Public Health in Practice 7 (2024) 100491

Contents lists available at ScienceDirect

Public Health in Practice

journal homepage: www.sciencedirect.com/journal/public-health-in-practice

Preventable suicides involving medicines: A systematic case series of coroners' reports in England and Wales

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ARTICLE INFO

Keywords:
Suicide
Medicines
Overdose
Patient safety
Mortality
Prevention

ABSTRACT

Background: In England and Wales coroners have a duty to write a report, called a Prevention of Future Deaths report or PFD, when they believe that actions should be taken to prevent future deaths. Coroners send PFDs to individuals and organisations who are required to respond within 56 days. Despite the increase in mental health concerns and growing use of medicines, deaths reported by coroners that have involved medicine-related suicides had not yet been explored. Therefore, this study aimed to systematically assess coroners' PFD reports involving suicides in which a medicine caused or contributed to the death to identify lessons for suicide prevention.

Methods: Using the Preventable Deaths Tracker database (https://preventabledeathstracker.net/), 3037 coroners' PFD reports in England and Wales were screened for eligibility between July 2013 and December 2019. Reports were included if they involved suicide or intentional self-harm and prescribed or over-the-counter medication; illicit drugs were excluded. Following data extraction, descriptive statistics, document and content analysis were performed to assess coroners' concerns and the recipients of reports.

Results: There were 734 suicide-related coroner reports, with 100 (14%) reporting a medicine. Opioids (40%) were the most common class involved, followed by antidepressants (30%). There was wide geographical variation in the writing of reports; coroners in Manchester wrote the most (18%). Coroners expressed 237 concerns; the most common were procedural inadequacies (14%, n = 32), inadequate documentation and communication (10%, n = 22), and inappropriate prescription access (9%, n = 21). 203 recipients received the PFDs, with most sent to NHS trusts (31%), clinical commissioning groups (10%), and general practices (10%), of which only 58% responded to the coroner.

Conclusions: One in four coroner reports in England and Wales involved suicides, with one in seven suicide-related deaths involving a medicine. Concerns raised by coroners highlighted gaps in care that require action from the Government, health services, and prescribers to aid suicide prevention. Coroner reports should be routinely used and monitored to inform public health policy, disseminated nationally, and responses to coroners should be transparently enforced so that actions are taken to prevent future suicides.

1. Three points for practice

1. The role of medicines in suicides, including the need for the safer prescribing of opioids and antidepressants, and the poor application of policies and procedures that were repeatedly identified by coroners must be addressed in guidance updates, training, and clinical practice.
2. Concerns raised by coroners in Prevention of Future Deaths reports (PFDs) should be urgently reviewed and used by the government, public health organisations, clinicians, and other interested bodies (i.e. the *National Confidential Inquiry into Suicide and Safety in Mental Health, NHS Resolution*, and the *NHS Mental Health Implementation Plan*) to aid in suicide prevention and patient care.

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https://doi.org/10.1016/j.puhip.2024.100491
Received 25 October 2023; Received in revised form 5 March 2024; Accepted 22 March 2024
Available online 23 March 2024
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3. Organisations that receive PFDs from coroners must prioritise taking action and responding to facilitate shared learning to prevent future deaths.

2. Introduction

Suicide is a leading cause of preventable deaths, involving over 700,000 deaths every year globally [1]. In England and Wales, 5691 suicides occurred in 2019, a 12% increase since 2000 [2]. In 2021, there were 5583 registered suicides in England and Wales [3]. Various factors are associated with the risk of suicide, including a previous attempt, self-harm, bereavement, mental ill-health, social isolation, and recent adverse life events [1,4,5].

Legislation to reduce pack sizes of over-the-counter (OTC) paracetamol has been effective in reducing deaths, with a 35% reduction in paracetamol poisonings between 1998 and 2009 [6]. The opioid, co-proxamol, was removed from UK markets in 2007 owing to its toxicity in suicide, with an estimated 500 lives saved between 2010 and 2015 [7]. Other opioids, such as codeine, are still available OTC in the UK with large volumes being sold [8].

