

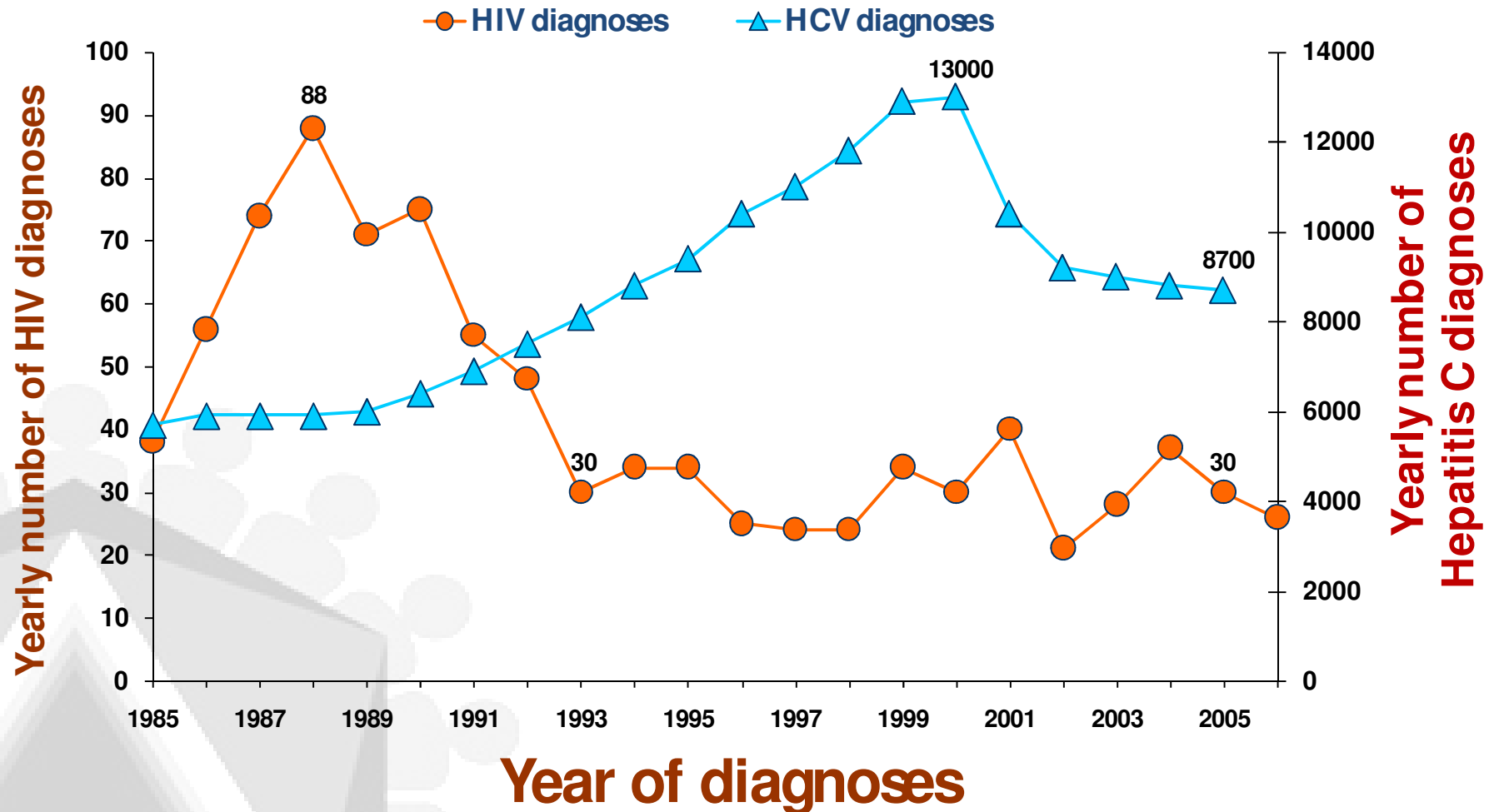
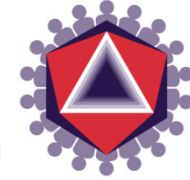
THE IMPACT OF NSPs ON HIV AND HCV TRANSMISSIONS IN IDUs IN AUSTRALIA: A MODEL-BASED ANALYSIS

