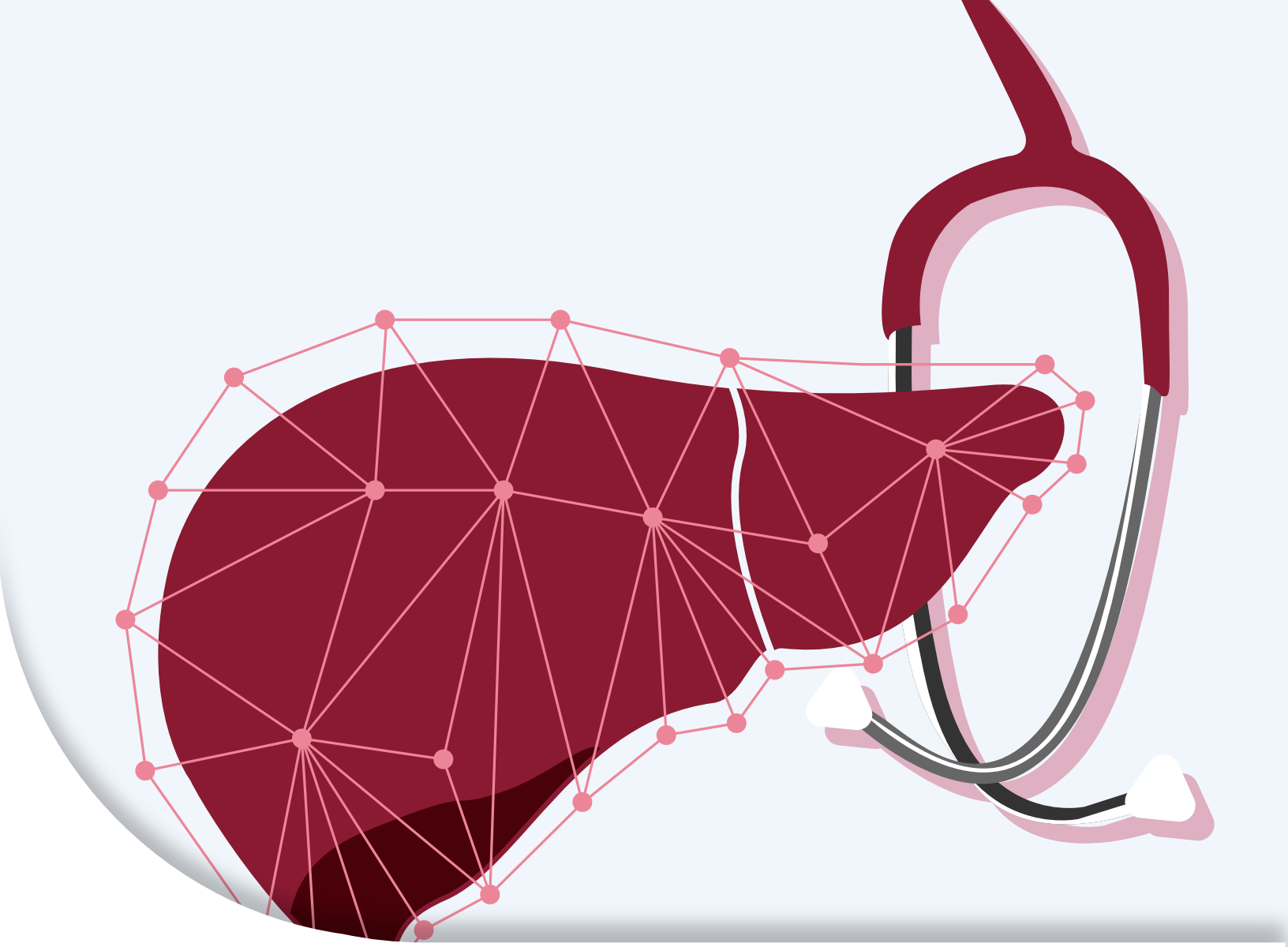

BEST PRACTICES IN LIVER HEALTH POLICY

a **Liver Health is Public Health** Report

Second Edition

GLI GLOBAL LIVER INSTITUTE

LIVER HEALTH IS PUBLIC HEALTH

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INTRODUCTION

In recent years, there have been significant advancements in the understanding and treatment of liver health conditions, including expanded diagnostic options, vaccines and treatments for viral hepatitis, and, most recently, breakthroughs in pharmaceutical interventions for Steatotic Liver Disease (SLD) - commonly known as fatty liver disease. However, access to care and opportunities for liver health improvement remain elusive for many patients globally.

The ramifications of liver disease are substantial; this affects individuals, communities, and economies worldwide. From losses in productivity due to fatty liver disease and the healthcare burden of viral hepatitis to premature loss of life from end-stage liver disease, the toll is significant. Additionally, the link between liver disease and other prevalent health conditions like cardiovascular disease, diabetes, and obesity further complicates treatment outcomes and increases healthcare costs.

Currently, liver disease accounts for two million deaths annually and is responsible for 1 out of every 25 deaths worldwide.[1] Steatotic liver disease affects a quarter of the global adult population and is the second-leading cause of end-stage liver disease and liver transplantation in Europe and America.[1] A rise in alcohol consumption, along with an aging population and increased prevalence of metabolic risk factors, is expected to lead to a significant surge in mortality associated with both alcohol-associated and steatotic liver disease.[1] However, growing political involvement and investment in implementing proven healthcare advancements bring much promise. This report continues to serve as a call to action for the policymakers and health ministers who serve their populations; it provides examples of successfully implemented policies that can be modified and followed in further communities to improve liver health outcomes around the world.

A review of this report reveals a few themes: limited public understanding of liver health, widespread disparities and underdiagnosis, and a need for public awareness of the impact of obesity on liver health. The policies presented aim to address these issues. Each edition adds more standout examples of policies from settings with different barriers, resource limitations, and diverse cultural contexts. Please take insight and inspiration from this report to develop policies that will improve the lives of liver patients and their families in your community.

Liver disease causes
two million deaths
each year.

CHAPTER **ONE**

From Awareness to Action: Policy Efforts to Reshape Brazilian Diets

Executive Summary

Brazil has taken significant steps to address the public health crisis posed by metabolic dysfunction-associated steatotic liver disease (MASLD) and its related conditions, such as obesity, diabetes, and cardiovascular diseases. With over 60% of adults classified as overweight or obese and millions living with diabetes, the country faces a growing burden of non-communicable diseases.[1, 2] Recognizing the harmful effects of trans fats on liver and cardiovascular health, Brazil has implemented aggressive policies to eliminate these harmful substances from the food supply.

Over 60% of adults classified as overweight or obese and millions living with diabetes

Background

MASLD is a pressing public health issue in Brazil. With over 60% of adults classified as overweight or obese and approximately 12.3 million Brazilians living with diabetes, the country faces a dual burden: hepatic fat accumulation leading to MASLD and its progression into more severe conditions such as liver cancer (hepatocellular carcinoma).

Given that consuming trans fats can lead to increased fat accumulation in the liver, exacerbating MASLD and contributing to liver cancer.[3,4] Brazil's efforts to eliminate trans fats are part of a broader strategy to mitigate these risks. Historically, Brazil has been proactive in addressing dietary health issues, with initiatives dating back to 2003, when trans fat labeling became mandatory. More recently, Brazil has capped trans fats at 2% of total fats in 2021 and banned partially hydrogenated oils by January 2023. These measures not only aim to reduce MASLD prevalence but also curb the broader metabolic disorders linked to obesity and diabetes, setting a proactive example for public health policy in addressing interconnected health challenges.

Objectives

1. **Reduce trans fat consumption:** Brazil aims to limit trans fat intake to less than 1% of the total energy value of the diet by eliminating industrially–produced trans fats. This aligns with WHO's recommendation to reduce trans fat intake to less than 1% of total daily energy intake.[5]
2. **Improve public awareness on impacts of nutrition:** Brazil emphasizes the importance of educating the population about the risks associated with trans fat consumption and the benefits of dietary shifts towards healthier fats. These are priorities of the Brazilian Association of Nutrition (ASBRAN) and the Federal Council of Nutritionists (CFN).[6]
3. **Enhance food safety regulations:** Brazil aims to implement and enforce strict regulations on food manufacturers to ensure compliance with trans fat limits and bans on partially hydrogenated oils. Agência Nacional de Vigilância Sanitária (ANVISA), Brazil's health regulatory agency, plays a crucial role in enforcing these regulations.
4. **Improve metabolic/cardiovascular health of Brazilians:** Brazil's goal of trans fat elimination policies is to improve the metabolic and cardiovascular health of its population by addressing the root causes of non-communicable diseases. Trans fats have been linked to increased risks of metabolic disorders like obesity and type 2 diabetes, which are prevalent in Brazil. Additionally, eliminating trans fats improves cholesterol profiles by lowering LDL and increasing HDL, decreasing the risk of heart disease.

Policy Components and Implementation

1. **Regulatory framework:** ANVISA approved regulations in December 2019 to limit trans fats in foods, with a phased implementation plan culminating in a ban on partially hydrogenated oils by January 1, 2023.[7] This regulatory framework is consistent with WHO's REPLACE action package, which includes reviewing dietary sources, promoting healthier fats, legislating regulatory actions, assessing and monitoring trans fat content, creating awareness, and enforcing compliance.[5]
2. **Public awareness campaigns:** Advocacy groups like ASBRAN and CFN have been instrumental in raising awareness about the health risks of trans fats. Their campaigns have included public hearings, media engagement, and social media outreach to mobilize support for policy changes.[6]
3. **Industry compliance:** Food manufacturers have had to reformulate products to meet the new trans fat standards. This has been supported by international organizations like the Global Health Advocacy Incubator, which provided strategic and technical assistance to Brazilian advocates.

