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Epidemiology of HCV Infection Among People who Inject Drugs: Where do we Really Need to Focus Our Efforts to prevent HCV (and generate better evidence)?

Matt Hickman, Sarah Larney, Natasha Martin, Peter Vickerman, Hannah Fraser, Zoe Ward, Louisa Degenhardt

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Acknowledgements & Disclosure/CoI

- NIHR Health Protection Research Unit in Evaluation of Interventions
- Health Protection Scotland: HCV Action Plan
- European Commission Drug Prevention and Information Programme (DIPP) "Treatment as Prevention in Europe: Model Projections [JUST/2013/DPIP/AG/4812]
- NIHR (HS&DR) (12/3070/13) - Assessing the impact and cost-effectiveness of NSP
- MH received honoraria from Abbvie, MSD, Janssen, Gilead.

The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health.

Collaborators:- Sharon Hutchinson, Vivian Hope, Graham Foster, John Dillon, Sema Mandell, Mary Ramsay, Helen Harris, Ross Harris, Fiona Gordon, Stephen Ryder, David Goldberg, Daniela De Angelis, Will Irving, Noel Craine, Marion Lyons, Norah Palmateer, Esther Aspinall, Lucy Platt, Amy Master, Maria Prins, Bernd Schulte, Henrikki Bummer, Viktor Mravcik, Martin Kåberg, Anne Ovrehus, Geert Robaeys, Patrizia Varreiri, Marie Jauffret, Olav Dalgard, Majca Matičič, Hannah Fraser, Zoe Ward, Jason Grebely, Greg Dore, Margaret Hellard, Bristol Drug Project. Silvia Minozzi, Holly Hagan, Clare French, Louisa Degenhardt, Lisa Maher, Sarah Larney

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NDARC National Drug & Alcohol Research Centre

Global prevalence of injecting drug use and sociodemographic characteristics and prevalence of HIV, HBV, and HCV in people who inject drugs: a multistage systematic review

Prof Louisa Degenhardt, PhD, Amy Peacock, PhD, Samantha Colledge, BPsychSc[Hons], Janni Leung, PhD, Jason Grebely, PhD, Prof Peter Vickerman, PhD, Jack Stone, MMathStat, Evan B Cunningham, BSc[Hons], Adam Trickey, MSc, Kostyantyn Dumchev, MD, Prof Michael Lynskey, PhD, Paul Griffiths, MSc, Prof Richard P Mattick, PhD, Prof Matthew Hickman, PhD, Sarah Larney, PhD

The Lancet Global Health
Volume 5, Issue 12, Pages e1192-e1207 (December 2017)
DOI: 10.1016/S2214-109X(17)30375-3

Global, regional, and country-level coverage of interventions to prevent and manage HIV and hepatitis C among people who inject drugs: a systematic review

Dr Sarah Larney, PhD, Amy Peacock, PhD, Janni Leung, PhD, Samantha Colledge, BPSc, Prof Matthew Hickman, PhD, Prof Peter Vickerman, PhD, Jason Grebely, PhD, Kostyantyn V Dumchev, MD, Paul Griffiths, MSc, Lindsey Hines, PhD, Evan B Cunningham, BSc, Prof Richard P Mattick, PhD, Prof Michael Lynskey, PhD, Prof John Marsden, PhD, Prof Sir John Strang, FMedSci, Prof Louisa Degenhardt, PhD

The Lancet Global Health
Volume 5, Issue 12, Pages e1208-e1220 (December 2017)
DOI: 10.1016/S2214-109X(17)30373-X

ELSEVIER

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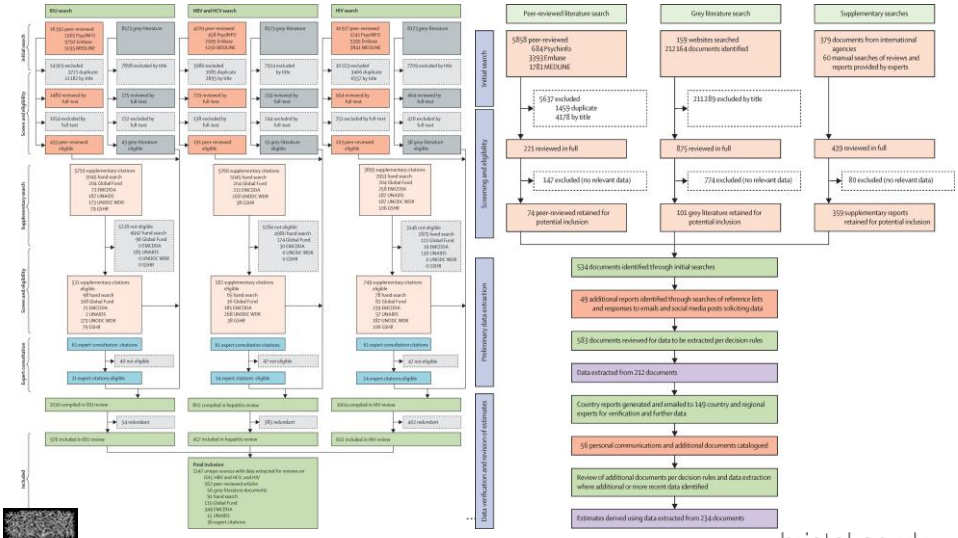
Flowchart presenting no. of sources from identification to inclusion



