Apport de la modélisation dans le choix des stratégies de prescription des anti-infectieux

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Service des Maladies Infectieuses et Tropicales Hôpital Bichat Claude Bernard

Equipe ATIP/Avenir INSERM (U1137): 'Modélisation, Aide la Décision, et Coût-Efficacité en Maladies Infectieuses'

Université Paris Diderot: site Bichat

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La prise de décision en médecine

- Fondée sur les **indicateurs sanitaires** qui évaluent les **conséquences à court terme** d'une stratégie

La prise de décision en médecine

- Fondée sur les indicateurs sanitaires qui évaluent les conséquences à court terme de l'état de santé d'une population.
- Déterminer **les conséquences à long terme**
- Prendre en compte des indicateurs sanitaires **de mortalité, de morbidité, et de qualité de vie**

  et **la situation économique, les ressources financières, et les aspects sociaux.**

Antibiothérapie

- Impact de la consommation des antibiotiques sur l'évolution des résistances : **conséquences à long terme +++**

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Antibacterial Prophylaxis after Chemotherapy for Solid Tumors and Lymphomas

Michael Cullen, M.D., Neil Steven, Ph.D., Lucinda Billingham, Ph.D., Claire Gaunt, B.Sc., Mark Hastings, M.D., Peter Simmonds, M.D., Nicholas Stuart, M.D., Daniel Rea, Ph.D., Mark Bower, Ph.D., Indrajit Fernando, M.D., Robert Huddart, Ph.D., Simon Gollins, D.Phil., and Andrew Stanley, M.R.Pharm.S., for the Simple Investigation in Neutropenic Individuals of the Frequency of Infection after Chemotherapy +/– Antibiotic in a Number of Tumours (SIGNIFICANT) Trial Group*

N Engl J Med 2005;353:988-98.

Levofloxacine 500mg/j pdt 7 j
Placebo

après chimio au moment de la survenue de la neutropénie

Résistances : conséquences à long terme +++ ?

Table 3. Incidence of Febrile Episodes, Probable Infections, and Hospitalization for Infection.*

	Levofloxacin	Placebo	Relative Risk (95% CI)	P Value†
Yes	27 (3.5)	62 (7.9)	0.44 (0.28–0.68)	<0.001
No	736	699		
Unknown	18	23		
Probable infection				
Yes	109 (14.0)	152 (19.4)	0.72 (0.57–0.90)	0.005
No	658	614		
Unknown	14	18		
Hospitalization for infection				
Yes	52 (6.7)	81 (10.3)	0.64 (0.46–0.90)	0.01
No	712	681		
Unknown	17	22		

On Demand PrEP with Oral TDF/FTC in MSM Results of the ANRS Ipergay Trial

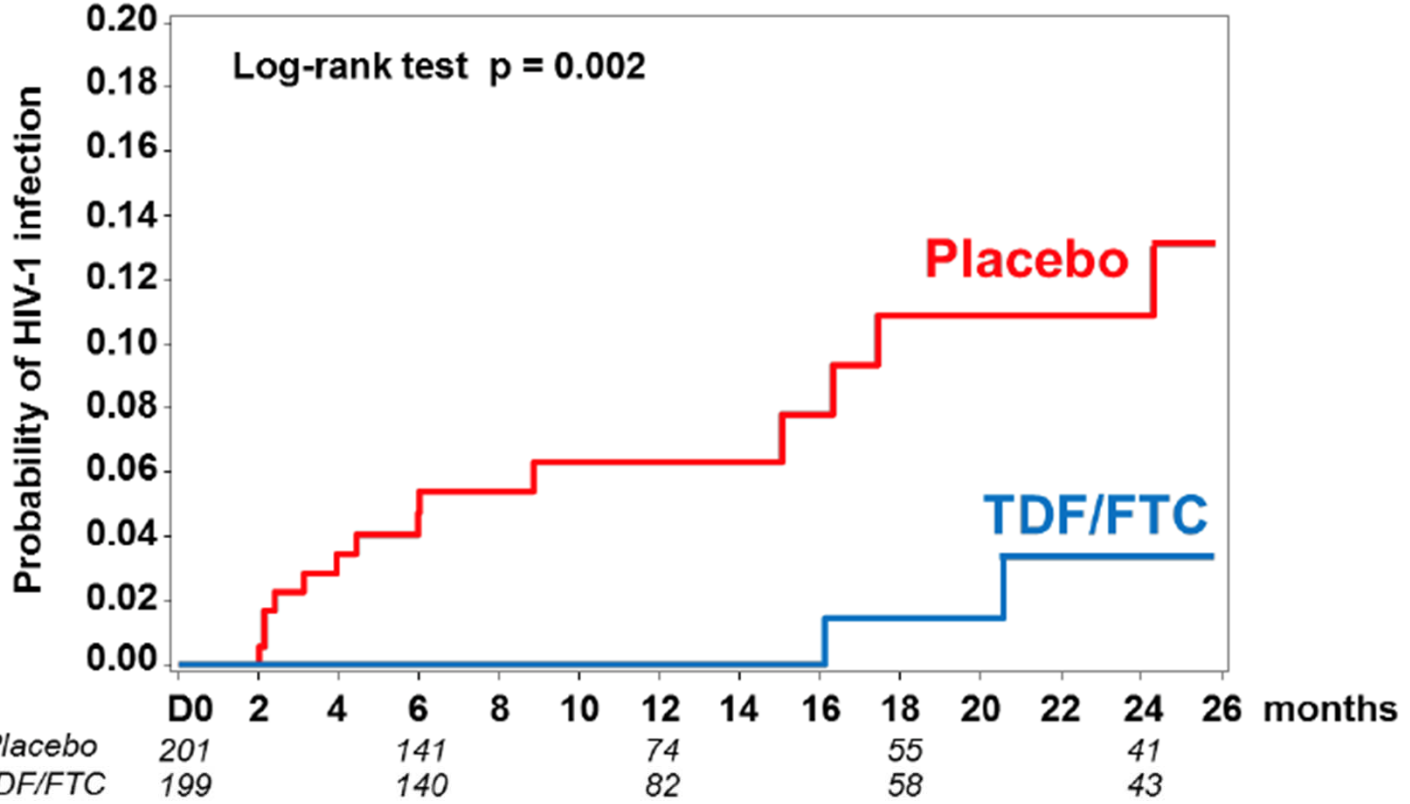
Molina JM, Capitant C, Spire B, Pialoux G, Chidiac C, Charreau I, Tremblay C, Meyer L, Delfraissy JF, and the ANRS Ipergay Study Group

Hospital Saint-Louis and University of Paris 7, Inserm SC10-US019 Villejuif, Hospital Tenon, Paris, Hospital Croix-Rousse, Lyon, UMR912 SEAS Marseille, France, CHUM, Montreal, Canada and ANRS, Paris, France

anrs France REcherche Nord & sud Sida-hiv Hépatites
Agence autonome de l'Inserm

ipergay
ANRS
Intervention Préventive de l'Exposition aux Risques avec et pour les Gays

KM Estimates of Time to HIV-1 Infection (mITT Population)



Mean follow-up of 13 months: 16 subjects infected

14 in placebo arm (incidence: 6.6 per 100 PY), **2 in TDF/FTC arm** (incidence: 0.94 per 100 PY)

86% relative reduction in the incidence of HIV-1 (95% CI: 40-99, p=0.002)

NNT for one year to prevent one infection : 18

anrs France REcherche Nord & sud Sida-hiv Hépatites
Agence autonome de l'Inserm

PreP

- Long-term impact of PrEP on parameters which will have a critical role in PrEP effectiveness?
  - behavioural changes
  - acquisition of viral resistance
- Cost?
- Feasibilty: counseling is imperative to maintaining ARV adherence, which is essential for PrEP efficacy
  - not clear whether we can deliver the same services in non-experimental settings.

PreP

- The viability of PrEP itself as an HIV-prevention strategy should be considered in light of the development of other biomedical prevention modalities and especially in light of “test and treat” strategy
  - Earlier treatment initiation can impact the effectiveness of PrEP: if in a higher proportion of HIV-infected patients the viral load is suppressed, and as a result transmission is lower, PrEP may be a less attractive option, even in high-risk populations.
  - Although multiple preventive strategies are effective, and combined prevention is desirable, resources are increasingly scarce.

- Translational research from ‘bedside to population side’.

Mathematical modelling of HIV prevention intervention

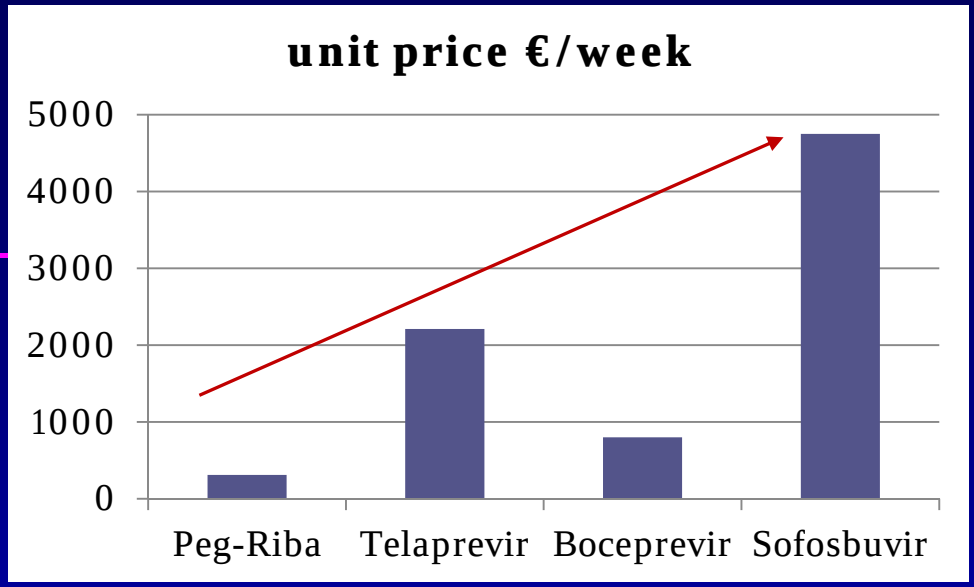
Rodolphe Thiébaut[a] and Margaret T. May[b]

AIDS 2013, **27**:475–476

Keywords: antiretroviral therapy, cost-effectiveness, HIV, mathematical modelling, prevention

- "Mathematical modelling is useful for bridging the gap between demonstrating the efficacy of the intervention and implementing it on a whole population."

Des progrès thérapeutiques révolutionnaires mais aussi une augmentation des couts



1,000€ for 12-week RBV
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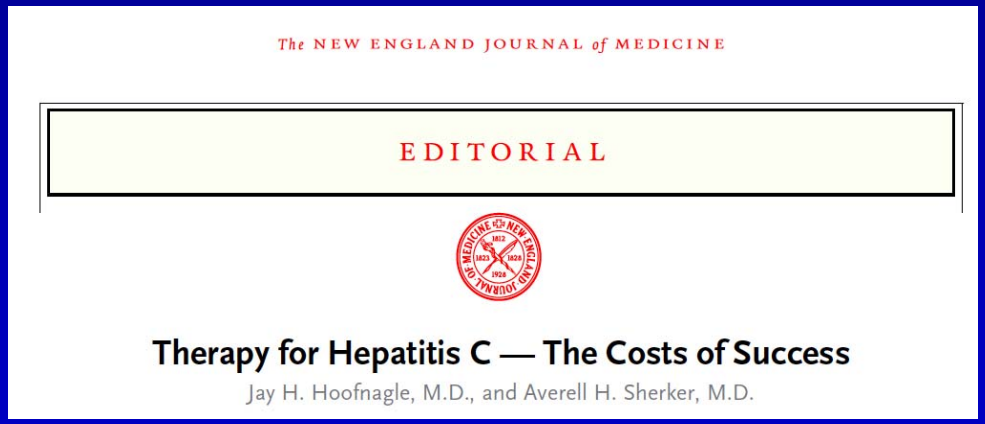
35,000€ for 12- or 24-week DCV
35,000€ for 12-week SIM

Impact budgetaire?



The NEW ENGLAND JOURNAL of MEDICINE

EDITORIAL

Therapy for Hepatitis C — The Costs of Success

Jay H. Hoofnagle, M.D., and Averell H. Sherker, M.D.

'With the present estimates of costs, treating even half the HCV-infected persons in the United States would add billions of dollars to an already overburdened medical care system. Costs alone cast a pall over the stunning success in achieving the long-hoped-for goal of a safe and effective therapy for hepatitis C.'

Hoofnagle JH, and Sherker AH. N Engl J Med 2014; 370:1552–53.

