Economic and Clinical Outcomes of Cell-Based Versus Egg-Based Influenza Vaccines in U.S. Pediatric and Adult Populations: A Modeling Study

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Study Objective

This study aims to evaluate the clinical and economic impact of cell-based versus egg-based influenza vaccines in individuals aged 6 months to 64 years in the U.S. from a payer perspective.

Background

- Influenza remains a substantial global health burden, underscoring the critical importance of effective vaccination strategies.[1,2]
- Traditional egg-based vaccine production can introduce egg-adapted mutations that alter antigenicity and reduce vaccine effectiveness (VE).[3]
- Five seasons of available evidence demonstrate cell-based influenza vaccines are more effective than egg-based vaccines in children and adults <65 years of age; use of cell-based vaccines could have a substantial public health impact.[3–6]

Methods

- We employed a dynamic, age-stratified transmission model[7] to estimate influenza-associated direct medical costs, assuming a current U.S. influenza immunization rate of 50% for individuals aged 6 months–64 years.
  - Two distinct influenza seasons were modeled: low incidence (2011–2012) and high incidence (2017–2018).
- Absolute VE (representing egg-based vaccines) was averaged from the U.S. Centers for Disease Control and Prevention reports over the past 10 seasons (58% [children], 40% [adults]),[8] and relative VE (rVE) for cell- versus egg-based vaccines was set at 12.5%, based on a straight average of rVE reported from a series of retrospective test-negative design studies conducted over five U.S. influenza seasons on individuals aged 4–64 years (2017–2020) or 6 months–64 years (2022–2024).[4–6]
- Outcomes included total influenza-related outpatient and inpatient expenditures, and all U.S. direct medical costs per event were sourced from published literature.[9]

Conclusions

Adoption of cost-effective strategies, such as cell-based vaccines, alongside improvements in influenza vaccination rates for pediatric and adult populations has the potential to significantly reduce direct medical expenditures, alleviate healthcare system burden, and advance national public health goals.

Results

- Compared with egg-based vaccines, cell-based influenza vaccines were projected to reduce total direct influenza-associated medical costs by $958 million in a low influenza incidence season and by $3,855 million during a high influenza incidence season (**Figure 1A**).
- Reductions in direct medical costs from both pediatric and adult populations are attributable to the expected reductions in clinical outcomes (**Figure 1B**):
  - 1.9–3.6 million outpatient visits (of which 1.2–2.6 million are in adults) and 40,802–83,465 inpatient admissions (31,749–71,425 in adults), depending on seasonal influenza activity.

Figure 1A. Total direct medical costs with cell-based vs egg-based influenza vaccines in the U.S. population aged 6 months to 64 years

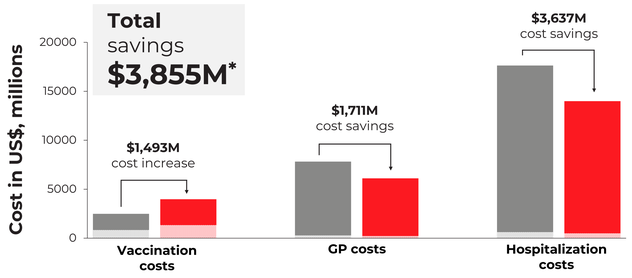
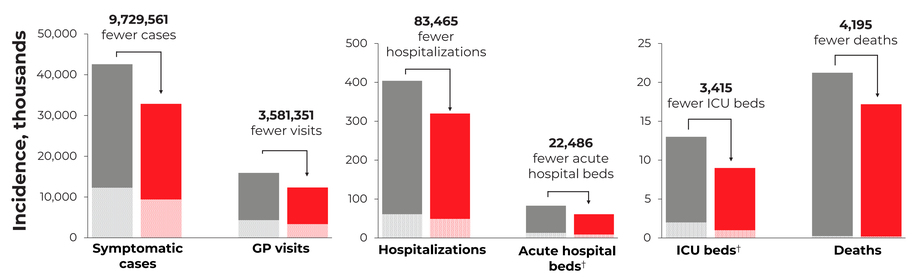


Figure 1B. Clinical outcomes with cell-based vs egg-based influenza vaccines in the U.S. population aged 6 months to 64 years



*Assumed costs for low-risk individuals were $57–378 per GP appointment and $8,514–34,926 per hospitalization; for high-risk individuals, $57–1,148 and $12,913–74,709, respectively. All assumed costs differed by age. †Utilized at the peak of influenza epidemic.
GP, general practitioner; ICU, intensive care unit; M, million; US, United States.

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Disclosures
Joaquin F. Mould-Quevedo is an employee of CSL Seqirus and owns shares in CSL. Van H. Nguyen has received consultant honoraria from CSL Seqirus for conducting the research presented in this poster.

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