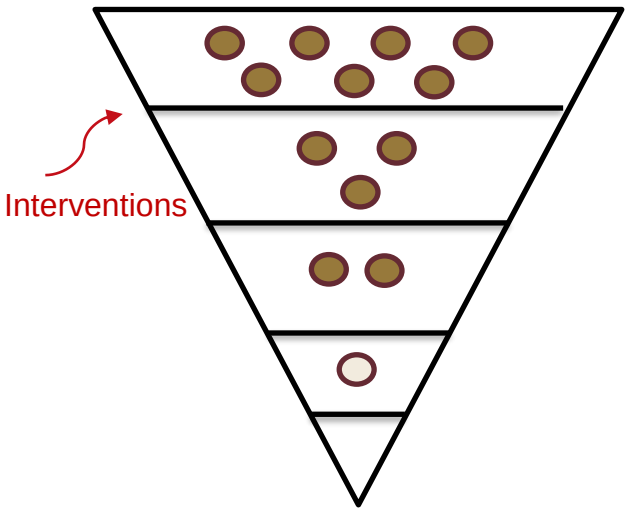
Kirby Institute

Control, elimination and eradication goals and targets –

Vaccine preventable diseases

Dr Laila Khawar | April 18, 2024

Infectious disease control



Impact and process targets

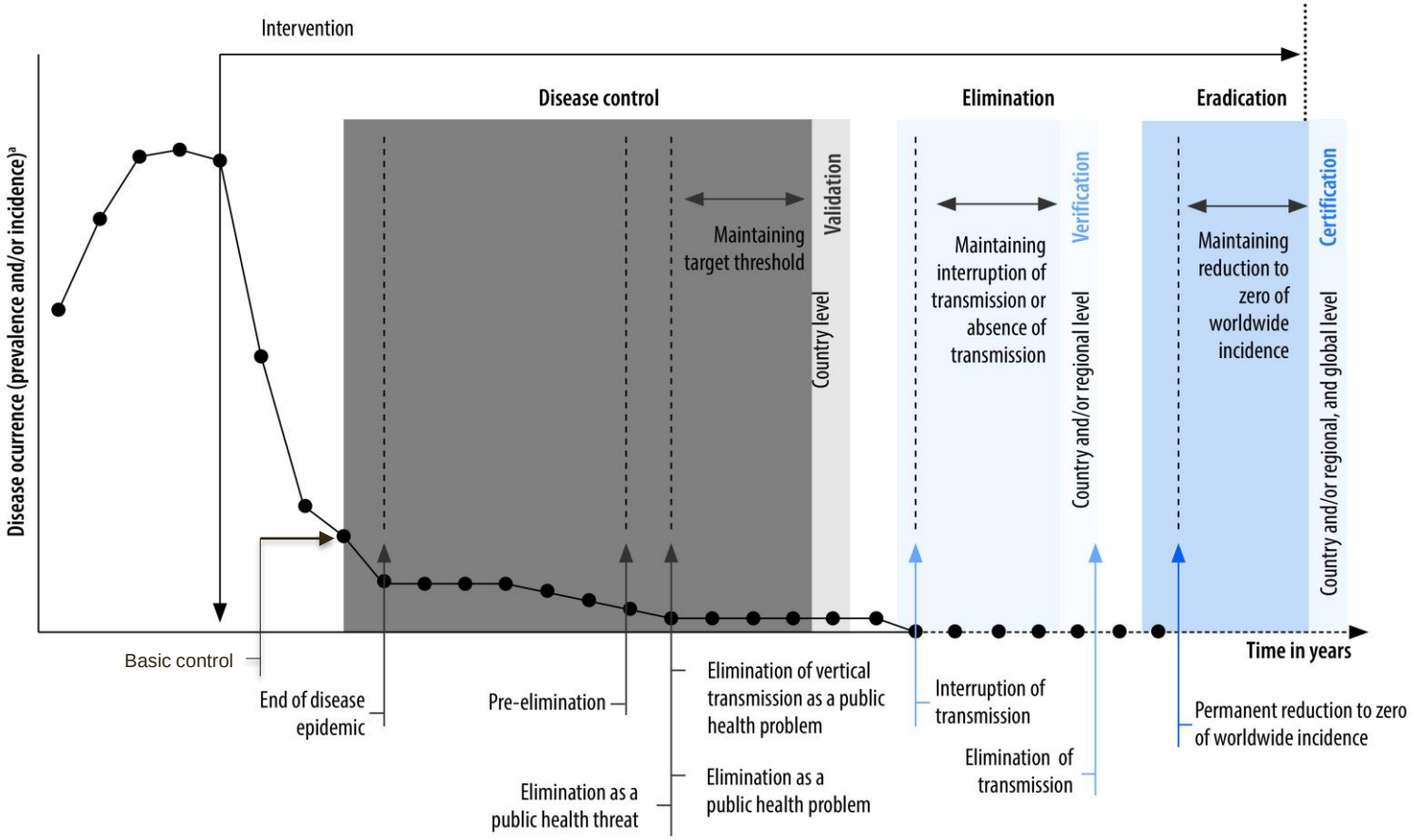
Elimination targets	Elimination of chronic HBV infection as a public health problem	
2030 GHSS relative reduction reference targets (compared to 2015)	**Incidence** 95% reduction	**Mortality** 65% reduction
HBV- and HCV-specific absolute prevalence, incidence and mortality targets	**HBV EMTCT** ≤0.1% HBsAg prevalence in ≤5 year olds[a,b] *Additional target:* ≤2% MTCT rate (where use of targeted HepB-BD)[c]	**Annual mortality**[g] (HBV) ≤4/100 000
Programmatic targets[d]	**Countries with universal HBV vaccine birth dose (BD)** ≥90% HepB3 vaccine coverage ≥90% HepB timely hepatitis B BD (HepB-BD) coverage[e]	**Testing and treatment** ≥90% of people with HBV diagnosed ≥80% of people diagnosed with HBV and eligible for treatment are treated[h]

Impact – i.e. reduction in incidence, prevalence, mortality etc.

