

## Antiviral Drugs and Their Impact on Public Health

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### ABOVE THE STUDY

In the landscape of modern medicine, antiviral therapy stands as one of the most transformative tools in our fight against infectious diseases. However, despite their critical importance, antiviral therapies are often misunderstood and underappreciated, both by the public and even in some medical discussions. As we navigate an era punctuated by recurring viral, understanding and appreciating the role of antiviral therapy is more important than ever. Antiviral therapy fundamentally differs from treatments for bacterial infections. Bacteria, being independent organisms, can often be targeted with drugs that disrupt their cell walls or metabolic processes. Viruses, by contrast, are parasites at the cellular level they cannot replicate outside a host cell. This dependency makes antiviral therapy inherently more complex. To be effective, antiviral drugs must interfere with the viral life cycle without causing significant harm to the host cells. Diseases such as HIV/AIDS, once considered a death sentence, are now manageable chronic conditions in many parts of the world, thanks to combination Anti Retroviral Therapy (ART). Similarly, the development of antiviral drugs for hepatitis B and C has dramatically improved patient outcomes, reducing liver failure and cancer risk. Even in the context of influenza, drugs such as oseltamivir have provided clinicians with tools to reduce the severity and duration of illness, especially in vulnerable populations like the elderly or immunocompromised. These examples illustrate that antiviral therapy is not merely a treatment option it is a lifeline for millions.

However, antiviral therapy is not without its limitations and controversies. One major concern is the development of drug resistance. Viruses mutate rapidly and improper or incomplete treatment can foster resistant strains, undermining therapeutic effectiveness. This issue is particularly pronounced in HIV treatment, where adherence to complex medication regimens is crucial. Resistance not only jeopardizes individual health but also poses a public health challenge, as resistant viruses can

spread through communities. This highlights the need for public education, strict adherence protocols and continued research into next generation antivirals that are less susceptible to resistance. While antiviral therapy can be life saving, it remains out of reach for millions in low and middle income countries due to high costs, limited supply chains and weak healthcare infrastructures. The COVID 19 pandemic, for instance, exposed stark inequalities in access to antiviral treatments and vaccines. Although pharmaceutical companies and global organizations have made strides to improve distribution, the gap between the wealthy and the underprivileged remains significant. Furthermore, public perception and misinformation can undermine antiviral therapy. Some individuals harbor skepticism toward antiviral drugs, fueled by misinformation about side effects or conspiracy theories. Such skepticism can lead to delayed treatment, increased viral transmission and preventable morbidity. Addressing these challenges requires transparent communication, science based education and the involvement of trusted community voices to build confidence in antiviral treatments.

During outbreaks of diseases like Ebola, Zika, or COVID 19, timely antiviral administration can limit the spread of infection, reduce severe disease and buy critical time for public health measures to take effect. In this sense, antiviral therapy is not just a clinical intervention but a public health tool, capable of shaping the course of epidemics and saving countless lives. Advances in molecular biology, genomics and artificial intelligence are accelerating the discovery of novel antiviral compounds and strategies. Personalized medicine approaches may allow treatments to be tailored to an individual's genetic and immune profile, maximizing effectiveness while minimizing side effects. Additionally, research into broad spectrum antivirals could revolutionize preparedness for emerging viral threats, reducing the lag between outbreak emergence and effective treatment availability. Antiviral therapy is a crucial and evolving pillar of modern medicine, offering hope and improved quality of life to millions worldwide.

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