

# EGYPT'S VIRAL HEPATITIS PROGRAM

## Eliminating Hepatitis C from Egypt: 2017 Update on Current Trends and Policy Recommendations



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*2017 Update on Current Trends and Policy  
Recommendations***

**Policy Brief**

# 1. Overview of Recent Developments

Egypt is making historic headway against Hepatitis C, one of its most insidious killers. In 2016, roughly 40,000 Egyptians died of the disease, and nearly 4.5-5 million are currently infected—the highest burden in the world for Egypt’s population size.<sup>(1)</sup> But the landscape has changed dramatically in the past few years. Following successful negotiations between the Egyptian government and drug makers in 2014, breakthrough medications known as direct-acting antiviral agents (DAAs) have become widely available at markedly reduced prices.

Since then, more than a million Egyptians have been treated, with a cure rate exceeding 95% in many settings.<sup>(2)</sup> Such rapid progress has brought Egypt growing international attention, with some predicting that Egypt’s approach might serve as a model for other low and middle-income nations facing similarly large Hepatitis C burdens. In addition to lowering the cost of drugs, Egypt has succeeded in opening new treatment centers, creating electronic portals to enroll patients, and expanding its domestic pharmaceutical industry to ensure a steady pipeline of affordable medications.

These commitments, in turn, have raised political stakes inside Egypt and encouraged even more ambitious targets: Egyptian President Abdel Fattah el-Sisi, in a series of high-profile speeches and statements over the past two years, has spoken frequently of his dream to rid the country of the disease.

Yet Egypt faces significant challenges toward meeting this ambitious goal. The fact that one million people were treated so quickly reflects, to a large degree, pent up demand: For years, Egyptians diagnosed with Hepatitis C had no good treatment options, so when effective medications finally became available, many rushed to get treatment.

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(1) Estimates of the prevalence of Hepatitis C in Egypt vary by data set, year, and methodology. The figure quoted here reflects findings by the Ministry of Health and Population (2015), Waked et al (2014), and the Bank’s own modelling, adjusted for recent trends.

(2) See World Bank (2016), Treatment Program Policy Analysis. Note that cure rates vary somewhat based upon treatment regimen and underlying patient characteristics, e.g. presence of cirrhosis, history of prior treatment failure, etc.

The situation today looks quite different for the millions who still need treatment, as most have yet to be diagnosed and are unlikely to seek treatment on their own. As a result, Egypt faces pressure to take a more proactive approach to finding infected individuals—through screening programs and other measures—to ensure that the program’s early momentum continues.

Beginning in 2015, the World Bank began collaborating with the Egyptian government to provide technical advice on the country’s efforts to eliminate Hepatitis C. This work builds upon the country’s National Viral Hepatitis Plan of Action, which outlined a series of strategic goals and policies for eliminating the disease. While offering a strong foundation, the plan lacked specific projections on the cost and impact of various policy choices over the short and long-term that policymakers would need to plan their response. To address those gaps, over the past year, the Bank, in close coordination with the government and other stakeholders, has undertaken a series of policy analyses and economic modelling exercises, the results of which are summarized and updated here.

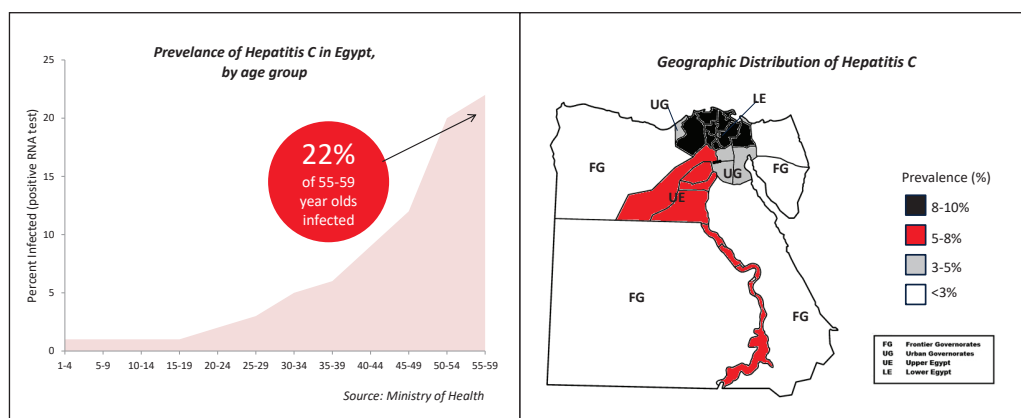
The Bank’s findings sketch out a series of strategies and actions that could inform Egypt’s drive toward eliminating Hepatitis C. They provide estimates of funding commitments that may be needed to make the vision of a Hepatitis C-free Egypt a reality, and offer a realistic timeline for carrying out such efforts given existing constraints. With appropriate resources, strategies, and continued policy leadership, Egypt can build upon recent progress and maintain its momentum toward eliminating this disease.

