Respiratory Syncytial Virus (RSV)

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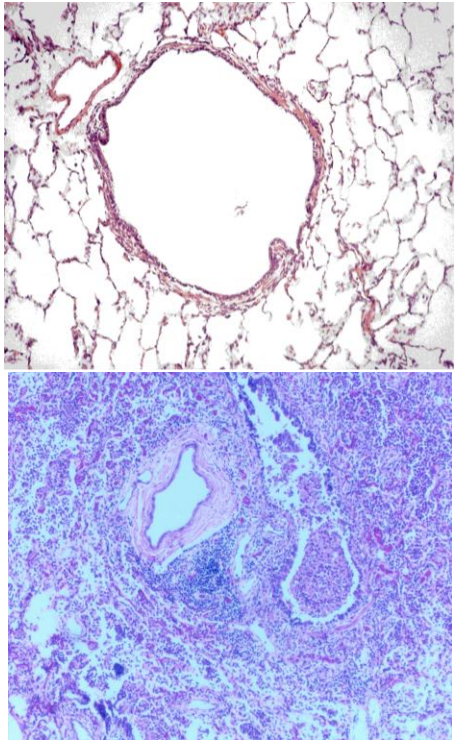
Disclosures

- No relevant disclosures

Annual global pediatric RSV disease burden (< 5 years of age)

- Leading cause of severe respiratory tract infection
  - 33M episodes, 20% in < 6 m.o.
- Leading cause of pediatric hospitalization
  - 3.6M hospitalizations, 39% in < 6 m.o.
- Significant pediatric mortality
  - 101K deaths, 46% in < 6 m.o.
  - Share of global child mortality due to RSV
    - 3.6% < 6 m.o.
    - 2.3% < 5 y



Graham B. *ICRV* 2003.

Li Y, et al. *The Lancet* 2022 3992047-2064DOI: (10.1016/S0140-6736(22)00478-0)

RSV in the elderly

- Up to 10% annual attack rate in older adults within the community
  - Between 5%-10% of older adults within residential settings
- Increased risk of severe disease and hospitalization in older adults with RSV
- Increasing population of aging adults

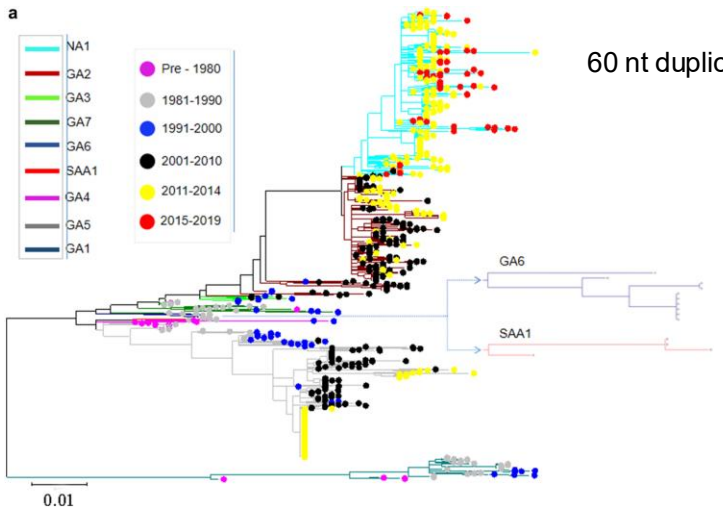
Branche AR, et al. 2015. *Drugs Aging*. 32:261-9.
Pastula ST, et al. 2017. *Open Forum Infect. Dis*. 4:ofw270.

