Cost effectiveness of case finding for hepatitis C in former injecting drug users

Dr Ken Stein

Senior Clinical Lecturer in Public Health

Director, Peninsula Technology Assessment Group

Peninsula Medical School

University of Exeter, United Kingdom

PENINSULA MEDICAL SCHOOL
UNIVERSITIES OF EXETER & PLYMOUTH

PenTAG

Acknowledgements

- Dr Jo Thompson Coon — Research Fellow
- Emanuela Castelnuovo — Research Fellow
- Dr Martin Pitt — Research Fellow
- Alison Price — Information scientist
- Professor Uwe Siebert — Decision Scientist
- Dr Matthew Cramp — Hepatologist

- Clinical advisory group: Professor Graham Foster, Dr Matthew Hickman, Dr Sharon Hutchinson, Professor William Irving, Dr Janice Main, Dr David Mutimer, Dr Nicholas Pugh, Dr Eleanor Anderson, Professor John Campbell

- Project funded by the NHS HTA Programme
- Carried out Oct 2004 – May 2005

Background

- UK policy supports active case finding
  - Hepatitis Action Plan for England (2004)
  - All Party Parliamentary Group on Hepatitis
  - Royal College of Physicians (here)
  - EASL
- Treatment options have improved
  - Pegylated interferon + ribavirin are standard
  - NICE guidance
- Previous HTA of case finding
  - GUM and drug services
  - Emphasised importance of drug services
  - Case finding in GUM probably not cost effective unless restricted to former drug users
  - No evidence of behavioural change from knowledge of HCV infection
  - More case finding in GUM than drug services

Objectives

- Estimate the clinical and cost effectiveness (cost utility) of case finding for hepatitis C among *former* injecting drug users in the UK
- Explore cost effectiveness in different settings
  - Drug and alcohol services
  - Prisons
  - General practice

Methods

- Former injecting drug users
- Testing and diagnosis – decision tree
- Treatment and disease progression – Markov
- Spontaneous presentation and “re-presentation”
- Perspective – UK NHS (2004)
- Discounting – 6% & 1.5% (3.5% in S/A)
- Cohort: mean age 37
- Outputs – Cost/consequence; Cost per LYG; Cost per QALY; PSA; EVPI

Case finding scenarios

- General case
  - 2 minute consultation along with offer of testing
- General practice
  - Search for IDUs in practice systems
  - General population approach
- Prisons
  - Offer at induction based on existing empirical data on acceptance and prevalence in tested prisoners
- Drug and Alcohol services
  - Offer to all people in contact with services not currently injecting

Methods

- Obtaining data inputs
  - Initial searches in wide range of databases:
    - Epidemiology
    - Natural history
    - Acceptability of testing and adherence
    - Effectiveness of treatment
    - Costs of treatment and long term consequences
    - Quality of life

Methods

- Testing uses ELISA and PCR (not RIBA)
- Biopsy only in genotype 1 or 4
  - Treatment only in moderate/severe
- Treatment without biopsy in G2/3
- Treatment with pegylated interferon and ribavirin for 48 weeks
- Response in mild disease is as for moderate/severe
- Progression to cirrhosis is sequential and linear
- Decompensation and HCC lead to transplant

Key sources

- Freeman (2003)
  - meta-analysis of progression to cirrhosis
- Trent HCV Cohort Database
  - Age at diagnosis (37 years)
  - Treatment eligibility and acceptance
  - severity of hepatitis at diagnosis (HAI score)
  - ALT levels
- Hutchinson et al (2005)
  - Gender and alcohol consumption
- Progression to HCC
  - Literature review inconclusive (2.5% per annum)
- Shepherd *et al* (2004)
  - Effectiveness of combination therapy

Key sources

- Bird *et al* (2005)
  - Number of undiagnosed cases
- HTA Mild HCV Trial
  - costs and utilities for relevant health states
- Mortality
  - state specific and *general population*
- Prisons
  - Horne et al & Rosenberg et al
- General practice
  - Anderson et al
- Drug services
  - Serfaty et al, Plymouth Drug & Alcohol Action Team