## 2. Background:

### Assessing the Burden of Hepatitis C in Egypt

Egypt has the highest burden of Hepatitis C in the world. As of 2015, roughly 7% of the Egyptian adult population (age 15-59) was infected.<sup>(3)</sup> Many of these infections, unfortunately, occurred in the 1960-1980s as part of a nationwide campaign to eradicate schistosomiasis, a parasitic worm found in the Nile River that can cause organ failure and cancer if left untreated; as part of that campaign, more than 6 million people were treated with injectable therapies, often with reused and inadequately sterilized glass needles.<sup>(4)</sup> As a result, Hepatitis C, which was not discovered until the late 1980s, spread rapidly through the population. The disease burden today reflects this legacy: More than one in the five Egyptians age 50-59 are a carrier of Hepatitis C, compared to less than 1% of children and teenagers (figure 1). The disease is also much more common among Egyptians who are poor and rural-dwelling, particularly those living in the Delta (figure 1).

Figure 1: Age and Geographic Distribution of Hepatitis C in Egypt



Source: Ministry of Health and Population; 2015 Egyptian Demographic and Health Survey; Kandeel et al 2017

(3) World Bank (2017). Egypt's Viral Hepatitis Program: Burden & Response, an Economic Analysis.

(4) Frank, C., et al., The role of parenteral antischistosomal therapy in the spread of hepatitis C virus in Egypt. *The Lancet*, 2000. 355(9207): p. 887-891.

Yet Hepatitis C is not just a problem of historical infections, as nearly 150,000 Egyptians were estimated to have been newly infected in 2016 alone. The rate of new infections—also thought to be the highest in the world—reflects both the large reservoir of people carrying the disease as well as the continued role of unsafe medical practices, which increase the risk of transmission. Efforts to improve blood safety at blood banks and to implement stronger infection control policies in hospitals and other health settings are underway, but significant work remains.

The direct health impacts of Hepatitis C in Egypt are immense. Hepatitis C is a chronic, often dormant infection, with most individuals living asymptotically for decades before developing complications. These complications, unfortunately, are becoming increasingly common as Egypt's infected population ages. Roughly 40,000 Egyptians will die of Hepatitis C-related complications this year—35,000 from liver failure, another 5,000 from liver cancer—making it Egypt's third-leading cause of death, trailing only cardiovascular disease and stroke (figure 2).<sup>(5)</sup>

A fraction of patients will be eligible for a liver transplant, but given how costly and resource-intensive transplantation can be, few will receive one; only 400-500 liver transplants are performed in Egypt every year.<sup>(6)</sup>

Meanwhile, the percentage of Egyptians dying from Hepatitis C has steadily increased over the years. Today, 9.1% of all deaths among Egyptian males are related to Hepatitis C, up from 5.8% in 1990; among women, the number has also risen, from 4.4 to 5.6% over the same time period (figure 2).<sup>(7)</sup>

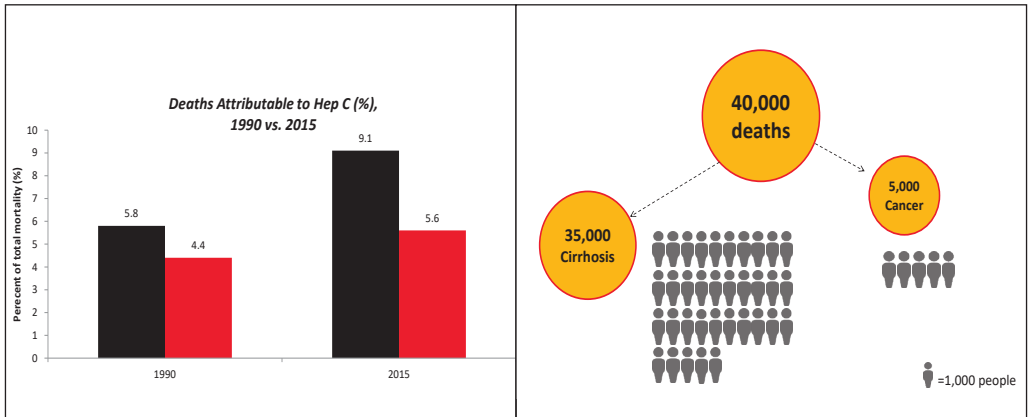
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(5) Institute for Health Metrics and Evaluation.

(6) Figures retrieved from the Global Observatory on Organ Donation and Transplantation database.

(7) World Bank (2017). Egypt's Viral Hepatitis Program: Burden & Response, an Economic Analysis.

