

# ONGOING HIV TRANSMISSION FOLLOWING A LARGE HIV OUTBREAK AMONG PEOPLE WHO INJECT DRUGS IN ATHENS, GREECE

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## Background

In 2011-2013, an outbreak of HIV infection among People who Inject Drugs (PWID) occurred in Athens, Greece. This was the largest epidemic documented in this population in Europe and North America since 2010. **HIV prevalence** in the population of PWID increased from **less than 1%** in **2010** to **16.5%** in **2013**. Several interventions were implemented in Athens, and **HIV incidence** declined from **7.8** in **2012** to **1.7** cases/100 person-years in **2013**. Since then, the number of newly diagnosed **HIV cases** among PWID in Greece **never returned to pre-outbreak levels**. We aim to provide updated estimates of HIV incidence and prevalence up to 2020.

## Methods

Two "seek-test-treat" community-based programs were implemented in 2012-2013 (**ARISTOTLE, N=3,320**) and 2018-2020 (**ARISTOTLE HCV-HIV, N=1,635**) aiming at increasing the diagnosis and linkage to care for HIV and HIV/HCV, respectively. ARISTOTLE HCV-HIV was interrupted due to the national lockdown (March 2020). A common design was used in the two programs.

**Respondent-Driven Sampling** (RDS) was used to reach rapidly the target population. Participation included interviewing, anti-HIV testing and sequencing, and linkage to care. **Multiple recruitment rounds were implemented** (5 in 2012-2013, 2 in 2018-2020). PWID could participate in multiple rounds but only once in each round. Thus, multiple HIV tests/questionnaires were available over time for the majority of participants.

To estimate **HIV incidence** after 2013, we analysed initially seronegative **participants with at least two available tests (N=699)** using as seroconversion time the **midpoint** between the last negative/first positive test (**Figure 1**). **Cox** proportional hazards model was used to assess **risk factors** for seroconversion.

We estimated the **change in HIV prevalence** from **2012-2013** to **2018-2020** in a sub-sample participating in both programs (**Figure 1**).

### Main findings concerning HIV transmission among PWID in 2014-2020

- Ongoing HIV transmission
  - HIV incidence remained at stable moderate levels as in the second half of 2013
  - HIV prevalence increased by approximately 55% in a cohort of PWID tested in 2012-2013 and 2018-2020
- Deterioration of socioeconomic characteristics
  - increase in homelessness and unemployment
  - lack of health insurance
- A shift in the use of cocaine
- Failure to sustain the upscale of HIV prevention services that was achieved during the HIV outbreak in 2011

**Table 1.** Trends in socio-economic and network characteristics, drug use behaviour and access to HIV prevention services in people who inject drugs participating in both ARISTOTLE (2012-2013) and ARISTOTLE HCV-HIV (2018-2020) programs (N=681) (as assessed in their first visit to each program).

	2012-2013	2018-2020	p-value
<b>A. Socio-economic and network characteristics</b>			
Homeless now, n (%)	110 (16.2)	174 (25.6)	<0.001
Unemployment, n (%)	535 (78.9)	619 (91.0)	<0.001
Without health insurance, n (%)	518 (61.7)	538 (79.5)	<0.001
History of imprisonment (past 12 months), n (%)	148 (21.9)	87 (12.8)	<0.001
Size of participant's injection network, median (25th, 75th)	20 (10, 50)	20 (10, 50)	0.024
<b>B. Injecting drug use behaviour</b>			
Main substance of use (past 12 months), n (%)			
Heroin/Thai	549 (80.7)	362 (55.3)	<0.001
Cocaine	113 (16.6)	184 (28.1)	<0.001
Speedball	14 (2.1)	97 (14.8)	<0.001
Other	4 (0.6)	12 (1.8)	0.057
Daily injecting drug use (past 12 months), n (%)	246 (36.2)	194 (29.7)	0.002
Injecting drug use (past 30 days), n (%)	554 (81.7)	536 (78.8)	0.176
Receptive syringe-sharing about half the time or more (past 12 months), n (%)	277 (40.8)	156 (23.8)	<0.001
Use drugs divided with a syringe that someone else had already injected with about half the time or more (past 12 months), n (%)	60 (8.9)	36 (6.2)	0.050
<b>C. Access to testing, drug treatment and prevention</b>			
Currently in opioid substitution treatment, n (%)	93 (13.8)	207 (30.5)	<0.001
Received free syringes (past 12 months), n (%)	352 (51.8)	307 (45.1)	0.005

## Results

At their first visit, participants' mean (SD) age was 35.0 (7.5) years, 81.7% were active injectors, 80.7% reported heroin as the main substance injected and 13.8% were on opioid substitution programs (**Table 1**).