Process – e.g. 90% vaccination coverage

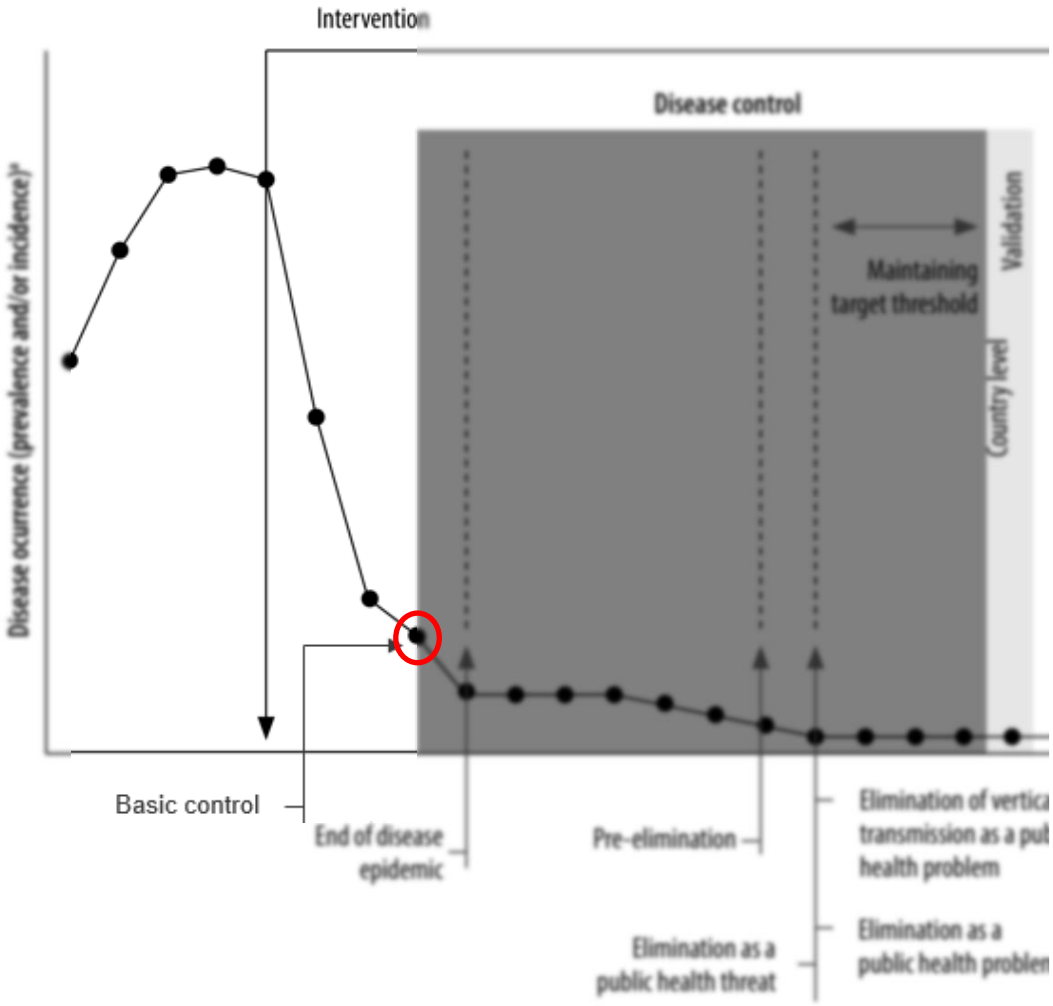
1. World Health Organization. 2021

Goals



2. Khawar L *et al*, Bull World Health Organ. 2023

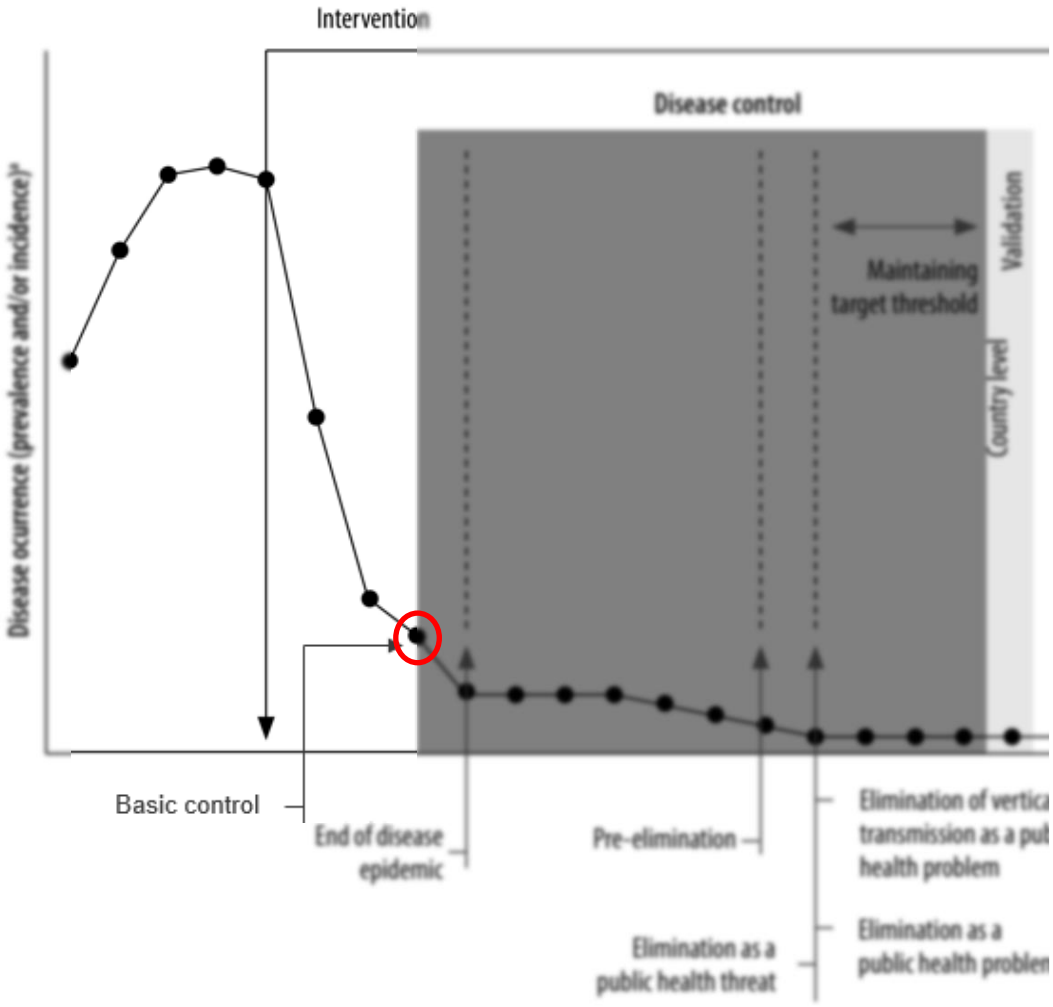
Basic control



Vaccine-preventable infectious diseases

1. Diphtheria
2. Pertussis
3. Tetanus
4. Varicella (Chickenpox)
5. Herpes Zoster (Shingles)
6. Hepatitis A
7. Influenza
8. COVID-19
9. Rotavirus
10. Tick-borne encephalitis
11. Mpox

Basic control



Diphtheria, pertussis, tetanus (DPT)

- Impact target: Not specified
  (exception: maternal & neonatal tetanus)
- Process target for vaccination:
  DPT3: Global target of 90%[3]
  (the Immunization Agenda 2030 highlights the need to expand immunization delivery across the life course)

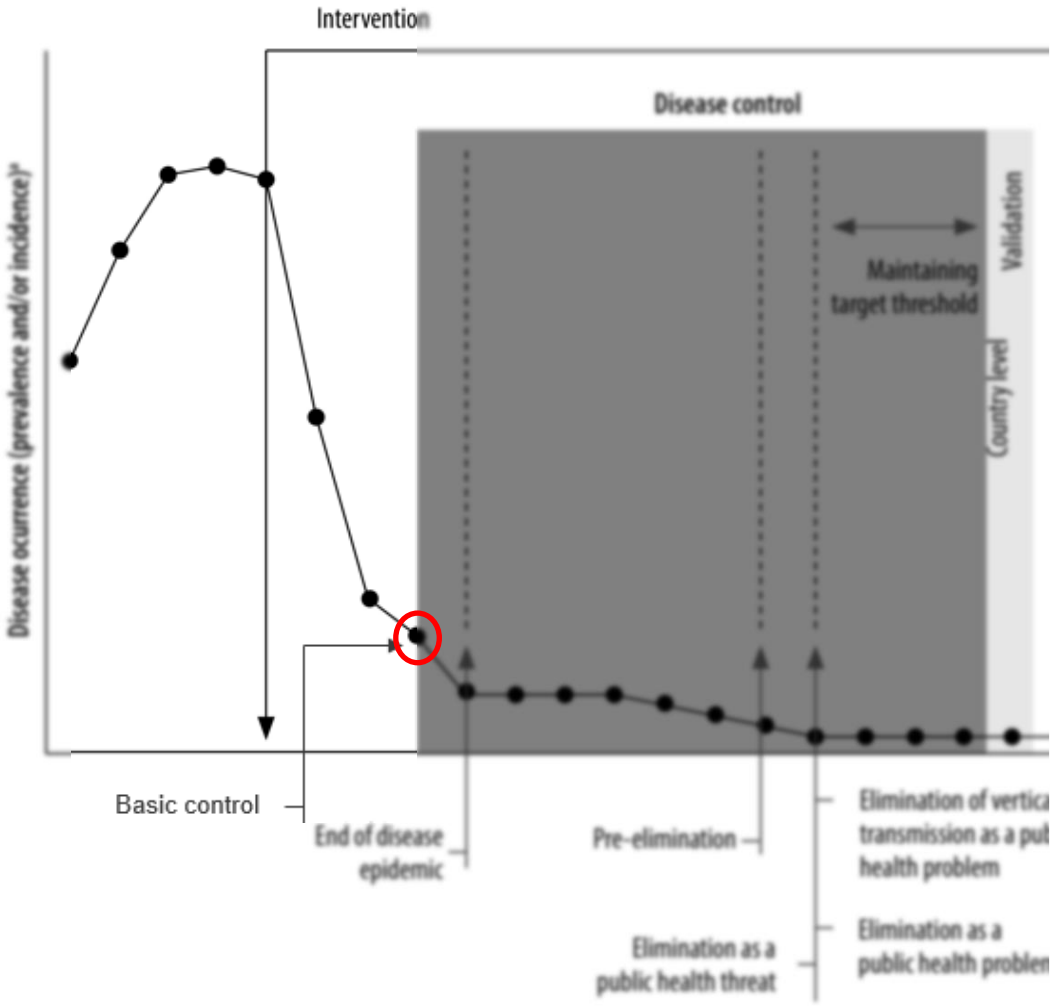
WHO recommendations for vaccination in adults:

WHO recommendations for vaccination in adults:

Pertussis[6]:
- Pregnant women
- HCWs.

3. World Health Organization, 2021; 4. World Health Organization, 2017; 5. World Health Organization. 2017; 6. World Health Organization, 2015

Basic control



Varicella (chickenpox)

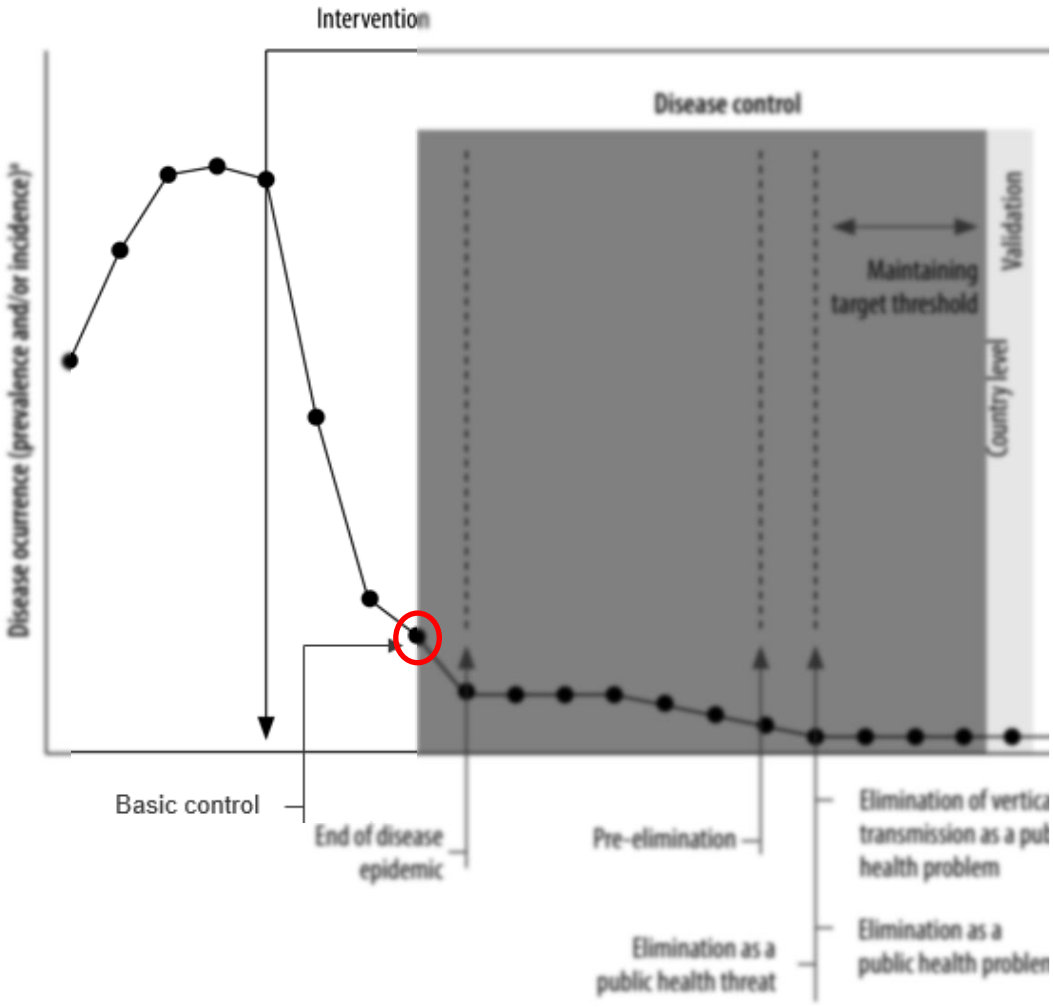
- Impact target: Not specified
- Process target for vaccination: vaccine coverage ≥80%
  (Countries where varicella is an important public health burden)
- Vaccination target for adults: None

WHO recommendations for vaccination in adults:

- Countries with a high average age (≥15 years of age) of acquisition of infection.
- Potentially susceptible HCWs

7. World Health Organization. 2014

Basic control



Hepatitis A & Herpes Zoster (Shingles)

