GGD
Amsterdam

Hepatitis C treatment for people who inject drugs: are direct-acting antivirals cost-effective?

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NO CONFLICT OF INTEREST

Introduction

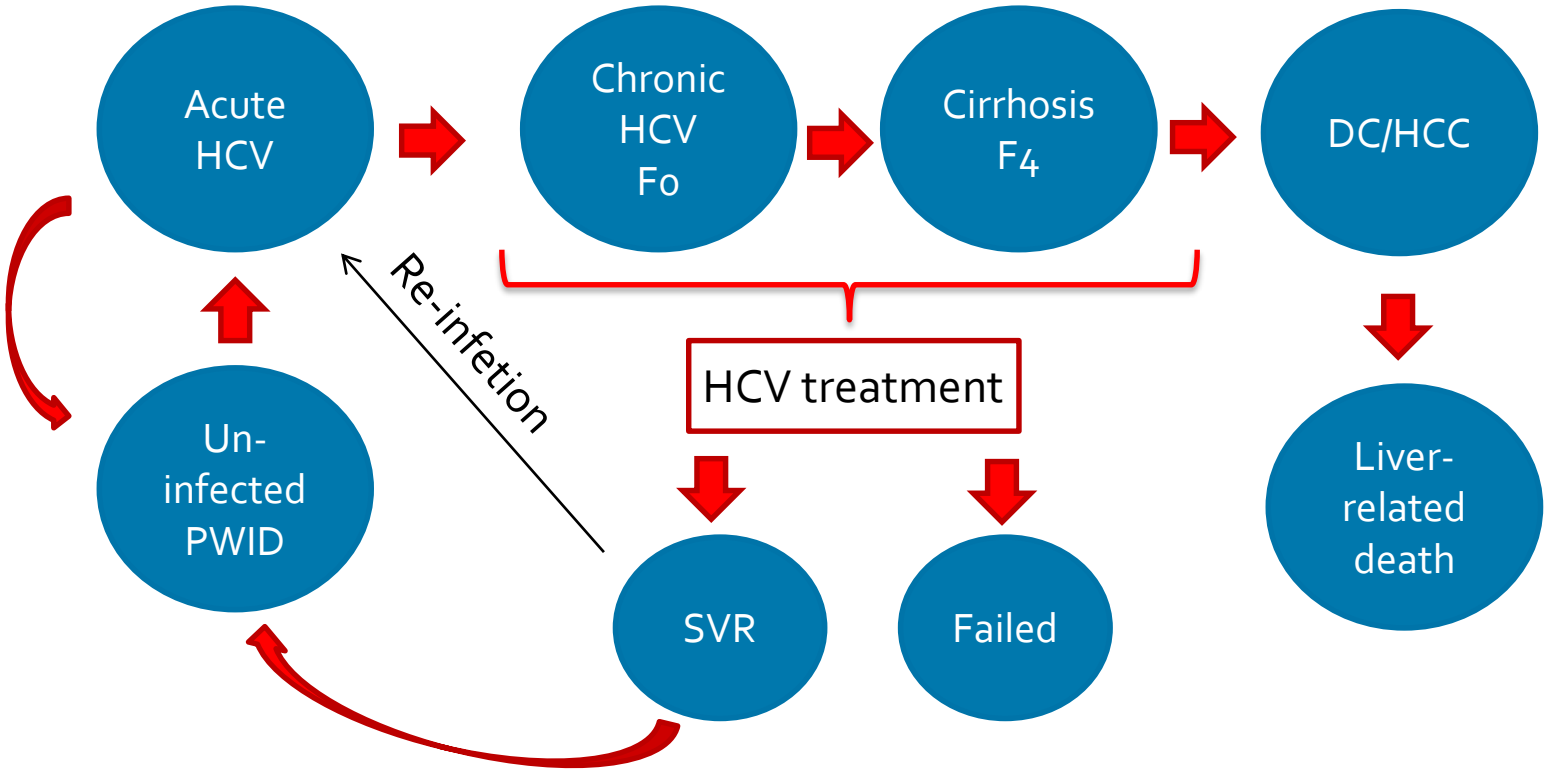
- People who inject drugs (PWID) are the main group affected with Hepatitis C virus (HCV) infection worldwide
- The efficacy of HCV treatment has significantly improved in recent years with the introduction of direct-acting antivirals (DAAs)
- Different combination of DAAs possible, with or without PegIFN
- However, DAAs are more costly than pegylated-interferon and ribavirin (PegIFN/RBV)
- Cost-effectiveness can depend on the type of HCV epidemic (declining or stable)

Aim

In this study we aim to assess the incremental cost-effectiveness ratio (ICER) of **six** HCV treatment strategies among PWID in a stable and a declining HCV epidemic.

