5th WAidid CONGRESS

Milan 2024
28-30 November 2024
HOTEL NHOW MILAN

Update and management of bronchiolitis

Dr Anna Chiara Vittucci
General Pediatrics Unit
Bambino Gesù Children's Hospital, Rome

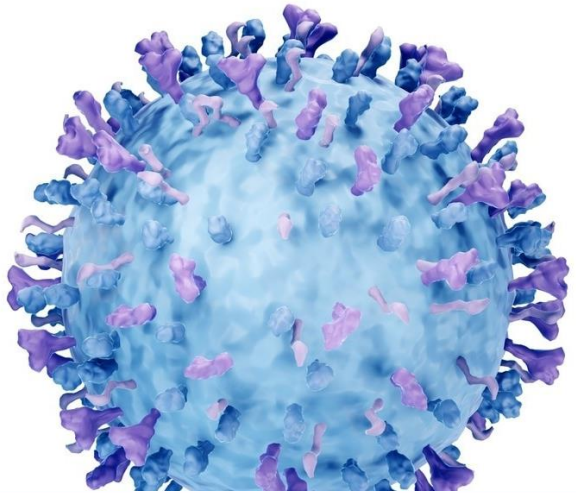
WAidid
World Association for Infectious Diseases and Immunological Disorders

Bronchiolitis

Bronchiolitis is an acute viral infection of the lower respiratory tract that affects infants and young children worldwide.

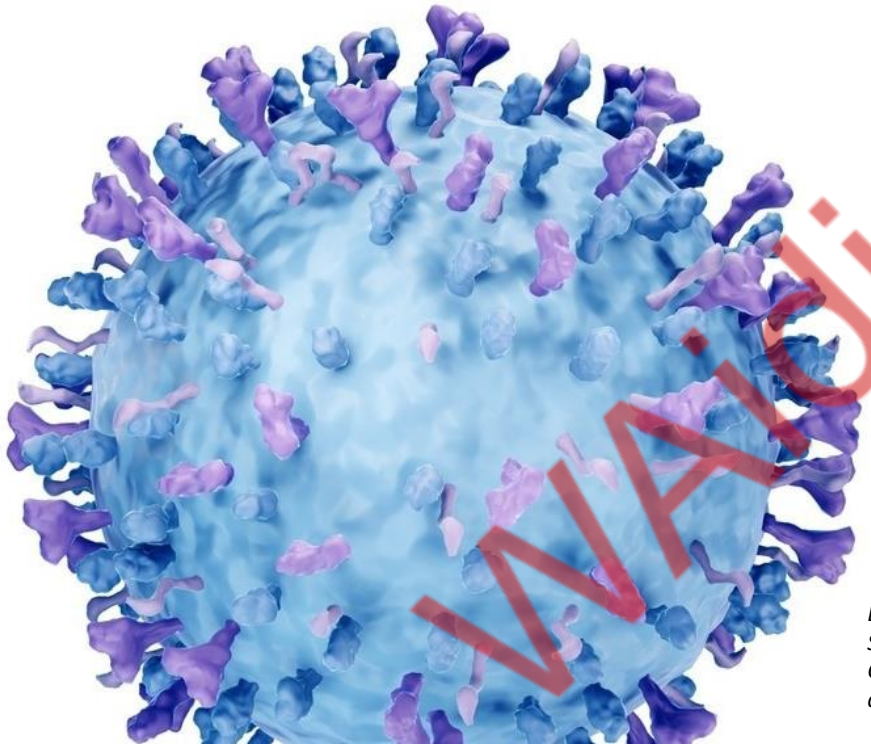
It is most commonly caused by human respiratory syncytial virus

60-80% RSV



Dalziel, S. R. et al. Bronchiolitis. Lancet 400, 392–406 (2022)

