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Original Research

# Preventable deaths related to haemorrhage in England and Wales, 2013–2022: A systematic case series of coroners' reports

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ABSTRACT

*Objectives:* To identify preventable haemorrhage-related deaths, classify coroner concerns and explore organisational responses.
*Study design:* Retrospective systematic case series of coroners' Prevention of Future Deaths (PFD) reports from 1st July 2013 to 16 November 2022, in England and Wales.
*Methods:* Reports were acquired from the Courts and Tribunals Judiciary website and screened for haemorrhage-related deaths using a reproducible automated computer code. Demographic information, coroners' concerns, and organisational responses to PFDs were extracted and analysed, including risk factors predisposing to haemorrhage.
*Results:* 339 PFDs (8 % of all PFDs) involved a haemorrhage event contributing to death. The average age of death was 78 years, and 57 % were male. The majority of haemorrhages were intracranial (64 %). 31 % of haemorrhage-related PFDs reported the use of anticoagulation, most often warfarin. Coroners reported 942 concerns directly relevant to the haemorrhage event, including failures to follow protocols, guidelines, or risk assessments (17 %), failures in communication or handovers (14 %), and failures in providing appropriate care, including investigations and observations (13 %). Just under half (48 %) of PFDs did not have responses published on the Judiciary website. Of the organisations who responded, 85 % reported plans to initiate new changes to address these concerns. Improvements most frequently focused on improving protocols, pathways and guidance documents, as well as education and training.
*Conclusions:* Coroner PFDs offer unique insights into haemorrhage-related deaths, highlighting the systems and processes which fail in everyday practice. Improving awareness and dissemination of these reports to clinicians and policymakers nationally may improve patient safety and save lives.

## 1. Introduction

Injuries or trauma, whether accidental or intentional, are a major cause of life-threatening bleeds, causing an estimated 4.4 million deaths worldwide each year.[1,2] In the United Kingdom (UK), haemorrhage was responsible for an average of more than half a million hospitalisations and 13,000 deaths per year between 2019 and 2024.[3] Intracerebral haemorrhage is estimated to have a global incidence of 30 per 100,000 person years,[4] and data from the Office for National Statistics (ONS) in the UK reported 1537 deaths from such events in 2022.[5]

Understanding and managing preventable factors which increase the risk of both acute or chronic haemorrhage, or directly cause them, is key to improving morbidity and mortality from bleeding events. The risk of having a major bleed is increased if an individual has a medical

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condition which affects their ability to clot,[6,7] or if they are taking anticoagulant medications.[8,9] In patients with traumatic injury, a significant proportion will already have lost blood and have deranged clotting,[10,11] but awareness of this can be low, leading to delayed treatment and preventable harm.[1,12] A three-year prospective study (the ORANGE study) of 2192 patients presenting with major bleeding associated with oral anticoagulant use in the UK identified further risk factors for mortality, including intracranial bleeds, advanced age, spontaneous bleeds (rather than traumatic), liver failure, and cancer.[13]

The UK's National Institute for Health and Care Excellence (NICE) provides guidance for community and hospital-based healthcare professionals around a number of areas pertinent to preventable bleeds, including the prescription of anticoagulation,[9] assessment and management of head injuries,[14] and falls prevention.[15] NICE also recommends the use of bleeding risk tools when deciding whether to commence an anticoagulant, such as the ORBIT score for people with atrial fibrillation.[16] However, despite this guidance and ability to risk assess patients, deaths from preventable haemorrhage continue to occur.

While data are available on the epidemiology, treatment, and mortality associated with bleeding events, there has been little research into the systems and processes which go wrong in practice leading to preventable deaths from haemorrhage.

Coroners in England and Wales have a duty to report and communicate a death when the coroner believes that action should be taken to prevent similar deaths.[17,18] This communication results in the writing of a Prevention of Future Deaths (PFD) report that is sent to an individual or organisation who has the power to act. These reports are cited as an official source of data for the NHS Patient Safety Strategy.[19] However, there is no public information that demonstrates their routine use by NHS organisations. Thus, the concerns raised by coroners in PFDs remain poorly explored and disseminated, missing opportunities for systemic learning.

