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INTRODUCTION

- In Australia and Germany, despite progress toward WHO viral hepatitis and UNAIDS HIV elimination goals^{1,2}, high percentages of undiagnosed HBV (31%³ and 80%⁴), HCV (16%⁵ and 63%⁶) and HIV (8%^{7,8}) indicate that the current blood-borne virus (BBV) testing strategies are insufficient to meet these goals.
- European and US studies demonstrate the cost-effectiveness and improved patient outcomes of combined emergency department (ED) BBV opt-out testing (OOT) in high-prevalence areas⁹⁻¹¹.
- In Australia, while there have been successful pilot programs for ED OOT for viral hepatitis^{12,13}, testing is not routinely performed in EDs and is typically indicator-based¹⁴⁻¹⁶.
- In Germany, there are no real-world studies evaluating ED BBV OOT in practice, and no systematic testing in EDs.

Study goal: We aimed to estimate the potential health and economic value of ED BBV OOT in high-prevalence areas of Australia and Germany, two epidemiologically distinct countries, to inform decision-making on innovative testing strategies.

METHOD

We developed a hybrid cost-effectiveness model based on published clinical pathways to compare projected short- and long-term outcomes of ED BBV OOT with current ED testing as standard of care (SoC). Key model inputs are provided in Table 1.

Model	Data Sources	Outcomes
<ul style="list-style-type: none"> Simulated short-term outcomes were assessed through a <i>decision tree</i>, based on published care models Projected long-term outcomes were assessed through a <i>Markov model</i>, for HIV⁸; models for chronic HBV and HCV were developed de novo 	<ul style="list-style-type: none"> Publicly available country-specific data International literature National expert opinion 	<p>Short-term</p> <ul style="list-style-type: none"> Number of new diagnoses Number linked to care (LTC) and re-linkage to care <p>Long-term</p> <ul style="list-style-type: none"> Quality-adjusted life years (QALYs), discounted Costs (converted to US dollars), discounted
	<p>Perspective</p> <ul style="list-style-type: none"> National Health Service perspective over a lifetime 	

Table 1: Key model parameter assumptions by country[†]

	Australia	Germany
ED BBV prevalence rates*	HBV:0.90% ³ ; HCV:1.02% ¹³ ; HIV: 0.18% ¹⁷	HBV:0.40% ¹⁸ ; HCV:0.80% ¹⁹ ; HIV: 0.35% ¹⁹
Undiagnosed rates in ED	HBV: 18.5% ¹² ; HCV: 19.6% ²⁰ ; HIV: 7.7% ²¹	HBV: 85% ⁴ ; HCV: 65% ⁴ ; HIV: 35% ²²

*In high-prevalence cities [†]HBsAg/HCV Ab screening with HCV RNA confirmatory/HIV Ag/Ab screening with western blot confirmatory

LAY SUMMARY

- Innovative testing strategies are needed to meet global WHO and UNAIDS elimination targets for BBVs (HBV, HCV and HIV).
- We developed a health economic model to simulate short-term (new diagnoses and patients LTC) and long-term (costs and quality of life) impacts of ED BBV OOT in high-prevalence areas of two countries with very different patterns of infection and healthcare provision (Australia and Germany).
- Our results indicated that this strategy could be excellent value for money for healthcare systems, with weighted averages of **\$6,613** (Germany) and **\$2,260** (Australia) per QALY gained. These results are well below the national thresholds of cost-effectiveness and remained cost-effective even when assumptions and input values changed.
- Our findings suggest that combined emergency department blood-borne virus opt-out testing in high-prevalence areas could offer substantial benefits for patients and health systems and should be considered for advancing the WHO and UNAIDS elimination targets.

RESULTS

ED BBV OOT was effective in identifying BBV cases, improving LTC and re-LTC, compared to SoC in both countries (Figure 1).

Figure 1: Model short-term results

For 10,000 people having ED blood tests, compared to SoC, ED BBV OOT resulted in:

32 new BBV diagnoses [†]	17 individuals newly LTC	37 individuals re-LTC*
<ul style="list-style-type: none"> HBV: 14 HCV: 16 HIV: 2 	<ul style="list-style-type: none"> HBV: 11 HCV: 5 HIV: 1 	<ul style="list-style-type: none"> HBV: 20 HCV: 16 HIV: 1
82 new BBV diagnoses [†]	39 individuals newly LTC	2 individuals re-LTC*
<ul style="list-style-type: none"> HBV: 29 HCV: 42 HIV: 11 	<ul style="list-style-type: none"> HBV: 18 HCV: 14 HIV: 7 	<ul style="list-style-type: none"> HBV: 0 HCV: 0 HIV: 2