Challenges to Implementation

1. **Industry resistance:** Some food manufacturers may resist reformulation due to costs and product shelf-life considerations. The food industry's reliance on cost-effective substitutes has created disparities in product quality, with cheaper items often containing less healthy lipid profiles, complicating efforts to improve overall dietary health.[8]
2. **Bridging from awareness to action:** While Brazil has education initiatives, ensuring widespread understanding of the health risks associated with trans fats remains a challenge. Brazil's nutrition education initiatives, primarily through the National School Feeding Program, integrate food and nutrition education into school curricula. However, knowledge does not translate to action, and it can be difficult to bring people to change their shopping and consumption behavior.
3. **Regulatory enforcement:** Continuous monitoring and enforcement are necessary to ensure compliance with trans fat regulations across the food industry. ANVISA's role is critical in maintaining these standards. One study found that one-third of products containing i-TFA were falsely labeled as trans-fat-free due to loopholes allowing manufacturers to declare "0g trans fat" for servings containing less than 0.1g of TFA.[9]
4. **Substitutes of trans fats:** A primary challenge with product reformulation is the substitution of trans fats with alternative fats, such as palm oil, which often results in higher levels of saturated fatty acids in processed foods. While the removal of partially hydrogenated oils has significantly reduced trans fat content, the widespread use of palm oil due to its high palmitic acid content.[8]

Impact

1. **Health benefits:** Reducing trans fat intake is expected to lower the risk of cardiovascular diseases and fatty liver disease. A study using the TFA macrosimulation model estimated that banning partially hydrogenated oils could prevent or postpone approximately 10,500 deaths in Brazil in 2018.[10] Additionally, reducing premature deaths and disabilities can lead to significant economic savings.

2. **Public awareness:** Advocacy campaigns led by ASBRAN and CFN have helped raise awareness, culminating in 97% of public comments supporting ANVISA's trans fat regulations in 2019.[11]

3. **Product reformulation:** Brazil's trans fat regulations prompted significant product reformulation efforts, with 93.4% of products meeting regional targets by 2010, even before the full ban on partially hydrogenated oils (PHOs) in 2023.[12] Food manufacturers replaced trans fats with healthier alternatives (such as palm oil and interesterified fats), reducing trans fat levels by approximately 230 tons annually. These reforms improved the nutritional quality of processed foods.[8]

4. **Economic benefits:** By reducing the burden of cardiovascular diseases and liver diseases, Brazil can also expect economic benefits. The TFA macrosimulation model projected savings of about $166.7 million due to reduced productivity losses.[10] Furthermore, eliminating trans fats aligns with WHO's goals, which can facilitate trade and ensure industry reformulation across countries.

Conclusion

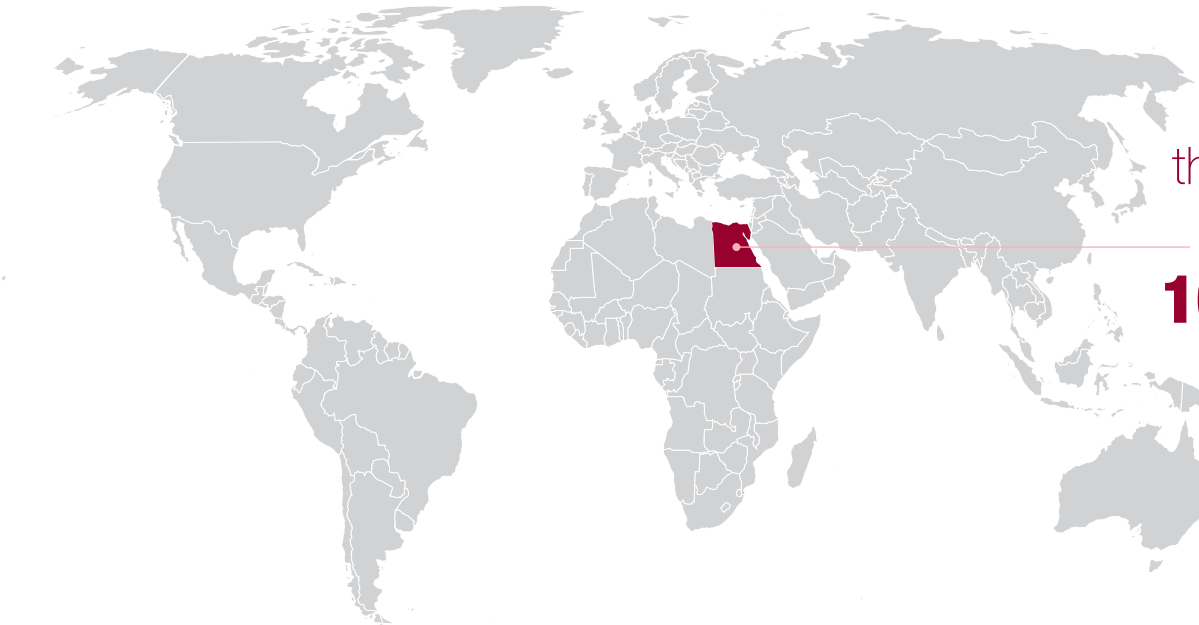
Brazil's efforts to eliminate trans fats demonstrate a proactive approach to addressing metabolic and cardiovascular health issues, including liver disease. By combining regulatory measures with public awareness campaigns, Brazil sets a strong precedent for global health policy initiatives aimed at reducing the burden of non-communicable diseases. Despite challenges, the long-term benefits of these policies are expected to significantly improve public health outcomes in Brazil, positioning the policy as a best practice in liver health promotion.

CHAPTER **TWO**

100 Million Healthy Lives to Eliminate HCV in Egypt

Executive Summary

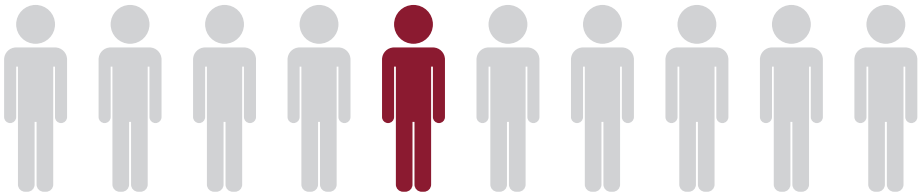
Hepatitis C virus (HCV) infection is a significant public health concern globally because it affects millions of people and poses substantial economic burdens on healthcare systems worldwide. Through unified public health efforts, Egypt has successfully transitioned from having one of the highest rates of hepatitis C in the world to one of the lowest – reducing the prevalence of hepatitis C from 10% to 0.38% in just over a decade.[1] Egypt initiated national control programs starting in 2008, with a significant shift towards elimination strategies by 2018. Egypt has made remarkable strides in combating this disease by implementing a comprehensive strategy that has led to significant reductions in HCV prevalence. Key components include national screening programs, the establishment of treatment centers, negotiation for affordable drug prices, public awareness efforts, community engagement, and international collaborations. Despite challenges such as limited healthcare infrastructure and stigma, Egypt, poised to achieve full elimination targets by 2030, offers valuable lessons globally for HCV elimination efforts.



Egypt reduced the prevalence of hepatitis C from **10% to 0.38%** in just over a decade.

Background

It is crucial to understand the burden of HCV in Egypt to understand the policy solutions deployed. Egypt, a lower middle-income country with a population of 100 million, had one of the highest burdens of HCV infections globally. In 2008, 15% of the population had antibodies to HCV, indicating they had been exposed to the virus, and 1 in 10 Egyptians aged 15–59 years had chronic HCV infection.[2] Chronic HCV infection can progress to advanced liver disease, including cirrhosis and liver cancer. Vulnerable populations, such as those with limited access to healthcare, are disproportionately affected. Addressing this burden through effective policy interventions was imperative to reduce HCV prevalence, prevent new infections, and alleviate the economic burden on the healthcare system, ultimately improving the health outcomes of the Egyptian population.



1 in 10 Egyptians aged 15–59 years had chronic HCV infection.

Objectives

In 2008, Egypt's National Committee for Control of Viral Hepatitis (NCCVH) established the first Egyptian National Control Strategy for Viral Hepatitis, focusing on prevalence detection, treatment access expansion, and research quality enhancement. The initial objectives of the program were straightforward and ambitious, with the goal of infection control:

- Expand detection through a national screening program.
- Treat 2 million patients annually by 2030 to reduce new infections and prevent deaths.

Building on earlier initiatives, efforts to combat HCV intensified in 2014.

1. The 2014–2018 Plan of Action for the Prevention, Care & Treatment of Viral Hepatitis emphasized prevention, education, and access to care, with the goal of treating 300,000 patients annually.
2. Egypt committed to WHO's 2030 goal of eliminating viral hepatitis and consulted with the World Bank to model elimination scenarios, ultimately opting for an ambitious approach that would eventually reduce health budgetary burdens.
3. In its transition from HCV control to elimination, Egypt seeks to lead by example and become a global model for hepatitis C elimination.[2]

Policy Components and Implementation

1. **Establishment of treatment centers:** The NCCVH, which was established in 2006 by the Ministry of Health in Egypt to help develop strategies for managing HCV in the country, set up specialized treatment centers across the country to provide comprehensive care for HCV patients. These centers provided access throughout the country to deliver treatment, monitor progress, and ensure patient retention.[2]

2. **Development of treatment guidelines:** NCCVH formulated treatment guidelines to standardize care and ensure quality across all healthcare facilities.[2]

3. **Negotiation for affordable drug prices:** The Egyptian government worked with several local and international pharmaceutical and medical device companies to negotiate reduced prices and procure direct-acting antiviral drugs for all residents, which helped make treatment affordable and accessible to the full population.[2]

4. **Mass screening campaigns:** Egypt launched mass screening campaigns, such as the "100 Million Seha" (100 Million Healthy Lives) campaign, to reach a significant portion of the population and identify individuals with HCV infection. These campaigns utilized a combination of media coverage, community engagement, and widespread availability of screening sites to maximize participation.[2]

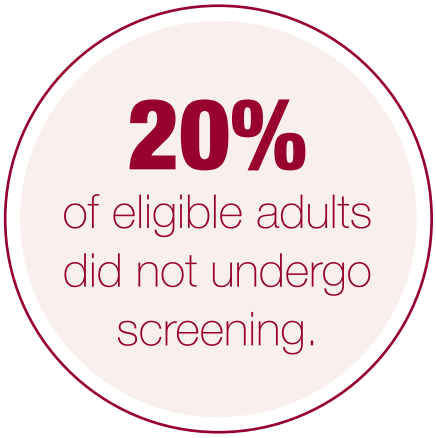
5. **Public awareness and education:** The Ministry of Health and Population conducted extensive public awareness and education campaigns to reduce stigma, increase testing rates, and promote understanding of HCV transmission, prevention, and treatment options. These efforts aimed to empower individuals to seek testing and treatment proactively. The local media also played a role in promoting screening and treatment initiatives to the public.[2]

