

Media coverage of the “violence epidemic” in England and Wales: are we adding fuel to the fire? (Supplementary file)

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Methods

Data sources on serious violence

Supplementary Table 1 summarises the three data sources we used to estimate trends in serious violence in England and Wales from 2002 to 2018. We manually extracted the count data from annual reports for Mortality Statistics and Hospital Episode Statistics (HES),^{1,2} and derived rates per 1000 population using the Office for National Statistics’ Mid-Year Population Estimates for England and Wales.³ Rates per 1000 population were already estimated for Attendances to Emergency Departments by the National Violence Surveillance Network (at Cardiff University). We extracted these estimated rates from the National Violence Surveillance Network’s annual reports.⁴ The data and code for replicating the graphs included in the manuscript and are freely available at Github (<https://github.com/DKHumphreys>).

Mortality Statistics. As described in Supplementary Table 1, Mortality Statistics use ICD codes based on information from medical certificates. Contrary to police-recorded homicides which uses a subtractive approach, the data generation process for mortality statistics uses an additive approach, where deaths by homicides are added following coroner inquests. This means that homicide figures (ICD codes: X85-Y09, including late effects of assault Y87.1) for more recent years may underestimate the true number of homicides while inquests and investigations are still pending.

Different approaches may be used to counteract this limitation (see Supplementary Figure 1). Specifically, ICD codes for accelerated registrations of probable homicide pending verdict may be included (special purpose ICD code: Y33.9/U50.9) and/or deaths the broader category of death by undetermined intent (ICD codes: Y10-Y34). Including these ICD codes shift the bias in the opposite direction, overestimating recent homicide counts as a proportion of these cases will not be determined to be homicide following investigations. Although there are no specific ICD codes for homicide by knife pending verdict, there is a specific ICD code for death by knife of undetermined intent (ICD: Y28), but this code may include suicide and accidental deaths by knife (see Supplementary Figure 2). In the main manuscript, we report a combined homicide figure for homicide (ICD codes: X85-Y09), late effects of assault (ICD code: 87.1), and probable homicide pending investigation (special purpose ICD code:

Y33.9/U50.9). Our overall homicide figures will therefore inflate the number of recent homicides. For homicide by knife, we only report homicide by knife (ICD code: X99) and may underestimate the number of recent homicides by knife.

In the interest of open science and transparency, the raw data for mortality statistics and the R code for extracting our figures are freely available from the OSF (https://osf.io/4kwj7/?view_only=9aae634f87db4dc7b948f0c3789629f5). Note, these figures include all homicides of English and Welsh residents, encompassing homicides of residents that occurred outside of England or Wales.

Hospital Episode Statistics. HES for Admitted Patient Care report on three main measures: (1) finished consultant episodes (FCE), continuous spell of admitted patient care under the same consultant; (2) hospital admissions or finished admission episodes (FAE), spell of admitted patient care (i.e., the first FCE); (3) emergency admissions, an FAE where the method of admission was indicated to be an emergency. All three measures are broken down by ICD codes. FCEs are most prone to double counting and 5% of FCEs does not equal FAEs due to discontinuity in admitted consultant care. Emergency admissions are least prone to double counting (see Supplementary Table 1). The differences between each measure are minimal and show consistent trends for external injury by assault and external injury by assault by knife (see Supplementary Figure 3). In the manuscript we report emergency admissions as this measure, rather than elective admitted patient care, is most representative of injury following an event of serious violence (i.e., assault).

Media reports on serious violence

We identified the number of articles reporting on increases in violent crime in the mainstream media, as reflected by articles in the digital archives of The Guardian. Using the Guardian's Application Programming Interface (API), we queried articles that were published since 2002 for key words in the title, by line, or body. Specifically, we used lucene syntax query to identify the number of articles reporting on *increasing violence* (key words: violence AND increase). To account for potential changes in the overall number of Guardian articles, we also searched for the number of total articles each year using the key word "". We used these results to derive rates per 100 total articles for reports on *increasing violence*. The python code used to carry out this web-scrape of the Guardian's API has been made freely accessible at the Open Science Framework (osf.io/k2v6x).⁵

Supplementary Table 1. Summary of data sources on trends in serious violence in England and Wales.