PFDs have been used to conduct research on deaths related to preventable falls,[20] medicines including opiates,[21,22] and sepsis.[23] However, PFDs implicating haemorrhage have not yet been explored. In this study, we therefore aimed to conduct the first systemic case series of PFDs to describe and characterise haemorrhage-related deaths, collate coroners' concerns, and analyse organisational responses to these deaths.

## 2. Methods

### 2.1. Study design

A systematic case series of coroners' Prevention of Future Death (PFD) reports was designed, and the study protocol was preregistered on an open repository.[24]

### 2.2. Data collection, screening and eligibility

Reports were acquired from the Courts and Tribunals Judiciary website[25] on 16 November 2022 using an openly available and reproducible web scraper[26] designed by a study author (FD). The scraper was used to automatically download all portable document format (pdf) reports that were then searched using pre-determined keywords. Both thromboembolism and haemorrhage were included in the same initial search. The keywords chosen included 'clot', 'clots', 'embolism', 'thromboembolism', 'emboli', 'embolisms', 'thrombosis', 'thromboses', 'thrombi', 'clotting', 'clotted', 'thromboembolic', 'coagulation', 'coagulant', 'bleed', 'bleeds', 'bleeding', 'bled', 'haemorrhage', 'haemorrhage', 'haematoma', 'haematoma', 'haemorrhagic', 'hemorrhagic', and the positive control word 'coroner' (to identify cases which couldn't be read).

The code identified and downloaded 4305 PFDs, of which 4205 (98 %) were reports written by coroners and the remainder were mislabelled response letters. Two thousand and ten (48 %) of the documents were readable by the code and eligible for screening by at least one author (MH, FD) (Supplementary Appendix Fig. 1). The remaining pdfs were independently screened by two study authors (KS, CP, JJ, DL, HF, MH). Cases were included if a haemorrhage was deemed to have caused or contributed to death, including cases where multiple factors in addition to the haemorrhage were found to have contributed to that death. Bleeds included intracranial and gastrointestinal haemorrhage, as well as significant bleeding from other rarer sites. Cases where the deceased had a history of bleeding, but this did not contribute to the preventable death, were excluded. Bleeds as a result of intentional harm, whether self-inflicted or inflicted by another individual, were also excluded. Any ambiguities regarding case inclusion were discussed with and resolved by the senior investigator (FD).

### 2.3. Data extraction

Demographics, causes of death and morbidity, haemorrhage risk factors, coroner concerns and actions reported in responses from recipients were manually extracted by authors (HF, MH) and reviewed by FD. Where deaths were related to multiple causative factors, the data extracted were those relevant to the haemorrhage event.

### 2.4. Data analysis

Annual proportions of haemorrhage-related PFD reports were calculated as the number of haemorrhage-related cases divided by the total number of PFD reports for each calendar year (2013–2022). Ninety-five percent confidence intervals for each annual proportion were estimated using the Wilson method. To assess whether there was a significant linear trend in the proportion of haemorrhage-related reports over time, a Cochran-Armitage test for trend in proportions was performed. Statistical significance was defined as $p < 0.05$.

Medians and interquartile ranges (IQRs) were calculated for continuous variables (e.g., age) and frequencies were reported for categorical variables (e.g. sex). We calculated the years of life lost (YLL)[27] for each case (where age was reported) by extracting their remaining life expectancy from the Office for National Statistics (ONS) cohort life tables.[28]

Two investigators (MH, HF) assigned the International Statistical Classification of Disease and Related Health Problems 11th Revision (ICD-11)[29] codes for the causes of death to each PFD.