6. **Monitoring and evaluation:** Efficient monitoring and evaluation mechanisms were established and used to track progress, identify gaps, and inform adjustments. Regular evaluation of implementation activities helped optimize resource allocation and improve program effectiveness, while analysis of the outcomes allowed evaluation of the success of the program.[2]

7. **Community engagement:** Various community engagement strategies were employed to foster trust, promote participation, and address cultural barriers to care. These strategies included engaging community leaders, forming partnerships with local organizations, and tailoring interventions to meet the needs of diverse populations.[2]

8. **International collaborations:** Egypt collaborated with international organizations, including the World Health Organization (WHO) and the Coalition for Global Hepatitis Elimination, to leverage technical expertise, learn best practices, and access resources for program implementation. The World Bank provided $530 million of monetary assistance from the International Bank of Reconstruction and Development.[3] By connecting Egypt to these resources, international partnerships played a crucial role in the country's efforts to combat HCV.[2]

Challenges to Implementation



Egypt faced some significant challenges in implementing its HCV programs, including limited healthcare infrastructure, financial constraints, access barriers, stigma, treatment costs, political instability, followed by a new president in 2014, and the overall complexity of HCV care. International collaborations were a huge contributor to combating these challenges. One of the largest challenges was low rates of follow-up testing after treatment and inadequate screening participation. Approximately 12.5 million Egyptian adults, constituting 20% of eligible adults did not undergo screening. While the cause of this is unidentified, the absence from screening could be attributed to the fact that around 10 million Egyptians live and work out of the country.[2] Certain aspects of primary prevention could have been inadequately addressed such as limiting HCV in intravenous drug users as well as sex workers. The NCCVH plans to establish a harm reduction program for drug users, including syringe distribution as well as the establishment of a national follow-up program to combat these insufficiencies in implementation.[2] Overcoming these barriers required a coordinated effort to ensure comprehensive care delivery and achieve the goal of eliminating HCV as a public health threat in Egypt.

Impact

- Egypt has successfully transitioned from having one of the highest rates of hepatitis C in the world to one of the lowest – reducing the prevalence of hepatitis C from 10% to 0.38% in just over a decade.[1]
- The "100 Million Seha" campaign spearheaded by the Ministry of Health and Population has facilitated the testing of over 60 million individuals and the treatment of more than 4 million people.[2]
- The incidence of new infections has drastically reduced from 300 per 100,000 in 2014 to 9 per 100,000 in 2022, bringing Egypt closer to the ultimate goal of HCV elimination.[2]
- Egypt has made significant strides in combating HCV infection, to become the first, and so far only, country to attain the "gold tier" status on the path to elimination as per WHO criteria.[3,4] This achievement signifies Egypt's fulfillment of WHO's programmatic coverage targets, which positions the nation to achieve reduced incidence and mortality targets for full elimination before 2030.[2]

Conclusion

Egypt's success in combating HCV stands as a global model. Through a multifaceted approach including national screening programs, affordable treatment access, public awareness campaigns, and international collaborations, Egypt transitioned from a high prevalence country to a leader in elimination efforts for HCV. Enabled by political support and strategic partnerships, Egypt's comprehensive strategies have significantly reduced both incidence and prevalence, showcasing the importance of sustained commitment and collaborative action.

Continued dedication to sustaining these efforts is essential for Egypt to achieve its ultimate goal of HCV elimination by 2030. Encouragingly, the NCCVH plans to sustain HCV-related gains through initiatives such as screening pregnant women for HCV and hepatitis B virus (HBV), screening students in schools, and rescreening and treatment for at-risk individuals who missed or did not attend the initial screening program.[2] Political commitment, adequate funding, and ongoing public engagement are imperative to maintain momentum and further decrease the HCV burden. Egypt's experience provides valuable lessons for other countries facing similar challenges in combatting HCV and advancing toward elimination.

CHAPTER **THREE**

Integrating NASH into India's National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases & Stroke

Executive Summary

In 2021, India spearheaded a national initiative to address NAFLD and nonalcoholic steatohepatitis (NASH), thus recognizing the escalating prevalence and socio-economic implications of these liver diseases. Integrated within the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases & Stroke (NPCDCS) frameworks, this guidance prioritizes early detection to mitigate healthcare costs and foster socioeconomic growth. Operational guidance spans management principles, monitoring, screening, health promotion, media planning, and capacity building. Implementation efforts include developing national guidelines, training healthcare workers, and establishing centers of excellence. Challenges in securing funding and launching training programs exist, nevertheless, analysts foresee a reduction in NASH prevalence, which would position India as a global leader in addressing NAFLD/NASH.

Implementation efforts include **developing** national guidelines, **training** healthcare workers, and **establishing** centers of excellence.

Background

This initiative, crafted by a coalition of prominent physicians and health policymakers, emerged in response to growing concerns over the rising prevalence of NAFLD/NASH and its consequential social and economic burdens on the nation. Studies suggest the prevalence of NAFLD is around 9% to 32% of the general population in India, with a higher prevalence in those who are overweight or obese and those with diabetes or prediabetes.[1] Researchers have found NAFLD in 40% to 80% of people who have type 2 diabetes and in 30% to 90% of people who are obese.[1] Lean NAFLD, NAFLD in patients who are not obese, is especially prevalent in Indian populations. Cumulative survival has been shown to be significantly shorter for patients with lean NAFLD, while risk of severe liver disease is higher compared to overweight/obese NAFLD.[2] With this heightened risk in mind for the Indian population, efforts to reduce fatty liver disease are of vital importance to the nation.

Researchers have found NAFLD in **40% to 80%** of people who have type 2 diabetes and in **30% to 90%** of people who are obese.

Objectives

As an integral component of the broader NPCDCS initiative, operational guidelines were unveiled to streamline the detection and treatment of NAFLD/NASH, across five categories.[3]

1. Establish operational principles for managing NAFLD/NASH at community, regional, and national levels.
2. Implement monitoring and screening protocols.
3. Foster health promotion strategies tailored towards NAFLD/NASH.
4. Form media plans to raise awareness.
5. Enhance capacity building and training programs.

Lean NAFLD is disproportionately high in Indian populations, and it is linked to **higher risk** of severe liver disease and shorter survival.

Policy Components and Implementation

The Ministry of Health and Family Welfare spearheaded the launch of this guidance, which emphasizes the goal of early detection of NAFLD/NASH, with a two-pronged approach of curtailing escalating healthcare costs and mitigating the adverse effects on socio-economic development.[3] The monitoring framework for all non-communicable diseases (NCDs) has been expanded to encompass indicators for NAFLD/NASH. Population-based risk factor screening data can now be analyzed through the NCD data portal. At both the national and state levels, the following initiatives are underway[3]:

1. Development of national guidelines for the diagnosis and treatment of NAFLD/NASH.
2. Creation of a training manual for healthcare workers to disseminate information and educate communities.
3. Establishment of a Centre of Excellence for NAFLD/NASH tasked with overseeing the implementation of actions outlined in the guidelines at the state level.
4. Implementation of a clinical pathway for the detection and management of NAFLD/NASH by integrating liver function tests (LFTs) into primary care based on Clinical Biochemistry Analytical Committee recommendations with risk stratification tools and transient elastography (an ultrasound-based non-invasive diagnostic technology)

Examination of Findings

Evaluation is still underway to assess the effectiveness and impacts of this policy.

Challenges to Implementation

Incorporating NAFLD/NASH into the national health priorities through NPCDCS-enabled funding would cover various activities like health promotion, population-based screening, monitoring and evaluation, and capacity-building efforts. However, since funding explicitly marked for NAFLD/NASH care pathway is not specified, there might be competition for resources with other NCDs. This could hinder implementation. Capacity-building will play a crucial role in facilitating the widespread rollout of management guidance. Training programs have not yet been put into action.

Dedicated funding for NAFLD/NASH and investment in workforce capacity building will are needed to fully deploy this initiative in India.

Impact

- According to analysts at GlobalData, the inclusion of NAFLD into the national prevention program is
  expected to lead to a decrease in the prevalence of NASH in India.[4]
- This adds to the strength of India's efforts to address chronic disease through lifestyle promotion. Combined with the country's 'Eat Right India' and 'Fit India Movement' initiatives, the government has taken an active role in the shift from diagnostic to preventive care.[1]
- India became the first country to approve an innovative therapy, saroglitazar (Lipaglyn), a dual peroxisome proliferator-activated receptor α/γ agonist for NAFLD in December 2020, following approval for NASH in March 2020.[5]

Conclusion

India's proactive approach to tackling NAFLD/NASH through the integration of operational guidance shows its commitment to addressing significant health challenges. By prioritizing early detection, implementing monitoring and screening protocols, fostering health promotion strategies, and building the capacity of its workforce and infrastructure, India has set a precedent for global action. Despite challenges in funding and launching training programs, the anticipated decrease in NASH prevalence shows the potential effectiveness of India's efforts.

CHAPTER **FOUR**

Screening Diabetes Patients for NAFLD with Community Pharmacy Data, an Irish Example

Executive Summary

NAFLD poses a significant health challenge for the Irish population. Its prevalence closely aligns with that of type 2 diabetes (T2D) and, to a lesser extent, obesity, with projections indicating it could impact up to a quarter of Ireland's population within the next decade.[1] Dr. Suzanne Norris (St James's Hospital and Liver Wellness®) and collaborator Diabetes Ireland spearheaded an initiative to boost liver health by screening for NAFLD and NASH in T2D patients. Using community pharmacy and transient elastography, an ultrasound-based non-invasive diagnostic technology, the program swiftly identifies high-risk individuals for tailored assessment and treatment. Though facing funding challenges, the initiative promises early detection, cost savings, and better outcomes, which emphasizes the need for ongoing investment in liver health initiatives for Ireland's population.

Nonalcoholic fatty liver disease (NAFLD) poses a significant **health challenge** for the Irish population.

Background

NAFLD is increasingly recognized as a pressing health issue in Ireland as rates of obesity and T2D rise. Ireland is estimated to become Europe's most overweight nation by 2025: 36% of the Irish population aged over 50 is obese, with a further 43% overweight.[2] Lifestyle factors like sedentary behaviors and poor dietary habits, compounded by genetic predispositions and socioeconomic factors, contribute significantly to NAFLD susceptibility and severity.

