Building Resilient Health Systems: Sharing Investments in Hepatitis Elimination and Pandemic Preparedness
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The availability of reliable tests for viral hepatitis, effective vaccines for hepatitis B, and curative therapies for hepatitis C is making global hepatitis elimination possible. For the first time in history, we have the tools needed to eliminate this global killer and can do so in under a decade. The World Health Assembly endorsed the elimination of hepatitis as a public health threat by 2030 by adopting the Global Health Sector Strategies on hepatitis in 2016 and 2022, reiterating political support for the fight against hepatitis. By eliminating hepatitis by 2030, over 7 million premature deaths from liver cancer and disease will be averted worldwide, bringing significant savings to health systems.

However, the COVID-19 pandemic has threatened to throw progress towards hepatitis elimination off course. The health system disruptions caused by the pandemic have had a negative impact on hepatitis services worldwide, pushing many countries further behind on WHO’s 2030 goals. Yet, expectantly, the pandemic has also resulted in an exponential global increase in vaccination, viral testing and treatment capacity, and an unprecedented pace of innovation that has the potential to push hepatitis elimination forward. In this paper, we look at lessons learned from the COVID-19 pandemic that can be used to support progress towards hepatitis elimination. Through this paper, we call on global health leaders, funders, and national policymakers to utilise investments in pandemic preparedness that accelerate the fight against viral hepatitis and, in return, harness strengthened viral hepatitis elimination infrastructure to support pandemic preparedness—integrating these programmes to provide both cost savings to the system and better outcomes for populations.

“By applying the lessons learned from the pandemic, greater impact on morbidity and mortality for neglected diseases can occur.”

Mohammed Abdulaziz, Head, Division of Disease Control and Prevention, Africa CDC

Leverage COVID-19 investment and innovation to accelerate the fight against viral hepatitis

- Repurpose COVID-19 testing and vaccination infrastructure to strengthen hepatitis response
- Adopt advances in telemedicine and self-testing brought into routine practice by the COVID-19 pandemic to strengthen delivery of hepatitis services

Invest in viral hepatitis elimination to support pandemic preparedness

- Include hepatitis in pandemic planning to build infrastructure for dual use—eliminating hepatitis and providing indicators of preparedness of the health systems for pandemic response
- Strengthen the response to new and emerging infectious diseases through investment in integrated hepatitis surveillance
Nearly 7 million people have died from COVID-19. Countries and institutions around the world are more focused in 2023 than ever before on developing pandemic preparedness programmes and ensuring they are ready to confront the next global health threat. Intensive negotiations are underway at the World Health Organization to act on lessons learned and formalise improved cooperation to deal with outbreaks and pandemics.

During the same time span, more than 3.5 million people died from the hepatitis B virus (HBV) and hepatitis C virus (HCV)—diseases that are both targeted for elimination by WHO. An unexpected learning from the pandemic was that several countries, including Georgia and Egypt, managed to lessen the impact of COVID-19 on their populations because of the health system infrastructure they had in place to eliminate hepatitis. Their experiences suggest that countries with comprehensive hepatitis programmes are well placed to face future pandemics. Equally, by extension, countries that built effective infrastructure to tackle COVID-19 might also be better equipped to make progress in eliminating viral hepatitis. This paper explores the significance of these developments and proposes actions that would enable countries to accelerate hepatitis elimination while strengthening health systems for multiple challenges and threats.

Achieving WHO’s goal of eliminating hepatitis as a public health threat by 2030 will avert over 7 million deaths from liver cancer and disease. To reach this goal, actions to strengthen health systems are needed. Hepatitis elimination, while ambitious, is achievable. Medical advancements worthy of the 2020 Nobel Prize have delivered reliable tests as well as short, safe, and affordable HCV treatments that cure over 95% of treated persons. There is also a vaccine that prevents over 95% of HBV infections, giving humanity the tools to eliminate liver disease that continues to cause over 1 million deaths per year. The world has the tools to prevent, detect, and cure these infections before the onset of liver disease and cancer. Countries now need the capacity to make these scientific advances in HBV and HCV prevention, diagnosis, and curative treatments equitably available and to bring hepatitis elimination within reach of all.