We calculated the raw number of haemorrhage-related PFD reports, and the proportion of PFD reports which were haemorrhage-related, written for each coroner jurisdiction and represented this on a choropleth map using the standard administrative regions of England and

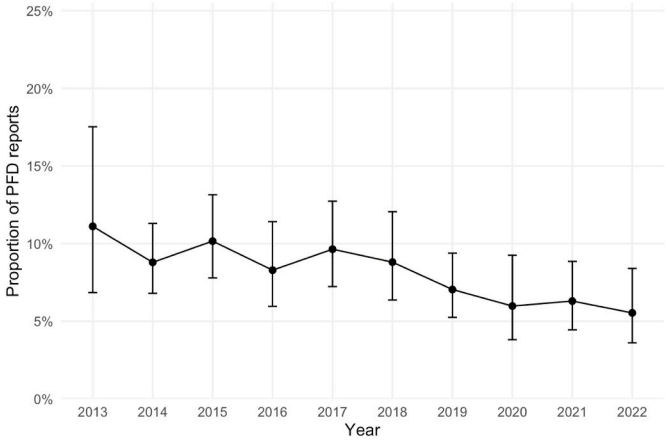



**Fig. 1.** The proportion (with 95 % confidence interval) of all coroners' Prevent Future Deaths reports (PFDs) published between 2013 and 2022 in England and Wales where haemorrhage caused or contributed to the reported death.

Wales.

We used directed content analysis[30] to collate and evaluate coroners' concerns to classify and identify recurrent themes. If concerns failed to fit into predefined categories, we developed new themes as appropriate. This allowed us to highlight cases involving previously recognised concerns, and to explore concepts, drawing similarities and disparities from the data.

Responses from organisations or individuals to whom the PFDs were addressed were collated and summarised in a table. Responses were classified as "early or on time" (on or before the due date), "late" (dated after the 56-day legal requirement[18]), or "overdue" (response was not available on the Judiciary website at the time of extraction). We collated actions taken by organisations who responded to the PFD to identify and classify repeated themes.

### 2.5. Software

R (Version 4.1.1) was used for statistical analysis, creation of line graphs, and to create the openly available code to download and screen pdfs.[26] Datawrapper was used to produce bar charts and choropleth maps. All data and study materials are openly available on an open repository.[24]

### 2.6. Missing data

Coroners have a duty to produce PFD reports when the coroner believes that action should be taken to prevent future deaths, but this is not mandatory. Thus, the data is constrained by the working practices of coroners who may vary in their thresholds for writing a PFD report. We could therefore only analyse the available data as provided in the PFD reports, in the knowledge that this is likely to be an underestimate of preventable haemorrhage-related deaths nationally.

## 3. Results

### 3.1. Case characteristics

There were 339 haemorrhage-related PDFs published between July 2013 and 16 November 2022 in England and Wales, representing 8 % of all PDFs. The proportion of reported haemorrhage-related PFDs decreased over time from 11 % in 2013 to 5.5 % in 2022 ($p < 0.001$) (Fig. 1, Supplementary Appendix Table 1).

The median age at death was 78 years old (IQR 60–86 years, n = 232). This corresponded to a median of 11 years of life lost (YLL) per death (IQR 6–24 years) and total 4202 YLL. In 58 % of PFDs (n = 195), the deceased was male.

The 339 PFDs were written across 69 coroner jurisdictions (Supplementary Appendix Table 2). Coroners in Northwest England wrote the most (21 %, n = 72) haemorrhage-related PFDs (Fig. 2A, Supplementary Appendix Table 3), followed by South-East England (14 %, n = 47). However, the highest number of haemorrhage-related PFDs as a proportion of all the PFDs was reported in Wales (14.3 %) and the East Midlands (13.6 %) (Fig. 2B–Supplementary Appendix Table 3).

On the Judiciary website, 59.4 % (n = 233) of haemorrhage-related PFDs were classified as "Hospital Deaths" reports (Supplementary Appendix Table 4). The next most frequent classifications were "Care Home Health related deaths" (12.2 %; n = 48) and "Community health care and emergency services related deaths" (5.9 %; n = 23).