**Amy JS Kwon, Jenny Iversen, Lisa Maher,
Matthew G Law, David P Wilson**

NCHECR

October 2009

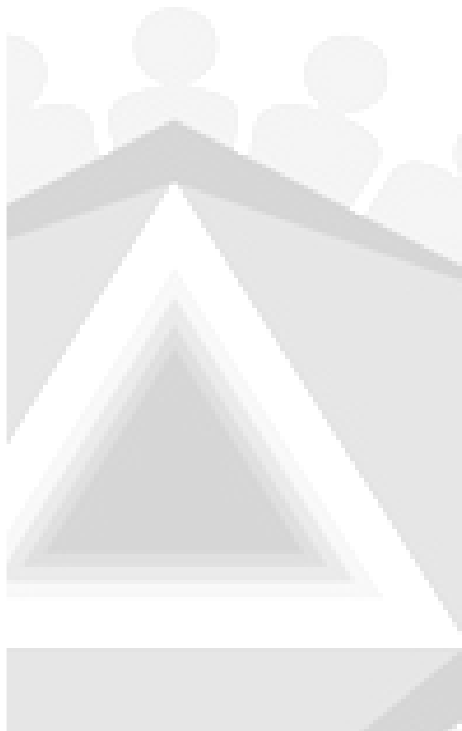
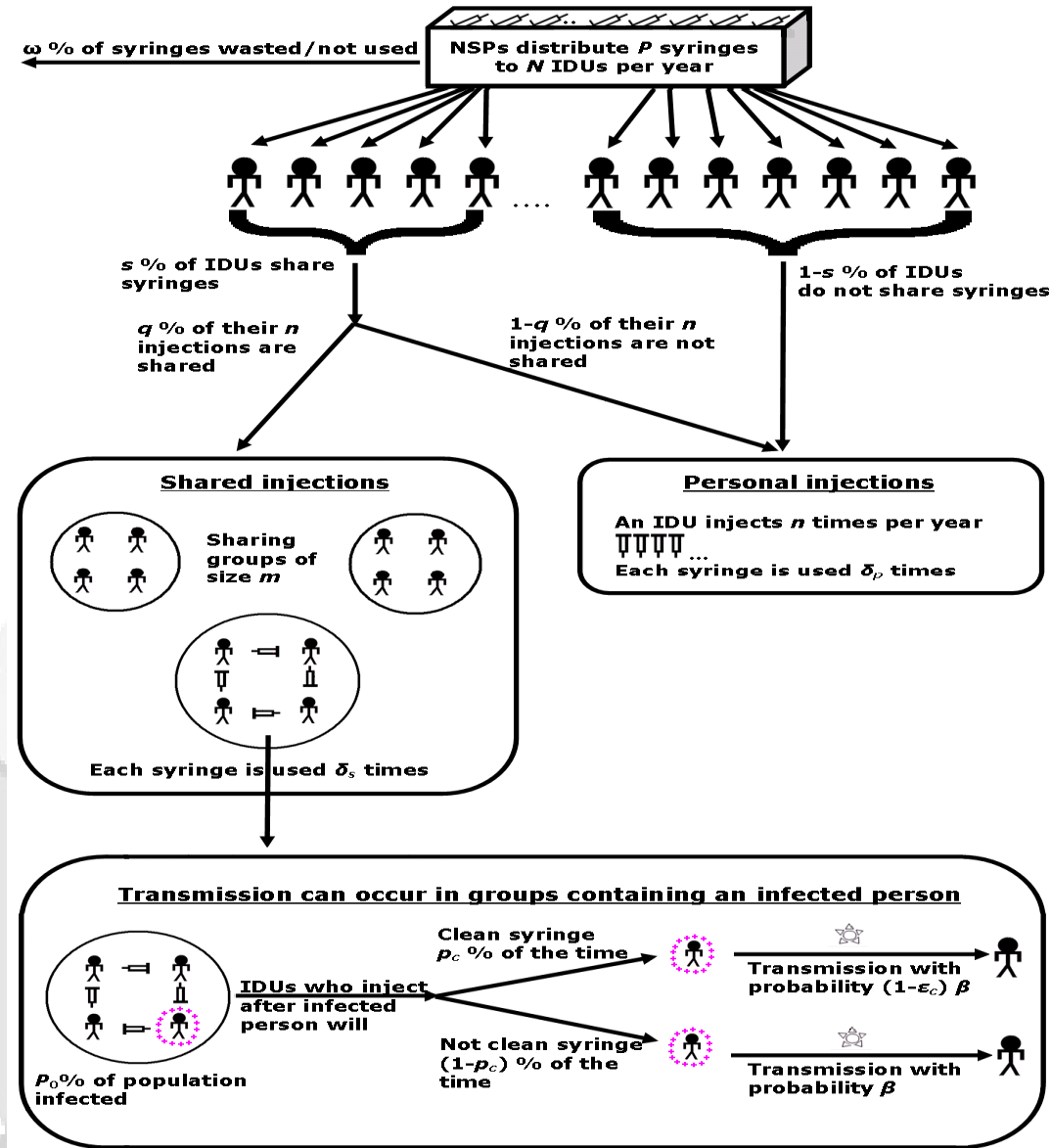
Incidence among Australian IDUs



