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# DIA : GRAM



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## Shining a Light on Liver Health

**Micro-elimination strategies**  
*How can we achieve the WHO 2030 hepatitis elimination goals?*

**The liver disease continuum**  
*Understanding the connection between hepatitis and liver cancer*

**Hepatitis survivor to patient advocate**  
*Major Alvi describes his passion to improve liver disease management in Pakistan*



# Note from the Editor



Dear Readers,

Around one in five people globally suffer from chronic liver disease, despite the fact that 90% of these cases are preventable. As a result, there is a huge **global burden of Hepatitis and Hepatocellular Carcinoma (HCC)**. There is a strong call to action now - to understand the global burden of Hepatitis and Hepatocellular Carcinoma (HCC), and what can be done to improve the detection and management of liver disease for patients everywhere.

**Diagram** brings this conversation to Asia Pacific.

Hear from **Dr Tatsuya Kanto**, Director General, The Research Center for Hepatitis and Immunology, National Center for Global Health and Medicine from Japan, on how the national surveillance program effectively tackled the burden of HCC.

**Major (r) Anwar ul Hussein Alvi**, Member of the Technical Advisory Group for the Government of Pakistan, talks about his journey as a patient and how his present role as a patient advocate addresses patients' needs and enables better management of liver disease. **Dr Bao Toan Nguyen**, Lab Manager for MEDIC Center from Vietnam, discusses the importance of innovation in diagnostics, for greater accuracy and improved patient outcomes.

This edition dives into the various issues present in liver disease management today and what can be done to improve patient outcomes because no matter what the disease, everyone deserves to get tested.

**Read these stories now.**

**Shruti Bose**

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## Navigating Liver Disease Management

# Can Asia Pacific Successfully Establish an Integrated Approach?

The Asia Pacific region faces various resource challenges and access barriers to healthcare. Navigating these challenges requires an innovative approach to enhance liver disease management.

Micro-elimination strategies might just be the solution to improved patient care.

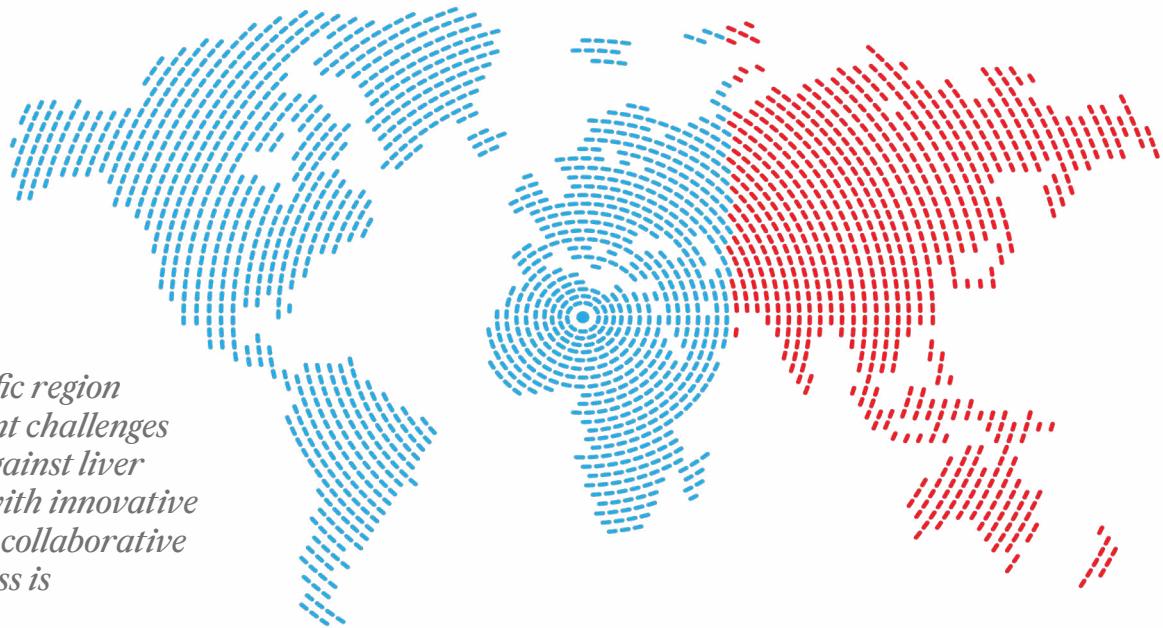
The past decade has seen the World Health Organization (WHO) set forth ambitious goals for the elimination of significant adversaries to global health, specifically hepatitis and its complications, such as hepatocellular carcinoma (HCC). Viral hepatitis, particularly types B and C, represents a substantial threat to public health worldwide. Chronic infection can lead to severe liver damage, and may result in HCC, one of the most prevalent types of liver cancer. Annually, over a million around the world succumb to conditions related to acute hepatitis and chronic infection, resulting in liver cancer and cirrhosis - a death toll three times higher than HIV/AIDS and nine times higher than malaria.<sup>1</sup>

Chronic hepatitis B and C infections are the leading causes of chronic liver disease and cancer. A WHO study found that an estimated 4.5 million premature deaths could be prevented in low- and middle-income countries by 2030 through vaccination,

diagnostic tests, medicines, and education campaigns.<sup>2</sup> The WHO's Global Health Sector Strategy on Viral Hepatitis aims to reduce new hepatitis B & C infections by 90% and hepatitis-related deaths by 65% by 2030. While significant progress has been made, few countries are on track to achieve the WHO target of eliminating viral hepatitis by 2030. Challenges such as a lack of awareness, stigma and discrimination, limited funding, and political commitment, impede access to testing and care. As countries continue awareness efforts to educate patients on the need for screening, to remove stigma and discrimination, and to meet the WHO's goals, testing and treatment still remain largely inaccessible for many people worldwide. 80% of hepatitis C infections and 90% of hepatitis B infections remain undiagnosed, and approximately 5% of the global population has a significant level of undetected liver fibrosis or established cirrhosis.<sup>3, 4, 5, 6</sup>



*The Asia-Pacific region faces significant challenges in the battle against liver diseases, but with innovative strategies and collaborative action, progress is attainable.*



This is why the WHO emphasises a “massive expansion in the availability of prevention, diagnostic and treatment services in low- and middle-income countries”<sup>7</sup>.

