

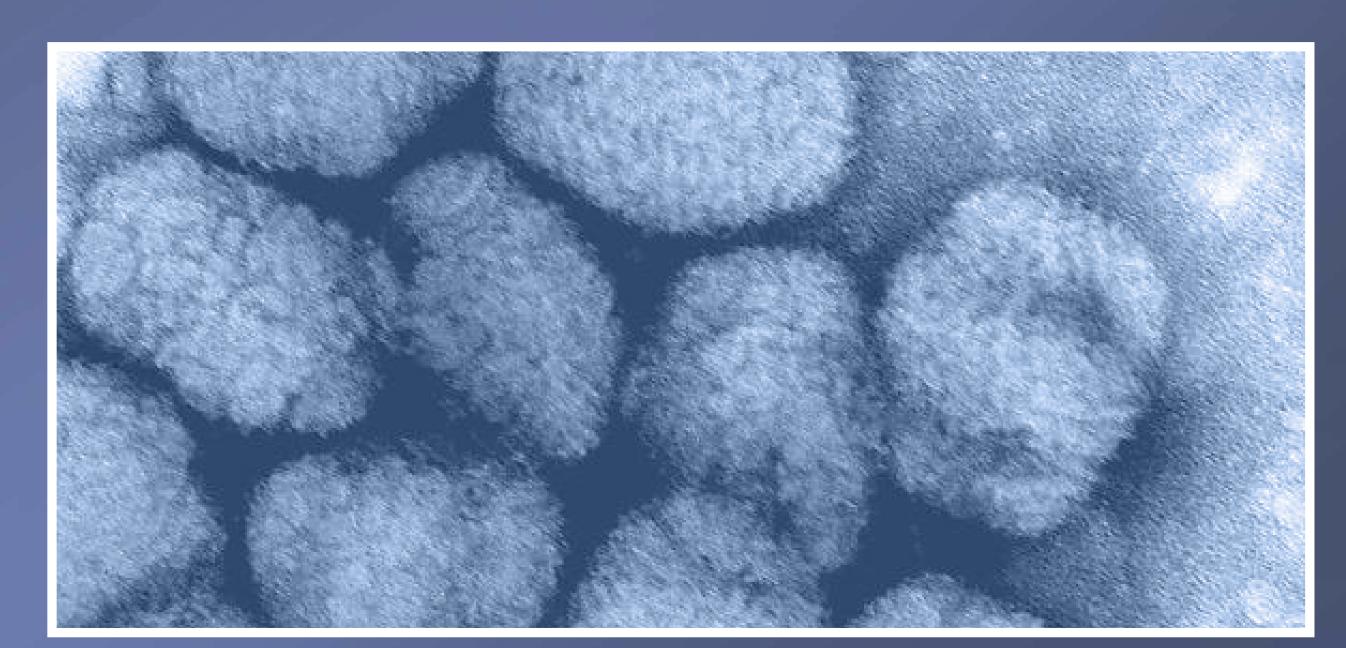
# Unique Biosecurity and Biosafety Aspects of Eradicated Pathogens: Smallpox Case Study

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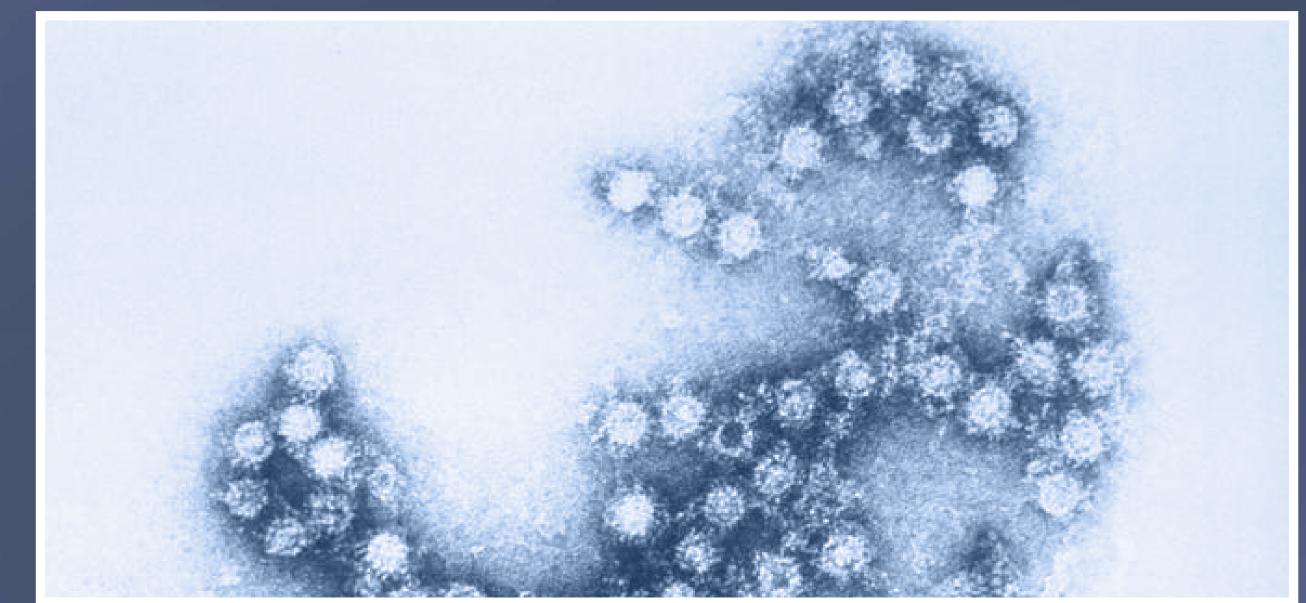
Release of Smallpo



