AFFORDABILITY AND COST-EFFECTIVENESS OF HCV AND HIV TESTING

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Université Paris Diderot: site Bichat

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Inserm

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Infection • Antimicrobiens • Modélisation • Evolution

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How best to utilize the resources that are available?

To assist in choosing from among competing alternatives, in situations of uncertainty and limited resources, not only policy makers, but also developers of evidence-based clinical guidelines, public health officials, health-care providers and other decision makers

DIFFERENT APPROACHES

- Long-term evaluation = Cost-effectiveness analysis
  - To estimate the additional value to society of a new intervention relative to the current ones
  - To understand, prioritize and optimize the use of health care services

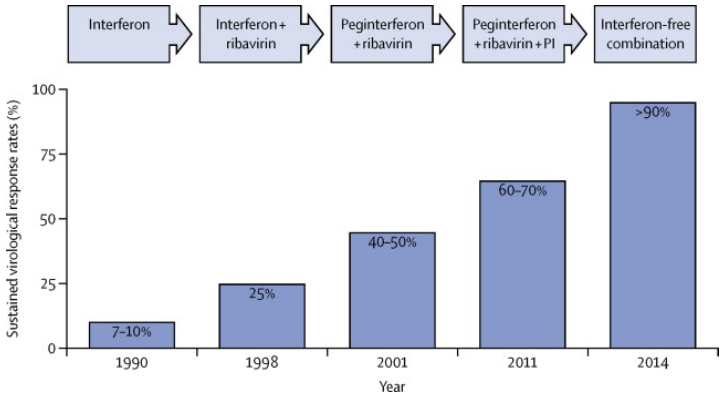
DIFFERENT APPROACHES

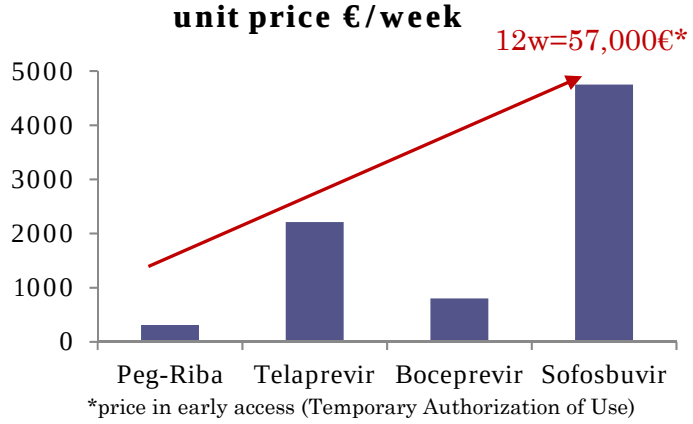
- Short-term evaluation = Budget impact analysis
  - To forecast the impact of new drugs/technologies on health care budgets:

    "Cost-effective doesn't mean cheap"

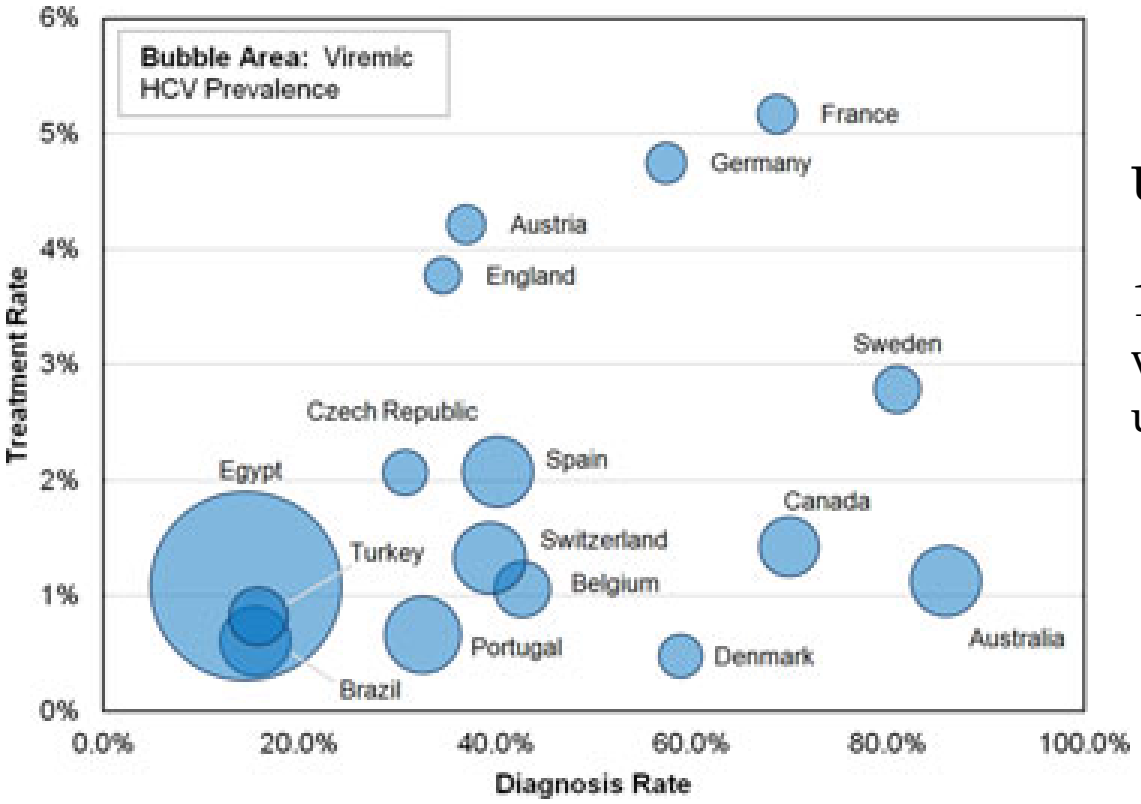
HCV- Favorable therapeutic context in 2013

- Therapeutic progress accompanied by an increase in health related costs
- Concern raised about the high cost of new DAAs
- How best to utilize the resources that are available?





HCV DIAGNOSIS AND TREATMENT RATES
HETEROGENEITY ACROSS COUNTRIES



Update in France (2018)

100,000 chronic hepatitis C with more than an half undiagnosed

But the need to improve HCV screening everywhere

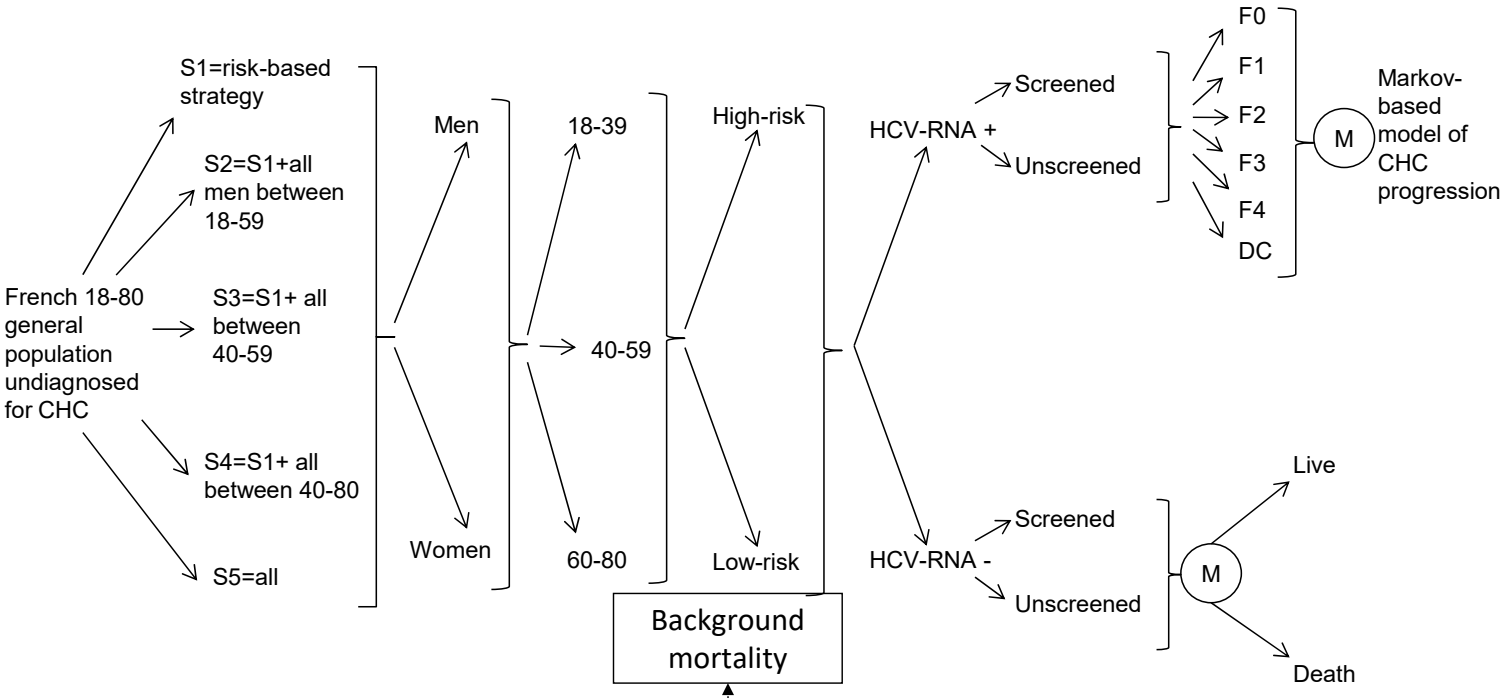
Dore et al, J Hepatol 2014; Deuffic-Burban et al, unpublished data