The response to the pandemic as an urgent threat has strengthened health systems for diagnosis, delivery of vaccines, and care, including treatments with antiviral therapies. These are the same services many countries require to reduce and ultimately eliminate the high prevalence of viral hepatitis. These common building blocks can improve health outcomes across the board, not least to eliminate hepatitis and prepare for the next pandemic. Hepatitis elimination, performant health systems, and improved pandemic preparedness and response are aligned, achievable, and mutually advantageous—driving shared solutions for immediate and long-term health benefits for all.
Building Resilient Health Systems: Sharing Investments in Hepatitis Elimination and Pandemic Preparedness

The emergence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) prompted unprecedented efforts to contain the virus, including the largest global testing programme in history that has tested hundreds of millions of individuals to date. Innovations in research and development rapidly resulted in vaccines, diagnostic tests, and therapeutics for the control of COVID-19. Embedding these innovations into policy and action resulted in highly successful testing and vaccination programmes in many countries. As combating COVID-19 became the primary priority for health systems globally, routine health services were disrupted. Public health programmes, including hepatitis programmes, were impacted by social distancing measures and workforce diversion. Over time, health systems responded by developing and deploying new technologies as well as introducing health protection policies to combat COVID-19. These tools also opened new possibilities for delivery of routine healthcare services, such as telemedicine, at-home self-testing, and enhanced community care. The lightning speed at which these innovations were implemented shows that, with political will, financing, and the right architecture, rapid health system change is possible.

As nations emerge from the COVID-19 pandemic, there are unique opportunities to consider and adapt the policies, funding, and infrastructure for future pandemic prevention and response, and see how they can drive progress on the elimination of hepatitis. The response of countries like Georgia or Egypt to the pandemic demonstrate that there is a link between investment in hepatitis programmes and readiness to respond to health threats and challenges such as COVID-19. However, to date, hepatitis programmes are largely left out of the discourse on pandemic preparedness and health system strengthening. The Independent Panel for Pandemic Preparedness and Response submitted its main report in September 2020, ‘COVID-19: Make it the Last Pandemic’, which included no mention of viral hepatitis elimination in their strategy, while infectious diseases with similar or lesser burdens in national populations, such as AIDS, malaria, and tuberculosis, were included. The absence of hepatitis elimination initiatives is also common in other key pandemic preparedness reports. Most recently, in March 2023, The Pandemic Fund opened its first call for proposals to support the development of the workforce, surveillance, and laboratory systems to help countries prevent, prepare for, and respond to health emergencies. Although hepatitis is not specifically mentioned, these funds explicitly provide opportunities to integrate pandemic preparedness to bolster existing health systems.

With the immediate threat of COVID-19 gone, but its effects on health systems still raw, now is the optimal moment to reflect on lessons learned. More importantly, now is the time to consider what practices can be adopted from the pandemic response to create resilient health systems that are able to meet the immediate challenges of our time, such as hepatitis elimination. This paper sets out the investment case for including hepatitis in pandemic preparedness, providing evidence from countries across the world where hepatitis infrastructure supported a robust defence against COVID-19, and where health system strengthening from COVID-19 can help countries on the path to hepatitis elimination. Our recommendations call to action those investing in both pandemic preparedness and hepatitis elimination to consider the mutual benefits of linking strategies and investment at both global and national levels.

INTRODUCTION

“A good investment case for hepatitis elimination will have a dual use to help to stop the next outbreak while addressing other needs of the health system, the community, and the country.”

Carolyn Reynolds, Co-founder, Pandemic Action Network

With the immediate threat of COVID-19 gone, but its effects on health systems still raw, now is the optimal moment to reflect on lessons learned. More importantly, now is the time to consider what practices can be adopted from the pandemic response to create resilient health systems that are able to meet the immediate challenges of our time, such as hepatitis elimination. This paper sets out the investment case for including hepatitis in pandemic preparedness, providing evidence from countries across the world where hepatitis infrastructure supported a robust defence against COVID-19, and where health system strengthening from COVID-19 can help countries on the path to hepatitis elimination. Our recommendations call to action those investing in both pandemic preparedness and hepatitis elimination to consider the mutual benefits of linking strategies and investment at both global and national levels.
In this chapter, we explore the global drive for hepatitis elimination and outline the barriers to success felt by countries around the world that could be addressed through more concerted and integrated policy and health system efforts.

**Progress towards elimination**

Viral hepatitis affects millions across the globe. It is estimated that 316 million people are living with hepatitis B virus (HBV), and 58 million people are living with hepatitis C virus (HCV). Annually, an estimated 1.1 million persons die of HBV- and HCV-related liver disease, more than HIV and malaria combined.

In 2015, the World Health Organization (WHO), with endorsement from the World Health Assembly, set goals for the elimination of viral hepatitis as a public health threat, including a target of 90% reduction in new HBV and HCV infections and a 65% reduction in hepatitis-related deaths by 2030. The first Global Health Sector Strategy (GHSS) on viral hepatitis was published in 2016. More recently, in 2022, the World Health Assembly renewed commitments to hepatitis elimination by launching the strategy on HIV, viral hepatitis, and sexually transmitted infections for the period from 2022 to 2030 and approving its implementation for the next 8 years. The new strategies aim to end these epidemics by 2030 by tackling disease-specific challenges, as well as issues common to the three disease areas through health system strengthening and increased collaboration. However, despite the global commitment to eliminate hepatitis by 2030, no region is on track to reach elimination targets.

