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Study highlights risk of lapse in surgical skills among nation's pediatric surgeons

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Some pediatric surgeons perform so few rare and complex procedures once they finish their surgical training that they may have a hard time maintaining operative skills in the long run, according to a new study led by researchers at Ann & Robert H. Lurie Children's Hospital of Chicago.

The study, to be published March 30 in *JAMA Surgery*, did not look at how well patients fared based on the number of procedures their surgeons had performed. However, the authors say, the findings are alarming because there is strong evidence linking the frequency and number of surgeries performed to a surgeon's skill level and patient outcomes.

"The notion that practice makes perfect is especially true in surgery, and a surgeon's ability to perform a given procedure well is a result of how many cases that physician sees and treats," says study lead investigator Fizan Abdullah, MD, PhD, director of the division of general pediatric surgery at Lurie Children's and professor of surgery at Northwestern University Feinberg School of Medicine. "The concern here is that even a great surgeon's skills can languish over time if he or she does not perform certain procedures on a regular basis."

The research team tracked case volumes for 308 general pediatric surgeons applying for license renewal between 2009 and 2013 with the Pediatric Surgery Board, part of the American Board of Surgery, the organization that defines standards for education, knowledge and training of pediatric surgeons and provides certification to practice.

In their report, researchers focused on 21 key procedures that pediatric surgical trainees are required to learn and perform before they can enter the field and start operating on their own.

The results showed that a significant number of surgeons applying for recertification had either not performed certain complex procedures within the year prior to their certification or had done only a handful of them.

For example, nearly half of surgeons (45 percent) had not removed a kidney tumor in the year prior to their recertification, while 60 percent had not performed liver surgery for biliary atresia, the most common form of liver disease in newborns that, left untreated, can rapidly progress to liver failure and require a transplant. Additionally, 42 percent of surgeons in the study had not performed a single spleen operation in a year, while 37 percent had not performed a single surgery to remove a tumor called neuroblastoma, a cancer of the adrenal glands typically found in young children. Thirty-nine percent had not performed a single correction of a malformed esophagus, and 39 percent had not done a partial or full lung removal in a year.

"The implications are clear: Patients treated by someone who performs a procedure 15 or 20 times a year would fare better than patients treated by a surgeon who performs that same procedure once or twice a year," Abdullah says.

The study found that the most commonly performed general surgeries in children were:

- Appendectomy, a procedure to remove an infected or inflamed appendix with an average of 49 cases per year per surgeon
- Treatment of traumatic injuries, an average of 20 cases per year
- Groin hernia repair in an infant younger than 6 months, with an

average of 15 cases per surgeon

For six of 10 pediatric surgeries designated as "rare," the mean number of procedures performed by surgeons applying for recertification was fewer than two per year. The "rare and complex" category includes intestinal and abdominal defects, lung defects, upper digestive and airway tract anomalies and certain pediatric tumors.

The researchers note that many of these so-called "rare and complex" procedures may be uncommon but are still deemed defining in the practice of pediatric surgery. As such, these procedures demand that any general pediatric surgeon be skilled enough to perform them and do so well.

"These cases may be relatively rare but do, in fact, occur often enough to make them a key requirement for all pediatric surgeons," says study co-investigator Colin Gause, MD, a pediatric surgery research fellow at Northwestern University Feinberg School of Medicine.

The investigators say one option to ensure that practicing surgeons maintain skill level after graduation and throughout their careers is the use of high-fidelity simulation-based training with 3-D printed models that mimic the anatomy of complex conditions. Evidence shows that simulation training can improve surgical skills and reduce risk for errors.

Provided by Ann & Robert H. Lurie Children's Hospital of Chicago