# Data Lacking On Pediatric Surgery Outcomes

Relationships between surgical volume and outcome appear to extend to pediatric populations, although variation in studies' definitions and methods confounded efforts to compare results, authors of a literature review concluded.

More than three-fourths of the studies showed positive correlations between experience and primary outcomes, reported Jarod McAteer, MD, of the University of Washington and Seattle Children's Hospital, and colleagues.

In general, hospital-related factors correlated with outcomes for complex procedures whereas surgeon-specific variables tended to influence outcomes for common procedures, they wrote online in JAMA Pediatrics.

"Data on experience-related outcomes in children's surgery are limited in number and vary widely in methodologic quality," the authors stated. "Future studies should seek both to standardize definitions, making results more applicable, and to differentiate procedures affected by surgeon experience from those more affected by hospital resources and system-level variables."

Extensive research has documented the influence of hospital and surgeon characteristics on patient outcomes. In general, studies involving adult patients have exhibited methodologic consistency. In contrast, studies in pediatric patients have reflected less consistency in the quantity and quality of outcome data, the authors noted.

Few if any comprehensive reviews have examined correlations between hospital and surgeon characteristics and outcomes of surgery in children. In an attempt to evaluate the evidence base, McAteer and colleagues performed a systematic review of published English-language observational studies focused on pediatric surgery patients. The review encompassed the period from 1980 through mid-April 2012.

The authors identified 63 studies suitable for inclusion in their analysis. The studies evaluated outcomes related to 25 distinct procedures.

A majority (62%) of the studies had a sample size of more than 1,000 patients, and a similar proportion (63%) involved at least 25 hospitals and/or at least 50 surgeons. The exposure definition most commonly employed in the studies was annual case volume (57%). The primary outcome was mortality/survival in 35 (56%) of the studies.

All but 12 of the studies included some form of multivariate adjustment.

The studies consisted of 14 related to surgery for congenital heart disease, four in neurosurgery, three in otolaryngology or craniofacial surgery, three in urology, and two each in orthopedics and transplantation. The remaining studies were

characterized as general surgery.

Overall, 32 (51%) of the studies had yielded positive results, and 17 others (27%) had mixed results that included some positive associations between volume and outcome. Positive studies included 12 of the 14 in congenital heart disease, three of four in neurosurgery, four of nine in appendicitis (general surgery), and two of seven in pyloric stenosis (general surgery). All four studies involving patients with solid tumors (Wilms tumor, neuroblastoma) were negative.

The authors pointed out several examples of the heterogeneity they observed among the studies:

- 31 of 43 (72%) hospital-level studies used annual volume as the exposure definition compared with five of 11 (45%) surgeon-level studies
- 13 of 14 (93%) studies of congenital heart disease defined exposure as annual volume versus three of nine (33%) studies of appendicitis
- 9 of 52 (17%) studies used volume to define exposure, and the remaining studies "categorized the variable in a myriad of ways that showed little consistency"
- 51 of 63 studies employed some form of adjustment, but six of the 51 (12%) did not adjust for severity
- 37 of 63 (59%) studies used administrative databases, but 10 were not based on any type of database (such as surgeon subspecialty)

"Our review of the literature highlights a number of strengths and limitations in the present evidence base, and clarifying these may help inform the design of future studies that would be more amenable to comparison and meta-analysis," the authors concluded.