In the Asia-Pacific region, liver diseases pose a significant public health challenge that has been exacerbated by factors such as high prevalence rates, limited access to healthcare services, and inadequate resources. Home to over half of the world’s population, the region witnesses 63% of global liver disease deaths, with viral hepatitis and liver cancer, predominantly HCC, being major contributors.<sup>8</sup>

Inequities in access to healthcare perpetuate disparities in liver disease prevention, diagnosis, and treatment, particularly in resource-limited settings across the Asia-Pacific region. Over 80% of HCC cases are diagnosed at a late stage, by which time the disease has already advanced significantly, making curative outcomes challenging.<sup>9</sup> Quality healthcare services remain a significant concern, with inadequate diagnostic facilities, limited treatment options, and under-resourced healthcare infrastructure. Rural communities, such as those in Bangladesh, often lack access to essential screening and diagnostic services, leading to delayed diagnosis and suboptimal management of liver diseases.<sup>10</sup> Deficiencies in healthcare delivery in parts of India also contribute to poor health outcomes among individuals with liver diseases.<sup>11</sup> This emphasises the urgent need for improved service provision.

A recent whitepaper by the Asia Pacific Liver Disease Alliance highlights the urgent need for comprehensive liver disease management strategies tailored to the unique needs and challenges of the region. It emphasises the disproportionately low funding allocation for liver diseases compared to other health priorities in many countries across the region.<sup>12</sup> Additionally, the sustainability of these strategies remains a challenge, as short term initiatives often fail to yield lasting impacts on liver disease prevention and control. Drawing on data and insights from across the region, the whitepaper calls for a concerted effort to address key barriers and stresses the importance of national planning, sustained political commitment, financial support, and community engagement in achieving meaningful progress in liver disease management across the region to increase access to the much needed screening services easily.

#### **Tailored solutions because everyone deserves to get tested**

Accessible and reliable diagnostics are key to delivering on the WHO’s target of eliminating the virus by 2030. In response to these challenges, the concept of micro-elimination has emerged as a promising strategy to accelerate progress towards hepatitis C in the Asia-Pacific region. Micro-elimination involves targeting specific populations with high disease burdens for quick and efficient delivery of interventions aimed at elimination.

By focusing on a distinct population, important components contributing to elimination such as prevention, surveillance, testing, linkage to care, and treatment can all be tailored to the needs of that population, resulting in more effective outcomes.

Real-world examples from the region demonstrate the effectiveness of micro-elimination strategies in the elimination of hepatitis C,<sup>13</sup> and can therefore be applied to tackle HCC as well. In Vietnam, a community-based and HIV-integrated testing model for hepatitis B and hepatitis C has significantly increased awareness and service availability among at-risk communities, successfully linking 70% and 38% of those confirmed with the respective infections. This offers a crucial opportunity to enhance testing uptake, early case detection, and linkage to care thereby mitigating the risk of advanced HIV, chronic liver disease, cancer and death.<sup>14,15</sup>

In addition to targeted interventions, micro-elimination initiatives leverage innovative approaches to reach marginalised populations and improve health outcomes. In Pakistan, mobile health clinics have been deployed to remote areas, providing diagnosis and testing for various health conditions, including hepatitis B and C.<sup>16</sup> Mobile health clinics offer quality healthcare to vulnerable and underserved populations, addressing healthcare disparities in rural regions where access to healthcare services are limited. Furthermore, by focusing resources on high-burden communities

# Liver Disease Management in Asia Pacific

Adapted from the Asia Pacific Liver Disease Alliance Whitepaper (2023)

Majority of the world's Hepatitis and HCC cases are found in APAC. To improve clinical outcomes and to reduce the overall disease burden, there needs to be systemic changes in the healthcare system where more time and effort is dedicated towards regular testing and monitoring. The whitepaper by the Asia Pacific Liver Disease Alliance sheds light on the turmoil brought about by liver disease.

## CURRENT STATE OF HCC MANAGEMENT



## ECONOMIC AND CLINICAL BURDEN OF HEPATITIS AND HCC



**3X higher**  
hepatitis death  
rate compared to  
HIV/AIDS.



**AUD 26 BILLION**  
in lost productivity due  
to hepatitis C related  
absenteeism, presenteeism,  
and premature deaths.



**610,000**  
new cases of liver  
cancer in APAC in  
2020.



**72%**  
of total HCC deaths  
worldwide were  
attributed to APAC  
alone.



**USD 11.1 billion**  
estimated economic  
burden caused by HCC in  
2019, 0.047% of the local  
GDP, in China

and implementing targeted interventions, countries can achieve significant gains in liver disease control without overstressing limited budgets.

Putting people at the centre of health system responses – by organising services around people's needs rather than around diseases, promoting integrated patient-centred approaches, and linking with primary health care services – is key to ending epidemics like viral hepatitis and HCC. While the specific needs and risk factors may differ across countries, adopting tailored micro-elimination strategies, emphasising screening and early diagnosis, and investing in comprehensive disease management can pave the way for transformative change.

Micro-elimination offers one such opportunity. By targeting high-risk groups, improving existing healthcare infrastructure, and investing in sustainable solutions, countries in the Asia-Pacific region can increase access to screening and testing facilities. We will undoubtedly accelerate progress towards the WHO's targets for hepatitis elimination and pave the way towards a future free from the burden of such epidemics.

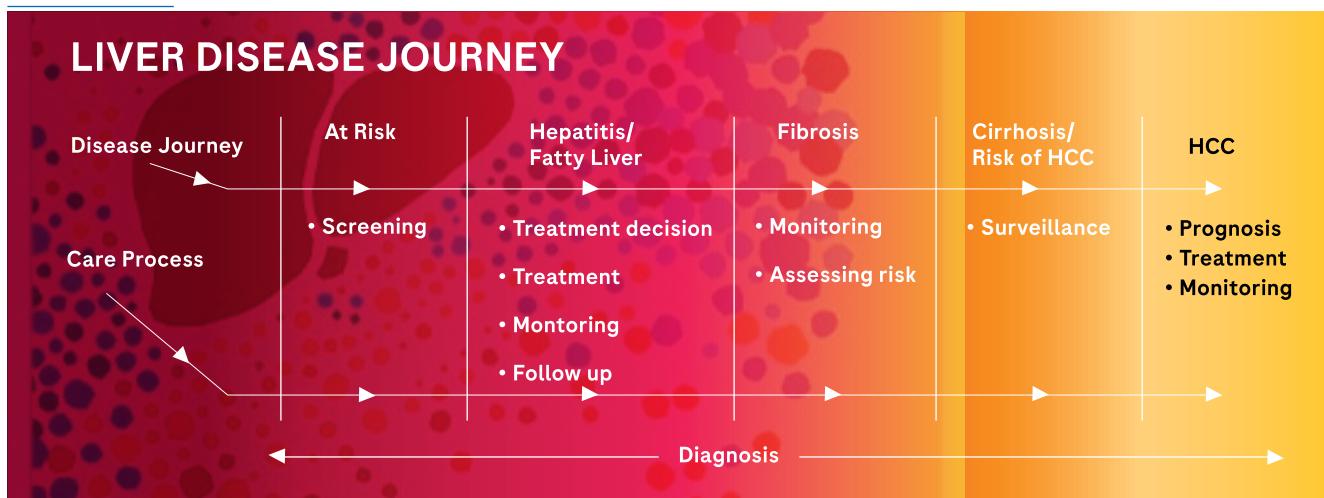


# Transforming Hepatitis and Hepatocellular Carcinoma Management with Digital Solutions

Disrupting the chronic liver disease continuum to prevent the progression of liver cancer