Effective vaccination against hepatitis B, a curative treatment for hepatitis C, and reliable tests to diagnose both infections before the onset of liver disease have made hepatitis elimination an achievable goal. WHO Member States have made substantial progress towards hepatitis elimination, demonstrating that elimination goals can be achieved. The world achieved the interim United Nations (UN) Sustainable Development Goal (SDG) of reducing global hepatitis B prevalence to <1% among young children through vaccination, placing many countries on track to achieve the final SDG goal of <0.1% HBV prevalence by 2030. Model countries scaled up access to HCV testing and curative therapies. With increased awareness of the benefits and feasibility of hepatitis elimination, other countries are in various stages of developing programmes for hepatitis C elimination. Despite these advances towards hepatitis elimination, major inequities exist in access to hepatitis prevention and testing and treatment services. Fewer than one in five persons with HBV or HCV infection are aware of their status and receiving care. These inequities are greatest for low- and middle-income countries, contributing to the greater burden of hepatitis infection and death. To reach the goals set out by the GHSS, significant expansion of diagnostic services, alongside prevention and treatment measures, is necessary.
Renewed commitment to eliminate viral hepatitis creates the foundations to strengthen global health security—

Key barriers to elimination

**Lack of political will**

Although all UN member states have committed to viral hepatitis elimination targets, the vast majority are not on track. The overarching barrier to hepatitis elimination is the lack of actionable policies, such as costed and actionable national hepatitis plans.

Currently only 27 countries have costed national viral hepatitis plans. Countries with a greater number of viral hepatitis policies in place, or in development, are likely to see more significant progress towards hepatitis elimination compared to those with fewer or no policy indicators at all. While global funding for hepatitis elimination has increased modestly in recent years, it still falls far below the estimated US$6 billion per year that is needed to achieve elimination by 2030.

More funding is needed, particularly for low- and middle-income countries, to scale up vaccination, testing, and treatment programmes. The lack of credible information regarding the disease burden contributes to a lack of political will to eliminate hepatitis.

Political commitment to eliminate hepatitis must be strengthened to provide high-quality, people-centred prevention and care on the scale needed to eliminate transmission and disease.

**Poor integration of testing in primary care**

The majority of viral hepatitis cases remain undiagnosed globally. Of the millions of HBV and HCV infected persons, under 20% are aware of their infection, and under 10% have received appropriate treatment.

This is largely due to testing accessibility. While accurate and affordable hepatitis tests are available, testing is poorly integrated with primary care, and is more commonly accessible in specialist care. Specialist care models make testing inaccessible for many vulnerable and high-risk groups, such as people who do not have a stable home environment, migrants, or people who inject drugs. Separating hepatitis from primary care disrupts the linkage of care and makes it challenging for people living with hepatitis to receive necessary health services.

**Siloed disease-specific programmes and funding**

To achieve the overall SDG 3 goal of greater health and well-being for all, and eliminate communicable diseases such as viral hepatitis, HIV, or malaria, we must build stronger health systems that can deliver universal health coverage. However, disease-specific programmes and global vertical disease elimination initiatives often have limited interfaces with national healthcare systems and adjacent programmes.

As funding is siloed, there is little to no crossover of testing, diagnostic infrastructure, or workforce. In the absence of policy change and workforce development following the scale-up of testing capacity for the COVID-19 response, there is often reluctance to share testing infrastructure between different diseases and a lack of integration of laboratory information systems.
Model programmes demonstrate that hepatitis testing can be readily integrated into primary care systems. By placing hepatitis services in convenient locations where persons routinely receive care, it may help persons receive holistic care.  

**Low coverage for hepatitis B birth dose vaccination**

Elimination of mother-to-child transmission of HBV is essential to achieve the goals for hepatitis elimination. Indeed, mother-to-child transmission places children at highest risk of chronic HBV infection, leading to chronic hepatitis B in 95% of all cases.

The hepatitis B vaccine is the most effective tool at our disposal to achieve elimination of HBV. Despite a recommendation from WHO in 2009 that all newborns should receive the timely hepatitis B birth dose vaccine, implementation has been slow in some countries that have a large burden of hepatitis B, particularly in Africa, resulting in heterogeneous coverage.

Few countries in Africa have integrated HBV birth dose vaccines in their Expanded Programme on Immunization. As a result two in every three new chronic infections of HBV globally are among children in Africa. Despite committing to support countries introducing HBV birth dose prior to the pandemic, Gavi, the Vaccine Alliance, has yet to start funding vaccination of children at highest risk for HBV infections.

