



Commentary

Simulation studies to generate evidence for policy change: The case for progress towards elimination of hepatitis C

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Over the past two decades the course of the global HIV epidemic has been fundamentally changed by innovations in antiretroviral agents. Pre-exposure prophylaxis (PrEP) using antiretroviral drugs to prevent new HIV infections has revolutionized HIV prevention efforts in many countries, while advances in HIV treatment using triple-drug antiretroviral therapy (ART) has turned HIV into a chronic condition. The use of antiretroviral drugs for HIV prevention and treatment has raised important public health concerns, however. One particular consideration is growing evidence for the increasing incidence in sexually transmitted infections (STIs) among recently initiated PrEP users [1]. Among STIs of concern, Hepatitis C (HCV) is now considered curable and has been identified by the World Health Organisation (WHO) for elimination [2]. This elimination strategy targets a 90% decrease in HCV incidence by 2030 but policy guidelines tend to be targeted at those considered to be at highest risk for infection (HIV co-infected men who have sex with men (MSM)).

In this issue of EClinicalMedicine, MacGregor et al. [3] present the results of a modeling analysis to investigate the impact of scaling up screening and treatment for elimination of HCV in the era of HIV PrEP among *all* men who have sex with men. To do so, the authors integrate empirical evidence with *in-silico* experiments to project outcomes and high probability scenarios, based on a UK setting. Through this model, the authors are able to investigate possible drivers, including reduction of condom usage, which are unethical to investigate empirically, and for the first time, consider screening and treatment policy aimed at HIV-uninfected individuals.

The main findings of this work show that strategies surrounding screening and treatment for HCV may vary considerably depending on the coverage of PrEP use, giving rise to alternate strategies depending on the local context and health system decisions about provision of PrEP. Key to developing a strategy for screening and treatment of HCV will be understanding the behavior change

occurring in this at-risk population due to the wider availability of PrEP. The second finding is that the 2030 targets for HCV elimination set by the WHO *may* be achievable in the UK, but will most likely require a modification of current policy. The work presented clearly demonstrates the interlinkage of public health strategies, a consideration often ignored during health guidelines development.

Like all modeling studies, these findings rely on the assumptions and structure of the simulation model itself. This model is carefully described, calibrated and sensitivity analyses undertaken. Importantly, the authors are not shy about pointing out the limitations on model findings, and though the findings of this model cannot be directly applied to other settings, a re-parameterised model could be considered.

More generally, this paper demonstrates the importance of simulation studies as a modality for investigation of programmatic decisions and potential impact on health. These evaluations are critical to understand the consequences of introductions of new policies or programmes – in this case PrEP – or changes to treatment guidelines that may not be directed at a specific population, but nevertheless impact wide population groups. Simulation modeling and *in silico* experiments are typically not about preventing proposed policy changes or improvements in care, but about understanding how these changes may ripple out to affect other populations and the health system as a whole. In conjunction with sensitive cost effectiveness analyses, simulation modeling provides our best opportunity for prediction and preparation. The major strengths of simulation studies are in the ability to model interventions and policy change on population levels, and this work demonstrates this strength well. Decision making, however, should be based on multiple sources of evidence, of which simulation models are just one, and care must be taken to reflect on the accuracy of the assumptions and context as time and policy changes occur.

Declaration of Competing Interest

None.

References

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