

Ónæmiskerfið og bólusetningar

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Yfirlit

- Ónæmiskerfið
- Bólusetningar



Ónæmiskerfið - hlutverk



- *Recognition*
- *Effector response*
- *Regulation & memory*



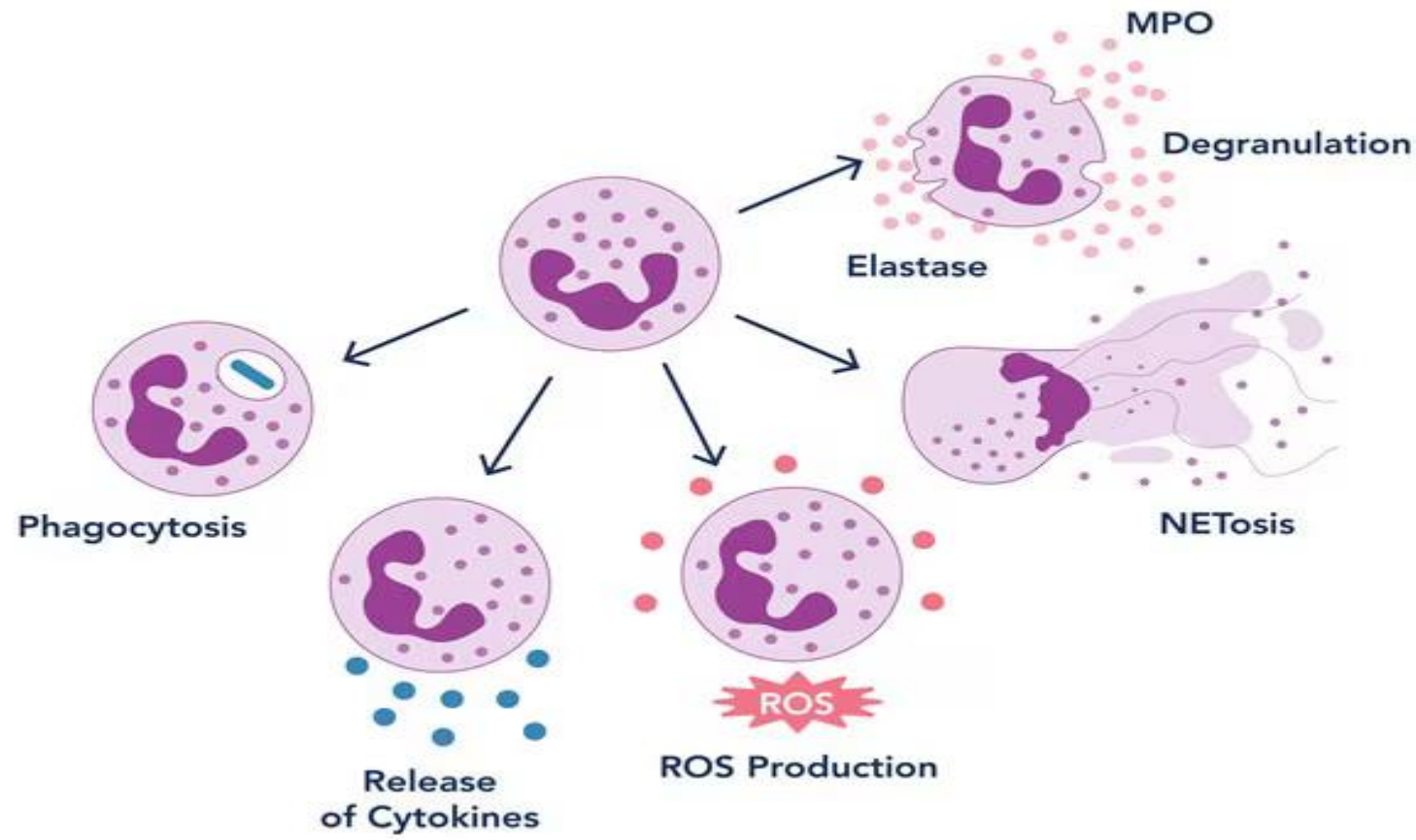
Ónæmiskerfið



- *Innate immune system – hratt, lítið sértækt*
 - *Neutrophilar, macrophagar, complement*
- *Adaptive immune system – antigen specific. Memory*
 - *T frumur (cellular immunity)*
 - *B frumur (humoral immunity)*

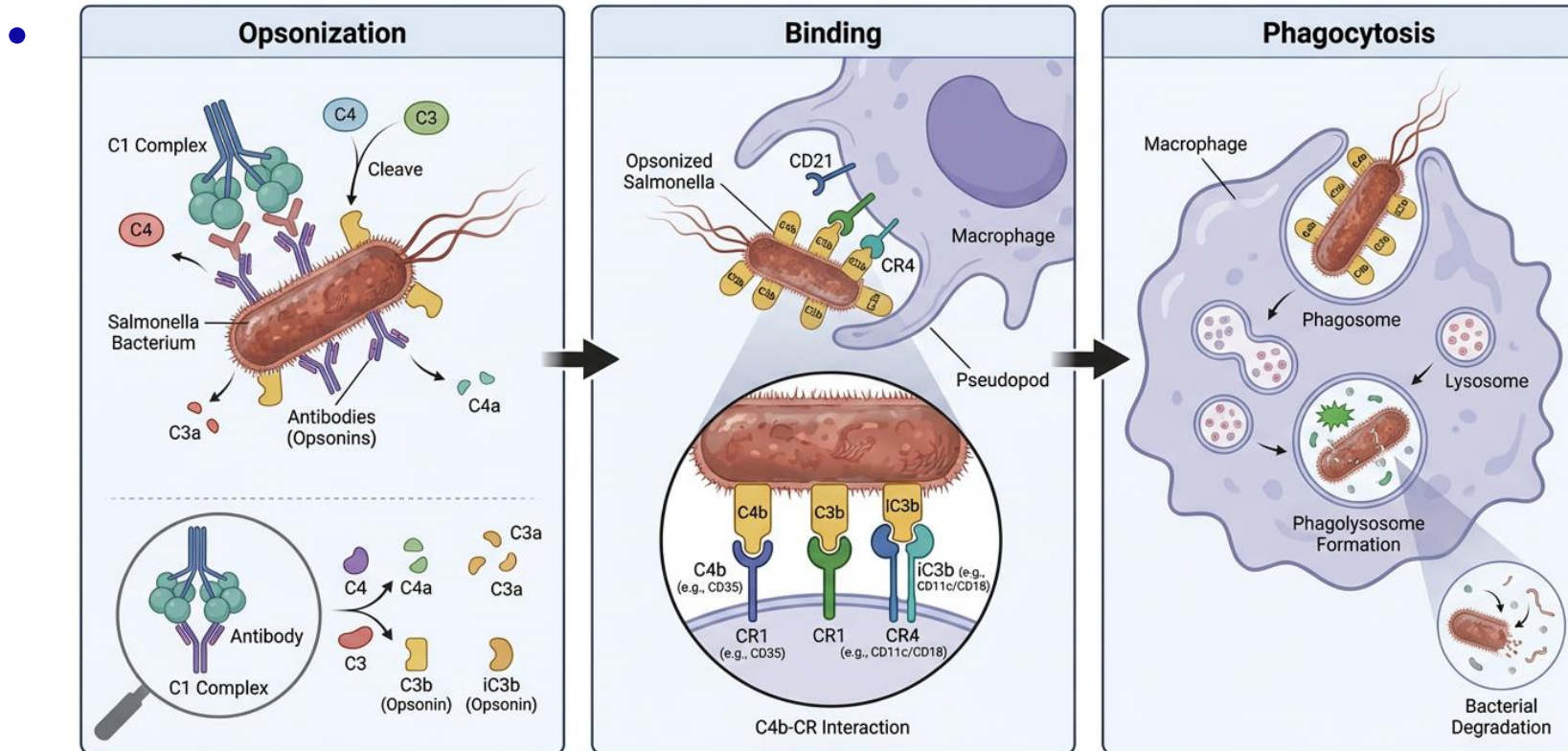


Hvernig virkar ónæmiskerfið?



Hvernig virkar ónæmiskerfið?

Opsonization and Phagocytosis



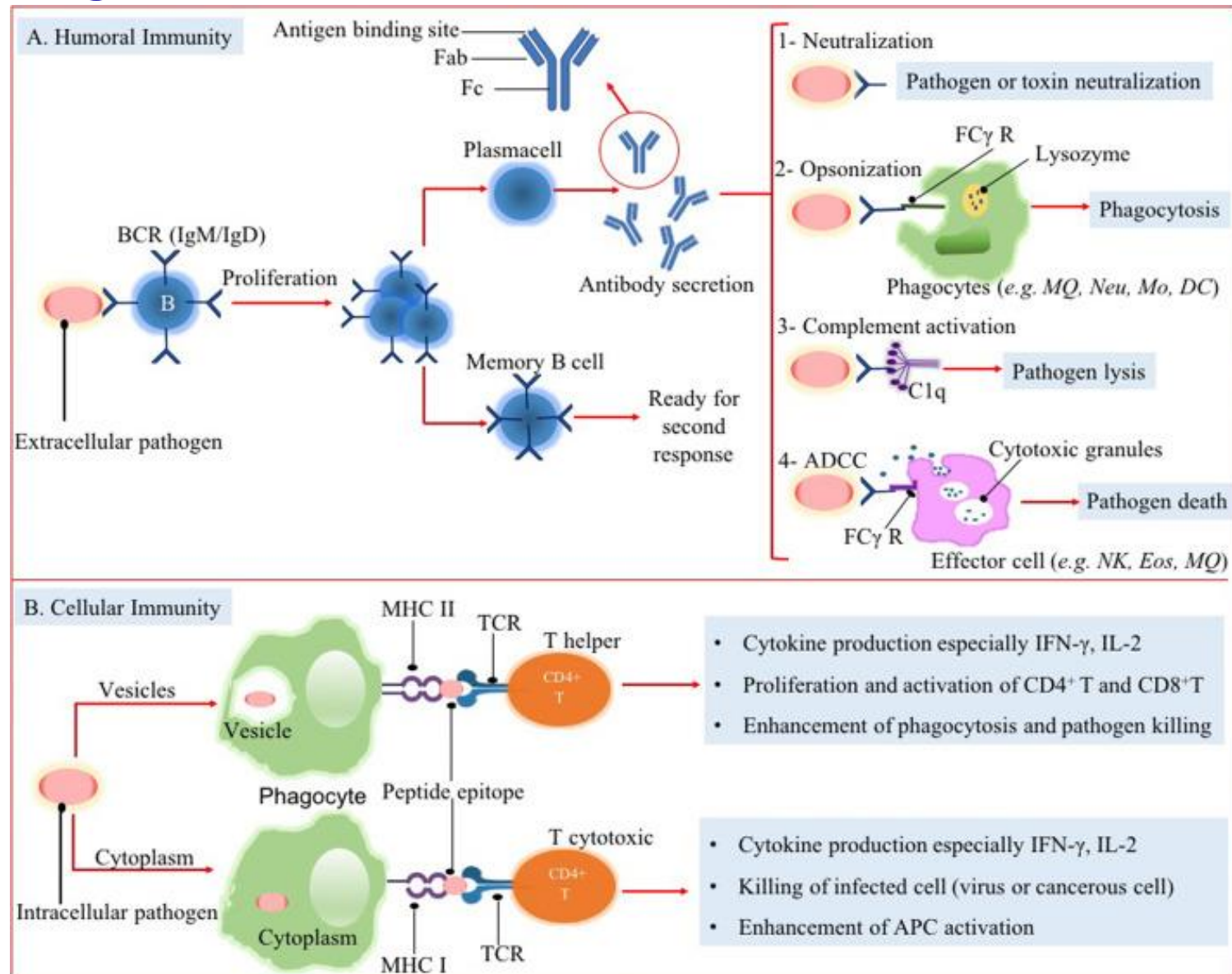
Hvernig virkar ónæmiskerfið?



