Preventable Deaths Involving Medicines: A Systematic Analysis of Coroners' Case Reports in England and Wales Before and During the COVID-19 Pandemic

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Background

Medicines cause over 1700 preventable deaths annually in England alone[1]. Medication errors affect around 20% of patients after hospital discharge[2], and medicines contribute to up to 18% of hospital deaths[3]. It is currently not known whether this problem changed during the COVID-19 pandemic.

In England and Wales, coroners are mandated to report deaths when they believe that actions should be taken to prevent similar future events. 'Prevention of Future Death' reports (PFDs) are mandated under the Coroners and Justice Act 2009, and the Coroners (Investigations) Regulations 2013. PFDs give a short summary of the death and factors believed to have been contributory (coroners' concerns). These publicly available reports provide a comprehensive survey of preventable deaths in England and Wales. They have been used in previous studies to investigate various causes of avoidable mortality[4,5].

Objectives

We set out to compare (i) drug types and (ii) coroners' concerns listed in medicines-related PFDs before and during the COVID-19 pandemic, and to identify changes in these parameters that practitioners and policymakers might address.

Methods

We systematically screened all 3785 PFDs published between 1 July 2013 and 23 February 2022, including reports where deaths were caused or contributed to by medicines (defined as biologically active compounds taken to modify body function). This definition includes drugs of abuse. We excluded alcohol and tobacco from our analysis.

We split cases into groups where the date of death was before and on/after 11 March 2020, the date the WHO declared the COVID-19 pandemic. This created a pre-pandemic group and a pandemic group.

We classified medicines by descriptions in the *British National Formulary* or, if they were not listed there, the IUPHAR/BPS *Guide to Pharmacology*. We used directed content analysis to identify common themes among coroners' concerns. We first generated minor themes, then categorized them into six major themes. We compared the proportions of drug types and concerns in the pre-pandemic and pandemic groups.

Results

Medicines contributed to or caused 18.6% (n=704) of deaths reported in PFDs in England and Wales between 2013 and 2022. We identified 641 medicine-related PFDs in the pre-pandemic group, and 63 medicine-related PFDs in the pandemic group.

The classes of medicines implicated in the greatest proportion of deaths were opioids, antidepressants, anticoagulants, and hypnotics (**Fig. 1**). This was the case in both groups. Most medicines contributed to a similar proportion of PFDs before and during the pandemic, although opioids and anticoagulants increased slightly, and cannabinoids disappeared.

Although most major themes of concern were unchanged, those related to education and training became more prevalent during the pandemic and communication issues became less common (**Fig. 2A**). The largest changes related to (i) failures to learn from past events, (ii) inadequate training, and (iii) inappropriate dosages (**Fig. 2B**). There were increased concerns related to medication errors (incorrect drugs or dosages). Of the concerns that were more prevalent during the pandemic than before, most related to human errors or failings.

Discussion

There were no major changes in the prevalence of different types of medicines.

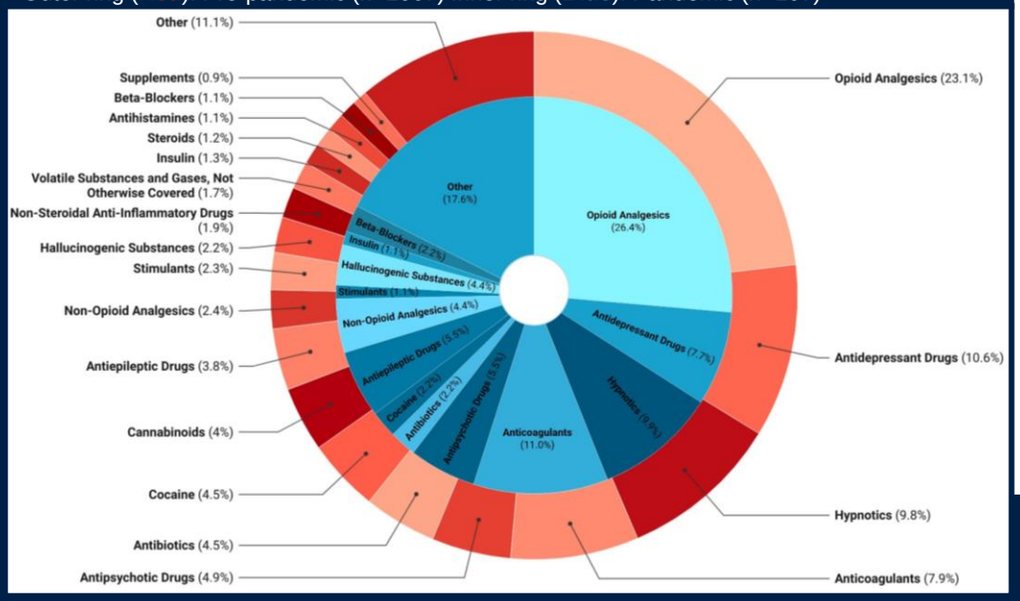
Concerns related to human errors broadly increased, and those related to fallible groups fell. This may reflect increased reliance on professional judgement during a pandemic, with novel risks and fewer relevant policies, further supported by the increase in concerns regarding lack of protocols.

Increases in failures to learn from past events suggest reduced effectiveness of audits, reviews, or other methods based on previous mistakes. This is a significant concern, as these systems exist to encourage improvement; their failings can lead to stagnation and repeated preventable deaths.

