

REINFECTION OF HEPATITIS C AMONG PEOPLE WHO INJECT DRUGS IN NORWAY: OPPORTUNITY FOR INTERVENTION - A MODELLING STUDY

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Background	Methods
<ul style="list-style-type: none"> Reinfection after the successful treatment of hepatitis C virus (HCV) is a concern in groups that continue to engage in high-risk behavior It is conceivable that education and counseling during and after treatment can decrease the risk of reinfection This study examined the impact of decreasing the probability of reinfection among active PWID that were successfully treated 	<ul style="list-style-type: none"> A modeling approach was used to estimate the impact of reducing the probability of reinfection among active PWID after the successful treatment of HCV on the reduction of incidence of viremic HCV, including the specific impact on reinfections, among active PWID in Norway from 2015-2030 The model was calibrated to historical data, specifically examining the population sizes, risk factors, and risk reduction among active PWID in Norway (Table 1) Three scenarios were considered to specifically examine reinfection dynamics: <ul style="list-style-type: none"> Base <ul style="list-style-type: none"> The base scenario assumed that the probability of reinfection was equal to the probability of an initial infection thus assuming that there was no change in high-risk behavior after successful treatment A treatment program was developed to achieve a 90% reduction in total prevalence among active PWID by 2030 (Table 1, Table 2) 50% Reduction <ul style="list-style-type: none"> This scenario utilizes the same treatment paradigm as in the base but decreases the probability of reinfection among successfully treated active PWID to 50% of that of initial infection 75% Reduction <ul style="list-style-type: none"> A third scenario utilizes the same treatment paradigm as in the base but decreases the probability of reinfection after successful treatment to 75% of that of initial infection

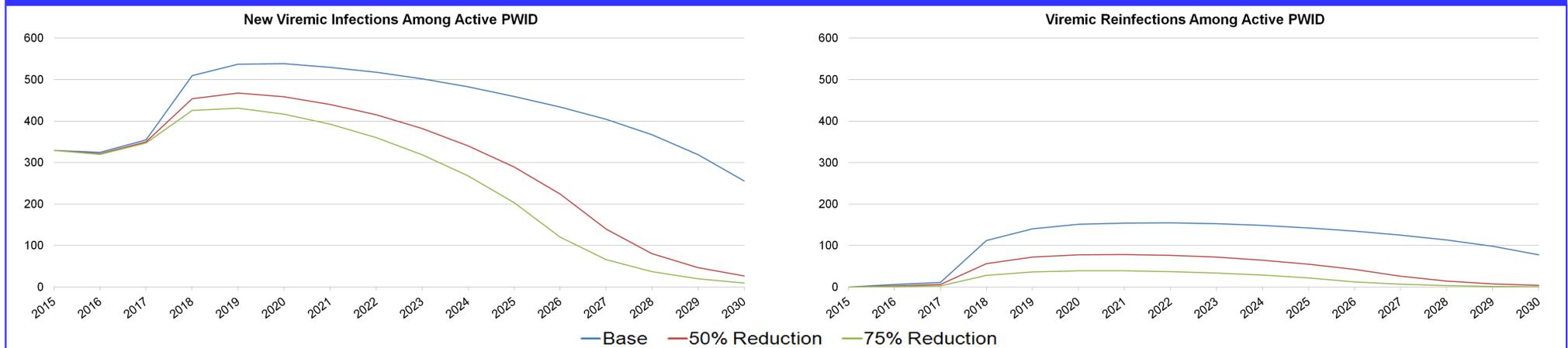
Table 1. Model inputs and 2015 estimates

Total PWID in 2015	8,000
Viremic prevalence	48%
PWID mortality	2%
Duration of injecting carrier	9.52
Regularly engaged in harm reduction (%)	87%
OST	2%
NSP	57%
OST/NSP	28%
% Sharing needles	58%
Prob. of infection from one contaminated injection	5%
Years to infection	1.83
New PWIDs	510

