

Chapters 12–22: The global smallpox eradication effort in the final stages

Chapters 12 to 22 detail the final phases of the global smallpox eradication campaign, focusing on regional eradication efforts across **South America, Asia, Africa, and the Middle East**. The program's success relied on country-specific strategies, including **mass vaccination, surveillance, containment, and public health mobilization**. Despite significant challenges such as **civil wars, political instability, difficult terrain, and vaccine shortages**, each region played a crucial role in achieving the ultimate goal: **the complete eradication of smallpox by 1980**.

Chapter 12: South America

By **1967**, Brazil accounted for almost all smallpox cases in the Americas. A **regional eradication strategy** was implemented under the **Pan American Health Organization (PAHO)**, prioritizing **mass vaccination, outbreak containment, and improved reporting systems**. The **last known cases in Brazil occurred in 1971**, marking the continent's **successful elimination of smallpox**.

Chapter 13: Indonesia

Indonesia was one of the five Asian countries still experiencing endemic smallpox in 1967. Given its **geographic isolation**, it was a high-priority target for eradication efforts. Despite initial resistance from the **WHO regional office**, a nationwide program launched in **1968**. Indonesia **achieved eradication by 1972**, introducing innovative strategies like **village-to-village searches, reward systems for case reporting, and visual recognition cards for smallpox identification**.

Chapter 14: Afghanistan and Pakistan

Both countries were **high-risk zones** due to their shared border, nomadic populations, and the **persistence of variolation practices**. Afghanistan's rugged terrain and **lack of infrastructure** made vaccination campaigns difficult. However, an **intensive surveillance program and containment strategies** helped eradicate smallpox by **1972**.

Pakistan, despite having a better healthcare system, **was slower to adopt surveillance-based strategies**. It continued **mass vaccination until 1973**, delaying full eradication. The **last case occurred in 1974**, making it one of the last countries in Asia to eliminate smallpox.

Chapter 15: India and the Himalayan Region

India was **the largest remaining smallpox reservoir in the world** in the 1960s. Early eradication efforts struggled due to **population density, religious beliefs, and poor reporting systems**. However, a shift from **mass vaccination to surveillance and containment** led to the **launch of "Operation Smallpox Zero" in 1974**. This campaign, **mobilizing 100,000 health workers**, successfully eradicated smallpox by **May 1975**.

Nepal, Bhutan, and Sikkim followed similar approaches. By **1975**, the entire **Himalayan region** was smallpox-free.

Chapter 16: Bangladesh

Bangladesh successfully interrupted transmission in **1970**, but the **1971 civil war** caused massive refugee movements, **reintroducing smallpox**. Poor vaccination coverage in refugee camps led to a severe outbreak, requiring a **renewed eradication effort post-independence**. The **last case in Asia occurred in Bangladesh in October 1975**.

Chapter 17: Western and Central Africa

This region had some of the world's most **challenging conditions for smallpox eradication**, including **remote villages, poor transportation, and political instability**. The **US Centers for Disease Control (CDC)** led efforts, implementing **mass vaccination campaigns supported by USAID**. By **1970**, smallpox had been eliminated from **21 countries** in just **3.5 years**, demonstrating that eradication was achievable even in **resource-limited settings**.

Chapter 18: Zaire and Sudan

Zaire (now **Democratic Republic of the Congo**) had the **highest smallpox burden** in central Africa. A **national vaccination campaign began in 1968**, but surveillance remained weak. In **1971**, the **first human case of monkeypox** was detected, leading to increased monitoring of **orthopoxviruses**.

Sudan faced **multiple smallpox reintroductions** due to **population displacement and war**. By **1971**, intensified containment strategies led to eradication.

Chapter 19: Eastern Africa

Countries including **Kenya, Uganda, Tanzania, Rwanda, and Burundi** had relatively strong health infrastructures, making eradication **more straightforward than in central Africa**. By **1970**, smallpox was eliminated from the region, though occasional **imported cases from Ethiopia and Sudan** required rapid containment.

Chapter 20: Southern Africa

In **Angola, Mozambique, South Africa, and surrounding countries**, smallpox was not a major problem, but **political challenges complicated WHO's ability to coordinate efforts**. Civil wars in **Angola and Mozambique** limited eradication campaigns, requiring indirect interventions through **Portugal**. By **1973**, all cases had been eliminated from the region.

Chapter 21: Ethiopia, Yemen, and Democratic Yemen

Ethiopia was the **last African country to eradicate smallpox**, facing extreme challenges like **civil war, famine, and rugged terrain**. Initial efforts were **underfunded and poorly supported**, but a final intensified effort in **1975-1976** succeeded.

Yemen's smallpox eradication efforts began in **1969**, but poor infrastructure led to delays. Democratic Yemen had fewer reported cases and was considered **non-endemic by 1973**.

Chapter 22: Final Eradication and Certification

By **1977**, the last **naturally occurring smallpox case was recorded in Somalia**. WHO then **launched a global surveillance effort to confirm eradication**, monitoring suspected cases until **1980**, when **smallpox was officially declared eradicated**.

Conclusion

The eradication of smallpox was **one of the greatest achievements in public health history**, requiring **global coordination, innovative surveillance strategies, and rapid containment of outbreaks**. Despite **geopolitical challenges, war, and infrastructure limitations**, smallpox was **eliminated through persistent scientific effort and international cooperation**. The campaign set the foundation for future **disease eradication programs**, proving that **global public health interventions can succeed even in the most difficult conditions**.