



LIVER HEALTH  
IS PUBLIC HEALTH

# GLOBAL STATE OF LIVER HEALTH

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# LETTER FROM DONNA R. CRYER, JD

More than most people realize, the liver is central to much of the function of the body. Yet it is not well understood by the majority of people and not well protected by most health systems across the globe. I know this all too well – after my own life was threatened by an autoimmune liver condition, a liver transplant gave me a second chance at life. I founded Global Liver Institute (GLI) twenty years later so that one day, no one else has to go through what I did. We help people have the tools they need to take care of their livers, and we know health systems and governments can do a lot to facilitate this for their people.

Throughout the years, GLI has trained hundreds of patient advocates, continued to regularly convene dozens of leaders in the liver health field, called global attention to the prevalence of nonalcoholic steatohepatitis (NASH), and fought for policies that protect liver patients. While our mission remains the same, we have added our vision, **for liver health awareness to be universal and for liver disease to take its proper place on the global public health agenda consistent with its prevalence and impact**. The necessity of this vision has become more evident with each year.

The **Liver Health is Public Health** initiative is GLI's direct response to the world's failure to meaningfully prioritize liver health. Along with several of the most dedicated and respected organizations in both hepatology and intersecting specialties, we will rouse a global conversation about liver health, beyond the circles that traditionally focus on liver disease, to draw the liver to the top of the health agenda for governments, NGOs, and the general public. Everyone who can make a difference in liver health must be spurred to change, from the people deciding how to allocate research funds to the people shopping for food for a household.

We are proud to launch the first edition of **The Global State of Liver Health** as a cornerstone of the **Liver Health is Public Health** initiative. To know where we need to go, as a society, we must first examine where we are. Through reporting, evaluating, and analyzing, this resource will establish the state of liver health across the world. We will



identify best practices by comparing and contrasting different areas of disease across geographical regions and highlight the invaluable work of clinical and patient groups and other networks. Thus this report can serve as a tool to policymakers, key clinical groups, patient groups and the media to stimulate discussion and spark change for the better.

I am grateful to the experts who have lent their time and insight to this momentous report. The perspectives from each contributor are essential to represent the vast global landscape of liver health.

Promoting liver health to prevent chronic conditions and connecting those with liver disease to effective diagnosis and treatment may seem formidable expenses today, but, as with most thoughtful preventive measures, will undoubtedly reduce future economic and social costs for the world.

Thank you for taking the time to read this report and to open your eyes to the reality of liver disease for our global community.

**Donna R. Cryer, JD**  
Founder, President, & CEO  
Global Liver Institute

# INTRODUCTION

Despite meaningful advances in the diagnosis and treatment of liver disease in recent decades, many things remain nearly unchanged. Liver disease is still under-diagnosed, misrepresented and stigmatized. Advanced liver diseases, especially liver cancer, suffer from poor outcomes. There is also limited public knowledge about the danger that soaring rates of obesity pose the health of our livers.

Far too many patients have been failed on a clinical level, as well. We hear of patients receiving liver transplants but unable to obtain the immunosuppressant medications that will keep them alive, while patients in other countries are charged unfeasibly high fees to receive the basic hepatitis tests that would prevent the spread of the virus.

Liver disease thus places a sizable economic burden on communities across the world. This takes many forms: for instance, the many thousands of parents taking time off work to care for sick children, the loss of productivity caused by the millions living with NASH, or the developing countries that see significant portions of their working-age population succumb to liver cancer. Liver disease also increases the cost and outcomes of treating cardiovascular disease (CVD) and diabetes – for

example, one recent study in India showed that diabetes was present in nearly 12% of all patients recently diagnosed with chronic liver disease.

Nonetheless, several countries still have no policy on underage drinking, and too many governments have no public health policy on obesity and its link to nonalcoholic fatty liver disease (NAFLD). Liver disease, it appears, is simply not a public health priority today, tomorrow or in the foreseeable future.

This oversight has led the world directly to the public health catastrophe we now face:

- Today, **844 million people around the world are living with chronic liver disease**, which results in two million deaths per year<sup>1</sup> – including 700,000 from liver cancer<sup>2</sup> and 1.1 million from hepatitis B and C infection.<sup>3</sup>
- Globally **1 in 4 people are impacted by NAFLD** and of those, 1 in 5 will go on to develop the more advanced liver condition NASH.<sup>4</sup>

As this tide of liver disease swells in regions around the world, it, despite varied etiologies, places similar burdens on both patients and healthcare systems.



## A NOTE FROM THE LIVER HEALTH IS PUBLIC HEALTH PROGRAM DIRECTOR

- Giacomo Donnini

This report, of course, can only begin to represent the many factors that contribute to liver health globally. The world comprises diverse communities in a myriad of cultural and geographic pockets; each of these communities draws upon a distinct set of resources to face its own particular challenges to liver health. Even within similar geographies, cultural, historic, and political differences create vastly different landscapes for the liver health of a population. Through this preliminary edition of the report, we begin to establish the global trends by investigating a selection of countries in a wide range of situations. Recognizing that not all countries are presently reflected in this report, we look forward to incorporating insights from additional countries and perspectives in the future.



# EUROPE

 **750 MILLION**  
people



## HEALTH OVERVIEW

Covering 10.53 million km, Europe is the second most densely populated continent after Asia.

The many countries of Europe straddle a widely varying range of economic indicators. The top four economies, Germany, UK, France and Italy, between them hold more than 50% of the share of the European GDP, and annual GDP per capita ranges from US\$143,000 dollars (Liechtenstein) to \$14,150 (Ukraine).

Across Europe, healthcare is the responsibility of, and administered by, individual countries and virtually all provide some form of universal healthcare. Funding is either wholly or partly by taxes, sometimes supplemented with varying forms of point of care payments.

Health spending per head varies widely across the continent, with Norway and Germany coming out top at around €4,500 per capita. Italy, despite being the fourth largest economy in Europe, spends nearly 45% less at €2,470.

Sources: International Monetary Fund: World Economic Outlook Database

## LIVER HEALTH OVERVIEW

According to a recent commission report published in the Lancet, chronic liver disease led to 287,000 deaths in Europe in 2019, of which 63,500 were due to primary liver cancer.<sup>5</sup>

Liver-related deaths accounted for 3% of all deaths in Europe in 2019, which is an increase from the 204,000 deaths in 1990 (2%-3% of all deaths).<sup>5</sup> These changes equate to a 25% increase in deaths due to chronic liver disease and a 70% increase in deaths to primary liver cancer.<sup>5</sup> After ischaemic heart disease, liver disease is now the second biggest cause of deaths of people of working age in Europe.<sup>5</sup>

Obesity rates across the continent are, in line with the rest of the world, rising quickly. According to a World Health Organization Report released in May 2022, Europe has the second highest rates of obesity globally, after America.<sup>6</sup> Across Europe as a whole, 21.8% of men and 24.5% of women are deemed obese, with the UK leading the way (26.9% of men and 28.6% of women).<sup>6</sup>

Obesity is currently responsible for around 1.2 million fatalities in the region each year – around 13% of all deaths – and predicted by the WHO to overtake cancer as the leading cause of death in the next decades.<sup>6</sup>

The WHO notes that the European Region has the highest proportion in the world of total ill health and premature death due to alcohol. One-fifth of the European population aged 15 and above report heavy episodic drinking (five or more drinks on one occasion) at least once a week. Binge drinking is widespread across all ages and across all the countries of Europe, not just those in the North.<sup>7</sup> More than 50% of all end-stage liver disease across Europe is due to unhealthy alcohol consumption.<sup>8</sup>

**Chronic liver disease led to**  
**287,000** Deaths  
**63,500** Due to Liver Cancer

## EUROPE



Obesity is responsible for  
**1.2 MILLION**  
fatalities in the region each year

There have, however, been some success stories across Europe, most notably in the vaccine and treatment programs introduced to combat viral hepatitis, including childhood vaccination against the hepatitis B virus (HBV) and antiviral drugs to combat the hepatitis C virus (HCV). So, although it is currently estimated by the European Centre for Disease Control (ECDC) that more than 10 million Europeans may be living with chronic HBV or HCV, the prevalence of chronic HCV is estimated to have declined, perhaps by as much as a third, in many western European countries during the past five years.<sup>9</sup>

Liver disease is now a major threat to public health in every country across Europe. Yet the three main causes of liver disease – viral hepatitis, obesity and alcohol abuse - are all preventable. A concerted commitment to address the need for education around obesity and alcohol, intervention programs, early detection, readily available and free vaccinations and treatments could save the lives of almost 300,000 people across Europe each year.<sup>5</sup>



Liver disease  
is a **major**  
**threat to**  
**public**  
**health**  
across  
Europe



# BULGARIA

**Population:** 6,916,548 (2021)

**GDP Per Capita:** US\$11,635  
Almost half of Bulgarian households say they find it difficult to cover healthcare costs.


**Life Expectancy:** 71.1 years (men) 78.2 years (women)

**Healthcare Spending:** 8.1% of GDP


**Healthcare Funding:** A mix of a compulsory social health insurance (SHI) scheme with additional 'out of pocket costs' (mainly for medicines and medical devices) borne by the individual. A small number of voluntary health insurance schemes. An estimated one million Bulgarians have no health insurance, and out of pocket spending is 2.5 times the EU average.<sup>10</sup>

Source: EC Commission Report: The State of Health in the EU, Bulgaria: Country Health Profile 2021






**€3580**  
Average Income Per Household



**8.1%**  
of the GDP is spent on Healthcare



**71.1 years (men)**  
and **78.2 years (women)**  
Life Expectancy

Collating data on the causes, epidemiology, treatment pathways and outcomes around liver disease in Bulgaria has proven to be a challenge. Bulgaria's first National Cancer Plan for example, published in May 2022, made no specific mention of liver cancer even though Bulgaria ranks eighth in the WHO European Region for alcohol consumption, which is closely tied to liver cancer.

A search for figures on autoimmune liver disease proved to be fruitless. Likewise, it has proven impossible to establish the economic burden of liver disease to the Bulgarian people.

The Global Nutrition Report estimates that 26.3% of adult women and 28.3% of adult men in Bulgaria live with obesity. This is higher than the regional average of 25.3% for women and 24.9% for men (an average of 25.1%). At the same time, diabetes is estimated to affect 7.6% of adult women and 9.7% of adult men (an average of 8.65%).<sup>10</sup>

Assuming that the prevalence rate for nonalcoholic fatty liver disease (NAFLD) is around 60% in high-risk populations including the obese and those with diabetes, it could be estimated that around 2.1 million Bulgarians are living with the condition.<sup>11</sup>


According to the Organization for Economic Co-operation and Development (OECD), Bulgaria has one of the highest levels of alcohol consumption – 12.7 liters of pure alcohol per capita per year.<sup>12</sup> The WHO International Agency for Research on Cancer cites 640 cases of liver cancer in 2020.<sup>13</sup>

The National Program for the Prevention and Control of Hepatitis was finally implemented in 2021, after a nine-year campaign by the HepActive Patient Association Bulgaria and other patient and clinical groups. The current plan (running from 2021-2025) aims to test all adults between the ages of 40-65 for HBV and HCV every five years.

In 2021 there were


**13**

**Liver Transplants**



**26.3%**  
OF ADULT WOMEN

**28.3%**  
OF ADULT MEN



in Bulgaria live with obesity

There have been compulsory vaccinations for all newborn children against HBV since 1992. However, these rates are dropping. In 2011, 96% of newborns completed the course of vaccinations but, in 2018, that number had fallen to 85.1%.

There is currently no national or regional register for chronic viral hepatitis but, there were 2,249 cases of acute viral hepatitis registered in 2019, over 50% of which were specified as caused by hepatitis A.

According to data from the Polaris Observatory, in 2020 1% of the population of Bulgaria (around 86,000) people were living with HCV, and 3% (around 227,000) with HBV (2016 figures). They estimate that 19% of HCV are diagnosed and there are 412 deaths each year from the disease. Only 13% of HBV infections are diagnosed, 3% are treated, and there are 93 deaths each year.<sup>14</sup>

In 2021 around 540 people were being actively treated for HCV and 2,300 for HBV. This represents a drop in numbers from 2019, which has been directly attributed to a cessation of the screening program during COVID-19.<sup>14</sup>

Liver transplants are extremely rare in Bulgaria. The register of the Executive Agency Medical Supervision records that, between 2016-2019, only 41 liver transplants took place in Bulgaria. There were 13 liver transplants in 2021.<sup>5</sup>



## LIFE ON THE FRONT LINE OF LIVER DISEASE IN BULGARIA

## BULGARIA

Silvana Lesidrenska has been the President of the HepActive Patient's Association, Bulgaria since 2012. She lives with chronic hepatitis B and campaigns for improved treatment for hepatitis and liver disease patients.

Ms. Lesidrenska says: 'In Bulgaria, nearly all medicine is clinic-based, doctors and hospitals are paid by the government according to the numbers of procedures and tests they carry out. The downside

of this is that, sadly, the patient often undergoes needless hospital-based tests which could easily be carried out on an outpatient basis or, sometimes, are not needed to begin with. For example, patients may have to be admitted twice a year for three days just to undergo a simple blood test, missing out on work and family life. I am relatively lucky because my doctor only admits me for a few hours for my blood tests. Others are not so fortunate.'

## FEW STATISTICS BUT MANY CHALLENGES TO LIVER HEALTH

### LACK OF DATA:

There is currently no national register for the number of patients living with viral hepatitis, liver cancer or autoimmune liver disease, NAFLD or NASH. There is no data on long term patient outcomes in liver disease either by disease or region. Hospitals and clinics are not required to keep data on their patient outcomes.



### HEALTH SPENDING IS CONCENTRATED ON HOSPITAL/IN PATIENT CARE:

Because of a system that rewards state and private hospitals and doctors for inpatient care, inpatient spending took up 40% of the health budget in 2019, almost double that of other European countries, with outpatient care only accounting for 18.3%.<sup>16</sup>



In order to receive a hepatitis blood test check, a healthy patient will have to spend up to three days in the hospital twice a year. After a five-year court battle, which was contested by the hospitals, patients with well-managed HCV are no longer required to have a mandatory liver biopsy, although this is still required for HBV.

### HIGH BURDEN OF 'POINT OF CARE' PAYMENTS:

State spending accounts for around 60% of all health spending. This leaves nearly 40% to be covered by the individual at point of care – one of the highest rates of out-of-pocket payments in Europe. The majority of this spending is on medicines. Many patients, particularly those who are uninsured, may struggle to pay for vital treatments. This is particularly relevant for liver disease which tends to be a chronic condition often requiring lifelong medication.



### HIGH NUMBER OF UNINSURED AND VULNERABLE PATIENTS:

The Ministry of Finance estimates that around 10% of the population are not paying into the social health insurance (SHI) scheme and are therefore uninsured. These include the long-term unemployed and those unable to obtain a national identity card. These populations are more likely to experience lifestyle and living conditions that are implicated in liver disease, including poor nutrition and sanitation, alcohol and drug abuse.



### REFERRAL QUOTAS:

GP and clinic referrals to specialist centers for tests and diagnostic procedures are subject to a quota system that often results in patients paying for the procedures themselves, or if they are unable to pay, going without. Effective ongoing management of liver disease relies heavily on lifelong liver function and other crucial tests. Without these, patient outcomes will most likely be greatly reduced.



### LACK OF PALLIATIVE CARE:

Palliative care in a hospital setting is rationed to 22 days within the SHI scheme. End-stage liver disease requires specialist palliative care to include treatments for many potentially distressing complications.



### POSITIVE CHANGES:

The Bulgarian government is planning a €310 million investment to modernize state hospitals and to upgrade diagnostic and other equipment.



## OVERVIEW

# UNITED KINGDOM

**Population:** 67,886,000 (2022)

**GDP Per Capita:** US\$47,334.40

**Life Expectancy:** 79.0 years (men)  
82.9 years (women)

**Healthcare Spending:** 11.9% of GDP

**Healthcare Funding:** Funded through general taxation and National Insurance contributions. Patients, with some exceptions, contribute via prescriptions costs and dental treatment. Private health insurance schemes are available, and most private hospitals accept a mix of private and the National Health System (NHS)-funded patients.

*Source: World Bank*



67,886,000  
Population



**£31,400**  
Average Income  
Per Household



**79 years (men)**  
and **82.9 years (women)**  
Life Expectancy



**11.9%**  
of the GDP is spent  
on Healthcare



Since 1970, deaths due to liver disease in the UK have increased by 400%-almost fivefold.<sup>17</sup> Overall, it is estimated that 600,000 people in the UK are living with serious liver disease. Liver disease itself is set to overtake CVD as a main cause of premature death in the UK.<sup>16</sup>

However, some areas of liver disease are better served statistically than others. Data are readily available on the prevalence and incidence of liver cancer and viral hepatitis, but incidence and prevalence of **NAFLD** and prevalence of **NASH** are generally estimates. With the rapid increase in obesity seen in recent years, these figures are generally accepted to represent a significant underestimation of the real statistical picture around NAFLD and the danger this represents.

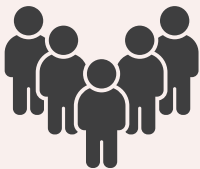
Indeed, one in four adults in the UK are now classified as obese,<sup>18</sup> with adult obesity rates the sixth highest in the OECD (26.9% compared to an OECD average of 19.4%).<sup>19</sup>

The overall costs of NAFLD and NASH in the UK was estimated in 2016, as £5.24 billion of economic ('direct') costs and £26.03 of billion well-being ('societal') costs. NAFLD is set to overtake alcohol as the main cause of liver disease in the next few years.<sup>20</sup>

However, the UK government, similar to many developed countries, has continued to focus efforts and budgets on raising awareness of the link between obesity and type 2 diabetes (T2D) rather than obesity and NAFLD.

As a result, there is a real lack of awareness of the condition including the causes, comorbidities, and the consequences of the condition. Worryingly, this poor awareness is not just seen in the general public, who have a one in five risk of NAFLD, but also in high-risk groups such as patients with T2D who have a prevalence of NAFLD of around 70% (see page 11 for Pilot Study).<sup>21</sup>

180,000  
PEOPLE  
are living with chronic hepatitis B



Along with NAFLD, alcoholic-associated liver disease (ALD) accounts for much of the rise in the rates of liver disease in the UK, with the number of hospital admissions due to ALD increasing by 57% since 1970. In the last 15 years alone, admissions have nearly doubled, from 13,201 in 2004 to 24, 544 in 2020/21.<sup>22</sup> According to the British Liver Trust, alcohol consumption is now the most common cause of liver disease in the UK, accounting for 60% of all liver disease cases.

However, although awareness levels of the risks of alcohol abuse have risen, alcohol consumption shows little sign of reducing, and the incidence of alcoholic-associated liver disease continues to rise.

Viral hepatitis is contained and well-managed in the UK with well-established and effective national strategies for prevention and control. The HBV vaccination program is available for all new-born babies as well as high risk adults. Vaccination against hepatitis A virus not usually offered as the rates are so low. Hepatitis E virus are low, with around 1,200 registered infections in 2019.<sup>23</sup>

Around 180,000 people are living with chronic HBV infection in the UK and 95% of new infections are now found in individuals who were infected overseas, including during early childhood.<sup>24</sup> The number of people living with chronic HCV infection in England has fallen by 37% since 2015, to 81,000 in 2020.<sup>25</sup> Hepatitis D is rare in the UK.

The incidence of liver cancer is rising exponentially in the UK. Between 1993-1995 and 2016 and 2018, liver cancer increased by 141% in females and 171% in males.<sup>26</sup> Rates are still climbing and expected to continue to do so, driven by alcohol consumption and obesity.

Each year, around 6,000 cases of primary liver cancer are now diagnosed in the UK, making a once relatively rare cancer the 8th most common cancer. Outcomes are poor, with 40% of males and 36% of females surviving for one year after diagnosis, though five-year survival rates are 13%. There are 5,800 deaths each year.<sup>26</sup>

The UK spends less than almost any other western European country on cancer (and nearly half the amount of Austria, the top spending country).<sup>27</sup> This relatively low level of investment impacts on diagnostic services and medicines and, ultimately, on UK survival rates, which are lower than those in other similarly wealthy countries.

Autoimmune liver diseases are classed as rare and have, up until recently, been under-diagnosed and under-resourced. There are now guidelines for primary biliary cholangitis (PBC), (which is thought to affect around 20,000 people in the UK), autoimmune hepatitis (AIH) (10,000) and primary sclerosing cholangitis (PSC) (less than 1,000). However, some patient groups argue that these guidelines are not always followed, and good treatment can be sporadic and location-dependent.<sup>28</sup>



Each year, around  
6,000  
CASES  
of liver cancer are diagnosed in the UK



Alcohol  
Consumption  
is now the most common  
cause of liver disease in the UK

PILOT STUDY IN AN OUTPATIENT  
DIABETES CARE SETTING

A recent pilot study, led by Professor Saima Ajaz, carried out by Kings College Hospital London at an outpatient Diabetes Care Center in South London, set out to evaluate the awareness of NAFLD knowledge, the prevalence of it, and the prevalence of advanced fibrosis in patients with T2D who regularly attend a secondary diabetes clinic.

The pilot study used the Fibroscan method to examine the livers of 90 T2D patients and questioned them about their awareness of NAFLD/ NASH.

In total, 85.6% (87) patients were unaware of NAFLD/ NASH. Of the 87 valid scans, 56.3 % of patients had steatosis and 27.6% already had advanced fibrosis, which required referral to a specialist liver center. The authors of the pilot study concluded that this group of high-risk patients were 'mostly unaware of this silent epidemic' and called for 'better screening of patients who are already in our healthcare system due to other pre-existing conditions.'



