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# Bending the curve of hepatitis C virus infection in Machar Colony: a mass screen-and-treat intervention in a slum settlement in Karachi, Pakistan

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## Introduction

People living in slums represent a crucial yet often neglected group in hepatitis C virus (HCV) elimination, highlighting the need for innovative strategies to reach them. We implemented a community-based intervention aiming to offer HCV testing and treatment to all people 12 years and older living in Machar Colony, a large slum in Karachi, Pakistan. We assessed intervention effectiveness in reducing population-level HCV prevalence and identified cascade steps for which improvements would have the greatest impact on effectiveness.

## Methods

Door-to-door mobilisation for screening was conducted in all dwellings across Machar Colony from March 2022 to March 2024. People were screened in their homes or in a screening van. Those with reactive results were asked to provide a blood sample for PCR testing and attend a nearby Médecins Sans Frontières clinic to collect results and receive free-of-cost treatment with one of three direct-acting antiviral regimens. Using programmatic data, we characterised cascade steps as a series of conditional probabilities leading to cure. The product of these probabilities gave the expected population-level reduction in HCV prevalence. Uncertainty was incorporated through simulation. "Cascade gain" was the expected additional number of people cured if a given step in the cascade had performed optimally.

## Ethics

The study was approved by the Pakistan National Bioethics Committee (No.4-87/NBC-883/22/185) and by Médecins Sans Frontières Ethics Review Board (ID:2221). People of all ages screened in the community were invited to opt out of their data being used for research purposes. Adults initiated on treatment provided written informed consent and children (12–17 years) initiated on treatment provided written informed assent.

## Results

We identified 78,753 eligible people living in Machar Colony, with 78.4% (61,808) invited for screening during household visits. Among these, 82.7% (51,137) agreed to test. An additional 23,521 people came directly to the screening van. Of 74,658 people screened, 9.4% (7037) were reactive. Among 2329 people with a positive PCR (37.2% of 6260 samples tested), 76.4% (1779) collected their results, with 94.1% (1674) initiated on treatment. A further 437 people attending the clinic as walk-ins also initiated treatment and were included in the analysis. The number LTFU any time after initiation on any regimen was high (1016 [48.1%] of 2111). The proportion of people with sustained virological response after receiving 12 weeks of first-line sofosbuvir-daclatasvir was 94.2% (982 of 1042 tests). We estimate cure was achieved in 1878 people, representing a reduction in HCV prevalence of 48.5% (95% uncertainty interval 43.4–55.3). The step with highest cascade gain was collection of PCR results (462 extra cured).

## Conclusion

This mass screen-and-treat intervention in a slum settlement achieved important reductions in HCV prevalence but was limited by high levels of LTFU before and during treatment. We recommend future interventions integrate cascade analysis into monitoring and evaluation to enable early identification of the likely impact of LTFU on programmatic effectiveness. This should be combined with in-depth qualitative evaluation to understand and address barriers to care.

## Conflicts of interest

All authors declare no competing interests.