- *Adaptive immune system*
 - *T frumur*
 - *CD8 (cytotoxic) drepa viral sýktar frumur*
 - *CD4 – support B cell maturation*
 - *B frumur (humoral immunity)*
 - *Framleiða sértæk mótefni skv uppskrift*
 - *Affinity maturation*



Hvernig virkar ónæmiskerfið?



Bólusetningar



- *Hvernig virkar það?*
- *Antigen gefið => antigen presenting cell => memory B og T frumur.*

Booster skammtar => nákvæmari og betra mótefnamyndun

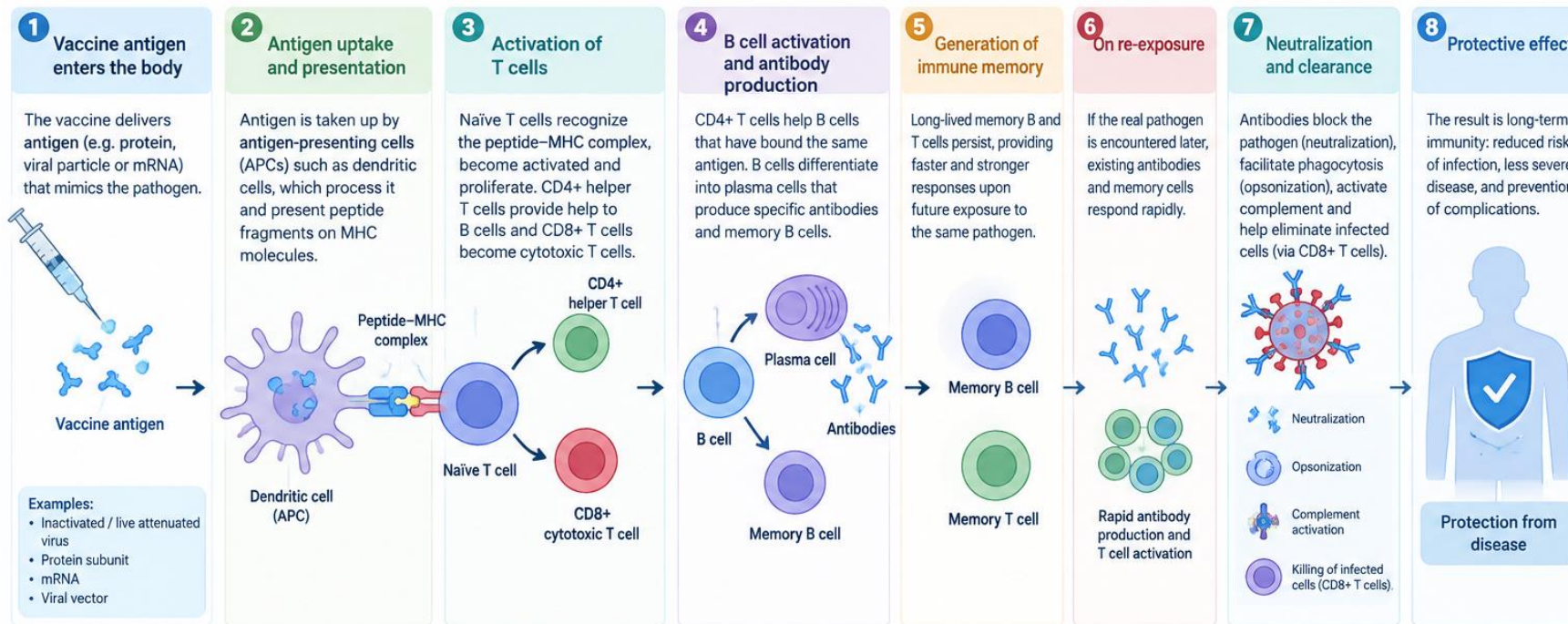


Bólusetningar



From Antigen (from Vaccine) to Protective Effect

How vaccination trains the immune system



The immune system's key functions (relevant to vaccination)



Defence

Eliminates pathogens and infected cells



Memory

Provides long-lasting protection



Inflammation

Recruits and activates immune cells



Regulation

Prevents excessive or misdirected responses



Cooperation

Innate and adaptive immunity work together



Bólusetningar barna

Almennar bólusetningar barna á Íslandi
frá október 2025



Aldur:		Bólusetning gegn:	
Á meðgöngu		Kíghósta (<i>Boostrix</i> , gefið móður við u.þ.b. 28v meðgöngu)	
0–6 mánaða: RSV bólusetning (nirsevimab) við fæðingu október–mars eða að hausti	6 vikna	Rótaveiru (munndropar; <i>RotaTeq</i>)	
	3 mánaða	Rótaveiru (munndropar; <i>RotaTeq</i>) Kíghósta, barnaveiki, stífkrampa, Haemofilus influenzae sjúkdómi af gerð b (Hib) og mænusótt í einni sprautu (<i>Pentavac</i>) Pneumókokkum í annarri sprautu (<i>Vaxneuvance</i>)	
	5 mánaða	Rótaveiru (munndropar; <i>RotaTeq</i>) Kíghósta, barnaveiki, stífkrampa, Haemofilus influenzae sjúkdómi af gerð b (Hib) og mænusótt í einni sprautu (<i>Pentavac</i>) Pneumókokkum í annarri sprautu (<i>Vaxneuvance</i>)	
	12 mánaða	Kíghósta, barnaveiki, stífkrampa, Haemofilus influenzae sjúkdómi af gerð b (Hib) og mænusótt í einni sprautu (<i>Pentavac</i>) Pneumókokkum í annarri sprautu (<i>Vaxneuvance</i>) Meningókokkum í þriðju sprautu (<i>MenQuadfi</i>)	6–59 mánaða: Inflúensubólusetning (<i>Vaxigrip</i>) árlega að hausti
	18 mánaða	Mislingum, hettusótt, rauðum hundum og hlaupabólu í einni sprautu (<i>ProQuad</i>)	
2,5 árs		Hlaupabólu (<i>Varilrix</i>)	
4 ára		Barnaveiki, stífkrampa og kíghósta í einni sprautu (<i>Boostrix</i>)	
12 ára		Mislingum, hettusótt og rauðum hundum í einni sprautu (<i>M-M-RVAXPRO</i>) HPV, tvær sprautur gefnar með a.m.k. 6 mánaða millibili (<i>Gardasil 9</i>)	
14 ára		Barnaveiki, stífkrampa og kíghósta ásamt mænusótt í einni sprautu (<i>Repevax</i>)	



RSV

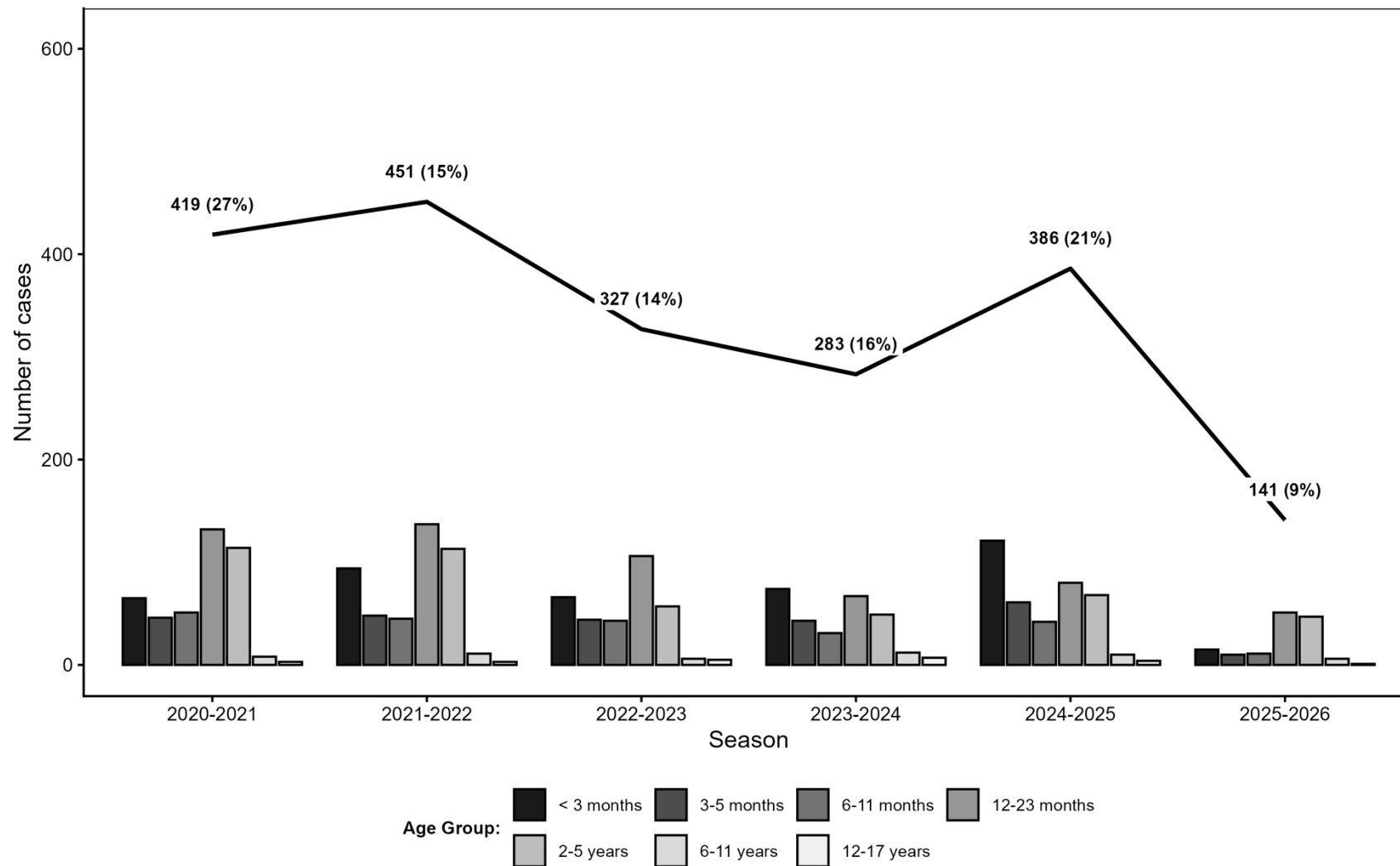


- Bronchiolitis
 - *Alvarlegustu einkennin hjá börnum yngri en 6 mánaða*
 - *Talsverð byrði hjá 6-24 mánaða, minna hjá eldri börnum*



