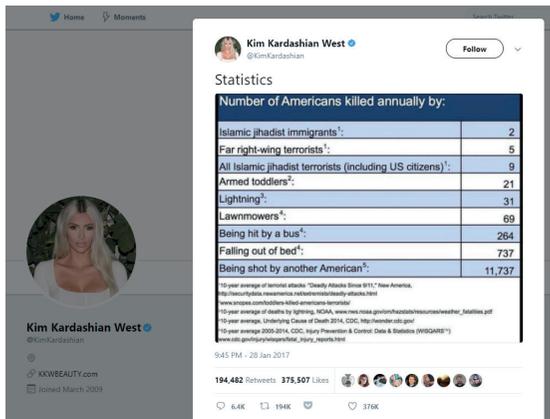


Lawnmowers versus terrorists

The Royal Statistical Society's first 'International Statistic of the Year' has sparked debate. **Norman Fenton** and **Martin Neil** argue against the choice of winner, while **Nick Thieme** writes in favour



ABOVE Kim Kardashian's attention-grabbing tweet.

In December, the Royal Statistical Society (RSS) named its first International Statistic of the Year. It was 69: the annual number of Americans killed, on average, by lawnmowers over the past decade, compared with two Americans killed annually, on average, by immigrant Jihadist terrorists.

As the RSS explained in its press release: "The figure was highlighted in a viral tweet this year from Kim Kardashian [pictured above] in response to a migrant ban proposed by President Trump; it had originally appeared in a Richard Todd article for the Huffington Post.

"Todd's statistics and Kardashian's tweet successfully highlighted the huge disparity between (i) the number of Americans killed each year (on average) by 'immigrant Islamic Jihadist terrorists' and (ii) the far higher average annual death tolls among those 'struck by lightning', killed by 'lawnmowers' and in particular 'shot by other Americans'."

The award generated reams of media coverage, but it also led to criticism: Nassim Nicholas Taleb was among the most vocal, arguing that it was inappropriate to compare lawnmower deaths with terrorist killings: "the 2 variables are NOT comparable statistically," he wrote (bit.ly/2CanC6n).

Here, Norman Fenton and Martin Neil expand on the argument against the International Statistic of the Year, after which Nick Thieme mounts a defence.

Brian Tarran

A highly misleading view of risk

By Norman Fenton and Martin Neil

In the citation for its International Statistic of the Year, the RSS said that "Kardashian's use of these figures shows how everyone can deploy statistical evidence to inform debate and highlight misunderstandings of risk in people's lives", adding that "anyone, statistician or not, can use statistics to illustrate an important point and illuminate the bigger picture."

Contrary to these assertions, we believe the comparison between lawnmower and terrorist deaths provides a highly misleading view of risk. First, there is the under-reporting of deaths from terrorists: the choice of period excludes the 3000 deaths on 9/11, and we believe it also excludes other attacks during the period that were ultimately classified as Jihadist terrorist attacks.

But perhaps more importantly, the comparison omits crucial causal information that explains the statistics observed. These are very different for the two fatality numbers. Taleb summed up the problems in comparing the two numbers when he stated: "Your lawnmower is not trying to kill you."

Taleb argues that there is a key difference between risks that are *systemic*, which can affect more than one person (such as a terrorist attack), and those that are not (such as using a lawnmower) which can be considered *random*. It is impossible for 1000 people in New York City to die next year from using lawnmowers, but not from terrorist attacks. Systemic and non-systemic risks have very different distributions, as shown in Figure 1.

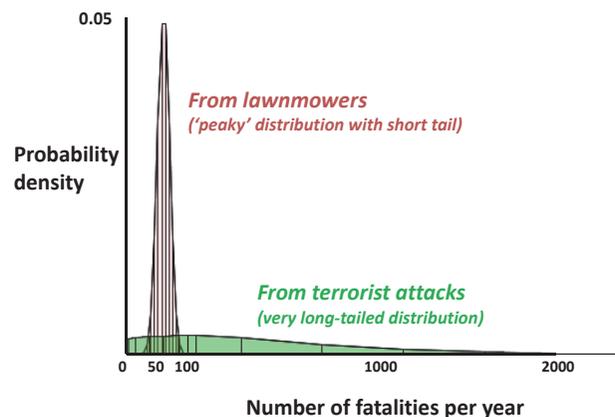


FIGURE 1 Comparing probability distributions of number of fatalities per year. Systemic risks have long tails that capture low (but non-zero) probability events. Unlike the lawnmower deaths distribution, there is a small non-zero probability of 2000 fatalities from terrorist attacks in a single year.

