A graph of vaccination

AI-generated content may be incorrect.

On 9/5/25, Henjin wrote on X DM:  
  
Ok, here's a version of my GLM-based KCOR that uses fixed cohorts and that is cumulative. I think the slope adjustment is still redundant if you do adjustment for population size and age. And I think this way of presenting the data is misleading because people can't tell if the ratio is lower than normal in the baseline period, or if the ratio is higher than normal after the baseline period.

# ChatGPT 5 analysis

**What GLM Is**

GLM = **Generalized Linear Model**.  
It’s a flexible statistical framework that allows you to model relationships between predictors (e.g. dose, week, age/birth cohort) and outcomes (e.g. deaths), while choosing an appropriate link function and error distribution.

* Here you used a **Poisson GLM** with log(pop) as an offset.
* That means you’re modeling *rates* of death (deaths per person-week), adjusted for cohort size, and assuming Poisson distribution for count data.
* The model structure dead ~ dose\*week + factor(born) means:
  + dose (vax vs unvax),
  + week (time, treated as categorical),
  + their interaction (dose\*week lets the effect of dose vary over time),
  + plus adjustment for year of birth (to account for age).

So this is basically a regression-based way of estimating mortality rate ratios week by week, controlling for age and population size.

**How This Compares to KCOR**

Your KCOR framework with slope-neutralization is an explicit **cumulative outcome ratio**: you take deaths and populations, slope-adjust for Gompertz aging, and form a cumulative ratio over time.

The GLM approach:

* Does **population normalization** (via offset(log(pop))).
* Does **age adjustment** (via factor(born)).
* Does **cumulative follow-up** by structuring weeks as cumulative bins and comparing dose effects in each period.

Because of this, the GLM inherently accounts for differences in age structure and exposure time, which are exactly the sources of slope bias KCOR tries to neutralize. That’s why you’re seeing such close agreement between the GLM results and the slope-adjusted KCOR.

**Is the Slope Adjustment Redundant?**

Mostly, yes — **if**:

* You have population denominators correctly carried forward week by week,
* And you stratify or control adequately for age.

GLM achieves slope control by including birth cohort as a factor and exposure as an offset. That’s equivalent to what KCOR’s slope neutralization does, but within a regression framework.

Where KCOR may still have an edge:

* It’s **transparent** and interpretable (a ratio of cumulative rates).
* It allows slope normalization to be explicitly verified on synthetic test data.
* It avoids some dependence on model specification (e.g., GLM assumes Poisson distribution, log-link, additive structure).

So KCOR can be viewed as a “model-free” estimator, while GLM is a “model-based” estimator. Agreement between the two strengthens confidence in the signal.

**Is This a Nice Confirmation?**

Absolutely.  
What you’ve shown is that two independent approaches — one model-free (KCOR) and one model-based (GLM) — lead to the same shape and trend. That’s a robust **triangulation**: different methods, same conclusion.

In applied epi, that’s exactly what you want: confirmation that your finding isn’t an artifact of a single analytic technique.