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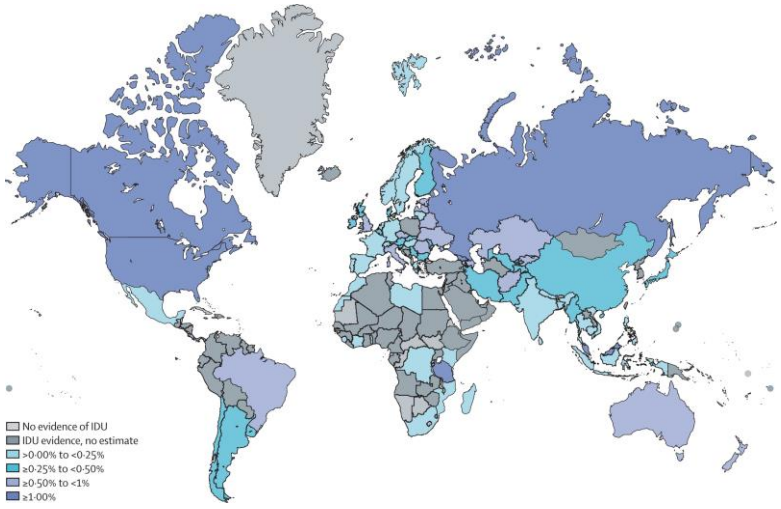
Estimated prevalence of injecting drug use by country



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Total:- 15·6 million (95%UI 10·2–23·7 million)
PWID aged 15–64 years globally

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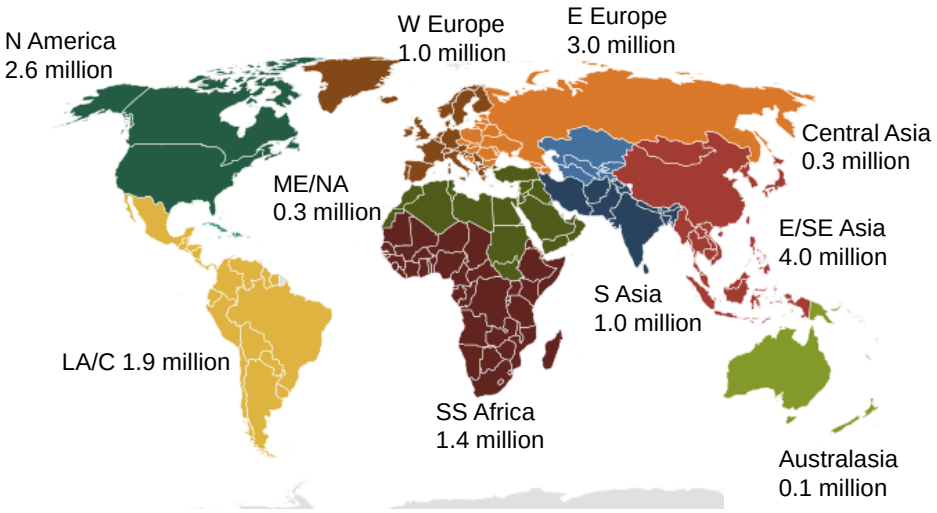
15.6 million people inject drugs globally



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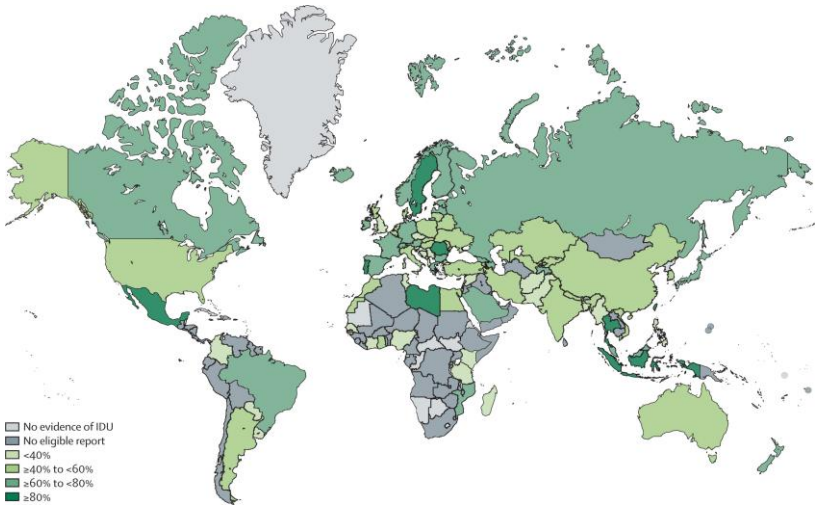
Estimated HCV antibody prevalence in PWID



