

# Reflections on the development of the Hybrid Electronic Medical Registry in Pietermaritzburg

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The senior author has spent almost all of his surgical training and career at University of KwaZulu-Natal (UKZN) and as such has been influenced by the rich surgical heritage of the surgical department and its affiliated hospitals. The surgical department developed in an environment of a huge patient load and limited resources, while being tasked to provide care and undertake research. It was evident to the former head of surgery at the time, Professor Lynne Baker, that the contribution to surgical knowledge was going to be focused on common diseases in the region and was going to be based on surgical audit.

At the time, the management of colonic trauma was a major area of surgical controversy. The wartime approach of defunctioning all colonic injuries, with their attendant morbidity and need for a second operation to restore continuity, was increasingly challenged in the 1970s. This led to a series of research questions answered by collecting data on colonic injuries managed without colostomy. A colonic trauma database was maintained in the department, and this provided the data for a number of seminal papers on colonic trauma and the adoption of primary repair as a safe and effective alternative.<sup>1,2</sup>

Professor John Robbs, the next head of department, developed a database for vascular surgery that was maintained for many years and also provided the data for a large number of papers looking at the management of vascular trauma and later other vascular conditions.<sup>3,4</sup> These databases were products of the time and were essentially paper based-records, which were then entered into an electronic spreadsheet. This entailed a paper form to be completed by a surgical trainee that was then entered into an electronic database by a research assistant. Despite the manifest inefficiencies in these databases, they produced hugely influential research papers which clarified management approaches to a number of pathologies.

The development of Pietermaritzburg as an academic training centre begun at the turn of the millennium. Over the last two decades, the centre has grown to be an essential part of the training programme of UKZN. The natural extension of these old-style databases was the development, for all surgical activities, of the hybrid electronic medical registry

(HEMR). The design and implementation of this registry has been documented in the literature and has been the basis of a PhD thesis.<sup>5-7</sup>

The principle behind the HEMR was that we wanted to have point of entry data capture and that this would entail integrating the system into the patient medical record system of the hospital. Clerking staff enter the patient history and examination directly onto an electronic interface. This data is captured directly into a relational database. The system then provides a structured print version of the captured data for the patient medical record. All the information is stored in a relational database on the hospital network. The system fulfils two roles. It provides a structured, legible patient record and data that can then be easily accessed for audit and research purposes. Since the development of the HEMR and its roll-out in December 2012, over 12 000 trauma patients and 15 000 general surgery patients have been entered.

User audits and surveys have shown a high degree of both satisfaction and compliance of junior staff with the system. So effective has this been that other departments such as ophthalmology have begun to develop their own system based on our experience with the HEMR. The trauma and non-trauma categories of the HEMR have been repeatedly audited with an example of the former in this issue.<sup>8</sup> The data captured on the HEMR has formed the basis of over one hundred surgical publications, 10 PhDs and 30 Masters' degrees.

The HEMR has also been used to provide the data for quality improvement projects and for the monthly morbidity and mortality conferences in the department. The HEMR facilitates tracking of morbidity that allows for detailed assessment of the whole care pathway allowing the identification of risk factors for morbidity and informing the development of interventions designed to improve outcomes.<sup>9</sup> The HEMR has succeeded beyond most of our expectations and has become an integral part of the surgical department in Pietermaritzburg.

Surgical audit remains an essential component of surgical research both globally and locally. The development of modern digital registries has augmented surgical audit by allowing the capture of comprehensive datasets for analysis.

Surgical insight and innovation remain key to drawing insights from the data and to developing new surgical theories and praxis. We encourage those who have embarked on the pathway to continue and those who have not to give it serious consideration.

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