

THE LANCET HIV

Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

Supplement to: Des Jarlais DC, Sypsa V, Feelemyer J, et al. HIV outbreaks among people who inject drugs in Europe, North America, and Israel. *Lancet HIV* 2020; 7: e434–42.

Appendix: Case Histories of each of the HIV Outbreaks

Athens, Greece

Dates: 2011-2013

Size: 1,100 new HIV diagnoses among PWID during 2011-2013 (with 525 new cases of HIV among PWID in 2012);²⁰ HIV prevalence in PWID increased from 0.8% in 2010 to 16.5% in 2013. In 2012, PWID accounted for 50.4% of newly diagnosed cases, compared to 5% in 2010.²⁰

Prior conditions/precipitating factors: Severe economic disruption due to great recession, homelessness, particularly among migrant PWID, low levels of harm reduction services.²²

Highly vulnerable subgroups: homeless, migrant PWID

Public Health Response/Current situation: A very large seek, test, and treat intervention using respondent driven sampling (ARISTOTLE program) was implemented. NSP, OST and ART were expanded.²² A large decline in HIV incidence was observed during ARISTOTLE program (78% decrease in 2013 compared to 2012);^{22,24,25} however the annual number of newly diagnosed cases is still higher than in pre-outbreak years; there were 106 cases of HIV diagnosed in 2018.²⁰

Bucharest, Romania

Dates: November 2011- ongoing but at a lower incidence (only partially controlled)

Size: Increase in HIV incidence/newly identified cases from approximately 5-12 cases per year among PWID to 308 cases in the peak year of the outbreak (2013). HIV prevalence among PWID reached 50%. Prior reports had documented only sporadic cases of HIV among PWID in Romania previous to the outbreak (HIV prevalence less than 3% among PWID).^{29,30}

Prior conditions/precipitating factors: New psychoactive drugs including legal highs and bath salts became available for PWID. These stimulants impose/need more frequent daily injections compared to heroin. There was a lack of correct information and difficulties of accessing medical services due to changes in "health card" regulations. Along with increasing poverty levels that made the general population more "selfish" toward PWID and fear of withdrawal among PWID, this combination of factors helped to create the epidemic situation.³¹ Additionally, there was a significant rate of turnover of Health ministers (14 in 10 years).

Highly vulnerable subgroups: MSM who inject drugs and practice commercial sex.

Public Health Response/Current situation: Increase in distribution of syringes from 1,000,000 in 2013 to 2,000,000 in 2014-2015 (the reduction in the new HIV cases among PWID seen after 2013 was caused partially by the "backshift" of many users to heroin after seeing that new psychoactive stimulants were much worse, but also by the fact that many active users did not want to be tested anymore, saying they prefer to die "drugged and happy," and not stressed by knowing they also have HIV.

Dublin, Ireland

Dates: January 2014 – December 2015

Size: In a population of approximately 13,480 (including 7000 PWID on OST treatment) in Dublin, there were 57 new HIV cases documented in 2014-2015 among PWID (39 were p24 positive or newly acquired) compared to 10-20 cases in previous years.

Prevalence of opiate drug users in Dublin was 13,458 (12,564-14,220) corresponding to 15.15 drug users per 1000 population aged 15 – 64 years in 2014.³²

Prior conditions/precipitating factors: Increased use of a new psychoactive substance (NPS) alpha-pyrrolidinovalerophenone (“snow blow”) and polydrug use; sex with PWID, and sharing of injection related equipment (including syringes).³³ There was also a 7-fold increase in homelessness among opiate users between 2011-2014, at a time of economic recession and increased homelessness in the wider population.

Highly vulnerable subgroups: Homeless (74% of PWID) and chaotic polydrug users of long duration, female drug users (approximately 40% of PWID were female, 94% of female PWID were homeless, and 75% co-infected with HCV).

Public Health Response/Current situation:

A multisectoral, multidisciplinary outbreak response team was mobilized. All relevant services were alerted and active case finding instituted. HIV testing was offered to all addiction service users, and collaborative working between the clinical and addiction services was established to improve HIV treatment uptake and adherence among HIV positive PWID, and providing clear prevention messages to PWID across all services. HIV awareness materials were developed and circulated to relevant services. HIV, addiction, and homeless services continue to raise awareness and provide clear prevention messages to PWID and work collaboratively to improve referral, HIV treatment uptake and adherence among HIV positive PWID.

HIV point of care (POC) testing was carried out at homeless facilities for case finding and to raise awareness among homeless services. Addiction services provided further training for staff and worked to improve access to methadone and needle exchange services. HIV notifications in PWID decreased following the interventions and currently account for 4% of HIV notifications nationally.

Glasgow, Scotland

Dates: 2015-2019 (outbreak ongoing)

Size: Over 160 new HIV cases among PWID (compared to typically 10 new diagnoses per year). HIV prevalence among PWID increased from 0.1% to 4.8% in Glasgow and from 1.1% to 10.8% in Glasgow city center during the outbreak.³⁴

Almost all HIV cases were subtype C and had E138A and V179E mutations in the RT region that led to NNRTI resistance.