- Impact target: Not specified
- Process target for vaccination: Not specified
- Vaccination target for adults: None

WHO recommendations for vaccination in adults (HAV)[8]:

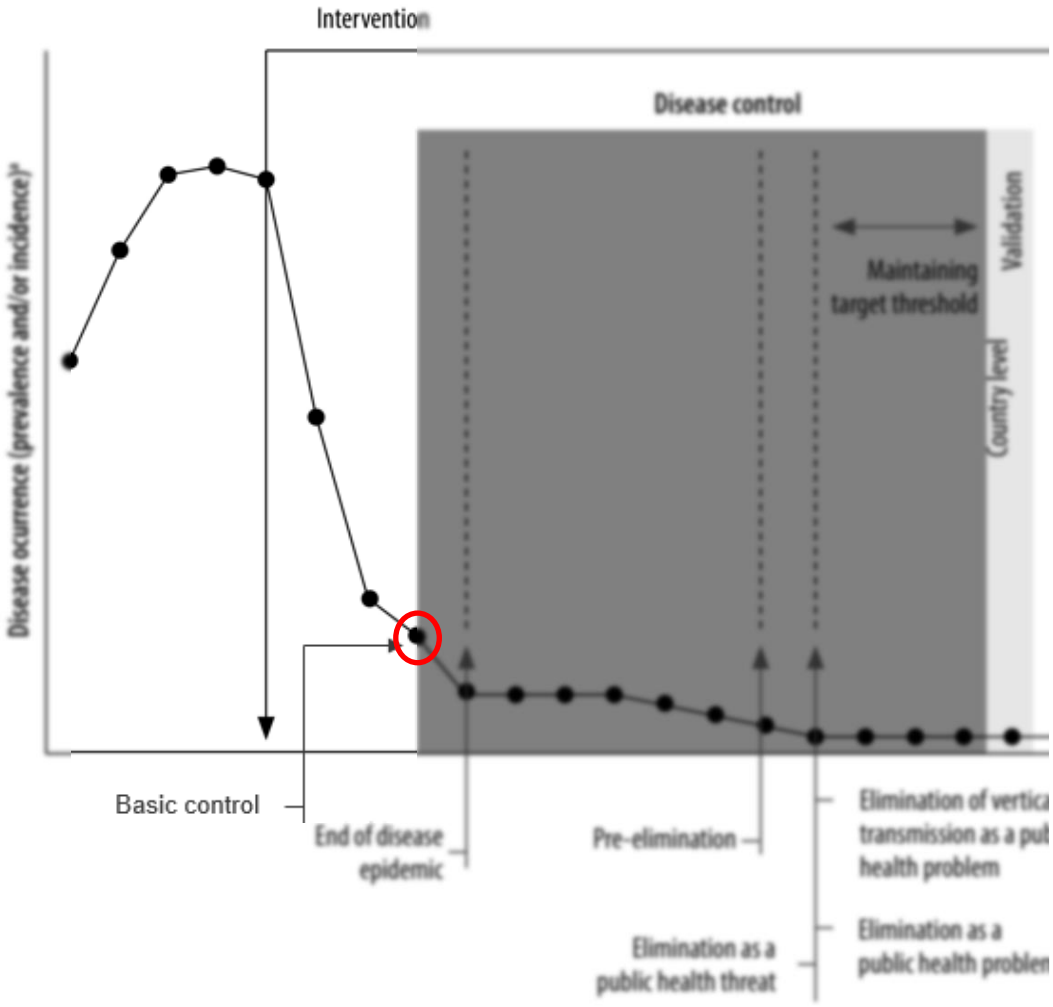
- an increasing trend over time of

WHO recommendations for vaccination in adults (HZ)[7]:

- Immunocompetent individuals aged ≥50 years

7. World Health Organization. 2014; 8. World Health Organization. 2022

Basic control



Influenza

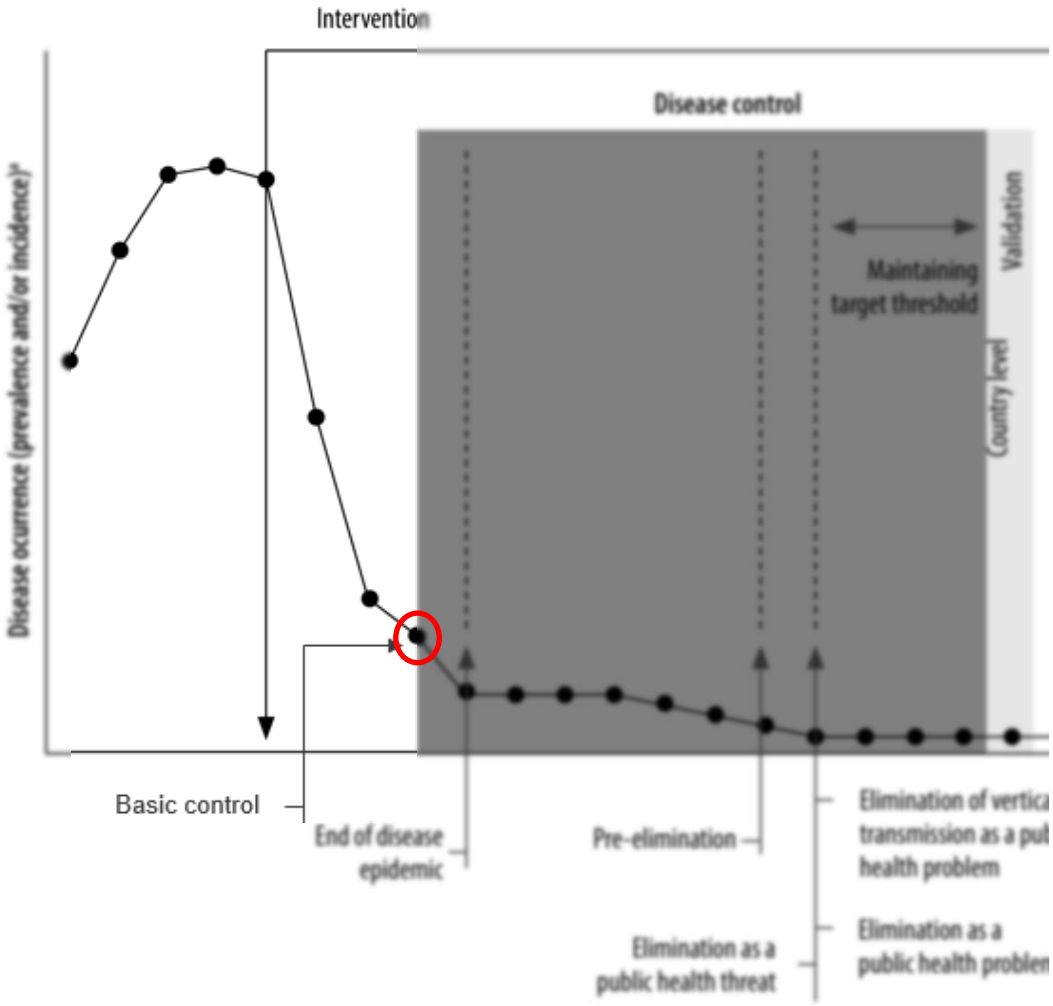
- Impact target: None
- Process target for vaccination: Not specified
- Vaccination target for adults: ≥75% among the elderly (≥65 y)[9]

WHO recommendations for vaccination in adults[10]:

- Pregnant women as the most important risk group for inactivated seasonal influenza vaccination.
- HCWs
- Those with high-risk conditions

9. World Health Organization. 2003; 10. World Health Organization. 2019

Basic control



COVID-19

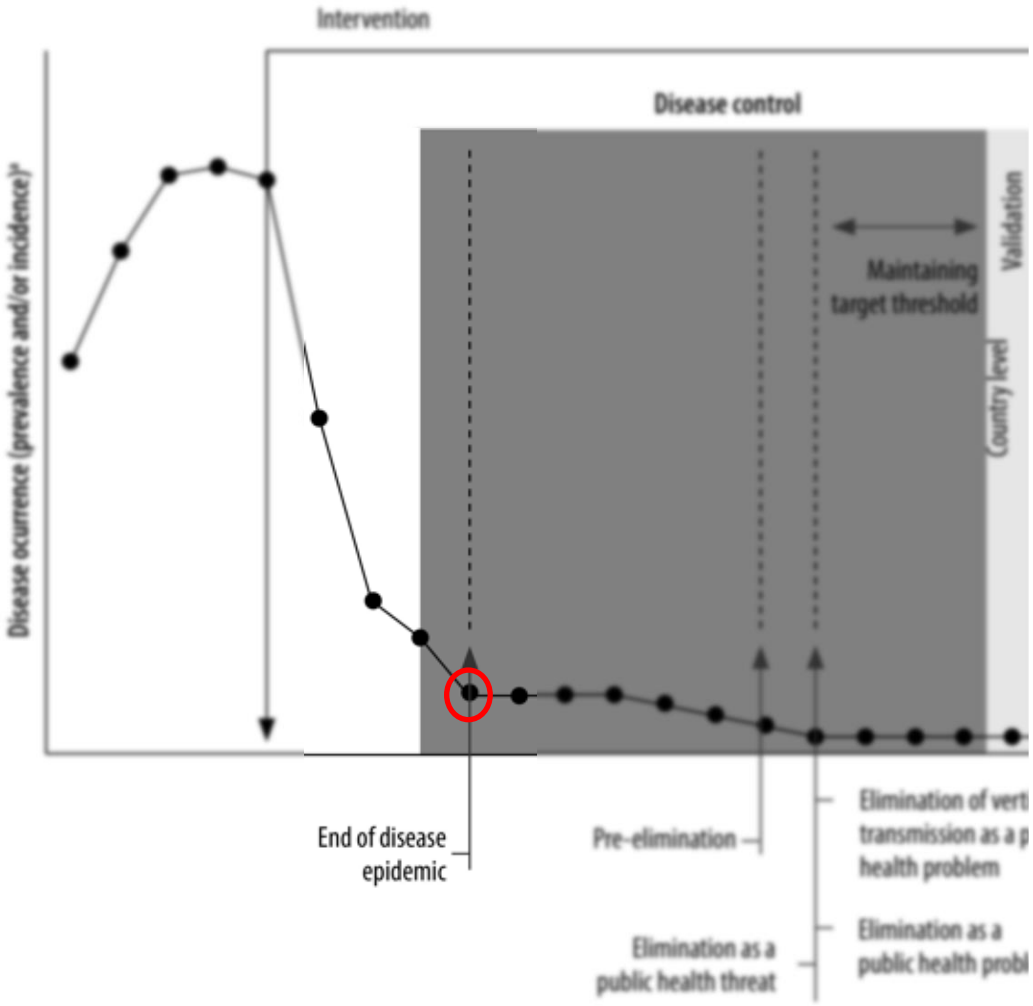
- Impact target: None
- Process target for vaccination: Not specified (COVID-19 vaccination coverage will potentially be included in the 90% target set by the Immunization Agenda 2030 on vaccination coverage[3])

