Effect of New Fellowship Programs on Resident Case Volume in Pediatric Surgery

John R Potts III, MD, FACS

BACKGROUND: The effect of subspecialty programs on associated general surgery programs is largely undocumented. This study examined the effect of new pediatric surgery fellowship (PSF) programs on the pediatric surgical experience of residents in the associated general surgery programs.

STUDY DESIGN: Pediatric surgery fellowship programs established after 2002–2003 (earliest available ACGME caselogs) were identified. The number of pediatric surgery cases reported by each completing resident as surgeon in the associated general surgery programs from academic year (AY)2002–2003 to AY2016–2017 were recorded and examined before and after entry of the first fellow into associated pediatric surgery programs.

RESULTS: Fifteen general surgery residency programs associated with new PSF programs were reviewed. First fellows entered the new PSF programs from 2002–2003 to 2013–2014. General surgery caselog availability before and after fellow matriculation varied accordingly. Data were available from 12 programs through the 5 years before matriculation of the first fellow into the associated PSF program. Over that time, the number of pediatric surgery cases performed by residents in those general surgery programs increased from 54.56 ± 2.98 to 68.71 ± 4.12 ($p = 0.003$). In 12 general surgery programs with resident caselogs available for the first 5 years after matriculation of the first fellow into the associated PSF programs, the mean number of resident pediatric surgery cases declined from 56.75(± 3.42) to 47.15(± 2.73) ($p = 0.015$).

CONCLUSIONS: Establishment of a new PSF program results in a significant decline in the pediatric surgery experience as surgeon for residents in the associated general surgery program. This outcome should be carefully weighed in the decision to establish a new PSF program. (J Am Coll Surg 2019;229:126–133. © 2019 by the American College of Surgeons. Published by Elsevier Inc. All rights reserved.)

The number of fellowship programs in subspecialties derivative of general surgery continues to rise. Much has been written about the reasons that residents seek subspecialty training. The overall impact of fellowship programs on general surgery education has been addressed by others. There has been very little research, though, on the impact of a derivative subspecialty fellowship program on an individual general surgery residency program in the same institution.

The aim of this study was to examine the impact of a derivative subspecialty program on 1 aspect of the coexisting general surgery program; the operative experience of residents in that subspecialty. The subspecialty of pediatric surgery was chosen because the ACGME caselog system clearly documents pediatric surgery cases performed by general surgery residents,[1] and it is 1 of only 3 subspecialties derivative to general surgery in which ACGME-accredited programs are limited to a single training paradigm. Furthermore, pediatric surgery is an "essential component" of general surgery,[2] and its importance in the training of general surgeons has been designated by that or some analogous title for decades. In its 2017–2018 Booklet of Information, the American Board of Surgery notes that "comprehensive knowledge and management of conditions in [pediatric surgery] generally requires additional training" but that "…in some circumstances, the certified general surgeon provides care in [the area.]"[3] General surgeons may be called on in many settings to respond to

Disclosure Information: Nothing to disclose.

Presented at the Western Surgical Association 126th Scientific Session, San Jose del Cabo, Mexico, November 2018.

Received December 17, 2018; Revised March 5, 2019; Accepted March 5, 2019.

From the Accreditation Council for Graduate Medical Education, Chicago, IL.

Correspondence address: John R Potts III, MD, FACS, ACGME, 401 N Michigan Ave, Suite 2000, Chicago, IL 60611. email: jpotts@acgme.org

https://doi.org/10.1016/j.jamcollsurg.2019.03.009
ISSN 1072-7515/19

pediatric surgical emergencies—both traumatic and nontraumatic. In some settings, particularly in underresourced areas (rural or urban), the general surgeon may be asked to provide elective consultation in the pediatric population as well. Therefore, it is important to provide pediatric surgical experience—including operative experience—to all general surgery residents.

One potential method for understanding the impact of a pediatric surgery fellowship program on the associated general surgery program would be to compare the pediatric surgical operative experience of residents in general surgery programs that are affiliated with pediatric surgery fellowship programs to that of residents in general surgery programs that are not affiliated with pediatric surgery fellowship programs. It is a reasonable assumption, though, that pediatric surgery fellowship programs are established in institutions that have an abundance of pediatric surgery cases. Furthermore, it is a reasonable assumption that despite the presence of a pediatric surgery fellowship program, some of that abundance of cases "trickles down" to the residency level. For those reasons, a different method was chosen for this study. We examined the operative experience in pediatric surgery of the residents in general surgery programs associated with new fellowship programs in that subspecialty and did so both before and after establishment of the subspecialty programs. In this way, each program essentially serves as its own control in determining the effect of a new pediatric surgery fellowship program co-located in the same institution.

