

**Viral suppression not decreased during COVID-19 among people with HIV and unstable housing enrolled in a low-barrier clinic-based program (POP-UP)**

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**Abstract**

COVID-19 threatens to further worsen HIV outcomes among people experiencing homelessness. We conducted an interrupted time-series analysis of care engagement and viral suppression among unhoused individuals in the ‘POP-UP’ low-barrier, high-intensity HIV primary care program during COVID-19. Among 85 patients, care engagement and viral suppression did not decrease in the five months following implementation of San Francisco’s ‘shelter-in-place’ ordinance. Low-barrier, in-person HIV care for homeless individuals may be important for maintaining HIV outcomes during COVID-19.

## Introduction

COVID-19 is impacting access to medical care and social services, potentially worsening HIV outcomes among vulnerable populations.<sup>1</sup> Beginning March 17, 2020, San Francisco implemented a ‘shelter-in-place’ public health order and required delay or shift to telemedicine for non-essential medical care in response to the COVID-19 pandemic.<sup>2,3</sup> The pandemic’s impact on access to medical care,<sup>4</sup> housing resources and social services,<sup>5</sup> combined with challenges of those with unstable housing engaging with telemedicine,<sup>6</sup> may disproportionately affect people living with HIV who experience homelessness.<sup>1</sup>

Independent of barriers to care introduced by COVID-19, homelessness and unstable housing (HUH) substantially worsen viral suppression for people living with HIV (PWH).<sup>7–10</sup> In January 2019, Ward 86, a large publicly-funded HIV clinic in San Francisco, initiated POP-UP, a low-barrier, multicomponent model of care to address barriers to care for PWH experiencing homelessness.<sup>11</sup> Throughout the COVID-19 pandemic, POP-UP remained open to drop-in, in-person visits due to challenges patients faced with telehealth. We hypothesized that care engagement and HIV viral suppression would not worsen during the COVID-19 pandemic among PWH experiencing HUH enrolled in this low-barrier, clinic-based supportive care model.

## Methods

POP-UP is based at the Ward 86 HIV clinic at San Francisco General Hospital. Ward 86 provides care for approximately 2400 publicly insured patients, one-third of whom experience HUH.<sup>9</sup> Eligibility criteria for POP-UP include: 1) current homelessness or unstable housing, 2) current unsuppressed HIV viral load ( $\geq 200$  copies/mL), and 3)  $\geq 1$  missed primary care visit and  $\geq 2$  unscheduled drop-in visits in the prior twelve months.

The POP-UP intervention includes drop-in (i.e. no appointment needed), incentivized HIV primary care and behavioral health services, on-site medication pick-up, and a care navigator to conduct patient outreach by phone or physically in the community. During shelter-in-place, POP-UP visits were deemed ‘essential’ and the program remained fully open for in-person clinic visits.

We conducted an interrupted time series analysis, comparing care engagement and viral suppression during monthly intervals in the five months before and after San Francisco’s shelter-in-place order (hereafter pre-COVID 10/17/2019–3/16/2020, post-COVID 3/17/2020–8/16/2020). Patients enrolled in POP-UP for at least one month during this period were included in analysis. Because enrollees, by definition, had a visit and were not virally suppressed at POP-UP enrollment, we included newly-enrolled patients in this analysis beginning the month after initial enrollment. Care engagement was defined as a clinic visit within each one-month period. Viral suppression was defined as most recent HIV viral load  $<200$  copies/mL within the past 3 months; patients were otherwise considered unsuppressed. We also conducted sensitivity analysis including only viral loads measured during each monthly interval. Mixed effects logistic regression models compared outcomes over each one-month period, pre- and post-COVID, accounting for clustering by individual. Odds ratios

were reported comparing the 'level-change' from the last month of the pre-COVID period to the first month of the post-COVID period.<sup>12</sup>

## Results

Eighty-five patients were included, 44 who enrolled prior to 10/17/2019, 27 who enrolled pre-COVID, and 14 who enrolled during the post-COVID period. Thirteen patients discontinued POP-UP during follow-up, five pre-COVID and eight post-COVID.

Unenrollment reasons include transfer to another provider/clinic (n=7), moving out of San Francisco (n=3), and death (n=3). Patient characteristics include median age 40 years (IQR 26-58), 52% nonwhite, 85% cisgender men, 53% experiencing street homelessness (with others unstably or temporarily housed). Additionally, 98% had a substance use disorder, among whom 89% used methamphetamines.

The mean number of visits per patient-month was 1.6 pre-COVID (range 0-9) and 1.7 post-COVID (range 0-13). The proportion of POP-UP patients with a visit each month remained similar during the COVID-19 pandemic (64% pre-COVID vs 58% post-COVID, OR 0.66, 95% CI 0.39-1.11). Viral suppression remained similar during the COVID-19 pandemic (48% pre-COVID, 47% post-COVID, OR 1.19, 95% CI 0.078-1.82, Figure). Limiting analysis to only viral loads measured during each monthly interval yielded similar results.

## Discussion

Despite concerns that COVID-19 might worsen outcomes, particularly among people experiencing homelessness, care engagement and viral suppression did not worsen among 85 patients enrolled in a supportive, low-barrier care model for unstably-housed patients in an urban HIV clinic. Continued access to comprehensive, in-person medical and social services during the pandemic likely contributed to maintenance of HIV care outcomes during this period. In addition, 15% of POP-UP patients were temporarily housed in shelter-in-place hotels funded by San Francisco during COVID-19, providing shelter and a location where the POP-UP navigator could conduct phone-based and in-person outreach.

Our results are notable given that there were 31% higher odds of viral non-suppression post-COVID among patients accessing traditional primary care services at Ward 86, with further worsening among people experiencing homelessness.<sup>1</sup> This is noteworthy because people experiencing homelessness have faced additional structural barriers and competing needs during COVID-19, including disrupted access to shelter and decreased access to substance use and mental health treatment.<sup>5,13</sup> By minimizing barriers to accessing medical care during this critical time, POP-UP's drop-in, incentivized, comprehensive services may have been protective against the impact of additional structural barriers introduced by COVID-19. However, although virologic suppression rates did not drop further during COVID-19 for patients in the POP-UP program, viral suppression in this population remains inadequate and reflects ongoing need for additional interventions.

Limitations of our study include the non-randomized pre-post design and the limited sample size. We utilized an interrupted time series analysis to help isolate the effects of shelter-in-place implementation from other temporal trends. We also used an open cohort

design to reduce the likelihood that improvements in viral suppression were simply due to greater duration of engagement with the POP-UP intervention. Though we did not observe large changes in outcomes during the pandemic, the limited sample size may have reduced our ability to detect smaller changes.

In conclusion, care engagement and viral suppression did not worsen during COVID-19 among people experiencing homelessness engaged in a supportive program to provide low-barrier, comprehensive HIV primary care, in contrast to worsening viral suppression rates observed among patients accessing traditional care models. Multi-component interventions such as POP-UP may help maintain viral suppression despite introduction of unanticipated structural barriers, such as those associated with COVID-19.

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**Figure:** HIV viral suppression pre- and post-COVID-19 shelter-in-place orders. Follow-up was conducted in one-month intervals from Oct 17, 2019 – Aug 16, 2020. Month 6 began on March 17, 2020, the first day that shelter-in-place and suspension of non-essential medical care were implemented. The odds of viral suppression for month 6 compared to month 5 were 1.19 (95% CI 0.78-1.82), representing a non-significant increase associated with the onset of shelter-in-place.