### 3.2. Causes of death

The top three causes of haemorrhage-related deaths were traumatic subdural haematoma (30 % of all included PFDs), followed by unintentional fall from unspecified height (16 %) and intracerebral haemorrhage (8 %, Supplementary Appendix Table 5). However, not all information was available; 50 PFDs (15 %) where a haemorrhage contributed to a death could not be allocated a specific ICD-11 code, either because it was directly missing, or it could not be inferred from the report.

**Table 1**
Selected examples of specific concerns raised by coroners from the four most common concern themes.

| Theme | Case number | Example Concerns |
|---|---|---|
| **Failure to follow (or lack of) relevant pathways, protocols, guidelines or risk assessments (16.8 %)** | 2021–0418 | "[Guidance provides that] women of reproductive age, presenting to the ED collapsed, in whom a pulmonary embolism is suspected, should have a Focussed Assessment with Sonography in Trauma (FAST) scan to exclude intra-abdominal bleeding from ruptured ectopic pregnancy … if guidance had been followed … it is likely to have prevented the administration of alteplase [a thrombolytic drug] in a lady who was suffering intra-abdominal bleeding". |
| **Failure in communication (including with patients) or handover (13.6 %)** | 2019–0131 | "[Following surgery on high dependency unit] experienced two unwitnessed falls … staff caring for him were aware that he was at risk of falling … they had put in place steps to reduce that risk and after the first fall instigated further preventative measures. [Later] transferred to surgical ward … suffered three further falls … not nursed in a floor level bed … neurological observations not done … consideration was not given as to whether anticoagulation medication should be stopped". Concern as to when a patient is transferred between wards whether there is sufficient handover of safety information. |
| | 2015–0161 | "[Due to drug interaction risks] an additional INR check [for warfarin monitoring] was requested by the hospital … it was not transferred from one sheet to another … the INR test was not undertaken. [A request from family for the test] was noted by the surgery but … not acted upon by the community district nurses. [Redacted] suffered an intra-cerebral haemorrhage … attributed to … elevated levels of warfarin". |
| **Failure in providing appropriate care, including investigations and observations (13.3 %)** | 2019–0117 | "[Redacted] was out for a night socialising with friends and was seen to fall … handed over [by ambulance to hospital doctors] as 'intoxicated' … not seen [for another 3 h] by a doctor who did not diagnose his head injury … not reviewed again … suffered a respiratory collapse and significant head injury was diagnosed with fractured skull and haematoma". |
| **Failure to assess risk of bleeding/clot, including underlying health conditions and genetic factors, and screening programmes (9.6 %)** | 2016–0021 | "[Redacted] wrote her relevant medical history of hemochromatosis on the patient questionnaire but the Nurse Endoscopist was now aware of this when he scoped her. He saw a lesion which he decided to biopsy, which in fact was a gastric varix … died as a result of gastrointestinal haemorrhage". |

Responses from organisations to haemorrhage-related PFDs.

**Table 2**
Summary of the responses received from coroners' Prevent Future Deaths reports (PFDs) sent to recipients by organisation type, and classification of response time using the 56 day statutory requirement.

| Organisation Type | Total PFDs Received (%) | On time responses | Late responses | Overdue responses |
|---|---|---|---|---|
| NHS Clinical Commissioning Group (CCG) | 5 (1.0) | 3 | 1 | 1 |
| NHS England | 26 (5.3) | 7 | 8 | 11 |
| NHS Ambulance Services | 25 (5.1) | 13 | 4 | 8 |
| NHS Trusts & Hospitals | 196 (39.9) | 85 | 26 | 85 |
| NHS GPs | 11 (2.2) | 5 | 0 | 6 |
| Welsh NHS Health Boards | 28 (5.7) | 16 | 1 | 11 |
| NHS Mental Health Trusts & Clinics | 1 (0.2) | 0 | 0 | 1 |
| NHS Community Health Organisations | 1 (0.2) | 0 | 1 | 0 |
| Care/Nursing Homes | 37 (7.5) | 12 | 3 | 22 |
| Care Providers | 12 (2.4) | 6 | 0 | 6 |
| Housing Associations & Supported Accommodation | 1 (0.2) | 1 | 0 | 0 |
| Government Bodies/Departments | 65 (13.2) | 18 | 14 | 33 |
| Professional Bodies | 70 (14.3) | 23 | 4 | 43 |
| Other | 13 (2.6) | 3 | 2 | 8 |
| **Total** | **491** | **192 (39.1)** | **64 (13.0)** | **235 (47.9)** |

Just under half (43 %) of haemorrhage events occurred in hospitals, followed by own homes (21 %), and care homes (18 %). Coroners did not specify the location of bleed in 25 (7 %) PFDs (Supplementary Appendix Table 6).