**HIV prevalence** (95%CI) increased from **14.2%** (11.7%-17.1%) in **2012-2013** to **22.0%** (19.0%-25.3%) in **2018-2020** (p<0.001) (**Table 2**).

**HIV incidence** (95% CI) for the periods 2013 – 2020 was 1.98 (1.48–2.65) and 3.26 (1.81-5.89) new cases/100 person-years, respectively (N=59 seroconversions) (**Figure 2**).

Younger age, lower educational level, unemployment, larger injection network and daily injecting were associated with increased risk of HIV seroconversion (**Figure 3**).

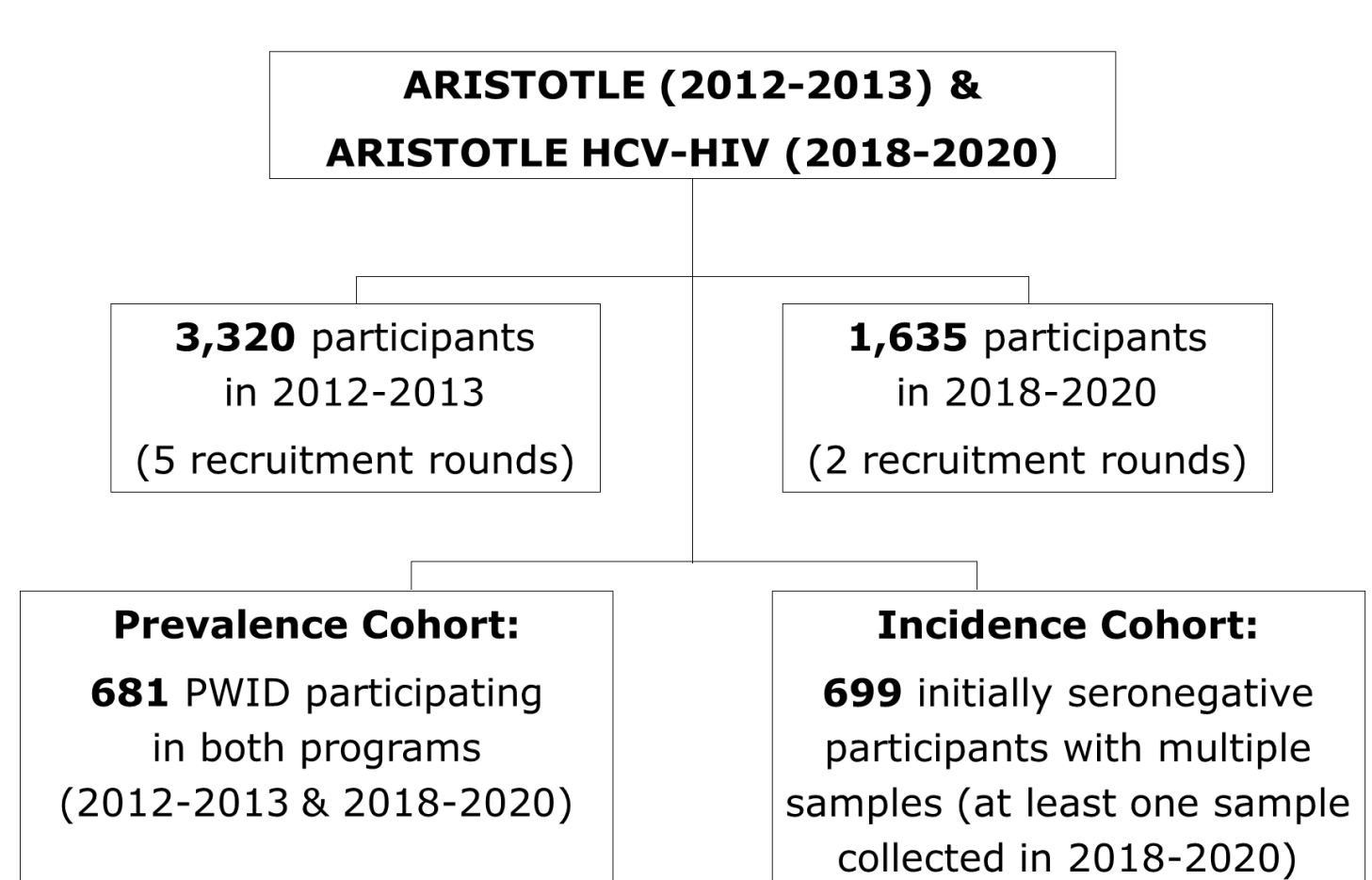
## Conclusion

The ongoing HIV transmission among PWID in Athens provides empirical evidence that the current level of prevention and treatment services is inadequate to control the epidemic and results in the expansion of the pool of infected PWID and in increase of HIV prevalence. In conjunction with the COVID-19 pandemic, access to care and HIV-testing has seriously been compromised. Immediate action for re-evaluation of prevention and treatment programs is urgently needed.

