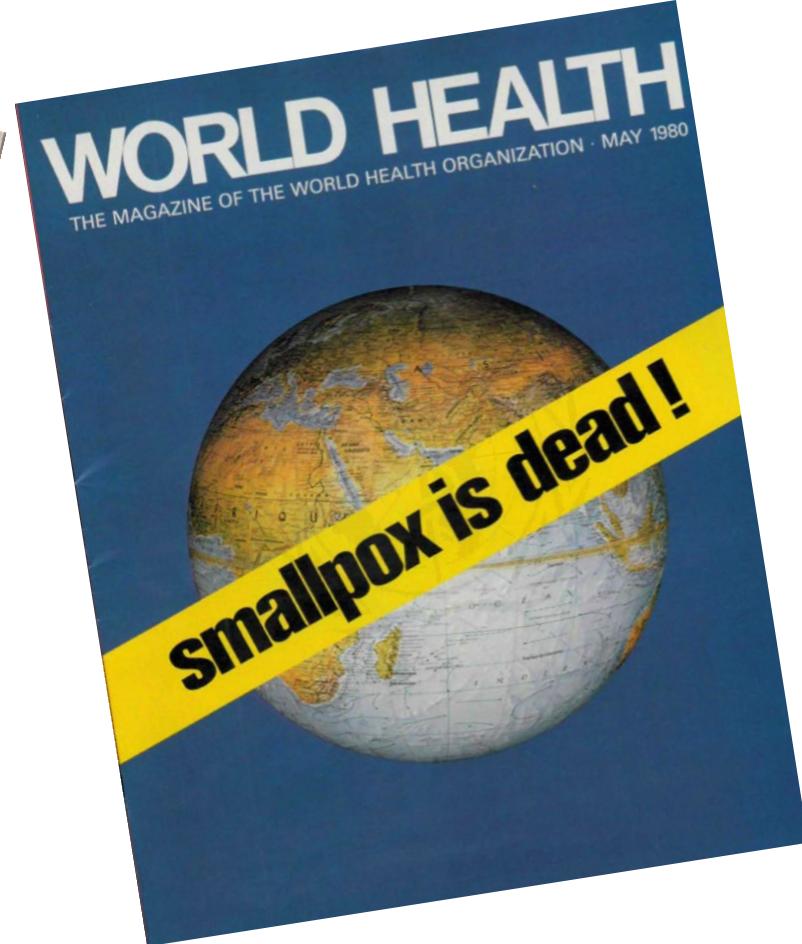
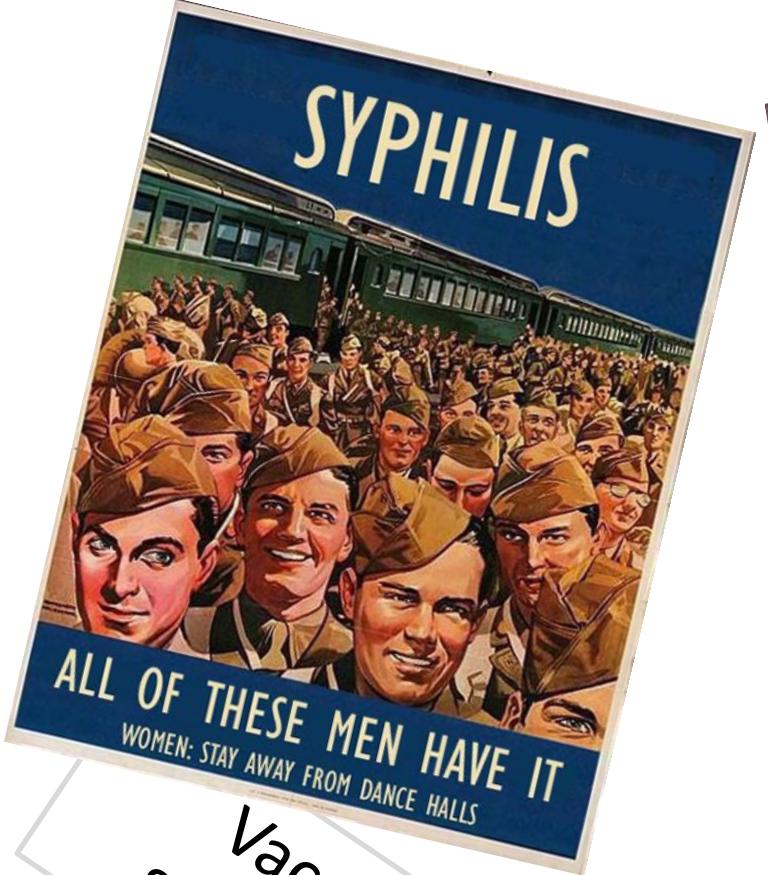
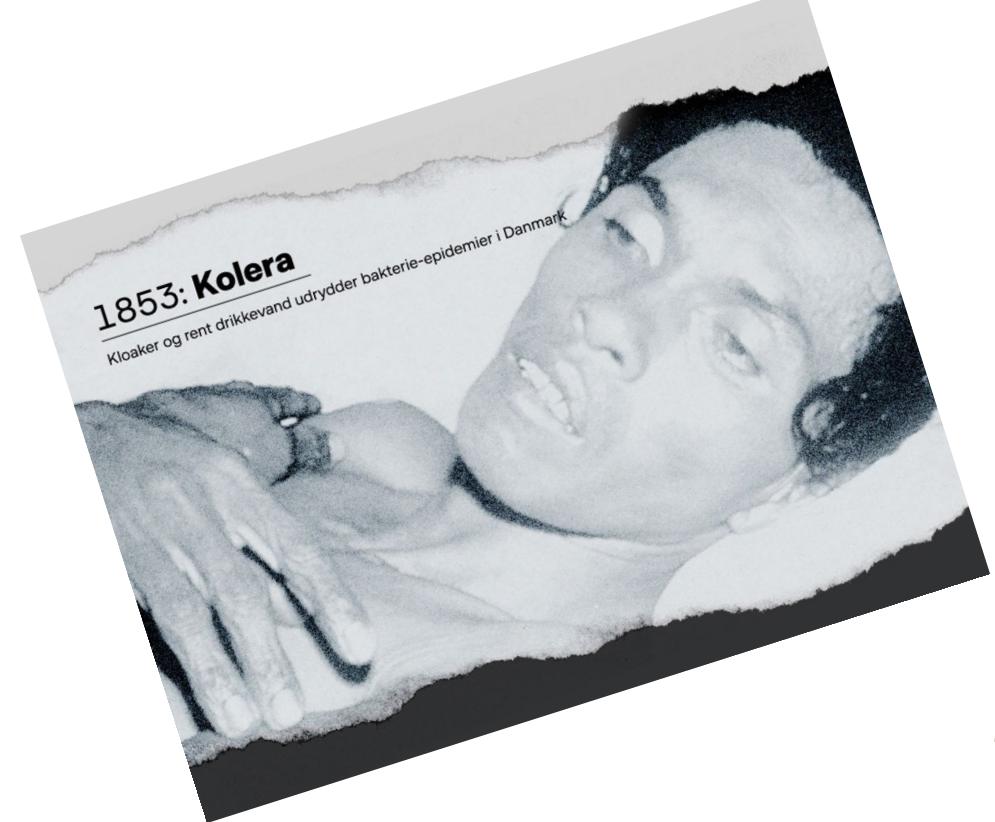


Fremskridt og visioner Infektionsmedicin

Ole Kirk

Formand, Dansk Selskab for Infektionsmedicin
Klinik for infektionssygdomme, Rigshospitalet



Den spanske Syge.
—
Alle Kommuneskoler paa
Kristianshavn er blevet luk-
ket.
—

Nobelpriser i fysiologi og medicin

2020: Harvey J. Alter, Michael Houghton and Charles M. Rice "for the discovery of **Hepatitis C virus**".

