Challenges Conquered and the Role of Vaccination in International Disease Eradication and Control Efforts

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Successes in disease eradication

- Smallpox (1980)
- Rinderpest (2011)
1300s Rinderpest spreads across Asia
Rinderpest in Netherlands circa 1750
Bourgelat
Lyon, France, 1762
1887-1897 Great African Rinderpest Pandemic
ERADICATING RINDERPEST: moments in time

Reported outbreaks of rinderpest steadily declined over the last 100 years.

Share of countries infected with rinderpest in the different regions of the world.

- **Africa (52)**
- **Asia (24)**
- **Europe (54)**
- **Middle East (14)**

Last reported outbreak of rinderpest in cattle in Kenya
Factors contributing to eventual success

- Infrastructure, sustained investment, partnerships (donors)
- Coordination (regional and international bodies)
- Political will
- Governance and strong health services
- Effective sanitary measures (detection, quarantine)
- Availability of safe efficacious vaccine providing long-lasting immunity
- Availability of cost effective and quality vaccines
- Antigenic stability (one serotype)
- Narrow host range without carriers
Post-eradication preparedness

- Potential for re-occurrence through a lab accident or criminal act

- Official data shows that rinderpest virus is stored in 22 facilities worldwide
  - No formal vaccine stockpile, although 22 institutes have seed stock or manufactured vaccine
  - Unfortunately, study showed that PPR vaccine did not protect against rinderpest infection

- Contingency plans???
Prospects for future eradication

- Peste des petits ruminants (PPR)
- Polio
- Measles
- Rabies from street dogs
- Progressive control of FMD
Solidarity

H5N1 zoonotic influenza
H5N1, the prospect of a pandemic, and the need to share viruses

- 2003-2006 H5N1 spread to poultry in 60+ countries, CFR in human cases 50-60%
- Could this lead to a devastating pandemic?
- Viruses need as potential vaccine candidates (for humans)
- Concerns about access and equity (as well as other factors) were a barrier to sharing viruses
Action on animal health side

- Resolution requiring all OIE Reference Labs to share viruses and data (2007)
- Animal health experts at the WHO GISRS vaccine strain selection meetings on H5N1
WHO Pandemic Influenza Preparedness (PIP) Framework

- Strengthen preparedness against pandemic influenza
- Improve sharing of viruses of human pandemic potential and establish more predictable, efficient and equitable access to interventions
- Global Influenza Surveillance and Response System (GISRS) is a WHO-coordinated network of national public health labs

Mechanisms

- Standard Material Transfer Agreement – contract with manufacturers using GISRS, real time access to products (diagnostics, vaccines, antivirals)
- Partnership Contribution paid to WHO (supports GISRS)
Could these principles of solidarity be extended to other human and animal diseases and zoonoses?
International vaccine banks

- Public private partnerships
- Ensure ‘access’ to quality vaccines for countries with limited resources
- Can be supported through ‘in kind’ contribution of staff, cold chain transport/storage, syringes and needles (through P-P-Ps, NGOs)
- Avian influenza H5N1 – crisis management
- Foot and mouth disease – contain outbreaks and protect country freedom
- Rabies – break cycle of human transmission/ support elimination from street dogs
- Peste des petits ruminants – support eradication
Concluding remarks

- Not all diseases are eradicable, some are, and vaccines are only part of an effective campaign.
- For international disease control efforts, such as influenza, equity, transparency and solidarity are essential.
- Investments in international vaccine banks can support international efforts and protect the international community.
- Vaccines must be of good quality and sufficiently matched to field strains.