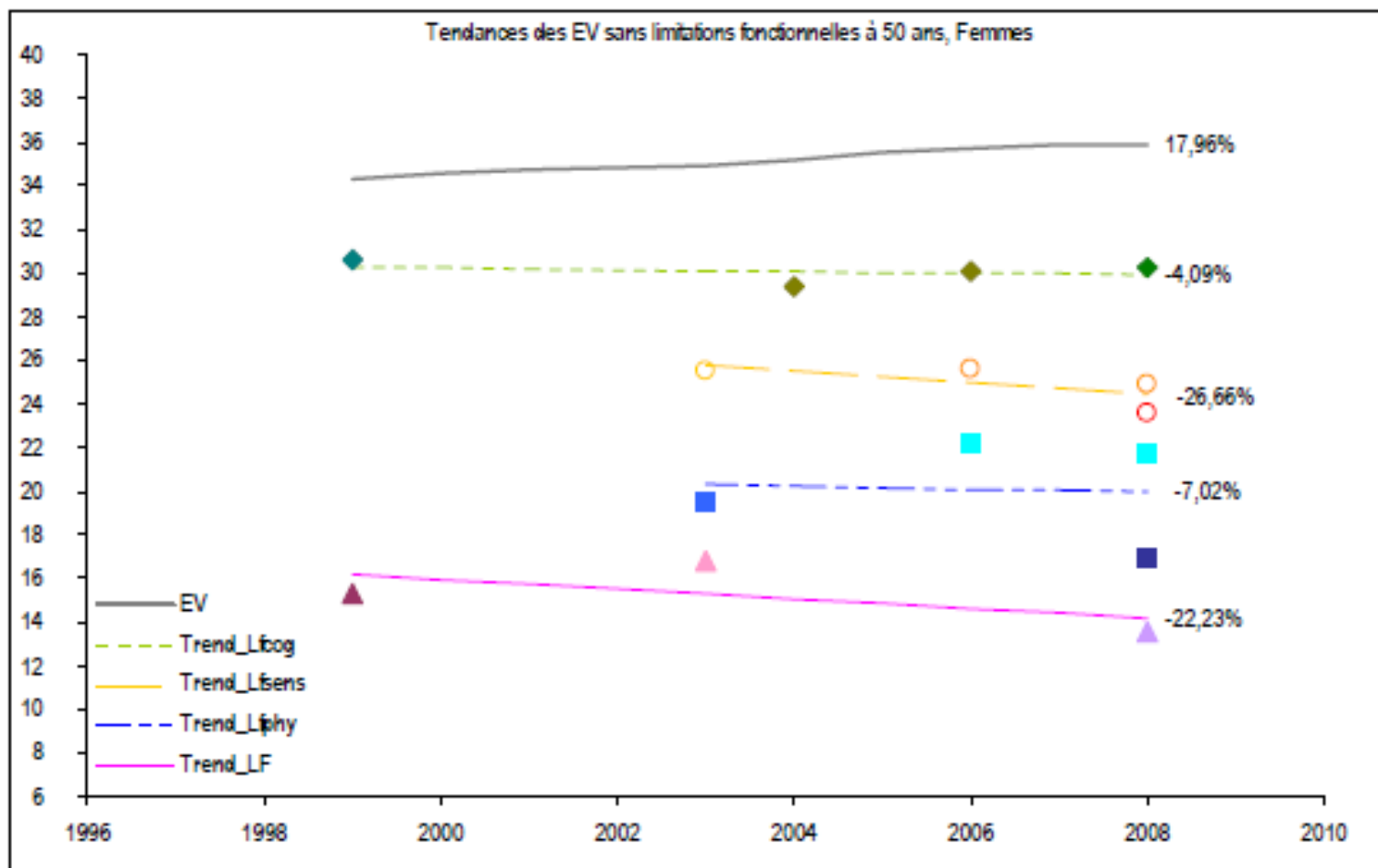
En 2050, espérance de vie d'un **homme** à la naissance = **82,2 ans**

Année	Espérance de vie des femmes (en années)					Espérance de vie des hommes (en années)				
	à la naissance	1 an	20 ans	60 ans	80 ans	à la naissance	1 an	20 ans	60 ans	80 ans
2013	85,0	84,3	65,5	27,4	10,8	78,7	78,1	59,3	22,8	8,7
2018	85,4	84,7	65,9	27,7	11,2	79,5	78,9	60,1	23,3	9,1
2019	85,6	84,8	66,0	27,8	11,3	79,7	79,0	60,3	23,4	9,2
2020	85,1	84,4	65,5	27,3	10,9	79,1	78,4	59,6	22,8	8,7
2021p	85,2	84,5	65,7	27,4	11,1	79,2	78,5	59,7	22,9	8,9
2022p	85,1	84,4	65,6	27,3	11,0	79,3	78,6	59,8	23,0	8,9
2023p	85,7	85,1	66,2	27,9	11,5	80,0	79,4	60,6	23,7	9,4

Espérance de vie à 80 ans ?

Année	Espérance de vie des femmes (en années)					Espérance de vie des hommes (en années)				
	à la naissance	1 an	20 ans	60 ans	80 ans	à la naissance	1 an	20 ans	60 ans	80 ans
2013	85,0	84,3	65,5	27,4	10,8	78,7	78,1	59,3	22,8	8,7
2018	85,4	84,7	65,9	27,7	11,2	79,5	78,9	60,1	23,3	9,1
2019	85,6	84,8	66,0	27,8	11,3	79,7	79,0	60,3	23,4	9,2
2020	85,1	84,4	65,5	27,3	10,9	79,1	78,4	59,6	22,8	8,7
2021p	85,2	84,5	65,7	27,4	11,1	79,2	78,5	59,7	22,9	8,9
2022p	85,1	84,4	65,6	27,3	11,0	79,3	78,6	59,8	23,0	8,9
2023p	85,7	85,1	66,2	27,9	11,5	80,0	79,4	60,6	23,7	9,4

Espérance de vie sans incapacité (2010)



Qu'est ce qu'un sujet âgé ?



Autonome actif

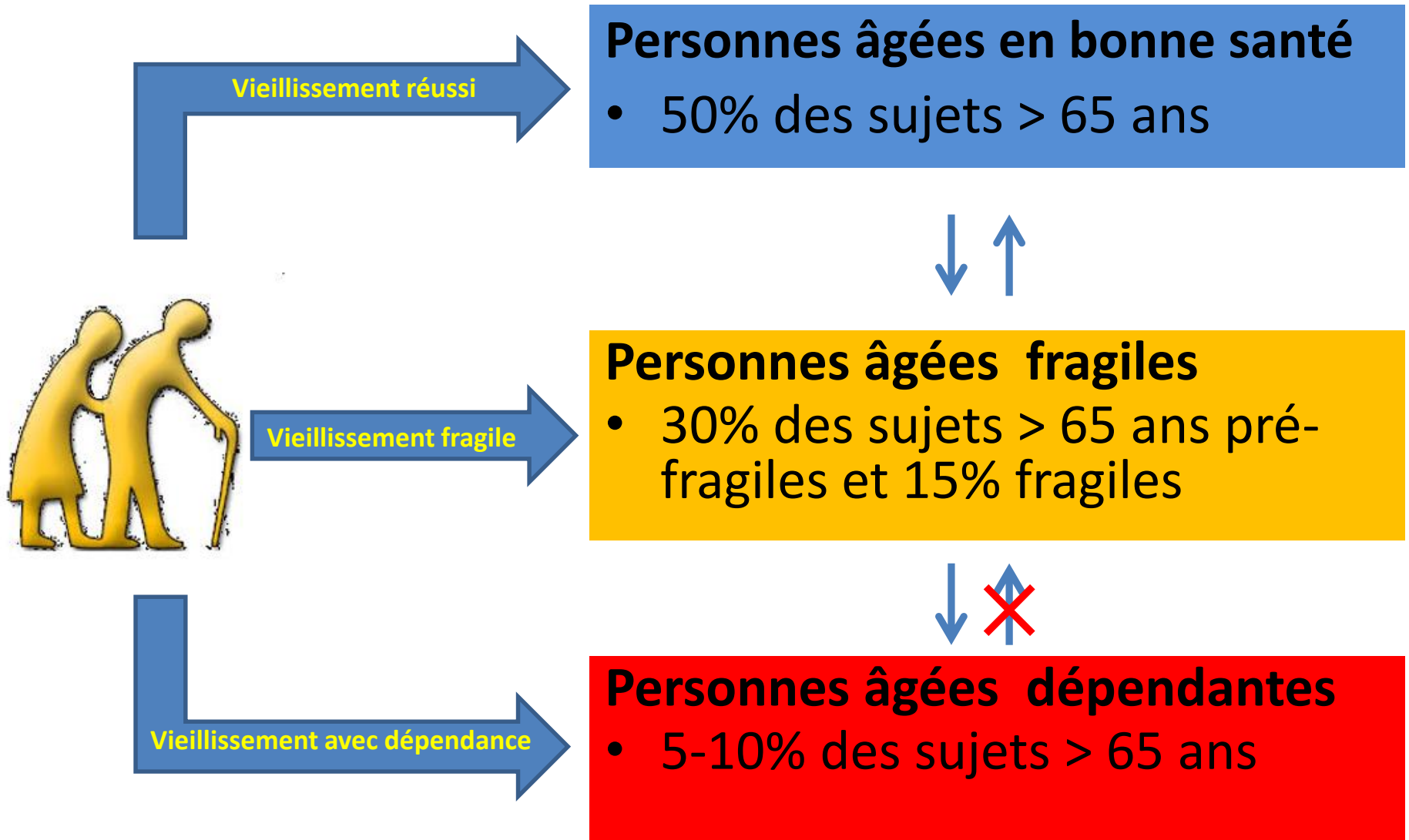


Fragile



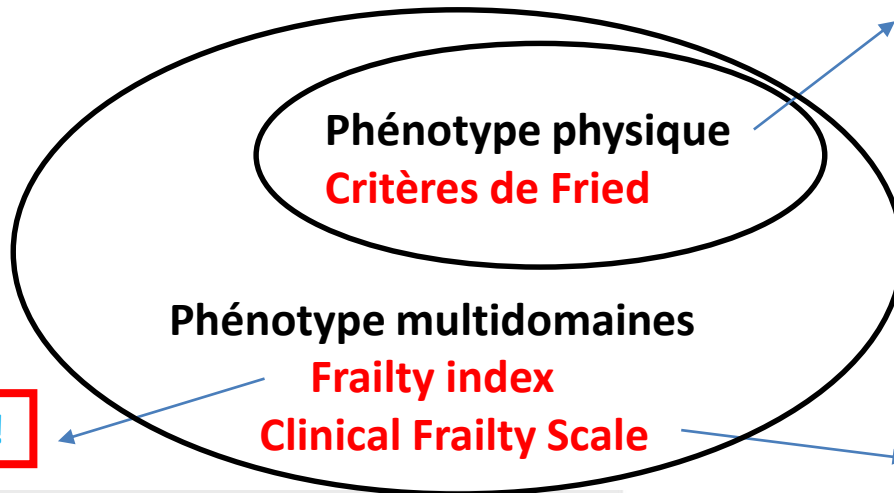
Dépendant

Personnes âgées: 3 catégories*



*Fried LP, Tangen CM, Walston J, et al. Cardiovascular Health Study Collaborative Research Group. Frailty in older adults: evidence for a phenotype. J Gerontol A Biol Sci Med Sci 2001; 56: 146-56.

Comment évaluer la fragilité ?



Perte de poids $\geq 4,5$ kg par an
Fatigue
Absence d'activité physique
Vitesse de marche < 1 m/sec
Faiblesse musculaire
 ≥ 3 critères = fragile

70 variables !

Autonomie
Robuste
Fragile (activités vie quotidienne)
Totalement dépendant
(9 stades)

Appendix 1: List of variables used by the Canadian Study of Health and Aging to construct the 70-item CSHA Frailty Index

- Changes in everyday activities
- Head and neck problems
- Poor muscle tone in neck
- Bradykinesia, facial
- Problems getting dressed
- Problems with bathing
- Problems carrying out personal grooming
- Urinary incontinence
- Toileting problems
- Bulk difficulties
- Rectal problems
- Gastrointestinal problems
- Problems cooking
- Sucking problems
- Problems going out alone
- Impaired mobility
- Musculoskeletal problems
- Bradykinesia of the limbs
- Poor muscle tone in limbs
- Poor limb coordination
- Poor coordination, trunk
- Poor standing posture
- Irregular gait pattern
- Falls
- Mood problems
- Feeling sad, blue, depressed
- History of depressed mood
- Tiredness all the time
- Depression (clinical impression)
- Sleep changes
- Restlessness
- Memory changes
- Short-term memory impairment
- Long-term memory impairment
- Changes in general mental functioning
- Onset of cognitive symptoms
- Clouding or delirium
- Paranoid features
- History relevant to cognitive impairment or loss
- Family history relevant to cognitive impairment or loss
- Impaired vibration
- Tremor at rest
- Postural tremor
- Intention tremor
- History of Parkinson's disease
- Family history of degenerative disease
- Seizures, partial complex
- Seizures, generalized
- Syncope or blackouts
- Headache
- Cerebrovascular problems
- History of stroke
- History of diabetes mellitus
- Arterial hypertension
- Peripheral pulses
- Cardiac problems
- Myocardial infarction
- Arrhythmia
- Congestive heart failure
- Lung problems
- Respiratory problems
- History of thyroid disease
- Thyroid problems
- Skin problems
- Malignant disease
- Breast problems
- Abdominal problems
- Presence of snout reflex
- Presence of the palmomental reflex
- Other medical history

Activités basiques de la vie quotidienne (ADL)	Activités Instrumentales de la vie quotidienne (IADL)
1. Hygiène corporelle	1. Aptitude à utiliser le téléphone
2. Habillage	2. Courses
3. Aller aux toilettes	3. Préparation des aliments
4. Locomotion	4. Entretien ménage
5. Continence	5. Blanchisserie
6. Manger seul	6. Moyens de transport
	7. Prise du traitement
	8. Aptitude à manipuler l'argent

Clinical Frailty Scale

1 Very Fit

- Robust, active, energetic and motivated
- Commonly exercise regularly
- Among the fittest for their age



2 Well

- No active disease symptoms
- Less fit than category 1
- Exercise or are very active occasionally, e.g. seasonally



3 Managing Well

- Have medical problems that are well controlled
- Are not regularly active beyond routine walking



4 Vulnerable

- Not dependent on others for daily help
- Symptoms do, however, limit activities
- A common complaint is being 'slowed down', and/or being tired during the day



5 Mildly Frail

- More evident slowing
- Need help in high-order IADs
- Mild frailty progressively impairs activities outside and inside the home



6 Moderately Frail

- Need help with all outside activities and with keeping house
- Often have problems with stairs and bathing in the home
- Might need minimal assistance with dressing



7 Severely Frail

- Completely dependent for personal care
- However, are still stable and not at a high risk of dying (within 6 months)



8 Very Severely Frail

- Completely dependent
- Approaching the end of life
- Typically, could not recover from even a minor illness



9 Terminally Ill

- Approaching the end of life
- A life expectancy of <6 months
- However, they are not otherwise evidently frail



TRST (Triage Risk Screening Tool)

