

# LIFE IS TOO SHORT WITH HCV AND NCDs—100 MILLION HEALTHY LIVES INITIATIVE

**Hala Zaid, Aysam Salaheldein, Mostafa Monier Othman, and Mohamed Hassany**, Ministry of Health and Population, Egypt  
**Ahmed Sorour**, Egypt Country Office, World Health Organization

Global healthcare is moving towards implementing medical innovations through automation and digital transformation of e-health strategies and applications. Digital health supports the application of universal health coverage (UHC), which ensures no one is excluded from obtaining health and medical services due to financial hardship.<sup>1</sup> Strengthening information and communication technologies (ICT) changes the shape of service delivery and improves individual and public health. E-health helps to ensure that health information is provided to the right person at the appropriate time and place.<sup>2</sup>

Leadership enables these changes—especially on the national level—ensuring alignment with strategic health goals. In 2018, Egypt's highest level of authority started to show commitment towards digital health by establishing automation and digital transformation units in all ministries. Shortly thereafter, the Ministry of Health and Population (MoHP) started addressing and enhancing the health information system (HIS) through assessment and definition of specific objectives. The primary focus of the MoHP is to assess health risks using population surveys. Using these evidence-based surveys ensures that resources are allocated efficiently and allows for effective decision-making.

The two main health risks in need of assessment in Egypt are hepatitis C virus (HCV) and non-communicable diseases (NCDs). An estimated 84% of all deaths in Egypt are NCD-related. Statistics from 2008 show that Egypt had the highest HCV prevalence worldwide,<sup>3</sup> with an estimated 6.8 million patients between the ages of 15 and 59 diagnosed with the virus.<sup>4</sup> The prevalence of HCV decreased by 30% from 2008 to 2015 but, despite this decrease,<sup>5</sup> Egypt still had the highest prevalence globally—a reported 7% or roughly 4.5 million patients.<sup>6</sup> The use of population surveys as an assessment tool for health risks has yielded moderate results. To strengthen the influence and

impact of these surveys, further action needs to be taken to improve data governance, transparency, population coverage, fraud detection, and instant monitoring. These matters can only be enhanced through digital technologies.

## Methodology

From October 2018 to April 2019, the MoHP ran a large-scale HCV and NCD screening and treatment program for Egyptians aged 18 years and older. Egypt is known to be the country with the highest prevalence of HCV and the highest number of mortalities due to the complications of NCDs. Despite this, the MoHP did not have precise records for the incidence and prevalence of HCV and NCDs. In addition, the MoHP had neither comparison with other countries nor the peripheral distribution between provinces. This initiative—named *100 Million Healthy Lives*—was launched under the patronage of the Egyptian president. The aim of this program is to eliminate hepatitis C by 2020 and to assess the prominence of NCDs in the country. It includes early detection, referral, and treatment for HCV and NCDs. The cross-sectional screening had three phases and covered 27 governorates representing the country. Over seven months, screening teams consisting of 60,057 medical professionals and data entry staff worked in 5,716 screening sites, such as primary healthcare (PHC) units, government hospitals, mobile clinics, and youth centers.<sup>7</sup> Over 49.8 million people were screened and tested for NCDs and HCV, 2.2 million were referred for polymerase chain reaction (PCR) tests, and 0.9 million started their first dose of HCV treatment. Monitoring and evaluation of the program, in collaboration with the World Health Organization (WHO) Egypt Country Office, took place in two parts—field visits during the screening and a verification process to ensure the quality of the screened data.<sup>8</sup>

The process flow of the patient cycle was divided into technical and medical. The technical side of the cycle focused on data collection to create patient profiles at the beginning of the process and to record medical results and assessments at the end of the process. Based on the personal data collected at the beginning of the cycle, the system determined whether tests for NCDs and/or HCV were required. Trained health professionals—mainly physicians, dentists, and/or pharmacists—performed the necessary medical tests following pre-defined standards. The health professionals were also responsible for completing the technical side of the cycle by providing medical data as input for the system. In the case of negative results, the patient file was closed. If results were positive, the patient proceeded to a second phase where further testing was conducted and medical professionals established patient specific treatment plans.