**Lack of hepatitis awareness and poor health literacy**

A lack of awareness and understanding about viral hepatitis is another baseline barrier in hepatitis elimination. A FIND study on the qualitative assessment of values and preferences on hepatitis C self-testing found that more emphasis needs to be placed on raising awareness.

FIND also conducted a randomised controlled trial that integrated hepatitis C testing into existing HIV testing platforms in several countries and found that full enrolment took more than four times longer than expected (over 12 months as opposed to 3 months, largely due to a lack of awareness of hepatitis).

Country leaders and the people they represent need to be educated on the burdens associated with hepatitis for progress towards elimination to occur.

The Cairo Declaration on Viral Hepatitis, which was adopted and endorsed for implementation by Heads of State and Government of the African Union Member States in 2020, is an example of ambitious high-level commitments to galvanise political support and drive action. Yet with the 2030 milestone to eliminate hepatitis on the horizon, generating greater political will and funding to support elimination services is needed to make progress both nationally and globally. The next chapter summarises the opportunity to leverage health system funding, service innovations, and policies introduced during the COVID-19 pandemic to overcome the barriers to elimination we have highlighted.
BUILDING RESILIENT HEALTH SYSTEMS: SHARING INVESTMENTS IN HEPATITIS ELIMINATION AND PANDEMIC PREPAREDNESS

While hepatitis services were disrupted by the COVID-19 pandemic, the crisis has provided opportunities for positive change. This chapter sets out examples of innovations in policy, health system delivery, and technologies from the COVID-19 pandemic that can be utilised to accelerate progress on hepatitis elimination and summarises our recommendations for health system decision makers on how they might do the same.

In a survey conducted by the Coalition for Global Hepatitis Elimination (CGHE), 88% of respondents—including clinicians and hepatitis programme managers—reported changes in their work activities as a result of COVID-19.

- 88% reported disruptions in hepatitis B and hepatitis C treatment services, and a decrease in the volume of in-person care compared to pre-pandemic levels.
- 31% reported that more than a quarter of their time had been reallocated to COVID-19-related services.
- 41% reported that more than a quarter of their time had been reallocated to COVID-19-related services.

Hepatitis and other health programmes are often left behind when a new infectious disease threat emerges. For example, a Spanish study concluded that 41% of gastroenterology and hepatology beds, as well as a large portion of the specialist workforce, were reallocated to COVID-19 patient care. This was seen previously during the 2014 Ebola outbreak in West Africa when hepatitis patients faced a breakdown of care. Non-Ebola-related burdens ultimately exceeded the burdens from the outbreak due to under-provision of essential healthcare as resources were diverted to the outbreak. However, times of crisis also often lead to breakthrough innovation, which can be leveraged to accelerate progress towards hepatitis elimination.
Building Resilient Health Systems: Sharing Investments in Hepatitis Elimination and Pandemic Preparedness

Testing
The world is lagging behind on testing and linkage to care targets needed for hepatitis elimination. Following the outbreak of COVID-19, country leaders had to redirect or receive new resources for testing and diagnosis to battle the outbreak in a timely manner. However, funding for testing and diagnostics has historically been siloed within disease areas. Even with increased testing capacity following the outbreak of COVID-19, there is reluctance to share testing infrastructure between different diseases, with the laboratory workforce only able to run samples for their specific pathogen.

As the world emerges from the challenges of the pandemic, the increased availability of viral testing should be leveraged to identify more people living with viral hepatitis and get them into care. To ensure there is increased access to hepatitis treatment and screening, there needs to be an integrated system that allows services and workforce to be used across various diseases.

Vaccination
Despite WHO’s recommendation in 2014 that all newborns receive the timely hepatitis B birth dose, scale-up of the timely birth dose vaccine has lagged behind that of infant vaccines. Moreover, Gavi, which has funded the Expanded Programme on Immunization in many low-income settings, has yet to support hepatitis B birth dose vaccination. By 2019, only 43% of newborns globally had received the birth dose vaccine, while less than one in five newborns had received it in WHO African region. As a result, over 2.5% of African children are infected with HBV compared to <1% globally. There has been a long advocacy campaign for Gavi to fund hepatitis birth dose vaccine; however, this advocacy campaign has been unsuccessful thus far.

To accelerate progress towards hepatitis B elimination, Gavi must extend support beyond hepatitis B containing pentavalent vaccine for infants to include delivery of hepatitis B vaccines for newborns. A hepatitis B birth dose vaccination strategy would extend Gavi’s existing investment support on hepatitis B to contain a pentavalent vaccine. If it is executed well and timely, the hepatitis B birth dose vaccine disrupts most vertical transmissions and closes the gap in immunity between the birth and primary vaccine series. Reaching the GHSS goal of 90% coverage of hepatitis B birth dose vaccination would save 500,000 children in Africa from hepatitis B infection and prevent future early deaths from liver cancer and disease.