Test and Treat hépatite C

Le traitement a un double impact :

- Individuel : guérison du malade
- Collectif : la transmission du VHC par voie parentérale est associée au niveau de la charge virale plasmatique du VHC

  → Patients non-virémiques : ne transmettent pas l'infection[1]

Traitements plus efficaces : pose la question de l'intérêt du traitement dans un but de prévention de la transmission secondaire (« TasP ») dans la population des UD

(1) Yadanpanah *et al.*, Clin Inf Dis, 2005

BRIEF REPORT

Emergence of Zaire Ebola Virus Disease in Guinea — Preliminary Report

Sylvain Baize, Ph.D., Delphine Pannetier, Ph.D., Lisa Oestereich, M.Sc., Toni Rieger, Ph.D., Lamine Koivogui, Ph.D., N'Faly Magassouba, Ph.D., Barrè Soropogui, M.Sc., Mamadou Saliou Sow, M.D., Sako Hilde De Clerck, M.D., Amanda Tiffany, M.P.H., Gemma Dc Mathieu Loua, M.D., Alexis Traoré, M.D., Moussa Kc Emmanuel Roland Malano, M.D., Emmanuel Heleze, M.D., Ar Stephane Mély, M.Sc., Hervé Raoul, Ph.D., Valérie Ca Dániel Cadar, D.V.M., Ph.D., Martin Gabriel, M.D., Meike F Dennis Tappe, M.D., Jonas Schmidt-Chanasit, M.D., Benido

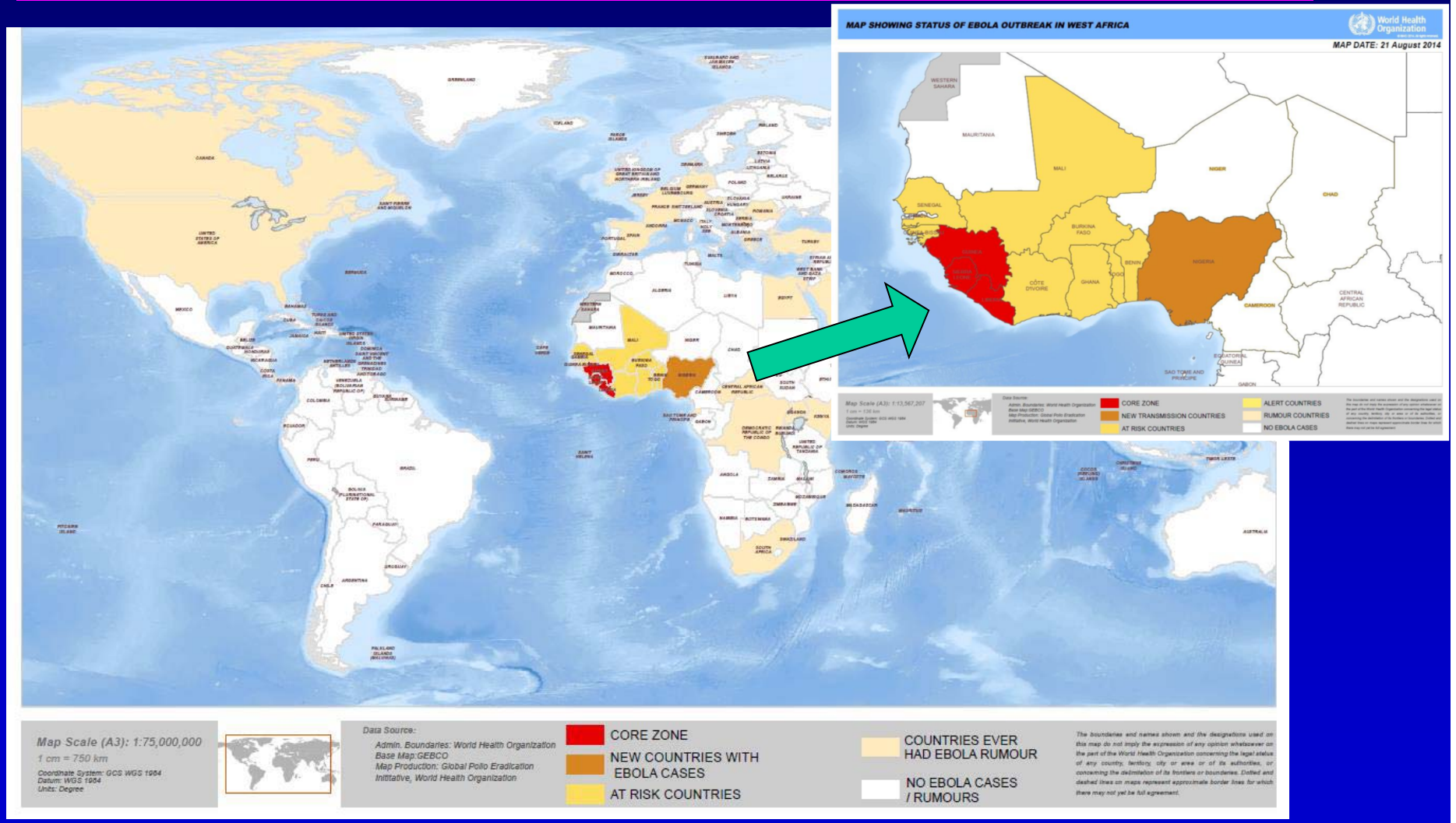
Épicentre en Guinée (Guéckédou, Macenta) début 2014

Fin mars, l'épidémie s'est propagée au Liberia et au Sierra Leone voisins

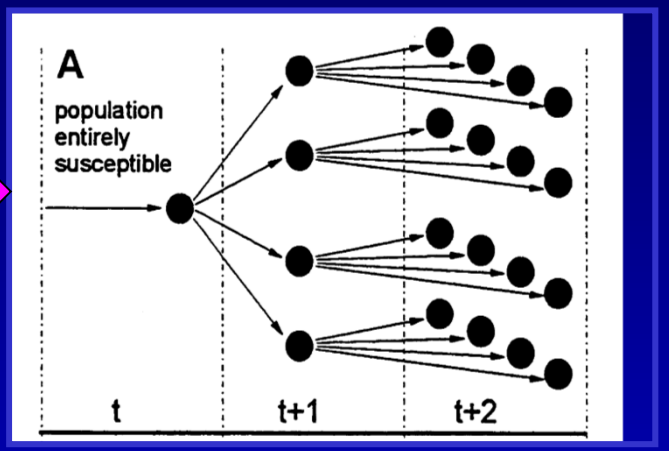
Figure 1. Map of Guinea Showing Initial Locations of the Outbreak of Ebola Virus Disease.

The area of the outbreak is highlighted in red. The main road between the outbreak area and Conakry, the capital of Guinea, is also shown. The map was modified from a United Nations map.

30/08/2015 : 28 109 cas; 11 305 décès (létalité observée près de 40%)



$R_0 = 4$
with whole population susceptible



R*o* : « Une échelle de Richter » pour les maladies transmissibles ?

Rougeole	R*o* = 15 à 20
Grippe	R*o* = 1,8 à 2,5
Variole	R*o* = 3
SRAS	R*o* = 2

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

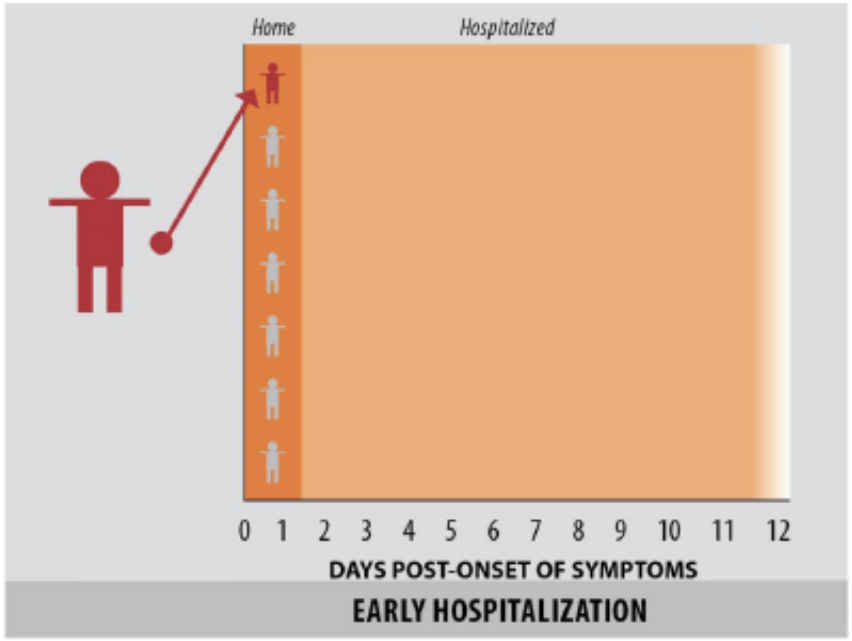
Ebola Virus Disease in West Africa — The First 9 Months of the Epidemic and Forward Projections

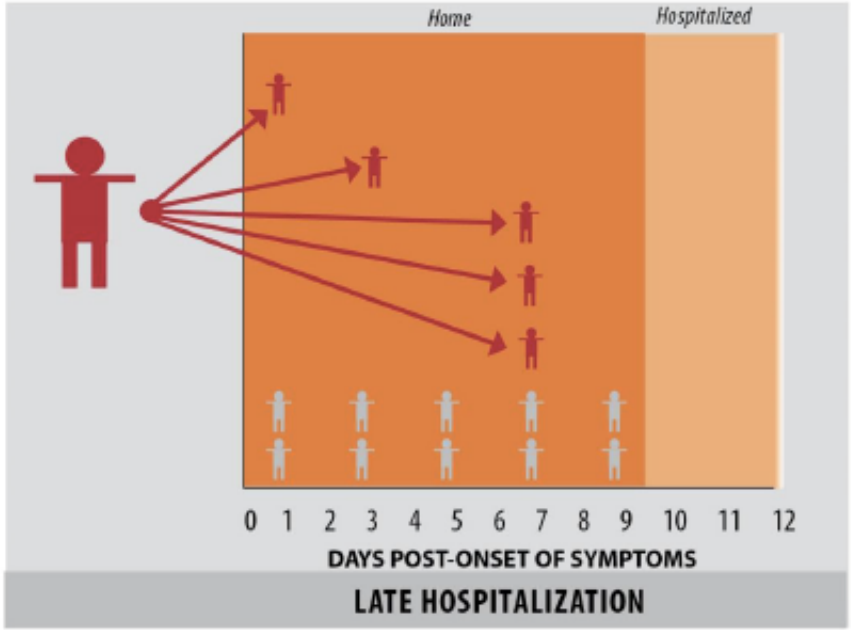
WHO Ebola Response Team*

	Guinea	Liberia	Nigeria	Sierra Leone
R0	1.71	1.83	1.20	2.02
R1	1.81	1.51		1.38

Ebola transmission dynamics:

early hospitalization vs. late hospitalization

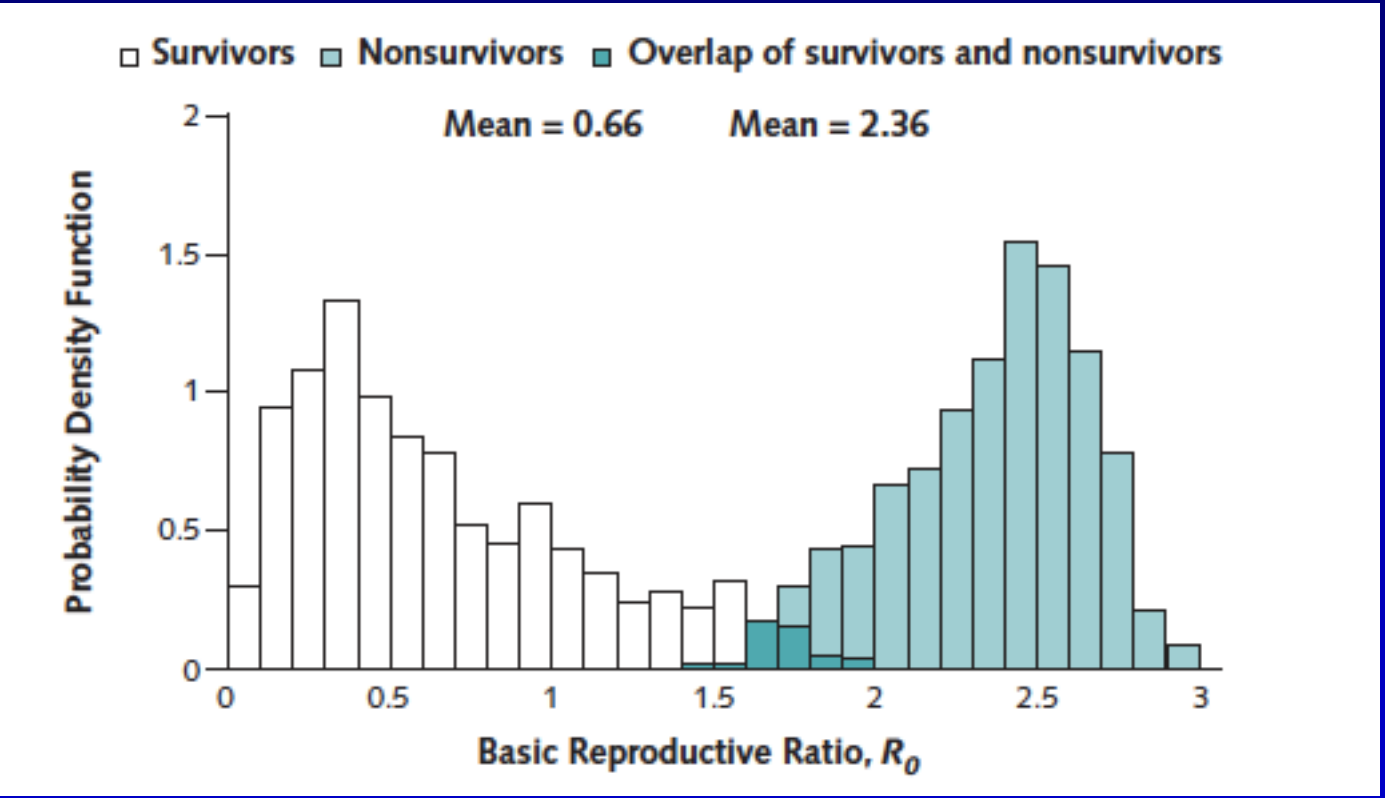




Fewer contacts
Less risk of transmission
Better survival

Multiple contacts
High risk of transmission

Effect of Ebola Progression on Transmission and Control in Liberia.



