

Advancing Elimination Targets for Viral Hepatitis and Human Immunodeficiency Virus in Australia: Estimating the Cost-effectiveness of Emergency Department Opt-out Testing for Blood-borne Viruses

Doyle JS^{1,2}; Keen P³; Delpech V⁴; Evans L⁵; Bates L⁶; Ma Y⁶; Polokaova A⁶; Robinson E⁶; Adams E⁶; Jarrett J⁷; Ruf M⁸

¹Department of Infectious Diseases, Alfred Health and Monash University, Australia; ²Disease Elimination Program, Burnet Institute, Australia; ³The Kirby Institute, UNSW Sydney, Australia; ⁴North Coast Population and Public Health Directorate, Port Macquarie, NSW, Australia; ⁵Department of Clinical Immunology, Liverpool Hospital, NSW and the University of New South Wales; ⁶Aquarius Population Health, London, United Kingdom; ⁷Global HEOR, Gilead Sciences, London, United Kingdom; ⁸Medical Department, Gilead Sciences Europe Ltd, London, United Kingdom

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Key message

Our modelling analysis suggests combined blood-borne virus opt-out testing in emergency departments could **identify more infections, improve health outcomes**, and, within a range of assumptions, be **highly cost-effective** in high-prevalence areas in Australia.

Background

- Despite significant progress towards global elimination targets of blood-borne viruses (BBVs) in Australia, many individuals remain **undiagnosed** (33%¹, 12%², and 6%³ of individuals with hepatitis B [HBV], hepatitis C [HCV], and HIV, respectively) or receive a **late BBV diagnosis**⁴⁻⁶.
 - Late and underdiagnosis continue to **disproportionately affect** vulnerable groups, including Culturally and Linguistically Diverse (CALD) communities and people who inject drugs^{3,7-9}.
 - Emergency department (ED) opt-out testing (OOT) has the potential to overcome these barriers and increase diagnosis and linkage to care (LTC), as the ED is often a **primary healthcare access point** for populations vulnerable to missed diagnoses^{8,10-11}.
 - Successful pilot studies in EDs in Australia demonstrate that OOT for HBV and HCV **improves health outcomes** compared to current testing practices¹⁰⁻¹¹ and that universal testing for HBV is a potentially **cost-effective** approach¹².
- **Objective:** We aimed to assess the potential health and economic impacts of ED BBV OOT in high-prevalence areas in Australia.

Methods

- We developed a hybrid cost-effectiveness model to compare outcomes between BBV OOT and current testing in EDs as standard of care (SoC). Key model inputs and assumptions are provided in **Table 1**, and all key model inputs were varied in sensitivity analyses.

Model	Perspective
- Simulated short-term outcomes were assessed through a decision tree, and long-term outcomes through a lifetime Markov model¹³. - The model was adapted to the Australian setting using Australia-specific data.	National Health Service (Medicare) perspective over a lifetime.
	Outcomes
	- Number of new diagnoses. - Number of LTC. - Quality-adjusted life years (QALYs)[†]. - Costs^{‡§}.

Table 1

Key data inputs			
	HIV	HBV	HCV
Opt-out programme uptake rate		86.2% ¹¹	
Current ED testing probability (SoC)	0.3% ¹⁴	1.9% ¹¹	1.0% ¹⁵
Prevalence (in high-prevalence urban EDs*)	0.2% ¹⁶⁻¹⁷	0.9% ⁹	1.0% ¹⁸
Percentage of positive tests that are new diagnoses	7.7% ¹⁹	18.5% ¹¹	19.6% ¹⁸
Linkage to care probability (new diagnosis)	91.7% ²⁰	74.9% ¹¹	32.9% ²¹
Linkage to care probability (prior diagnosis)	20.0% ²⁰	74.9% ¹¹	32.9% ²¹

*Sydney, Melbourne and Brisbane; † Discounted at 5% per annum; § Adjusted to 2024 values using Australia's health-specific Consumer Price Index (CPI)

Results

- Compared to SoC, for **10,000** people having blood tests, ED BBV OOT identified **32** additional diagnoses (>85% were active chronic **viral hepatitis**) and yielded **17** new individuals LTC (**Figure 1**).
- Combined ED BBV OOT was **highly cost-effective** (**Figure 2**) over a lifetime, with a cost per QALY gained of \$3,273, below the willingness-to-pay threshold (\$50,000)²².
- Cost-effectiveness varied by individual BBV, with ED HCV OOT being **cost-saving** due to the earlier diagnoses and curative treatment.
- Combined testing remained cost-effective** when BBV prevalence was lower, including at an HCV prevalence of 0.1%. In one-way sensitivity analyses, **LTC was a key cost-effectiveness driver**.