Table 2. Model Inputs – Norway, 2015-2030

	2015	2016	2017	2018	2020	2025
Base Average SVR12	61%	79%	88%	88%	90%	90%
PWID -Treated						
Gen Pop	2	2	2	2	2	5
NSP	17	17	330	330	330	330
OST	4	4	15	15	15	15
NSP & OST	52	52	900	450	155	100
Total	75	75	1,250	800	500	450

Figure 1. Effect of the Reduction of Risk of Reinfection on Incidence Among PWID – Norway, 2015-2030



Results

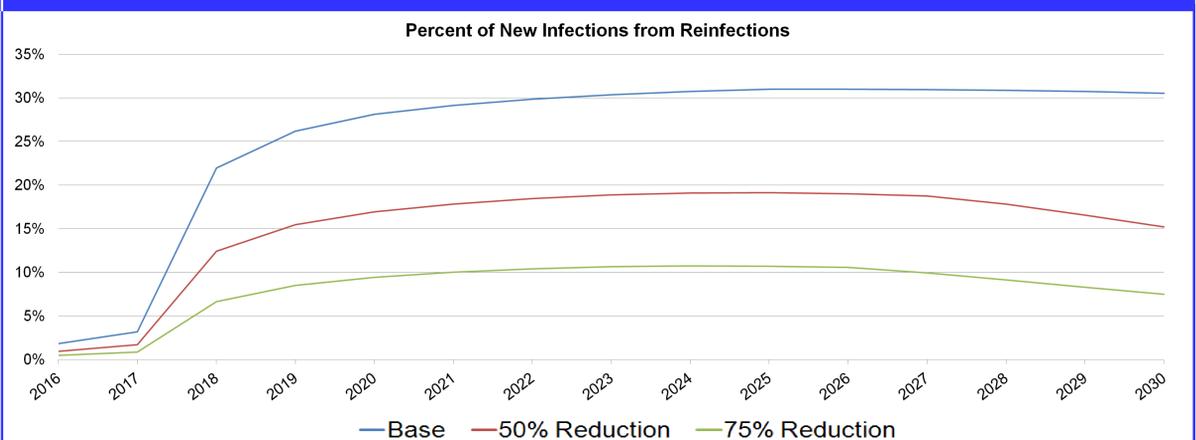
Base Scenario

- In 2016, the number of new cases of viremic HCV among active PWID was estimated to be 320, peaking at 540 in 2020 before dropping to 260 in 2030 (Figure 1)
- As treatment increases the number of reinfections increase as well, going from 10 in 2016, to 80 in 2030 after peaking at 155 in 2022 (Figure 1)
- While the total numbers of reinfections may drop, the portion of all infections that come from reinfections increases to 31% in 2025 and remains relatively constant through 2030 (Figure 2)
- There are a total of 1,720 reinfections that occur from 2016-2030 in this scenario

50% Reduction

- By decreasing the risk of reinfection by 50%, the number new cases of viremic HCV among active PWID peak at 470 in 2019 before dropping to 30 in 2030
- In this scenario, reinfections peak at 80 in 2020 and decline to 5 in 2030
- The portion of all new infections that come from reinfections peaks at 19% in 2024 but drops to 15% in 2030
- There are a total of 660 reinfections that occur from 2016-2030 in this scenario

Figure 2. Reinfection Dynamics – Norway, 2016-2030



75% Reduction

- The number of new cases of viremic HCV among active PWID peak in 2019 at 430 before dropping to 10 in 2030
- Reinfections peak at 40 in 2021 before dropping to <5 in 2030
- The portion of all new infections that come from reinfections peak at 11% in 2025 before dropping to 8% in 2030
- There are a total of 300 reinfections that occur in this scenario

Conclusions

- The reduction of the probability of reinfection after successful treatment among active PWID can increase greatly the impact of treatment
- In a large scale treatment program, like the one examined in this study, over 30% of all new infections among active PWID can come from reinfections if there is not behavioral changes
- This number can be reduced by 75% if there is a change in behavior that results in a reduction in the risk of reinfection
- Interventions that reduce the risk of reinfection after successful treatment of active PWID should be explored and can have a large impact on the treatment of these individuals and should be considered