### 3.3. Types of haemorrhage

Intracranial haemorrhage was the most frequently reported type of haemorrhage, representing 66 % of all haemorrhage cases (n = 223, Supplementary Appendix Table 7). The most common intracranial haemorrhage subtype was subdural/epidural haemorrhage (39 % of all haemorrhages). Gastrointestinal bleeds comprised 11 % of total bleeds (n = 37). "Other" causes of haemorrhage represented 27 % of haemorrhage-PFDs (n = 91). Only three cases of bleeds did not report a specific bleed type.

The use of anticoagulation was reported in 31 % of PFDs (n = 106, Supplementary Appendix Table 8). Of these cases, 117 anticoagulants were named, of which warfarin was the most common (36 %, n = 42), followed by rivaroxaban (6 %, n = 7) and enoxaparin (6 %, n = 7).

Among the 106 PFDs which reported anticoagulation use, indications for these medications included atrial fibrillation (28 %, n = 30), previous VTE, 19 %, n = 20), mechanical heart valves (7 %, n = 7), and "other" specified indications (26 %, n = 27) (Supplementary Appendix Table 9).

Causes of haemorrhage were classified as spontaneous, traumatic (excluding fall), surgical or other procedure, fall-related, or other specified cause. Of these categories, the most common provocation of haemorrhage was due to falls (49 %, n = 167), followed by spontaneous (23 %, n = 79) and procedural/surgery related causes (15 %, n = 51, Supplementary Appendix Table 10).

### 3.4. Coroners' concerns

Coroners reported 1018 individual concerns across the haemorrhage-related PFDs, of which 942 were directly relevant to the haemorrhage event (Fig. 3, Supplementary Appendix Table 11). The most frequent concerns raised were failure to follow (or lack of) relevant pathways, protocols, guidelines, or risk assessments (17 %, n = 158), failure in communication (including with patients) or handovers (14 %, n = 128), and failure in providing appropriate care, including investigations and observations (13 %, n = 125).

Examples of specific concerns raised by coroners are illustrated in Table 1 and Table 2.