RSV



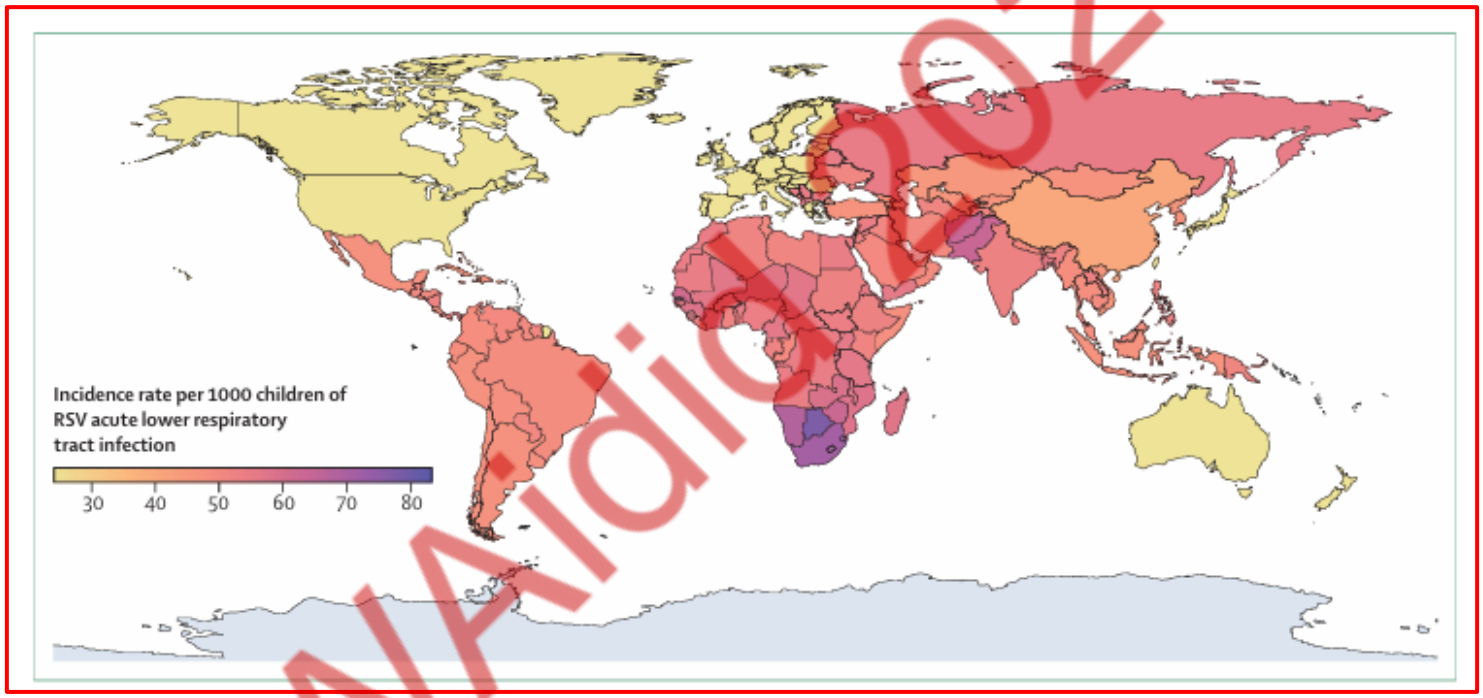
3 200 000

Hospitalization /year

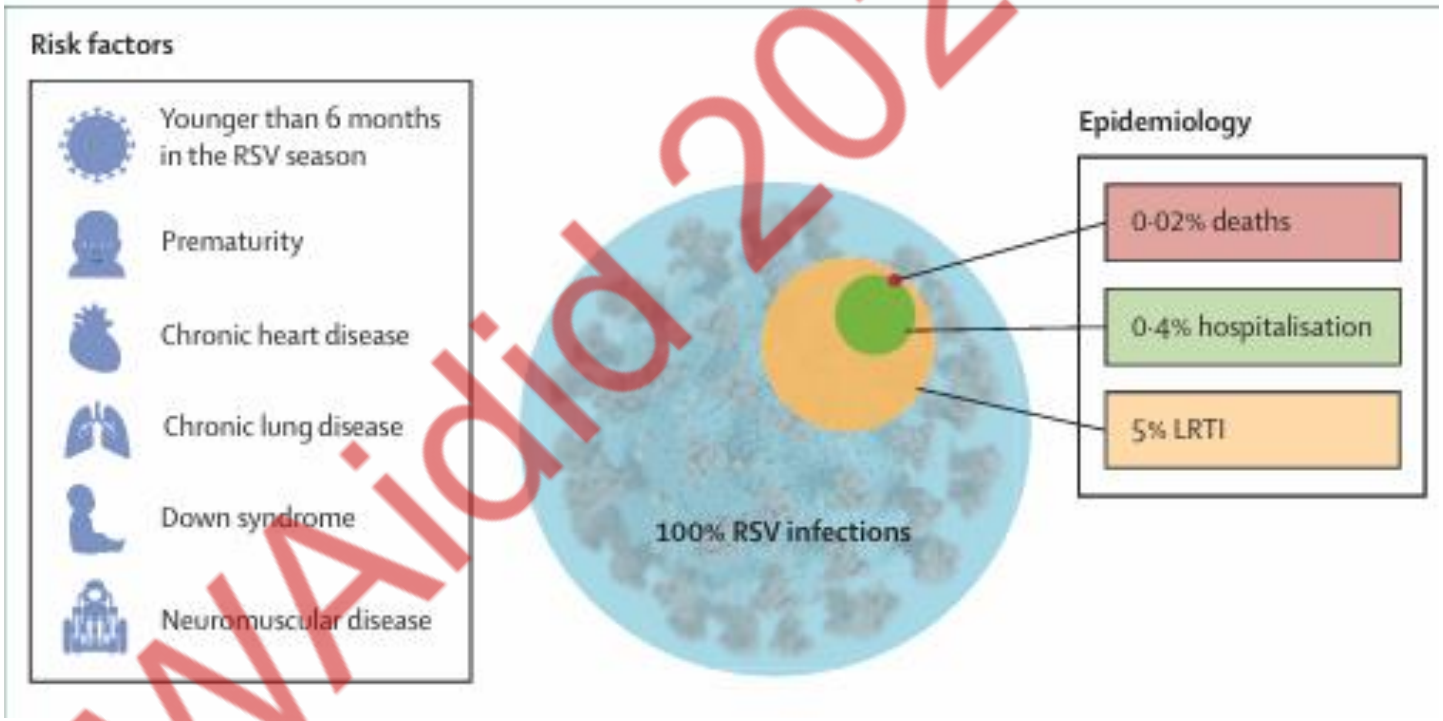
200 000

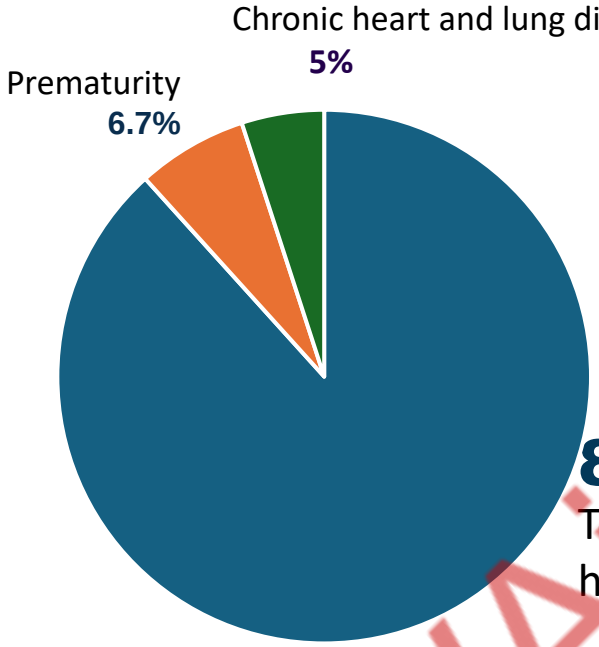
Death /year

Dalziel, S. R. et al. Bronchiolitis. Lancet 400, 392–406 (2022)
Shi T, et al. The Lancet. 2017;390(10098):946–958;
CDC. RSV in Infants and Young Children. https://www.cdc.gov/rsv/high-risk/infants-young-children.html

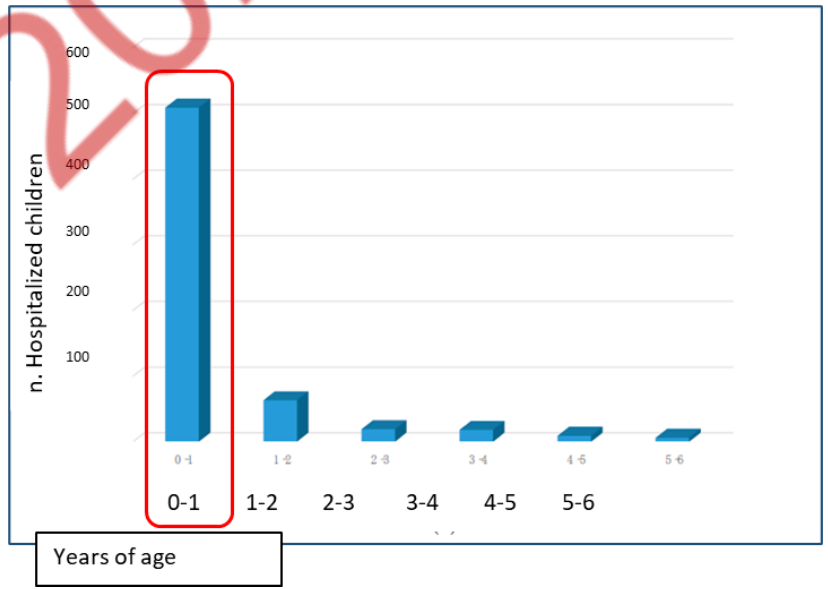

Incidence rate per 1000 children of RSV acute lower respiratory tract infection
30
40
50
60
70
80

Risk factors





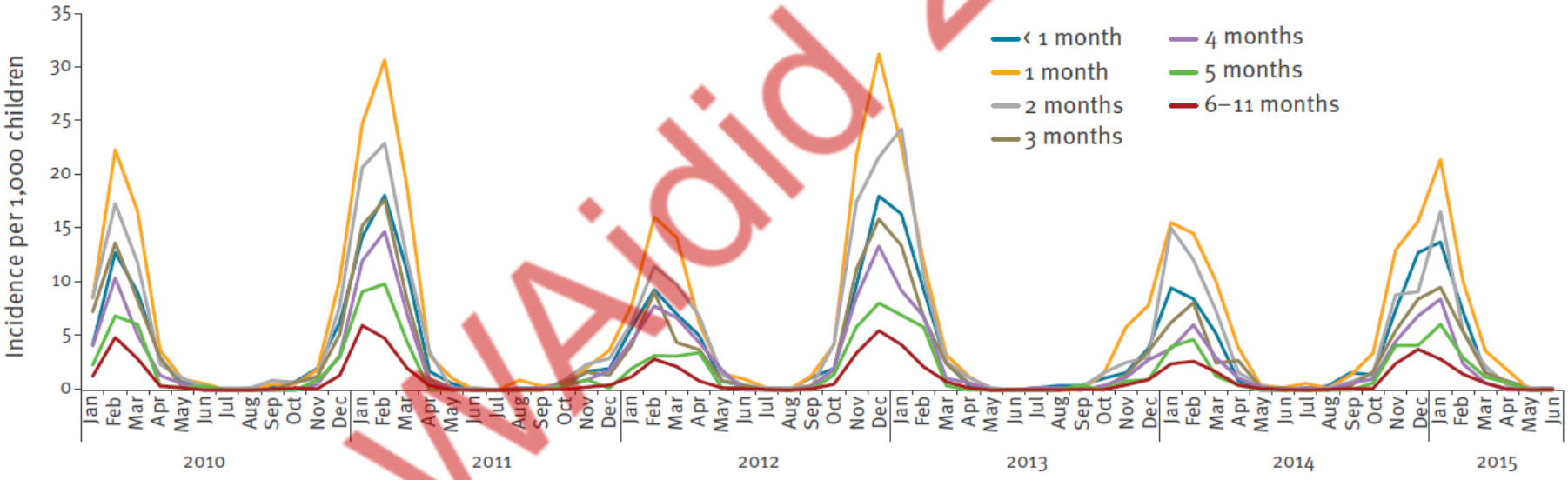
Hospitalizations in Italy



Barbati F, Azzari C, et al. MDPI Vaccines, 2020.

Season of born

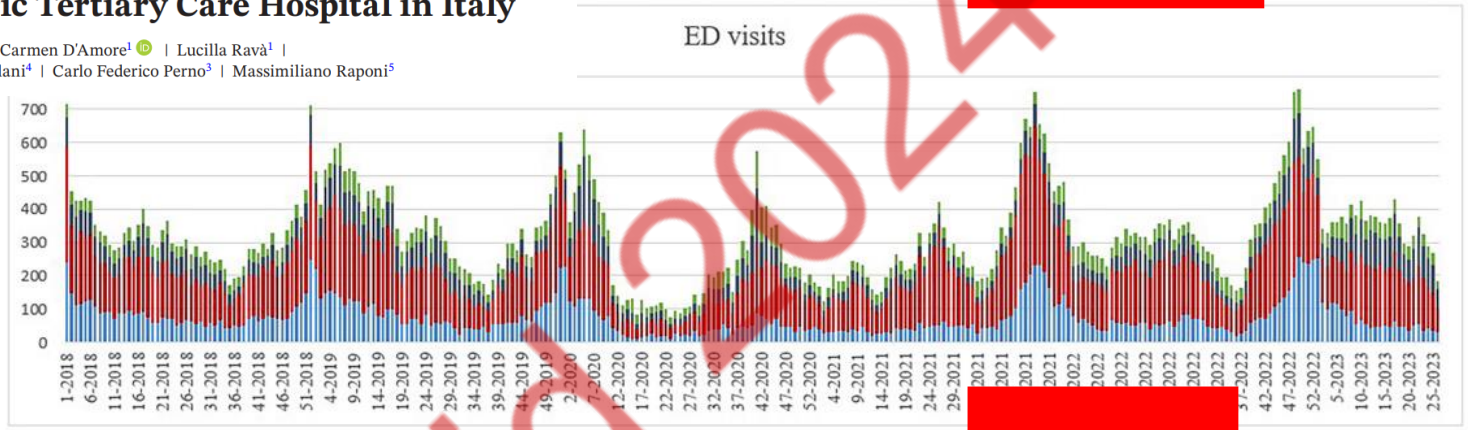
age



Impact of SARS-CoV-2 Pandemic on Emergency Hospitalizations for Acute Respiratory Infections: The Experience of a Paediatric Tertiary Care Hospital in Italy

Marta Luisa Ciofi degli Atti[1] | Flavia Beccia[1,2] | Carmen D'Amore[1] | Lucilla Ravà[1] | Paola Bernaschi[3] | Cristina Russo[3] | Alberto Villani[4] | Carlo Federico Perno[3] | Massimiliano Raponi[5]

