Devising a strategy to eradicate the HCV epidemic among PWID in British Columbia, Canada.

I. Rozada[1*], J. Montaner[1,2], V. Lima[1,2]

1. British Columbia Centre for Excellence in HIV/AIDS, Vancouver, Canada, 2. University of British Columbia, Department of Medicine, Faculty of Medicine, Vancouver, Canada

Abstract #533   *Contact: irozada@cfenet.ubc.ca

Background

- In 2012, only 1% of HCV-infected people who inject drugs (PWID) in BC received HCV treatment.
- The recent availability of high-efficacy HCV medications will allow treating large numbers of individuals who were previously ineligible.
- Curing HCV does not confer immunity; reinfection risks need to be accounted for.

Objectives

- We modelled the effect that the new high-efficacy treatments will have on HCV-infected PWID, and determined the number of incident cases for a given number of individuals treated per year.
- We determined the tipping point at which the treated and removed outnumber new incident cases.
- We simulated reinfection risks ranging from non-existent, to equal to the general PWID treatment naïve population.

Methods

- We designed an ODE-based model of HCV disease transmission based on the PWID population in BC, simulating the treatment of a fixed number of individuals per year.
- A yearly threshold for HCV eradication was determined as the number of PWID treated per year required to offset the number of new incident cases

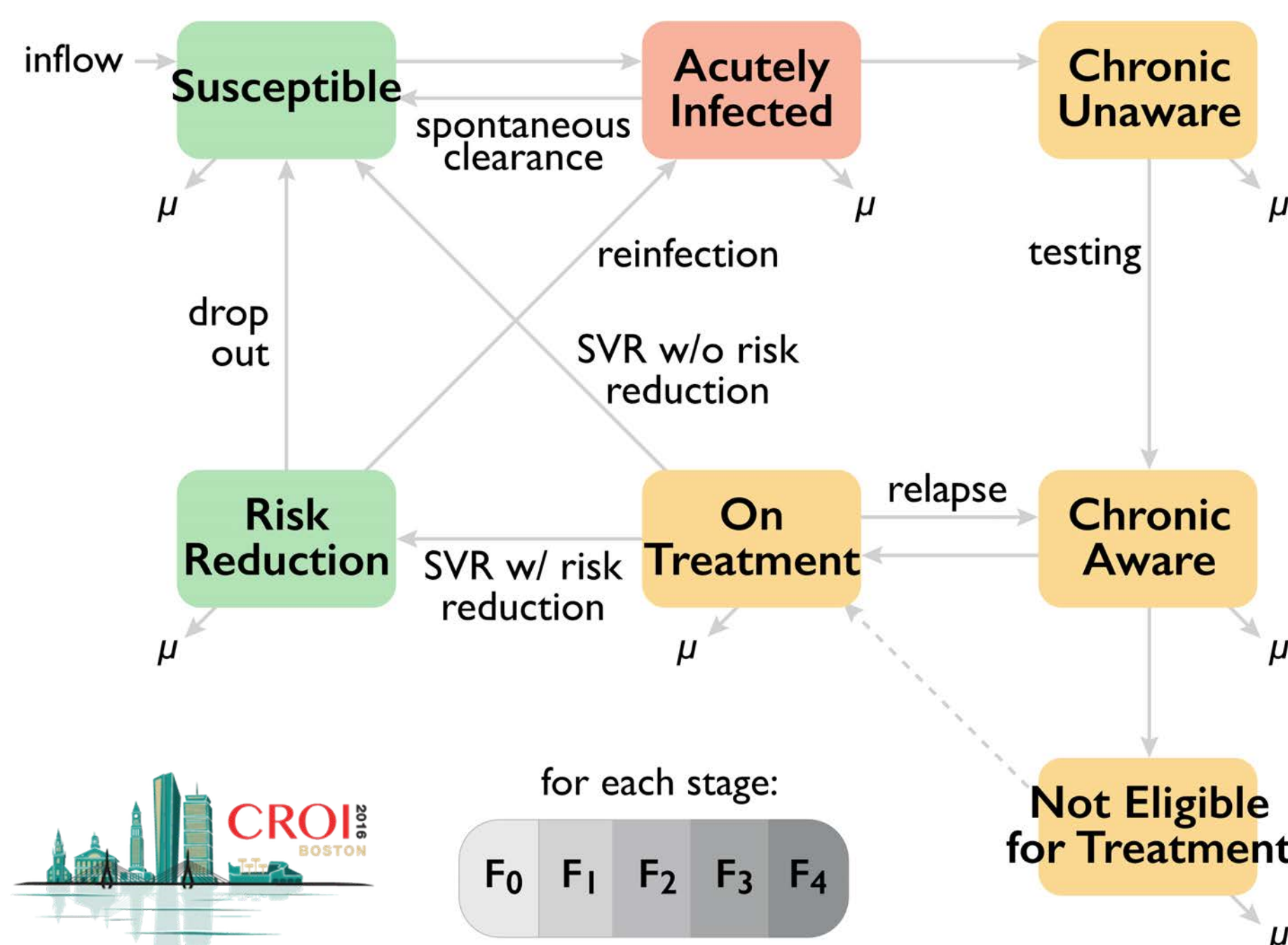**Figure 1.** Fibrosis-aware compartmental HCV model

