

# Economic Evaluation of an Electronic Health Record Alert by Age in Primary Care for the Detection of Patients with Chronic Hepatitis C

Antonio García Herola<sup>1</sup>, Raquel Domínguez-Hernández<sup>2</sup>, Miguel Ángel Casado<sup>2</sup>

<sup>1</sup> Division of Gastroenterology, Hospital Marina Baixa de Villajoyosa, Alicante, Spain; <sup>2</sup> Pharmacoeconomics & Outcomes Research Iberia (PORIB), Madrid, Spain

## BACKGROUND

- Increasing the diagnosis of hepatitis C in the population with the highest prevalence is necessary to identify hidden cases of infected people, aiming to the virus elimination of the disease in the short and medium term.
- In Valencian Region, prevalence is higher in patients born between 1955 and 1975 [1].
- An electronic alert system in primary care for the identification of patients without prior serology, would help to detect patients with chronic hepatitis C (CHC) that unknow their status.

## METHODS

- Diagnosis of CHC:
  - A decision tree evaluating the diagnosis by HCV serology and viral load in anti-HCV-positive patients and subsequent antiviral treatment was developed.
  - The target population was obtained from total population born between 1955 y 1975 in Valencian region (1,581,117 individuals) [2], considering only the people with health card and those population that attend to primary care (75%), which was collected from official sources of the region.
  - Epidemiological data and diagnostic costs were extracted from literature and sources of the Valencian Region [3-4].
- The progression of the chronic disease:
  - A previously validated lifetime Markov model simulated the natural history of the disease [5-6].
  - In both alternatives (with and without EHR alert), it was assumed that 100% of the patients detected were treated. A rate of sustained virological response of 95.7% was assumed [7].
  - The average pharmacological cost per patient of antiviral treatment was calculated form the total number of patients treated [7] and the total investment in antivirals for HCV in Spain [8].
  - Probabilities, utilities and costs of each health state of the model were obtained from the literature [5-6].
- The perspective of analysis was the National Health System and the time horizon was lifetime.

## OBJECTIVE

**In Valencian Region (Spain), an economic evaluation based on an electronic health record (EHR) alert in primary care was conducted to detect undiagnosed chronic hepatitis C subjects born between 1955 and 1975, in comparison with the non-application of the alert, followed by direct-acting antiviral (DAA) therapy.**