Using number of deaths per year to compare different types of “risk” fails to consider the many factors that affect the true risk to individuals or groups. Death by lawnmower is almost impossible for those not using a lawnmower, whereas there is a greater risk to gardeners; residents of major cities are at greater risk from terrorists than residents of the countryside. Crucially, there are also causal factors explaining the number of terrorist deaths that need to be considered: terrorist cells can be responsible not just for multiple deaths in a single attack, but also multiple attacks, so deaths in terrorist attacks can be related by a *common cause*. Moreover, deaths from terrorist attacks would drastically increase without security measures.

If number of recent fatalities were used as the sole driver for risk assessment then we would have no need for expensive flood barriers in London (such as the Thames barrier) and no need for any measures to combat climate change in New York. Conversely, had security measures which are now routine at all airports been put in place before 9/11, there would have been no fatalities on 9/11; yet, exactly as suggested by some in relation to the partial migrant ban proposed by President Trump (as cited by the RSS) in 2017, there would have been strong arguments claiming that the measures were unnecessary.

These types of causal influences and relations are the focus of much of our book, which explains the limitations of statistics and helps build models that incorporate causal context. ■

Note

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“Statistic of the Year”, not “Statistic of the Next Ten Years”

By Nick Thieme

As explained by RSS president Sir David Spiegelhalter, the International Statistic of the Year was chosen not to highlight a misunderstanding in the perceived threat of future terror attacks, but to illustrate “possible misunderstandings about facts about the past”. Aside from the use of the word “risk” – which Spiegelhalter admits could have been better chosen – the RSS statement is clear on this point, referring only to average numbers of deaths in the past, and staying clear of forecasting.

If asked about causes of death over the last decade, the average US citizen would likely place terrorists higher than lawnmowers. This statistic is valuable because it corrects that misconception. We can and should debate whether description or inference better serves the public need for evidence, but to fall so strongly in the inference camp and dismiss the usefulness of description ignores its greatest quality – that it occurred with probability 1. In the current political moment, many seem dangerously unconcerned with admitting events that provably happened. Taleb and Fenton may be upset that the RSS provided a descriptive statistic and not an inferential one, but they should admit that the statistic is historically accurate.

They criticise the statistic for not “illuminat[ing] the bigger picture”, but ignore that it wonderfully “illustrate[s] an important point”. Taleb is correct in saying that “Your lawnmower is not trying to kill you”, but it is also true that no one has yet proposed a ban on aerators because they happen to look similar to lawnmowers. Over the

last decade, comparatively few have died from Jihadist terror attacks, but there are endless examples of innocent immigrants being discriminated against for having a particular “look”.

Taleb and Fenton argue the statistic is unfair because it ignores the roughly 3000 deaths on 9/11. But suppose that tragedy occurred in 2011, rather than 2001. The Jihadist statistic would then read 302, about the same number of deaths caused by buses striking pedestrians, and about half as many as caused by falling from bed. And what if the 9/11 attack recurred annually? Death by terrorist would still be one-third as deadly as “rote” gun violence.

Indeed, the comparison with gun violence is intended as the deeper one. The RSS statement draws particular attention to the difference between Jihadist terror and shooting deaths. Speaking with Spiegelhalter confirms this point: “The lawnmower statistic is intended to arouse curiosity, and provides a sort of anchor from which to judge the high number of gun deaths with the low number of victims of immigrant Jihadists.”

Shootings, importantly, cannot be criticised like lawnmower accidents. To use Fenton’s words, they are “systemic” threats with long tails. They are the atomic kilogram by which to weigh the gram, and a gram it turns out to be. Unlike terrorist fatalities, tens of thousands of people are shot dead annually – triple the number in Taleb and Fenton’s long tail, and hundreds of times more than around its mode. ■

