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Longitudinal trajectories of sexual behavior and incident HCV re-infection among men who have sex with men in the Netherlands

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Introduction

- WHO set ambitious targets to eliminate HCV as a public health threat (i.e. 80% reduction in new chronic infections and 65% reduction in mortality)

- MSM with HIV are a key population[1,2]

- Re-infection rate among MSM with HIV remains high due to continuing risk behavior[3]

- While there have been studies that linked specific behaviors to HCV re-infection, none examined how these behaviors evolved over time

[1]Hagan et al. AIDS, 2015. [2]van Santen et al. J Hepatol, 2017. [3]Hosseini-Hooshyar et al. Lancet HIV, 2022.

Study objective

To identify classes of MSM with HIV with different patterns of HCV-related sexual behavior over time and assess the risk of re-infection within these classes

Methods

Study design and participants

- MSM Observational Study of Acute Infection with hepatitis C (MOSAIC) study (2009-2018)
- Longitudinal study with semi-annually visits
- Sociodemographic, clinical and virologic data
- Detailed self-administered questionnaire about HCV-related risk behavior

Inclusion criteria

- Participants at risk for re-infection (i.e., after spontaneous clearance or successful treatment)
- Completed ≥1 questionnaire

Methods

Study outcomes

- HCV-MOSAIC risk score[1] [range 0-7]
  - Receptive CAS (β=1.1), sharing of toys (β=1.2), unprotected fisting (β=0.9), IDU (β=1.4), sharing of straws (β=1.0), ulcerative STI (β=1.4)
  - Score $\geq$2 indicating high reinfection risk
- HCV re-infection: defined as having a positive HCV-RNA test following HCV clearance

Statistical analyses

- Latent class analysis modelling HCV-MOSAIC score adjusting for age, group sex and casual partnerships
- HCV re-infection risk was jointly modelled with a class-specific survival model

[1]Newsum et al. Euro Surveill, 2017.

Results – Study population

Characteristics at first visit at risk for HCV re-infection

	Overall (n=123)	Not re-infected (n=90)	Re-infected (n=33)	p
Age, years	45 (41-50)	46 (41-50)	43 (39-50)	0.33
Dutch origin	105 (85.4)	76 (84.4)	29 (87.8)	0.78
College degree or higher	78 (63.4)	56 (62.2)	22 (66.7)	0.81
CD4 cell count (cells/mm^3)	475 (328-642)	520 (360-700)	370 (270-561)	<0.01
Nadir CD4 cell count (cells/mm^3)	436 (290-610)	460 (340-695)	339 (250-480)	<0.01
Follow-up time, years	2.7 (1.2-4.7)	2.8 (1.2-4.7)	2.5 (1.1-3.6)	0.59

Presented are n (%) or median (IQR)
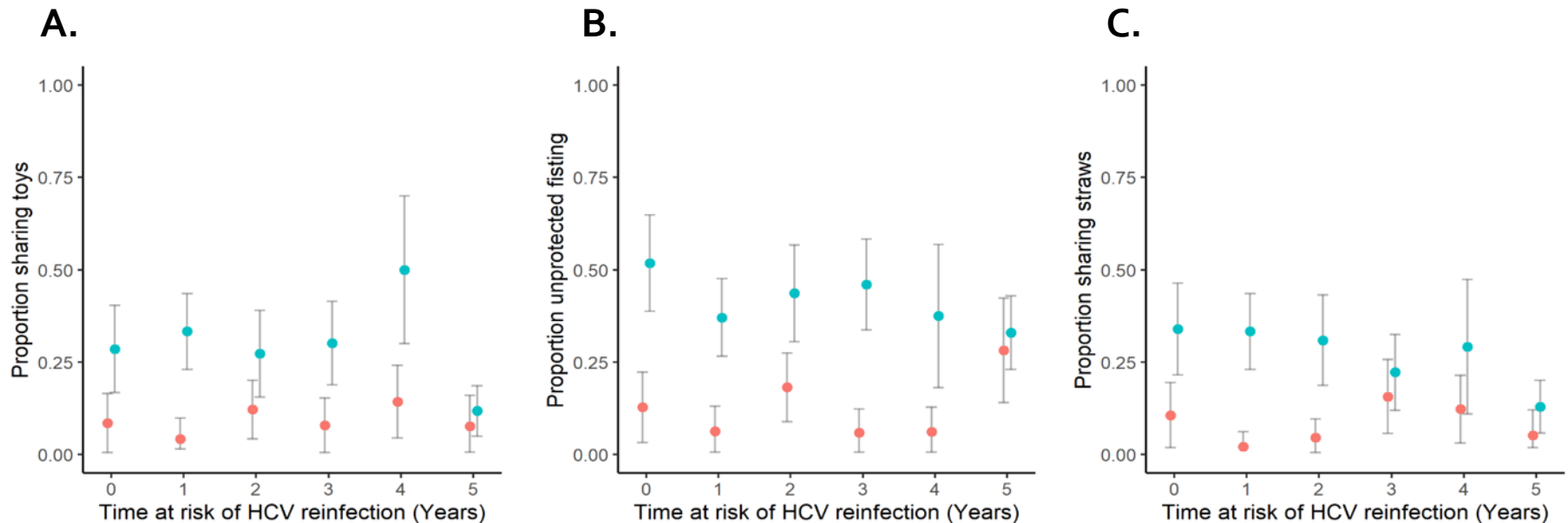
Results – Trajectories HCV-MOSAIC score over time