METHODS

Pediatric surgery programs that have achieved ACGME accreditation since July 1, 2002 were identified. The choice of that date was dictated by the fact that general surgery resident/program specific caselogs have been available only since the 2002—2003 academic year. In the general surgery programs associated with newly accredited pediatric surgery programs, the number of pediatric surgery operations logged as surgeon by each completing resident from the 2002—2003 academic year (AY) through the 2016—2017 AY was recorded. Trends in the number of pediatric surgery cases done by residents before and after the first fellow matriculated into the associated pediatric surgery fellowship program were identified and were analyzed using regression analysis and Student's *t*-test (Excel Analysis TookPak). Pediatric surgery case numbers are represented as means ± standard error of the mean.

RESULTS

A total of 17 pediatric surgery fellowship programs received ACGME accreditation between July 1, 2002 and June 30, 2017. Two of those programs were in children's hospitals, which do not sponsor general surgery programs. Therefore, 15 general surgery programs were available for potential review. The first fellows matriculated into the associated new pediatric surgery programs at various times beginning with the 2002—2003 AY and ending with the 2013—2014 AY. Therefore, caselogs were available for residents completing associated general surgery programs from 0 to 11 years before matriculation of the first fellow into the associated pediatric surgery program and from 3 to 14 years after the matriculation of that fellow. Owing to that variability, analyses were performed grouping the general surgery residents/programs by the number of years before or after matriculation of the first fellow into the associated pediatric surgery program, rather than by academic year.

A preliminary analysis included the pediatric surgery cases recorded by residents in each of the 15 general surgery programs at each interval from the matriculation of the first fellow into the associated pediatric surgery program. That analysis revealed a pattern of an increasing number of cases before the first fellow entered the associated pediatric surgery program followed by a decreasing number after that first fellow (Fig. 1).

That preliminary analysis included varying numbers of programs (hence, residents) at different intervals from the establishment of the pediatric surgery fellowship program. Figure 2 shows results from the 9 general surgery programs for which data were available for the period from 5 years before to 5 years after matriculation of the first fellows into the associated pediatric surgery programs. The general pattern seen in Figure 1 again emerged. In the period from 5 years to 1 year before matriculation of the first pediatric surgery fellow, the average number of pediatric surgery cases done by each general surgery resident increased approximately 31% (7.75%/year) from 54.87 (± 2.94) to 71.89 (± 4.73) ($p = 0.002$). In the 5 years after matriculation of the first fellow into the associated pediatric surgery program, the mean number of pediatric surgery cases performed by general surgery residents fell approximately 29.6% (4.9%/year) from 61.89 (± 4.48) to 50.63 (± 3.64) ($p = 0.027$).

In 12 of the 15 programs, data were available for the period of 5 years to 1 year before matriculation of the first fellows into associated pediatric surgery programs. In those programs, the mean number of pediatric surgery cases recorded by residents increased approximately 25.9% (6.5%/year) from 54.56 (± 2.98) 5 years before the first fellow to 68.71 (± 4.12) the year before the first fellow matriculated ($p = 0.003$) (Fig. 3). Likewise, in 12 of the 15 programs, there were data available from the first 5 years after matriculation of the first fellow into