RSV - Iceland

Number of RSV cases per season (line) broken down by age-group (columns)

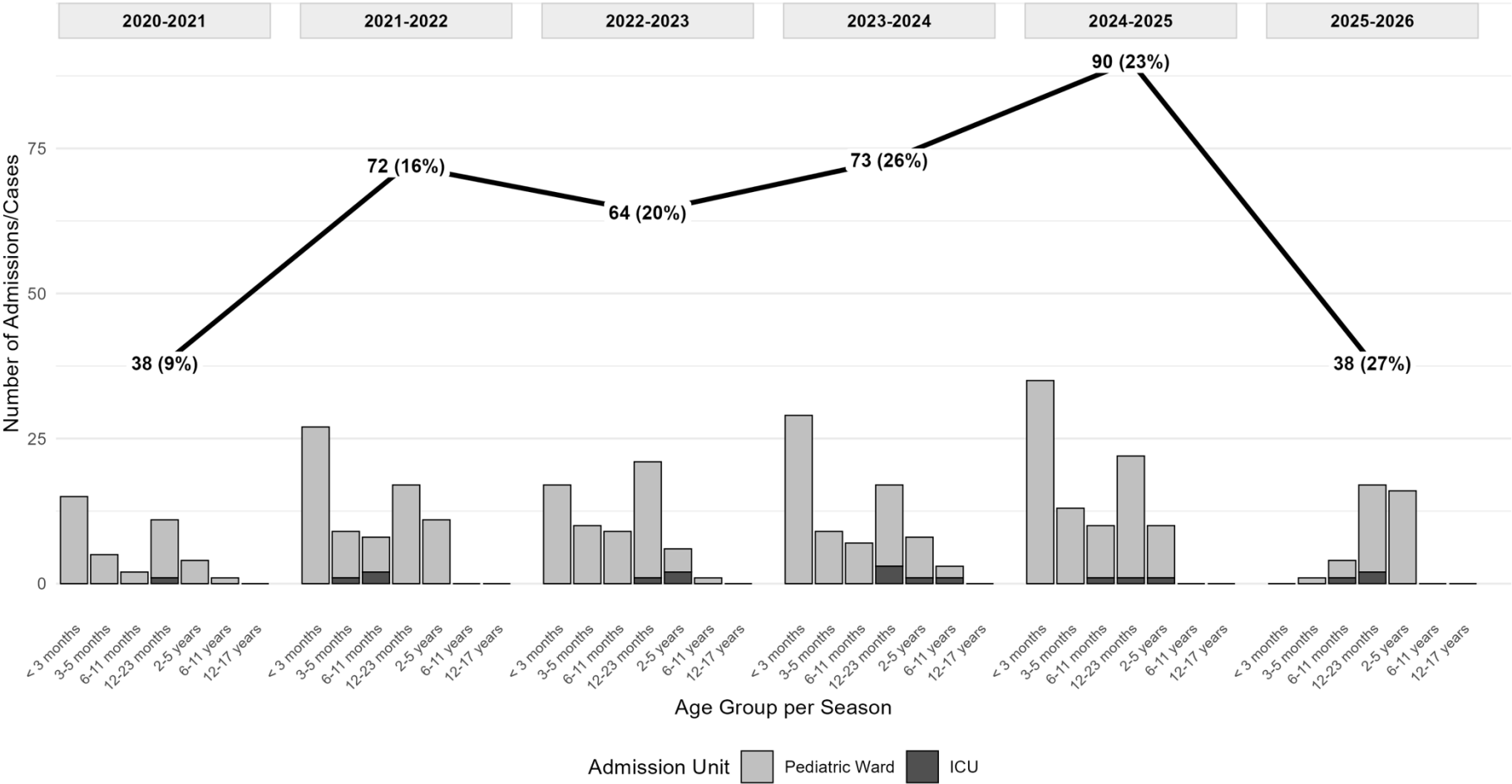


RSV - Iceland



Total RSV Admissions and Breakdown by Age Group and Admission Unit

Line denotes total admissions (percentage of positive cases requiring admission)