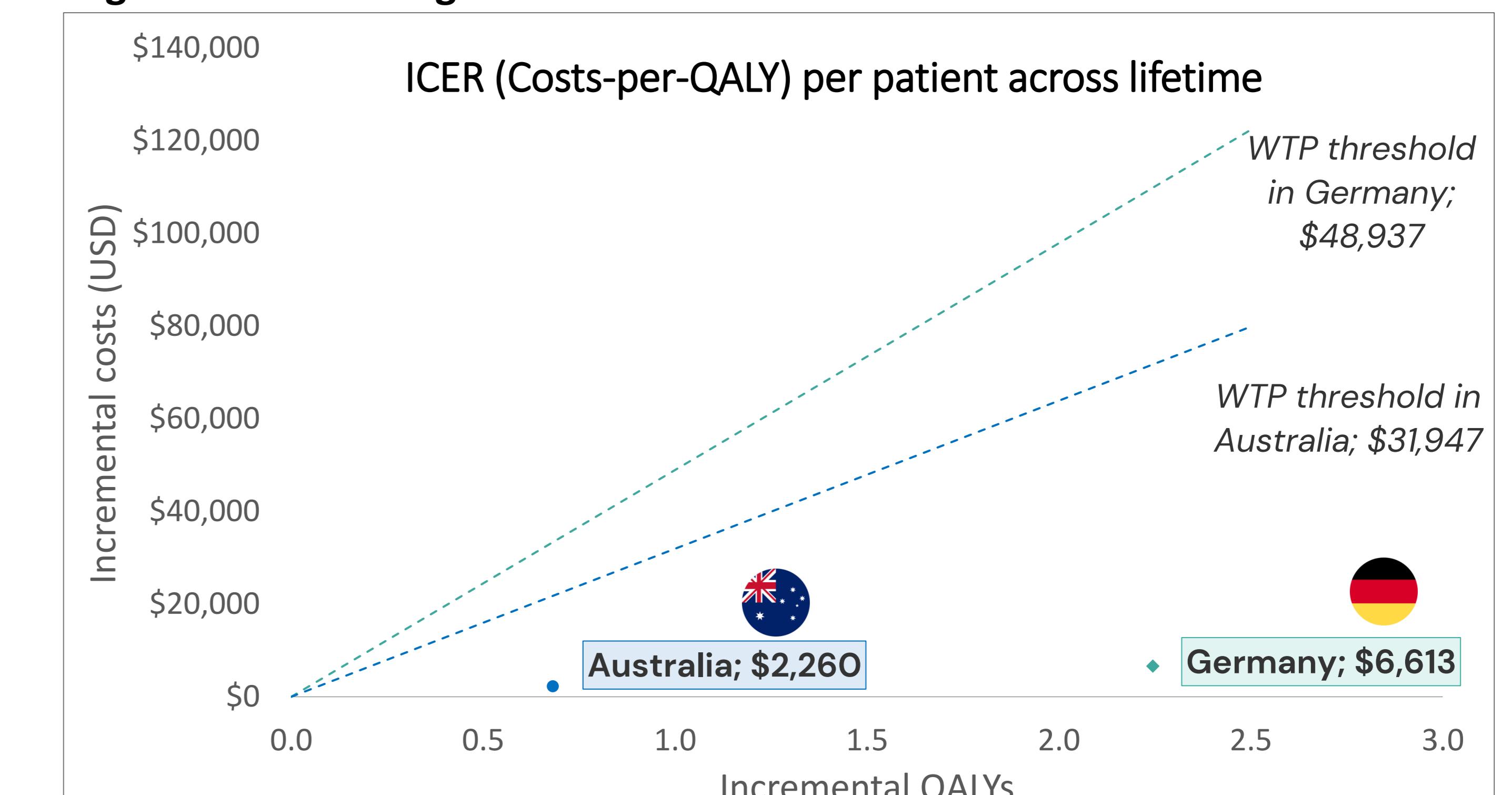
[†]HBsAg/HCV Ab screening with HCV RNA confirmatory/HIV Ag/Ab screening with western blot confirmatory *Bringing individuals back into HIV/hepatitis care after they were previously diagnosed but had disengaged or been lost to care

- In both countries, **ED BBV OOT was highly cost-effective**^{23,24} over a lifetime, with an incremental cost per QALY gained of **\$6,613 in Germany** and **\$2,260 in Australia** (Figure 2).
- While individual cost-effectiveness varied by virus, **HCV testing was estimated to be cost-saving in both countries**, driven by undiagnosed disease progression and high treatment cure rates for those LTC.
- In scenario analyses, the weighted average **ICERs across all BBVs remained cost-effective** even with a hypothetical low HCV prevalence of 0.1%.

Conclusions

- Our findings indicate that combined emergency department blood-borne virus opt-out testing in high-prevalence areas in Germany and Australia could **enhance earlier viral hepatitis and HIV infection diagnosis, facilitate engagement in care, and prove cost-effective** in both countries.
- The model may **underestimate the true benefits and costs avoided**, as we did not consider **transmissions and reinfections averted or societal benefits**.
- We encourage continued dialogue and **real-world studies** to validate our findings and explore ways to address implementation challenges.

Figure 2: Model long-term results



QALY = Quality adjusted life-year, WTP = Willingness to Pay

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REFERENCES

References can be accessed by scanning this QR code



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