WHO recommendations for vaccination in adults[11]:

To reach high coverage with the primary vaccination series and a first booster dose among all eligible people

11. World Health Organization. 2022; 3. World Health Organization, 2021

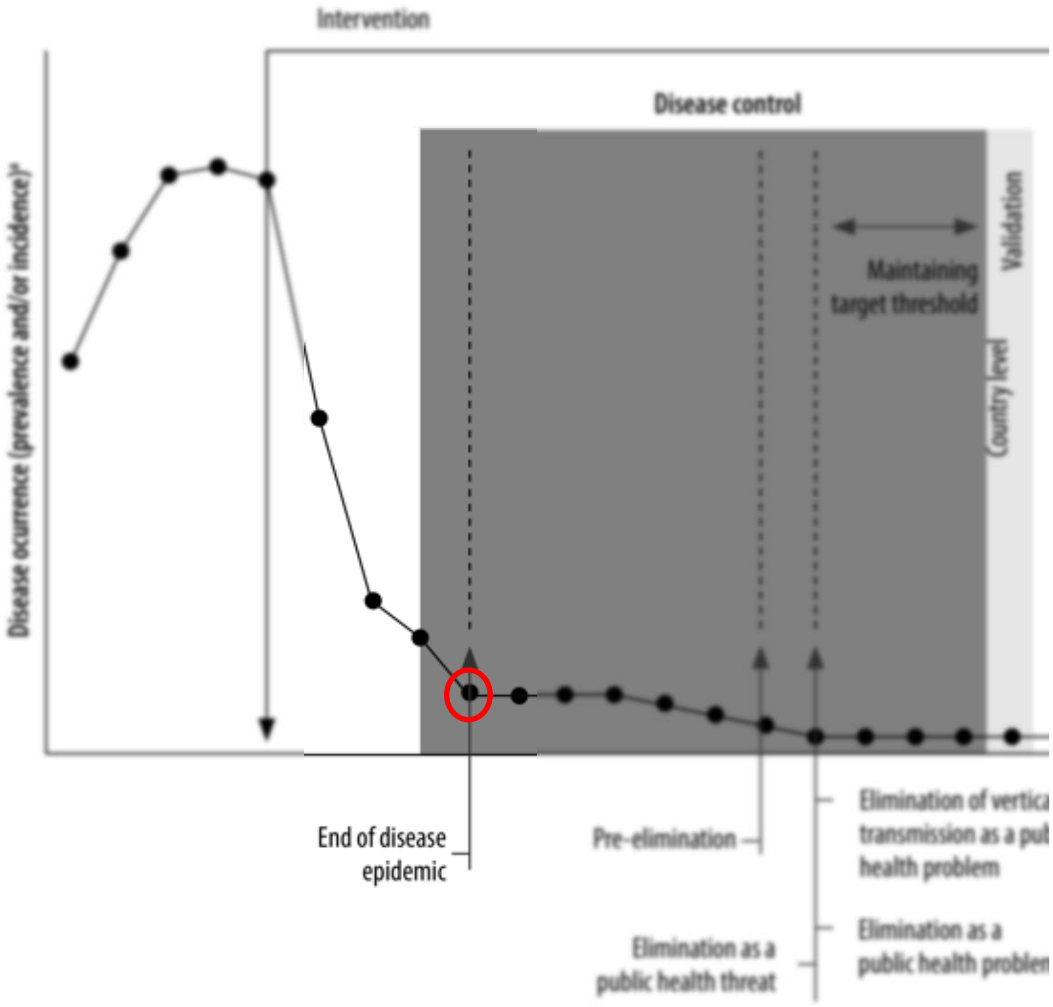
End of disease epidemic



Vaccine-preventable infectious diseases

1. Bacterial meningitis
2. Yellow fever
3. Cholera
4. Tuberculosis (high-incidence countries)

End of disease epidemic



Meningitis (Nm, Spn, Hib & GBS)

- Impact target: Reduce cases of vaccine preventable bacterial meningitis by 50% & deaths by 70% by 2030[12]
- Process target for vaccination: 90% coverage by 2030[12]
- Vaccination target for adults: None

WHO recommendations for vaccination in adults

(Nm) (low endemicity - <2 cases/100,000)[13]:

- `
- I
- I
- I
conditions

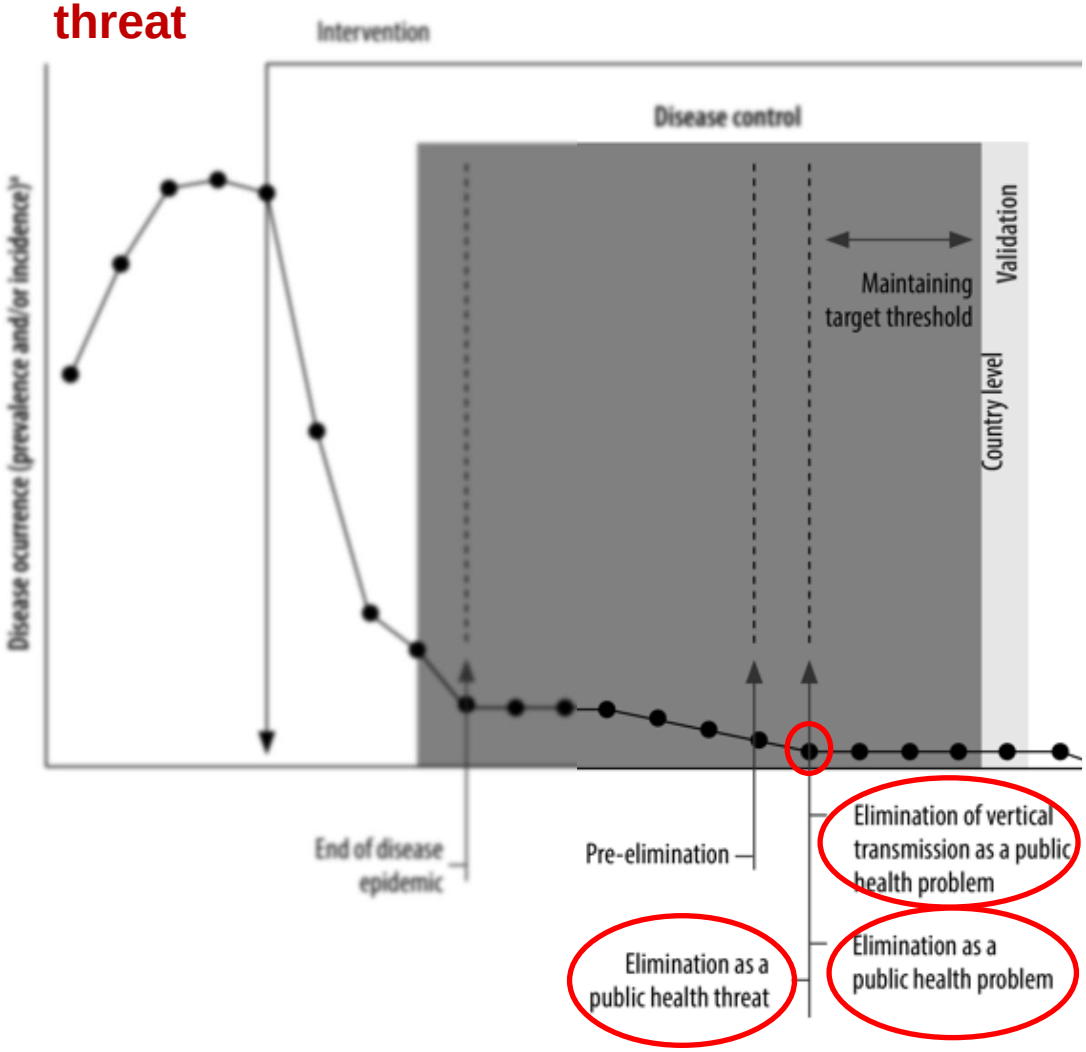
WHO recommendations for vaccination in adults

(Spn)[14]:

- Adults (≥,50 y)