92.140 tot



10.541 tot

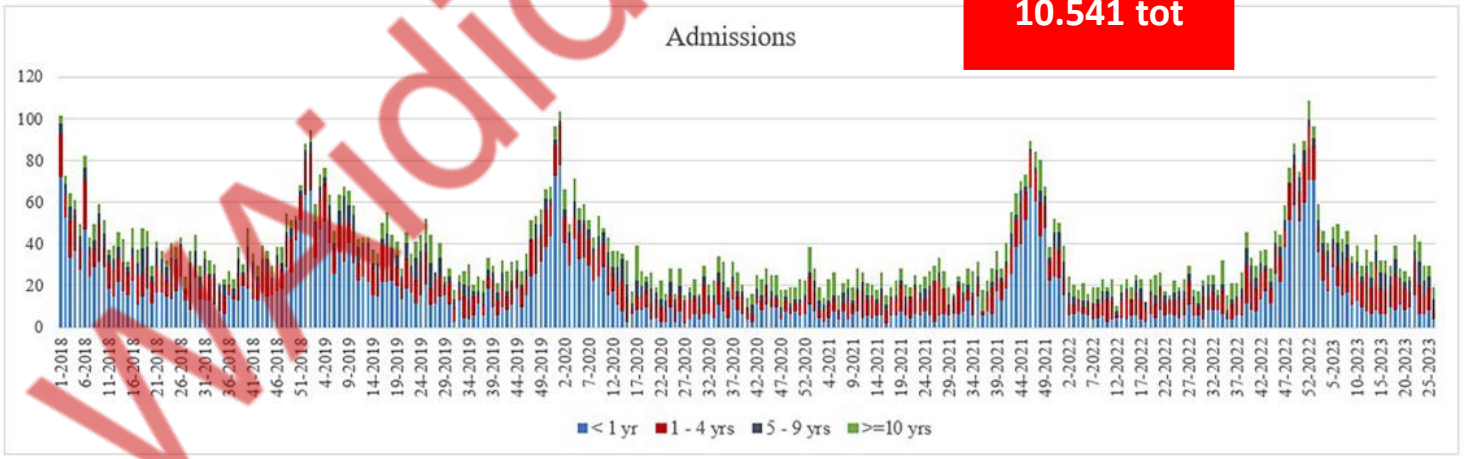


FIGURE 1 | Number of ED visits and hospital admissions for ARI, by week and age group, registered at OPBG, January 2018–June 2023.

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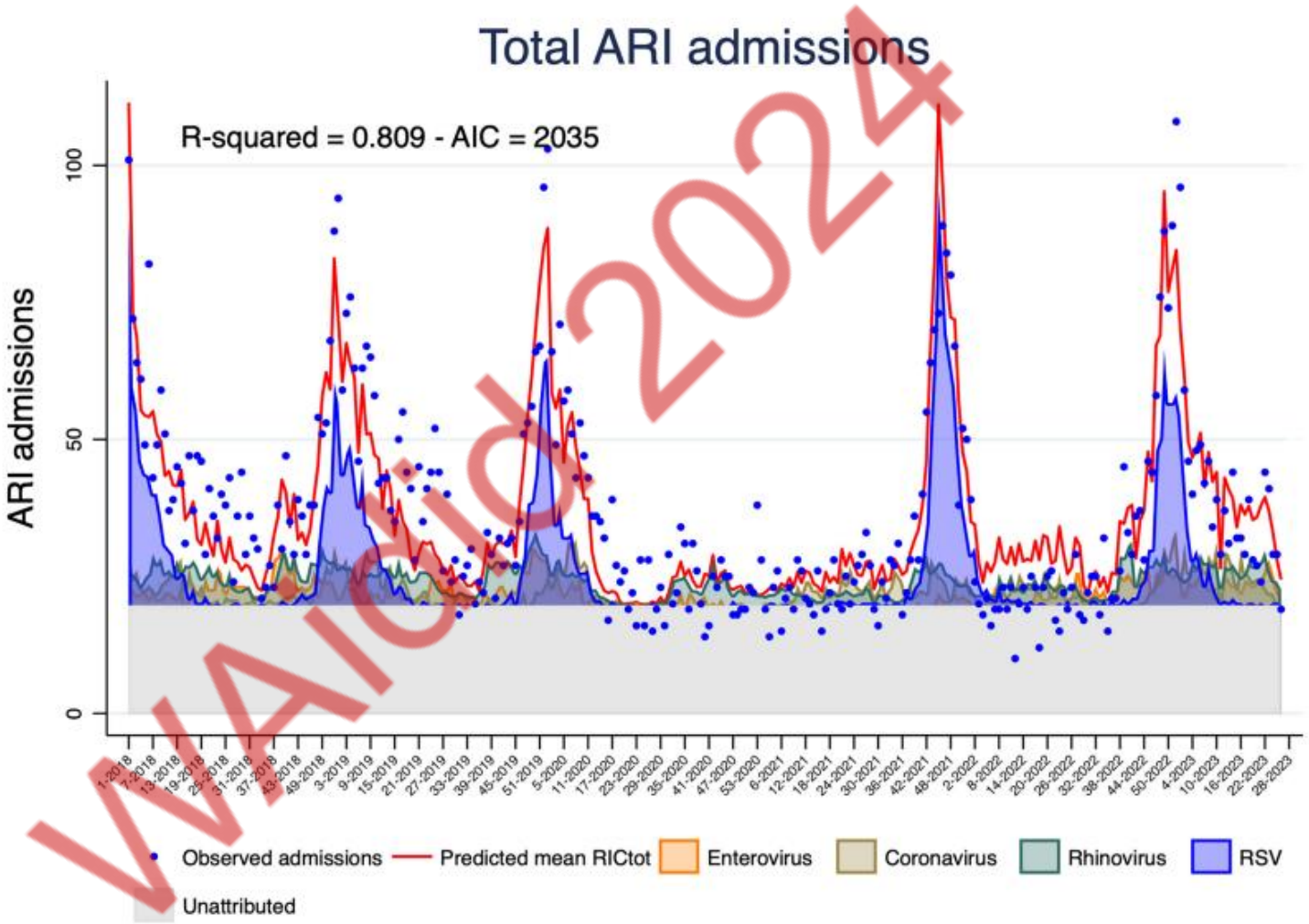
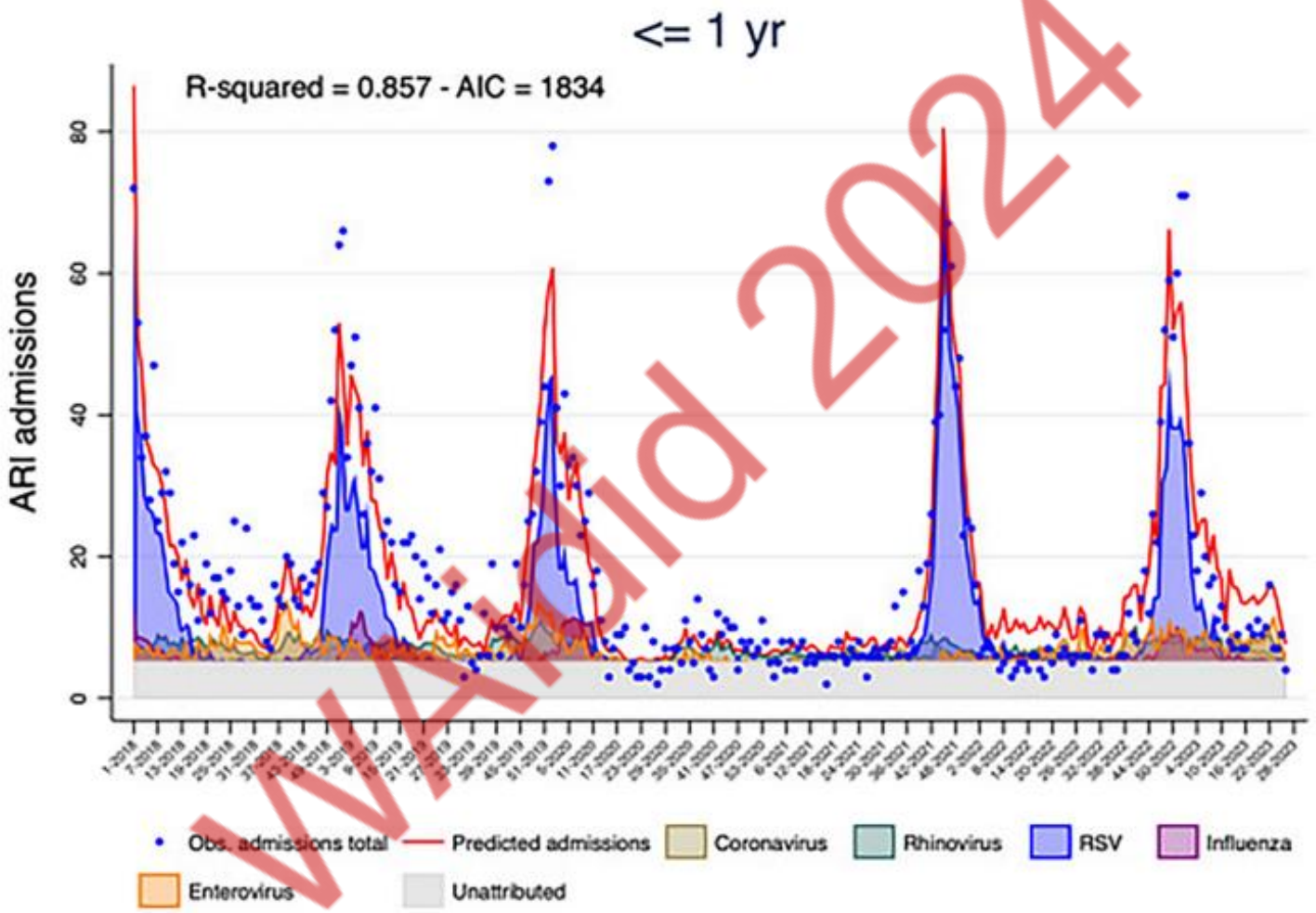
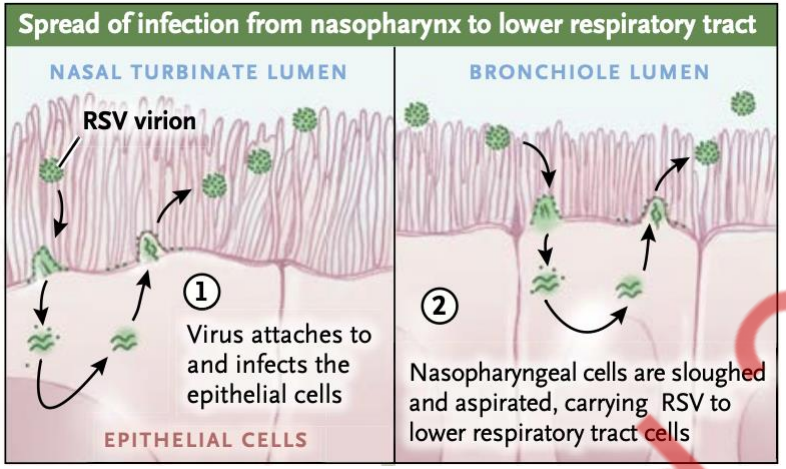
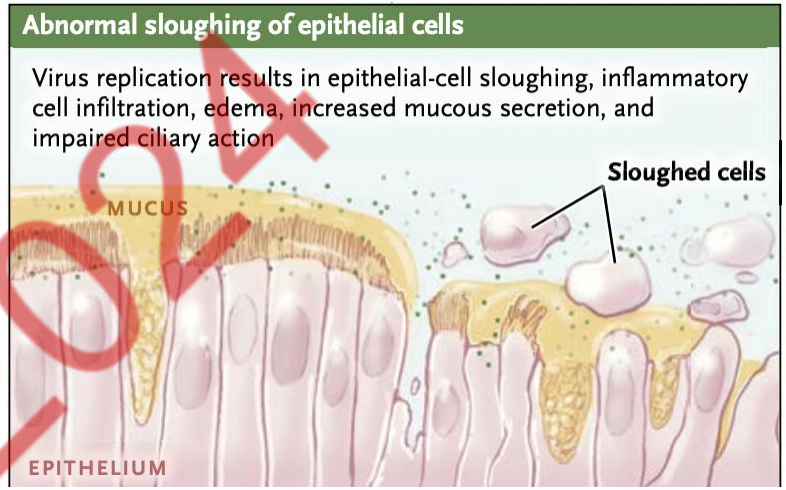
RSV

