

Að koma í veg fyrir sjúkdóma
Um bólusetningar barna

Bólusetningar á Ísland



Gegn hvaða sjúkdómum
er bólusett á Íslandi

Fyrirkomulag barnabólusetninga á Íslandi frá janúar 2025

<https://www.landlaeknir.is/smit-og-sottvarnir/bolusetningar/bolusetningar-barna/>

Bólusetningar



Embætti landlæknis
Sóttvarnalæknir

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, stífkampa, 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, stífkampa, 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, stífkampa, Haemofilus influenzae sjúkdómi af gerð b (Hib) og mænusótt í einni sprautu (<i>Pentavac</i>) Pneumókokkum í annarri sprautu (<i>Vaxneuvance</i>) Meníníkokkum í þriðju sprautu (<i>MenQuadfi</i>)
18 mánaða	Mislingum, hettusótt, rauðum hundum og hlaupabólu í einni sprautu (<i>ProQuad</i>)
2,5 árs	Hlaupabólu (<i>Varilrix</i>)
4 ára	Barnaveiki, stífkampa 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, stífkampa og kíghósta ásamt mænusótt í einni sprautu (<i>Repevax</i>)

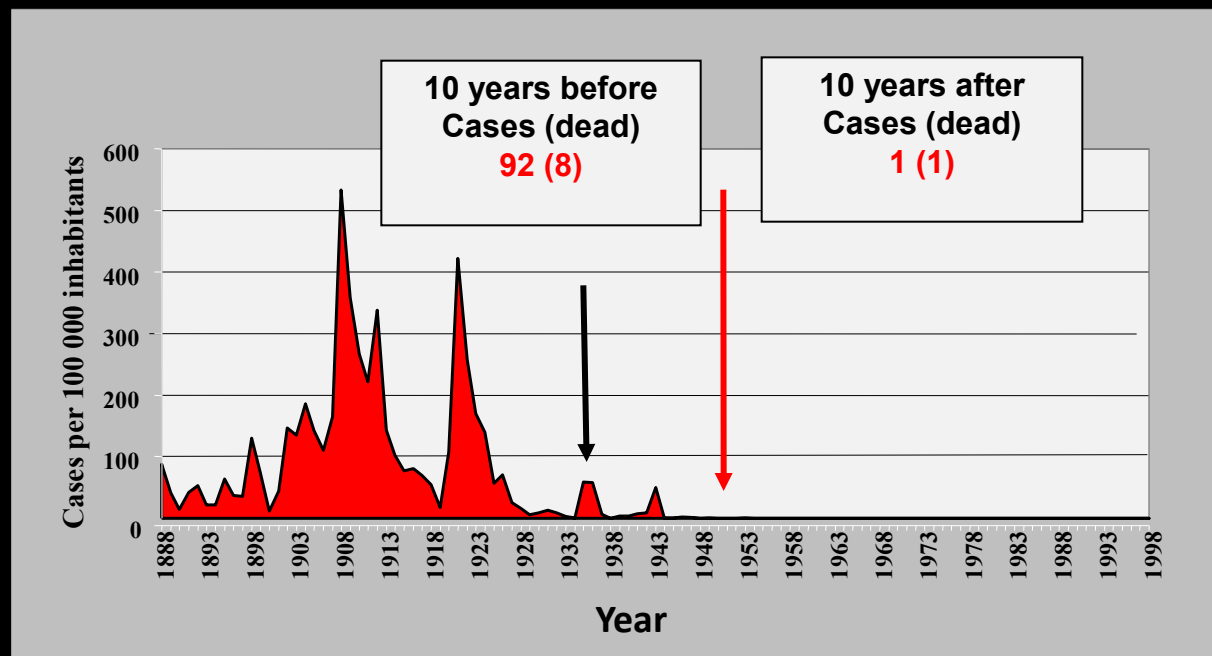
6–59 mánaða:
inflúensubólusetning (*Vaxigrip*)
árliga að hausti

Frekari upplýsingar um bólusetningar barna má finna á vef embættis landlæknis
(<https://island.is/bolusetningar-barna>) og á heilsugæslustöðvum.

Fyrirkomulag barnabólusetninga á Íslandi frá október 2025

<https://www.landlaeknir.is/smit-og-sottvarnir/bolusetningar/bolusetningar-barna/>