Source: Annual Surveillance Report: HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia , NCHECR

Razali K, et al. Modelling the hepatitis C virus epidemic in Australia. *Drug Alcohol Depend* 2007;91:228-235.

Modelling viral transmission among IDUs



Model Assumptions



- **We weighted the heterogeneous behavioural data such that each IDU injects ~300 times per year (ON AVERAGE)**
 - Australian NSP Surveys National Data Report 2007;
NSW Needle and Syringe Program Periodic Survey 2008 NCHECR
- **15-20% of IDUs share their syringes with others**
 - They do so in 13-17% of their injections are shared
- **A shared syringe is used an average of 2.7 times before disposal** (based on current syringe distribution)
 - Syringes not shared are used on average of 2.1 times
- **0-1% of shared syringes are cleaned before re-use**

Model inputs (epidemiology)

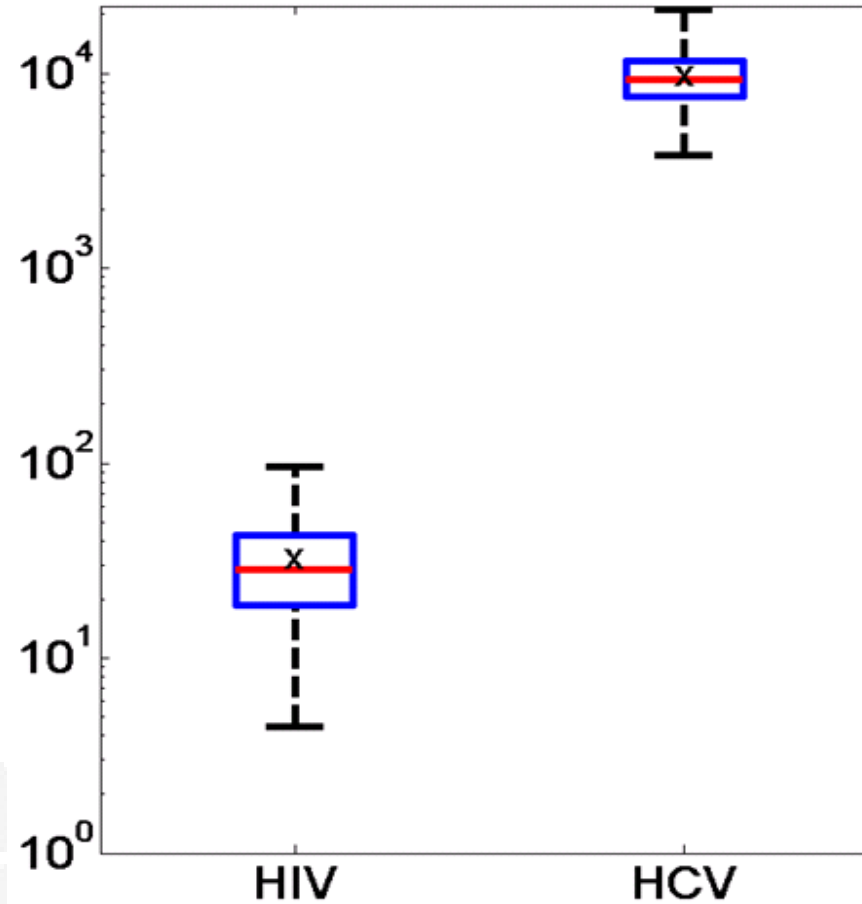


- **Transmission probability per injection with a contaminated syringe:**
 - HIV = 0.003
 - HCV = 0.0375
- **Prevalence among IDUs:**
 - HIV = ~1%
 - HCV = ~60%
- **215,000 IDUs in Australia (in 2005)**
- **~30,000,000 syringes distributed per year**
 - (~0.5-1% of distributed syringes are wasted)

Estimated annual HIV/HCV incidence



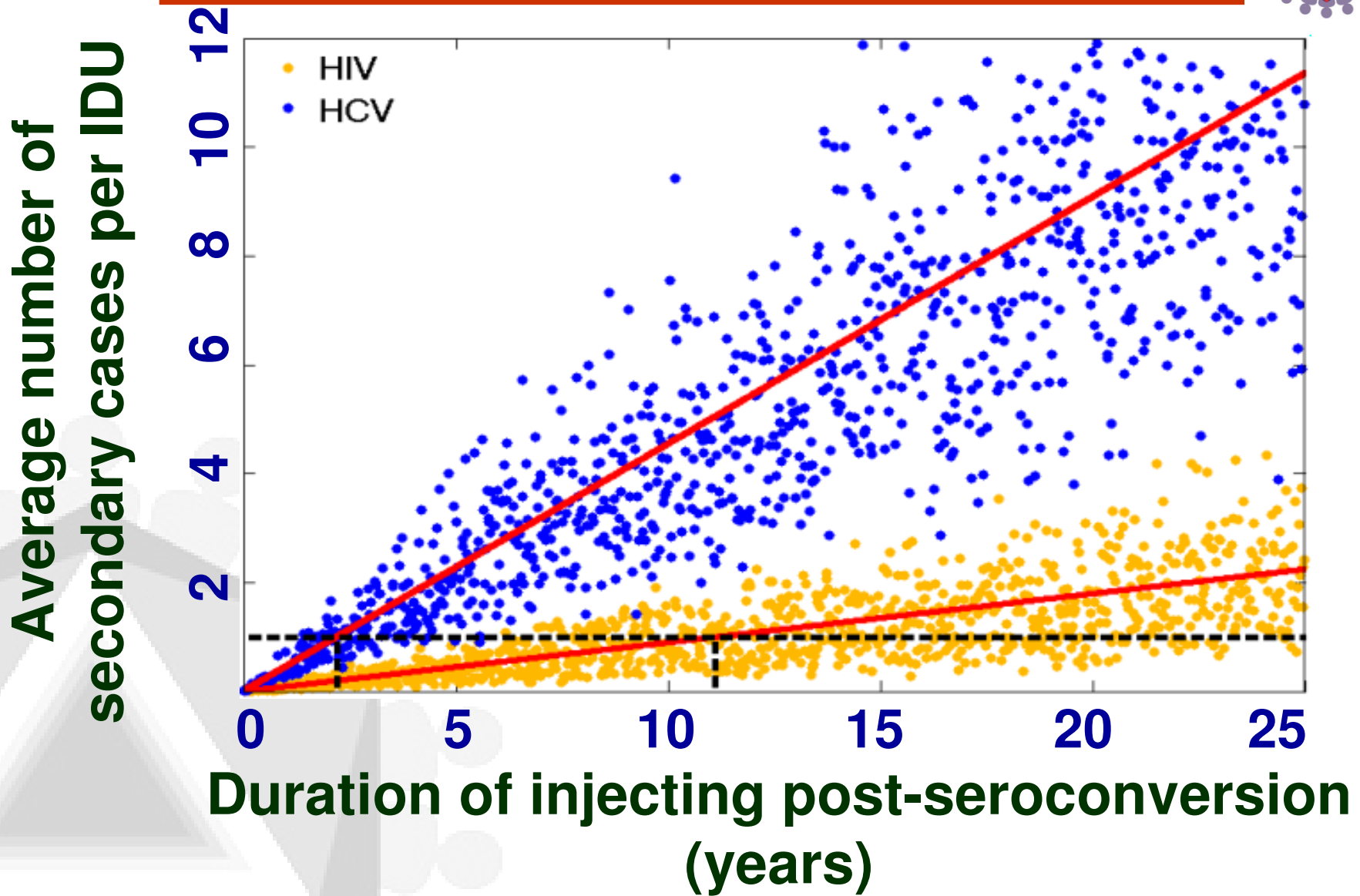
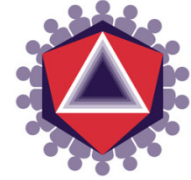
Annual number of infections
among Australian IDUs