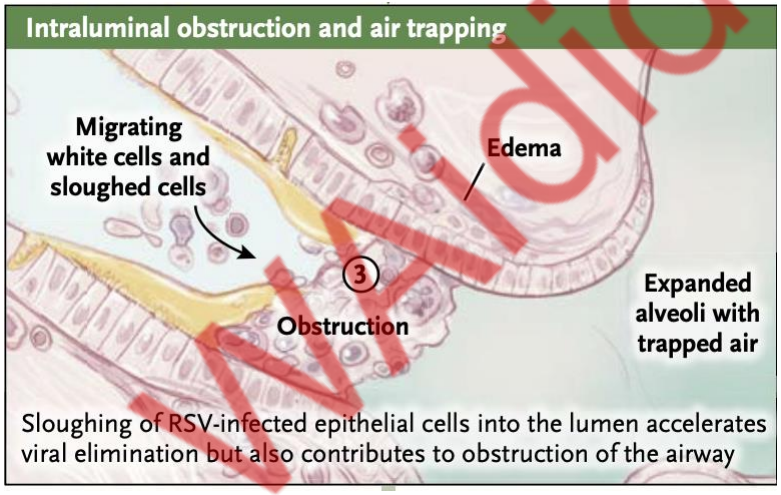


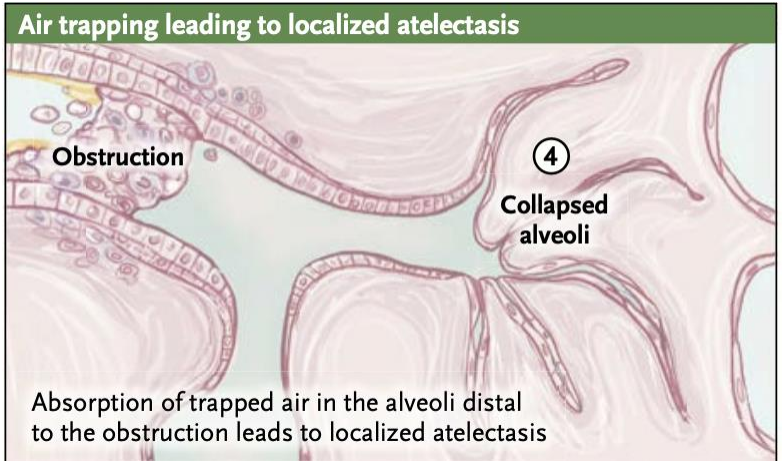
RSV







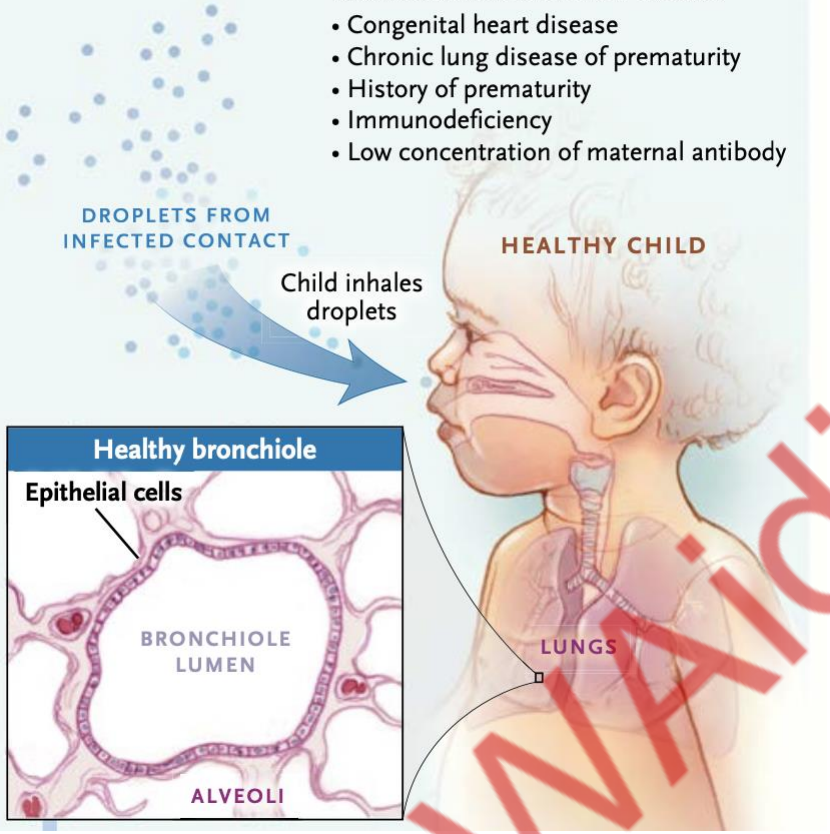




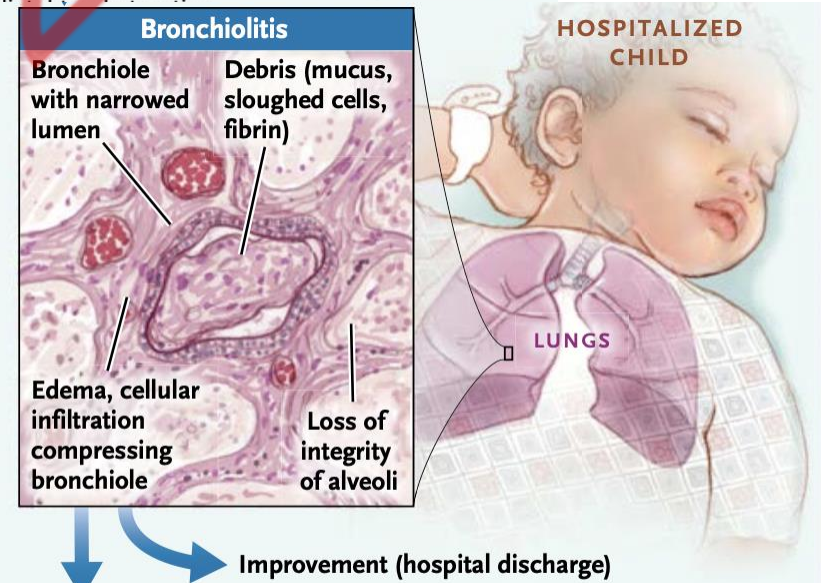
A Clinical Progression of Respiratory Syncytial Virus (RSV)

Risk factors for severe RSV disease

- Congenital heart disease
- Chronic lung disease of prematurity
- History of prematurity
- Immunodeficiency
- Low concentration of maternal antibody