The downstream impacts of NAFLD extend beyond individual health, imposing substantial economic and public health burdens. Costs include direct healthcare costs for diagnosis, management, and treatment and indirect costs such as productivity loss and added travel. Progression to severe stages like NASH, cirrhosis, and liver cancer significantly increases healthcare expenditures and mortality rates.[3] Addressing NAFLD through targeted interventions, including liver screening initiatives, is crucial to mitigate these downstream impacts and alleviate the growing burden on both individuals and society as a whole in Ireland.

Objectives

- Evaluate the practicality and advantages of screening high-risk individuals for NAFLD/NASH in primary care settings.
- Develop a framework and evidence to establish a national policy.
- Reduce rates of progression to NASH and cirrhosis through early detection and treatment.

Policy Components and Implementation

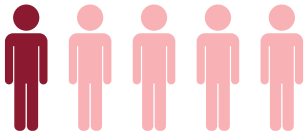
- Individuals with T2D are identified through pharmacy prescription records.
- After identification, target individuals receive invitations to participate in a screening with transient elastography technology at a community-based location.[2]
- After the screening, assessments are provided on the same day, with personalized recommendations forwarded to the respective primary care physician or consultant for further treatment considerations.[4]
- High-risk individuals and treatment guidance follow the recommendations outlined in the 2016 practice guidelines from the European Association for the Study of the Liver (EASL).[2,4]

Challenges to Implementation

Community pharmacies represent readily accessible healthcare environments with the potential for scalability; however, without financial and technical resources allocated towards transient elastography technology and the time of general practitioners or consultants for the program review, widespread implementation of the program is nearly impossible.

Impact

1 in 5 individuals screened had advanced fibrosis/cirrhosis of the liver.



4 in 5 individuals identified through screening had signs of diminished liver function.

Transient elastography technology, usually limited to specialized centers, demonstrated the capability to facilitate risk stratification and enable earlier detection of liver fibrosis when deployed in a community setting.[5] The assessment of fibrosis outside of the hospital environment is anticipated to yield significant cost savings for the broader healthcare system, considering the national economic burden of NAFLD in terms of direct annual medical costs has been estimated at $103 billion in the US, €27.7 billion in three European countries combined (Germany, France, Italy) and £5.24 billion in the UK.[3] Given that early diagnosis of NAFLD is crucial to a patient's liver health[4], this initiative provides patients the opportunity for an early diagnosis, limiting progression and further complications.

Conclusion

Led by Dr. Suzanne Norris (St James's Hospital and Liver Wellness®) and in collaboration with Diabetes Ireland, the initiative to enhance liver health in Ireland through proactive screening for NAFLD/NASH among individuals with T2D represents a critical step towards improving public health outcomes by promoting early screening and diagnosis for a high-risk population.

By leveraging community pharmacy data to identify high-risk patients and transient elastography for quick screening, this initiative identifies liver fibrosis at earlier stages than usual, allowing for timely interventions and personalized treatment recommendations. Overall, the potential impact of this policy extends beyond the immediate care pathway, with anticipated benefits including improved patient outcomes, reduced healthcare costs, and enhanced health equity. Moving forward, funding and community buy-in will be essential to effectively operationalize this technique to improve liver health by addressing the pressing public health issue of NASH for individuals across Ireland.

CHAPTER **FIVE**

How Does Japan Achieve the World's Highest Liver Cancer Survival Rate?

Executive Summary

Japan has achieved notable success in reducing the burden of hepatocellular carcinoma (HCC) through a comprehensive, multi-pronged approach spanning surveillance, viral hepatitis management, public awareness campaigns, and a robust clinical infrastructure. Historically, the country grappled with high rates of liver cancer linked to hepatitis B and C. By the late 20th century, HCC had become a leading cause of cancer-related deaths.

In response, Japan deployed significant public health interventions - beginning in 2008 - that prioritized early detection, accessible treatment, and proactive viral hepatitis control. These strategies have since driven down both incidence and mortality while improving survival outcomes.

In the late 20th century, **liver cancer was a leading cause of cancer-related deaths** in Japan.

Background

Historically, Japan has faced a severe burden of HCC, primarily associated with high rates of hepatitis B and C infections. In the late 20th century, liver cancer was a leading cause of cancer-related deaths in Japan. Over the past 20 years, primary liver cancer, which is largely comprised of hepatocellular carcinoma (HCC) at a rate of 95%, has consistently ranked as the third leading cause of death from malignant neoplasms in men and the fifth leading cause in women.[1] Recognizing the critical need for intervention, Japan implemented a series of public health efforts that have transformed liver health outcomes. Since 2008, the country's approach to liver health has included proactive screening, comprehensive management of viral hepatitis, and a strong emphasis on early detection and treatment of HCC. As a result, the incidence and mortality of HCC have steadily declined, and survival outcomes have improved over the past few decades.

Objectives

The objectives of Japan's organ transplant policies are to:

1. **Reduce HCC mortality through early detection and surveillance:** Japan aims to identify HCC at its earliest stages when treatment is most effective. Surveillance of high-risk individuals with viral hepatitis increases early detection of HCC.
2. **Decrease HCC incidence by improving management of hepatitis B and C infections:** The objective is to significantly reduce the prevalence of chronic hepatitis infections through widespread screening, vaccination for hepatitis B, and antiviral treatments. Japan targets a reduction in hepatitis C prevalence to less than 1% of the population by 2030.[2] Japan has already made significant progress in reducing hepatitis-related mortality.
3. **Promote public awareness of liver disease risks and prevention:** Through public awareness campaigns featuring celebrities, Japan aims to educate the population about liver disease risks, prevention strategies, and the importance of regular screenings.
4. **Enhance patient outcomes through accessible and high-quality care:** Japan aims to ensure that 95% of diagnosed HCC patients have access to appropriate treatment within four weeks of diagnosis and to improve the 5-year survival rate for HCC to over 60% by 2030.[3]

Policy Components and Implementation

1. **Surveillance system:** Regular monitoring using biomarkers, imaging, and patient and physician education ensures early HCC detection. Japan's nationwide surveillance system uses a combination of ultrasonography and three tumor markers (AFP, PIVKA-II, and AFP-L3) at 3–4-month intervals for super-high-risk patients (cirrhosis caused by hepatitis B or hepatitis C virus).[4]

Robust Biomarkers for Liver Cancer

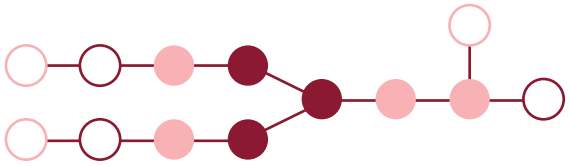
Alpha-Fetoprotein (AFP)

In healthy adults, AFP levels are usually very low. If they become elevated, it can be a warning sign of liver cancer.

MOST DIGANOSTIC TESTS LOOK FOR AFP. JAPAN USES TWO MORE BIOMARKERS:

Protein Induced by Vitamin K Absence or Antagonist-II (PIVKA-II)

Prothrombin is a protein produced by the liver that helps the body activate certain blood-clotting factors. When liver cancer is present, the liver may produce an abnormal form of prothrombin, called PIVKA-II, which can indicatethat liver cancer might be present.



L3 Fraction of Alpha-Fetoprotein (AFP-L3)

AFP can come in different "versions," and one type – called AFP-L3 – is more closely linked to cancerous tumors. When there's a high percentage of AFP-L3, it often points to a more aggressive form of liver cancer.

2. **Viral hepatitis management:** Universal hepatitis B vaccination programs and free hepatitis screening at public health centers have reduced chronic infection rates.[5] Additionally, the rapid integration of antiviral therapies for both HBV and HCV into the national health insurance system has ensured that patients receive timely treatment, reducing the progression of liver disease.

3. **Public health campaigns:** These efforts have been crucial in increasing early diagnosis rates and improving patient outcomes. The key components of these campaigns include healthcare professional education: The Japan Society of Hepatology has played an important role in educating other medical professionals about the importance of regular HCC screening. Additionally, the Japanese government and healthcare organizations have implemented various public awareness programs informing the public on free hepatitis B and C virus testing at local health centers and medical facilities nationwide. The education program "Shitte kan-en" (in English, "Let's learn about hepatitis") features celebrities (actors and singers) to emphasize the importance of hepatitis testing and early diagnosis.[6] The project aims to reduce the undiagnosed and untreated population by delivering concise, accurate information through multiple channels – including television, social media, and on-site promotional events.

4. **Clinical infrastructure:** Japan has developed a comprehensive network of specialized liver centers that provide high-quality care for patients with liver diseases. These centers offer a wide range of services, from early screening and diagnosis to advanced therapies, including interferon-free therapy, nucleic acid analog therapy, and procedures like laparoscopic liver resection and radiofrequency ablation.[7] The system is structured with regional core centers in every prefecture, supported by specialized institutions and primary care physicians, ensuring patients receive appropriate care at each stage of their disease. Japan's investment in advanced imaging and treatment equipment, coupled with integrated healthcare delivery systems, has allowed for cost-effective, high-quality care that continues to evolve with new evidence. Additionally, electronic medical record alert systems help non-specialist physicians refer patients with positive hepatitis screening results to hepatologists, ensuring continuity of care and reducing mortality rates for hepatitis and liver cancer.

Challenges to Implementation

1. **Financial sustainability:** Maintaining extensive surveillance programs is expensive. Although central government subsidies (e.g., nearly USD 176 million allocated for hepatitis countermeasures in fiscal year 2022) support these initiatives, long-term funding must be secured as technology advances and patient volumes shift.[8]

2. **Patient adherence and behavioral barriers:** Regular, integrated screening requires high patient compliance. Socioeconomic disparities and the burden of frequent testing (including potential wage loss) can impact participation in surveillance programs.

3. **Geographic and demographic disparities:** Rural areas often have less access to high-quality diagnostic facilities and specialized care, leading to potential delays in diagnosis. Additionally, with the oldest population in the world, Japan faces an imminent increase in comorbidities and risk factors for liver cancer within its population.

4. **Changing etiologies of liver cancer:** The growing role of metabolic dysfunction-associated steatotic liver disease (MASLD) amid a decline in viral hepatitis poses a significant challenge for Japan's HCC policies. Historically, public health strategies have focused on controlling HBV and HCV infections, but with more patients now developing HCC from metabolic causes (e.g., obesity, diabetes, metabolic syndrome), Japan must adapt screening protocols, prevention efforts, and treatment approaches to address this shifting disease landscape.