2015: William C. Campbell and Satoshi Ōmura "for their discoveries concerning a novel therapy against infections caused by **roundworm parasites**"
Tu Youyou "for her discoveries concerning a novel therapy against **Malaria**"

2008: Harald zur Hausen "for his discovery of **human papilloma viruses** causing cervical cancer"

Françoise Barré-Sinoussi and Luc Montagnier "for their discovery of **human immunodeficiency virus**"

2005: Barry J. Marshall and J. Robin Warren "for their discovery of the bacterium ***Helicobacter pylori*** and its role in gastritis and peptic ulcer disease"

1997: Stanley B. Prusiner "for his discovery of **Prions** – a new biological principle of infection"

1976: Baruch S. Blumberg and D. Carleton Gajdusek "for their discoveries concerning new mechanisms for the origin and dissemination of **infectious diseases**"

1952: Selman Abraham Waksman "for his discovery of streptomycin, the first antibiotic effective against **tuberculosis**"

1951: Max Theiler "for his discoveries concerning **yellow fever** and how to combat it"

1945: Sir Alexander Fleming, Ernst Boris Chain and Sir Howard Walter Florey "for the discovery of **penicillin** and its curative effect in various infectious diseases"

1939: Gerhard Domagk "for the discovery of the **antibacterial effects of prontosil**"

1928: Charles Jules Henri Nicolle "for his work on **typhus**"

1927: Julius Wagner-Jauregg "for his discovery of the therapeutic value of **malaria inoculation** in the treatment of **dementia paralytica**"

1907: Charles Louis Alphonse Laveran "in recognition of his work on the role played by **protozoa** in causing diseases"

1905: Robert Koch "for his investigations and discoveries in relation to **tuberculosis**"

1903: Niels Ryberg Finsen "in recognition of his contribution to the treatment of diseases, especially **lupus vulgaris**, with **concentrated light radiation**, whereby he has opened a new avenue for medical science"

1902: Ronald Ross "for his work on **malaria**, by which he has shown how it enters the organism and thereby has laid the foundation for successful research on this disease and methods of combating it"

1901: Emil Adolf von Behring "for his work on **serum therapy**, especially its application against **diphtheria**, by which he has opened a new road in the domain of medical science and thereby placed in the hands of the physician a victorious weapon against illness and deaths"

Nobelpriser i fysiologi og medicin

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Franc

Antimikrobiel behandling:

- **Prontosil og sulfonamider**
- **Penicillin**
- **Streptomycin**
- **'Kemoterapeutiske midler' (pyrimethamine, trimethoprim, acyclovir)**

1927: Julius Wagner-Jauregg "for his discovery of the therape

Parasitter:

- **Malaria**
- **Cancer parasitter**
- **DDT**
- **Rundorm**

"in recognition of his
ns and discoveries in
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laria, by which he has
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y placed in the hands of the physician a victorious weapon against illness and deaths"

Vira:

- **HIV**
- **Hepatitis C**
- **Gul feber**
- **Polio**
- **Hepatitis B virus**
- **Bakterifager**
- **Sarkom virus**
- **Human Papilloma virus**
- **Polyoma virus**
- **Revers transkriptase**
- **Virale onkogener**
- **Kuru**
- **Prioner**

and its rol

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st tuberc

cillin and its curative effect in various infectious

Immunitet:

- **Serumbehandling**
- **Antimicrobielt forsvar**
- **MHC**

Bakterier:

- **Tuberkulose**
- **Tyfus**
- **Syfilis behandling**

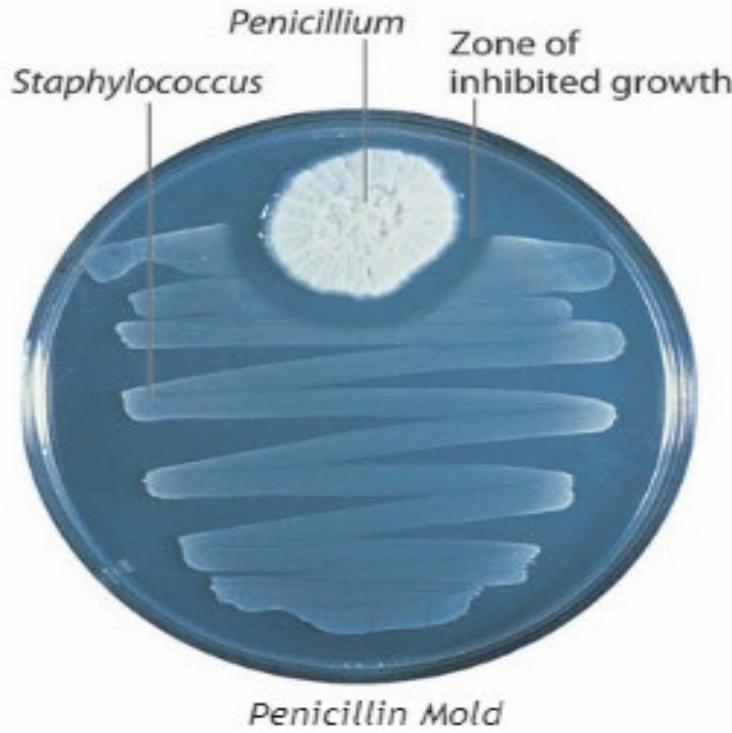
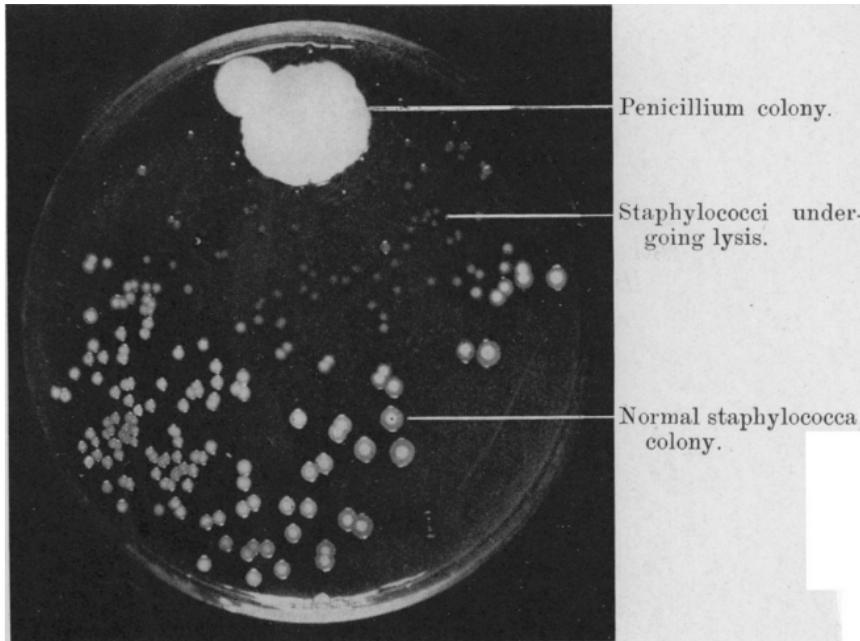
pus vulgaris, with concentrated light reduction,

ereby has laid the foundation for successful

eria, by which he has opened a new road in the

Penicillin

- When I woke up just after dawn on September 28, 1928, I certainly didn't plan to revolutionize all medicine by discovering the world's first antibiotic, or bacteria killer. But I suppose that was exactly what I did.



