P343

Projected health benefits and economic value of combined opt-out testing for HIV/HBV/HCV in urban emergency departments in Germany, Greece, and Poland

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Background

Persistent gaps in diagnosis

- Despite progress towards global elimination goals for HIV and viral hepatitis, Germany, Greece, and Poland remain below key targets[1].

GERMANY	GREECE	POLAND
91%[1]	92%[1]	81%[1]
Of people living with **HIV** know their diagnosis		
85% of people with **HBV** and **65%** of people with **HCV** remain undiagnosed[3].	**50%** of people with **HBV**[4] and **70 to 80%** of people with **HCV**[5] remain undiagnosed.	**39%** of people with **HBV**[6] and **95%** of people with **HCV**[7] remain undiagnosed.

UNAIDS 95 target

95% of people living know their HIV diagnosis[1].

SDG 3.3

By **2030**, end AIDS and combat hepatitis and other communicable diseases[2].

Emergency departments as an opportunity for earlier diagnosis

- **Emergency departments** (EDs) are **a key access** point **for people** who may **not engage with traditional** testing services[8].
- **Opt-out testing** (OOT) in EDs has identified previously undiagnosed BBV infections and supported linkage to care in **routine service delivery in England**, with **modelling studies** also suggesting it can be **cost-effective**[9-11].
- **European guidance** and expert initiatives increasingly **support** integrated BBV OOT in EDs[12-14].

Definition of opt-out testing (OOT)

All adults undergoing blood tests are INFORMED they are routinely tested for BBVs unless they decline[15]

Study objective

To estimate the potential health and economic value of combined HIV, HBV, and HCV OOT in high-prevalence urban EDs in Germany, Greece, and Poland.

Methods

We adapted a cost-effectiveness model to compare combined ED BBV OOT with the current standard of care (SoC, no systematic ED testing) in Germany, Greece, and Poland.

Model approach

- A decision tree simulated the ED OOT pathway, including testing, diagnosis, and linkage or re-linkage to care.
- Outputs from the decision tree informed disease-specific Markov models, which projected longer-term disease progression and associated lifetime costs and health outcomes.

Perspective

- Country-specific national health-system perspective over a lifetime horizon.

Data sources

- Country-specific data where available.
- Supplemented by expert input from local clinical and public health specialists.

Key outcomes

Short-term	Long-term
Number of: • New diagnoses • Linked to care • Re-linked to care	• Costs • Quality-adjusted life years (QALYs) • Incremental cost-effectiveness ratios (ICERs)

Key assumptions:

- Current ED testing rate (SoC): 0% [16], assumed; Opt-out programme uptake rate: 89%[17] in Germany and Greece and 99%[18] in Poland.
- Patients who were not newly diagnosed may be LTC with re-diagnosis, although re-LTC rates are lower than LTC rates for newly diagnosed patients. HIV and HCV diagnoses use reflex confirmatory testing.
- Select model inputs and assumptions are provided in Table 1.

Table 1: Key parameters

	Germany	Greece	Poland
Urban ED prevalence rates	HIV: 0.4%[19]	HIV: 1.1%[9,23-25]	HIV: 0.4%[30-32]
	HBV: 0.4%[20]	HBV: 2.9%[26]	HBV: 0.9%[30,33-35]
	HCV: 0.8%[21]	HCV: 0.7%[26]	HCV: 0.4%[35,36]
% of diagnoses that are new	HIV: 35%[17]	HIV: 35%[17]	HIV: 72%[32]
	HBV: 85%[3]	HBV: 85%[3]	HBV: 86%[37]
	HCV: 65%[3]	HCV: 65%[3]	HCV: 80%[37]
Linkage to care rates (newly diagnosed)*	HIV: 63%[22]	HIV: 73%[27]	HIV: 63%[22]
	HBV: 63%[22]	HBV: 89%[28]	HBV: 80%[35]
	HCV: 33%[10]	HCV: 71%[29]	HCV: 37%[35]

*Re-linkage assumptions for previously diagnosed patients vary by country and may differ from linkage rates for newly diagnosed patients.

Lay summary

- We modelled routine opt-out testing for HIV, HBV and HCV in high-prevalence emergency departments in Germany, Greece, and Poland.
- For every 10,000 people tested, the approach was projected to identify 82 additional infections in Germany, 272 in Greece, and 128 in Poland, and help more people initiate or return to care.
- Combined testing was projected to be cost-effective in all three countries, with costs of €8,017 per QALY gained in Germany, €7,982 in Greece, and €13,272 in Poland, all below the country-specific thresholds identified in published literature.
- These findings suggest that routine emergency department testing could help find infections earlier and reach people missed by existing testing services.