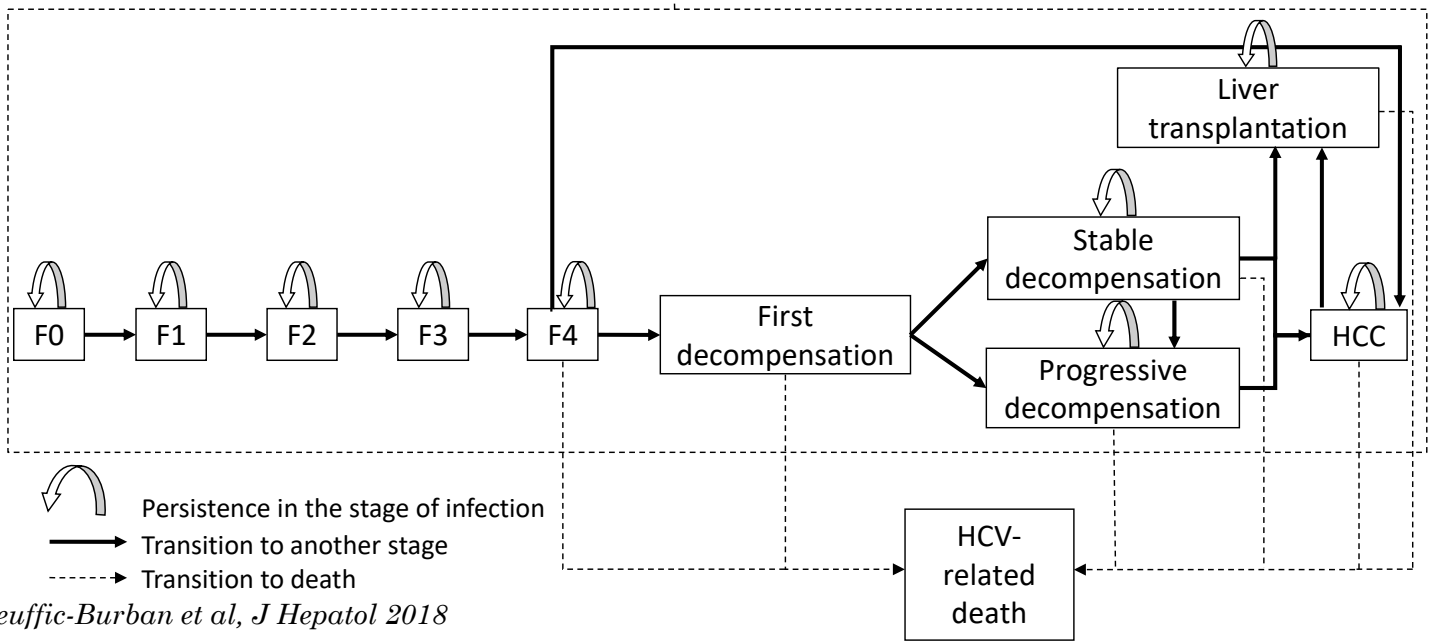
WHAT IS THE BEST SCREENING STRATEGY?

- S1 = current strategy targeting the at risk population
- S2 = S1 and all men between 18 and 59 years
- S3 = S1 and all individuals between 40 and 59 years
- S4 = S1 and all individuals between 40 and 80 years
- S5 = all individuals between 18 and 80 years (universal screening)

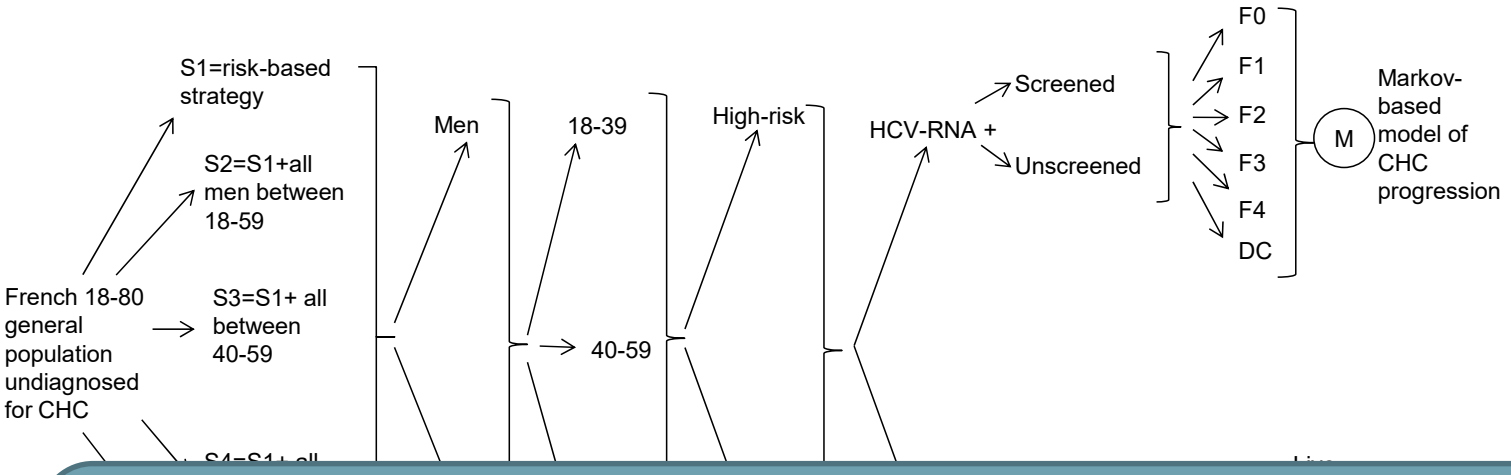
Effectiveness, cost and cost-effectiveness analysis using mathematical modelling