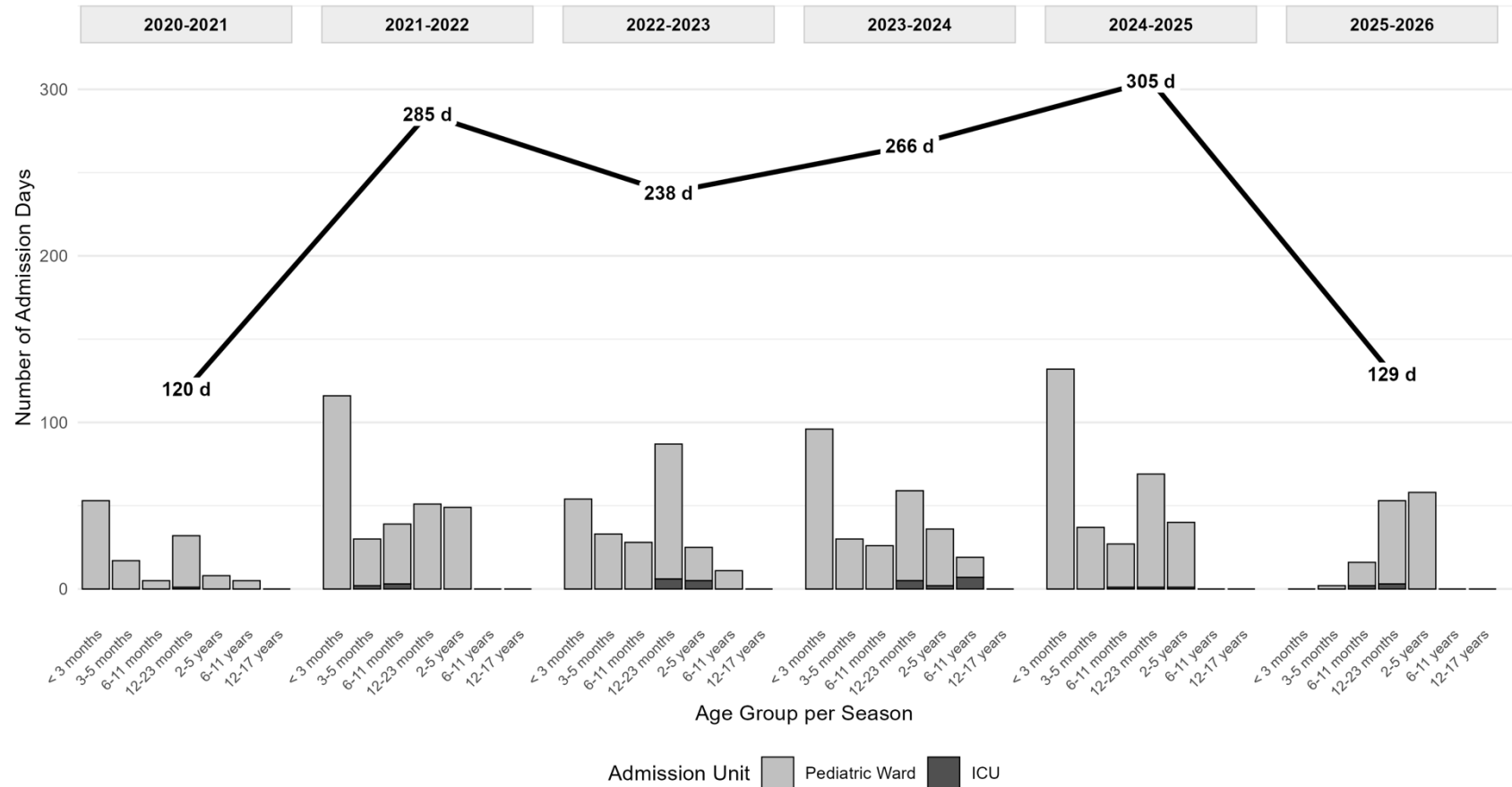


RSV - Iceland



Total RSV Admission Days and Breakdown by Age Group and Admission Unit

Line denotes total cumulative admission days across all age groups



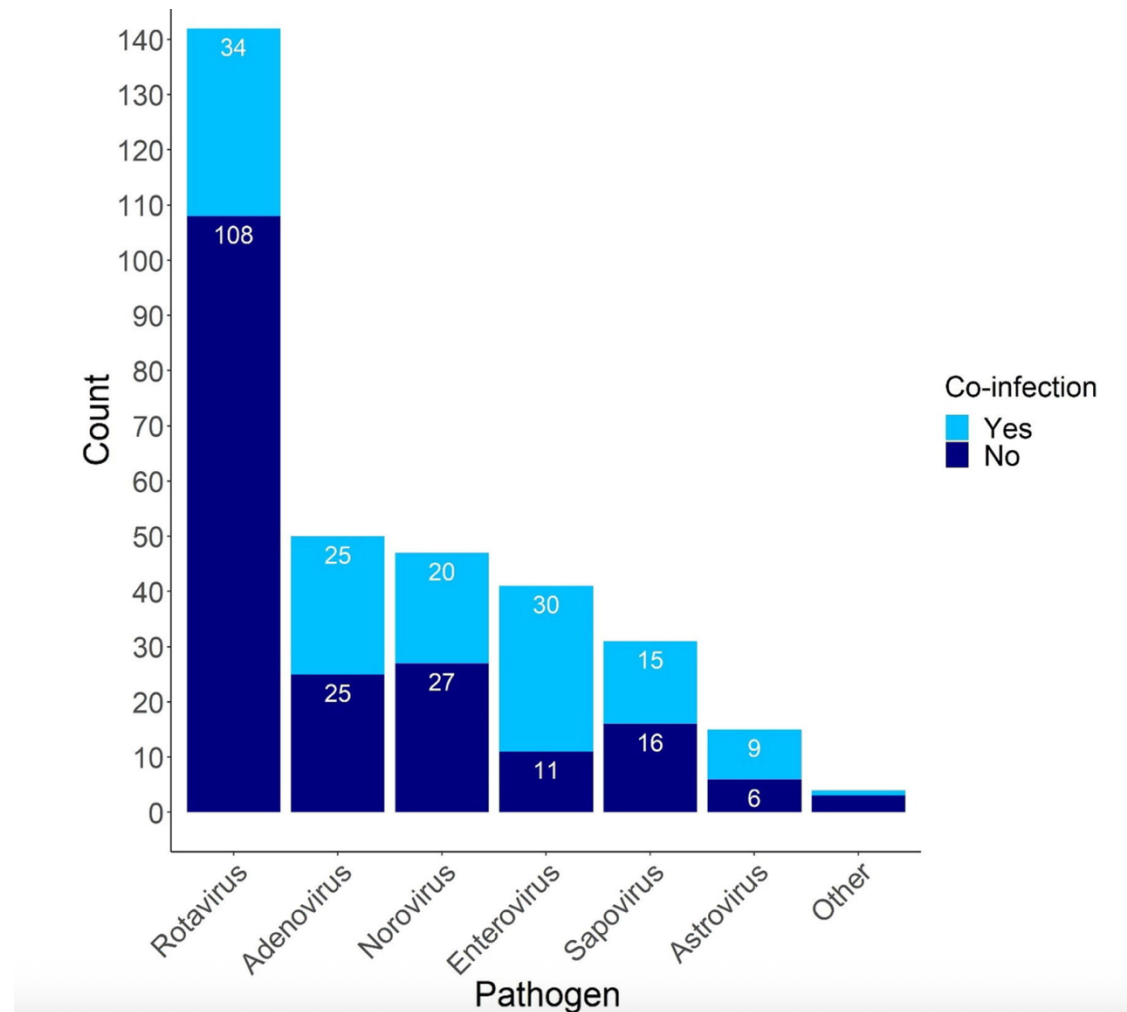
Rotaveira



- Algengasta ástæða gastroenteritis hjá börnum yngri en 5 ára
- Langvarandi einkenni, innlagnir á spítala
- Flog



Viral gastroenteritis in < 5 year olds



Kristinsdottir, Thors et al. Vaccine 2021



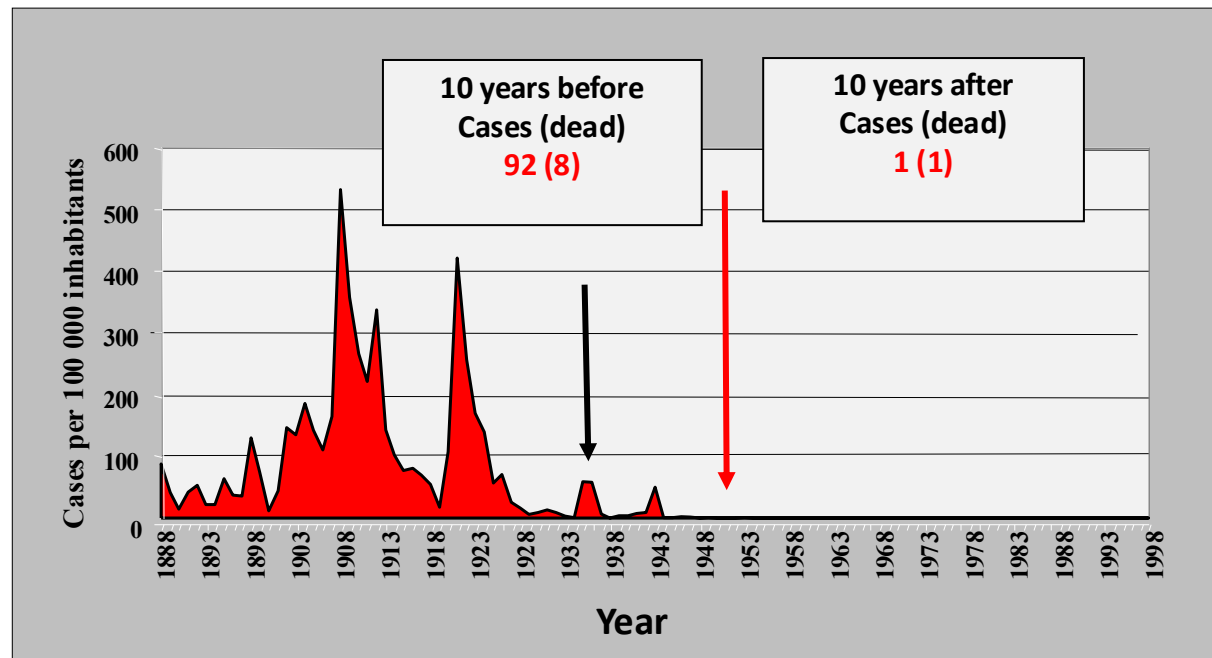
Sjúkdómarnir – DKTP-Hib



- Diphtheria
- Kíghósti
- Tetanus
- Polio
- Haemophilus influenzae – type b

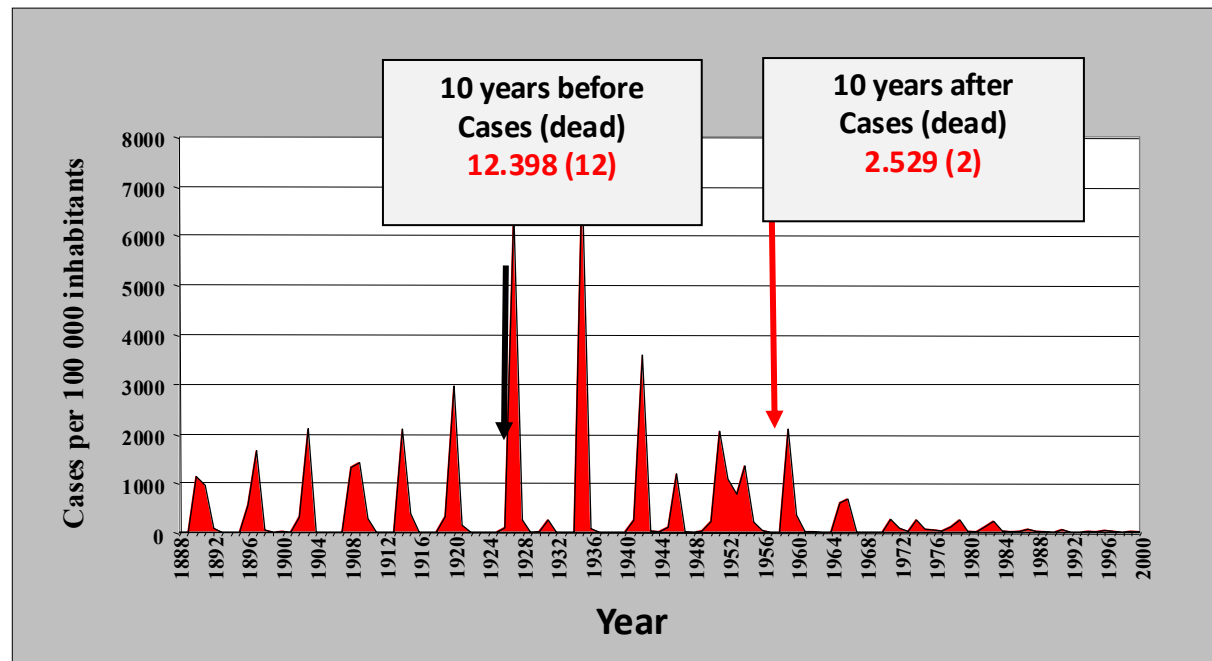


Diphtheria in Iceland



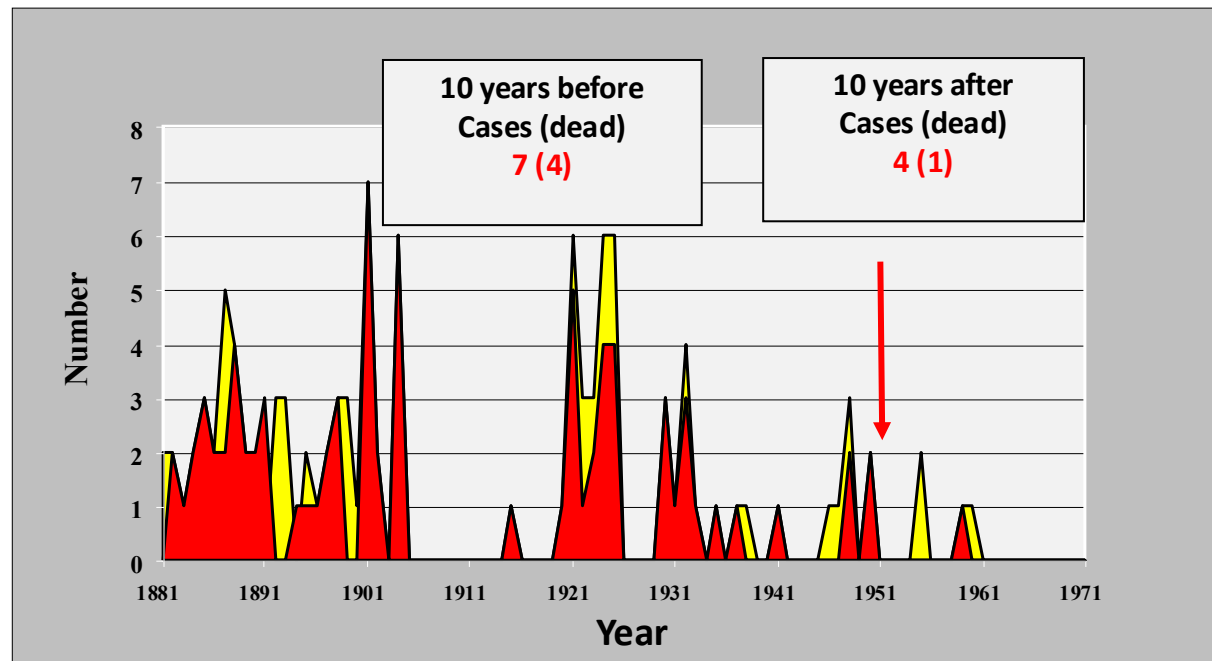
First tried in 1935, probably stopped an epidemic
1950: All infants offered immunisation against diphtheria