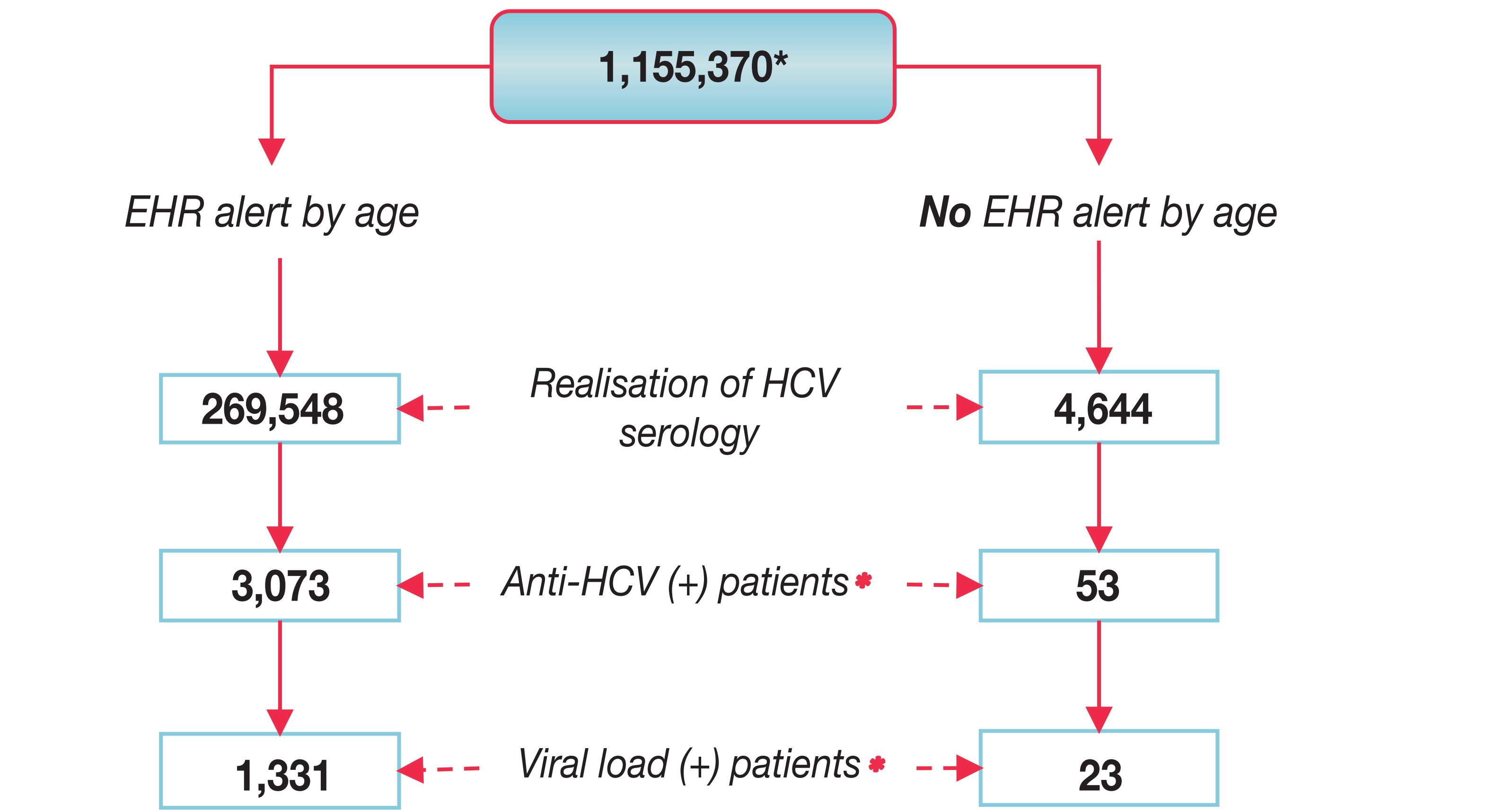
Table 1. Analysis parameters

Parameters	Value base-case
Realisation of HCV serology	100.0%* (EHR alert) vs 1.7% ‡ (No EHR alert)
Anti-HCV prevalence	1.14% <sup>1</sup>
Viral load (+)	43.3% <sup>1</sup>
Fibrosis F0, F1, F2, F3 and F4	23.8%, 33.5%, 16.8%, 9.7% and 16.1% <sup>‡</sup>
Primary care visit cost	€30.2 <sup>4</sup>
Antiviral treatment cost per patient	€17,126 <sup>7-8</sup>

\*Assumption; ‡ Experts

## RESULTS

Figure 1: Population result



- \*Total population of Valencian Region born between 1955 and 1975 with health card  
EHR, Electronic Health Record; HCV: Hepatitis C Virus
- Healthcare outcomes with the EHR alert by age generated the detection of 269,548 patients non previously tested, of whom 1,331 would be HCV-RNA positive (vs 23 without EHR alert).

Table 2. Clinical events avoided

Cost-Effectiveness results per patient with chronic hepatitis C				
	Diagnosed Cost	Treatment and management Cost*	Total Cost	QALY
EHR alert	€7,224	€19,232	€26,456	17.8
No EHR alert	€124	€15,452	€15,152	14.5
Difference	€7,100	€3,781	€10,880	3.3

- \*Pharmacological and monitoring costs during treatment  
EHR, Electronic Health Record; QALY: Quality-adjusted life year
- The incremental results per patient of the EHR alert by age (vs non alert) were 3.3 QALYs and €10,880. For a willingness-to-pay threshold of €20,000 per QALY gained, the EHR alert by age was cost-effective with an ICUR of €3,321 per QALY.

