Poliomyelitis Virus vs Smallpox: an ordinary differential equation model comparison

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The smallpox and poliomyelitis (polio) viruses were at a time one of the largest threats to global public health. Millions of individuals were killed or debilitated by these viruses until global eradication campaigns were put into effect. On the one hand, the world saw the successful eradication of the smallpox virus within a span of twenty years. However, while the polio virus was widely eradicated for most of the world, it continues to persist in endemic levels for some regions. A myriad of factors including government will, funding, public trust, and vaccination distribution contribute to this anomaly. At the heart of this issue is the biology of the viruses and their different modes of transmission. In this project we will explore this biological question using mathematical models. Specifically, we will use ordinary differential equations to model the transmission of polio and smallpox to shed light on why smallpox was eradicated and polio still persists.