Global PWID: 52·3% (42·4–62·1) HCV prevalence
~ 8·2 million (4·7–12·4 million) people

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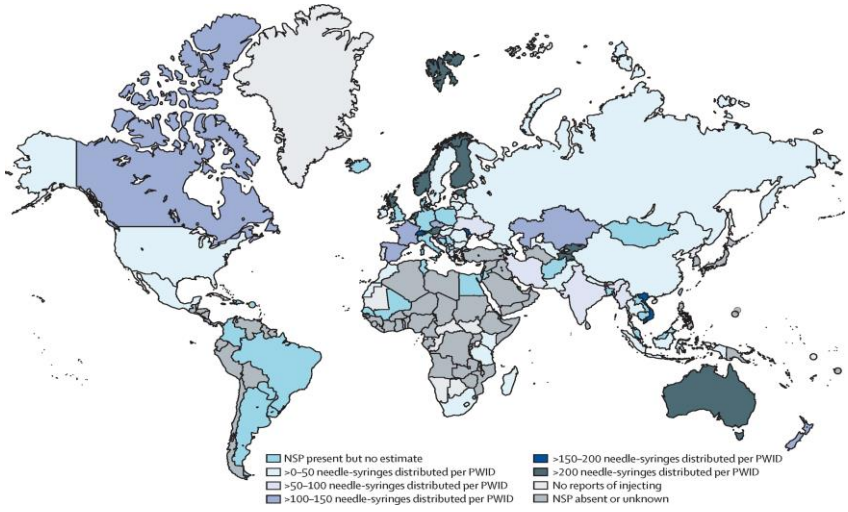
Global coverage of NSP



Globally estimate 33 (uncertainty interval [UI] 21–50) needle-syringes distributed via NSP per PWID annually

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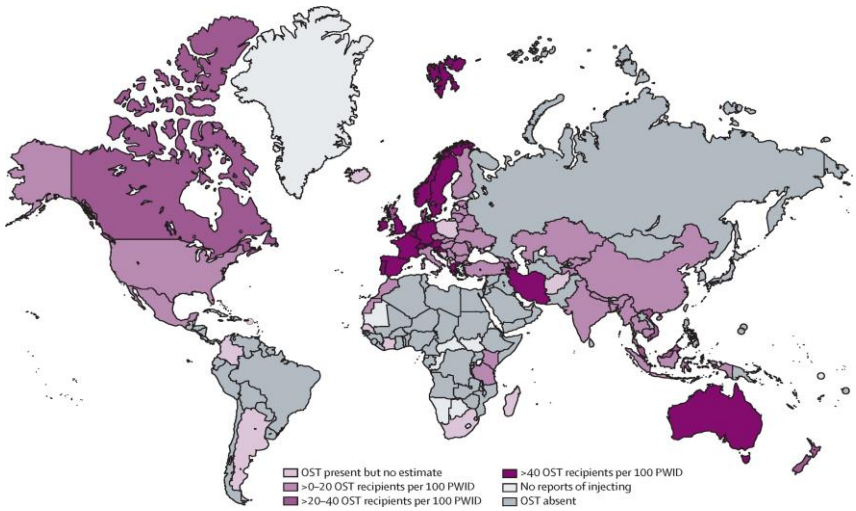
Global coverage of OST



Globally estimate 16 (UI 10–24) OST recipients per 100 PWID.

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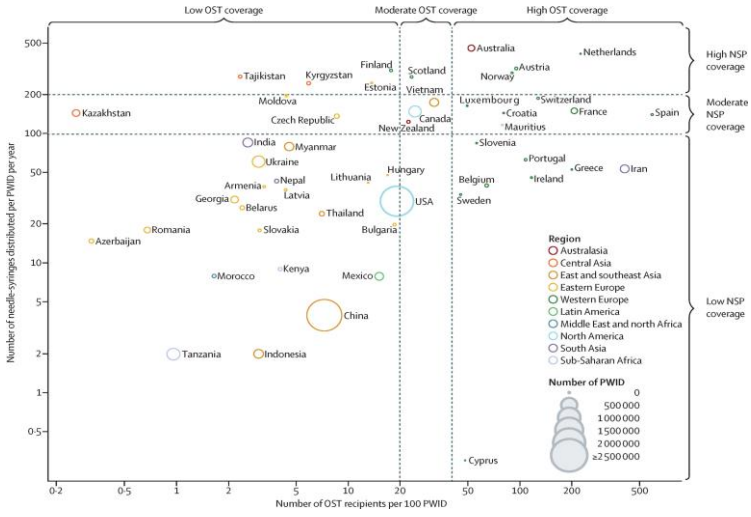
Combined coverage of NSP and OST for PWID