*Regular screening, early detection, and appropriate medical management are crucial in managing hepatitis and reducing the risk of liver cancer*

Hepatitis is a viral infection that primarily affects the liver. An estimated 354 million people worldwide live with hepatitis B or C, leading to around 1.1 million deaths per year.<sup>1</sup> For most, testing and treatment remain beyond reach.<sup>2</sup> Approximately 90% of people living with hepatitis B and 80% of patients with hepatitis C are unaware they are infected, which leads to further transmission rates.<sup>3</sup>

The hepatitis virus attacks liver cells, causing inflammation and damage. Over time, if the infection persists or becomes chronic, it can lead to a condition known as liver cirrhosis, a progressive scarring of the liver tissue, which disrupts its normal structure and function. This scarring can develop over many years and is often a result of ongoing liver inflammation and damage. Around one in five people globally live with chronic liver disease (a progressive deterioration of liver functions), and numbers are on the rise.<sup>4,5,6,7,8</sup> In 90% of cases, chronic liver disease could be prevented, and most remain undiagnosed.<sup>3,9</sup>

Unfortunately, liver cirrhosis increases the risk of developing Hepatocellular Carcinoma (HCC), which is the most common type of liver cancer. Today, millions of people are progressing silently through the continuum of chronic liver disease to liver cancer.<sup>3</sup> A silent killer, the symptoms of HCC often remain undetected, only to be found when it's too late.<sup>9</sup> If this doesn't change, it is predicted that deaths from liver cancer will more than double by 2040, causing devastation among families and adding pressure to healthcare systems.<sup>10</sup>

### The crucial role of testing algorithms in the diagnosis of HCC

Innovations in diagnostics, and integrating these into existing laboratory and clinical environments are critical to ensure the

improvement in screening, detection, and medical management of hepatitis and to reduce the risk of liver cancer. Thanks to digitalisation, pioneering technologies are transforming the way HCC can be detected, enabling physicians to better predict a disease's prognosis and be more informed about treatment options for their patients at the outset. These innovations in science and digital diagnostics may lead to a new era in screening for HCC.

Testing algorithms can help to streamline the diagnostic process, minimise unnecessary testing, and improve the accuracy of diagnosis by reducing the risk of false-positive or false-negative results. The Gender-Age-AFP-DCP (GAAD) score is an algorithm used to diagnose early-stage HCC and save lives. It intends to provide a semi-quantitative result by combining in an algorithm - the quantitative measurements of the Alpha-fetoprotein assay and the PIVKA-II assay in human serum and plasma with gender and age. This communicates patients' risk factors, providing clinicians with more accurate information earlier to save more lives.

New digital approaches and technologies are connecting medical solutions, providers, and patients more closely than ever. This enables better insights and wider access – fast-tracking the digital evolution of healthcare. Like many other forms of digital diagnostics, this algorithm is a beacon of hope for those suffering the effects of HCC now and into the future by improving patient outcomes and potentially easing the burden on healthcare systems.

While there is no one-size-fits-all solution, technology and advanced diagnostic tools are transforming the way liver cancer is diagnosed, improving outcomes, and quality of life for patients everywhere.

# Shifting the paradigms in liver cancer care in China

In China, 80% of hepatocellular carcinoma (HCC) cases are diagnosed at an advanced stage, resulting in lost opportunities for radical treatment.<sup>1</sup> To address this issue, a public-private partnership with Zhuhai People's Hospital led to the launch of Project Pearl, which aimed to improve the early diagnosis rate of HCC in China.<sup>1</sup> The project successfully established a stratified management procedure for HCC screening and surveillance using a self-developed digital platform with highly-sensitive diagnosis indicators. This effort significantly increased the HCC early diagnosis rate to 95.2%, from the baseline of 30% at the Zhuhai site.<sup>1</sup>

Under Project Pearl, the Liver Disease Pathway (LDP) was developed - a digital

platform for liver disease management. The LDP digital platform provided a comprehensive evaluation of risk levels, conducted initial screenings including the use of abdominal ultrasound, AFP, PIVKA II, and GAAD evaluation, synchronised patient data in real time, and calculated risk levels efficiently. The platform also facilitated patient engagement through mobile apps, offering online consulting, tailored education articles, and lab report interpretation.

Launched in 2022, Project Pearl has enrolled 3,500 patients to date, with 21 patients diagnosed with HCC, 20 of which were at an early stage. This represents a significant increase in early diagnosis compared to the baseline. Additionally, 14% of the 2,030

risk-stratified patients were classified as high-risk for HCC and received a well-structured surveillance plan.

The increased early diagnosis provides better outcomes for patients. A standardised screening and management system improves early diagnosis and operational efficiency. As this strategy is scaled up among hospitals in China, it is expected to become the new standard of care for liver disease management.