Coroners in England and Wales have a duty to communicate a death when they believe that actions should be taken to prevent future deaths [9]. These reports, called Prevention of Future Deaths reports (PFD) [10–12], are sent to individuals or organisations with the power to act. Once received, recipients must respond to the coroner within 56 days, outlining actions taken or proposed. However, there is no mechanism to enforce responses or to analyse, monitor, or learn from PFDs [13].

Previous studies have assessed suicide-related PFDs [13–15], but these have focused on specific issues, including claims against the NHS. The Guardian reviewed 500 PFDs in 2018 to identify deaths related to mental illness [16,17]. A systematic case series of PFDs involving medicines was also conducted in 2013–2022, identifying opioids and antidepressants as the leading medicines involved in all preventable deaths [18]. The ONS has published an analysis of 164 suicide-related PFDs, covering 2021 and 2022 alone [19]. However, no research to date has investigated PFDs involving medicines and suicides before the SARS-CoV-2 pandemic. We therefore aimed to assess all available PFDs detailing deaths by suicide in which a medicine caused or contributed to the death. Our primary objectives were to discover: 1) the medicines involved; 2) the concerns raised by coroners; 3) the recipients to whom PFDs were addressed; and 4) the response rates of addressees.

3. Methods

We designed a retrospective case series and pre-registered the study protocol on an open repository [57].

3.1. Data sources

PFDs have been openly available on the Courts and Tribunals Judiciary website since 2013 [20]. We developed a computer program called a 'web scraper' to automate the collection of all published PFDs from the Judiciary website. This computer program visits every uniform resource locator (URL) that contains a PFD and extracts details including the case reference number; the date of the report; the name of the deceased; the coroner's name; the coroner's area; the category of death (defined by the Chief Coroner's Office); to whom the report was sent; and the URL of the Judiciary website. The computer program stores this information in a comma-separated values (CSV) file that is then used as a database of all coroner reports. The code of the web scraper is openly available on GitHub [55] and has been previously used and described [18,58]. Population data for suicides in England and Wales corresponding to the dates of PFDs (2013–2019) were obtained from the Office for National Statistics (ONS) [2].

3.2. Eligibility of PFDs

There were 3037 PFDs available at the time of the web scraping (December 2019). PFDs were screened by one study author using a predefined algorithm (Supplement Figure S1), in which suicide was defined as intentional self-harm that led to or contributed to death or death of undetermined intent by injury or poisoning. This definition was widened compared with the ONS definition of suicide because the standard of proof for reaching a conclusion of suicide was changed from a criminal to a civil one in 2018 [21]. The ONS relies on the conclusion supplied by the coroner, which is influenced by factors such as the age and sex of the deceased, the suicide method, marital status, and the individual likelihood that the coroner will supply a narrative verdict [22–25]. If there were uncertainties in eligibility, cases were discussed with the authorship team and a conclusion was reached.

Following the inclusion of all suicide-related PFDs, cases were reviewed for medicines. PFDs were included if a medicine was listed as a medical cause of death or was stated as contributing to the death by the coroner or was the cause of toxicity resulting in death. A medicine was defined as any prescription-only or over-the-counter medication. Cases were excluded if the drug or drugs were obtained illicitly as the aim of this study was to investigate legally accessed medicines to understand what lessons can be learnt and actions can be taken to improve the safety of medicines in healthcare (e.g. reducing over-prescribing or changing the status of over-the-counter products). Cases were also excluded if the suicide involved non-medical products (e.g. alcohol), or if the medicine was mentioned in the report, but there was no indication that it directly or indirectly contributed to the death.

3.3. Data extraction

Following the screening for eligibility, one study author manually extracted data from the included PFDs into a predesigned Google Sheet if the information was reported by the coroner. The data extracted, included.

1. The date of death,
2. The inquest start date and end date,
3. The age of the deceased,
4. The sex of the deceased,
5. The location of the death,
6. The medicine that caused or contributed to the death,
7. How the medicines were obtained,
8. Health service contacts before the death,
9. relevant medical, mental health, and social history,
10. concern(s) raised by the coroner,
11. Those who responded to the PFD, and
12. The date on which the response was received.