Figure 2. Percent change in averted incident cases for various constant treatment intervention scenarios, as a function of reinfection risk as compared to treatment naïve PWID. The black lines are the thresholds beyond which treated and removed individuals outnumber incident cases
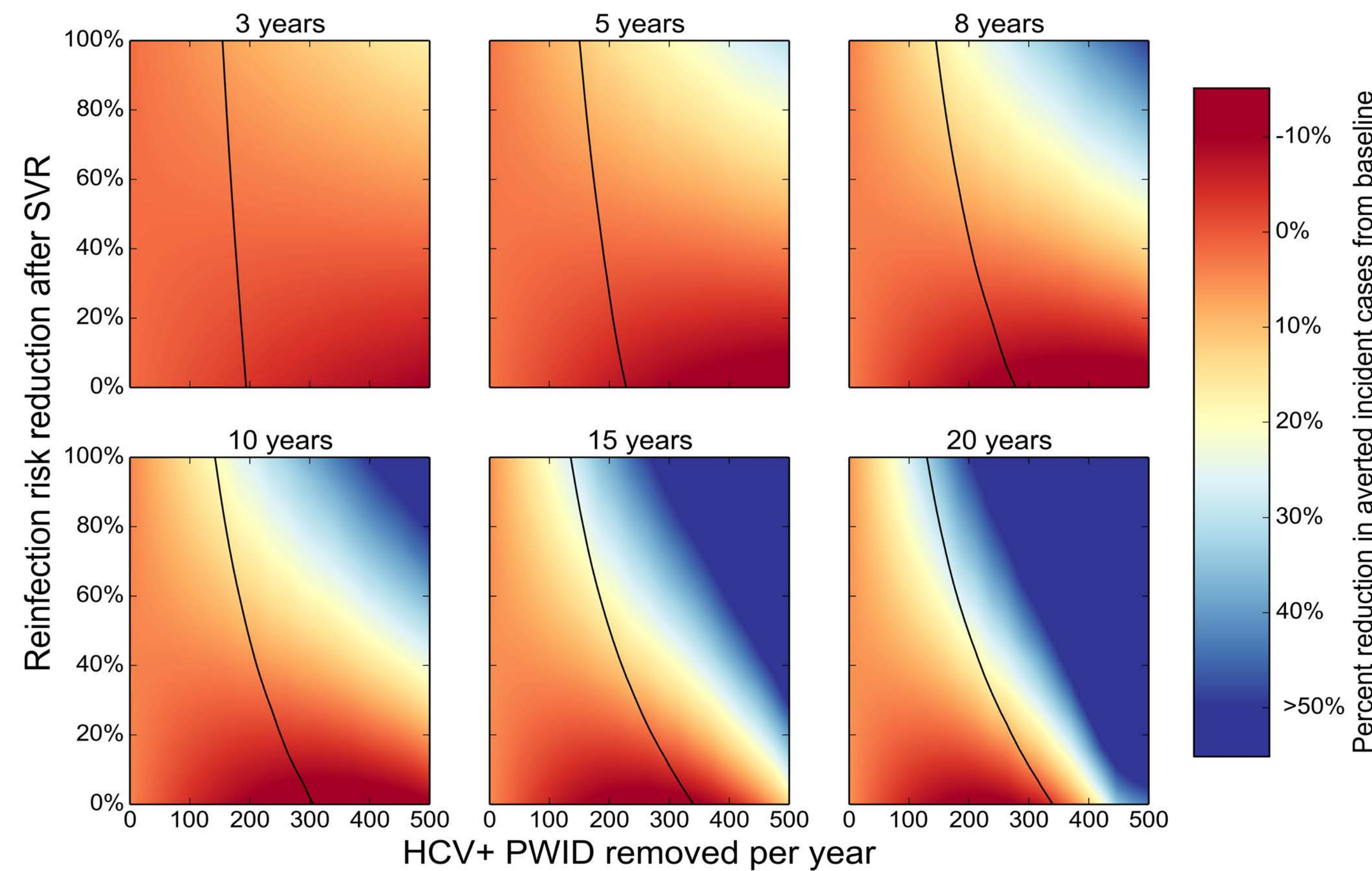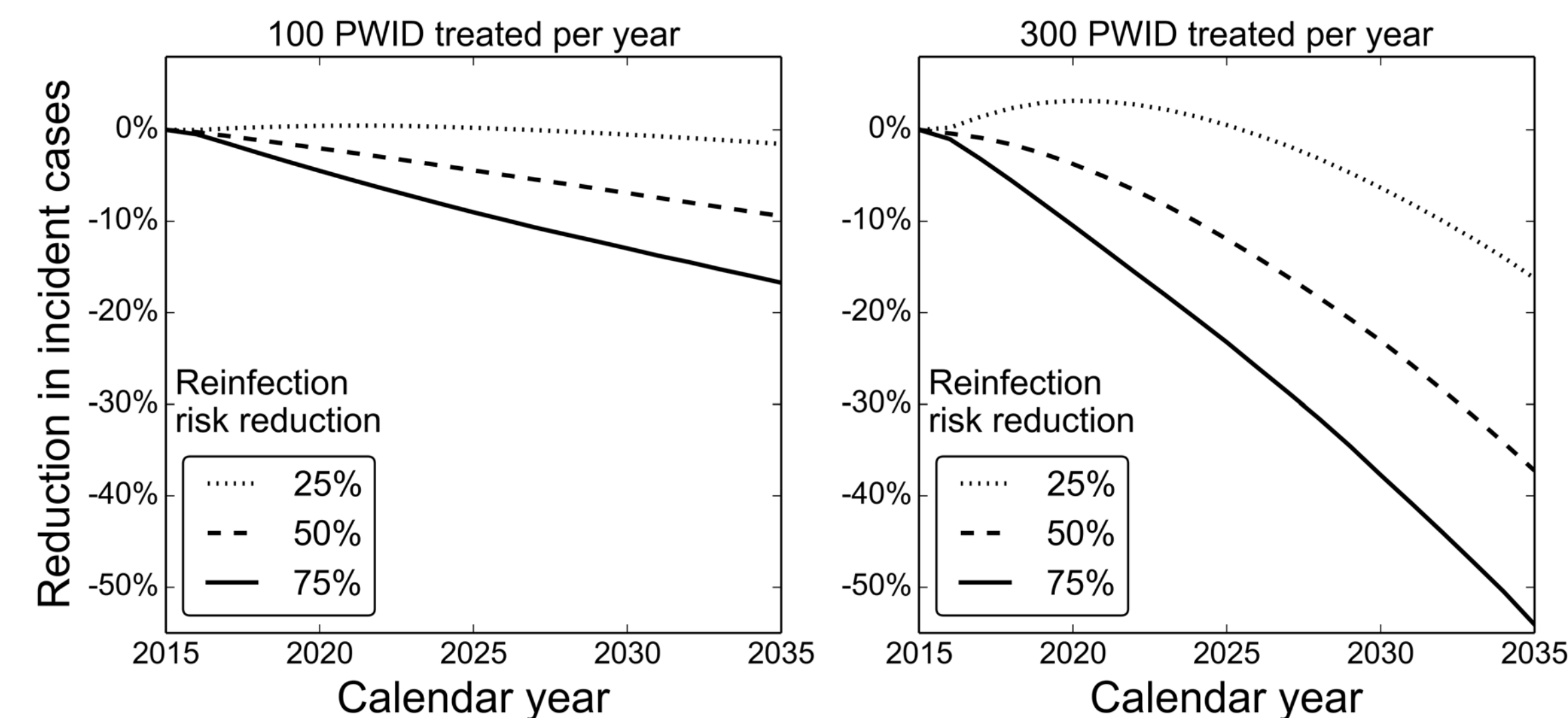