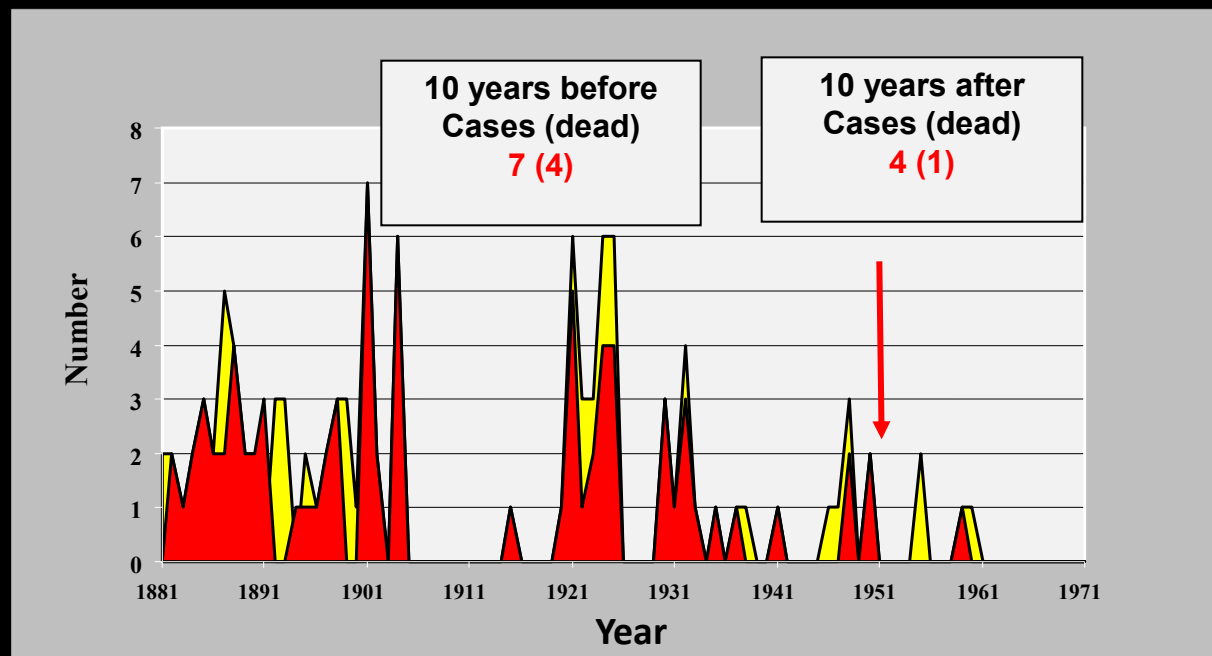
Diphtheria in Iceland



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

Þórólfur Guðnason/Haraldur Briem
Directorate of Health

Tetanus in Iceland

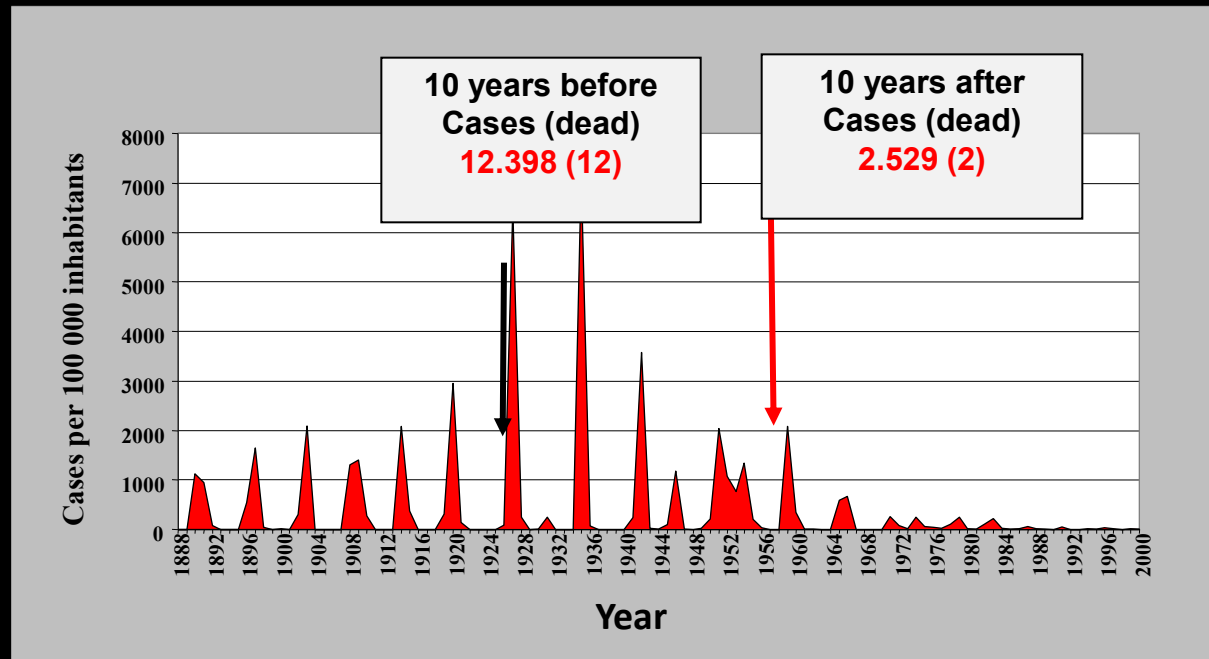


1953 Immunisation started

Last case: 2008

Þórólfur Guðnason/Haraldur Briem
Directorate of Health

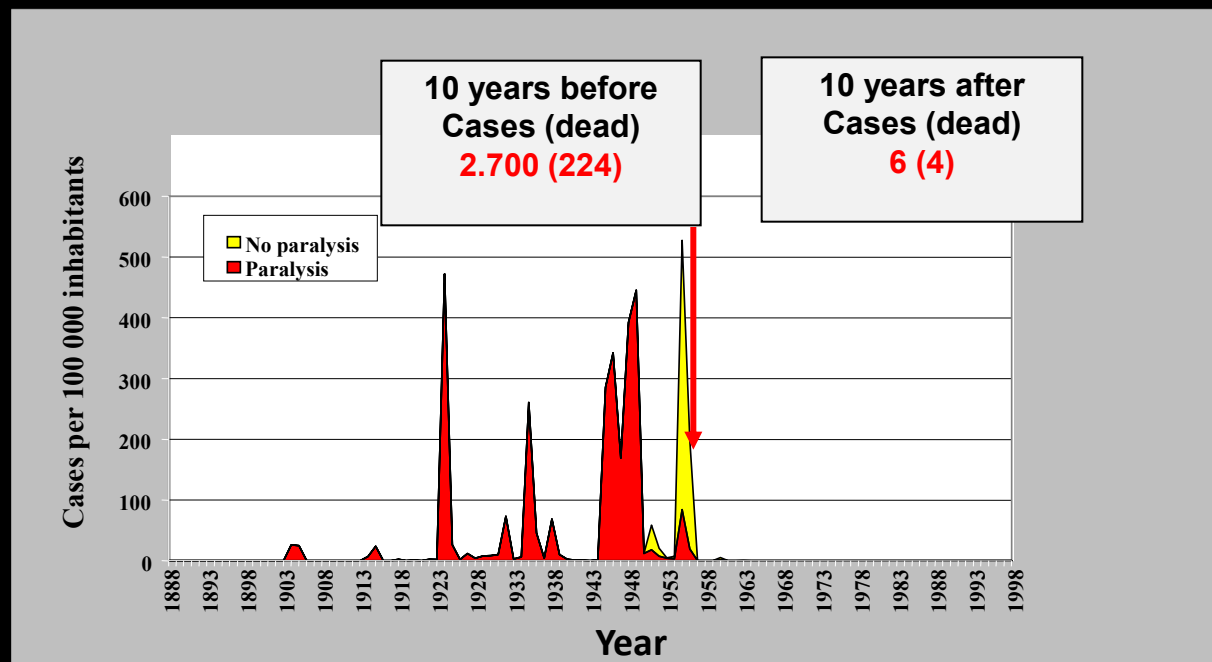
Pertussis in Iceland



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

Þórólfur Guðnason/Haraldur Briem
Directorate of Health

Poliomyelitis in Iceland

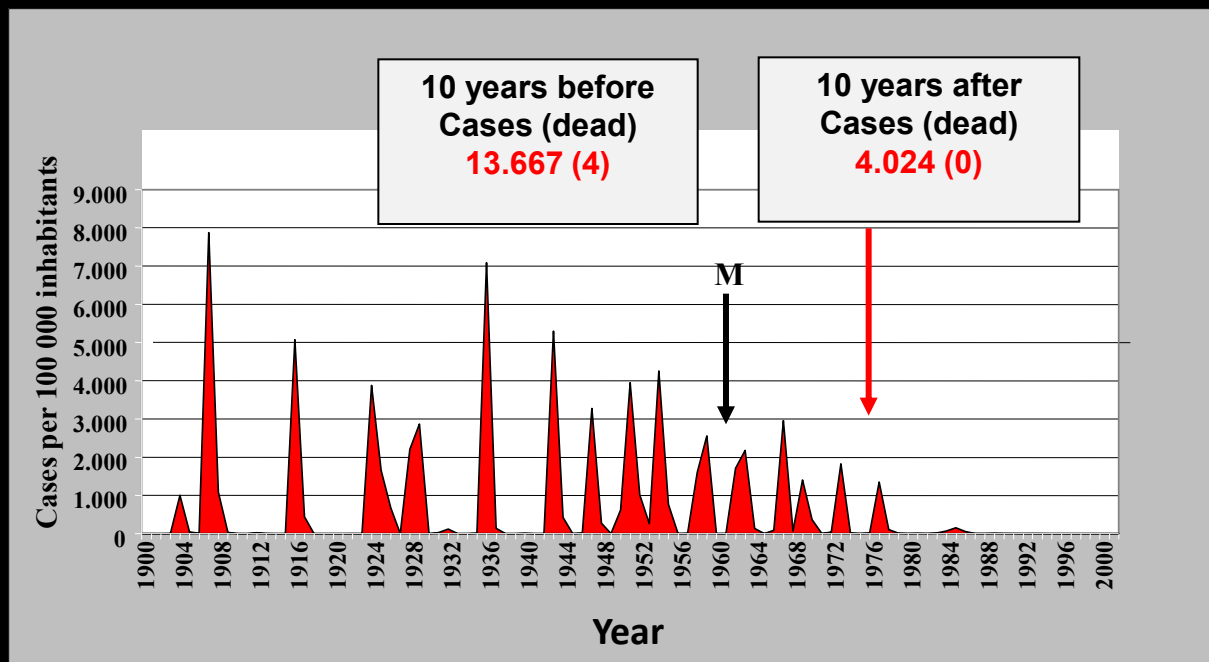


1956 Immunisation started

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

Þórólfur Guðnason/Haraldur Briem
Directorate of Health

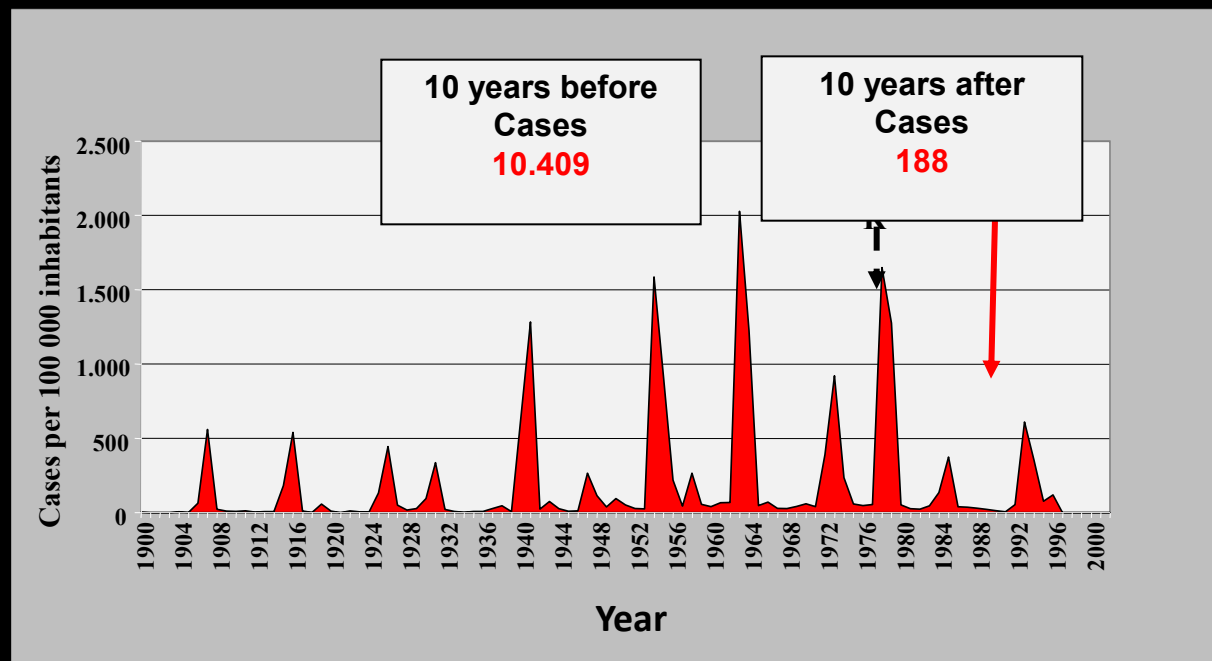
Measles in Iceland



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

Þórólfur Guðnason/Haraldur Briem
Directorate of Health

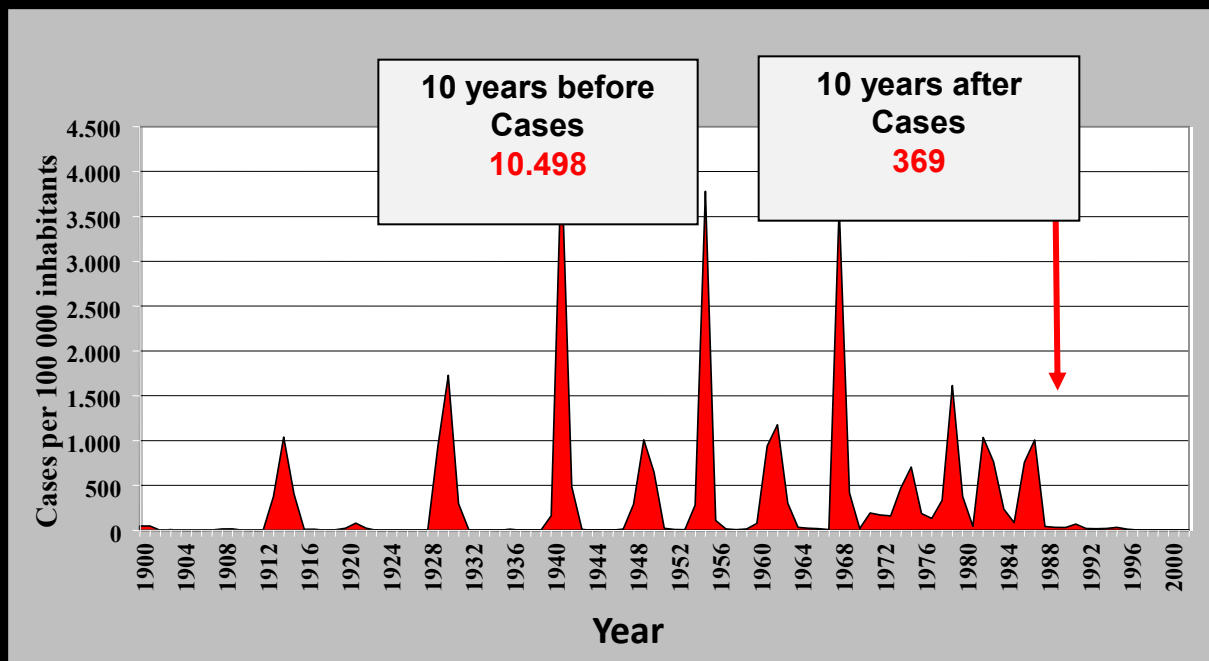
Rubella in Iceland



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

Þórólfur Guðnason/Haraldur Briem
Directorate of Health