Yamin D, et al. Ann Intern Med

Journal of Antimicrobial Chemotherapy (2005) **56**, 257–258
doi:10.1093/jac/dki230
Advance Access publication 21 June 2005

JAC

Mathematical model—tell us the future!

Pentti Huovinen*

Antimicrobial Research Laboratory, Department of Bacterial and Inflammatory Diseases, National Public Health Institute, Finland

Les modèles mathématiques développés

- Modèles de transmission (modèles SI, SIR, SEIR, …)

- Modèles « d'histoire naturelle »

Les modèles mathématiques développés

- Modèles de transmission (modèles SI, SIR, SEIR, …)

  Susceptible (S)
  Exposed (E)
  Infecté (I)
  Guéri (R)

- Modèles « d'histoire naturelle »

- ***Quelle stratégie pour controler la transmission des Enterobacterie productrices de BLSE***
  - **Lavage des mains**
  - Isolement/Cohorting
  - Restriction d'utilisation des antibiotiques

Hand Hygiene, Cohort Nursing or Antibiotic Restriction to Control Extended-Spectrum Beta-Lactamase-Producing *Enterobacteriaceae* (ESBL-PE) Transmission: Back to Basics

Camille Pelat, Lydia Kadras, Gabriel Birgand, Etienne Ruppé, Michaël Schwarzinger, Antoine Andremont, Jean-Christophe Lucet & Yazdan Yazdanpanah

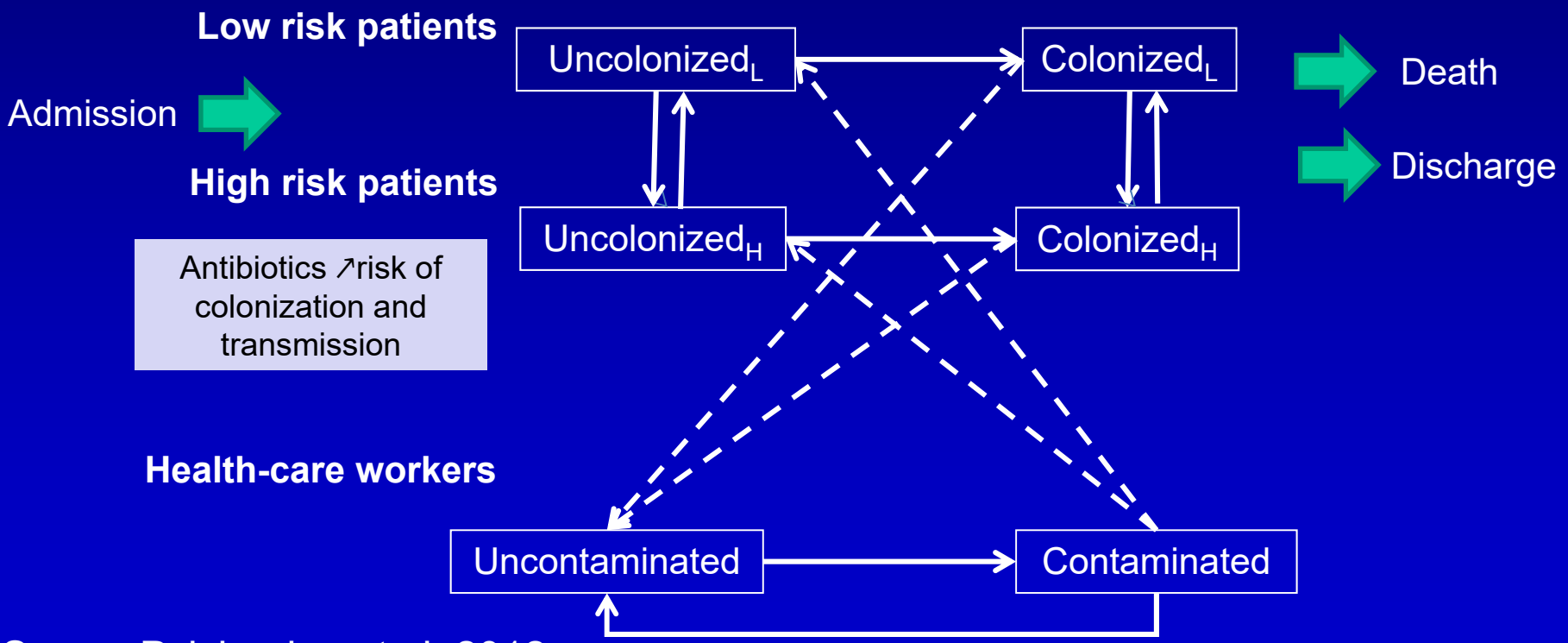
INSERM

Université Paris Diderot,

Bichat-Claude Bernard Hospital, Paris, France

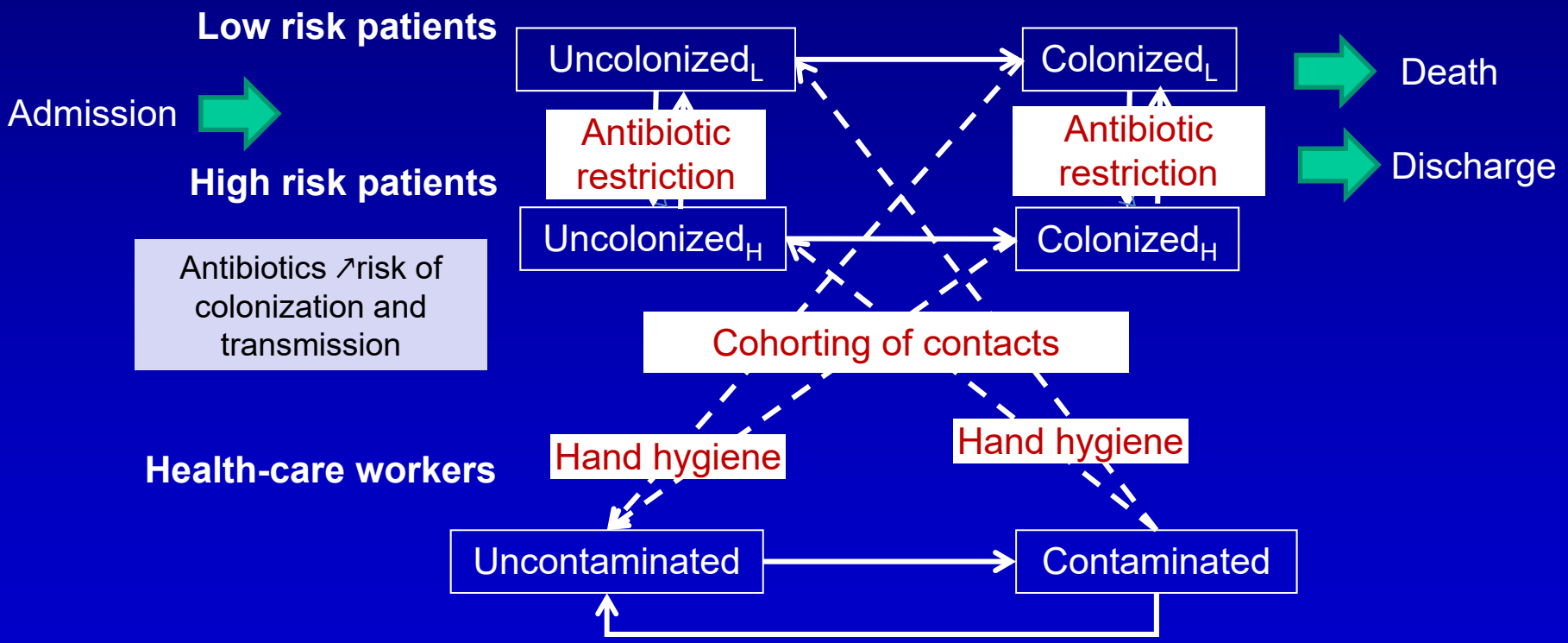
Infect Control Hospit Hyg 2015

Model stochastic de transmission



Sypsa, Psichogiou et al. 2012
Austin, et al. 1999
D'Agata et al. 2005

Stochastic model of ESBL-PE transmission



- Réanimation de 10 lits : 4 infirmiers et 2 aide soignants
- Admission d'1 patient porteur de BLSE

Results

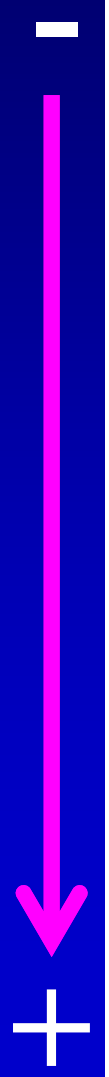
K. pneumoniae

Intervention	Mean	Reduction (%)	Median duration
No intervention (baseline)	5.6	-	57

Results

K. pneumoniae

Intervention	Mean	Reduction (%)	Median duration
No intervention (baseline)	5.6	-	57

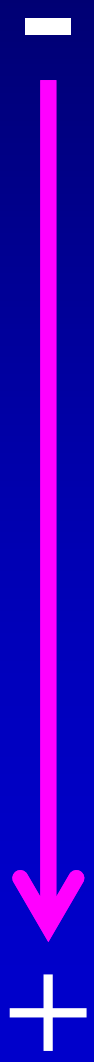


Results

K. pneumoniae

Intervention	Mean	Reduction (%)	Median duration
No intervention (baseline)	5.6	-	57
HH 1 (55% - 80%)	1.53	-73	30

↗ hand hygiene before contact from 55% to 80%



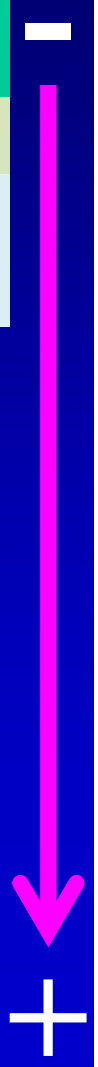
Results

K. pneumoniae

Intervention	Mean	Reduction (%)	Median duration
No intervention (baseline)	5.6	-	57
HH 1 (55% - 80%)	1.53	73	30
HH 2 (80% - 80%)	0.47	92	25

↗ hand hygiene before contact from 55% to 80%

↗ hand hygiene before/after contact from 55/60% to 80/80%



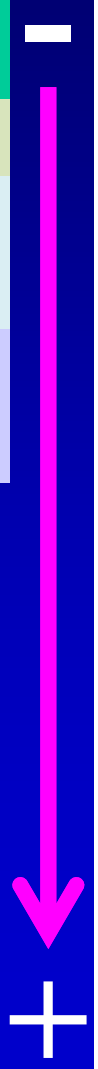
Results

K. pneumoniae

Intervention	Mean	Reduction (%)	Median duration
No intervention (baseline)	5.6	-	57
HH 1 (55% - 80%)	1.53	73	30
HH 2 (80% - 80%)	0.47	92	25
Cohort nursing 60%	2.41	57	35
Cohort nursing 80%	1.58	72	29

The probability of contact with a cohorted nurse = 60%

The probability of contact with a cohorted nurse = 80%



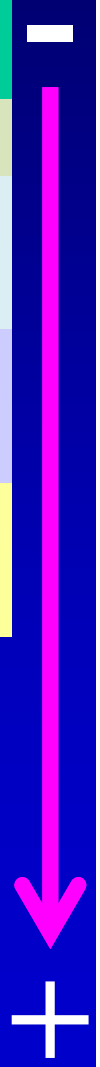
Results

K. pneumoniae

Intervention	Mean	Reduction (%)	Median duration
No intervention (baseline)	5.6	-	57
HH 1 (55% - 80%)	1.53	73	30
HH 2 (80% - 80%)	0.47	92	25
Cohort nursing 60%	2.41	57	35
Cohort nursing 80%	1.58	72	29
ATB 1	4.55	18.7	50.5
ATB 2	3.69	34.1	42.2

↘ ATB1 + antibiotic duration in the ICU by half

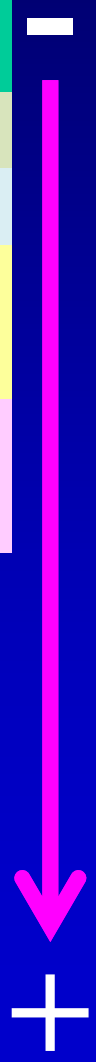
↘ Proportion of patients on antibiotics at admission from 56% to 28%



Results

K. pneumoniae

Intervention	Mean	Reduction (%)	Median duration
No intervention (baseline)	5.6	-	57
HH 2 (80% - 80%)	0.47	92	25
HH 2 + cohort nursing 60%	0.26	95	23
HH2 + cohort nursing 80%	0.18	97	22
HH2 + ATB 1	0.40	92.9	24
HH2 + ATB 2	0.36	93.8	25.6



Results

K. pneumoniae

Intervention	Mean	Reduction (%)	Median duration
No intervention (baseline)	5.6	-	57
HH 2 (80% - 80%)	0.47	91.6	25
Hand hygiene 1+cohort nursing 2+ATB 1	0.44	92.1	24.25
Hand hygiene 2+ATB 1	0.40	92.9	23.99
Hand hygiene 1+cohort nursing 2+ATB 2	0.38	93.1	24.02
Hand hygiene 2+ATB 2	0.35	93.8	23.58
Hand hygiene 2+cohort nursing 1	0.26	95.4	23.18
Hand hygiene 2+cohort nursing 1+ATB 1	0.22	96	22.91
Hand hygiene 2+cohort nursing 1+ATB 2	0.19	96.6	22.67
Hand hygiene 2+cohort nursing 2	0.18	96.7	22.41
Hand hygiene 2+cohort nursing 2+ATB 1	0.16	97.07	22.63
Hand hygiene 2+cohort nursing 2+ATB 2	0.15	97.37	22.33

- Comment faire pour améliorer le lavage des mains?