TRST: outil d'évaluation de la complexité

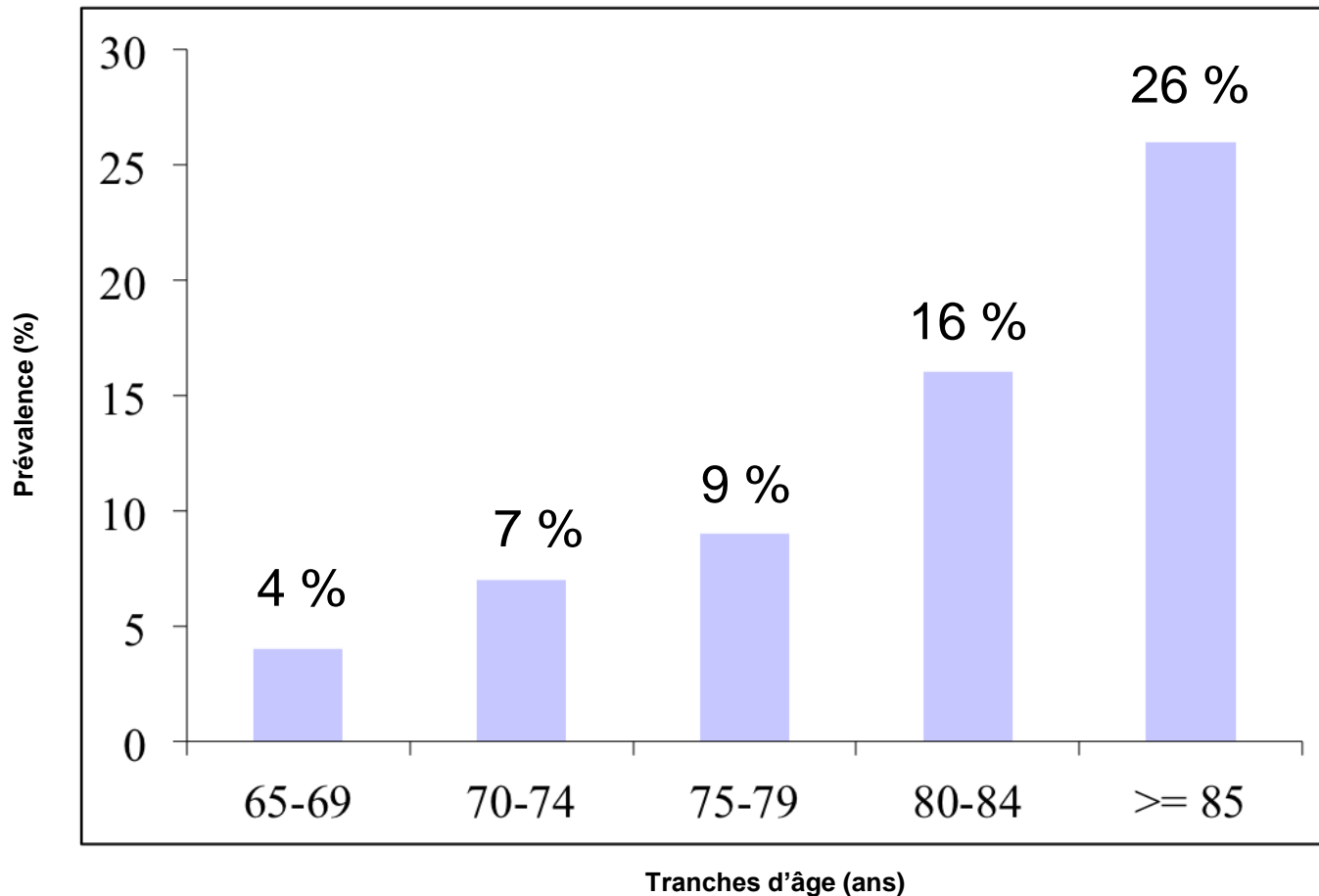
1. Présence de troubles cognitifs
2. Troubles de la marche, difficultés de transfert ou chutes récentes
3. Polymédication (utilisation de 10 médicaments ou plus)
4. Antécédents d'hospitalisation (3 mois)
5. Evaluation fonctionnelle réalisée par un soignant
 - **ADL** (Hygiène corporelle, habillage, aller aux toilettes, locomotion, continence, manger seul)
 - **isolement social**

– Le score varie de 0 (pas de risque) à 6 (à très haut risque)

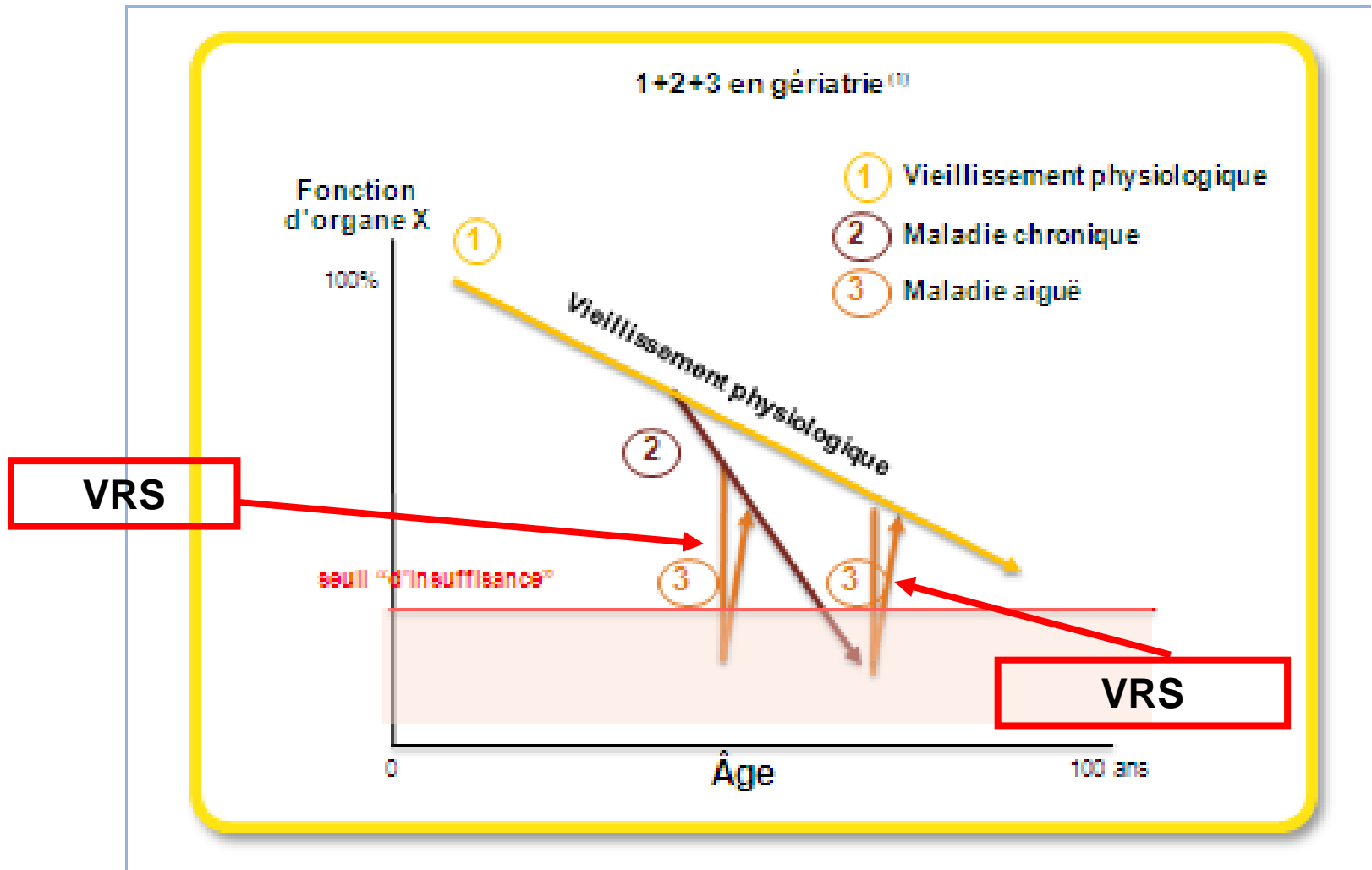
Score ≥ 2 = Avis gériatrique (EGS)

Augmentation de la prévalence de la fragilité avec l'âge

Prévalence de la fragilité = 10 % (IC à 95 % 9,6-10,2 %); résultat associant 15 études utilisant la définition physique de la fragilité, portant sur 44 894 participants.



infections virales chez le sujet âgé : perte d'autonomie +++



Comment repérer la fragilité en soins ambulatoires ?

Le repérage de la fragilité permet de prédire le risque de perte d'autonomie (niveau de preuve élevé), de chutes, d'institutionnalisation, de décès et d'hospitalisation des personnes âgées

Le repérage précoce de la fragilité chez les personnes âgées a pour objectif d'identifier les déterminants de la fragilité et d'agir sur ces déterminants afin de retarder la dépendance dite « évitable » et de prévenir la survenue d'événements défavorables.

GERIATRIC SYNDROME MANAGEMENT RECOMMENDED IF > 75 years and TRST ≥ 2

«CAVADCD» SCALE	EVALUATION	MANAGEMENT
COGNITION	<ul style="list-style-type: none"> • Memory Impairment Screen (MIS) (abnormal: omission of 1 word in 10 minutes) • Mini-Mental State Examination (MMS) (abnormal < 24) 	<ul style="list-style-type: none"> • Home nurse visits to administer treatments
AUTONOMY	<ul style="list-style-type: none"> • Activities of Daily Living (ADL) (n = 6) • Instrumental Activities of Daily Living (IADL) (n = 14) 	<ul style="list-style-type: none"> • Implement home help (PAERPA (people at risk of losing autonomy))
VELOCITY (WALKING SPEED)	<ul style="list-style-type: none"> • 6-metre walking test (n > 1 m/s) 	<ul style="list-style-type: none"> • Appropriate physical activity (APA)
FALL	<ul style="list-style-type: none"> • Single leg stance test (Normal > 10 m/s) • Timed up and go test (Normal < 20 s) 	<ul style="list-style-type: none"> • Correctly treat predisposing factors or modifiable precipitating factors • Regularly walk and/or do physical activity • Correct any vitamin D deficiency with daily intake of at least 800 IU
DENUTRITION	<ul style="list-style-type: none"> • Weight loss: > 5% in 1 month or > 10% in 6 months • Body Mass Index (BMI) < 21 • Serum albumin < 35 g/L (interpret the serum albumin level taking into account inflammation by evaluating the CRP level) • Mini nutritional assessment (MNA) < 17 	<ul style="list-style-type: none"> • Dietary advice + oral nutritional supplements
COMORBIDITIES	<p>Charlson score</p> <ul style="list-style-type: none"> • Score 3 – 4: mortality at 1 year = 52% • Score > 5: mortality at 1 year = 85% 	<ul style="list-style-type: none"> • Manage comorbidities • Vaccinations
DEPRESSION	<p>Geriatric depression scale (GDS) (n = ?/15)</p> <ul style="list-style-type: none"> • 0 to 5 → Normal • Greater than or equal to 10 → Depression 	<ul style="list-style-type: none"> • Antidepressant treatment (selective serotonin reuptake inhibitors) / advice + specialist monitoring

Evaluation gériatrique : réduction de la mortalité à 1 an après une hospitalisation

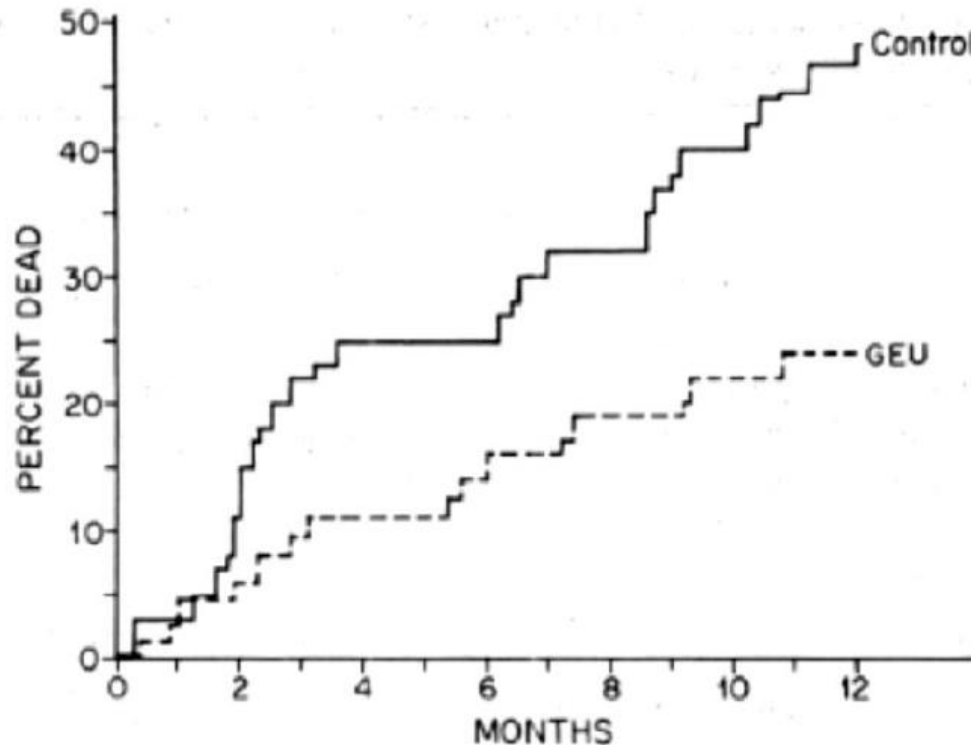
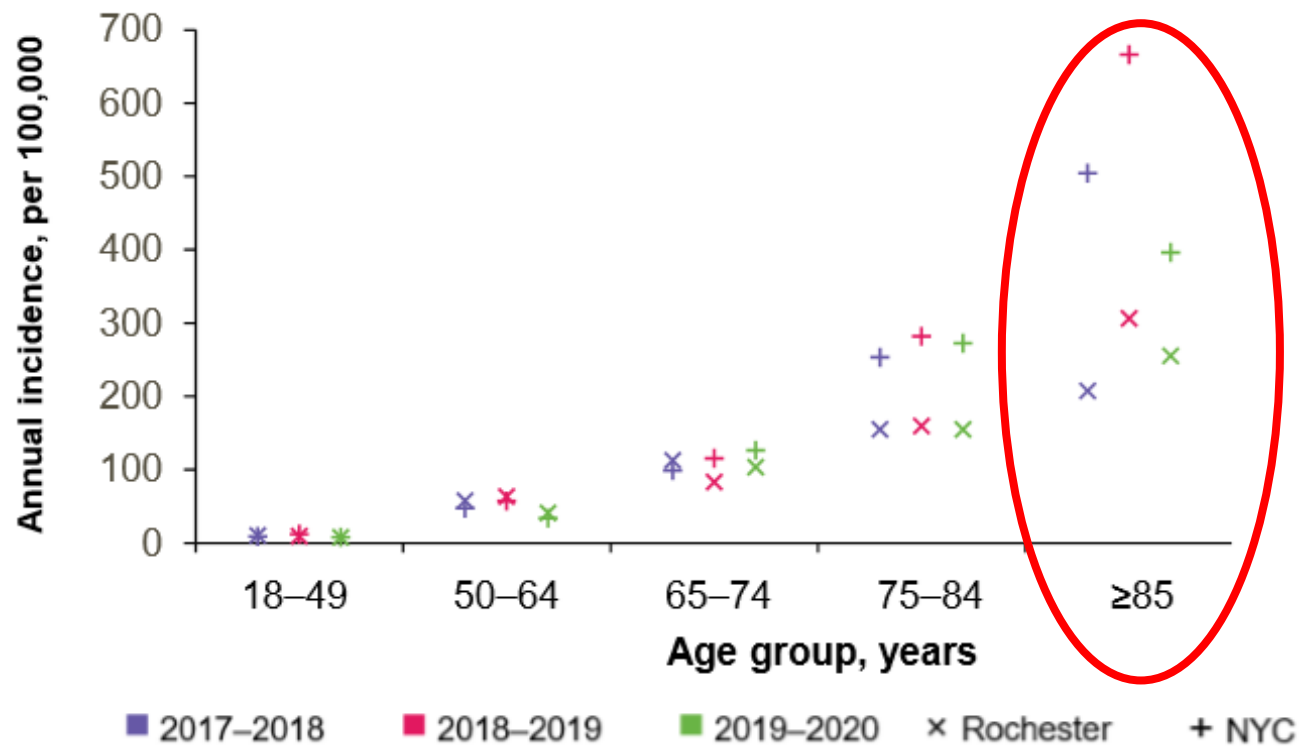


Figure 1. One-Year Mortality Curves for Geriatric Evaluation Unit (GEU) and Control Patients.