## Findings

### 1. Instant monitoring of the process

The MoHP developed software solution offers a holistic approach to the screening, referral, and treatment process. It provides instant reports derived from the data entries at every registered site. The system updates every ten minutes. It is able to detect which screening units did not make any data entries for patients within the last fifteen minutes. This enables monitoring officers to overcome any obstacle or challenge that may be faced within these locations, such as technical issues related to the database, code debugging, internet accessibility, or even lack of workforce motivation. All of these challenges can be solved once detected.

Between 2011 and 2015, rapid political changes affected the health system. Short-term wins were created to demonstrate power, while long-term programs lacked political commitment. This eventually led to duplication of services through parallel programs. Now the system enables standardization between different entities, centralized around the patient. This system enables the medical team to determine—during the screening process—whether the patient is insured or not. If possible, the patient is referred directly to a nearby hospital that belongs to their health insurance organization (HIO). If not insured, the patient is referred to a hospital with administrative ties to the curative sector in the MoHP. In this case, the patient gets financial coverage from another insurance scheme. The referral place and time of the patient's next visit are provided during the screening, enabling the patient to understand the next steps before leaving the screening site. Having the system accessible at each referral site enables all patient information—from screening, treatment, and results—to be entered, stored, and easily tracked.<sup>9</sup>

The software produces updates every ten minutes and can provide instant reports about screenings across the country. The system generates a targeted number of screenings for each site per day and compares that to the actual screened population. It also analyzes the population per gender, shows the highest contribution by age group, and is capable of identifying the peak screening time within a day or peak times

throughout the screening process. Its enormous capacity allows access to 20,000 users at the same time, captures 750,000 screening transactions per day, and captures 47 screening transactions per second.

### 2. Evidence-based decision-making

Limited resources are usually the main challenge facing public health interventions. Resource mobilization driven by data is the optimum solution to overcome this obstacle. A well-developed software solution offers multilayer output. This approach starts from a national level and narrows to regions, governorates, districts, cities, and villages—eventually reaching a population covered by a primary healthcare unit. This multilayer approach clarifies which screening centers have covered the targeted population numbers and which centers have not. This targeting is followed by behavioral change and awareness campaigns, using messages sent to targeted citizens in a specific geographical area to motivate them to undertake the screening.

The system produces data, such as the total number of screened cases and their results, on all layers from the national level to villages and specific areas. This aids in placing targeted interventions in the needed areas. The system also shows correlation between diseases and related risk factors. For example, the data shows a strong correlation between hypertension and obesity, a decrease in the incidence of hypertension with increased physical activity and lifestyle management, a higher prevalence of hypertension in males, and a higher prevalence of diabetes in females.

### 3. Data governance and transparency

Lack of data governance can raise security and management issues, while lack of transparency may decrease trust and cause decisions based on incomplete information. Data governance aims to establish evidence-based decision-making. It aims to distribute responsibility and authority across the Ministry of Health. The system effectively connects campaign senior management, tactical teams, and operational managers. Policies and rules for the medical and technical teams are utilized to ensure the best governance. The system has built-in data validation rules to ensure the integrity and consistency of all data. This creates a closed-loop system for the screening process that includes data security, privacy, operation, analysis, and decision-making. The system encapsulates processes and procedures and defines them as implementable operational steps. It promotes consistency, data flows, data analytics, and data mining. Training for operational teams, managerial teams, and steering committees enabled each group to understand the system, manage data, and make decisions. Finally, audits are in place to ensure data quality.

Transparency was achieved through a verification report on the data quality, performed by WHO, Egypt. Data verification and transparency strengthened the results from the population surveys. Results of the screening are displayed on public billboards for citizens and other parties to see. Reports are under development to share the results of this large-scale screening. Media campaigns are also being used to communicate why the general public should undertake the screening.