Mathematical modelling: a tool for hospital infection control

H Grundmann, B Hellriegel

Health-care-associated infections caused by antibiotic-resistant pathogens have become a menace in hospitals worldwide and infection control measures have lead to vastly different outcomes in different countries. During the past 6 years, a theoretical framework based on mathematical models has emerged that provides solid and testable hypotheses and opens the road to a quantitative assessment of the main obstructions that undermine current efforts to control the spread of health-care-associated infections in hospitals and communities. We aim to explain to a broader audience of professionals in health care, infection control, and health systems administration some of these models that can improve the understanding of the hidden dynamics of health-care-associated infections. We also appraise their usefulness and limitations as an innovative research and decision tool for control purposes.

Lancet Infect Dis 2006; 6: 39–45

HG is at the National Institute of Public Health and the Environment, Bilthoven, and Department of Medical Microbiology, University of Groningen, Groningen, Netherlands; BH is at the Institute for Medical Statistics and Epidemiology, TU Munich,

BMJ

BMJ 2011;343:d5694 doi: 10.1136/bmj.d5694

RESEARCH

Screening, isolation, and decolonisation strategies in the control of meticillin resistant *Staphylococcus aureus* in intensive care units: cost effectiveness evaluation

Julie V Robotham *mathematical modeller*[1], Nicholas Graves *professor of health economics*[2], Barry

PreP

- The viability of PrEP itself as an HIV-prevention strategy should be considered in light of the development of other biomedical prevention modalities and especially in light of “test and treat” strategy
  - Earlier treatment initiation can impact the effectiveness of PrEP: if in a higher proportion of HIV-infected patients the viral load is suppressed, and as a result transmission is lower, PrEP may be a less attractive option, even in high-risk populations.
  - Although multiple preventive strategies are effective, and combined prevention is desirable, resources are increasingly scarce.

Effectiveness, cost, and cost-effectiveness of new interventions:

- PreP
- TasP
- Testing

Strategies that should be considered not one by one but in light of each other

The new role of antiretrovirals in combination HIV prevention: a mathematical modelling analysis

Ide Cremin[a], Ramzi Alsallaq[b], Mark Dybul[c,d], Peter Piot[e], Geoffrey Garnett[f] and Timothy B. Hallett[a]

AIDS 2013

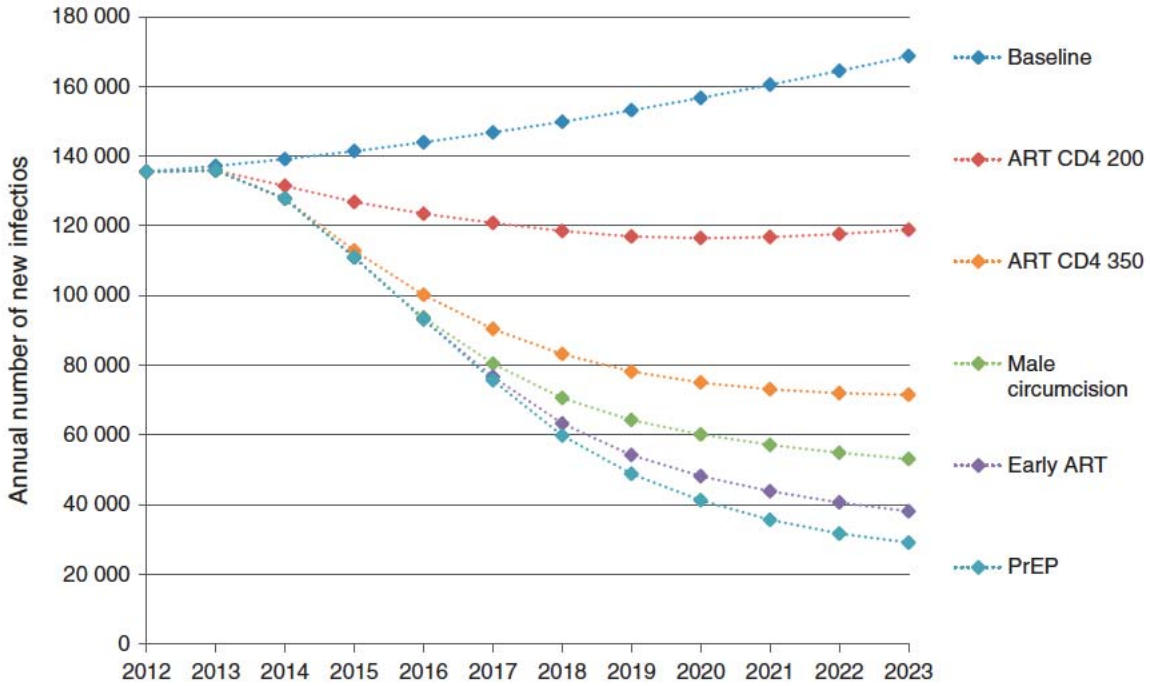
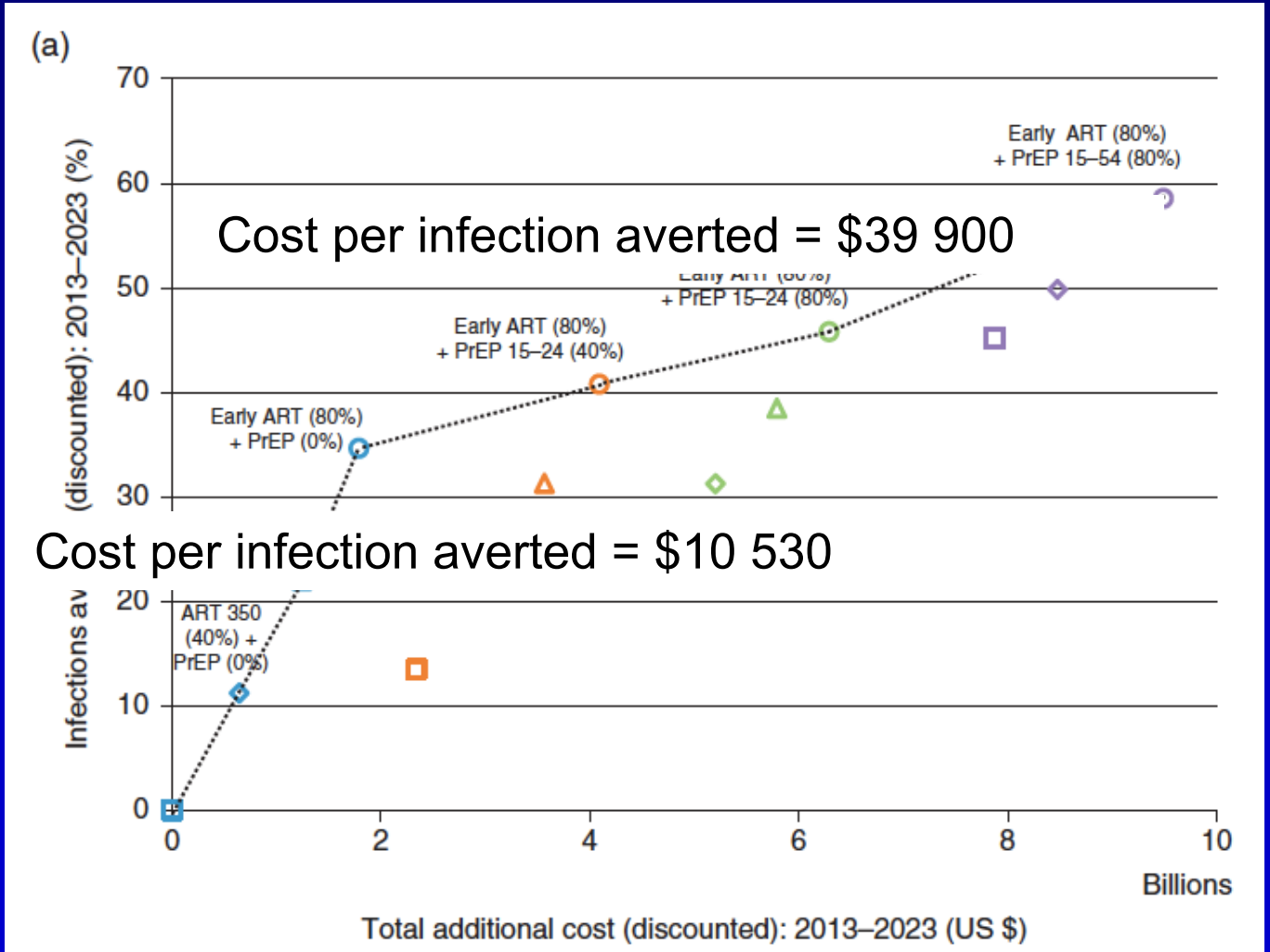


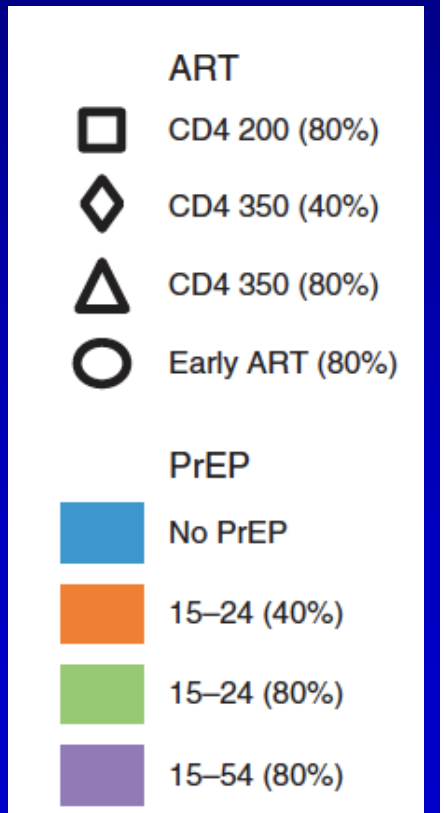
Fig. 4. The impact of combination prevention on the annual number of new HIV infections. The impact on new HIV infections of complete ART coverage at CD4 200; and very high ART coverage at CD4 350; and a male circumcision intervention; and early ART; and PrEP. See Table 3 for corresponding assumptions.

