Impacts on Influenza A(H1N1)pdm09 infection from cross-protection of seasonal trivalent influenza vaccines and A(H1N1)pdm09 vaccines: systematic review and meta-analyses

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Abstract:

Background

Cross-protection by seasonal trivalent influenza vaccines (TIVs) against pandemic influenza A H1N1 2009 (now known as A[H1N1]pdm09) infection is controversial; and the vaccine effectiveness (VE) of A(H1N1)pdm09 vaccines has important health-policy implications. A systematic review and meta-analysis is needed to assess the impacts of both seasonal and A(H1N1)pdm09 vaccines against A(H1N1)pdm09.

Methods

We did a systematic literature search to identify observational and/or interventional studies reporting cross-protection of TIV and A(H1N1)pdm09 VE from when reporting of the pandemic occurred (2009) until July 2011. The studies fulfilling inclusion criteria were meta-analysed. For cross-protection and VE, respectively, we stratified by vaccine type, study design and endpoint.

Results

Thirty-three studies with 3,019,399 subjects were included; meta-analyses of 26 studies revealed:

1) TIV: cross-protection for confirmed illness was 19% (95% confident interval [CI]=−13 to 42%) based on 13 case-control studies with notable heterogeneity; a higher and significant cross-protection of 34% (95% CI=9 to 52%) was found in a sensitivity analysis (when 5 studies were excluded due to moderate risk of bias); one RCT (7,334
subjects) reported a cross-protection of 38% (95% CI=19 to 53%) for confirmed illness while another with lower power (sample size=431) showed no difference. One case-control study reported a cross-protection of 50% (95% CI=40 to 59%) against hospitalised cases. No effect was detected on the risk of other endpoints (ILI, sickness absenteeism).

2) A(H1N1)pdm09 vaccines: VE for confirmed illness was 86% (95% CI=73 to 93%) based on 11 case-control studies (although notable heterogeneity was detected) and 79% (95% CI=22 to 94%) in two cohort studies; by contrast, against medically attended ILI, VE was 32% (95% CI=8 to 50%) in one cohort study.

Conclusion
TIVs provided moderate cross-protection against both laboratory-confirmed A(H1N1)pdm09 illness (based on 8 case-control studies with low risk of bias and one RCT) and also hospitalisation. A(H1N1)pdm09 vaccines were highly effective against confirmed A(H1N1)pdm09 illness. Although cross-protection was less than the direct effect of strain-specific vaccination against A(H1N1)pdm09, TIV was generally beneficial before A(H1N1)pdm09 vaccine was available.