Methods (1)

Individual-based model was used describing HCV and HIV transmission and disease progression among PWID (de Vos et al. 2012)



At any moment PWID can leave the model due to HIV-related or all-cause mortality

Methods (2)

Treatment setting and uptake

Multidisciplinary approach (DUTCH-C): outpatient clinic at the Public Health Service of Amsterdam

- Medical doctor/coordinator as the outpatient clinic
- Nurses provide PegIFN injections and provide counselling
- Medical specialists: HIV specialist, liver-specialist, psychiatrist.

Uptake:

- **15** PWID treated per year

Methods (3)

Treatment strategies

Scenario:	Genotype	Genotype
	1-4	2-3
1	No therapy	No therapy
2	PegIFN/RBV	PegIFN/RBV
3	DAA/RBV	DAA/RBV
4	DAA/RBV/PegIFN	DAA/RBV
5	Dual DAA	DAA/RBV
6	Dual DAA	Dual DAA

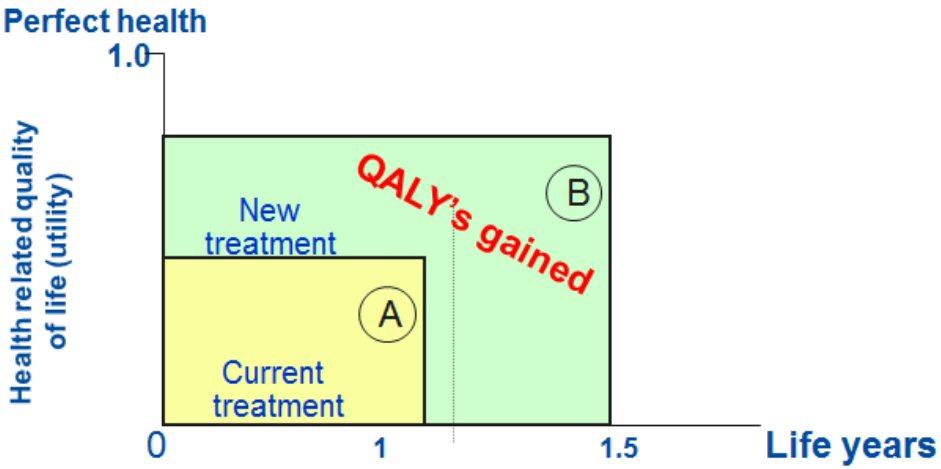
Methods (4)

Costs (from 2014)

- Health-perspective: only health care costs are included
- Included costs specific for PWID (e.g. nurse counselling)

QALYs / Utilities

- Multiplied by 0.85 for PWID



Methods (5)

- Incremental cost-effectiveness ratio (ICER)

$$\frac{\text{Cost strategy B} - \text{Cost strategy A}}{\text{QALYs strategy B} - \text{QALYs strategy A}}$$

- Cost-effectiveness frontier ➔ compared to a scenario without treatment

- Based on WHO:
  Highly cost-effectives: 1x Gross Domestic Product (GDP=38,255)
  Cost-effective: 3x GDP

