Cost-effectiveness of Hepatitis B case-finding interventions in the UK

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Outline

- Why perform economic evaluations for case finding?
- Cost-effectiveness of HBV case-finding in migrants living in the UK (completed project)
- Cost-effectiveness of A&E opt-out screening for HBV (ongoing project)
- Conclusions and considerations
Economic evaluations of case-finding interventions

• Why perform economic evaluations of case-finding interventions?
  • To help allocate limited resources efficiently
  • To compare the costs and effects of different interventions

• We can use economic models to predict the lifetime impact of interventions….
  • But we can also consider which scenarios an intervention might be cost-effectiveness
Basics of cost-effectiveness analyses

- Includes incremental costs:
  - Cost of intervention (testing) and cost of treatment
  - Reduced costs relating to disease progression

- Outcomes captured as quality adjusted life years (QALYs):
  - Capture increased length of life, weighted by quality
    - 1 QALY is a year in perfect health
  - ↑ health benefits associated with reduced disease progression

- UK cost-effectiveness threshold (set by NICE) between £20-30,000 per QALY
An Economic Evaluation of case-finding HBV in UK migrant populations

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Rationale

• Universal infant vaccination in the UK began in 2017, but few transmissions are thought to occur in the UK

• 80-90% of new diagnoses in the UK are amongst migrants from intermediate or high prevalence countries (≥2% prevalence)¹
  • However, testing is low in this population (one study reported 12% tested for HBV²)

• One-time HBV screening in migrant populations found to be cost-effective in the Netherlands³

Intervention

- A one-time test for hepatitis B for individuals from countries with intermediate or high HBV prevalence (≥2% prevalence)

- Patients written to and invited to opt-out of HBV testing, and those not opting out were contacted for an appointment
  - Results based on an uncontrolled pilot study

- After one-time intervention, testing rates returned to current levels (estimated 2.6% per year\(^1\))

Key parameters for model

**Intervention costs**
- Assumed £4 intervention cost per eligible individuals (i.e. all contacted)
  - Cost of identification and invitation to test
- £10 HBsAg test

**Cascade of care**
- 2% prevalence (assumption/scenario)
- 19.7% uptake of opt-out testing (pilot study, London)\(^1\)
- 38% of HBsAg+ referred, attend referral, and engage in care (assumption, based on HCV data)\(^2\)

**Model structure, disease progression, utility (quality of life)**
- Mostly from previous HTA in HBV\(^3\) and other published clinical data

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Comparator (background testing only)

Target population (UK migrants from intermediate-high HBV countries) → 2.6% background testing (per year) → 2% positive (HBsAg prevalence) → 38% of positives attend referral and engage in care*

*Patients engaged in care receive treatment if indicated
Intervention effect (then background testing)

- **Target population (UK migrants from intermediate-high HBV countries)**
- **2.6% background testing (per year)**
- **2% positive (HBsAg prevalence)**
- **38% of positives attend referral and engage in care***

**19.7% Intervention uptake (one-time)***

*Patients engaged in care receive treatment if indicated

**After one-time intervention, testing returns to background rate per year (2.6%)***
Results

• At 2% prevalence:
  • ICER: £21,400/QALY

• At 1% prevalence
  • ICER: £25,400 /QALY

• Sensitivity analyses show results most sensitive to:
  • Intervention cost
  • Intervention uptake
  • Subsequent care pathway (% engaging following positive test)

ICER: Incremental cost-effectiveness ratio
ICER at prevalence thresholds

- X-axis: HBsAg prevalence (%)
- Y-axis: ICER per additional QALY

- The ICER decreases as the HBsAg prevalence increases.
- ICER values range from approximately £0 to £40,000.

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Conclusions

• There is uncertainty around the cost and effect of the intervention…
  • Data derived from uncontrolled pilot study

• However, in many sensitivity analyses the intervention remained cost-effective at 2% prevalence

• In the base case results, testing in populations with 1% prevalence also likely to be cost-effective
  • Results more sensitive to parameter changes
Cost-effectiveness of routine HBV (and HCV) testing in A&E departments in the UK

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Funding provided by NIHR HPRU and Gilead
BBV testing in A&E departments

- Opt-out HBV and HCV* tests performed on routine blood tests taken in A&E departments

- If HBsAg+, patient contacted by phone (multiple attempts to contact performed)

- If contact is successful, patients encouraged to attend assessment with hepatologist (and/or infectious disease specialist) and engage in care

*Hepatitis B surface antigen test, Hepatitis C IgG antibody test
Care pathway for HBV testing in A&E

Routine blood test (in A&E)

- Opt-out
- HBsAg test
  - Negative: no further action
  - Positive: attempt to contact patient
    - Unable to contact
    - Known diagnosis (engaged in care)
    - New diagnosis OR known diagnosis not in care
      - Patient does not attend specialist care
      - Patient attends specialist care
Care pathway (interim phase II results)

- **Routine blood test (in A&E)**: 15,624
  - **Opt-out**: 4,139
    - **Negative: no further action**: 11,415
    - **Positive: attempt to contact patient**: 70 (0.62% prevalence)
      - **Unable to contact**: 36*
      - **Known diagnosis (engaged in care)**: 14
        - **New diagnosis OR known diagnosis not in care**: 20 (19 Attend, 1 Do Not Attend specialist care)
      - **Known diagnosis (not engaged in care)**: 1
  - **Known diagnosis (engaged in care)**: 11,367 (73% uptake)
    - **Patient does not attend specialist care**: 1
    - **Patient attends specialist care**: 19

*Includes 5 deaths between diagnosis and attempt to contact
Early thoughts for A&E case-finding

• Cost-effectiveness results expected late 2018
  • Prevalence thresholds will indicate geographical areas or target populations where A&E testing may be cost-effective

• Dedicated linkage to care coordinator likely required to contact patients and organise follow up
  • Prompt patient contact increases engagement

• Most recent results (phase III) suggest:
  • Automated text messages (with phone number to call back) improves contact rates
  • Appropriate IT database facilitates linkage to care
  • Established processes with homeless improves contact rates
Overall conclusions for case-finding interventions

- One-time testing in migrant populations recommended (PH guidelines)
  - Uncertainty in scale up
  - Other settings currently being evaluated

- Cost-effectiveness of case-finding depends on both prevalence and subsequent cascade of care
  - Other studies looking to improve case management (cascade of care)
  - Combining case-finding and improved case management likely to complement each other

- Multiple case-finding interventions are likely to overlap
  - General models required to evaluate many interventions concurrently
Thank you