Deuffic-Burban et al, J Hepatol 2018



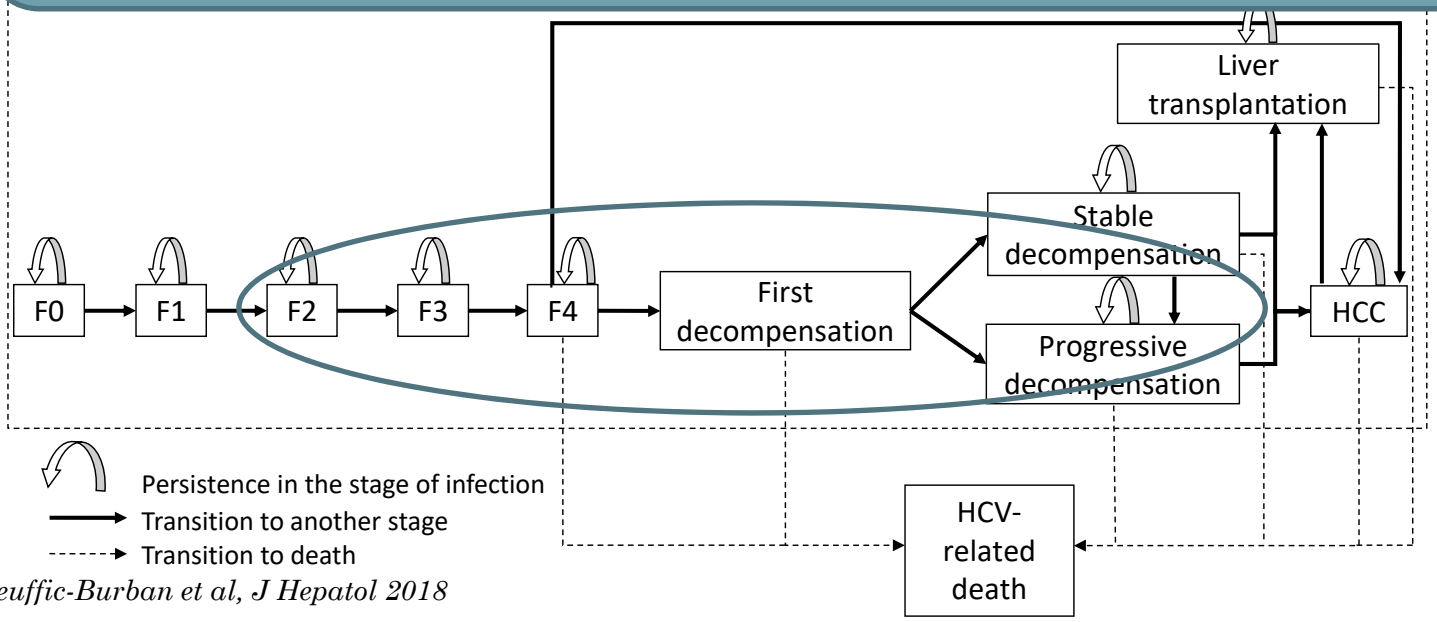


Deuffic-Burban et al, J Hepatol 2018

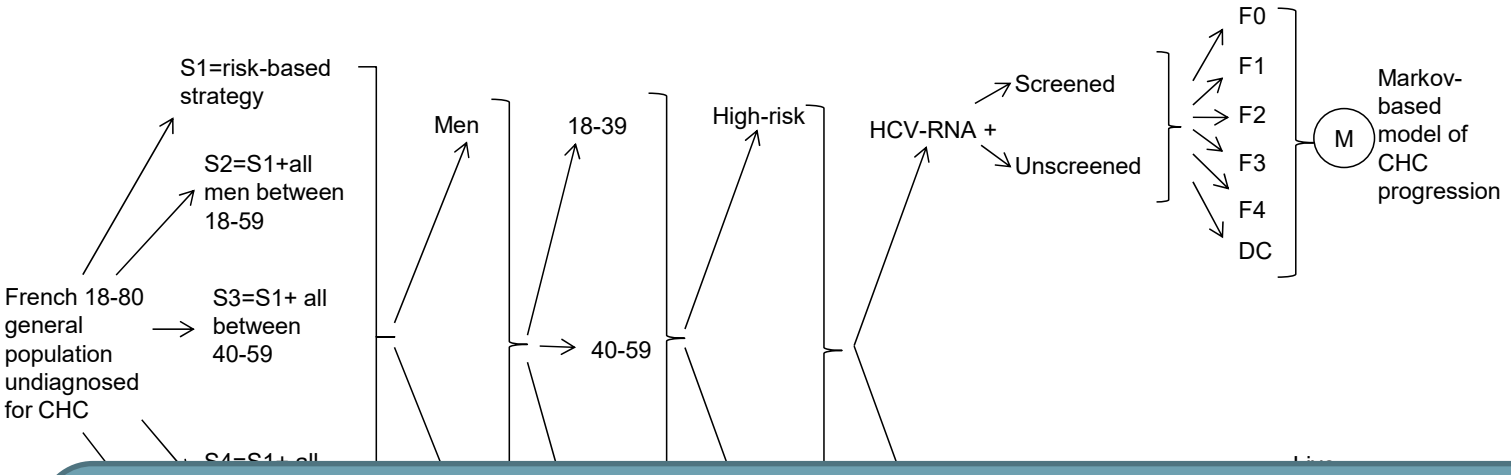


Once CHC diagnosed, treatment was initiated:

- to patients with fibrosis stage ≥F2

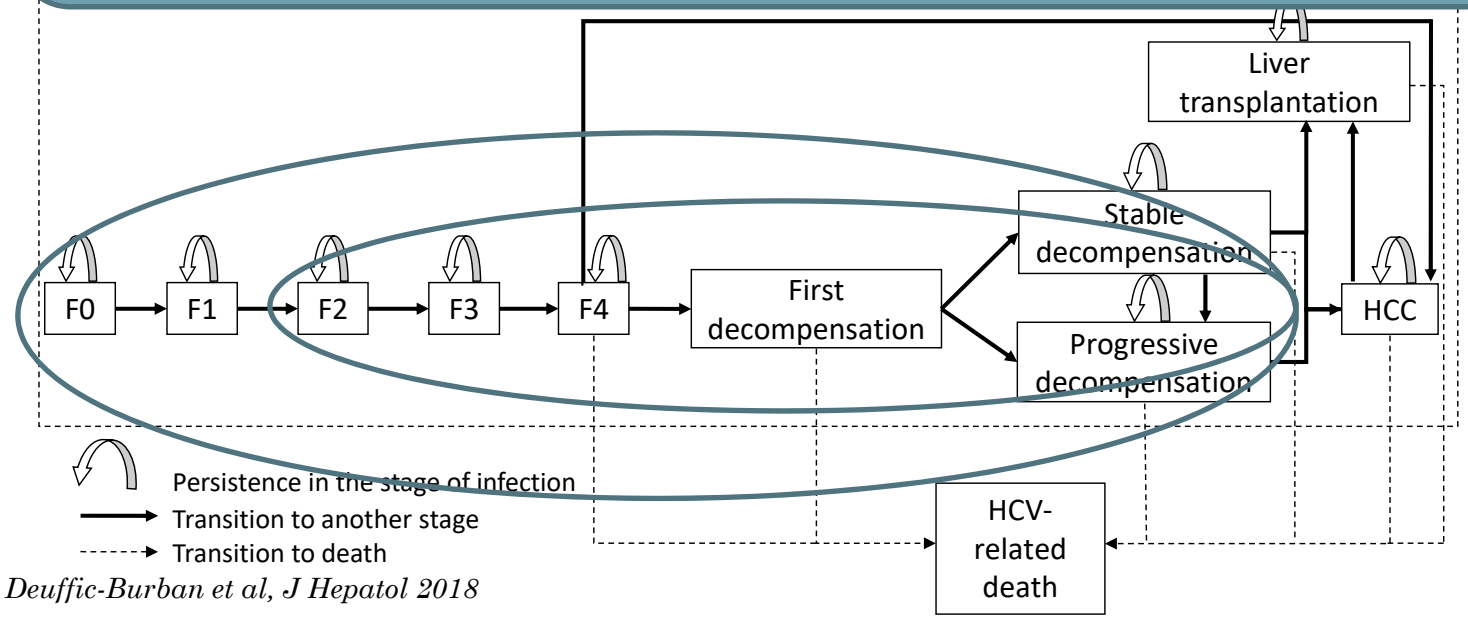


Deuffic-Burban et al, J Hepatol 2018



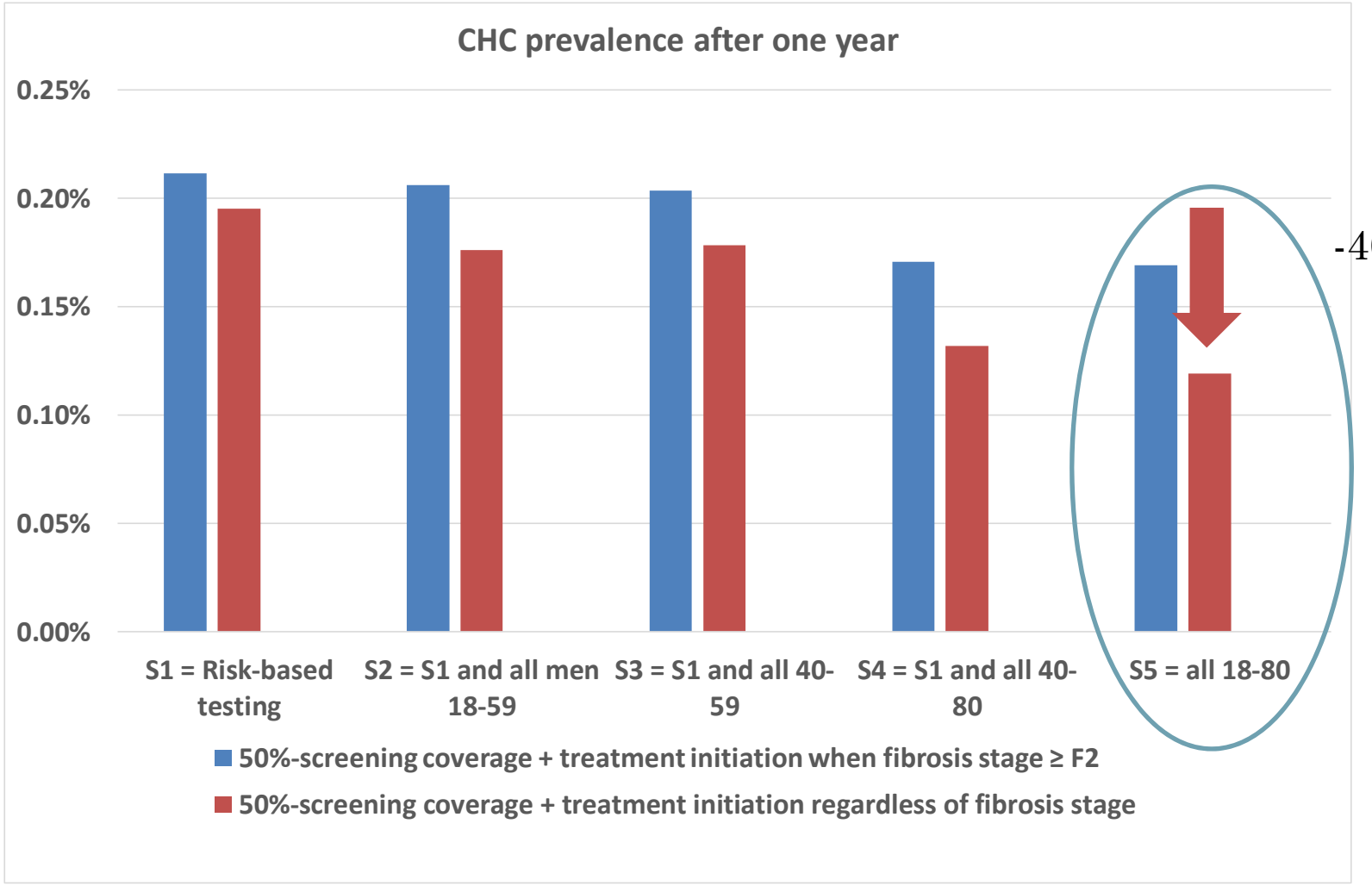
Once CHC diagnosed, treatment was initiated:

- to patients with fibrosis stage ≥F2
- regardless of fibrosis (universal treatment)



Deuffic-Burban et al, J Hepatol 2018

Effectiveness analysis on CHC prevalence among studied population



Deuffic-Burban et al, J Hepatol 2018

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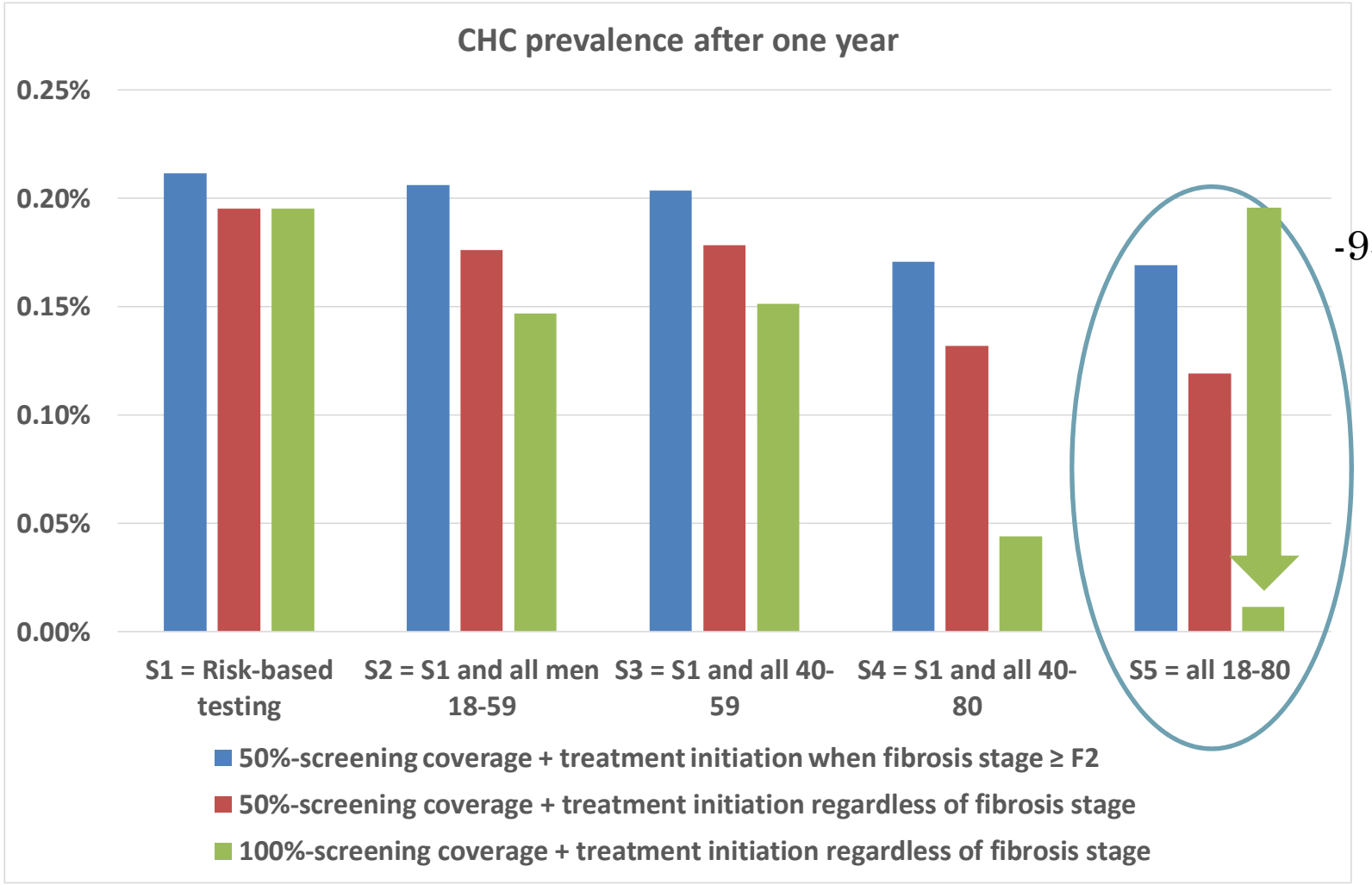
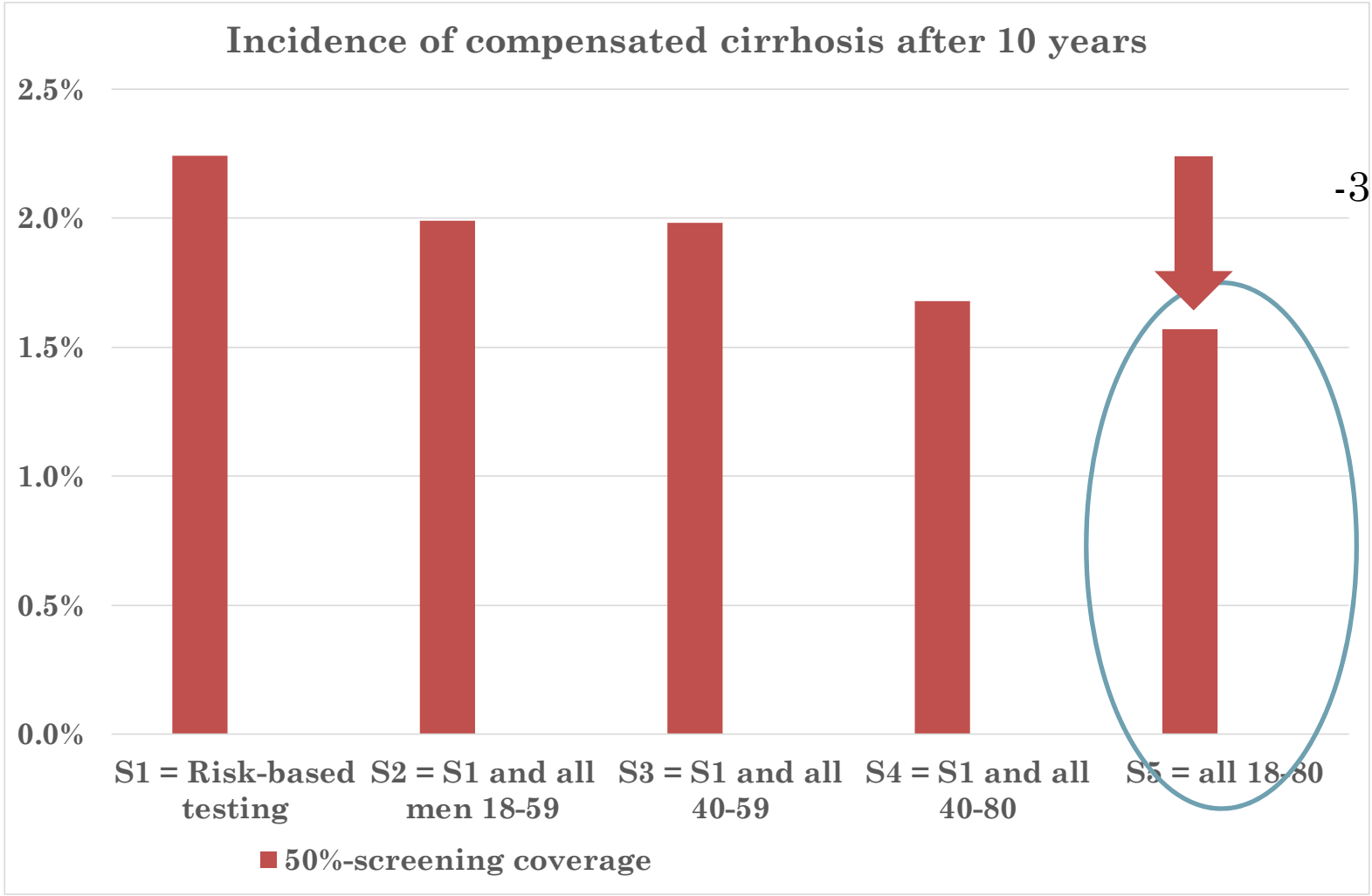