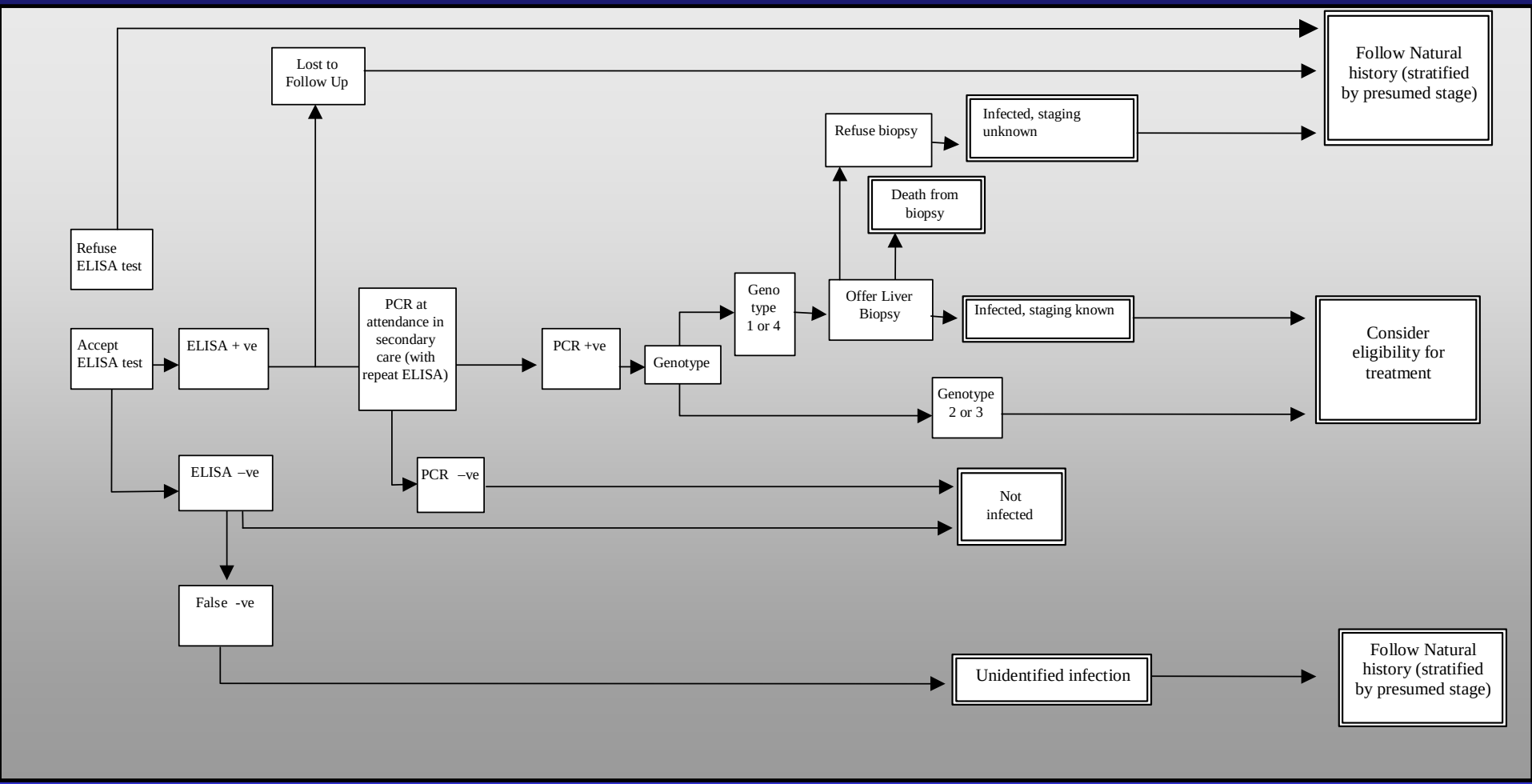
Treatment effectiveness

	Study		
Outcome	**Manns[43] (N=511)**	**Fried[44] (N=453)**	**Pooled[42] (N=964)**
	%	%	%
SVR, Overall (ITT)	54	56	55
SVR, Genotype 1 or 4 (ITT)	42	48	45
SVR, Genotype 2 or 3 (ITT)	82	76	79
SVR, Patients with cirrhosis (ITT)	44	43	44
Adherence to treatment	97	78	88
Genotype 1 or 4, (treatment completers)	43	61	50
Genotype 2 or 3, (treatment completers)	85	97	90
Cirrhosis (treatment completers)	45	55	48

