

# Modelling the effect of a test and treat strategy for HCV prevention using highly effective DAAs in people who inject drugs in British Columbia

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Poster # TUPE055

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## Background

- It is estimated that globally 67% of all people who inject drugs (PWID) are infected with HCV (Nelson PK et al. Lancet 2011).
- British Columbia (BC) has 18,000 PWID, of which 65% are HCV-infected, and less than 1% are treated each year.
- Once-daily, direct-acting antivirals (DAA) for HCV with very high tolerability and efficacy are poised to revolutionize the HCV landscape.

## Objectives

- We modelled the effect that DAAs will have on the HCV epidemic among PWID, and determined the conditions necessary for eradication of the epidemic.
- We studied the effect of increased access to testing and treatment on the basic reproductive ratio  $R_0$ .
- We simulated a 15 year treatment regime and looked at the effect on incidence, prevalence, and mortality.

## Methods

- We developed a dynamic compartmental model with seven major compartments and 5 fibrosis sub-compartments for each.
- Testing, treatment, harm reduction efforts, and reinfection were explicitly modeled.

Figure 1. Compartmental HCV model

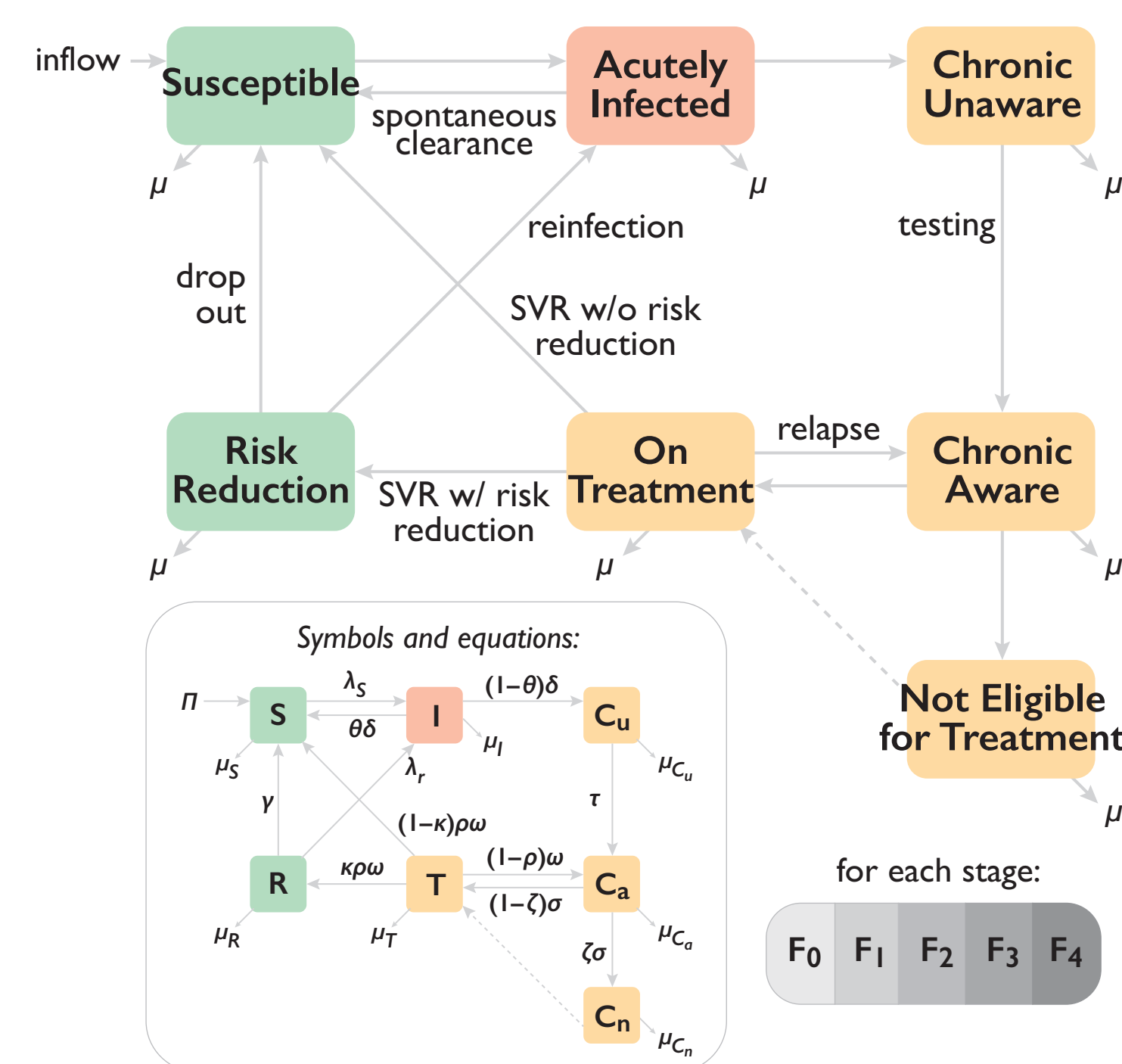
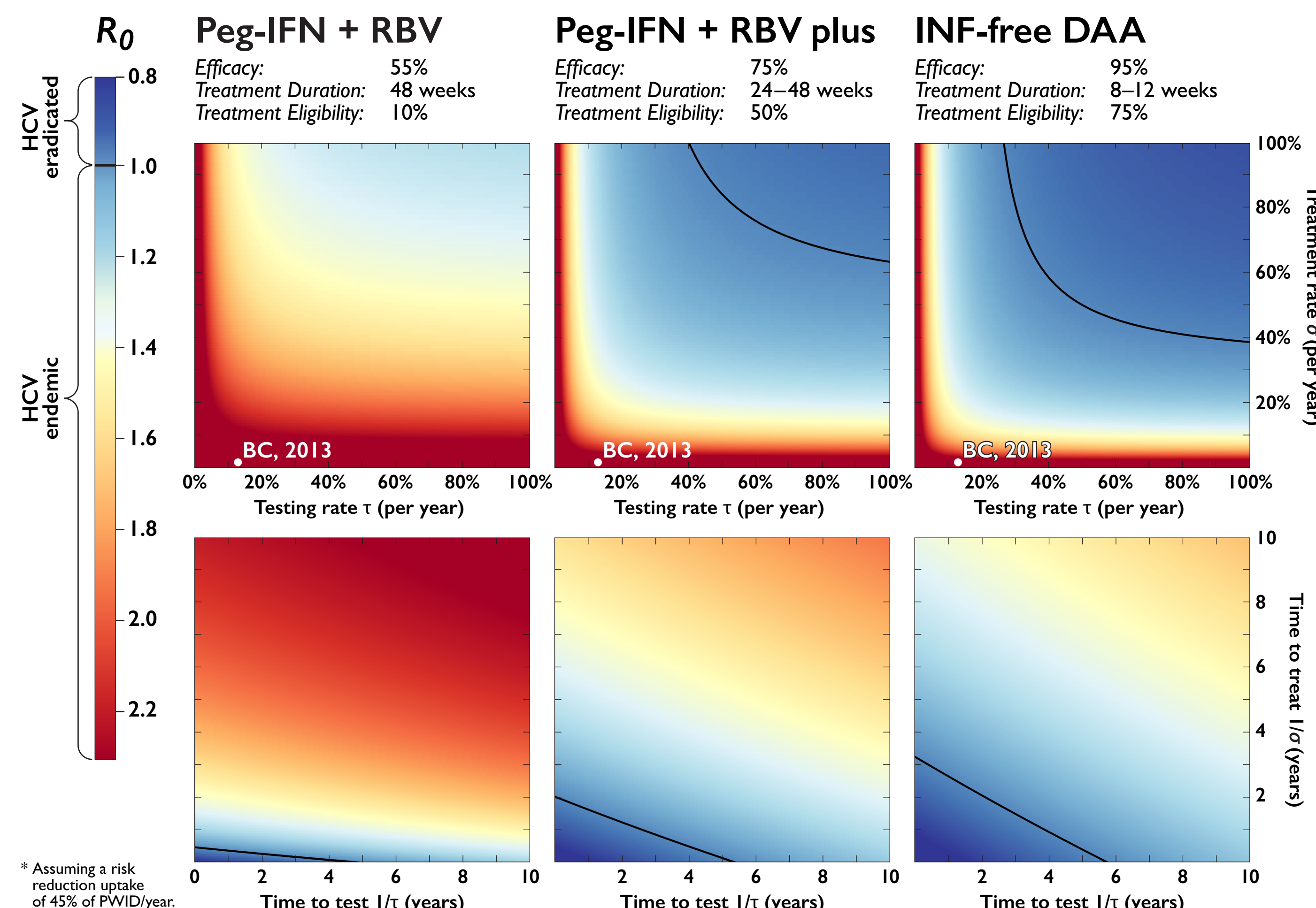


Figure 2.  $R_0$  dependence on treatment and testing coverage



\* Assuming a risk reduction uptake of 45% of PWID/year.