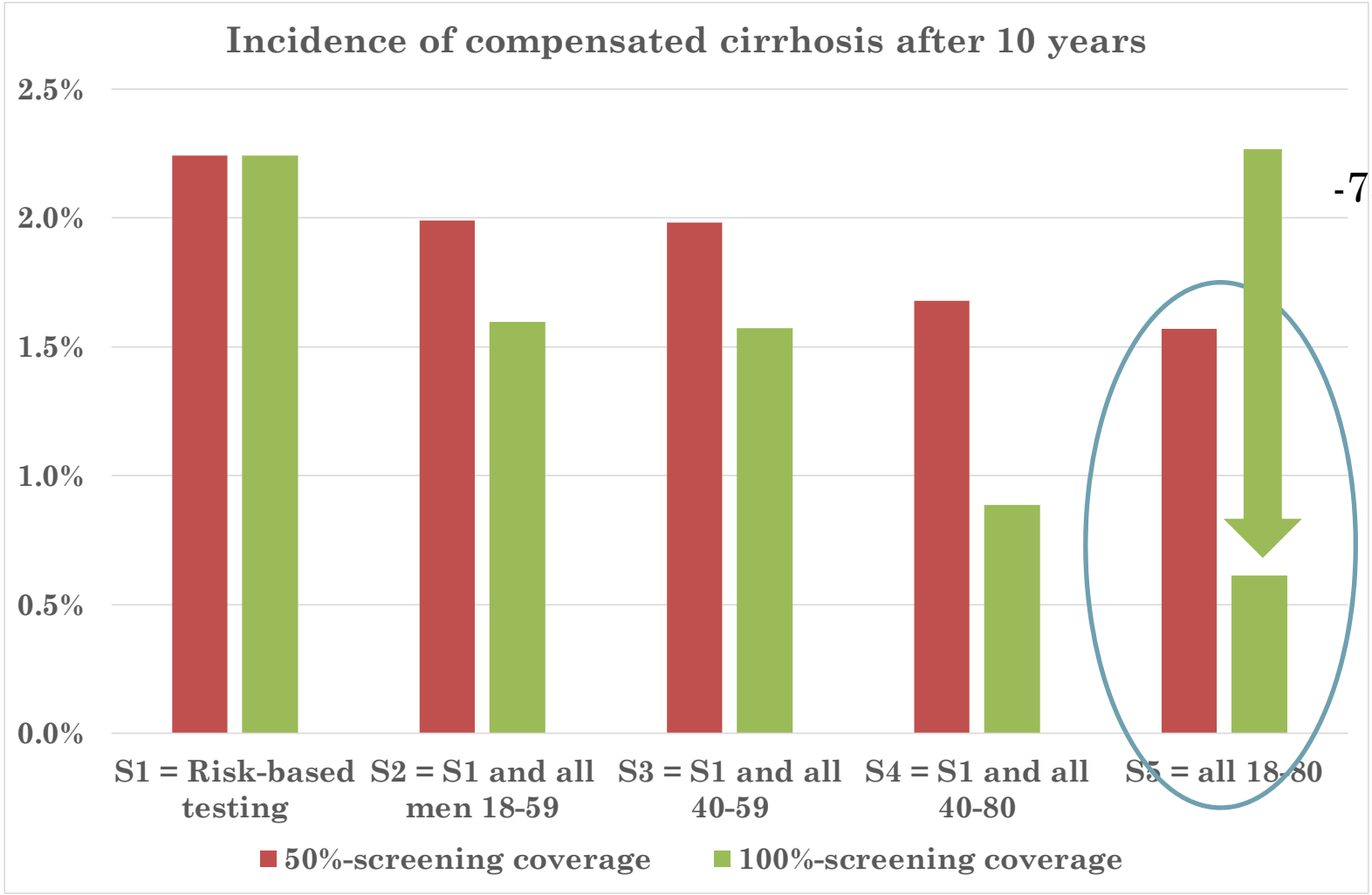
Deuffic-Burban et al, J Hepatol 2018

Effectiveness analysis on liver-related events among CHC population



Deuffic-Burban et al, J Hepatol 2018

Effectiveness analysis on liver-related events among CHC population



Deuffic-Burban et al, J Hepatol 2018

COST-EFFECTIVENESS ANALYSIS OF DIFFERENT HCV SCREENING

Strategy	QALY	Cost (€)	ICER (€/QALY)
Treatment initiation regardless of fibrosis immediately after diagnosis			
S1 = risk-based	21.308202	77.26	
S3 = S1+all 40-59	21.308268	79.45	Dominated
S2 = S1+all men 18-59	21.308336	80.16	Dominated
S4 = S1+all 40-80	21.308413	81.78	21,400
S5 = all 18-80	21.308514	84.92	31,100

Deuffic-Burban et al, J Hepatol 2018

WHAT ARE WE WILLING TO PAY?

- NICE (UK)
  - 20,000-30,000£/LY or QALY
- Sweden
  - Informal, according to the severity of the disease
    - Moderate ≈ 50,000/LY or QALY
    - Severe ≈ 100,000/LY or QALY
- France, Belgium, Germany
  - No thereshold
  - Efficiency frontier in Germany
- WHO (The Commission on Macroeconomics and Health)**???**
  - CE ratios < GDP/capita = "very cost-effective"
  - CE ratios < 3 x GDP/capita = "cost-effective"

Updating Cost-Effectiveness — The Curious Resilience of the $50,000-per-QALY Threshold

Peter J. Neumann, Sc.D., Joshua T. Cohen, Ph.D., and Milton C. Weinstein, Ph.D.

« As the United States debates anew how much to spend on medical care — a question that has been highlighted by high-priced drugs for cancer and hepatitis C — it is useful to reexamine what the ratio means, why it persists, and how it might be applied more reasonably to inform resource-prioritization discussions in today's health care and economic climate. »

N Engl J Med 2014

COST-EFFECTIVENESS ANALYSIS OF DIFFERENT HCV SCREENING

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S4 = S1+all 40-80	21.308413	81.78	21,400
S5 = all 18-80	21.308514	84.92	31,100
Treatment initiation when ≥ F2			
S1 = risk-based	21.306358	66.69	
S3 = S1+all 40-59	21.306403	68.78	Dominated
S2 = S1+all men 18-59	21.306404	69.09	Dominated
S4 = S1+all 40-80	21.306520	70.92	26,100
S5 = all 18-80	21.306538	73.57	147,200

Deuffic-Burban et al, J Hepatol 2018 (under embargo until July 1st)

Cost-effectiveness analysis of different HCV screening

Strategy	QALY	Cost (€)	ICER (€/QALY)
Treatment initiation regardless of fibrosis immediately after diagnosis			
S1 = risk-based	21.308202	77.26	
S3 = S1+all 40-59	21.308268	79.45	Dominated
S2 = S1+all men 18-59	21.308336	80.16	Dominated
S4 = S1+all 40-80	21.308413	81.78	21,400
S5 = all 18-80	21.308514	84.92	31,100

In France, universal screening is the most effective strategy and is cost-effective when treatment is initiated **regardless of fibrosis stage and rapidly after diagnosis**.

Deuffic-Burban et al, J Hepatol 2018

CMAJ OPEN 2017

Research

Model-based projection of health and economic effects of screening for hepatitis C in Canada

William W.L. Wong PhD, Aysegul Erman MSc, Jordan J. Feld MD, Murray Krahn MD MSc

A one-time hepatitis C screening and treatment program in Canada is likely to be cost- effective for a birth cohort of people aged 25–64 years

Cost effectiveness of universal 1-time screening vs. birth cohort screening: United States

- Universal screening was cost effective compared with birth cohort screening when the prevalence of HCV antibody positivity was greater than 0.07%

Eckman et al. Clin Gastroenterol Hepatol. 2018

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RÉPUBLIQUE FRANÇAISE

MINISTÈRE
DES AFFAIRES SOCIALES
ET DE LA SANTÉ

Paris, le 25 mai 2016

COMMUNIQUE DE PRESSE

Marisol TOURAINE s'engage pour un accès universel aux traitements innovants contre l'hépatite C

À l'occasion de la Journée de lutte contre les hépatites virales, Marisol TOURAINE, ministre des Affaires sociales et de la Santé, a annoncé l'accès universel aux traitements innovants contre l'hépatite C. Chaque malade qui le souhaite pourra en bénéficier. Ces traitements sont actuellement réservés en priorité aux patients dont l'état de santé est le plus préoccupant, conformément aux recommandations de la Haute Autorité de Santé (HAS).