Incidence of Respiratory Syncytial Virus Infection Among Hospitalized Adults, 2017–2020



ESTIMATION OF HOSPITALIZATIONS ATTRIBUTABLE TO RSV INFECTION IN ADULTS OVER 50 YEARS OLD IN FRANCE USING A MODEL-BASED APPROACH, 2010-2020

cardio-respiratory 24,319 yearly hospitalizations

		Cardio-respiratory causes (ICD-10 I21, I50, I63, I64, J00-J99)
50 - 64 years	n n/100,000	5,955 [5,425 ; 6,461] 48.1 [43.8 ; 52.1]
65 - 74 years	n n/100,000	8,007 [7,728 ; 8,280] 131.1 [126.5 ; 135.6]
75 years and older	n n/100,000	16,312 [16,014 ; 16,602] 274.5 [269.5 ; 279.4]

Table 1. Evolution of the number of hospitalization by age group for respiratory and cardio-respiratory causes

Burden of respiratory syncytial virus infection in older and high-risk adults: a systematic review and meta-analysis of the evidence from developed countries

Infections respiratoires VRS plus fréquentes après 65 ans

a) Study	Country	Age group (years)	Population type	Sample and infection	ROB	RSV cases (n)	Tested samples (n)	Proportion of RSV cases % (95% CI)
Annual data								
Community								
GRAAT, 2003	NL	≥60		SS ARI	0/9	0	107	0.00 (0.00-3.47)
Medically attended								
ARBEFVILLE, 2017#	US	≥60		CI ARI	4/9	13	614	2.12 (1.24-3.59)
VISSEAU, 2017	FR	≥60	IP	CI ARI	3/9	82	2449	3.35 (2.71-4.14)
WALKER, 2017	US	≥60	IP	CI ARI	3/9	31	168	18.45 (13.32-25.00)
PABA, 2014	IT	≥60	IP	SS ILI	1/9	23	107	21.50 (14.77-30.19)
WANSULA, 2016	US	≥65	IP	SS SARI	2/9	3	156	1.92 (0.66-5.50)
CHARLES, 2008	AU	≥65	ED	SS PNM	1/9	13	587	2.21 (1.30-3.75)
ANTON, 2016	ES	≥65	OP	SS ILI	0/9	8	339	2.36 (1.20-4.59)
HUIJTS, 2018*	NL	≥65		SS PNM	2/9	91	2917	3.12 (2.55-3.81)
PRICE, 2019	AU	≥65		CI ARI	3/9	244	7777	3.14 (2.77-3.55)
GAYMARD, 2018	FR	≥65		CI ARI/ILI	5/9	169	4232	3.99 (3.44-4.63)
TRAMUTO, 2016	IT	≥65	ICU	CI ARI/ILI	2/9	3	75	4.00 (1.37-11.11)
JAIN, 2015	US	≥65	IP	SS PNM	1/9	33	821	4.02 (2.88-5.59)
GAYMARD, 2019	FR	≥65		CI MSARI	5/9	287	6931	4.14 (3.70-4.64)
KATSURADA, 2017	JP	≥65		SS PNM	1/9	89	2037	4.37 (3.56-5.35)
VARGHESE, 2018	AU	≥65		SS ILI	2/9	25	447	5.59 (3.82-8.13)
ARONEN, 2019*	FI	≥65	IP	SS ARI	0/9	22	382	5.76 (3.83-8.57)
GIMFERRER, 2019	ES	≥65		SS ARI	3/9	420	6534	6.43 (5.86-7.05)
AMBROSIONI, 2014	CH	≥65		CI ARI	4/9	127	1039	12.22 (10.37-14.36)
REM for ≥65 years age group (Q=247.58, p<0.01; I ² =95.1%)								4.29 (3.32-5.51)
REM for medically attended data (Q=376.35, p<0.01; I ² =97.6%)								4.89 (2.44-6.65)
REM for annual data (Q=379.21, p<0.01; I ² =97.5%)								4.66 (3.34-6.48)

4,6%

Respiratory infections

Study	Country	Age group (years)	Population type	Sample and infection	ROB	RSV cases (n)	Tested samples (n)	Proportion of RSV cases % (95% CI)
Seasonal data								
Community								
VAN BEEK, 2017	NL	≥60		SS ILI	1/9	25	4360	0.57 (0.39-0.85)
ANSADI, 2012	IT	≥60		SS ILI	2/9	2	45	4.44 (1.23-14.83)
FALSEY, 2014	EE	≥65		SS ILI	3/9	0	17	0.00 (0.00-18.43)
FALSEY, 2014	UK	≥65		SS ILI	3/9	0	13	0.00 (0.00-22.81)
FALSEY, 2014	FR	≥65		SS ILI	3/9	1	30	3.33 (0.59-16.67)
FALSEY, 2014	BE	≥65		SS MSILI	3/9	1	20	5.00 (0.89-23.61)
FALSEY, 2014	CA	≥65		SS MSILI	3/9	2	38	5.26 (1.46-17.29)
FALSEY, 2014	NL	≥65		SS ILI	3/9	3	45	6.67 (2.29-17.86)
FALSEY, 2005	US	≥65		SS ARI	2/9	46	608	7.57 (5.72-9.94)
FALSEY, 2014	PL	≥65		SS ILI	3/9	10	90	11.11 (6.15-19.26)
FALSEY, 2014	DE	≥65		SS ILI	3/9	7	47	14.89 (7.41-27.69)
FALSEY, 2014	NO	≥65		SS ILI	3/9	2	13	15.38 (4.33-42.23)
FALSEY, 2014	CZ	≥65		SS MSILI	3/9	12	70	17.14 (10.09-27.62)
REM for ≥65 years age group (Q=13.57, p=0.19; I ² =31.9%)								9.62 (6.94-13.19)

9,6%

Respiratory Syncytial Virus Infection in Elderly and High-Risk Adults

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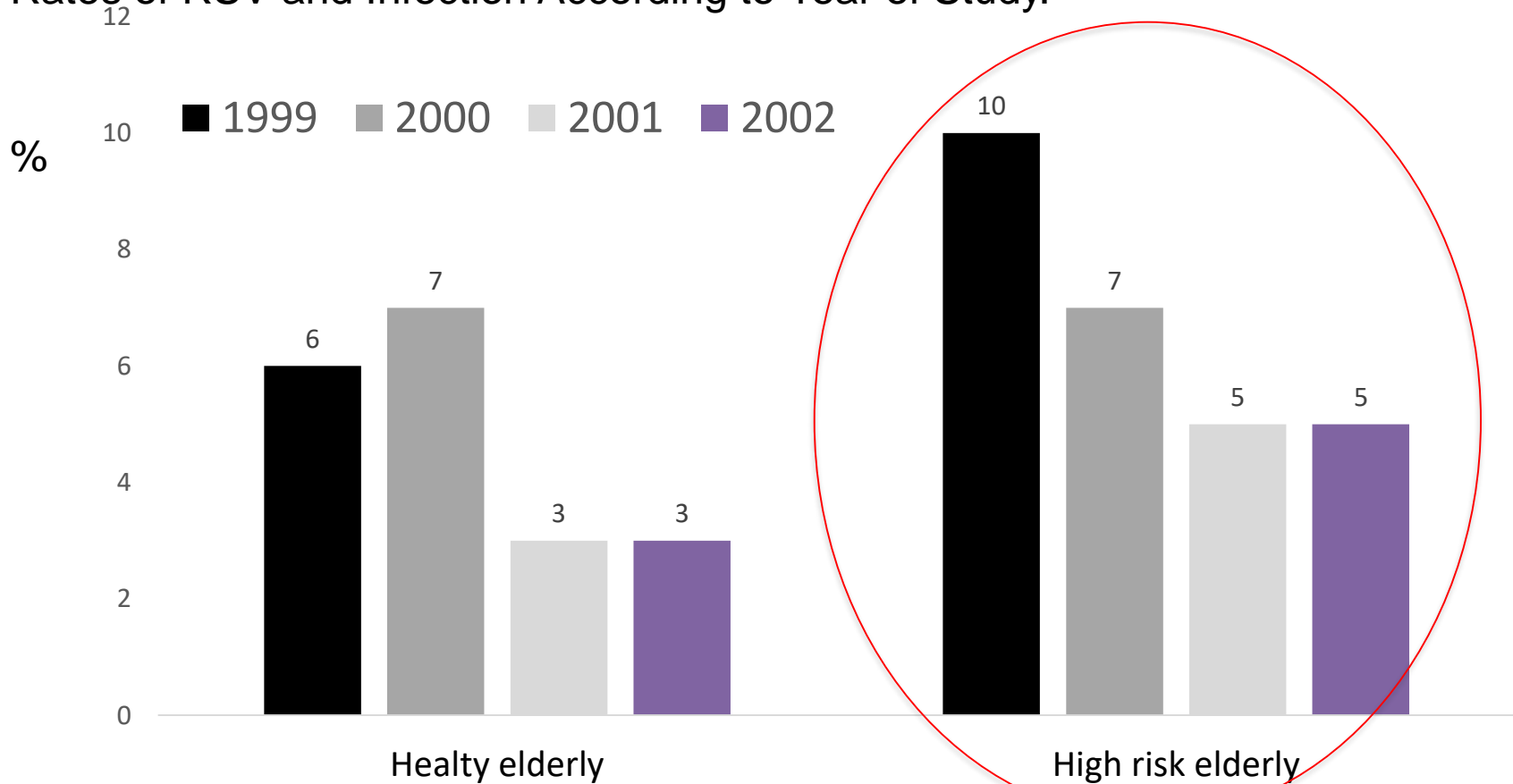
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Le patient âgé avec des comorbidités à plus de risque d'infections VRS

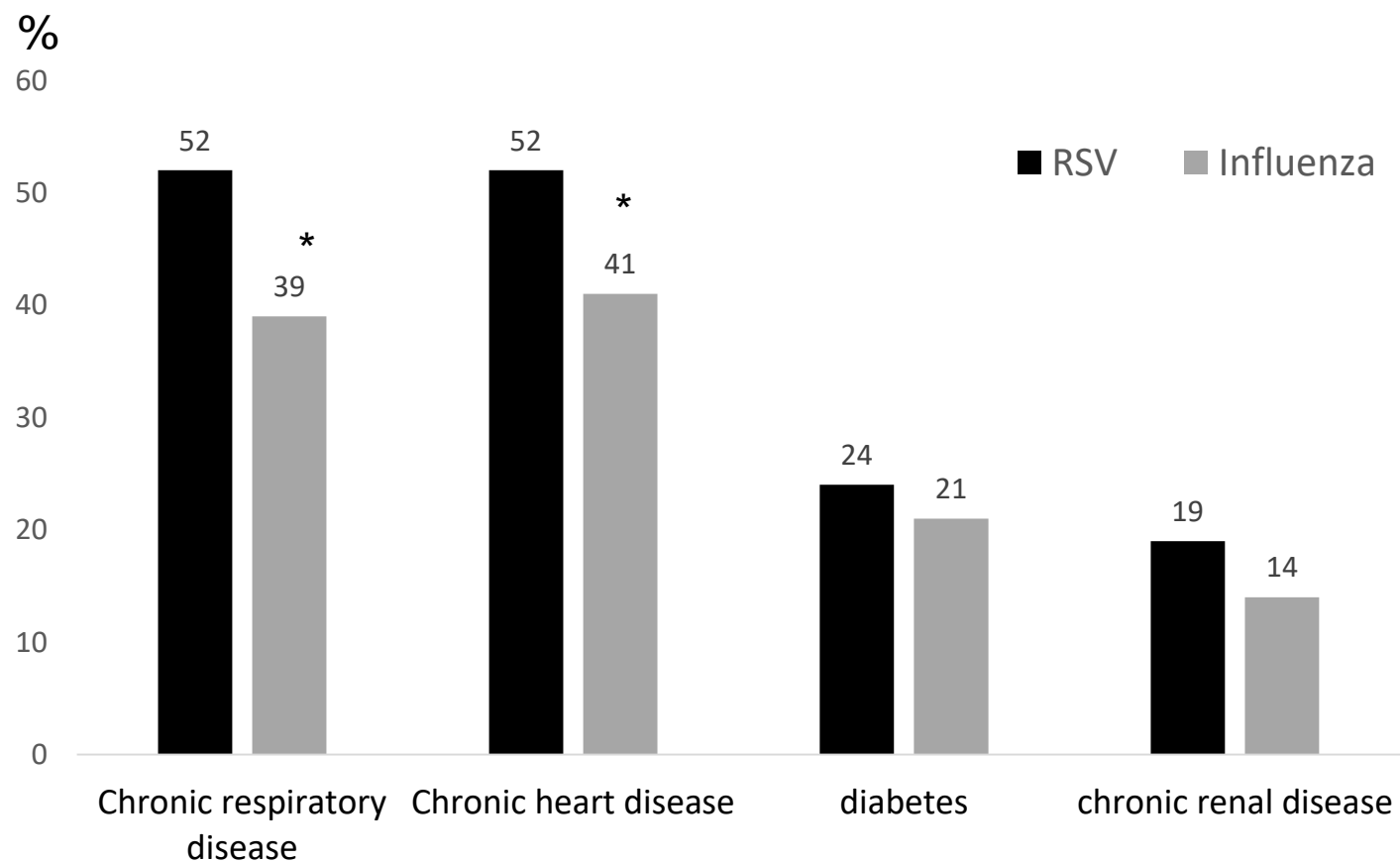
Rates of RSV and Infection According to Year of Study.



In-hospital and midterm post-discharge complications of adults hospitalised with respiratory syncytial virus infection in France, 2017–2019: an observational study

FLUVAC study group

Pathologies respiratoires et cardiaques augmentent le risque d'infections VRS



* $p < 0,05$

Burden of respiratory syncytial virus infection in older and high-risk adults: a systematic review and meta-analysis of the evidence from developed countries

Infections respiratoires VRS plus fréquentes en cas de comorbidités cardiaques ou pulmonaires

Study	Country	Age group (years)	Study setting	Population type	Sample and infection	ROB	RSV cases (n)	Tested samples (n)	Proportion of RSV cases % (95% CI)
Annual									
Cardiopulmonary									
GORSEY, 2023	US	≥60	comm		SS ARI	0/9	1	100	1.00 (0.18-5.45)
STOLZ, 2019	CH	>40	comm		SS ARI	0/9	16	391	4.09 (2.53-6.54)
SEEMUNGAL, 2001	UK	≥18	comm		SS ARI	2/9	19	168	11.31 (7.36-16.99)
FALSEY, 2006	US	≥40	comm		SS ARI	0/9	11	92	11.96 (6.81-20.15)
CHARLES, 2008	AU	≥18	meda	ED	SS PNM	1/9	10	359	2.79 (1.52-5.05)
SNYDER, 2017	US	≥18	meda	IP	CI AEC	3/9	7	250	2.08 (1.36-5.67)
KHERAD, 2010	CH	≥60	meda	IP	SS AEC	1/9	3	86	3.49 (1.19-9.76)
CAMERON, 2006	AU	>45	meda	ICU MV	SS AEC	1/9	7	107	6.54 (3.20-12.89)
ROHDE, 2003	DE	≥18	meda	IP	SS AEC	1/9	13	85	15.29 (9.16-24.43)
BORG, 2003	DE	≥18	meda	IP	SS AEC	1/9	22	79	27.85 (19.17-38.58)
DIMOPOULOS, 2015	GR	≥18	meda	IP	SS AEC	1/9	108	247	43.72 (37.68-49.96)
PANCER, 2011	PL	>18	meda	OP	SS ARI	3/9	44	96	45.83 (36.22-55.77)
REM for subgroup (Q=285.87, p<0.01; I ² =95.8%)									9.68 (4.77-18.68)
CKD									

