

# Under-reporting of deaths to the coroner by doctors: a retrospective review of deaths in two hospitals in Melbourne, Australia

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## Abstract

**Background.** ‘Under-reporting’ of deaths to the coroner has significant implications for the identification and investigation of preventable deaths. In extreme cases, it may even be a symptom of the system failures that allowed cases such as Harold Shipman, Australia’s King Edward Memorial Hospital, the alleged incidents at the Bundaberg Hospital and the Bristol Royal Infirmary to persist. Several initiatives in Australia and the UK are currently reviewing the coroner’s system in light of the recommendations made by the Luce report and the Bundaberg Hospital inquiry to consider whether the coroner’s system effectively meets the needs of our society, including the healthcare sector. Reporting of deaths to the coroner is a key issue for consideration in this debate.

**Objective.** This study’s primary aim is to identify the number of deaths in the hospital setting that meet the reporting criteria set out by the coroner’s Act, Victoria 1985 (‘reportable deaths’).

**Method.** This study utilized a method of retrospective structured medical record review of in-patients who died between 1 January 2002 and 30 June 2003 at two major public hospitals in Victoria, Australia.

**Results.** In total, 229 cases (95.4% of records requested) were included in this review (120 from Hospital A and 109 from Hospital B). The number of cases at both hospitals meeting the coroner’s reporting criterion was 58, of which, 22 (37.9%) were reported to the coroner.

**Conclusion.** This study provides the first experimental evidence of significant ‘under-reporting’ of deaths to the coroner by hospitals. This is an important consideration for the reform initiatives currently underway. Better communication channels need to be fostered between doctors and coroners if coronial investigations are to be used effectively for reviewing deaths in hospitals.

**Keywords:** coroners and medical examiners, death certificates, forensic medicine, health policy, mandatory reporting

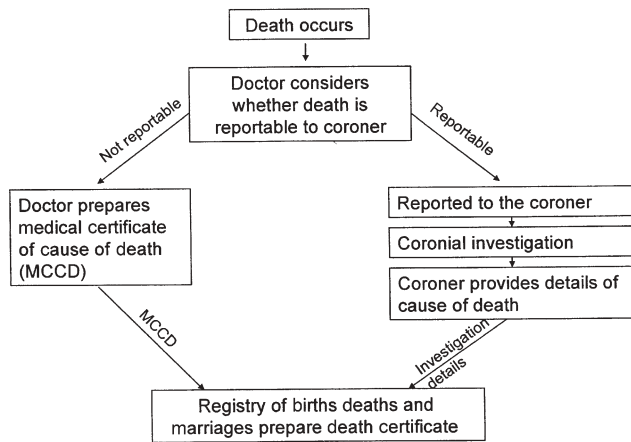
‘Under-reporting’ of deaths to the coroner has significant implications for the understanding of preventable deaths in healthcare. In extreme cases, it may be a symptom of the systemic troubles that allowed cases such as Harold Shipman, Australia’s King Edward Memorial Hospital, the alleged incidents at the Bundaberg Hospital and the Bristol Royal Infirmary to persist [1–4].

Both the Luce Inquiry, which followed the Harold Shipman case, and the Bundaberg Hospital Inquiry recommended tighter death certification procedures and auditing of death reporting practices [2, 5]. Several initiatives in Australia and the UK are reviewing the coroner’s system

in light of these recommendations to consider how such recommendations could be implemented to make the Coronial system more effectively meet the needs of modern society [6, 7].

Doctors are responsible for reporting a large proportion of deaths to the coroner (see Fig. 1) [5]. At present in Australia, there is a legal requirement for doctors to report deaths that meet the following criteria: unexpected, unnatural, violent deaths, deaths resulting from accident or injury and deaths during or resulting from an anaesthetic [8]. However, as each state and territory of Australia has its own Coronial legislation, the criteria for reporting vary slightly between jurisdictions.

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**Figure 1** Registration of deaths in Victoria. Source: Victorian Parliament Law Reform Committee [28]

Failure to report a death to the coroner can result in penalty points or a fine for doctors, but such penalties have rarely been issued in practice due to the coroner's inability to proactively identify 'reportable' cases. In Victoria (one of eight states/territories in Australia), doctors are also required to complete a medical deposition when reporting deaths.

Approximately 15% of the 30 000 deaths per year in Victoria are reported to the Victorian coroner [9]. The coroner's finding must include the identity of the deceased, the cause of death and how the death occurred. In Victoria, coroners can formulate recommendations in relation to public health and safety [10]. As one of few regulatory processes that can evaluate the healthcare profession in an external, objective and multidisciplinary manner, coroners' reviews have the potential to contribute to a greater understanding of adverse events in healthcare [11].

The research that has been conducted in this area indicates there is likely to be substantial under-reporting to the coroner by doctors [12]. Using hypothetical scenarios, Start *et al.* [13] observed that clinicians in the UK identified approximately half of the cases that should have been reported to the coroner. Correct reporting was not related to the clinician's level of experience. Another similar study surveyed general practitioners in the UK and found that only 3% (61% response rate) correctly identified all the cases that should have been reported to a coroner [14].