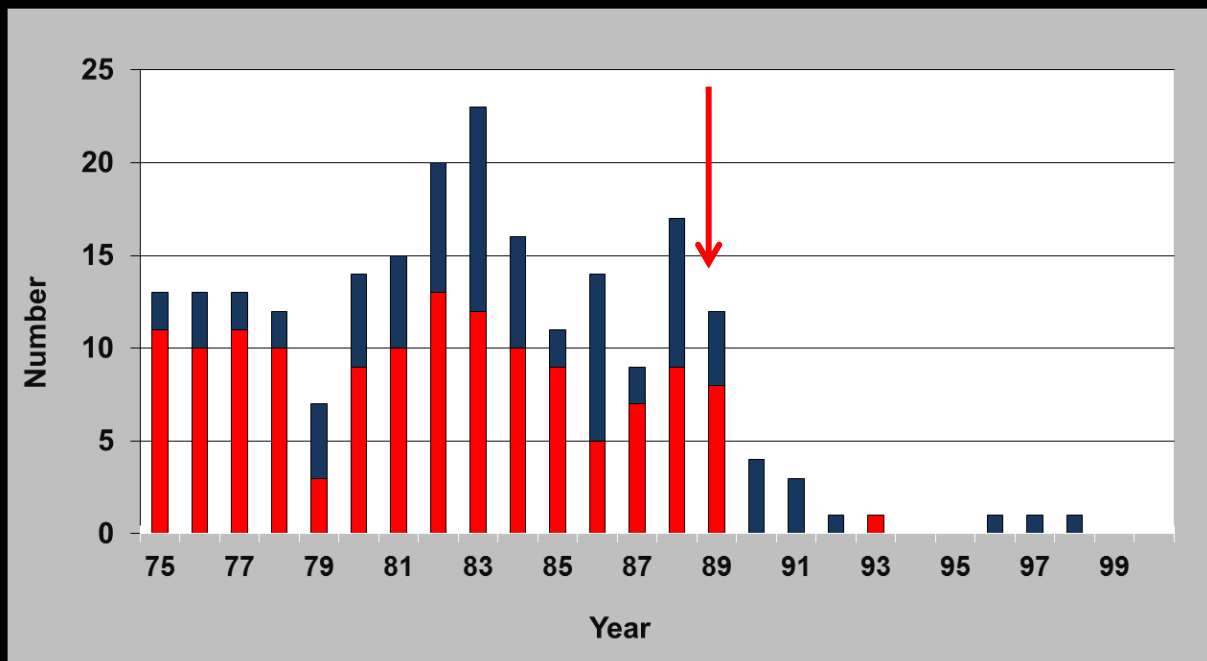
Mumps in Iceland



**1989: Immunisation with MMR at 18 months of age started
Booster at 12 years of age**

Þórólfur Guðnason/Haraldur Briem
Directorate of Health

Hib in Iceland



1989: Immunisation against *Haemophilus influenza* type b starts



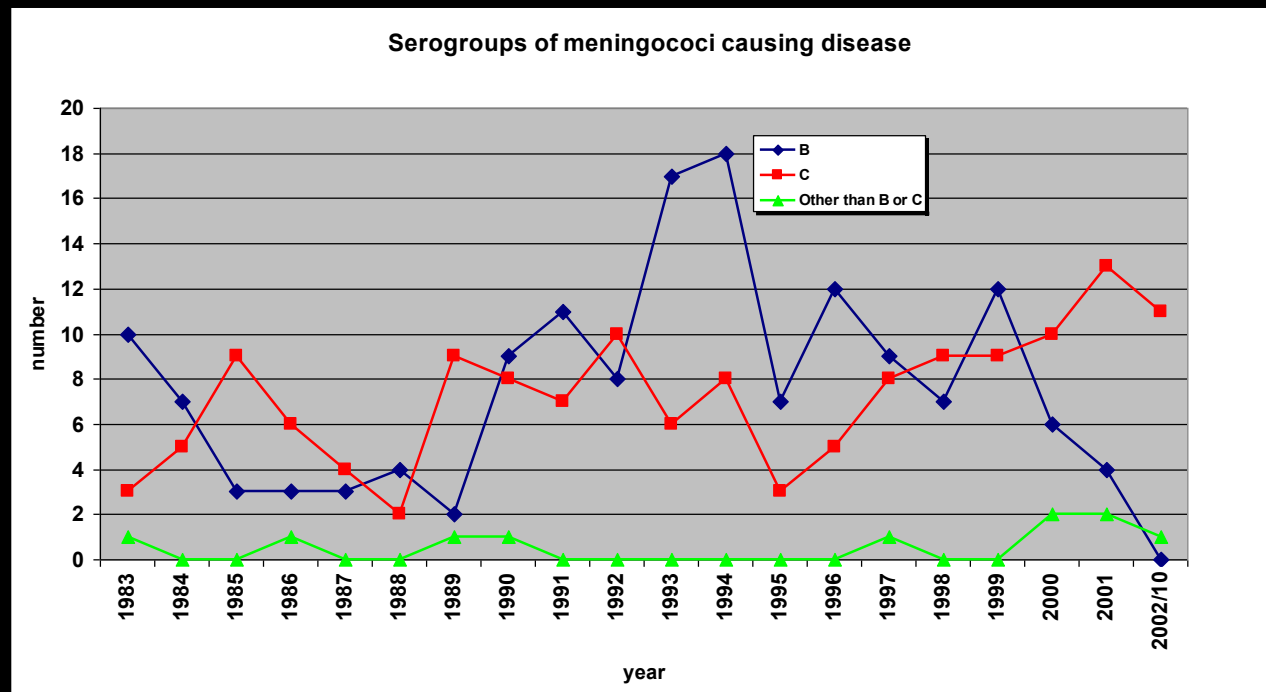
Meningitis



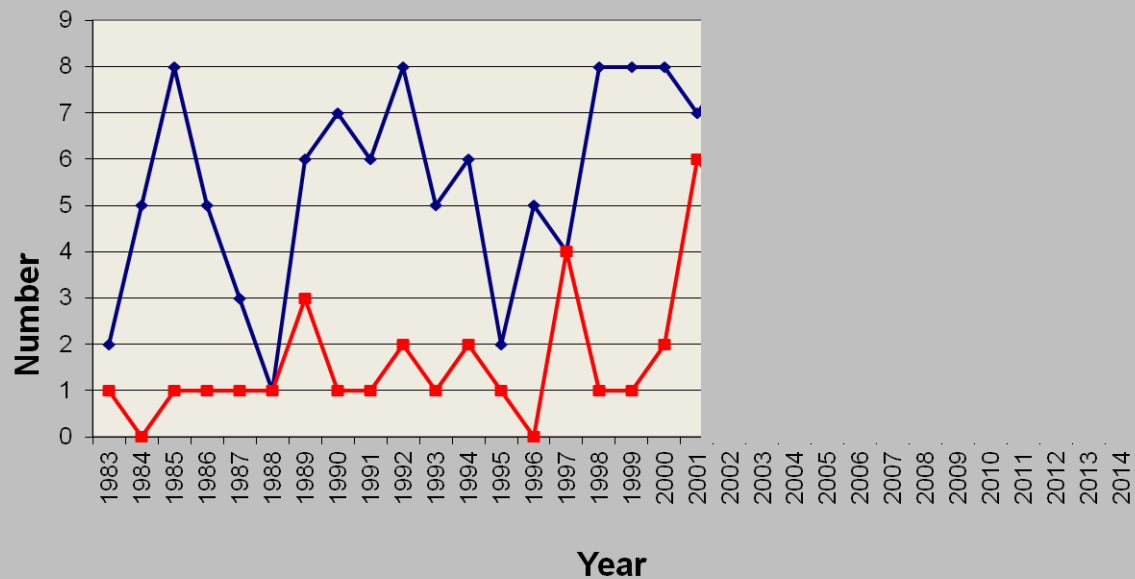
Sepsis/blood stream infections

Þórólfur Guðnason/Haraldur Briem
Directorate of Health

Meningococcal serogroups - in Iceland (until Oct. 2002) -



Men C in Iceland



1989: Immunisation against *Str Meningitidis* serotype C starts

— < 20 years of age

— > 20 years of age

Að koma í veg fyrir sjúkdóma Um bólusetningar barna

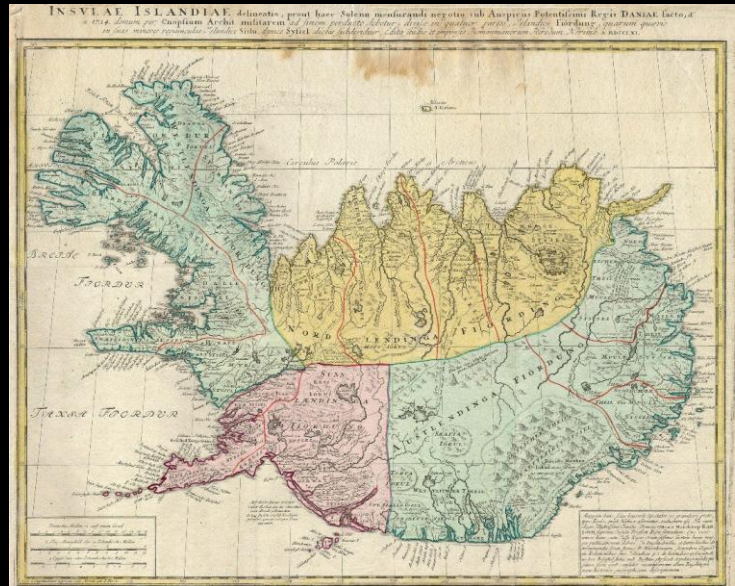
Sögulegt yfirlit

Sögulegt yfirlit - inoculation

- Lady Mary Montagu kynnti “inoculation” fyrir Evrópu snemma á átjándu öld – **variolation**



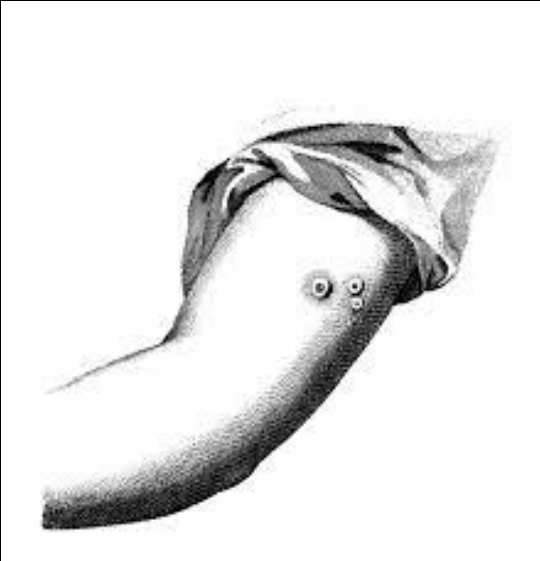
Sögulegt yfirlit - Ísland



1707 – 1708: Stórabóla á Íslandi
25% þjóðarinnar deyr
Aðallega börn og fullorðnir <40 ára
Meiri skaði en í Móðuharðindunum !

1707 – 1708: Stórabóla á Íslandi
25% þjóðarinnar deyr
Aðallega börn og fullorðnir <40 ára
Meiri skaði en í Móðuharðindunum !

Vaccinations !



John Fewster:

Realised that infections with cowpox protected against smallpox (1738)

Some research ongoing in England, Germany and USA

Vaccinations !

Edward Jenner (1749-1823): Father of immunology

Tested cowpox inoculation against smallpox (Vaccine!)



Vaccinations !

Jenner's experiment – the first vaccine!!

Blossom – the cow

Sarah Nelmes

Herra Phipps

James Phipps

James Phipps
challenged



Smallpox

Around for 3000 years

Around 1948, 50 million people were infected annually

Mortality rate around 1:3



Small Pox



- 1967 WHO initiated small pox eradication activity
- 1977 (1978) eradication of small pox completed!!!
- 1980 WHO recommends stopping vaccination against small pox
- Jenner's vaccination in 1798
- Lady Mary Wortley Montagu 1718
- Variolation in India, Africa and China in the 10th century?

Dauðsföll á síðustu öld.....

Vegna stríðs
beint vegna stríðs, hungurs,
farsóttar, fangabúða, þjóðarmorðs
..... 150-200 millj