Impact

The impact of Japan's policies is evident in both clinical outcomes and health economics.

1. **Improved survival outcomes:** The 5-year overall survival rate for HCC has improved from approximately 5% in 1978-1980 to 58% in 2010–2013.[9] The median survival increased from 4 months to 80 months in the same period. The surveillance system that uses a combination of ultrasonography and three tumor markers at 3-4-month intervals for super-high-risk patients has ensured that over 62% of cases are diagnosed through surveillance at early stages and 6% are diagnosed at advanced stages.

2. **Enhanced diagnostic efficacy:** Japan's comprehensive surveillance program has led to success in early detection of liver cancer. Approximately 62% of liver cancer patients in Japan are diagnosed at stages A and B, which are considered early stages.10 This high rate of early detection is further evidenced by the 24th Nationwide Follow-up Survey of Primary Liver Cancer in Japan, which revealed that 68% of HCC cases are detected as solitary tumors, and 53% of HCCs are identified when lesions are 3cm or smaller in size.[10] Early detection via advanced imaging and biomarker screening is credited with a significant drop in mortality rates.

3. **Economic Benefits:** Early detection and timely intervention reduce the need for more costly treatments like liver transplantation-an approach that not only mitigates economic burdens, as evidenced by a 33% reduction in the cost of illness for liver cancer between 2002 and 2014, but also spares patients the profound life-altering impact of undergoing an organ transplant. Sustained reductions in disease progression further decrease indirect costs, including loss of productivity and long-term healthcare expenditures.

Conclusion

Japan's achievements in tackling HCC underscore the importance of comprehensive policy, early detection, and proactive public health engagement. Predictions suggest that if these strategies continue, liver cancer incidence will continue to decline. Nonetheless, there remains significant potential to enhance treatment protocols and boost the 5-year survival rate. Overall, Japan's model offers valuable lessons for countries aiming to improve liver health outcomes through proactive policy measures. Despite challenges, Japan's model sets a strong standard for countries striving to achieve advancements in liver cancer management.

CHAPTER **SIX**

Mexico's Multifaceted Approach Toward Healthier Nutrition

Executive Summary

Mexico has emerged as a leader in implementing progressive public health nutrition policies to curb obesity and improve metabolic health. Faced with one of the highest obesity rates globally, the country introduced a multifaceted policy approach targeting sugar-sweetened beverage (SSB) consumption and consumer nutrition awareness to mitigate obesity and related diseases like metabolic dysfunction-associated steatotic liver disease (MASLD).

Central to Mexico's strategy are its 2014 nationwide SSB tax and its 2020 front-of-package labeling (FOPL) law, both of which aim to inform consumers and shift industry practices. These efforts are supported by legal backing from the Mexican Supreme Court and complemented by broader initiatives such as school food regulations, a national nutrition strategy, and income-based programs like *Prospera* and *Liconsa* that improve access to healthy foods.

However, Mexico faces ongoing challenges, including high reliance on ultra-processed foods, food industry resistance, and disparities in healthy food access. Continued investment in consumer education, equitable nutrition policy, and targeted public health campaigns will be critical to sustaining momentum and achieving further health gains.

Mexico is faced with **one of the highest obesity rates globally.**

Background

Mexico has faced significant challenges with obesity and related health issues, with adult obesity prevalence reaching 36.1% as of 2018-19. This represents a 42.2% increase in obesity rates over the past 30 years. Combined, overweight and obesity affect roughly 75% of Mexican adults. Today, one of the leading causes of mortality associated with obesity is liver disease (7.6%).[1] MASLD, formerly known as non-alcoholic fatty liver disease (NAFLD), is highly prevalent, and it is estimated to affect roughly 26% of Mexico's population.[2] Obesity greatly increases the risk of MASLD – it affects an estimated 50-75% of obese individuals.[3] Recognizing the critical role of nutrition in health outcomes, Mexico implemented a sugar-sweetened beverage (SSB) tax in 2014, followed by a more comprehensive front-of-package labeling (FOPL) policy in 2020.

Objectives

The objectives of Mexico's health policy on sugar and ultra-processed food reduction are to:

1. **Reduce consumption of sugar-sweetened beverages and ultra-processed foods:** Efforts aim to lower the intake of SSBs to mitigate obesity and related metabolic disorders.
2. **Improve public awareness to make informed dietary choices:** Mexico introduced new FOPL requirements as a public health tool for consumers when purchasing prepackaged foods and non-alcoholic beverages to reduce public purchase and consumption of "unhealthy" foods.
3. **Encourage product reformulation:** The introduction of the FOPL requirements encourages food manufacturers to reformulate their products to avoid the negative association of the labels, with the end goal of improving the nutritional quality of products available in Mexico.
4. **Improve metabolic health:** Policies aimed at decreasing the prevalence of diabetes, obesity, and related diseases like MASLD by mitigating key metabolic factors.
5. **Increase consumption of healthy foods in schools:** Mexico established guidelines for the sale and distribution of prepared and processed food and drinks in schools to promote healthier eating habits.
6. **Increase access to food and nutrition education:** The implementation of policies such as the National Strategy for Prevention and Control of Overweight, Obesity, and Diabetes, along with initiatives like *Liconsa* and *Oportunidades*, aim to address food insecurity and lack of nutrition education, empowering individuals to make informed dietary choices to improve their health.

Policy Components and Implementation

1. **Sugar-sweetened beverage tax:** Implemented in January 2014, Mexico's nationwide excise tax on sugar-sweetened beverages, set at 1 peso per liter (about a 10% price increase), has been a cornerstone of the country's public health strategy.[1] The tax applies specifically to soft drinks, energy drinks, bottled teas and coffees, and fruit juices/fruit-flavored drinks with added sugars. The tax is levied on manufacturers and not at the point of sale to consumers.

2. **Front-of-package warning labels:** These labels, designed as prominent black octagons, are required on food packaging. The FOPLs on processed food and drink products state whether or not the products have calories, sugars, salt, saturated fat, or trans fat beyond a designated threshold. The label is intended to alert the consumer about unhealthy levels of ingredients and discourage the purchase of foods with excess nutrients that are linked to obesity and other cardiometabolic conditions.

3. **Legal and regulatory support:** Support for these policies has been reinforced by the Mexican government. The Mexican Supreme Court has upheld the constitutionality of these measures, ensuring the government's commitment to public health remains a priority.

4. **Removing unhealthy foods in schools:** Implemented in 2025, Mexico has placed guidelines for the sale and distribution of prepared and processed food and drinks in schools as part of its comprehensive strategy to combat obesity and promote healthier eating habits among children. This initiative aims to reduce the availability of ultra-processed foods and sugar-sweetened beverages in educational institutions, replacing them with more nutritious options.

5. **National strategy for prevention and control of overweight, obesity, and diabetes:** Launched in 2013, this strategy represents a comprehensive, government-led effort to slow the growing rates of overweight, obesity, and related chronic diseases, like type 2 diabetes. Key components include promoting healthier diets, encouraging physical activity, improving access to healthcare, and raising public awareness about the risks of obesity. This strategy works in concert with other policies, such as the SSB tax and front-of-package labeling, to create a supportive environment for healthier choices and ultimately improve the health outcomes of the Mexican population.

6. ***Oportunidades* and *Liconsa*:** Government initiatives aimed at supporting low-income families with health services, food assistance, and nutrition education *Oportunidades* (now known as *Prospera*) provides conditional cash transfers to families, contingent upon their participation in health services and ensuring their children attend school. This program aims to improve health outcomes and educational attainment, breaking the cycle of poverty. *Liconsa*, on the other hand, focuses on providing subsidized milk to low-income families, ensuring access to affordable and nutritious food.

Challenges to Implementation

1. **High dependence on ultra-processed foods:** Currently, 30% of the total energy intake in the Mexican diet comes from ultra-processed foods.[2,3] Shifting these dietary habits poses a significant hurdle.
2. **Socioeconomic disparities:** Although lower-income groups have shown notable reductions in sugar-sweetened beverage consumption, disparities in access to healthy food persist, complicating efforts to achieve health benefits across the Mexican population.
3. **Industry challenges:** Continuous pressure from food and beverage manufacturers can delay further policies and enforcement efforts. For example, a proposal to lower the sugar tax rate passed in the Mexican Chamber of Deputies but failed in the Senate.[4]
4. **Consumer education:** Sustained public education is needed to ensure that warning labels have long-term behavior change and that consumers understand the risks associated with consuming ultra-processed foods.

Impact

1. **Reduced consumption of SSBs:** Within three years of Mexico implementing a tax on SSBs, adults in Mexico consumed fewer soft drinks. The likelihood of being a non-consumer increased by 4.7%, while medium and high consumption decreased by 6.8% and 6.1%, respectively.[5] These changes were most pronounced among lower socioeconomic groups, whose SSB purchases fell by 9% in early 2014 – the first year of the new policy – and reached a 17% reduction by the end of the year. Concurrently, there was a notable shift toward healthier alternatives, with bottled water purchases rising by 16.2%.[5] Modeling studies predict that over a decade, the tax could lower the average BMI by 0.15 units, reduce obesity prevalence by 2.5%, and potentially prevent 86,000–134,000 new cases of type 2 diabetes by 2030.[5] Additionally, between 2014 and 2015, the tax generated USD 2.6 billion in revenue. A portion of the revenue was used to fund water fountains in schools and public places and to implement obesity prevention programs.[6]

2. **Product reformulation:** The implementation of FOPL has led to meaningful reformulations of products by food companies; total calories as well as added sugars, saturated fat, sodium, non-caloric sweeteners, and caffeine. Notable changes include a decrease of up to 63.1% in products exceeding warning-label cutoffs for sodium in the bread and other cereals category and up to 26.3% decrease in products exceeding cutoffs for saturated fat in salty snacks.[7] As more balanced and nutritious products become available, this should continue to positively impact consumption and health outcomes.

3. **Changes in consumption:** Early evidence suggests that Mexico's front-of-pack labels is influencing consumer behavior. National surveys indicate that approximately 44.8% of adults and 38.7% of adolescents reported reducing purchases of at least one category of unhealthy foods in response to the labels.[8] As consumers increasingly avoid products with warning labels, industry reformulation efforts are expected to accelerate, further enhancing the impact on public health. The success of Chile's front-of-pack labeling system provides a promising model for Mexico's similar initiative. In Chile, households reduced their purchases of products with warning labels, buying 37% less sugar, 22% less sodium, 16% less saturated fat, and 23% fewer total calories.[9] These significant reductions in calorie and nutrient intake from labeled products in Chile suggest that Mexico may experience comparable trends, as both countries have implemented similar warning label systems. The parallel outcomes in sugary drink purchases and calorie intake observed in Chile offer strong external validation for the potential effectiveness of Mexico's FOPL policy.