Consistent lower risk class

Fluctuating higher risk class
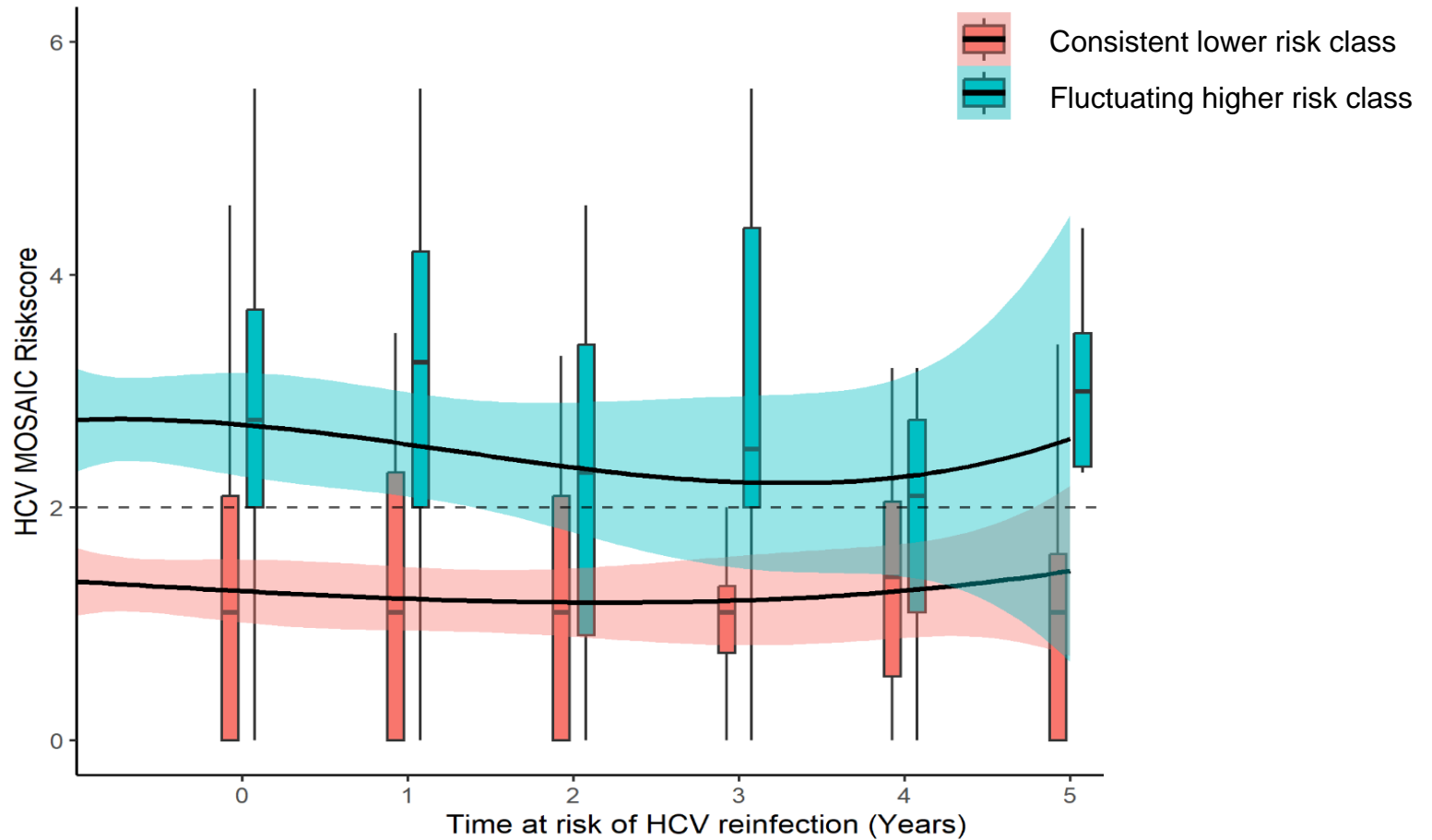
Number of MSM at risk