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Global Review of Effectiveness

Cochrane Library
Cochrane Database of Systematic Reviews

Needle syringe programmes and opioid substitution therapy for preventing hepatitis C transmission in people who inject drugs (Review)

Platt L, Minozzi S, Reed J, Vickerman P, Hagan H, French C, Jordan A, Degenhardt L, Hope V, Hutchinson S, Maher L, Palmateer N, Taylor A, Bruneau J, Hickman M

ADDICTION
SSA SOCIETY FOR THE STUDY OF ADDICTION
HCV PREVENTION
doi:10.1111/add.14012

Needle and syringe programmes and opioid substitution therapy for preventing HCV transmission among people who inject drugs: findings from a Cochrane Review and meta-analysis

Lucy Platt[1], Silvia Minozzi[2], Jennifer Reed[3], Peter Vickerman[4], Holly Hagan[3], Clare French[4], Ashly Jordan[3], Louisa Degenhardt[5], Vivian Hope[6], Sharon Hutchinson[7], Lisa Maher[8], Norah Palmateer[7], Avril Taylor[9], Julie Bruneau[10] & Matthew Hickman[4]

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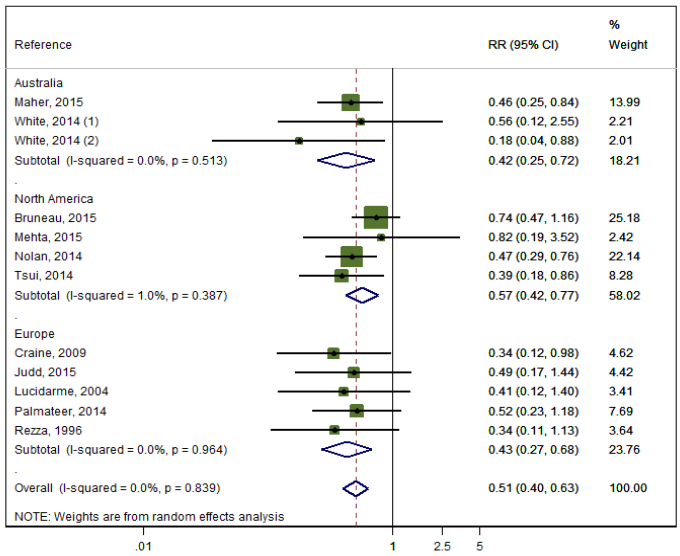
Impact of current OST exposure (adjusted estimates)



- 12 studies:
- 6361 participants
- 1030 HCV cases
- **50% reduction** in risk of HCV
- Little heterogeneity
- GRADE: Low Evidence.

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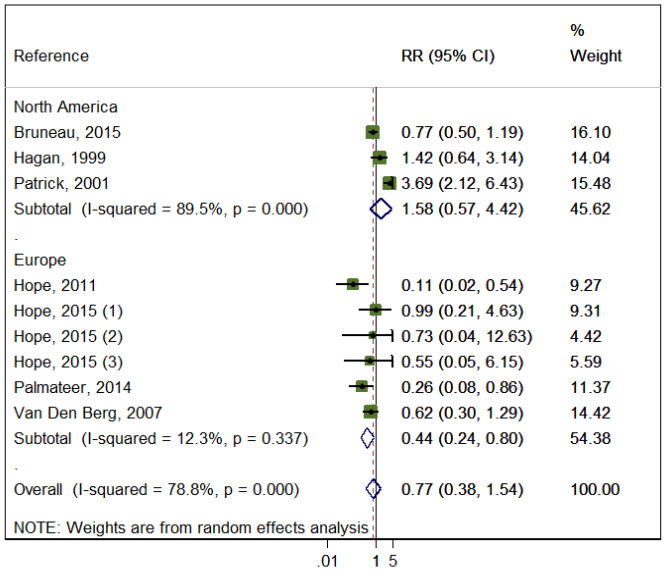
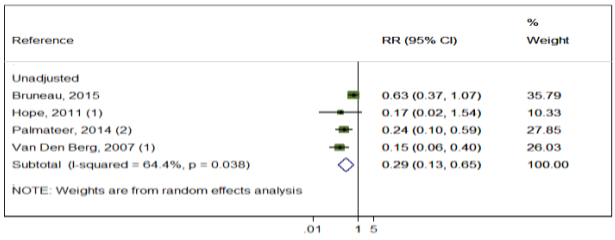
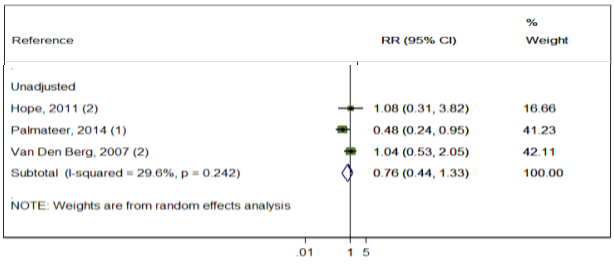
Impact of high NSP by region (unadjusted analyses)