4. **Projected health outcomes:** Because the FOPL is relatively new, it is difficult to assess its impact in Mexico. However, simulation models suggest that these interventions could lead to a potentially significant decrease in BMI and obesity prevalence over the long term and reduce obesity-related conditions.

Conclusion

Mexico's multifaceted approach-combining a sugar-sweetened beverage tax, front-of-package labeling, industry reformulation, and supportive legal measures-demonstrates a comprehensive public health strategy to combat obesity and associated liver diseases. While significant challenges remain, particularly regarding dietary reliance on ultra-processed foods and socioeconomic disparities, early impacts indicate meaningful shifts in consumer behavior and potential long-term health benefits. Continued evaluation, public education, and policy refinement will be critical to maintaining momentum and ensuring that these interventions translate into substantial reductions in obesity, MASLD, and other related chronic conditions. Mexico's current efforts demonstrate a cost-effective way of reducing the prevalence of MASLD. However, it will take more time to determine the exact impact of these policies.

Additionally, Mexico continues to tackle obesity through new policies such as reducing unhealthy foods in schools. This government-led initiative is part of the broader strategy to improve nutrition in Mexico, reduce childhood obesity, and foster healthy eating habits from a young age. Mexico's policies will have a lasting positive impact on metabolic health. The national reduction of the consumption of foods contributing to obesity and metabolic syndrome is critical for preventing MASLD.

CHAPTER **SEVEN**

How Qatar Established Leadership in Liver Disease Research

Executive Summary

Qatar has established itself as a leader in liver disease research and treatment in the WHO Eastern Mediterranean Region (EMRO), despite facing significant public health challenges. Liver disease is the seventh leading cause of death in Qatar, with high rates of metabolic dysfunction-associated steatotic liver disease (MASLD) and viral hepatitis. To address this, Qatar has implemented a comprehensive strategy focused on increasing research output, hepatitis C elimination, universal hepatitis B vaccination, and accessible liver transplantation.

While challenges such as financial constraints, public awareness gaps, and healthcare workforce capacity exist, Qatar has made significant progress. The country has emerged as a research leader, is on track to eliminate hepatitis C by 2030, and offers an equitable liver transplantation program. These efforts highlight Qatar's success in reducing the burden of liver disease.

Qatar leads the region in hepatitis epidemiology research.

Background

Liver disease is a major public health concern in Qatar. It ranks as the seventh leading cause of death nationwide, and the country faces high rates of MASLD and viral hepatitis B and C. High rates of viral hepatitis, prevalent in the EMRO Region, are due to factors such as limited early screening, lack of widespread vaccination, and increased population mobility. Between 1990 and 2017, Qatar saw about a 7.7-fold increase in hepatitis-related cirrhosis cases, highlighting the urgency for intervention.[1]

Despite these challenges, Qatar has made strides in addressing liver health through a combination of research initiatives, regional collaboration, and innovative healthcare policies.

Objectives

1. **Increase research output:** Qatar aims to increase research on liver disease by heavily investing in research infrastructure.
2. **Establish regional leadership in liver research:** Qatar is actively involved in regional hepatitis research and is recognized as a WHO Collaborating Centre for Disease Epidemiology Analytics. This designation reflects its leadership role in providing epidemiological evidence and strategic action plans for combating hepatitis C in the EMRO region.
3. **Elimination of hepatitis C:** Qatar aims to eliminate hepatitis C by 2030.[2]
4. **Universal vaccine coverage of hepatitis B:** Following the WHO targets to reduce hepatitis B prevalence among children under five to less than 1%, Qatar aims to vaccinate its population for hepatitis B.[2]
5. **Increase transplantation:** Qatar aims to make liver transplantation services available to all residents.

Policy Components and Implementation

1. **Investment in robust research infrastructure:** Qatar has prioritized strengthening its research capacity to better understand and combat liver diseases. Leveraging resources from institutions like Cornell Medicine-Qatar, the country has developed state-of-the-art facilities to study viral hepatitis and cirrhosis. The Qatar National Research Fund supports these efforts by funding projects focused on epidemiology, treatment, and prevention strategies.

2. **Universal vaccination coverage for hepatitis B:** Qatar's hepatitis B vaccination program is implemented through a comprehensive, universal approach. The hepatitis B vaccine has been part of the routine infant immunization schedule since 1989, with a birth dose added in 2000 and a 4-dose schedule (including pentavalent and hexavalent combination vaccines) introduced in 2003.[3] Vaccines are provided free of charge to all newborns, regardless of nationality, and are integrated into the National Expanded Programme on Immunization. Additionally, all children entering school - including those of expatriates - must provide immunization certificates, ensuring high coverage among both nationals and non-nationals.

3. **Surveillance of hepatitis:** Qatar employs a comprehensive screening strategy to reduce hepatitis, particularly hepatitis B, in the population. All expatriates entering the country are mandatorily screened for hepatitis B and C at the Medical Commission before being granted residency, reflecting the high proportion of non-Qatari residents. Additional targeted screening is conducted for pregnant women, blood donors, and healthcare workers, as well as for certain professions (such as barbers), as part of the licensing process. These measures, combined with robust surveillance and mandatory reporting of cases by all healthcare providers, have contributed to a notable decline in hepatitis B incidence in recent years.

4. **Accessible liver transplantation system:** Qatar offers free liver transplantation services to all patients – Qatari citizens and expatriates alike – through a unified waitlist system managed by Hamad Medical Corporation. This approach ensures equitable access to life-saving procedures while maintaining high standards of care. The transplantation program is supported by public education campaigns that encourage organ donation and reduce the stigma surrounding transplantation.

Challenges to Implementation

1. **Public awareness gaps:** Limited awareness among the general public and some healthcare providers about liver diseases, risk factors, and the benefits of early intervention can hinder prevention, timely treatment, and participation in prevention programs.[4] Due to the lack of public awareness, cases may remain undiagnosed until serious complications like cirrhosis or liver cancer arise.[4]

2. **Rapid growth and diversity of population:** Qatar's rapidly growing and highly diverse expatriate population complicates surveillance, vaccination, and treatment efforts, as new arrivals may have varying levels of immunity, risk, and access to care.[2]

3. **Reaching high-risk and marginalized groups:** Social discrimination and stigma make it difficult to effectively reach and treat specific populations, such as people who use drugs and prisoners, who have higher hepatitis C prevalence.[2]

4. **Rising prevalence of MASLD:** Driven by high rates of obesity, diabetes, unhealthy diets, and sedentary lifestyles, recent studies estimate that MASLD affects 44.4% of Qatar's general population.[5] Addressing these underlying lifestyle factors requires broad, sustained public health interventions and behavioral change, which can be difficult to achieve at the population level.

Impact

1. **Research output:** Qatar has established itself as a regional leader in liver disease research, with institutions like Weill Cornell Medicine-Qatar's Infectious Disease Epidemiology Group (IDEG) conducting over 100 studies on viral hepatitis and related diseases in the Eastern Mediterranean Region in about a decade. DEG's work, much of it funded by the Qatar National Research Fund, has directly supported WHO public health strategies and produced major collaborative reports, such as the comprehensive WHO report on hepatitis C in the region.[7,8] The Qatar Biomedical Research Institute (QBRI), with 71 researchers and numerous international partnerships, further drives innovation in biomarker discovery and translational research, supporting Qatar's high publication output and its reputation as a hub for scientific collaboration in liver disease.[9]

2. **Epidemiological trends:** National hepatitis C prevalence has dropped from 2% in earlier studies to 0.82% among the total population and from 0.8% to 0.2% among Qataris.[2] Additionally, all confirmed cases receive direct-acting antiviral (DAA) therapy free of charge, with a treatment response rate exceeding 95%. Efforts to reduce hepatitis also include vaccination– as of 2022, 98% of one-year-old children are fully immunized, with coverage consistently remaining between 92% and 99%.[10] Overall, Qatar is among the top ten globally on track to eliminate hepatitis C by 2030 through expanded antiviral treatment programs and public awareness campaigns.

3. **Liver transplantation outcomes:** Qatar's transplantation program stands out as one of the most equitable in the region. Liver transplants are provided free of charge to all patients - both nationals and expatriates - through a unified waitlist system managed by Hamad Medical Corporation. Given that an estimated 2.76 million non-Qatari residents make up 88.4% of the population, this unified waitlist demonstrates a commitment to improving liver health throughout the country.[11] The program has also achieved high success rates, contributing to improved quality of life for patients with end-stage liver disease.

Conclusion

Qatar's proactive approach to addressing liver diseases highlights the importance of integrating research, public health campaigns, and accessible healthcare services into national policy frameworks. By prioritizing universal vaccination coverage, regional collaboration, and equitable transplantation services, Qatar has established itself as a model for tackling chronic liver diseases in the Eastern Mediterranean Region. Continued investment in infrastructure and public awareness will be critical for sustaining these achievements and further reducing the burden of liver disease nationwide.

CHAPTER **EIGHT**

Scotland's "intelligent Liver Function Testing" (iLFT) Pathway

Executive Summary

The intelligent Liver Function Testing (iLFT) pathway emerges as a crucial response to the escalating liver disease burden in Scotland, leveraging automated algorithms to streamline diagnosis and management. The iLFT enables primary care practitioners to electronically request tests, which brings about automated investigations and tailored management plans. Despite challenges such as anticipated increases in referrals and the need for additional laboratory technology and training, iLFT demonstrates significant benefits, including improved diagnosis rates and cost-effectiveness. General practitioner feedback is overwhelmingly positive, and the intention by the National Health Service (NHS) Scotland to adopt the iLFT program throughout the country underscores its potential to enhance patient outcomes and healthcare efficiency.

The intelligent Liver Function Testing (iLFT) pathway emerges as a **crucial response** to the escalating liver disease burden in Scotland.