Figure 1: Short-term results

Compared to SoC, for **10,000** people having ED blood tests, ED BBV OOT resulted in:

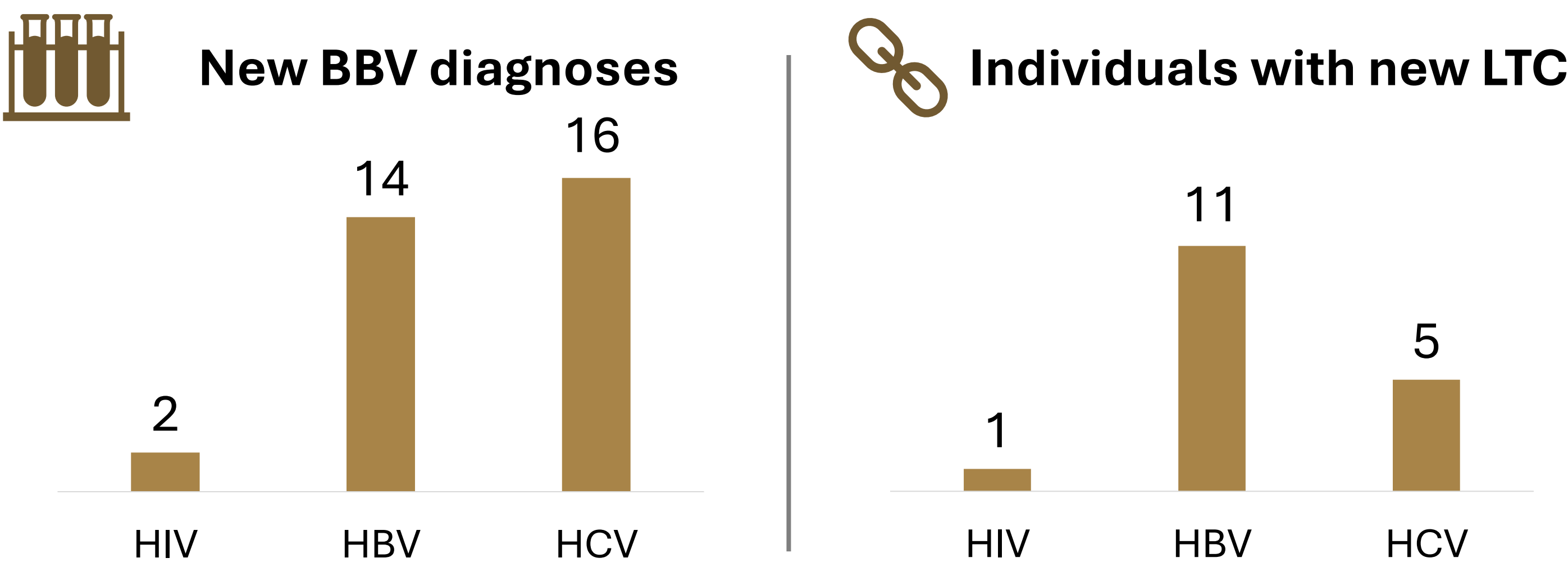
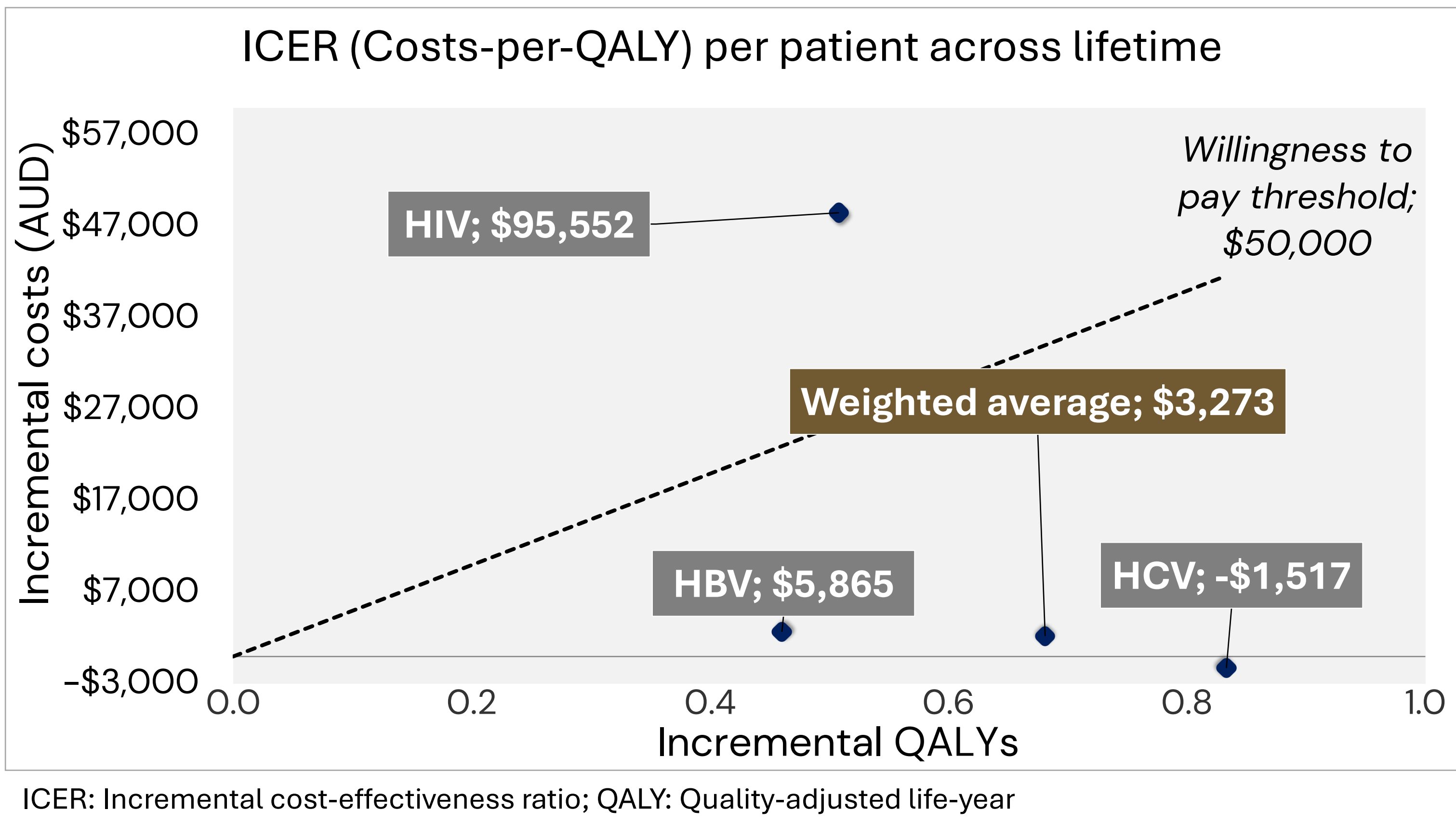


Figure 2: Long-term results



Conclusions

- ED BBV OOT in high-prevalence areas in Australia could **improve case detection and linkage to care** and be **highly cost-effective** through simultaneous testing for viral hepatitis and HIV.
- Our model likely **underestimates** the true benefits and cost savings by not accounting for **broader social impacts** and **transmission averted (U=U)**.
- Scaling up** real-world ED BBV OOT testing could transform early diagnosis and **move Australia closer** to ending preventable BBV infections and meeting transmission elimination goals.

Contact

To find out more about this work, please speak to the presenting author, Prof. J. S. Doyle (joseph.doyle@monash.edu). To find out more about Aquarius, please visit aquariusph.com

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References

References can be accessed by scanning this QR code.

