

# Renal Impairment in a Pre-exposure Prophylaxis Implementation Cohort in Australia

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## Background

- Co-formulated tenofovir disoproxil fumarate/emtricitabine is prescribed as pre-exposure prophylaxis (PrEP) to prevent HIV infection.
- Prior studies have found low incidence of new renal impairment in people taking PrEP but have been restricted to clinical trial settings.

## Objectives

- To describe the rate of loss of renal function amongst HIV-negative patients receiving PrEP.
- To describe the relative contribution of risk factors for renal disease amongst HIV uninfected patients receiving PrEP enrolled in the EPIC trial in NSW.

## Methods

- We included participants enrolled in the EPIC-NSW study with baseline eGFR  $\geq 60$  ml/min/1.73m<sup>2</sup> with more than one PrEP dispensing visit between 1 March 2016 and 30 April 2018, and no recorded prior PrEP use.
- Patients without eGFR monitoring were excluded.
- The primary outcome was new sustained renal impairment defined as an average eGFR of two consecutive tests  $< 60$  ml/min/1.73m<sup>2</sup>.
- Risk of progression to new sustained renal impairment was estimated using the Kaplan-Meier method.
- Cox proportional hazards models stratified by study site were used to compare risk factors including baseline eGFR (60-90,  $\geq 90$  ml/min/1.73m<sup>2</sup>); age (<40, 40-49,  $\geq 50$  years); recreational drug use; hepatitis B virus (HBV) and hepatitis C virus (HCV) infection status; and time-updated PrEP medication possession ratio (defined as the proportion of elapsed days covered by prior dispensed PrEP, and dichotomised in this study as  $< 0.95$ ,  $\geq 0.95$ ).
- Significant covariates ( $p < 0.10$ ) were included in a multivariate model.

## Results

- 5,868 participants were included, with over 5,620 person years (PY) of follow-up.
- 28.5% had baseline eGFR between 60-90 ml/min/1.73m<sup>2</sup>, and 71.5%  $\geq 90$  ml/min/1.73m<sup>2</sup>.
- 65.9% of participants were aged  $< 40$  years; 19.4% were aged 40-49 years; and 14.7% were aged  $\geq 50$  years.
- 47.0% had an average medication possession ratio  $< 0.95$ ; and 53.0%  $\geq 0.95$ .
- 19.6% reported recreational drug use.
- 10.4% had a positive HBV surface antigen.
- 1.2% had positive HCV serology.