Background

The prevalence of NAFLD and NASH in Scotland reflects a significant public health concern. There were 17.4 chronic liver disease deaths per 100,000 population in Scotland in 2022.[1] Studies have indicated a rising prevalence of NAFLD/NASH that mirrors global trends driven by sedentary lifestyles, poor dietary habits, and rising rates of obesity. Liver disease is closely linked with inequality and deprivation. In Scotland, premature deaths from liver disease are 4 times higher in the most deprived areas compared with the most affluent.[2] Early diagnosis of a progressive disease such as liver cirrhosis holds immense value as a crucial upstream intervention to mitigate the risk of complications like liver cancer and the need for transplantation, which will ultimately enhance patient outcomes and quality of life. There is an urgent need for target interventions and policy measures, such as iLFT to address this growing health challenge.

Objectives

- Authenticate an iLFT tool for diagnosing prevalent liver conditions, offering fibrosis staging, and recommending management strategies.[3]
- Establish clear, objective criteria necessary for confident diagnosis in a substantial real-world cohort of patients.[3]
- Diminish morbidity, mortality, and expenses linked with late-diagnosed liver diseases by enhancing early detection, ensuring proper referrals, and maintaining cost effectiveness.[4]

Policy Components and Implementation

Professor John Dillon, consultant gastroenterologist and hepatologist, and Dr. Ellie Dow, consultant in biochemical medicine, worked with colleagues from NHS Tayside and the University of Dundee to develop the iLFT pathways to detect liver disease at an early stage, potentially saving thousands of lives.[5]

- In Dundee, general practitioners can electronically request liver function tests (LFTs).[5]
- General practitioners can input patient data such as BMI, alcohol consumption, and other risk factors.[5]
- If abnormal LFT results are detected, additional tests are automatically conducted on the same blood sample to identify the cause and stage of fibrosis.[5]
- The system automatically identifies the diagnosis and determines the need for specialist referral.[5]
- The system provides a management plan, including lifestyle advice for patients with NAFLD/NASH.[5]
- The iLFT utilizes automated algorithms to investigate abnormal LFT results from initial blood samples in primary care.[5]

Examination of Findings

- The accuracy of diagnosis and management advice from 323 iLFT cases were compared to the clinician's final opinion to confirm validity.[3]
- An automated pathway achieved diagnostic agreement in 82.4% of cases, indicating appropriate referral selections by the algorithm.[3]
- Correct referral choices were made in 91.3% of cases, irrespective of diagnostic accuracy.[3]
- Implementation of iLFTs led to a 43% increase in diagnoses.[6]
- iLFTs proved cost-effective, estimated to save the NHS £3,216 per patient over their lifetime.[6]

Implementation of iLFTs led to a **43% increase in diagnoses.**

Challenges to Implementation

Anticipated increases in referrals to liver services are expected due to heightened diagnosis and follow-up, particularly in the short term, but are crucial for timely interventions and improved outcomes.[4] The anticipated increases in referrals to liver services may place additional strain on specialists' workload and resources, necessitating careful management of patient flow and allocation of healthcare resources to ensure efficient and effective delivery of care. While the algorithm's implementation minimally impacts training and resources in primary care, additional technology and training are needed in testing laboratories. Testimonials from patients, doctors, and health system administration may be necessary to boost confidence in the algorithm among general practitioners before wider implementation.

Increased diagnosis means **increased referrals,** which may put strain on liver specialists.

Impact

- iLFTs offer a safe and reliable method of risk-stratifying and diagnosing patients based on a single blood draw, thus reducing the necessity for invasive, expensive procedures.[6]
- General practitioners expressed positivity towards iLFTs, found them user-friendly and workload-reducing, and expressed a desire to maintain access.[6]
- Since being launched as a routine service in NHS Tayside, the program has tested more than 7,500 patients. The tests have now been made standard practice across NHS Tayside, and the Scottish government's Modern Outpatient Programme is considering the opportunities this might present, with work underway to roll this out more widely across Scotland. It has already been established in sites in England.[5]

Conclusion

The iLFT pathway offers a promising solution to address under-investigated abnormalities in LFTs. By utilizing automated algorithms, iLFT streamlines the diagnostic process, leading to early diagnosis, reduced referrals, and technology/training needs. iLFT has demonstrated notable benefits: increased diagnosis rates, cost-effectiveness, and positive feedback from general practitioners. The endorsement for adoption by NHS Scotland highlights confidence in iLFT's ability to improve patient outcomes and healthcare efficiency. Continued support and integration efforts are essential for maximizing iLFTs impact across healthcare settings. Overall, iLFT represents a valuable tool in enhancing early detection, proper referrals, and cost-effective management of liver diseases, contributing to improved patient care and outcomes.

CHAPTER **NINE**

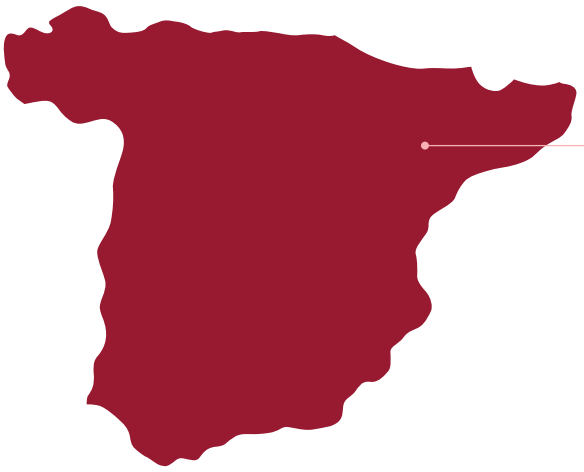
How Spain's Organ Donation Model is Saving Lives

Executive Summary

Spain has maintained its position as a global leader in organ donation and transplantation for 33 consecutive years.[1] This success is underpinned by a comprehensive policy framework centered on its opt-out organ donation system, strong hospital coordination, and strategic funding, overseen by the country's National Transplant Organization (ONT).

Key components of Spain's approach include an opt-out policy for donation after circulatory death (DCD), public engagement campaigns, guidelines that expand donors, and a comprehensive management system.

Spain's organ transplantation reached an all-time high in 2024, with 1,344 liver transplants performed.[2] Public awareness efforts have further strengthened donor participation. The outcomes of Spain's model are evident: waiting lists have been reduced by nearly 50% since 2015, and survival has improved more than 10% since 1984-1994 for liver transplant patients – with first-year patient survival reaching 88.5% in 2010-2012.[3] Moving forward, Spain must continue to address emerging challenges, including workforce shortages in transplantation careers and increasing transplant demand, through smart funding and targeted policy adaptations.



Spain's organ transplantation reached an all-time high in 2024, with **1,344 liver transplants performed.[2]**

Background

Spain's success in organ transplantation is rooted in its comprehensive healthcare system and progressive policies. Starting with its first liver transplant in 1984, Spain made organ donation and transplantation a cornerstone of its healthcare system.[4] The country's shift to an opt-out donation model in 1979 was instrumental in dramatically increasing donor availability through a policy supported by widespread public trust in the healthcare system.[5]

Spain's universal healthcare system strives to ensure that all citizens have equitable access to transplant services. This strong foundation has made it easier for hospitals to coordinate transplants efficiently. Moreover, Spain's culture places a high value on solidarity and communal responsibility. However, this is not without challenges. In recent years, there has been increasing discussion around ethical considerations regarding the soft opt-out model, with some advocating for a more explicit, consent-based system.

Additionally, demographic shifts present new hurdles. With Spain's population aged 65 and over predicted to account for 26.0% of the total population in 2037, the demand for transplants is expected to rise along with donor age. Older populations often experience higher rates of liver diseases, increasing the need for transplants. Furthermore, medical advancements in transplant procedures mean an increase in the number of patients eligible for transplantation. While Spain leads globally in transplant rates, sustaining this success will require ongoing policy adjustments, investment in infrastructure, and continued public engagement efforts.

Objectives

1. **Increase donation and transplantation rates.** This objective is directly tied to policies such as the opt-out system and targeted public awareness campaigns, which lead to consistently high donor participation. Within this soft opt-out model, everyone is an organ donor by default unless they indicate otherwise, but families of the deceased retain the final say.[6]
2. **Improve patient outcomes through access to transplantation.** The expansion of donation criteria, particularly through DCD, has led to shorter waiting lists and improved survival rates.
3. **Expand recipient eligibility criteria to include broader indications.** By adopting new guidelines for conditions like hepatocellular carcinoma and older recipient candidates, Spain has ensured more patients can benefit from transplantation.
4. **Leverage innovation and research to optimize processes.** Continuous investment in transplant research has helped refine procedures and improve efficiency, further enhancing Spain's reputation as a leader in the field.

Policy Components and Implementation

1. **Donation after circulatory death:** Spain pioneered the DCD program, significantly expanding its donor pool. The ONT collaborates with hospitals to provide standardized training for medical professionals, ensuring the proper implementation of DCD protocols. Workshops, simulation-based training, and best-practice sharing sessions are conducted to optimize the procedure.

2. **Consensus guidelines:** The Spanish Society for Liver Transplantation (SETH), in collaboration with the ONT, updates guidelines to ensure best practices in patient selection and transplant procedures. SETH released comprehensive guidelines in 2019 to broaden transplantation criteria. These include new protocols for conditions like hepatocellular carcinoma and older recipient candidates. Age limits were removed in favor of case-by-case evaluation for older recipients. Additionally, the guidelines expanded recommendations to not only include patients with tumors within the Milan criteria (single tumor ≤5 cm or up to 3 tumors ≤3 cm each) but also those with larger tumors or a higher number of lesions, based on specific criteria for tumor biology and response to treatment.

3. **National Transplant Organization (ONT):** ONT plays a crucial role in ensuring policy implementation, managing logistics, and coordinating between stakeholders, including hospitals, regional healthcare agencies, and donor families. It also leads awareness and education efforts to shape social and cultural understanding of organ donation and transplantation. The ONT organizes annual conferences to align national transplant strategies and oversees data collection to enhance efficiency. Spain currently has 24 liver transplantation centers for adults and 5 for children.[7]

4. **Hospital coordination model:** Spain employs dedicated hospital coordinators who streamline donor management, liaise with families, and oversee transplantation logistics.

5. **Public engagement campaigns:** Awareness campaigns have increased organ donation consent rates, fostering a culture of solidarity and trust in the healthcare system.