12. World Health Organization, 2021; 13. World Health Organization, 2011; 14. World Health Organization, 2021

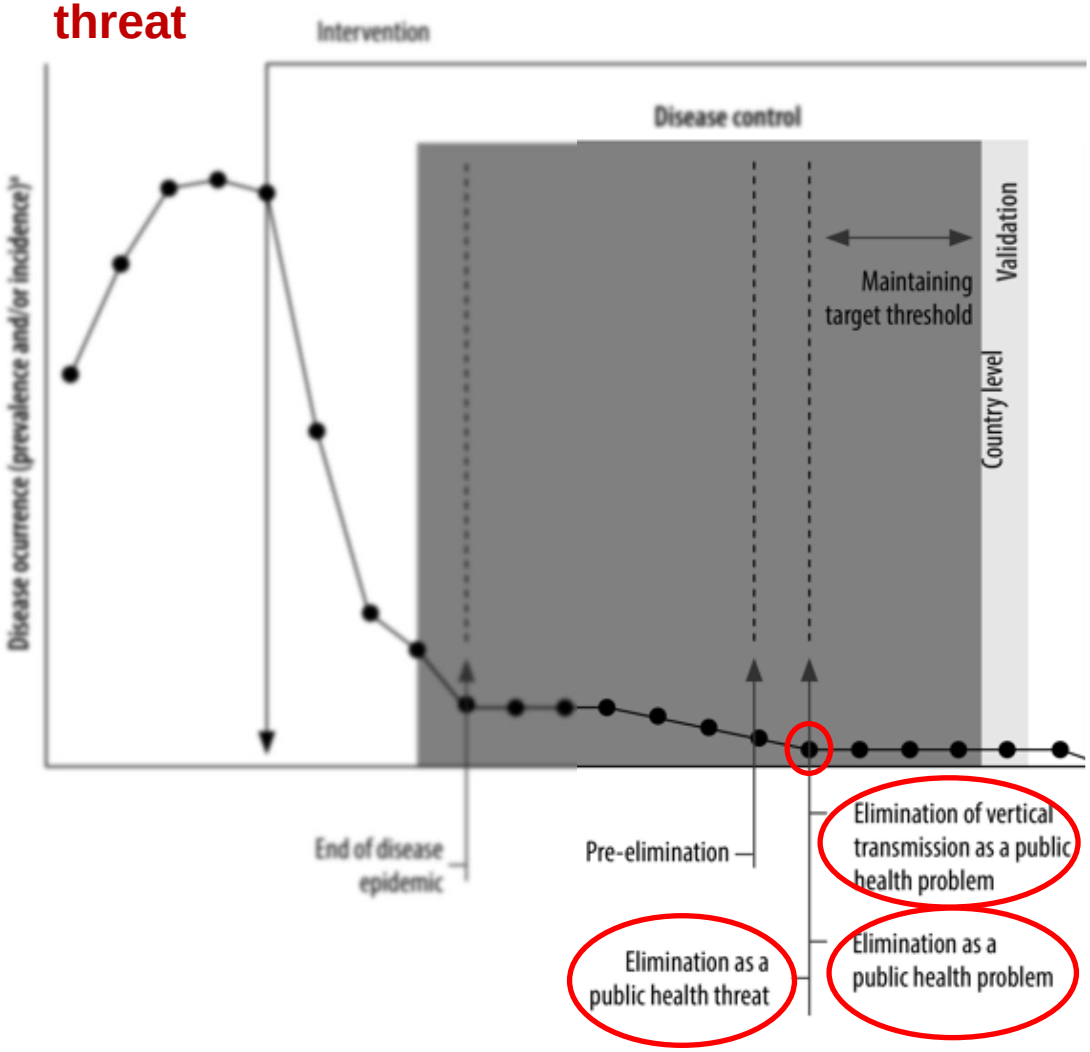
Elimination as a public health problem or threat



Vaccine-preventable infectious diseases

1. Hepatitis B
2. Maternal and neonatal tetanus
3. HPV related cervical cancer
4. Tuberculosis (low incidence countries)
5. Rabies (dogs)
6. Leprosy

Elimination as a public health problem or threat



Hepatitis B

- Impact target[15]:
  - ≤ 0.1% HBsAg prevalence in children 0–5 years by 2030;
  - ≤ 2/100 000 cases/yr by 2030;
  - ≤ 4/100 000 deaths/yr by 2030
- Process target for vaccination[15]:
  - Countries with universal timely HepB-BD – BD ≥90%; HepB3 vaccine coverage ≥90%

Vaccination target for adults: None

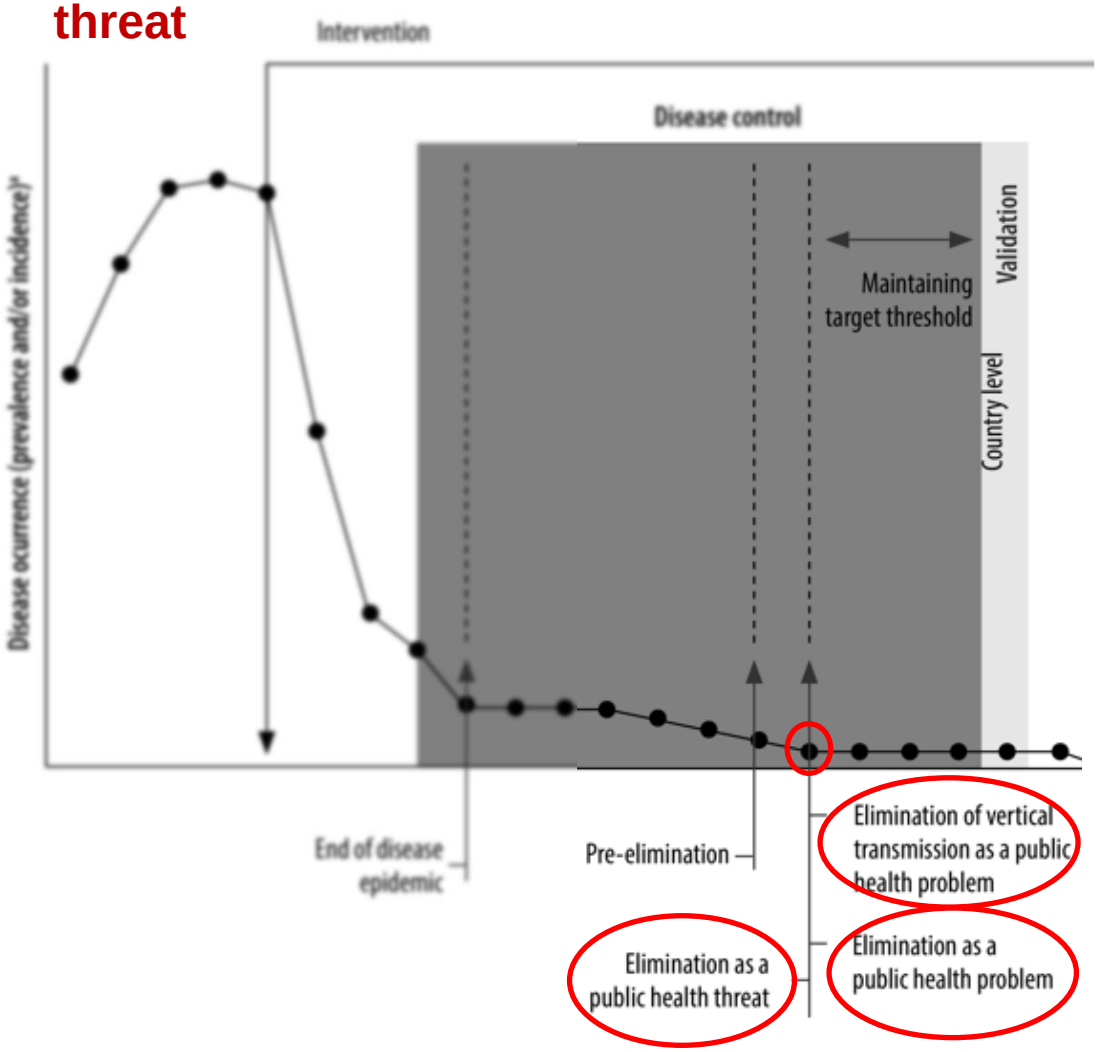
WHO recommendations for vaccination in adults[16]:

All (unvaccinated) adults at higher risk for infection:

- HCWs
- Close contacts of chronic HBV patients
- MSM
- ID users
- Dialysis patients
- HCV patients etc.

15. World Health Organization 2022; 16. World Health Organization 2017

Elimination as a public health problem or threat



Maternal and neonatal tetanus

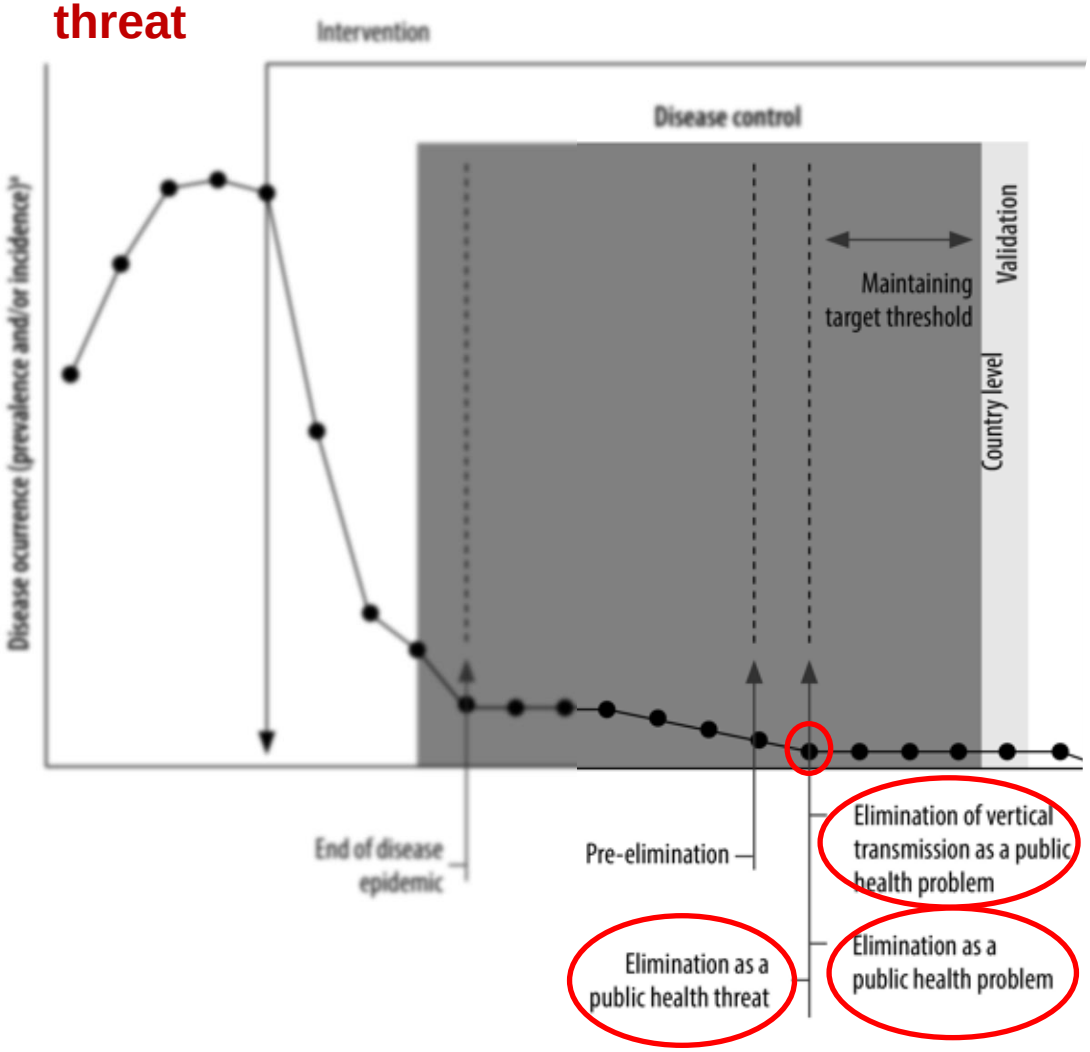
- Impact target[17]: <1 case of neonatal tetanus per 1000 live births per year in all districts of a country
- Process target for vaccination[17]:
  - ≥80% of pregnant women in every district (≥2 doses)
  - High-risk districts: ≥80% coverage with ≥2 doses of tetanus toxoid-containing vaccine among women of reproductive age