The 339 PFDs were sent to 491 recipients, which represented 277

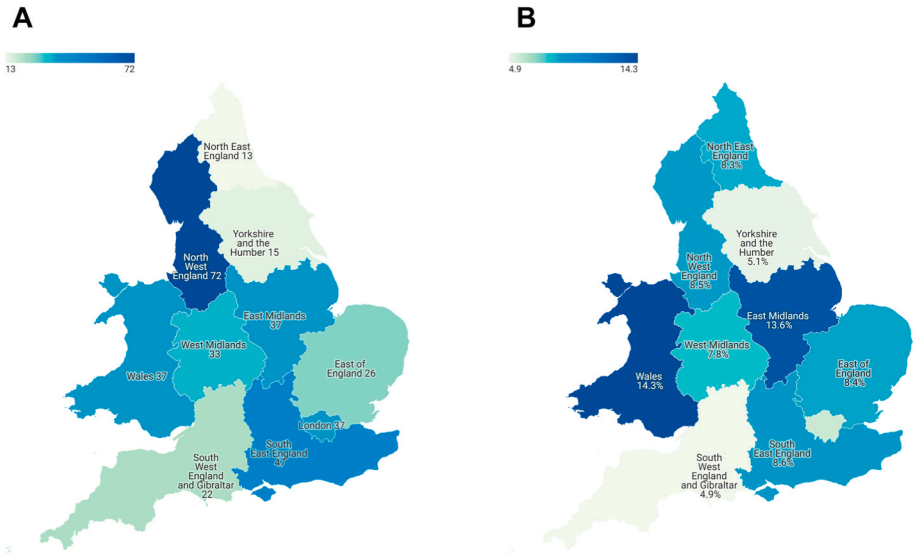



**Fig. 2.** A) Total number of haemorrhage-related PFDs published per administrative region of England and Wales, 2013–2022. B) Number of haemorrhage-related PFDs published per region expressed as a percentage of all PFDs published by that region in the same time period.

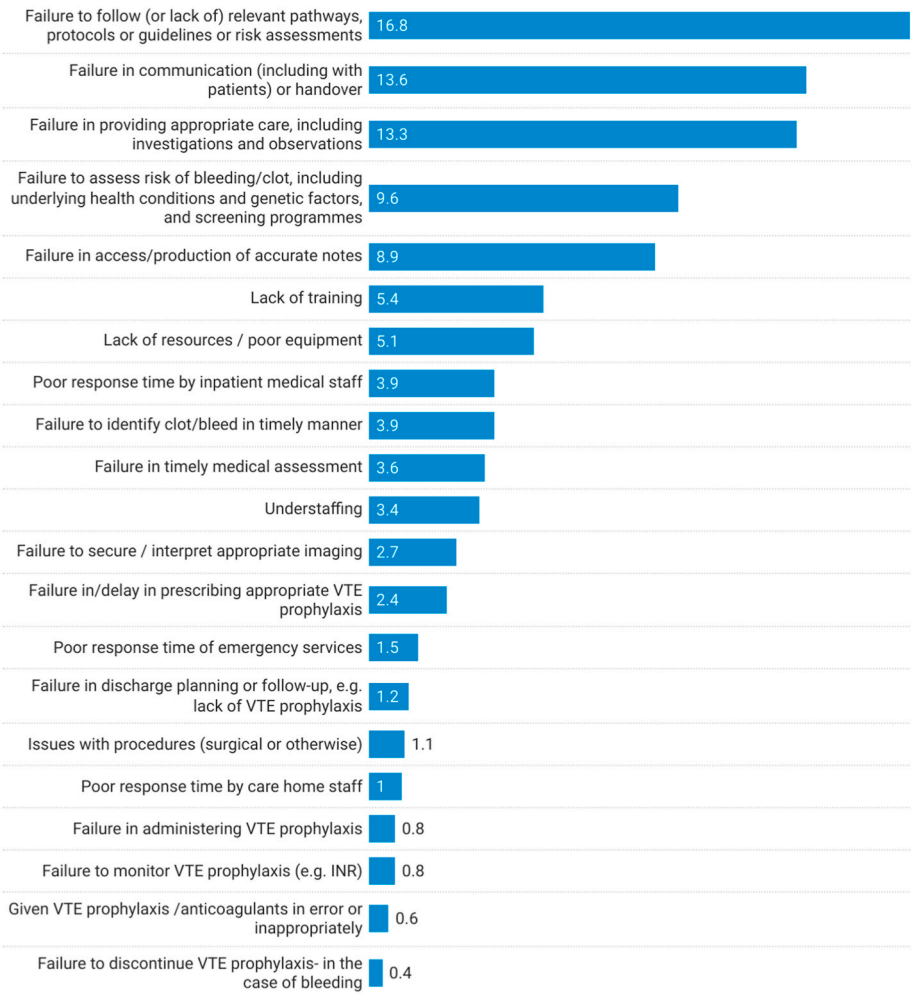



**Fig. 3.** Concerns raised by coroners in haemorrhage related Prevent Future Deaths reports (PFDs) in England and Wales between July 2013 and November 2022 (presented as percentage of PFDs containing each concern theme).

unique recipients. Of the 491 PFDs sent, 39 % (n = 192) received a response on time, 13 % (n = 64) received a late response, and 48 % (n = 235) had not received a response at the time of data extraction.