Implications

Pandemic conditions did not alter the types of drugs that contributed to preventable deaths in England and Wales, but changed the failings causing these preventable deaths. During the pandemic, more deaths were related to human errors and fewer PFDs highlighted systemic issues. This may be due to a lack of guidance, preventing criticism. Our findings highlight (i) the importance of adequate policy generation, and (ii) key areas of which clinical pharmacologists should be aware, regarding prescribing or medication during pandemics, to reduce preventable deaths.

Fig. 1: BNF/IUPHAR-defined drug classes reported as proportions of total number of drugs mentioned (n) in medicine-related PFDs published July 2013 to February 2022.
Outer ring (Red): Pre-pandemic (n=1067) Inner ring (Blue): Pandemic (n=107)



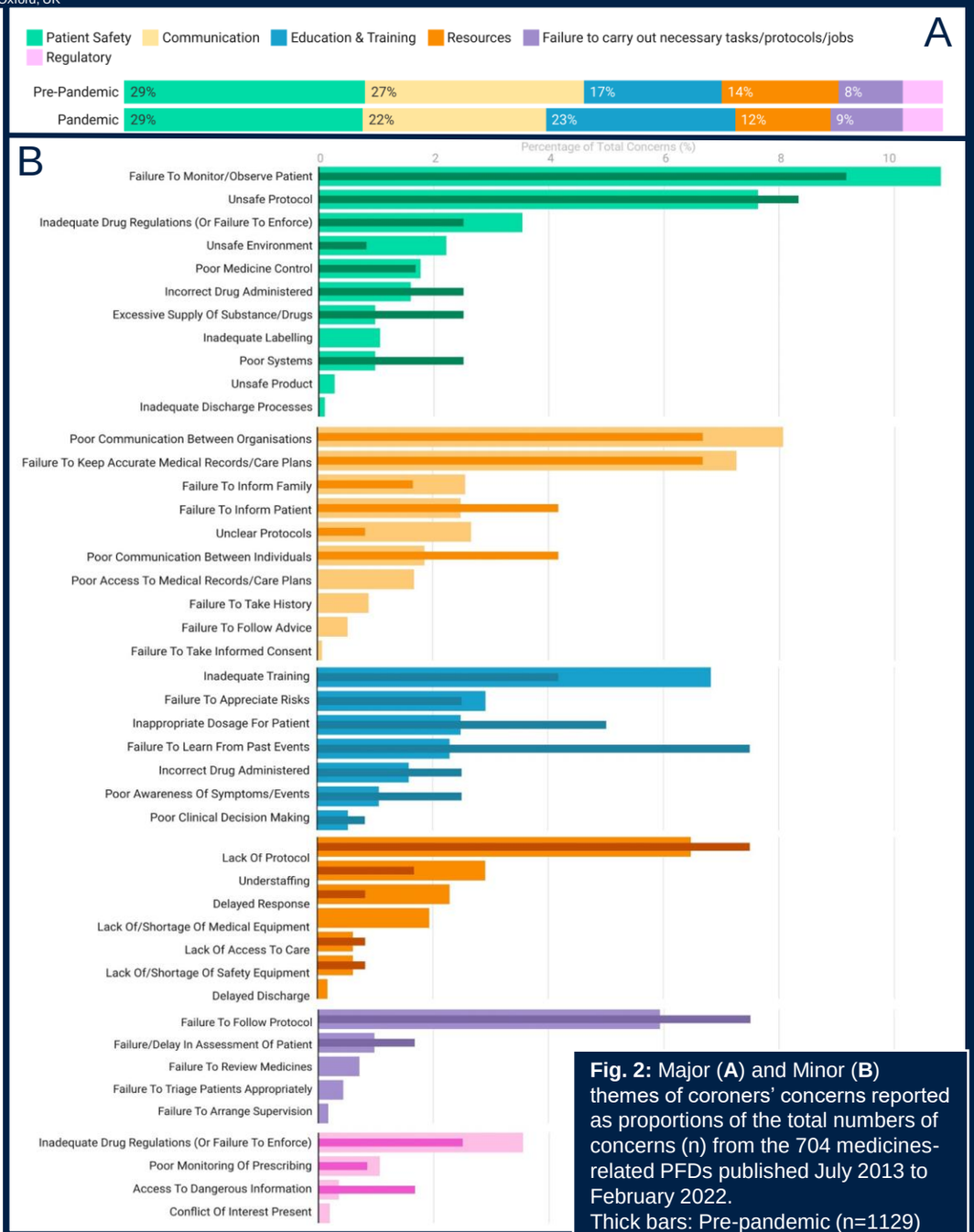


Fig. 2: Major (**A**) and Minor (**B**) themes of coroners' concerns reported as proportions of the total numbers of concerns (n) from the 704 medicines-related PFDs published July 2013 to February 2022.
Thick bars: Pre-pandemic (n=1129)
Thin bars: Pandemic (n=120)

Key Points for Clinical Pharmacologists

- Pandemic conditions increased the proportions of preventable deaths involving human errors, including medication errors
- Organizations and individuals seemed less likely to learn from past events during the COVID-19 pandemic and to improve thereby
- The COVID-19 pandemic had no major effect on the types of medicines associated with preventable deaths in England and Wales

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