- 7 studies
- High heterogeneity (I^2=79%)
- Weak evidence overall – RR 0.77
- In Europe NSP associated with 66% reduction in HCV
- Grade: very low evidence

Impact of NSP and OST





High NSP with OST

- 4 studies
- 3356 participants
- 518 HCV cases **Reduced HCV by 71%**
- moderate heterogeneity

Low NSP with OST

- 3 studies
- 3071 participants
- 449 HCV cases,
- **Reduced HCV by 24%**

- GRADE: low evidence

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MODELLING HCV TREATMENT AS PREVENTION

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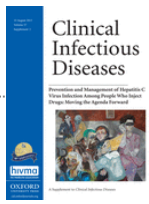

Combination Interventions to Prevent HCV Transmission Among People Who Inject Drugs: Modeling the Impact of Antiviral Treatment, Needle and Syringe Programs, and Opiate Substitution Therapy

Natasha K. Martin,[1,2] Matthew Hickman,[1] Sharon J. Hutchinson,[3,4] David J. Goldberg,[4] and Peter Vickerman[2]

Modeling HCV Combination Interventions • CID 2013:57 (Suppl 2) • S39

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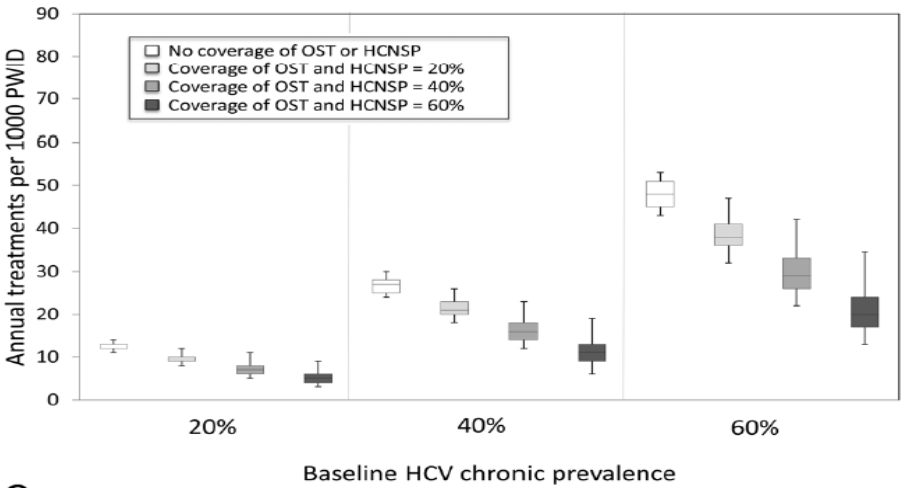
DAA TREATMENT RATES TO HALVE CHRONIC PREVALENCE IN 10 YRS WITH HARM REDUCTION



Martin NK, Hickman M, Hutchinson SJ, Goldberg DJ, and Vickerman P. C. Clinical Infectious Diseases 2013

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ARE CURRENT HCV TREATMENT RATES SUFFICIENT?

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ARTICLE IN PRESS

Research Article
Viral Hepatitis

JOURNAL OF HEPATOLOGY

Model projections on the impact of HCV treatment in the prevention of HCV transmission among people who inject drugs in Europe

Hannah Fraser[1,*], Natasha K. Martin[2,1], Henrikki Brummer-Korvenkontio[3], Patrizia Carrieri[4,5], Olav Dalgard[6,7], John Dillon[8], David Goldberg[9], Sharon Hutchinson[10,9], Marie Jauffret-Roustide[11,12], Martin Kåberg[13], Amy A. Matser[14,15], Mojca Matičič[16,17], Havard Midgard[6], Viktor Mravcik[18,19,20], Anne Øvrehus[21], Maria Prins[14,22], Jens Reimer[23,24], Geert Robaeys[25,26,27], Bernd Schulte[24], Daniela K. van Santen[14], Ruth Zimmermann[28], Peter Vickerman[1,†], Matthew Hickman[1,†]