Epidemiology of RSV

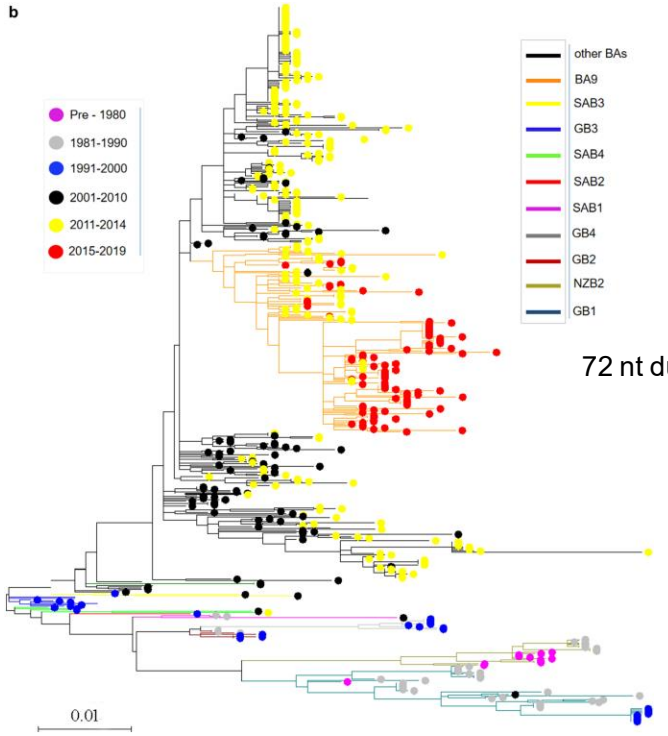
Epidemiology of RSV

- Ubiquitous pathogen
  - 4th most common after influenza A and B, SARS CoV-2
  - Two co-circulating subgroups (A and B) based on antigenic and sequence analysis
- Seasonal (winter months in Northern and Southern hemispheres)
- >50% of infants are infected during 1st RSV season, ~100% by 2 yrs.
  - Most serious infections in infants
  - ~1% require hospitalization
- Reinfections are common
  - Protective immunity to RSV is not long-lived
  - Decreased severity, frequency with age.
  - Increased severity at >65 yrs

Evolution of RSV subgroups A and B (G gene sequences)



