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Cost-effectiveness of microneedle patches in childhood measles vaccination program

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Currently-available measles vaccines are administered by subcutaneous injection and require reconstitution with diluent and a cold chain that is resource-intensive and challenging to maintain. To overcome these challenges and potentially increase vaccination coverage, microneedle patches are being developed to deliver measles vaccine. We compared the relative cost-effectiveness of these patches with traditional vaccine delivery by syringe-and-needle. We constructed a simple mathematical model that accounts for measles virus transmission, birth rate, measles vaccine effectiveness, vaccination coverage, differing levels of herd immunity as vaccination coverage changes and costs of vaccine delivery. We assumed that microneedle vaccines will be, compared to current vaccines, more heat stable and require less expensive cool chains when used in the field. At 95% vaccination coverage, microneedle patch vaccination was estimated to cost $1.78 per measles case averted (range: $1.35–$2.25) compared with an estimated cost of $2.98 per case averted (range: $2.24–$3.73) using subcutaneous vaccinations. Use of microneedle patches saves costs; however, the cost-effectiveness of patches would depend on the acceptability and vaccine effectiveness of the patches relative to existing conventional vaccine delivery method. These results reinforce the need to continue research and development of this vaccine delivery method that could dramatically boost measles elimination efforts through improved access and increased vaccination coverage.

Biography

Bishwa B Adhikari has completed his PhD from Michigan State University and worked as Post-doctoral fellow at Centers for Disease Control and Prevention, Atlanta, GA. After the fellowship, he worked for Public Health Agency of Canada, Health Canada and currently works as Health Economist at Centers for Disease Control and Prevention. He recently served in Ebola Response team as a member of modeling task force. His current research interests are infectious disease modeling, cost-effectiveness of healthcare interventions, health policy and human behavior.

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