### 3.5. Actions reported in responses to PFDs

Of the 256 organisations who responded to coroners' PFDs, 85 % acknowledged concerns and reported initiating new changes to address these (n = 217, Supplementary Appendix Table 12). In 29 responses, organisations stated pre-existing systems or solutions were adequate. Only 9 responses did not acknowledge or agree with the coroner's concerns.

When organisations reported that they took or would initiate changes, the most frequently recorded responses involved commitments to improving or implementing new protocols, pathways or guidance documents (29 % n = 125), followed by improvements to education or training (24 %, n = 102) (Supplementary Appendix Table 13). Responses often contained more than one category of improvement; 432 categories of improvements were suggested for the 217 responses.

## 4. Discussion

### 4.1. Summary of findings

There were 339 haemorrhage-related PFDs published between July 2013 and November 2022 where coroners believed action should be taken to prevent future deaths. The number of haemorrhage-related PFDs as a proportion of all PFDs decreased over time. An average of 11 years of life were lost per person. These haemorrhage-related preventable deaths predominantly occurred in the hospital setting, and often involved intracranial bleeds, of which a proportion were complicated by coexisting anticoagulation, the most common being warfarin. Almost half of haemorrhage-related deaths were due to a preceding fall.

Coroners raised almost 1000 concerns in these reports, with most regarding failures in following guidelines, risk assessments, assessing patients and communicating safely. The majority of organisations receiving PFDs did not respond or were overdue. When organisations did respond, they tended to acknowledge concerns and reported plans to initiate changes, most frequently focused on improving protocols/pathways and guidance documents, as well as education and training.

### 4.2. Comparison with existing literature

Our study found that the proportion of PFDs which were haemorrhage-related decreased over time. Previous studies have observed a reduction in bleeding-related hospitalisation and mortality between 2014 and 2019, which may partly explain our findings.[3] However, unmeasured changes in coroner reporting practices as a further contributory cause cannot be excluded.

Previous analyses of fall-related PFDs confirm our findings that many intracranial bleeds are precipitated by an often-preventable fall, whether due to missed falls risk assessments, problems with medical

care after falls, or unsafe hospital or home environments.[20] Anticoagulants are the fourth most commonly implicated drug in medication-related preventable deaths reported by coroners,[22] and were noted in just under a third of our haemorrhage-related PFDs, and alongside falls have been highlighted as key priorities in the NHS Patient Safety Strategy.[19] Previous work on cardiovascular deaths involving anticoagulants noted numerous issues surrounding the safe prescribing of these medications, mirroring many of the concerns raised in the present study.[31]

A case series analysis of Australia's National Coronial Information System (NCIS) analysed haemorrhage-related deaths between 2009 and 2011 and showed major bleeding deaths occurred in men of older age and originated most often from trauma or gastrointestinal haemorrhage.[32] Similar to our analysis most events occurred either in hospitals or at home, with those at home often not surviving to hospital. However, this study excluded instances of bleeding in critical areas such as the brain, which we found was the most common cause of death in our cohort. Intracranial bleeds can be chronic as well as acute, particularly in older people, and remain an important cause morbidity and mortality in this population especially if not recognised early.[33]

Twenty percent of bleeds in the ORANGE study resulted from a fall, substantially lower than the proportion among our 49 % of preventable deaths.[13] This may be due to our inclusion of bleeds which occurred in the community, or that these fall-related bleeds have a clear and observable cause which may result in a higher likelihood of preventability and therefore having a PFD written.

We found a low response rate from organisations who had been sent a PFD, a finding which has been seen across previous research into PFDs.[34] However, if organisations did respond, the majority initiated improvements to address coroner concerns, a pattern seen similarly in previous analyses of PFDs related to patient safety issues such as fall and sepsis.[20,23]

### 4.3. Strengths and limitations

This study adds to previous research undertaken to analyse subgroups of PFDs,[34] with specific reference to haemorrhage-related deaths. We used reproducible data collection methods to extract and analyse information from haemorrhage-related PFDs from both inpatient and community settings. Despite forming a small proportion of total haemorrhage-related deaths in England and Wales, PFDs provide insights into processes and preventable failings in care which are not well-represented in other publicly available data sources.