3.4. Data analysis

We descriptively analysed the extracted data using medians and interquartile ranges (IQR) for continuous variables and frequencies (percentages) for categorical variables. The types of medicines were categorised into drug classes using the British National Formulary (BNF). To examine geographical variation, we further grouped coroner areas into standard regions to create a choropleth map.

We used document and content analysis with inductive logic to group concerns raised by coroners from included PFDs. Common themes and phrases were highlighted and drawn out, and frequencies were calculated using the total number of concerns as the denominators.

We calculated a response rate to PFDs for each organisation as the proportion of reports to which a response was submitted over the total number received. In October 2020, responses were further classified as either early (delivered before 56 days), on-time (delivered on the 56th day), late (submitted after 56 days), or overdue (when no response was

present on the Judiciary website).

3.5. Protocol deviations

The registered study protocol was designed to analyse all suicide-related deaths reported in PFDs [57]. However, the team decided to focus the main analysis on suicides involving medicines due to the increasing concerns of self-poisonings. We had also planned to analyse the text of the responses and submit freedom of information (FOI) requests to increase the number of responses to PFDs, but this analysis was not conducted due to resource constraints.

3.6. Software and data sharing

We used Google Sheets to analyse the data, Tableau to create figures, and Datawrapper to build the choropleth map. The data and study materials are available on an open repository [56], and the code for the web scraper is openly available on GitHub [55].

4. Results

734 PFDs (n = 735 deaths) involved a suicide between July 2013 and December 2019 (Supplement Figure S2). Of these suicide-related PFDs, 14% (n = 100) reported that a medicine caused or contributed to the death. Over the 6.5-year study period, there was a median of 118 (IQR: 102–119) suicide-related PFDs each year and a median of 17 (IQR: 10–19) medicine-related suicides (Fig. 1; Supplement Table S1).

On the Judiciary website, PFDs are assigned to one or more categories. Of the 100 medicine-related suicide deaths, only 19 were correctly assigned to the suicide category. The rest were listed as "hospital related" (48%), "community healthcare and emergency services related" (20%), and only 17 were listed in the "alcohol, drug and medication related" group despite all deaths involving a medicine (Supplement Figure S3).

In the 100 PFDs involving medicines and suicides, 46 unique medicines were reported, involving a total of 152 medicines. Morphine (15%) was the most often reported, followed by paracetamol (12%), and zopiclone (10%) (Fig. 2). Using BNF drug classes, opioids (n = 40) caused or contributed to the most medicine-related suicides, followed by anti-depressants (n = 30) (Supplement Table S2). In 16 PFDs the type of medicines were unspecified.

Across the 100 suicides involving medicines, there was an equal sex ratio of males (n = 50) and females (n = 50). The median age of the deceased was 42 years (IQR: 28–50 years; n = 61).

Depression (n = 29) was the most common mental health problem reported, followed by anxiety disorders (n = 12), emotionally unstable personality disorder/borderline personality disorder (n = 11), and psychotic symptoms (n = 10) (Supplement Figure S4).

Fifty-three coroners across 47 areas wrote the 100 PFDs. Coroners in the Northwest (22%) and Southwest (16%) of England wrote the most, whereas coroners in the Northeast (3%) and Yorkshire and the Humber (3%) regions wrote the fewest (Fig. 3). Manchester South issued the highest number of PFDs involving medicines and suicide (8%) (Supplement Table S3).

237 concerns were raised by coroners in the 100 PFDs. The concerns were categorised using content analysis, which identified 18 themes (Fig. 4). The concerns most frequently reported included procedural inadequacies (14%, n = 32), inadequate documentation and communication (9.3%, n = 22), inappropriate prescription access (8.9%, n = 21), and improper risk assessment (7.2%, n = 17; Supplement Table S4).