Prior conditions/precipitating factors: Transmission among a population who inject psychoactive drugs within Glasgow city center, with increased cocaine injecting (reaching up to 77% in 2017-2018).³⁴

Highly vulnerable subgroups: Homeless, with high levels of imprisonment/involvement in the criminal justice system (approximately 45% of newly identified HIV seropositive PWID were homeless)

Public Health Response/Current situation: Increasing awareness of the risks of HIV, education of the at-risk population and addiction services regarding HIV, increasing capacity of needle and syringe programs (e.g., greater evening availability), improving the frequency of HIV testing and its accessibility and proactively supporting the early

treatment of those newly diagnosed so as to reduce the risk of onward transmission.³⁵

Luxembourg

Dates: 2013-2017

Size: Small, 68 PWID infected with HIV among 1,500 estimated PWID. Average of less than 10 cases among PWID per year prior to the outbreak in 2013.³⁶

Prior conditions/precipitating factors: Both overall cocaine use and cocaine injection increased between 2012 and 2015. Since 2011, the drug market landscape has considerably changed in Luxembourg with the aggressive introduction of cocaine supply, and restriction of access to heroin for opioid injectors. The economically precarious situation of drug users combined with the lack of universal medical coverage in Luxembourg also likely contributed to the outbreak.³⁷

Highly vulnerable subgroups: Young and female injection drug users

Public Health Response/Current situation: Increased access to HIV testing, improved awareness of HIV infection in PWID and among drug center personnel, together with prompt access to antiretroviral therapy were actively used the last 4 years to contain the outbreak. 82% of the 68 new HIV cases are under antiretroviral therapy and 73% have an undetectable viral load in December 2018. Increase in syringe provision in 2017 among PWID along with opening facility for drug consumption in southern Luxembourg. Outreach projects launched aimed at reaching marginalized drug users with poor contact with care programs. Incidence is stabilized in 2018 at the pre-outbreak level in 2012 (4 newly diagnosed PWID).

Southeastern Saskatchewan, Canada

Dates: 2016-2017

Size: Small: (16 new cases were diagnosed among PWID, previous to outbreak there was less than one case of HIV per year among PWID).

Prior conditions/precipitating factors: Homelessness, poverty, drug use, and lack of access to services were the main precipitating factors. NSP and OST programs existed in the area (one NSP was available).

Highly vulnerable subgroups: Indigenous people and those who resided in a rural area within a defined region in southeastern Saskatchewan.

Public Health Response/Current situation: Rapid mobilization of an integrated response between government jurisdictions, health providers and indigenous communities focused on patient-centered and culturally safe care and services in the rural region. Together with communities, two additional needle/syringe programs were opened. An indigenous community-driven and led outreach facility was opened and offered holistic and culturally competent services. HIV/HCV care were significantly enhanced through a mobile outreach clinic and telehealth technology.^{38,39}

Scott County, Indiana, United States

Dates: 2014- 2018

Size: Large, with 237 new HIV infections among an estimated 500-600 PWID.

Prior conditions/precipitating factors: Development of widespread injecting opioid analgesic, Opana[®] ER. The high frequency of injection, syringe sharing, and drug sharing due to the short half-life of the drug when injected and high cost of the pill occurred in a context of no HIV prevention services. HIV testing was limited, ART and OST were not available in the community, and NSPs were illegal.^{40,41}

Highly vulnerable subgroups: Tightly knit community with ‘drug houses’ where PWID, including multi-generational families, injected multiple times per day, sharing pill solution and injection equipment. Multiple injections per injection episode were required due to large volumes of pill solution.⁴¹

Public Health Response/Current situation: Relevant laws were changed, and NSP and ART programs were implemented with increased availability of HIV screening. OST access was increased in 2016, but problems with access to OST persist. Although viral suppression rates for people living with HIV is 77% (as of November 29, 2018), incidence continues at a reduced level.

Tel Aviv, Israel

Dates: 2012-2013

Size: 73 new HIV infections in 2012 (prior to the outbreak there was an average of approximately 40 cases of HIV among PWID per year for the entire country).⁴² During the outbreak, there was a large rate of acute HIV infections among PWID, while no cases of diagnosed HIV seroconversion in PWID were observed before and after the described outbreak. This reflects the extremely high rate of HIV infection in this high-risk population in Tel-Aviv.

Prior conditions/precipitating factors: A shift in drug use patterns, by sharing and injecting cathinone derivative (often in combination with buprenorphine) without using single-use reservoirs for drug preparation.

Highly vulnerable subgroups: Long-time illicit drug users who resided in southern Tel Aviv and practiced drug injection within a defined region in and around the Tel Aviv Central Bus Station.