Annual savings: 1×10^6 US\$

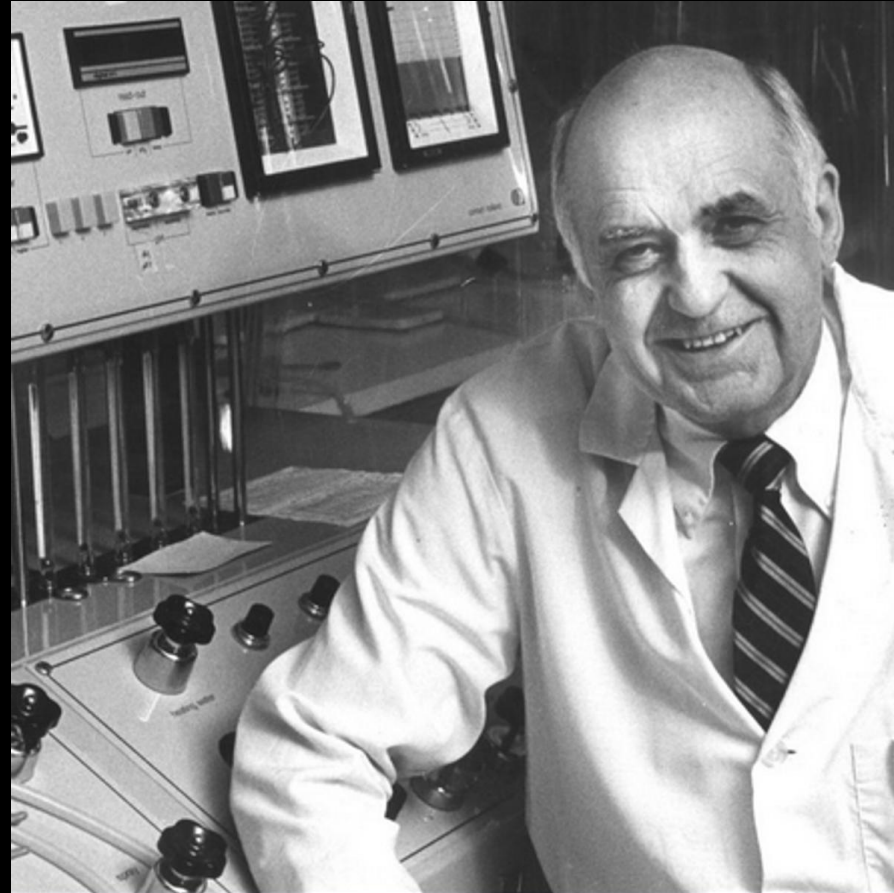
Bólusótt

.....300-500 millj



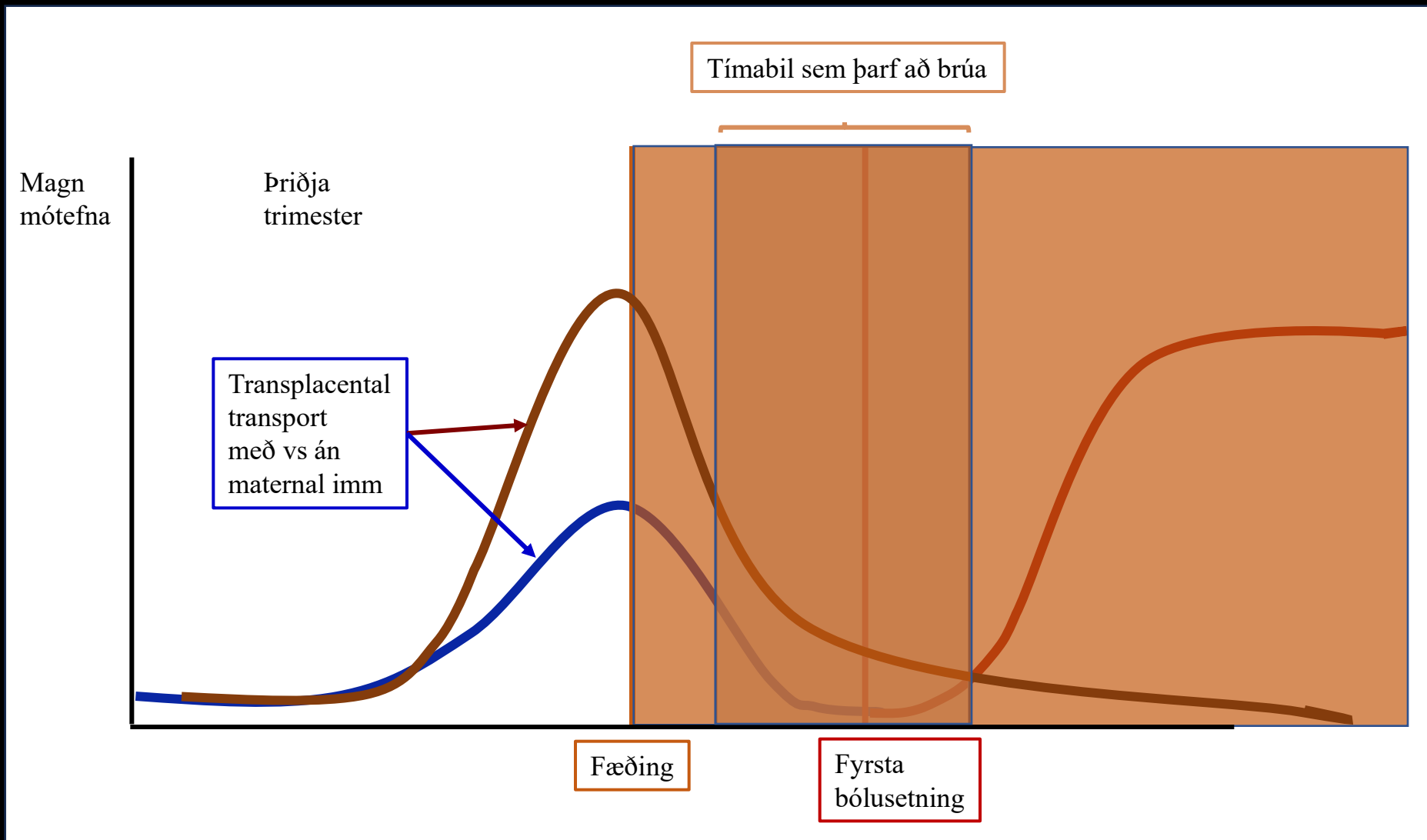
Annual savings:

Maurice Hilleman



Að koma í veg fyrir sjúkdóma
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Kíghósti – kikhósti
Pertussis



Að koma í veg fyrir sjúkdóma Um bólusetningar barna

Mislingar

Mislingar

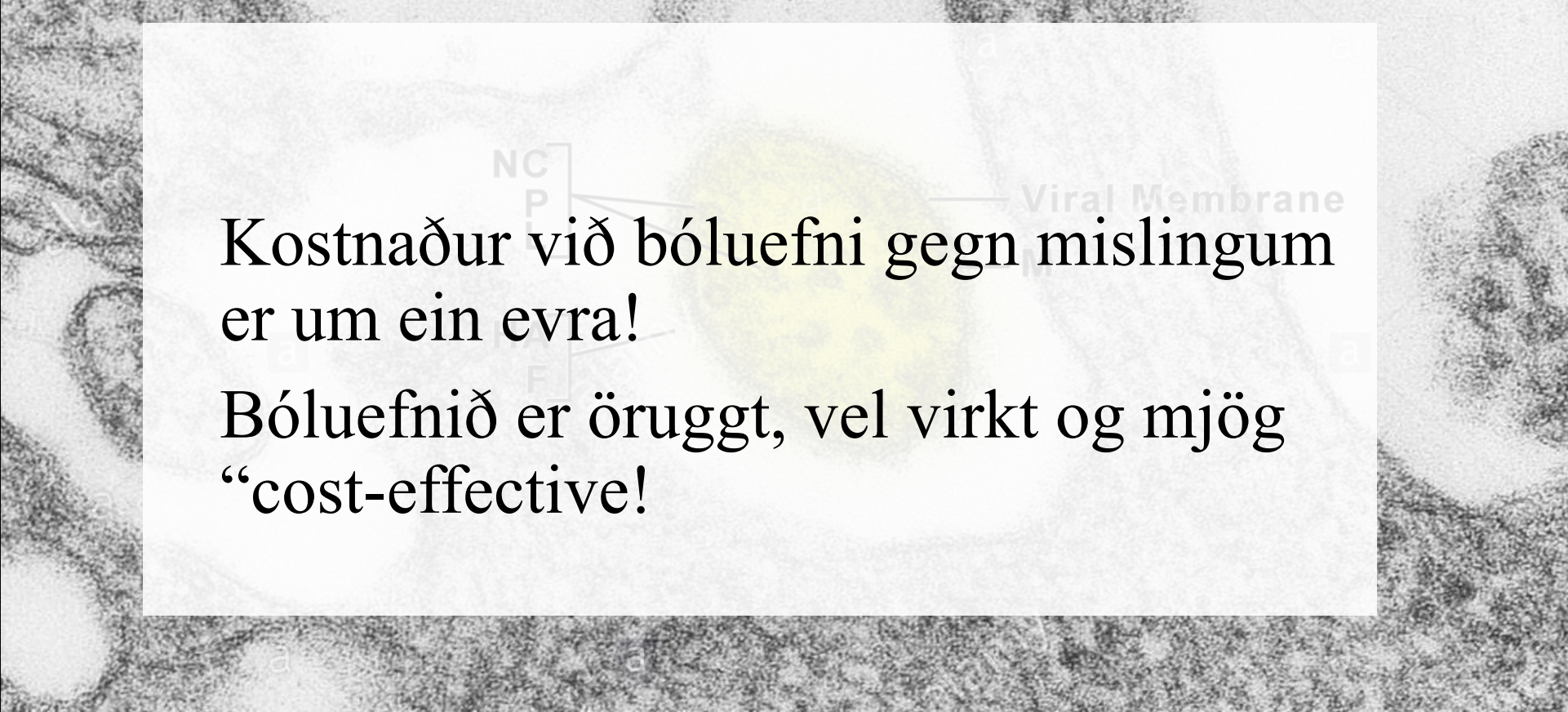
- ✓ Ein helsta ástæða dauða ungra barna í heiminum
- ✓ Er eingöngu í mönnum – ekki í dýrum eða fuglum

Mislingar

- ✓ 2000-2016, measles vaccination prevented >20 million deaths
- ✓ The risk of death from measles is usually 0.2% but up to 10%
- ✓ In 2016, there were 90.000 measles deaths globally
 - the first below 100.000 per year
- ✓ Now again >100.000 per year

(>10 deaths / hour!)