Universal treatment access

Lower and unique price
= 28,700€

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RÉPUBLIQUE FRANÇAISE

MINISTÈRE
DES AFFAIRES SOCIALES
ET DE LA SANTÉ

Paris, le 31 mars 2017

COMMUNIQUÉ DE PRESSE

Accès universel aux traitements innovants contre l'hépatite C :
Après avoir permis l'accès de tous les malades aux traitements, Marisol TOURAINE obtient une baisse de prix importante

Après avoir annoncé l'accès universel aux traitements innovants contre l'hépatite C le 25 mai 2016, Marisol TOURAINE, Ministre des Affaires sociales et de la Santé, a obtenu une baisse de prix importante des traitements innovants contre l'hépatite C. Les arrêtés seront publiés très prochainement et permettront à ces nouveaux tarifs d'entrer en vigueur dès le 1er avril 2017. C'est une étape de plus pour garantir la soutenabilité de notre système de santé et l'accès de tous les malades à des traitements innovants.

A la demande de la Ministre, le Comité économique des produits de santé (CEPS) a mené une négociation ferme avec les laboratoires. Après un premier accord conclu le 8 décembre 2016 avec le laboratoire MSD, les négociations pour faire baisser les prix des traitements du VHC viennent de s'achever avec l'accord conclu avec le laboratoire Gilead pour ses produits Harvoni® et Sovaldi®.

Désormais, le prix des traitements sera inférieur à 28 700 €, contre 41 000 € pour le Sovaldi® auparavant. Marisol TOURAINE permet donc aujourd'hui à tous les patients atteints

What is the budget impact of universal screening?

- French general population aged 18 to 80 years, without any known diagnosis of HCV-RNA positivity ~ 45 million
- Testing coverage = 9 million / year

Budget impact over 5 years to test and treat all adults in France = 869.4 million €

Deuffic-Burban et al, unpublished data

IF DIAGNOSIS OR TREATMENT RESOURCES ARE LIMITED

HEALTH SYSTEM CAPACITY OR CAPITATED TREATMENT BUDGETS

- **Prioritizing PWIDs or others at high risk of transmission (**incarcerated individuals)

  Martin NK, Vickerman P, et al. Hepatology. 2016;63(6):1796–808.
  Martin NK, J Hepatol. 2016;65(1):17–25.
  Bennett H, et al. Eur J Health Econ. 2017;18(8):1001–11.

- **Prioritizing people currently aged 40 to 65:**

  Coffin et al. Clin Infect Dis 2012
  Eckman et al Clin Infect Dis 2013
  Liu S, PLoS One. 2013;8(3):e58975.

- **Prioritizing people living in high-prevalence geographical areas**

  Eckman et al. Clin Gastroenterol Hepatol. 2018

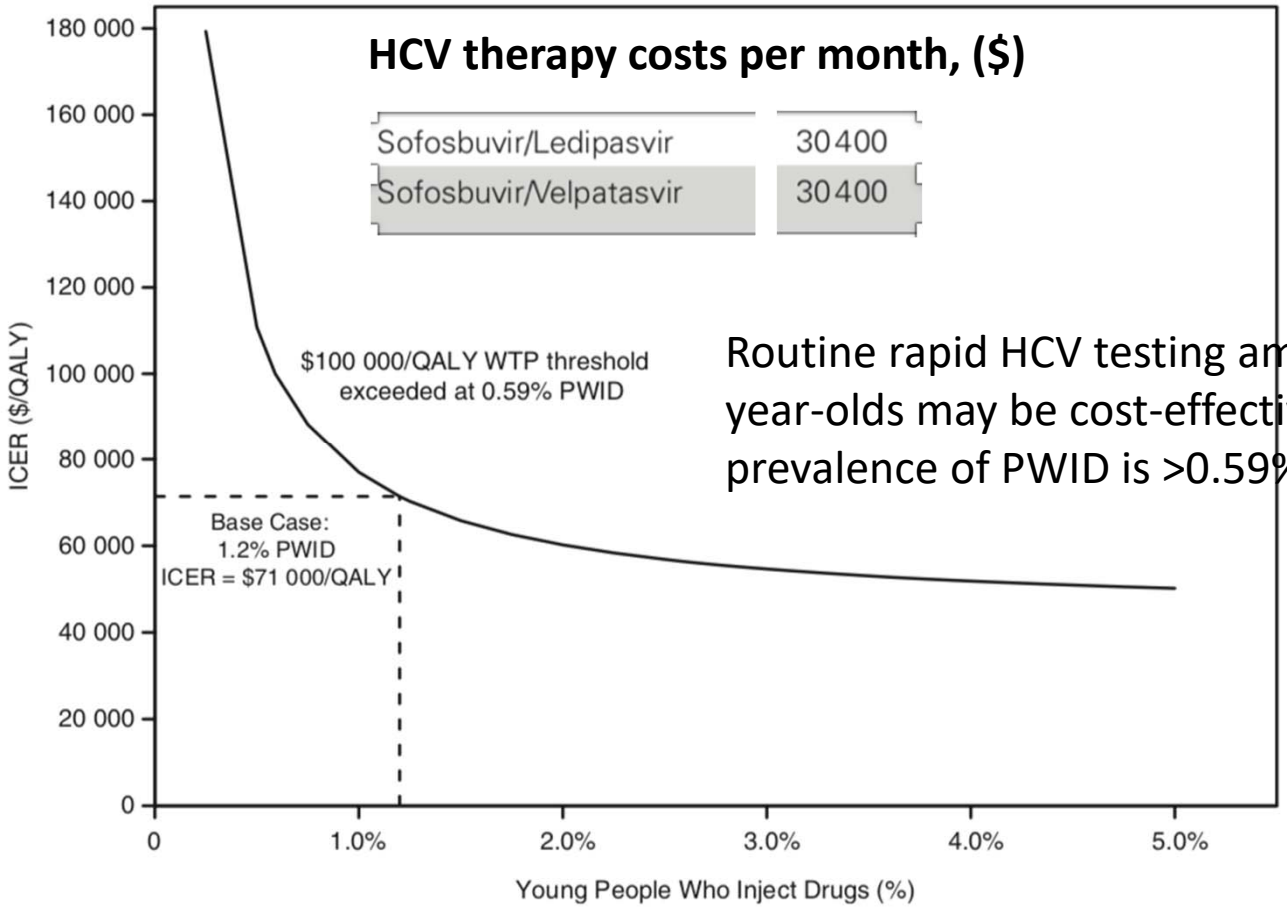
MAJOR ARTICLE

IDSA Infectious Diseases Society of America hivma hiv medicine association OXFORD

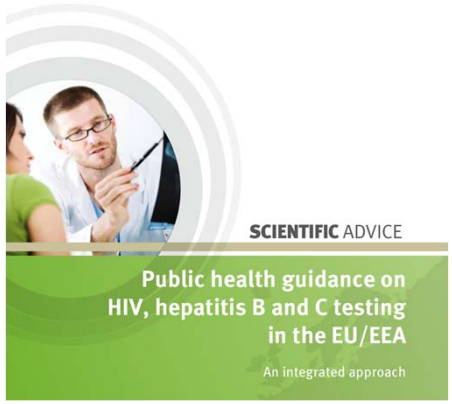
2018

Cost-Effectiveness of One-Time Hepatitis C Screening Strategies Among Adolescents and Young Adults in Primary Care Settings

Sabrina A. Assoumou,[1,2] Abriana Tasillo,[1] Jared A. Leff,[3] Bruce R. Schackman,[3] Mari-Lynn Drainoni,[2,4,5] C. Robert Horsburgh,[1,6] M. Anita Barry,[7] Craig Regis,[7] Arthur Y. Kim,[8] Alison Marshall,[9,10,11] Sheel Saxena,[11] Peter C. Smith,[1,12] and Benjamin P. Linas[1,2,6]



Routine rapid HCV testing among 15- to 30-year-olds may be cost-effective when the prevalence of PWID is >0.59%.