Additionally, the need for adult hepatitis B vaccination should not be overlooked. Adults most at risk of HBV infection include healthcare providers and emergency responders, who are crucial to a country’s pandemic response.

Evidence: Ethiopia increases PCR testing capacity
The Ethiopian Public Health Institute and St Paul’s Hospital in Addis Ababa purchased their first PCR machines for COVID-19 diagnostics as the pandemic began. These machines have the capacity to test 3,000 samples in 24 hours and have the capability to test for hepatitis and sexually transmitted infections. Having local testing centres has strengthened Ethiopia’s health system and their position in pandemic preparedness. A dynamic and agile health system enables a nation to effectively reallocate its resources to where capacity is needed most.

RECOMMENDATION 1: Repurpose COVID-19 testing and vaccination infrastructure to strengthen hepatitis response

“Over the pandemic a huge vaccination capacity has been created. The care chain has also been strengthened substantially with donor support during the pandemic, which will of course be useful for future vaccination programmes.”

Tamar Gabunia, First Deputy Minister of Internally Displaced Persons from the Occupied Territories, Labour, Health and Social Affairs of Georgia

Over the pandemic a huge vaccination capacity has been created. The care chain has also been strengthened substantially with donor support during the pandemic, which will of course be useful for future vaccination programmes.

Tamar Gabunia, First Deputy Minister of Internally Displaced Persons from the Occupied Territories, Labour, Health and Social Affairs of Georgia
response, as well as oncology patients and people in long-term care facilities, who may be more severely affected by infectious disease outbreaks.  

Currently, COVID-19 vaccines require regular boosters, which has prompted some health systems to invest in creating sustainable, long-term infrastructure for vaccine delivery. Investing in sustaining COVID-19 vaccination infrastructure and leveraging this infrastructure to improve hepatitis B vaccination would reduce incidence of hepatitis B, and in time decrease the demand for hepatitis B testing, allowing for testing resources to be redirected to other infectious diseases.

**RECOMMENDATION 2: Adopt advances in telemedicine and self-testing brought into routine practice by the COVID-19 pandemic to strengthen delivery of hepatitis services**

**Telemedicine**

Telemedicine has emerged as a fundamental tool to improve health outcomes during the COVID-19 pandemic. A bibliometric analysis of 285 publications on telemedicine use during the pandemic found that telehealth reduces unnecessary hospitalisation, increases patient access to treatment, improves health outcomes, and reduces costs for all stakeholders in the healthcare system.  

Routine implementation of telemedicine can reduce the financial and infrastructural burden on health systems and build up the resilience needed to respond to emerging infectious disease threats. Telemedicine infrastructure developed as a part of COVID-19 response can be repurposed to follow up with hepatitis patients on their diagnostics and treatment, making sure they do not fall out of the continuum of care during health emergencies. The widespread use of telemedicine following the pandemic can also be leveraged to provide hepatitis care to people in remote and underserved areas.

**Evidence: Effective use of telemedicine during the COVID-19 pandemic**

In Canada, there was a rapid expansion and adoption of telemedicine consultations during the pandemic, as well as the development of virtual care infrastructures. In response to the pandemic, virtual hepatitis C care allowed for efficient engagement in hepatitis C treatment and reduced loss to follow-up in patient care. This new system was cost-effective, timely, and convenient for both patients and healthcare providers. Further research is being conducted to determine virtual hepatitis C care treatment completion rates in comparison to pre-pandemic levels.

In Egypt, telemedicine infrastructure that was built to service liver disease patients in remote areas was deployed to service COVID-19 patients, strengthening the country’s pandemic response.

In Pakistan, Rawalpindi Medical University (RMU) confronted the COVID-19 pandemic by actively deploying its workforce and resources from across the Department of Infectious Diseases, investing and expanding capabilities rapidly. RMU began to leverage and expand existing resources before the first case of COVID-19 was identified in Rawalpindi, developing local guidelines based on the anticipated disease burden. New programmes designed to ease the disease burden were initiated, including a telemedicine centre that offered 24/7 mobile and video consultations free of cost to patients. The telemedicine centre now serves patients with a variety of health issues.

**Community service delivery models**

The COVID-19 pandemic highlighted the value of community involvement in responding to an emerging disease threat. As hospitals were overwhelmed by an unprecedented number of admissions and the health workforce was stretched thin, innovative community care responses such as home care, community surveillance, and contact tracing were deployed to mitigate the impact of the pandemic.  