## Acknowledgement

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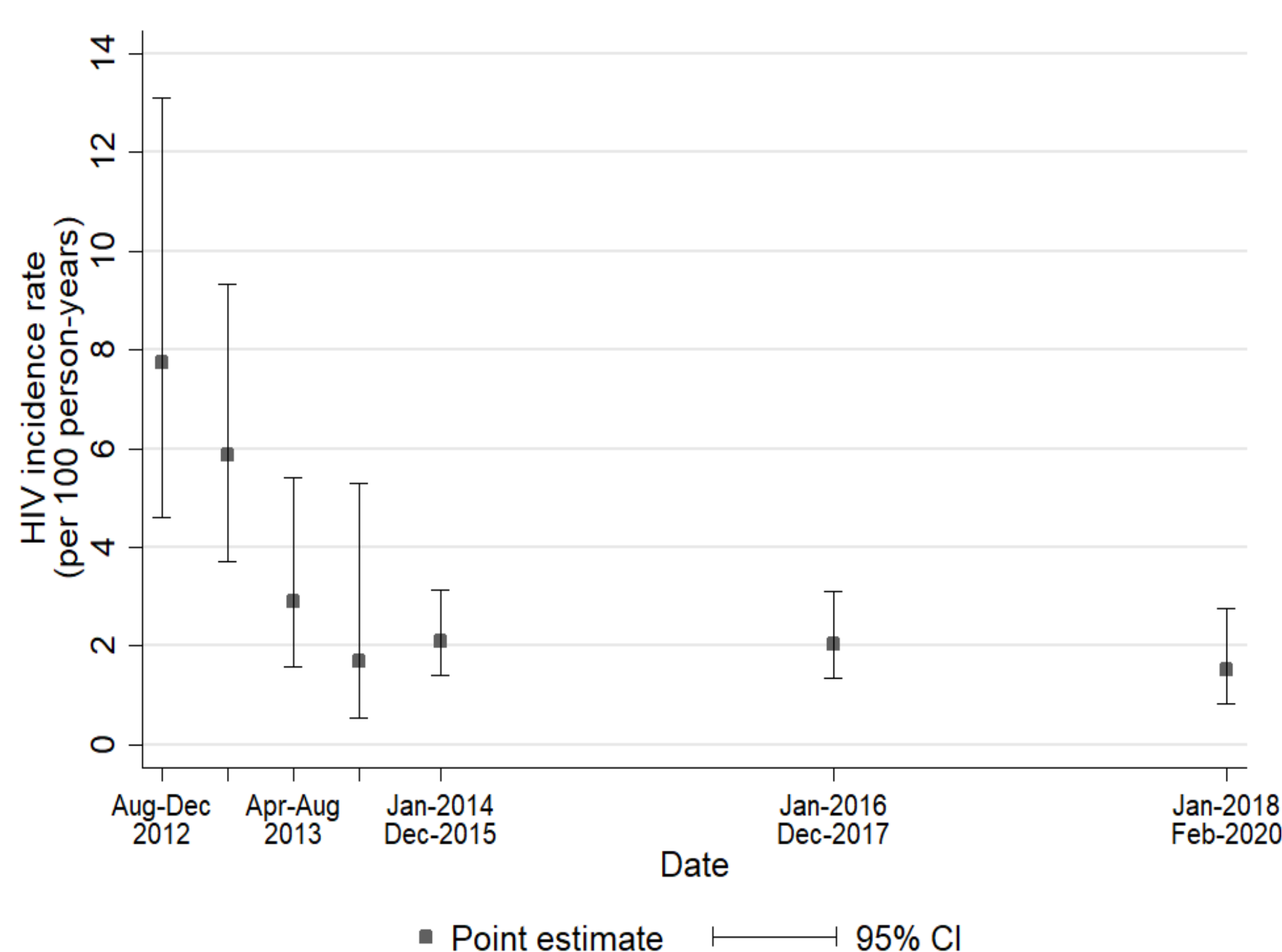
**Figure 1.** People who inject drugs participating in ARISTOTLE (2012-2013) and ARISTOTLE HCV-HIV (2018-2020) included in the analysis of HIV prevalence and incidence in Athens, Greece



