

Are lawnmowers a greater risk than terrorists?

Norman Fenton and Martin Neil, 3 January 2018

In December 2017 the Royal Statistical Society announced the winner of its “International Statistic of the Year”. The citation¹ announced it as follows:

Contrary to the statement in the Royal Statistical Society citation, the figures directly comparing numbers killed by lawnmower with those killed by Jihadist terrorists, do NOT ‘highlight misunderstandings of risk’ or ‘illuminate the bigger picture’. They do the exact opposite as we explain here.

WINNER: INTERNATIONAL STATISTIC OF THE YEAR

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This is the annual number of Americans killed, on average, by lawnmowers - compared to two Americans killed annually, on average, by immigrant Jihadist terrorists.

The figure was highlighted in a viral tweet this year from Kim Kardashian 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’.

Todd and 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.

Judging panel member Liberty Vittert said: ‘Everyone on the panel was particularly taken by this statistic and its insight into risk - a key concept in both statistics and everyday life. When you consider that this figure was put into the public domain by Kim Kardashian, it becomes even more powerful because it shows anyone, statistician or not, can use statistics to illustrate an important point and illuminate the bigger picture.’

¹ <https://www.statslife.org.uk/news/3675-statistic-of-the-year-2017-winners-announced>

The original Kim Kardashian tweet is shown in Figure 1.

In addition to the problems discussed below, the terrorist statistics do not include the 3000 deaths on 9/11 and also a number of other attacks that were ultimately classified as Jihadist terrorist attacks (for example, the 2009 attack at Fort Hood that killed 14 – carried out by a foreign-born Jihadist – was for several years classified as ‘work place violence’).

Based on the same time period the number of people killed in the USA from man-made climate change is zero. Using the same reasoning as in the RSS statement one could conclude that climate change risk is infinitesimally smaller than that of lawnmowers, and that measures to combat it are no more rational than President Trump’s measures to combat foreign Jihad attacks on America

Number of Americans killed annually by:	
Islamic jihadist immigrants ¹ :	2
Far right-wing terrorists ¹ :	5
All Islamic jihadist terrorists (including US citizens) ¹ :	9
Armed toddlers ² :	21
Lightning ³ :	31
Lawnmowers ⁴ :	69
Being hit by a bus ⁴ :	264
Falling out of bed ⁴ :	737
Being shot by another American ⁵ :	11,737

¹10-year average of terrorist attacks "Deadly Attacks Since 9/11," New America, <http://securitydata.newamerica.net/extremists/deadly-attacks.html>
²www.snopes.com/toddlers-killed-americans-terrorists/
³10-year average of deaths by lightning, NOAA, www.nws.noaa.gov/om/hazstats/resources/weather_fatalities.pdf
⁴10-year average, Underlying Cause of Death 2014, CDC, <http://wonder.cdc.gov/>
⁵10-year average 2005-2014, CDC, Injury Prevention & Control: Data & Statistics (WISQARS™) www.cdc.gov/injury/wisqars/fatal_injury_reports.html

9:45 PM - 28 Jan 2017

Figure 1 Tweet by Kim Kardashian that earned "International Statistic of the Year" 2017

While the announcement was met with enormous enthusiasm, one significant dissenter was Nassim Nicolas Taleb – a well-known expert on risk and ‘randomness’. He exposed a fundamental problem with the statistic, which he summed up in the tweet of Figure 2.

1) Look at head statistician from the Royal Society promoting that BS. No, the 2 variables are NOT comparable statistically.
Your lawnmower is not trying to kill you.

9:45 PM - 28 Jan 2017

Figure 2 Taleb's response to the RSS announcement

Indeed, rather than “inform debate and highlight misunderstandings of risk in people’s lives” as stated by the RSS, this example does exactly the opposite. It provides a highly misleading view of risk because it omits crucial causal information that explains the statistics observed. These are very different for the two different fatality numbers. One of the objectives of our book² is to help readers understand how to see through such statistics and build models that incorporate the necessary causal context.

The probability of being killed by a lawnmower in New York City is especially low because relatively few people there have lawns to mow. This illustrates another flaw in the RSS risk argument – it does not take account of different personal ‘profiles’: if you do not own or use a lawnmower your risk of being killed by one is zero

Informally, Taleb’s argument is 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**. The chances that the number of people who die from a non-systemic risk, like using a lawnmower, will double next year are extremely unlikely. But this cannot be said about the number of people dying from systemic risks like terrorist attacks and epidemics. The latter can be ‘multiplicative’ whereas the former cannot. It is impossible for a thousand people in New York City to die from using lawnmowers next year, but it is not impossible for a thousand to die there from terrorist attacks.

Systemic and non-systemic risks have very different ‘probability distributions’ as shown in Figure 3.

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 getting 2000 fatalities from terrorist attacks in a single year in the USA.