## NAFLD, NASH AND ALD: A LOOMING CRISIS IN UK HEALTH

Dr. Saima Ajaz is a gastroenterologist at Kings College Hospital and Honorary Senior Clinical Lecturer at the School of Immunology and Microbial Sciences, Kings College London. She runs clinics for patients with NASH.

‘In the UK millions of pounds have been poured into raising awareness of T2D and CVD, yet the same has somehow not happened with NASH and NAFLD. As a result, we have a huge lack of awareness of these conditions and crucially, the link with obesity. This is not just true of the general public: A recent informal survey carried out at our hospital found that only 20% of hospital staff were aware of what NASH was, and, if indicative of clinicians as a whole, we can see that there is definite need for more education on these diseases.

‘Further, we are clearly underdiagnosing NAFLD and NASH, even in high risk populations as demonstrated by our recent pilot study. Additionally, we do not have an effective screening program. Even our high-risk populations, such as those with diagnosed T2D and metabolic syndrome are not being regularly screened, while other at risk populations – for example the overweight and obese – are extremely unlikely to be offered any liver screening until and unless they are admitted to secondary care. Finally, we have no established patient treatment pathways between primary and secondary care and, as a result, the specialists often don’t see patients until the disease is quite advanced.

“ Here in the UK **millions of pounds have been poured into raising awareness of T2D and CVD**, yet the same has somehow not happened with NASH and NAFLD. DR. SAIMA AJAZ ”

‘However, it is important to point out that preventing liver disease is only partially a clinical issue. In general, and as a society, we are not dealing well with obesity. It is still something we don’t like to talk about or address, often the obese person and their family will be in denial. There is little education at school level and clinical advice usually consists of telling the patient to lose weight and come back when they have. That is not an effective way to see change.

‘In my experience, no one wants to be overweight, most people at least try to lose weight, but it can be a very difficult thing to do for a variety of reasons. It can be down to economic issues, or the person may be immobile and unable to exercise, and depression, or loneliness or stress can all lead to overeating.

Likewise, as a society we tend to look on alcoholic-associated liver disease as being the ‘fault of the patient’ rather than a manifestation of economic or mental health or life issues. This stigma discourages people from asking for help, or seeing their doctor, or attending alcohol support clinics. As a result sadly, we often only see patients with ALD when the disease is far advanced and much harder to treat.’

## AN EIGHT-POINT PLAN FOR AVERTING A DISASTER IN LIVER DISEASE

- #1 FUND A ROBUST COST BENEFIT TRIAL**
- #2 RAISE AWARENESS OF NAFLD AND NASH**
- #3 TACKLE THE OBESITY CRISIS**
- #4 ESTABLISH AND RESOURCE AN EFFECTIVE DIAGNOSTIC SCREENING SYSTEM**

- #5 HARNESS NEW TECHNOLOGY**
- #6 REMOVE THE STIGMA OF ALCOHOL-ASSOCIATED LIVER DISEASE**
- #7 ENCOURAGE POINT OF CARE TESTING**
- #8 CREATE A CLEAR PATIENT PATHWAY FOR ALL HIGH-RISK PATIENTS**

# NORTH AMERICA

## HEALTH OVERVIEW

The third largest continent in the world geographically, with a population of around 370 million, North America comprises the northern portion of the Western hemisphere. With a combined GDP of over US\$20 trillion and GDP per capita income of US\$67,514, North America is the wealthiest region on earth. 16.32% of the GDP is spent on healthcare in North America, with health spending per capita at around US\$10,000 a year, although around 11% of this amount comes from out-of-pocket payments.

Despite its wealth, North America is also a region of great inequality, often along racial lines. In the United States for example, an estimated 28% of Black households and 26% of LatinX households had zero or negative net worth in 2019, twice the proportion of white communities. This inequality is particularly reflected in healthcare, especially in the United States where, unlike other developed countries, residents do not have universal healthcare access. Although North America has a highly developed medical infrastructure – world-class hospitals equipped with cutting-edge diagnostic equipment and staffed with globally-recognized experts providing the latest treatment therapies – many low-wage workers receive no health insurance,

sick pay or pension plans. They have little hope of funding medical insurance costs and instead rely on emergency care facilities or poorly funded public clinics and hospitals.

North America is also a region of immigrants; 2017 saw a net migration of nearly six million people from around the world. This migration brings with it many health challenges, including chronic hepatitis, tuberculosis and HIV. At the same time, many of these immigrant communities begin their lives in North America living in areas of deprivation where often basic amenities, including access to healthcare, are unavailable and adding to their health burden.

*Sources: World Bank, Institute for Policy Studies, US Census Bureau*



# CANADA

The second largest country in the world by area, 80% of which is uninhabited. Canada is a developed country divided into English speaking (58%) and French speaking (20%) territories. Around 5% of the population identify as native Indigenous people.

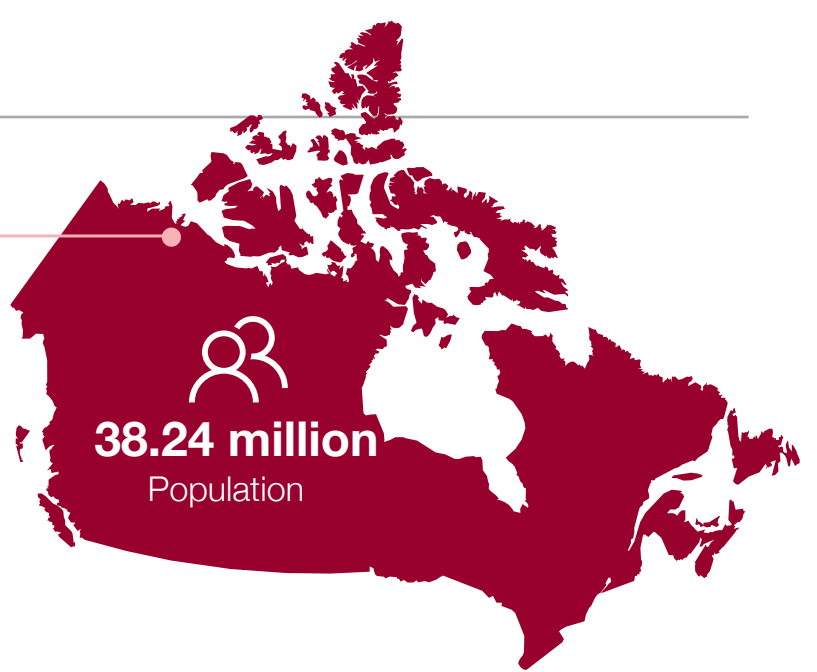
- Population:** 38.24 million (2021)
- GDP Per Capita:** \$52,051.40
- Life Expectancy:** 79.7 (men) and 83.9 (women)

**Healthcare Spending:** As of 2021, Canada had a GDP of US\$1.99 trillion, and government spending on healthcare is approximately 10.8% of GDP (2019) equating to around US\$5,000 per capita. Domestic private health expenditure is around 29% of all healthcare spending.

**Healthcare Funding:** The Canadian Medicare system provides for universally available and free necessary primary and hospital care, administered and funded by the individual provinces supported by per capita assistance from the federal government.

Funding for other healthcare services, for example dental care and prescriptions, vary depending on the provincial funding but is usually available for certain low income groups such as pensioners, veterans and the Indigenous populations. Around two thirds of Canadians have some form of private insurance either through their employment, unions, or paid for privately, which also covers services such as optical and dental care.

Each province and territory is responsible for administering and overseeing its own health, and,



as a result, there are wide variations in the focus on and availability of different healthcare services, including treatment pathways. Experts have cited this fragmented approach along with lack of federal leadership as one of the reasons why Canada was recently placed 10th out of 11 developed countries for the provision of good quality healthcare, ahead only of the USA.

Overall, the Canadian healthcare system provides a GP-led primary care which is available for all, although in some remote areas – which particularly affects Indigenous people – these services can be geographically difficult to access and may be nurse rather than doctor-led.

Secondary and tertiary care is provided by a mix of public and private (although usually not-for-profit) hospitals mostly overseen by local authorities or community boards. Specialist care can be accessed privately but is usually available via GP referral to the relevant tertiary care center.

*Sources: World Bank, The Commonwealth Fund, WorldData.Info*



**\$52,051.40**  
GDP per capita



**10.8%**  
of the GDP is spent on  
Healthcare Spending



**79.7 years (men)**  
and **83.9 years (women)**  
Life Expectancy

A universal healthcare system, globally recognized research centers, and world class hospitals benefiting from the best diagnostic equipment and clinical expertise should, in theory, be good news for liver health. Yet Canadians are facing a crisis in liver health. Deaths from liver disease rose nearly 30% from 7.2 per 100,000 to 11 per 100,000 between 2000 and 2020 and, in 2013, the Canadian Liver Foundation estimated that one in ten Canadians were living with liver disease, with the number likely to have risen in recent years due to a rise in the rates of obesity and the corresponding emergence of NAFLD and NASH.<sup>29,30</sup>

Historically, viral hepatitis has been the main driver of chronic liver disease in Canada. This has been caused in part by relatively high rates of HBV found in immigrants arriving from developing countries, along with challenges in ensuring appropriate testing and treatment for Indigenous populations, who have a five-times higher incidence and prevalence rate of HCV than in the general population.<sup>31,32</sup>

A lack of federal initiatives has resulted in a fragmented approach to hepatitis control. For example, although childhood vaccinations for HBV have been in place since the 1990s, the age at which it is offered still varies widely between provinces and territories from birth to age 12.<sup>32</sup> Still, overall rates of viral hepatitis are showing a downward trend. Following a 14.4% rise between 2014 and 2018, between 2018 and 2019, the rates of HCV dropped by 10.2% in adults (although it rose in children). HBV rates also fell to their lowest in ten years between 2018 and 2019.<sup>33</sup>

Additionally, the introduction of widely available and fully funded antiviral therapies have transformed the outlook for HCV, which is now by and large considered to be a curable disease in Canada.<sup>34</sup> This is reflected in the liver transplant rate. Although the number of liver transplants in Canada per year increased from 251 in 2000 to 349 in 2018, the proportion of patients transplanted for HCV decreased from 31.5% in 2000 to 3.4% in 2018.<sup>35</sup>

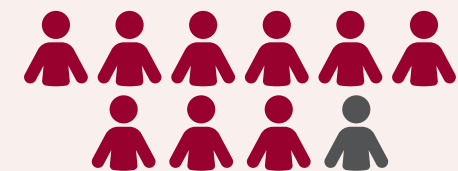
However, as the danger from viral hepatitis slowly recedes, the transplant rates clearly demonstrate that another crisis is looming in liver health.

Canada, in line with the rest of the developed world, is beginning to suffer the consequences of the obesity epidemic on liver health. Just over one in four adults in Canada are now considered obese, with 62.6% either overweight or obese; NAFLD and NASH rates are soaring commensurately.<sup>36</sup> Estimates suggest that today 21.1% of all Canadians have some form of NAFLD and that 5.4% – just over 2 million adults – have NASH, the consequences of which are already being felt in liver health.<sup>37</sup> In 2000, just 0.4% of all liver transplants were performed due to NASH. By 2018 that number had risen to 12.6%, and by 2040 NASH is now expected to be the number one cause of liver cirrhosis in Canada.<sup>35,38</sup> However, despite this threat and the potential financial burden this represents to the health system, there appears to be little federal leadership around the liver health crisis, with no national guidelines and treatment pathways for NAFLD and NASH varying between individual provinces and territories.

There is also another danger looming with 22.2% of all Canadian adults classified as heavy drinkers, and, based on current trends, alcohol-associated liver disease is expected to become one of the main causes of liver cirrhosis (just behind NASH) by 2040.<sup>36,38</sup>

With increasing chronic liver disease upstream, the number of new cases of liver cancer in Canada is also increasing, with the percentage of transplants for HCC rising from 2.3% in 2000 to 32.4% in 2018 and a projected expectation of 3,500 new cases in 2022.<sup>35,39,40</sup>

There is little data on autoimmune liver disease in Canada. A 2018 study identified around 8680 cases of PBC across Canada, and another estimated the rate of PSC at 0.92 per 100,000.<sup>41,42</sup> There is no data on autoimmune hepatitis in the adult population.



In 2013, an estimated **one in ten Canadians** were living with liver disease



## WE NEED TO BE PROACTIVE, INNOVATIVE AND MAKE OUR VOICE HEARD

Dr. Mark G. Swain is Professor of Medicine and holds the Cal Wenzel Family Foundation Chair in Hepatology at the University of Calgary, Alberta, Canada. He is the current President of the Canadian Association for the Study of the Liver (CASL).

Dr. Swain comments: 'In Canada, as in many areas of the world, liver disease is shaping up to be one of the major health issues of the next few decades. Currently, at least a quarter of the Canadian population are living with NAFLD. However, with the rates of alcohol-associated liver disease, NAFLD and NASH, and liver cancer all projected to rise over the next few years, it is perhaps not an exaggeration to say that we are facing a tsunami of liver disease which will place an increasingly unsustainable burden on our healthcare system.

'We can see the early waves of this tsunami lapping up on our shores already. For example, seven years ago I didn't need to hold a clinic specifically for NASH or NAFLD patients. Today, due to increased demands, we dedicate NASH and NAFLD clinics on a regular basis.

'Alcohol-associated liver disease used to be considered a disease of older, male, lifelong heavy drinkers, and we rarely saw young people with severe alcohol-associated liver disease. Now, and especially since the pandemic when alcohol intake soared, it is common for me to be called in to hospital to deal with people in their 20s and 30s who have been admitted with acute alcoholic hepatitis or even liver failure. Even more striking, increasingly these are young women. Liver cancer, once a fairly rare cancer in Canada, has unfortunately become a 'growth industry', with incidence rates rising faster than any other cancer.

'It is quite shocking for us as hepatologists to witness these dramatic changes in such a short period of time, and we understand that this situation cannot continue. Thus, we are working hard to try to be more proactive in making effective changes. For example, we don't currently have NAFLD or NASH guidelines in Canada, so CASL members are in the process of setting up a committee with primary care physicians, nursing and other specialists, to develop guidelines that will also include more multi-disciplinary approaches.

## CANADA

“

Our challenge then isn't so much in treating the patients with liver disease that we do see.

**It's finding the patients - preferably as early as possible - that don't even know they have it!**

- DR. MARK G. SWAIN

”

'In Calgary, together with our primary care colleagues, we have co-developed an innovative screening and treatment pathway for NAFLD (see page 17 for more info). 'This model has been running since 2017 and has proven to be a great success. This type of primary care-based approach to liver disease case finding needs to be more widely employed across Canada.

'However, we are clinicians, not policy makers, and it is they who can make the big difference to liver health in terms of disease awareness, prevention, and early diagnosis. Unfortunately, possibly due to an established – and incorrect – narrative of liver disease always being the fault of the patient, there appears to be a lack of will, at the government level, to face up to and tackle the oncoming challenges of liver health.

'We believe that it is imperative for liver disease to have a national voice, and to this end we are working with external partners to try to reach health policymakers in order to better achieve the big changes needed. To support this strategy, we also need accurate data to reinforce the message that prevention and early diagnosis can prevent the spending of healthcare dollars on liver disease further down the line, when people present for care with advanced cirrhosis, liver failure or liver cancer.

'When I became a hepatologist in the early 1990s, we had very few effective liver treatments to help our patients. Today, while we have effective therapies and a growing number of care pathways for almost every type of liver disease, we can still only ever treat the patients we know about. Unfortunately, liver disease is typically a silent disease and many people don't know that they are living with it, so they don't ask for and receive help until it is often too late.

'To a certain extent, our challenge then isn't so much in treating the patients with liver disease that we do see. It's finding the patients - preferably as early as possible - that don't even know they have it!'

## BEST PRACTICES NAFLD CARE IN CALGARY, ALBERTA

A multi-disciplinary collaboration exists to develop a pathway for the screening and triaging of patients at risk of NAFLD within a primary care setting.<sup>43</sup>

Between January 2016 and December 2017, it was noted that around 40% of patient referrals to the Calgary hepatology service were for patients with NAFLD, to be assessed for the risk of liver fibrosis. Most were found to be of low risk and did not require further tertiary follow up.

Hepatologists, radiologists and primary care physicians in Calgary therefore partnered to co-develop an innovative screening pathway for those NAFLD patients at risk of fibrosis. Rather than referral, the primary care physician could directly order an ultrasound-based test called shear wave elastography (SWE), from a community ultrasound provider, assess the results, and, based on a pathway-based algorithm, advise on best treatment options which might then include referral or ongoing management in the primary care medical setting, in conjunction with management of common comorbidities including diabetes, high blood pressure and elevated cholesterol where relevant. Along with SWE-based screening blood serum, liver tests were also taken and, based on the pathway, other potential causes of liver disease were ruled out.

## CANADA

# DID YOU KNOW?



Between 2016-2017, it was noted that around 40% of patient referrals to the Calgary hepatology service were for patients with NAFLD.

The NAFLD pathway was implemented in January 2018 and made available to all primary care physicians in the Calgary Health Zone. Of the 2084 patients with suspected NAFLD who were initially evaluated in primary care using the pathway, 91.5% were found not to need referral to hepatology, 60.3% were classified as being obese, and 52.5% had elevated serum liver enzymes which would have previously qualified them for tertiary referral. The pathway is now standard practice in primary care settings across Calgary.

'Since January 2016 almost 14,000 patients have gone through this pathway,' explains Dr. Mark Swain who led the initiative. 'Of those, only around 7% of patients have needed to be referred to a liver specialist, with the remainder being effectively treated within their primary care setting.

'This innovative primary care-based case finding system has provided significant benefits, for both the tertiary care service and the patients who are now able to have their disease managed within a primary care setting, alongside their own primary care physician, in conjunction with any other health issues they may have.'



# UNITED STATES OF AMERICA

The third largest country in size in the world, the US has the third largest population after China and India. The US is a federal republic made up of states, territories, and a federal district. There is no official language although English is the first language for around 79% of the population, and Spanish is spoken by around 13% of the population (equating to approximately 41 million people). 2% of the population (around 6.6 million people) identify as native Indigenous people

**Population:** 316 million

**GDP Per Capita:** US\$69,287.50

**Life Expectancy:** 74.5 (men) and 80.2 (women)

**Healthcare Spending:** As of 2021, the US had a GDP of US\$21.37 trillion, making it the world's largest economy. Government spending on healthcare is approximately 16.77% of GDP (2019) equating to around US\$10,921 per capita. Private health expenditure makes up over 50% of all healthcare spending.

**Healthcare Funding:** Uniquely in the developed world, the US has no universally available healthcare program. Private insurance, obtained as an employee benefit or privately purchased, provides health coverage for 67% of Americans, and the details of private coverage vary widely. Other forms of health provision include Medicare for those over 65 or with long-term disabilities and Medicaid for low income families, both of which are government-funded. There is no universal coverage for long-term health care, and few insurance policies provide this cover. Just over half of the hospitals are nonprofit, a quarter are for-profit and 19% are state-owned public hospitals. It is estimated that 8.5% of the population is uninsured.

Sources: World Bank, The Commonwealth Fund, WorldData.Info



The wealthiest and probably the most medically advanced country in the world is facing a crisis in liver disease of dramatic proportions. Currently, around 4.5 million adults in the US are living with a diagnosed liver disease and just over 50,000 people die of the condition every year, with 60% of these deaths attributed to alcohol-associated liver disease.<sup>44</sup> By 2030 however, it is predicted that liver deaths will have increased (since 2015) by 178% to an estimated 78,300 deaths, mostly attributable to NAFLD/NASH, which is expected to overtake alcohol-associated liver disease as the main liver-related cause of death.<sup>45</sup>

This dramatic change in the liver disease landscape is directly attributable to the high rates of obesity which has been a characteristic of American health for several decades. Indeed, 42.4% of Americans are now classified as obese, so the burden of fatty liver disease is translating into serious liver health issues including cirrhosis and decompensated liver disease.<sup>46</sup> A 2020 study of 100 physicians involved in treating liver disease found that NASH and NAFLD combined make up around 42% of specialists' and primary care physicians' (PCPs') liver patients.<sup>47</sup>

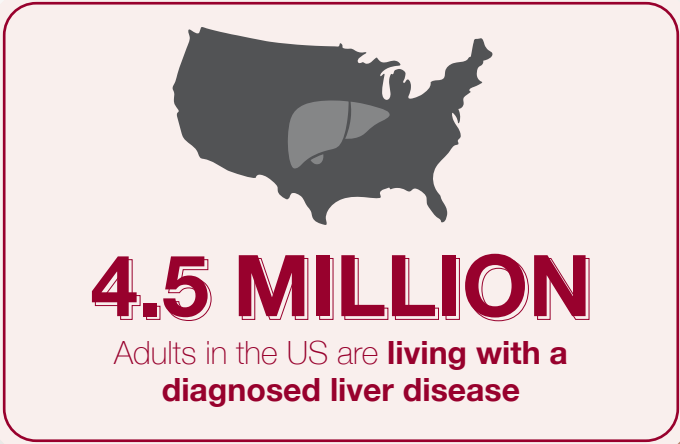
During the period 2015-2030, there are projected to be nearly 800,000 excess liver deaths with the accompanying social and economic costs.<sup>45</sup> A 2016 study estimated the annual medical costs of NAFLD in 2016 as US\$103 billion.<sup>48</sup> This figure is likely to have risen and to continue to rise exponentially over the next few years in parallel with the incidence of NAFLD and progression to NASH.