ON THE ANTIBACTERIAL ACTION OF CULTURES OF A
PENICILLIUM, WITH SPECIAL REFERENCE TO THEIR
USE IN THE ISOLATION OF *B. INFLUENZÆ*.

ALEXANDER FLEMING, F.R.C.S.

From the Laboratories of the Inoculation Department, St Mary's Hospital, London.

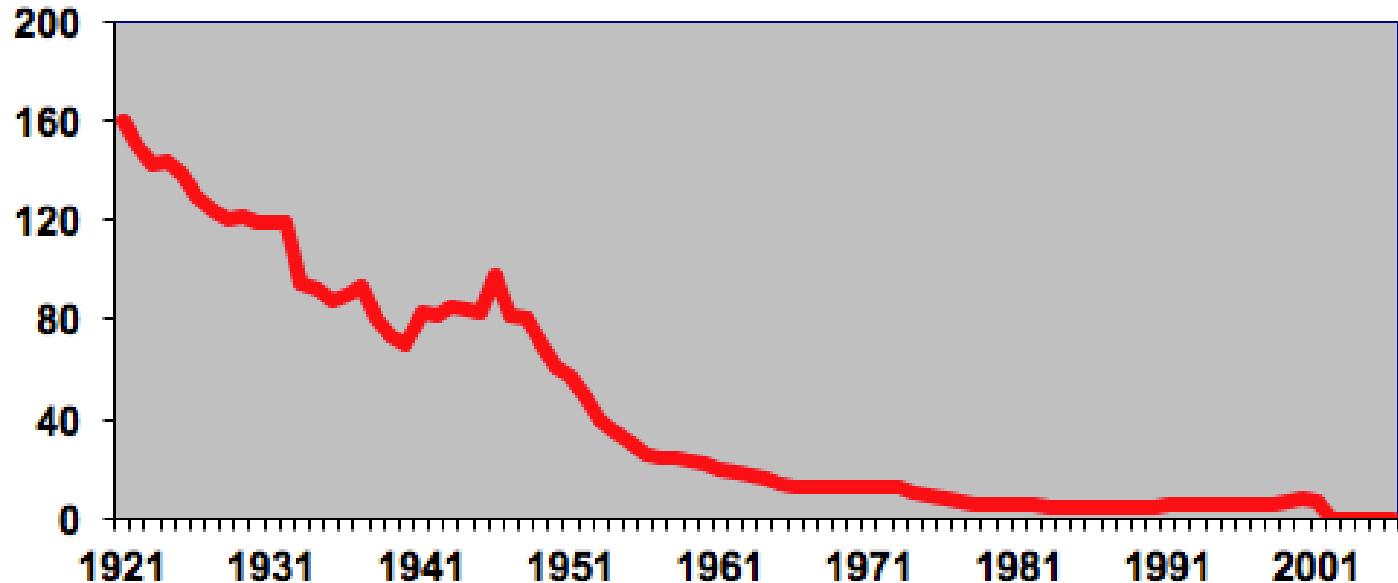
Received for publication May 10th, 1929.

BRITISH JOURNAL OF EXPERIMENTAL PATHOLOGY, VOL. X, No. 3.



