

Adult Vaccine Avoidance Cost \$7 Billion in 2015

Diana Swift | October 17, 2016

Unvaccinated adults took a toll on the US economy to the tune of \$7.1 billion in 2015: 80% of a total cost-of-illness burden of \$8.95 billion for vaccine-preventable diseases, according to estimates reported online October 12 in *Health Affairs*.

Researchers led by Sachiko Ozawa, PhD, an associate professor at the Eshelman School of Pharmacy at the University of North Carolina, Chapel Hill, statistically modeled the costs of in- and outpatient healthcare, medications, and related lost productivity for vaccine-preventable diseases. They also included the value of averting death according to a full-income model.

The researchers analyzed data from the Medical Expenditure Panel Survey and the Nationwide Inpatient Sample database. Identifying 178 eligible studies in the literature, they looked at 10 vaccines against 14 pathogens: hepatitis A and B viruses, herpes zoster, human papillomavirus (HPV), influenza, measles, mumps, rubella, meningococcal disease, pneumococcal disease, tetanus, diphtheria, pertussis, and varicella. In total, the 14 pathogens caused 18.5 million cases of illness in 2015, of which 16.6 million were attributable to influenza.

Of the almost \$9 billion cost associated with vaccine-preventable diseases (plausible range, \$4.7 - \$15.2 billion), the greatest cost accrued from influenza, which accounted for \$5.79 billion (16.6 million cases) of 2015 direct and indirect expenditures. It was followed by pneumococcal disease, at \$1.86 billion (283,000 cases); herpes zoster, at \$782 million (1.1 million cases); and HPV-linked conditions, at \$333 million (447,000 cases). In- and outpatient costs represented 95% of the burden, and lost productivity the remaining 5%.

Inpatient care unit expenditures ranged from lows of \$5770 per case of influenza and \$6030 for rubella to highs of \$15,200 for pneumococcal disease and \$15,600 for invasive meningococcal disease. Outpatient care unit costs ranged from \$108 to \$457, and medication unit costs varied from \$0 for diseases with no curative treatment to as much as \$605 for drugs to treat tetanus (26 cases).

As for lost productivity, the inpatient per person loss ranged from \$122 for mumps to \$580 for tetanus. The per person outpatient productivity loss varied from \$23 and \$24 for hepatitis B and influenza, respectively, to \$29 for various conditions such as mumps and varicella, to \$154 for HPV-related illnesses. Conditions such as HPV cancers requiring multiple visits vs a single visit increased the loss.

Dr Ozawa pointed to the ripple effect of vaccine avoidance: "Adults who do not vaccinate are incurring costs to society. It is not just the person who gets sick from the vaccine-preventable disease who pays for the costs, but everyone who pays for insurance," she told *Medscape Medical News*. "Also, when people get sick, they miss work, and someone else may have to do their work or the business may not function as well. Therefore, it is important to prevent diseases and the resulting avoidable economic burden."

Although the study's calculations are within the ranges of other research, Dr Ozawa and associates called its \$6.9 billion estimate of annual costs in unvaccinated adults older than 50 years conservative. The authors attributed variations between their and other, often higher, estimates in the literature to differences in methodology.

An analysis looking just at influenza, pneumococcal disease, herpes zoster, and pertussis, for example, estimated annual costs of \$26.5 billion in 2013 for this age group. According to Dr Ozawa and colleagues, the higher costs in that study may have been driven by such factors as greater pertussis incidence, higher case cost estimates derived from different sources, and the measurement of additional indirect costs.

They stress that the findings illustrate the need for increased uptake of the vaccines recommended for people aged 19 years and older. "Estimating the economic burden of vaccine-preventable diseases among adults is a first step toward understanding the benefits of increasing adult vaccine uptake in the United States," the authors write. "By highlighting the tremendous financial burden that unvaccinated individuals place on the economy and the health system, we hope that our estimates will spur creative policy solutions to reduce the negative externality or spillover effect, while preserving the autonomy of patients to make more informed choices."

Calling the study "the first comprehensive quantification of costs associated with some of the most common vaccine-preventable diseases in adults," Bruce Y. Lee, MD, an associate professor of international health and director of operations research at the International Vaccine Access Center at Johns Hopkins University in Baltimore, Maryland, agreed the study's estimates lean to the cautious side. "In some ways, the study is conservative and underestimates many of the indirect costs associated with the diseases," he told *Medscape Medical News*.

He noted that adult vaccination rates for adults tend to be considerably lower than those for children. "While over 90% of children receive the measles-mumps-rubella, polio, hepatitis B, and varicella vaccines, in 2014, only 20.1% adults got the tetanus-diphtheria-pertussis vaccine, 43.2% the influenza vaccine, 9.0% the hepatitis A vaccine, and 24.5% the hepatitis B vaccine," Dr Lee said. "When adults get sick because they are not vaccinated, employers and society end up having in part to bear these costs."

In general, US adults continue to be immunized at rates far below those recommended, with, for example, only 42% receiving the influenza vaccine during the 2015 to 2016 season, according to the Centers for Disease Control and Prevention. In addition, a 2007 Centers for Disease Control and Prevention analysis put the annual cost of influenza epidemics in direct medical expenses for US adults at an estimated \$1.6 billion to \$25.2 billion.

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