As with the rest of the developed world, liver health appears to be low on the list of priorities for both health administrators and health campaigners in the US. Obesity is regularly linked to diabetes and cardiovascular disease, but liver disease is rarely cited as a consequence of obesity. Thus 30% of physicians from across primary and secondary care were unable to name any national guidelines for the management of chronic liver disease.<sup>47</sup>

In 2020, Global Liver Institute and its NASH Council released the U.S. NASH Action Plan to address NASH, the most advanced form of NAFLD, and its impact on patients, families, public health, and the economy.

The U.S. NASH Action Plan, the only national NASH strategy, was a logical next step in the work of the GLI NASH Council to address the multiple challenges and barriers to better NASH screening, diagnosis, and treatment. Against the backdrop of NASH's prevalence and impact, each of these recommendations plays an instrumental role in elevating the disease to its rightful place on the public health agenda.

While the NAFLD/NASH epidemic continues to grow, alcohol-associated liver disease continues to be a significant cause of liver-related death. The age-adjusted death rate from alcohol-associated liver cirrhosis increased by 47.0%, from 4.3 deaths per 100,000 population in 2000 to 6.4 deaths per 100,000 population in 2019, with rates for white males increasing by 106%.<sup>49</sup>





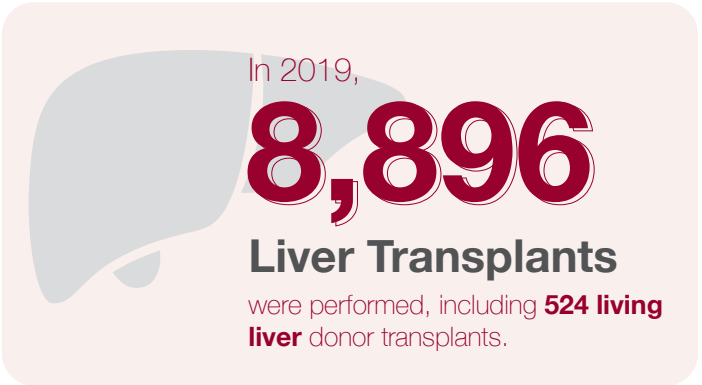
A 2019 national survey of around 25% of the adult population (aged over 18) reported binge drinking at least once in the previous month and estimates suggest 14.5 million people over the age of 14 have an alcohol use disorder.<sup>50</sup> At the same time, it is reported that less than one in ten people received any treatment for their condition.<sup>49</sup> In total, 29,505 people died from alcohol-associated liver diseases in 2020.<sup>44</sup> Further, between 2008 and 2019, alcohol-associated liver disease increased from 22% to 31% as a proportion of candidates for liver transplantation.<sup>51</sup>

On another hand, viral hepatitis is generally well controlled with effective vaccination and testing programs, combined with the latest available antiviral treatments which have kept acute case numbers stable for HBV and HCV (although infection rates for HCV are slowly rising).<sup>51</sup> Between 2010 and 2019, the proportion of candidates for liver transplant with a diagnosis of HCV dropped from 30.6% to 12.6%.<sup>51</sup>

However, it is not all good news. Both acute and infection rates of hepatitis A have been rising steadily since 2017 with an unprecedented spike in acute cases in 2019 attributed to a rise in needle-to-needle drug use and homelessness.<sup>51</sup> Overall, just under 4,000 people died from viral hepatitis in 2020, representing 1.2 deaths per 100,000 of population.<sup>52</sup>

The US carries out the highest number of liver transplants in the world and continues to be a center of global expertise. In 2019, there were 8,896 liver transplants were performed including 524 living liver donor transplants.<sup>51,53</sup>

Finally, it must be noted that the US benefits from numerous highly motivated and well-organized clinical and patient groups who have, between them, produced a large, high-quality and focussed database of relevant information on the current and future state of liver health. If there was any doubt before, there can be no more excuses for the government not to develop a national strategy on NAFLD and NASH as a matter of urgency to combat this potentially catastrophic public health crisis.



Professor Scott Friedman is the Chief of the Division of Liver Diseases and Dean for Therapeutic Discovery and Professor of Pharmacologic Sciences at the Icahn School of Medicine at Mount Sinai Hospital in New York.

‘We are facing several significant and interrelated challenges in liver health, all of which, if unresolved, are set to place a progressively larger burden on our healthcare system and providers over the next few years and even decades to come.

‘The first major challenge is that posed by NAFLD and NASH. Driven by our high obesity rates, there is every indication that the prevalence of these conditions is increasing fast and will continue to do so for the foreseeable future. Concurrently, and as a direct consequence of this, we are also facing rapidly rising rates of liver cancer. Primary liver cancer has the fastest rising incidence rates of any cancer, not just in the US, but globally.

‘There is a further danger to note here. Whereas with viral hepatitis, less than 5% of patients progress to liver cancer without at least some cirrhosis, the pathology pathway of NASH is somewhat different, and we estimate that around 30% of patients with NASH may progress to liver cancer without cirrhosis. This group of patients will have been far less likely to be in a screening program, and, therefore, their cancer is more likely to be diagnosed at a more advanced stage.

‘Currently we are not in a great position to counteract the effects of NAFLD and NASH through medications. The only approved treatment we can offer is to work with our patients to lose weight and exercise more, and in extreme cases bariatric surgery may improve NASH, as discussed below. However, as every clinician knows, weight loss can be extremely difficult for some patients to achieve – let alone managing and maintaining the weight – and is also a challenging therapy for the doctor to manage.

‘Additionally, there is a lack of regular screening for patients who are at high risk of NAFLD or NASH. In part, this is due to limits on capacity, but it is true to say that there is also a certain mindset amongst some clinicians, perhaps particularly in primary or general medicine, who feel there is little point looking for a disease for which there is no effective treatment. Even if the patient is included in a screening program, there is often uneven knowledge of ‘what to do next’ with someone who has elevated transaminases or high levels of fat around the liver. We need to change that clinical mindset – early detection always means better outcomes.

‘One potential solution to obesity is, of course, bariatric surgery, with many patients and their clinicians opting for this route in increasing numbers. However, while bariatric surgery is indeed beneficial for weight loss (along with providing some other metabolic benefits), it is an invasive and life-changing procedure, not to mention costly. As a result, this is not a solution that can be scaled up to an extent that it would provide a solution to the current US numbers of patients with NAFLD and NASH. Likewise, while we have a world-class liver transplantation program, with ongoing incremental improvement in transplant medicine, you simply cannot expect this complex and expensive procedure to provide a broad solution for the oncoming wave of medical need.

“ We are facing several significant and interrelated challenges in liver health, all of which, if unresolved, **are set to place a progressively larger burden on our healthcare system.**

- PROFESSOR SCOTT FRIEDMAN

”





MANY CHALLENGES IN LIVER HEALTH,  
BUT THE POSITIVES ARE WITHIN REACH

‘That leaves us with future pharmaceutical therapies, which have the advantage of being available to potentially treat large numbers of people. Probably our best hope of turning the tide of liver disease will come from treatments which directly work on the pathology of the liver to reverse the damage caused by NAFLD and NASH, and with several drugs currently undergoing late-stage trials we hope that at least one or two of these prove to be an effective therapy.

‘However, we cannot rely on the pharmaceutical industry to provide all the solutions to liver health. We have to consider that it may be time for a re-think of our current healthcare structure in order to meet this new type of health challenge.

‘Previously most liver disease was caused by viral hepatitis, or was alcohol-associated, with both conditions managed wholly within the specialty of hepatology. Now we have a situation where a patient who is at high risk for liver disease (ie an obese or T2D patient) may see a primary care doctor or a family practitioner. Then, depending on their most pressing medical need, they might be receiving specialist treatment from an endocrinologist, a cardiologist and other specialists.

‘Therefore, rather than being seen as a disease of just one speciality, NAFLD and NASH may be better managed via multi-disciplinary pathways effectively coordinated across all the various relevant specialities, supported by robust, widely approved clinical guidelines. This change would take a comprehensive conversation between clinicians and health care providers, and it is something we should think about sooner rather than later.

‘Apart from NASH and NAFLD there are several other areas of liver health that are challenges for hepatologists and their patients. Alcohol-associated liver disease continues to rise – especially during the COVID-19 pandemic - with little sign of slowing down. Pediatric liver disease may not affect the same numbers as NAFLD and NASH, but they can prove to be catastrophic for the child and, of course, devastating for their families. Unfortunately, we still have too few treatments and incomplete understanding of these often very complex conditions.

UNITED STATES OF AMERICA

‘Drug-induced liver injury is another area of liver health which is often downplayed and while sporadic, is still a major unmet need. Often, we only reach diagnosis by exclusion of other conditions, and far too late to prevent severe damage from occurring. Hepatologists have also noted that COVID-19 can worsen liver function in patients with advanced liver disease, and we are continuing to see the effects of this in our patients, even while the epidemic is waning.

‘It is important, however, to remember that while liver disease presents a huge challenge for us all, we have many positives to think about. Firstly, most liver diseases are mostly either preventable or treatable, so if we focus on implementing effective preventative and awareness strategies then the burden should start to reduce. Secondly, we have some pharmaceutical therapies coming down the line which should improve outcomes of some liver conditions. Finally, and perhaps most importantly, uniquely of all our organs the liver has an amazing capacity to heal. All we have to do is give it a chance.’

“  
Uniquely of all  
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”  
- PROFESSOR SCOTT FRIEDMAN



 Many countries in the  
region can point to a  
**high quality healthcare.**

HEALTH OVERVIEW

Stretching from Cape Horn in the south to the Mexican US border in the north, and encompassing South America, Central America and the Caribbean islands, Latin America covers just over 19 million square kilometers – almost 13% of the Earth’s landmass – and is home to nearly 650 million people.

According to a report by the United Nations, Latin America has some of the starkest inequity in the world, with GDP per capita in 2021 ranging from US\$28,526 (Chile) and US\$26,662 (Uruguay) to under US \$6,000 (Bolivia, Ecuador and Paraguay).

This disparity is reflected in healthcare spending. In 2019, Uruguay allocated US\$1660.95 per capita to health, nearly seven times that of Bolivia, at US\$245.92 per capita.

The majority of Latin American countries provide some form of free state-sponsored healthcare. However, vast differences between the health funding systems from country to country results in wide variation in accessibility. Many countries require some level of patient financial contribution at point of care. According to a 2015 joint Pan American Health Organization/World Health

Organization (PANO/WHO) report, approximately 30% of the population in Latin America and the Caribbean lack access to healthcare for economic reasons. In addition to this, the report found that 21% of the population do not seek care because of geographical barriers.

However, many countries in the region can point to a high quality healthcare network for those that can access it. Brazil, for example, boasts 6,642 hospitals (1 for every 32,000 people). Chile, which has over double the GDP per capita of Brazil has just 322 (1 for every 60,512 people).

Sources: TheGlobalEconomy.com, Pan American Health Organization, United States of America International Trade Administration, Statista



LIVER HEALTH OVERVIEW

Despite limitations in available data on liver health, it is clear that one of the primary challenges to liver health in Latin America is obesity (as an etiology of NAFLD).<sup>54</sup>

The 2022 Report ‘Liver Diseases in Latin America: Current Status, Unmet Needs, and Opportunities for Improvement’ notes:

‘The high prevalence of liver diseases in Latin America is influenced by genetic factors, the elevated prevalence of obesity and metabolic syndrome, and environmental factors such as diet, low exercise and excessive alcohol intake.’<sup>55</sup>

Latin America is experiencing <sup>57</sup> some of the highest obesity rates in the world, alongside the fastest growing rate of T2D.<sup>56</sup> In Mexico and Bolivia for example, 32.2% of adults (nearly one in three) are classed as obese, and a 2017 meta-analysis of 19 Latin America countries found that only five of the named countries could manage rates of obesity below 20%.<sup>57</sup> Given regional and global trends, it is likely that figures have increased since then.

The average prevalence of NAFLD in the general population is now estimated to be around 24%, though in high-risk groups, such as the obese and those with T2D, this figure soars to around 68%.<sup>58</sup>

However, despite the prevalence of NAFLD and the danger it represents to the liver health of Latin America, there are no prevalence figures for NASH and no formal screening programs for high-risk groups.

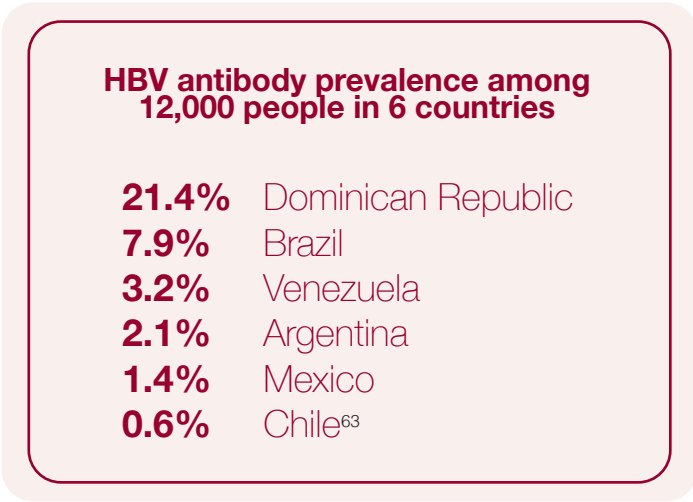
Viral hepatitis continues to be a significant burden on liver health in Latin America. According to figures from WHO/PANO Mortality Information System 2008 and 2010, 10% of all deaths in Latin American countries were due to the effects of viral hepatitis.<sup>59</sup>

A 2021 report noted that less than half of Latin American countries collect data on the prevalence of HCV, and several have no national viral hepatitis program to provide estimates of the HCV disease burden.<sup>60</sup>

Figures from 2010 estimated that approximately 7.8 million (2010) persons were infected with HCV in Latin America.<sup>61</sup> Despite this high burden, rates of diagnosis of HCV range widely from 56% (Mexico) to 3% (El Salvador).<sup>62</sup>

LATIN AMERICA

Figures from an investigation into the prevalence of HBV antibodies in over 12,000 subjects in six countries found:



Additionally, in 2018 there were an estimated 38,400 cases of liver cancer in Latin America and 38,000 deaths with the highest rates seen in Honduras, Costa Rica and Cuba (1.4-1.9 per 1000,00) and Chile (1.00-1.39 per 100,000).<sup>55</sup>

The main cause of liver cancer in the region is still viral hepatitis, followed by alcohol consumption, although it is thought that NAFLD may soon become a predominant risk factor for the cancer.<sup>64</sup> Many studies refer to the challenge of late-stage diagnosis in liver cancer in Latin America, exacerbated by geographical distances and economic inequalities.<sup>65</sup>

Latin America has high alcohol per capita consumption, with those aged over 15 years drinking 6.8 liters of pure alcohol per year compared to the global average consumption (6.4 liters per capita).<sup>66</sup> Thus, excessive alcohol consumption is the leading cause of cirrhosis in Argentina, Brazil, Chile, Mexico and Peru with around 53% of cirrhosis attributable to alcohol.<sup>55</sup>

Despite the disparity in healthcare, Latin America also boasts a large number of tertiary hospitals with high levels of equipment and expertise. More than 2,500 liver transplantations are performed yearly – equating to 17% of global liver transplants.<sup>67</sup>

OVERVIEW

BRAZIL

**Population:** 215,347,203 (2022)

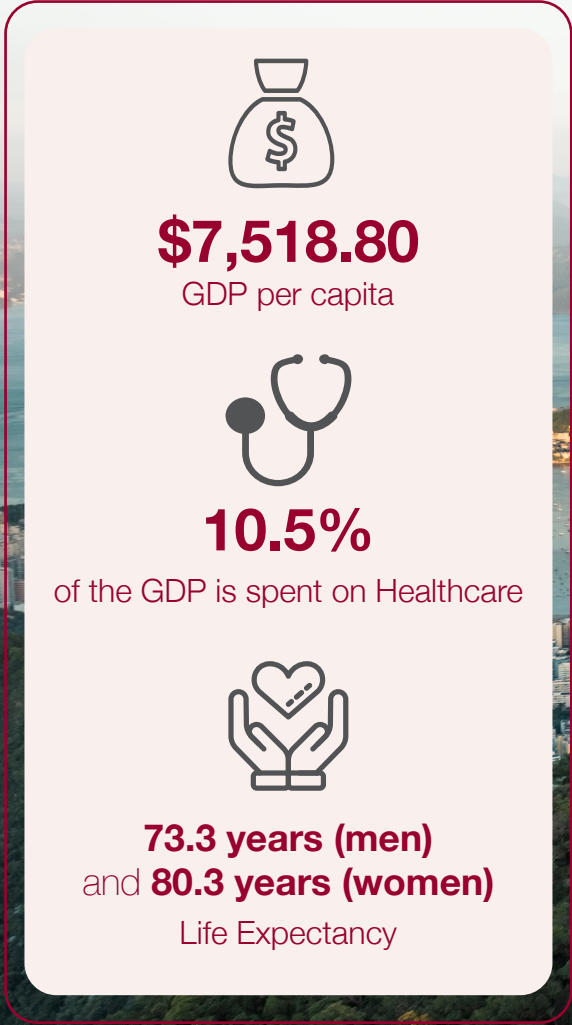
**GDP Per Capita:** US \$7,518.80 (2022)

**Life Expectancy:** 73.3 years (men)  
80.3 years (women) (2021)

**Healthcare Spending:** 10.5% of GDP (2019)

**Healthcare Funding:** The Sistema Unico de Saude, or SUS (Unified Health System) is funded through general taxation and provides free access to primary, secondary and tertiary care, including medications, to all Brazilians. The private sector is accessed via pay as you go or insurance schemes.

*Sources: Organization for Economic Co-operation and Development (OECD), 2020 Epidemiological Bulletin: Health Surveillance Secretariat of the Ministry of Health, Brazil Epidemiological Bulletins Ministry of Health*





In 2019, it is estimated that **15-20 people** per 100,000 died of cirrhosis in Brazil <sup>68,69</sup>

As with the other countries featured in this chapter, research and data on liver disease are disproportionately focused on viral hepatitis, which, in Brazil, is still the main etiology for deaths from liver disease.

In 2019, Brazil had **37,771** NEW CASES OF VIRAL HEPATITIS

2%	Cases of Hepatitis A
37%	Cases of HBV
60%	Cases of HCV
0.4%	Cases of Hepatitis D <sup>70</sup>

According to a 2021 report, there are currently 1,787,000 people living with HCV, equating to 0.9% of the population, of whom 8% were newly diagnosed in 2019.<sup>71</sup> There are up-to-date clinical guidelines on HCV, a universal screening program, a national registry and government financial assistance for treatment therapies.<sup>71</sup>

From 1999 to 2020, there were 254,389 confirmed cases of HBV in Brazil.<sup>72</sup> A 2016 modeling study found that the prevalence rate of HBV infection was 0.6%, of which only 28% of infected individuals were diagnosed and only 12% of the population was treated.<sup>73</sup>

HBV particularly affects people living in poverty and, although a relatively wealthy country within the Latin American region, remote areas of Brazil are some of the most deprived in the region. A study from the favelas in Goiás State, Central-West Region of Brazil, for instance, found that the prevalence rate of HBV exposure was more than ten times the national rate.<sup>73</sup>

Similar to other Latin American countries, obesity rates are soaring. Between 1990 and 2017, the prevalence of obesity increased by 244.1%, and 165.7% for men and women, respectively. However, there are no registered figures on NAFLD, though prevalence is estimated to be about 38%.<sup>68</sup>

Brazilians drink around 7.5 liters of alcohol per year per person, which is on a par with their neighbors. When adjusted to those who actually drink alcohol, the amount rose to 19.2 liters per year. Alcohol-associated liver disease is one of the main causes of cirrhosis in Brazil.<sup>75</sup>

According to DATASUS, only 11% of cases of liver cancer were diagnosed at an early stage. 67% of diagnoses could only receive palliative care.<sup>76</sup>

Nonetheless, Brazil is a key center of expertise for liver transplant needs from across Latin America, and now carries out the second highest number of liver transplants in the world.<sup>77</sup>

 **2,033** Liver Transplants were performed in 2021.

Dr. Bianca Della-Guardia and Dr. Marcio Dias de Almeida are hepatologists based at the Albert Einstein Hospital, San Paulo, Brazil. They specialize in liver transplantation.

They say: ‘The prevalence of NAFLD and NASH is growing fast in Brazil as in all countries, but while we have some individual pieces of research from universities or hospitals, there is no significant national data. All we can do is estimate the size of the problem.

‘All hepatologists are now regularly seeing patients with advanced cirrhosis because of NASH, and we think it could soon become one of the main reasons for liver transplant in the next decade. NASH is also impacting our liver cancer rates, which are rising fast.

‘Our government has put some effort into raising awareness of diabetes, which affects 12% of the population, and trying to tackle childhood obesity; but we really need to do the same and more for NASH and NAFLD. If we carry on as we are, and with the obesity rates we have, we are heading for a public health crisis in Brazil and very soon.

‘We ‘We believe that the government should prioritize health education, including funding a properly targeted national awareness program about NASH, NAFLD and liver disease. Secondly, we are in need of accurate and current data. We need a government-funded and supported research project to establish the extent of liver disease across Brazil.. Once we know the extent of the challenge, we can show that we need action fast and can start to put focussed health policies into place.

‘Our viral hepatitis rates are high compared to other South American countries, particularly in the remote areas and away from the cities. This is partly because Brazil came too late to tackle this disease,

but also because there has been a big national effort recently to raise awareness of hepatitis and to screen and diagnose hepatitis, so we are finding previously unrecorded cases.