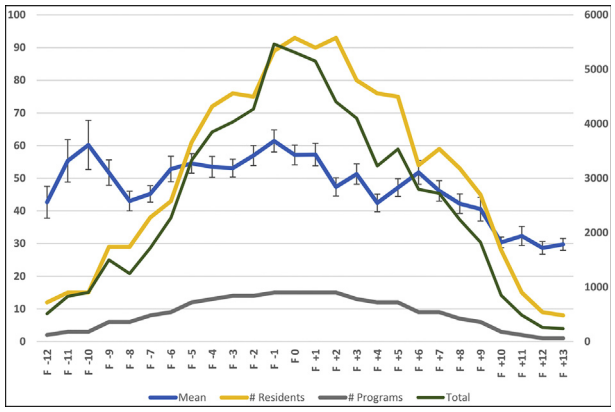

Figure 1. Data from all 15 studied general surgery programs at all intervals. The number of programs (# Programs), the number of residents (# Residents), the mean number of pediatric surgery cases performed by each general surgery resident (Mean), and the total number of pediatric surgery cases performed by general surgery residents in all study programs (Total, right vertical axis) are shown for all intervals. F 0 denotes the year that the first fellow matriculated into the associated pediatric surgery program. Negative numbers (ie F −9) represent intervals before matriculation of the first pediatric surgery fellow. Positive numbers (ie F +9) represent intervals after matriculation of the first pediatric surgery fellow. Error bars represent standard error of the mean. Data were available from all 15 programs only from the F −1 to the F +2 interval. The number of programs (therefore, the number of residents) varies in other intervals, depending on the number of years of pre- and post-fellowship data that were available for each program between the 2002 to 2003 and 2016 to 2017 academic years.

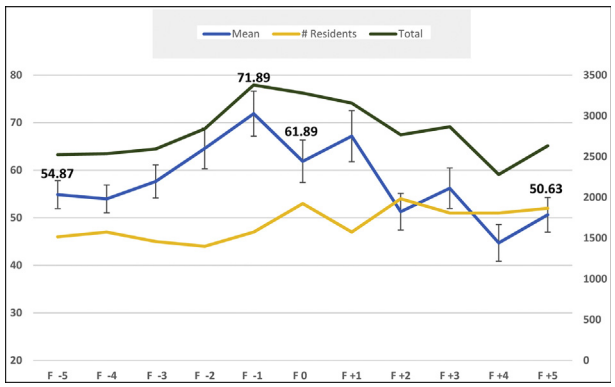

Figure 2. The number of residents (# Residents), the mean number of pediatric surgery cases performed by each resident (Mean), and the total number of pediatric surgery cases performed by residents in all programs (Total, right vertical axis) are shown for the 5 years before matriculation of the first fellow in the associated pediatric surgery program and for 5 years, thereafter. Nine programs were available for this analysis. Error bars represent standard error of the mean. Data points labeled are mean case numbers. The increase in mean cases from year F −5 to year F −1 was significant ($p = 0.002$). The decrease in mean cases from year F 0 to year F +5 was also significant ($p = 0.027$).

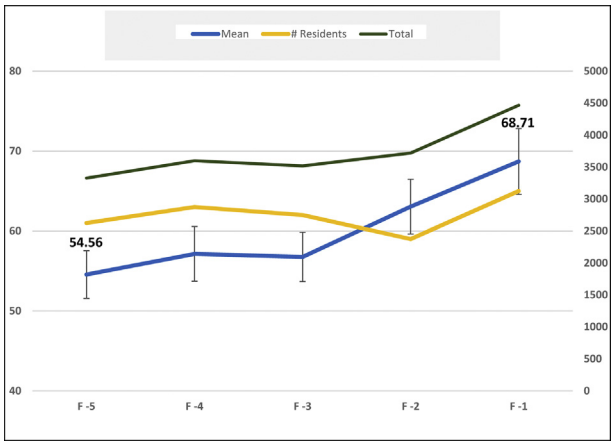

Figure 3. The number of residents (# Residents), the mean number of pediatric surgery cases performed by each resident (Mean) and the total number of pediatric surgery cases performed by residents in all programs (Total, right vertical axis) are shown for the 5 years before matriculation of the first fellow in the associated pediatric surgery program. Twelve programs were available for this analysis. Error bars represent standard error of the mean. Labeled data points are mean case numbers. The increase in mean cases from year F −5 to year F −1 was significant ($p = 0.003$).

the associated pediatric surgery programs. The mean number of pediatric surgery cases done by each general surgery resident over that period decreased approximately 17% (3.4%/year) from 56.75(± 3.42) to 47.15(±2.73) ($p = 0.015$) (Fig. 4). Three of the general surgery programs studied completed residents for 10 years after matriculation of the first fellow into the associated pediatric surgery program. The mean number of pediatric surgery cases done by residents in those programs decreased from 45.42(± 3.99) to 30.36 (± 1.62) ($p = 0.002$) over that 10-year period.

Finally, 2016−2017 caselog data were available for 63 residents in 9 programs in this study that had been affiliated with a pediatric surgery fellowship program for more than 5 years. The number of pediatric surgery cases reported by those residents ranged from 20 (the ACGME Review Committee for Surgery minimum for the number of pediatric surgery cases reported by a total of 4 residents in 3 different programs) to 126, with a mean of 40.43 (± 2.88) and a median of 35.