Tuberkulose

Incidens



< 10 cases/100.000 = low incidence country

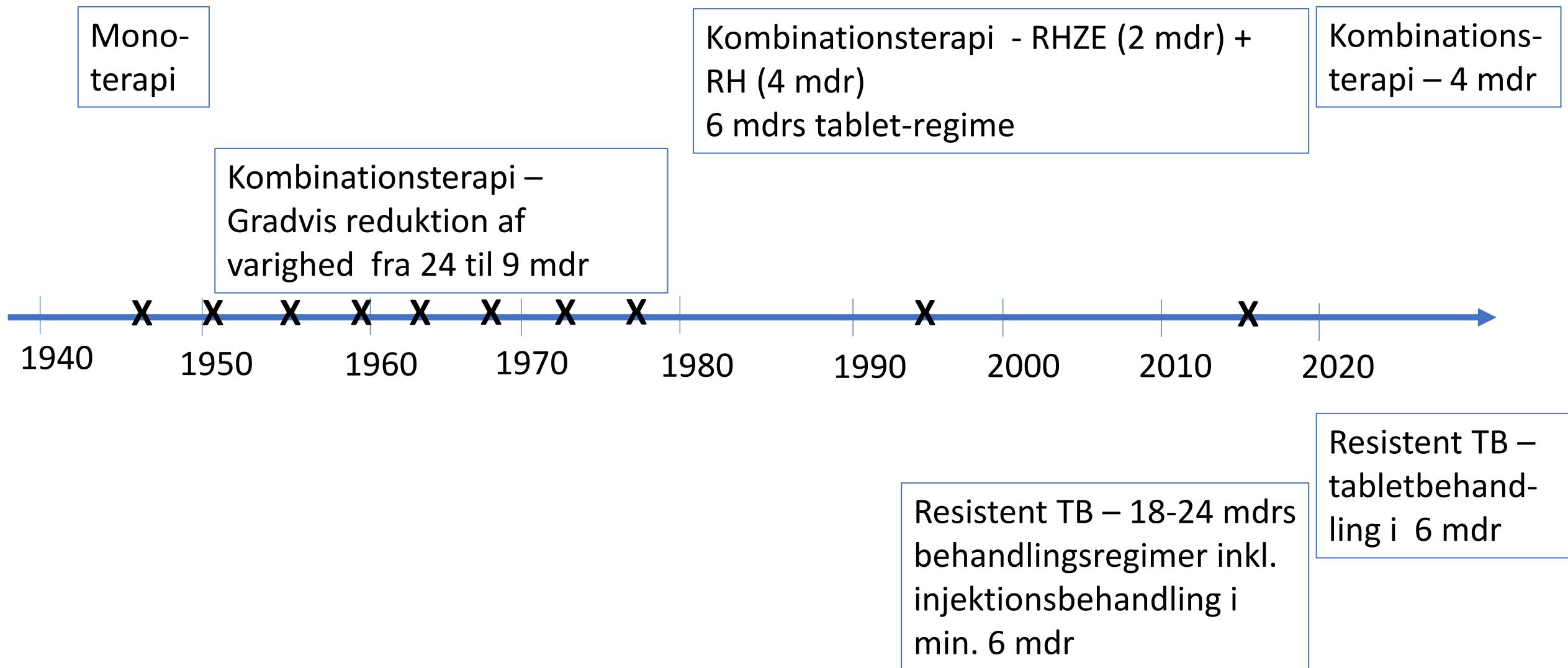


BRITISH MEDICAL JOURNAL

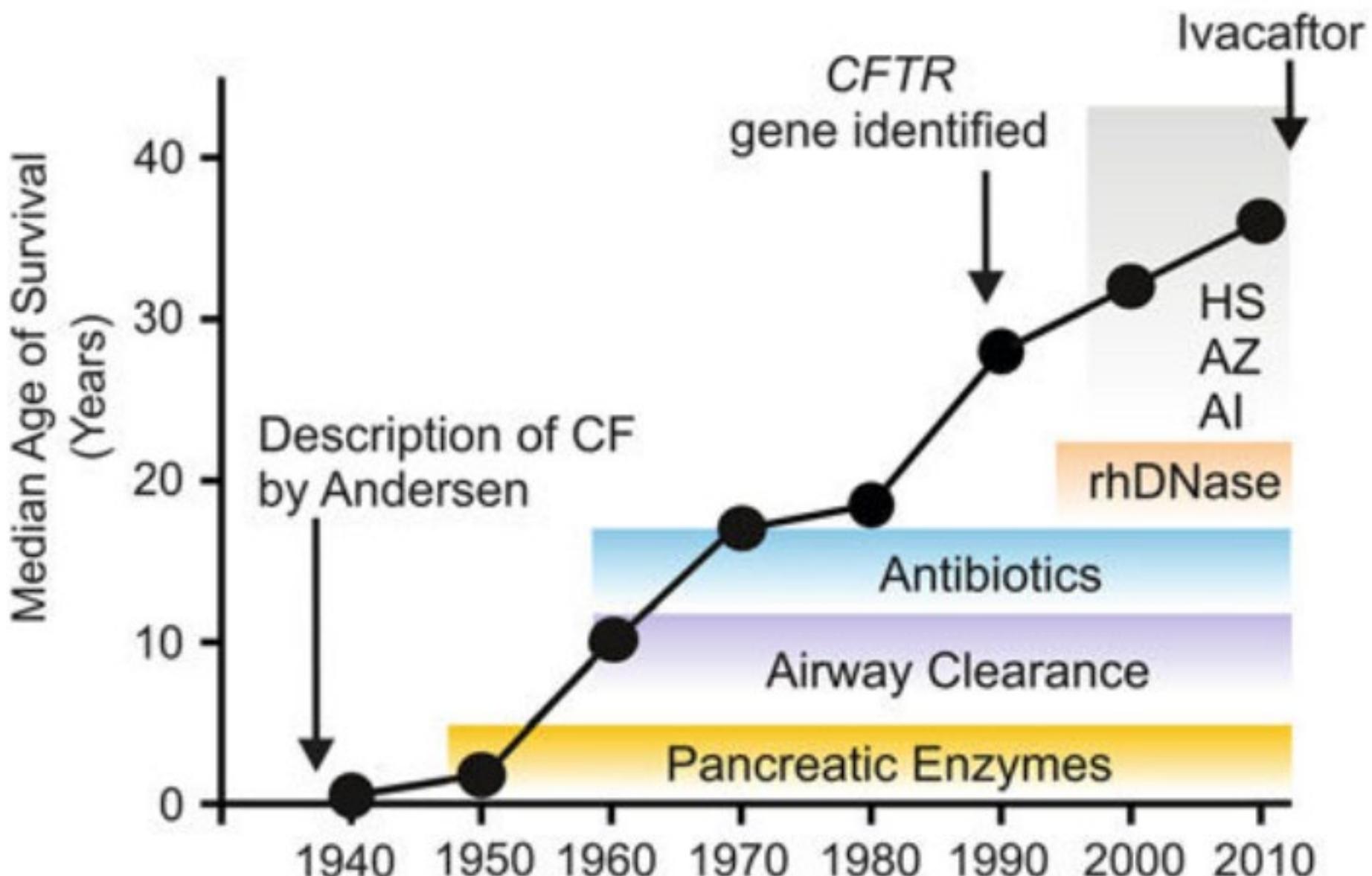
LONDON SATURDAY OCTOBER 30 1948

STREPTOMYCIN TREATMENT OF PULMONARY TUBERCULOSIS
A MEDICAL RESEARCH COUNCIL INVESTIGATION

Tuberkulose



Cystisk fibrose – en revolution



HIV/AIDS Timeline

RARE CANCER SEEN IN 41 HOMOSEXUALS

Outbreak Occurs Among Men in New York and California
— 8 Died Inside 2 Years



Françoise Barré-Sinoussi and Luc Montagnier discover HIV as the cause of AIDS and later win the Nobel Prize



AZT, developed in mice, becomes the first drug approved for treating AIDS



Infant HIV infections begin to fall due to AZT treatment



AIDS-related deaths fall in developed countries due to combination treatments



After tests in mice and macaques, Truvada is shown to reduce the risk of HIV infection



The majority of people worldwide eligible for antiretrovirals are now receiving them

1981

1984

1987

1994

1997

2010

2012

1982

1985

1990

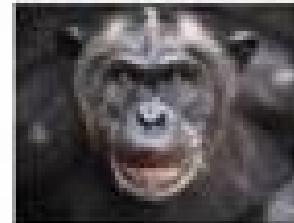
1996

2007

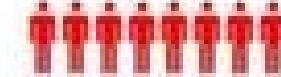
2011

The name "AIDS" – Acquired Immune Deficiency Syndrome – is created

A test for screening blood donations is developed through chimpanzee research



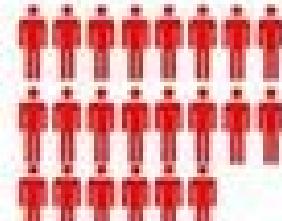
8 million people have HIV



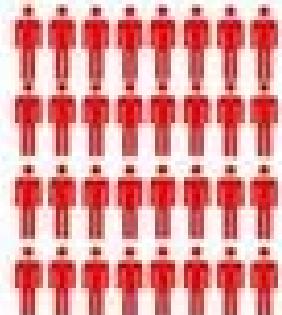
Combination treatment of antiretrovirals developed



22 million people have HIV



33 million people have HIV



Antiretrovirals are shown to reduce the risk of transmitting HIV by 96%

Image credits: Trocaine, Gates Foundation, Stock/Corbis, Harwell

HIV/AIDS Timeline



RARE CANCER SEEN IN 41 HOMOSEXUALS

Outbreak Occurs Among Men in New York and California
— 8 Died Inside 2 Years



Françoise Barré-Sinoussi and Luc Montagnier discover HIV as the cause of AIDS and later win the Nobel Prize

The New York Times reports a mysterious illness



AZT, developed in mice, becomes the first drug approved for treating AIDS



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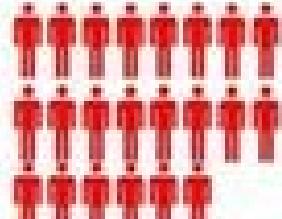
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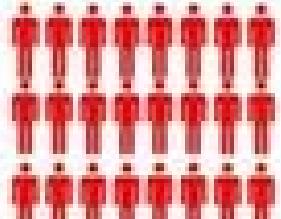
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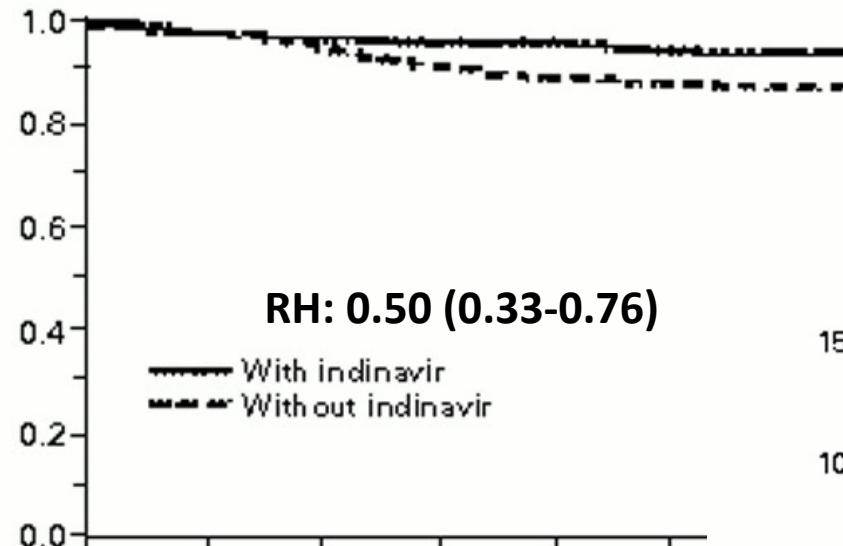