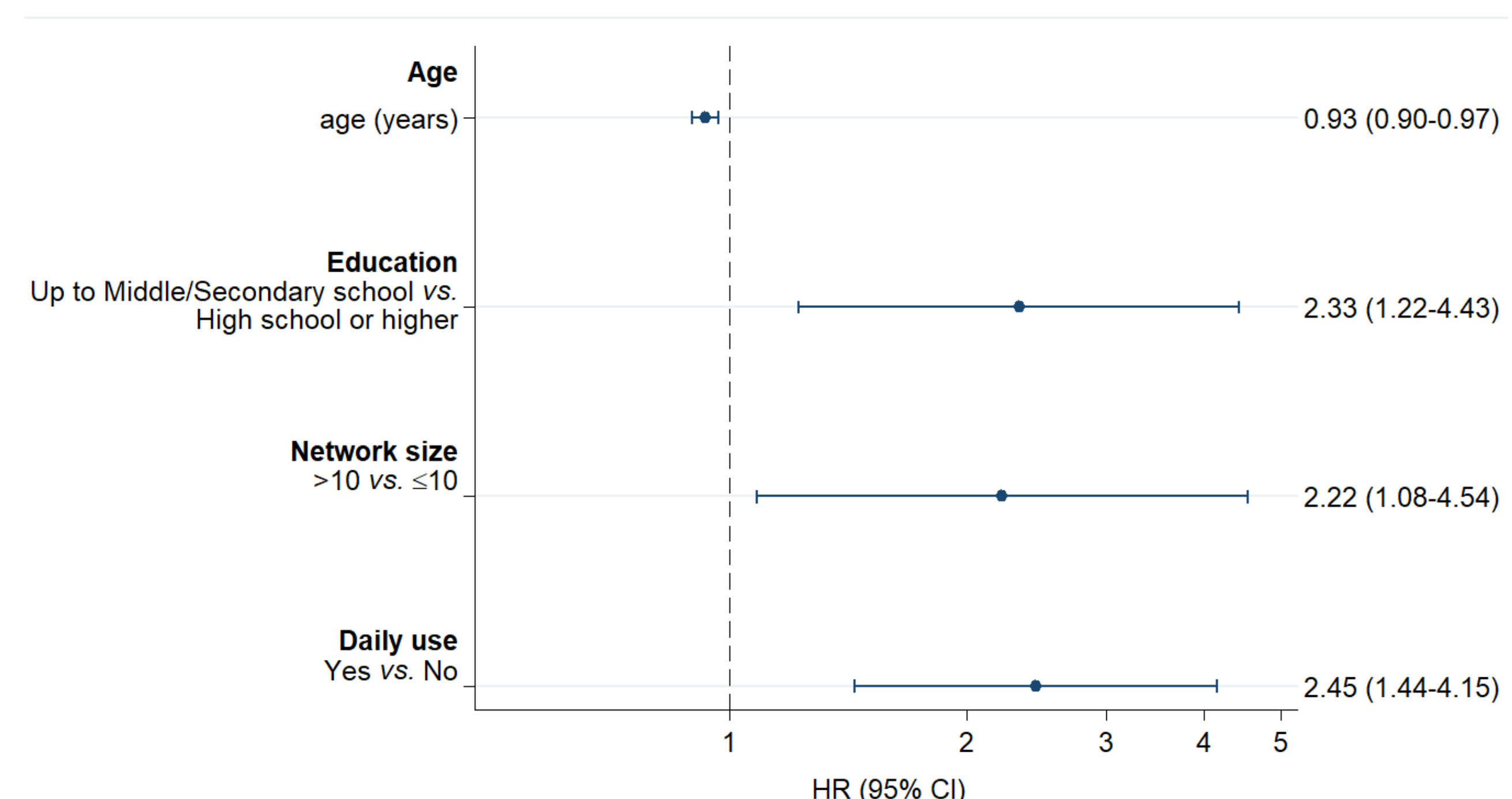
**Table 2.** Trends in HIV prevalence in people who inject drugs participating in both ARISTOTLE 2012-2013 and ARISTOTLE HCV-HIV 2018-2020 programs in Athens, Greece (N=681).

	N	2012-2013		2018-2020		p-value <sup>1</sup>
		HIV(+)	% (95% CI)	HIV(+)	% (95% CI)	
Male	554	82	14.8 (11.9-18.0)	126	22.7 (19.3-26.5)	<0.001
Female	127	15	11.8 (6.8-18.7)	24	18.9 (12.5-26.8)	0.004
<b>Total</b>	<b>681</b>	<b>97</b>	<b>14.2 (11.7-17.1)</b>	<b>150</b>	<b>22.0 (19.0-25.3)</b>	<b>&lt;0.001</b>

**Figure 2.** Incidence rate of HIV infection during the period August 2012-February 2020 among people who inject drugs. The first four estimates for the outbreak period August 2012-December 2013



**Figure 3.** Predictors of HIV seroconversion in people who inject drugs, Athens, Greece (N=699).



## Communication

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