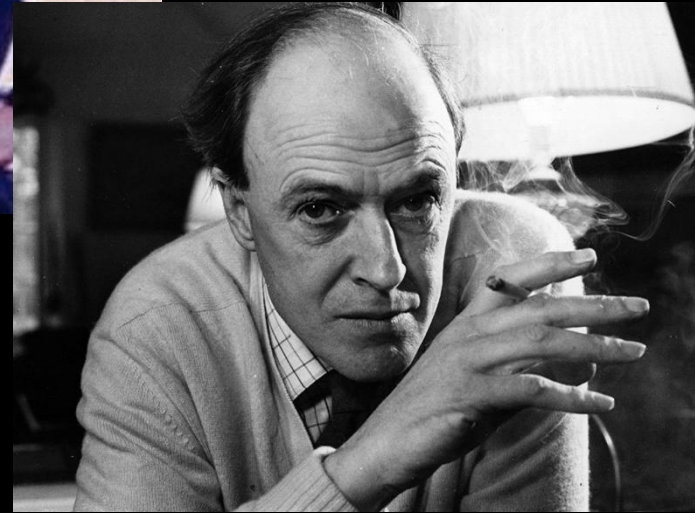
Mislingar



Kostnaður við bóluefni gegn mislingum
er um ein evra!

Bóluefnið er öruggt, vel virkt og mjög
“cost-effective!

Olivia



Roald Dahl on Olivia, writing in 1986

"MEASLES: A dangerous illness.

Olivia, my eldest daughter, caught measles when she was seven years old. As the illness took its usual course I can remember reading to her often in bed and not feeling particularly alarmed about it. Then one morning, when she was well on the road to recovery, I was sitting on her bed showing her how to fashion little animals out of coloured pipe-cleaners, and when it came to her turn to make one herself, I noticed that her fingers and her mind were not working together and she couldn't do anything.

'Are you feeling all right?' I asked her.

'I feel all sleepy,' she said.

In an hour, she was unconscious. In twelve hours she was dead.

The measles had turned into a terrible thing called measles encephalitis and there was nothing the doctors could do to save her. That was twenty-four years ago in 1962, but even now, if a child with measles happens to develop the same deadly reaction from measles as Olivia did, there would still be nothing the doctors could do to help her.

Að koma í veg fyrir sjúkdóma
Um bólusetningar barna

Hlaupabóla
Varicella

Hlaupabóla

(varicella, chickenpox)

- HHV 3, varicella zoster virus (human herpes virus)
- Hálssærindi og hitavella í upphafi
- Meðg. 4-16 d (allt að 21 d).
- Prevalence: við 12 ára hafa um 90% fengið hlaupabólu
- Smita 1-2d f útbrot og þar til lesionir eru þurrar (vika)
- Útbr: ávalar lesionir
- Macula → papula → vesicula → pustula → crust **(allar í einu)**
- Ath hársvörð, munn/slímhúðir, lófar/iljar.
- Centripetal dreifing, birtast á 3-5d, mikill kláði

Alvarleiki

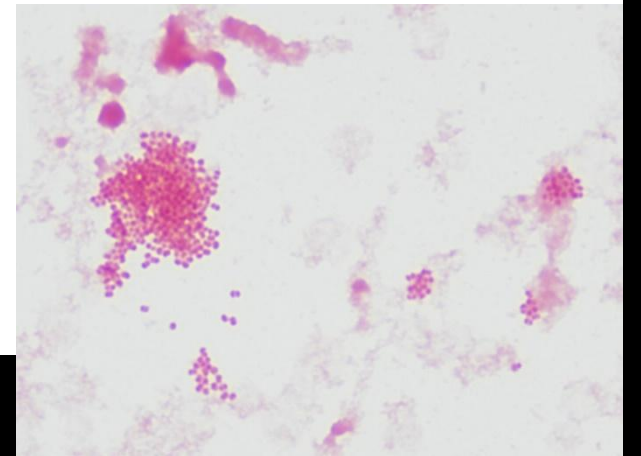
- Nýburar
- Ungbörn
- Aldraðir
- Barnshafandi konur
- Ónæmisbældir
- Aðrir undirliggjandi sjúkdómar

Að koma í veg fyrir sjúkdóma Um bólusetningar barna

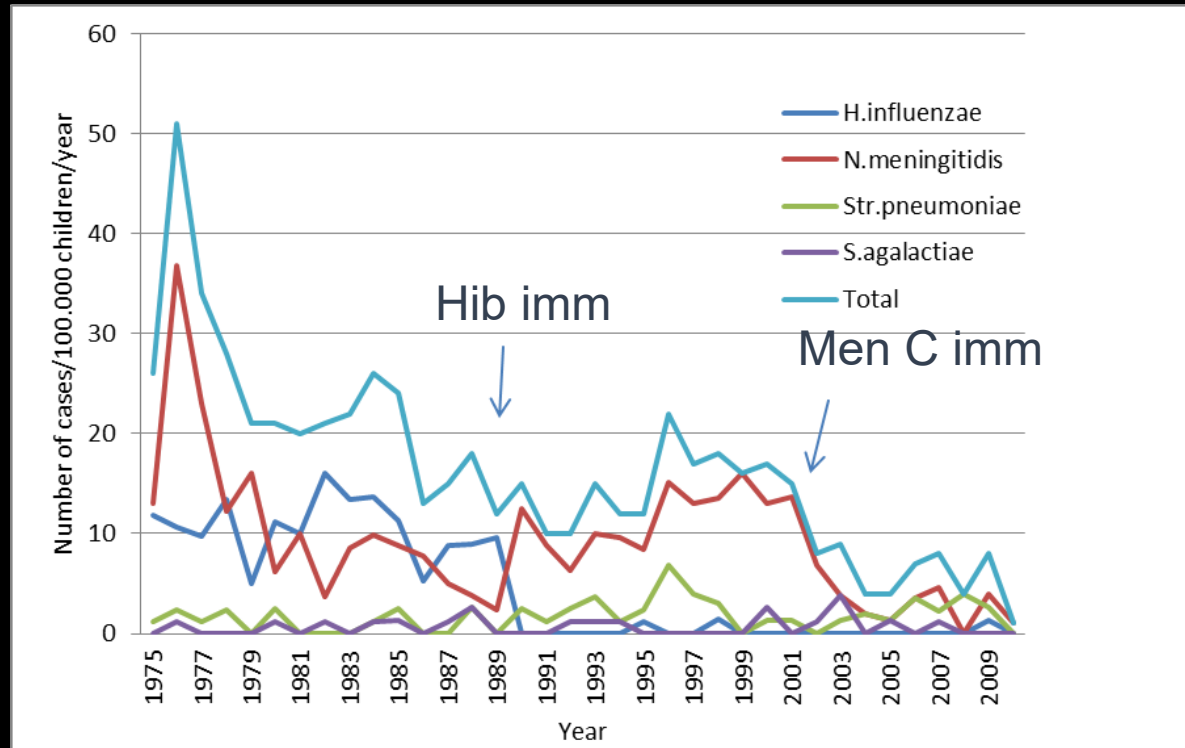
Meningococcar

N meningitidis!

