

Hepatitis C screening of prison inmates would benefit wider community, be cost-effective

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The benefits of screening prison inmates for infection with the hepatitis C virus (HCV) and treating those who test positive for the infection would extend far beyond the prison population, according to projections made by investigators from Massachusetts General Hospital (MGH) and the University of Pittsburgh Graduate School of Public Health. In a report published in *Annals of Internal Medicine*, the research team describes how their simulation found that a prison-based screening and treatment program could reduce HCV transmission in the general community and would be highly cost effective over the long run.

"In addition to reducing the transmission of HCV after prisoners are released, universal HCV testing and treatment in prisons would reduce outcomes of advanced HCV - such as liver cancer, end-stage liver disease and death - among prisoners," says Jagpreet Chhatwal, PhD, of the MGH Institute for Technology Assessment, senior author of the report. "We now have highly effective treatments for HCV, so we wanted to know the impact of providing routine testing and treatment to inmates, a group in which the infection is highly prevalent."

Among individuals with a history of incarceration, HCV infection is primarily transmitted by the use of injected drugs. It is the leading cause of liver cancer, and HCV-associated liver failure the most common situation requiring a liver transplant. While about 1 percent of the general U.S. population is infected with HCV, more than 17 percent of

prisoners are infected. HCV-associated liver disease is a frequent cause of death among prisoners, recently surpassing HIV infection. In recent years several drugs capable of eradicating HCV infection in more than 90 percent of patients have become available, but they are quite costly, which could discourage their use in state and federal prisons that have limited budgets for inmate health care.

To evaluate the health and economic benefits of instituting HCV screening and treatment in U.S. prisons, Chhatwal and his team - including lead author Tianhua He, MD, formerly at the University of Pittsburgh Public Health Dynamics Laboratory and now at Tsinghua University Medical School in Beijing - developed a computer simulation model to project outcomes of several screening strategies. The four scenarios were one-time screening of current and newly incarcerated individuals with a history of injected drug use or universal opt-out screening of all current inmates as well as new inmates for one, five or ten years. Their model simulated the dynamics of HCV disease among inmates and the general population and incorporated factors such as the progression of HCV disease, transmission of HCV to uninfected individuals, and the movement of inmates into and out of prisons. The model projected both the costs involved with screening and treatment and the resulting benefits - cost savings from the reduction of future treatment needs and the prevention of both serious HCV-related outcomes among infected inmates and of further transmission in the community.

The simulation indicated that the four strategies would diagnose from 42,000 to almost 123,000 new cases of HCV among inmates over a 30-year period. Treating these individuals when their disease reached an advanced stage could prevent from 5,500 to 12,700 new transmissions over that period; and compared with no screening, prison screening could prevent 4,200 to 11,700 liver-related deaths - 80 percent in the community - 3,000 to 8,600 cases of [liver cancer](#), 2,600 to 7,300 cases

of end-stage liver disease, and the need for 300 to 900 liver transplants.

The four scenarios would reduce costs associated with HCV disease over 30 years by from \$260 million to as much as \$760 million. While the costs of applying screening, treatment and HCV disease management would require an 12.4 percent increase in the health care budgets of state and Federal prisons during the first year, that would decline to an annual increase of less than 0.7 percent after 15 years. Over 30 years, the model predicts that screening and treatment of HCV infections in U.S. prisons would become highly cost-effective.

The standard measure to evaluate the cost effectiveness of a medical intervention is whether it costs less than \$100,000 for each additional year of life gained. The simulation indicated that the universal opt-out strategies would cost up to \$29,000 for each quality-adjusted life year, well within cost-effectiveness standards. In comparison, screening individuals in the general public for HCV infection based on their year of birth - a recommendation the U.S. Centers for Disease Control and Prevention added to risk-associated screening in 2012 - costs \$35,000 to \$65,000 for each additional life year, considerably more than opt-out prison screening.

Chhatwal, who is an assistant professor of Radiology at Harvard Medical School, stresses that 80 to 90 percent of all the benefits resulting from HCV screening in prisons will be gained among the general population. "Prisons have limited budgets and may therefore be reluctant to provide universal HCV [screening](#) and treatment. But providing additional resources that would allow prisons to conduct programs like these would benefit society as a whole, both by reducing the need to treat infected inmates after they are released and by preventing future HCV transmission and the associated costs."

Lead author He adds, "Our model is the first of its kind to capture the

indirect, societywide benefits of HCV control interventions in prisons. We expect this new approach to measuring the impact of medical interventions on HCV in the wider community may also be applied to future studies of other infectious diseases."

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