- Scenario analysis 45 PWID treated per year

Results (1)
Incrementally

- **Declining epidemic**

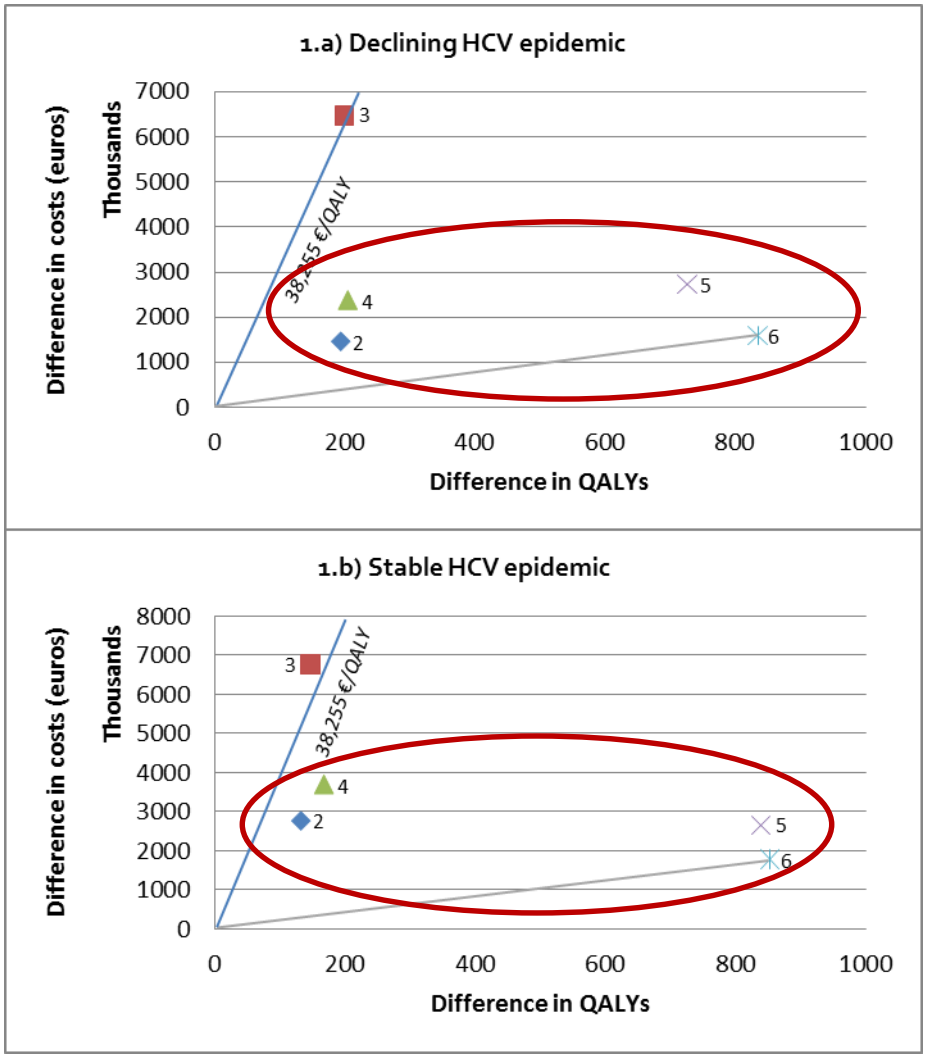
Dual DAA therapy ICER = 1,932 €/QALY vs. scenario without treatment