Figure 2: Mortality Patterns Associated with Hepatitis C in Egypt



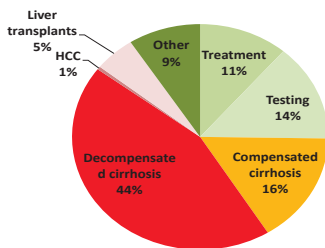
The budget impacts are equally large. Given the size of its infected population, Egypt is already spending hundreds of millions of dollars a year on Hepatitis C, mostly on late-stage complications. In 2017, the Bank’s modelling shows that Egypt is expected to spend an estimated \$463 million on Hepatitis C, nearly half of which (\$230 million) will be on the late-stage liver failure (decompensated cirrhosis, liver transplants) or cancer.<sup>(8)</sup> Based upon these projections, if Egypt continues on its current treatment path, it will spend nearly \$4 billion on Hepatitis C by 2030 (figure 3). These costs reflect direct health spending only. When one takes into account the economic productivity lost due to premature deaths from Hepatitis C, estimates suggest that Egypt in 2015 lost nearly \$1 billion in GDP alone.<sup>(9)</sup>

(8) Spending estimates are based on a policy scenario that assumes 5% of the adult population is screened annually, in addition to demand-driven treatment. See section 4 of this brief for additional details.

(9) World Bank (2017). Egypt’s Viral Hepatitis Program: Burden & Response, an Economic Analysis.

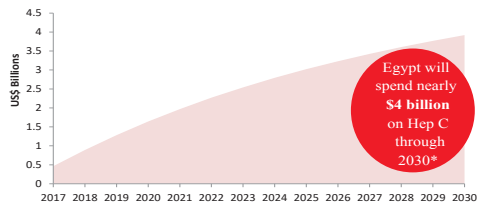
Figure 3. Estimated Direct Health Costs of Hepatitis C Under Current Policy Trends

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\$463 million in total  
\$204 million on decompensated cirrhosis

Projected Cumulative Spending on Hepatitis C Under Current Policies



Egypt will spend nearly \$4 billion on Hep C through 2030\*

Note that these figures are based on a scenario that assumes 5% of the adult population is screened annually, with all those testing positive receiving appropriate treatment, in addition to demand-driven treatment. Estimates include costs for testing, treatment, and complications related to hepatitis C, including cirrhosis, liver cancer, and transplantation.



## 3. Tackling the Challenge:

### Political and Policy Leadership

Efforts to address Hepatitis C in Egypt have been building for years, but the Egyptian government opened a remarkable new front against the disease in 2014, when it successfully negotiated with Gilead Sciences, a U.S.-based drug maker, to make the company's new Hepatitis C treatment available in Egypt at greatly reduced prices. The drug, Sofosbuvir, was approved in the United States in 2013 with cure rates exceeding 90%, representing a major advance over previous interferon-based therapy, which was costly and worked for only about half of the patients who took it. But Sofosbuvir's price tag was high: more than \$80,000 for a 12-week curative course. Egypt, following negotiations with Gilead, was able to secure the drug for only \$900, a deal that opened up the possibility of treating infected Egyptians in large numbers.<sup>(10)</sup>

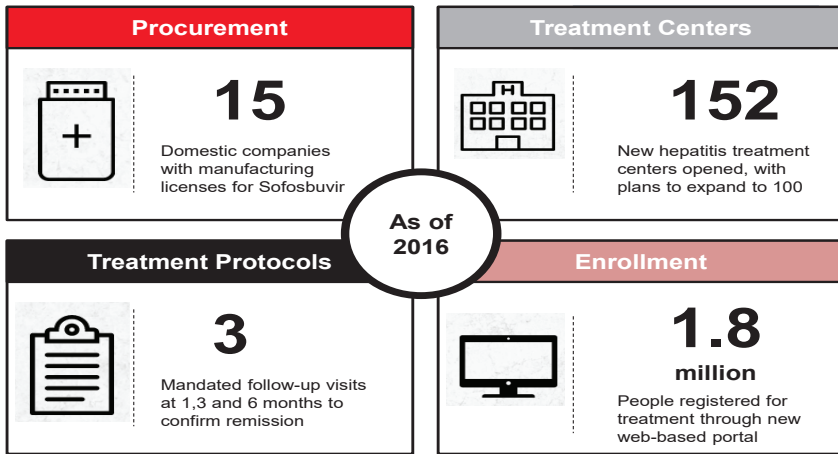
Since those initial negotiations, the government of Egypt has taken major steps to get medications into the hands of patients (figure 4). Building upon the Viral Hepatitis Plan of Action, the government opened 56 new treatment centers by 2016, with plans to reach 100 in total. It developed a web-based registration system that allows Egyptians to enroll for testing and, if needed, receive treatment. In an effort to reduce drug prices even further, the government has supported the development of the domestic pharmaceutical industry. More than a dozen Egyptian companies are now licensed to manufacture DAAs, leading to further drops in prices. The three-month course (of select regimens) now costs less than \$100, and apart from a \$2 user fee charged at the treatment centers, the medicines are provided free of charge for any Egyptian seeking treatment in public facilities.<sup>(11)</sup>

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(10) Fick, M. and Hirschler, B. Gilead offers Egypt new hepatitis C drug at 99 percent discount. Reuters. March 21, 2014.