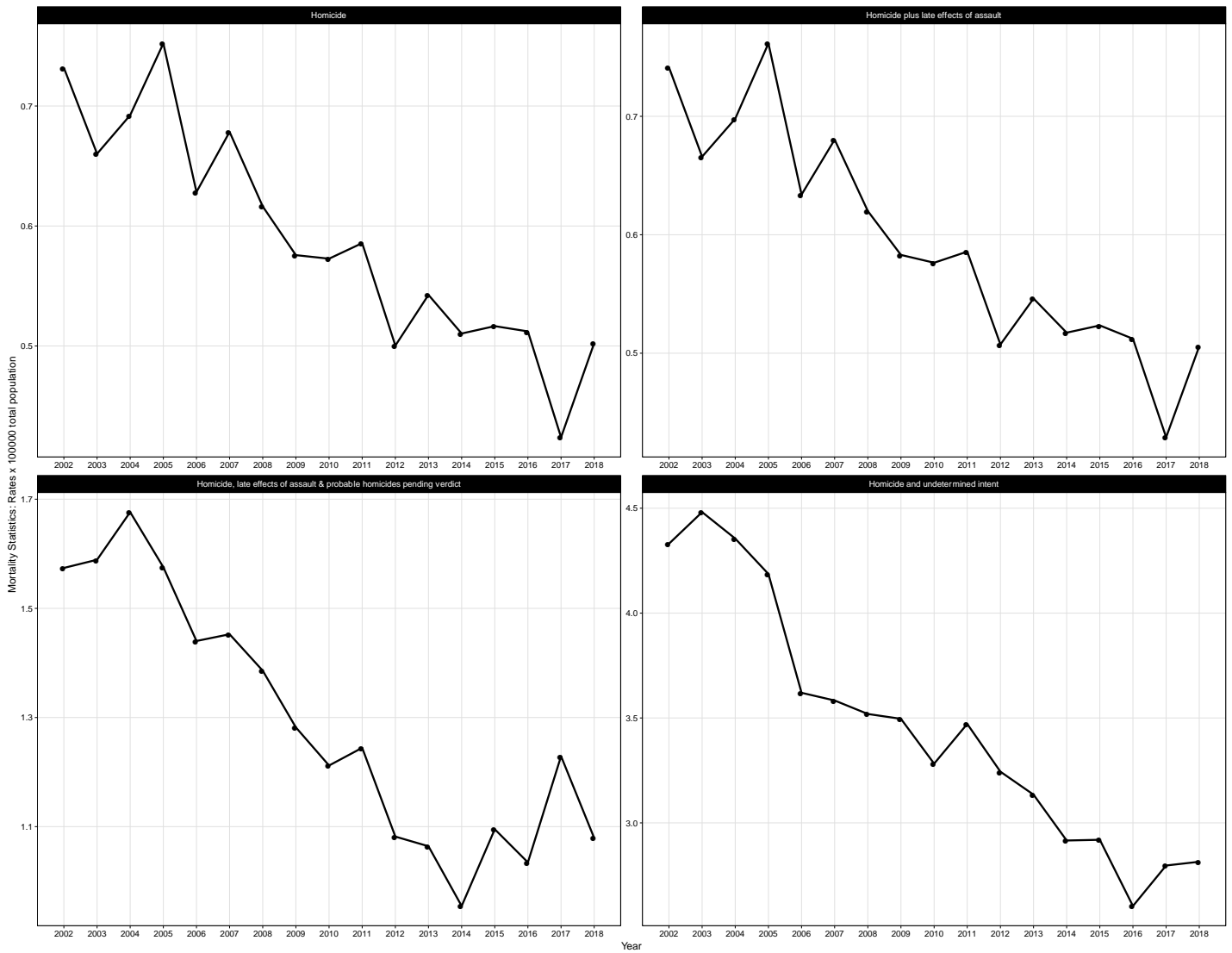
Data source	Measures & definitions	12 month reporting period	Data generation	Recording changes since 2002	Limitations
Mortality Statistics for England & Wales, Office for National Statistics					
Number of deaths registered in England and Wales and underlying cause of death, as defined using ICD-10	<p>Homicide: Deaths caused by assault (ICD codes X85-Y09), sequelae of assault (ICD code: Y87.1), and probable homicide pending verdict (ICD code: Y33.9/U50.9)</p> <p>Homicide by knife: Deaths caused by assault by a sharp object (ICD code: X99)</p>	Calendar year (Jan to Dec)	Mortality statistics are based on information recorded when deaths are certified and registered. Most deaths are certified by a medical practitioner, using the Medical Certificate of Cause of Death. This certificate is taken to a registrar by an informant – usually a near relative of the deceased. While registration delays are commonly under 5 days, they are often longer for external causes of death. ⁶ These delayed external causes of deaths are typically captured by accelerated registrations. ONS assigns a temporary underlying cause code and manner of death, which can represent probable homicide pending verdict. ⁷ Once the inquest is complete, the coroner will typically update ONS with the final verdict and cause of death when these are known	<p>Until 2006, mortality statistics measured the number of deaths that occurred in the calendar year. Since 2006, mortality statistics have measured the number of deaths registered in the calendar year¹</p> <p>In 2007, the probable homicide pending verdict ICD code changed from Y33.9 (a sub-code within undetermined intent) to U50.9 (a separate special purpose code)</p> <p>Until December 2010, ONS used the Mortality Medical Data System ICD-10 version 2001.2 software provided by the United States National Center for Health Statistics to code cause of