Class 1	67	38	28	20	15	11
Class 2	56	32	21	13	7	6

# Results – Trajectories of individual risk behaviors

- Higher proportions of sharing toys (**A**), unprotected fisting (**B**) and sharing straws (**C**) in the fluctuating higher risk class (blue) vs. the consistent lower risk class (orange)

Results – HCV re-infection probabilities

HCV event free probability

— Consistent lower risk class
— Fluctuating higher risk class

Time at risk of HCV reinfection

Number of MSM at risk

Class 1	67	38	28	20	15	11
Class 2	56	32	21	13	7	6
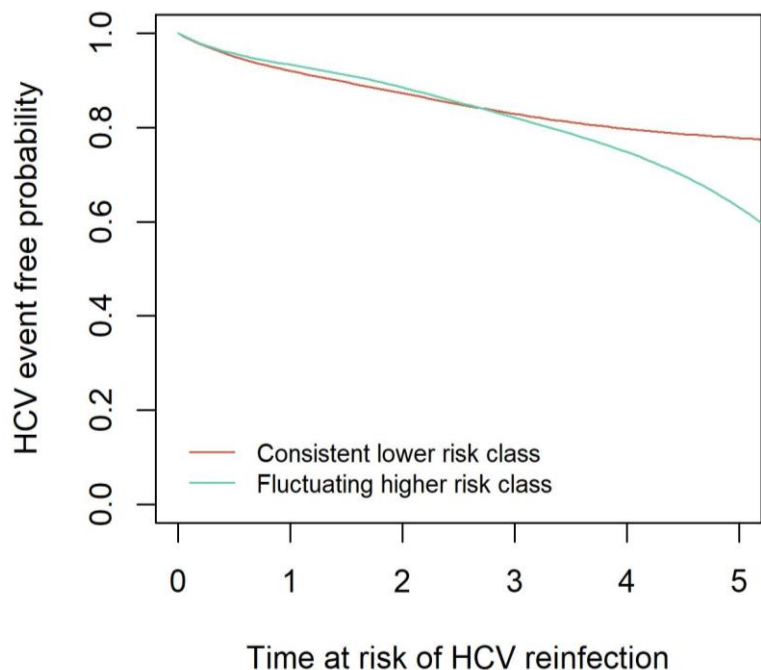
- IR consistent lower risk: 6.5 (95%CI=3.6-11.8) per 100 PYs

- IR fluctuating higher risk: 11.9 (95%CI=7.0-20.0) per 100 PY

- IRR: 2.0 (95%CI=0.9-4.5) fluctuating higher risk vs. consistent lower risk

HCV re-infection probabilities		
	Consistent lower risk class	Fluctuating higher risk class
Year 3	18%	17%
Year 5	22%	37%

Discussion

Strengths

- Prospective study design with frequent monitoring of detailed sexual behavior

Limitations

- Small number of MSM at risk for re-infection at ≥3 years
- Unable to identify reasons for behavioral variations
- Generalizable mostly to MSM with HIV from high-income countries with at least a college degree

Discussion and conclusion

- We identified two classes of MSM with different patterns of behavioral risk

- Re-infection became more frequent in the fluctuating higher risk class after 3 years of follow-up
  – Periods of higher risk among the consistent lower risk class
  – Level of waning immune protection?

- Wide variation in risk behaviors suggests that behavioral assessment is continually needed to ensure timely testing

Acknowledgements

MOSAIC study participants

and

Thank you for your attention!

Questions?
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