

LAIV vs IIV literature review

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What follows is a "first pass" of the literature regarding live attenuated influenza vaccine (LAIV) and influenza, inactivated vaccine (IIV). The next iteration of this document will hopefully contain more information on young adults (most research I've found so far groups ages 18-49 or 18-64 all together), strain mismatch, and waning protection over time.

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Literature review

Recommendations

For young children:

- As of November, 2014, the American Academy of Pediatrics' Committee on Infectious Diseases recommends that children ages 2 through 8 with "no contraindications or precautions to the intranasal vaccine" should receive LAIV; IIV should be administered "if LAIV is not readily available". [1]
- Though not recommended for children with high-risk conditions, a Canadian study examined administration of "Flu-Mist" to children with asthma, CF and chronic conditions. No atypical adverse events were encountered. The only contraindications they suggest are if the child is "on systemic corticosteroids... medically-attended wheezing episode in the 7 days prior to vaccination... aged 2... nasal polyps or rhinorrhoea considered too significant... to allow LAIV to reach the nasal mucosa and ... immunosuppressed." [2]

For adults:

- Influenza immunization is recommended for all age groups greater than 6 months of age. [3]
- There is lots of evidence suggesting that LAIV is more effective at younger ages, but "there are insufficient data to determine at what age or with how many successive seasons of vaccination the relatively greater efficacy of LAIV diminishes in children aged 6 through 18 years." [3]
- LAIV is contraindicated for pregnant women, but is still delivered at a rate of 0.3 per 1000 [4]

Social

Acceptability / feasibility:

- In a randomized trial in Canadian elementary schools, schools assigned to get LAIV instead of IIV had higher uptake (19.3% to 12.2%). However, cost per vaccine was slightly higher for LAIV (\$43.50 vs. \$38.67). [5]
- Due to its short shelf-life (18 weeks, relative to IIV's year), the likelihood of LAIV being administered *after* expiration is higher, which may bias the results of some studies. [6]
- Adult self-examination has been examined in detail and appears to be an effective option. [7] (Medimmune-funded and non-randomized)

Effectiveness

Relative to IIV

- In a very large study of US military adults (41,670 vaccination administered over the course of multiple flu seasons), there was no difference in the effectiveness of LAIV versus IIV. However, multiple potential sources of bias (LAIV vs. TIV administered based on supply, etc.). [8]
- Among 3 to 8 year-olds, LAIV was 95.4% and 88.5% effective against moderate/severe influenza (relative to placebo). Relative to IIV, LAIV was 52.2% and 45.0% effective against moderate/severe influenza. [9]
- Biologically, LAIV priming appears to inhibit virus recovery (among young children) more effectively than IIV. [10]

Cross-protection

- A study of mice suggests that LAIV-delivered influenza B vaccine is effective, but that in a mixed delivery model timing is important. [11]
- A meta-analysis of IIV and LAIV in both matched suggests that LAIV might be slightly more effective during

mismatched years. [12]

Over time

- It appears that vaccine protection wanes more rapidly in elderly populations, but cannot find evidence to suggest differential waning between LAIV and IIV. [3]

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Details

Full code at https://github.com/joebrew/uf/tree/master/gerke_independent_study/lit_review.

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