Estimating Indirect War Deaths Directly

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There is growing interest in *non-violent deaths* caused *indirectly* by war.

It’s easy to imagine mechanisms that could transform war violence into non-violent deaths so I won’t use up any of my 12 minutes enumerating such possibilities.

Rather, I’ll focus on statistical methods to estimate numbers of indirect non-violent war deaths.

More specifically, I’ll expose a flaw in how researchers estimate these numbers and propose a solution.

The standard approach proceeds as follows, using sample surveys for measurement and null hypothesis significance testing (NHST) to screen results.

1. Estimate a pre-war death rate for violent and non-violent deaths combined

2. Estimate a during-war death rate for violent and non-violent deaths combined.

3. Subtract the pre-war death rate from the during-war deaths rate to find what is called the *excess death rate*.

4. Assume that this difference (during-war minus pre-war) is *caused* by the war.

5. Separate excess deaths into violent and non-violent components.

Step 4 isn’t central to today’s talk but it is an important and underappreciated step so let’s pause briefly on it.

It is a logical fallacy (*post hoc ergo propter hoc*) to conclude that A causes B just because B follows A – think of assuming that your alarm clock causes the sun to rise because the sun always rises after your alarm clock rings.

My point is that it’s fine to report an excess death rate but to argue that war has *caused* the change from the pre-war to the during-war rate requires to you make a case for such causality, not just blithely assume it.

OK, enough on this.

Today I highlight the way that violent and non-violent deaths are unnecessarily conflated early in the standard calculation and then separated later.

This indirect method to estimate indirect deaths creates distortions and suppresses the uncertainty surrounding estimates - although this method can have benefits in some circumstances.

We propose an alternative that method that addresses these issues.

Remember – our whole purpose here is to estimate *non-violent* deaths *indirectly* caused by war.

Therefore, it is strange that begin such a calculation by mixing in violent deaths with non-violent ones.

The standard method ultimately separates the two types of deaths from each other, but why start with conflation and then later undo this conflation?

At a minimum, the standard method is awkwardly roundabout – but the problems go beyond awkwardness.

Now we need to note two more key points.

1. There will be an uncertainty interval (UI) surrounding any decent estimate for an excess death rate.

2. Typically, estimates are screened for statistical significance using NHST – this means in practice that people attach a lot of importance to whether or not the bottom of the UI is above or below 0.

The NHST paradigm is a big part of the problem we highlight in our paper and we should not blindly trap ourselves within its boundaries but in what follows I will largely take it as given.

Consider a simple numerical example (extending through slide 14)

I distinguish between *true* underlying rates and *estimates* of these true rates (that include uncertainty intervals which I will provide when they are germane to the argument).

True Rates

True pre-war non-violent death rate – 6 per 1,000 per

True during-war non-violent death rate – 6 per 1,000 per year

True violent pre-war death rate – 0

True violent during-war death rate – 5 per 1,000 per year

True excess death rate – 5 per 1,000 per year (11 – 6) – *all violent*

True non-violent excess death rate (new concept) - 0 (6 – 6)

Estimates

Estimated pre-war non-violent death rate – 5 per 1,000 per

Estimated during-war non-violent death rate – 7 per 1,000 per year

Estimated violent pre-war death rate – 0

Estimated violent during-war death rate – 5 per 1,000 per year

Estimated excess death rate – 7 per 1,000 per year – UI runs from 2 to 12

Estimated non-violent excess death rate - 2 per 1,000 per year - UI runs from -3 to 7

The Standard (Indirect) Method

The excess deaths estimate passes the statistical significance screen because the bottom of the UI is greater than 0 (from the last slide the bottom of the UI is +2)

Separate out the non-violent component of excess deaths by subtracting the violent death estimate (5) from the excess death estimate (7).

Report the estimate of 2 without an uncertainty interval – the suppression of uncertainty is pretty much mandated by the route to arrive at the estimate.

Our Proposed (Direct) Method

Estimate the non-violent excess death rate – 2 per 1,000 per year - UI runs from -3 to 7

Report that this estimate does not clear the statistical significance bar, following the NHST paradigm.

Personally, I would report the UI, note that the bottom is well below 0, say that the non-violent excess death rate is probably positive but that there is a lot of uncertainty (This is another discussion.)

In this example the true non-violent excess death rate is 0 (slide 7) so the direct method does better than the indirect one – moreover, it is easy to see that the story would be similar for non-violent excess death rates near to, but not equal to, 0.

Weaknesses of the Standard (Indirect) Approach Relative to the Direct Approach

1. It's more *complicated*

2. It doesn't give you a *UI*

3. It l*owers the statistical significance bar* - mixing in violent deaths pulls estimates away from 0

4. It is p*rone to overestimation of non-violent excess deaths* – it treats spurious random overestimation (underestimation) of during-war (pre-war) death rates as statistically significant evidence of excess non-violent deaths.

5. It *chases noise* – random fluctuations in estimates are treated as real movements without uncertainty intervals.

The problems I've been describing are not just theoretical.

A famous estimate of half a million excess deaths in Iraq falls almost exactly into the trap described by the above numerical example :

1. The authors claim, using the indirect method, that 40% of their excess death estimate is non-violent deaths.

2. They give no UI for excess non-violent deaths.

3. Direct estimation of non-violent excess deaths leads to a UI of -210,000 to 410,000.

Our Paper has some Simulations

In this short presentation I managed just one numerical example which, hopefully, has succeeded in conveying the main concepts.

In the paper we also report some preliminary simulations that aim to generalize our conclusions.

In particular, we set up a bunch of simulated war-ravaged countries with varying death rates (violent, non-violent, pre-war, during-war) - we then simulate measurements of these death rates using household surveys and apply and compare the methods.

The simulations have various limitations described in the paper that we have no time for here.

They do generally confirm the insights listed above but I should quickly report that they also reveal an advantage for the standard method - in situations when the true non-violent excess death rate is fairly high relative to the violent death rate but not high enough to guarantee a statistically significant result for the indirect method.

This advantage can be offset by not robotically applying the NHST paradigm but, still, this is an issue worth considering.

Conclusions

Estimating a non-violent excess death-rate complete with a UI should be a mandatory part of assessments of non-violent deaths indirectly caused by war.

There is still some value in estimating traditional excess death rates with UI's - that is, we can simultaneously apply the standard indirect method and our proposed direct method.

However, we should ban the manoeuvre of saying that X percent of a standard excess-death estimate is non-violent and then treating this non-violent portion as a sure thing.