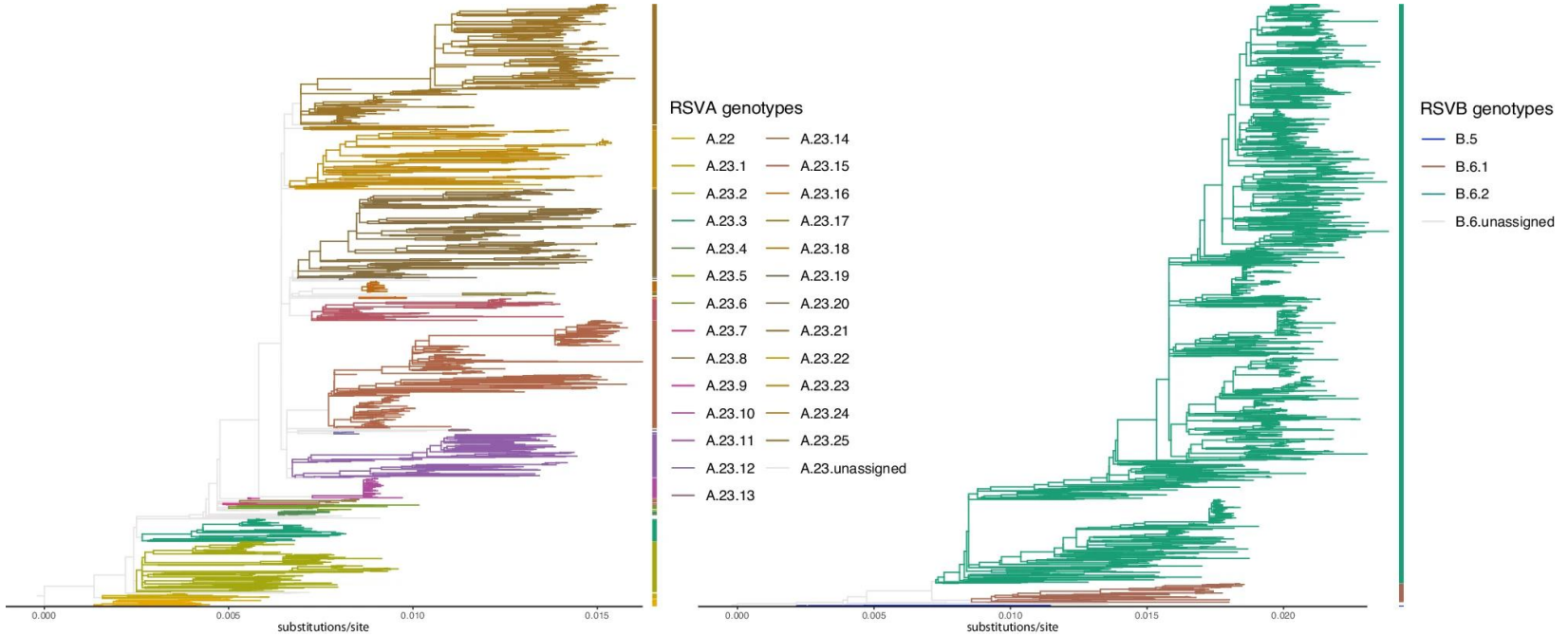
60 nt duplication



72 nt duplication

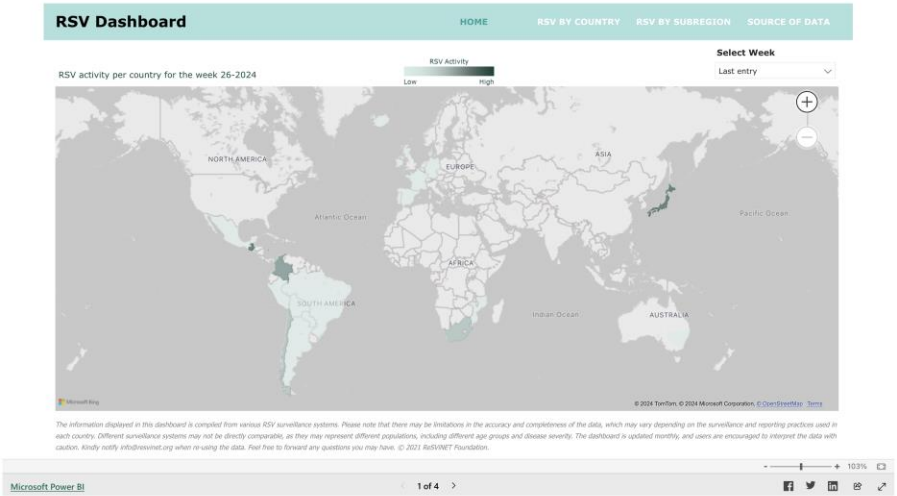
Yu JM, et al. 2021. Sci. Rep. 11, 12941

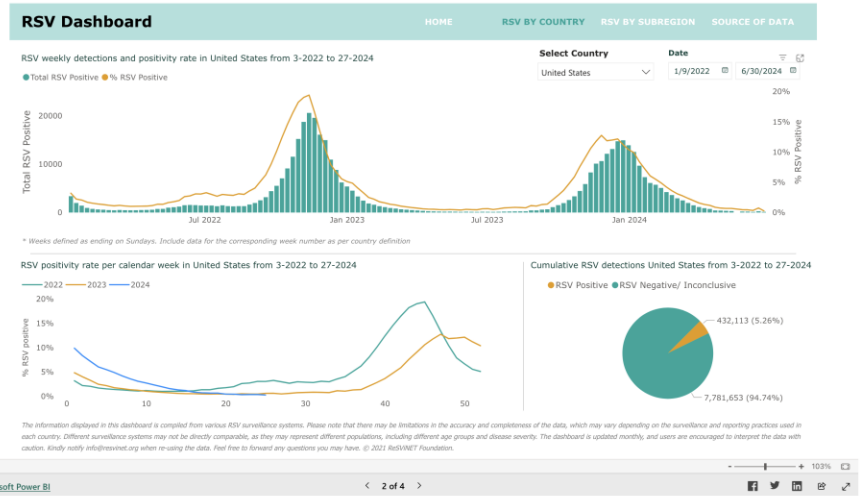
Evolution of RSV subgroups A and B



Langedijk, A.C. *et al. Nat Commun* **15**, 3083 (2024).
https://doi.org/10.1038/s41467-024-47118-6

RSV testing and surveillance





https://resvinet.org/rsv-tools/rsv-dashboard/

Real world RSV vaccine effectiveness

Formalin-inactivated RSV vaccine failure

RESPIRATORY SYNCYTIAL VIRUS DISEASE IN INFANTS DESPITE PRIOR ADMINISTRATION OF ANTIGENIC INACTIVATED VACCINE

KIM HW, CANCHOLA JG, BRANDT CD, PYLES G, CHANOCK RM, JENSEN K, PARROTT RH
American Journal of Epidemiology, Volume 89, Issue 4, April 1969, Pages 422–434,
https://doi.org/10.1093/oxfordjournals.aje.a120955