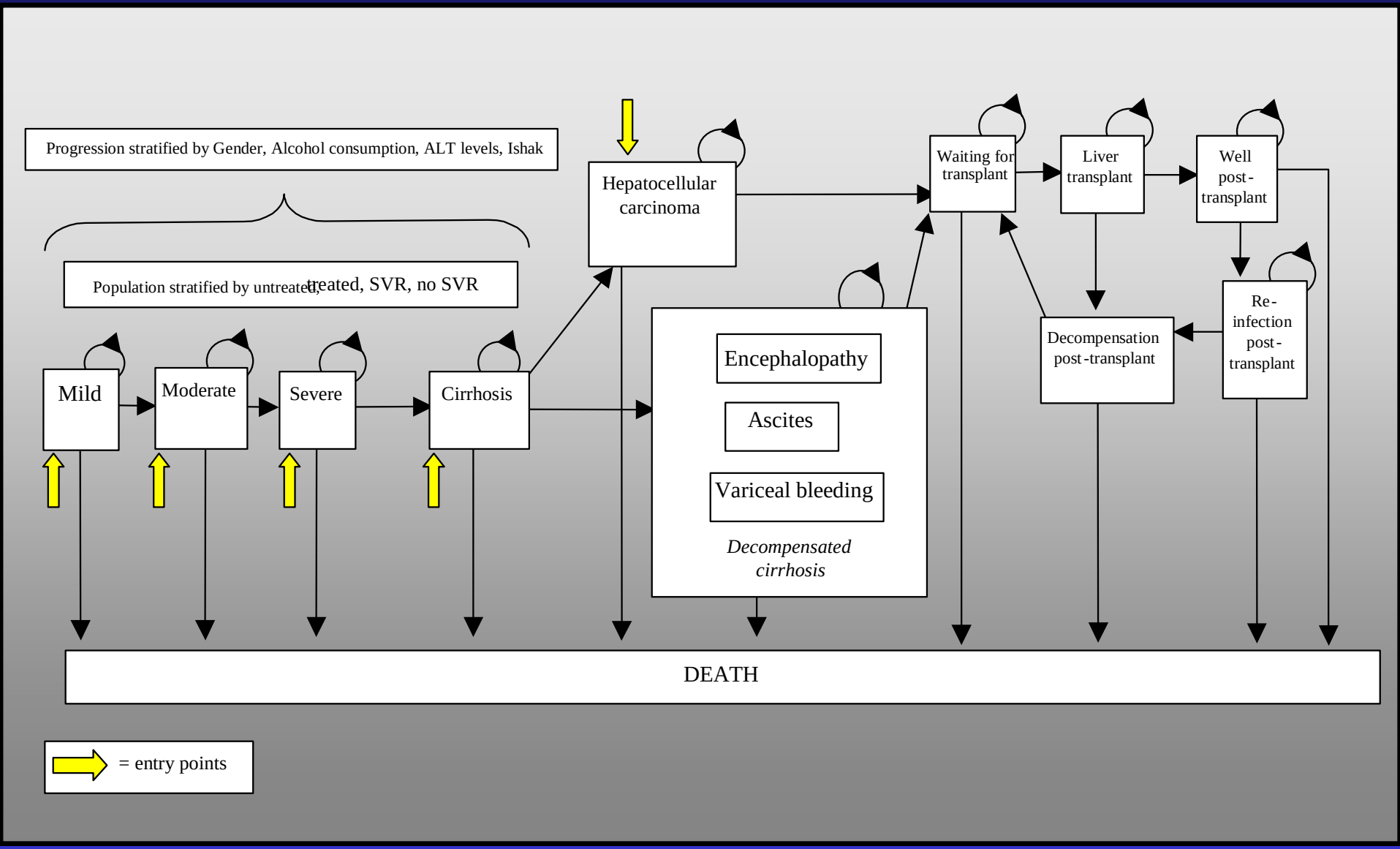
Different scenarios

Setting	ELISA acceptance rate (%)	Proportion of positive results (%)
General case	49	49
Prison scenario 1	8.5	16
Prison scenario 2	12	42
General practice Targeted approach	49	49
General practice Population approach	10	12.5
Drug and alcohol services	49	68

Testing & Diagnosis



Disease progression



Analysis of uncertainty

- One way sensitivity analyses
- Probabilistic sensitivity analysis
  - All parameters
- Scenario analyses
  - Settings
  - Age groups (proxy for severity)
- Value of information analysis
  - 15 year decision duration
  - 100,000 people

Initial results of case finding

- Initial yield from case finding is low
  - 490 accept of testing
  - 240 ELISA +ve
  - 94 attend for specialist investigation
  - 77 PCR +ve (i.e. chronic infection)
    - 10 with absolute contraindications
    - 35 genotype 2 or 3 – offer treatment
    - 32 genotype 1 or 4
      - biopsy 88% and treat moderate to severe hepatitis only)
  - 25 patients treated

Longer term outcomes

Consequences averted:

- Decompensated cirrhosis = 3.5
- Hepatocellular Ca = 1.5
- Liver transplants = 0.14
- Deaths due to HCV = 3

- Cost of case finding
  - £760,000
  - Highest costs in group with mild hepatitis (£242,000)

