



Developing impact from the HIPPO study: Surgery and health systems research

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Inguinal hernia repair is one of the world's most common elective surgical procedures, yet the absolute number of people suffering from a hernia globally is steadily increasing and morbidity and mortality of this condition cannot be neglected¹. To deliver quality care to these patients it requires an efficient system that facilitates early reporting for diagnosis, and timely referral for surgery. Inguinal hernia can be used as a tracer condition because of its high prevalence, well established diagnosis and management criteria, and its impact on patients when it is not treated. Tracer conditions are good targets for research into whole surgical systems². The Hernias, Pathways and Planetary Outcomes for Inguinal Hernia Surgery (HIPPO) study was a major global surgery cohort study that included 18,058 inguinal hernia patients from 83 countries³. To assess a whole system, this study moved away from a single primary outcome measure and established a set of six outcomes relevant to different points in the patient journey from community to surgery. This process allowed a more comprehensive assessment of capacity for elective care.

HIPPO evaluated access to timely elective care and found that having access to diagnosis was essential to then progress further in the pathway. Therefore, diagnosis can be considered the first point of access to elective care⁴. In settings where the waiting time before diagnosis was shorter, the emergency surgery rates were lower and the waiting time after diagnosis to surgery was longer. However, in settings where patients waited longer before a diagnosis, the emergency surgery rates were higher but the waiting time after diagnosis to surgery was shorter. Interpreting these results in context, it seems that where first access to elective care is delayed, the risk of emergent presentation is higher. This suggests that having a functional elective pathway, even if with reasonable delays, may be better than having none, considering the higher risks and complications of

undergoing emergency surgery⁵. Furthermore, training more community healthcare workers on symptoms and signs of hernias and improving referral pathways to get evaluated by a surgeon will make the elective pathway more efficient. This approach could be transferable to other surgical conditions where elective care has the highest benefit to patients⁶.

In many healthcare systems, building capacity to provide more surgery will need to focus on surgical training. NIHR Global Health Research Unit on Global Surgery will test this in a future clinical trial, Task Sharing in InGuinal hErnia Repair (TIGER), which aims to speed training in inguinal hernia repair whilst maintaining safety and quality.

HIPPO also evaluated the quality and safety of inguinal hernia repair. It found that mesh was used in 97.6% of adult patients in high-income countries as opposed to 61.0% in low-income countries, likely increasing the risk of recurrence for patients in low-income countries^{7,8}. Quality will be improved if mesh becomes widely available in lower income settings. Barriers to mesh use still need further research but most likely include cost, supply chain, and training opportunity shortages. Global quality improvement projects to boost mesh use in regions where it is low is necessary to complement the many but still only local initiatives that exist.

Another key finding of the HIPPO study was the low adoption of day case surgery, even when evaluating in eligible patients only (53.3%, 6,740/14,768). We know from other studies that day case operations lead to faster recovery, protect patients from hospital-acquired infections and release hospital beds⁹. The benefit of this strategy goes beyond inguinal hernia patients, as patients that do need an admission to have their operation, might be operated faster if beds are spared. Considering



more than three quarters of the hospitals that took part in the study had the facilities to provide day-case surgery, future research to clarify the reasons behind low adoption of day-case would be helpful. Even in hospitals with facilities, the rate of adoption was only 57.3%, but the reasons to justify this were beyond the scope of the study. Hospital managers should be engaged to evaluate the adoption of day-case where capacity already exists and plan an expansion of its use. Once day-case is expanded for inguinal hernia repairs, it can also be a first step to use in other procedures, providing benefits to an even wider population.

Future cohort studies will benefit from adopting the HIPPO methodology if aiming to conduct a broad global surgical audit, to advance whole system surgical research at a faster pace. Selecting a prevalent condition, with well-defined diagnostic criteria and treatment, where the lack of treatment can cause harm to patients is essential to perform this dual assessment of patient outcomes and system evaluation. Procedures listed in the Essential Surgery package by the World Bank can be a starting point¹⁰, but working together with the global surgical community to identify other surgical tracer conditions will be essential.

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