HIV: 34 (IQR 11-75)

HCV: 10,268 (IQR 5,884-15,192)

Reproductive Ratio (R_0)

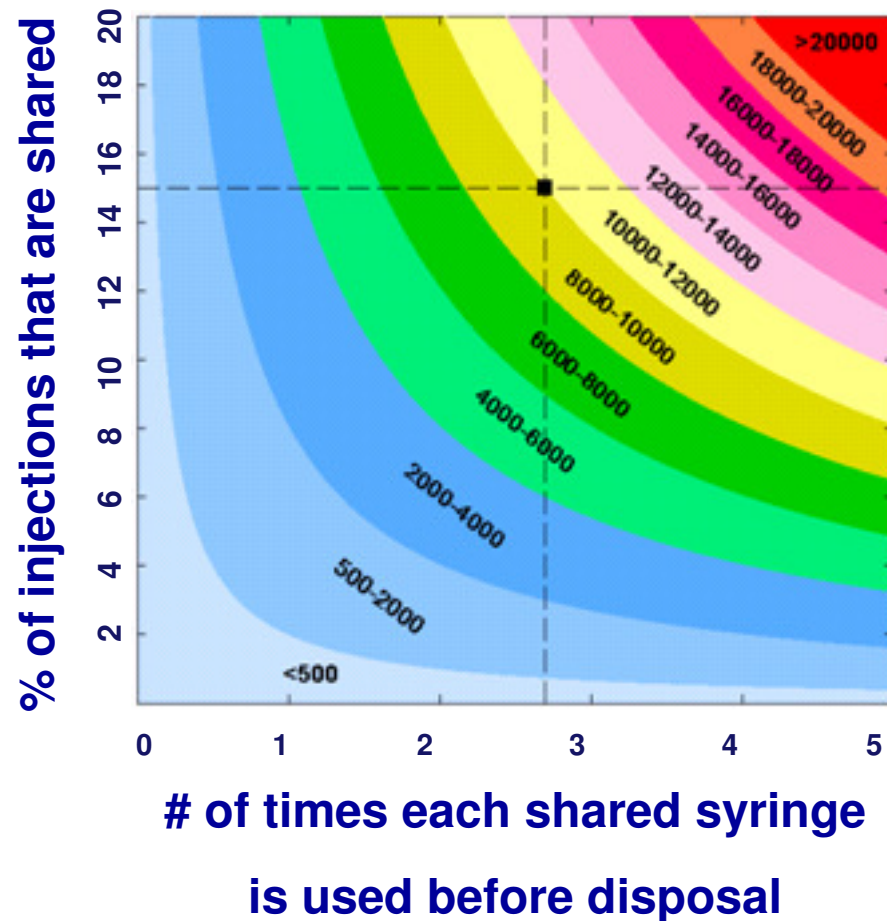
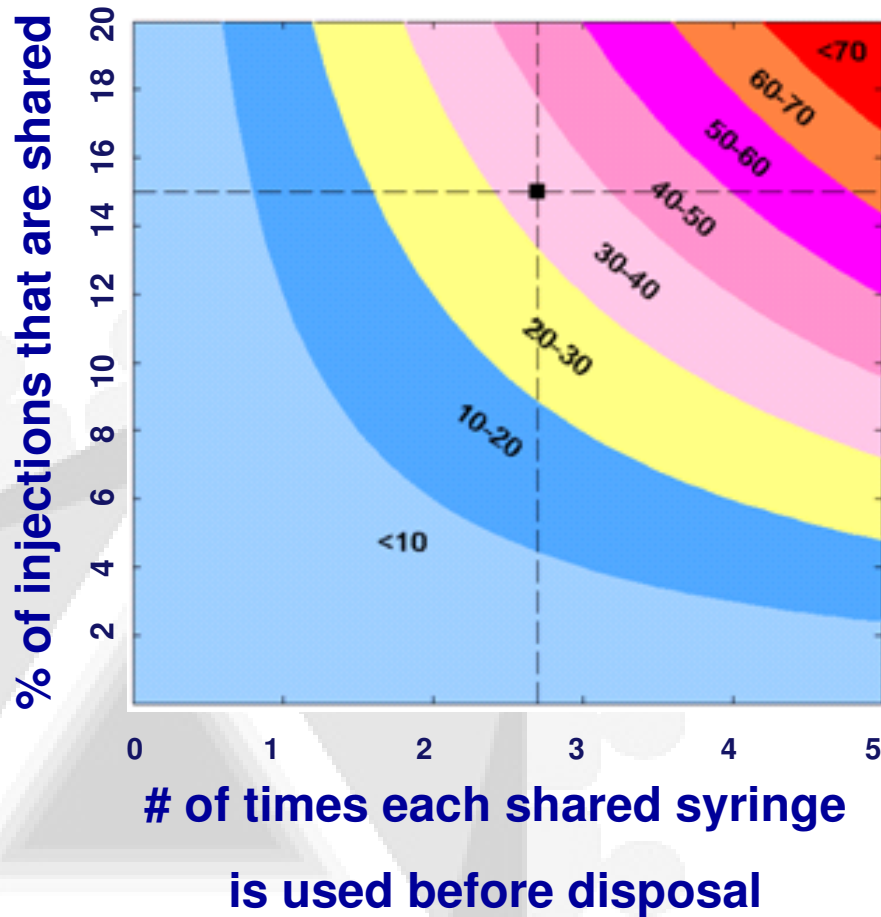