9,7%

Respiratory Syncytial Virus Infection in Elderly and High-Risk Adults

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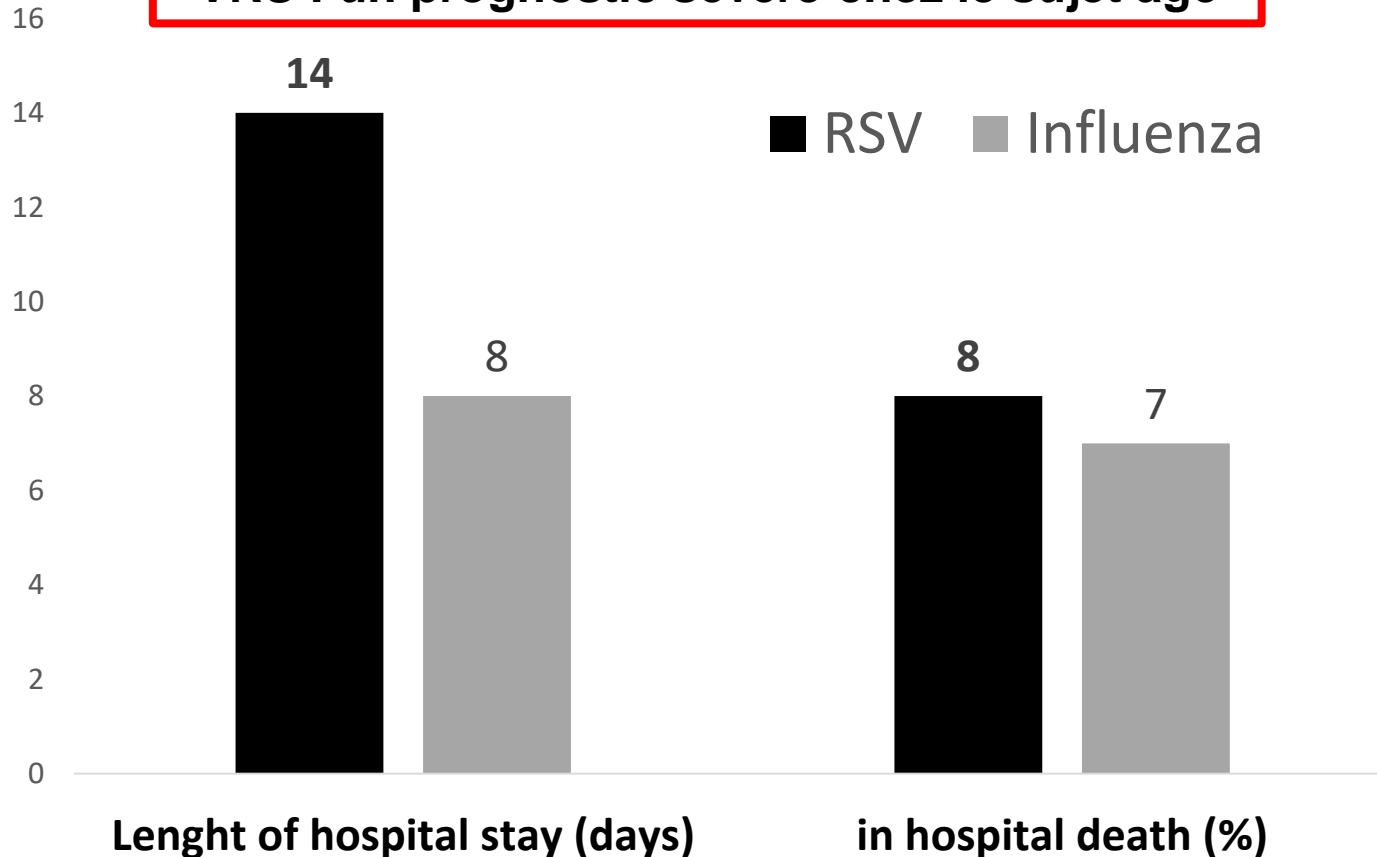
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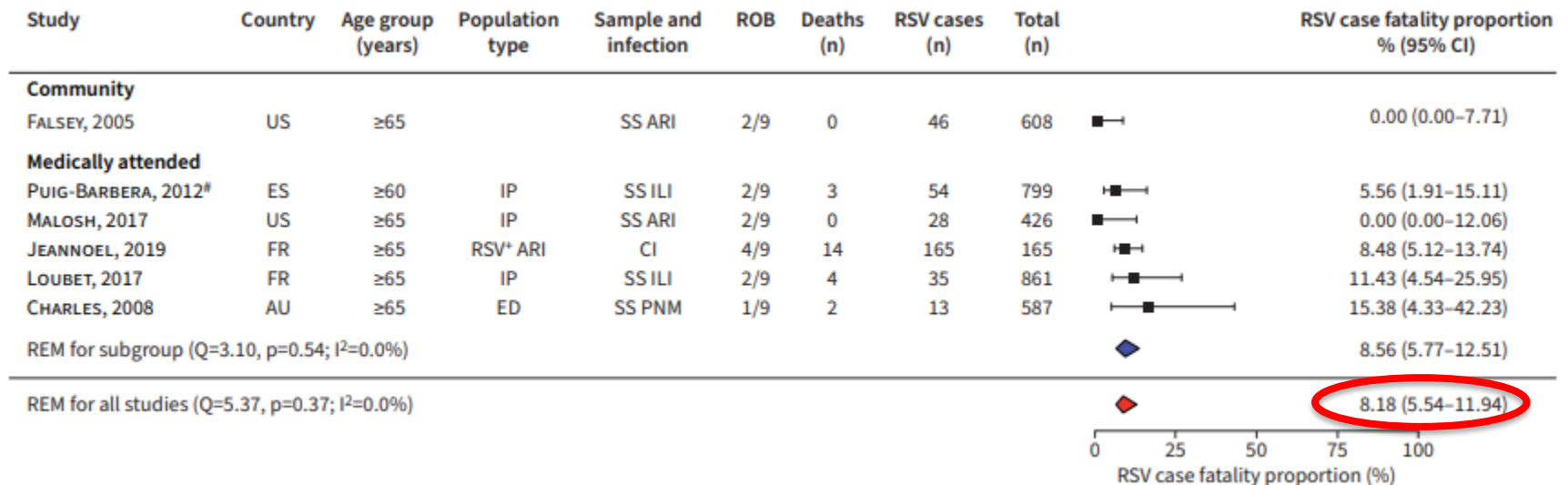
VRS : un pronostic sévère chez le sujet âgé

1999-2003

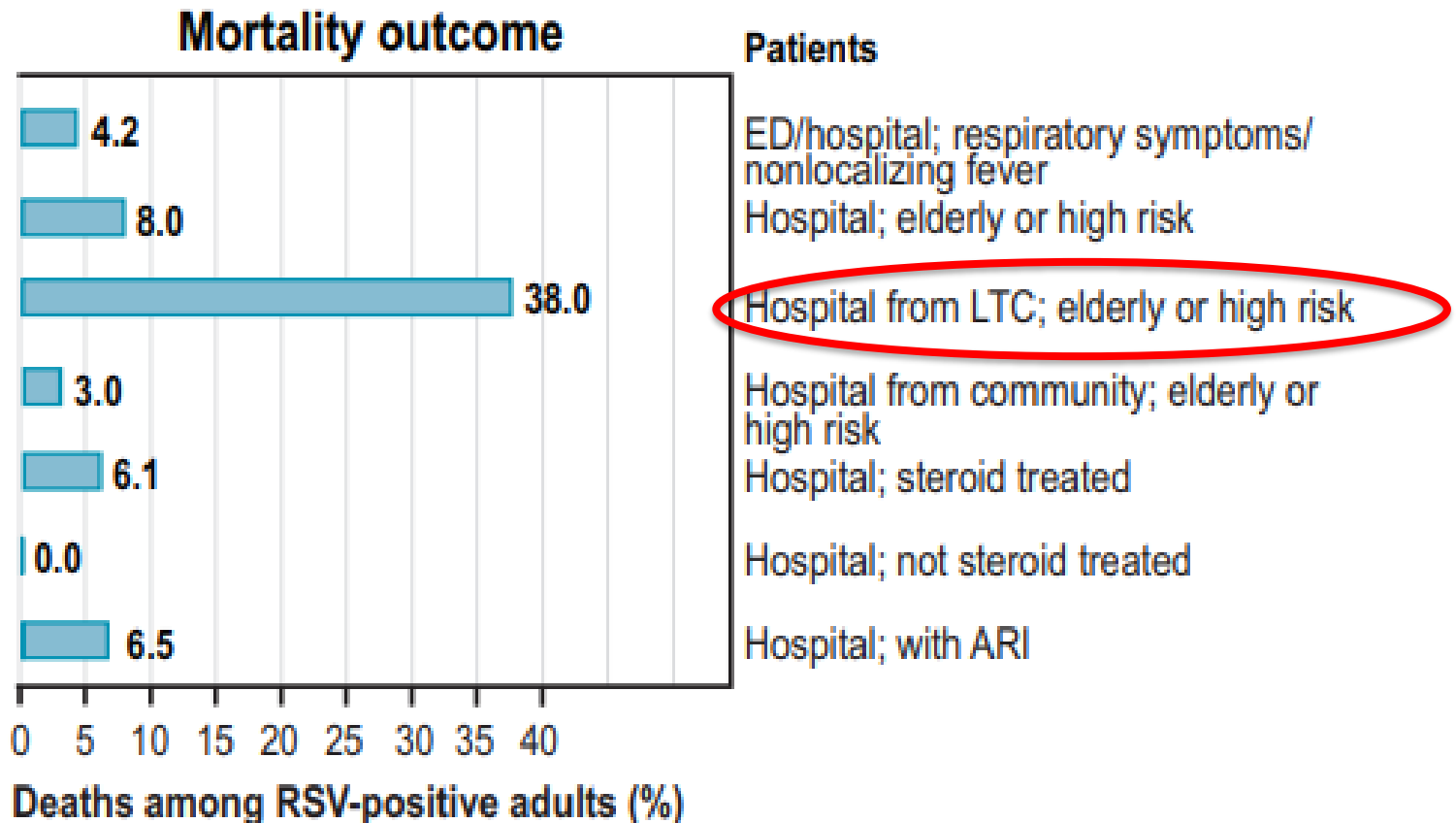


Burden of respiratory syncytial virus infection in older and high-risk adults: a systematic review and meta-analysis of the evidence from developed countries

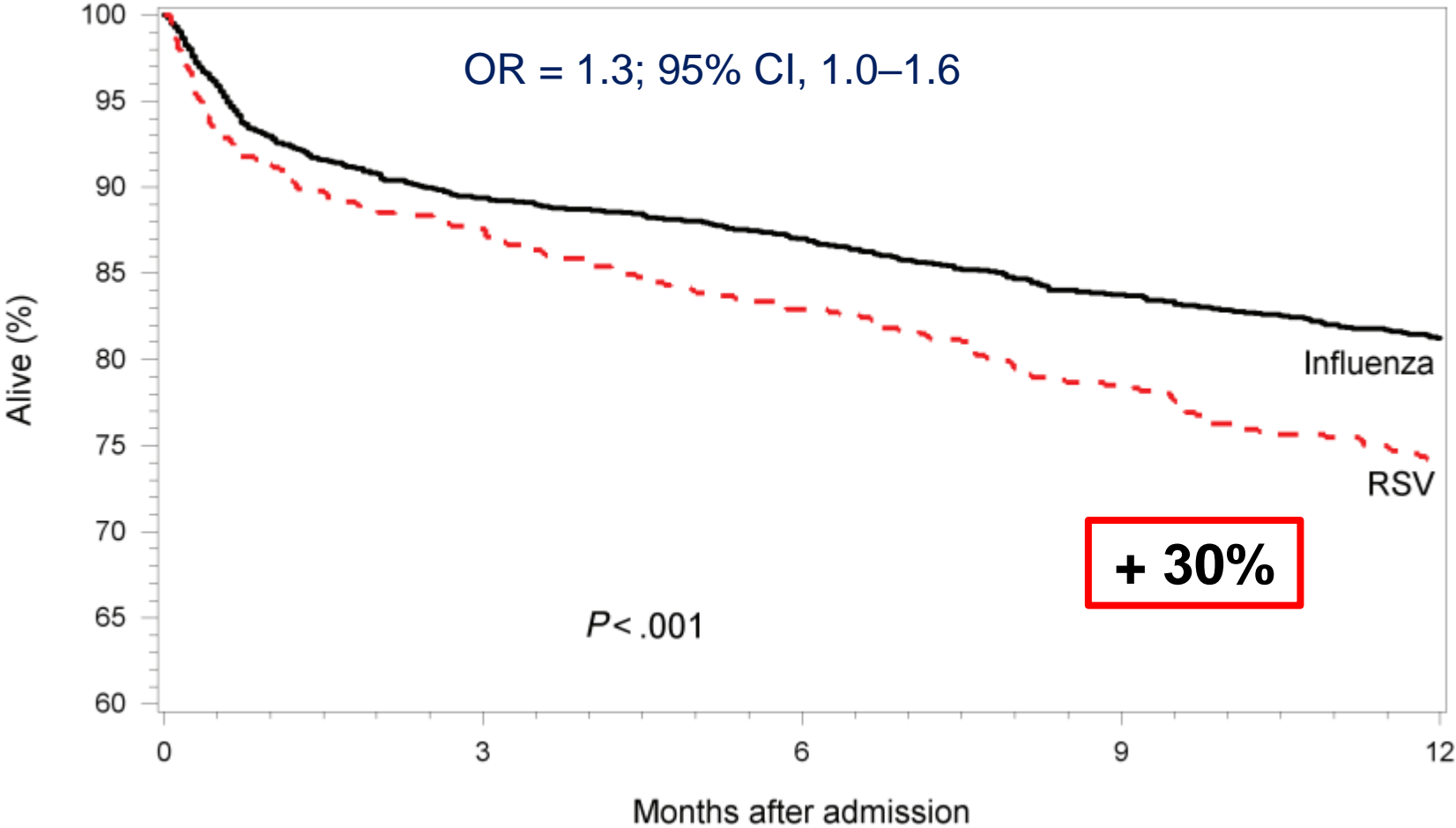
Mortalité



The epidemiology of medically attended respiratory syncytial virus in older adults in the United States: A systematic review

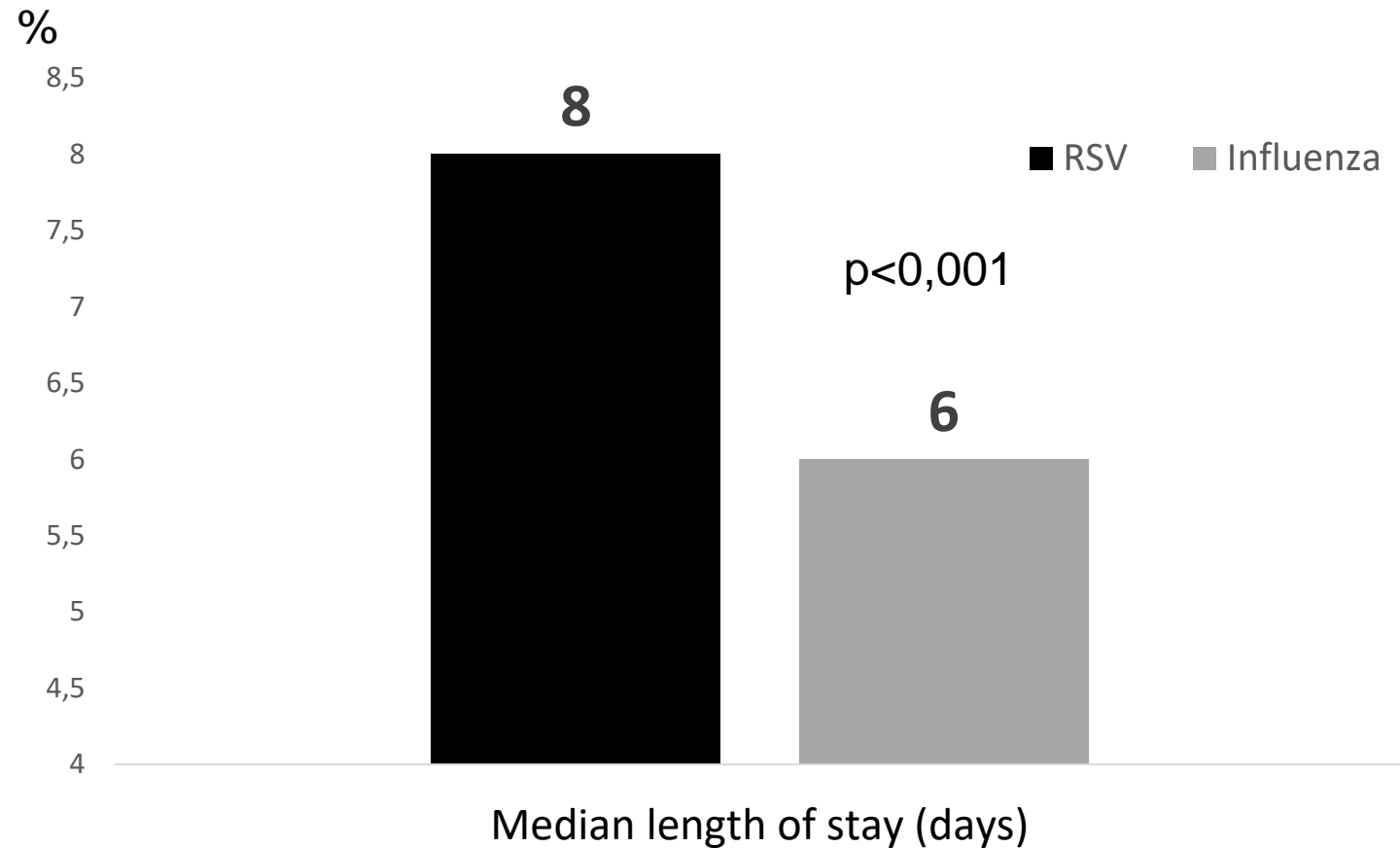


Severe Morbidity and Mortality Associated With Respiratory Syncytial Virus Versus Influenza Infection in Hospitalized Older Adults