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10 Building Resilient Health Systems: Sharing Investments in Hepatitis Elimination and Pandemic Preparedness
Out of the estimated 172,000 people living with hepatitis C in Spain, approximately 80,000 struggle to get access to lifesaving drugs. Treatments for hepatitis C are only prescribed by doctors in specified clinics, which presents a barrier for vulnerable populations in impoverished neighbourhoods. In Madrid, the introduction of a mobile screening unit ‘Unidad Móvil de Cribado’ or UMC, has increased access to testing and treatment of hepatitis, amongst other infectious diseases.

The team that came up with this idea found that the use of a mobile unit was extremely efficient in improving the patient’s linkage to care and identifying, as well as treating, marginalised people with active hepatitis C.

Successful deployment of innovative community care models relied heavily on existing community structures for other infectious diseases. Community screening and testing has long been an integral part of the hepatitis response. Strengthening hepatitis community service delivery models to reflect COVID-19 innovations can serve to expand access to screening, testing, and treatment for a range of infectious diseases. This will ultimately both accelerate progress towards elimination and strengthen pandemic preparedness, providing a more rapid and efficient response to emerging disease threats.

Community-based grassroots organisations also have a key role to play in increasing health literacy, encouraging vulnerable populations to get tested, and linking them to care. They are well suited to raise awareness, as they often have a better understanding of the level of knowledge in their target populations and how these messages may resonate with them most effectively.

“In partnerships, too much vertical investment is wasteful, and we need to make effective and efficient uses of resources—resources must be used in an integrated way to target multiple endemic diseases.”

Mohammed Abdulaziz, Head, Division of Disease Control and Prevention, Africa CDC

The World Bank Financial Intermediary Fund for Pandemic Preparedness and Response cites community engagement as one of the key areas for investment to plug capacity gaps at country and local levels and strengthen country-level pandemic preparedness capacity. Investing in community-based grassroots organisations to enable them to increase awareness and encourage viral hepatitis testing is an important link in the healthcare continuum that is needed for pandemic preparedness.
Evidence: Providing hepatitis care for the African migrant community in Spain
The Hepatitis B Virus Community Screening and Vaccination in Africans (HBV-COMSAVA) study screened and vaccinated African migrants in Barcelona, Spain, during the COVID-19 pandemic.

The study demonstrated that it was possible to diagnose, link to care, and vaccinate African migrants by employing a community-based model of care.70

Self-testing
While the response to the COVID-19 pandemic disrupted hepatitis services, it has also resulted in behaviour changes that could support hepatitis elimination. One of the main behaviour changes emerging from the COVID-19 pandemic is the global perception and attitude towards self-testing. Prior to the pandemic, self-testing was not routinely done outside of home pregnancy tests.71 As a result of the pandemic, millions of people have used at least one form of COVID-19 self-testing.

In the 2021 recommendations and guidance on hepatitis C virus self-testing, WHO recognised the potential of hepatitis C self-testing to scale up testing for key populations and complement national testing programmes.72

Even though hepatitis C self-testing is more expensive than facility testing per diagnosis, a WHO coordinated study estimates it is highly cost-effective in high-burden settings and in populations with the greatest gaps in diagnosis.73

Self-testing also increases the convenience for the patient by enabling them to collect a sample at a time that best suits them, which has the potential to support retention in the cascade of care. The highest level of retention in the care cascade was associated with the shortest turnaround times.74 Self-testing removes an additional step for the patient, a step that is often the weakest link in the cascade of care, and a significant barrier to treatment.

Investment in hepatitis C self-testing also has the potential to address one of the key barriers to hepatitis elimination, which is the lack of integration in global funding. As self-testing does not require machine infrastructure, it could be used to circumvent uncertainties about testing infrastructure jurisdiction resulting from siloed vertical funding. Public-private initiatives that subsidise the purchase and distribution of self-tests to key populations, followed by facility-based confirmatory testing, have the potential to dramatically accelerate progress towards elimination.75

“The biggest barrier to hepatitis elimination is the lack of individuals or organisations committed to hepatitis elimination. If you have committed partners, you will find a way to overcome other barriers.”

Naranbaatar D. Dashdorj, Co-Founder and Chairman of the Board at Onom Foundation
Elimination of viral hepatitis is within reach\textsuperscript{76} and has the potential to pave the way for elimination of other communicable diseases.

This chapter provides recommendations for how investment in hepatitis elimination programmes can aid pandemic preparedness by building resilient health systems to protect the world from current and emerging infectious disease threats.

“To achieve hepatitis elimination, it is important to be part of other disease elimination programmes rather than being a standalone programme.”

