

CHAPTER 2

AN OVERVIEW OF VIRAL PANDEMICS OVER THE PAST DECADE

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INTRODUCTION

Coronaviruses, first identified in 2017, have affected a wide range of domestic and wild animals. These viruses are among the largest RNA viruses. In late December 2019, a series of unexplained cases of acute and chronic pneumonia were reported in Wuhan, China. The Chinese government and health researchers took swift actions to control the outbreak and initiated etiological investigations. On January 12, 2020, the World Health Organization (WHO) temporarily named this new virus as the novel coronavirus-2019. On January 30, 2020, WHO declared the outbreak of the novel coronavirus-2019 as a Public Health Emergency of International Concern (PHEIC) (1). On February 11, 2020, WHO officially named the disease caused by the novel coronavirus-2019 as COVID-19. Coronaviruses belong to the enveloped, non-segmented RNA viruses with a single-stranded, positive-sense RNA genome originating from animals and are classified under the family Coronaviridae in the order Nidovirales. The virus genome size ranges from 26 to 32 kilobases, making them one of the largest RNA viruses. These viruses have two types of surface proteins, and their name is derived from this distinct structural feature. The Coronaviridae family is divided into the genera Alpha, Beta, Gamma, and Delta based on genotypic and serological characteristics.

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Finally, the integration of innovative scientific solutions, timely policy responses, and a unified global approach will be the cornerstone of reducing the burden of viral diseases in the future. The emergence of new viral threats is inevitable, but by strengthening our collective global preparedness, we can better control these threats and minimize their impact. While there is no single solution to the problem of viral pandemics, a multifaceted approach, driven by science, technology, and international cooperation, offers the best hope for a healthier, more resilient world in the face of future viral challenges.

Extensive research on coronaviruses and other related viruses shows that these pathogens, although structurally and genetically diverse, can pose serious threats to public health. Each of these viruses, from Menangle viruses to Filoviruses, has unique characteristics that vary based on their genome type, target hosts, and transmission mechanisms. Frequent outbreaks and sometimes global pandemics such as COVID-19 and influenza highlight the importance of preparedness and rapid response in the face of these viruses. Improving diagnostic technologies, developing effective vaccines, and implementing preventive programs are key strategies to reduce the public health impacts of these viruses. In addition, strengthening global health systems and international cooperation to control viral outbreaks are of particular importance. Future research should focus on better understanding the mechanisms of pathogenesis, genetic changes in viruses, and finding new ways to prevent and treat diseases caused by these viruses to prevent similar health crises from occurring.

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