death. In January 2011, this was updated to version 2010, which incorporated most of the WHO amendments authorised up to 2009⁸</p> <p>On 1 January 2014, ONS changed the software used to code cause of death to a package called IRIS (version 2013). The development of IRIS was supported by Eurostat, the statistical office of the European Union⁸</p>	<p>Most incidents of serious violence do not result in death</p> <p>The proportion of serious violence incidents resulting in death is dependent on effective medical intervention</p> <p>There are often substantial delays between the occurrence and registration for deaths by assault due to pending investigations.⁶ To address this limitation, we included accelerated registrations. These registrations comprise of ICD codes for probable homicide pending verdict (ICD codes: Y33.9/U50.9) and are not subject to the same registration delays.⁷ An equivalent accelerated registration code is not available for homicide by knife specifically</p>
Hospital Episode Statistics for England, NHS Digital					
Number of emergency admissions by external causes, as defined using ICD-10	<p>Injury by assault: External injury caused by assault (ICD codes X85-Y09)</p> <p>Injury by assault by knife: Assault with a sharp object (ICD code: X99)</p>	Financial year (Apr to Mar)	HES data are based on all records of admissions, appointments and attendances for patients at NHS hospitals in England ²	In 2003, the NHS started to use HES data for financial re-imbursements (Payment by Results), this incentivised hospitals to improve their data recording procedures and HES accuracy	<p>Not all serious violent incidents will result in hospital attendance and admitted patient care. Some injuries may be dealt with outside of the hospital and others may be dealt with in A&E without any episode of admitted patient care</p> <p>Data measure the number of episodes and admissions. Thus, some events may be</p>