Jeffrey V. Lazarus, Professor, CUNY Graduate School of Public Health and Health Policy, New York City
RECOMMENDATION 3: Include hepatitis in pandemic planning to build infrastructure for dual use—eliminating hepatitis and providing indicators of preparedness of the health systems for pandemic response

A key lesson from the COVID-19 pandemic was that implementing a coordinated rapid response to an emerging infectious disease threat is extremely challenging and often delayed. Data from countries with strong pre-existing infrastructure for hepatitis testing, including Georgia, Egypt, Mongolia, as well as Chinese Taipei, show that they were better prepared to respond to COVID-19 outbreaks than comparable countries without this infrastructure, and suffered fewer consequences.

By building and maintaining virologic testing capacity and associated data systems pre-pandemic, these areas of the world quickly redirected their capacity for virologic testing when the need for COVID-19 testing suddenly accelerated. This allowed for a near immediate response and prevented testing systems from becoming overwhelmed.

“In having the diagnostic capacity and modern diagnostics systems, including a trained workforce, is really critical. This was one of the key success factors for Georgia to be able to establish COVID-19 diagnostics very fast at an early stage of pandemic and roll it out quickly.”

Tamar Gabunia, First Deputy Minister of Internally Displaced Persons from the Occupied Territories, Labour, Health and Social Affairs of Georgia

Hepatitis programmes also provide valuable indicators of how resilient health systems are in terms of pandemic preparedness, demonstrating the systems’ resources and capacity for surveillance, diagnostics, vaccination, and more.

Through their investments in viral hepatitis elimination, these countries improved their health security and ultimately their pandemic preparedness.

Evidence: Georgia’s hepatitis elimination programme aided COVID-19 response

As a part of its national hepatitis elimination programme, Georgia has developed a laboratory network of more than 1,000 public and private laboratories and screening sites to ensure quality of services, surveillance, and linkage to care.77

Georgia’s hepatitis elimination programme has been credited with building up national public health capacity, including the country’s response to the COVID-19 pandemic.78

Georgia’s established workforce, including trained public health workers who had been focused on Georgia’s hepatitis elimination project, also aided in the response. A substantial effort was made to train public health workers, including epidemiologists, and to improve the connection between primary care providers and public health services.

As a result, at the beginning of the pandemic Georgia was able to quickly establish a surveillance system across primary care and public health services to provide testing and treatment in community settings, as well as follow-up and contact tracing.79
Evidence: Egypt’s hepatitis elimination programme aided COVID-19 response

Egypt has taken successful measures to control the spread of hepatitis C and has a high potential of reaching elimination targets by 2030. As part of Egypt’s “100 Million Healthy Lives Initiative – President’s Initiative to eradicate hepatitis C and non-communicable diseases (NCDs),” between October 2018 and April 2019, the government of Egypt tested almost 50 million people for hepatitis C.

In its pandemic response, the government repurposed a portion of its PCR testing hubs for COVID-19 testing during the pandemic. With more than 70 PCR hubs, Egypt had a strong testing capacity prior to the pandemic. As these PCR hubs are part of the national laboratory information system, the results are available both centrally and peripherally. Having this existing infrastructure placed Egypt at an advantage over other countries when responding to the COVID-19 pandemic.

Egypt had a lower caseload and mortality than its North African peers, and was able to institute shorter lockdowns. As a result, Egypt’s economy experienced growth during the first year of the pandemic, while the global economy shrank by 5.2%.

“Egypt has more than 70 PCR hubs which is significantly more than most countries. This meant that we had huge testing capacity from day one of the pandemic. Therefore, there wasn’t a need to increase capacity for PCR tests. Having the existing infrastructure put Egypt at an advantage compared to other countries in response to the COVID-19 pandemic. Elimination is not about the diagnosis of all patients; it is about the sustainability of the system.”

Wael Abdel-Razek, Deputy Executive Director of National Committee for Control of Viral Hepatitis, Ministry of Health and Population, Egypt

There are many synergies between hepatitis elimination and pandemic preparedness. Investments in hepatitis elimination programmes can sustain testing and surveillance programmes needed for a rapid response. Integrating hepatitis into pandemic preparedness infrastructure can improve pandemic response and pave the way for elimination of hepatitis and control of other communicable diseases.

**RECOMMENDATION 4:**

Strengthen the response to new and emerging infectious diseases through investment in integrated hepatitis surveillance

Advances in diagnostic testing, along with the adoption of a ‘One Health’ approach, which fosters collaboration between human, animal, and environmental sectors, have the potential to improve pandemic preparedness and national economic security. By leveraging synergies to counter new threats and prepare for future pandemics, investment pays dividends even in the absence of such events, and ultimately creates a sustainable system.

An emphasis on hepatitis surveillance for global health security will improve pandemic preparedness and response interventions by acting as an entry point for outbreak detection.