Two distinct organizations in Victoria have also identified instances of 'under-reporting'. The Registrar of Births, Deaths and Marriages referred an additional 400 deaths in 2005 to the coroner that were not reported by treating medical practitioners. The Victorian State Trauma Registry identified 35 trauma-related deaths in 2003 that had not been reported to a coroner [15].

Although previous studies used hypothetical situations or surveys to examine the difficulties of identifying deaths that should be reported to a coroner [13, 14, 16], we did not identify any research into under-reporting in a naturalistic setting. The paucity of this type of research may be due to researchers' misgivings that identifying deaths that should

be reported to the coroner, but were not, can incur penalties for the doctors who failed to report them. This barrier was overcome in this study by obtaining the express consent of the State coroner and each hospital involved in this research.

The study's aim is to identify the number of deaths in the hospital setting that should have been reported (irrespective of whether they actually were reported) according to the criteria set out by the coroner's Act, Victoria 1985 ('reportable deaths').

The secondary objective was to detect the sensitivity and specificity of hospital death reporting to the coroner by doctors in this setting using the Coronial researcher's determination as the 'gold standard'.

## Methods

Retrospective structured medical record review of in-patients that died between 1 January 2002 and 30 June 2003 was used. Two major public hospitals in Victoria were invited and agreed to participate. One is a tertiary referral centre, treating about 100 000 patients per year, whereas the other is largely a community-based hospital, treating about 40 000 patients per year.

The primary analysis is based on

- (i) whether each death met the coroner's reporting criteria as determined during the primary review ('reportable') and
- (ii) whether it was reported ('reported').

The majority of the statistical evaluation is univariate and descriptive. To improve consistency, one research nurse examined all medical records. The reviewer undertook a formal training program prior to commencing the review with the State coroner, a forensic pathologist and a facilitator from the Project Group. A data collection form and a reference manual were developed for use during the study and procedures were established for the reviewer to discuss any ambiguous cases with the forensic pathologist.

A list of patient deaths were generated from each hospital and randomly selected for review using SPSS [17]. To be eligible for the study, the deceased person had to be alive at the time of hospital presentation and the death must have occurred during the period of hospitalization. Stillbirths, cases in which the death was not confirmed within the medical notes and cases in which the deceased was transported to a hospital for the purposes of death certification only were excluded.

One hundred and twenty medical records were requested from each hospital to guarantee a sufficient number of complete medical records from each site. An eighteen-month period of review was used to ensure an adequate sample size.

Whether the death was reported to a coroner, the category under which it was reported, and the patient's gender and age were obtained. Selected clinical factors were also gathered to identify potential factors associated with 'under-reporting' (Table 1).

**Table 1** Selected variables for 'reportable' cases

	All reportable deaths ( $n = 58$ )	Death was reported to the coroner ( $n = 22$ ) % [row total]		$P$ -value
Mean age in years (SD)	68.0 (20.5)	59.4 (22.8)		$T(34) = 2.73, P = 0.01$
Gender				
Female	31	11	35.5%	$\chi^2(1) = 0.17, P = 0.68$
Male	27	11	40.7%	
Time of death				
0:00–06:00	16	3	18.8%	$P = 0.076^a$
06:01–12:00	12	4	33.3%	$\chi^2(1) = 0.14, P = 0.71$
12:01–18:00	16	8	50.0%	$\chi^2(1) = 1.37, P = 0.24$
18:01–23:59	14	7	50.0%	$\chi^2(1) = 1.14, P = 0.29$
Day of death				
Monday	9	4	44.4%	$\chi^2(1) = 0.19, P = 0.66$
Tuesday	13	4	30.8%	$\chi^2(1) = 0.36, P = 0.55$
Wednesday	4	1	25.0%	$P = 0.72^a$
Thursday	7	4	57.1%	$\chi^2(1) = 1.25, P = 0.26$
Friday	9	2	22.2%	$P = 0.46^a$
Saturday	10	5	50.0%	$\chi^2(1) = 0.75, P = 0.39$
Sunday	5	2	40.0%	$P = 1.00^a$
'Not for resuscitation' ordered				
Yes	25	3	12.0%	$P < 0.001^a$

<sup>a</sup>These values were calculated using a two-tailed Fisher's exact test.

The researcher's determination of whether the death was 'reportable' was assessed by undertaking an intra-rater assessment of 17 cases. The kappa score (0.46,  $P = 0.02$ ) was found to be comparable to other studies using similar methodology [18, 19].

Formal approval for the study was obtained from the State coroner. Both of the hospital ethics committees approved the study on the proviso that no identifying information would be collected. Furthermore, the ethics committees stipulated that no cases were to be reported to the coroner *ex post facto*.

## Results

There were roughly 1200 (~1.3% of all admissions) deaths certified at Hospital A and roughly 500 (~1.3% of all admissions) certified at Hospital B during the review period [20].