double counted; where the same individual is re-admitted more than once following the same event⁹

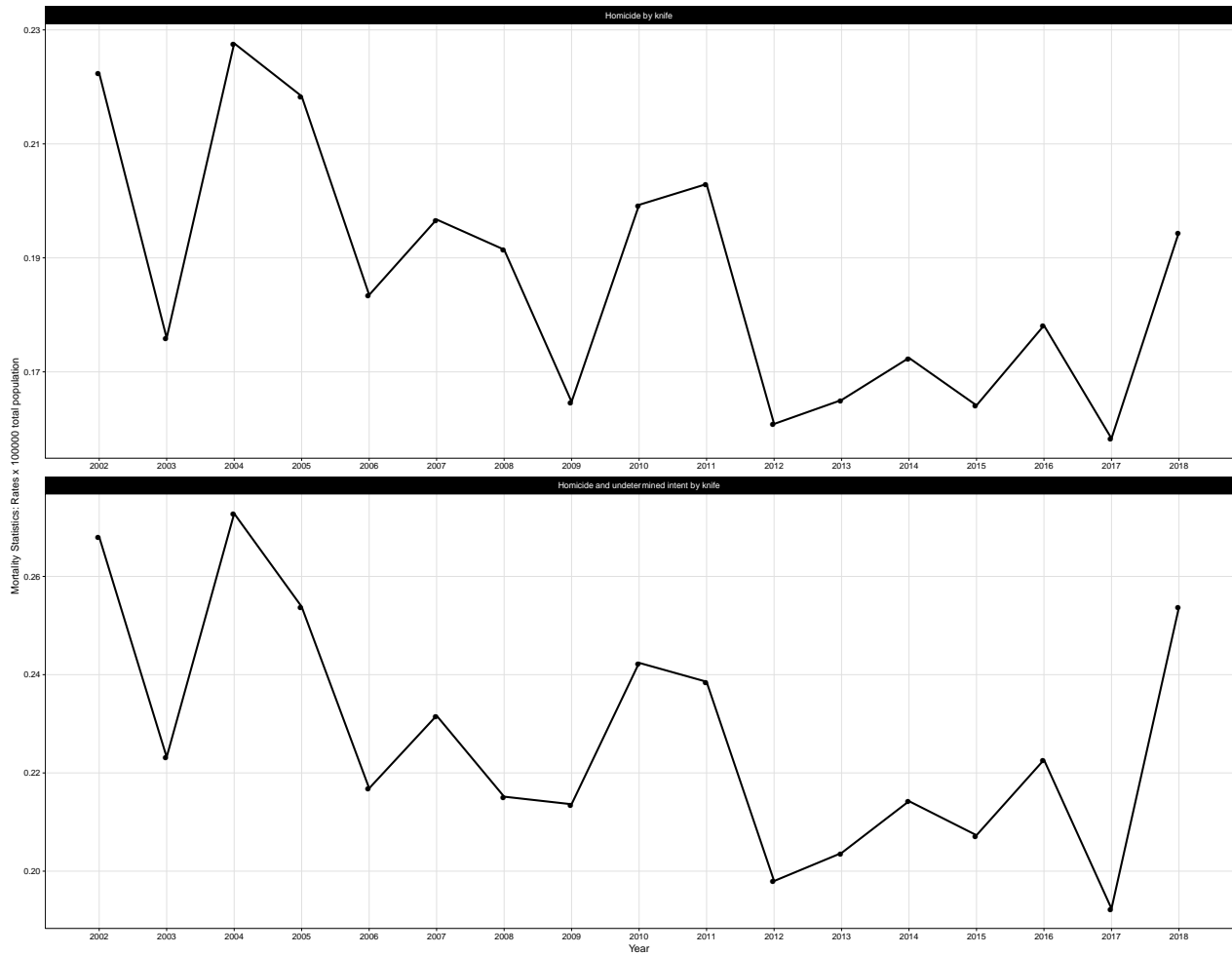
Attendances to Emergency Departments in England & Wales, National Violence Surveillance Network