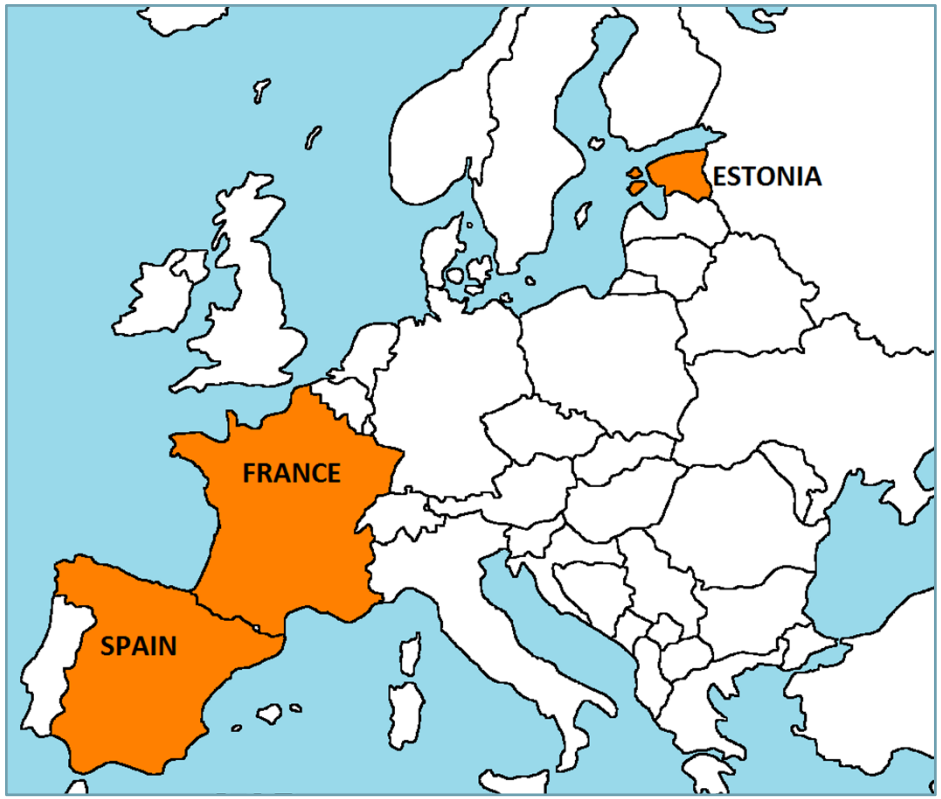
Who to test for HBV, HCV and HIV

Population groups that should be considered for targeted HBV, HCV and HIV testing; two criteria:

- high burden of infection
- likelihood of ongoing transmission.

The general population may also be considered for testing initiatives, such as universal testing in high-prevalence geographical areas or birth-cohort testing.

HIV Screening Strategies Across Europe: A Cost-Effectiveness Analysis



General population
One additional lifetime test costs
France = 35,800€/YLS
Spain = 28,100€/YLS

Testing every three years
Estonia = 13,000€/YLS

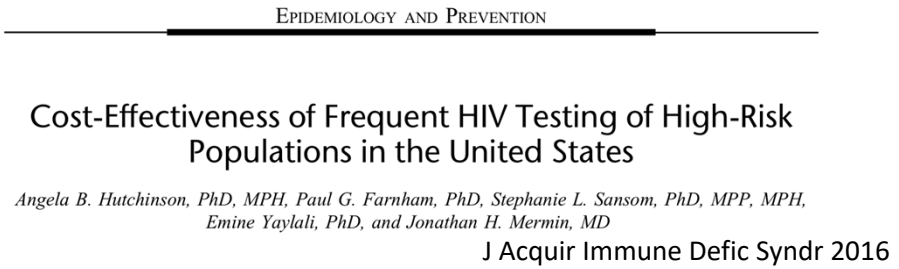
Mabileau et al CROI 2016

OptTEST
Co-funded by the 2nd Health Programme of the European Union

IF RESOURCES ARE LIMITED

HEALTH SYSTEM CAPACITY OR CAPITATED TREATMENT BUDGETS

- **At risk populations: Increased targeted testing**
  - PWID
  - MSM


EPIDEMIOLOGY AND PREVENTION

Cost-Effectiveness of Frequent HIV Testing of High-Risk Populations in the United States

Angela B. Hutchinson, PhD, MPH, Paul G. Farnham, PhD, Stephanie L. Sansom, PhD, MPP, MPH, Emine Yaylali, PhD, and Jonathan H. Mermin, MD

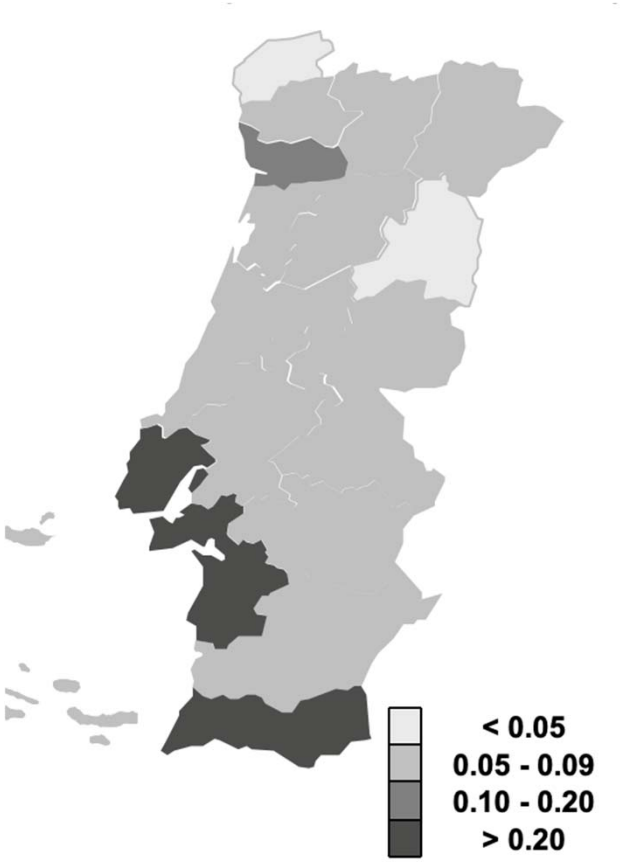
J Acquir Immune Defic Syndr 2016

Frequency of HIV screening in Europe should reflect each country's HIV epidemic profile (incidence, CD4 at diagnosis), HIV test and drug costs

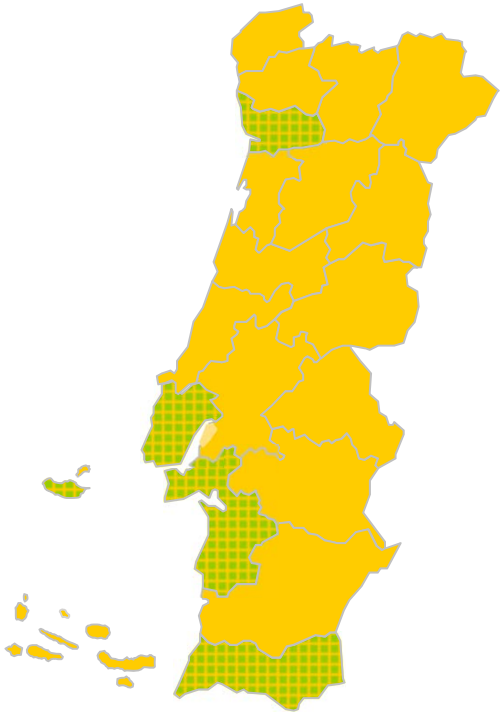
- **People living in high-prevalence geographical areas**