The new role of antiretrovirals in combination HIV prevention: a mathematical modelling analysis

Ide Cremin[a], Ramzi Alsallaq[b], Mark Dybul[c,d], Peter Piot[e], Geoffrey Garnett[f] and Timothy B. Hallett[a]

AIDS 2013





- Si ratio C/E < PIB par habitant du pays = stratégie très coût-efficace
- Si ratio C/E < 3*PIB par habitant du pays = stratégie coût-efficace

PIB par habitant de la France = 90 000 euros

PIB par habitant de Côte d'Ivoire = 708 $

Eur J Health Econ (2011) 12:499–502
DOI 10.1007/s10198-011-0348-5

EDITORIAL

Budget impact analysis in economic evaluation: a proposal for a clearer definition

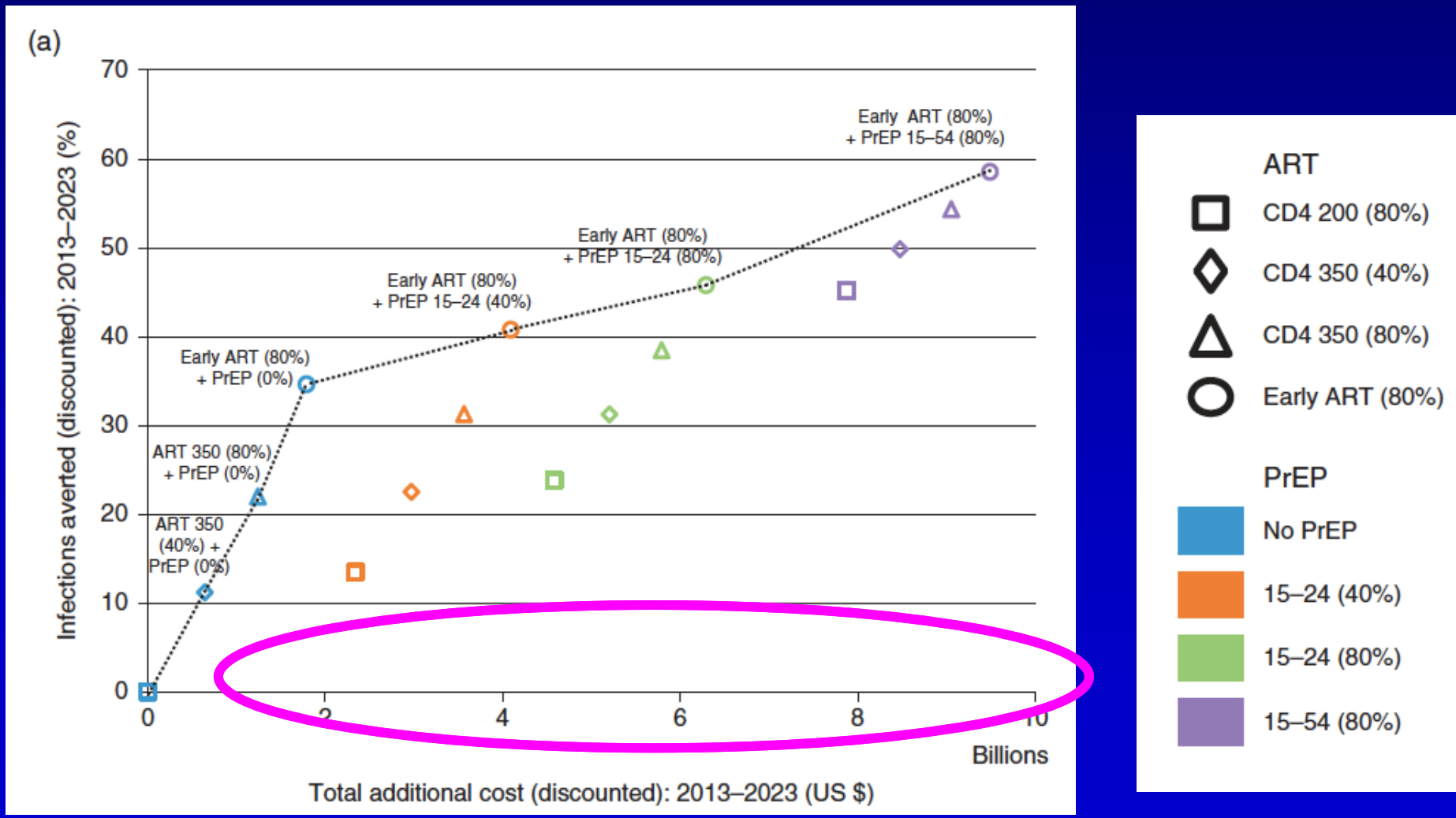
Livio Garattini · Katelijne van de Vooren

The financial consequences of introducing a new technology in a specific setting over the short to medium term : *affordability*

The new role of antiretrovirals in combination HIV prevention: a mathematical modelling analysis

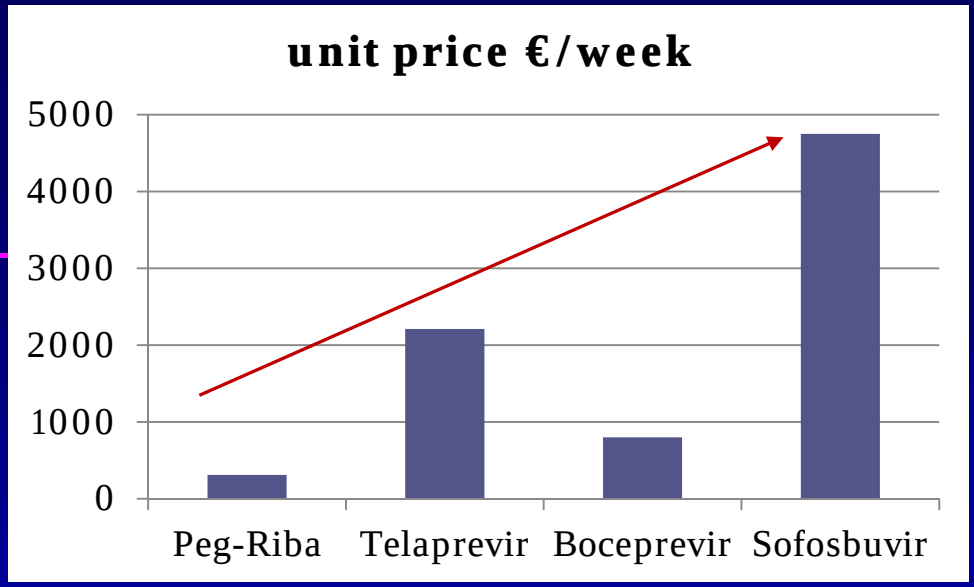
Ide Cremin[a], Ramzi Alsallaq[b], Mark Dybul[c,d], Peter Piot[e], Geoffrey Garnett[f] and Timothy B. Hallett[a]

AIDS 2013



Modèles « d'histoire naturelle » : conséquences d'une infection en termes de morbidité, de mortalité

Des progrès thérapeutiques révolutionnaires mais aussi une augmentation des couts



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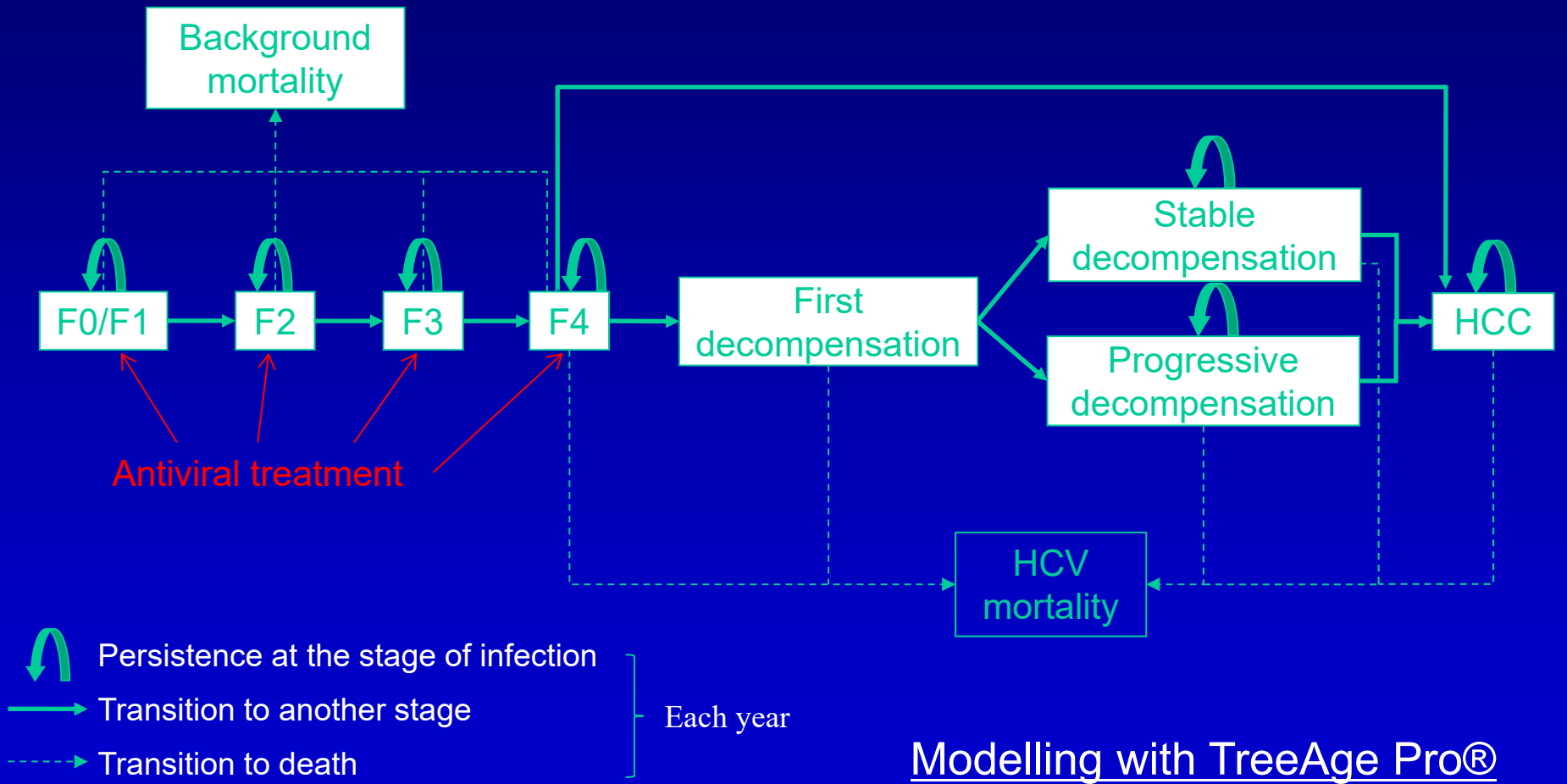
41,400€ Viekirax
3,600€ Exviera
35,000€ for 12- or 24-week DCV
35,000€ for 12-week SIM

How can antiviral treatments best be used?

- Optimal timing of initiation?
- In patients diagnosed and presenting to care, at which fibrosis stage is it cost-effective to treat?

Mathematical modelling: Natural history of chronic HCV



Modelling with TreeAge Pro®

Long-term evaluation: Sofosbuvir-based regimens vs. SOC in United States

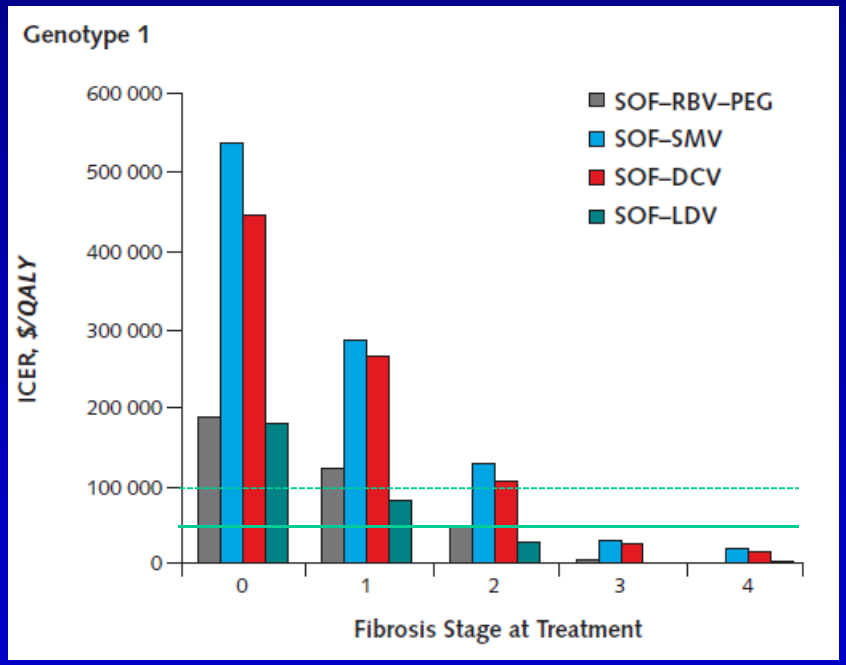
- Najafzadeh et al, 2015: IFN-free regimens compared to SOC

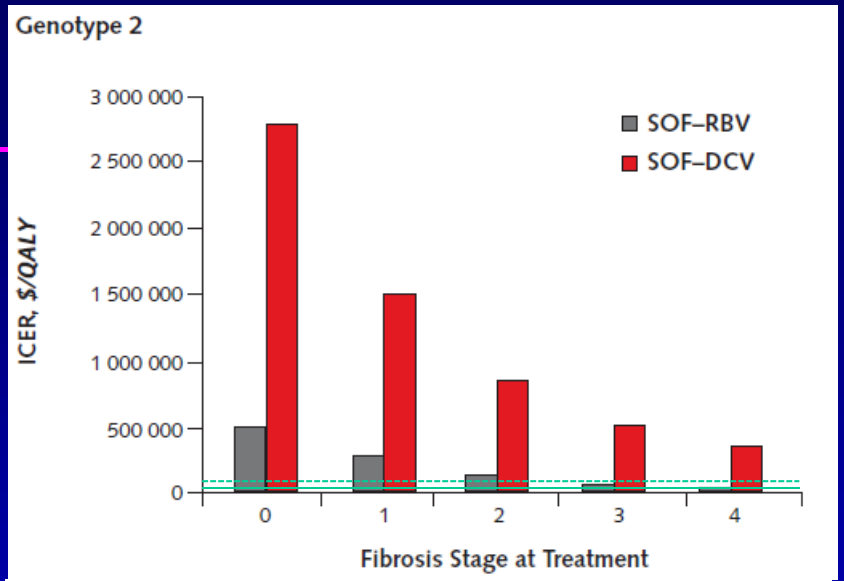
Treatment costs, *$/wk*	
PEG	580
RBV	371
BOC	1100
SOF	7000 (500 to 9500)
SMV	5500 (500 to 9500)
DCV	5500 (500 to 9500)
LDV	875 (500 to 9500)