Figure 5 represents the mean number of pediatric surgery cases reported by residents completing the individual programs that were reviewed.

For comparative purposes, trends in the national mean for total major cases and for pediatric surgery cases performed by general surgery residents are provided in Figure 6. During the 14 years for which data are available, the mean number of pediatric surgery cases performed by general surgery residents fell approximately 37%

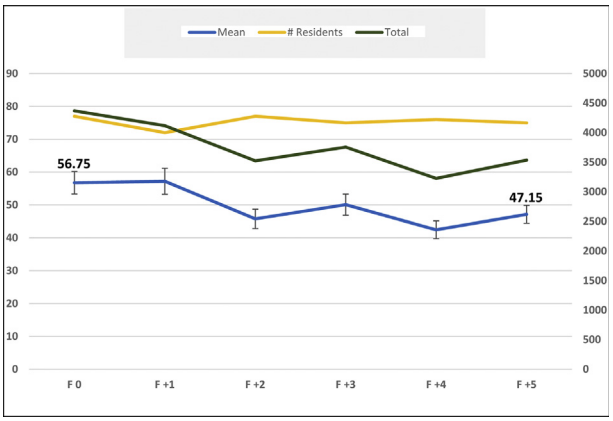

Figure 4. The number of residents (# Residents), the mean number of pediatric surgery cases performed by each resident (Mean) and the total number of pediatric surgery cases performed by residents in all programs (Total, right vertical axis) are shown for the first 5 years after matriculation of the first fellows into the associated pediatric surgery programs. Twelve programs were available for this analysis. Error bars represent standard error of the mean. Labeled data points are mean case numbers. The decline in the mean number of cases is significant ($p = 0.015$).

(2.6%/year). Figure 7 depicts the total number of pediatric surgery cases recorded nationally in ACGME-accredited general surgery residency and pediatric surgery fellowship programs (calculated as the number of graduates/year × the mean number of cases as surgeon). The decline in the total number of pediatric surgery cases performed nationally by residents is highly significant ($p < 0.001$), as is the increase in the total number of cases performed as surgeon by pediatric surgery fellows ($p < 0.001$). Figure 8 depicts the proportions of the total pediatric surgery cases in the ACGME caselog that were performed by residents and by fellows.

DISCUSSION

In the 2016–2017 AY, there were 505 ACGME-accredited programs in subspecialties derivative to general surgery[4] (Table 1). This represents an approximate 20% increase in the number of such programs in the last 15 years.[5] Other agencies currently accredit more than 280 additional fellowship programs in subspecialty areas derivative to general surgery.[6-11] Importantly, the vast majority of derivative subspecialty fellowship programs accredited by ACGME and other agencies reside in ACGME-accredited sponsoring institutions that also sponsor ACGME-accredited general surgery residency programs. The increasing number of general surgery residents who seek subspecialty training has been well documented,[12] and surveys have elucidated some of the reasons for that increase.[13-15] The overall impact of increased subspecialty training on specialty training in general surgery has also been addressed.[16-19] However, there is a paucity of data about the impact of the creation of a derivative subspecialty fellowship program on the operative experience in that subspecialty by residents in a general surgery residency program coexisting in the same institution.

Three single-institution studies have examined the effects of minimally invasive surgery programs on the associated general surgery programs. Two of these found that there was no adverse effect on the minimally invasive operative experience of the general surgery residents.[20,21] Interestingly, Linn and colleagues[22] found that the discontinuance of a laparoscopic surgery fellowship program led to an increase in laparoscopic cases by residents in the associated general surgery program. Snyder and colleagues[23] specifically examined the effect of the implementation of 1 new pediatric surgery fellowship and identified a significant reduction in the pediatric surgery case volume of residents in the associated general surgery program, despite an increased number of pediatric surgery faculty members and an increase in hospital admissions to the pediatric surgery service.