In-hospital and midterm post-discharge complications of adults hospitalised with respiratory syncytial virus infection in France, 2017–2019: an observational study

Durées de séjour plus longues en cas d'infections à VRS



Respiratory Syncytial Virus Infection in Elderly and High-Risk Adults

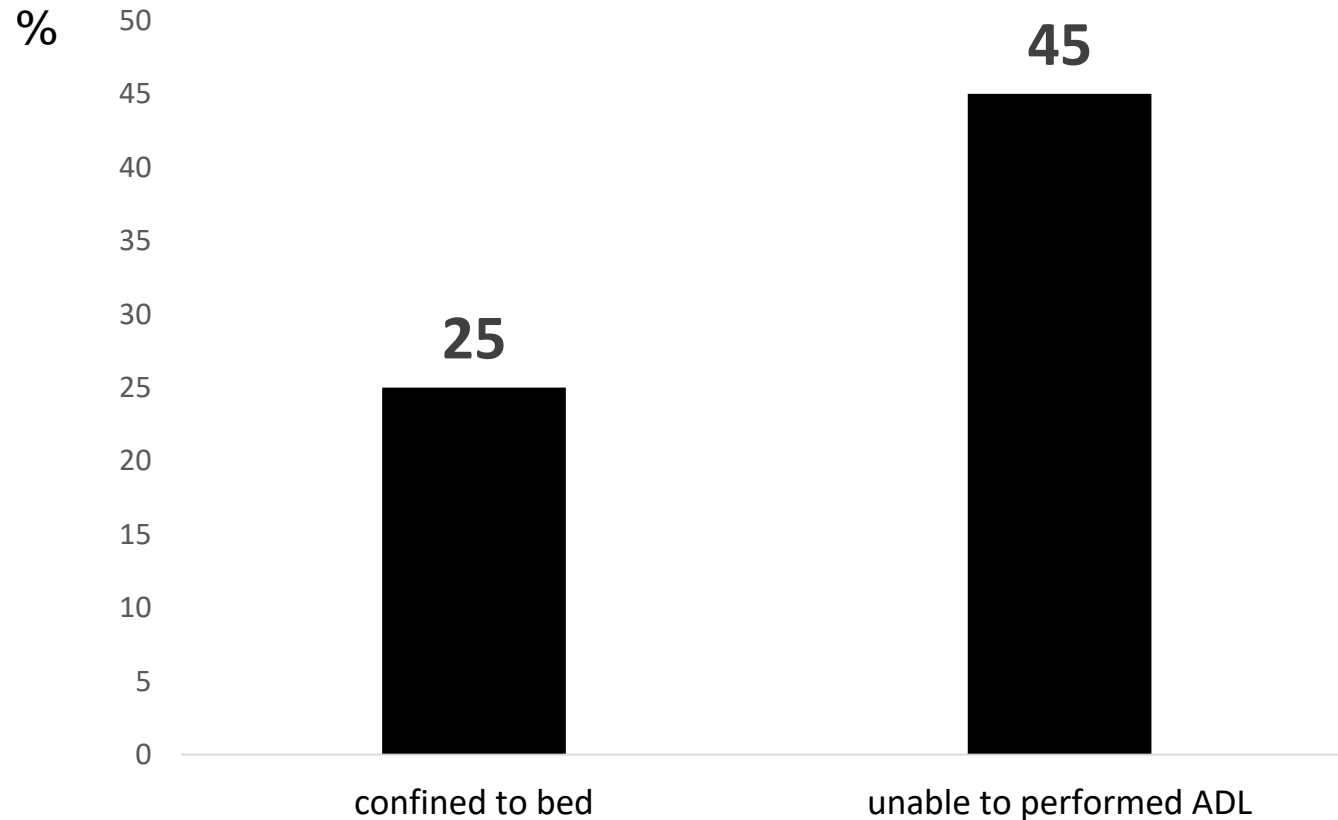
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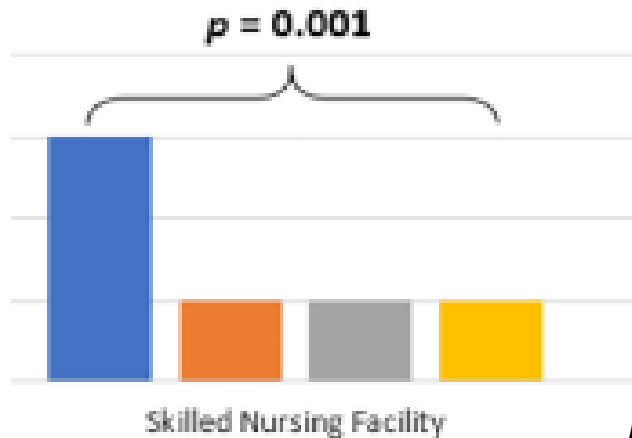
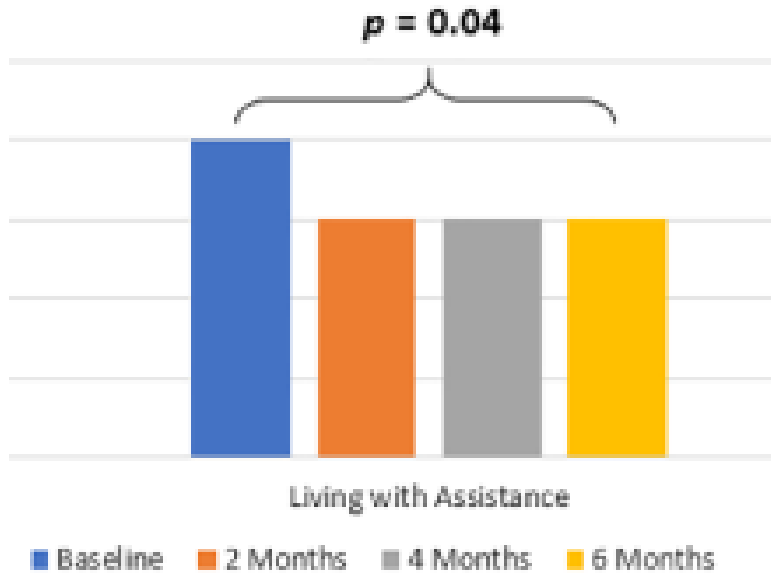
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Infections VRS : un fardeau sur la qualité de vie



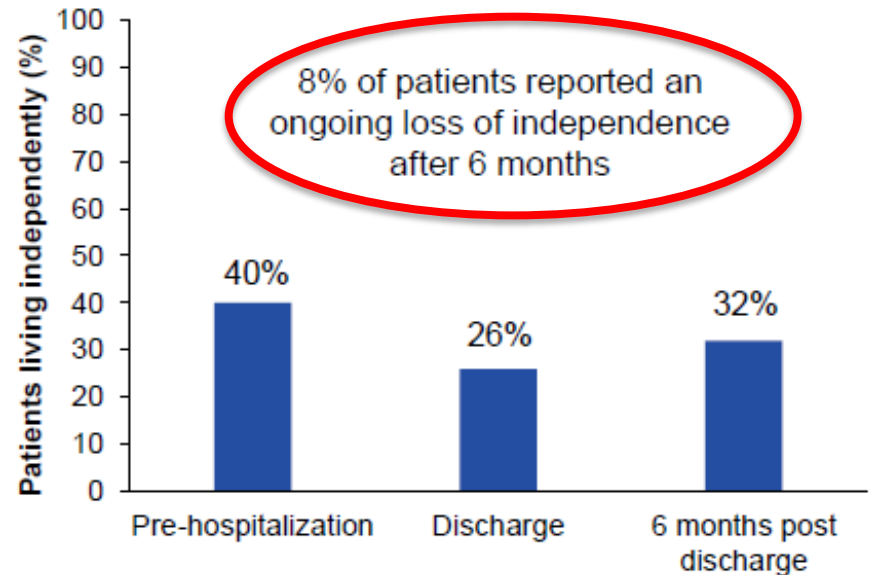
Change in functional status associated with respiratory syncytial virus infection in hospitalized older adults

Lawton-Brody Instrumental Activities of Daily Living (IADL)



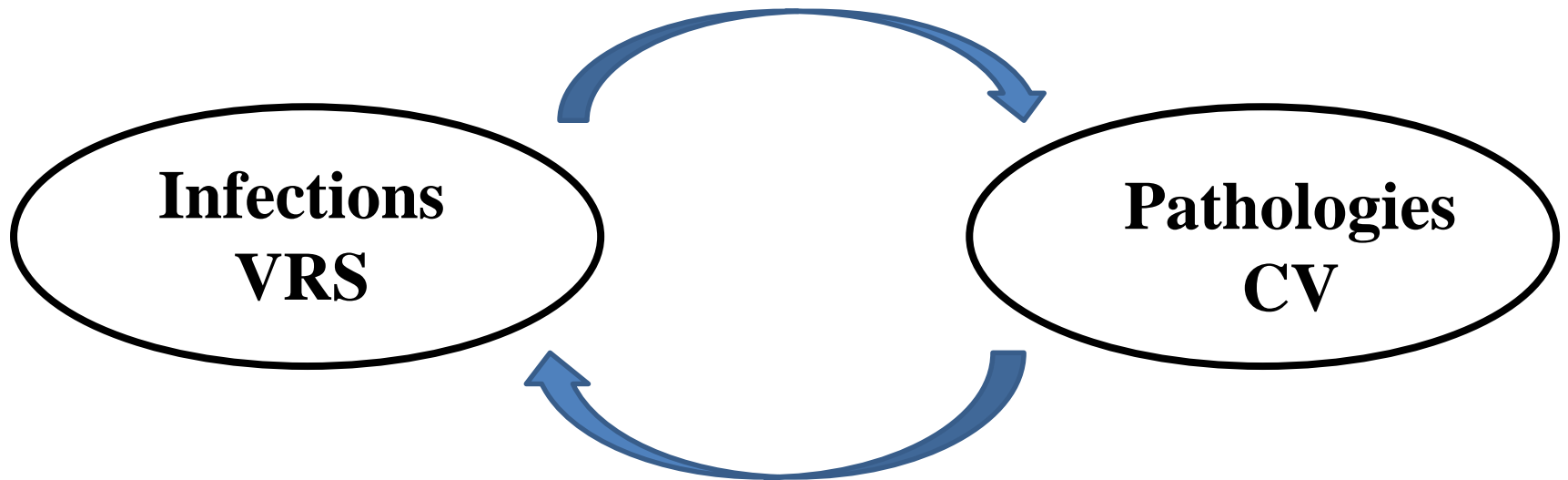
**Infections VRS :
Diminution de l'autonomie**

% of patients living independently



Infections VRS et pathologies cardiovasculaires chez le sujet âgé

Infections VRS plus fréquentes

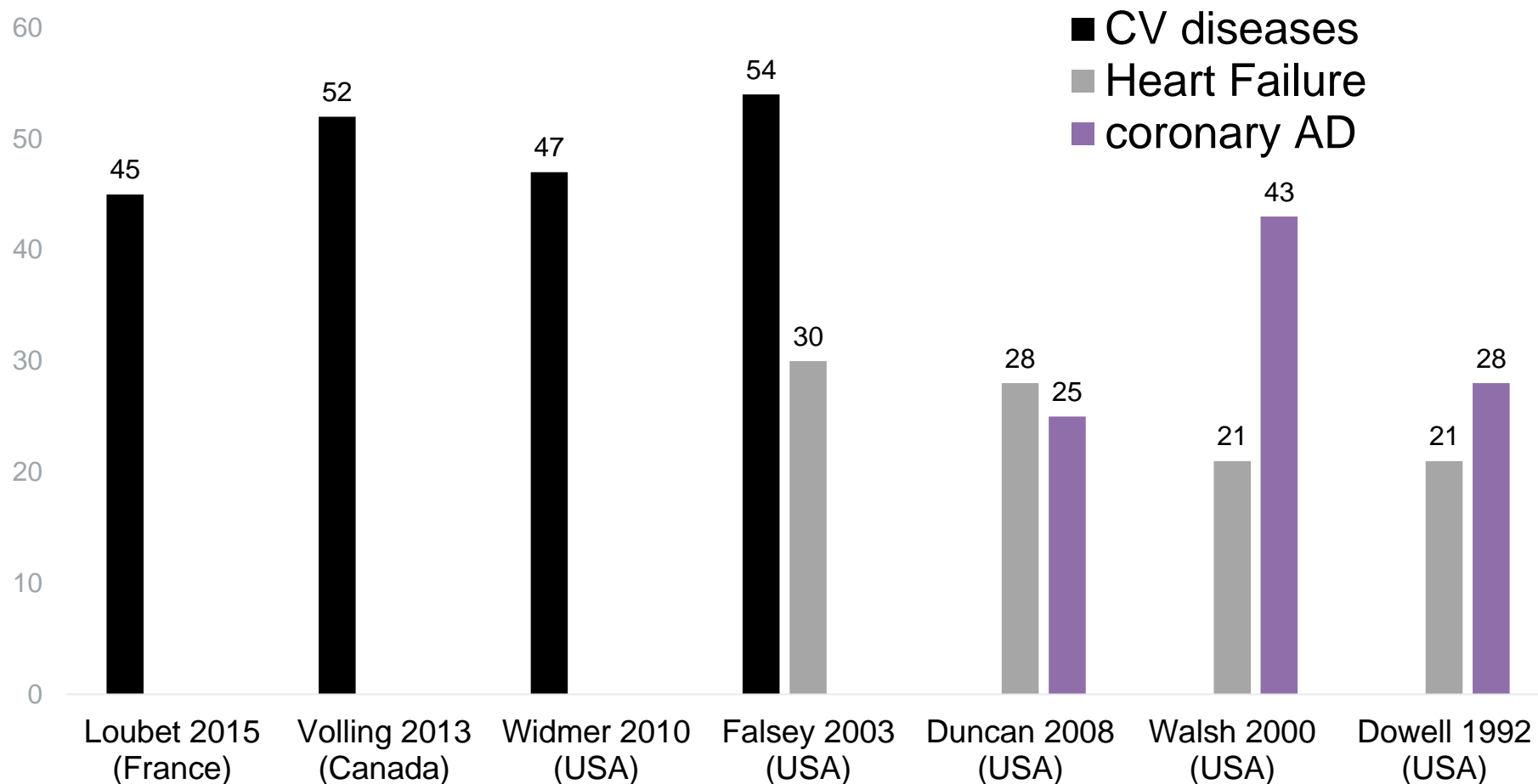


Pathologies CV plus graves

Respiratory Syncytial Virus and Associations With Cardiovascular Disease in Adults