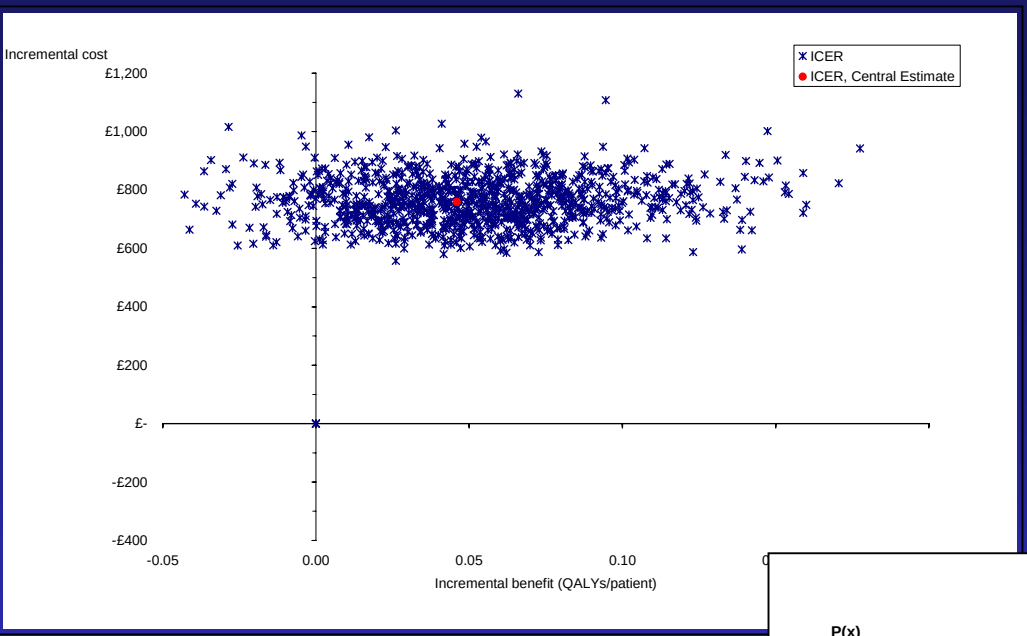
Cost effectiveness analysis

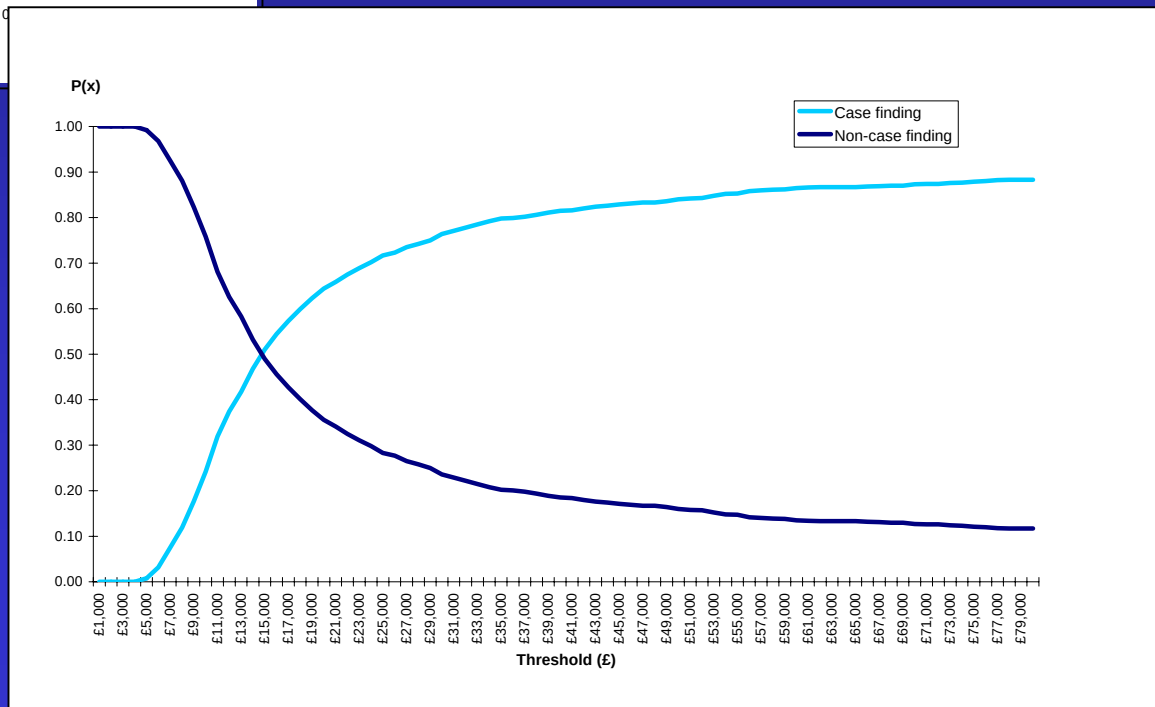
- Incremental costs and benefits are small
- £20,000 per LYG
- £16,514 per QALY
- By duration of infection:
  - 0-9 years: £23,000 per QALY
  - 20-29 years: £15,000 per QALY
  - 30+ years: £17,000 per QALY
- By setting:
  - Prisons: £20,000 per QALY
  - Family practice: £16,500 per QALY
  - Drug services: £17,500 per QALY