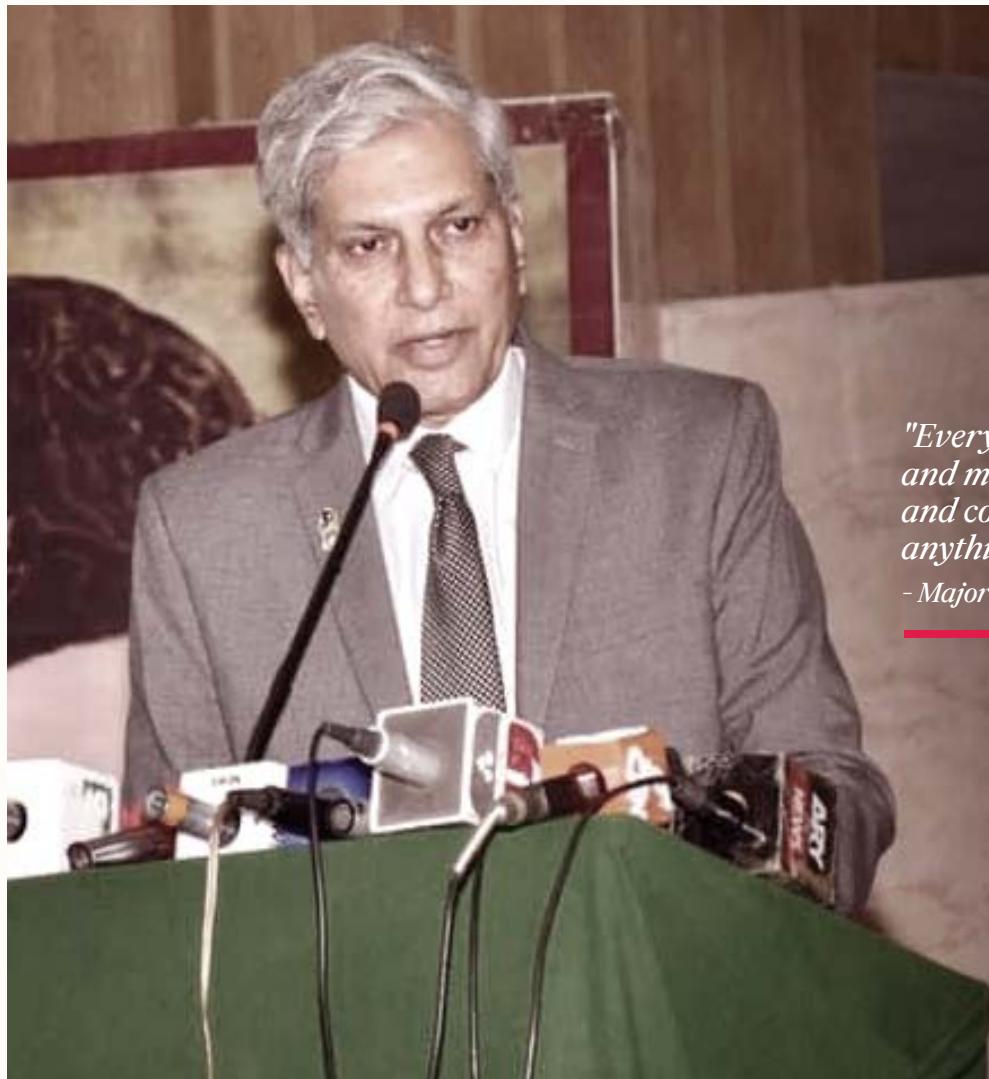


Major (r) Anwar ul Hussain Alvi

# Putting Patients at the Forefront of Hepatitis C Management in Pakistan

Major (r) Anwar ul Hussain Alvi shares his victorious triumph over hepatitis C and how it has shaped his purpose of helping others. Today, he is on the Technical Advisory Group in the government of Pakistan where he leads various awareness campaigns and helps to set up multiple testing services throughout the country.





*"Everyone deserves good health and must have the strength and conviction to fight against anything that comes in their way."*

- Major (r) Anwar ul Hussain Alvi

The diagnosis of hepatitis C was very unexpected for Anwar Alvi. Having first been diagnosed with appendicitis, Anwar Alvi was admitted to the hospital in 1998. For a fairly short and routine procedure like an appendectomy, nothing worse was expected. However, an error during this routine procedure led to a switch from an appendectomy to a complete colostomy. To make matters worse, his open surgical wound led to him contracting both tuberculosis (TB) and hepatitis C. However, he remained unaware of this and his health deteriorated further.

From August 2007 to April 2009, he was dealing with TB and hepatitis, lost more than 23 kilograms, was unable to walk without support, and suffered significant damage to his liver - to the extent that a liver transplant was his only option for survival. However, many doctors said that due to the immense strain on his body from his previous ailments, it would be very difficult for him to heal and surviving a liver transplant would be nearly impossible.

Despite hearing such devastating news, Anwar Alvi stood strong and battled every challenge that came his way. His determination to survive led him to search for a surgeon willing to perform the liver transplant. He finally found a surgeon in India. 15 May 2009 - A day Anwar Alvi will never forget - his son, Mr Muhammad Irfan ul Hussain Alvi, was his donor, and he underwent the liver transplant with the support of his doctor and family.

"In my journey, I've been deeply grateful for my family's unwavering support. However, not many patients have what I have. I hope to bridge this gap, to ensure that every person facing health challenges receives the holistic care and resources they need to thrive."

Anwar Alvi often mentions how important his family was during this journey and that he is incredibly grateful for their support. This is his motivation and life's mission - to empower and encourage as many hepatitis patients in Pakistan as he can.





## Understanding and managing hepatitis C in Pakistan

Anwar Alvi realised that, even in the late 2000s, there was little to no awareness of how hepatitis C occurs and how it can be managed.<sup>1</sup> This is especially concerning as some everyday activities can cause hepatitis. A study by Asian Medicine, conducted in the Islamabad–Rawalpindi metropolitan area, the fourth-largest metropolitan area of Pakistan, showed that most patients with hepatitis C had visited barber shops where old-fashioned razors are used. Also, a routine checkup at the dentist may make anyone a hepatitis C patient due to the lack of sanitation.<sup>2,3</sup> With nearly 9 million patients suffering from hepatitis, more must be done to improve awareness levels and testing rates in Pakistan.<sup>4</sup>

All this is worsened by the high levels of stigma surrounding hepatitis C. Many patients often feel like they are treated differently by their loved ones and colleagues once they reveal their diagnosis.<sup>5</sup> In another study conducted in Rawalpindi and Islamabad, nearly 20% of 140 patients reported feeling their loved ones alienated them and avoided conversations.<sup>6</sup> Female patients are often questioned about such a diagnosis and many worry about it spreading to their future children.<sup>7</sup> Such behaviour towards patients may discourage them from getting regular screening and treatment.

With timely diagnosis and proper treatment, hepatitis C is curable.<sup>8</sup> However, due to these barriers, it is left undetected and untreated.

From 2015 to 2019, there was a 5% increase in the number of deaths related to hepatitis C<sup>9</sup> in Pakistan. This set off alarm bells and led to the creation of a nationwide vaccination and testing program that aims to test as many Pakistanis as possible. The National Hepatitis Strategic Framework was launched in 2017.

While this program significantly increased the testing and timely diagnosis rate for many individuals, it was still widely city-based in the Punjab and Sindh regions.<sup>10</sup> Over 60% of the Pakistani population resides in remote and rural areas.<sup>11</sup> These areas not only have fewer facilities and access to healthcare services but in general, many of the residents here have never even heard of this disease.

Hence, to enhance the program further, the Technical Advisory Group within the Pakistani government started playing a stronger role.<sup>5</sup>

## Mitigating the challenges against effective disease management in Pakistan

The lack of funding often derails the efforts of the Advisory Group and prevents them from reaching the more remote areas in Pakistan. This is where multi-level stakeholder engagement becomes key. By working with global organisations such as the World Health Organization (WHO), leveraging collective resources, and learning from other countries such as Egypt and Japan, Pakistan can learn how to effectively

implement micro-elimination programs.