Infections VRS plus fréquentes en présence de patho CV

Prevalence of Pre-Existing Cardiovascular Disease in Patients With RSV



Respiratory Syncytial Virus Infection and Risk of Acute Myocardial Infarction

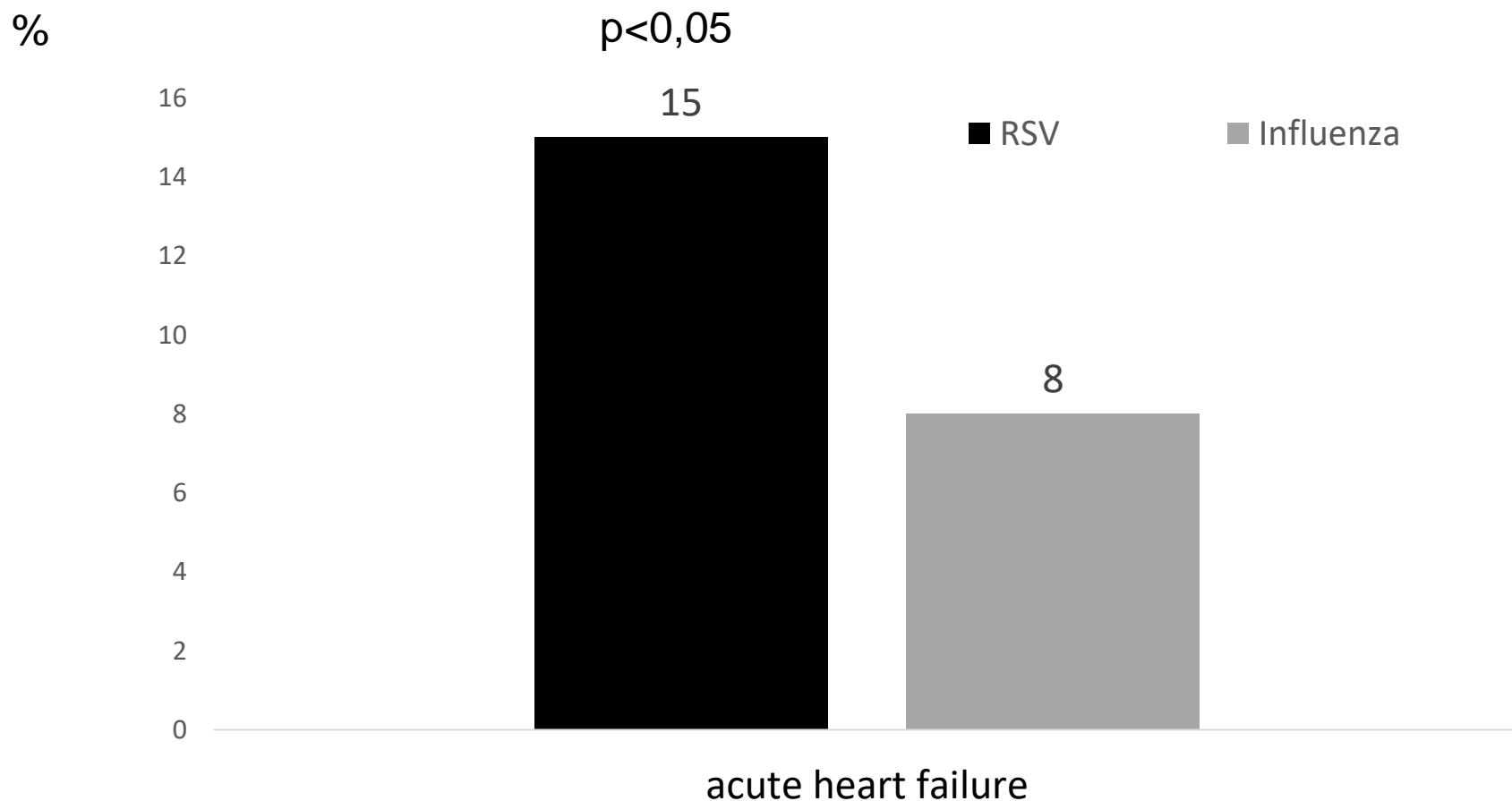
Risque d'IDM augmenté

TABLE 4. Adjusted OR (95% CI) for variables associated with AMI after adjustment for potential confounding variables

Variables ^a	Adjusted OR	95% CI	P
RSV (positive vs. negative)	11.1	3.3–29.5	<0.001
CMV (positive vs. negative)	3.1	1.01–8.3	0.048
HSV-1 (positive vs. negative)	5.9	1.8–15.6	0.004
<i>C pneumoniae</i> (positive vs. negative)	3.1	1.1–8.1	0.040
Current smoking (yes vs. no)	4.7	1.5–10.3	0.009
Hypertension (presence vs. absence)	3.9	1.2–9.1	0.020
Triglyceride (mmol/L)	2.7	1.2–5.5	0.017
Occupation (no-employment/retired vs. employment)	2.0	1.04–8.4	0.042

In-hospital and midterm post-discharge complications of adults hospitalised with respiratory syncytial virus infection in France, 2017–2019: an observational study

Risque de décompensation cardiaque augmenté



Respiratory Syncytial Virus and Associations With Cardiovascular Disease in Adults

Complications CV plus fréquentes en cas d' Infections VRS

TABLE 2 Cardiovascular Complications of Laboratory-Confirmed RSV Infection in Adults

First Author (Ref. #)	Study Years	Study Location	Patients With Cardiovascular Complications of RSV Infection
Loubet et al. (36)	2012-2015	France	Acute heart failure: 19.0%
Anderson et al. (67)	2012-2013	Mayo Clinics in Rochester, Minnesota, and Jacksonville, Florida	20.7% (CHF exacerbation, atrial fibrillation, acute coronary event, or acute CV event)
Volling et al. (12)	2012-2013	Toronto, Ontario, Canada	All CV complications: 22.0% CHF exacerbation: 14.0% New arrhythmia: 8.0% Stroke: 2.0% Myocardial infarction: 1.0%
Lee et al. (68)	2009-2011	Hong Kong, China	14.3% (CHF exacerbation, atrial fibrillation, acute coronary event, or acute cerebrovascular event)
Falsey et al. (18)	1999-2003	Rochester, New York	CHF: 13.0% (based on chest radiograph)
Falsey et al. (13)	1989-1992	New York	CHF: 20.0% (based on principal discharge diagnosis)

Risk Factors for Respiratory Failure Associated with Respiratory Syncytial Virus Infection in Adults

La présence de pathologies CV aggrave le pronostic des infections VRS

Risque d'hospitalisations pour insuffisance respiratoire

Variable	OR	95% CI	P value
Viral load log ₁₀ (value +1)	1.0	0.5–1.7	.91
COPD	4.6	1.2–17.7	.02
Any cardiac disease ^a	7.5	1.3–43.6	.01
DM	5.0	1.0–26.0	.03

The Journal of Infectious Diseases 2009; 200:1242–6

Respiratory Syncytial Virus Infection in Guatemala, 2007–2012

La présence de pathologies CV aggrave le pronostic des infections VRS

Table 4. Predictors of Severe Outcome Among Respiratory Syncytial Virus (RSV)–Positive Hospital Patients With Acute Respiratory Illness—Guatemala, November 2007–December 2012

Characteristic	Severe Outcome, ^a Proportion (%)	Odds Ratio (95% CI)	
		Crude	Adjusted ^b
Pulmonary disease	7/42 (17)	0.84 (.37, 1.90)	1.13 (.46, 2.76)
Cardiovascular disease	15/41 (7)	2.51 (1.31, 4.80)	4.1 (1.9, 8.8)

Acute Cardiac Events in Hospitalized Older Adults With Respiratory Syncytial Virus Infection

12 states over 5 RSV seasons (annually from 2014-2015 ,2017-2018, 2022-2023)

6 248 hospitalized adults

Cardiac event	Overall (N = 6248)	
	Unweighted No.	Weighted prevalence (95% CI), %
≥1 Acute cardiac event	1383	22.4 (21.0-23.7)
Acute heart failure	965	15.8 (14.6-17.0)
Acute ischemic heart disease	468	7.5 (6.8-8.3)
Hypertensive crisis	76	1.3 (1.0-1.7)
Ventricular tachycardia	73	1.1 (0.8-1.4)
Cardiogenic shock	40	0.6 (0.4-0.8)
Other acute cardiac event ^c	94	1.3 (1.0-1.6)

Acute Cardiac Events in Hospitalized Older Adults With Respiratory Syncytial Virus Infection

Risk Factors for Acute Cardiac Events

Factor	Overall (N = 6248)	
	ARR (95% CI)	P value
Age group, y		
50-64	1 [Reference]	NA
65-74	1.10 (0.96-1.26)	.15
75-84	1.20 (1.01-1.42)	.04
≥85	1.44 (1.20-1.73)	<.001
Sex		
Female	1 [Reference]	NA
Male	1.12 (1.00-1.25)	.06
Race and ethnicity		
Asian American or Pacific Islander	0.96 (0.84-1.09)	.49
Black	1.16 (0.98-1.36)	.08
Hispanic or Latino	0.92 (0.72-1.19)	.53
White	1 [Reference]	NA
Other ^b	1.29 (0.97-1.72)	.08
Underlying conditions ^c		
Heart failure ^d	3.23 (2.83-3.69)	<.001
Atrial fibrillation	1.18 (1.08-1.30)	<.001
Coronary artery disease ^e	1.22 (1.00-1.48)	.05
Diabetes (type 1 or 2)	1.18 (1.06-1.31)	<.001
Chronic kidney disease ^f	1.03 (0.89-1.19)	.69
COPD ^g	0.97 (0.86-1.09)	.58
Cerebrovascular accident or stroke	0.92 (0.82-1.03)	.14
Severe obesity ^h	1.00 (0.85-1.17)	.98

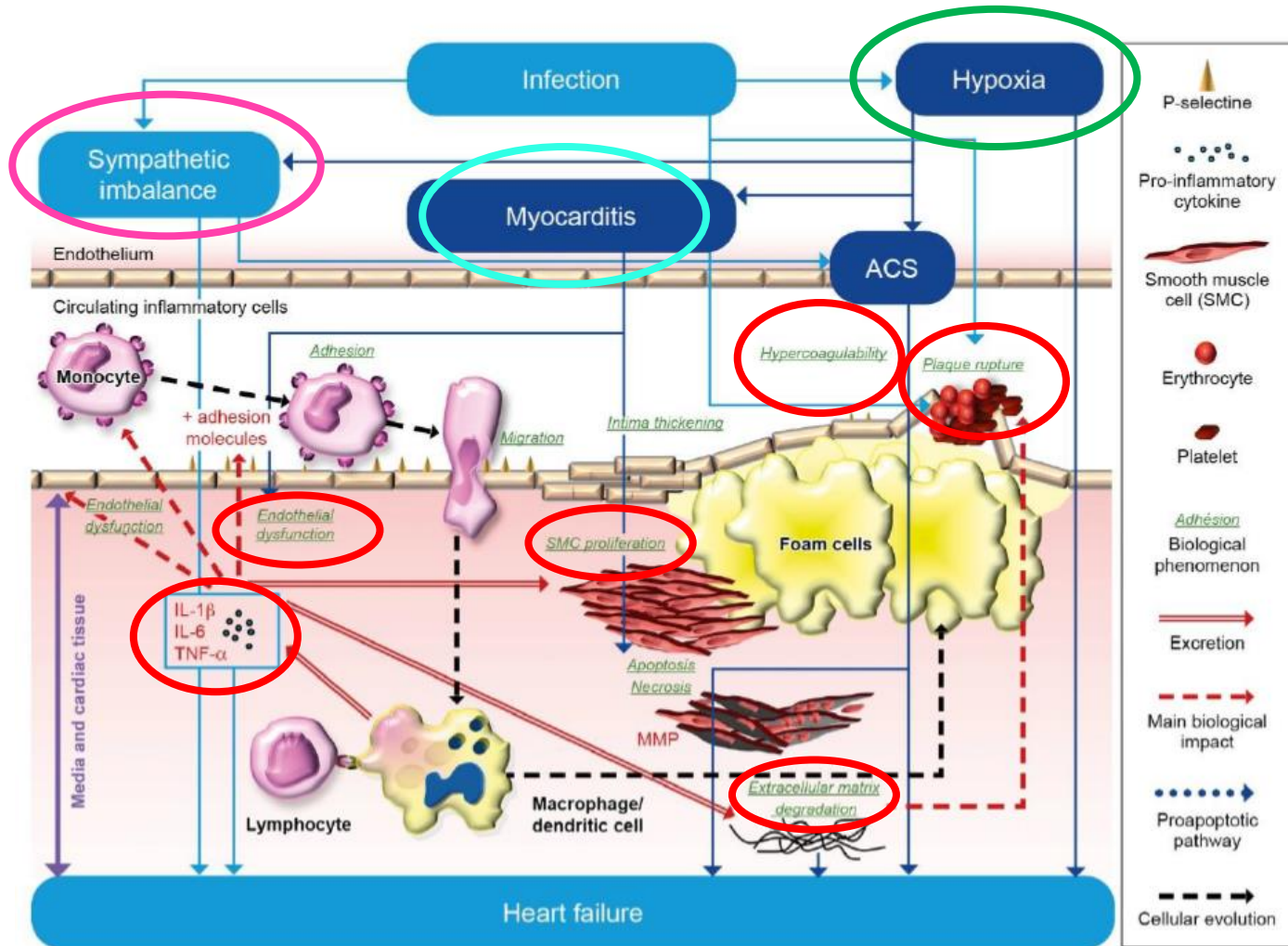
Acute Cardiac Events in Hospitalized Older Adults With Respiratory Syncytial Virus Infection

Acute Cardiac Events and Severe Outcomes Among Hospitalized Adults

Outcome and event	Bivariate models		Multivariable models ^a	
	RR (95% CI)	P value	ARR (95% CI)	P value
ICU admission				
≥1 Acute cardiac event	1.58 (1.24-2.03)	<.001	1.54 (1.23-1.93)	<.001
Acute heart failure	1.37 (1.04-1.81)	.02	1.25 (0.95-1.66)	.11
Acute ischemic heart disease	1.68 (1.41-2.01)	<.001	1.61 (1.41-1.85)	<.001
Ventricular tachycardia	1.84 (1.18-2.86)	.01	1.60 (1.18-2.17)	<.001
Other acute heart disease ^b	2.14 (1.71-2.66)	<.001	1.98 (1.71-2.30)	<.001
Invasive mechanical ventilation				
≥1 Acute cardiac event	2.00 (1.27-3.15)	<.001	2.00 (1.44-2.79)	<.001
Acute heart failure	1.56 (1.02-2.37)	.04	1.47 (1.08-2.00)	.01
Acute ischemic heart disease	2.58 (1.76-3.77)	<.001	2.28 (1.74-2.99)	<.001
In-hospital death				
≥1 Acute cardiac event	2.07 (1.60-2.66)	<.001	1.77 (1.36-2.31)	<.001
Acute heart failure	1.67 (1.32-2.11)	<.001	1.29 (1.01-1.65)	.03
Acute ischemic heart disease	2.05 (1.56-2.70)	<.001	1.86 (1.46-2.37)	<.001

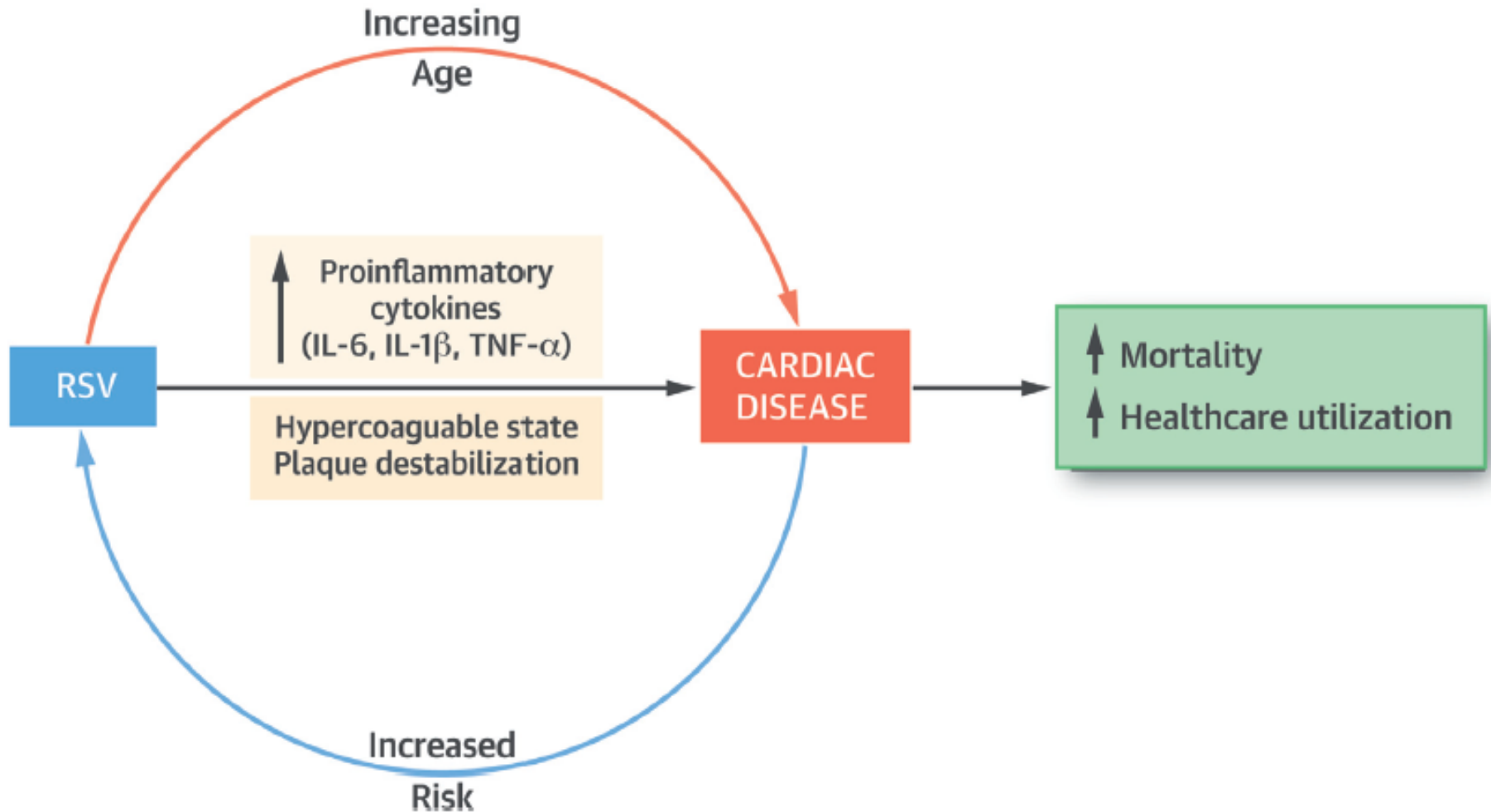
JAMA Internal Medicine Published online April 15, 2024

