

Cost-effectiveness of Direct Antiviral Agents for Hepatitis C Virus Infection and a Combined Intervention of Syringe Access and Medication-assisted Therapy for Opioid Use Disorders in an Injection Drug Use Population

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Background. There are too many plausible permutations and scale-up scenarios of combination hepatitis C virus (HCV) interventions for exhaustive testing in experimental trials. Therefore, we used a computer simulation to project the health and economic impacts of alternative combination intervention scenarios for people who inject drugs (PWID), focusing on direct antiviral agents (DAA) and medication-assisted treatment combined with syringe access programs (MAT+).

Methods. We performed an allocative efficiency study, using a mathematical model to simulate the progression of HCV in PWID and its related consequences. We combined 2 previously validated simulations to estimate the cost-effectiveness of intervention strategies that included a range of coverage levels. Analyses were performed from a health-sector and societal perspective, with a 15-year time horizon and a discount rate of 3%.

Results. From a health-sector perspective (excluding criminal justice system–related costs), 4 potential strategies fell on the cost-efficiency frontier. At 20% coverage, DAAs had an incremental cost-effectiveness ratio (ICER) of \$27 251/quality-adjusted life-year (QALY). Combinations of DAA at 20% with MAT+ at 20%, 40%, and 80% coverage had ICERs of \$165 985/QALY, \$325 860/QALY, and \$399 189/QALY, respectively. When analyzed from a societal perspective (including criminal justice system–related costs), DAA at 20% with MAT+ at 80% was the most effective intervention and was cost saving. While DAA at 20% with MAT+ at 80% was more expensive (eg, less cost saving) than MAT+ at 80% alone without DAA, it offered a favorable value compared to MAT+ at 80% alone (\$23 932/QALY).

Conclusions. When considering health-sector costs alone, DAA alone was the most cost-effective intervention. However, with criminal justice system–related costs, DAA and MAT+ implemented together became the most cost-effective intervention.

Keywords. cost-effectiveness; HCV; PWID; combination intervention; DAA.

Hepatitis C virus (HCV) is a major cause of preventable morbidity and mortality worldwide [1]. Between 2010 and 2015, the number of new HCV infections in the United States nearly tripled [2], and HCV-related deaths in the United States exceeded deaths related to human immunodeficiency virus (HIV) and 60 other infectious diseases combined [3, 4].

In North America, there are an estimated 2.56 million people who inject drugs (PWID), and 1.41 million (55.2%) are estimated to be positive for HCV antibodies [5]. Combined, HCV infections and other consequences of drug injection contribute

to billions of dollars of preventable expenses in health-care costs, as well as costs to society and individuals: in particular, costs associated with the criminalization of drug use [6–8]. The rise in HCV infections has been closely linked to the epidemic of misuse of prescription opioids in the United States, which has led to a resurgence of heroin use and injection in the United States [9, 10].

The risk of HCV acquisition can be reduced through effective PWID “harm reduction” strategies [11]. When syringe access programs (NSP) are combined with medication-assisted treatment (MAT) and provided simultaneously as a single intervention (ie, individuals on MAT also receive high NSP coverage [MAT+]), it is associated with a 76% reduction in the risk of HCV acquisition, compared to no MAT and low/no coverage with NSP [11]. This represents a significant improvement in efficacy, compared to implementing MAT and syringe access programs as separate interventions [11].

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