There are important limitations in using information from PFDs. Firstly, PFDs are only written in response to deaths where the coroner believes action should be taken, but this is not mandatory.

Thus, the data is constrained by the working practices of coroners who may vary in their thresholds for writing a PFD report as well as the process and mechanism for publishing these online. We could therefore only analyse the publicly available data which is likely an underestimation of preventable haemorrhage-related deaths nationally. Inter-regional and inter-coronial variability on PFD publishing exists, highlighted in the relative subjectivity of coroner practices and their documented concerns.[35] Furthermore, PFDs reporting of demographic data including ethnicity, gender, and age is inconsistent and a proportion of this information will be undocumented. Classification of PFDs as 'haemorrhage-related' may be complicated by other factors contributing to death but which were haemorrhage-independent. Lastly, where organisations have responded to coroners' concerns, we could only analyse those which were uploaded to the judiciary website. It is also impossible to ascertain whether the proposed organisational changes were implemented in practice, and the extent to which this has improved haemorrhage-related outcomes locally and nationally.

### 4.4. Implications for practice

The predominance of concerns regarding following relevant protocols, pathways and guidelines suggests that continued awareness and use of these in clinical practice is a key element to preventing haemorrhage-related deaths. Reducing preventable bleeds requires a multi-disciplinary approach, including optimising safe prescription of drugs such as anticoagulants, and reducing the risk of traumatic events such as falls or procedural complications. These approaches must be implemented in both community and hospital settings, as evidenced by our analysis of PFDs across these settings.

Analysis of themes leading to haemorrhage include failure to follow relevant guidance, such as that provided by NICE which aims to standardise safe practice in community and hospital-based healthcare. PFDs have previously impacted NICE guidance related to bleeding risk, including one case of haemorrhage related to direct oral anticoagulant (DOAC) use (Case 2019-0106), which was acknowledged in a NICE surveillance report[36] and led to DOACs being given the same risk status as warfarin in investigation of possible intracranial bleeds. Guidance may need to be updated or revised so that guidelines to protect patients at risk of haemorrhage reflect recent evidence.

A quarter of changes initiated by organisations related to improved education and training. Improving the recognition of potential bleeds is crucial in commencing prompt and appropriate management, as evidenced in the cases included in this study. This might be aided by general clinical education, but also by the use of imaging techniques such as FAST scans[37] in trauma scenarios and computed tomography in possible head injury. Improved understanding of the risks and benefits of anticoagulation would contribute to safe prescribing efforts.

## 5. Conclusions

One in twelve preventable deaths reported by coroners in England and Wales between 2013 and 2022 involved a haemorrhage event. PFDs provide unique insights into these cases, especially around the systems and processes which lead to preventable harms. Improved dissemination and awareness of PFDs is needed at clinician and policymaker level to improve patient safety locally and nationally. Accountability to learn from these deaths through a preventable deaths tracker may also encourage the reporting of PFDs for coroners across England and Wales.

## Ethical statement

This study uses publicly available information, for which ethics committee approval is not required. Both the General Data Protection Regulation (GDPR) and the Data Protection Act (2018) no longer apply to identifiable data that relate to a person once they have died.

## Funding

No funding was obtained or received to undertake this study.

## Declaration of competing interests

MH and HSF declare no interests. FD, CP, KS, JJ, and DL work as doctors in the National Health Service (NHS). GCR is employed by King's College London as a King's Prize Research Fellow through the Anthony and Elizabeth Mellows Charitable Settlement. GCR is the Director of Richello Limited, providing consultancy across private, charitable and public sectors, and is the Director of Preventable Deaths Tracker. GCR has been reimbursed for travel expenses to speak at conferences and events, and received speaker fees for training and presenting at coronial law and inquest events. GCR receives fees from subscriptions to a personal Substack publication.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.puhe.2025.106054.

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