Infections virales et pathologies cardio-vasculaires : mécanismes



Respiratory Syncytial Virus and Associations With Cardiovascular Disease in Adults

CENTRAL ILLUSTRATION Relationship of Respiratory Syncytial Virus and Cardiac Disease in Adults



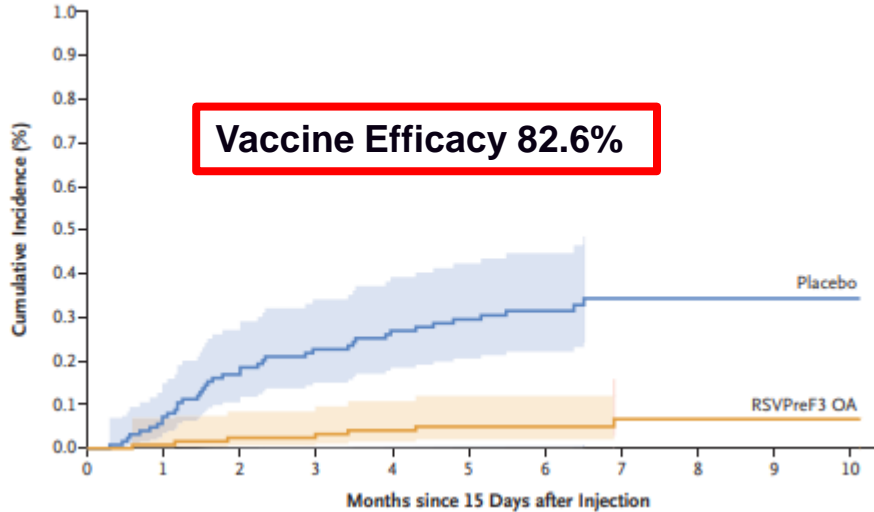
RESEARCH SUMMARY

Respiratory Syncytial Virus Prefusion F Protein Vaccine in Older Adults

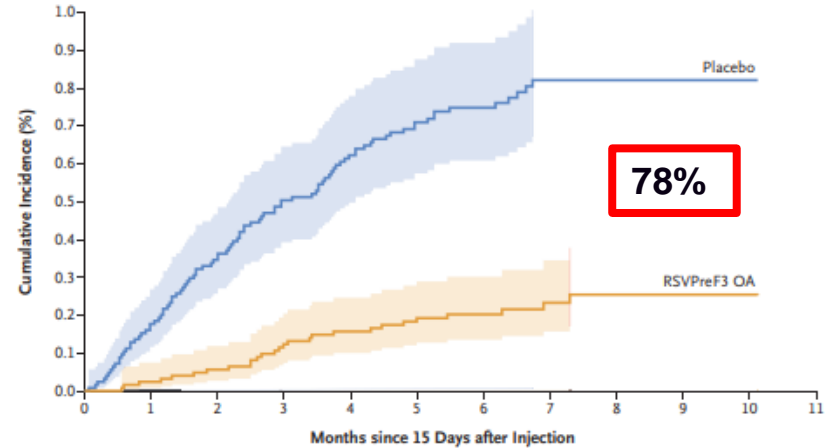
Papi A et al. DOI: 10.1056/NEJMoa2209604

24,966 participants, > 60 years Mean =69.5 years

A RSV-Related Lower Respiratory Tract Disease



B RSV-Related Acute Respiratory Infection



Vaccine efficacy 94.1% against severe RSV-related lower respiratory tract disease

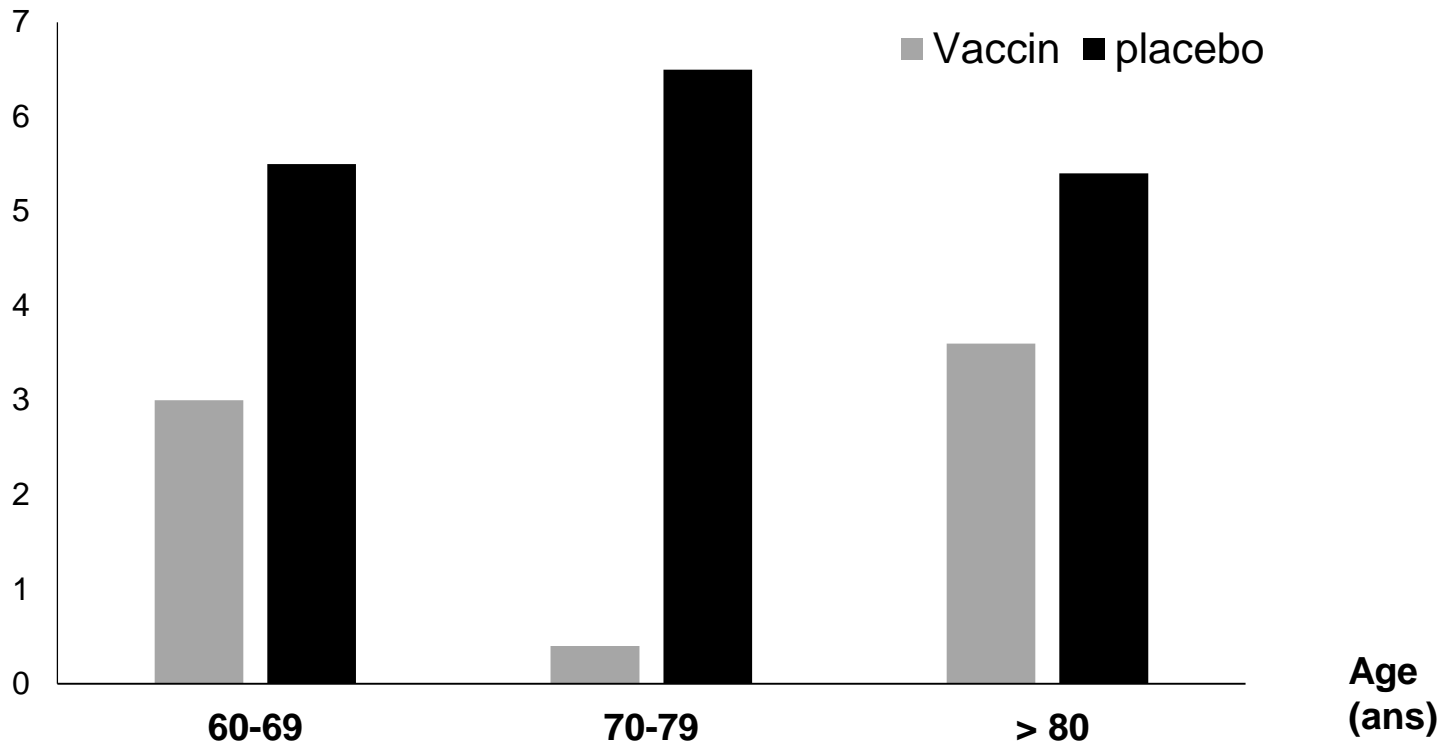
RESEARCH SUMMARY

Respiratory Syncytial Virus Prefusion F Protein Vaccine in Older Adults

Papi A et al. DOI: 10.1056/NEJMoa2209604

Events /1000 participant-years

≥ 80 ans, n = 2044 = 8,2%



RESEARCH SUMMARY

Respiratory Syncytial Virus Prefusion F Protein Vaccine in Older Adults

Papi A et al. DOI: 10.1056/NEJMoa2209604

frail, n = 366 / 24 966

End Point	RSVPreF3 OA Group			Placebo Group			Vaccine Efficacy (CI)†
	No. of Participants	No. of Events <i>no. of events/1000 participant-yr</i>	Incidence Rate	No. of Participants	No. of Events <i>no. of events/1000 participant-yr</i>	Incidence Rate	
According to frailty status							
Frail	189	1	10.4	177	1	10.8	14.9 (-6638.7 to 98.9)
Prefrail	4,792	1	0.4	4,778	14	5.5	92.9 (53.4 to 99.8)
Fit	7,464	5	1.2	7,519	25	5.9	80.0 (46.7 to 94.0)

RESEARCH SUMMARY

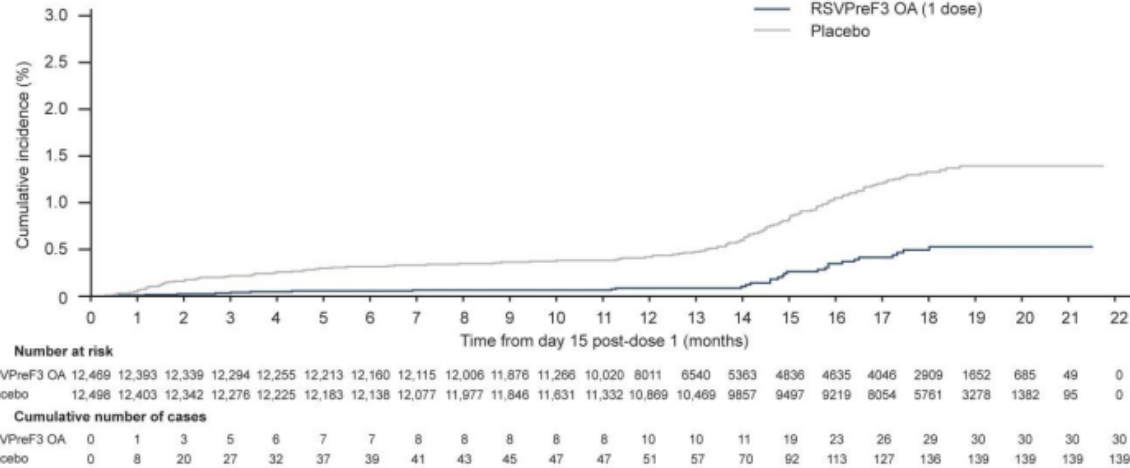
Respiratory Syncytial Virus Prefusion F Protein Vaccine in Older Adults

Papi A et al. DOI: 10.1056/NEJMoa2209604



Efficacy and Safety of Respiratory Syncytial Virus (RSV) Prefusion F Protein Vaccine (RSVPreF3 OA) in Older Adults Over 2 RSV Seasons

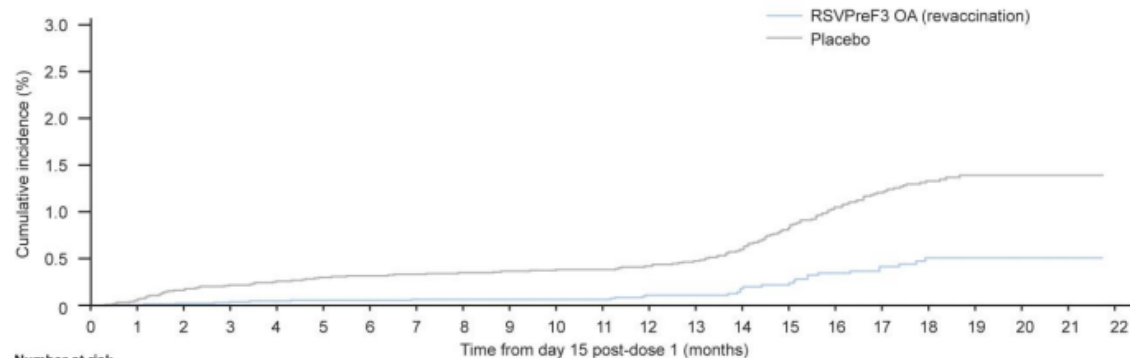
A RSV-LRTD after a single dose of RSVPreF3 OA



Efficacy 67.2%
against RSV-LRTD

Efficacy 78.8%
against **severe RSV-LRTD.**

B RSV-LRTD after a first dose of RSVPreF3 OA dose and a revaccination 1 year later



Efficacy 67.1%
against RSV-LRTD

Efficacy 78.8%
against **severe RSV-LRTD.**

ORIGINAL ARTICLE

Efficacy and Safety of a Bivalent RSV Prefusion F Vaccine in Older Adults

Pfizer's RSVpreF Vaccine Candidate Program

Vaccine

Bivalent stabilized prefusion F

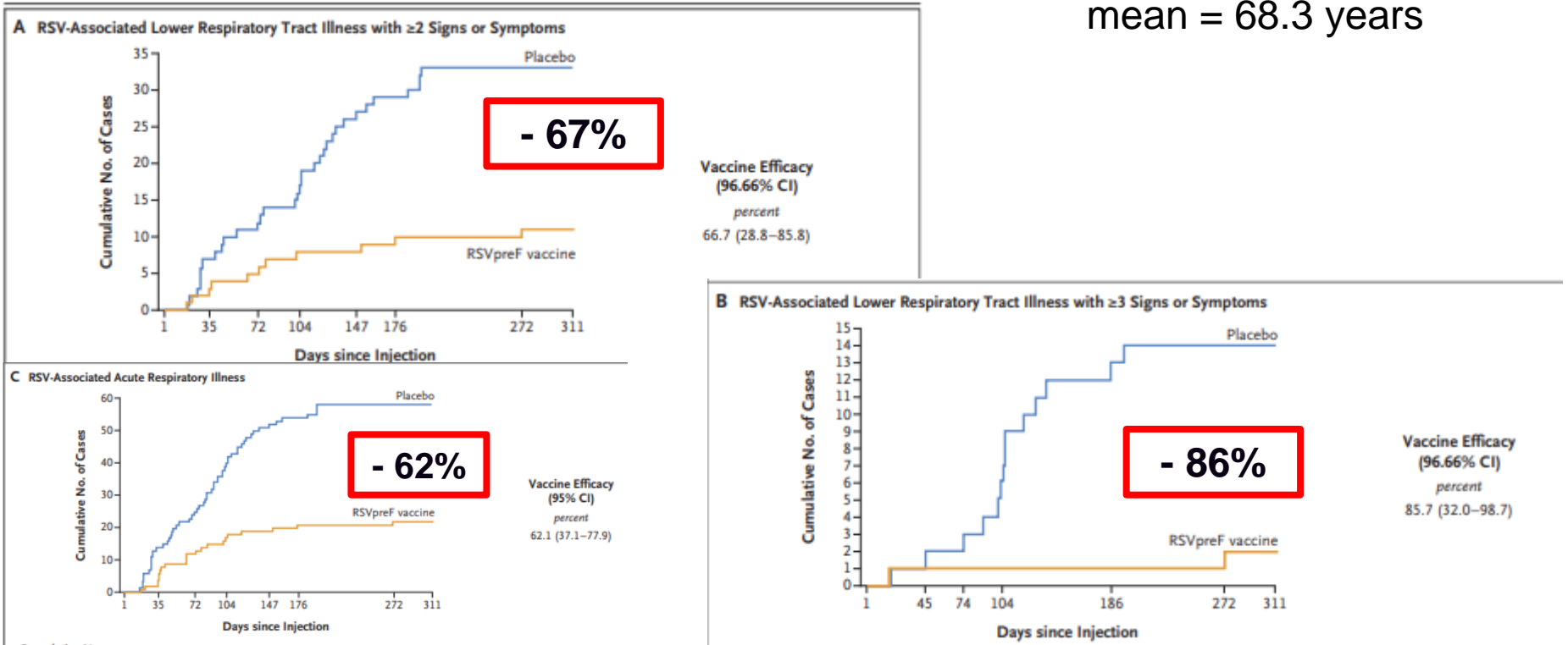
- Sequence based on contemporary RSV A and RSV B strains
- Elicited high neutralizing titers for both RSV A and RSV B in Phase 1/2 studies^{1,2,3}