Sensitivity of incidence to sharing



HIV Incidence = 34

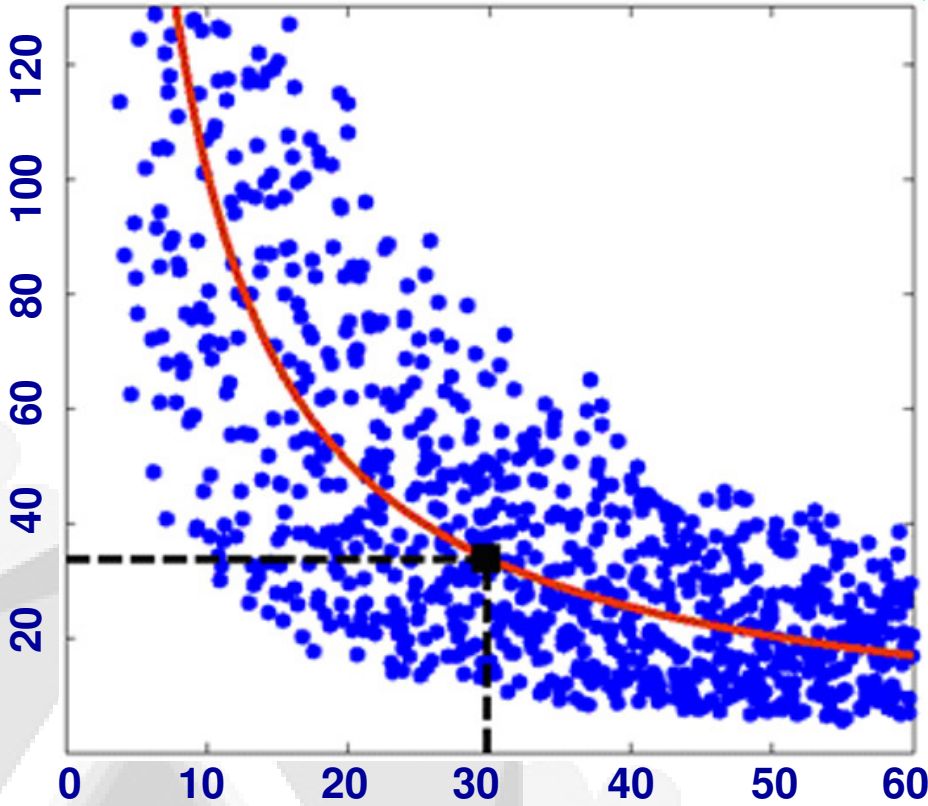
HCV Incidence = 10,268



Predicted impact of syringe coverage

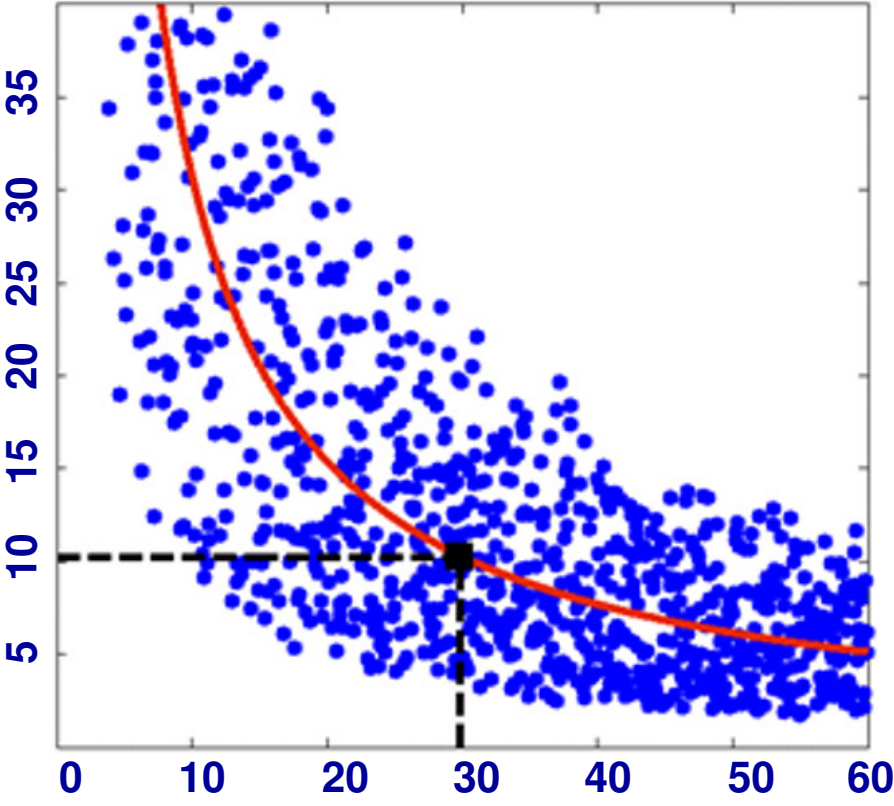


HIV Incidence



Number of syringes distributed
in Australia (millions/year)

HCV Incidence (1000s)



Number of syringes distributed
in Australia (millions/year)

Impact of changes in syringe distribution



	Current Level	Reduced by 1/3	Double
Number of sterile syringes distributed	~30 million	~20 million	~60 million
HIV Incidence among IDUs	34	51	17
HCV Incidence among IDUs	10268	15000	5100

Summary



- **HIV and HCV epidemics are divergent due to differences in transmission probabilities**
- **HIV is largely being controlled but HCV will not be controlled under current conditions**
- **This research highlights the large benefits of NSPs and indicates that increased coverage could result in significant reductions in viral transmissions among IDUs**
 - **Doubling syringe distribution could halve the number of new infections**
 - **Reductions in syringe distribution is likely to lead to significant increases in incidence**

Acknowledgements



- **Special thanks to David Wilson for his great guidance and supervision**
- **Thanks for Matthew Law, Lisa Maher and Jenny Iversen with their great effort with this paper**