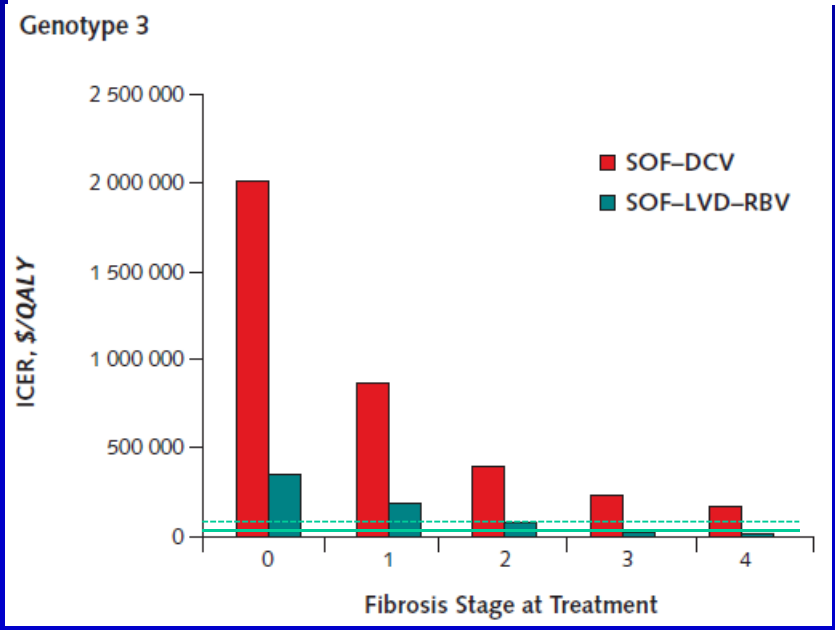
- G1: $14,432 (sof-ldv) to $70,097 (sof-smv) / qaly gained
- G2: $55,953 (sof-rbv) / qaly gained
- G3: $62,141 (sof-ldv-rbv) to $259,507 (sof-dcv) / qaly gained

Najafzadeh et al, Ann Intern Med 2015

- Les ratio coût-efficacité varient en fonction du stade de fibrose à l'initiation de trt

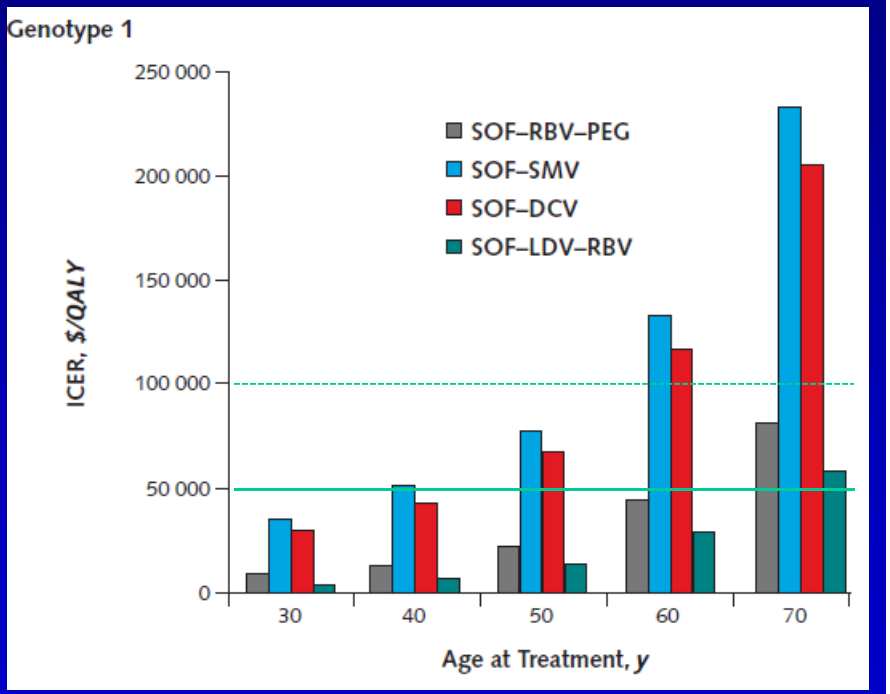


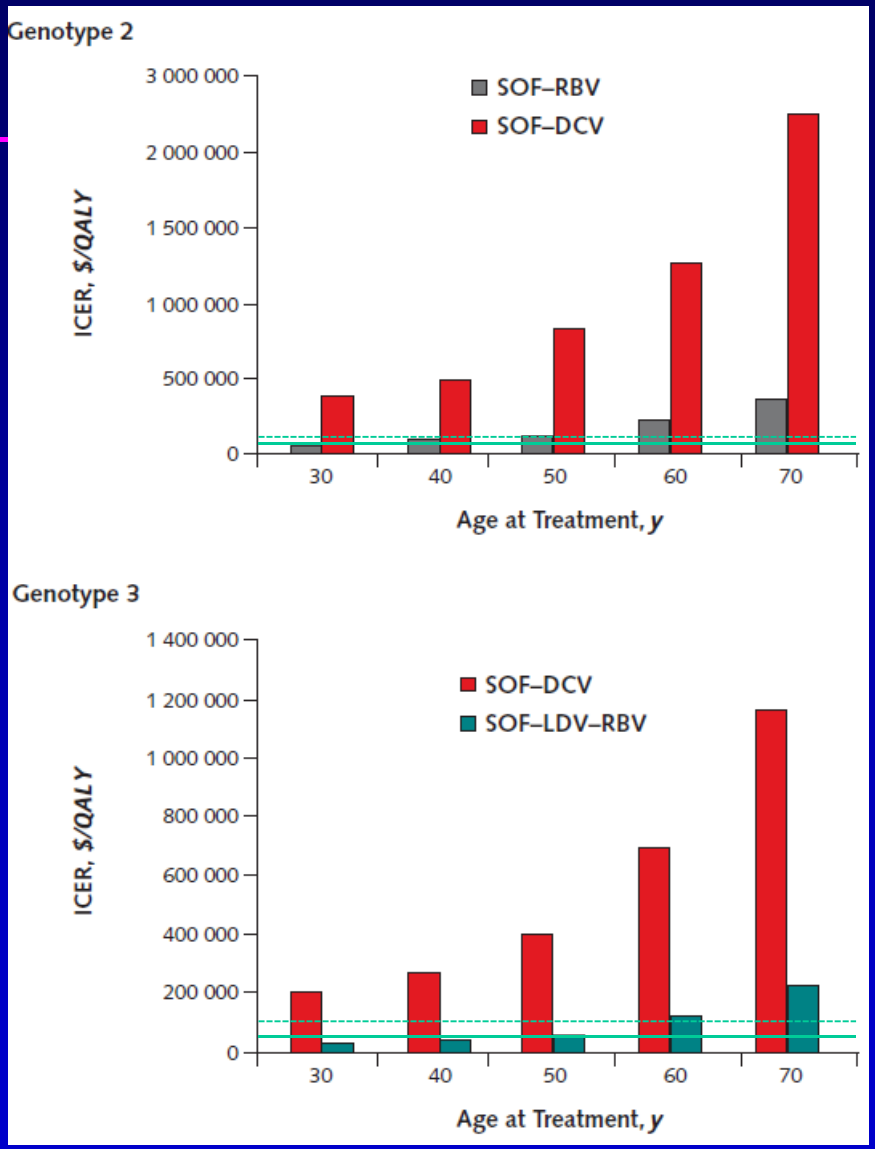




Najafzadeh et al, Ann Intern Med 2015

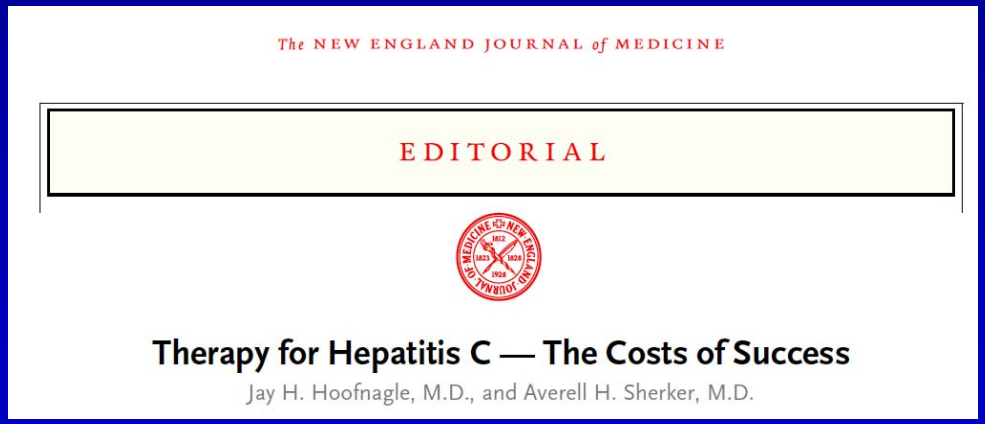
- Les ratio coût-efficacité varient en fonction de l'âge





Najafzadeh et al, Ann Intern Med 2015

Impact budgetaire



The NEW ENGLAND JOURNAL of MEDICINE

EDITORIAL

Therapy for Hepatitis C — The Costs of Success

Jay H. Hoofnagle, M.D., and Averell H. Sherker, M.D.

'With the present estimates of costs, treating even half the HCV-infected persons in the United States would add billions of dollars to an already overburdened medical care system. Costs alone cast a pall over the stunning success in achieving the long-hoped-for goal of a safe and effective therapy for hepatitis C.'

Hoofnagle JH, and Sherker AH. N Engl J Med 2014; 370:1552–53.

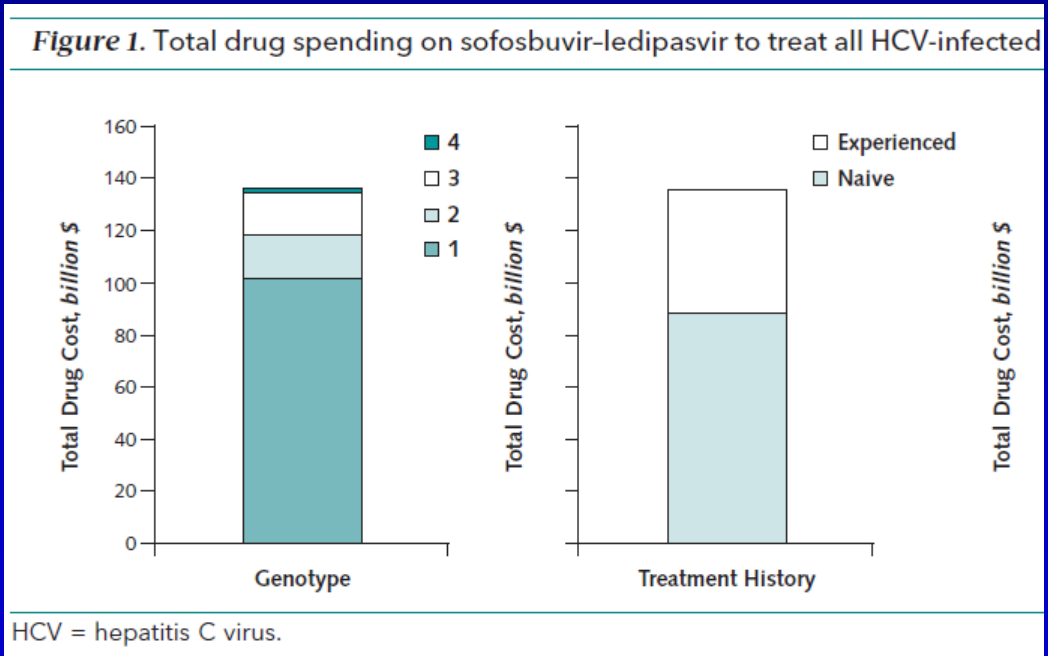
Coût de la prise en charge des patients à court terme (Etats Unis)

- Over 5 years
- Only drug costs ($/week)
  - Peg-RBV=$587
  - RBV=$309
  - BOC=$1100
  - TVR=$4100
  - SOF=$7000
  - LDV=$875
- Assumptions
  - 1.32 million treatment-naive and 450,000 treatment-experience persons aware of their HCV disease
  - 510,000 diagnosed in the 5 years

Chhatwal et al, Ann Intern Med 2015

Coût de la prise en charge des patients à court terme (Etats Unis)

⇨ 1.60 million persons eligible for treatment during the next 5 years = **$136 billion** = $85,000 / pts



Chhatwal et al, Ann Intern Med 2015

Coût de la prise en charge des patients à court terme (France)

- Over 3 years
- Only drug costs
  - 87€ for RBV
  - 41,000€ for 12-week SOF
  - 48,000€ for 12-week SOF+LDV
  - 35,000€ for 12- or 24-week DCV
- Assumptions
  - Treating if ≥ F2 with priority to ≥ F3
  - ≤ 20,000 patients treated/year
  - Scenarios
    1. Limited to 18-70 years old
    2. ≥ 18 without age limit

	Fibrosis stage at treatment initiation	Treatment history	Therapeutic option*	Duration (weeks)
Genotype 1	F2	All	Harvoni	12
	F3-4	Naive	Harvoni	12
		Non-naive	Harvoni	12
	Decompensated cirrhosis	All	Harvoni + RBV	12
Genotype 2	F2	All	SOF + RBV	12
	F3-4	Naive	SOF + RBV	12
		Non-naive	SOF + RBV	16
	Decompensated cirrhosis	All	SOF + DCV	24
Genotype 3	F2	All	SOF + RBV	24
	F3-F4	Naive	SOF + DCV†	24
		Non-naive	SOF + DCV + RBV†	24
	Decompensated cirrhosis	All	SOF + DCV + RBV†	24
Genotype 4	F2	All	Harvoni	12
	F3-F4	Naive	Harvoni	12
		Non-naive	Harvoni	12
	Decompensated cirrhosis	All	Harvoni	24