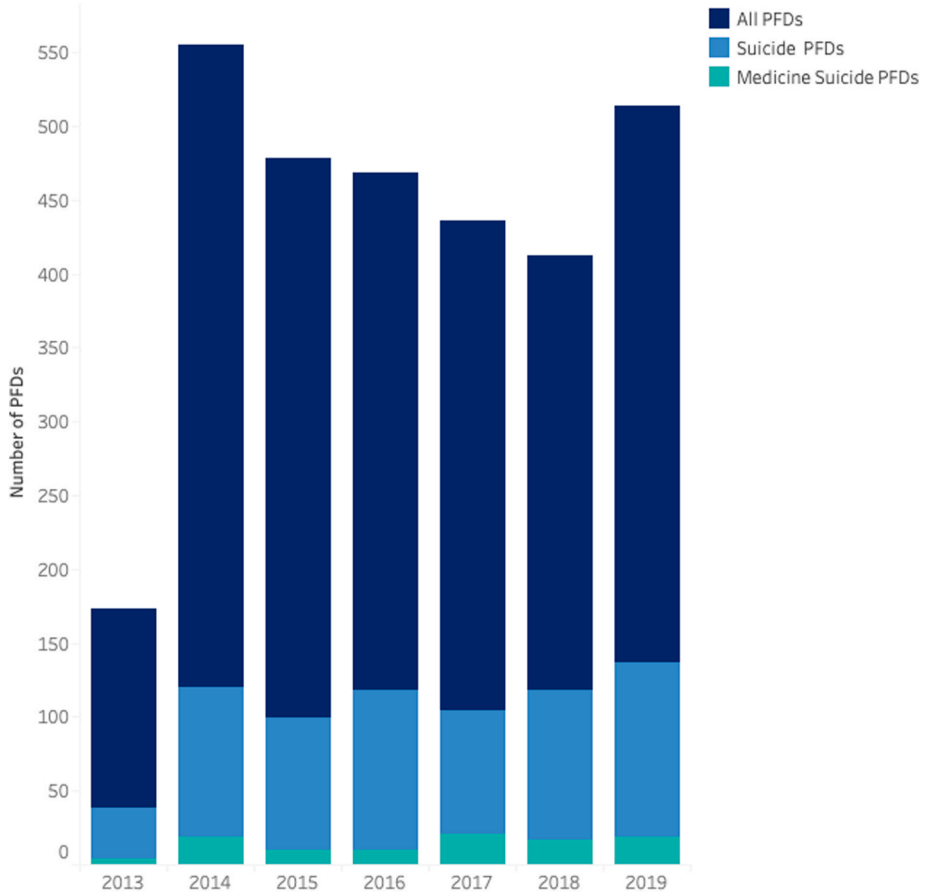


Fig. 1. Trends of coroners' Prevention of Future Deaths reports (PFDs) published between July 2013 and December 2019 in England and Wales involving suicides (light blue) and medicine-related suicides (green) compared with the total number of published PFDs (dark blue).