Pertussis in Iceland



1927 Immunisation tried. Infant immunisation from 1959
2000: Acellular pertussis, 2007 added to immunisation at 14 y

Tetanus in Iceland



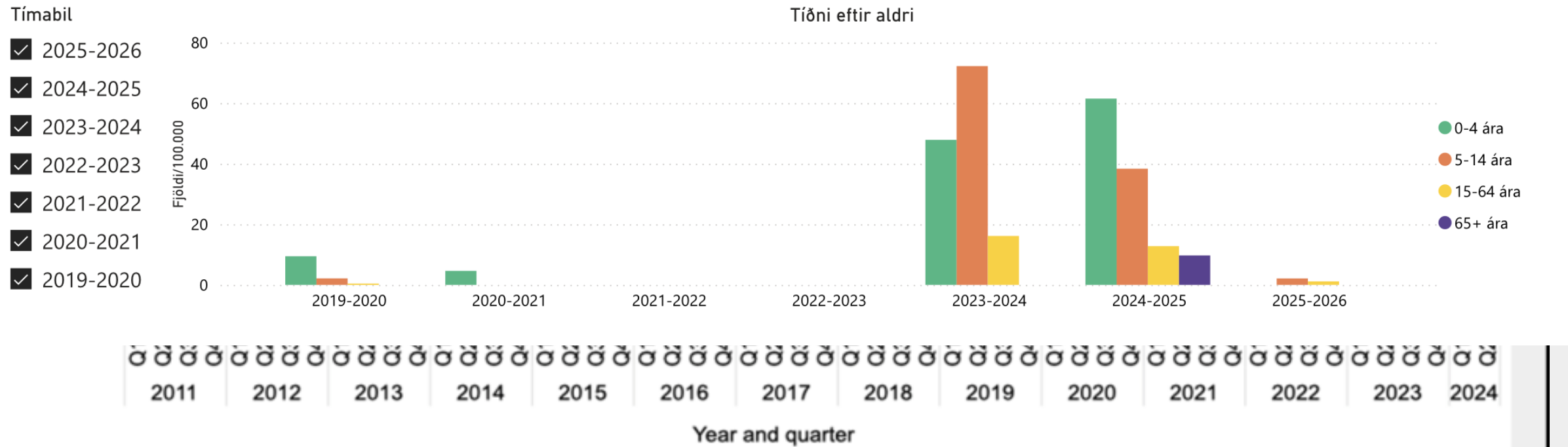
1953 Immunisation started
Last case: 2008

Pertussis



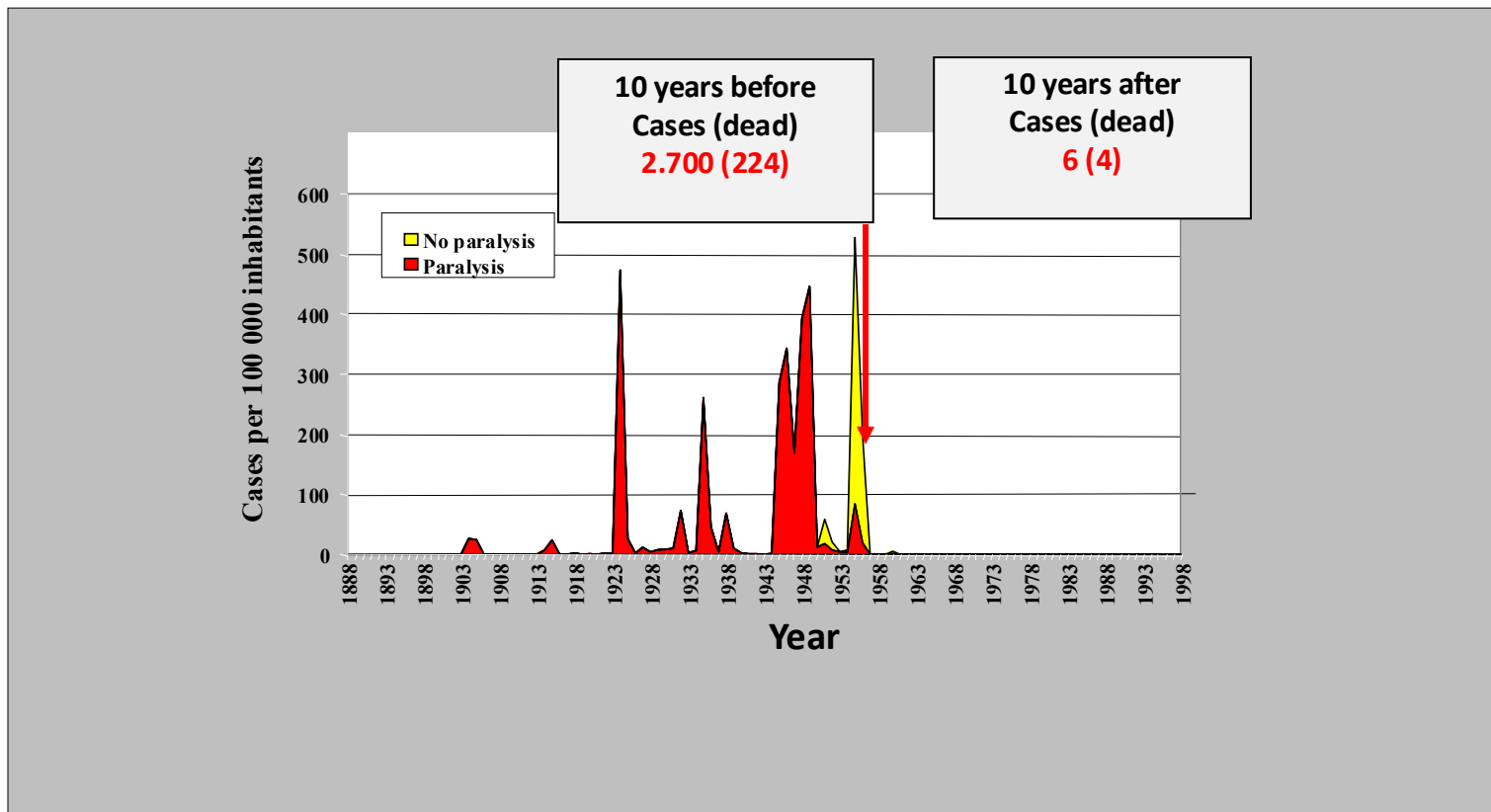
Figure 5: Laboratory confirmed cases of pertussis by quarter in England: 2011 to June 2024

Kíghósti



Government of the United Kingdom. Confirmed cases of pertussis in England by month [Internet]. Available from: https://assets.publishing.service.gov.uk/media/66b24edafc8e12ac3edb0b96/Fig3_pertussis_June2024.svg. Copyright ©

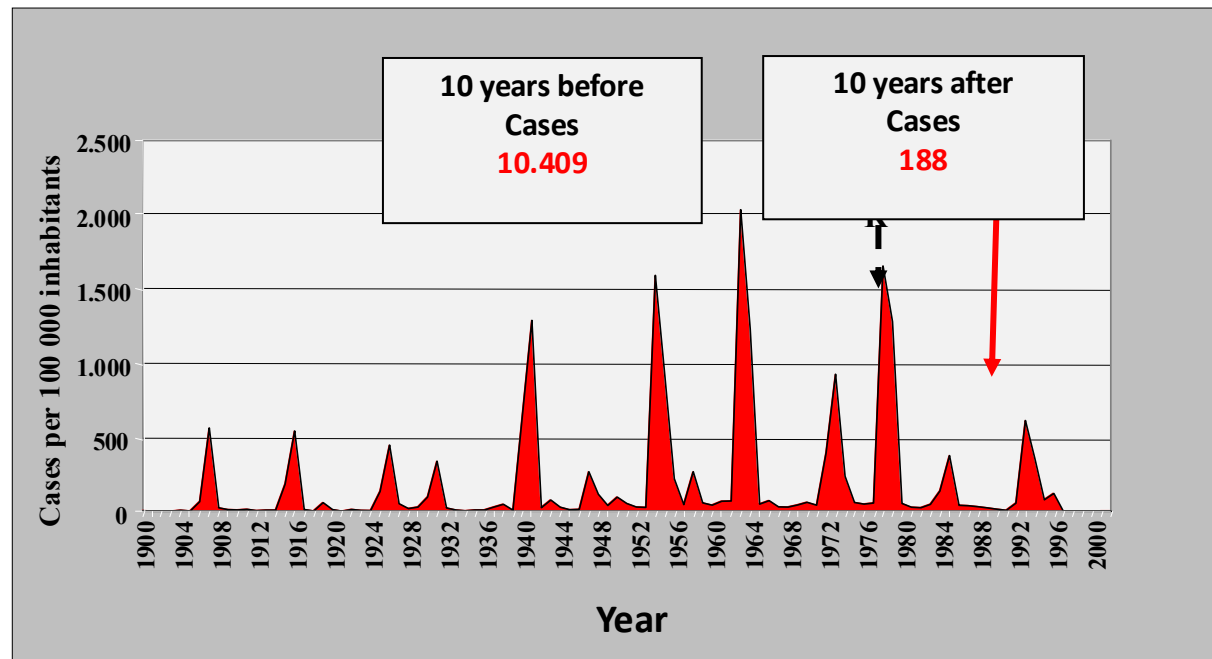
Poliomyelitis in Iceland



1956 Immunisation started

1960: Last cases with paralysis, 1963: Last case (foreign origin)