- **Stable epidemic**

Dual DAA therapy ICER = 2,086 €/QALY vs. scenario without treatment

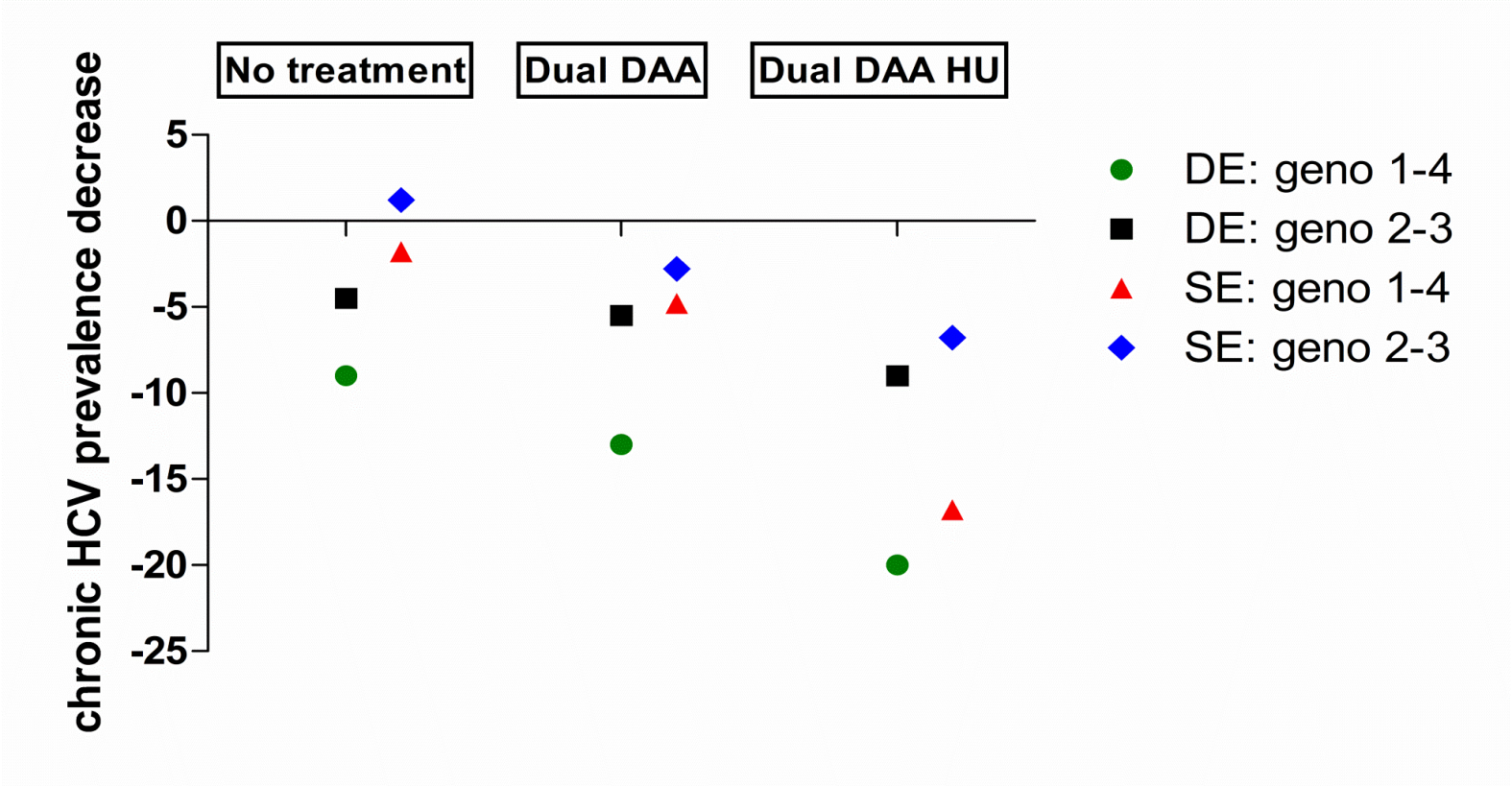
- Robust over a range of sensitivity analyses

Cost-effectiveness frontier



- 2. PegIFN/RBV
- 3. DAA/RBV
- 4. DAA/RBV geno2-4 & DAA/RBV/PegIFN for geno1-4
- 5. DAA/RBV geno2-4 & dual DAA for geno1-4
- 6. Dual DAA for all genotypes

Scenario analyses
Higher Uptake



DE: declining epidemic - SE: stable epidemic - HU: higher uptake

Discussion (1)

- With current treatment uptake, only a slight decrease in HCV RNA prevalence can be expected in a stable epidemic
- Therefore, scaling-up treatment is essential if the goal is to eliminate HCV
- Supports previous studies from *Martin et al. J viral Hepat, 2015*

Discussion (2)

Limitations:

- SVR mainly based in clinical trials
- Harm-reduction programs in place for screening
- Different health models to provide HCV treatment
- Future research should assess the cost-effectiveness of different health models with DAAs
- Did not assess the effect of an increasing HCV incidence

Strengths:

- Individual based model that took HCV re-infections into account
- Explored different types of HCV treatment
- Based on observation data among PWID

Conclusion

- DAA-containing regimes are highly cost-effective among PWID irrespective of the type of HCV epidemic
- Providing economic support for treatment for PWID
- Now that the treatment landscape is promising even for those traditional "difficult to treat populations", start thinking about those "difficult to reach populations" which in many countries are PWID

Thank you for your attention and everyone involved in this study!