- *Neisseria meningitidis* causes approx 500.000 cases of meningitis
- Especially young children and teenagers
- Fatality rate 10% in resource-rich countries
- Fatality rate virtually unchanged for decades
- 30% of survivors with severe long-term sequelae (deafness, amputation and cognitive impairment)



Meningitis in Iceland



Bacterial meningitis in children in Iceland, 1975–2010: A nationwide epidemiological study

KOLFINNA SNAEBJARNARDÓTTIR¹, HELGA ERLENDSDÓTTIR^{1,2},
INGI KARL REYNNISSON¹, KARL KRISTINSSON¹, SANDRA HALLDÓRSÓTTIR¹,
HJÓRDÍS HARDARDÓTTIR², THÓRÓLFUR GUDNASON^{1,3,4},
MAGNÚS GOTTFREDSSON^{1,5} & ÁSGEIR HARALDSSON^{1,3}

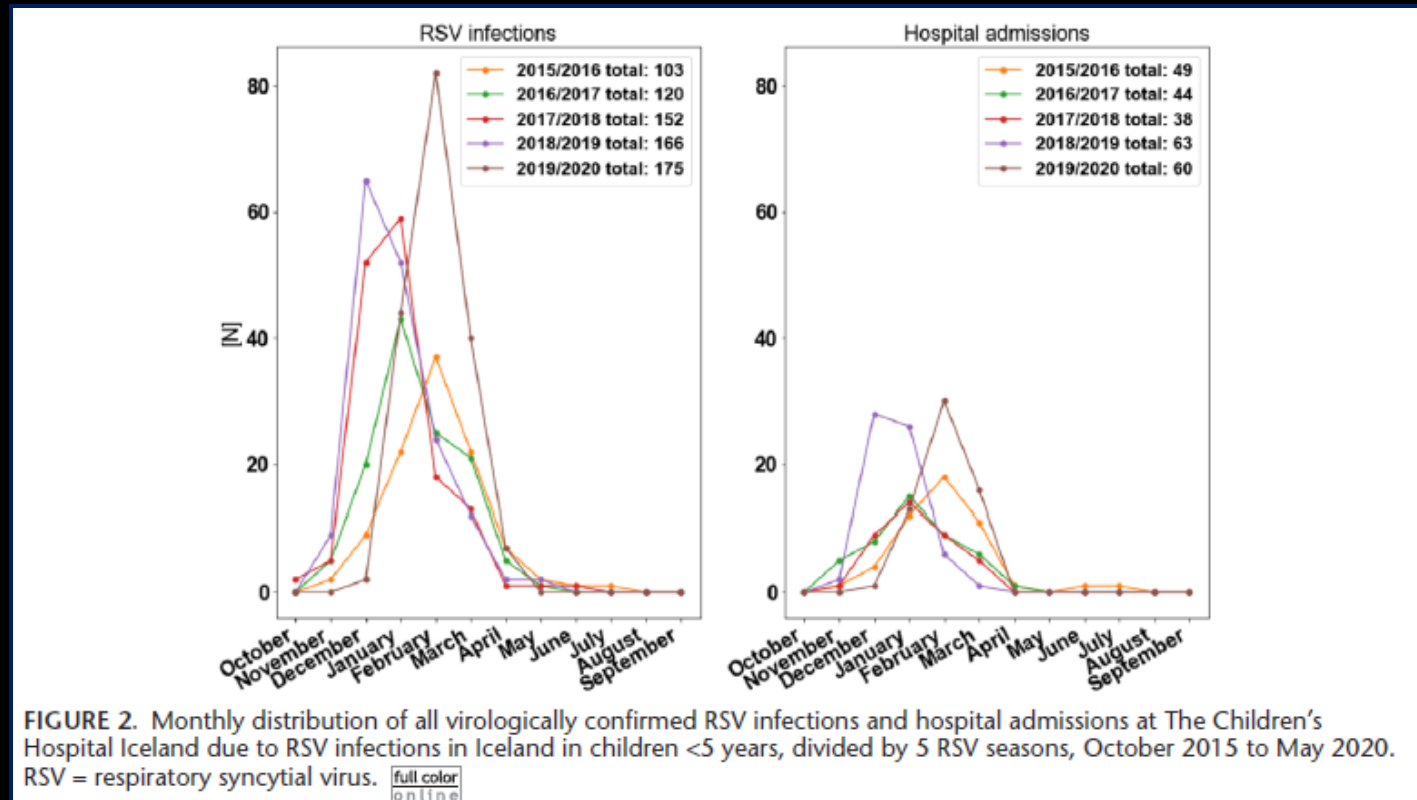
Scandinavian Journal of Infectious Diseases, 2013

Að koma í veg fyrir sjúkdóma
Um bólusetningar barna

RSV ??

RSV

Bólusetning - mótefnagjöf



Clinical and Socioeconomic Burden of Respiratory Syncytial Virus in Iceland

Ymir Oskarsson, MD,* Asgeir Haraldsson, MD, PhD,*† Bryndis Hogni I Oddsdottir, BSc,†
Tinna Laufey Asgeirsdottir, BA, PhD,‡ and Valtyr Thors, MD, PhD*†

RSV á Íslandi

Kostnaðarútreikningar

Nær öll born fá RSV <2 ára aldur:
<3 ára: 30% fá RSV árlega
3-4 ára: 10% fá RSV árlega
<5 ára: # barna 31.655

3856 RSV sýkingar árlega
Hjá börnum <5 ára

Tapaðir vinnudagar 2.5/sýkingu
→ 9640 tapaðir vinnudagar/ár

Þjóðhagslegt tap vegna
tapaðra vinnudaga:
€ 3.9 milljónir

Heildarkostnaður sjúkrahússins
á rannsóknartímanum

Heildarkostnaður þjóðfélagsins
vegna RSV:
€ 4.3 milljónir (650 milljónir ISK)

Clinical and Socioeconomic Burden of Respiratory Syncytial Virus in Iceland

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The Pediatric Infectious Disease Journal 2022

RSV á Íslandi

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3856 RSV sýkingar árlega
Hjá börnum <5 ára

Tapaðir vinnudagar 4.0/sýkingu
→ 9640 tapaðir vinnudagar/ár

Þjóðhagslegt tap vegna
tapaðra vinnudaga:
€ 3.9 milljónir

Heildarkostnaður sjúkrahússins
á rannsóknartímanum

Heildarkostnaður þjóðfélagsins
vegna RSV:
€ 6.3 milljónir (953 milljón IKR)

... og svo má hafa í huga að RSV
er ekki eingöngu sjúkdómur barna!

Clinical and Socioeconomic Burden of Respiratory Syncytial Virus in Iceland

Ymir Oskarsson, MD, Asgeir Haraldsson, MD, PhD,*† Bryndis Hogni Oddsdottir, BSc,†
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Our rather cautious estimation of the total annual financial burden of RSV disease in Iceland is around €4.3million.

When all aspects are considered, many of which are difficult to measure, this is likely to be an underestimate in a population of 364,000.

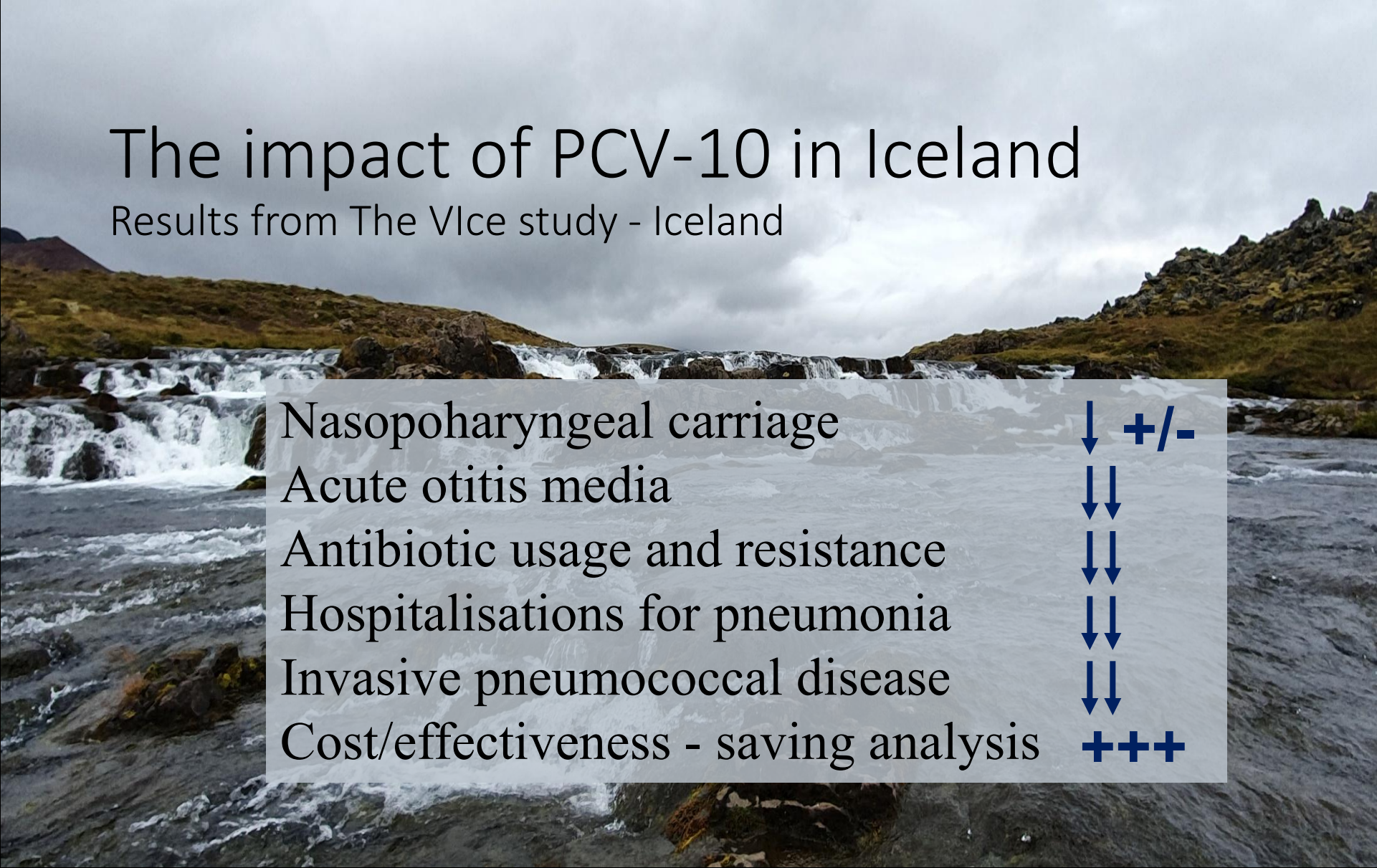
The true societal cost of RSV disease may be even higher.