#### **4. Population coverage and health mapping**

Population coverage—using a multilayer approach—is a key measure that defines the success of Egypt's population-based survey. Data mining and analytics based on the most critical cases, such as hypertension over 180/110 mmHg and diabetes over 600mg/dL, will lead to a health map matrix that can inform communication campaigns and treatment. The data will be analyzed for correlations between the screened diseases and geographical areas. For instance, four governorates from phase one have double the prevalence of hypertension compared to the rest of the governorates. This enables defining the risk factors by governorates and narrowing further to focus on small areas and villages. Other risk factors are also taken into consideration, such as gender, age group, distribution between rural and urban, and profession. In addition to the health mapping matrix, the analytics will be used to produce various reports and research articles. Finally, the software produces a dashboard that offers a strategic overview of the mass screening.

#### **5. Cost-effective approaches, fraud detection, and financial sustainability**

The economic burden of diseases is critical, as it increases out of pocket and catastrophic health expenditures. Wise decisions must be adopted to decrease the financial load on the population. The fragmentation of the Egyptian health system makes it difficult to detect service duplication, standardize services across different entities, or stabilize pricing for services. However, the technology system has capabilities that enable integrating the different entities, detecting fraud, and ensuring efficient interventions.

The National Committee for Control of Viral Hepatitis (NCCVH) is the governmental entity that develops strategy for the screening, prevention, and treatment process. In the past, this was a long process, which included time-consuming and costly paperwork and accounted for 65% of the out of pocket cost to patients. Now, the process of approval is completely electronic and confirms the treatment regimen with no financial burden on the patient. The screening is free of charge and has eliminated out of pocket and catastrophic expenditures.

## **Conclusion and recommendations**

The case study of the Egyptian presidential initiative, called *100 Million Healthy Lives*, set a few goals, which include improving the public health status of 100 million Egyptians, eliminating HCV from Egypt by 2030, and assessing the situation of NCDs. The objective of this mass screening was to screen 50 million citizens above 18 years old and connect them to treatment through a proper referral system. This initiative was successful due to the digital health application. It generated an enormous amount of data that can be easily transformed into useful information for wise decision-making.

Automation and digital transformation of public health interventions ensure prompt evaluation and provide clear evidence for decision-making, governance modalities, health metrics, and

the best economic approaches. The health system in Egypt is fragmented due to unintegrated health services and complex vertical programs and silos. The only solution for fixing this issue is through connecting all the services and the institutions together to prohibit duplication of services, define the needed services, and ensure transparency. Data mining and analytics are cost-effective approaches to mobilizing resources toward the most crucial health needs.

Egypt is the chair of the African Union in 2019. The sister countries have similar health system challenges regarding health informatics. This has motivated policymakers to support other countries through knowledge and technology transfer. Currently, some countries are adopting the lessons learned and building on Egypt's experience, according to their status and needs. Requirements for each of the nominated member states is currently being assessed through field visits. The approach will then be modified and tailored to satisfy the specific needs of member states.

There is a critical need in science and public health in Egypt to develop more effective medicines and medical devices and to ensure that they are available and accessible for all who need them. A solution to this problem is under development through enterprise resource planning (ERP)—business process management software that includes supply chain management, inventory management, documentation management, and human resources management. This system will integrate various applications that digitize back-office processes and procedures and will be utilized for all governmental bodies, not only MoHP.

#### **Notes:**

- 1 WHO, 2016.
- 2 WHO, 2012.
- 3 WHO, 2017.
- 4 Kandeel et al., 2017.
- 5 Talaat et al., 2019.
- 6 Kouyoumjian et al., 2018.
- 7 WHO, 2019.
- 8 WHO, 2019.
- 9 Additional information is available at <http://stophcv.eg/upload/end-note-weblink-2-pager.pdf>

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