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COVID-19 AND HIV/AIDS. WHERE THEY DO AND DO NOT OVERLAP: EPIDEMIOLOGY AND SCIENCE

This is the second in a series of articles on COVID-19: an agenda for action. In this article, we examine the similarities and differences between HIV and COVID-19; and what one can learn from the other.

Until COVID-19 arrived at the beginning of 2020, the human immunodeficiency virus and acquired immunodeficiency syndrome ([HIV/AIDS](#)) was the most serious disease to afflict humankind since the 1918 influenza pandemic. A number of potential pandemics had been averted over the past 20 years: [SARS-CoV](#), a severe acute respiratory syndrome (SARS), first seen in China in 2002; [MERS-CoV](#), the cause of Middle East Respiratory Syndrome ([MERS](#)), which appeared in 2012; and [Ebola](#) in 2014.

As we move into March 2021, we are entering a period of first year anniversaries for the current SARS-CoV-2 pandemic. These are ones we would rather not mark. To mention just a few: on 1 March 2020 Scotland confirmed its first COVID-19 case and Australia confirmed the first death; on 2 March Portugal confirmed its first two cases, and Ireland cancelled the St Patrick's day parade scheduled for 17 March; and on 3 March Argentina confirmed its first case.

A year ago, numbers were mounting in the USA and most western nations, while in the global south numerous countries were reporting their first cases and deaths. On 9 March 2020 there were 11,422 cases reported globally; by the end of the month there were over one million cases. Less than a year later (16 January 2021) the 100 million cases barrier was breached and there had been over two million deaths. Countries were rapidly going into lockdown and shutting borders.

The etymology is complicated. The virus is officially called 'severe acute respiratory syndrome coronavirus 2', abbreviated to 'SARS-CoV-2'. COVID-19 is the name of the disease. The [World Health Organization \(WHO\) states:](#)

'From a risk communications perspective, using the name SARS can have unintended consequences . . . For that reason and others, WHO has begun referring to the virus as 'the virus responsible for COVID-19' or 'the COVID-19 virus' when communicating with the public'. The similarities with HIV and AIDS will be apparent to Global Fund Observer (GFO) readers; however, COVID-19 is unique and catastrophic. There are lessons to be learnt from the AIDS epidemic, but equally there are significant differences.

Epidemiologic Overlaps

In 1981 AIDS was first recognized as a new disease in specific populations, such as men who have sex with men (MSM), in the west. By 1983 the disease was better understood and was being reported from the developing world. It is, like SARS-CoV-2, a [zoonotic](#) disease. Both originated in wild animals, in the case of HIV-1 in chimpanzees and HIV-2 in sooty mangabey monkeys. SARS-Cov-2 is believed to have jumped from pangolins to humans, although this is still under investigation. Both probably evolved in bats.

The numbers infected by HIV rose dramatically in the 1980s and 1990s. However, over time, it became apparent that the disease was primarily confined to particular populations. These included gay men in the west; intravenous drug users around the world, but especially in Eastern Europe; sex workers in Thailand; and long-distance drivers in Africa. It was evident that pregnant women stood about a 30% chance of passing the virus to their infants.

What took more than 20 years with HIV has happened in just over a year with COVID-19. The speed of spread of SARS-Cov-2 has been astounding. There are indications that globally the number of new cases may be falling. The [Johns Hopkins Coronavirus Resource Center](#) is just one of [several websites](#) keeping track of the pandemic, but it is easy to use. This shows the first spike in cases in April 2020 and then a steady global increase up to early January 2021, when numbers began to fall. It should be noted while these data can be trusted in aggregate, there are daily fluctuations. The daily death totals from the same website show that the number of deaths relative to cases has fallen. This is indicative of improvements in treatment and was paralleled over a longer period in HIV. The big difference is that most people infected with COVID-19 will recover and return to 'normal' life. People with HIV should begin treatment as early as possible and must continue it for the rest of their lives.

Issues of measurement that bedeviled HIV and AIDS data continue with COVID-19. For example, measuring COVID-19 mortality is complex. In the UK the government releases seven-day rolling averages every day. As an aside for GFO readers who are not familiar with the intricacies of the British government, health is a devolved matter. This means the data are collected independently, and may be subtly different, in England, Northern Ireland, Scotland and Wales.

There are very few global south countries with good vital statistics (birth, marriage and death registration). Generally, the best way to track the impact of COVID-19 is excess deaths compared to five-year averages. Of course, people have a sense of what is going on and how busy their hospitals are. The progress of COVID-19 could be tracked through non-standard means. Professor Whiteside's team in Durban at the Health Economics and HIV and AIDS Research Division (HEARD) at the University of KwaZulu-Natal [developed ways](#) of following [Swaziland's AIDS mortality](#) using death notices in newspapers and records from undertakers.

While COVID-19 infections may be widespread (in South Africa it is estimated that up to 60% of the population of the Eastern Cape have been infected), they are primarily recorded among older people who are more likely to fall ill, require treatment and, sadly, die. Most people with COVID-19 will display no, or mild to moderate, symptoms. Some will require hospitalization and the most critical cases need supplementary oxygen. The case fatality rate is under [3%](#). This is lower than recent epidemics that caused global concern such as Ebola, MERS and SARS. It is also very different from HIV where most new infections are in people in their 20s and 30s and, in the absence of intervention, people die.