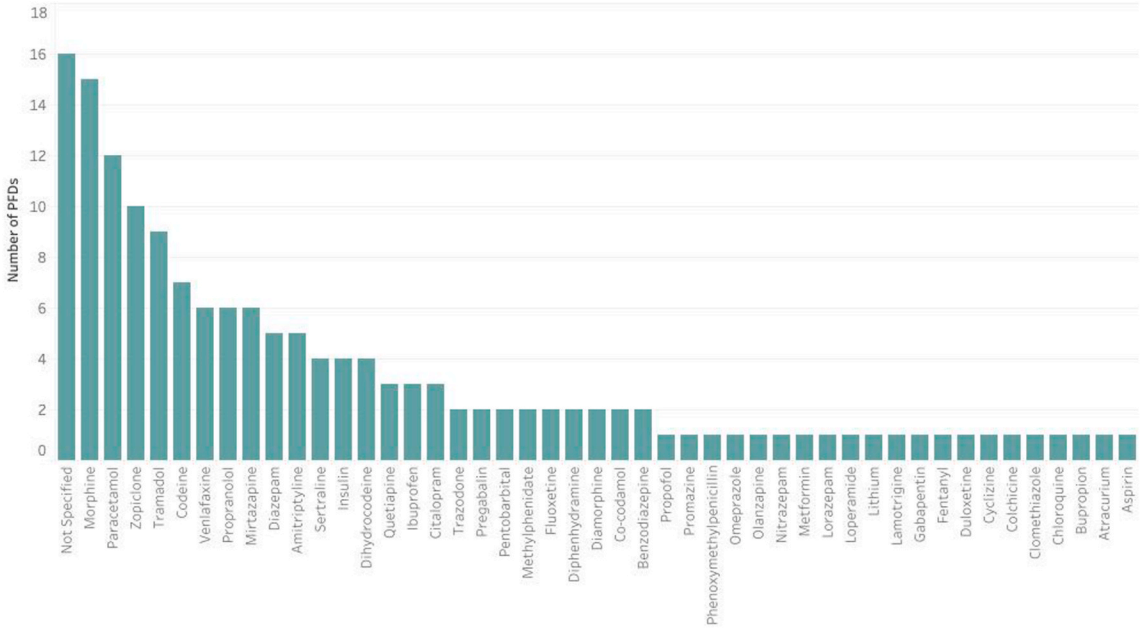


Fig. 2. Types of medicines reported by coroners in suicide-related Prevention of Future Death reports (PFDs) in England and Wales between July 2013 and December 2019.

Coroners sent 203 PFDs to 145 individuals or organisations (Supplement Table S5). NHS trusts (31%; n = 63), clinical commission groups (CCGs; 9.9%; n = 20), and general practices (9.9%; n = 20) were sent the most PFDs (Supplement Figure S5).

By law, recipients must respond to the coroner within 56 days, but only 42% (n = 85) were received. Thirteen per cent (n = 27) were late, and 42% (n = 86) were overdue. Government bodies (63%) and NHS bodies (62%) had the highest response rates, while law enforcement (44%) had the lowest response rates.

5. Discussion

One in four deaths deemed preventable by coroners involved a suicide in England and Wales, with one in seven of these preventable suicides involvg medicines. Coroners often raised concerns regarding procedural inadequacies, inadequate documentation and communication, and inappropriate prescription access. Opioids, antidepressants, and paracetamol were the most common medicines involved in suicide-related PFDs. NHS organisations and Government bodies received the most PFDs, but only 58% responded to the coroner.

5.1. Comparison with previous research

A range of studies have been conducted that highlight similar concerns and findings from the assessment of preventable deaths involving suicides and medicines. A case series of nearly 4000 coroners' PFDs to identify all deaths involving medicines similarly found that opioids and antidepressants were the most common medicines reported in PFDs [18]. The ONS likewise reported that opioids, antidepressants, and paracetamol were the most common drugs reported in self-poisoning suicides [26]. The 2023 Healthcare Quality Improvement Partnership (HQIP) annual *National Confidential Inquiry into Suicide and Safety in Mental Health* also found that opioids were the most common type of drugs involved in suicides, most often obtained by prescription [27]. An analysis of PFDs between January 2021 and October 2022 by the ONS found 164 PFDs categorised as suicide from the Judiciary website, which identified similar coroners' concerns to our study [19]. NHS Resolution has also reported similar concerns highlighted in suicide-related PFDs between 2015 and 2017, identifying issues in communication, risk assessments and the observational processes [13]. The repeat nature of these research findings indicates that information reported by coroners is not being used to inform suicide prevention.

Despite the statutory requirement that mandates a response to the coroner's PFD within 56 days [11], there is no mechanism to follow up responses or the ability to assess and ensure that actions proposed in responses are implemented. We found that over 40% of responses were still outstanding, making it challenging to understand whether action had been taken to reduce future medicine-related suicides. Others have similarly found low response rates to coroners' PFDs [18,28,29]. Future research should assess the factors that affect the response rate, such as the nature of death and the types of recipients.

We identified significant variations in the writing of PFDs across England and Wales. Others have similarly reported this [14,18,28]. Future research should determine the factors driving this variation, including population statistics, mortality rates and coroners' attitudes towards writing PFDs.