FIELD EVALUATION OF A RESPIRATORY SYNCYTIAL VIRUS VACCINE AND A TRIVALENT PARAINFLUENZA VIRUS VACCINE IN A PEDIATRIC POPULATION

CHIN J, MAGOFFIN RL, SHEARER LA, SCHIEBLE JH, LENNETTE EH
American Journal of Epidemiology, Volume 89, Issue 4, April 1969, Pages 449–463,
https://doi.org/10.1093/oxfordjournals.aje.a120957

RSV vaccines

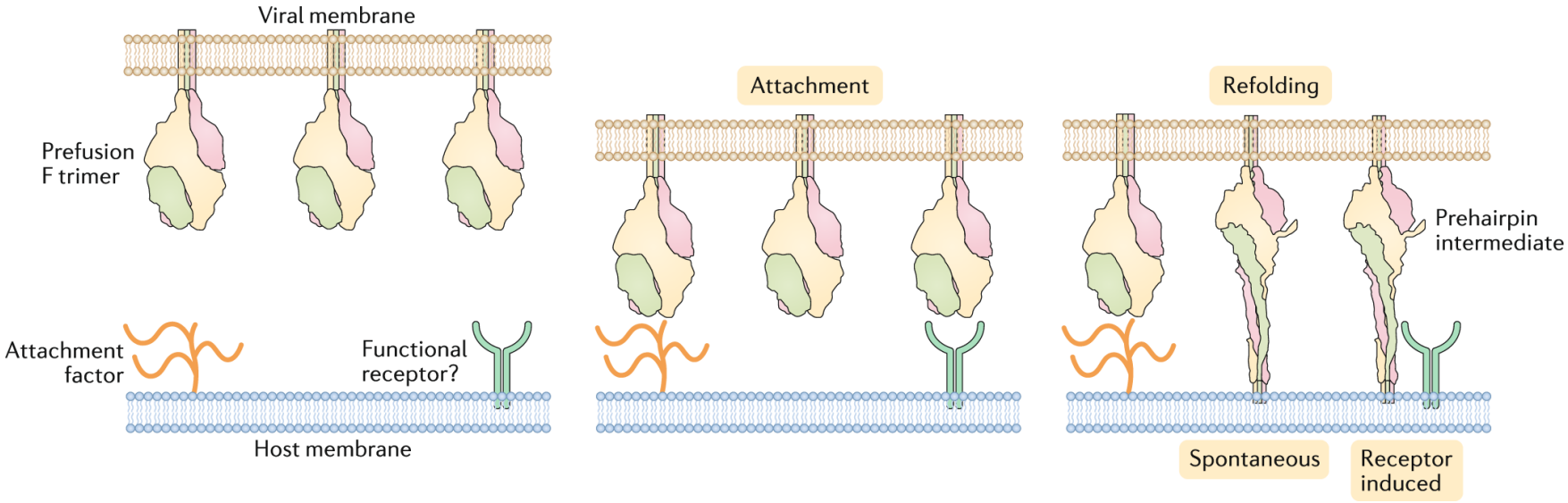
Protein

- Arexy (GSK)
  - RSVpreF3, monovalent (A), $AS01_E$ adjuvant
  - 120 μg, i.m.
  - > 60 y.o. (18 – 59 high risk)
- ABRYSVO (Pfizer)
  - RSVpreF, bivalent (A and B), unadjuvanted
  - 120 μg i.m.
  - > 60 y.o. (18 – 59 high risk)
  - Maternal immunization (GA 32 - 36 wks)

mRNA

- mRESVIA (Moderna)
  - LNP-mRNA
  - RSV preF, monovalent (A)
  - 50 μg i.m.
  - > 60 y.o. (18 – 59 high risk)

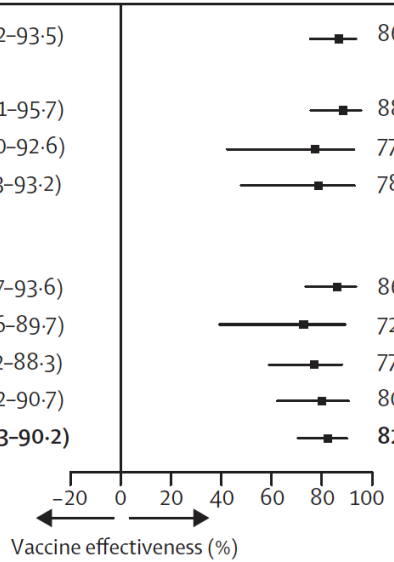
RSV fusion (F) protein



Battles, M.B., McLellan, J.S. *Nat Rev Microbiol* **17**, 233–245 (2019). https://doi.org/10.1038/s41579-019-0149-x