Public Health Response/Current situation: Education of NSP staff regarding cathinone use, education of PWID (by the NSP staff) about the outbreak and its association with cathinone use, increased syringe and needle supplies, together with single-use reservoirs for drug preparation, active HIV screening at NSP, coupled with linkage to care and early initiation of ART for HIV positive individuals, and enhanced referral of PWID to drug withdrawal programs and support. The outbreak has currently been contained and new HIV infections among PWID have now dropped below pre-outbreak levels (25 HIV cases among PWID in 2016).⁴²

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Additional search strategy for Review:

("HIV"[Mesh] OR "HIV"[TI] OR "AIDS"[TI]) AND ("Disease Outbreaks"[Mesh] OR "Outbreak"[TI] OR "Outbreaks"[TI]) AND ("Substance Abuse, Intravenous"[Mesh] OR "PWID"[TI] OR "Injection drug use" [TI] or "drug injection"[TI])

(complete global overview search of outbreaks, restricted to any outbreaks from 2009 onwards among PWID)

Figure 1: Flow Chart of Search Results for HIV Outbreak Studies

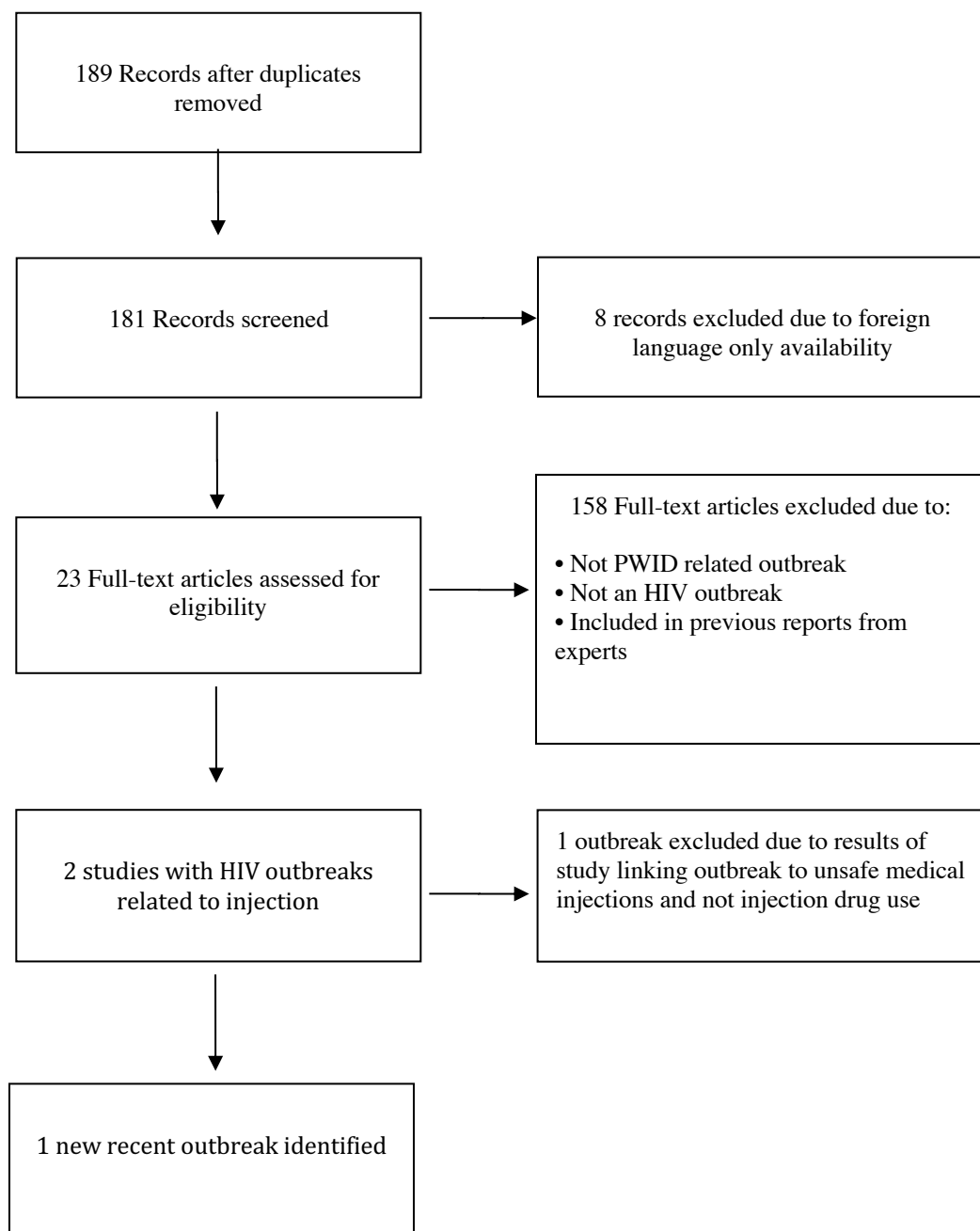


Figure 2: Data abstraction template for HIV outbreak studies

Location	Dates of Outbreak	Size of Outbreak	Prior Conditions/ Precipitating Factors	Highly Vulnerable Groups	Public Health Response/Current Situation
Athens, Greece					
Bucharest, Romania					
Dublin, Ireland					
Tel Aviv, Israel					
Luxembourg					
Scott County Indiana, USA					
Glasgow, Scotland					
Southeastern Saskatchewan, Canada					