(11) See World Bank (2017), Egypt's Viral Hepatitis Program: Burden and Response, An Economic Analysis, for additional costing information.

Figure 4. Key Steps in Expanding Treatment Access in 2016



Source: World Bank(2017), *Treatment Program Policy Analysis*.

Although more than a million Egyptians have now been treated under the new program, recent reports suggest the momentum may be slowing. When DAAs became widely available in Egypt, in 2015, most Egyptians diagnosed with Hepatitis C rushed to get treated. Demand was so great that many treatment centers were overwhelmed by long wait times and hundreds of patients a day seeking treatment. By the end of 2016, however, these wait times had largely resolved; most patients who wanted treatment had received it. Yet according to estimates, 4-5 million Egyptians still carry the disease and have yet to seek treatment, likely because they do not know they are infected.

To ensure infected individuals continue to receive treatment, Egypt is beginning to scale up efforts to implement screening programs, which will be critical for eliminating the disease within desired time frames. Working with the World Bank, authorities in early 2017 carried out a Hepatitis C pilot screening program in the Upper Nile region, using teams of community health workers traveling through villages to screen for the virus. In three months, more than 1 million people were tested, suggesting that screening large numbers in relatively short time periods is feasible if screening programs are implemented in a strategic and well-planned manner. Additional screening activities are now underway in Cairo.

Today, Egypt stands poised to continue its march toward eliminating Hepatitis C, but critical decisions must be made about the direction of the program.

Although current approaches will continue to have a major public health impact, expanding screening over the next several years could greatly accelerate progress toward a Hepatitis C-free Egypt and rapidly cut new infection rates and the number of chronic carriers. Yet such a bold course of action will also require greater up-front investments, as a national screening program and supportive measures will demand greater initial spending to save more lives (and potentially money) and reduce future suffering.

The following sections summarize a series of in-depth reports produced by the World Bank to assist Egyptian authorities as they weigh their options. The reports are intended to help policymakers make informed decisions about the potential impacts and costs of various approaches as they move forward on the national effort to eliminate Hepatitis C from Egypt.

## 4. Choosing the Best Path Forward:

### Updated Economic & Impact Assessments

Since 2015, the World Bank has been engaged with the Egyptian government to unlock the potential of its Viral Plan of Action. As part of its technical assistance, the Bank has carried out multiple in-depth studies of Egypt's Hepatitis C program, analyzing epidemiological, policy, economic, and fiscal data to help authorities prioritize their actions as they seek to eliminate the disease. These studies have included:

- A costing study of the various components of the national Viral Plan of Action, focusing on the costs of various treatment, care, and prevention strategies
- Cost-effectiveness analyses of treatment and screening scenarios to identify the relative costs and benefits of each
- Economic analyses of targeted prevention strategies, including improving blood safety and infection control

To establish a solid foundation for this work, in 2016, the Bank, working closely with Egyptian stakeholders and the World Health Organization, conducted a costing exercise of the different components of Egypt's Plan of Action for eliminating Hepatitis C. Participants reviewed efforts undertaken by other countries to determine the cost of similar programs; collected cost information in Egypt based upon market rates; and convened workshops involving a wide spectrum of stakeholders (World Bank, WHO, Ministry of Health, and other academic and civil society technical and clinical experts) to produce consensus findings.

Building upon this work, the World Bank modelled multiple treatment and screening scenarios, examining the costs and impacts (number treated, reduction in chronic carriers, rate of new infections, and deaths averted) of each. Five scenarios were initially modelled; please see World Bank (2017), *Burden & Response: An Economic Analysis*, for more details. A subset of these scenarios are briefly described in Table 1 below, along with an additional scenario, labeled

“Current Path,” which reflects the Bank’s best estimate of current policies in Egypt given the rapidly changing landscape for screening and treatment. This updated scenario aims to capture these late-breaking developments, while also demonstrating the model’s ability to adapt to evolving conditions and policies.

