

Time series analysis of the HIV epidemic in Hong Kong over the past two decades

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Background

With the advancement of treatment options and biomedical prevention means, the HIV epidemic in Hong Kong is well controlled. We aimed to understand its temporal trend and identify sub-populations requiring further interventions to achieve the 2030 end-AIDS goal.

Methods

A time series study was conducted between 1995 and 2024 using publicly available data. Quarterly reported numbers of newly diagnosed cases were classified by exposure category, gender, and diagnosis age with a cutoff of 50 years. Time series decomposition was conducted to each group to extract overall trend and seasonal pattern. Autoregressive Integrated Moving Average (ARIMA) models were developed for predicting future epidemic trend. Structural break analysis was used to assess the impact of health policies.

Results

Overall HIV case numbers in Hong Kong rose since the 1990s and peaked at around 2015, then declined in the past decade. A seasonal pattern with Q3 the peak and Q1 the trough was observed. The ARIMA(1,1,2) model indicated a linear trend with short-term impacts. The model predicted 179 cases to be reported in the first half of 2025, which was close to the actual figure (n=180). It further predicted the number will plateau at about 84 cases per quarter over the coming few years. The trend of MSM in the past decade was slowly declining but became flat recently. Ethnic Chinese cases were and will be declining, yet cases with at least 50 years old at diagnosis showed an increasing trend in both genders. Structural breaks patterns were diverse across sub-populations. Most observed a breakpoint at around late 2019 except for Asian non-Chinese and injecting drug users, indicating the COVID-19 had no impact on the trend.

Conclusion

Health interventions in Hong Kong were effective in controlling the epidemic, especially for MSM. Continued efforts are needed to further reduce transmission in the community. Multilingual public education targeting different age groups is needed to deal with the recent epidemiological changes.

Keywords: HIV, time series, health policy, men who have sex with men, general population