HIV is transmitted through body fluids during unprotected sex, by sharing needles and from mothers to infants. It requires a person to do something, or all too often in the case of women and girls, have something done to them. By contrast, most COVID-19 cases are transmitted through aerosols; when people breathe they expel moisture that contains virus particles. Both can be prevented!

It was estimated that, in 2018, 74.9 million people had been infected with HIV and 32 million people had died of AIDS-related illnesses. At the peak, in 2004, 1.7 million people died; and, in 2018, 770,000 people died. Most live in low- and middle- income countries, particularly Sub-Saharan Africa. Without treatment, HIV-infected people experience periods of illness that increase in frequency, severity and duration; and end in death. The lag between infection and death is about 10 years. The COVID-19 story is still being written; in absolute numbers the case load has already exceeded that of HIV, but it is likely the death toll will be lower.

At Risk Populations

Age plays a significant role in the mortality and morbidity of those infected with SARS-CoV-2, although the presence of comorbidities dramatically raises the risk of dying from COVID-19. These include diseases such as diabetes and, increasingly, obesity is implicated. There is a marked difference in the incidence of COVID-related mortalities in those older than 65 and those younger than 65: [early research](#) in April 2020 noted that 'The severity and outcome of coronavirus disease 2019 (COVID-19) largely depends on a patient's age. Adults over 65 years of age represent 80% of hospitalizations and have a 23-fold greater risk of death than those under 65'. However, during the second wave of the coronavirus pandemic this changed, where people between the ages of 20 and 29 seemed to represent the [highest number of new cases](#)

The significance of age can be illustrated with data from two countries, Italy and South Africa, with similar populations. Italy, a country with virtually the same size population as South Africa, has had twice the number of COVID-19-related deaths as South Africa, but in Italy's case, 23% of the population is older than 65 years and 16.2% is older than 70. In Italy, 85.3% of those who died from SARS-CoV-2 were older than 70. South Africa has an older population than most African countries but only 5.8% are older than 65.

Knowing the at-risk groups allows both prevention and treatment interventions. In the case of HIV there were specific groups, for example children born to infected mothers and adolescent girls. COVID-19 mortality and morbidity are linked to age. The concept of targeted responses was well developed in the AIDS epidemic and can be applied in this pandemic. The prevention messages have parallels, and this will be covered in subsequent articles in this series.

Scientific and medical overlaps

Coronaviruses were identified in the mid-1960s. Three specifically caught the attention of the health professionals: SARS-CoV, the virus that causes severe acute respiratory syndrome (SARS), first seen in China in 2002, that caused 774 deaths; MERS-CoV, the cause of Middle East Respiratory Syndrome (MERS), which appeared in 2012 and resulted in 858 deaths; and the current SARS-CoV-2 which causes

COVID-19.

The emergence of HIV led to an acceleration in science and that in turn meant that science was able to move very fast when COVID-19 appeared. It is truly remarkable that effective vaccines should have been developed and their administration started in less than a year.

There is, as yet, no cure for COVID-19 but there are treatments, and most people recover. The infectiousness of COVID-19 has meant very intense and expensive nursing for those needing hospitalization. In a number of countries, the health services have been overwhelmed and medical staff forced to triage, although this has never been explicit.

Conclusion

Epidemics can grow exponentially. In 1990, the doubling time for HIV infections in South Africa was 8.5 months. The [effect on HIV infections was clear](#): 'By the end of 1989 the number of HIV-infected black South Africans aged 15-49 years was estimated to be between 45,000 and 63,000, and it is predicted that these numbers will rise to between 119,000 and 168,000 by the end of 1990, and to between 317,000 and 446,000 by the end of 1991'.

With COVID-19, the doubling time for new positive cases was calculated in days. From the time that the world had 100,000 cases (4 March 2020) to the day it had 200,000 cases (15 March 2020) was a mere eleven days. Seven days later the number exceeded 400,000, then seven days later it was more than 800,000. As the global growth rate steadily decreased, the doubling time increased. In December 2020 the growth rate for new cases stood at 0.94%, or a doubling time of 74 days. On the same date the daily mortality rate was 0.72%, which translates to a doubling time of 96 days.

Thanks to AIDS, the world was in a stronger position to face COVID-19. In a document on COVID-19 and HIV, [UNAIDS](#) noted:

Unlike the HIV response, which essentially had to build an infrastructure from the ground up, COVID-19 responses have the potential to piggyback on the important infrastructure that HIV investments have created. For example, the newly trained and credentialed health personnel that HIV investments have deployed, including more than 280,000 new health-care workers trained by PEPFAR (the US President's Emergency Plan for AIDS Relief) alone, are currently assisting as first responders to COVID-19 in many low- and middle-income countries.

This preparedness is also evident in precautions adopted by health care workers. TB and SARS-CoV-2 are respiratory diseases. Health care workers, whether they are working in the formal or in the informal sectors, are trained to protect themselves and others when they have contact with TB patients. They are familiar with the correct use of gloves and masks as well as other protective attire.

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Further reading:

- https://iv.iiarjournals.org/content/34/3_suppl/1633 on Human Gene Sequences in SARS-CoV-2 and Other Viruses

- [Covid fightback: the critical role of HIV experts | Health | The Guardian](#)

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