Cost-Effectiveness of One-Time HIV Screening in Different Regions

2010 Annual Incidence (%)



CE of Regional One-Time Screening



Infarmed Threshold : ICER < 30,000

WHO CE Threshold : ICER < 50,000

>WHO Threshold

Yazdanpanah, Pelerman, et al Plos One 2013

- Medicalised HIV testing

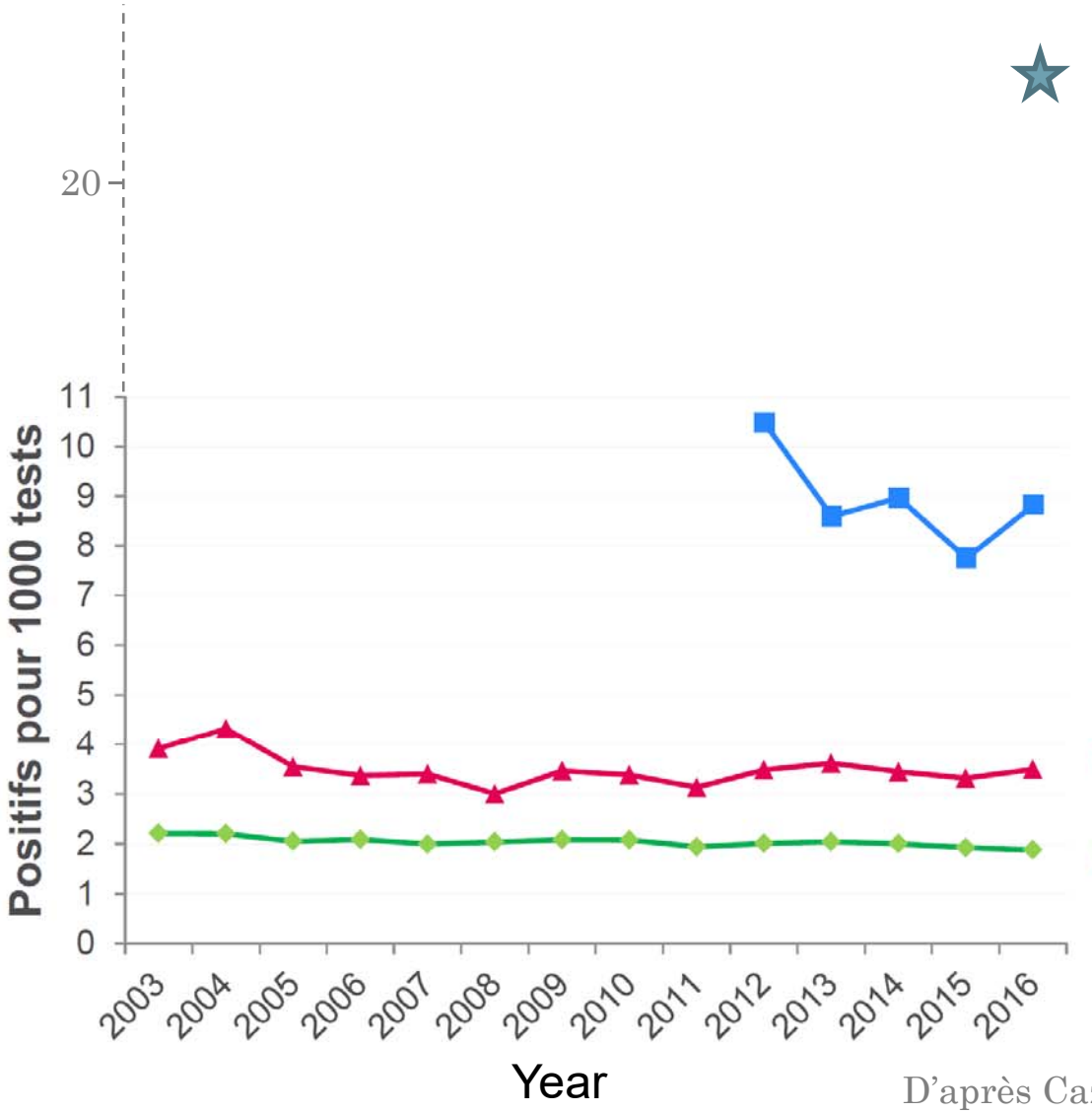
- Non-medicalised HIV testing;
  - Rapid test in the community
  - Self test
  - Home testing

Reliability of HIV rapid diagnostic tests for self-testing compared with testing by health-care workers: a systematic review and meta-analysis

Carmen Figueroa, Cheryl Johnson, Nathan Ford, Anita Sands, Shona Dalal, Robyn Meurant, Irena Prat, Karin Hatzold, Willy Urassa, Rachel Baggaley

Lancet HIV 2018;

HIV positive tests/overall tests



Partner Notification
120-530/1000

Community testing
8,7 / 1000

VCTs
3,6 / 1000

General population
2,0 / 1000

D'après Cazein et al. BEH 2017 (29-30)

THANK YOU FOR YOUR ATTENTION

BACK-UP SLIDES

Sylvie DEUFFIC-BURBAN

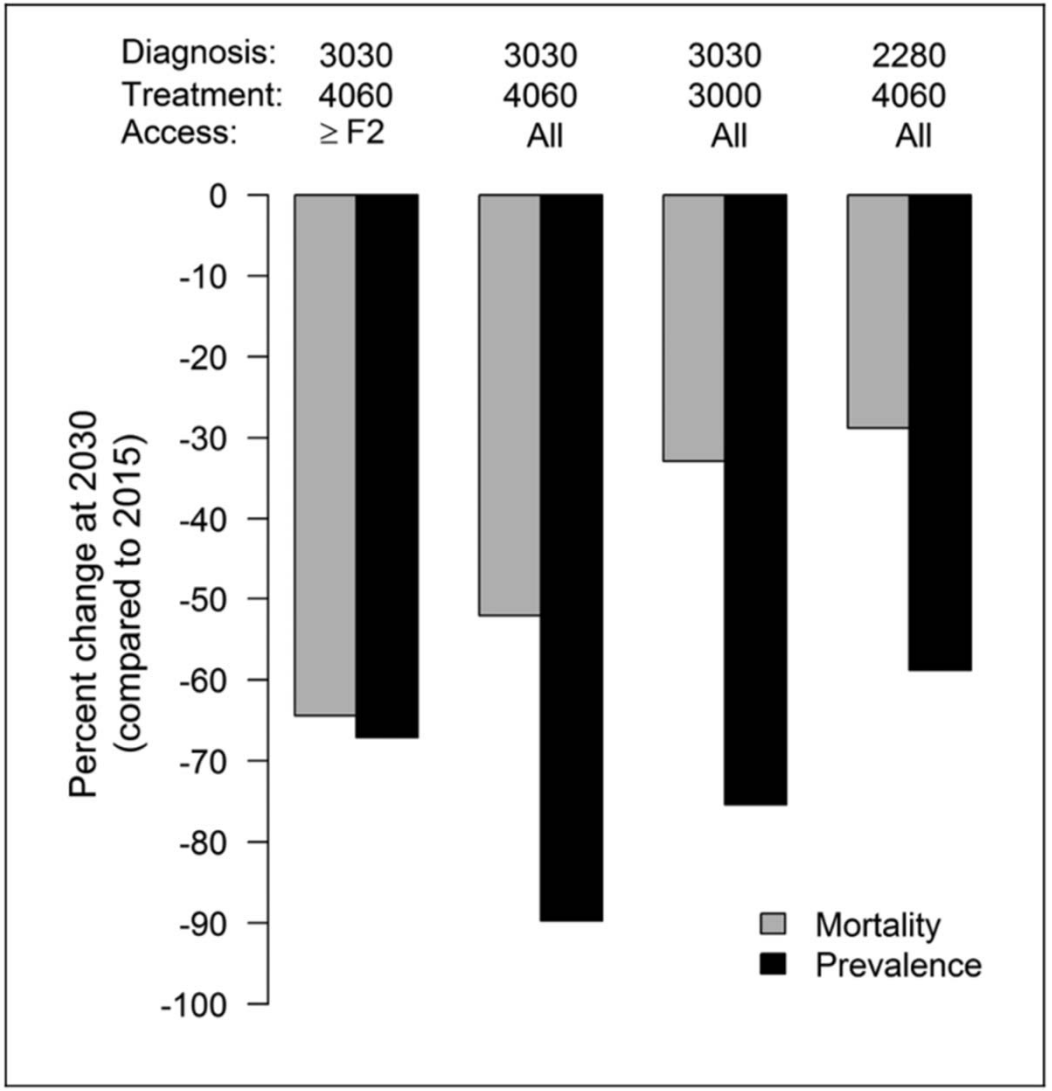
Inserm, UMR 1137, Paris

KEY DATA OR ASSUMPTIONS

- Characteristics of the studied populations issued from the 2004 national seroprevalence survey of the French National Public Health agency
  - % RNA positivity according to gender, age and the presence of risk factors
  - Current screening coverage
  - % excessive alcohol abuse by gender and age
  - Distribution in fibrosis stage
- Coverage of new screening strategy = 50%
- Initiation of treatment following screening = 100%
- Cost
  - Treatment cure = 28,730 €
  - HCV Ab test = 14.85 €
  - HCV RNA test = 59.40 €
- Health-related quality of life using EuroQol-5D

Meffre et al, J Med Virol 2010; Deuffic-Burban et al, to appear in J Hepatol (under embargo until July 1st); Cossais et al, EASL 2015 (P0745); Pol et al, EASL 2015 (P0747)

Percent change in mortality rate and prevalence in Belgium 2030 vs.2015 estimates under four policies (diagnosis vs. Treatment).



- HCV transmission or reinfection risk not taken into account (under or over-estimation of long-term costs and benefits):
  - Cured individuals would have infect others: avert the costs and health harms of other infections
  - Cured individuals may be reinfected (high-incidence communities): attenuating the secondary benefits of curing the index case

Of the 23 articles that made comparisons of expanded access to earlier fibrosis stages compared to more restrictive treatment access policies:

five models included disease transmission;

one model included a risk of reinfection after successful treatment