RENOIR Study

34 284 participants ≥ 60 years

mean = 68.3 years



≥ 80 ans, n = 1928 = 5,6%

Table S6. Vaccine efficacy of RSVpreF by subgroup against first episode of RSV-LRTI with ≥2 signs/symptoms, ≥3 signs/symptoms, and RSV-ARI

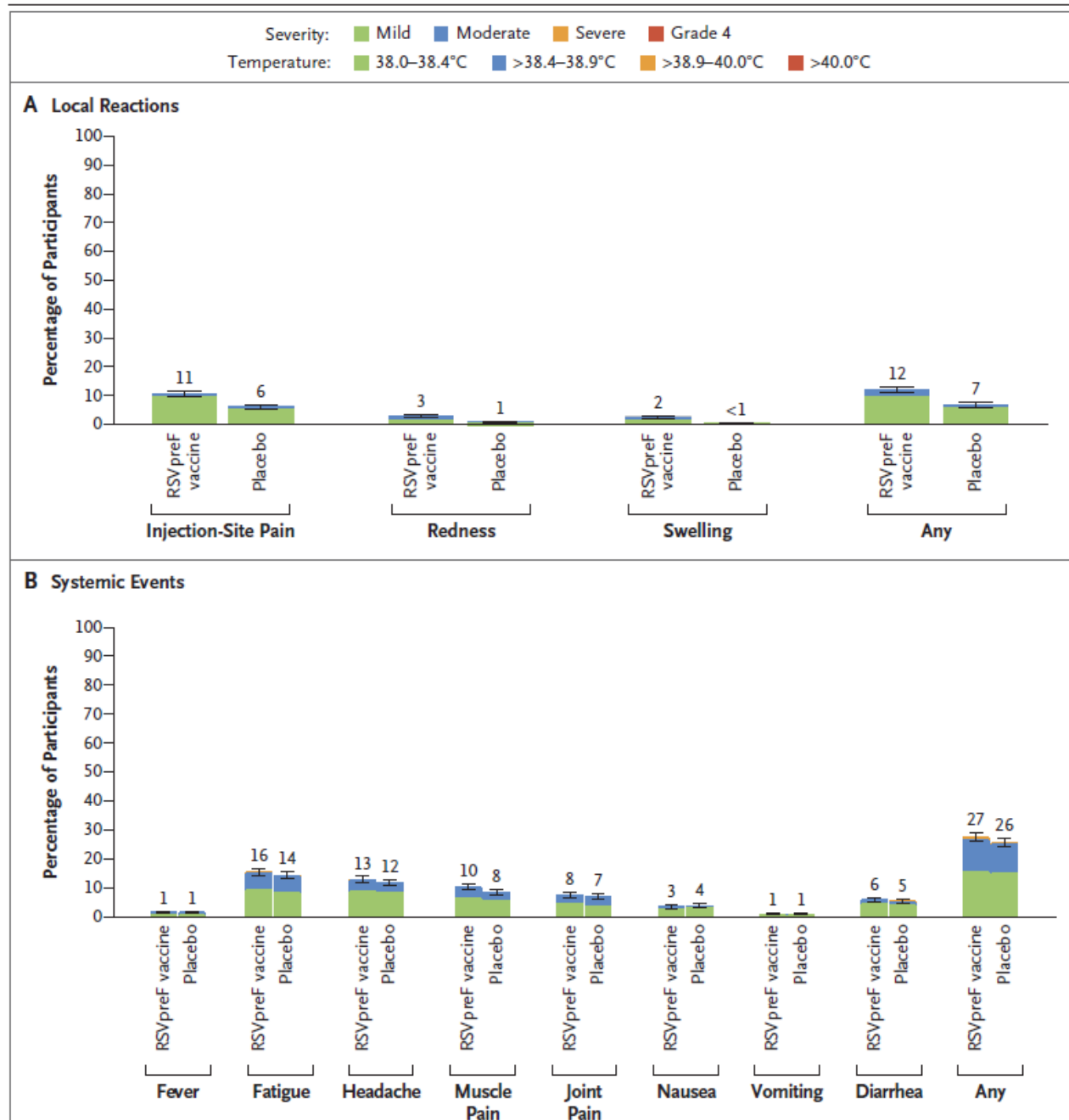
Efficacy endpoint	Vaccine group as randomized		VE=1-risk ratio VE, %*
	RSVpreF (N=16,306)	Placebo (N=16,308)	
	Cases, n	Cases, n	
First episode of RSV-LRTI with ≥2 signs/symptoms			
Overall	11	33	66.7 (96.66% CI 28.8, 85.8)
Age at vaccination			
60–69 years	8	19	57.9 (96.66% CI –7.4, 85.3)
70–79 years	2	9	77.8 (96.66% CI –18.7, 98.1)
≥80 years	1	5	80.0 (96.66% CI –104.3, 99.7)

≥ 80 ans, n = 1928 = 5,6%

Table S6. Vaccine efficacy of RSVpreF by subgroup against first episode of RSV-LRTI with ≥2 signs/symptoms, ≥3 signs/symptoms, and RSV-ARI

Efficacy endpoint	Vaccine group as randomized		VE=1-risk ratio VE, %*
	RSVpreF (N=16,306)	Placebo (N=16,308)	
	Cases, n	Cases, n	
First episode of RSV-LRTI with ≥3 signs/symptoms			
Overall	2	14	85.7 (96.66% CI 32.0, 98.7)
Age at vaccination			
60–69 years	2	9	77.8 (96.66% CI –18.7, 98.1)
70–79 years	0	2	100.0 (96.66% CI –573.8, 100.0)
≥80 years	0	3	100.0 (96.66% CI –191.2, 100.0)

Efficacy and Safety of a Bivalent RSV Prefusion F Vaccine in Older Adults

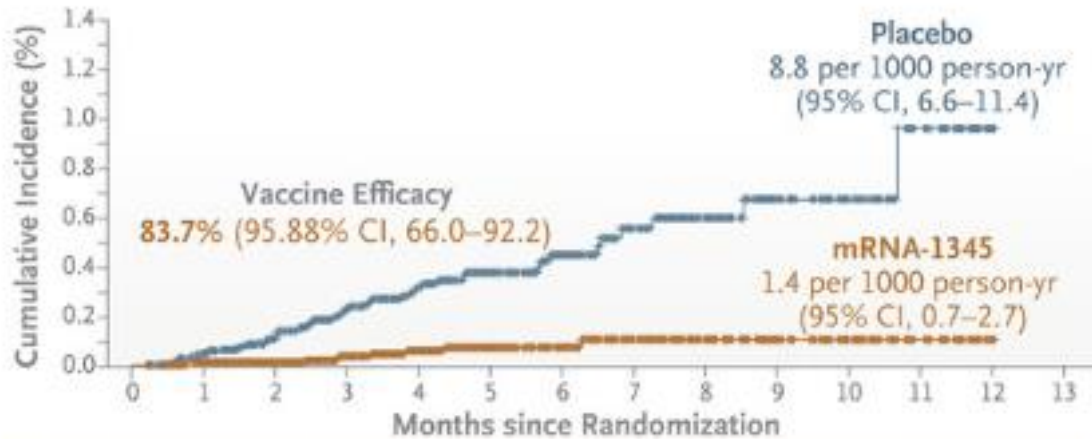


RESEARCH SUMMARY

Efficacy and Safety of an mRNA-Based RSV PreF Vaccine in Older Adults

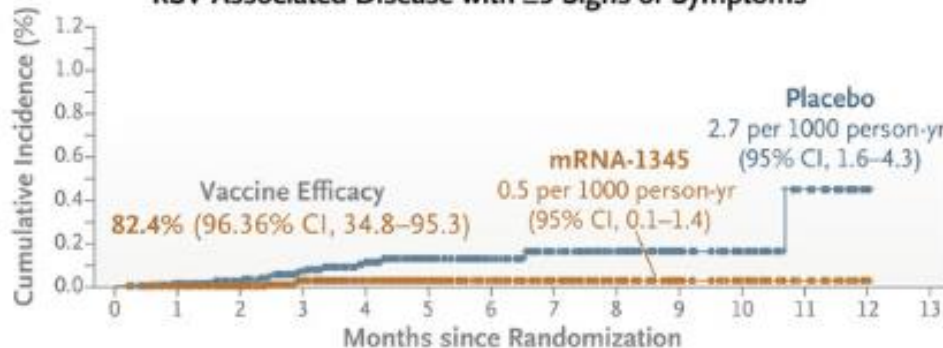
Wilson E et al. DOI: 10.1056/NEJMoa2307079

RSV-Associated Disease with ≥ 2 Signs or Symptoms

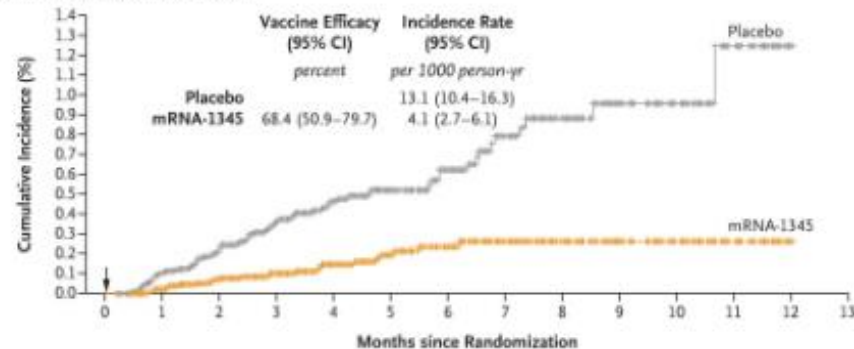


N = 35 541 , > 60 ys
Mean = 68 ys

RSV-Associated Disease with ≥ 3 Signs or Symptoms



RSV-Associated Acute Respiratory Disease

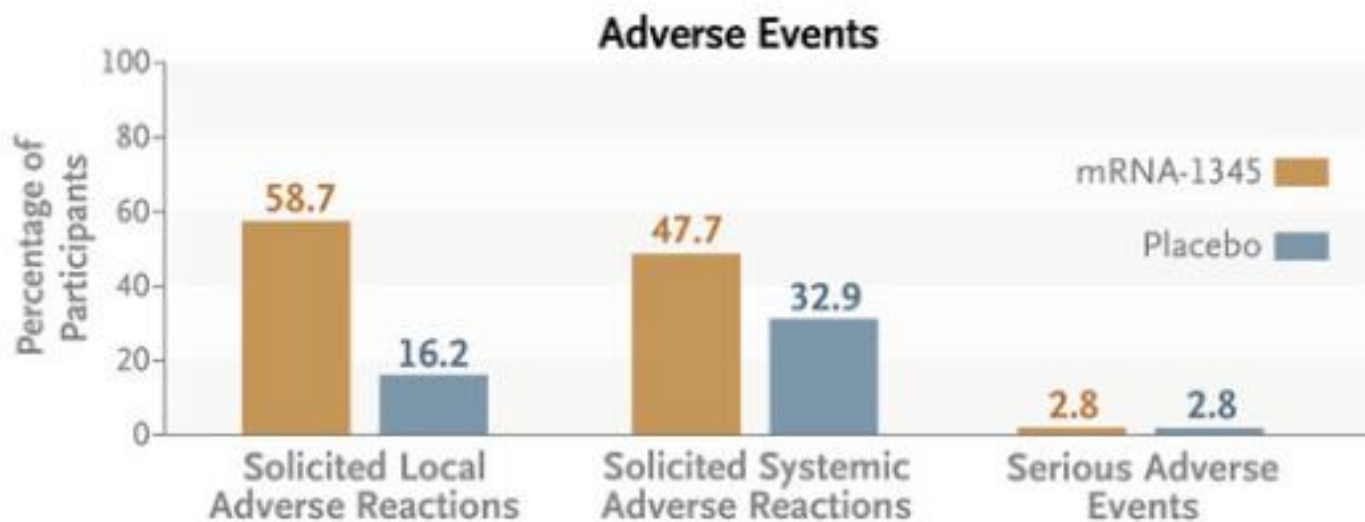


RESEARCH SUMMARY

Efficacy and Safety of an mRNA-Based RSV PreF Vaccine in Older Adults

Wilson E et al. DOI: 10.1056/NEJMoa2307079

N = 35 541 , > 60 ys



RESEARCH SUMMARY

Efficacy and Safety of an mRNA-Based RSV PreF Vaccine in Older Adults

N = 1946 > 80 ys

Wilson E et al. DOI: 10.1056/NEJMoa2307079

End Point	mRNA-1345		Placebo		Vaccine Efficacy (CI) [†] %
	<i>no. of participants</i>	<i>no. of events</i>	<i>no. of participants</i>	<i>no. of events</i>	
RSV-associated lower respiratory tract disease with ≥2 signs or symptoms[‡]					
Overall	17,572	9	17,516	55	83.7 (66.0 to 92.2)
Age group					
60–69 yr	11,168	8	11,118	33	76.0 (48.0 to 88.9)
70–79 yr	5,440	1	5,416	22	95.4 (65.9 to 99.4)
≥80 yr	964	0	982	0	NE (NE to NE)
RSV-associated lower respiratory tract disease with ≥3 signs or symptoms[§]					
Overall	17,572	3	17,516	17	82.4 (34.8 to 95.3)
Age group					
60–69 yr	11,168	3	11,118	11	72.9 (2.8 to 92.4)
70–79 yr	5,440	0	5,416	6	100 (NE to 100)
≥80 yr	964	0	982	0	NE (NE to NE)

RESEARCH SUMMARY

N = 1981 frail

Efficacy and Safety of an mRNA-Based RSV PreF Vaccine in Older Adults

Wilson E et al. DOI: 10.1056/NEJMoa2307079

End Point	mRNA-1345		Placebo		Vaccine Efficacy % (95% CI)
	Number of Participants	Number of Events ^{1,‡}	Number of Participants	Number of Events ^{1,‡}	
RSV-LRTD with ≥ 2 symptoms^{§,¶}					
Overall	17,572	9	17,516	55	83.7 (66.0, 92.2)**
Frailty status					
Fit (0–3)	13,396	8	13,250	45	82.3 (62.5, 91.7)
Vulnerable (4–5)	2799	0	2859	3	100.0 (NE, 100.0)
Frailty (≥ 6)	982	0	999	3	100.0 (NE, 100.0)
RSV-LRTD with ≥ 3 symptoms^{§,¶}					
Overall	17,572	3	17,516	17	82.4 (34.8, 95.3)**
Frailty Status					
Fit (0–3)	13,396	3	13,250	13	77.0 (19.2, 93.4)
Vulnerable (4–5)	2799	0	2859	1	100.0 (NE, 100.0)
Frailty (≥ 6)	982	0	999	2	100.0 (NE, 100.0)

Etudes vaccins VRS sujet âgés

- Peu de sujets > 80 ans
- Peu de sujets fragiles
- Pas (encore ?) d'analyse sur l'autonomie
- Pas (encore ?) d'analyse sur les décompensations cardiaques

NOTE DE
CADRAGE

Stratégie vaccinale de prévention des infections par le VRS chez l'adulte âgé de 60 ans et plus

Recommandation vaccinale

Validée par le Collège le 21 décembre 2023

**Date de validation de la recommandation
vaccinale du collège : juillet 2024**

Infections VRS chez le sujet âgé

Sujet âgé :

- à plus **haut risque** de faire **infection VRS**
- à plus **haut risque** de forme **sévère**
- à plus **haut risque** de **complications CV**
- **Risque de perte d'autonomie**

= > Vaccination VRS : intérêt majeur chez le sujet âgé

=> peu de sujets > 80 ans, fragiles (données des sous groupes similaires aux plus jeunes)

=> **Besoin de données « en vie réelle » dans cette population**

Formes graves, hospitalisations, qualité de vie, pathologies CV ?