Male suicides account for three-quarters of suicides in England and Wales [2], leading to increased initiatives to reduce male-related suicides. However, we found no sex differences for medicines-related suicides. Studies have further highlighted the fact that female deaths are less likely to be reported to the coroner, be taken to inquest, and reach a conclusion of suicide, with accident, misadventure or narrative verdicts being favoured for females [2,24,25,30–32]. Future research should account for potential sex biases in the reporting of such deaths in PFDs.

5.2. Strengths and limitations

This study is the first to have assessed medicines-related suicides reported in PFDs before the Covid-19 pandemic. Our reproducible data collection methods allowed us to examine six and a half years of data from over 3000 PFDs. Previous studies have used less than two years of data and manually selected PFDs using the Judiciary website categorisation of deaths [14,19,28,29]. However, our research illustrates that the Judiciary categories are not fit for purpose with only 19% correctly categorised as suicide. Therefore, previous studies that have used the Judiciary categorisation have underestimated the total number of deaths and these studies may exhibit selection biases [14,19,28,29]. While screening PFDs for inclusion, we expanded previous definitions of



Fig. 3. Choropleth map of medicine-related suicides reported in coroners' Prevention of Future Deaths reports (PFDs) published in England and Wales from July 2013 to December 2019.

suicides to reduce potential coronial variation in reaching the conclusion of suicide.

The 100 deaths included in this study do not represent all deaths deemed preventable involving suicides and medicines between July 2013 and December 2019, as the writing of PFDs depends on the coroner's decision to write a PFD and the evidence presented during the death investigation. A qualitative interview of 32 senior coroners in 2009 showed that only 50% of respondents regarded public health as a key aspect of their duties [33]. We also acknowledge other medicines, such as isotretinoin, are reported in preventable suicides, but we were limited by the information reported by coroners, with 16 PFDs not specifying the types of medicines involved [34]. We encountered missing data for other essential variables, including age (not reported in 39% of PFDs), where the medicine was obtained (not reported in 47%), and the location of the suicide (not reported in 19%). Finally, it may also be possible that some PFDs and their responses may not have been published on the Judiciary website, resulting in publication biases.

6. Implications

Suicide rates in England and Wales decreased from the early 1980s to the early 2000s, in recent years rates have started to climb. In 2019, a suicide rate of 16.9 deaths per 100,000 in males was recorded, the highest since 2000; the female suicide rate was equally the highest since 2004 [2,35]. Concerns raised by coroners in PFDs should aid in suicide prevention and patient care. The '*10 ways to improve safety*' by the *National Confidential Inquiry into Suicide and Safety in Mental Health* featured recommendations such as reducing drug and alcohol misuse, safer wards, and personalised risk management [27]. Our study highlights the continued need for the safer prescribing of opioids and antidepressants. In England, the prescribing of opioids and antidepressants has increased by 34% and 100% respectively between 2008 and 2018 [36,37]. The poor application of policies and procedures that were repeatedly identified by coroners should be addressed when updating NICE guidance on depression, which will be renewed in 2023 [38,39]. Medicines implicated in these suicides may be emerging evidence of risks associated with these medications. For example, the MHRA are considering if further action is required following concerns raised regarding increased risk of suicide when using ciprofloxacin and quinolones [40,41].

Our study examined suicide-related PFDs published before the Covid-19 pandemic (July 2013 to December 2019). There is substantial evidence that the Covid-19 pandemic negatively affected the mental