One way sensitivity analyses

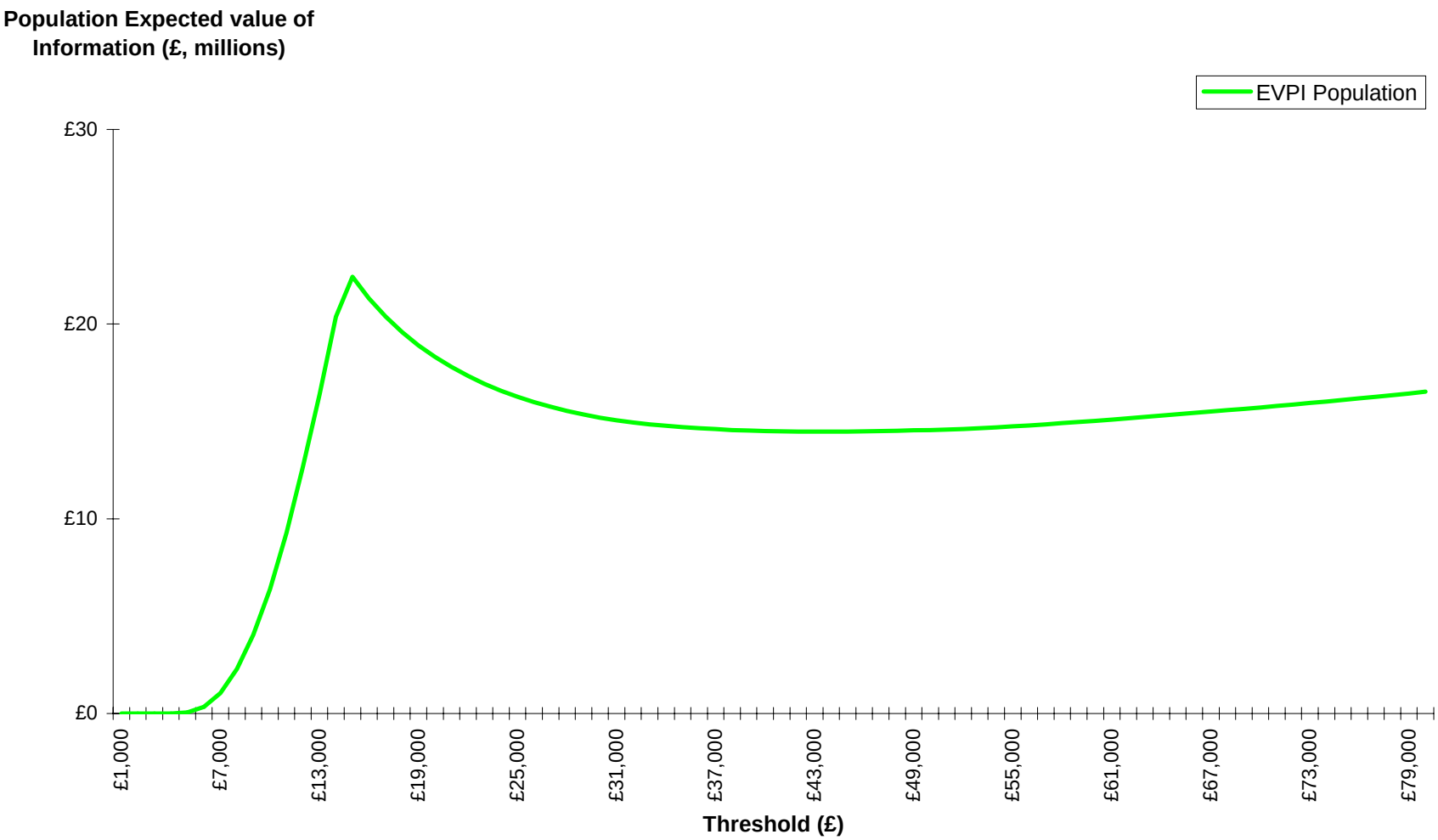
- Not influential
  - Acceptance of testing and treatment
  - Test characteristics and costs
  - Incidence of long term complications
- Some influence
  - Distribution of severity at presentation
  - Response to treatment
  - Background mortality
- Influential
  - Discount rate (£29,000 per QALY @ 3.5%)
  - Prevalence of HCV
  - Differential and absolute rates of spontaneous and re-presentation