*Harvoni=Sofosbuvir+Ledipasvir, RBV=Ribavirin, SOF=Sofosbuvir, DCV=Daclatasvir ;

†Harvoni+RBV in sensitivity analysis

Deuffic-Burban et al, AASLD 2014

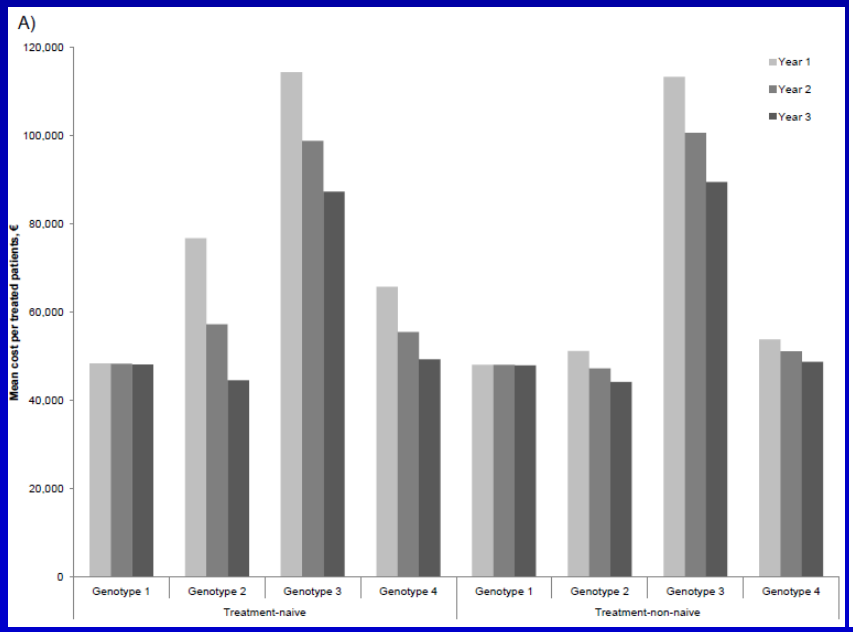
Coût de la prise en charge des patients à court terme (France)

- 1ère année : 80% des F3-F4, 50% des F2
- 2ème année : 100% des F3-F4, 80% des F2
- 3ème année : 100% des F2-F4

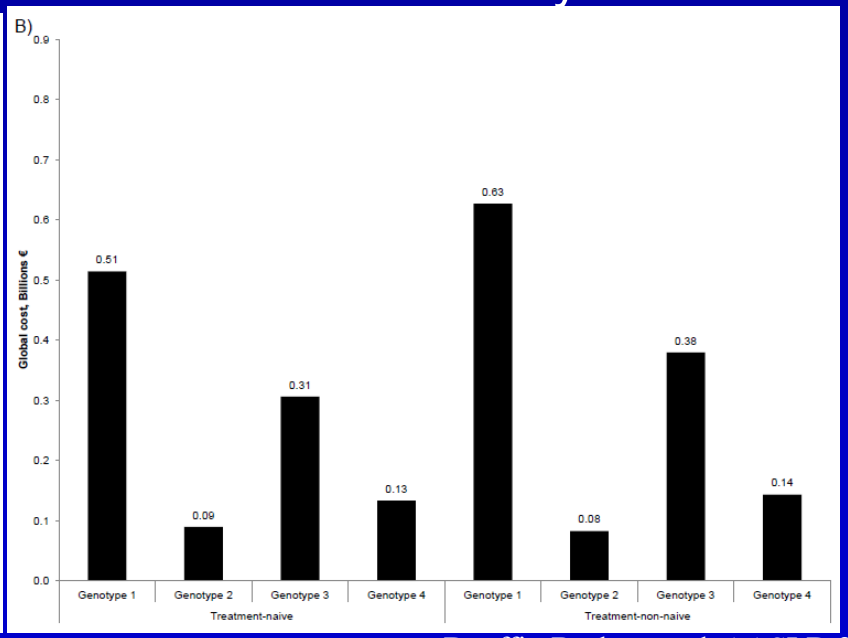
⇨ 38,200 treated patients =1.8-2.3 billion €

=€47,120-60,209/pt

Mean cost per treated patients



Global cost over 3 years



Deuffic-Burban et al, AASLD 2014

HEPATOLOGY
Official Journal of the American Association for the Study of Liver Diseases

RAPID COMMUNICATION

Ledipasvir/Sofosbuvir Regimens for Chronic Hepatitis C Infection: Insights From a Work Productivity Economic Model From the United States

Zobair M. Younossi,[1,3] Yushan Jiang,[2] Nathaniel J. Smith,[2] Maria Stepanova,[3,4] and Rachel Beckerman[2]

- Une analyse qui se base sur les résultats des essais cliniques randomisés (1 an)

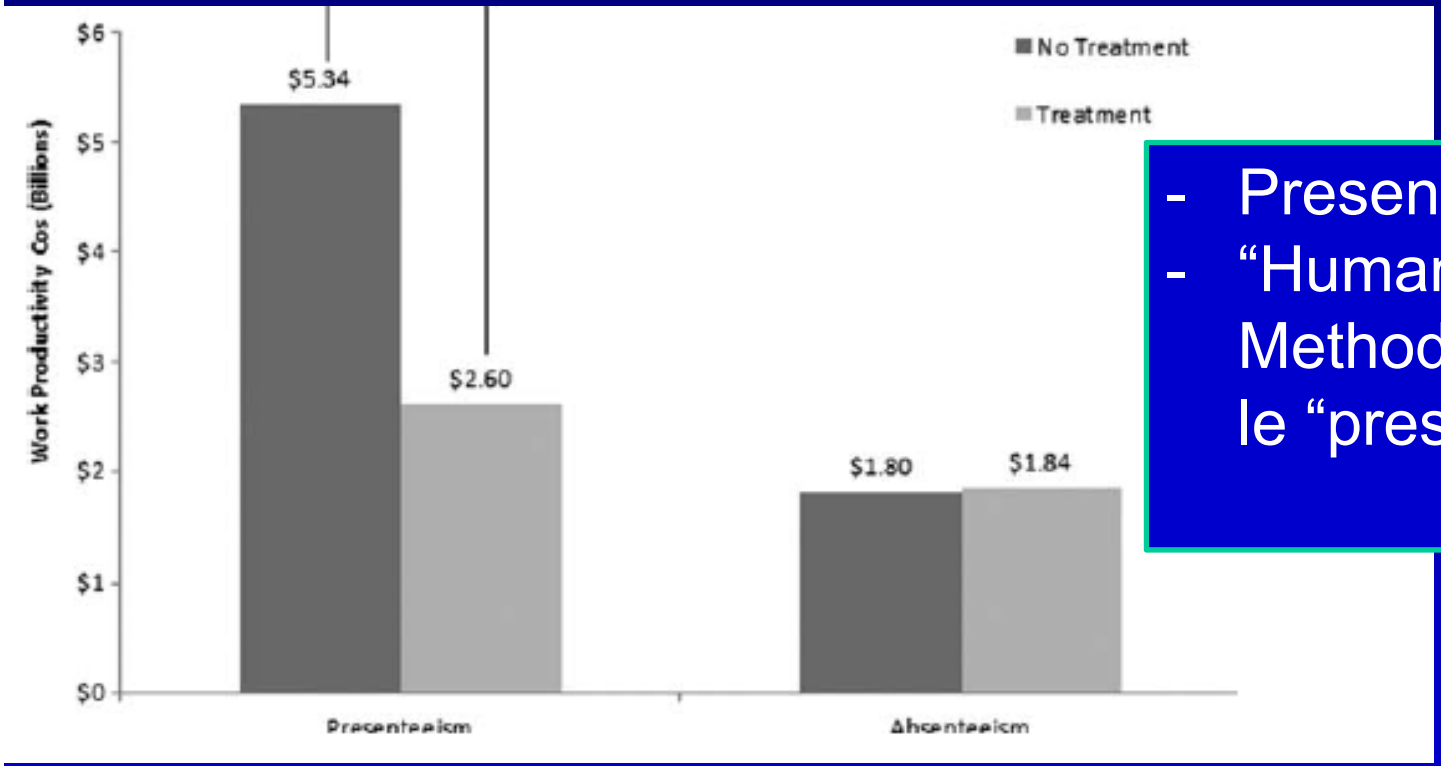
Table 2. Model Base-Case SVRs and Work Productivity Inputs

	No Treatment	Treatment With LDV/SOF	Source
% patients achieving SVR	0	93.21	Younossi et al.[22]
SVR achieved, %			
Absenteeism	2.57	2.62	Younossi et al.[22]
Presenteeism	7.83	3.53	Younossi et al.[22]
SVR not achieved, %			
Absenteeism	2.57	2.57	Younossi et al.[22]
Presenteeism	7.83	7.83	Younossi et al.[22]

- Absenteeism : missed hours of work
- Presenteeism: decreased productivity while working

Hepatology 2015

Perte de productivité



- Presenteeism?
- "Human capital Method" pour valoriser le "presenteeism"?

"A systematic review of measurement properties of instruments assessing presenteeism."

- "Most presenteeism instruments have been examined for some form of validity; evidence for criterion validity is virtually absent."

Am J manag Care 2015

Eur J Health Econ
DOI 10.1007/s10198-014-0652-y

ORIGINAL PAPER

Estimating productivity costs using the friction cost approach in practice: a systematic review

Jesse Kigozi · Sue Jowett · Martyn Lewis · Pelham Barton · Joanna Coast

"The friction cost approach was developed by health economists from the Netherlands who argued that the human capital approach to valuing productivity costs of morbidity and mortality generates overestimated costs from a societal perspective"

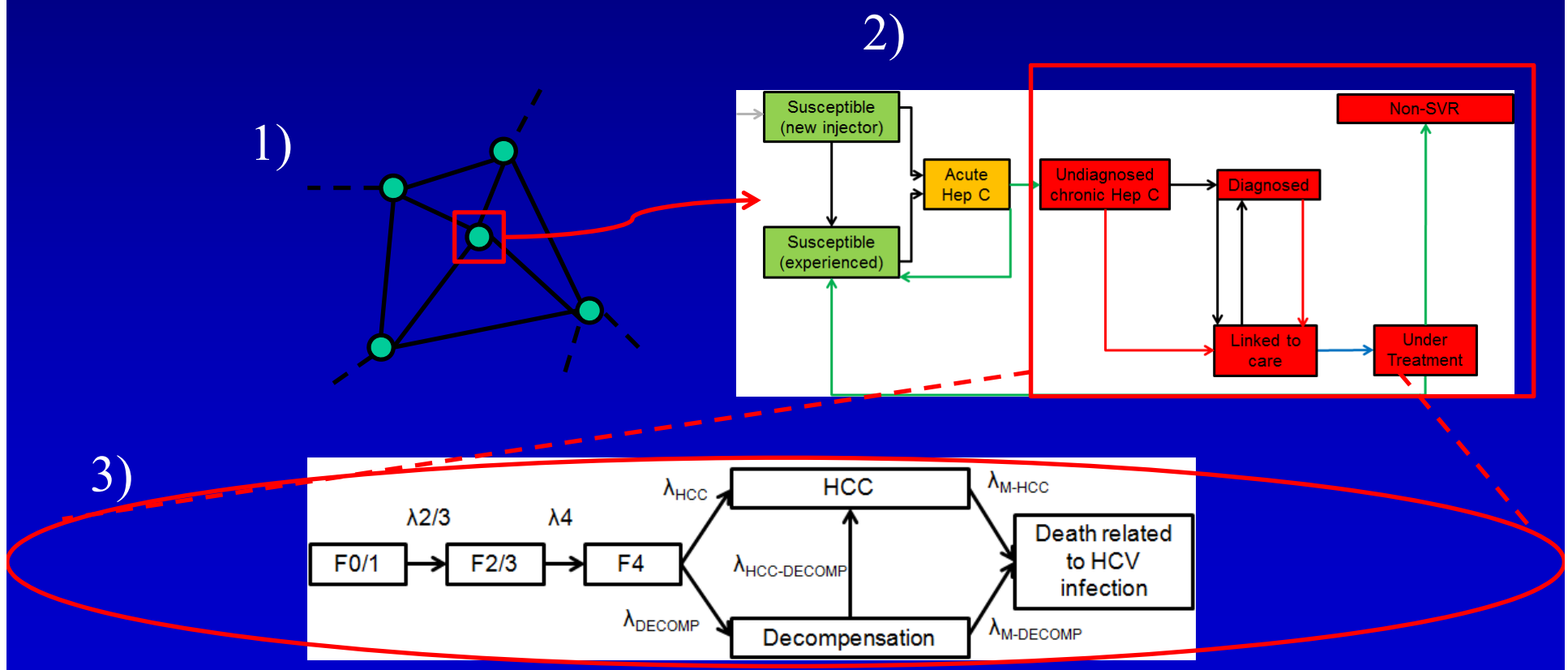
Impact d'amélioration de dépistage sur la survenue des complications dans la population des UDI (ANRS 95146)