Understanding ANIMAL RESEARCH

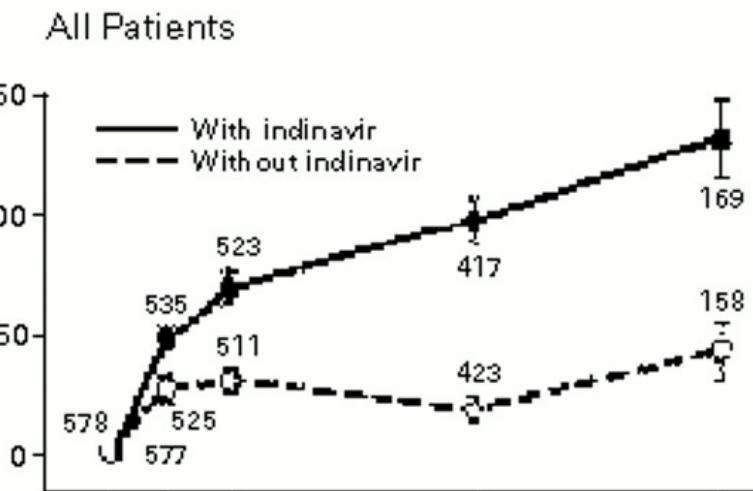
HIV

AIDS or Death

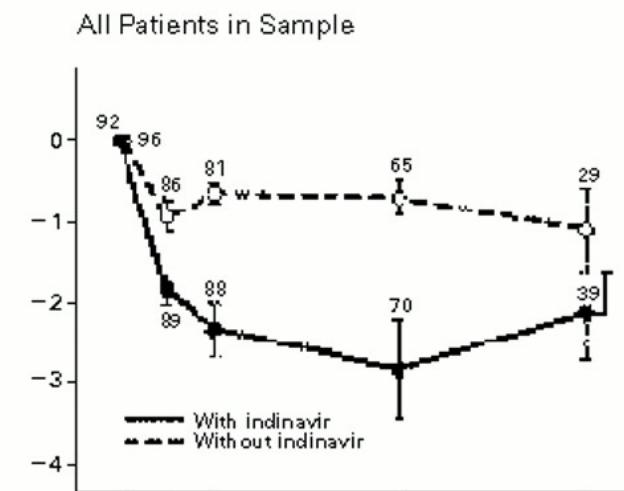
All Patients (N = 1156)