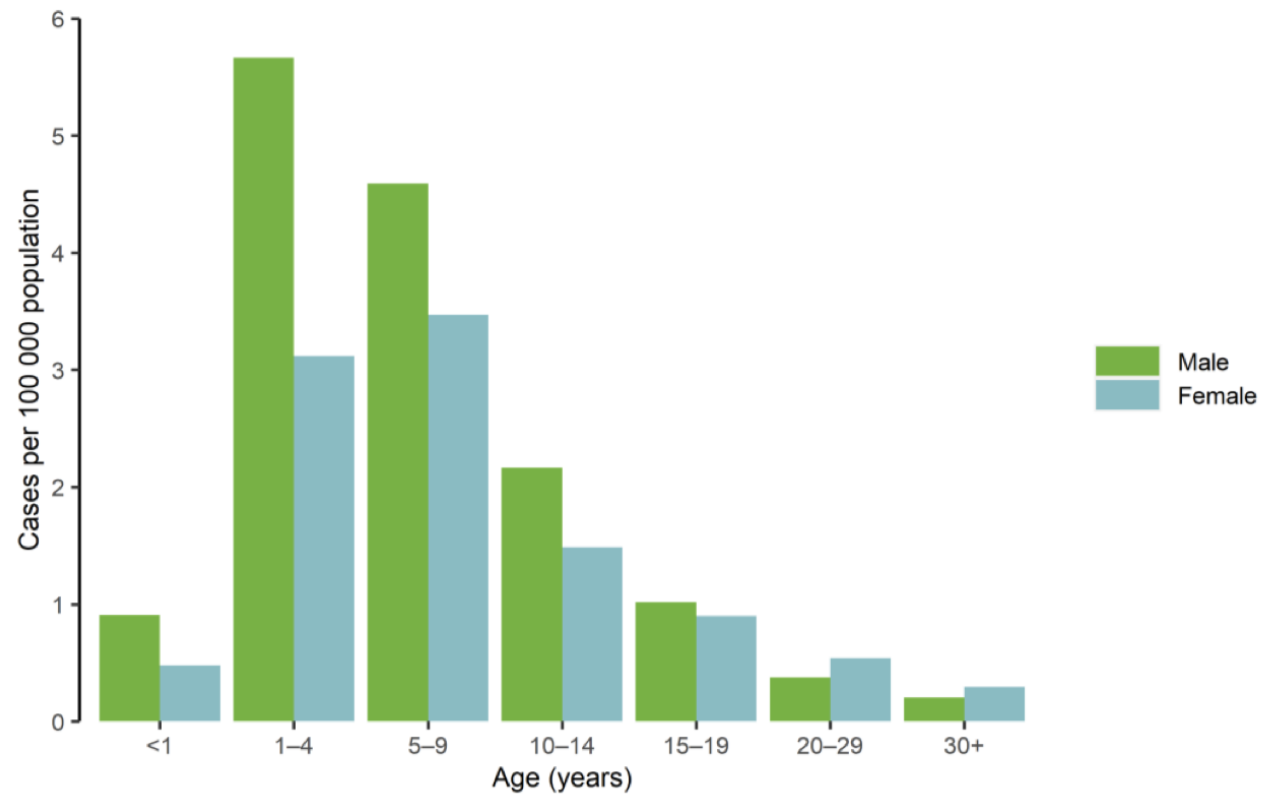
Rubella in Iceland



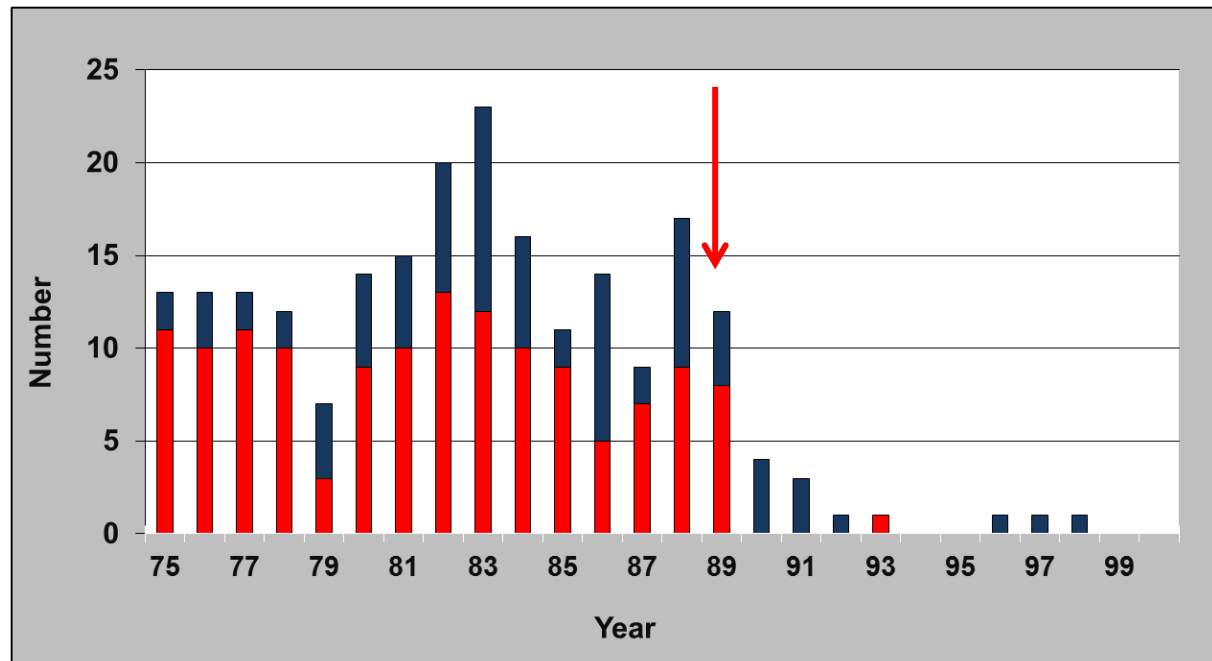
1977: Immunisation started, girls at 12 years of age
1989: Immunisation with MMR at 18 months of age started

Mumps

Figure 2. Mumps cases per 100 000 population, by age and gender, EU/EEA, 2023



Hib in Iceland



1989: Immunisation against *Haemophilus influenza* type b starts



Meningitis



Sepsis/blood stream infections

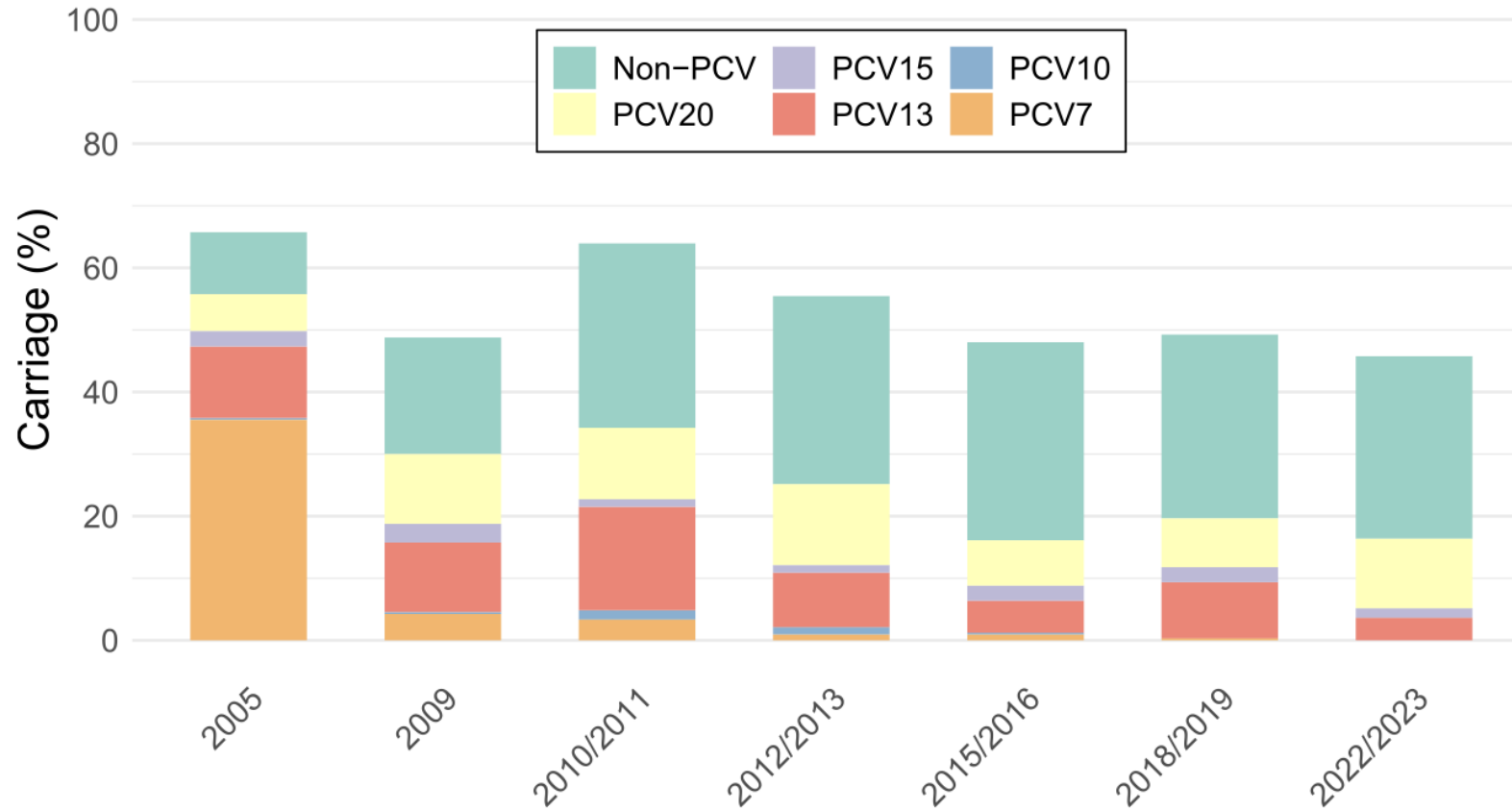
Pneumokokkar



- Ífarandi sýkingar: Blóðsýkingar, heilahimnubólga
- *Lungnabólga – empyema*
- *Eyrnabólgur*



Pneumokokkar - carriage



Pneumokok

FIGURE 1. Changes in incidence rate* of invasive pneumococcal disease (IPD) among children aged <5 years before and after introduction of 7-valent pneumococcal conjugate vaccine (PCV7), by age and year — Active Bacterial Core surveillance, eight states,[†] 1998–2005