‘Now, real efforts are being made by both the government and the World Health Organization to reduce the rates of viral hepatitis. In addition to awareness programs, there is a vaccination program for new-borns and infants, and anyone can walk into a clinic and have a free blood test for hepatitis. The problem, of course, is that in remote areas, where it can take a few days to get to a clinic, people may not go for a test until they feel ill – by which time the liver disease is much harder to manage. In an attempt to solve this problem, we are having conversations about self-testing, particularly in remote areas.

‘We believe that the government should prioritize health education, including funding a properly targeted national awareness program about NASH, NAFLD and liver disease. Secondly, we are very short of good quality data. We need a government-funded and supported research project to establish precisely the extent of liver disease across Brazil, especially NAFLD and NASH. Once we know the extent of the challenge, we can show that we need action fast and can start to put focussed health policies into place.

‘Finally, we need more diagnostic resources so that when we get more people coming forward, we can scan them within weeks, not months, to begin treatment as soon as possible.’

“ If we carry on as we are, and with the obesity rates we have, **we are heading for a public health crisis in Brazil and very soon.** DR. BIANCA DELLA-GUARDIA AND DR. MARCIO DIAS ”



## OVERVIEW

# MEXICO

**Population:** 131,873,500 (2022)

**GDP Per Capita:** US\$9,926.40

**Life Expectancy:** 71.7 years (men)  
77.1 years (women) (2021)

**Healthcare Spending:** 6.2% of GDP

**Healthcare Funding:** A complex mix of several employment-based social insurance schemes managed by national institutions, an insurance funded private sector, pay at point of care and a public assistance scheme for the uninsured operated by both state and federal authorities and supported by a financial protection scheme. A 2020 WHO review found that 14% of the population lacked financial healthcare protection, and the other insured sectors are wildly varying in the amount and type of health cover they provide.

Sources: World Bank, WHO



**\$9,926.40**

GDP per capita



**6.2%**

of the GDP is spent on Healthcare



**71.7 years (men)**  
and **77.1 years (women)**

Life Expectancy

**131,873,500**  
Population

## LIVER HEALTH OVERVIEW

Liver disease poses a substantial burden for the people of Mexico. In 2019, cirrhosis of the liver was reported to be the fourth most common cause of death in Mexico, behind diabetes, CVD, and chronic kidney disease,<sup>78</sup> with more than 30 people per 100,000 living with the condition.<sup>78,69</sup>

Between 2012 and 2017, the most frequent causes of **liver cirrhosis** included

**36.2%** HCV  
**31.2%** ALD  
**23.2%** NASH<sup>79</sup>



The **least frequent** were

**1.1%** HBV  
**7.3%** Autoimmune Disorders  
**1.0%** Other Conditions<sup>79</sup>

It is impossible to discuss liver health in Mexico without discussing the country's obesity epidemic – Mexico currently has the highest rate of obesity in OECD.<sup>80</sup> Over the past two decades, adult obesity, morbid obesity, and even childhood obesity are all rising quickly.<sup>80,81</sup> In 2018-2019, 36.1% of the population were deemed to be obese, while only 23.5% of the population were of a healthy weight.<sup>81</sup>

In response, the Mexican government has implemented a series of measures to try to improve the eating habits of the population, including taxes on sugary drinks and non-nutritional high calorie foods, clear nutritional labeling on products and beverages as well as banning the use of cartoon characters on children's foods.

However, despite this emerging catastrophe, there is still no national register for NAFLD or NASH. Based upon the current numbers of people with diabetes, an estimated 14.4 million people in Mexico have NAFLD, of whom approximately 4.3 million suffer from NASH.

## MEXICO

**2 MILLION**

Mexicans will be living with chronic liver disease **by 2050**



Studies into liver disease trends predict the outcome of this public health crisis. If present trends continue, two million Mexicans will be living with chronic liver disease by 2050 (see breakout).<sup>82</sup>

In 2016, Mexico joined the WHO global campaign for the elimination of viral hepatitis. Detection campaigns have been implemented in the open population and in at-risk groups that include sex workers, people who inject drugs, immigrants, and prisoners. The 'Specific Action Program' was launched within the WHO global framework with the aim of detecting 90% of all HBV and HCV cases.

Additionally, there have been concerted efforts by the Mexican government to reduce the burden of disease and mortality from HCV and associated diseases, including liver disease. In addition to patient education campaigns, the latest treatment regimens, rescue medications (in case of failure of the first treatment regimen), and tests to corroborate HCV elimination are all used regularly in Mexican hospitals today.

As noted in 2020 by the Epidemiological Surveillance Program, these efforts have paid off with a sharp downward trend – 57% reduction in total cases of HCV. Still, prevalence remains at about 1.5% of the general population.

Around three million adults are estimated to have acquired HBV, though 90% of these cases are inactive.<sup>83</sup> However, geography plays a role in these patterns: Higher rates of HBV infection are found in areas of dense populations and in regions with frequent itinerant populations.<sup>83</sup>

Average alcohol consumption in Mexico is around 5.05 liters per year, lower than that of many neighboring countries.<sup>84</sup> However, the rate of alcoholism is estimated to be around 3.4% of the population. Alcohol-associated liver disease currently accounts for around 30% of all liver cirrhosis in the country.<sup>79</sup> According to estimates, ALD will account for nearly a million cases of liver disease by 2050.<sup>84</sup>



LIVER HEALTH OVERVIEW  
*continued*

Mortality from liver tumors in Mexicans over the age of 60 is now the third most common cause of cancer deaths in the country for men and the second for women. In recent years, the mortality for HCC per 100,00 people in the country has more than doubled.<sup>85</sup>

To deal with liver disease, most patients must receive care from the specific network of doctors, clinics, hospitals, and pharmacies in their scheme. Within the state sector, non-complex CLD, early stage hepatitis or NAFLD is managed in primary care or clinic settings. Larger hospitals in bigger cities manage complex liver care through a system of referrals.

The private healthcare sector is well resourced and sought after, and liver scans and complex treatments are carried out in private hospitals.

Though there is infrastructure to support liver transplants in the country, rates were affected by the COVID-19 pandemic. According to the Mexican National Transplant Registry, a total of 72 liver transplants were performed in 2020, which is only a third of those performed in 2019.<sup>86</sup> Of the 23 currently active liver centers, only seven performed 10 or more liver transplants each year. 22 centers were based in or around Mexico City, raising the question of geographic inequality.<sup>86</sup>

MEXICO AND THE COST OF OBESITY

The economic, social and physical costs that obesity represents for the people of Mexico was spelled out by the OECD Secretary General Angel Gurría, speaking at the 2020 Mexico City launch of the OECD study, *“The Heavy Burden of Obesity: The Economics of Prevention.”* Mr. Gurria noted:

‘According to our projections, overweight-related diseases will reduce life expectancy in Mexico by more than four years over the next 30 years ... Our analysis estimates that overweight and related diseases will:

-  **Reduce Mexico’s labor force by the equivalent of 2.4 million full-time workers per year**, as people with overweight and related conditions are less likely to be employed and, if employed, tend to be less productive;
-  Account for around **8.9% of health expenditure per year between 2020 and 2050**;
-  **Curb Mexico’s GDP by an estimated 5.3%**, well above the OECD average of 3.3%, a figure that is already too high.

In fact, Mexico is the OECD country where overweight, obesity and related diseases will have the greatest impact on GDP between 2020 and 2050.’

OBESITY RATES SET TO OVERWHELM OUR HEALTHCARE SYSTEM

Dr. Alma Laura Ladrón de Guevara is a gastroenterologist at Hospital Angeles in Mexico City. She has a special interest in metabolic disorders and obesity.

She says: ‘Obesity is becoming a killer in Mexico. We saw that in COVID – although we lost elderly and vulnerable people - most of the younger victims were obese..

‘The causes are fairly obvious. In a few decades, we have gone from being a country that ate mainly vegetarian foods and only rich foods occasionally to one where over 40% of our diet is processed food which are full of carbohydrates, sugars and fat. Add to that a genetic preposition to metabolic disorders in some of our ethnic populations and a cultural love affair with eating and you have a recipe for disaster. As well as terrifying rates of obesity, we also have entire families who have T2D. We spend more on diabetes medication than any other country in the world.

“  
**Obesity is becoming a killer in Mexico.**  
DR. ALMA LAURA LADRÓN DE GUEVARA  
”

‘Even doctors and nurses are obese, which adds to the problem. If our clinicians are overweight, how can they tell their patients to lose weight? The government is talking about tackling obesity, but we don’t see any effective plans.

‘In the past we have run successful health campaigns for breast cancer and diabetes. As a country we made a concerted effort to get on top of hepatitis, and over the last 20 years we have seen huge improvements in the reduction of hepatitis infections. However, it feels as if the government is not prioritizing health at the moment, much less liver health. We don’t even have the resources to screen patients living with diabetes for NASH, even though we know it is present in around 50%-60% of these patients.

‘We need to make people understand the link between obesity and liver disease, and we can do that through a concerted effort to educate people from a very young age. If not, we will face a rising death rate and a health system overwhelmed by far too many people dying early of liver disease.’





# ARGENTINA

**Population:** 47,327,407 (08/2022)

**GDP Per Capita:** US\$10,729.20


**Life Expectancy:** 73.5 years (men)  
80.12 years (women) (2020)

**Healthcare Spending:** 9% of GDP

**Healthcare Funding:** A mix of social security/union-run health insurance system, which covers 50% of the population, private medical insurance (Prepagas) (10%), and PAMI, a system which covers the elderly and disabled. Public hospitals are the responsibility of each province's Ministry of Health, and around 35% of the population relies on this free care.

Sources: United States of America International Trade Administration, SAHE





**\$10,729.20**  
GDP per capita



**9%**  
of the GDP is spent on Healthcare



**73.5 years (men)**  
and **80.12 years (women)**

In 2019, it is estimated that 15-20 people per 100,000 died of cirrhosis in Argentina<sup>87,89</sup>

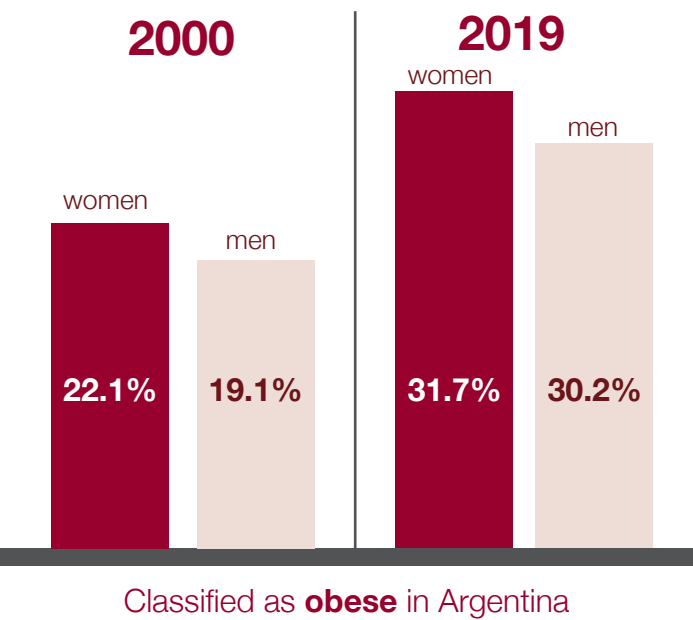
As in many Latin American countries, the most robust data for liver disease is related to viral hepatitis. It is estimated that 400,000 people in Argentina live with chronic HCV infection.<sup>88</sup>


It is estimated that 326,000 people live with HCV infection, 9% of whom were diagnosed in 2019.<sup>89</sup>

Despite the decrease in incidence, hepatitis continues to take a toll on liver health. Of the 4650 liver transplants carried out in between 2006 and 2019, 16.4% of them were due to hepatitis.<sup>90</sup>

However, Argentina has been at the forefront of attempts in Latin America to reduce the rates of hepatitis. For example, following an outbreak of hepatitis A between 2003 and 2004, Argentina became the first country in the region to introduce a single-dose vaccine against hepatitis A in 1-year old children, resulting in a dramatic reduction in the virus. Today, there is an effective HBV vaccination strategy for babies, while clinics throughout the country provide free testing on demand for HBV and HCV.

The data on obesity demonstrate that rates are rising fast in Argentina. The Global Nutrition Report reports that in 2000, 19.1% of males and 22.1% of females were classified as obese in Argentina. By 2019, those figures had risen to 30.2% and 31.7% of females.<sup>91</sup>





In 2019, it is estimated that

**15-20**

people per 100,000 **died of cirrhosis** in Argentina.<sup>88,90</sup>

As a result, there is increasing concern about the rates of NAFLD and NASH. Obesity is classed as high risk for NAFLD, and studies across Latin America have put the rate of NAFLD in high risk populations at around 68%.<sup>92</sup>

The ongoing prevalence of early stage liver disease leads to many patients who develop liver cancer. A study of liver cancer found that although 37% of all cases of liver cancer was caused by HCV, ALD was the cause of 20.8% of cases and NAFLD was 11.4%.<sup>93</sup> Crucially, there was a sixfold increase in the percentage of NAFLD as a cause of liver cancer between the years of 2009 and 2016. Given that obesity rates have risen dramatically since the close of this study, it can be hypothesized that this percentage has increased commensurately.<sup>93</sup>

Non-complex CLD, for example, early stage hepatitis or NAFLD, is managed in primary care or clinic settings within the 22 provinces. Scans and diagnostics are carried out at secondary care hospitals, where treatments such as chemoembolization, radioembolization and hepatobiliary surgery, are also offered.

Complex care needs, including end-stage liver disease, liver cancer and liver transplant are referred to tertiary centers usually situated in the large cities such as Buenos Aires. There are 35 centers, albeit many based in the large cities, with the expertise to carry out liver transplantation in Argentina. In 2021, despite the burden placed on the health system by the COVID-19 pandemic, 377 liver transplants were performed, although there are currently 1523 patients waiting for transplants.<sup>94</sup>



# AFRICA



Africa is home to 1.37 billion people – **around 18% of the world's population.**

## HEALTH OVERVIEW

Africa is the second largest continent on Earth, spread over approximately thirty million square kilometers (twelve million square miles). Africa is home to 1.37 billion people<sup>96</sup> around 18% of the world's population. A developing region that spends amongst the least in the world on healthcare, relying heavily on public health initiatives and the involvement of NGOs along with aid from other countries.

Current public health challenges include high rates of neonatal deaths, diarrheal disease, HIV/AIDS, malaria, tuberculosis and viral hepatitis – which leads to cirrhosis. Additionally, the next few decades will bring the need to restructure existing health initiatives to cope with significant changes in demographics. In Sub-Saharan Africa, for example, where more than 1 billion people live, 50% of the population are predicted to be under the age of 25 years old by 2050. Conversely, North Africa saw a 50% drop-in fertility rate between 1980 and 2017.

There are significant economic disparities between both countries and various economic indicators. Nigeria for example, has the highest GDP in Africa (US\$441 billion and 27<sup>th</sup> in the world) yet ranks at 18<sup>th</sup> in Africa according to GDP per capita. Meanwhile, 18 of the 20 countries with the lowest GDP per capita, worldwide, are African.

Healthcare spending is, by and large, aligned to GDP per capita, demonstrating more extreme inequalities between countries. In 2019, the Seychelles (which has the highest GDP per capita in Africa) spent more than four times Morocco and forty times more than Madagascar on healthcare per person.

Sources: *The World Bank, Statista*

## LIVER HEALTH OVERVIEW

According to the WHO, cirrhosis of the liver is the tenth leading cause of death across the continent, with 195 deaths per 100,000 population.<sup>95</sup>

Though limited liver disease surveillance is conducted across Africa, it appears to be a growing issue: Cirrhosis rates in Sub-Saharan Africa doubled between 1980 and 2010, driven mainly by viral hepatitis and alcohol-associated liver disease.<sup>96</sup> More than 50% of all liver patients in sub Saharan Africa are admitted to hospitals with advanced stage liver disease due to a combination of poverty, geographic barriers and distrust of Western medicine.<sup>96</sup>

The WHO notes that 'Dying from viral hepatitis in Africa is becoming a bigger threat than dying from HIV/AIDS, malaria or tuberculosis.'<sup>97</sup> It estimates that chronic viral hepatitis affects over 70 million people in Africa, 60 million of whom are infected with HBV and ten million with HCC.<sup>97</sup> Despite these staggering figures, the disease is, in many African countries, neglected with less than one in ten people able to access testing and treatment. As a result, each year, around 200,000 Africans die from advanced liver disease directly as a result of viral hepatitis.<sup>97</sup>

However, though viral hepatitis and excessive use of alcohol account for 70% of cirrhosis,<sup>98</sup> the widespread use of traditional herbal medicines may also contribute.<sup>96</sup>

Estimates suggest that NAFLD rates are generally lower in African countries around the world,<sup>99</sup> but these are based upon relatively small studies – characteristic of the limited up-to-date, high-quality data about liver disease available in the region.

As with the rest of the globe, however, Africa faces rising rates of obesity and T2D, both of which are risk factors for NAFLD and NASH.<sup>100</sup>

In Africa, liver cancer is the

**4th**

**most common cancer**



## AFRICA

“Dying from viral hepatitis in Africa is becoming a bigger threat **than dying from HIV/AIDS, malaria or tuberculosis.**”

What is required as a priority from Africa, are well-designed epidemiology studies that screen for NAFLD in the general population as well as high-risk groups such as patients with T2D or obesity.<sup>100</sup>

Liver cancer is the fourth most common cancer in Africa, and the second most common cancer for men.<sup>103</sup> In men, it is also the second most common cause of cancer death.<sup>101</sup>

As with cirrhosis, by far the major causes of liver cancer in Africa are hepatitis B and C, followed by alcohol misuse. However, this region has another unusual risk factor: aflatoxin, a substance secreted by a mushroom called *Aspergillus flavus* and a known carcinogen linked to HCC.<sup>102</sup> It is often found in several food items used across southern Africa such as cereal grains, spices and coffee and has been linked with hepatocellular cancer around the world. Around 40% of all HCC deaths linked to aflatoxin are in Africa and would be easily preventable with education and awareness.<sup>101</sup>

Alcohol provides a risk factor of 18% of all cirrhosis in northern Africa and 10% in sub-Saharan Africa.<sup>101</sup> In many areas of Africa, the risk of alcohol consumption factor is heightened as a result of degraded, adulterated, or artificial quality alcohol.<sup>101</sup> Still, alcohol consumption across the region is low compared to many other parts of the world. In sub-Saharan Africa for example, per capita consumption is about half of that consumed in Europe.<sup>103</sup> However, these figures hide a wide variation between countries such as Sudan, where 0.5 liters are consumed and more developed countries such as Nigeria where the figures rise to 10.8 liters per person each year.<sup>103</sup>

Despite the challenges, there is much opportunity for improvement of liver health in the region. A combination of prevention programs - nearly all African countries now provide the hepatitis B vaccine for newborns and awareness campaigns to reduce obesity – and the increasing availability of better and cheaper drug therapies for viral hepatitis could turn around the state of liver disease in the future in Africa.




# SOUTH AFRICA


**Population:** 60 million (2021)  
**GDP Per Capita:** US\$6,994.20  
**Life Expectancy:** 61 years (men) and 67.9 years (women)  
**Healthcare Spending:** 9.11% of GDP (2019)  
**Healthcare Funding:** Around 71% of the population is cared for by public sector healthcare, which is largely underfunded. The private sector is primarily funded by individual contributions to health insurance or medical aid schemes and serves ~27% of the population. To help mitigate this inequality, the South African government has introduced the National Health Insurance Scheme, which buys healthcare services for patients, which are then delivered at either public or private facilities.

Sources: WorldData.Info, Time Doctor, GlobalData, Data.WorldBank






**\$6,994.20**  
GDP per capita



**9.11%**  
of the GDP is spent on Healthcare




**61 years (men)**  
and **67.9 years (women)**  
Life Expectancy

South Africa has experienced great political and economic upheaval in the last few decades, which has inevitably impacted on the provision of healthcare. The additional burden of HIV and then COVID-19 have unsurprisingly contributed to significant gaps in the structure of the healthcare system, resulting in lack of progress in many key areas of health including liver disease. Overall, liver disease appears to take low priority: there are only three health professional councils registered as hepatologists in South Africa, all of whom are based in Groote Schuur Hospital in Cape Town.

There is also a dearth of epidemiological data on liver disease. Compared for example, to the widely accessible data on HIV, the quantification and management of viral hepatitis is greatly under-resourced.<sup>104</sup>

Much like most of southern sub-Saharan Africa, data shows an increasing prevalence of obesity in South Africa, with 13.5% of men and 42% of women obese.<sup>104</sup> However, despite having a greater prevalence of the associated risk factors, studies indicate that Black ethnic groups may have a lower risk of developing NAFLD when compared to white or Hispanic ethnic groups.<sup>105</sup> It is hypothesized that this may be due to predominantly subcutaneous rather than visceral fat distribution; visceral fat is correlated with buildup of hepatic fat, which causes NAFLD.<sup>105</sup> This notion has been corroborated by, a study in South Africa that found that despite having a higher level of total body fat, African women had a lower level of hepatic fat when compared to the Caucasian and Asian Indian study participants.<sup>106</sup> This suggests that, all else equal, the African region would bear a lessened burden of NAFLD.