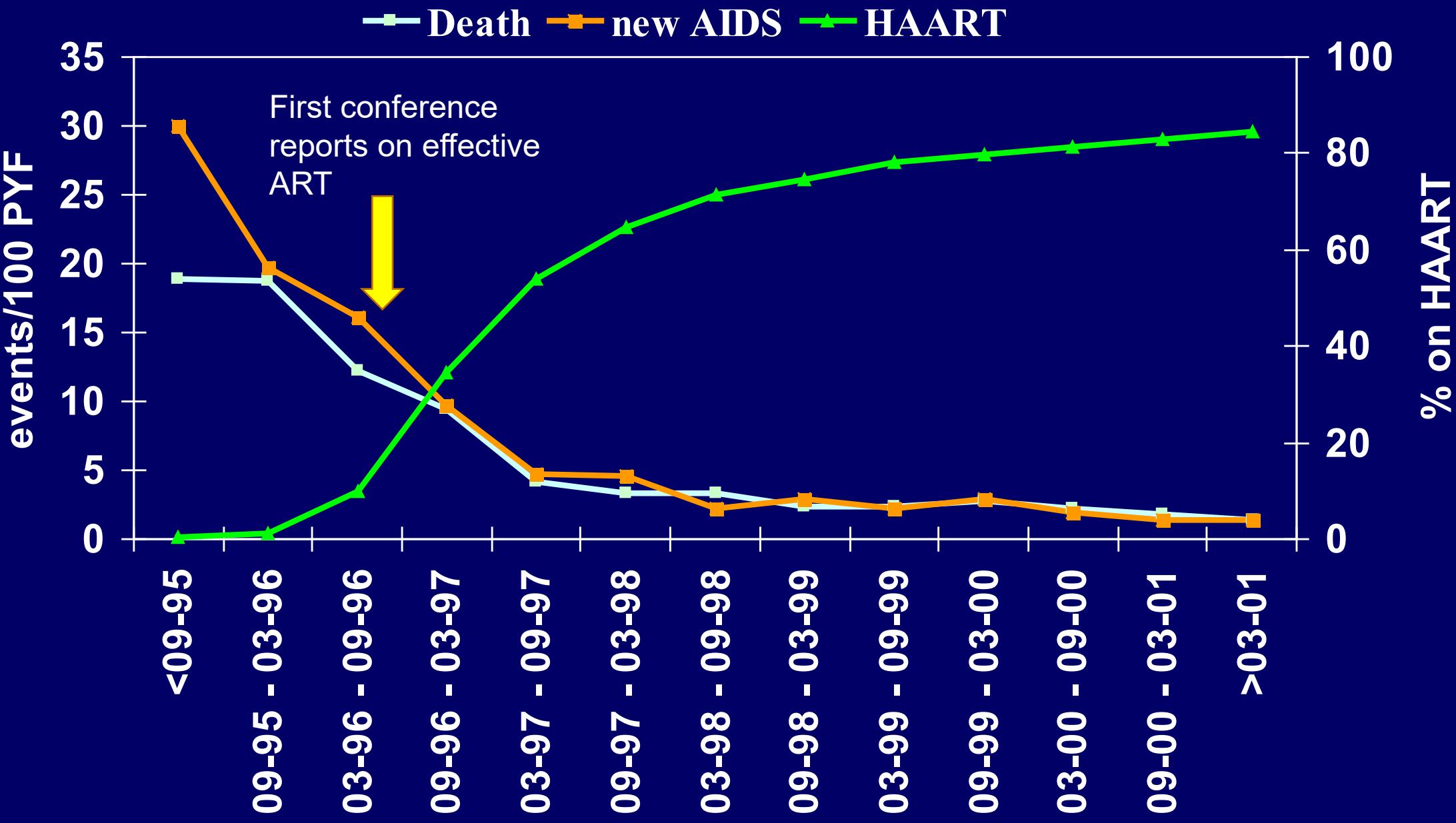


Change in CD4



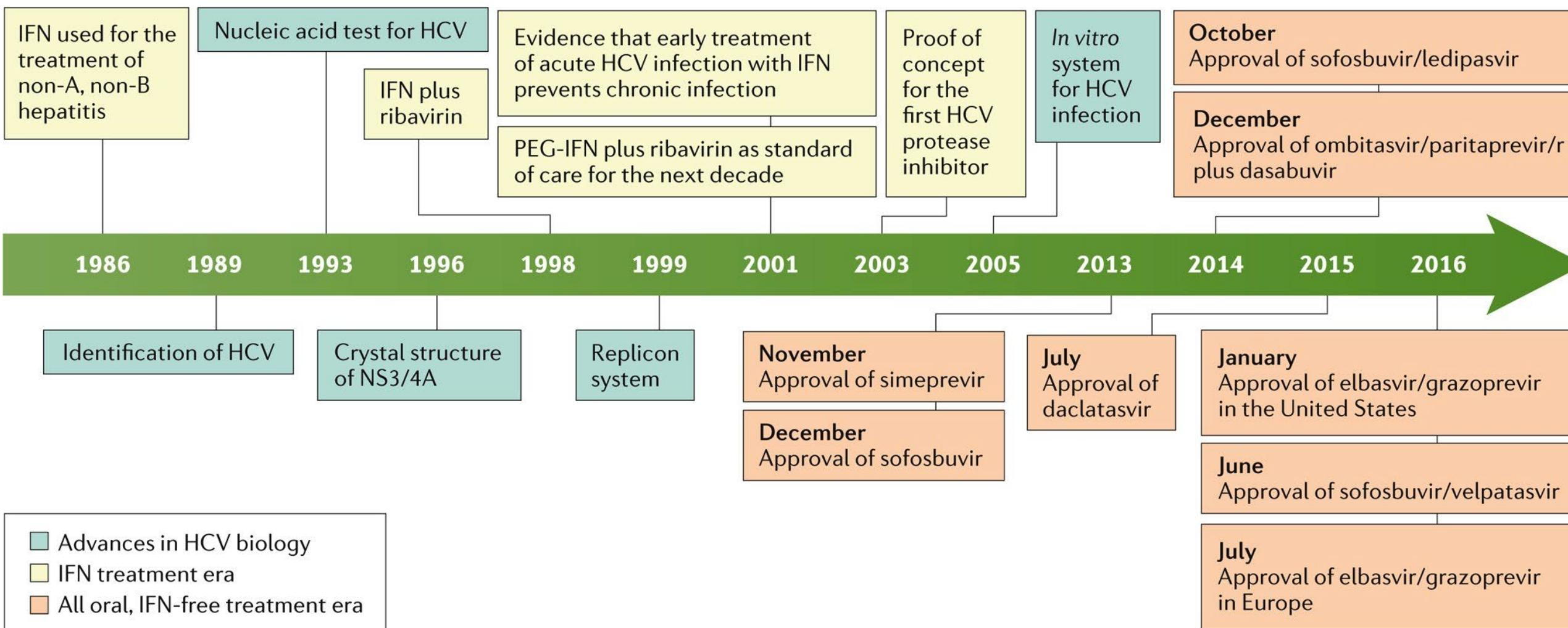
Change in HIV-RNA





Update: Mocroft, *Lancet* 1998

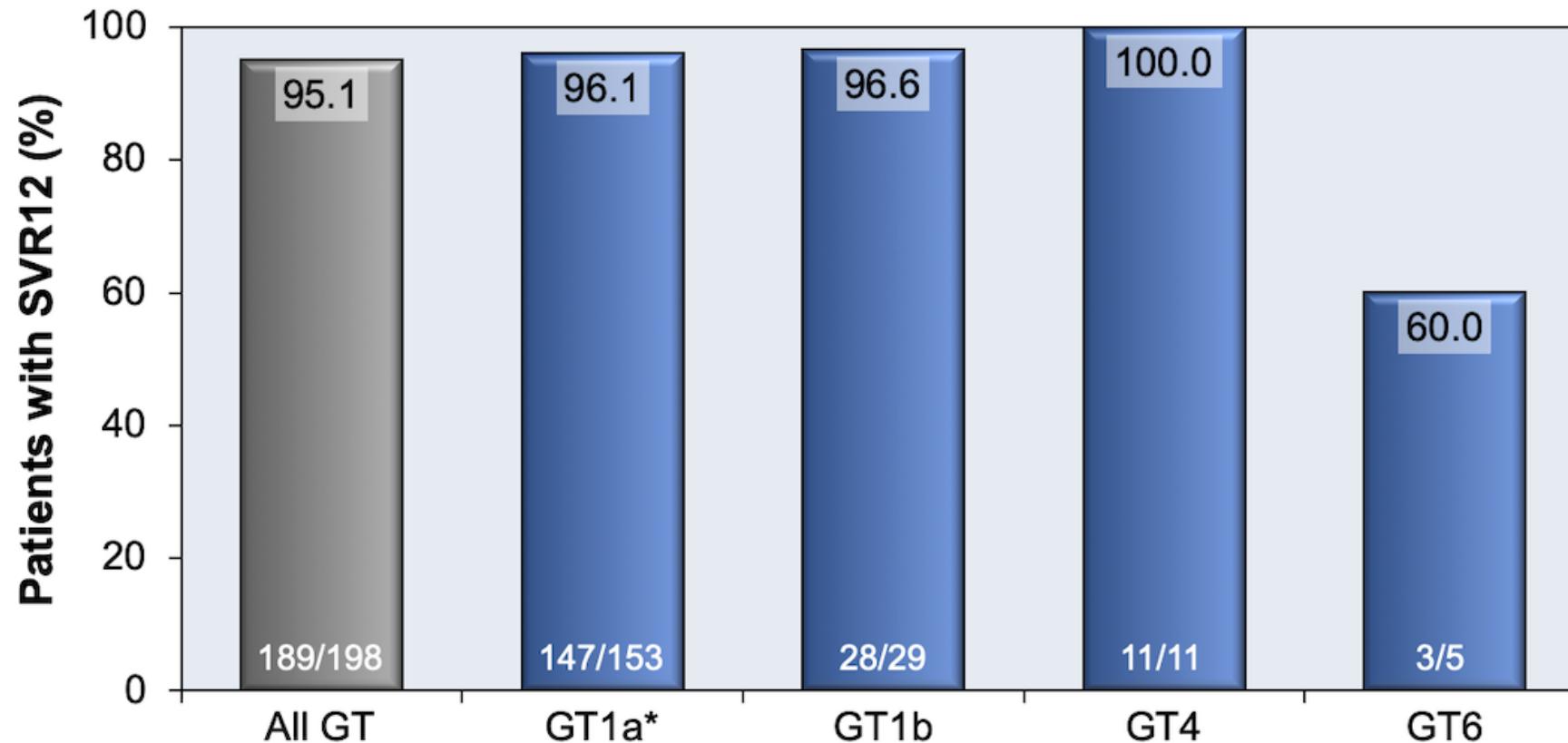
Hepatitis C





Hepatitis C

12 weeks of Elbasvir-Grazoprevir



^aExcludes patients who discontinued trial for non-treatment related reasons

*Includes one subject with mixed infection (GT 1a and 1b) who achieved SRV12

Source: Dore GJ, et al. Ann Intern Med. 2016;165:625-34.