- Ífarandi sýki
- Lungnabólga
- Eyrnabólga

ga

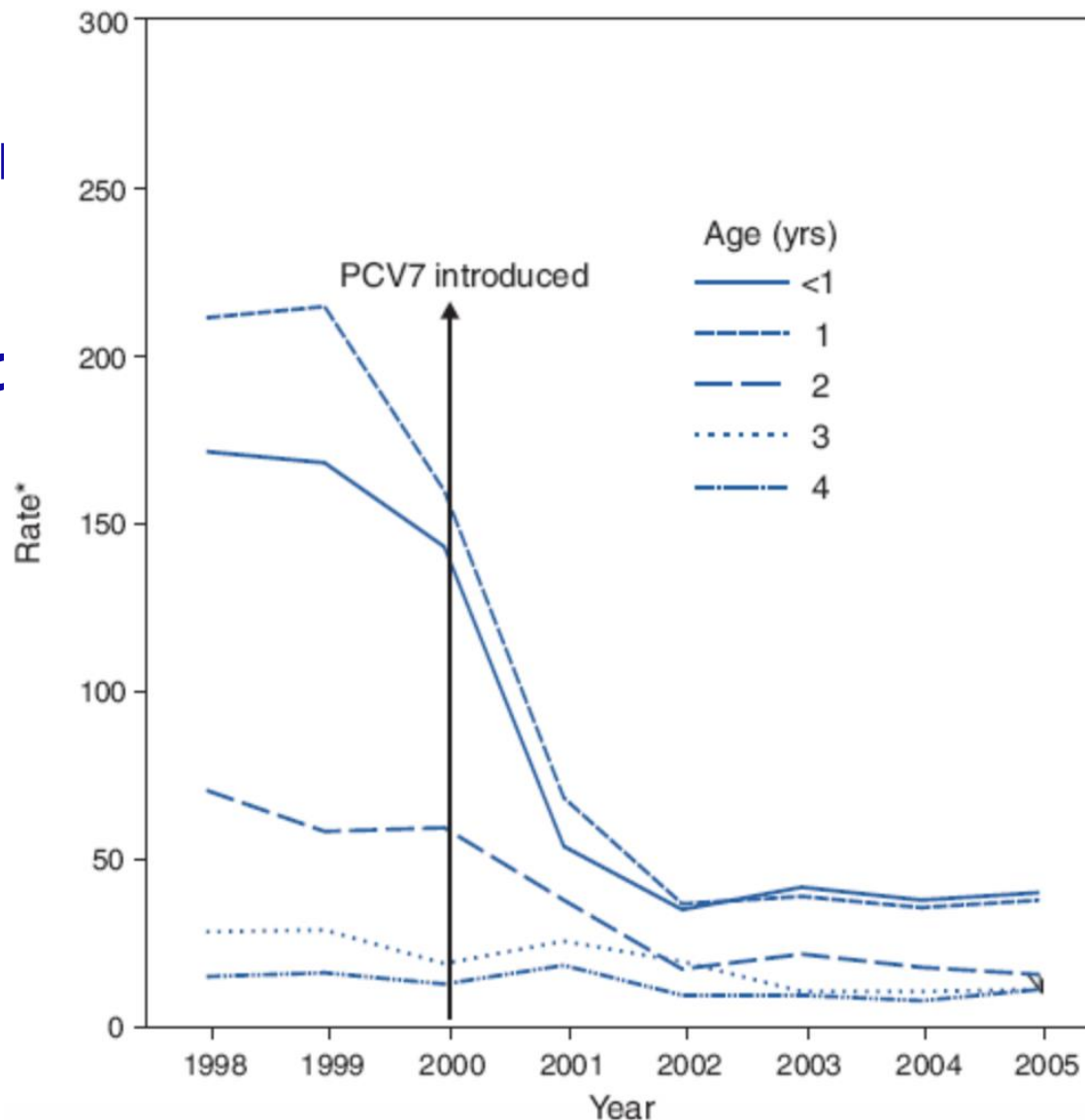
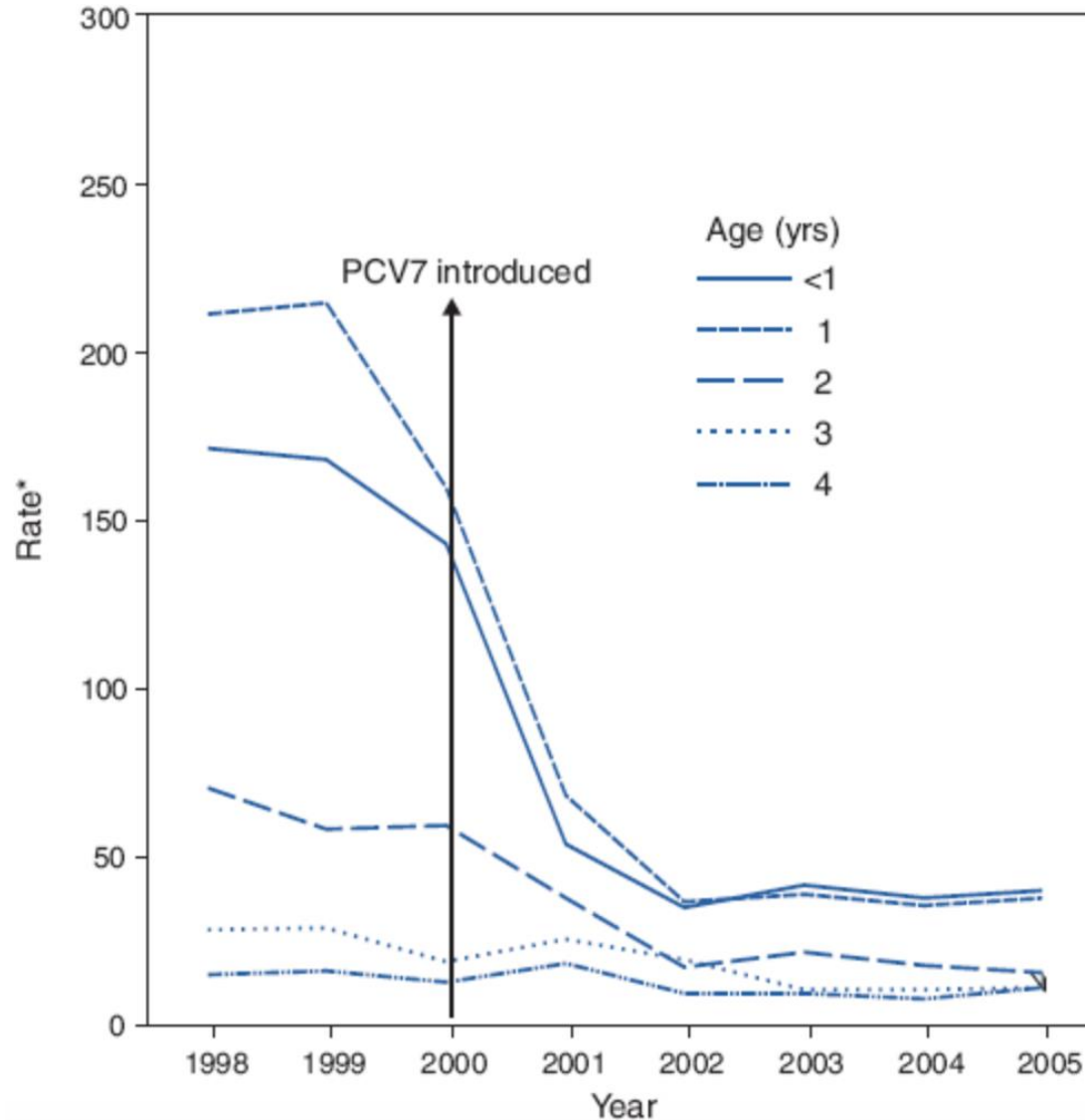


FIGURE 1. Changes in incidence rate* of invasive pneumococcal disease (IPD) among children aged <5 years before and after introduction of 7-valent pneumococcal conjugate vaccine (PCV7), by age and year — Active Bacterial Core surveillance, eight states,† 1998–2005



CDC



Meningokokkar

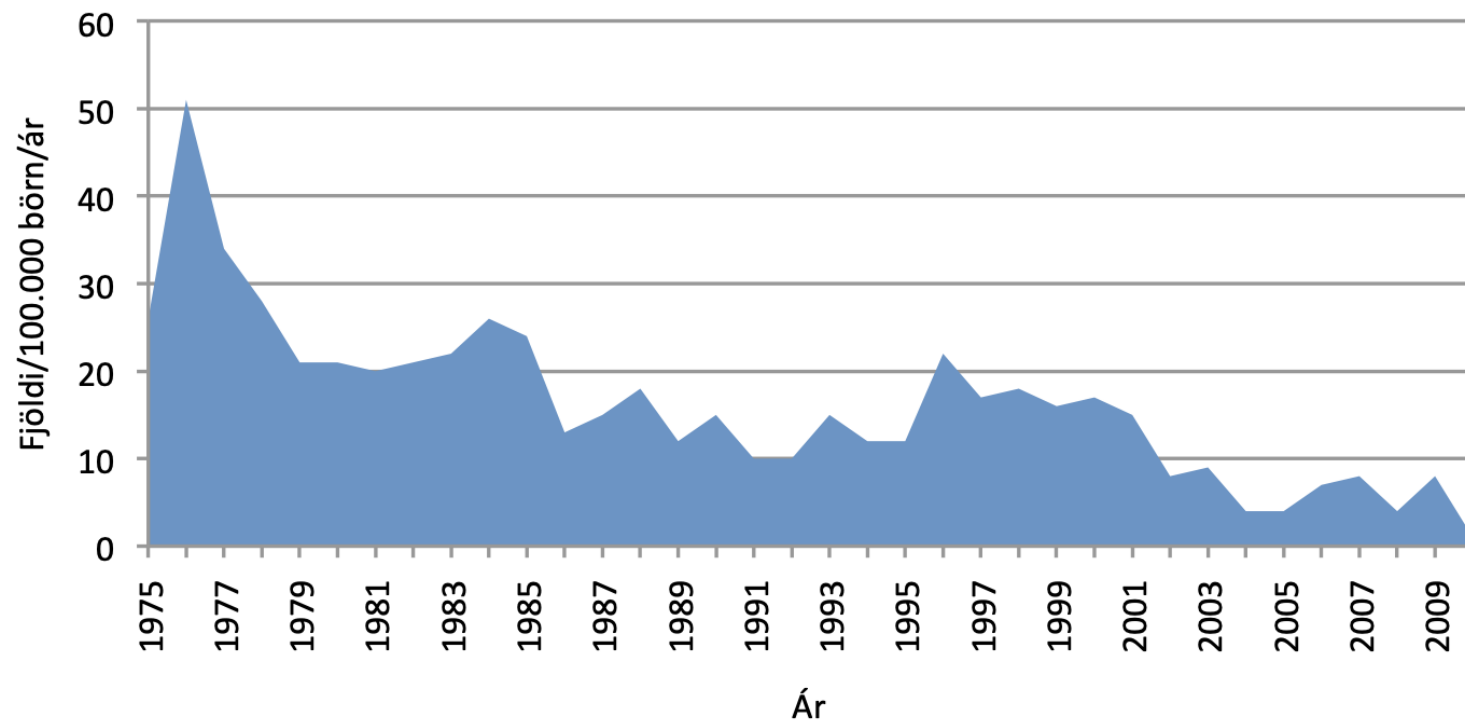


- Sepsis og heilahimnubólga
- *Týpur ACWY, ekki B!*



Meningokokkar

Nýgengi heilahimnubólgu á Íslandi



Mynd 6: Nýgengi heilahimnubólgu á Íslandi frá 1975 til 2010, á hver 100.000 börn ≤ 18 ára á ári.