When examining the prevalence of viral hepatitis in South Africa, it is impossible to ignore the impact of HIV co-infection. South Africa has the highest prevalence of HIV in the world – 7.7 million people.<sup>107</sup> Due to the shared modes of transmission, HIV/HBV and HIV/HCV co-infections are common.<sup>107</sup> Figures from West and Southern sub-Saharan Africa show that approximately 36% of HIV positive patients are also infected with HBV.<sup>108</sup> Co-infection with HBV, however, has been shown to be more fatal than co-infection with HCV.<sup>104</sup>



**36%**  
of HIV positive patients are also **infected with HBV**

Attempts to tackle the burden of viral hepatitis have had varying results. In April 1995, the South African government introduced a universal HBV vaccine program for newborns and infants, but has not yet begun to screen for the hepatitis B surface antigen (HBsAg), which indicates current or recent infection, during pregnancy.<sup>109</sup>

Still, the HBsAg prevalence in infants under the age of one, is high: 65.7%.<sup>110</sup> Meanwhile, the national prevalence will continue to grow, as it recently jumped ~20% over a period of 5 years.<sup>110</sup>

Alcohol consumption in South Africa varies between two extremes, with the population having a high prevalence of both binge drinkers and those who abstain from alcohol altogether.<sup>111</sup> Per 100,000 of compensated cirrhosis cases in South Africa, approximately 90,513 were due to alcohol-associated liver disease.<sup>112</sup> To counteract the alcohol-related harm that occurs within the population, political leaders in South Africa have taken drastic action, which included a nationwide prohibition of alcohol that was put in place during the COVID-19 lockdown.

Based on GLOBOCAN data, there was an estimated 37,353 deaths in South Africa due to liver cancer in 2012, with this figure expected to nearly double to 64,525 by 2030.<sup>113</sup> In addition, in recent years liver cancer rates have had a significant decrease among younger black African men but increased in older black African men and women.<sup>113</sup> The increased mortality in these age groups may be the consequence of improved overall life expectancy and the rising prevalence of risk factors related to lifestyle behaviors, though further investigation is merited.

For end-stage liver disease, approximately 40-50 liver transplants are carried out per year in South Africa, and outcomes are comparable to international transplant centers. However, transplant services are only available at three transplant centers in the country – one in Johannesburg and two in Cape Town.<sup>114,115</sup> Transplant facilities are in great need of expansion to address the increasing prevalence of liver disease in South Africa.



STIGMA AROUND LIVER DISEASE  
HOLDING BACK PROGRESS

SOUTH AFRICA

Professor Wendy Spearman is Head of the Division of Hepatology, Department of Medicine, Faculty of Health Sciences at the University of Cape Town and Head of the Liver and Liver Transplant clinics at Groote Schuur Hospital. She is the Local Chair of the Conference on Liver Disease in Africa (COLDA) and was the WHO Africa appointed lead clinician for the development of the National Guidelines for the Management of Viral Hepatitis in South Africa.

‘Professor Spearman comments: Liver disease is generally not seen as a major health problem in South Africa, especially when compared to infectious diseases such as HIV and TB or respiratory and cardiovascular disease. Policymakers and the general public have struggled to get beyond the idea that liver disease must somehow be related to alcohol abuse, and this has allowed it to be relegated as a public health issue.

‘This lack of focus has a number of implications. Firstly, there is a lack of awareness about the causes of liver diseases within the general public and even amongst many clinicians. Secondly, there is an ongoing lack of investment into research and collating real world data so there is difficulty in accessing reliable information across all the etiologies of liver disease. Of course, without reliable data it is difficult to ask for, and obtain, appropriate funding for testing, diagnostics and treatment therapies.

‘For example, hepatitis B is endemic and underestimated. It is probably running at around 4% prevalence in the general population. These “HBV-infected individuals often present with complications of advanced liver disease such as inoperable liver cancer in their early 20s.” Although in theory, viral hepatitis is a notifiable disease, the majority of these infections are not notified and in reality many of the deaths due to cirrhosis or liver cancer- particularly if they take place in rural areas which are serviced by overwhelmed primary care clinics - are not correctly recorded.



HBV-infected individuals often present with complications of advanced liver disease such as **inoperable liver cancer in their early 20s.**

‘Likewise, the majority of liver cancer patients present at the late or end stage of disease, usually after becoming jaundiced or suffering weight loss. Although there are screening and diagnostic facilities in secondary care across all the provinces, for MRI scans, chemotherapy and the latest interventional radiology, the patient must be referred to tertiary care. Unfortunately, tertiary care cannot deal with everyone who needs us, so we have to select depending on whether we can provide them with an appropriate treatment. Even in tertiary care, the reality is that lack of funding is a barrier. For example, we do not have access to the latest first-line combination systemic therapy for liver cancer.

‘Alcohol-associated liver disease is a big issue in South Africa, although we have no specific data on this. Alcohol plays a big part of life in South Africa, across all socioeconomic strata, and although there are high numbers of the population who don’t drink at all, many South Africans are heavy drinkers.

STIGMA AROUND LIVER DISEASE  
HOLDING BACK PROGRESS

*continued*

‘There is little data on NAFLD or NASH in South Africa, nor is NAFLD currently incorporated into any non-communicable disease guidelines on diabetes, dyslipidemia and hypertension, even though obesity and diabetes rates are rising fast across the country. Obesity awareness campaigns do not mention fatty liver disease nor is there any education within schools. Even some clinicians are unaware of the link. This lack of awareness is also apparent within the health system - currently if a test shows abnormal liver enzymes, an obese patient will be referred straight to the hepatology department - whereas the correct management should probably be one of weight and metabolic control. Indeed, as the numbers of patients with NAFLD continue to increase, we are going to have to break down the barriers that see different specialists working in isolation and aim for a multi-disciplinary team approach.

‘We also must understand that social economic factors present real challenges to improving health care. Many South Africans live in rural areas and often have difficulty accessing tertiary healthcare. As a result, people will often only seek help when they become very ill. This is particularly relevant to liver disease which is mostly a silent disease with complications arise.

SOUTH AFRICA

“

**Obesity awareness campaigns do not mention fatty liver disease** nor is there any education within schools. Even some clinicians are unaware of the link.

- PROFESSOR WENDY SPEARMAN

”

Recently there have been some positive developments in liver disease. For example, palliative care is now available even at primary care level with access to opiates and other forms of palliative support. In 2019, the first National Guidelines for the Management of Viral Hepatitis were published, providing clear pathways for testing and treatment – although many of these recommendations will take some time to implement. ‘How can we improve? We really do need to get on top of hepatitis B by screening pregnant women for HBsAg, identifying highly viraemic women for third trimester tenofovir prophylaxis and implementing the HBV birth dose vaccines. We also need simplified treatment algorithms with access to molecular diagnostics and imaging to identify those individuals with hepatitis B and C who need upscaling through the health system from those who can be managed in primary or secondary care.

‘Finally, we urgently need more data across all liver diseases so that we can properly assess the resources needed to tackle the ever-increasing burden of liver disease in South Africa.’

“

Of course, without reliable data it is difficult to ask for, and obtain, **appropriate funding for testing, diagnostics and treatment therapies.**

- PROFESSOR WENDY SPEARMAN

”



# KENYA

**Population:** 54 million (2021)  
**GDP Per Capita:** US\$2,006.80  
**Life Expectancy:** 64.6 (men) and 69.4 (women)  
**Healthcare Spending:** 4.59% of GDP (2019)  
**Healthcare Funding:** Kenya's health sector relies on different sources of funding, namely public (government), private firms, households and donors, as well as health insurance schemes.

Public healthcare service delivery is divided into four levels, starting with community services on the ground, followed by primary care health services, and secondary and national hospitals. Primary healthcare and maternity services are free in public health centers and dispensaries. However, public hospitals continue to charge user fees.

Due to the devolutionary shift within Kenya's healthcare financing structure, there is a significant inter-country variation in financing arrangements for healthcare facilities and services.

Source: WorldData.Info, World Population Review, Data.WorldBank, Kenya Healthcare Federation



**\$2,006.80**  
GDP per capita



**4.59%**  
of the GDP is spent on Healthcare



**64.6 (men)**  
and **69.4 (women)**  
Life Expectancy

Similar to other countries in sub-Saharan Africa, there is a significant lack of available data on the prevalence, incidence, and mortality of liver disease in Kenya. Between 1980 and 2010, cirrhosis-related mortality doubled in sub-Saharan Africa, making liver disease a major healthcare burden for this group of countries.<sup>116</sup> Significant investment in liver disease treatment, diagnosis and prevention, as well in the collection and analysis of data is required to address this growing healthcare issue.

HCC is the 11th most prevalent form of cancer and the 9th highest cause of cancer-related death in Kenya.<sup>117,118</sup> A major risk factor for liver cancer in Kenya is Hepatitis B infection, with the virus having a prevalence of approximately 5-8% within the Kenyan population and attributing to over 60% and 90% of chronic liver disease and HCC cases, respectively.<sup>119,120</sup> The western area of Kenya, specifically the region of North Rift, has a particularly high prevalence of hepatitis B. It is hypothesized that this is due to a high concentration of mycotoxin grain contamination, since this region has extensive cereal production.<sup>117</sup>

To address the high prevalence of liver cancer in the region, the country's first liver cancer surgeries, funded by The French Ministry of Foreign Affairs, will be available in West Kenya.<sup>118</sup> Clinicians at the Moi Referral and Teaching Hospital (MTRH) will be trained to identify early risk factors, make diagnoses, and operate on living cancer patients with specialized equipment in both Peru and Paris.<sup>118</sup> If successful, this could be a flagship center to be replicated and established in other high-risk countries.



**9 OUT OF 10 CHILDREN** develop immunity to hepatitis A once they reach the age of 10

The hepatitis B vaccine was introduced in early 1980s, with the Kenyan Expanded Program of Immunization (KEPI) incorporating it into their initiative in 2002 by vaccinating newborns at six, 10 and 14 weeks.<sup>120</sup> Despite this program, a large proportion of the Kenyan population remain unvaccinated, especially those born prior to 2002 who missed out on the vaccine and are consequently at much higher risk of developing chronic hepatitis.

Although not as prevalent as hepatitis B, hepatitis A, C, D and E infection must also be considered when analyzing liver disease etiology in Kenya. In a 2017 report across four Kenyan hospitals, the most common cause of jaundice was chronic hepatitis B infection, with over half of the study participants testing positive for this virus.<sup>121</sup> Acute hepatitis A was the second most common cause of the symptom.<sup>121</sup> This was a relatively unexpected result, as previous studies carried out in Kenya have shown that 9 out of 10 children develop immunity to hepatitis A once they reach the age of 10. This indicates a re-evaluation of the need for an adult hepatitis A immunization program in Kenya.<sup>122</sup> Recent infection of hepatitis C, D or E was not found in the study.

Given the relatively limited data on the prevalence of NAFLD in sub-Saharan Africa, the two main studies investigating this disease prevalence in Kenya have fairly small sample sizes.<sup>123,124</sup> A recent study involving 783 individuals in Kenya found that 15.9% had NAFLD, with a three-fold higher risk in urban populations when compared to rural population groups.<sup>125</sup> A surprising female-to-male prevalence ratio of 2.8 to 1 was also identified in this study, calling for further investigation on the potential high-risk level for black African women in developing NAFLD compared to their male counterparts.<sup>125</sup>



**5 MILLION**  
people in Kenya are living with chronic HBV infection.



WE NEED A COHERENT STRATEGY FOR VIRAL HEPATITIS

Michael Nyawino is Executive Director Financial Awareness Foundation Ambassador of the Christian Community Healthcare Foundation in Kenya. Mr. Nyawino says: ‘Liver disease accounts for 5% of deaths in Kenya, making it a serious public health issue. Yet despite this high figure, it has largely been ignored by our government. As a result, liver disease, whether from alcohol abuse, hepatitis or NASH is usually only detected when it is at an advanced stage. This is partly due to lack of awareness but also lack of funding for healthcare in general - most people must pay a certain amount towards hospital treatment including testing - so generally the poorer populations will wait until the last minute until they absolutely cannot carry on without medical help.

‘Unfortunately, by the time they have reached that stage, it is usually far too late to carry out any effective treatment and in any case, there is usually a wait for beds in most public hospitals. It is a desperate situation for them. Sometimes, if a transplant or other complex treatments are needed, the family in many cases raise funds so they can send the patient to India. Alternatively, the private hospitals have good facilities including diagnostic equipment, but this has to be funded upfront, and this is out of reach for most people in Kenya.

‘One of the key causes of liver disease in Kenya is the relatively high rate of hepatitis B, particularly in the coastal regions, which are the least developed part of our country. Although we have free vaccinations for infants, there is no coherent testing program for adults, and generally people are only diagnosed when they are being treated for something else. A lot of government - and external - funding has been put into raising public awareness of HIV, malaria and tuberculosis. I would very much like to see the same being done for viral hepatitis including highlighting its impact on liver disease.



KENYA



IT’S A VERY SAD SITUATION

*Liver disease is not only widespread but it is often fatal. We urgently need a program of education around obesity and alcohol abuse, starting from an early age in the schools.*

- MICHAEL NYAWINO

‘We have no specific data on liver cancer in Kenya, although what we do have seems to indicate that liver is the third most common cancer amongst Kenyan males. It is almost certainly underdiagnosed. We hear regularly of people only going to the hospital at the very last minute or not even receiving treatment at all with their death not being correctly recorded as cancer. Currently viral hepatitis is believed to be the main cause of liver cancer here, but there is also concern about the rising rates of alcohol abuse.

‘In line with the rest of the world, obesity rates are rising, particularly in the urban areas where fast food consumption increases, moving away from the traditionally vegetarian diet of the past. We have no idea how people have NAFLD or NASH, as it is simply not recorded, partly due to government inaction, but also because we simply don’t have the scanning equipment to carry out a proper testing program.

T2D is also becoming common, but it needs regular medication. Many people can’t afford that, thus they resort to traditional remedies, which can often make things worse.

‘It’s a very sad situation. Liver disease is not only widespread but it is often fatal. We urgently need a program of education around obesity and alcohol abuse, starting from an early age in the schools. Hospitals desperately need more diagnostic resources so that we can begin a proper screening program for those at risk of liver disease.

‘If we carry on as we are, especially with the new challenges presented by NAFLD and NASH, we will be looking at a very serious crisis in liver disease in the next decade. The government needs to take action – and soon.’

OVERVIEW

CAMEROON

**Population:** 27.22 million (2021)

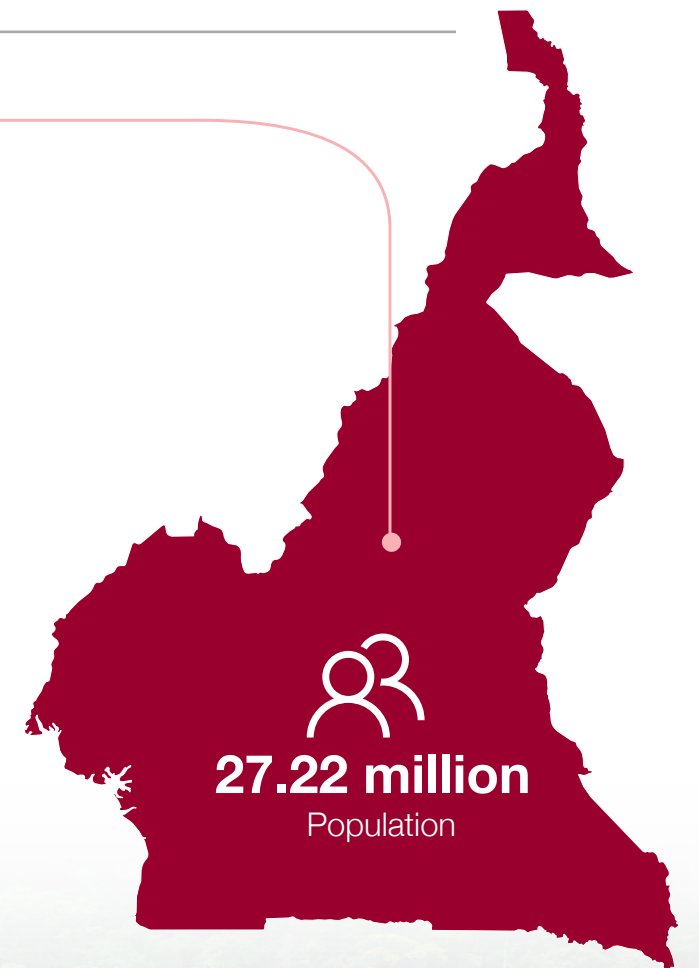
**GDP Per Capita:** \$1,161.70

**Life Expectancy:** 58.4 years (men) and 60.9 years (women)

**Healthcare Spending:** 3.6% of GDP (2019)

**Healthcare Funding:** The main sources of funding for the health sector in Cameroon are: the state budget, households, external financing, local authorities, NGOs and private health insurance, which provide a marginal contribution. These sources do not contribute equally. In 2009, for example, out of a total funding estimated at \$5,752,750,000, the contribution of households stood at 94.6% against 3.8% to the State and 1.6% for external partners. Healthcare hardly gets more than 5% of the country’s budget – far below the 10% standard from the WHO.

Sources: WorldData.Info, Salary Explorer, Data. WorldBank, MacroTrends.net, International Anatolia Academic Online Journal



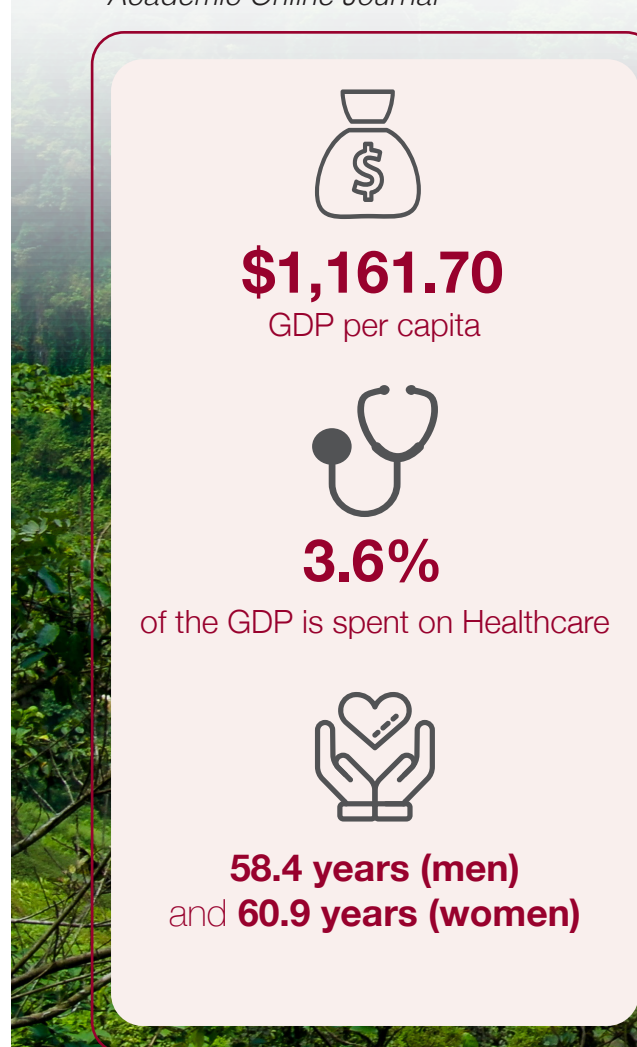
**\$1,161.70**  
GDP per capita



**3.6%**  
of the GDP is spent on Healthcare



**58.4 years (men)**  
and **60.9 years (women)**






There is a general lack of information on the prevalence and mortality of liver disease in Cameroon. To address this issue, a recent study gathered and analyzed data on liver disease in a group of patients admitted to Yaounde University Teaching Hospital. Among admitted patients, the prevalence of cirrhosis was 6.7%.<sup>126</sup> The three main causes of cirrhosis were HBV infection, HCV infection and alcohol intake, with a prevalence of 40.2%, 36.8% and 22.2% respectively. Mortality rate was also found to be high, with a rate of 20.5%.<sup>126</sup> These results demonstrate the high prevalence of liver disease within the country and, more worryingly, a pattern of late diagnosis that greatly increases the chances of mortality.

A similar study found that 47% of cirrhosis patients tested positive for HBsAg, so HBV infection has been a major risk factor for cirrhosis in Cameroon for decades.<sup>127</sup> Despite the introduction of the HBV universal vaccine in 2005, the overall prevalence of hepatitis B in Cameroon is high when compared to other countries, ranging between 6-16% within the general population.<sup>128</sup> Indeed, there were 12,000 new cases of the virus in 2019, up from 9,600 cases in the previous year.<sup>129</sup> Knowledge of effective HBV prevention and safe practice remains poor. Indeed, pregnant women across the country have been shown to adopt poor practices regarding HBV prevention.<sup>128</sup> Furthermore, as is the case for other universal vaccine programs, those born before the implementation of the HBV vaccine in Cameroon are at a high risk of developing chronic HBV infection.

To help combat the prevalence of hepatitis B infection, the Cameroon government has reduced the cost of treatment from \$250 a month to \$50, to encourage hospital attendance.<sup>129</sup> However, hospital attendance is still universally low in Cameroon, with only 35% of the population regularly using this healthcare service. The remainder of the population relies on more traditional healers or only attend hospitals once their conditions become critical.<sup>129</sup>



**1 in 6**  
people in Cameroon  
has **chronic HBV**  
infection.

An additional factor that must be considered when analyzing hepatitis B in Cameroon is the prevalence of hepatitis D co-infection, which is greater in severity than HBV infection alone.<sup>130</sup> In a recent study, of HBV-infected samples, 46.73% were positive for hepatitis D virus and 34.2% had an active co-infection.<sup>130</sup> This has major implication for viral hepatitis in Cameroon, as those infected with hepatitis B are at a greatly increased risk of medical complications and death.