In total, 229 cases (95.4% of records requested) were included in this review (120 from Hospital A and 109 from Hospital B). The number of cases at both hospitals meeting the coroner's reporting criterion was 58, of which, 22 (37.9%) were reported to the coroner. (Case studies for non-reported cases are available upon request). Four deaths (18.2% of those reported) were reported and should not have been, as they did not meet the criteria.

The sensitivity of doctors' reporting of deaths was 37.9% (95% confidence interval: 25.8–51.7%), indicating a high

number of cases in which a 'reportable' death was not reported ('false negatives'). The specificity was 97.4% (95% confidence interval: 93.2–99.2%), representing few deaths that were not 'reportable' but were reported anyway ('false positives'). The Negative Predictive Value was 80.9% (95% confidence interval: 75–86%) and the Positive Predictive Value was 84.6% (95% confidence interval: 71–98%).

Fifteen (6.6%) cases were thought to have insufficient detail within the medical record to determine whether the death was 'reportable'. The other demographic and selected clinical variables are shown in Table 1.

The majority of cases that were found to be 'reportable' but not reported were older and female. A significant proportion was more likely to have a 'Not For Resuscitation' order in place; and were more likely to die between 0000 h and 0600 h (see Table 1).

## Discussion

The results show that doctors reported fewer cases to the coroner than the coroner's staff would have expected based on clinical events (36/58, 62.1% of 'reportable' deaths).

Although the study was restricted to two, Melbourne-metropolitan hospitals, deaths were reported by a number of different doctors, who may work at multiple teaching hospitals. The study was limited to in-hospital deaths, as this allowed greatest access to clinical information,

a larger number of clinicians and a broader variety of patients. However, the similar research findings [14, 15] in the UK and the additional cases referred to the Victorian coroner by external sources suggest that 'under-reporting' is not confined to these hospitals or in-hospital deaths only.

Although it can be argued that the coroner's legalistic understanding of the reporting criteria is not practical to use as the 'gold standard' for which deaths in hospital should be reported, this was not the intended focus of our paper. If coroners are to optimize their potential to contribute to public health and safety, doctors reporting deaths and coroners must share a common understanding of which deaths are 'reportable'. Whether this is achieved by revising the current reporting criteria, initiating a process of death certificate auditing or by other means are still important issues requiring further discussion in the healthcare community [21–24].

The cases not reported to the coroner had a higher mean age than those reported and were more likely to have a 'Not for Resuscitation Order' in place. The cause of death may be less certain among elderly patients, who tend to suffer from multiple conditions that mask the effects of trauma. Other factors, such as family concerns regarding coroner's autopsies, may also play a part in 'under-reporting'.

The difference in time of death suggests that deaths occurring during the night shift are less likely to be reported that may be the result of less clinical or administrative staff on duty during these hours.

The limitations of this study relate to the method of review, as well as ethical and legal barriers arising from the research topic.

Insufficient medical notes could have implications for the quality of our research, as this was our primary data source. Cases with insufficient clinical detail may contribute to a biased estimation of whether the death was 'reportable'. Deaths reported to the coroner that were not documented in the medical record may also contribute to an over-estimation of the level of 'under-reporting'. However, this latter factor would not have a significant impact on our findings, as ~95% of cases reported in Victoria have medical deposition forms attached.

Our kappa statistic after reviewing the records is consistent with previous studies using medical record review. The well-understood limitations of medical record review and poor documentation may have reduced the reliability of the judgment [25]. Despite this, medical record peer review is generally accepted as the gold standard for reviewing patient care [26]. As the reviewer was not blinded to each case's outcome, bias was controlled by having the reviewer discuss unclear and ambiguous cases with the forensic pathologist [27].

As cases were made anonymous, we were unable to reconcile those deaths that may have been subsequently reported to the coroner's office after the review period was completed or contact the doctors involved to verify the case's status. However, only three cases, which were not reported, matched the cases on the National coroner's database (based on gender, age at death, date of death and hospital of death). Even if we assume that these three cases were reported by doctors later on, this would still indicate a high

level of under-reporting (33 of 58 reportable cases not having been reported).

## Conclusion

This study provides the first experimental evidence of significant 'under-reporting' of deaths to the coroner by hospitals. It also suggests some patterns of practice that may be related to 'under-reporting'. Further research will be necessary to clarify the specific causes of 'under-reporting' and how to remedy them. Reforms to the coroner's system are currently being discussed in Australia [6, 28] and the UK [5, 7]. Given our findings, these discussions are likely to benefit from greater input by doctors to resolve some of the issues contributing to under-reporting. Coroners rely on reporting, as they have no other capacity to discover 'reportable' deaths that have occurred in the health sector. If the coroner's investigation is to be used effectively as a resource for monitoring and reviewing patient deaths, effort should be directed at improving the system and fostering communication between doctors and coroners.

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Accepted for publication 13 April 2007