Probabilistic analysis

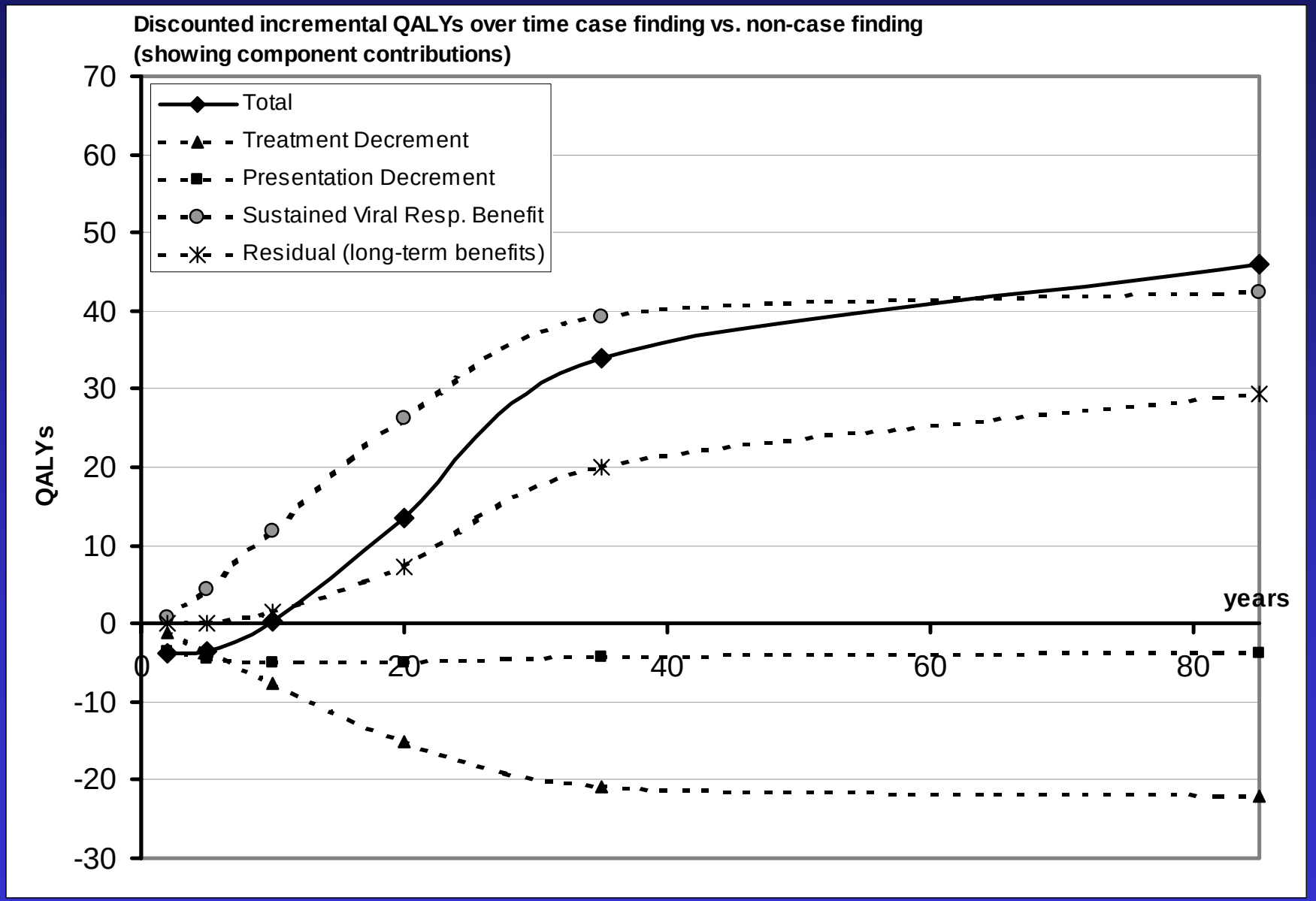




Value of information



Partition of benefits



Summary

- Case finding for HCV is probably cost effective
- Less striking than cost effectiveness of treatment
- Data are very limited in specific settings and for IDU population
- Further empirical (probably observational) studies are urgently required