Hepatitis C is also a major healthcare issue in Cameroon, and the country has a prevalence rate of approximately 4.9% amongst adults - the highest prevalence rate in world for HCV.<sup>131</sup> However, in a study published in 2018, the prevalence of HCV in Cameroon was found to be half of previous estimates, with a much higher prevalence amongst the older cohorts.<sup>131</sup> This was due to ages 49-59 having a reduced access to quality medical care in late 1950s, greatly increasing this groups infection rates for HCV. Indeed, the HCV prevalence for the 15-49 age group and 15-19 age group were only 0.81% and 0.2% respectively.<sup>131</sup> Due to this improved quality of healthcare in Cameroon over the last decade, an HCV-free generation is fully achievable as long as the prevalence of intravenous drug use is controlled.

Liver cancer is the fourth most common cause of cancer mortality in Cameroon, with approximately 955 deaths and 1021 new cases in 2020.<sup>132</sup> Both hepatitis B and C infection are the most common causes of HCC and account for approximately 90% of cases.<sup>133</sup> In June 2020, the Ministry of Public Health constructed a national strategic plan for the prevention of cancer in Cameroon, with the aim of improving primary and secondary care cancer services, along with developing new therapies and stimulating research. By implementing this plan, they hope to half the morbidity and mortality caused by cancer in Cameroon within the next decade.<sup>134</sup>

In terms of NAFLD and NASH prevalence in Cameroon, there is little to no data available. However, many related risk factors are increasing. Obesity rates are 11.4%, which places the country at number 135 in the world.<sup>135</sup> More notably, diabetes rates in Cameroon are rising, with prevalence increasing from 2% to 5.8% in 1999 and 2019 respectively.<sup>135</sup> These findings indicate a potential correlated increase in NAFLD and NASH rates in the Cameroonian population.

CAMEROON NEEDS INVESTMENT IN DATA, DISEASE TESTING & DIAGNOSIS

Dr. Mbianke Livancliff is a Senior Immunization Officer and founder of the Empowering Women Foundation in Cameroon.

Dr Livancliff comments: 'In Cameroon, we have many barriers which prevent us from providing anything more than a basic healthcare system, with liver disease hardly registering as a health issue at the government level.

'Firstly, similar to many sub-Saharan countries, we have huge issues with health funding. Our funding partly comes from the government and partly from international partners such as the WHO and UNICEF, who mainly concentrate on infectious diseases such as HIV, malaria and tuberculosis.


'Further, government commitment to health funding - which is distributed by the Ministry of Health - is inconsistent, badly managed and open to corruption both at a local and national level. As a consequence, funding often does not reach the areas it was intended for.

'A second barrier is that, although the government provides some free healthcare, the reality is that most is paid for 'out of pocket' as and when needed. However, with an average wage in Cameroon of just \$10 a day, for most people, anything but the most basic healthcare is out of reach.

'Additionally, many Cameroonians do not leave their local area, so unless they can reach a government or NGO clinic nearby, or a doctor travels to them, it is hard for them to receive consistent and ongoing healthcare. This is a problem for liver disease patients.


'Many people in rural areas still believe in and rely on traditional medicine. Not only does this discourage patients from seeking proper medical help, but often traditional treatments themselves can cause significant harm, particularly to the liver, and we often see cases of liver failure from such treatments.

'Corruption at local or national level is also a real issue. For example, we have one of the highest rates of hepatitis B and C in the world and the government and NGO are investing in this with testing and vaccinations. However in reality, even 'free' testing for viral hepatitis often requires a fee, paid by the patient. This is having devastating consequences on attempts to control the spread of viral hepatitis and other diseases.



**5% of our population are thought to have T2D**  
which we know is prevalent in all metabolic disorders.

- DR. MBIANKE LIVANCLIFF



'Finally, and importantly, we are hampered by an acute shortage of good quality data around liver disease. Most research here is carried out by smaller private institutions and extrapolated out throughout the rest of the country which does not provide a true picture of health on the ground. The figures that are available likely misattribute the cause of death due to limited understanding of liver disease and folk beliefs, like witchcraft. All this prevents us from making meaningful assessments of how and where we need to focus our efforts.

'Around 5% of our population are thought to have T2D, yet there has been no interest from the government about NAFLD or NASH, which we know is prevalent in all metabolic disorders.

'We do know, however, that the rates of liver cancer are rising and now account for 5% of all cancer deaths with liver cancer the fourth largest cause of cancer mortality.

'At the same time, over the last few years, even some of the bigger hospitals have had to close their radiology departments for lack of funding and there are still too few clinicians who are experts in treating cancer, let alone liver cancer. Virtually all liver cancers are detected at a very late stage, and liver cancer treatment is usually limited to palliative chemotherapy with liver surgery pretty much non-existent. We have no liver transplant centers in Cameroon.

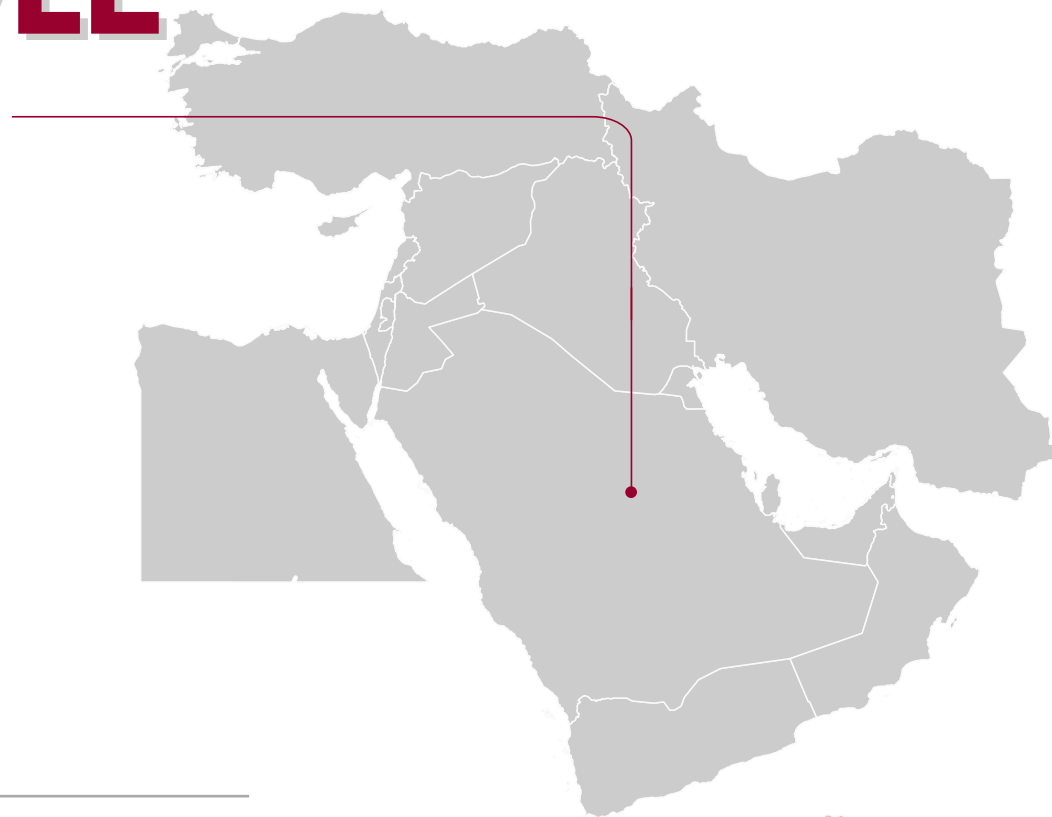
'All this is frustrating for us as medical professionals; many of my colleagues have left to work in other countries, and I sometimes feel like giving up. However, I strongly believe that if we can make some changes on overall health policy, we can make a huge difference on the ground.

'I would like to see the government focus on breaking the infection chain of viral hepatitis by investing in diagnosis and testing – all of which must be free. Furthermore, we urgently need better public education on all aspects of liver disease, including hepatitis, obesity, NAFLD and NASH.

'Finally, I would beg the government to invest in a system of providing good quality data on all aspects of liver health, including outcomes, so that we who are working in public health can start to develop a relevant and effective plan of action.'



# MIDDLE EAST



## HEALTH OVERVIEW

Home to more than 400 million people, the Middle East is a transcontinental area that covers countries across western Asia such as Iran, Saudi Arabia and Türkiye, all the way through to North Africa, including Egypt and Libya.

Throughout this geopolitical region, there is a wide range of economies. Qatar and Israel are global economic leaders, while others, for example Iraq and Syria, are plagued by war and poverty. There are also a range of cultural and historical factors which engenders many different healthcare systems – and often uneven levels of health – in the region.

As expected, those countries with a stable and successful economy have well-funded healthcare centers, accessible to the majority of the population and even sometimes sought after by patients across the globe. This includes Qatar, which has an exclusively public healthcare system and is ranked 13th in terms of the best healthcare systems globally.

In contrast, Iraq's healthcare system has undergone a 90% funding cut due to war and the resulting economical and political instability; many healthcare professionals have left the country for a more stable home. This predicament is mirrored in other Middle Eastern countries such as Syria, where the healthcare system has been decimated by conflict.

Increasing rates of non-communicable diseases, such as heart disease, obesity and diabetes can be seen across the Middle East. As in other regions, this can be attributed to the recent and rapid adoption of Western diets and lifestyle patterns, placing a significant burden on the various healthcare systems.

Sources: Legatum Institute – Cloud Hospital, Prosperity Index, The World Bank



The Middle East has the **highest prevalence of NASH**

# 32%

when compared to worldwide figures.

## LIVER HEALTH OVERVIEW

As diarrheal and infectious diseases have decreased in prevalence over the last few decades across the Middle East, they have been replaced by gastrointestinal cancers and cirrhosis. Indeed, liver disease is now amongst the top four killers across all countries in this region, with Egypt having by far the highest mortality rates, followed by Yemen and Morocco.<sup>136</sup> Chronic liver disease is responsible for two thirds of hospital admissions in Iraq, most commonly hepatitis B, alcohol, hepatitis C, immune hepatitis and metabolic disorders.<sup>136</sup>

In parallel with the increase in obesity and diabetes, NAFLD rates are also on the rise in the Middle East. A global analysis has found that the region has the highest prevalence for this condition (32%) when compared to worldwide figures, and approximately 20%-30% of these cases progress to NASH.<sup>137</sup> This is expected to continue to rise, with one study reporting that by 2030 there will be an increase of 48% and 46% in NAFLD cases for Saudi Arabia and the United Arab Emirates, respectively.<sup>137</sup> This pattern can largely be attributed to lifestyle changes: changes in dietary patterns, such as the adoption of more Western-based diets, as well as widespread physical inactivity. These factors must be addressed by policymakers to combat the growing burden of NAFLD.

Viral hepatitis has a wide range of prevalence across the Middle East, with hepatitis B ranging from 0.6% (Iraq) to more than 8% (Sudan).<sup>138</sup> For hepatitis C infection, Egypt is thought to have the highest prevalence of HCV in the world (18%) whereas in Lebanon, Saudi Arabia, and Iran, prevalence is less than 1%.<sup>138</sup> The occurrence of extremely high rates of viral hepatitis infection indicates an urgent need for government and policymaker intervention. However, the broad disparity across the region, as well as in associated risk factors, calls for tailored solutions.



## CHRONIC LIVER DISEASE

is responsible for **two thirds** of hospital admissions in Iraq.

Liver cancer is one of the top four causes of death in the Middle East, with hepatitis B and C infection being the main causes of hepatocellular carcinoma.<sup>136</sup>

Although the occurrence of hepatocellular carcinoma is lower than in East Asia, it is expected that it will increase in parallel with the rising incidence of NAFLD and HCV.<sup>139</sup>

More than other regions, religion also plays a critical role in liver health in the Middle East, given that Islam is the dominant religion, Islamic policymakers have complex views on organ transplantation from dead donors. However, in 1986, the Amman declaration was passed which allowed for the recognition of brain death in Muslim countries,<sup>140</sup> which opened a door for organ transplantation in the region and kick-started programs in several countries in the early 1990s. Türkiye carries out the most liver transplants in the region by far – mostly from living donors. In terms of liver transplantation from deceased donors, Iran carries out the most in the region.<sup>140</sup>






# TÜRKIYE


**Population:** 85.04 million (2021)  
**GDP Per Capita:** \$9,586.60  
**Life Expectancy:** 75 years (men) and 80.8 years (women)  
**Healthcare Spending:** 4.34% of GDP (2019)  
**Healthcare Funding:** Taxes (41%), insurance premiums (31%), and out-of-pocket payment (28%) fund the healthcare system, along with a combination of national and private health insurance. The coverage offered by compulsory health insurance provided by social security foundations, namely the Government Employees Retirement Fund to serve pensions for civil servants, the Social Insurance Organization for blue-collar workers, and Bag-Kur for the self-employed, is comprehensive. The private sector is rapidly growing and complements, rather than competes with, the state system.

Source: WorldData.Info, Global Data, WorldBank, Ministry of Health (Türkiye)






**\$9,586.60**  
GDP per capita



**4.34%**  
of the GDP is spent on Healthcare



**75 years (men)  
and 80.8 years (women)**  
Life Expectancy

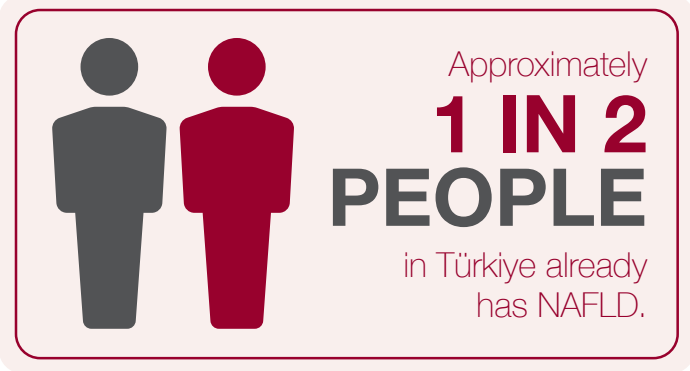
Türkiye faces many obstacles to liver health, including both unique challenges and those of broader global shifts.

Türkiye has high rate of obesity - a prevalence of approximately 32.1% according to 2016 data from the WHO.<sup>141</sup> Consequently, NAFLD is a major public health concern with some studies estimating that almost half of the Turkish population currently have NAFLD, with prevalence expecting to continue its upward trajectory over the next decade.<sup>141,142</sup> Between 2007 and 2016, there was a 22% rate of increase of the prevalence of NAFLD to 53.1% of the population in 2016.<sup>142</sup>

Additional data from this study show that the condition was most prevalent amongst men over 50.<sup>142</sup> Furthermore, it appears that NAFLD patients are at high risk of advancing to NASH. Another study found that, 90.4% of NAFLD patients screened at a Turkish healthcare center had NASH – much higher than the typical 20% – which highlights not only the severity of this epidemic but also the high risk of mortality due to advanced liver disease.<sup>143</sup>

Another key cause of liver disease in Türkiye is hepatitis B – about 56% of patients with HCC were infected with the virus.<sup>144</sup> Hepatitis B is also thought to be the cause of between 30%-40% of the country's cases of cirrhosis.<sup>145</sup> As of 2019, the estimated prevalence of hepatitis B in the Turkish population was estimated to be approximately 4.57%, or 3.3 million people.<sup>146</sup> An HBV vaccine was integrated into the Turkish child vaccination program in 1991 with two booster vaccines administered within 12 months of birth, which has resulted in a reduction of the incidence of HBV to less than 100,000 in children less than five years old.<sup>145</sup>

Although not as prevalent, hepatitis C infection is another major cause of cirrhosis and HCC in Türkiye, responsible for 20%-25% and 25%-30% of cases respectively.<sup>145</sup> Based on a national study carried out between 2009-2010, prevalence of HCV infection ranged from 0.5% to 0.96% of the population, with a higher concentration amongst the poor and older groups.<sup>147,148</sup> It is predicted that the burden of HCV infection will increase in the next decade, with an estimated 80,000 people being infected by 2030.<sup>145</sup>



An at-risk group that is somewhat unique to Türkiye are barbers due to their regular exposure to the bodily fluids of their customers. One study found that HBV and HCV had a higher prevalence in barbers when compared to the general population, making HCV and HBV infection an occupational hazard for this profession.<sup>149</sup>

To combat viral hepatitis, the Turkish government has established “The Turkish Viral Hepatitis Prevention and Control Program” with an aim to implement and improve policies and strategies targeting viral hepatitis. This includes raising awareness amongst the high-risk groups, along with the improvement of early diagnosis and preventative treatments.

Alcohol is considered to be a significant risk factor for liver disease in Türkiye, and an approximate 15.9% of HCC patients in the country have a history of heavy drinking.<sup>144</sup> However, given that the vast majority of the population is Muslim, alcohol consumption tends to be limited, though relevant data is limited as well.

In 1989, the Ministry of Health in Türkiye established a national organ-sharing program, followed in 2001 by the establishment of the National Coordination Centers for the allocation of deceased donors. Following on from these programs, liver transplantation has made great strides in Türkiye. Between the years of 2002-2013, almost 7000 liver transplants were carried out with an 83% success rate, which is highly competitive with global figures.<sup>150,151</sup> As it currently stands, there are now 45 liver transplant centers across the country, with treatment costs starting at \$52k per transplant, much lower when compared to other countries.<sup>151</sup>



A HIGH QUALITY HEALTHCARE SYSTEM  
BUT LOW PRIORITY FOR LIVER HEALTH

Dr. Fulya Gunsar is Professor of Gastroenterology at Ege University School of Medicine in Izmir. She is the current president of the Turkish Association for the Study of Liver Disease (TASL).

Dr. Fulya says: ‘The picture in Türkiye around liver disease is quite varied. For example, we have excellent transplant centers, our university hospitals and the public and private hospitals are generally well equipped with up-to-date diagnostic equipment and cutting edge treatments, and we have highly skilled hepatologists and gastroenterologists.

‘On the other hand – and with the exception of viral hepatitis - liver disease has not really been a priority for our government who have instead mainly focused on heart disease, diabetes and cancers rather than the links between obesity, NAFLD and NASH. ‘So currently we are in a situation where, although the rates of liver disease caused by viral hepatitis are falling, we are now dealing with increasing numbers of patients with NAFLD and NASH who need urgent interventions, often from a range of healthcare professionals.

‘However, this is an expensive system to maintain, and we know from the rates of obesity and the high rates of T2D in our population, that this cause of liver disease will continue to rise. The reality is that both clinicians and the government must work together to put strategies, including early detection, in place to deal with this upcoming crisis.

‘Currently the Turkish Association for the Study of Liver Disease is developing clinical guidelines for NAFLD which can be shared and used in both primary and secondary care. We sincerely hope that the government endorses and supports these guidelines. We really need to have national awareness of NAFLD and for everyone to understand that NASH can lead to cirrhosis or liver cancer.

“

The reality is that **both clinicians and the government must work together** to put strategies, including early detection, in place to deal with this upcoming crisis.

- DR. FULYA GUNSAR

”

TURKIYE

‘Viral hepatitis is generally well managed, with a program for the elimination of HBV and HCV by 2023, and treatment and testing available for all. However, there are still concerns about the rates of awareness of hepatitis B or C. We believe that the key here is to educate the primary care physicians, not just to be alert for symptoms of hepatitis B, but also to encourage testing for patients who could be at risk and to refer for diagnosis as quickly as possible.

‘Ninety percent of the population in Türkiye is Muslim, therefore, alcohol consumption is generally limited. Despite this, we have many patients with alcohol induced liver disease, and as required for these patients, we will carry out liver transplants after six months’ abstinence, or as an emergency if necessary.

‘Although our numbers on liver cancer are relatively low compared to other countries, we still see 70% of our patients at a late stage where curative treatments are often not an option. However, we have access to the latest medical advances, including radio frequency ablation, trans arterial radio embolization, chemoembolization, liver transplantation and liver resection for eligible patients with hepatocellular carcinoma. We generally use a multi-disciplinary approach with weekly input from radiologists, hepatologists, transplant surgeons and oncology.

‘Our national liver transplant program has been established for many years and is highly successful. Patients travel from many other countries to receive transplants. We have recently expanded our living donor program allowing us to increase our rate of transplantation. (See page 51).

A key consideration when we look to the future is the disparity between funding for the private and public hospitals. As the burden of liver disease continues to rise, the public sector, including the university hospitals are struggling to cope, often with basics such as bed space. Although the private system is very good, most people here cannot afford to pay for it. If we want liver health equality for all, not just for those who can pay, we need to invest in our public system once more.’

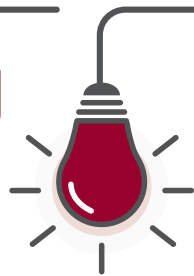
BEST PRACTICE LIVING DONOR  
LIVER TRANSPLANTATION

‘Our national liver transplant program was established in 1988,’ explains Dr Fulya Gunsar. ‘However due to the lack of donors from deceased patients, quite early on there was much clinical focus on living donor liver transplant (LDLT) as the most likely source of hope for patients awaiting liver transplant.

‘The first successful partial living donor liver transplant (LDLT) in children in Türkiye was performed by Haberal et al in 1990 and out of the 17544 liver transplantations performed in our country since 1988, 12839 (73%) of them have been from LDLTs.

