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Crowdsourcing anaesthesia care. Comment on *Br J Anaesth* 2016; 117: 276–279

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Editor—Anaesthesia residents, certified registered nurse anaesthetists (CRNAs), and anaesthetists traditionally learn anaesthesia case care considerations and surgeon preferences for specific cases from textbooks, online resources, and commonly, word of mouth from peers or mentors. The Johns Hopkins Department of Anesthesiology and Critical Care Medicine has attempted to house a repository of these practices and preferences on an internal online database. Save for the best practice institutional adaptations of enhanced recovery after surgery (ERAS) protocols, entries frequently become outdated as a result of faculty and resident turnover and lack of continued curation. The static nature of this resource yields less than satisfactory results. Additionally, learners and teachers alike have indicated that gaining access to intranet resources using a web browser at the point of care is cumbersome.

Seeing an opportunity, we created a novel, online, crowdsourced, mobile and user-friendly database of ambulatory anaesthesia care considerations and surgeon preferences using the off-the-shelf Microsoft Office 365 OneNote application (Microsoft Corp., Redmond, WA, USA). While researching ideas for further development, we read with great interest about the 'Wiki-Anaesthesia' concept proposed by Van Zundert and colleagues[1] to crowdsource an open-access repository of anaesthesia information as part of the teaching focus of the profession's 'big five' core pillars. We were also inspired after learning that Bow and colleagues[2] had created a crowdsourced model for making flashcards to help medical students self-generate study materials at our own institution. Recent reviews suggest that crowdsourcing is an effective means of collecting and disseminating medical information. Yet, there are few examples, if any, in anaesthesia practice.[3]

Van Zundert and colleagues[1] described an evolutionary process in which 'a constantly updated, crowd-sourced repository of anaesthesia information could grow from a fragmentary and incomplete source into an up-to-date, simple, accurate, comprehensive, easily accessible, international portal, whose content is cautiously edited, peer-reviewed, and verified by a reputable, overarching editorial organization.' We think that we have taken that first step by creating what is akin to an 'enterprise wiki'[4] that is intended initially for internal organisational use. Through our database, the end users (residents, CRNAs, and consultant anaesthetists) are themselves empowered to create and update surgeon-specific practice guidelines for outpatient operations and procedures. We suggest a basic template for entries but are not prescriptive as this simple approach fosters more participation. Although all anaesthesia providers can generate content, the faculty of the Division of Ambulatory Anaesthesia curates and continually vets the database through each use encounter. New entries and annotations are reviewed on a regular basis by the divisional Quality and Safety Committee. The crowd itself also polices the database content and can edit or report any suspected errors. Of note, the OneNote app can display the author, date, and time of each entry or edit, which allows for direct feedback from the division.

From this modest starting point of practice guidelines and surgeon preferences, we hope that rapid iterative improvement cycles by continuous user updates will correct any deficiencies noted in the early phases of entries. As the database grows, we are adding departmentally-approved best practice guidelines and ERAS protocols. With further crowdsourcing input, we plan to incorporate higher levels of editorial rigour driven also by a departmental (in addition to divisional) Quality and Safety Committee review. This process would bring us a step closer to what Van Zundert and colleagues[1] foresaw as the ultimate benchmark.

Several key questions emerge for the larger community around ways to motivate contributions in real time, measure adoption, and disseminate information. After its launch in November 2017, we currently have more than 120 entries under 14 surgical service lines from 100 users (31 consultant anaesthetists, 49 CRNAs, and 20 residents who have recently rotated through their ambulatory elective). The availability of both mobile and web versions dramatically increases convenience by making information available on both hospital

workstations and personal smart phones in real time. We plan to expand the reach of the database to inpatient operating facilities as well.

We are partnering with faculty in the Johns Hopkins Carey Business School to study the adoption of the crowdsourced app using the Technology Adoption Model (TAM)[5–7] that we can extend using diffusion theory concepts, such as social influence and perceived benefits.[8] The TAM approach uses simple surveys to help identify qualitative factors that might enhance or inhibit adoption of the database. Understanding these factors and responding to them will hopefully enable us to promote the sustainability and longevity of our database. Although the survey methods provide a snapshot view of the adoption process, usage data connected to entries and access to the mobile-based app will be used to study the dynamic growth and diffusion across the institution. We plan to analyse usage rigorously using the related Microsoft Analytics traffic data available through the off-the-shelf software to provide insight to implementing these types of platforms in anaesthesia.

As mobile technology use among anaesthesia providers continues to increase,[9] leading to better communication,[10] we hope to use this growth to accelerate the implementation of our model in other anaesthesia divisions. We could then help disseminate the template shell of our enterprise wiki to other specialties within Johns Hopkins, such as surgery and internal medicine, and ultimately to professionals outside our institution. As many large institutions already have paid for enterprise access to the Microsoft 365 Suite, they would be able to recreate our model, provide information technology support and security, and privately populate their own databases. If use of this model becomes more widespread, we envision that collaboration between several institutions could lay the groundwork for the ultimate goal to grow into a true Wiki-Anaesthesia.

Declarations of interest

The authors declare that they have no conflicts of interest.

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