Figure 3. Incidence, prevalence and death reductions after 15 years under treatment scale-up scenarios

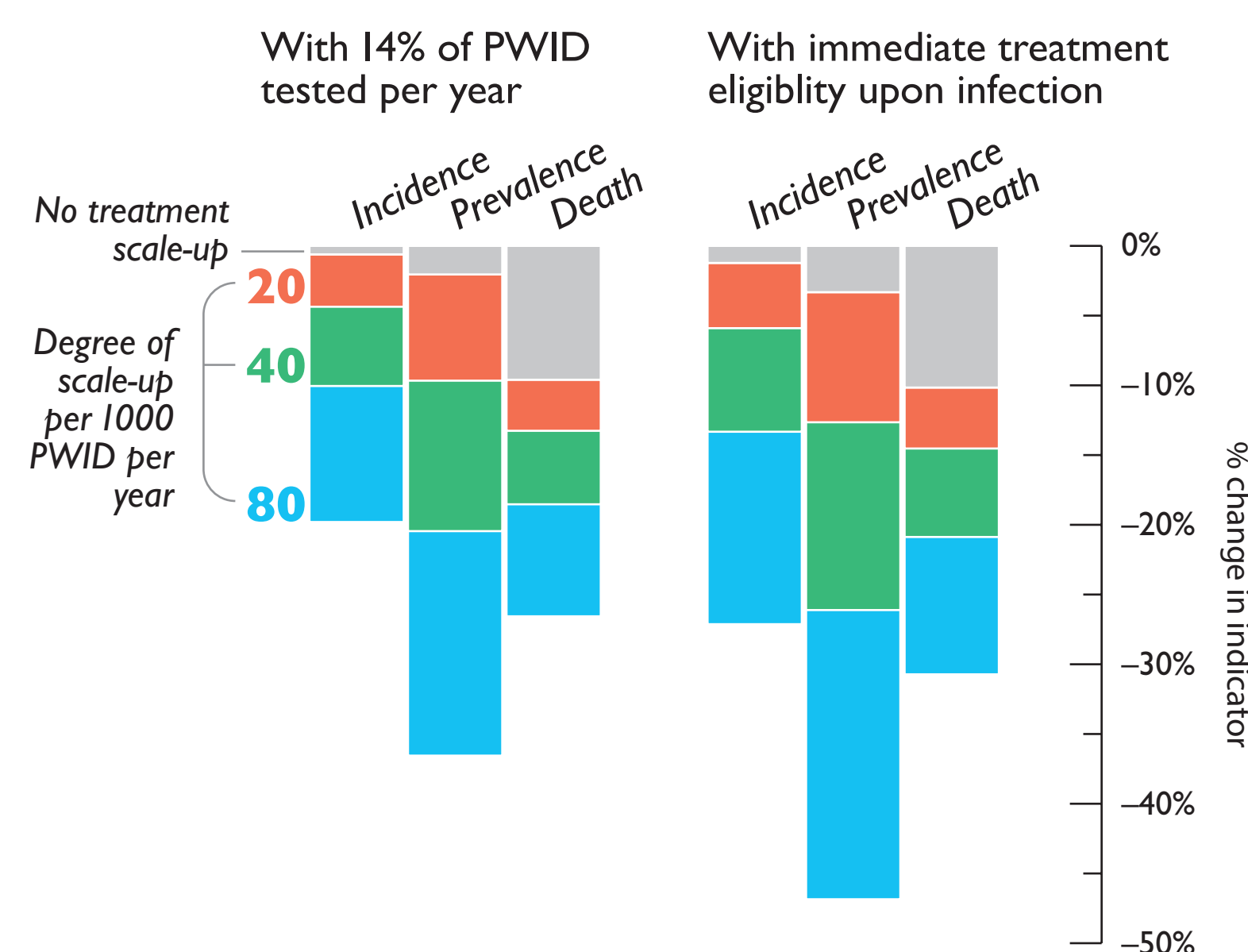
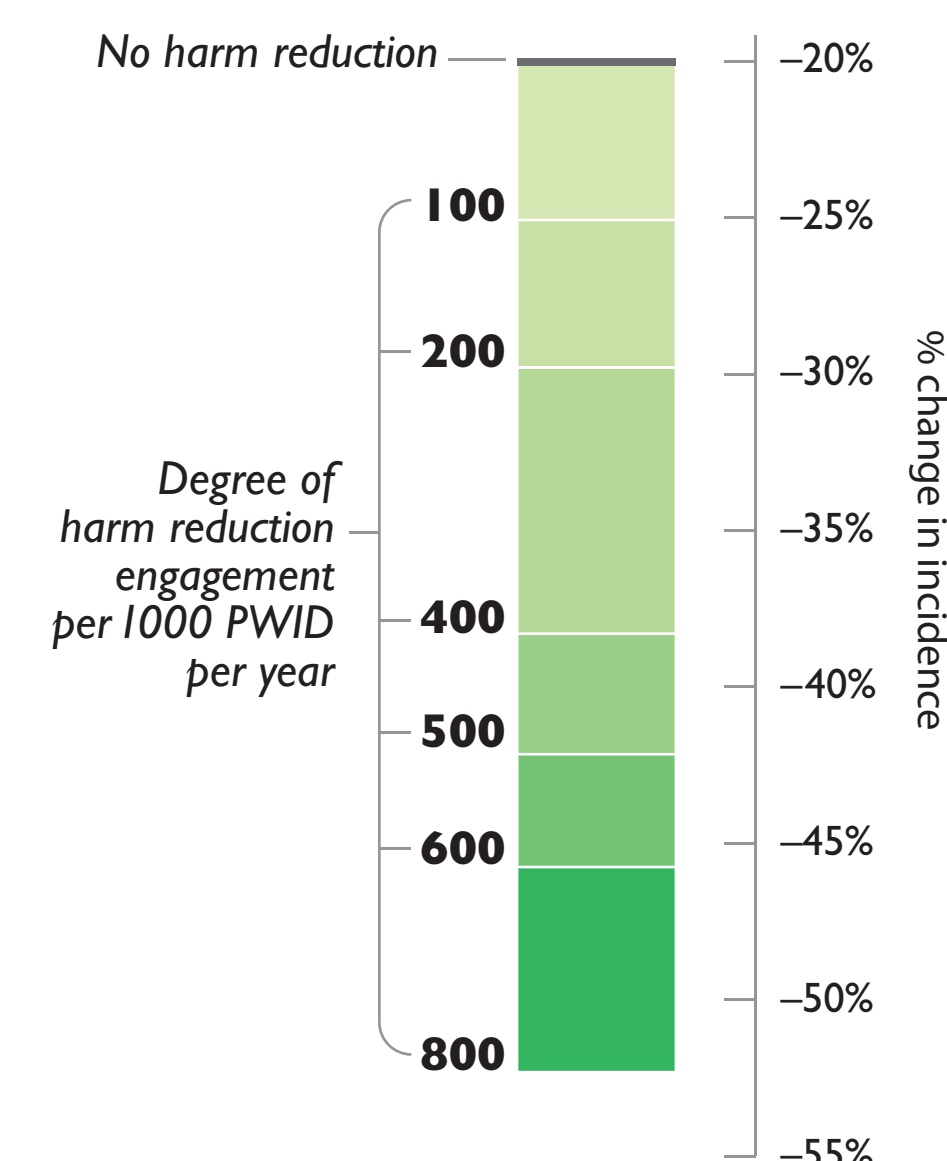


