# Letters

RESEARCH LETTER

## Miscategorization of Deaths in the US Food and Drug Administration Adverse Events Database

As the US Food and Drug Administration (FDA) moves to hasten approval of medical devices, data from postmarketing studies and registries are increasingly relied on to inform decision-making. With less time for premarketing clinical studies, postmarketing data are the principal way adverse events and risks become apparent. Even for high-risk implanted devices, premarketing trials are usually small and have short-term follow-up.[1] The process of reporting adverse events is cumbersome, and reporting rates are low.[2]

Although the FDA's medical device reporting regulations require that device-user facilities report adverse events to the FDA, physician reporting is voluntary.[3] Adverse event data may be recorded in registries such as the Transcatheter Valve Therapy database,[4] which gathers national data on interventional cardiology devices. However, the Transcatheter Valve Therapy registry does not make its data publicly available, which limits its value. Instead, the Transcatheter Valve Therapy registry submits reports to the FDA in summaries that may omit redacted information and obscure important data. Publicly accessible adverse event reports are housed in the FDA's Manufacturer and User Facility Device Experience (MAUDE) database, where they are classified as malfunction, injury, or death events. We examined the misclassification of death reports for the Sapien 3 and MitraClip devices (high-risk interventional cardiac devices that were approved by the FDA in 2013 and 2015, respectively) within the MAUDE database.

**Methods** | We used the software Device Events,[5] which collates adverse event reports from MAUDE in a more accessible format. We examined adverse event reports on the Sapien 3 and MitraClip devices from their respective approval dates through December 31, 2018. Device Events pulls directly from FDA raw data but in a user-friendly format with faster search times. The critical-events thesaurus within Device Events searches and identifies reports characterized as injuries and malfunctions for terms that indicate that a death may have occurred. We used the critical events thesaurus and search terms (**Box**) comprising synonyms for death, including *expired* and *passed away*, to gather reports in which a patient may have died but the event was misclassified as an injury or malfunction. Two authors (L.M. and E.Y.W.) independently analyzed the reports to determine if a death had in fact occurred. Owing to the use of publicly available deidentified data, the institutional review board at the University of California, San Francisco determined the study did not require approval.

**Results** | *Sapien 3*. We found 9320 injury and malfunction reports for the Sapien 3 device and 1021 reports of deaths; 217 (2.3%) of the injury and malfunction reports also stated that the patient had died during or after the implantation of the device. In addition to directly using the word *died*, the most commonly used terms in these reports to describe the death of a patient were *expired*, *passed away*, and *autopsy*. Thus, misclassified reports made up 217 of 1238 (17.5%) total patient deaths.

**Box. Search Terms**

| |
|---|
| Expired |
| Hospice |
| Comfort care |
| Passed away |
| Died |
| Autopsy or autopsied |
| Comfort |

*MitraClip*. We found 5323 injury and malfunction reports for the MitraClip device and 295 reports of deaths; 97 (1.8%) of the injury and malfunction reports also stated that the patient had died. Terms used in injury and malfunction reports to describe patient deaths included *expired*, *hospice*, and *passed away*. Thus, 97 of 392 (24.7%) patient deaths were misclassified as injury or malfunction events.

**Discussion** | We found a substantial misclassification of patient deaths in the FDA's MAUDE database for the Sapien 3 and MitraClip devices, which resulted in the underreporting of deaths. Our findings raise concerns about the accuracy of adverse-event reports for high-risk devices. The results complement recent news reports that the FDA allowed device manufacturers to file reports of malfunctions in a hidden database, known as alternative summary reporting.[6] Both the miscategorization of deaths in FDA adverse-event reporting and hidden adverse-events reports can lead to inaccurate public and physician perception of the safety of medical devices and can compromise informed decision-making. Given the increased reliance on postmarketing surveillance, improving the accuracy and clarity of adverse-event reporting should be a high priority for both the FDA and industry.

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*Study concept and design:* Wang, Tomes, Redberg.
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