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Introduction

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Meta-Analyses provide: the statistics to compare effect sizes, a summary of the results, and an estimate of the heterogeneity of the findings. In terms of confidence in outcomes and a cause-effect relationship between variables, a meta-analysis is also the highest level of evidence (see figure 2). Thus, understanding a meta-analysis is essential for determining both the level and grade of treatment recommendations.

A meta-analysis is a statistical approach that functions to combine effect sizes from conceptually similar studies to estimate the overall effect size of an intervention of interest (see Table below). Meta analysis typically begin with a systematic review to identify all relevant evidence.

Steps to Meta-Analysis
1. Formulate the research question
2. Define selection criteria for studies to be included
   a) Based on design quality criteria (e.g., Randomization, blinding, random allocation)
   b) Based on subject (e.g., influenza vaccination)
3. Search the literature
4. Decide which dependent variables/outcomes to include (e.g., difference scores, means, risk ratios)
5. Create a standardized form for data analysis
6. Grade the quality of the evidence
7. Standardized individual results
8. Perform analysis

Key Findings of 2018 Meta-Analysis of Flu Vaccine
- As of 12/31/16, there were 52 known clinical trials including over 80,000 healthy adults
- Only 15% of these were high quality in design and execution
- 22 of these studies were randomized trials that compared seasonal vaccine to placebo or no treatment; only half of these were high quality
- The majority of randomized trials reported insufficient information about loss to follow up
- There have been no randomized trials of seasonal vaccine efficacy or adverse events during pregnancy
- Flu vaccine in healthy adults probably has a small protective effect against the flu:
  ✓ Risk of getting the flu without vaccine: 2.3% (moderate certainty evidence)
  ✓ Risk of getting the flu with the vaccine: 0.9% (NNT = 71; see figure 3.)
- Without testing, health care providers cannot distinguish between influenza like illnesses and influenza (see Figure 4). Available evidence indicates no difference in clinical cases of flu with or without seasonal vaccine.
- Industry funding of influenza vaccines determines publication of trials in prestigious journals

Effect Sizes (95% CI) of Confirmed Seasonal Flu and Clinical (Symptom Defined) Flu