### Pathogens not Found in Nature:



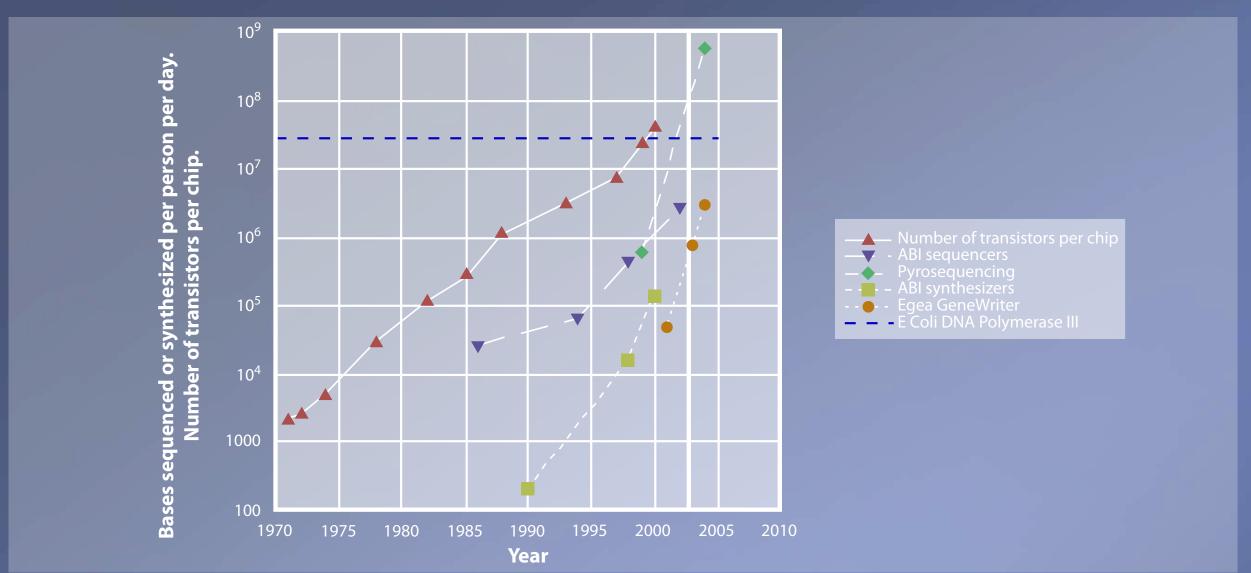
Smallpox virus



Polio virus (in the near future)



1918 Pandemic Influenza virus



## Novel Pathogens

\*source: Carlson, The Pace and Proliferation of Biological Technologies, 2003

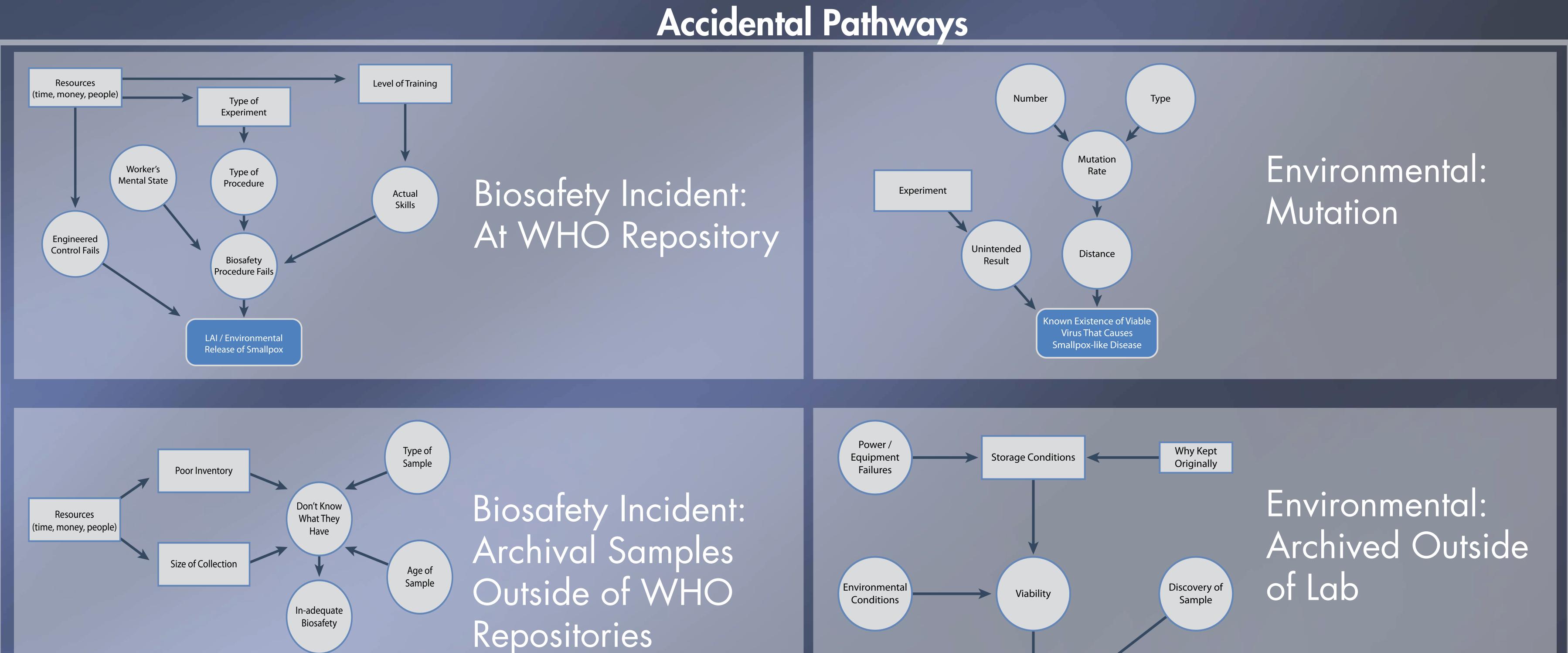
#### Conclusion:

The likelihood of an accidental or deliberate re-introduction evolves with time. For example, the likelihood of a biosafety incident is tied to both the biosafety measures (generally improving with time), the type and level of research (increased sophistication), as well as number and training of personnel. The viability of samples inadvertently retained outside of official repositories decrease with time, lowering the likelihood of re-introduction from these sources.

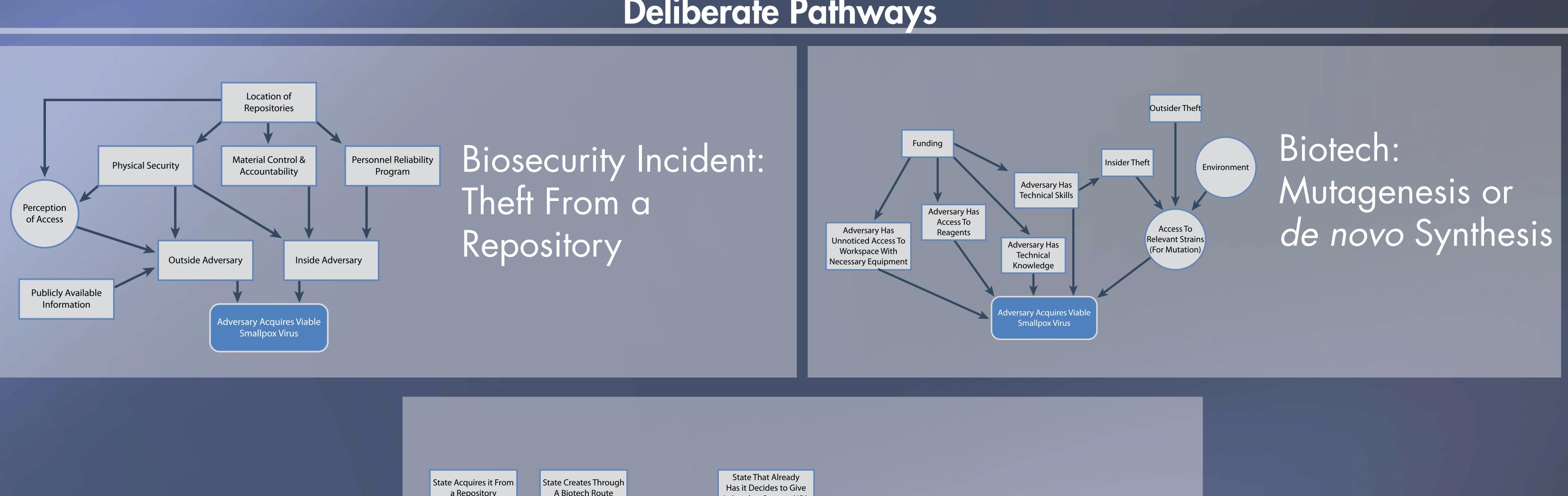
The likelihood of a biosecurity incident is also a dynamic balance between biosecurity safeguards and increased terrorist capability and interest in biological weapons. While historically of less concern, the deliberate mutagenesis or de novo synthesis will become increasingly important over time with the rapid advancement in biotechnology.

Although research with pathogens not found in nature is important from a scientific, public, and animal health perspective, lower risk tolerance by society may require facilities that have these organisms to implement enhanced biosafety and biosecurity measures. This requires more attention to personnel reliability programs, types of experiments, and the numbers of laboratories and personnel working with eradicated pathogens to ensure that the likelihood of re-introduction is responsibly managed.

## Natural and Deliberate Pathways for the Proliferation of Smallpox:



#### Deliberate Pathways



State Discovers Virus in Storage

State Illicit Weapons