Challenges to Implementation

Despite Spain's success, several challenges threaten the sustainability and growth of its organ transplant system:

1. **Shortage of transplant professionals:** Medical students are not pursuing careers in transplantation. Shown in the preference for more lucrative specialties, there is an increasing shortage of transplant surgeons and coordinators – with only one liver transplant surgeon for every 281,000 individuals in Spain.[8] If demand for liver transplants increases due to the aging population and broader criteria for liver transplants, this challenge will worsen.

2. **Concerns about the opt-out system:** While Spain's presumed consent model has been highly effective, ethical debates persist about whether presumed consent truly reflects individual autonomy. Some advocacy groups are pushing for greater transparency in decision-making.

3. **Aging donor pool:** As Spain's population ages, the availability of younger, healthier organ donors declines.
4. **Infrastructure limitations:** Spain's transplant centers raise concerns about the ability to meet future demand. Expansion and investment in transplant units are necessary to prevent reaching the capacity of the system.

Impact

Spain's organ transplant policies have had a substantial and measurable impact, making it a model for other nations. Some key indicators of success include:

1. **Reduction in waiting lists:** Since the implementation of Spain's opt-out system and coordinated hospital efforts, liver transplant waiting lists have been reduced by nearly 50% between 2015 and 2024.[3]
2. **Increased donor rates:** Spain achieved a record 52.6 organ donors per million population in 2024, more than double the EU average.[2]
3. **DCD contributions:** The DCD program resulted in 2,562 deceased donors in 2024.[9]
4. **Family refusal rates:** Family refusal rates have dropped from 25% in 2010 to 10-15% in 2024, a testament to Spain's effective public awareness and education campaigns.10 Additionally, Spain's family authorization for organ donation is 86%.[11]
5. **Transplant numbers:** In 2024, Spain performed 1,344 liver transplants, a 6% rise from the previous year, significantly improving liver health outcomes.[2]
6. **Economic savings:** Increased transplant success rates have led to a reduction in long-term healthcare costs, saving hundreds of millions annually by reducing dialysis reliance and improving post-transplant health outcomes. Every transplant in Spain represents an annual state budget saving of 21,000 euros.[12]

Conclusion

Spain's leadership in organ transplantation is rooted in its well-structured policies, public trust, and investment in healthcare infrastructure. Moving forward, Spain must focus on sustaining investment in transplantation programs, addressing workforce shortages, and reinforcing the benefits of its opt-out system to counter emerging opposition. Spain's well-directed investment combined with policies such as the opt-out policy in place of opt-in have led to great success in Spain.

CHAPTER **TEN**

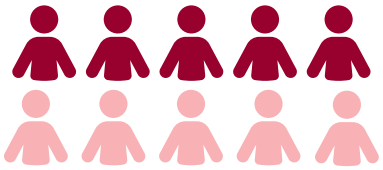
Türkiye Deploying Medical Recommendations to Control NAFLD & NASH

Executive Summary

The prevalence of NAFLD in Türkiye is concerning, affecting almost 1 in 2 individuals within the population.[1] Despite its significant impact on public health, the nation lacks comprehensive nationwide studies on NAFLD and its progressive form, NASH. In response, the Turkish Association for the Study of the Liver (TASL) issued guidelines tailored to the Turkish population, emphasizing evidence-based management strategies. These guidelines coincide with Türkiye's 2017 National Plan to Combat Non-Communicable Diseases (NCDs), a plan led by the Public Health Institute of the Ministry of Health in collaboration with other ministries, governmental bodies, academic institutions, and civil society organizations. However, challenges persist, such as the need for cost-effective screening programs specifically targeting NAFLD/NASH. There has been little response to the guidelines, possibly due to competing health priorities that must be overcome to address this pressing public health issue and hopefully contribute to the implementation of health policies to support NAFLD/NASH outcomes in Türkiye.

The prevalence of non-alcoholic fatty liver disease (NAFLD) in Türkiye is concerning, **affecting almost 1 in 2 individuals within the population.**

NAFLD stands as one of the **leading causes** of chronic liver disease and cirrhosis in Türkiye.



Background

NAFLD impacts nearly half of Türkiye's population – 48.3%.[1] NAFLD stands as one of the leading causes of chronic liver disease and cirrhosis in Türkiye, like in many Western countries.[2] Existing research primarily comprises small-scale, single-centered studies targeting specific groups, which leaves a notable gap in understanding.[1] To address this deficiency, health leaders and policymakers must initiate urgent large-scale, multi-center investigations to accurately assess the burden of NAFLD and NASH across diverse populations in Türkiye. Such endeavors are pivotal to informing and providing evidence to support policies and interventions to combat the escalating public health crisis posed by NAFLD and NASH in the country.

Objectives

2017 National Plan to Combat NCDs objectives:

- Prioritize prevention and control of NCDs in national and international agendas.[3]
- Strengthen national capacities, leadership, and partnerships for NCD prevention.[3]
- Reduce modifiable risk factors and address social determinants through health promotion.[3]
- Enhance health systems' response to NCDs and support research and development.[3]
- Monitor trends and assess progress in NCD prevention and control.[3]

TASL NAFLD and NASH guidelines objectives:

- Provide evidence-based management guidelines tailored to Türkiye's population.[4]
- Encourage the formulation of early intervention strategies for NAFLD diagnosis and prevention.[4]

Policy Components and Implementation

In 2017, Türkiye's Ministry of Health initiated a comprehensive action plan for NCDs. In 2021, the Turkish Liver Association released clinical guidelines for NAFLD, advocating lifestyle modifications and cost-effective screening programs. The Ministry of Health promotes healthy lifestyle choices to prevent cardiovascular disease, which indirectly reduce NAFLD/NASH incidence. Currently, no established policies exist for cost-effective screening programs, but these guidelines are expected to inform future health policies in this area.

2017 NCD Action Plan[3]:

- **Prevention:** Focus on tobacco control, healthy diets, physical activity, and alcohol reduction. Use community-based interventions like education programs and support groups.
- **Early Detection and Diagnosis:** Improve access to screenings for common NCDs such as diabetes, hypertension, and cancer within existing healthcare systems.
- **Treatment and Management:** Strengthen primary healthcare for comprehensive NCD care and ensure access to essential medicines and technologies.
- **Surveillance and Monitoring:** Establish a national NCD registry to collect data on prevalence, incidence, and risk factors, and enhance surveillance systems.
- **Intersectoral Collaboration:** Engage stakeholders and establish committees to coordinate efforts between government, healthcare, academia, and civil society to address social determinants of health.

TASL Guidelines on NAFLD and NASH[2]:

- Standardize clinical approaches that benefit specialists in various medical fields for NAFLD diagnosis and treatment.
- Increase the use of non-invasive diagnostic methods, given research indicating the clinical efficacy of non-invasive diagnostic methods such as transient elastography and FIB-4 (a liver fibrosis biomarker) within Turkish populations.
- Evaluate individuals with metabolic abnormalities for NAFLD presence.
- Begin diagnosis with abdominal ultrasound, with consideration of transient elastography and magnetic resonance elastography (MRE) for liver fibrosis assessment if accessible.
- Liver biopsy remains the gold standard for diagnosis.
- Emphasize lifestyle modifications, including dietary changes, exercise, and management of metabolic disorders, for effective NAFLD management.

Examination of Findings

Achieving the behavioral risk factor targets in the Multisectoral Action Plan of Türkiye for Noncommunicable Diseases 2017–2025 would have averted approximately 20,000 deaths in 2017.

Evaluation is still underway to assess the effectiveness and implications of Türkiye's NASH and NAFLD guidelines.

Challenges to Implementation

The national action plan prioritized interventions and capacity-building that offer broad benefits across all non-communicable diseases, resulting in greater cost-effectiveness. This may result in diminished emphasis on NAFLD/NASH specifically. There is evidence supporting the need for cost-effective screening programs and funding to launch pilot initiatives.

Impact

Studies have indicated that attaining non-communicable disease policy objectives can avert numerous fatalities within the nation.[6] However, there has been minimal uptake to the NAFLD/NASH guidelines, which suggests that fatty liver disease is considered a lower priority compared to other NCDs.

Conclusion

Addressing NAFLD/NASH in Türkiye's healthcare system is crucial, starting by integrating initiatives into existing national NCD action plans and establishing pilot screening programs. Leveraging resources and collaborating with health stakeholders can effectively combat NAFLD/NASH and improve health outcomes. Türkiye's proactive approach, exemplified by TASL guidelines and the 2017 Action Plan, demonstrates a commitment to combating NCDs and liver diseases. Continued dedication, collaboration, and resource allocation are vital for sustained progress in tackling these complex public health challenges.

CONCLUSION

This second edition of *Best Practices in Liver Health Policy* continues to highlight the critical yet oft-overlooked issue of liver health in several national contexts. Although one brief resource cannot analyze every innovative liver health policy, we highlight a selection of successful policies that have resulted in tangible improvements for patients. Despite affecting over 1.5 billion people worldwide, liver conditions still receive limited or delayed treatment, are subject to stigma, and lead to unnecessarily poor outcomes.[1] With the prevalence of liver disease projected to rise due to sedentary lifestyles and overnutrition, urgent action is needed to address this growing burden. Liver health requires a public health approach that prioritizes public education, accessibility to preventive measures, early detection, and seamless integration with healthcare systems. Practical interventions that consider individual preferences, cultural backgrounds, and socioeconomic circumstances are essential for effective disease management.

Global Liver Institute presents this second edition of the Report to inspire solutions and garner greater awareness of and political commitment to liver health. It continues to build upon the foundation of international gatherings of experts to place liver health at the forefront of public health agendas worldwide.

Moving forward, stakeholders across healthcare sectors must collaborate to implement policies and programs that prioritize liver health promotion and disease prevention. By working together, we can improve health outcomes for millions of individuals globally.

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CONCLUSION

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Global Liver Institute (GLI) is a 501(c)3 nonprofit organization founded in the belief that liver health must take its place on the global public health agenda commensurate with the prevalence and impact of liver illness. GLI promotes innovation, encourages collaboration, and supports the scaling of optimal approaches to help eradicate liver diseases. Operating globally, GLI is committed to solving the problems that matter to liver patients and equipping advocates to improve the lives of individuals and families impacted by liver disease. GLI holds Platinum Transparency with Candid/GuideStar, is a member of the National Health Council, and serves as a Healthy People 2030 Champion. Follow GLI on Facebook, Instagram, LinkedIn, and YouTube or visit www.globalliver.org

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