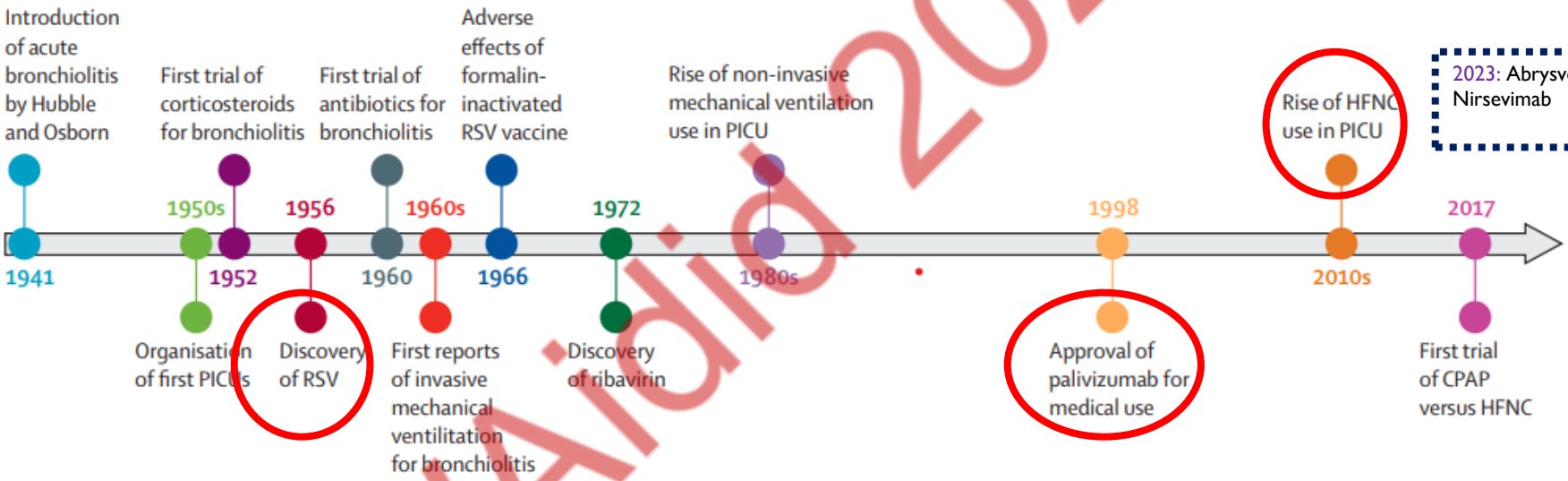


1. After 4–6-day incubation period, fever, congestion, rhinorrhea, irritability, and poor feeding develop.
2. 2–3 days after onset of upper respiratory tract symptoms, approximately one third of patients have spread of infection to lower respiratory tract (bronchiolitis).
3. Cough, tachypnea, wheezing, grunting, nasal flaring, and thoracic retractions may be present. Hyperinflation of the lung develops as air is trapped behind occluded bronchioles.
4. Air trapped in the alveoli is absorbed, resulting in localized atelectasis
5. Increased occur owi resulting i



N Engl J Med 2016;374:62-72

Timeline



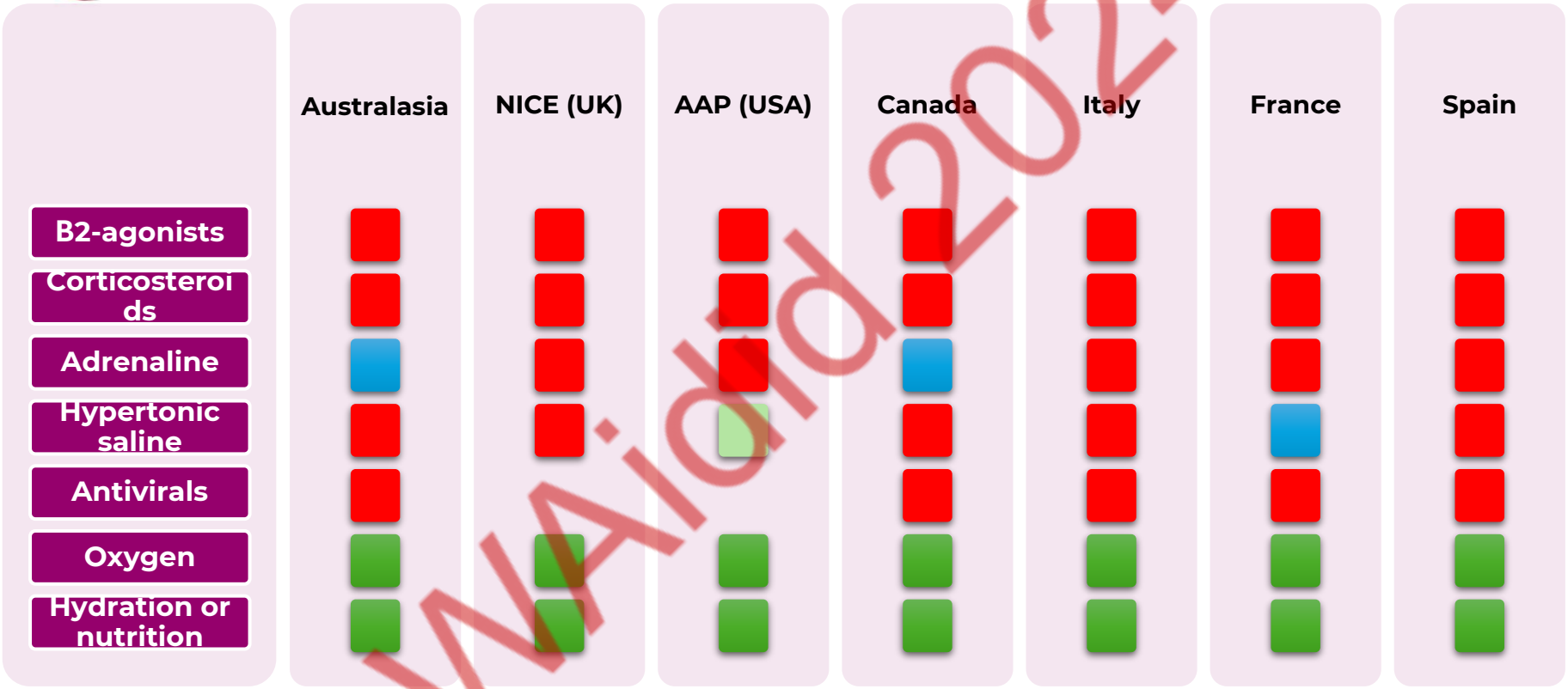
Bem RA, Bont LJ, van Woensel JBM. Life-threatening bronchiolitis in children: eight decades of critical care. Lancet Respir Med. 2020 Feb;8(2):142-144. doi: 10.1016/S2213-2600(19)30445-X. Epub 2019 Nov 18. PMID: 32035065.

Treatment

Level of evidence according to GRADE criteria

High | Moderate | Low | Very low

Intervention	Quality of evidence	Recommendation
Inhaled corticosteroid 		Not recommended
Systemic corticosteroids 		Not recommended
Leukotriene antagonist 		Not recommended
Monoclonal antibodies and immunoglobulins 		Not recommended
Antibiotics 		Not recommended
Ribavirin 		Not recommended
Conventional chest physiotherapy 		Not recommended
Chest physiotherapy based on slow expiratory techniques 		Not recommended
Steam inhalation 		Not recommended
Bronchodilators 		Not recommended
Nebulised hypertonic saline 		Not recommended


Australasia
NICE (UK)
AAP (USA)
Canada
Italy
France
Spain
B2-agonists
Corticosteroids
Adrenaline
Hypertonic saline
Antivirals
Oxygen
Hydration or nutrition

Oxygen-therapy

Hydration/nutrition

SOT

HFNC

CPAP /NIV

IMV

HFNC

Effects of the High Flow	Effects of the Heated Gas	Effects of Controlled FiO2
Physiological dead space washout of waste gases including carbon dioxide (CO_2)	Reduction in respiratory workload	No oxygen leak
Positive end-expiratory pressure	Reduction of bronchoconstriction	FiO2 up to 1.00 provided to the patient
Reduced airway resistance	Increased ciliary clearance	Better monitoring of oxygen saturation
Decreased respiratory rate	Better hydration of the mucosa	
Increased tidal volume	Better comfort	
Increased end-expiratory volume		

- Lack of standardized protocols
- Need for trained staff
- More expensive

Fainardi V. Update on the Role of High-Flow Nasal Cannula in Infants with Bronchiolitis. Children (Basel). 2021 Jan 20;8(2):66.