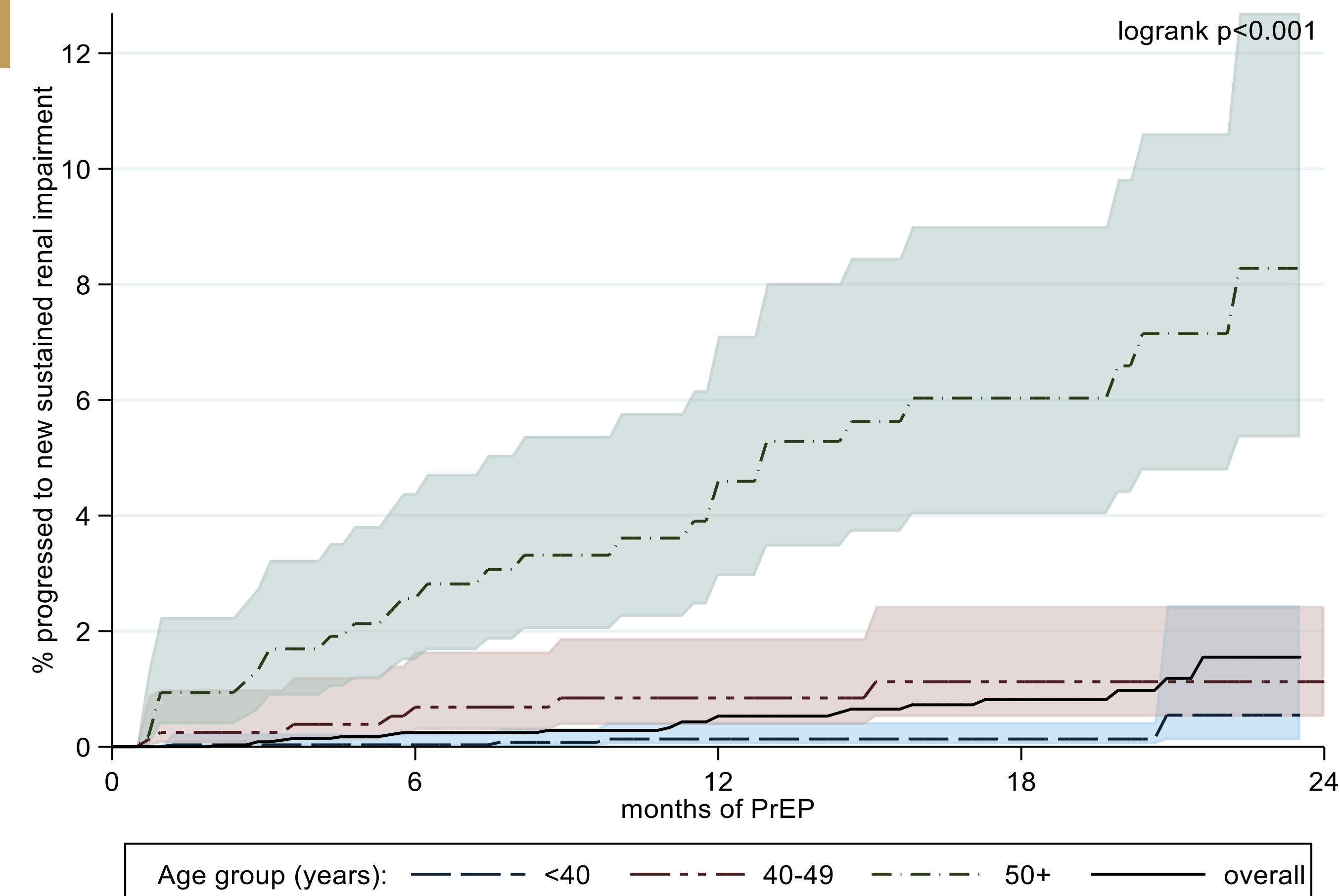


Figure: Progression to new sustained renal impairment (defined as an average eGFR of two consecutive tests  $< 60$  ml/min/1.73m<sup>2</sup>) by age group

Table: renal impairment by risk factor

a. numbers and rates

b: Cox proportional hazards models

Characteristic	Category	Failures	PY (000s)	Rate/1000 PY (95%CI)	p	HR (95%CI)	p	MV HR (95%CI)	p
<b>All</b>		32	5.62	5.69 (4.03-8.05)					
<b>Baseline eGFR (ml/min/1.73m<sup>2</sup>)</b>	$\geq 90$	30	1.66	18.1 (12.7-25.9)	$< 0.001$	1 (ref)		1 (ref)	
	$< 90$	2	3.96	0.50 (0.13-2.02)		37.8 (8.97-159.6)	$< 0.001$	16.5 (3.86-70.6)	$< 0.001$
<b>Age group (years)</b>	$< 40$	2	3.55	0.56 (0.14-2.25)	$< 0.001$	1 (ref)		1 (ref)	
	40-49	6	1.18	5.06 (2.28-11.3)		10.7 (2.12-54.2)	0.004	6.48 (1.26-33.38)	0.025
	$\geq 50$	24	0.78	30.6 (20.5-45.7)		66.7 (15.2-293.3)	$< 0.001$	26.7 (5.90-119.9)	$< 0.001$
<b>Recreational drug use</b>	No	28	4.33	6.46 (4.46-9.36)	0.127	1 (ref)			
	Yes	4	1.29	3.11 (1.17-8.27)		0.45 (0.16-1.28)	0.135		
<b>HBV surface antigen positive</b>	No	28	5.05	5.54 (3.83-8.03)	0.578	1 (ref)			
	Yes	4	0.57	7.02 (2.63-18.7)		1.53 (0.44-5.29)	0.505		
<b>HCV antibody positive</b>	No	31	5.56	5.58 (3.92-7.93)	0.323	1 (ref)			
	Yes	1	0.06	15.8 (2.22-112.0)		3.03 (0.41-22.5)	0.277		
<b>Medication possession ratio</b>	$< 0.95$	8	2.15	3.72 (1.86-7.44)	0.067	1 (ref)		1 (ref)	
	$0.95+$	24	3.47	6.92 (4.64-10.32)		2.11 (0.93-4.81)	0.076	1.56 (0.68-3.58)	0.292

## Conclusion

- In a large real-world PrEP cohort, risk of renal impairment increased over two years of PrEP, with older patients and those with pre-existing renal dysfunction at significantly higher risk.

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