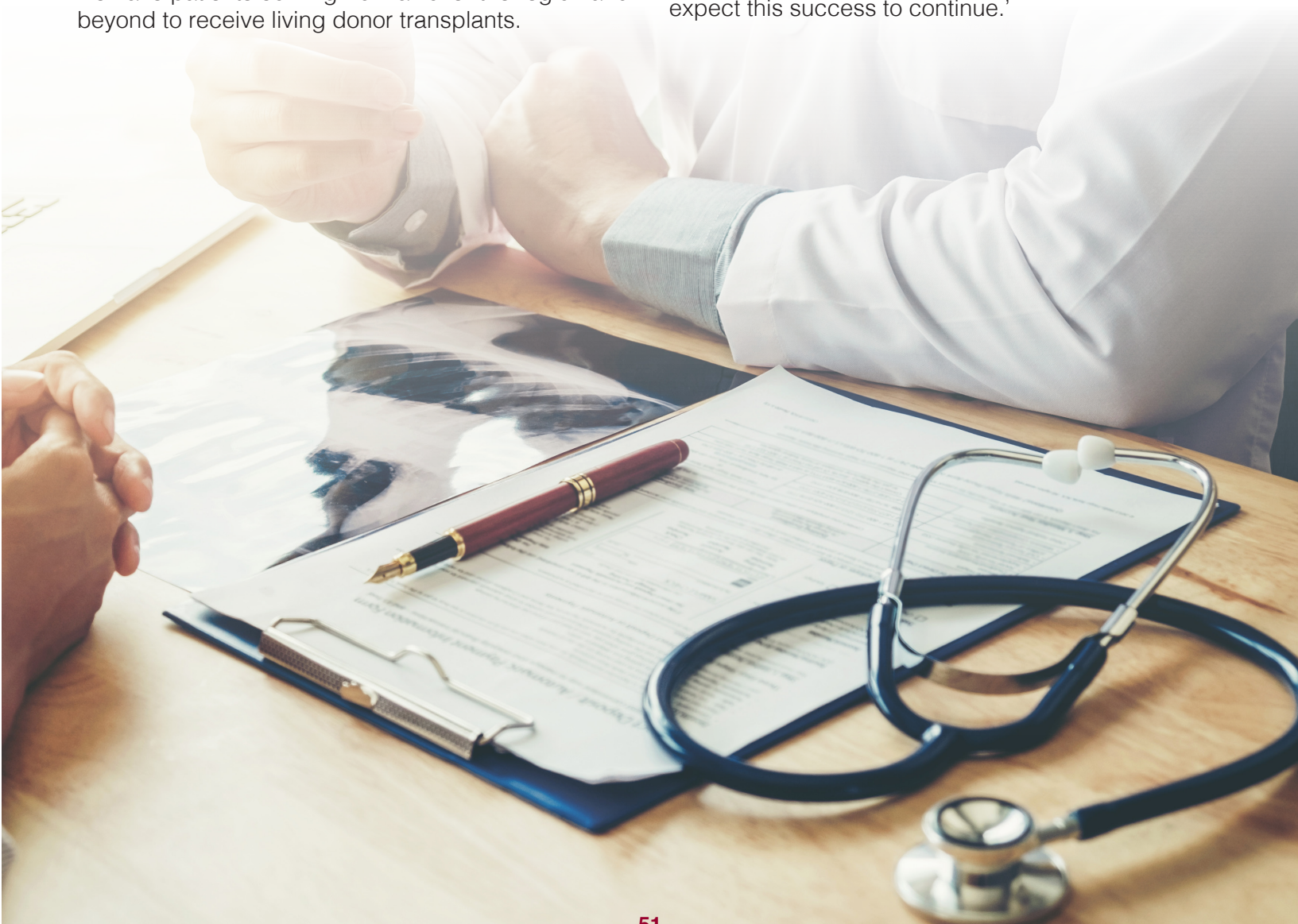
‘All this experience has led to Türkiye becoming a center of excellence for LDLT. The one year patient survival rate after LDLT is between 80% - 90% and we have patients coming from all over the region and beyond to receive living donor transplants.

DID YOU  
KNOW?



The **first successful partial liver transplant** was performed in 1990.

‘One of the key issues when carrying out LDLT is the safety of the donor material and this was, unfortunately, a significant challenge during the Covid 19 epidemic. However, despite this, we have recently expanded our living donor program to allow us to increase our rate of transplantation and we expect this success to continue.’





# LEBANON

**Population:** 6.77 million (2021)

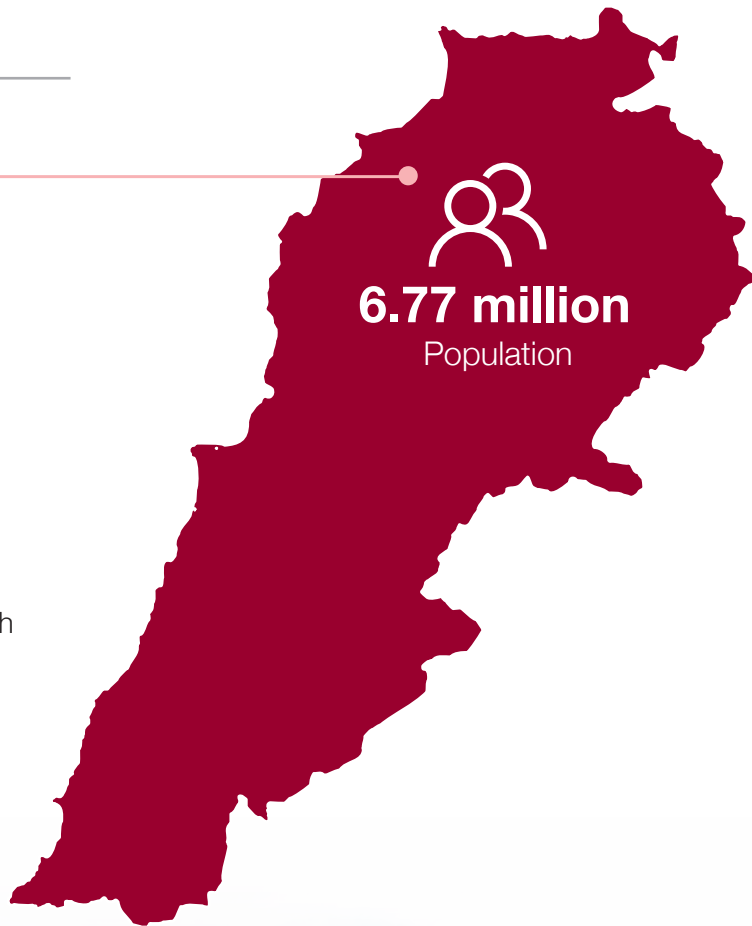
**GDP Per Capita:** \$2,670.40

**Life Expectancy:** 77.2 years (men) and 80.9 years (women)


**Healthcare Spending:** 8.65% of GDP (2019)

**Healthcare Funding:** The main source of funding is out-of-pocket payments from patients. Primary healthcare centers are mainly operated by non-governmental organizations through agreements with the Ministry of Public Health. However, secondary health care services, for example the majority of hospital beds (86%), are provided by the private sector. Lebanon’s health sector has long been viewed as fragile, but over the last two years a combination of COVID-19, high levels of poverty, hyper-inflation and heightened security risks have inflicted major damage on Lebanese healthcare.

Sources: WorldData.Info, salaryexplorer, Data. WorldBank, LSE Middle East Center Blog



  
**\$2,670.40**  
GDP per capita

  
**8.65%**  
of the GDP is spent on Healthcare

  
**77.2 years (men)  
and 80.9 years (women)**  
Life Expectancy

There is a limited amount of published data on the prevalence of liver disease in Lebanon. A study of patients who had undergone fibroscan in Beirut found that 58.3% had NAFLD.<sup>152</sup> Viral hepatitis infection was the second most common cause, with hepatitis B and C having a prevalence of 14.3% and 11.1% respectively.<sup>152</sup> Other causes included alcohol-associated liver disease (7.7%), drug-induced liver disease (3.3%) and autoimmune hepatitis (2.9%).<sup>152</sup> This provides a basis to begin to understand the leading causes of chronic liver disease in Lebanon, though its limitations in size and geography mean multi-center studies and epidemiologic surveillance efforts are necessary to further characterize liver disease in Lebanon.

Lebanon is an area of moderate endemicity for both hepatitis B and C infection per several sources. Indeed, a 2016 found that HBV and HCV prevalence of 1.74% and 0.21%, respectively.<sup>153</sup> This low prevalence can be attributed in part to the 1998 national hepatitis vaccination program for all newborns, in combination with an effective awareness campaign as well as active screening and vaccinations for high-risk groups.


However, it must be noted that due to a lack of funding, along with a volatile political situation, the Lebanese Ministry of Public Health has struggled to provide much-needed access to care for those suffering from chronic conditions, such as viral hepatitis. This increases the risk of complications arising in these patients and will continue to place an additional burden on Lebanon’s healthcare system as their conditions worsen. To complicate matters further, Lebanon is thought to have the highest number of refugees per capita globally, with this mainly being attributed to the Syrian crisis.<sup>154</sup> Indeed, one study found that hepatitis B and C was a neglected disease among these Syrian refugees in Lebanon, and urgent action was required to prevent this becoming a cause of increased prevalence of viral hepatitis in the country.<sup>154</sup>

Although health experts believe it is becoming a common cause of chronic liver disease, the prevalence of NAFLD in Lebanon is unknown.<sup>152,155</sup>

However, several Lebanese studies have analyzed dietary patterns of patients with NAFLD and found that their intake of Western diets of more meat, fruit and fast food was greatly increased compared to the more traditional, native diets.<sup>155,156</sup> An estimated 30.5% of men and 39.9% of women are classed as obese in Lebanon, which is significantly higher than the global national average of 7.5% and 10.3% for men and women respectively.<sup>157</sup> These figures may give an indication of the consequential health burden that NAFLD is and will continue to inflict on the Lebanese population.

Limited data on liver transplantation in Lebanon is available, although one center in Beirut recorded 10 liver transplants between the years of 1998-2010, with an acceptable 10-year survival rate of 67%.<sup>158</sup>

  
**39.9%**  
OF ADULT WOMEN

**30.5%**  
OF ADULT MEN  


**are classified as obese**  
in Lebanon



## WE MUST USE WHAT LITTLE HEALTHCARE RESOURCES WE HAVE EFFICIENTLY AND EFFECTIVELY

Dr. Jacqueline Kassouf Maalouf, PhD is the Founder and President of the National Diabetes Organization (DiaLeb). She is a certified diabetes educator and member of the International Diabetes Federation.

Dr. Maalouf shared: 'In Lebanon, we are facing an unprecedented economic collapse, which is impacting our healthcare system tremendously. Although, in theory we have a free or low cost primary healthcare system, along with a form of free secondary care, the reality is that many specific treatments are no longer available in the public health system. This is forcing people into the private health sector where they have to pay for treatment and medicines, often in US dollars.

'At the same time, the costs of many medicines are rising exponentially so, for many Lebanese people, finding the money to pay for medicines and treatment is extremely difficult. As a result, many patients will avoid going for essential tests until they feel very ill. This is particularly relevant for liver conditions such as viral hepatitis, where regular checks are essential to maintaining good control of the disease, and cirrhosis, which often needs rapid and urgent treatment. Unfortunately, we have no way of knowing exactly how the current economic situation is impacting the health of the Lebanese people.

'Another major challenge for our healthcare system is a lack of accurate and up to date on many of our key health issues, including liver disease. For example, there are no figures on NAFLD or NASH rates, while our figures on liver cancer date from 2016 and the latest figures on diabetes are from 2018. These almost certainly represent an underestimate of the true picture.

'The truth is we really don't know how many people are living with or dying of liver disease in our country and, because we have no national liver transplant program or liver donation registry, we can't even look to end stage liver disease for guidance in this area.

We do know however that obesity rates are rising, as are the number of people with diabetes, so we can assume that NAFLD and NASH rates will also be rising.

## LEBANON

“

Reducing the number of people who are obese will not only reduce the rates of T2D, but it also represents our best chance of preventing a huge rise in liver disease.

- JACQUELINE KASSOUF MAALOUF

”

'However, while there are government-run awareness campaigns around diabetes, few people are aware of the link between obesity and liver disease. This lack of awareness is even found within health care professionals - I have spoken to nurses and medical students who have never heard of NASH and NAFLD, much less how to treat it.

'To improve this situation, we must be realistic about what resources we have and use them as efficiently as possible. It seems logical that if we tackle obesity, which is a cause of both T2D, NAFLD and NASH, we could make some progress in both these disease areas. I would like to see our government focus on reducing obesity, perhaps through a national campaign where national experts visit schools, perhaps with initiatives on healthy eating in the workplace and training programs for healthcare professionals to support their patients to lose weight safely. Here at DiaLeb, we have been successfully running similar programs, although at a very small scale, so we know it can be done.

'Reducing the number of people who are obese will not only reduce the rates of T2D, but also represents our best chance of preventing a huge rise in liver disease cases. With the few resources we have, and are likely to have for the foreseeable future, this is our only realistic chance of salvation. It is as simple as that.'

# ASIA



## HEALTH OVERVIEW

Asia, the largest continent in the world, makes up one third of the Earth's surface. It is also the most populous continent but, due to extreme geographical features, many of its 4.7 billion people live in some of the most densely populated cities in the world including Dhaka, Bangladesh, and Manila and Pateros in the Philippines.

Although Asia is generally classified as a developing region and has three of the poorest countries in the world (Afghanistan, Cambodia and Nepal) within its boundaries, it is also home to Japan and Singapore, two of the most economically advanced countries in the world. As well as wide economic disparities and resultant inequalities, Asia has a vastly diverging range of cultural, political and social models including around health.



Asia has a diverse range of cultural, political and social models, including health models.




LIVER HEALTH OVERVIEW

Liver disease has long extracted a heavy toll of illness and mortality across Asia with the region experiencing some of the highest global rates of liver cancer and chronic liver disease.<sup>159</sup> In 2019 for example, estimates put the number of deaths from cirrhosis in South East Asia alone at 442,000 – the highest in the world - and the WHO notes that 72.7% of global deaths due to HCC occur within the Asia Pacific region.<sup>160</sup>

Much of this disease burden has traditionally been ascribed to relatively high rates of viral hepatitis – which is still not fully controlled across many regions of the continent. Though richer countries have introduced successful vaccination and testing programs, many of the poorer countries – often with populations living in densely urbanized cities with poor sanitation and healthcare, or in very remote areas - have failed to reach similar targets. Indeed, between 1990- 2019, Asia had the largest burden of acute viral hepatitis of the five continents of the world.<sup>161</sup>

While struggling to control viral hepatitis at pace with the rest of the world, Asia still faces the globalized pattern of growing rates of obesity and an epidemic of T2D, particularly amongst the aging population. Further, research has indicated that Asians may be genetically predisposed to the negative effects of metabolic disorders on liver health.<sup>162</sup>

Studies predict that the prevalence of NAFLD cases across the Asia Pacific region will increase between 2019-2030 by 6% to 20%, and NASH cases will increase by 20% to 35%.<sup>163</sup> Concurrently, cases of decompensated liver cirrhosis are expected to as much as double, and cases of hepatocellular carcinoma are also projected to rise by 65% to 85%.<sup>163</sup> Nonetheless, there have been some positive initiatives over the last few years. Asia was one of the first regions to put together a work group to establish guidelines on NAFLD and NASH in 2017, and in 2020 the Asian Pacific Association for the Study of the Liver released clinical practice guidelines for the diagnosis and management of metabolic associated fatty liver disease.<sup>164</sup>



442,000

estimated deaths in 2019 from cirrhosis in South East Asia – the highest in the world

ASIA

OVERVIEW

INDIA

India is the 7th largest country in the world by geographic size. Split between 29 states and seven union territories, India is second only to China as the most populous country in the world.

**Population:** 1.37 billion (2020)

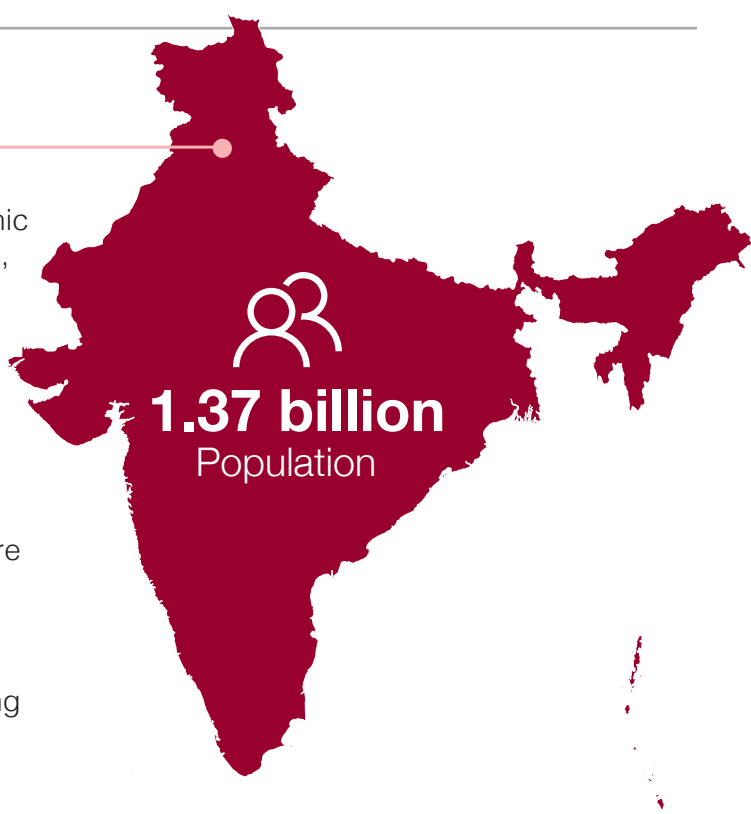
**GDP Per Capita:** \$2,277.40


**Life Expectancy:** 70.19 years (2022)

**Healthcare Spending:** As of 2019, India has a GDP of US\$2.83 trillion, and government spending on healthcare is approximately 1.23% of GDP (2019). Including out-of-pocket costs paid by patients, the country's total healthcare GDP equates to 3.6%

**Healthcare Funding:** About 20% of healthcare spending in India falls under the category of public funding, with the remainder being privately based. Due to the rapid rise of urbanization and a cultural lifestyle shift, almost 50 percent of this healthcare spending is now directed at in-patient beds to cope with the rising prevalence of lifestyle diseases. Unlike most other countries, demand for private healthcare in India is primarily driven by poorer patients, who are forced to pay out-of-pocket due to the shortcomings of public healthcare facilities. To mitigate this, in 2018 the Indian government introduced Ayushman Bharat, a national health protection plan, which allocates \$7,200 in annual coverage per patient for the most vulnerable and created Health and Wellness Centers to increase primary care access.


Sources: World Bank, Understanding India's Healthcare System.






\$2,277.40

GDP per capita



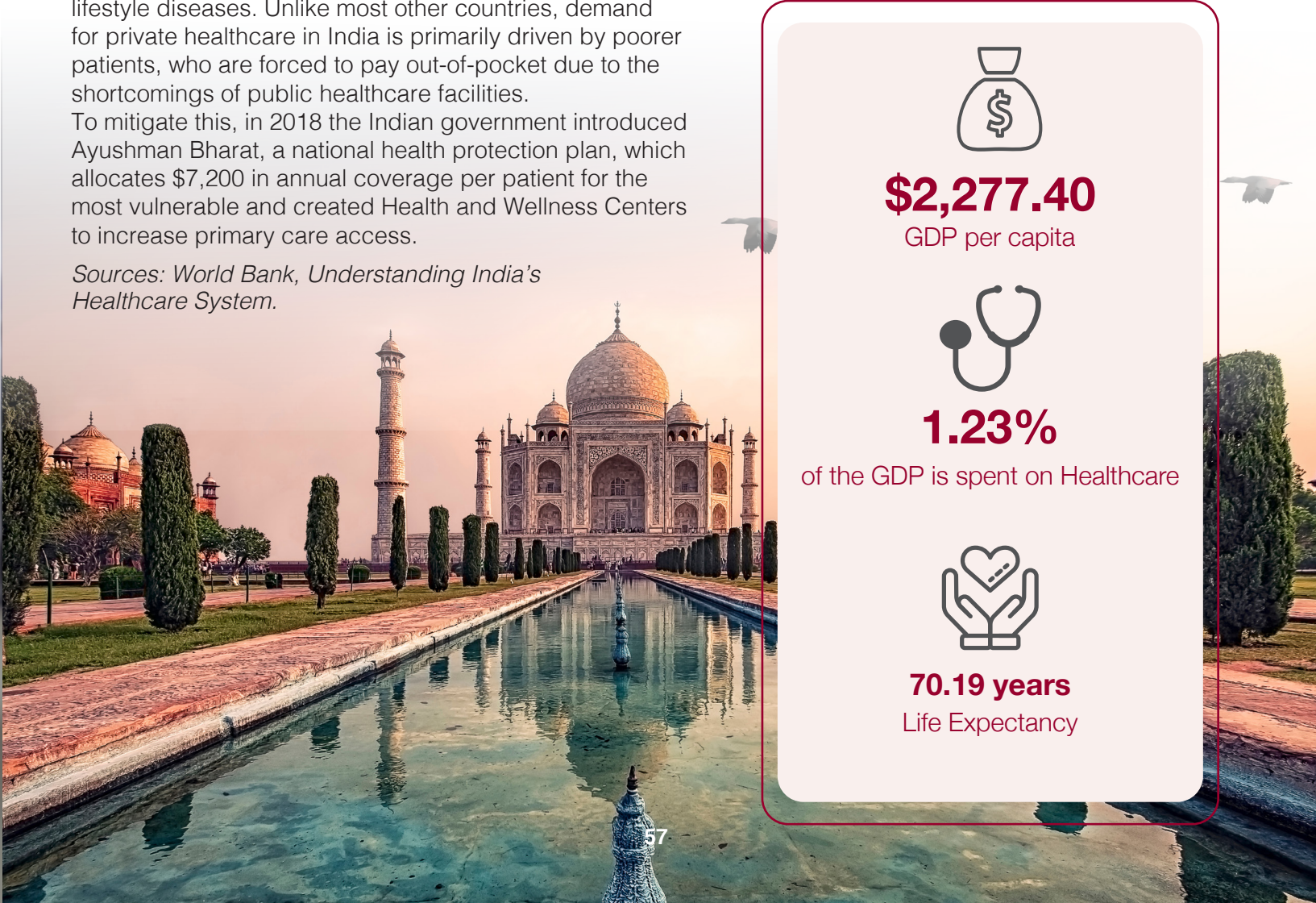
1.23%

of the GDP is spent on Healthcare



70.19 years

Life Expectancy



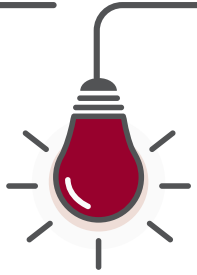


Out of the 2 million global liver disease deaths in 2015, liver disease mortality in India made up approximately 18.3%.<sup>165</sup> Indeed, mortality due to chronic liver disease has been steadily increasing in India since 1980, while with other large Asian countries, such as China, liver disease mortality has either remained stationary or been on downward trajectory.<sup>165</sup> Liver disease is rapidly being recognised as major public health issue for India.


