Screening strategies for hepatitis C virus elimination in Italy

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INTRODUCTION

Hepatitis C virus (HCV) elimination could be achieved in Italy by newly linking 36,400 patients to care and treating 38,000 patients annually by 2025. However, cost-effective screening strategies are needed to make the elimination a reality.

AIM

HCV is more prevalent in the older Italian population, so our objective was to determine if birth cohort-based screening would be cost-effective in Italy.

METHOD

A Markov model was populated with Italian data[1–5] to quantify the annual HCV-infected population by stage of liver disease, sex, and age. An economic impact module was added to quantify medical costs and health effects, denominated in quality-adjusted life years (QALYs), associated with HCV infection. The incremental cost-effectiveness ratio (ICER) was defined as the incremental cost of a scenario divided by its incremental benefit, relative to the status quo. A cost-effectiveness threshold of €25,000, commonly accepted in Italian guidelines, was applied. Prevalence of asymptomatic HCV infections not yet linked to care was used to calculate the number of HCV antibody screens needed.

Modeled outcomes over 2018–31 were assessed under the status quo and as well as a scenario that met the World Health Organization's (WHO) Global Health Sector Strategy (GHSS) targets for eliminating HCV by 2030:[6–7]

- 80% reduction in incidence of chronic HCV infections over 2015–30
- 65% reduction in chronic HCV infection-related deaths over 2015–30
- 90% diagnosis coverage of the HCV-infected population in 2015
- 80% treatment coverage of the eligible HCV-infected population in 2015

The elimination scenario was assessed under four screening strategies:

- Universal screening
- Screening the 1948–77 birth cohort
- Screening the 1958–77 birth cohort
- Graduated birth cohort screening (screening the birth cohort 1968–87 beginning in 2020 to identify young populations at risk for transmitting HCV, and expanding to the birth cohort 1948–67 beginning in 2023 to identify older populations before their disease advances)

RESULTS

The graduated screening scenario was the least costly, with €6.0 billion in total medical costs by 2031. This was €107.4 million less than screening in the 1948–77 birth cohort, €109.1 million less than screening in the 1958–77 birth cohort, and €467.1 million less than universal screening. Relative to the status quo, graduated screening would gain 143,929 QALYs by 2031, compared to 142,244, 128,384, and 144,759 QALYs for the 1948–77 birth cohort, the 1958–77 birth cohort, and universal screening, respectively. Graduated screening would see a reduction of 89.3% in prevalent HCV-infected cases over 2018–31, compared to 89.0%, 89.7%, and 88.7% for the 1948–77 birth cohort, the 1958–77 birth cohort, and universal screening, respectively. Relative to the status quo, graduated screening yielded the lowest ICER of €3,552 per QALY. Screens necessary to realize each scenario, screening costs, total medical costs (including those of screening), and QALYs gained are presented in Figures 1–4.

Finally, excluding the two scenarios that were costlier and less effective than graduated screening (screening the 1948–77 birth cohort and screening the 1958–77 birth cohort), universal screening yielded an ICER of €562,855 per QALY relative to graduated screening.

Table 1. Total medical costs, health effects, and ICER, by scenario

Scenario		Cost (€ millions), 2018–31	QALYs gained relative to status quo, 2018–31	ICER relative to status quo (€/QALY)	ICER relative to previous least costly scenario (€/QALY)
Status quo		5,463	–	–	
GHSS targets	Graduated screening	5,974	143,929	3,552	3,552
	Screening 1948–77 birth cohort	6,081	142,244	4,349	*
	Screening 1958–77 birth cohort	6,083	128,384	4,831	*
	Universal screening	6,441	144,759	6,758	562,855

ICER — incremental cost-effectiveness ratio; QALY — quality-adjusted life year; GHSS — Global Health Sector Strategy
* Strongly dominated scenario (costlier and less effective than another scenario)

Figure 1. Cumulative HCV antibody screens, 2018–31

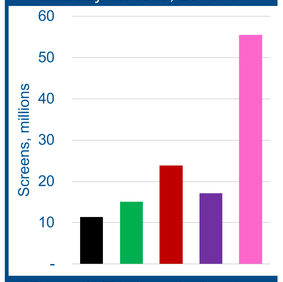


Figure 2. Screening costs, annual

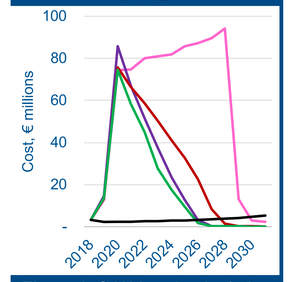


Figure 3. Total medical costs, annual

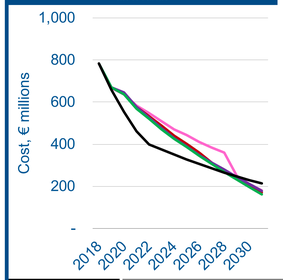
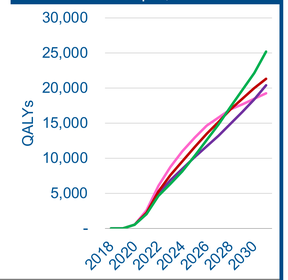
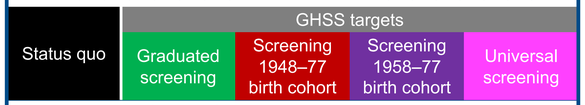


Figure 4. QALYs gained relative to status quo, annual





HCV — hepatitis C virus; QALY — quality-adjusted life year; GHSS — Global Health Sector Strategy

CONCLUSIONS

Universal screening, although cost-effective relative to the status quo, had an ICER higher than the willingness to pay for the Italian National Health System relative to graduated screening. On the contrary, implementing graduated screening in Italy — beginning with the 1968–87 birth cohort in 2020, followed by the screening of the 1948–67 birth cohort from 2023 — was the most cost-effective option, and showed the second largest reduction in overall disease burden by 2031. This strategy should be considered to sustain Italy's momentum towards achieving HCV elimination goals.

CONTACT INFORMATION

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