Anwar Alvi was an essential part of the Advisory Group where he led awareness campaigns all over Pakistan. These campaigns included speeches from clinicians and healthcare workers and informative pamphlets to educate individuals. As part of his lifelong dedication towards eliminating hepatitis C in Pakistan, Anwar Alvi used these campaigns to make everyone realise the importance of regular screenings and that with a timely diagnosis, they can beat this disease.

To him, it was important to address the situation with a two-pronged approach. Firstly, to address the main cause behind such high rates of infection, he encouraged safe and hygienic practices. Secondly, to decrease the infection rates, it was necessary to push individuals to get tested. While contributing to the Technical Advisory Group, Anwar Alvi also set up his organisation, LiverCare Society Pakistan, where he conducts awareness programs and helps patients by providing emotional and monetary aid. The LiverCare Society has been involved in testing programs in different parts of the country and also provides patients with treatment options beyond just Pakistan.<sup>12</sup>

“Everyone deserves good health and must have the strength and conviction to fight against anything that comes in their way.” Anwar Alvi has dedicated his entire life towards helping people and achieving new frontiers for liver disease management in Pakistan, and he will continue to do so. The work of Patient Advocacy Groups such as that of Anwar Alvi’s is essential for bridging the gap between patients and healthcare services. With stronger partnerships and more targeted efforts, the battle against hepatitis can be won.



A close-up portrait of a middle-aged man with light gray hair, smiling warmly at the camera. He is wearing a dark gray suit jacket over a white collared shirt and a patterned tie. The background is a plain, light-colored wall.

## Screening & Surveillance: Japan's Defence against Liver Cancer

With a proactive approach to early detection and management of liver cancer, Japan has implemented a nationwide surveillance program targeting high-risk populations and rigorous screening guidelines, with continuous government support.

Each year in Japan, around 41,388 new cases of liver cancer emerge, resulting in 26,420 deaths, making it the country's fifth most common cancer.<sup>1</sup> Despite this, Japan has emerged as a global leader in liver cancer surveillance due to its proactive approach to early detection. It is among 11 nations on track to eliminate viral hepatitis, the primary cause of liver cancer in the Asia-Pacific region, by 2030.

**Dr. Tatsuya Kanto**, Director General of The Research Center for Hepatitis and Immunology at the National Center for Global Health and Medicine, highlights the benefits of Japan's surveillance program, which has significantly improved patient care and optimised healthcare spending.

### What sets Japan's surveillance program apart, and what are the key factors contributing to its success in managing Hepatocellular Carcinoma (HCC)?

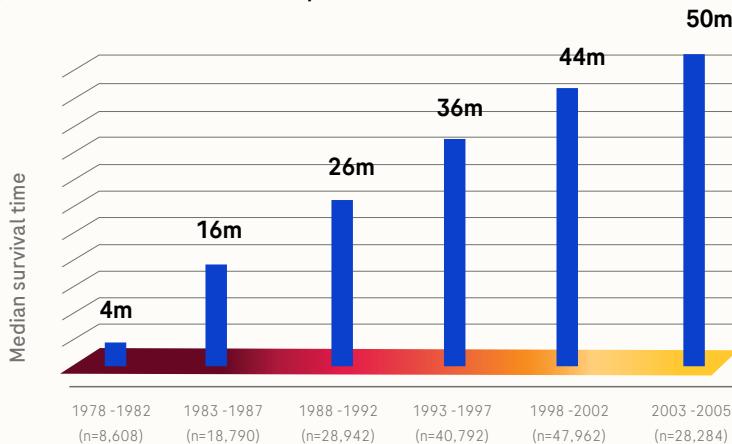
Japan's leadership in managing hepatocellular carcinoma (HCC), or liver cancer, dates back to the 1980s when it established a nationwide surveillance program. This program specifically targeted high-risk populations, including individuals with viral hepatitis and metabolic liver diseases like fatty liver, alcoholism, or type two diabetes. Notably, the program covered patient expenses and enforced rigorous screening guidelines, which included frequent tests at shorter intervals. Proactive screening and surveillance initiatives have led to a higher rate of detection of tumours at early stages, enabling the application of curative treatments, resulting in improved patient outcomes and extended survival rates. Around 62% of liver cancer patients in Japan are diagnosed at stages A and B, with up to 44% surviving beyond five years,<sup>2</sup> thanks to regular ultrasonography, tumour marker assays, and optional CT and MRI scans. A key to this success is the continuous evolution of government policies and funding support, underscoring Japan's commitment to combating liver cancer and improving public health.

**What preventive measures has Japan implemented, apart from its surveillance program, to address the progression of liver disease and liver cancer?**

In Japan, hepatitis C, constituting 60.3%, and hepatitis B, at 12.9%, were identified as the leading and third-most common causes of liver cancer between 2008 and 2016,<sup>3</sup> respectively. To combat the impact of these infections and reduce mortality rates from liver cancer, Japan has proactively implemented several countermeasures since the early 2000s. By instituting simple guidelines to identify individuals at risk and offering free hepatitis tests during routine health check-ups for citizens aged 40 to 70, Japan has substantially increased the rate of hepatitis virus screening. Notably, it has witnessed a decline in the estimated number of people with viral hepatitis - hepatitis B decreased from between 1.31 - 1.47 million in 2000 to 0.98 million in 2011, and for hepatitis C, it dropped from between 1.69 - 2.20 million to 1.58 million in 2011.<sup>4</sup>

Japan's effective management of liver disease is also attributed to a collaborative healthcare model. Local governments, particularly prefectural ones, have been instrumental in reducing regional disparities by leveraging their knowledge of local demographics, healthcare infrastructure, and cultural norms. This enables them to target resources and interventions effectively, maximising impact and promoting health equity. By closely collaborating with central authorities and other stakeholders, prefectural governments have contributed to the successful implementation of nationwide initiatives such as public education and

Five year survival rate for HCC in Japan



*"Japan's surveillance approach offers valuable insights for other nations grappling with the rising burden of HCC and related liver diseases."*

- Dr. Tatsuya Kanto



awareness campaigns, early screening promotion, and resource allocation for testing, treatment, and healthcare worker support. These multifaceted preventive measures have positioned Japan among the 11 countries poised to eliminate the hepatitis virus by 2030, representing significant progress in addressing more severe liver diseases on a national scale.