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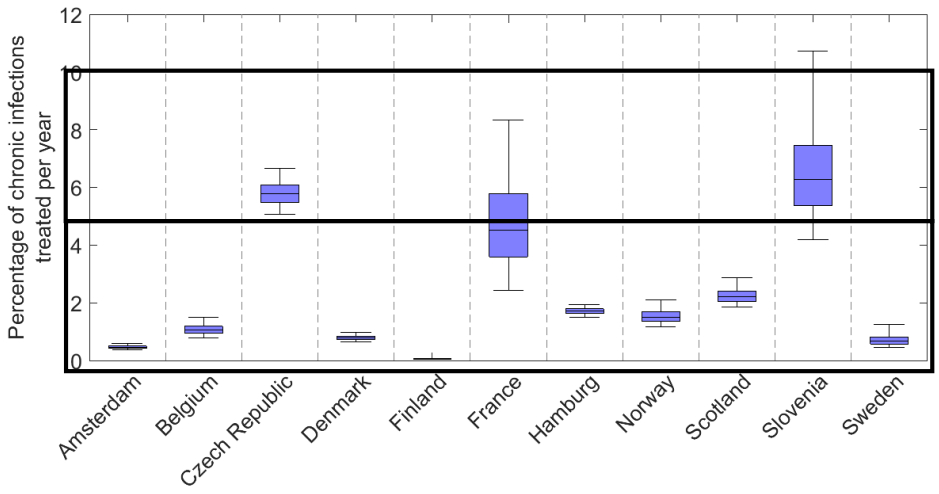
% of estimated PWID with chronic infections treated at baseline (2015/16)



Fraser et al, (2017) *Journal of Hepatology*

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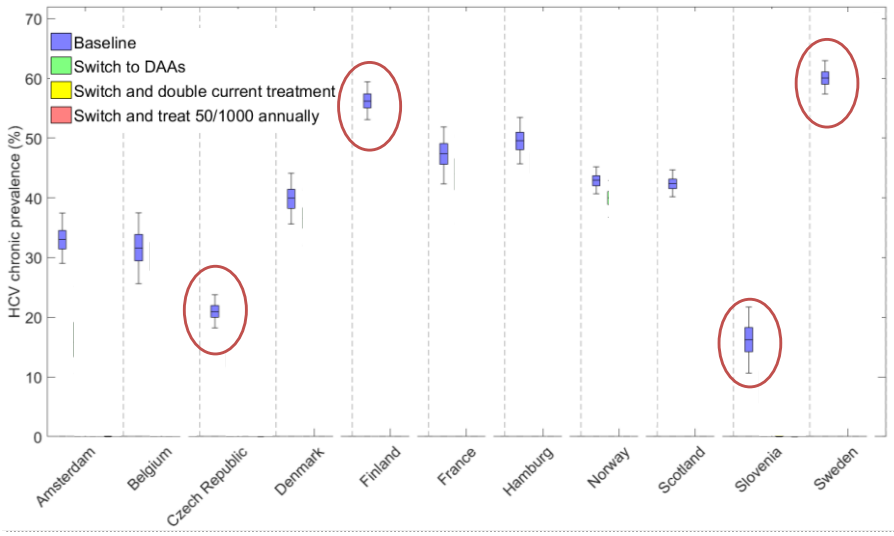
Baseline chronic prevalence



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Fraser et al, (2017) *Journal of Hepatology*

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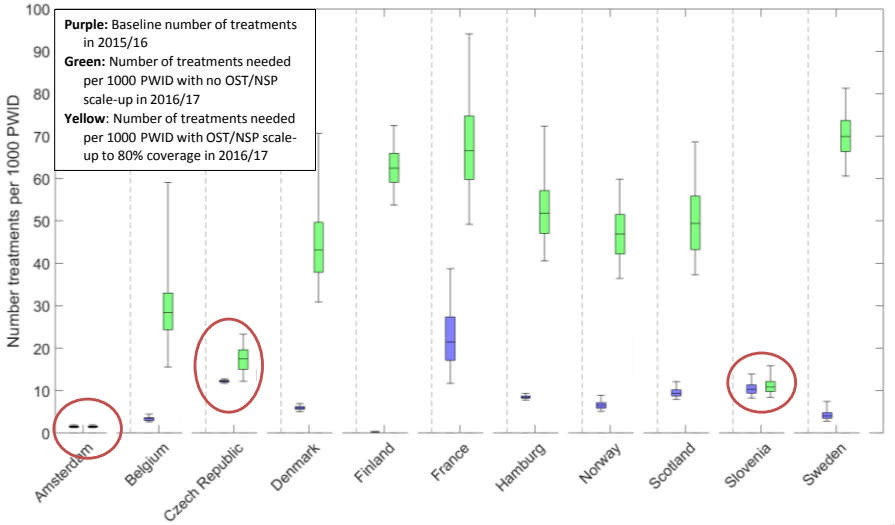
Treatment needed per 1000 PWID to reduce HCV to 2 per 100pyrs by 2026



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Fraser et al, (2017) *Journal of Hepatology*, In press

