Hepatitis C virus (HCV) prevalence among people who inject drugs (PWIDs) in Switzerland

Bruggmann P[1], Blach S[2], Deltenre P[3], Fehr J[4], Kouyos R[4], Lavanchy D[5], Müllhaupt B[6], Rauch A[7], Razavi H[2], Schmid P[8], Semela D[9], Stöckle M[10], Negro F[11]

1) Arud Centres for Addiction Medicine, Zürich, Switzerland; 2) Center for Disease Analysis, Louisville, Colorado, USA; 3) Division of Gastroenterology and Hepatology, Centre Hospitalier Universitaire Vaudois, University of Lausanne, Lausanne, Switzerland; 4) Division of Infectious Diseases & Hospital Epidemiology University Hospital Zürich, University of Zürich, Zürich, Switzerland; 5) Consultant, Denges, Switzerland; 6) Swiss Hepato-Pancreato-Biliary Center and Department of Gastroenterology and Hepatology, University Hospital Zürich, Zürich, Switzerland; 7) University Clinic of Infectious Diseases, University Hospital Bern, Bern, Switzerland; 8) Division of Infectious Diseases & Hospital Epidemiology, Cantonal Hospital St. Gallen, St. Gallen, Switzerland; 9) Division of Gastroenterology & Hepatology, Cantonal Hospital St. Gallen, St. Gallen, Switzerland; 10) Division of Infectious Diseases & Hospital Epidemiology, University Hospital Basel, Basel, Switzerland ; 11) Divisions of Gastroenterology and Hepatology and of Clinical Pathology, University Hospital, Genève, Switzerland

BACKGROUND AND OBJECTIVES

In Switzerland, HCV among PWIDs has been decreasing due to active harm reduction efforts and an aging population (average age – 44 yrs) [1]. Recent advances in HCV therapeutics may provide an opportunity to direct treatment to high-risk populations, with a goal of reducing HCV prevalence in the population and preventing new infections.

Objectives:

- Examine the dynamics of the injecting (at risk) population in Switzerland
- Using mathematical modeling, evaluate the impact of treating persons at-risk of transmitting HCV on prevalence among PWIDs

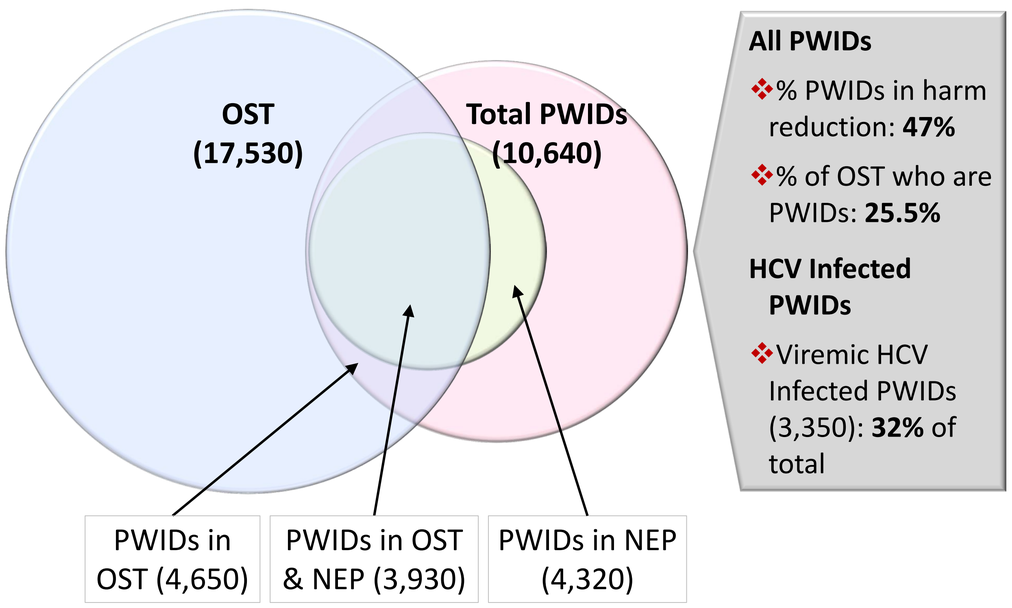
KEY INPUTS

- There are 8,000-12,000 active PWIDs in Switzerland, and 42% (27%-58%) are anti-HCV (+) [expert consensus]
- Between 17,000-25,700 individuals are enrolled in OST [1-2]
- Additionally, 1,598 individuals are enrolled in heroin substitution therapy (HeGeBe) [5-6]
- Among individuals on OST and HeGeBe, an estimated 27.4% (8.3%-47.1%) [3-4] and 54%-66% [5-6] respectively, continued to inject while on treatment

MATERIALS & METHODS

- HCV transmission was modeled using cohorts to track HCV incidence and prevalence among active PWIDs in four cohorts – General population; Opiate Substitution Therapy (OST); Needle Exchange Program (NEP); OST and NEP.
- The relative impact of increasing the number of PWIDs treated with new oral direct acting antivirals (DAAs) was considered, including the annual number needed to treat in order to reduce the HCV-infected PWID population by 2030
- Expert consensus, published literature and estimates from the Swiss Federal Office of Public Health were used to estimate the size of the active PWID population