RSV vaccine effectiveness in elderly

	Controls		Cases		Unadjusted vaccine effectiveness (95% CI)	Adjusted* vaccine effectiveness (95% CI)
	Unvaccinated	Vaccinated	Unvaccinated	Vaccinated		
Severe disease†	362	211	128	10	86·6 (75·2–93·5)	86·7 (75·4–93·6)
Reason for hospital admission						
Admitted with LRTI	361	200	97	6	88·8 (76·1–95·7)	88·6 (75·6–95·6)
Lung disease exacerbation‡	129	81	36	5	77·9 (46·0–92·6)	77·4 (42·4–92·8)
Lung disease, heart disease, or frailty exacerbation‡	142	88	40	5	79·8 (51·3–93·2)	78·8 (47·8–93·0)
Comorbidity group						
Immunocompetent	391	218	117	9	86·2 (73·7–93·6)	86·2 (73·6–93·6)
Immunosuppression	134	90	40	7	73·9 (42·6–89·7)	72·8 (39·5–89·3)
Chronic heart and vascular disease	317	189	97	13	77·5 (60·2–88·3)	77·0 (59·1–88·0)
Chronic respiratory disease	314	194	83	10	80·5 (63·2–90·7)	80·1 (62·4–90·6)
Overall	**525**	**308**	**157**	**16**	**82·6 (71·3–90·2)**	**82·3 (70·6–90·0)**



Abrysvo in England, 75 – 79 yo

Symes, R. et al. *Lancet Infect Dis* 2026; 26: 229–38.
https://doi.org/10.1016/ S1473-3099(25)00546-8

RSV monoclonal antibodies

Synagis (palivizumab)

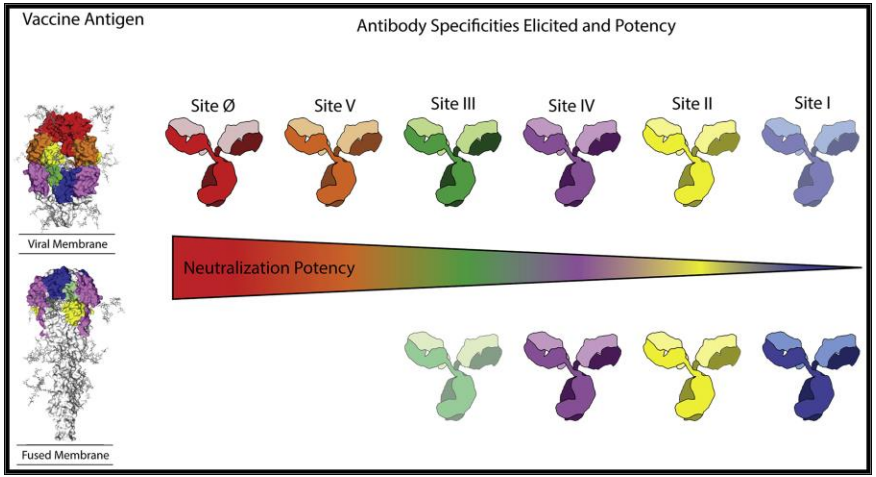
- Humanized anti-F monoclonal antibody (site II)
- 15 mg/kg s.c., monthly
- Recommended for preterm infants <29 wk GA and infants with chronic lung/heart disease

Beyfortus (nirsevimab)

- Human anti-F monoclonal antibody (site Ø)
  - In vitro-optimized
  - Extended serum half-life
- 50 mg i.m., <5 kg; 100 mg i.m., >5 kg