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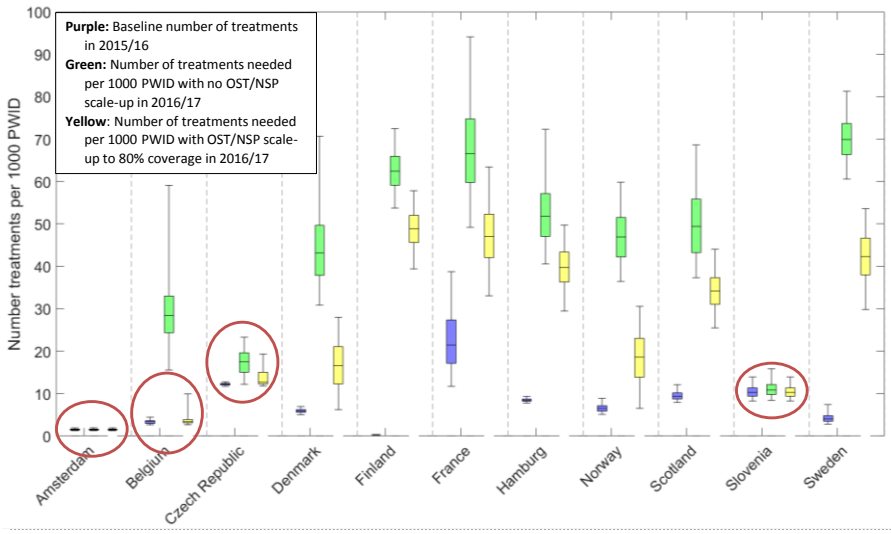
Treatment needed per 1000 PWID to reduce HCV to 2% by 2026 IF scale-up OST/NSP



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Fraser et al, (2017) *Journal of Hepatology*

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HCV PREVENTION
doi:10.1111/add.13948

Scaling-up HCV prevention and treatment interventions in rural United States—model projections for tackling an increasing epidemic

Hannah Fraser[1], Jon Zibbell[2], Thomas Hoerger[2], Susan Hariri[3], Claudia Vellozzi[3], Natasha K. Martin[4,1], Alex H. Kral[2], Matthew Hickman[1], John W. Ward[3] & Peter Vickerman[1]

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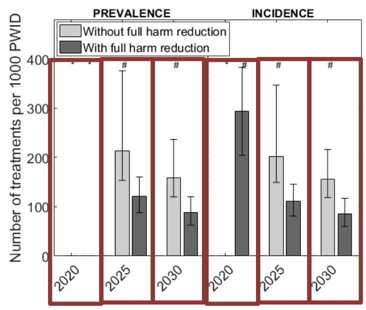
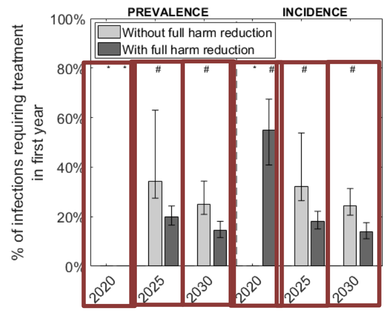
HCV in Scott County, Indiana

Treatment scale-up to reduce HCV to low levels

Projected number of PWID needing HCV treatment annually



Percentage of infections treated in mid-2016 to mid-2017



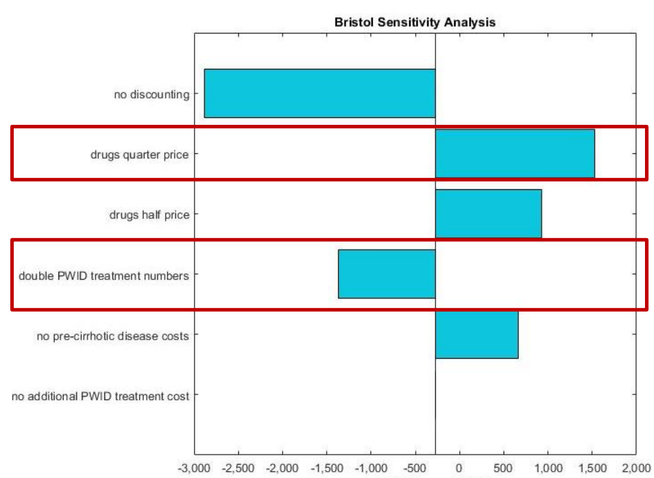
- 90% reduction by 2025 possible with ... if MAT/SSP also scaled up.
- 90% decrease in incidence may be possible (55% of simulations) if MAT and SSP also scaled-up.
- Treatment halved (89 treatments, 14.5%) if MAT/SSP scaled-up.

Only a proportion of parameter sets achieved the target.
* <5% of parameter sets achieved the target.