*Table 1: Description of Modelled Policy Scenarios*

| Scenario                                       | Description   |
|--|---|
| Treatment Only                                 | This scenario models what would happen if demand-driven treatment policies were continued but no efforts were made to implement or scale up screening.  |
| “CURRENT PATH”<br>(5% Screening and Treatment) | This scenario reflects the Bank’s best estimate of what is happening in Egypt today. With screening activities beginning in the first half of 2017, the Bank projects that Egypt might be able to screen up to 5% of the adult population this year (and in subsequent years), in addition to continuing demand-drive treatment.  |
| 10% Screening<br>(and Treatment)               | Under this scenario, 10% of the adult population would be screened annually beginning in 2017, and all individuals who screen positive would receive treatment in addition to those who seek treatment on their own.  |
| Elimination                                    | This scenario aims to demonstrate what would be required to eliminate Hepatitis C from Egypt in an accelerated but realistic manner given existing constraints. Under this scenario, 10% of the adult population would be screened in 2017; screening would be scaled up to 20% of the adult population from 2018-2021, with the remainder screened in 2022. As with the previous scenario, all who screen positive will be treated with appropriate medications. |

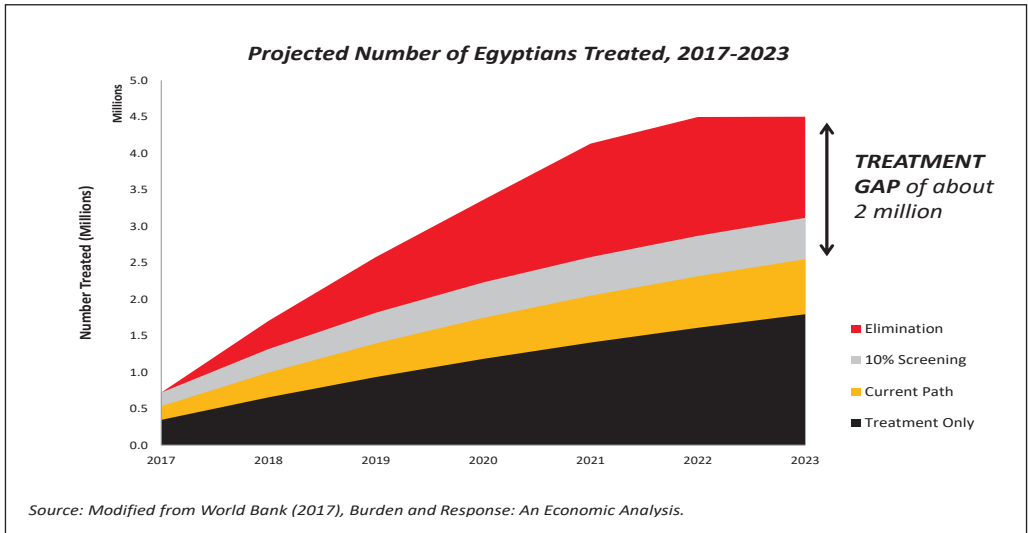
Although continuing current policies (“Current Path” scenario) or modestly scaling up treatment (10% screening scenario) will have major public health benefits, both approaches will fall short of timely elimination. As shown in Table 2 below, the model predicts that continuing current treatment policies (“current path”) will treat 2.5 million people and reduce the number of chronically infected and new annual infections by roughly 50 percent by 2023. These accomplishments would be laudable, but they would still leave 2.3 million people carrying the disease by 2023, falling well short of elimination. Scaling up screening moderately, as depicted in 10% screening scenario, would also fall short of elimination in the short-to-medium term, but it would get Egypt further towards its goal. Under this approach, 3.1 million people would receive treatment by 2023, chronic infections would be reduced by 60 percent, and new infection rates cut by 65 percent, while an additional 23,000 deaths would be averted by 2030 compared to current policies.

*Table 2. Summary of Expected Impact of Various Approaches to Screening and Treatment*

| <b>Scenario</b>                    | <b># Treated by 2023</b> | <b># Chronic Carriers in 2023 (% decline from 2017 levels)</b> | <b>#New Hep C Infections in 2023 (% decline from 2017 levels)</b> | <b>#Hep C Deaths (Net) by 2030</b> |
|------------------------------------|--------------------------|--|---|------------------------------------|
| <b>Treatment Only</b>              | 1,793,814                | 2,970,467 (34%)  | 76,603 (42%)  | 449,922                            |
| <b>Current Path (5% Screening)</b> | 2,548,425                | 2,310,830 (50%)  | 58,946 (54%)  | 420,193                            |
| <b>10% Screening</b>               | 3,115,077                | 1,791,229 (60%)  | 45,168 (65%)  | 397,114                            |
| <b>Elimination</b>                 | 4,500,588                | 350,460 (92%)  | 7,379 (94%)   | 348,844                            |