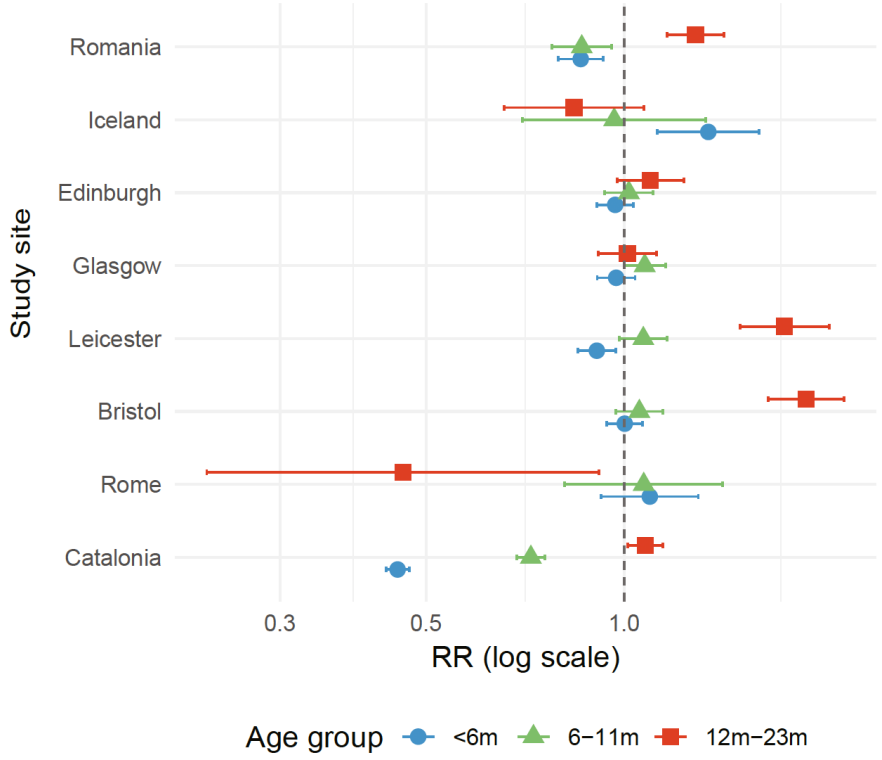
Enflosia (clesrovimab)

- Human anti-F monoclonal antibody (site IV)
  - Extended serum half-life
- 105 mg i.m.



Ruckwardt, et al. 2019. Immunity. 51:429.

Nirsevimab effectiveness (ED visits, 2024-2025 season)



Palivizumab for high-risk infants

Palivizumab for high-risk infants
Maternal immunization (49.2 – 60.5%)

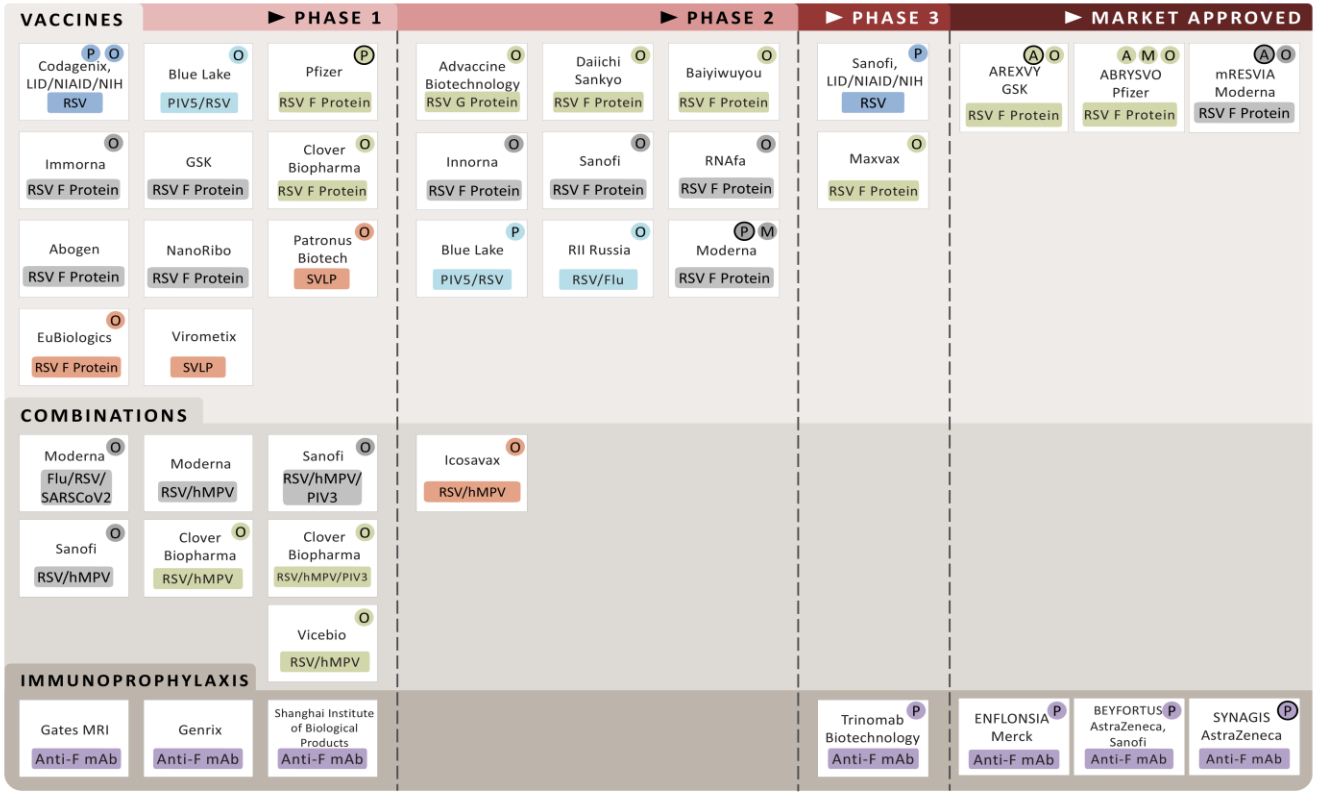
Nirsevimab (up to 75%)
beginning Nov. 2024