Results

Combined ED BBV OOT resulted in **additional new BBV diagnoses** and **increased linkage and re-linkage to care** rates compared with SoC in all three countries (Table 2a, 2b):

Table 2a: Short-term results: BBV new diagnosis outcomes*

For 10,000 individuals having ED blood tests, compared to SoC

	Germany	Greece	Poland
Number of new BBV diagnoses	HBV: 29	HBV: 203	HBV: 72
	HCV: 42	HCV: 37	HCV: 27
	HIV: 11	HIV: 32	HIV: 28
	Total: 82	**Total: 272**	**Total: 128**

** HBsAg/HCV Ab screening with HCV RNA confirmatory/HIV Ag/Ab screening with western blot confirmatory testing*

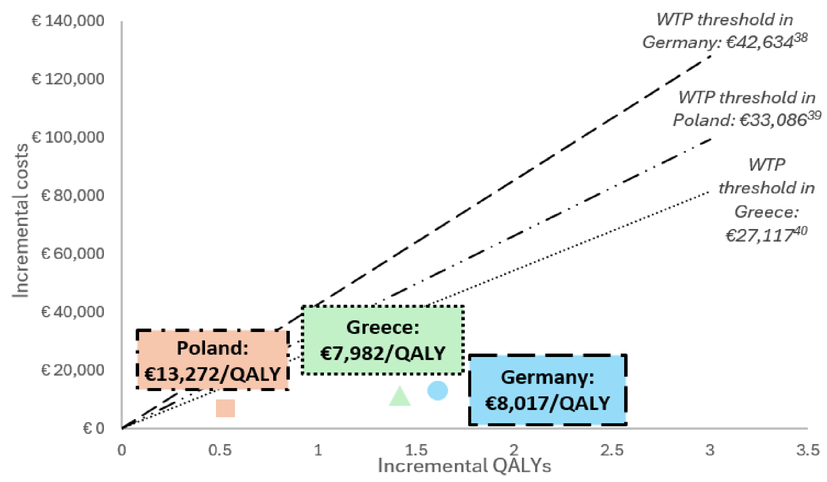
Table 2b: Short-term results: linkage and re-linkage to care outcomes

For 10,000 individuals having ED blood tests, compared to SoC

	Germany	Greece	Poland
Number of individuals linked and re-linked to care	HBV: 14	HBV: 180	HBV: 66
	HCV: 18	HCV: 26	HCV: 10
	HIV: 9	HIV: 36	HIV: 19
	Total: 41	**Total: 242**	**Total: 95**

- **Combined ED BBV OOT** remained **cost-effective** in all three settings, with estimated ICERs of €8,017/QALY in Germany, €7,982/QALY in Greece, and €13,272/QALY in Poland, below the willingness-to-pay (WTP) thresholds in each country (Figure 1).
- **Cost-effectiveness varied when each virus was assessed in isolation, with differences across countries:**
  - **Germany:** HIV not cost-effective; HBV cost-effective; HCV cost-saving.
  - **Greece:** HIV not cost-effective; HBV cost-effective; HCV cost-saving.
  - **Poland:** HIV, HBV, and HCV all cost-effective.
- Scenario analysis in all countries indicated that **linkage to care** was a **key driver** of **cost-effectiveness.**

Figure 1: Long-term results: ICER (cost per QALY)



ICER: incremental cost-effectiveness ratio; QALY: quality-adjusted life year; WTP: willingness-to-pay threshold

Conclusions

- ✓ **The combined ED BBV OOT approach maximises the value of a single ED testing opportunity**, identifying HIV, HBV, and HCV together and strengthening the overall economic case compared with HIV testing alone.
- ✓ **The model may underestimate the true benefits and costs avoided**, as transmission averted and wider societal benefits were not captured.
- ✓ Overall, the findings support **continued national dialogue on combined ED BBV OOT as a complement to existing testing strategies**, with scenario analysis indicating that optimising linkage-to-care pathways could further improve cost-effectiveness.
- ✓ **Local pilot evaluations are an important next step** to test feasibility, acceptability, linkage-to-care pathways, and real-world value in high-prevalence EDs.

Contact

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Disclosures

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References

References can be accessed by scanning this QR code.