WHO recommendations for vaccination in adults (low-incidence countries)[5]:

All pregnant women should have their tetanus vaccination history reviewed at their first antenatal care contact and any missing doses should be provided at that contact and at subsequent contacts, as may be indicated

5. World Health Organization. 2017; 17. World Health Organization. 2019

Elimination as a public health problem or threat



HPV related cervical cancer

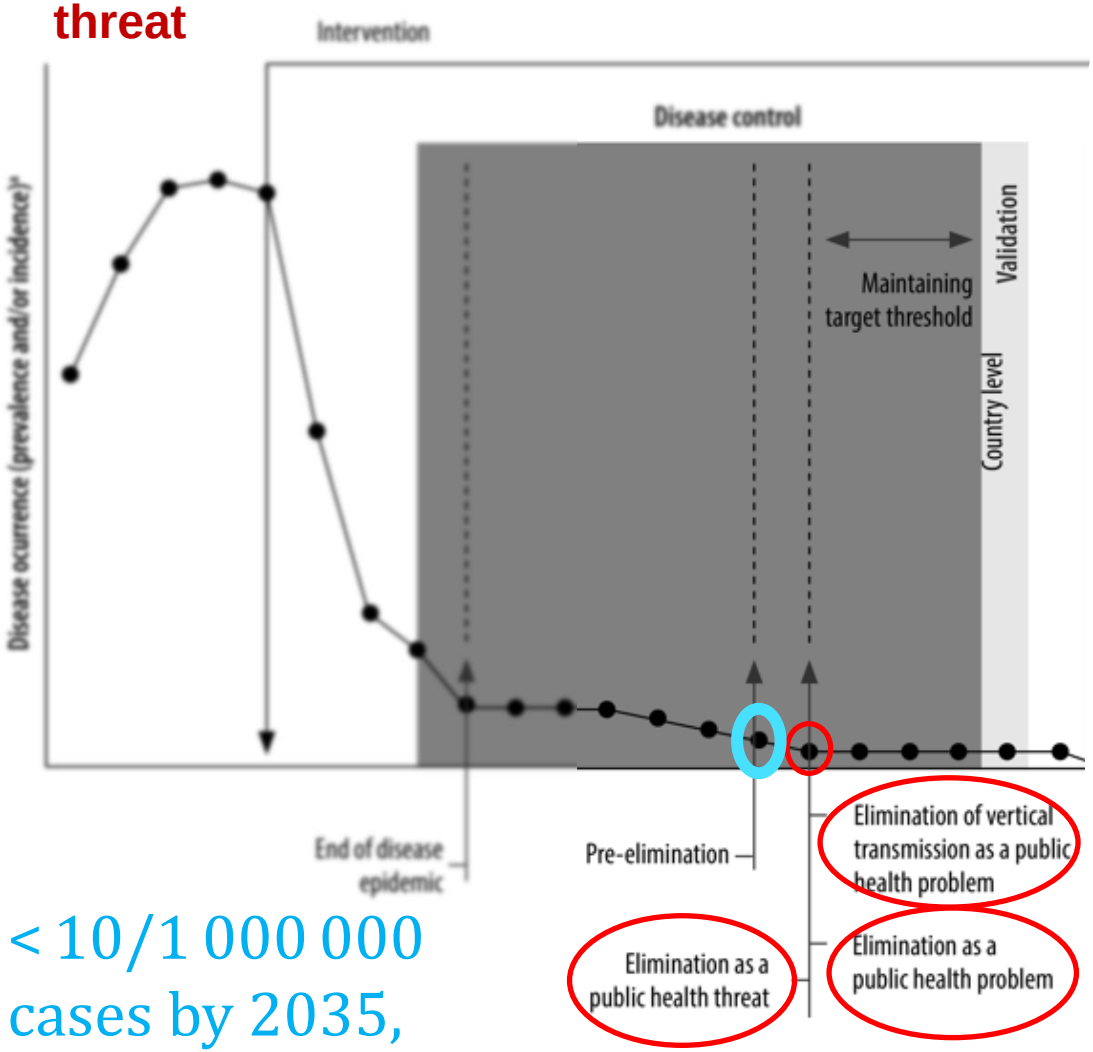
- Impact target[18]: An incidence of 4 per 100 000 women-years globally by the end of century (global)
- Process target for vaccination[18]: 90% of girls fully vaccinated with HPV vaccine by age 15 years by 2030

WHO recommendations for vaccination in adults[19]:

Vaccination of secondary target populations, e.g. females aged ≥15 years (≤45 y), boys, older males or MSM

18. World Health Organization. 2020; 19. World Health Organization 2022

Elimination as a public health problem or threat



< 10/1 000 000 cases by 2035, nationally

Tuberculosis (low incidence countries)

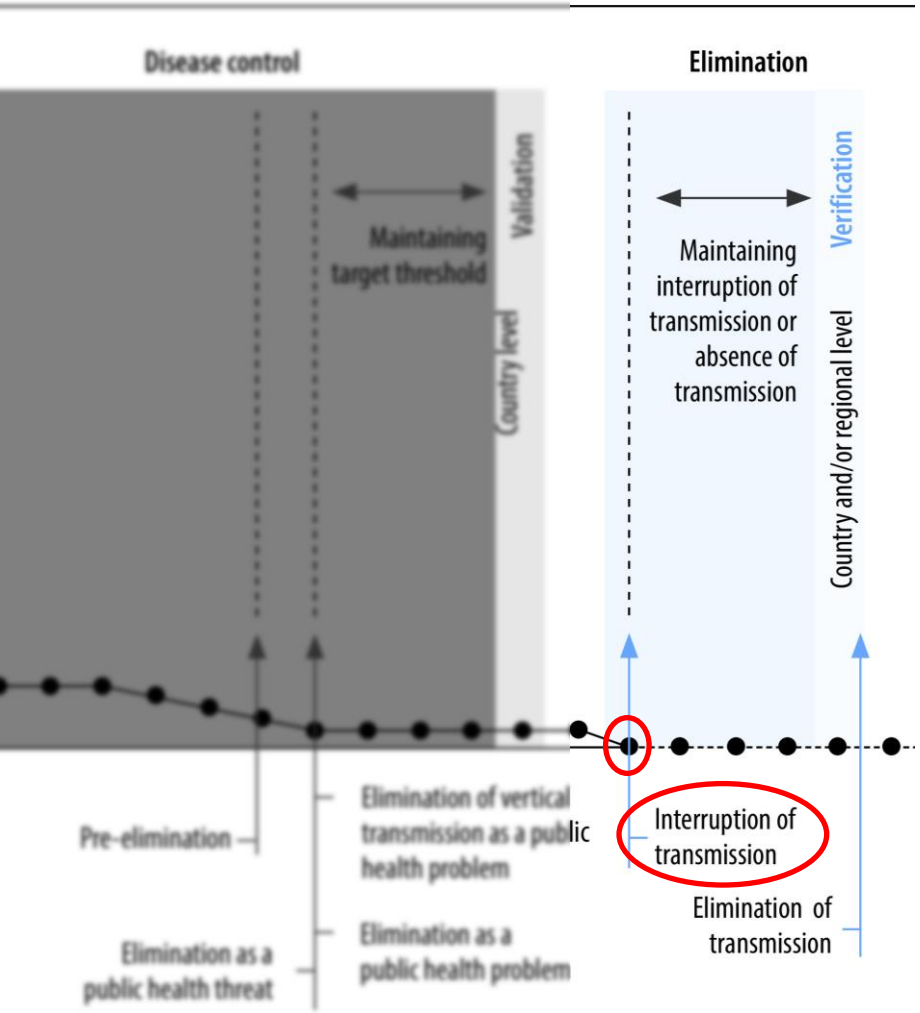
- Impact target[20;21]: <1 TB case per million population by 2050
- Process target for vaccination: None
  (to limit BCG vaccination to neonates and infants of recognised high-risk groups for tuberculosis[20])
- Vaccination target for adults: None

WHO recommendations for vaccination in adults[22]:

- Unvaccinated TST/IGRA-negative:
  - Those moving from low to high TB incidence/ leprosy burden settings
  - Persons at risk of occupational exposure