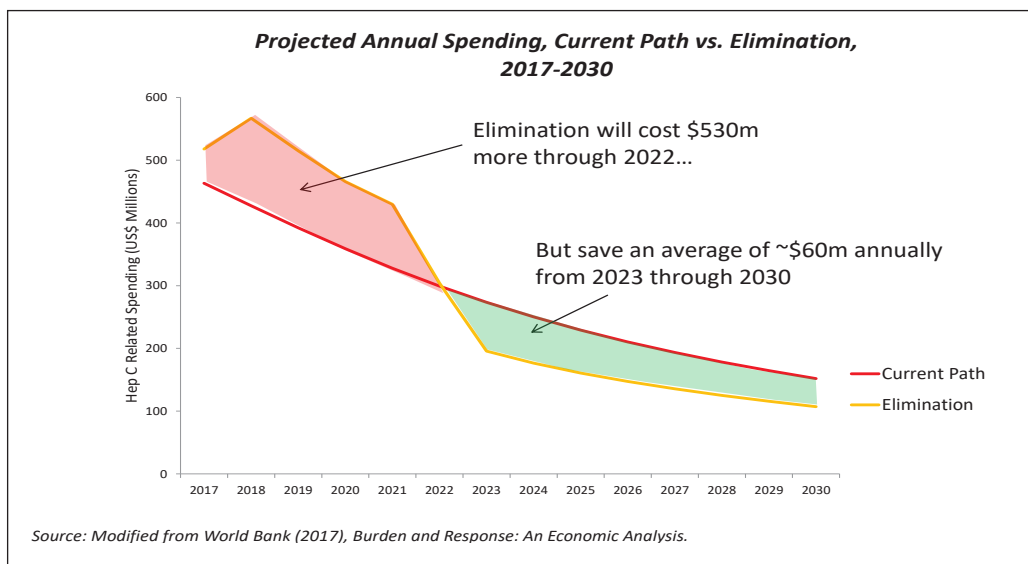
Eliminating Hepatitis C in a more rapid manner will require a substantial scale up in screening, as depicted in the model's more aggressive elimination scenario. According to the model, Egypt would treat approximately 4.5 million people by 2023 under the elimination scenario—nearly 2 million more than what could be expected under a 5% annual screening policy (Figure 5). Additionally, the Bank estimates that the number of chronic carriers and the rate of new infections would fall more than 90% from current levels by 2023, a much greater drop than predicted under other scenarios. The results also predict that nearly 72,000 deaths from Hepatitis C will be avoided by 2030 compared to continuing current policies.

*Figure 5. Comparison of Treatment Reach of Different Scenarios through 2023*



Scaling up screening will require greater short-term spending, however. If Egypt were to continue on its current path, it would spend an estimated \$463 million on Hepatitis C in 2017, and roughly \$2.5 billion by 2023. By comparison, pursuing elimination will cost an additional \$530 million through 2022, as shown in the shaded red in figure 6 below. These additional costs largely reflect the added costs of testing (currently estimated at \$6 per person for the initial antibody screening test and \$67 per person for the confirmatory RNA test), as well as the costs of treating positive cases with new DAA therapies. (Alternatively, scaling up screening more modestly, to 10% of the adult population annually, would cost an extra \$348 million through 2021, but also treat fewer people, as shown above.)

Figure 6: Spending and Savings Under Different Screening Approaches



From 2023 onward, the spending picture changes dramatically, as elimination becomes cost-saving relative to current policies. On an annual basis, elimination becomes the least costly scenario by 2023, as the number of patients needing testing and treatment decreases (as most have been tested and treated), and spending on late-stage complications falls. From 2023-2030, Egypt is projected to spend approximately \$60 million less every year on Hepatitis C-related care and treatment under elimination than current policies (green area in figure 6). These



savings nearly recoup the entire initial investment by the end of the decade. More detailed analyses of the relative costs of other scenarios, and the cost-effectiveness in terms of costs per infection and death averted, are provided in the full report. Needless to say, all screening and elimination approaches are considered cost-effective by standard definitions, and even more so for older age groups, among whom infection is much more common.

Targeted prevention strategies also provide excellent returns on investment. Because most new Hepatitis C infections in Egypt are caused by unsafe medical or hygiene practices, certain individuals are at much higher risk, including those frequently in hospitals or around blood, such as dialysis patients, healthcare workers, and patients who need repeat blood transfusions. Using best available data, the Bank examined three targeted prevention strategies—training health workers with safety engineered devices, supplying blood banks with modern analysis tools, and implementing infection control policies for dialysis patients—and found that all three strategies are highly cost-effective. For every \$1 spent, safety training for health workers provides a return on investment of more than \$12; updating blood banks, nearly \$1.70; and implementing infection control policies, nearly \$1.38.<sup>(12)</sup> More details can be found in the full report.