### How has Japan's surveillance program reduced the economic burden of HCC?

Investing in a well-funded surveillance program is essential for effectively managing the disease and achieving significant cost-effectiveness. The economic burden of HCC encompasses hospitalisation costs, outpatient care costs, lost worker productivity, treatment benefits, and societal costs. As the economic burden increases with disease progression, preventing disease advancement becomes crucial for cost reduction. Early detection and treatment play pivotal roles in achieving this, leading to substantial cost savings by avoiding expensive procedures such as liver transplantation and hospitalisation for advanced liver-related complications.

This ultimately reduces the overall burden of illness and improves patient outcomes. Analysis of the cost of illness (COI) in Japan reveals a downward trend, with a notable 33% decrease recorded in 2014 compared to 2002.<sup>5</sup> Loss of human capital due to death caused by HCC was the largest contributor to COI.<sup>6</sup> This suggests that the lower (and downward trending) COI in Japan could be attributed to the national surveillance program, which has led to earlier diagnosis and improved prognosis of HCC patients, demonstrating the cost-effectiveness of nationwide HCC surveillance.

Additionally, subsidy programs facilitate widespread access to testing, with local

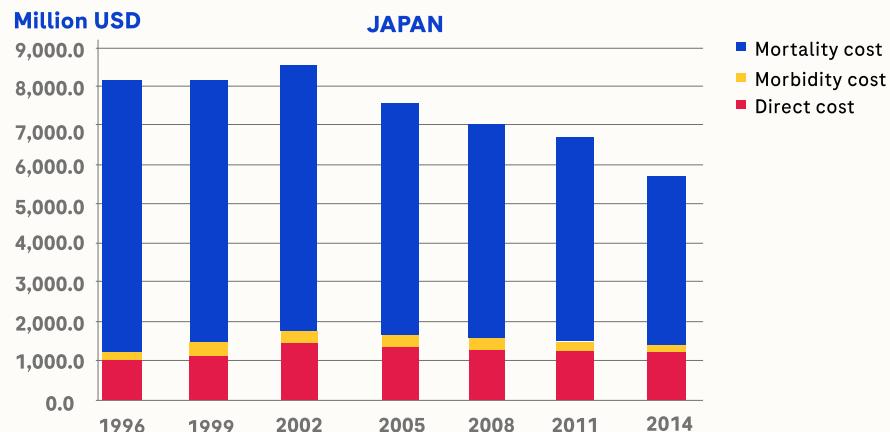
governments covering nearly all testing costs. In fiscal year 2022, the Ministry of Health, Labor and Welfare, allocated approximately USD \$176 million for hepatitis countermeasures, with nearly half of the budget (USD \$88 million) dedicated to treatment and a quarter (USD \$40 million) to testing. Subsidy programs are instrumental in covering the expenses of essential diagnostic tests like ultrasound and tumour marker tests for HCC testing and surveillance.

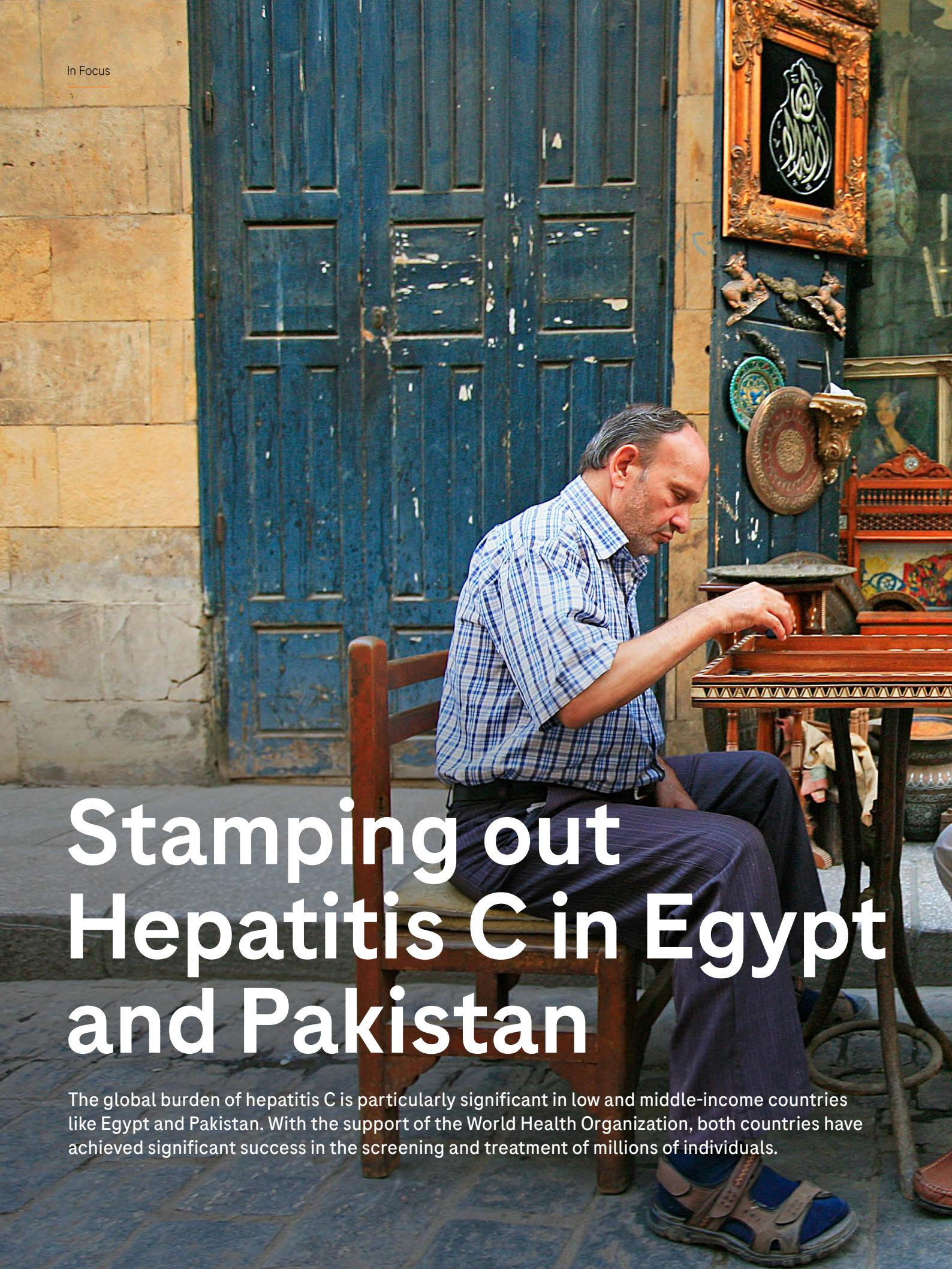
### What lessons can be learned from Japan's HCC screening programs, and how might they guide similar efforts in other countries?