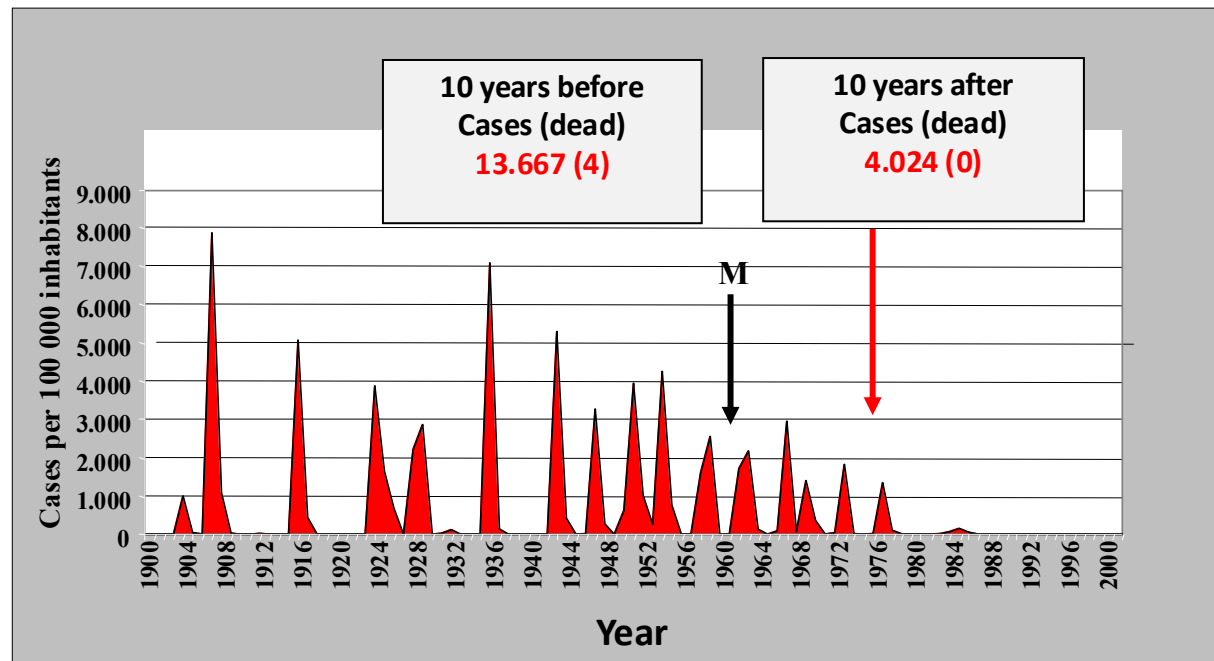
MMR-V



- Mislingar
- *Hettusótt*
- *Rubella*
- *Varicella*



Measles in Iceland



1960: Immunisation started, 1976: Started at 2 years of age
1989: Immunisation with MMR at 18 months of age started

Measles

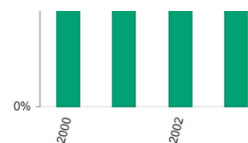
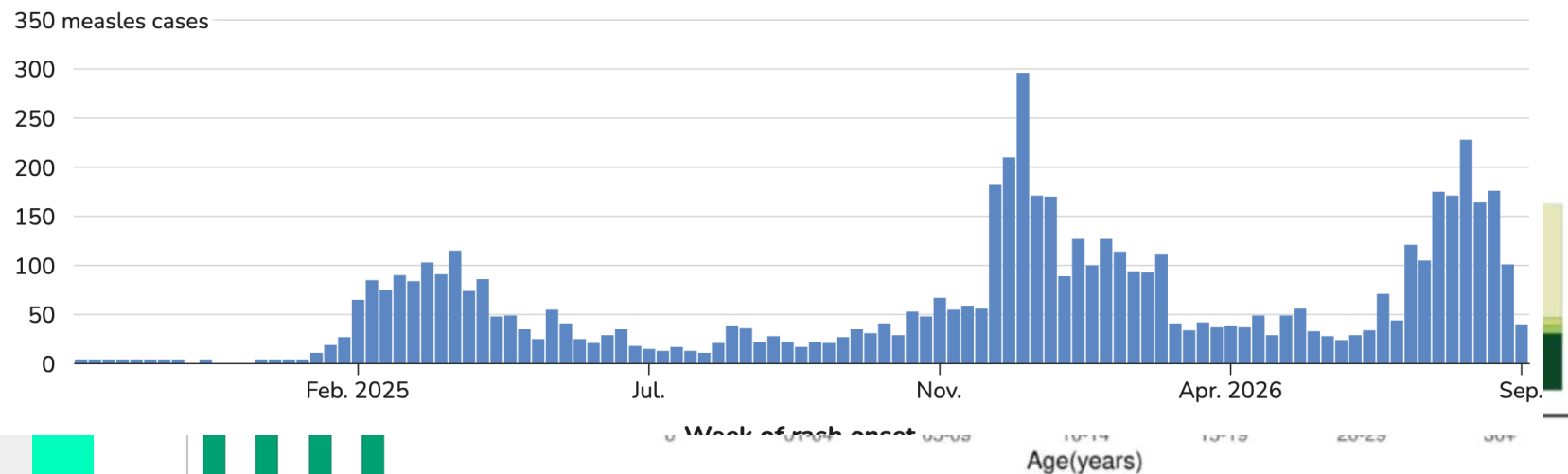


Measles



Weekly measles cases by rash onset date

2022–2026* (as of September 24, 2026)



for Disease Prevention and Control. Measles and Rubella monthly report, 11 March, 2025

- Coverage - European Region, Measles-containing vaccine, 1st dose
- Coverage - European Region, Measles-containing vaccine, 2nd dose
- Number of reported cases - European Region, Measles

Source: WHO Immunization Data portal

World Health Organization, WHO, 2025, All rights reserved

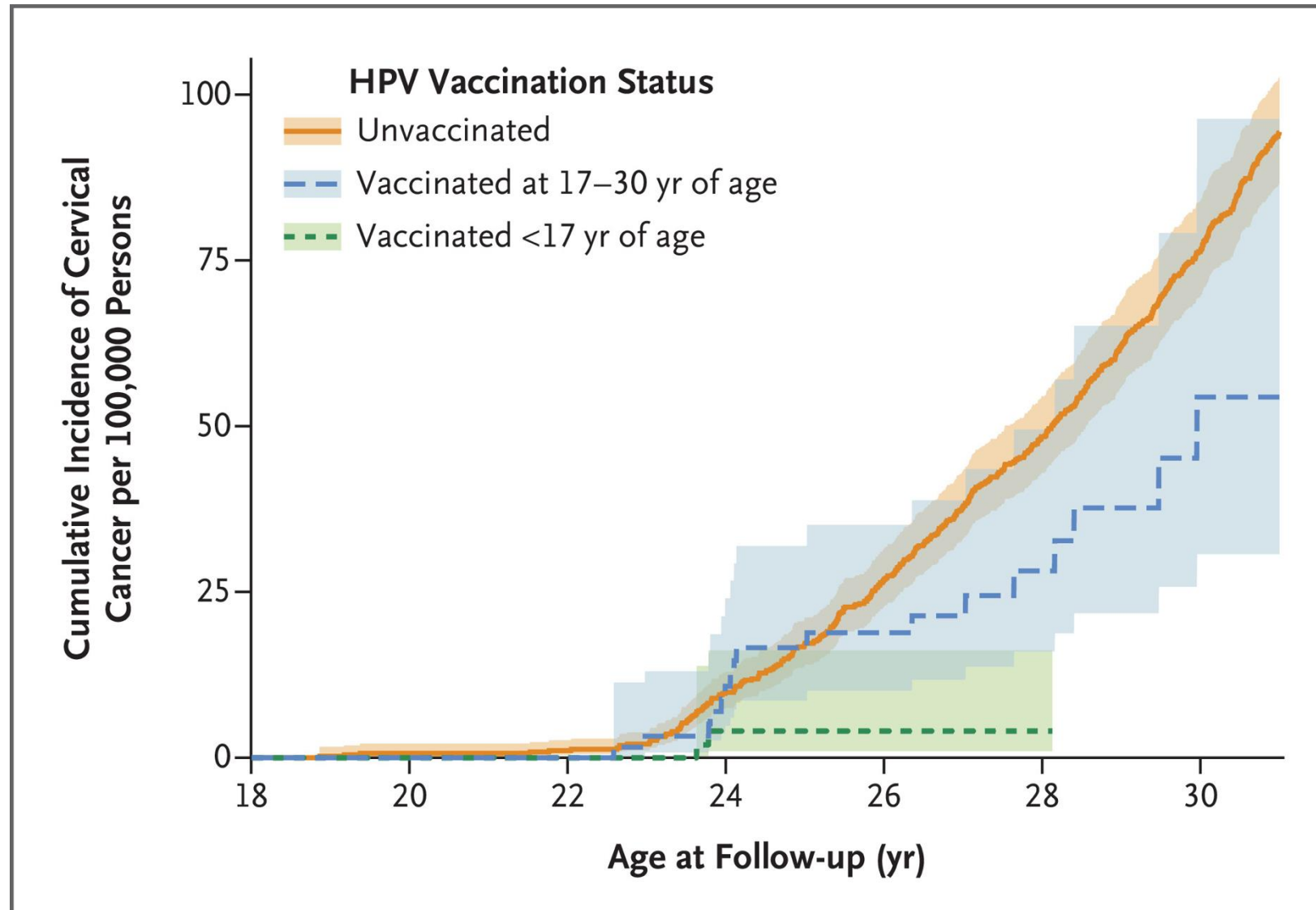
HPV



- Vernd gegn kynfæravörtum
- *Vernd gegn leghálskrabbameinum*



HPV



Lei et al. NEJM 2020

Bólusetningar



- Fórarlamb eigin velgengni
- *Meiri focus á aukaverkanir*



Áfram bólusetningar!