As is the case with most developing nations, there is a limited body of epidemiological data available on liver disease in India. This can mainly be attributed to a lack of electronic healthcare databases, poor uniformity of reporting and low levels of diagnostic precision and phenotyping.<sup>165</sup> Still, the increasing impact of liver disease on India's economy and healthcare system is evident.

A cultural, lifestyle shift is a driving factor in this increasing burden of liver disease. Western diets and sedentary habits are becoming the norm in India and once-prominent taboos about alcohol consumption have begun to ease.<sup>166</sup> As these lifestyle patterns shift, NAFLD/NASH and alcohol-associated liver disease are now among the main contributors to cirrhosis and liver-cancer related mortality in India, in addition to hepatitis B and C.<sup>157</sup>

As is the case worldwide, the increasing prevalence of obesity, hypertension and T2D has resulted in a significant increase in the prevalence of NAFLD in India. Current estimates state that approximately 16-32% of the country's population have NAFLD, with around 31% of these patients being diagnosed



**DID YOU KNOW?**



In 2015, there were 2 million global liver disease deaths. India made up 18.3%.

with NASH.<sup>168</sup> Data also suggests that this condition is highly prevalent within younger population, with one study estimating that over one in three children have NAFLD in India –much higher than the global estimates.<sup>169</sup>

Interestingly, an anomaly has been identified within Asian populations when analyzing the prevalence of NAFLD, referred to as the 'Asian Paradox'. NAFLD patients with Asian ethnicity, including in South Asia specifically, appear to have lower BMI and obesity rates when compared to patients from the west, making them more susceptible to developing NAFLD and other BMI related chronic conditions.<sup>168</sup>

In June 2022 and as part of International NASH day, the Indian National Association for the Study of the Liver (INASL) and Indian Consortium on NAFLD (ICON-D) announced the creation of an action plan for the prevention and control of NAFLD, in partnership with Global Liver Institute. Although the Action Plan is not yet complete, the first survey was launched in August 2022 to gather data for the second national action plan in the world.

Viral hepatitis is a major healthcare threat for India; it can be compared, in terms of risk level, to the "big three" communicable diseases – tuberculosis, malaria and HIV/AIDS. According to the WHO organization, there are over 40 million carriers of HBV in India, with over 115,000 deaths per year associated with the virus.<sup>170</sup> Despite the fact that hepatitis B vaccinations have been part of India's Universal Immunization Program for over a decade, only half of children are effectively immunized against the virus.<sup>171</sup>



Hepatitis B vaccinations have been part of India's Universal Immunization Program.

**Only half of the children are effectively immunized against the virus.**

Hepatitis C is also common in India, with many of the major risk factors for the virus being highly prevalent throughout the country, including hazardous medical practices, such as unsafe injections, and intravenous drug use. Consequently, 12-18 million people are infected with the virus, with an estimated prevalence of 0.1-1.5%.<sup>172</sup> A high concentration of HCV has also been observed specifically in the state of Punjab, known as the '**hepatitis C belt**'.<sup>172</sup> An initiative has been launched by the Punjabi state government to combat this prevalence; however, similar efforts must also come from HCV stakeholders, such as healthcare professionals, drug companies and non-government organizations, if HCV is to be effectively controlled in this region.

Hepatitis E is still the most common cause of acute liver failure in India.<sup>167</sup> Indeed, a study in north western India found that 49.7% of acute sporadic hepatitis cases were associated with HEV infection.<sup>173</sup> Unique to India, acute liver failure due to HEV infection is associated with a very high mortality in pregnant women, 20-30% in contrast to 0.2-1% in the general population.<sup>173</sup>

In response to the high prevalence of viral hepatitis, the Indian government launched an initiative in 2018 called the "National Viral Hepatitis Control Program (NVHCP)".<sup>174</sup> The NVHCP aims to strength diagnostics and management services, as well as develop treatment protocols for the management of viral hepatitis, with the aim of eliminating viral hepatitis in India by 2030.



According to the WHO organization there are **40 MILLION** carriers of HBV in India.

As is the case globally, alcohol consumption is the most important and common cause of liver mortality in India, accounting for 34.3% of all cirrhosis cases and 20% of liver disease patients.<sup>174</sup> Alcohol-associated liver disease has severely increased in prevalence over the recent years in India, mainly due to the increased availability and consumption of alcohol from younger ages.<sup>175</sup>

Estimated that the incidence rates for liver cancer range from 0.7 to 7.5 per 100,000 and 0.2 to 2.2 per 100,000 for men and women respectively.<sup>176</sup> The readily available guidelines on liver disease management from Europe, Asia and the USA are often inapplicable for the Indian population due to the expense of the proposed treatments. To address this, a task force set up by INASL was developed. They presented a consensus guide for diagnosis and management of liver cancer in 2014, tailored to the issues and resources of India.

India has also made some great strides in the last decade with its liver transplantation program. The Indian Liver Transplant Registry was recently formed, with the aim of providing more transparent and prospective data on liver transplantation. It is, however, still worth noting that less than 2000 liver transplants are carried out each year in India, in a country of 1.3 billion people.<sup>167</sup>





## AN URGENT CALL TO ACTION FOR GOVERNMENT AND CLINICIANS

continued

Retired hepatologist Dr. Shivaram. P. Singh is President of the South Asian Association for Study of the Liver and of the Indian National Association for Study of the Liver.

Dr. Singh says: 'The data tells the story of liver diseases in India today. While the incidence of alcohol-associated liver disease is rising exponentially, obesity rates and the numbers of people with T2D are climbing steadily and, with them, the rates of NAFLD and NASH. Meanwhile, millions of people in India are still infected with hepatitis B, with only around half of babies currently receiving the infant vaccination. I have been fighting to get the government to prioritize liver health for the last 20 years but, if nothing changes soon, liver diseases have the potential to become a real threat to public health across the country within the next decade.'

'Across India, public awareness of liver disease is patchy at best and non-existent at worst. For example, despite all the data we have on HBV and the resources given to treating it, around two in three Indians still have no idea what hepatitis B is. We need a widespread public awareness campaign so that people can understand how to protect themselves together with an effective testing program.'

'When it comes to alcohol, it could be argued that the government is more interested in raising taxes rather than reducing rates of alcohol consumption. To date, there have been no national government campaigns warning of the risk of alcohol abuse, and, although alcohol is banned in some states, there is little attempt to prevent the manufacture and sale of illicit and highly dangerous non-regulated alcohol.'

INDIA

“

**Liver disease is almost always preventable** and awareness is key.

- PROFESSOR DR. SHIVARAM. P. SINGH

”

'Obesity is rising exponentially, and with it NAFLD and NASH. This is of great concern to us all, given that south Asians are predisposed towards NAFLD, either genetically or through some other factor such as a unique gut microbiome. It is heartening that the government appears to have recognized this risk and have included NAFLD in a national action prevention program, although we are yet to see what this will mean in practice.'

'Meanwhile, together with my colleagues at the INASL, we are in the process of setting up an educational program on NAFLD for schools and colleges to raise awareness in young people. To do that, we have joined forces with The Rotary Club who are providing us with financial and other support.'

'Health inequality is a real challenge to receiving good quality healthcare. Although all states provide free medicines, whether you receive free diagnostic or other treatment depends on the state in which you live. This inequality especially affects liver diseases, which in the later stages will often require complex surgery or other treatments such as liver transplant. If you live in a state which requires you to pay for these treatments, and you are unable to do so, you either travel to another state and hope you can get admitted to a hospital there or, sadly, you die.'

'Liver disease is almost always preventable, and awareness is the key to this. We really need a concerted and joined-up effort by our government and professional medical bodies to ensure that the population is properly educated about how they can protect themselves and their families against viral hepatitis, alcoholic liver disease, NAFLD and other liver conditions. We need to do it now.'

## OVERVIEW

# PHILIPPINES

**Population:** 111 million (2021)

**GDP Per Capita:** \$3,548.80

**Life Expectancy:** 67.4 (men) and 75.6 (women)

**Healthcare Spending:** 4.08% of GDP (2019)

**Healthcare Funding:** In general, there are four main sources of financing:

- (1) national and local government,
- (2) insurance (government and private),
- (3) user fees/out of pocket and (4) donors.

As of 2007, 57% is paid out-of-pocket, 12% is paid for by the national government, 11% is paid for by the local government, 9% is paid for by social health insurance and 11% is paid for by other sources.

The 'Sin Tax' introduced in 2012, raised incomes from duty on alcohol and tobacco directly to fund healthcare, tripling the Department of Health budget within a year. Since then, two further tax bills have cemented this as part of the national health funding program.

*Sources: WorldData.Info, Statista, Data.WorldBank, Republic of the Philippines – Department of Health*



**\$3,548.80**

GDP per capita



**4.08%**

of the GDP is spent on Healthcare




**67.4 (men)  
and 75.6 (women)**

Life Expectancy

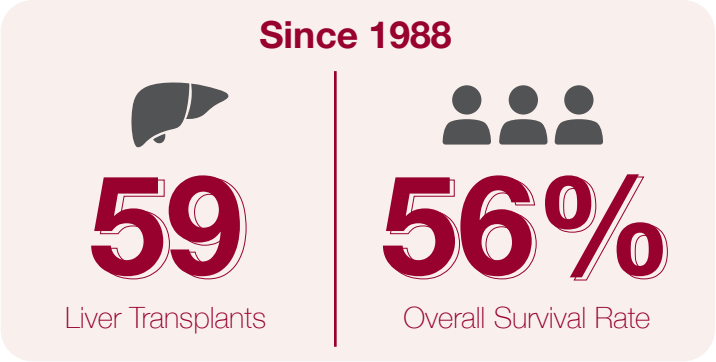


Liver disease is a significant healthcare burden in the Philippines, with approximately 16,500 deaths per year due to liver disease complications, accounting for 2.65% of the country’s total deaths in 2017.<sup>177</sup> Chronic hepatitis infection, NAFLD and alcohol-associated liver disease are the country’s most common causes of liver disease.<sup>177</sup> Furthermore, liver cancer is the fourth most common cause of cancer in the Philippines, leading to approximately 9,950 deaths in 2020.<sup>178</sup>

Hepatitis B is a major concern, with the WHO considering the Philippines to be hyperendemic for the virus. It is the country’s leading cause of hepatocellular carcinoma (HCC) and has a prevalence of approximately 16.7% within the general population, equating to 7.3 million persons infected.<sup>179</sup> Whereas with other countries in the Asia Pacific region in which the prevalence rate for hepatitis B has steadily decreased in the last few decades, mainly due to effective vaccination programs, the hyperendemic status of the Philippines has persisted.<sup>179</sup> As is the case in other countries, studies have also found that a lower annual income is a significant determinant of HBV infection in the Philippines, reducing the patients access to quality healthcare and increasing the risk of missed vaccinations.<sup>179</sup> The limitations in healthcare resources available for treatment underscore the necessity for prevention to limit infection. Although a universal immunization program was introduced for infants for hepatitis B in 1992, it wasn’t fully implemented until 2007 due to significant lack of funding. This greatly delayed its preventative effect, which may be a key reason for why the Philippines is so far behind many other nations in relation to hepatitis B eradication.<sup>179</sup>



Chronic hepatitis infection, NAFLD and alcohol are **common causes of liver disease.**



Following global trends, obesity is a growing healthcare issue in the Philippines. The number of Filipinos that are overweight or obese is approximately 27 million, with these numbers nearly doubling in the past two decades for both adults and adolescents.<sup>180</sup> Consequently, NAFLD risk is also increasing, though specific prevalence data is scarce. In one study published in 2008, patients admitted to a Philippine general hospital were tested for NAFLD and analyzed for common characteristics. Out of 12% of admitted patients in the study had NAFLD, with 29% being male and 71% being female and a mean age of 42.2 – a lower age when compared to previous studies.<sup>181</sup> A more recent study investigating Filipino NAFLD patients found that 11.9% of them were classed with “lean NAFLD,” providing an insight into this sub-condition found more frequently in Asian populations.<sup>182, 183</sup>

Excessive alcohol use is common in the Philippines: A 2018 WHO study noted that around 60% of adult Filipinos were binge drinking regularly.<sup>184</sup> In that year, 6 deaths per 100,000 were caused by alcohol-associated cirrhosis.<sup>185</sup>

Since 1988, there have only been 59 liver transplants carried out in the Philippines, with an overall survival rate of 56%; this is below the standard rate for transplant centers worldwide.<sup>186</sup> Liver transplantation is expensive in the Philippines – at least three times more than in India, meaning many patients require travel abroad for the life-saving procedures.<sup>187</sup> To address this issue, a new center has been funded by the Filipino government – the NKTl Liver Center. This facility will be equipped to carry out surveillance on liver disease patients, as well as provide treatments, preventative measures, and a state-of-the-art liver transplant service.<sup>188</sup>

Dr. Diana Payawal is Clinical Associate Professor, Department of Medicine, University of Santo Tomas in Manila. She is the former President of the Asian Pacific Association for the Study of Liver and the current President of the Philippines College of Physicians.

‘Similar to many other countries in southeast Asia, we are facing an epidemic of obesity which will almost inevitably result in an increase in the rates of NAFLD and NASH and eventually a burden of end stage liver disease.

‘So far, the government has run awareness campaigns on healthy eating, and there are many weight-loss programs available, particularly on the internet. **However, the link between obesity and liver health has not been highlighted and most of the public have no awareness that it is a health issue.** Even some doctors will concentrate more on diabetes and cardiovascular disease rather than focus on the risk to the liver when they see an obese patient.

‘We need both national and clinical strategies to deal with obesity, NAFLD and NASH including awareness campaigns along with clinical treatment guidelines. A multi-disciplinary approach within hospitals and clinics would also help, for example, endocrinologists working alongside gastroenterologists and dieticians. This is not something that hepatologists can manage on their own. Finally, in common with many developing countries, we have very little information on the prevalence of NASH and NAFLD, so gathering this data should also be a priority.

**We are facing an epidemic of obesity** which will almost inevitably result in an increase in the rates of NAFLD and NASH and eventually a burden of end stage liver disease.

- DR. DIANA PAYAWAL

‘Viral hepatitis has also been a challenge to bring under control, and this, along with our high rate of alcohol consumption, is one reason why we have relatively high rates of liver cancer. However, over the last few years, the government has made efforts to focus on reducing the rates of viral hepatitis with the Department of Health recently producing comprehensive guidelines on the management of hepatitis B, C and hepatocellular cancer.

‘Although the introduction of the ‘Sin Tax’ in 2012 made some impact on the sales of alcohol and tobacco, our rates of alcohol– induced liver cirrhosis are still far too high. As well as focussing on increasing taxes, we need an effective and sustained awareness campaign to try to reduce our national dependence on alcohol.’





# CONCLUSION

Liver disease is a silent disease which often presents itself at a late stage. It is too often a chronic disease, sometimes requiring lifelong and costly therapies in which many populations do not have access to. Across each region and examined country, the incidence of liver disease and liver deaths (from cirrhosis and cancer) has been rising quickly.

These findings confirm a daunting fear – that liver disease is set to become a global public health crisis to rival diabetes, cardiovascular disease and cancer. Yet at the same time, across the globe, liver disease is in no compelling instance treated as a major health threat by governments, policy makers, and the public – and, even, in some cases, by clinicians. Political mismanagement and even corruption is an ongoing issue, draining resources from where they are most needed and demoralizing healthcare professionals. Finally, this rise in liver disease has been a very recent phenomenon, comparable only to diabetes in its rapid and global onset.

In Europe, liver disease is now the second biggest cause of deaths of people of working age.<sup>5</sup> Chronic viral hepatitis affects over 70 million people in Africa, and dying from viral hepatitis there is becoming a bigger threat than dying from HIV/AIDS, malaria or tuberculosis.<sup>97</sup>

Latin America is experiencing some of the highest obesity rates in the world, alongside the fastest growing rate of T2D<sup>56</sup> with excessive alcohol consumption the leading cause of cirrhosis in Argentina, Brazil, Chile, Mexico and Peru.<sup>55</sup> In 2015, for instance, almost two-thirds of global deaths due to liver disease occurred in the Asia-Pacific region.<sup>160</sup> In the US it is predicted that, by 2030, liver deaths will have increased (since 2015) by 178% to an estimated 78,300 deaths, mostly attributable to NAFLD/NASH.<sup>45</sup>

Nonetheless, advancements in technique and technology provide a promising outlook for the global state of liver health. Leading healthcare professionals are developing innovative ways to further advance the field. Patient groups and organizations continue to bridge the gap by leading awareness campaigns to educate the public, by providing patient perspectives on care, and by advocating for equity and accessibility to treatments. Since the majority of liver diseases are preventable and treatable, emphasis should be placed on awareness and preventive strategies to reduce the rising tide of liver disease.

3

Throughout the report, **three major themes emerge:**



**Obesity**, no longer a disease of just the developed world, is now prevalent across many countries, **leading to greater incidence of NAFLD and NASH.**



**Alcohol** is losing its cultural stigma in some regions, while in other areas, heavy drinking across all age groups, sexes and demographics is becoming normalized – as several experts have noted that they now **regularly witness the tragedy of young people dying from alcohol-associated liver disease.**



**Viral hepatitis** is well-controlled in many areas of the world, yet it is still **a major cause of liver disease and death in some countries.**



We urge you to act, wherever you are, however you can, **to improve the global state of liver health.**



**WE CALL ON GOVERNMENT AND POLICY MAKERS GLOBALLY TO:**

- Initiate a global coordinated program of good quality data collection to inform the above.
- Elevate liver health to take its place in the public health agenda commensurate with its prevalence and impact.
- Support regionally appropriate public awareness/education programs across the three main causes of liver disease.
- Commit to the value of prevention – education, screening, early diagnosis and treatment.



**WE CALL ON CLINICIANS GLOBALLY TO:**

- Recognize and understand the dangers of liver disease and tackle its causes and risk factors.
- Coordinate with liver colleagues to continue to produce high quality clinical guidelines.
- Instigate and support research into liver disease.
- Educate and inform patients to manage their own disease and to become a conduit for educating others.



**WE CALL ON THE PUBLIC TO:**

- Learn and understand their own liver health risk factors including weight, alcohol abuse or exposure to viral hepatitis and, where appropriate, commit to a preventative program including a testing and screening program if necessary.
- Support liver health organizations and/or patient groups.
- Become an ambassador/advocate for liver health in schools, community groups etc.
- Call upon your local/national politicians to support increased resources for liver health.



ENDORSING ORGANIZATIONS

- AISF - Associazione Italiana per lo Studio del Fegato
- ALEH - Asociacion Latino Americana para el Estudio del Higado
- Arizona Liver Health
- CASL - Canadian Association for the Study of the Liver
- Community Liver Alliance
- ERN - European Reference Network
- ESOT - European Society for Organ Transplant
- Fatty Liver Alliance
- Fatty Liver Foundation
- Hepatology Society of the Philippines
- Liver Action Network
- Liver Coalition of San Diego
- Liver Health Foundation
- Liver Patients International
- Mid South Liver Alliance
- Nash Knowledge
- Northeast Ohio Liver Alliance
- PBC Foundation
- SAASL - South Asia Association for the Study of the Liver
- TASL - Turkish Association for the Study of the Liver
- Texas Liver Foundation
- WHA - World Hepatitis Alliance

ENDORSERS

- Dr. Alessio Aghemo, Secretary of AISF, Italy
- Dr. Graciela Castro, ALEH President, Latin America
- Dr. Raymond Chung, AASLD Past President, USA
- Dr. Scott Friedman, AASLD Past President, USA
- Dr. Fulya, Gunsar, TASL President, Türkiye
- Dr. Phil Newsome, EASL Past President, EU
- Dr. Diana Payawal, APASL Past President, ASIA/Pacific
- Dr. Juanita Perez-Escobar, ALEH Secretary, Latin America
- Dr. Shivaram Singh, INASL President Elect, India
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