Nirsevimab (>90%)

RSV Vaccine and mAb Snapshot

P =PEDIATRIC
M =MATERNAL
A =ADULT
O =OLDER ADULT
=LIMITED TO INCREASED RISK

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

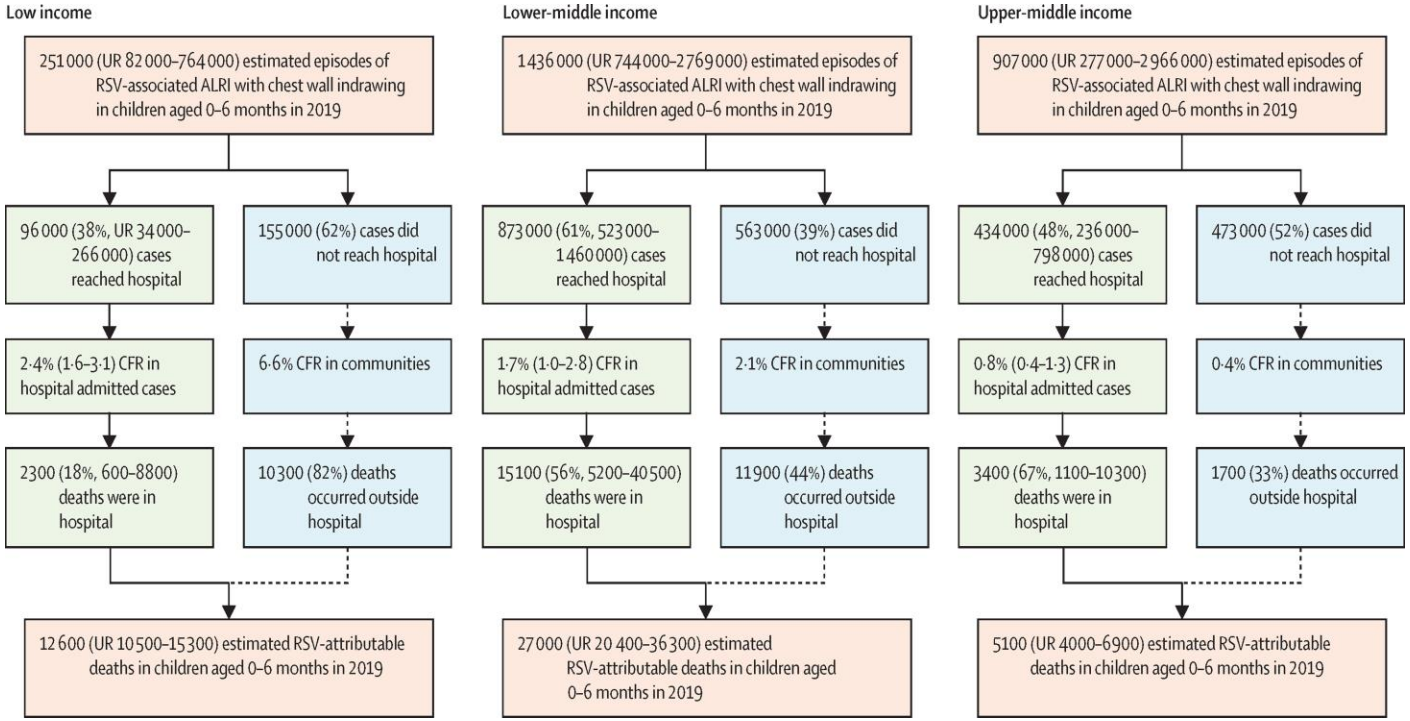


*SVLP = Synthetic virus-like particle

UPDATED: December 10, 2025 https://www.path.org/resources/rsv-vaccine-and-mab-snapshot/

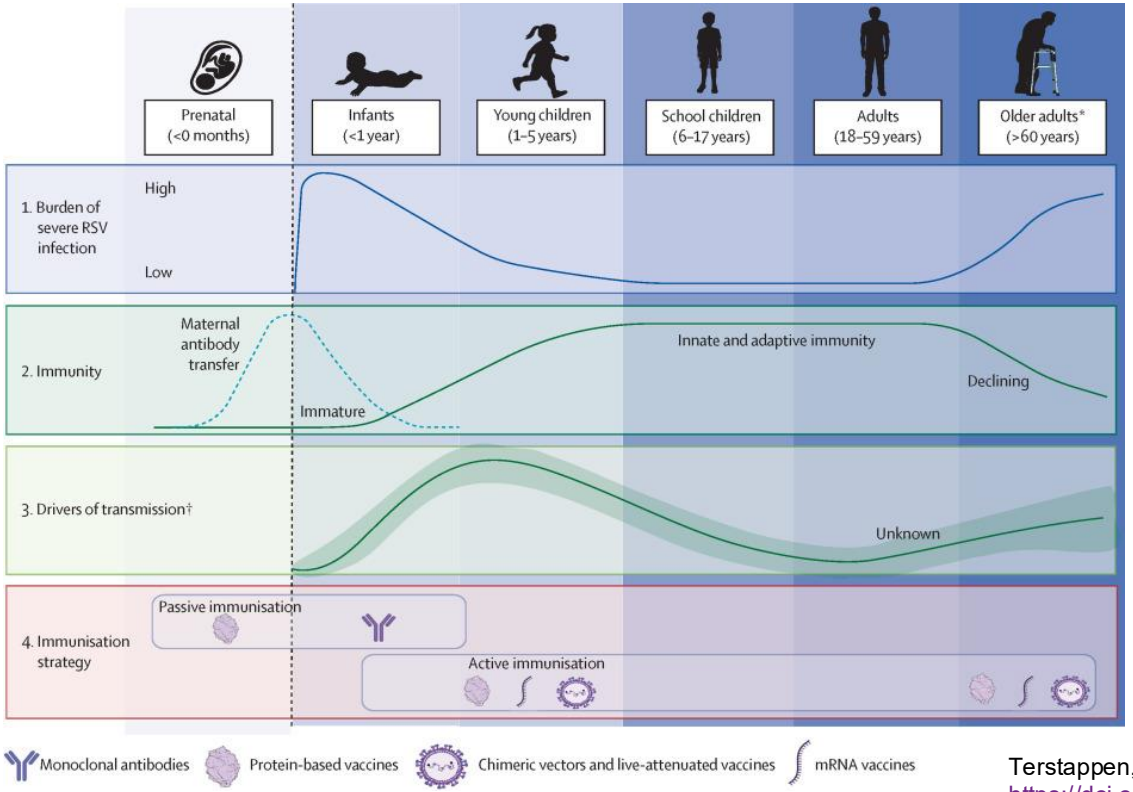
PATH

Most pediatric RSV mortality occurs in low- and middle-income countries



Li Y, et al. *The Lancet* 2022 3992047-2064DOI: (10.1016/S0140-6736(22)00478-0)

Current concepts of RSV prevention strategies



Terstappen, J, et al. 2024. Lancet Inf. Dis. 24:e747.
https://doi.org/10.1016/S1473-3099(24)00455-9

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