

A threshold analysis for the cost-effectiveness of hepatitis C testing in emergency departments in the UK

Jack Williams^{1,2}, Peter Vickerman^{2,3}, Sam Douthwaite⁴, Gaia Nebbia⁴, Laura Hunter⁵, Terry Wong⁶, Murad Ruf⁷, Alec Miners^{1,2}

1) Department of Health Service Research and Policy, London School of Hygiene & Tropical Medicine, UK 2) The National Institute for Health Research Health Protection Research Unit (NIHR HPRU) in Blood Borne and Sexually Transmitted Infections at University College London, UK 3) Population Health Sciences, University of Bristol, UK 4) Department of Infection, Guy's and St Thomas' NHS Trust, London, UK 5) Emergency Department, Guy's and St Thomas' NHS Trust, London, UK 6) Department of HIV/GU Medicine, Guy's and St Thomas' NHS Trust, London, UK 7) Gilead Sciences Medical Department, London, UK

Background

The prevalence of hepatitis C (HCV) is higher in emergency department (ED) attendees compared to the general population (0.6–2.9% in England), likely due to the higher attendance amongst marginalised communities, such as people who inject drugs (PWID).¹

HCV testing for those already receiving blood tests in EDs, could provide an efficient setting to diagnose and treat those with HCV, but there is no prevalence threshold for cost-effectiveness

Methods

A Markov model was developed to analyse the cost-effectiveness of opt-out HCV testing in EDs in the UK. The model used data from studies of ED testing in the UK to parameterise test costs and intervention effects (Table 1).

We considered what prevalence of HCV RNA would be required to make ED testing cost-effective at an incremental cost-effectiveness ratio (ICER) threshold of £20,000 willingness to pay per quality adjusted life year (QALY) gained.

We also performed threshold analyses, considering the prevalence required for the intervention to be cost-effective across various test costs and intervention effects.

Table 1: Key model parameters

Parameter	Value	Source
Proportion of positive patients successfully contacted	61.8%	Parry ² , Evans ³
Proportion requiring linkage to care*	49.5%	Parry ² , Evans ³
Proportion attending referral and accepting treatment	85.1%	Parry ² , Evans ³
HCV Antibody test cost	£3.64	Bradshaw ⁵
HCV RNA test cost	£68.38	Bradshaw ⁵
DAA treatment	£10,000	Assumption / Hurley ⁶
Cost to contact individual	£15.85	Parry ² / PSSRU ⁴

* New diagnoses, or known diagnoses not engaged in care

Funding

The research was funded by the National Institute for Health Research Health Protection Research Unit (NIHR HPRU) in Blood Borne and Sexually Transmitted Infections at University College London in partnership with Public Health England (PHE), in collaboration with London School of Hygiene & Tropical Medicine (LSHTM). The views expressed are those of the authors and not necessarily those of the NIHR, the Department of Health and Social Care or Public Health England. We acknowledge members of the NIHR HPRU in BBSTI Steering Committee: Caroline Sabin, John Saunders, Catherine H. Mercer, Gwenda Hughes, Greta Rait, Jackie Cassell, William Rosenberg, Tim Rhodes, Kholoud Porter, Samreen Ijaz and Sema Mandal. PV and the University of Bristol have received funding from Gilead to perform the economic analysis. The funder had no role in study design, data collection and analysis or decision to publish. SD, GN and LH have received, technical expertise, project management and funding as part of an ABPI joint working initiative between Guy's & St Thomas' NHS Foundation Trust and Gilead.

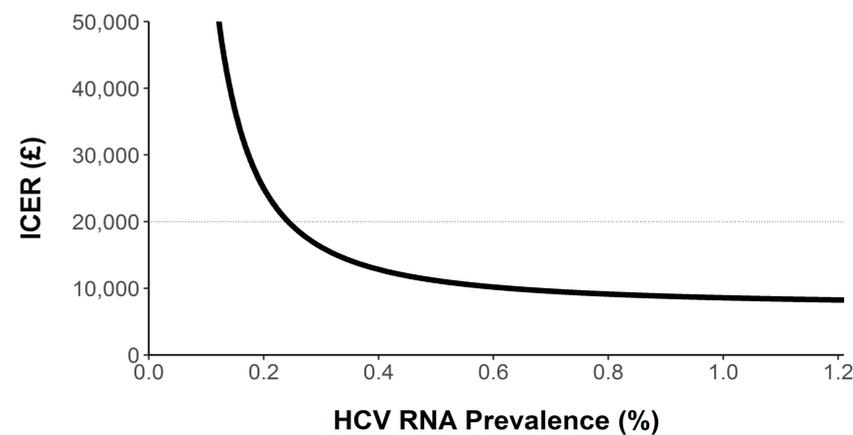
References

1) Hopkins et al. J Hepatology 2018;68:S156 2) Parry et al. Epidemiology and Infection. 2018;146(8):1026–35. 3) Evans et al. PLOS ONE. 2018;13(7):e0198520 4) Curtis et al. Personal Social Services Research Unit, University of Kent. 2017. 5) Bradshaw et al. HIV Medicine. 2018;19(S1):52–7 6) Hurley R. Slashed cost of hepatitis C drugs spurs drive to eliminate the disease. BMJ. 2018;361

Results

Testing was cost-effective at a HCV RNA prevalence of **0.25%** or higher (Figure 1).

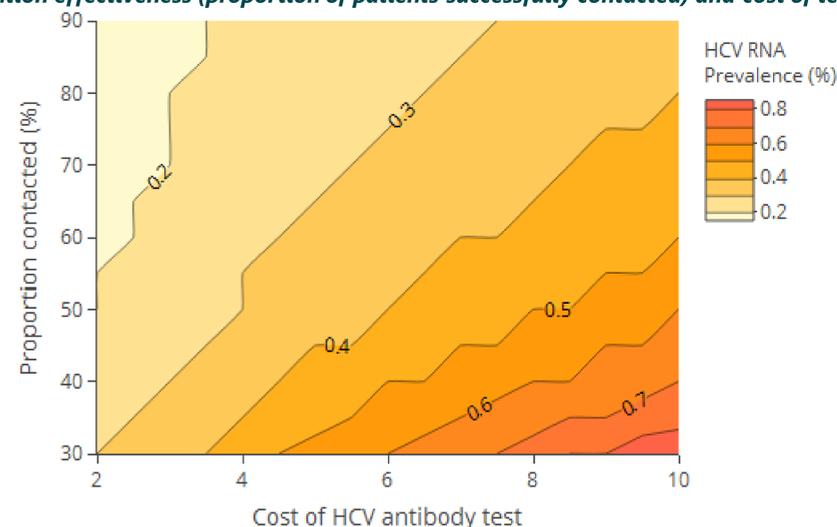
Figure 1: Incremental cost-effectiveness ratio (ICER) for testing, by prevalence



The threshold estimates are sensitive to the cost of the antibody test, and the proportion of patients successfully contacted (Figure 2).

The results were also sensitive to the cost of DAA treatment and the proportion of individuals accepting treatment (after referral).

Figure 2: Threshold analysis for HCV RNA prevalence required for cost-effectiveness by intervention effectiveness (proportion of patients successfully contacted) and cost of test



Limitations

Intervention effects and linkage to care estimates are based on two London ED studies only, both with their own limitations.

The model did not consider HCV transmission, meaning benefits associated with reduced onward transmission are not captured.

Conclusions

Early evidence suggests that ED HCV testing and linkage to care is likely to be cost-effective in many UK ED's, and potentially in other European and higher income ED settings.