NSP Cost-effectiveness

NSP remains cost-effective even when HCV treatment is cheaper

Increasing treatment increases cost-effectiveness of NSP



Ward et al, (2018) *Addiction in press.*

Implications – mixture of evidence

- Global evidence that OST/NSP coverage is low
  - BUT evidence incomplete especially in LMIC
- Empirical evidence OST/NSP reduces HCV
  - NSP & OST highly cost-effective
  - BUT evidence considered moderate/weak and needs to be strengthened
- Dynamic and Economic Models show that:
  - HCV treatment scale-up critical for HCV prevention
  - OST/NSP avert HCV infections & increase TasP impact
  - Early treatment of PWID cost-effective

Implications – mixture of evidence

- Model projections suggest treatment scale-up needed to observe change in HCV transmission
  - Substantial increases needed in most countries to achieve WHO elimination targets
  - Strengthen PH surveillance so can detect change
- Promote HCV TasP and OST/NSP scale-up to prevent HCV transmission - EVALUATE
  - Natural experiments
  - Revive and strengthen evidence for Harm Reduction
  - Re-infection density case control

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END

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Research Article

CrossMark

EASL JOURNAL OF HEPATOLOGY

Prioritization of HCV treatment in the direct-acting antiviral era: An economic evaluation

Natasha K. Martin[1,2,*], Peter Vickerman[2], Gregory J. Dore[3], Jason Grebely[3], Alec Miners[4], John Cairns[4], Graham R. Foster[5], Sharon J. Hutchinson[6,7], David J. Goldberg[6,7], Thomas C.S. Martin[8], Mary Ramsay[9], the STOP-HCV Consortium, Matthew Hickman[2]

[1]*Division of Global Public Health, University of California San Diego, San Diego, USA;* [2]*School of Social and Community Medicine, University of Bristol, UK;* [3]*Kirby Institute, UNSW Australia, Sydney, Australia;* [4]*Faculty of Public Health and Policy, London School of Hygiene and Tropical Medicine, UK;* [5]*Queen Mary's University of London, UK;* [6]*Glasgow Caledonian University, UK;* [7]*Health Protection Scotland, UK;* [8]*Guy's and St Thomas's NHS Foundation Trust, London, UK;* [9]*Public Health England, UK*

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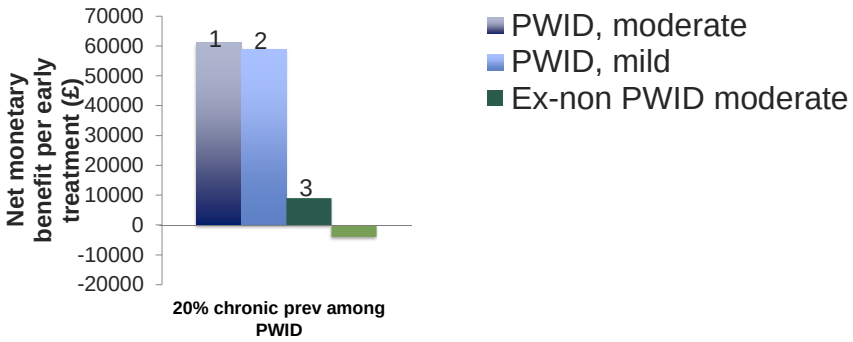
MORE COST-EFFECTIVE TO PRIORITIZE EARLY TREATMENT FOR PWID INSTEAD OF BY STAGE IN 20/40% PREV SETTINGS



*£20,000 willingness to pay.
Martin NK et al. J Hepatol 2016: 65(1):17-25.

Economic modeling supports treatment for and prioritization of PWID – essential for achieving elimination targets

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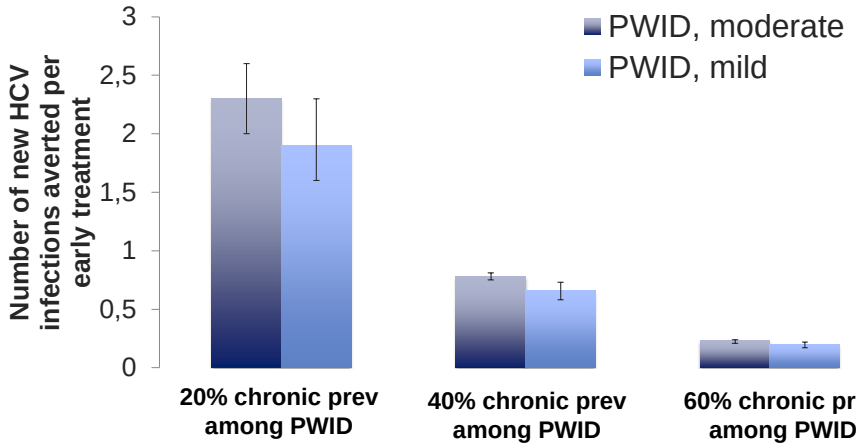
NUMBER OF NEW INFECTIONS AVERTED PER EARLY TREATMENT



Martin NK et al. J Hepatology 2016

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