Japan's surveillance approach offers valuable insights for other nations grappling with the rising burden of HCC and related liver diseases. While not all countries may replicate Japan's substantial budget allocations, establishing a national surveillance program is crucial. Public awareness initiatives like the *Shitte kan-en*<sup>6</sup> project featuring popular Japanese actors and singers have proven effective in encouraging early detection and treatment.

Delegating execution to local governments and prefectures ensures responsiveness to local needs, providing a framework for setting policy objectives, standardised guidelines, and mobilising resources. Investing in medical personnel training is also vital. In Japan, over 20,000 medical care coordinators across prefectures play a pivotal role in public education, patient support, and post-treatment follow-up, offering a blueprint for comprehensive liver cancer management. By blending national leadership with decentralised implementation and targeted investments, countries can construct resilient healthcare systems to tackle liver-related diseases effectively, ensuring quality care.

### Cost of Illness for HCC in Japan





# Stamping out Hepatitis C in Egypt and Pakistan

The global burden of hepatitis C is particularly significant in low and middle-income countries like Egypt and Pakistan. With the support of the World Health Organization, both countries have achieved significant success in the screening and treatment of millions of individuals.





Hepatitis C is a severe global public health problem; around 71 million people worldwide live with the hepatitis C virus but most of the disease burden can be found in low and middle-income countries. In Egypt, the country with the highest burden of hepatitis C, 10% of the population aged 15–59 years (up to 10 million people)<sup>1</sup> have a chronic infection. Pakistan has the second-highest infection rate<sup>2</sup> with more than 12 million people.<sup>3</sup> The high rate of hepatitis C in both countries stems from unsafe healthcare practices<sup>4</sup> such as the misuse of intravenous injection needles, often without being aware of it. With the WHO's call to eliminate hepatitis by 2030, the governments of Egypt and Pakistan have stepped up alongside other healthcare ecosystem partners to support the establishment of sustainable elimination programs to eliminate hepatitis C and provide robust and dependable diagnostic solutions.

### **Understanding the problem in Egypt**

Egypt's high rate of hepatitis cases stemmed from unsafe IV injection practices for the treatment of schistosomiasis, a disease caused by parasitic worms, from the 1950s to the 1980s.<sup>5,6</sup> In 2015, it was estimated that 6.3% of the population was living with hepatitis.<sup>7</sup> Faced with a tremendous healthcare and economic burden, in 2006, Egypt's Ministry of Health and Population (MOHP) created the National Committee for the Control of Viral Hepatitis (NCCVH) to help combat this vast epidemic.<sup>8</sup> With assistance from the World Health Organization (WHO), U.S. Centres for Disease Control and Prevention (CDC), and other stakeholders, the MOHP released the "Plan of Action for the Prevention, Care & Treatment of Viral Hepatitis, Egypt, 2014–2018" as a set of guidelines to battle hepatitis C and other forms of hepatitis.<sup>9</sup>

From 2014 to 2018, two million hepatitis patients were treated, but most of those infected were still undiagnosed. In 2018, Egypt embarked on an ambitious screening and treatment program, known as '100 million healthier lives', to detect and eliminate hepatitis by 2023.<sup>9</sup> Individuals positive for hepatitis antibodies were confirmed by PCR testing and treated with antiviral therapy.<sup>5</sup> With its current success in battling hepatitis, Egypt is now focusing on continued healthcare support, awareness, and education both locally and internationally.

# EGYPT NATIONAL HEPATITIS ELIMINATION PROFILE

# HEPATITIS C VIRUS

The National Committee for Control of Viral Hepatitis (NCCVH) set a national strategy in 2014 to make treatment paid for by the Egyptian government available for all and to scale up treatment to millions.



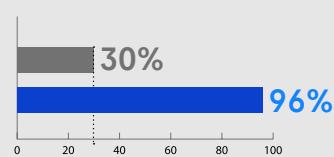
## THE HEALTH BURDEN OF VIRAL HEPATITIS

**450,000** **18,000**

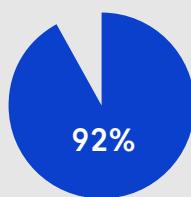
Living with hepatitis infection, 2021      Hepatitis - related deaths

## PROGRESS TOWARDS 2020 WHO ELIMINATION GOALS

■ WHO TARGET 2020 ■ EGYPT



Proportion of persons (>12 yrs) living with hepatitis diagnosed, 2021



Proportion of diagnosed persons who have initiated treatment



**4,000,000**

Number of people treated for hepatitis, 2014-2020



**1,600,000**

persons treated for hepatitis, 2020

## INNOVATIONS:

- Web-based online registration system to efficiently manage appointments
- Founding of the National Network of Treatment Centers

## ACHIEVEMENTS

- Launch of 100 Million Healthy Lives program in 2018
- Daily screening of 240,000 people in 77 testing sites all over Egypt
- Implementation of Universal Hepatitis Testing Policy
- Mass screening of 61 million adults and 9 million children
- Screening is free of charge

## NEXT STEPS TOWARD ELIMINATION

Continue to focus on HCV prevention



Improving blood safety



Reduce demand for unnecessary injections



Auto-disposable syringes



Emphasising infection control



Leveraging mass media campaigns

Implement hepatitis screening for at-risk individuals who missed the national screening program.



Drug users



Dialysis patients



Immune compromised



## Developing Hepatitis C elimination programs in Pakistan

Lessons learned from Egypt's hepatitis elimination strategies helped to shape Pakistan's national hepatitis elimination program through collaborations with private and public stakeholders in the country. In 2019, the Pakistani government announced its hepatitis elimination program, with an ambitious goal to screen 138 million people by 2030. The use of high-throughput molecular PCR systems in northern, central, and southern areas of Pakistan has been playing a key role in strengthening the diagnostics infrastructure across the country along with the development and delivery of health economic research and awareness campaign materials across various media platforms to support decision making.

The disease elimination program included targeted activities and collaborations with local NGOs, conducting local clinical studies and rolling out of these awareness campaigns across the country.

## Nationwide upsurge in screening in Egypt and Pakistan

By the end of 2019, the hepatitis elimination program had wide success all over Egypt, and the number of hepatitis tests started to decrease accordingly. As of July 2020, Egypt had screened more than 60 million people for hepatitis. As of March 2022, over 460,000 people in Pakistan have been screened through the hepatitis control programs led by the provincial governments of Punjab and Sindh.

These impressive results demonstrate what can be achieved through a nationwide hepatitis screening, monitoring, and treatment campaign by a country with extensive domestic and international collaboration.

# PAKISTAN

## NATIONAL HEPATITIS ELIMINATION PROFILE

# HEPATITIS C VIRUS

The vision of the NHSF 2017-21 is "In Pakistan; viral hepatitis transmission is halted and everyone living with viral hepatitis has access to safe, affordable and effective prevention, care and treatment services."