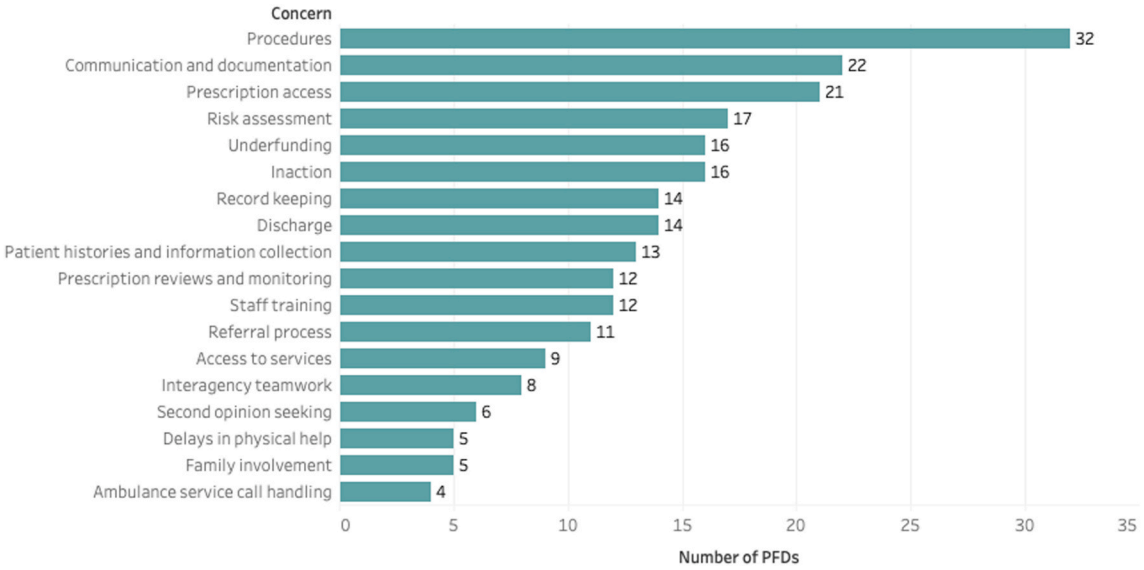


Fig. 4. Concerns reported by coroners in 100 suicide-related Prevention of Future Deaths reports (PFDs) involving medicines in England and Wales published between July 2013 and December 2019.

health of many people, particularly the young, minorities, and women [42–46]. The global burden of major depressive and anxiety disorders rose by 27% and 26% retrospectively during the Covid-19 pandemic [47]. An analysis of PFDs during the Covid-19 pandemic (2021–2022) has since been conducted by the ONS, which found 164 suicide-related PFDs [19]. In response to ONS's analysis of suicide-related PFDs, the Samaritans stated that *"It's hugely concerning that these common themes are consistently emerging and there's no evidence to suggest this will improve without urgent, deliberate action."* [48] Prescriptions for mental health conditions have been predicted to increase following the pandemic, and lockdowns may have increased the severity of mental illness [49,50]. Therefore, concerns raised by coroners in PFDs should be urgently used by policymakers to mitigate the increased risk of suicide.

Wider dissemination of PFDs and their responses could contribute to national initiatives to reduce suicides, as detailed by the NHS Mental Health Implementation Plan [51], national charities, and NHS Resolution [13,48,52]. Despite the legal requirement under Regulation 29 of The Coroners (Investigations) Regulations 2013 to respond to coroners within 56 days [11], 42% of responses remained overdue. NHS Resolution recommended in 2018 that neighbouring NHS trusts should share learnings from their PFDs and their responses to them, highlighting good practice to be regular meetings with their local and area coroner, to identify common themes arising [13]. The Justice Select Committee's report on the Coroner's Service also acknowledged that the absence of follow-up on coroners' PFDs is a missed opportunity and recommended that an Inspectorate be established to follow up on actions proposed in PFDs [53]. The Government responded, stating that they were "not in a position to accept the recommendation at this stage" and that the cost would be disproportionate to the benefit it may bring [54]. We therefore created the Preventable Deaths Tracker, a method, database, and resource to disseminate lessons from PFDs [59,60].

Future research should investigate the barriers and facilitators of writing and responding to PFDs, the suitability of concerns reported by coroners in suicide-medicine PFDs, the suitability of recipients of such PFDs, and the actions taken and proposed in the 117 responses received for suicide-medicine PFDs. Others can also use our data to analyse the 635 suicide-related PFDs that did not involve medicines between July 2013 and December 2019. The wide variation and missing data in PFDs also highlight areas for coronial training and the need to standardise reporting in PFDs and PFD-related research.