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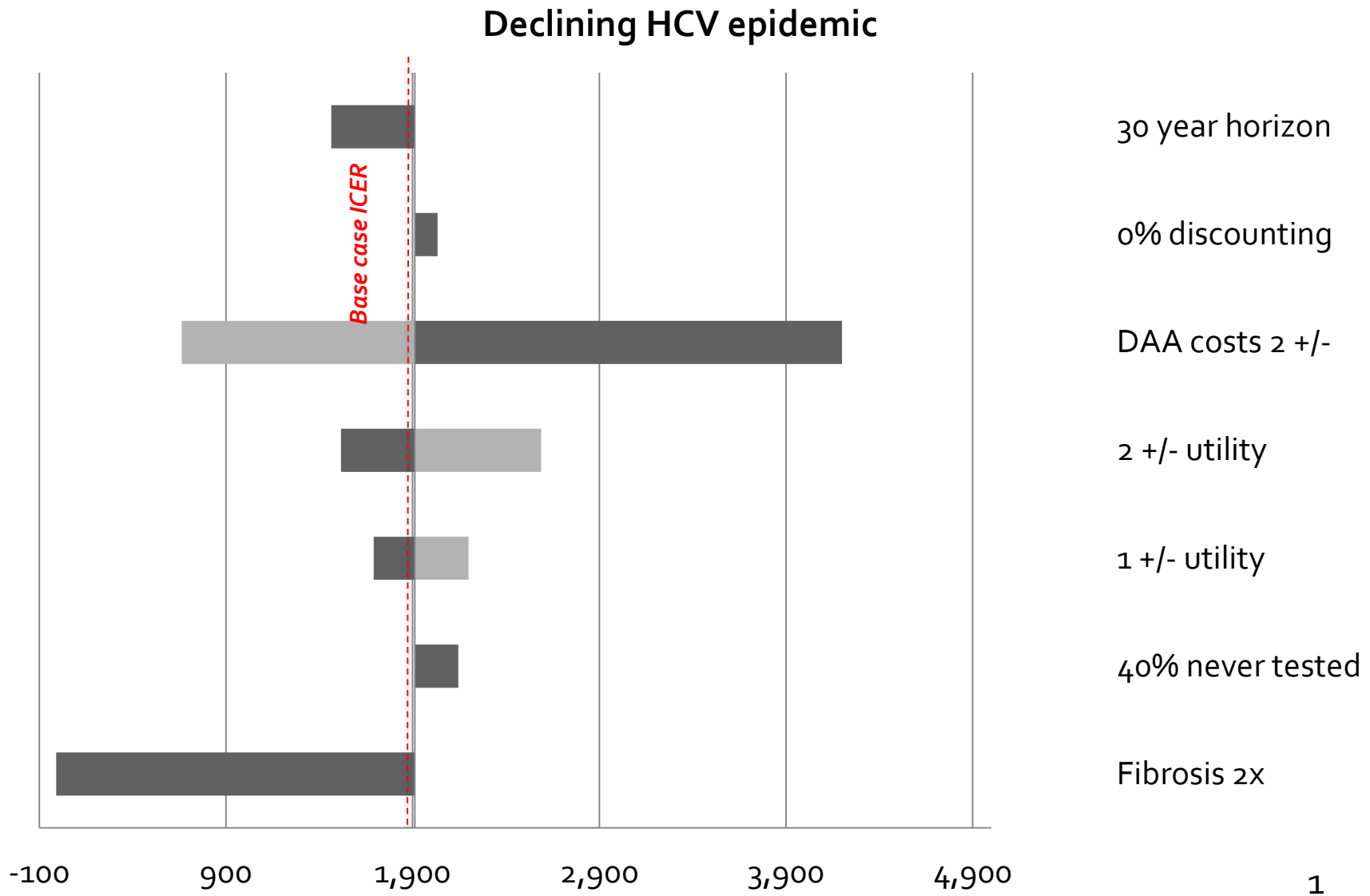
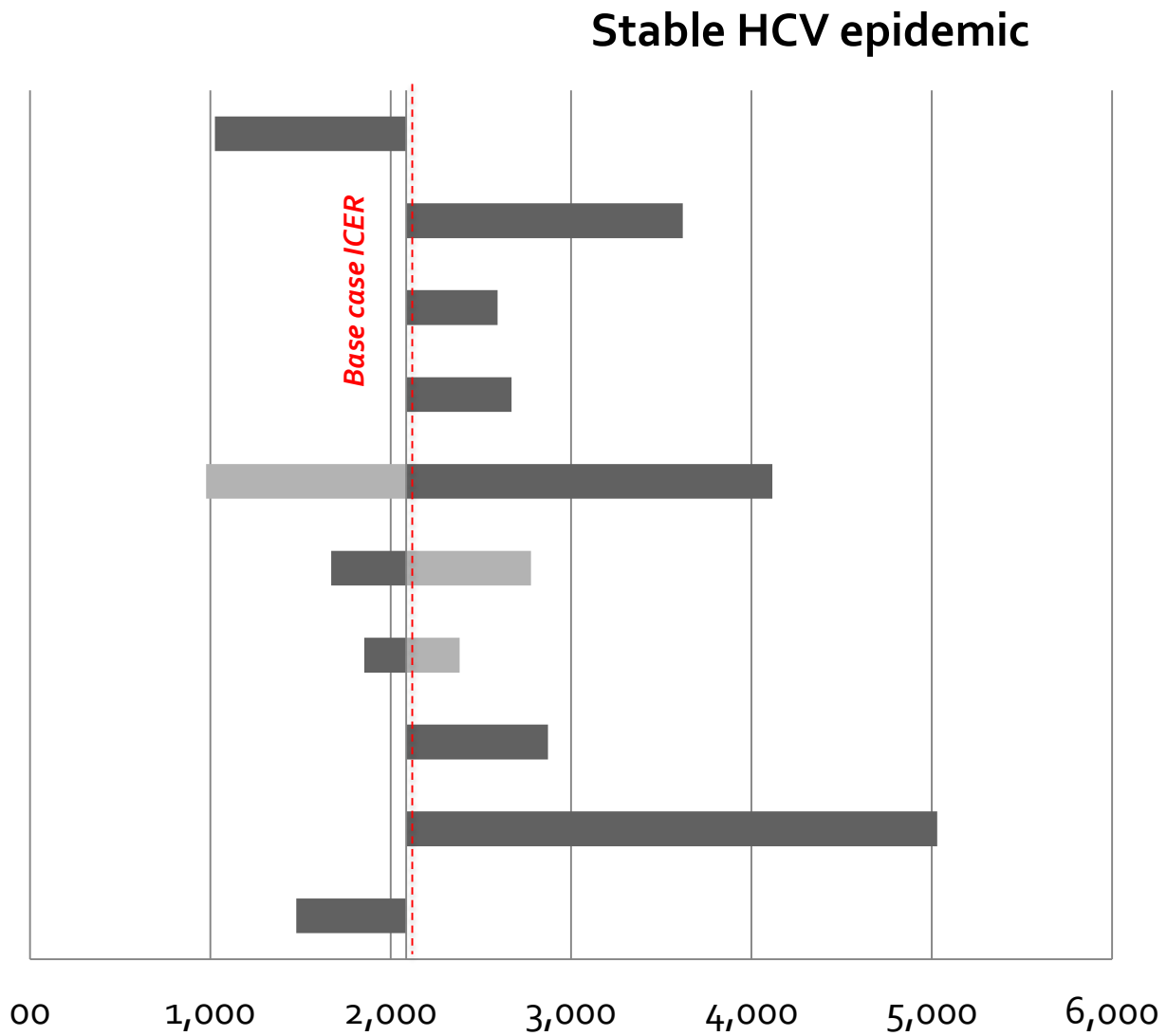
Sensitivity anayses: Dual DAA



Sensitivity anayses: Dual DAA



30 year horizon

HIV not treated

Treating re-infections

0% discounting

DAA costs 2 +/-

2 +/- utility

1 +/- utility

60% never tested

40% never tested

Fibrosis 2x

Incremental analyses example

- Interventions (treatment strategies) are ordered from least to most effective based on QALYs
- Calculate ICERs between successive pairs of options

Threshold = 21

Strategy	QALYs	Costs	ICER	
A	100	2000		
B	*200*	*4000*	*-*	*Ext. Dominated*
c	400	3000	3,33	Cost-effective
D	*800*	*5000*	*-*	*Ext. dominated*
E	810	5500	50	Dominated