20. World Health Organization. 2014; 21. World Health Organization 2020; 22. World Health Organization 2018

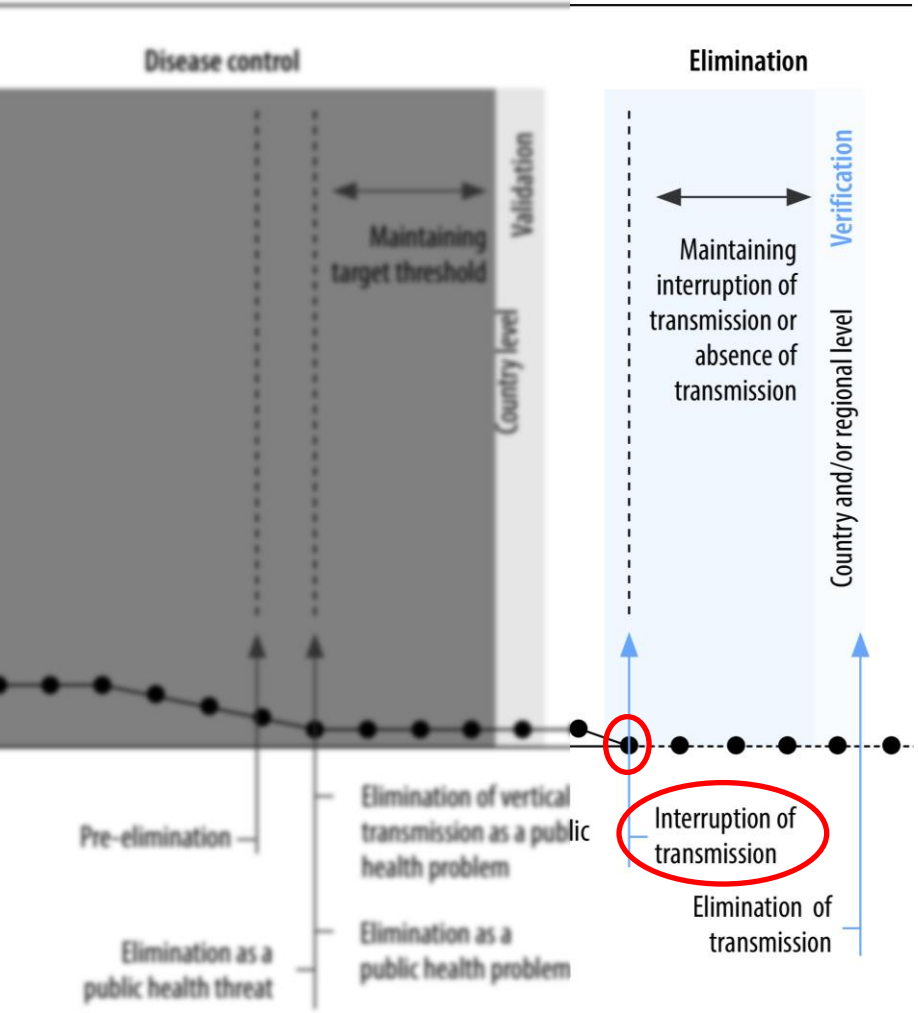
Interruption of transmission



Vaccine-preventable infectious diseases

1. Measles
2. Rubella and congenital rubella syndrome
3. Rabies (dogs)
4. Cholera
5. Leprosy
6. Malaria

Interruption of transmission



Measles, Rubella and congenital rubella syndrome

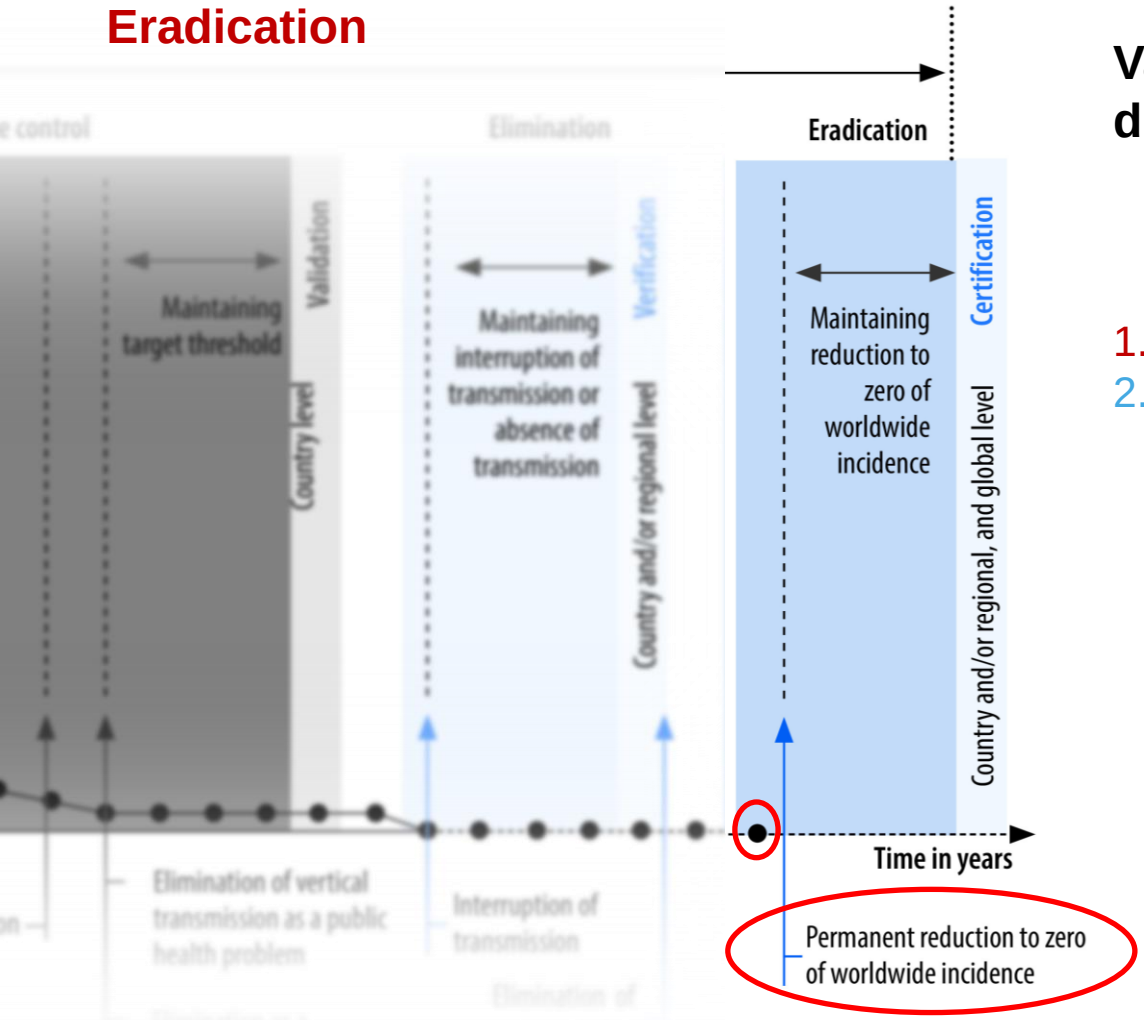
- Impact target[23]: Zero indigenous measles & rubella & CRS cases for at least a continuous 12 months period in the presence of a high-quality surveillance system
- Process target for vaccination[23]: ≥95% coverage of 2-doses of MRCV in each district and nationally

WHO recommendations for vaccination in adults[24;25]:

- Measles: all susceptible adults – particularly, travellers to measles-endemic countries, HCWs &PLHIV
- Rubella: All non-pregnant women of reproductive age who are not already vaccinated or who are seronegative for rubella

23. World Health Organization. 2014; 24. World Health Organization 2020; 25. World Health Organization 2017

Eradication

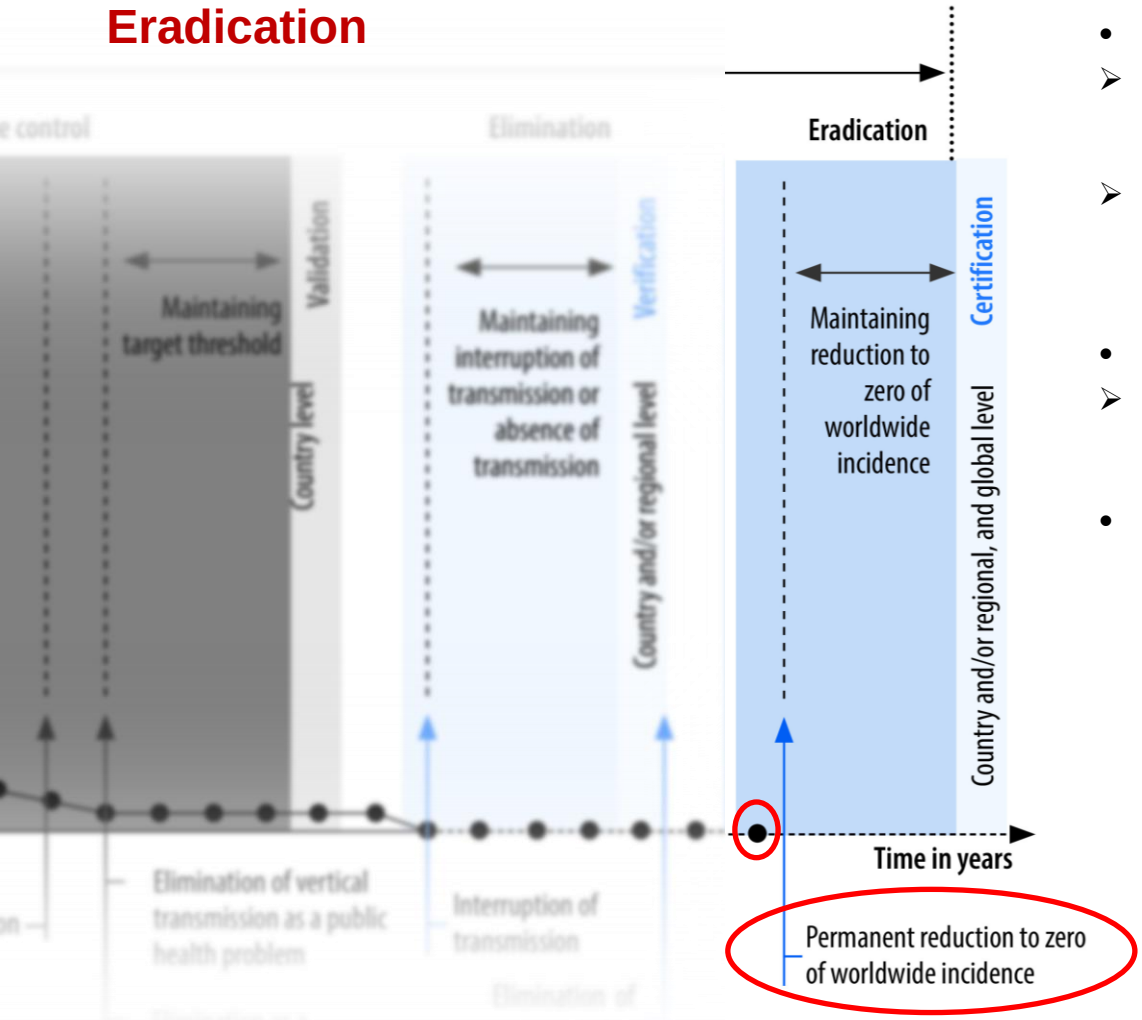


Vaccine-preventable infectious diseases

1. Polio
2. Smallpox (goal met)

Polio

Eradication



- Impact target[26]:
  - Permanently interrupt (zero cases) all wild poliovirus type 1 (WPV1) transmission in endemic countries
  - Zero new cases of vaccine-derived poliovirus type 2 (VDPV2) transmission and prevent outbreaks in non-endemic countries
- Process target for vaccination[26]:
  - None defined in the new polio eradication strategy for the 2022-2026 period
- Vaccination target for adults:
  None