Evidence: Global Hepatitis Outbreak and Surveillance Technology

Innovative hepatitis surveillance systems can be integrated into strategies for pandemic preparedness. One such system is the Global Hepatitis Outbreak and Surveillance Technology (GHOST).

GHOST is a cloud-based system that enables users of all computational expertise to analyse hepatitis transmission clusters accurately. It enables timely and relevant information to guide effective public health intervention measures and is readily applicable to other infectious diseases.
Technological advancements in diagnostics have made it possible to diagnose and treat multiple diseases. New diagnostic tools such as next-generation sequencing are being explored as options to improve surveillance, as these allow us to determine causes of unexplained disease outbreaks, trace and link sources of disease transmission, and facilitate a better understanding of how viruses and bacteria pass from animals to humans.

“Strong political will is needed to establish hepatitis elimination initiatives within pandemic preparedness.”

Youngheme Jee, Commissioner, Korea Disease Control and Prevention Agency

Accelerating genomic surveillance of viruses and rapidly sharing genetic information with the global community is critical for improving pandemic preparedness and informing public health strategies. The scaling up of genomic surveillance during the pandemic offers an opportunity for other pathogens, such as hepatitis C virus, whose high mutation rate and genetic diversity make it a great candidate for genomic surveillance. Scaling up genomic surveillance can augment traditional surveillance approaches and track nascent transmission networks to provide actionable information to public health officials and policymakers.

Investing in strong integrated testing and surveillance infrastructures will accelerate the progress on hepatitis elimination and it will also disperse the impact of other rapidly emerging infectious diseases, as funding and infrastructure could be modified appropriately and in a timely manner to fight an emerging pandemic.

Evidence: New York City hepatitis C surveillance

The New York City (NYC) surveillance model aided the response to the hepatitis C epidemic and was used to reallocate testing infrastructure to meet the capacity for COVID-19 cases. NYC has a person-level hepatitis C surveillance system that includes real-time digital laboratory reports, which also includes patient identifiers. This has helped to monitor the hepatitis C epidemic, provide resources for policy change, and evaluate the effectiveness of interventions.

The New York City Department of Health and Mental Hygiene routinely conducts surveys and studies to review and monitor epidemiological trends, changes in hepatitis disease prevalence, and access to care. This surveillance system has allowed for the identification of neighbourhoods in NYC with disparate disease burdens. During the pandemic, NYC’s Laboratory Based Surveillance was augmented for COVID-19 cases.

This example makes clear that the adaptation and modernisation of health data is an important aspect of a nation’s response to pandemics. By improving health data quality, availability, and accessibility, pandemic preparedness programmes offer the potential to create sustainable progress in tracking the journey towards hepatitis elimination.

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Building sustainable systems for infectious disease management, along with the increased workforce capacity and strengthened civil society to support its delivery, is essential to global health security, as it allows for rapid detection, diagnosis, and treatment. Investing in hepatitis services to support pandemic preparedness can help build dynamic health systems poised for agile reallocation of resources in response to emerging health crises.
This paper has brought together evidence from around the world to demonstrate how advances in testing and health system infrastructure from COVID-19 can be repurposed to accelerate progress towards hepatitis elimination. Furthermore, it highlights how investment in hepatitis elimination can support future pandemic preparedness.

The recommendations we make in this paper provide a blueprint for those building integrated strategies to tackle both current and future health threats. However, national action must be supported by global leadership. Global health initiatives and institutions, such as the Global Fund to Fight AIDS, Tuberculosis and Malaria and the World Bank, can help finance viral hepatitis elimination by providing funding for:

- The development and distribution of testing and surveillance systems for viral hepatitis
- Strengthening healthcare systems in low- and middle-income countries to improve access to prevention, testing, treatment, and care for people living with viral hepatitis
- Technical assistance to countries on how to implement and scale up effective interventions to combat viral hepatitis

As many countries look to upgrade their preparedness and response systems and develop plans to reinforce their disease surveillance, diagnostic services, infection control, and emergency preparedness, they will also want to understand how to make these investments cost-effective. Many of the capabilities and much of the infrastructure required for hepatitis programmes will also support efforts to improve pandemic preparedness and overall global health security, providing strong efficiency arguments that support the case for integration.

As this paper has set out, the journey to hepatitis elimination will require strong political will and enduring commitment from national policymakers, and a shift away from vertical funding to support integrated care models. But national governments cannot do it alone. International funds to fight infectious diseases and strengthen health systems must also incentivise the local integration of national strategies and reinforce the growing evidence, as outlined in this paper, of the deep links between hepatitis elimination and pandemic preparedness.
Building Resilient Health Systems: Sharing Investments in Hepatitis Elimination and Pandemic Preparedness