Figure 3. Change in incident cases over a 20 year time window. The figure on the left is below the eradication threshold, while the figure on the right is above the threshold


Results

- The eradication threshold at year 3 ranged from 160 PWID treated per year, assuming no reinfection risk, to 198 when there is no reinfection risk reduction. At twenty years, the threshold varied between 130 and 330 individuals treated.

Conclusions

- Treating between 200 and 300 PWID per year at minimum will lead to HCV eradication
- Minimizing the potential for HCV reinfection through harm reduction policies will result in much faster eradication.
- If reinfection risk remains close to that of the treatment naïve population, treating large numbers of individuals will result in a temporary increase in incident cases.

Figure 4. Eradication threshold band generated from 100 individual yearly thresholds
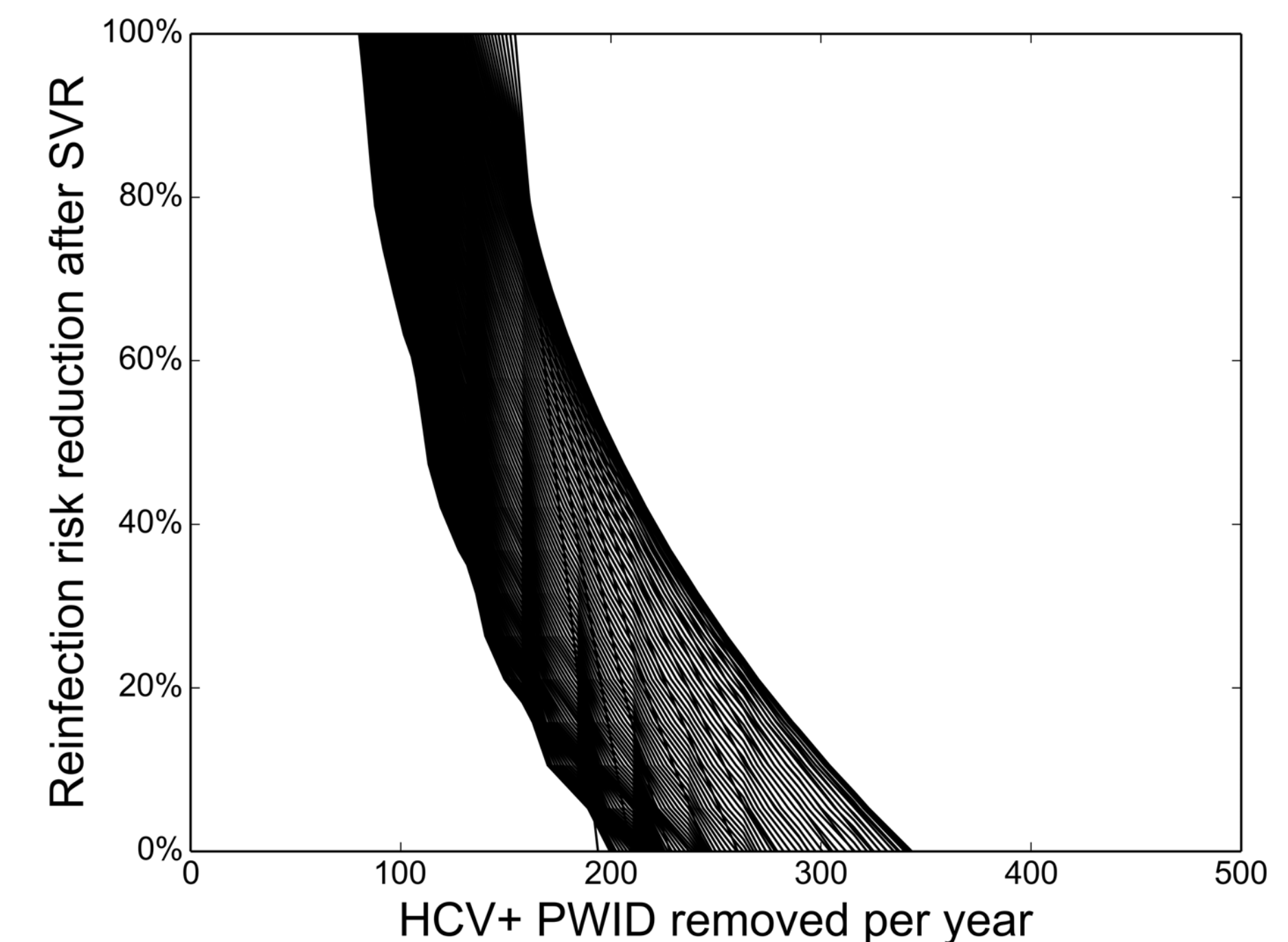
References

- Lima et al., PloS One, Dec. 2015
- Rozada et al., Journal of Theoretical Biology, Feb 2016