PURSUING ELIMINATION OF HEPATITIS C IN EGYPT: AN ECONOMIC EVALUATION OF A COUNTRY-WIDE PROGRAM AND ITS ASSOCIATED COST EFFECTIVENESS

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INTRODUCTION & OBJECTIVE

- Hepatitis C virus (HCV) is a global public health crisis impacting 71 million infected patients. Egypt presents the highest HCV global prevalence.
- Despite evidence of positive effects of HCV testing/screening, adoption globally remains limited.
- Recently, the Egyptian Ministry of Health implemented three different HCV screening/testing/therapy programs.
- The objective of this health economic evaluation is to estimate the absolute and incremental impact of Egypt's national HCV screening efforts on direct, indirect, and total healthcare costs.

METHODS

- In 2014 (wave 1), major decisions on HCV therapy were enacted, accompanied by a 99% discount for the HCV-therapy Sovaldi.
- In 2016 (wave 2), a first testing program was launched to identify patients for free treatment.
- In 2018 (wave 3), population-wide screening was conducted using a WHO-qualified test (SD Bioline HCV, Abbott, USA) to identify/treat all Egyptians with HCV.
- Population estimates and HCV testing & therapy rates were determined on the basis of published literature and via expert opinion.
- Using published evidence, the direct costs of the three different HCV programs were evaluated, accompanied by a conservative simulation of related major HCV health consequences (i.e., liver-related deaths/life years lost) and indirect costs.
- Total economic consequences of each HCV program were compared to each other and to baseline from a societal perspective.
- Future costs and health effects were discounted by 3% per year.
- An overview of the key estimates used as the basis of the health economic assessment are presented in Table 1, below.

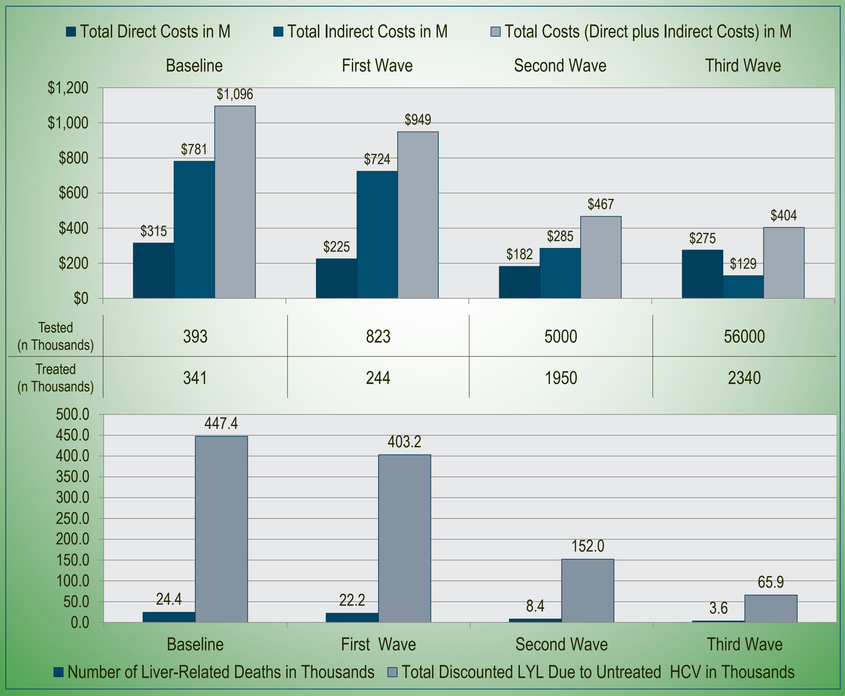
Table 1: Population Estimates / HCV Testing and Therapy Patterns

Observation Periods	Baseline	First Wave	Second Wave	Third Wave
Egypt (Time/Year)	2008 - 2014	2014 - 2015	2016 - Sept 2018	Oct 2018 - Sept 2019
Total observation period (in years)	6	1	3	1
Target Population (n)	49,700,000	61,150,000	62,000,000	67,400,000
HCV Prevalence (seroprevalence) %	14.7%	10.0%	8.0%	6.4%
HCV Prevalence (viremic) %	9.7%	7.0%	5.6%	4.5%
Proportion Viremic / Seroprevalence	66.0%	70.0%	70.0%	70.0%
HCV Prevalence (Seroprevalence) n	7,305,900	6,115,000	4,960,000	4,285,714
HCV Prevalence (Viremic) n	4,820,900	4,280,500	3,472,000	3,000,000
Population Tested (n)	391,234	822,889	5,000,000	56,000,000
HCV (newly) Detected (n)	39,123	82,289	365,000	2,400,000
Known HCV (n)	310,877	167,711	1,635,000	0
Population Treated (n)	350,000	250,000	2,000,000	2,400,000
Treatment Cure Rate	97.5%	97.5%	97.5%	97.5%
Treated Successfully (n)	341,250	243,750	1,950,000	2,340,000
Untreated/Not Succesfully Treated (viremic - n)	4,479,650	4,036,750	1,522,000	660,000

RESULTS

- Total costs (in USD) are based on the assessed direct costs and indirect costs related to HCV. All cost components are presented in Figure 1 below for each HCV screening, testing, & therapy wave. Discounted total costs: $1096M (baseline); $949M (wave 1); $467M (wave 2); and $404M (wave 3).
- Discounted HCV-related life years lost: 444.427 (baseline); 403.191 (wave 1); 152.017 (wave 2); and 65.921 (wave 3). These are presented together with the underlying number of liver-related deaths in Figure 1, below. As presented in Figure 1, negative HCV health consequences (i.e., liver-related deaths and life years lost due to HCV) decreased with each HCV screening, testing, & therapy wave.

Figure 1: Total Costs (Direct + Indirect Costs), Number of Patients & Liver-Related Deaths & Life Years Lost Due to HCV by Therapy Wave in Egypt



- Overall, with each successive HCV screening, testing and therapy wave, total costs were reduced while decreasing HCV-related mortality, achieving increasing cost effectiveness (dominance: cost savings accompanied by positive health consequences) in the pursuit of HCV elimination in Egypt.
- Wave 3 -- using the WHO-qualified test -- was the most cost effective of the three waves.

DISCUSSION

- The modeling approach used is this assessment is rated as very conservative, i.e., it likely underestimates the positive health effects and cost consequences of the different screening, testing and therapy waves, given that it takes into account only HCV-related death (and not the costs of ongoing HCV-related health consequences/medical resource consumption).
- This evaluation also uses a conservative approach to estimate the HCV-related deaths/life years lost.
- It is expected that the health economic results presented herein will likely be more pronounced should sophisticated Markov/ probabilistic modeling be performed.

CONCLUSION

- Country-wide HCV elimination programs can improve health outcomes and reduce economic HCV burden from a societal perspective.
- Use of the WHO-qualified test was the most dominant approach to cost effectiveness. **These results provide rationale for worldwide scalability of similar HCV elimination programs.**