Estimated rates of all violence-related attendances to EDs	Violence-related injury: Attendances to EDs due to violence-related injury	Calendar year (Jan to Dec)	Information relating to violence-related attendances were retrieved from 169 NVSN EDs in all nine regions of England & Wales. Using a coverage ratio representing the proportion of EDs sampled each year, the attendance data are weighted to obtain national estimates ^{10,11}	2017 data use data from Jan to Sept only and then inflated by a factor of 4/3 because from October 2017 a new method of recording was introduced and mandated in Type 1 EDs (Emergency Care Data Set) ¹⁰	Not all serious violent incidents will result in A&E attendance Potential bias from collecting data from a nonrandomised sample of EDs and then using a coverage ratio to estimate national figures
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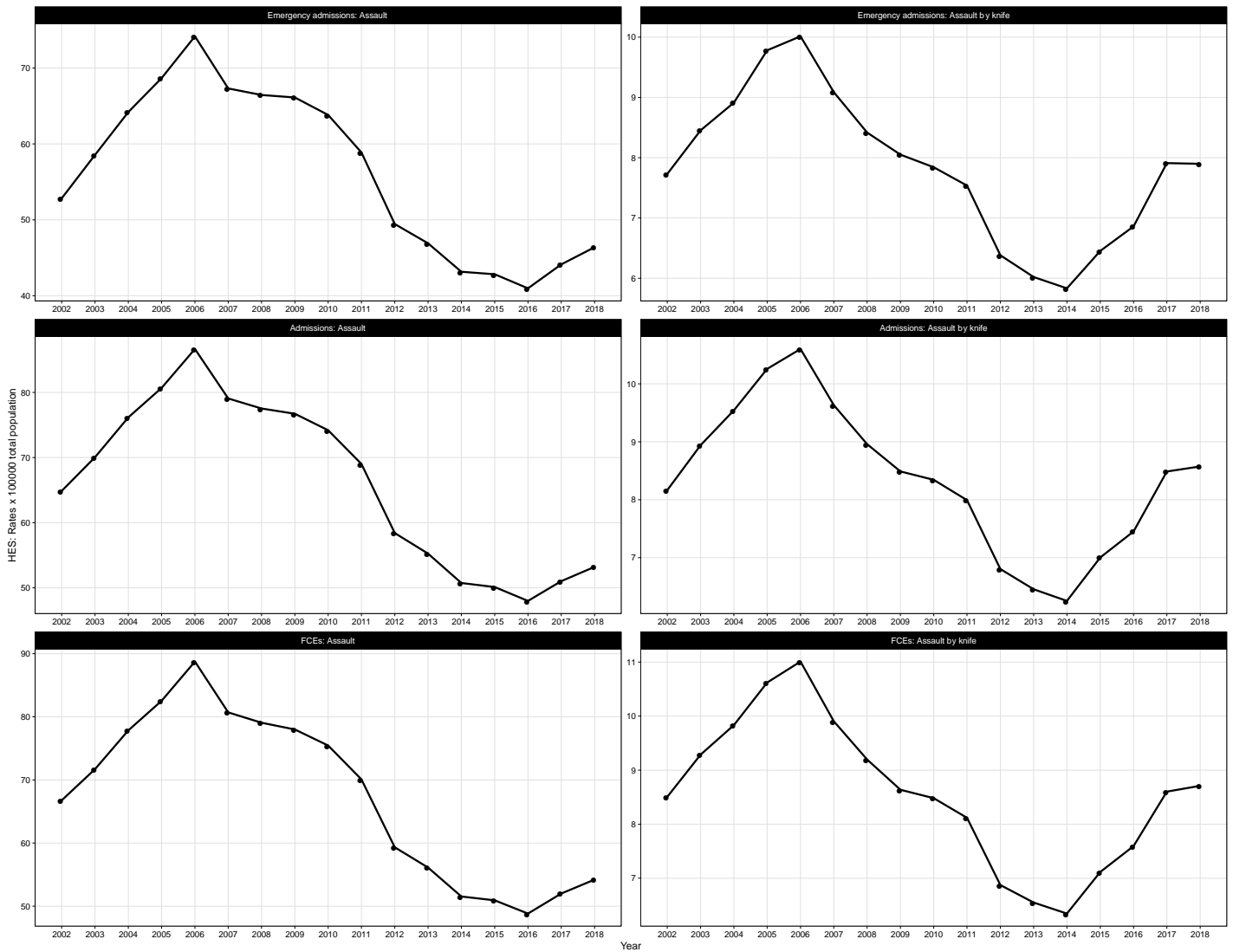
Notes. ICD-10 = International Classification of Diseases, Tenth Revision; WHO = World Health Organization; ONS = Office for National Statistics; NHS = National Health Service; HES = Hospital Episodes Statistics; EDs = Emergency Departments; NVSN = National Violence Surveillance Network.



Supplementary Figure 1. Different approaches for measuring homicide using Mortality Statistics, Office for National Statistics. *Top left* shows homicide only (ICD codes: X85-Y09); *top right* shows homicide plus late effects of assault (ICD codes: X85-Y09 plus Y87.1); *bottom left* shows homicide, late effects of assault & probable homicide pending verdict (ICD codes: X85-Y09, Y87.1, plus undetermined intent where verdict is pending Y33.9/U50.9); *bottom right* shows homicide and undetermined intent (ICD codes: X85-Y09 plus Y10-Y34). In the main manuscript we report figures presented in the *bottom left* panel.



Supplementary Figure 2. Different approaches for measuring homicide by knife using Mortality Statistics, Office for National Statistics. *Top* shows homicide by knife only (ICD code: X99); *bottom* shows homicide and undetermined intent by knife (ICD codes: X99 plus Y28). In the main manuscript we report figures presented in the *top* panel.



Supplementary Figure 3. Different approaches for measuring injury by assaults (left) and assaults by knife (right) using Hospital Episode Statistics, NHS Digital. *Top* panels shows emergency admissions; *middle* panels shows admissions or Finished Admission Episodes; *bottom* shows Finished Consultant Episodes. In the main manuscript we report figures presented in the *top* panels.

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