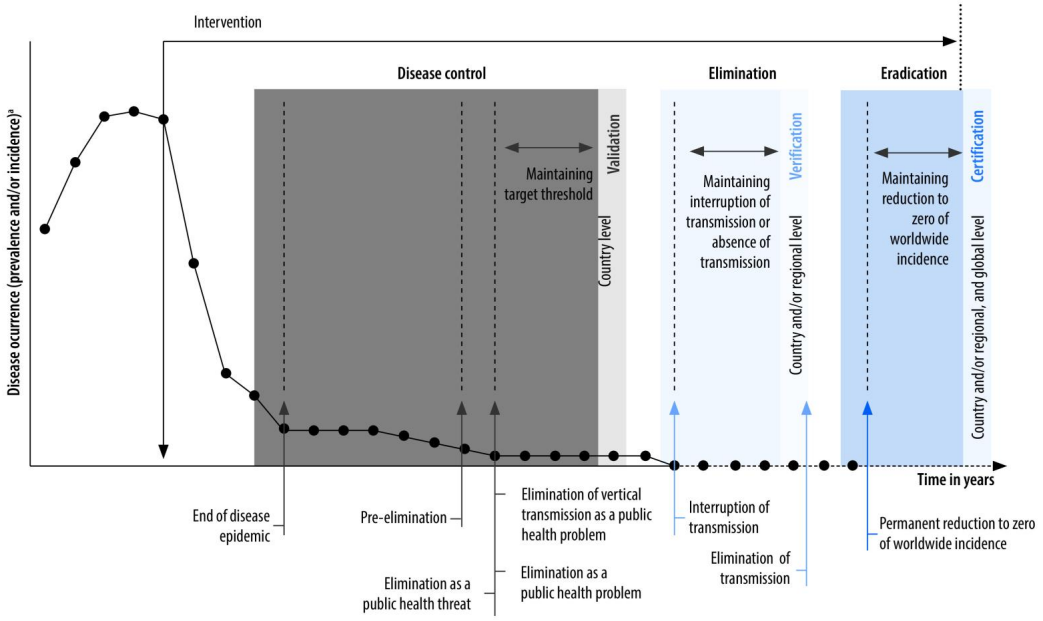
WHO recommendations for vaccination in adults[27,28]:

- Travellers from polio-free to polio-endemic countries
- People living in countries with active transmission of vaccine-derived virus
- Unvaccinated pregnant / lactating persons travelling to a country where WPV or VDPV is actively circulating

26. World Health Organization, 2021; 27. World Health Organization, 2023; 28. CDC, 2024;

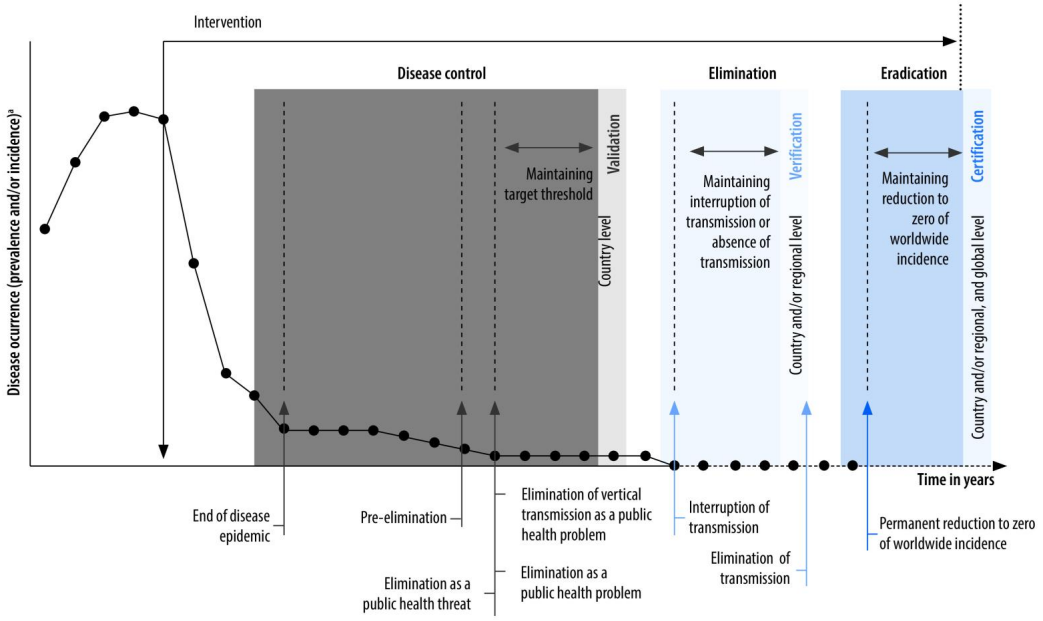
Challenges in setting and achieving targets

- Vaccine hesitancy and misinformation leading to suboptimal vaccination coverage in adults.
- Socioeconomic disparities impacting access to vaccination and healthcare
- Health system fragmentation across countries, hindering coordinated efforts.
- Surveillance and reporting on indicators – data quality
- Emerging infectious diseases and antimicrobial resistance pose ongoing threats.

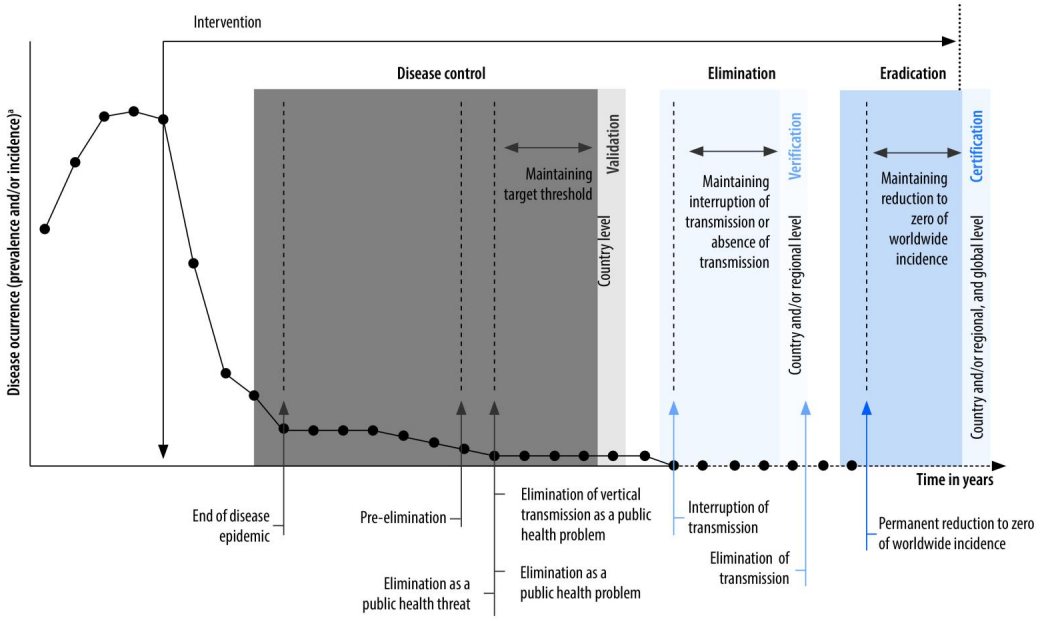


Where to from here…

- Strengthening vaccine confidence – targeted communication and education campaigns .
- Addressing social determinants of health to reduce disparities
- Enhancing cross-border cooperation and harmonisation of vaccination policies
- Investing in surveillance systems – timely detection and response
- Promoting R&D of new vaccines and innovative vaccine delivery strategies



Thank you



Dr Laila Khawar

Research Fellow
Kirby Institute, UNSW Sydney

Email: lkhawar@kirby.unsw.edu.au

1. Interim guidance for country validation of viral hepatitis elimination. Geneva: World Health Organization; 2021.
2. Khawar L, Donovan B, Peeling RW, Guy RJ, McGregor S. Elimination and eradication goals for communicable diseases: a systematic review. *Bull World Health Organ*. 2023
3. Implementing the Immunization Agenda 2030. World Health Organization 2021
4. Diphtheria vaccine: WHO position paper–August 2017. *Wkly Epidemiol Rec*
5. Tetanus vaccines: WHO position paper–February 2017. *Wkly Epidemiol Rec*
6. Vaccines, WHO Pertussis: WHO position paper–August 2015. *Wkly Epidemiol Rec*
7. Varicella and herpes zoster vaccines: WHO position paper - June 2014. *Wkly Epidemiol Rec*
8. WHO position paper on hepatitis A vaccines - October 2022. *Wkly Epidemiol Rec*
9. Prevention and control of influenza pandemics and annual epidemics. World Health Organization – May 2003
10. Global Influenza Strategy 2019-2030 – prevent. Control. Prepare. World Health Organization 2019
11. Interim recommendations on COVID-19 vaccination in autumn 2022 for the WHO European Region Conclusions and recommendations of the European Technical Advisory Group of Experts on Immunization
12. Defeating meningitis by 2030 a global road map – World Health Organization 2021
13. Meningococcal vaccines: WHO position paper – November 2011. *Wkly Epidemiol Rec*
14. Considerations for pneumococcal vaccination in older adults – WHO concept note – June 2021. *Wkly Epidemiol Rec*
15. A global strategy to eliminate yellow fever epidemics (EYE) 2017-2026, World Health Organization. 2018
16. Vaccines and vaccination against yellow fever: WHO position paper – June 2013. *Wkly Epidemiol Rec*
17. (15)Global health sector strategies on, respectively, HIV, viral hepatitis and sexually transmitted infections for the period 2022–2030. Geneva: World Health Organization; 2022
18. (16)Hepatitis B vaccines: WHO position paper – July 2017. *Wkly Epidemiol Rec*
19. (17)Protecting all against tetanus: guide to sustaining maternal and neonatal tetanus elimination (MNTE) and broadening tetanus protection for al populations Geneva: World Health Organization; 2019.
20. (18)Global strategy to accelerate the elimination of cervical cancer as a public health problem. World Health Organization, 2020.
21. (19)Human papillomavirus vaccines: WHO position paper (2022 update). *Wkly Epidemiol Rec*
22. (20)Towards tuberculosis elimination: an action framework for low-incidence countries. Geneva: World Health Organization; 2014
23. (21)Tuberculosis elimination in the WHO European Region: review of key actions, with a special focus on tuberculosis infection management. Copenhagen: World Health Organization Regional Office for Europe; 2020
24. (22)BCG vaccines: WHO position paper–February 2018. Wkly Epidemiol Rec
25. (23)Eliminating measles and rubella: framework for the verification process in the WHO European Region. Copenhagen: World Health Organization Regional Office for Europe; 2014
26. (24)Rubella vaccines: WHO position paper - July 2020. Wkly Epidemiol Rec
27. (25)Measles vaccines: WHO position paper – April 2017. Wkly Epidemiol Rec
28. (26)Polio eradication strategy 2022–2026: delivering on a promise. Geneva: World Health Organization; 2021
29. (27)International travel and health – 18 November 2022 (revised on 3 January 2023). 2023. World Health Organization
30. (28)CDC Yellow Book 2024. Poliomyelitis. Travel-Associated Infections & Diseases