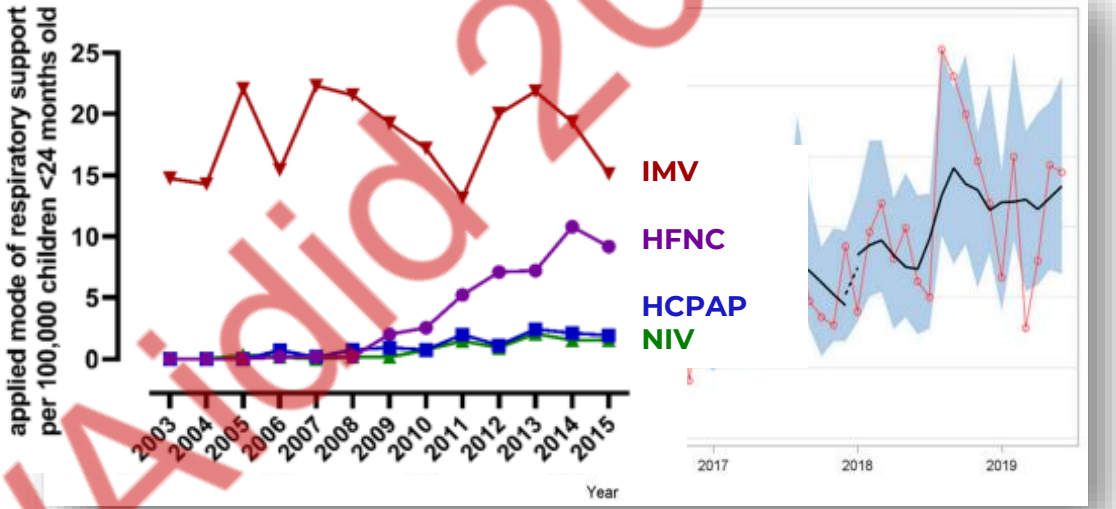
HFNC

REGULAR ARTICLE

Using a high-flow nasal ca
oxygen delivery in modera

High-flow nasal cannula ox
in a pediatric ward: a pilot

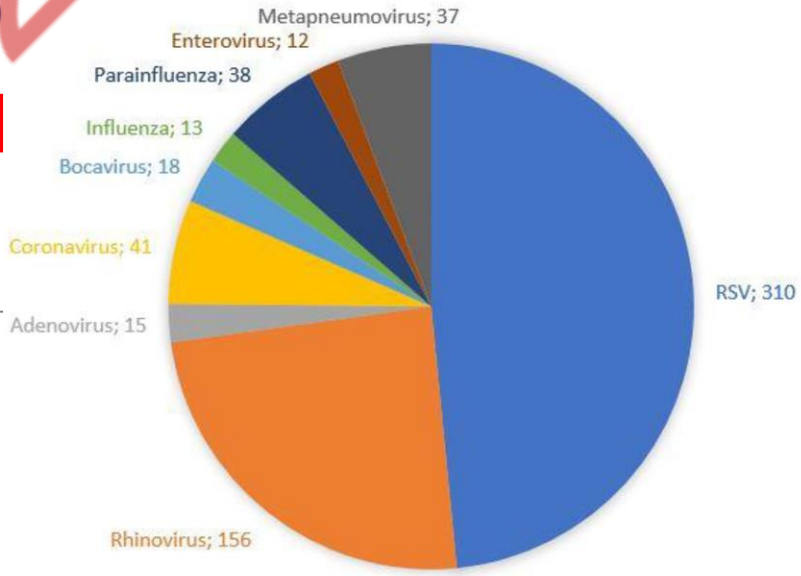
A. Schibler
T. M. T. Pham
K. R. Dunster
K. Foster
A. Barlow
K. Gibbons
J. L. Hough



ODafydd C. Efficacy and safety of high flow nasal oxygen for children with bronchiolitis: systematic review and meta-analysis. BMJ Open Respir Res. 2021 Jul;8(1):e000844.
Linssen RS. Burden of respiratory syncytial virus bronchiolitis on the Dutch pediatric intensive care units. Eur J Pediatr. 2021 1-3149.

COSTS

	RSV n = 310	Other n = 217	p-value
Age (days)	77.98 (± 58.02)	78.80 (± 64.16)	ns
Males (%)	45.8	54.83	ns
LOS (days)	4.98 (± 2.18)	4.22 (± 2.16)	< 0.00
Total cost (€)	1,783,562.76	1,170,746.54	
Mean cost (€)	5,753.43 (± 2,041.62)	5,395.15 (± 2,040.87)	0.04
Imaging (€)	18.95 (± 28.62)	16.00 (± 26.41)	ns
Laboratory (€)	3,486.38 (± 1,126.19)	3,454.70 (± 1,204.50)	ns
PICU (%)	4.19	2.30	ns



Frontiers in pediatrics 2021; 8, 594898

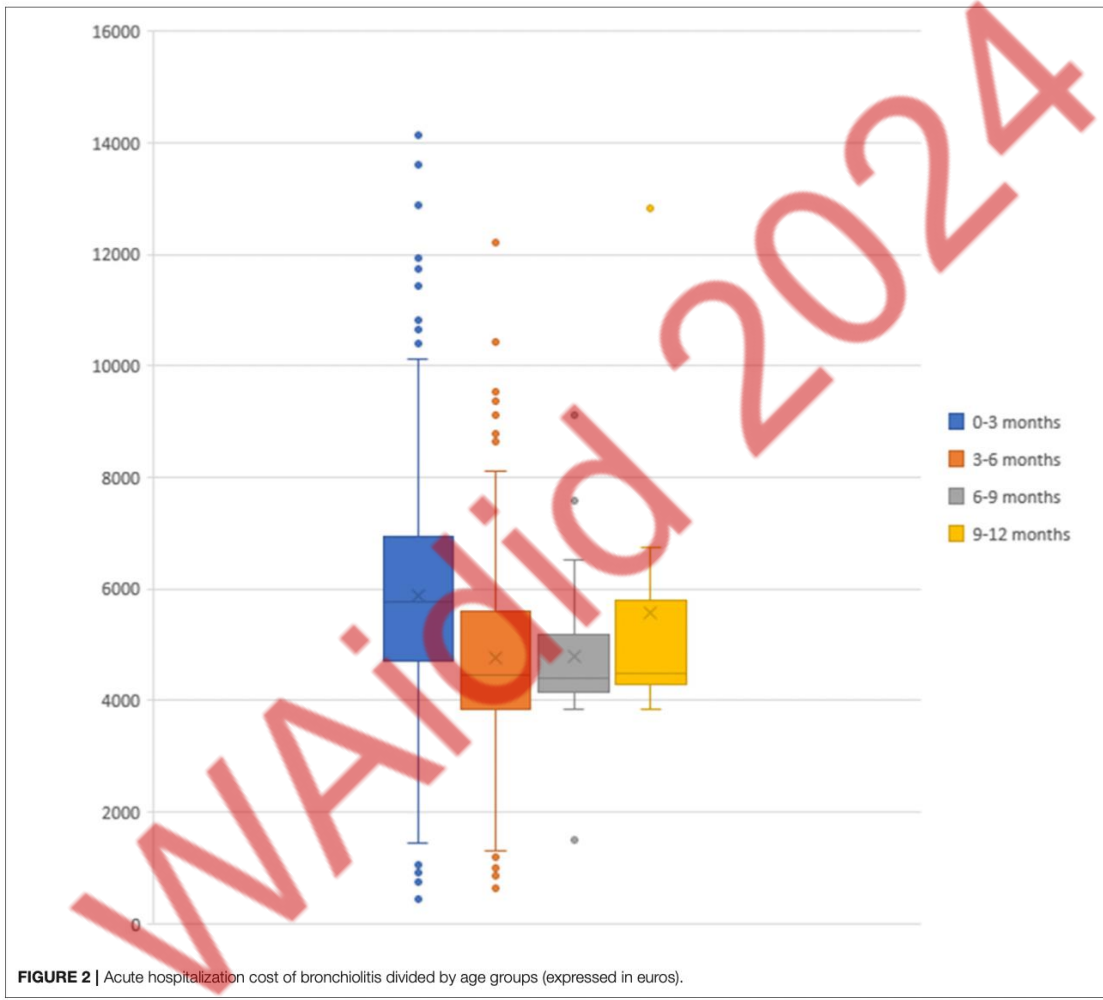


FIGURE 2 | Acute hospitalization cost of bronchiolitis divided by age groups (expressed in euros).

TABLE 3 | Demographic characteristics and AHC in of patients admitted to PICU and pediatric ward.

	PICU *n* = 18	Pediatric ward *n* = 513	*p*-value
Age (days)	51.17 (± 68.65)	79.72 (± 60.17)	0.049
Males (%)	66.67	48.73	Ns
LOS (days)	6.28 (± 1.60)	4.59 (± 2.20)	0.001
Total cost (€)	159,479.89 (± 2,056.53)	2,799,306.04 (± 2,037.79)	
Mean cost (€)	8,859.99 (± 2,577.61)	5,456.73 (± 1,919.52)	< 0.0001