Hanks and colleagues[24] examined the operative data recorded by individuals completing ACGME-accredited general surgery programs in a single year (2008–2009). They identified individuals who had completed a general surgery program that either was or was not associated with a fellowship program in colorectal surgery, vascular surgery, minimally invasive surgery, or endocrine surgery. They then compared the operative experience in each of those subspecialties of residents in general surgery programs associated with programs in that subspecialty to residents in general surgery programs that were not associated with such a subspecialty program. In some instances, they found a reduction in certain specific operations in the general surgery programs associated with a related subspecialty program. In other instances (notably, in endocrine surgery), they found that residents in general surgery programs that were associated with a subspecialty program performed a greater number of cases in the related subspecialty than residents in general surgery programs that were not associated with a fellowship program in that subspecialty. Their overall conclusion was that coexisting fellowship programs had minimal effect on the cases done by general surgery residents. One discussant of the study by Hanks and associates[24] noted the lack of comparison of the operative data of the general surgery residents before and after establishment of a fellowship program in the same institution as a major shortcoming of the study. His contention was that fellowship programs in a given subspecialty are

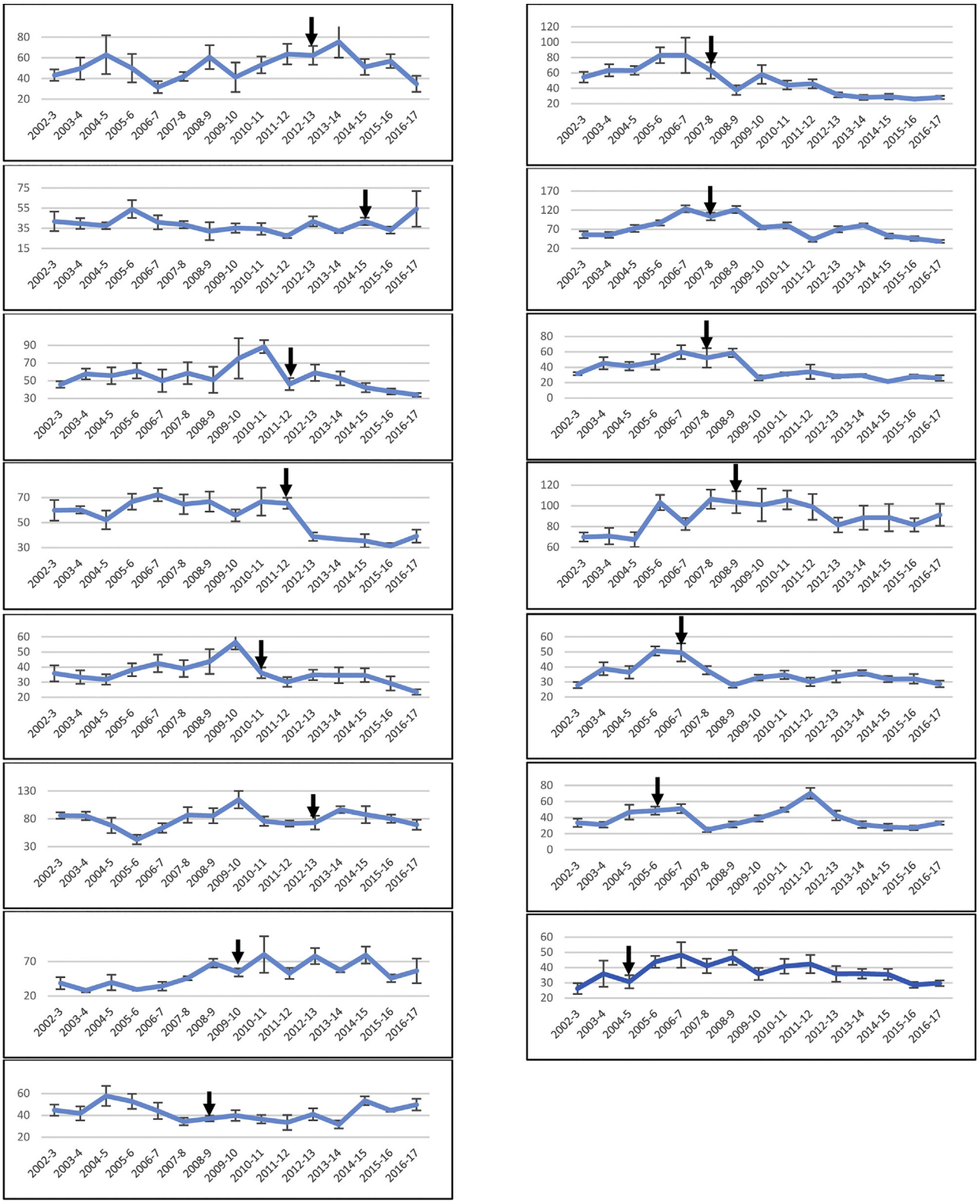

Figure 5. Mean number of pediatric surgery cases performed as surgeon by individuals completing each of the 15 programs annually from 2002 to 2003 through 2016 to 2017. The arrow in each graph denotes the year of matriculation of the first fellow into the associated pediatric surgery fellowship program. Error bars represent standard error of the mean.