Anthony Cousien, Viet Chi Tran, Marie Jauffret-Roustide, Sylvie Deuffic-Burban, Jean-Stéphane Dhersin, Yazdan Yazdanpanah

Cousien et al. Easl 2014

Methods

1) Network model for the infectious contacts in the population
2) Individual-based model for HCV infection and care
3) Natural history model for chronic hepatitis C
+ mortality, and cessation of drug use



Scenarios

Scenario	Testing (active / inactive PWID) Time to diagnosis (mean)	Time to linkage to care (mean)	Lost to follow-up (%/y)	Treatment initiation criteria	%SVR (genotype 1 / 2,3)
1 (ref)	1.25 y / 1.45 y	2.1 y	14%/y	F2 →F4	81.3%

Incoming DAAs regimens

Scenarios

Scenario	Testing (active / inactive PWID) Time to diagnosis (mean)	Time to linkage to care (mean)	Lost to follow-up (%/y)	Treatment initiation criteria	%SVR (genotype 1 / 2,3)
1 (ref)	**1.25 y / 1.45 y**	**2.1 y**	**14%/y**	**F2 →F4**	**81.3%**
2	**6 months**	2.1 y	14%/y	F2 →F4	81.3%

Scenarios

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3	1.25 y / 1.45 y	**6 months**	**5%/y**	F2 →F4	81.3%

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4	**6 months**	**6 months**	**5%/y**	F2 →F4	81.3%

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4	**6 months**	**6 months**	**5%/y**	F2 →F4	81.3%
5	1.25 y / 1.45 y	2.1 y	14%/y	F2 →F4	**90.0%**

Scenarios

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5	1.25 y / 1.45 y	2.1 y	14%/y	F2 →F4	**90.0%**
6	1.25 y / 1.45 y	2.1 y	14%/y	**F0 →F4**	81.3%

Scenarios

Scenario	Testing (active / inactive PWID) Time to diagnosis (mean)	Time to linkage to care (mean)	Lost to follow-up (%/y)	Treatment initiation criteria	%SVR (genotype 1 / 2,3)
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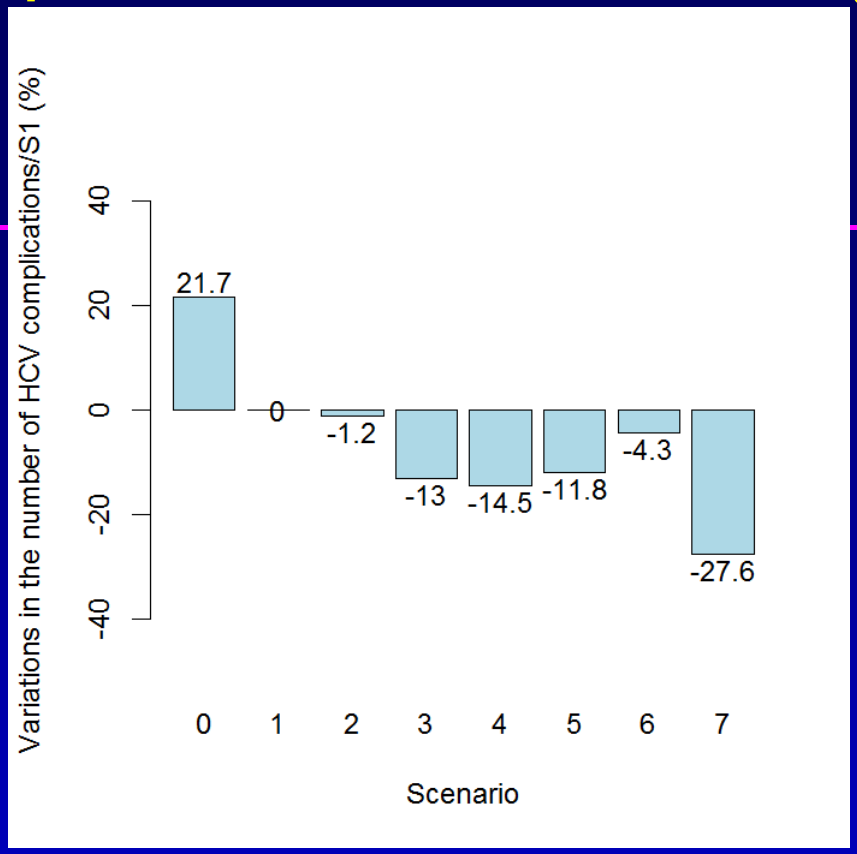
6	1.25 y / 1.45 y	2.1 y	14%/y	**F0 →F4**	81.3%
7	**6 months**	**6 months**	**5%/y**	**F0 →F4**	**90.0%**

Results: complications of cirrhosis (40 years)



- 0 - Current treatment standards
- 1 - Incoming DAAs regimens
- 2 - Incoming DAAs regimens & Improved testing
- 3 - Incoming DAAs regimens & Improved linkage to care
- 4 - Incoming DAAs regimens & Improved testing and linkage to care
- 5 - Incoming DAAs regimens & Improved adherence
- 6 - Incoming DAAs regimens & Treatment from F0
- 7 - Incoming DAAs regimens & Treatment from F0, improved testing, linkage to care and adherence

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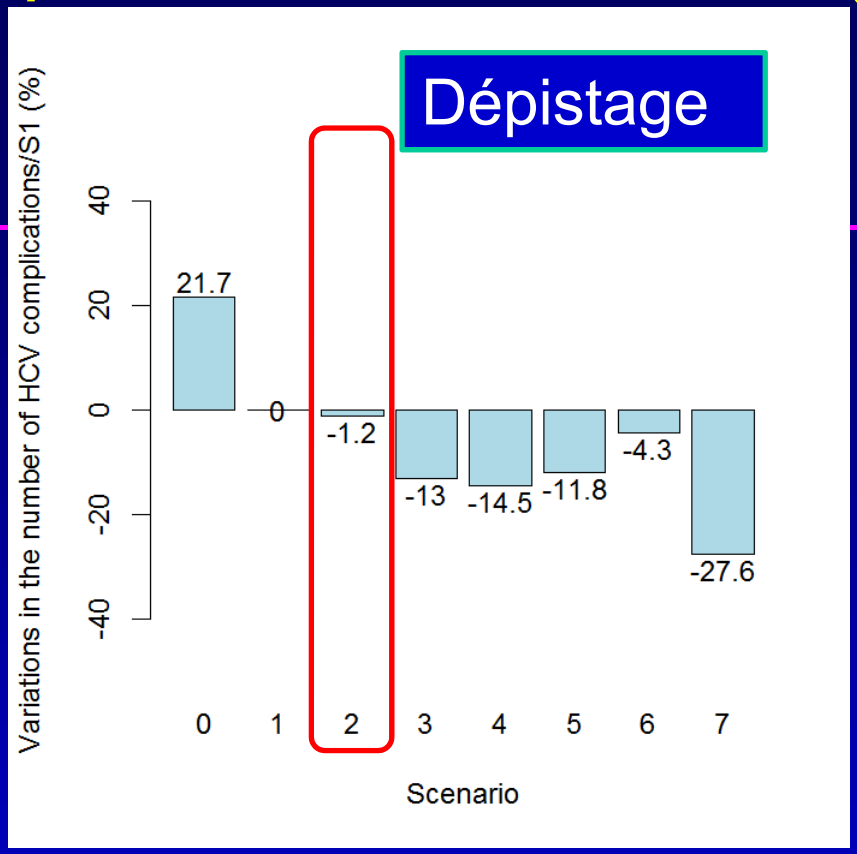

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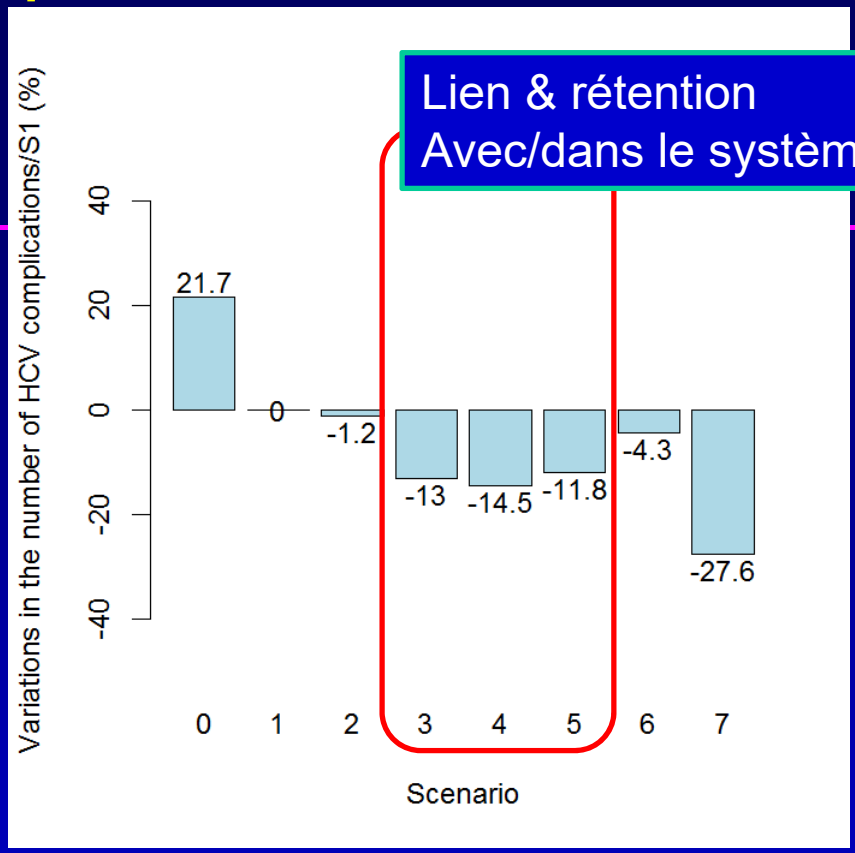

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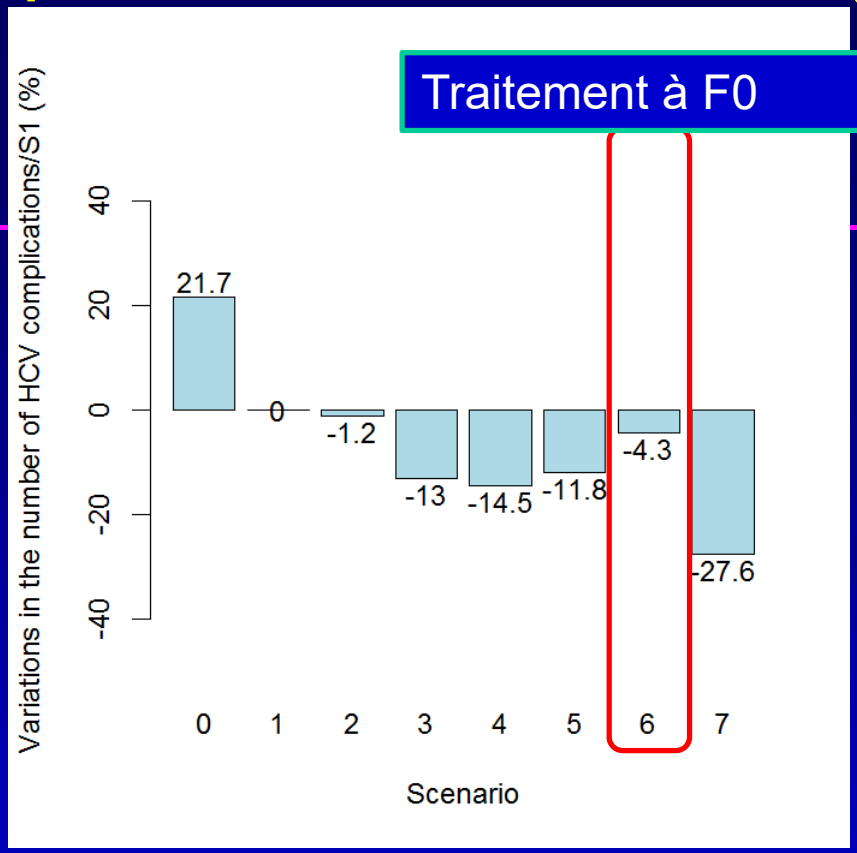

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- 7 - Incoming DAAs regimens & Treatment from F0, improved testing, linkage to care and adherence

Améliorer le dépistage et le lien avec les structures de soins

- Dépistage plus large
- Banalisation du test
- Diminuer temps Test/diagnostic
- Dépistage général restreint
- Banalisation du test dans les parcours de soins +++
- TROD hors les murs
- Autotests ?
- Dépistage groupé (VIH,VHC,VHB, Syph …)etc

- Parcours de soins innovants (ligne dédiée/ville, by-pass premier RDV, consultations avancées…
- Aide à la médicalisation des structures de dépistage (centres communautaires, CAARUD, CSAPA…)
- Valorisation dépistage/préventio n en MG …

"Decision analysis is decision-oriented not "truth" oriented"

Milton. C. Weinstein

Inserm, Avenir team « Decision Sciences in Infectious Disease Prevention, Control and Care »

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