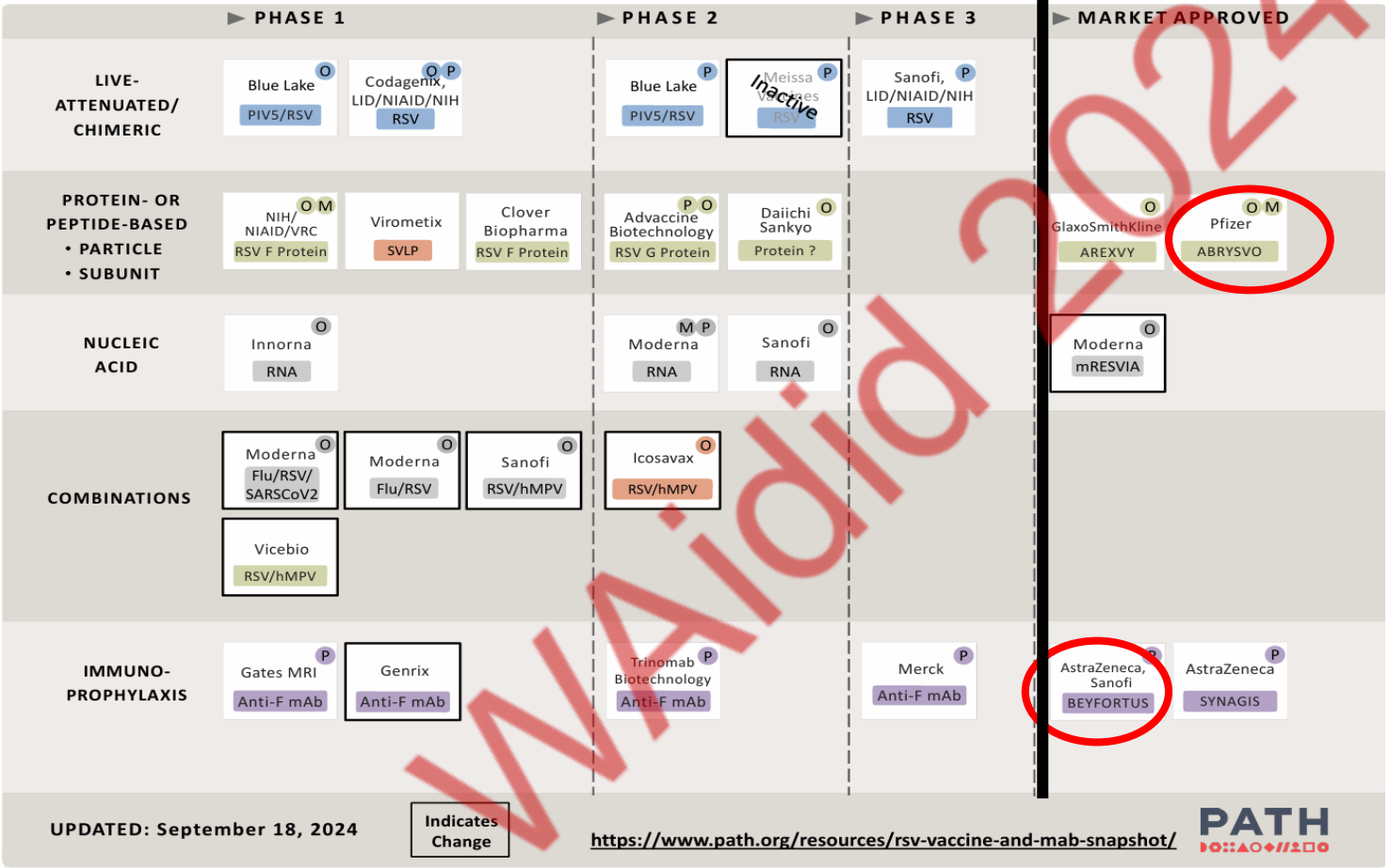
FIGURE 3 | Acute hospitalization cost for bronchiolitis in a pediatric ward and in the PICU (expressed in euros).

Frontiers in pediatrics 2021; 8, 594898

RSV Vaccine and mAb Snapshot

TARGET INDICATION: P =PEDIATRIC M =MATERNAL O =OLDER ADULT

PLATFORM KEY: =LIVE/CHIMERIC =PARTICLE =SUBUNIT =NUCLEIC ACID =mAb



UPDATED: September 18, 2024

Indicates Change

https://www.path.org/resources/rsv-vaccine-and-mab-snapshot/

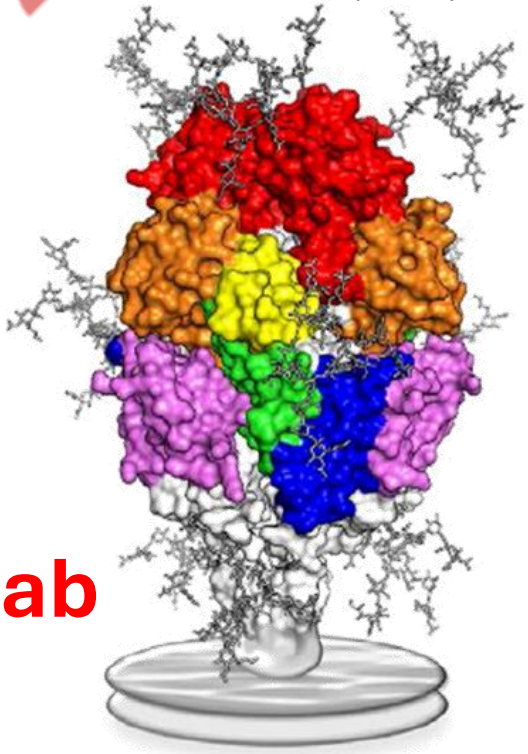
PATH

PRESENT

Recommended Dosage of Beyfortus in Neonates and Infants Born During or Entering Their First RSV Season[5]	
Body Weight at Time of Dosing	**Recommended Dosage**
Less than 5 kg	50 mg by IM injection
5 kg and greater	100 mg by IM injection

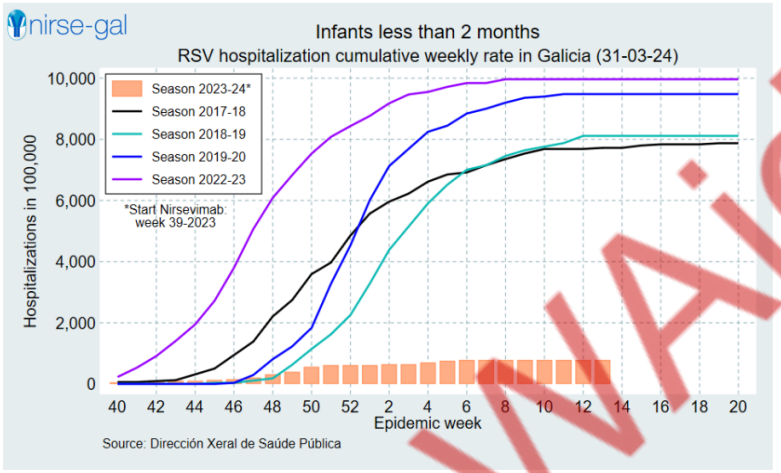
(2°C – 8°C).

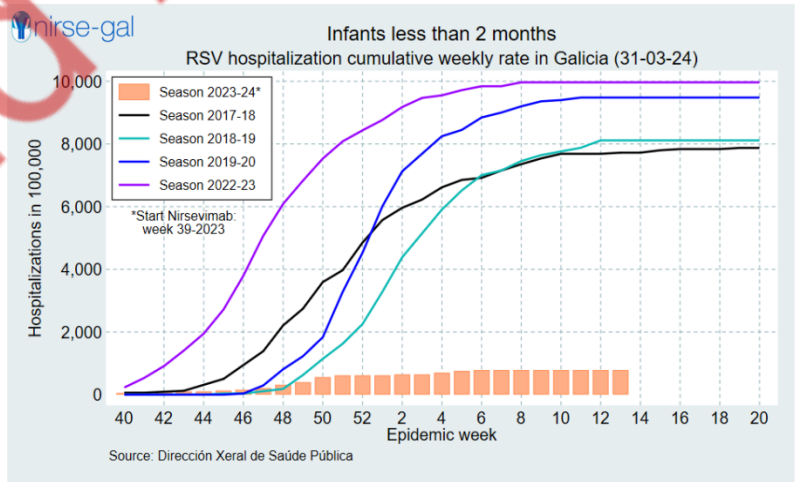
Nirsevimab
(site Ø)