HIV

- Diagnostisk test tilgængelig 3 år efter identifikation af virus
- Første behandling - zidovudin/retrovir - i brug efter 5 år
- Effektiv kombinationsbehandling efter 14 år
- Livslang behandling, ingen kur (men god langtidsprognose)
- Begrænse epidemien
- Ingen vaccine

Hepatitis C

- Diagnostisk test tilgængelig 4 år efter identifikation af virus
- Første behandling allerede i brug for non-A, non-B hepatitis
- Effektiv kombinationsbehandling efter 25 år
- 8-12 ugers behandling, kur
- Elimination/eradikation
- Ingen vaccine

COVID-19

- Identifikation af virus – SARS-CoV-2
- Diagnostik:
 - Diagnostic test
 - Masse-testning
- Behandling - antiviral og antiinflammatorisk
- Vaccination

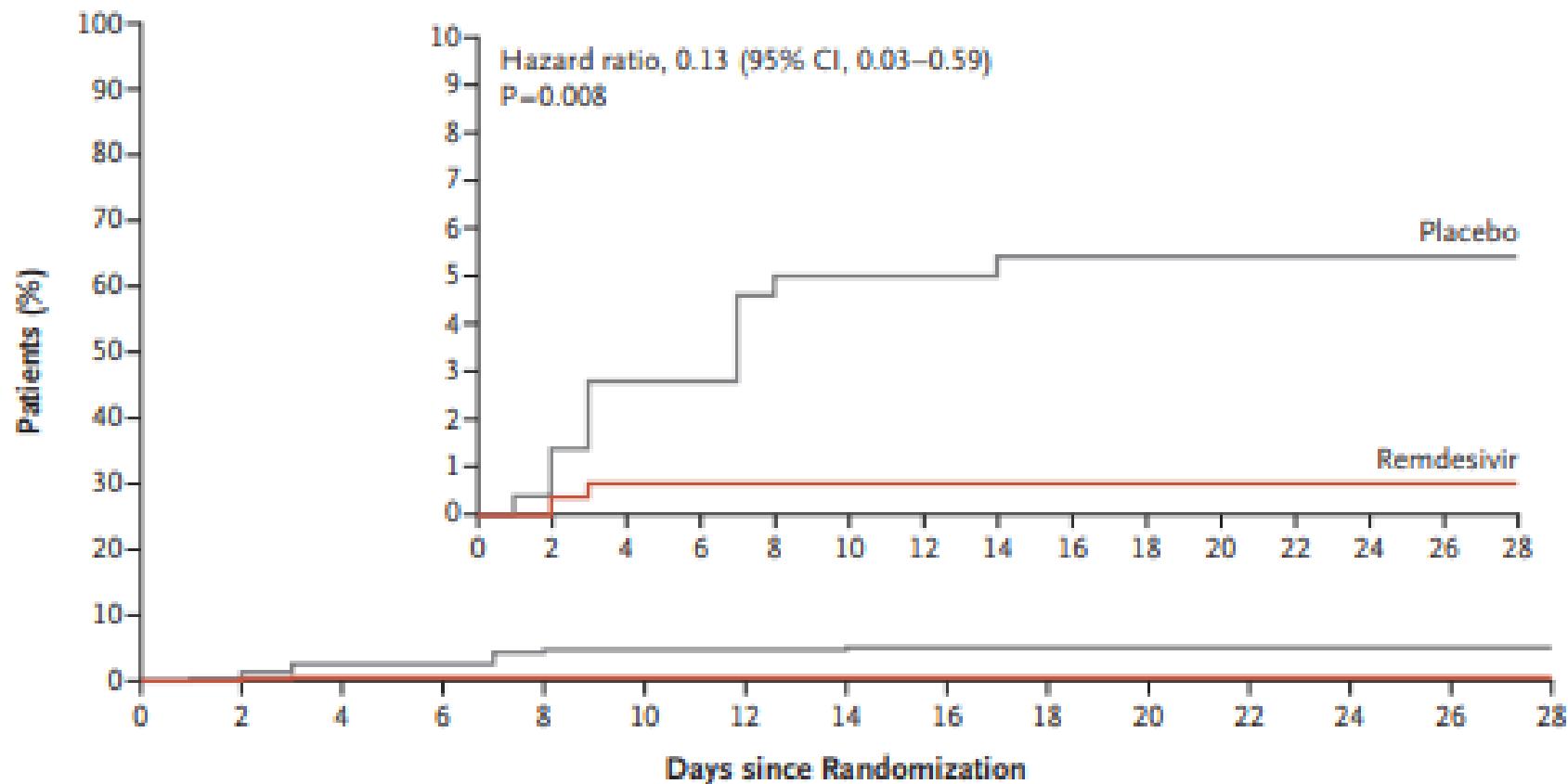
COVID-19

- Identifikation af virus – SARS-CoV-2
- Diagnostik:
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 - Masse-testning
- Behandling - antiviral og antiinflammatorisk
- Vaccination



Remdesivir

A Covid-19-Related Hospitalization or Death from Any Cause

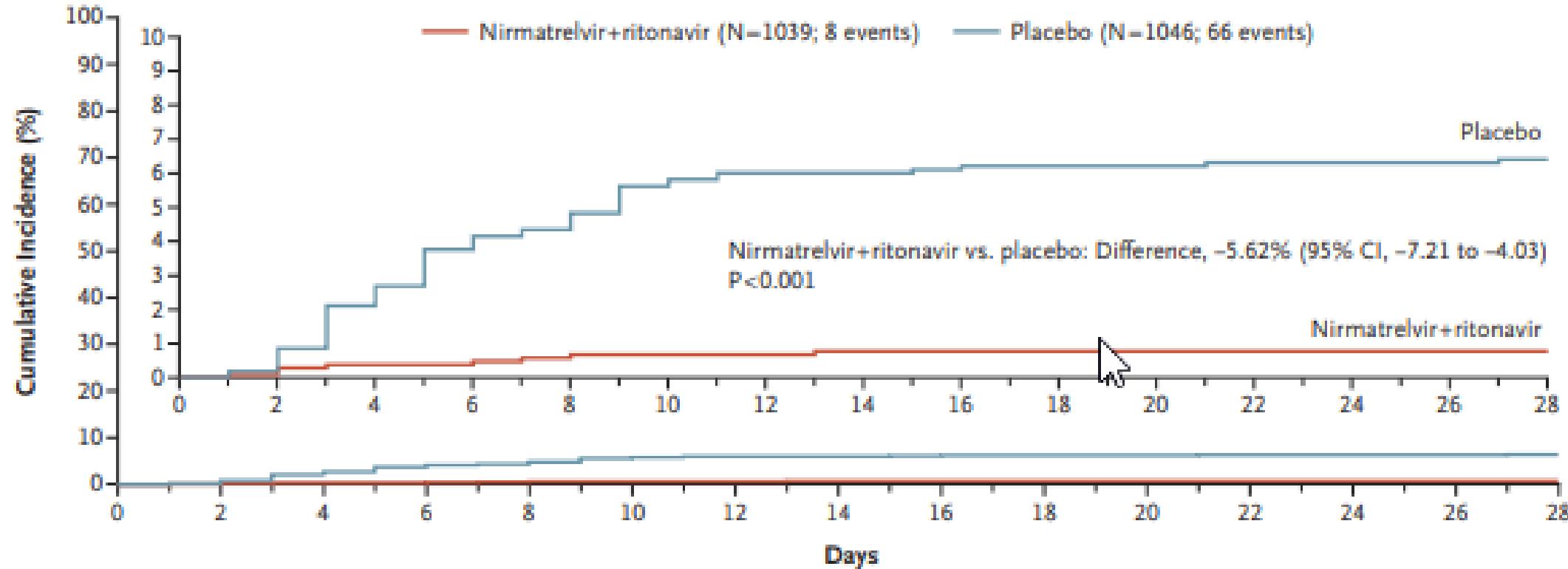


No. at Risk

Placebo	283	280	272	271	265	264	264	263	262	261	261	260	256	250	227
Remdesivir	279	276	272	272	271	268	268	268	264	264	264	264	260	252	226