Figure 1. Distribution of PWIDs in Switzerland



RESULTS

Base case outcomes in 2030

Under the current transmission paradigm, there are projected to be 2430 HCV-RNA - infected PWIDs, a 25% decrease from 2014

Reduction in prevalence by 2030 from treatment with new oral DAAs (Figure 2a)

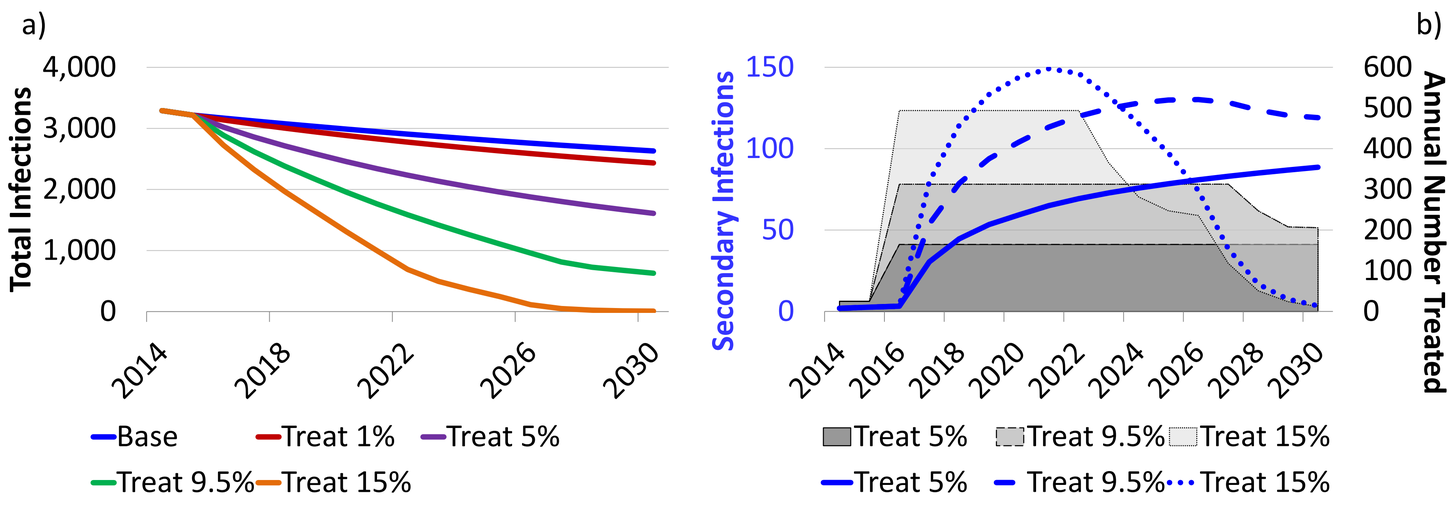
- Treat 40 / year (1% of HCV-infected PWID population in 2014): 9% reduction
- Treat 210/ year (5% of 2014 population): 50% reduction
- Treat 320/ year until 2027 (9.5% of 2014 population): >90% reduction

Targeting treatment to PWIDs engaged in OST and NEP would provide the greatest reduction in prevalence for the number of individuals treated

- 1.6 treated in OST/NEP to reduce prevalence by 1
- 3.4 treated in the general population to reduce prevalence by 1

A treatment rate of 15% would nearly eliminate secondary infections by 2030 (Figure 2b)

Figure 2. a) HCV prevalence in PWIDs, by percent treated annually, 2014-2030; b) Secondary infections, by percent and number treated annually, 2014-2030



CONCLUSIONS

- Treating a small number of PWIDs will result in substantial decreases in the HCV infected PWID population by 2030.
- The relative impact of treatment was greatest when focused on the population engaged in OST and NEP.
- Treatment is expected to increase the rate of secondary infections; however, secondary infections will decline as HCV prevalence decreases.
- This analysis supports the implementation of a screening and treatment strategy among PWIDs when combined with an expansion of harm reduction programs.

REFERENCES

[1] Cominetti 2015. Analysis of the Situation of HCV in Drug Users in Switzerland. Raisons De Sante 234. Lausanne [Ahead of Print]; [2] FOPH. Federal Office of Public Health: National Methadone Statistics - 1999-2014; [3] Bruggmann P. ARUD Centers for Addiction Medicine, Zurich, Switzerland. OST and injecting, ARUD centers, 2010-2013. Conversation with: Blach S. Center for Disease Analysis (CDA), Louisville, CO, USA. 2015 Feb 13. ; [4] Nordt C. University of Zurich, Zurich, Switzerland. OST and injecting in Zurich. Conversation with: Blach S,. Center for Disease Analysis (CDA), Louisville, CO, USA. 2015 Mar 9. ; [5] Federal Office of Public Health, Federal Department of Home Affairs, Division of National Prevention Program. [Treatment with prescription heroin/diacetylmorphine (HeGeBe), in 2009 and 2010]. Lausanne; 2011.; [6] Dickson-Spillman M, Hiltebrand D, Bollinger H, Schaub M. Heroin-assisted treatment in Switzerland: Results of the survey in 2013. Zurich; 2014.

Contact Information: p.bruggmann@arud.ch

Acknowledgement: The authors gratefully acknowledge the Swiss Federal Office of Public Health for providing data and comments throughout the model validation process

Disclosures: This project was supported by Gilead Sciences, Inc