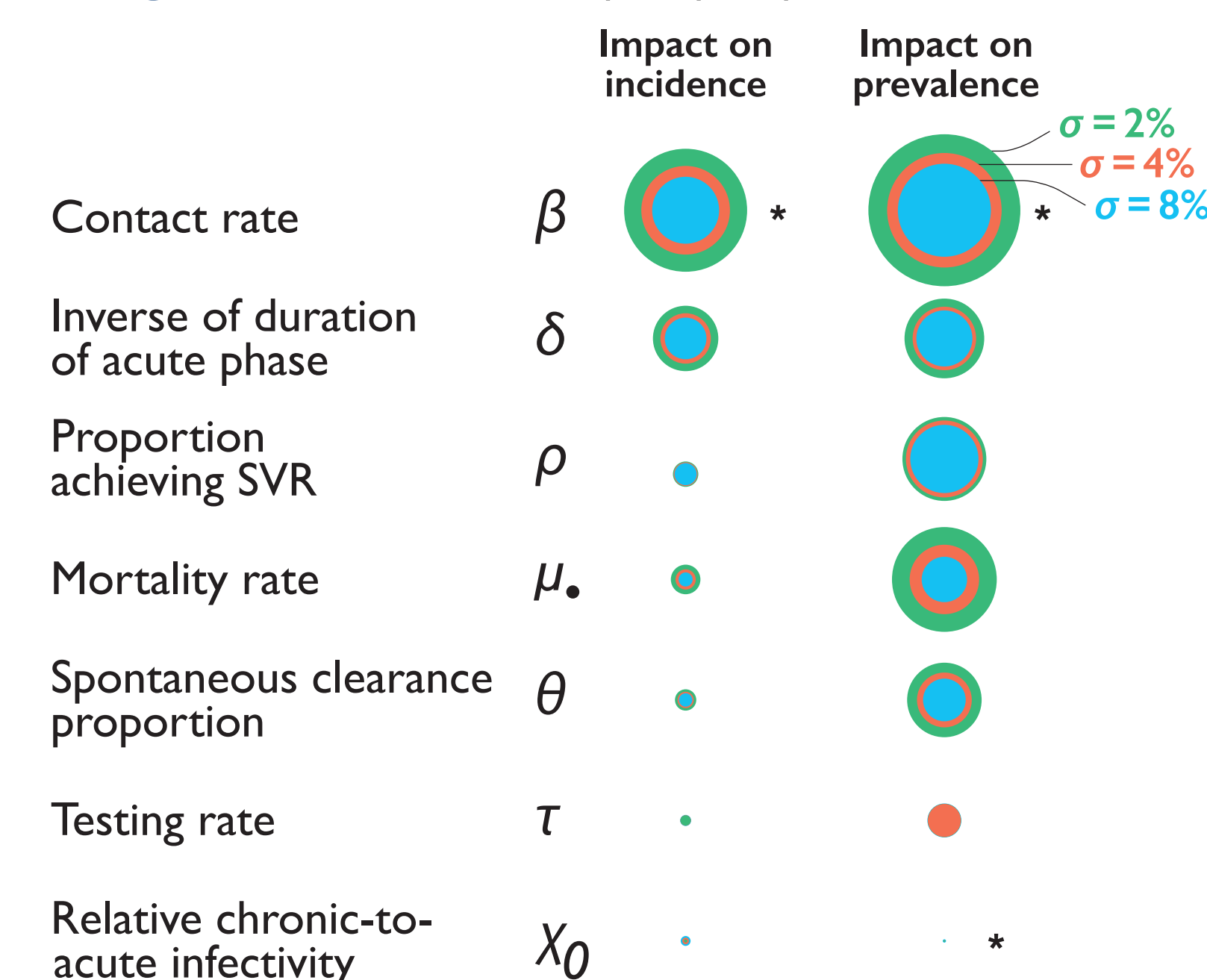
Figure 4. Incidence reduction under harm reduction engagement scenarios after 15 years



## Results

- In 15 years, under various treatment uptake scenarios it could be possible to reduce incidence and prevalence by over 20% and 40%, respectively. The results agree with previous independent modeling efforts (Martin NK et al., Hepatology 2013).
- At current testing and treatment rates,  $R_0$  would decrease from 2.87 to 2.74 with DAAs; to eliminate the endemic state significant test and treatment uptake is necessary.

Figure 5. Univariate sensitivity analysis by treatment level



Circle area is proportional to each factor's impact.  
 $\sigma$  = proportion of PWID treated per year \* = negative coefficient

## Conclusions

- Using DAAs it is possible to eliminate the HCV epidemic, which was not possible with previous regimes.
- However, at current treatment levels, the new drugs will have a minimal effect on the HCV epidemic on PWIDs in BC.
- Engaging patients into risk reduction will significantly reduce incidence (from reinfection).

## References

- Nelson PK et al. Lancet 2011;378(9791):571-83.
- Martin NK et al. Hepatology 2013;58(5):1598-609.



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