7. Conclusions

PFDs hold a wealth of information regarding gaps in suicide prevention measures and the risks of medicine-related suicides. However, it is unclear if these PFDs are being used to benefit patient care and prevent future deaths. To aid in suicide prevention, PFDs should be disseminated more widely, responses to PFDs should be audited, and regular analyses of the spatial and temporal changes in concerns should be conducted. This study provides a tool, the Preventable Deaths Tracker (https://preventabledeathstracker.net/), to increase lessons learnt from coroners' PFDs.

Ethical approval

The case reports used in this study have been publicly available on the Courts and Tribunals Judiciary website since 2013. Since the information is publicly available and the General Data Protection Regulation (GDPR) and Data Protection Act no longer apply to identifiable data once a person has died, approval from an ethics committee was not required.

Funding

No funding was obtained to undertake this study.

Declaration of interests

GA has no conflicts to declare. JKA has published articles and edited textbooks on adverse drug reactions and interactions and has often given medicolegal advice, including appearances as an expert witness in coroners' courts, dealing with the adverse effects of drugs. CH has received expenses and fees for his media work, received expenses from the World Health Organisation (WHO), Food and Drug Administration (FDA), and holds grant funding from the National Institute for Health and Care Research (NIHR) School for Primary Care Research (SPCR), and NIHR SPCR Evidence Synthesis Working Group [Project 380], NIHR Biomedical Research Centre (BRC) Oxford and WHO. On occasion, CH receives expenses for teaching EBM and is also paid for his GP work in the National Health Service (NHS) out of hours (contract with Oxford Health NHS Foundation Trust). GCR has a paid casual contract at the University of Oxford to teach Evidence-Based Medicine (EBM) and supervise

research. GCR has received research grants and scholarships from the NIHR SPCR, the Primary Care Research Trust of Birmingham and Midlands Research Practices Consortium, the Naji Foundation, and the Rotary Foundation. On occasion, GCR has had expenses reimbursed for speaking at conferences and events, and has received fees for speaking at coroners training events by the UK's Judicial College. GCR is an Associate Editor of BMJ Evidence Based Medicine for which she receives a small annual remuneration. GCR is the Director of a limited company that has been independently contracted to conduct work in the private sector, including for AstraZeneca via MSI Pharma and FieldFisher. GCR receives fees from subscriptions to a personal Substack publication.

Data availability

The study protocol (https://doi.org/10.17605/OSF.IO/EXJK3), data and analyses are openly available on a repository (https://osf.io/ad4up/)

Declaration of competing interest

GA has no conflicts to declare. JKA has published articles and edited textbooks on adverse drug reactions and interactions and has often given medicolegal advice, including appearances as an expert witness in coroners' courts, dealing with the adverse effects of drugs. CH has received expenses and fees for his media work, received expenses from the World Health Organisation (WHO), Food and Drug Administration (FDA), and holds grant funding from the National Institute for Health and Care Research (NIHR) School for Primary Care Research (SPCR), and NIHR SPCR Evidence Synthesis Working Group [Project 380], NIHR Biomedical Research Centre (BRC) Oxford and WHO. On occasion, CH receives expenses for teaching EBM and is also paid for his GP work in the National Health Service (NHS) out of hours (contract with Oxford Health NHS Foundation Trust). GCR has a paid casual contract at the University of Oxford to teach Evidence-Based Medicine (EBM) and supervise research. GCR has received research grants and scholarships from the NIHR SPCR, the Primary Care Research Trust of Birmingham and Midlands Research Practices Consortium, the Naji Foundation, and the Rotary Foundation. On occasion, GCR has had expenses reimbursed for speaking at conferences and events and has received fees for speaking at coroners' training events by the Judicial College. GCR is an Associate Editor of BMJ Evidence Based Medicine for which she receives a small annual remuneration. GCR is the Director of a limited company that has been independently contracted to conduct work in the private sector, including for AstraZeneca via MSI Pharma and FieldFisher. GCR receives fees from subscriptions to a personal Substack publication.

Appendix ASupplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.puhip.2024.100491.

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