Að koma í veg fyrir sjúkdóma Um bólusetningar barna

Pneumókokkar

The impact of PCV-10 in Iceland

Results from The Vlce study - Iceland



Nasopharyngeal carriage	↓ +/-
Acute otitis media	↓↓
Antibiotic usage and resistance	↓↓
Hospitalisations for pneumonia	↓↓
Invasive pneumococcal disease	↓↓
Cost/effectiveness - saving analysis	+++

Að koma í veg fyrir sjúkdóma
Um bólusetningar barna

Inflúensa



Influenza - 1918

H1N1

500 million people infected

(of a population <2 billion)

50-100 million deaths

(3-5% of the worlds population)

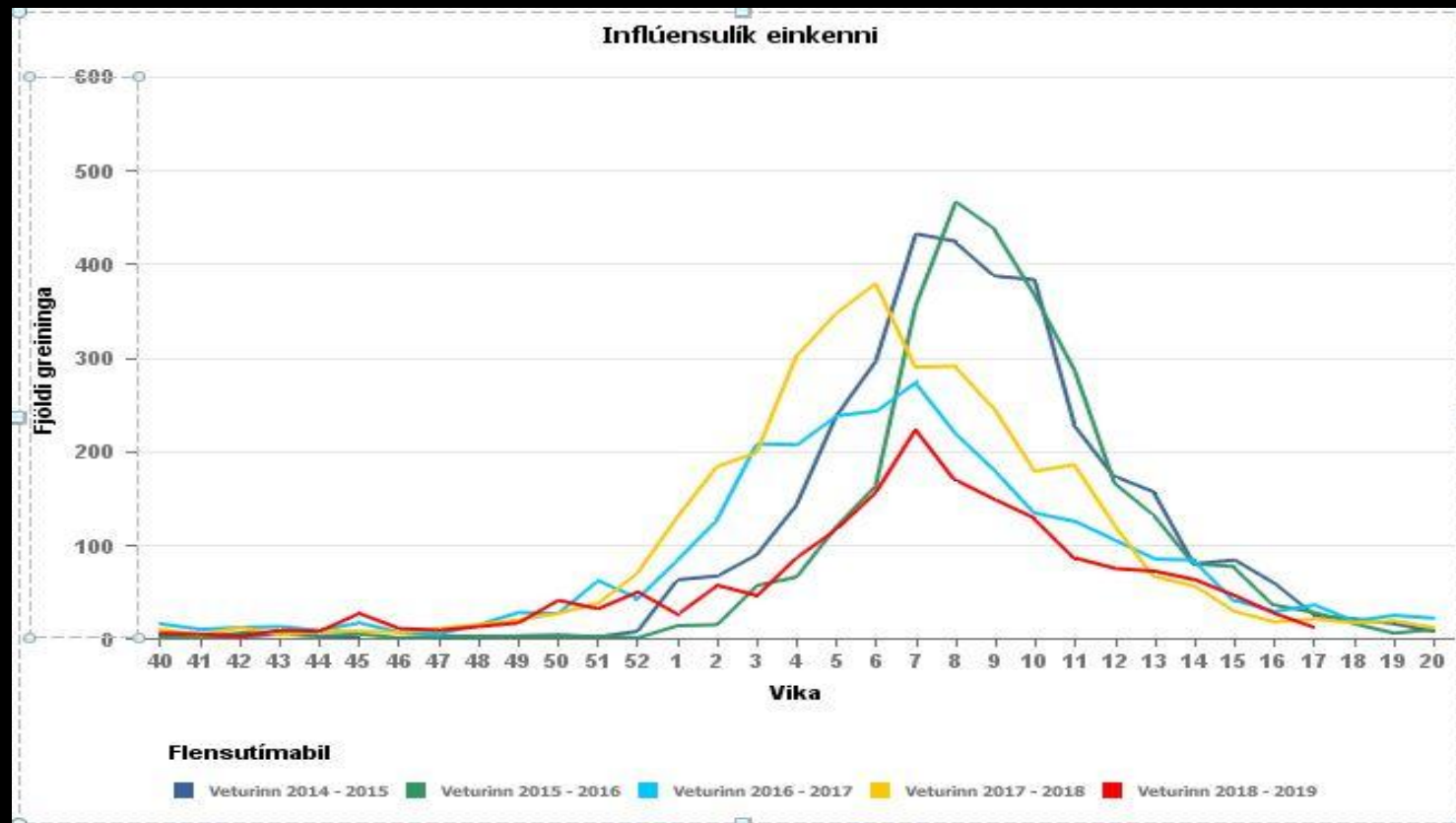
More deaths in 24 weeks

than from HIV in 24 years

More deaths in a year than

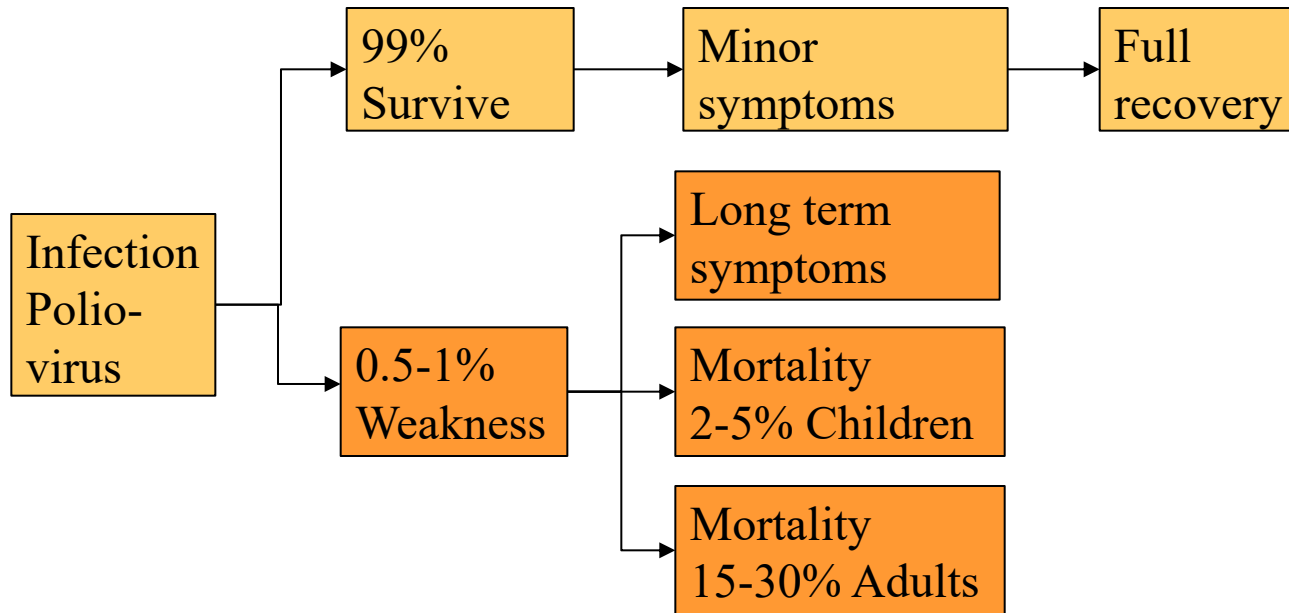
from black death in a century

Influenza - epidemiology





Poliomyelitis











When eradication is achieved, all children — the rich, poor, educated, illiterate, rural, urban, black, brown, yellow, white, male, female, illegal immigrant, political elite, nomad, slum dweller, refugee, animist, Buddhist, Christian, Hindu, and Muslim — will be protected from polio

The costs are limited, but the benefits are infinite.

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Árangur bólusetninga er ótvíræður

Ekki hika !!!!