Nirmatrelvir/rtv

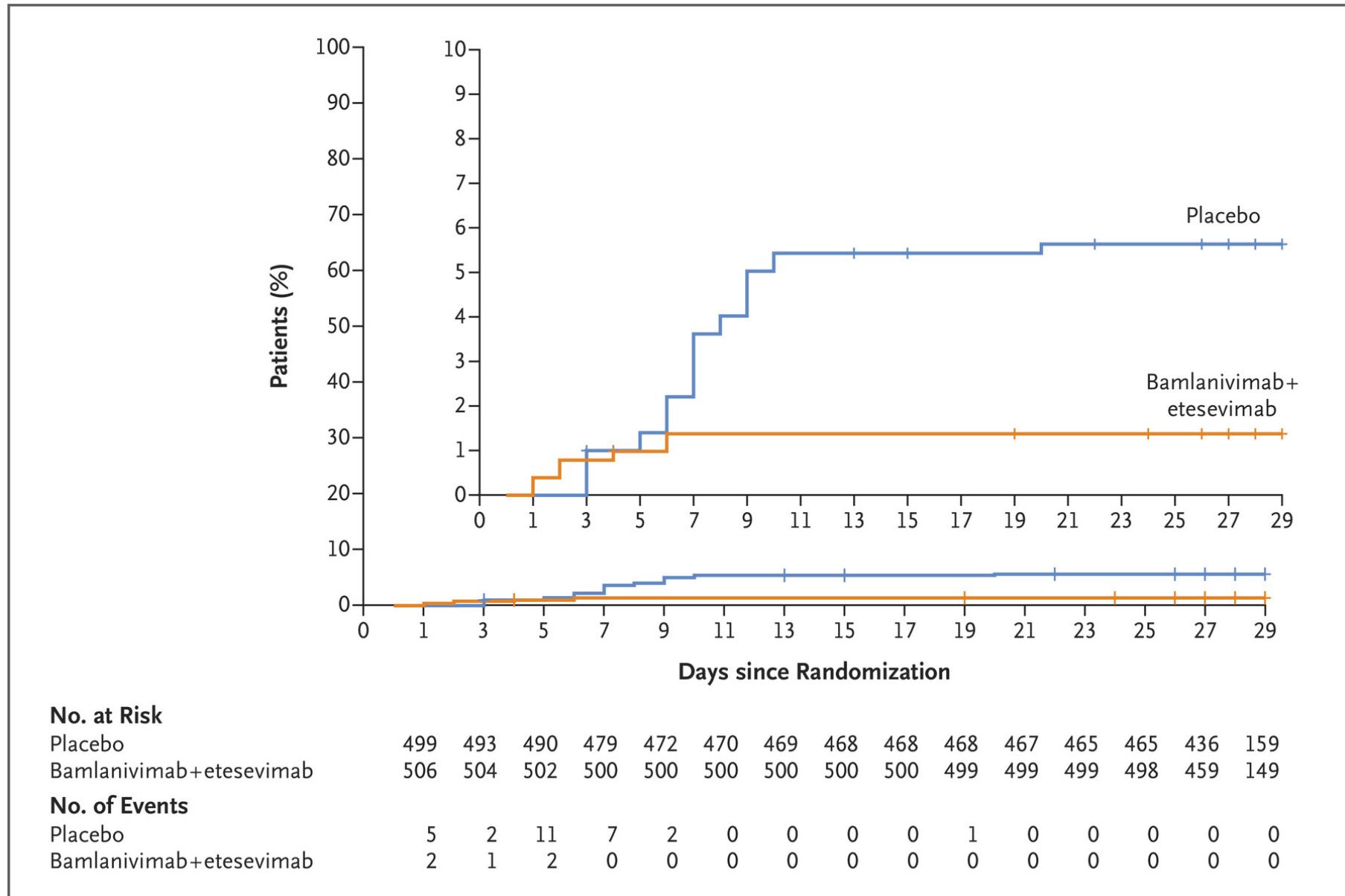
B Covid-19-Related Hospitalization or Death from Any Cause through Day 28 among Patients Treated ≤5 Days after Symptom Onset



No. at Risk

NMV-r	1039	1034	1023	1013	1007	1004	1002	1000	997	995	993	993	993	993	992
Placebo	1046	1042	1015	990	977	963	959	959	955	953	951	948	948	948	945

Monoclonal antibodies



Vaccination

- RNA-vaccine

Table 2. Vaccine Efficacy against Covid-19 at Least 7 days after the Second Dose.*

Efficacy End Point	BNT162b2		Placebo		Vaccine Efficacy, % (95% Credible Interval)‡	Posterior Probability (Vaccine Efficacy >30%)§
	No. of Cases	Surveillance Time (n)†	No. of Cases	Surveillance Time (n)†		
Covid-19 occurrence at least 7 days after the second dose in participants without evidence of infection	8 (N=18,198)	2.214 (17,411) (N=18,325)	162 (N=19,965)	2.222 (17,511) (N=20,172)	95.0 (90.3–97.6)	>0.9999
Covid-19 occurrence at least 7 days after the second dose in participants with and those without evidence of infection	9 (N=19,965)	2.332 (18,559) (N=20,172)	169 (N=20,172)	2.345 (18,708) (N=20,172)	94.6 (89.9–97.3)	>0.9999

HIV

- Diagnostisk test tilgængelig efter identifikation af virus
- Første behandling - zidovudin og retrovir - i brug efter 1996
- Effektiv kombinationsbehandling inden for 14 år
- Livslang behandling, kurativt
- Begrænse epidemien med behandling
- Ingen vaccine

COVID-19

- Diagnostisk test tilgængelig inden for uger-måneder
- Første behandling - inden for måneder (remdesivir, steroid)
- Effektiv behandling inden for 1-2 år
- <1 uges behandling
- Begrænse epidemien med viden
- Vaccine

Hepatitis C

- Diagnostisk test tilgængelig 4 år efter identifikation af virus
- Behandling allerede i brug -A, non-B hepatitis
- Kombinationsbehandling inden for 5 år
- Behandling, kurativt
- Eradikation med viden
- Vaccine

Visioner

Visioner - 1

- Diagnostik - hurtigere, højere sensitivitet og specifitet
- Behandling – mere effektiv, kortere varighed (ambulant)

Visioner - 1

- Diagnostik - hurtigere, højere sensitivitet og specifitet
- Behandling – mere effektiv, kortere varighed (ambulant)
- Præcisionsmedicin
 - Behandling målrettet den enkelte person

Visioner - 2

- Identifikation af nye sygdomme med infektiøs ætiologi (flere petriskåle i vindueskarme?)
- Epidemiberedskab – klar til næste epi-/pandemi (abekopper)
- På globalt plan: kontrol over store infektionssygdomme som tuberkulose, HIV, malaria

**POLIO WILL BE
THE 2ND HUMAN
DISEASE IN HISTORY TO BE
ERADICATED.**

#VaccinesWork



endpolio.org

Tak

Tak for opmærksomheden

Tak for slides og kommentarer til:

- Nina Weis
- Tavs Qvist
- Daniel Faurholt-Jepsen
- Michael Dalager-Pedersen
- Christian Fischer