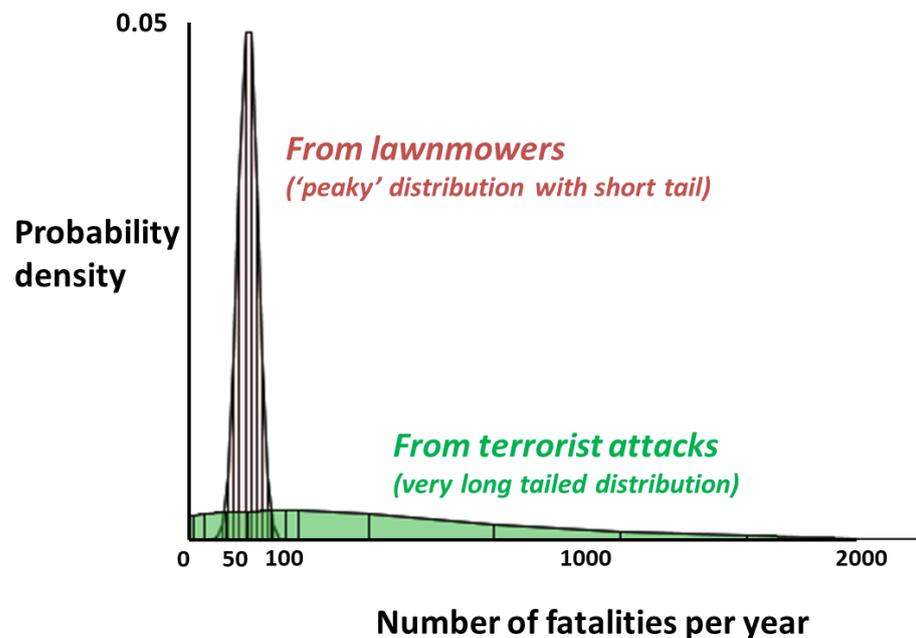


Figure 3 Comparing the probability distributions of number of fatalities per year

² Fenton, N.E. and M. Neil, Risk Assessment and Decision Analysis with Bayesian Networks. CRC Press, ISBN: 9781439809105 , ISBN 10: 1439809100, 2012. New Second Edition 2018

Using the number of deaths per year to compare different types of 'risk' fails to consider the range of factors that affect the true risk to particular individuals or groups. A person who does not use a lawnmower cannot be killed by one, whereas there is a greater risk to gardeners; similarly, residents of major cities are at greater risk from terrorists than residents who live in the countryside. Crucially, there are also **causal factors** that explain the number of terrorist deaths that need to be considered alongside the basic statistics: terrorist cells can be responsible for multiple deaths in a single attack, and also multiple attacks. Hence, unlike lawnmower deaths, the deaths in terrorist attacks are related by a common cause other than simply the artificial risk classification (lawnmower or terrorist attack). Moreover, because as Taleb says 'your lawnmower is not trying to kill you', there are extreme security measures in place to stop terrorist attacks. If these were removed the number of deaths would drastically increase.

In the lawnmower case Fred and Jane are killed by different lawnmowers. This is what makes them independent...in absence of common lawnmower design flaws (such as a controller bug inserted by a terrorist designer).

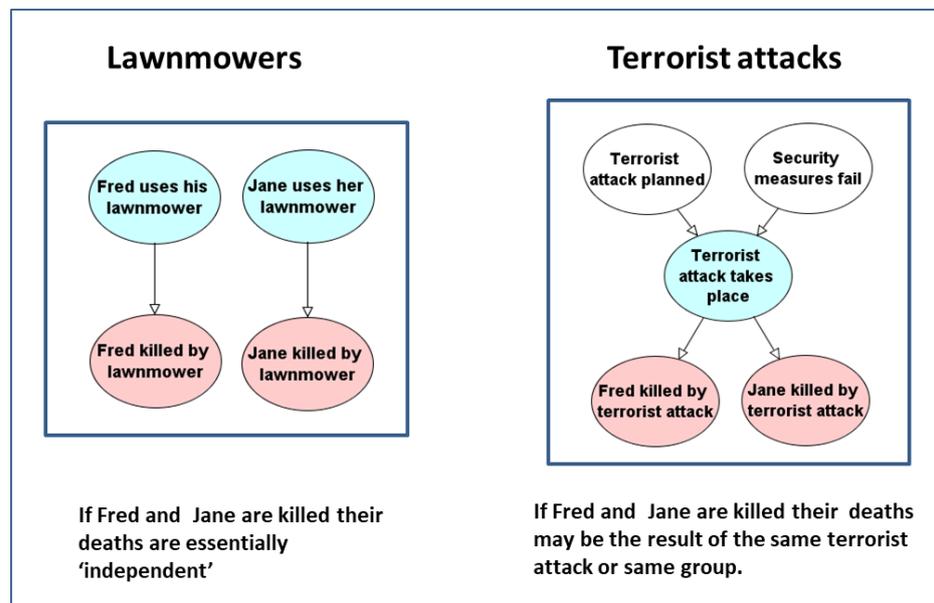


Figure 4 Causal view of lawnmower versus terrorist attack deaths

These types of causal influences and relations (summarised in Figure 4) are the focus of much of our book (new edition out in Sept 2018):

Fenton, N.E. and M. Neil, *Risk Assessment and Decision Analysis with Bayesian Networks*. CRC Press, ISBN: 9781439809105 , ISBN 10: 1439809100, 2012

www.bayesianrisk.com

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