Nirsevimab

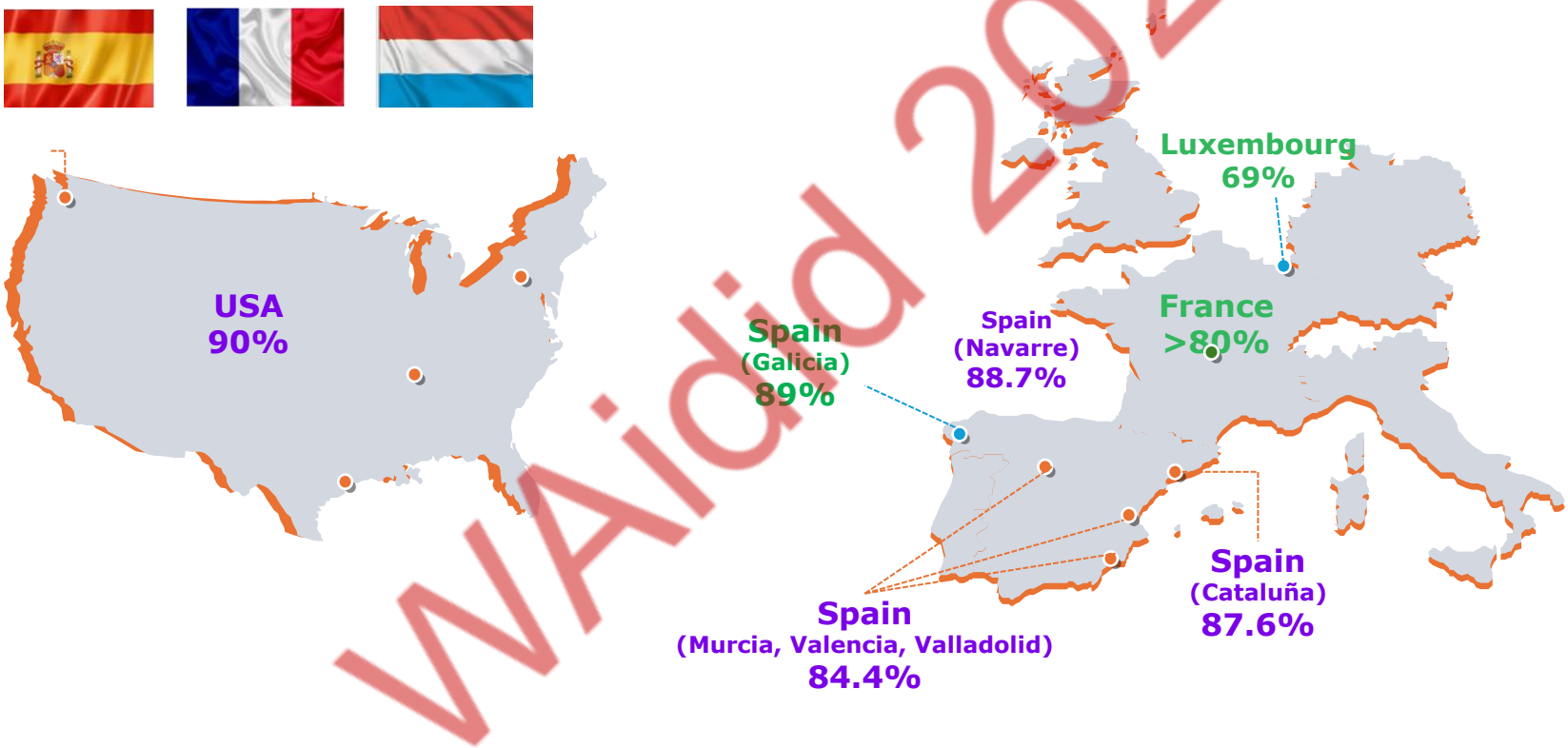
PRESENT





Servizo Galego de Saude. VRS. Link: https://www.sergas.es/Saude-publica/Virus-Sincitial-Respiratorio

Effectiveness and impact of universal prophylaxis with nirsevimab in infants against hospitalisation for RSV



FUTURE PROSPECTIVES

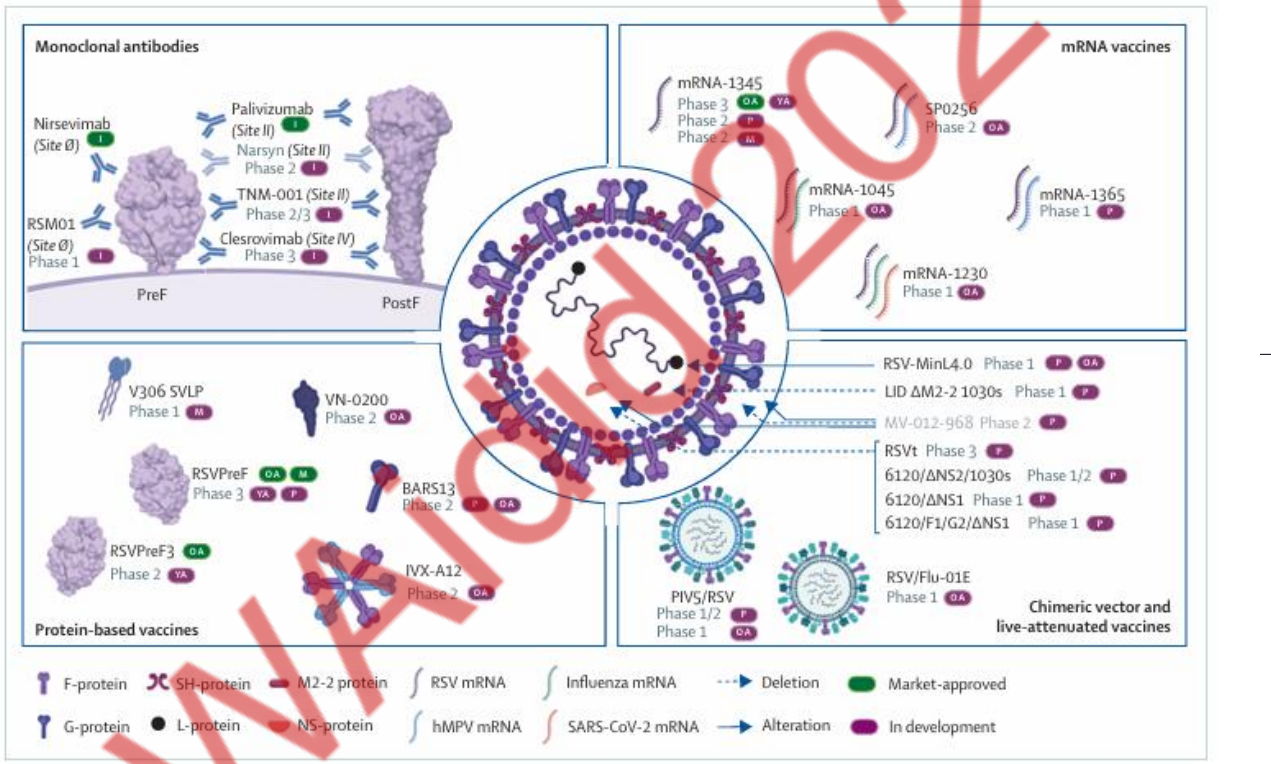


Figure 1: Overview of RSV vaccine candidates by preventive approach

Mazur et al, Lancet Infect Dis 2024; 24: e747–61

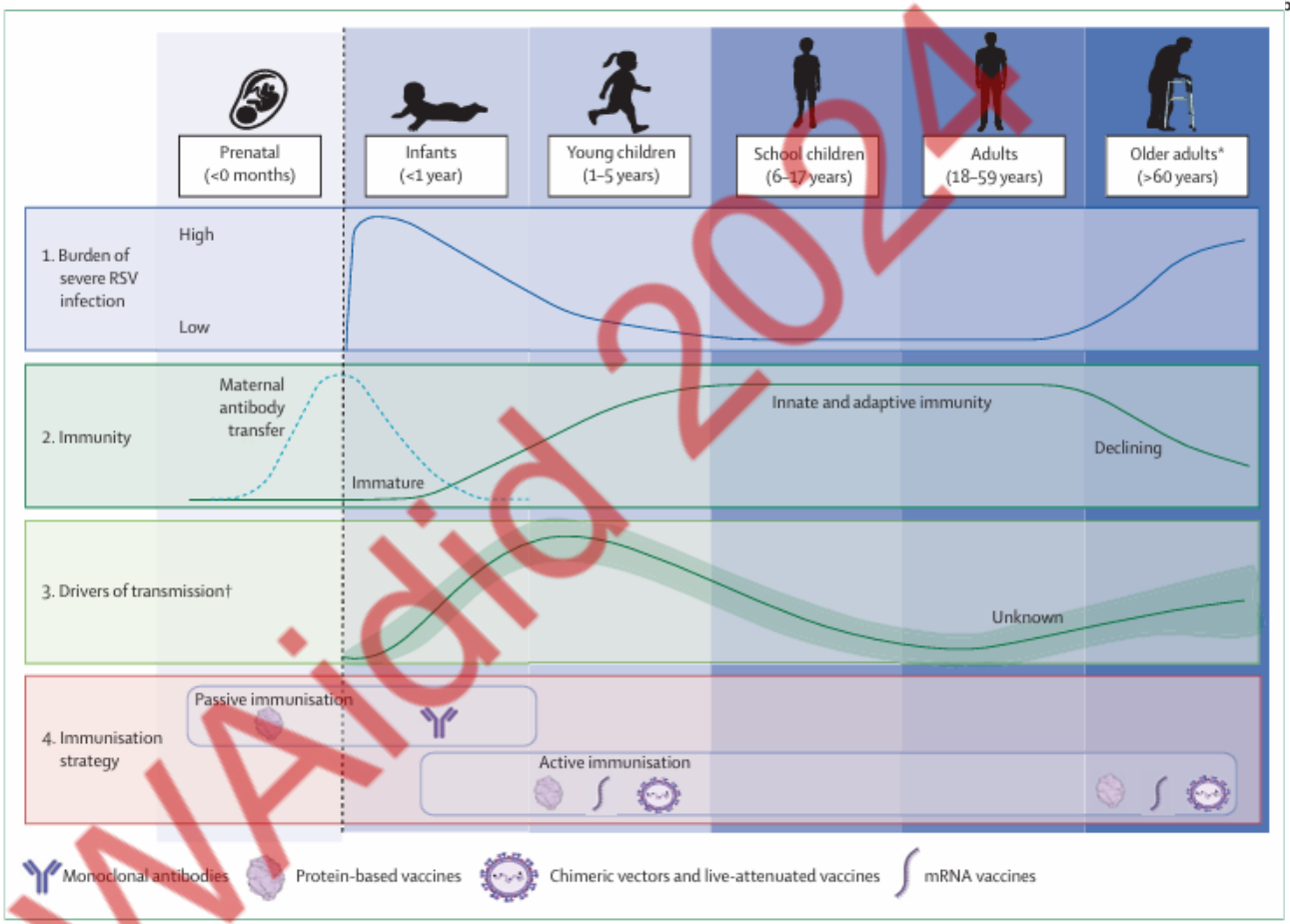


Figure 3: **Conceptual overview of RSV prevention strategies per target population**

Mazur et al, Lancet Infect Dis 2024; 24: e747–61

FUTURE
RSV: A VACCINE PREVENTABLE DISEASE

- Does vaccination for RSV alter the epidemiology of other seasonal respiratory viruses?
- What might be the impact of RSV vaccination on asymptomatic or mild RSV infection and how can this be monitored?
- The current vaccine for elderly patients is a single shot with protection for 2 years. Will a booster shot be necessary after 2 years and what might that do for the ongoing or longer periods of protection?
- Would RSV vaccination have long term benefits to children related to chronic respiratory disease or immunological development ?
- Does vaccination impact lung health of children beyond infancy and does immunization in early life impact mortality in later life
- ***… ……to be continued***

Thanks