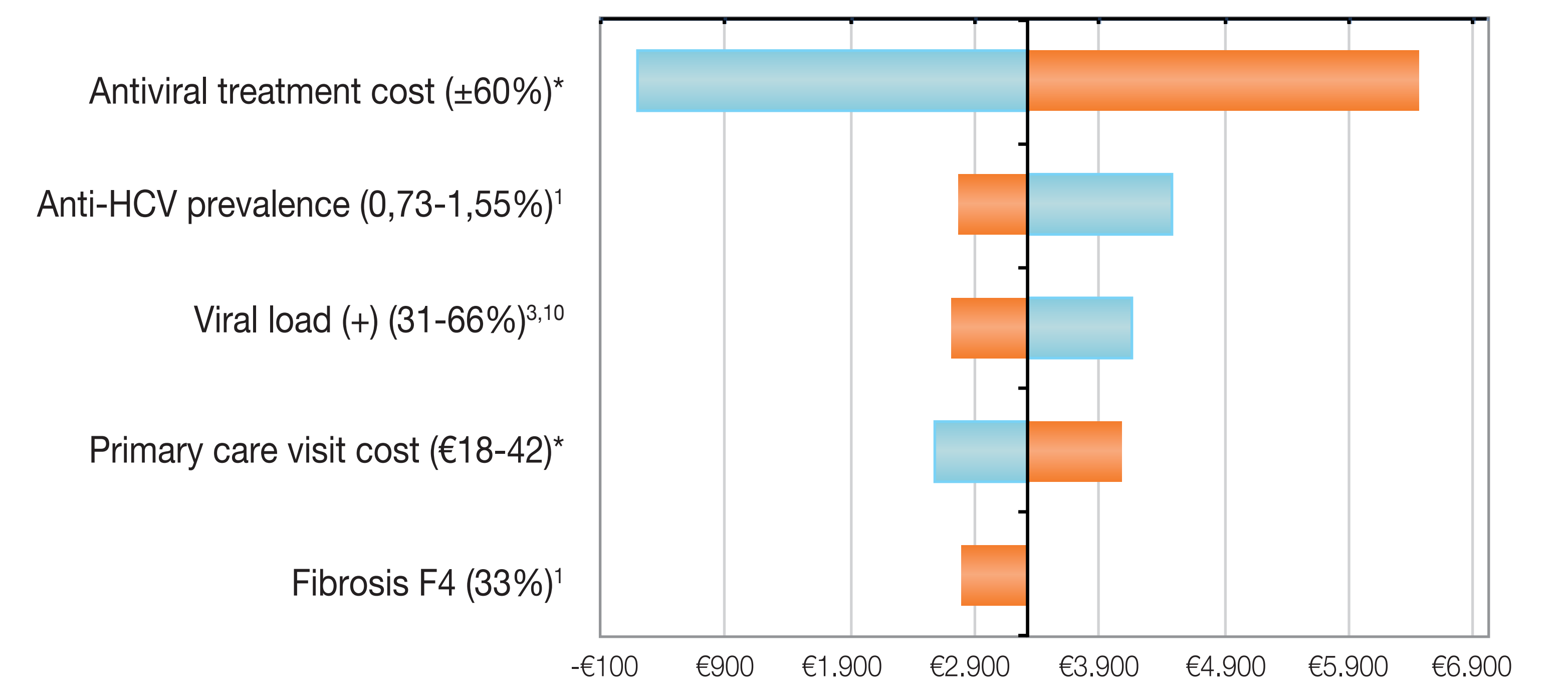
Table 3. Clinical events avoided

Cases of hepatic complications and mortality avoided for the total cohort (1,331 chronic patients)			
	EHR alert	No EHR alert	Difference
Decompensated cirrhosis	25	378	-352
Hepatocellular carcinoma	40	298	-258
Liver transplant	5	55	-50
Liver-related deaths	51	476	-425

EHR, Electronic Health Record

- The EHR alert was estimated to decrease the cases of decompensated cirrhosis by 93%, hepatocellular carcinoma by 87%, liver transplants by 90% and liver-related deaths by 89%. Results were robust in the univariate sensitivity analyses.

Figure 2. Sensitivity analysis results: Tornado Diagram



\*Assumption

- The SA showed variations on the ICUR in a range from €193 to €6,449 being the treatment cost and HCV prevalence the greater impact parameters (Figure 2). In addition, a variation in the percentage of serologies for HCV in the non-application EHR alert (1.7% vs 4.9%), would decrease the difference of patients detected, with minimal impact on the ICUR.

## CONCLUSIONS

**An EHR alert in Primary Care for the detection of HCV patients borned from 1975 to 1955 and their treatment with DAA, is an efficient strategy, obtaining significant healthcare benefits associated to the reduction of hepatic complications and mortality.**

## REFERENCES

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