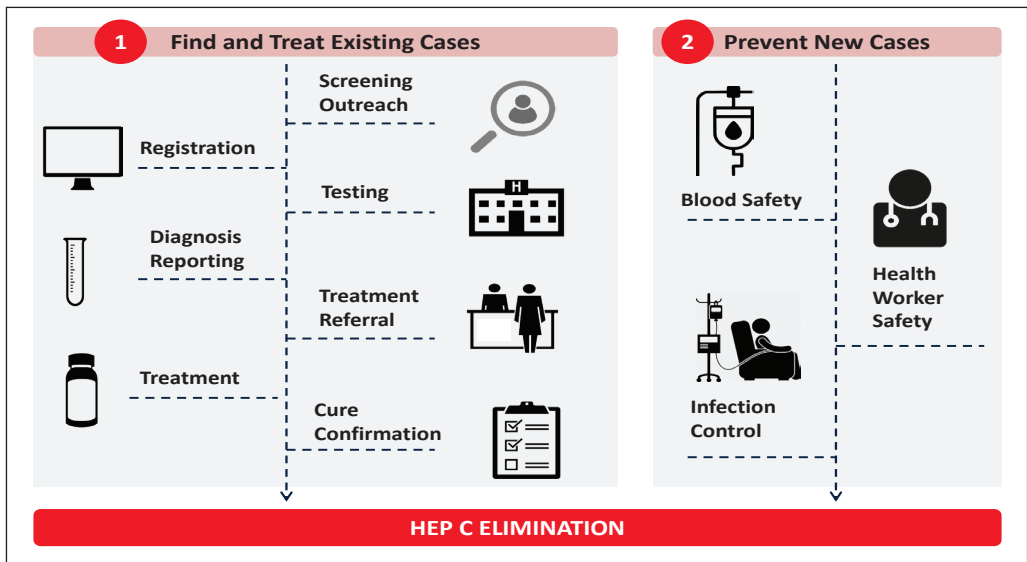
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(12) World Bank (2017). Egypt's Viral Hepatitis Program: Taking the National Plan of Action a Step Forward.

## 5. Monitoring the Progress

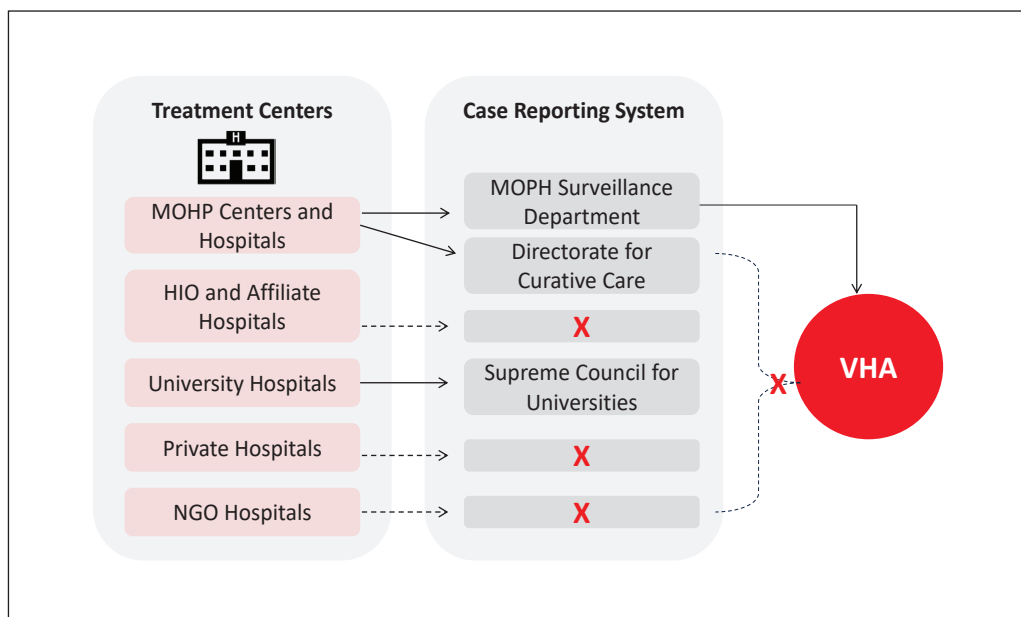
Although the advent of new medications has raised the hopes of a cure for millions of Egyptians, eliminating Hepatitis C will require more than just treatment; it also demands careful monitoring and coordination of program activities. As the diagram below illustrates, the process of getting someone tested and treated—and repeating that sequence for millions—is a multi-step undertaking, not only for the patient but also for the agencies required to coordinate that effort. Egypt has made some strides on this front, for example, creating a web-based registration portal to enroll Ministry of Health and Population (MOHP) patients for testing and treatment, and working to empower the Viral Hepatitis Administration (VHA), which has been tasked with overseeing various activities related to the elimination campaign.