### THE HEALTH BURDEN OF VIRAL HEPATITIS



**9,800,000**

Living with hepatitis infection, 2021

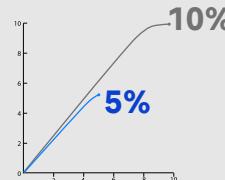


**17,644**

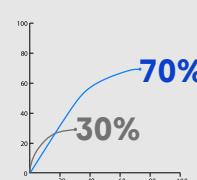
Hepatitis - related deaths

### PROGRESS TOWARDS 2020 WHO ELIMINATION GOALS

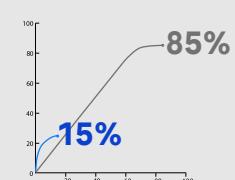
■ WHO TARGET 2020 ■ PAKISTAN



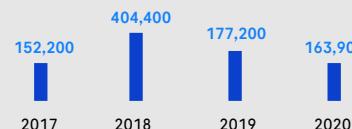
Percentage change in new deaths, 2015-2020



Proportion of persons living with hepatitis diagnosed, 2021



Proportion of persons diagnosed with hepatitis treated, 2021



Number of persons diagnosed with chronic hepatitis , 2017-2020

**2.6M**

Number of persons treated for hepatitis , cumulative, 2004-2020

*"Egypt and Pakistan's impressive results demonstrate what can be achieved through nationwide screening, monitoring, and treatment programs by a country with extensive domestic and international collaboration."*

### ACHIEVEMENTS:

- Anti-hepatitis testing is free-of-charge in the public sector.
- The Prime Minister set a target for July 2020 to June 2025 to screen 50% of the eligible population, aiming to reach 69M persons with Anti-hepatitis screening and 5.15M with PCR confirmation testing.

- A model community-based hepatitis based, "Test and Treat" programme is underway in Punjab province.
- An ambitious hepatitis programme aims to treat 9.8M patients by 2030.

### NEXT STEPS TOWARD ELIMINATION



Evolve a comprehensive monitoring and evaluation framework for provincial hepatitis elimination programs



Improve implementation of standard guidelines on blood transfusion, reuse of syringes and needles for tattooing and ear piercing, and insufficient sterilisation of potentially contaminated surgical and dental equipment



Build on early micro-elimination and hepatitis programs to scale-up HCV testing



Large-scale mass media campaigns to reduce demand for injections to lower risk of transmission

Dr Bao Toan Nguyen

# Leading the Way for HCC Surveillance and Diagnosis



**In Vietnam, late-stage diagnoses of hepatocellular carcinoma (HCC) are common due to limited awareness and screening methods, leading to significant financial and health burdens. Learn how innovation in diagnostics has enhanced patient outcomes and early detection of HCC.**

Hepatocellular carcinoma is a silent killer. Symptoms remain undetected, often only to be found when it's too late.<sup>1</sup> Less than 16% of patients diagnosed with late-stage disease survive more than 5 years.<sup>2</sup> In Vietnam, 60% of individuals with HCC are unfortunately diagnosed at the later stages.<sup>3,4</sup> This means that nearly 12,000 people have to deal with the consequences of a delayed diagnosis.<sup>5</sup> This is due to an array of factors like a lack of awareness of HCC, effective screening methods and inconsistent screening behaviour.<sup>6</sup> Being a low and middle-income country, having such a high HCC burden in Vietnam creates significant financial turmoil for individuals and the government with an annual expenditure of nearly USD \$2000 per patient.<sup>7</sup>

*"As the bedrock of healthcare, improvements to the diagnostics infrastructure are therefore key to ultimately improving the management of HCC at scale."*



Diagnosing HCC as early as possible is essential to improving patient outcomes, and reducing the financial burden on the nation. 30% of the state budget is currently allocated to healthcare and often, even this amount is insufficient.<sup>8</sup> In 2020, government healthcare expenditures came up to an average of 2% of the GDP, nearly 7 billion USD.<sup>9,10</sup>

As Lab Manager for MEDIC Center, the largest private lab group in South Vietnam, Dr Bao Toan Nguyen saw that more robust testing was required. While recent developments in screening and treatments are making advances in the prevention, diagnosis, and treatment of HCC, clinicians still face challenges in diagnosing the disease early enough. Innovations in diagnostics, and integrating these into existing laboratory and clinical environments are critical to ensure the improvement in screening, detection, and medical management of liver cancer.

Dr Nguyen took it upon himself to lead the adoption of immunoassays into testing procedures to improve the early detection of HCC, the most common type of cancer in Vietnam.<sup>11</sup> His goal was to reduce HCC-related mortality by promoting early tumour detection and facilitating curative treatments.

HCC surveillance in Vietnam relies on ultrasound and the Alpha Fetoprotein (AFP) Tumour Marker Test; this method has limitations in detecting early-stage HCC as readings can be compromised by obesity, fibrotic changes, and even the quality of the device or user experience.<sup>12,13,14</sup>

### The role of biomarkers in aiding more effective and early diagnosis

Protein induced by vitamin K or antagonist-II (PIVKA-II) has been identified as a promising biomarker with utility in the surveillance, diagnosis, and management of HCC.<sup>15,16</sup> PIVKA-II is an early version of a protein called prothrombin. It's abnormal and appears differently from the usual prothrombin. It is detected in people with liver diseases like hepatitis and cirrhosis,<sup>8</sup> and the assay is used as an aid in the diagnosis of hepatocellular carcinoma (HCC).

Testing for PIVKA-II can deliver higher sensitivity for earlier detection of HCC when paired with testing of the AFP protein compared to AFP testing alone.<sup>17</sup> In labs around the world, PIVKA-II testing is supplementing these older approaches because it enables clinicians to diagnose patients earlier and get them started on

treatment when the odds of survival are the highest.<sup>18</sup>

Through the efforts of Dr Nguyen, clinical doctors now combine PIVKA-II and AFP for HCC diagnosis and surveillance at the MEDIC Center. The overall sensitivity for HCC detection is 92% at a specificity of 82%, improving the diagnosis rates at the MEDIC Center by 40%.<sup>11</sup>

Liver cancer certainly hasn't been cured, but progress has been made. The chance of a timely diagnosis for improved patient outcomes has definitely improved. Changemakers like Dr Nguyen are essential advocates to leverage newer technologies and testing methods to improve the accuracy of detection and enable earlier diagnosis. As the bedrock of healthcare, improvements to the diagnostics infrastructure are therefore key to ultimately improving the management of HCC at scale.

Together with the availability of new and more effective treatments, there is more hope to improve the life expectancy for people with HCC than ever before.

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