*Figure 7. Screening, Treatment, and Prevention Pathways for Eliminating Hepatitis C*



Yet current coordination and monitoring efforts remain underdeveloped.<sup>(13)</sup> Healthcare delivery in Egypt is highly fragmented, and a variety of agencies, including the MOHP, quasi-government affiliated hospitals, university facilities, private hospitals, and NGO-run facilities, currently offer their own screening and treatment services. To the Bank’s knowledge, these institutions do not have an established system for communicating with one another, nor do they report their activities and results to a common agency. As a result, information about the number of people being tested, treated, or cured is not being adequately captured, and opportunities for identifying and fixing problems, not to mention tracking progress towards elimination, are likely being missed (figure 8).

*Figure 8. Example of Fragmentation of Current Reporting Systems for Hepatitis C*



(13) World Bank, 2017. Egypt’s Viral Hepatitis Program: Strengthening the Monitoring Evaluation Capacity. Washington, D.C.: World Bank.

As part of its assistance, the Bank formally assessed the VHA's capacity to carry out monitoring and evaluation activities critical for the program's success. Through interviews with key informants and a detailed mapping of how various actors communicate with one another, key gaps were identified that could threaten the program's long-term success and overall credibility of its findings.<sup>(14)</sup>

**These include the following:**

- Critical gaps in reporting and documentation. Although the MOHP's web-based portal allows it to track patients, other entities carrying out screening and treatment do not participate in a unified reporting system, making monitoring and evaluation difficult and limiting opportunities for corrective action.
- Limited oversight and coordination of prevention efforts. Egypt's system of blood banking, for example, is also highly fragmented. The National Blood Transfusion Service oversees 30% of the country's blood banks, with the remainder falling under the jurisdiction of other public and private hospital banks (or other entities). There is currently no single entity responsible for collecting information and enforcing standards for all of the country's banks. Likewise, although the VHA oversees infection control for MOHP hospitals, non-MOHP hospitals report to their own infection control departments—and rarely to the VHA.

Given these findings and the critical importance of having strong monitoring and evaluation mechanisms in place to ensure the program's success, the Bank developed several recommendations for strengthening coordination and reporting. **These include:**

- Developing a national screening program under the Viral Hepatitis Administration to coordinate and standardize all screening activities and ensure that positive cases are referred for treatment.
- Establishing a unified reporting system under the VHA, which would collect data on a regular basis from all treatment centers on the number of cases screened, treated, and cured.

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(14) World Bank, 2017. Egypt's Viral Hepatitis Program: Strengthening the Monitoring Evaluation Capacity. Washington, D.C.: World Bank.

- Establishing a National Blood Authority to ensure the quality and safety of the blood supply and enforce reporting of all positive cases.
- Standardizing infection control policies for all hospitals and regulating these activities under a single inspection/auditing entity.
- Developing key performance indicators to closely monitor progress and allow corrective action if certain elements of the program fall short of targets.

## Conclusion

Egypt today is at a critical juncture for addressing Hepatitis C. In the span of just a few years, it has treated more than a million patients and seriously raised the possibility of eliminating the disease within a time frame of years rather than decades. Political support has rallied behind these efforts, and international attention is high.

As this updated report outlines, to maintain its momentum, Egypt could consider expanding the scope of its treatment program to include a national screening effort that would draw new patients into the pipeline. Without screening, the number of patients receiving treatment will likely fall and significantly delay the prospects of elimination. Scaling up screening could help treat nearly 2 million more patients and rapidly cut the number of carriers and new infections, while averting tens of thousands of additional deaths by 2030.

More ambitious efforts will require additional spending initially, but the costs of inaction will be increasingly burdensome. Egypt is already spending in excess of \$450 million (US\$) a year on Hepatitis C related costs, mostly on treatments for liver failure and other end-stage complications. An investment of \$530 million (US\$) from 2017-2022 is projected to place Egypt on the path toward elimination while decreasing annual spending on Hepatitis C thereafter, nearly paying itself off by the end of the next decade. All screening scenarios modelled by the Bank are cost-effective by standard definitions, and several pilot screening programs are already underway.

As Egypt pushes to screen and treat millions of patients, it will also need to enhance its ability to monitor and evaluate its efforts, as well as to strengthen prevention activities. To build M&E capacity, it should consider empowering the Viral Hepatitis Administration (VHA) such that all treatment centers—whether government, private, NGO-run, or other—regularly report their activities to the VHA. Additional policies and capacity building are needed to strengthen reporting systems, safety measures, and quality oversight.

With sound policies, continued leadership, appropriate financial commitments, and a serious commitment to monitoring and evaluation, Egypt can continue on the path toward eliminating Hepatitis C. This would be a remarkable accomplishment in itself—and provide a global public good by pointing the way forward for other countries. percent discount. Reuters, March 21, 2014.

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