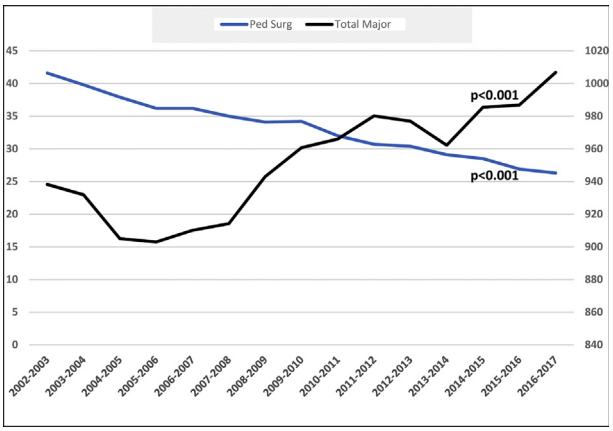

Figure 6. National mean case numbers for individuals completing general surgery residency in the years shown. "Ped Surg" represents the total number of pediatric surgery cases as surgeon. "Total Major" represents the total number of major cases as surgeon (right vertical axis). In both instances, "total" is the sum of surgeon-junior and surgeon-chief. The p values represent regression analyses of the means.

established in institutions in which there is an abundance of cases in that subspecialty, and it follows that the general surgery residents in those institutions would perform more cases in that subspecialty than would general surgery residents in institutions that did not have fellowship programs in that subspecialty. The finding in this study that the 63 residents completing the 9 study programs in 2016–2017 that had been affiliated with a pediatric surgery fellowship program for more

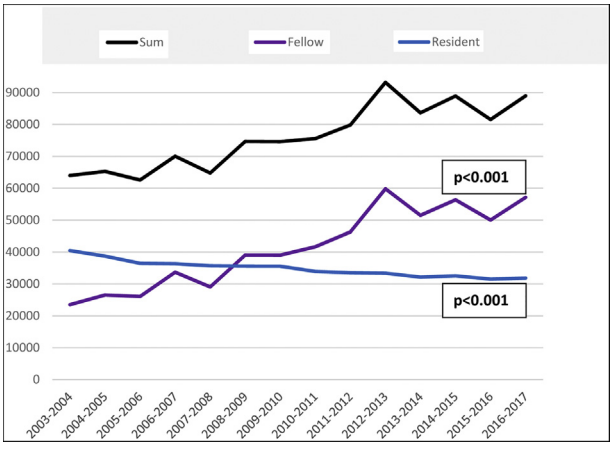

Figure 7. Total number of pediatric surgery cases recorded nationally in ACGME-accredited general surgery residency (Resident) and pediatric surgery fellowship (Fellow) programs, as calculated by the number of graduates per year × the mean number of pediatric surgery cases as surgeon. Note: National caselogs for pediatric surgery are available only beginning with the 2003 to 2004 academic year.

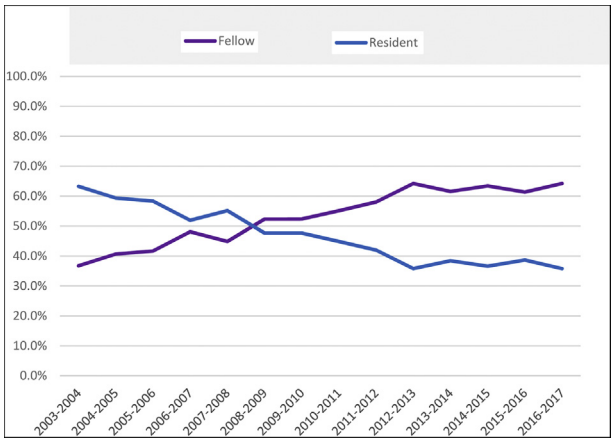

Figure 8. Proportion of the total pediatric surgery cases recorded in ACGME caselogs that were performed by general surgery residents (Resident) and pediatric surgery fellows (Fellow).

than 5 years reported a mean number of pediatric surgery cases (40.43), which was substantially higher than the national mean for that year (26.3), supports that assumption.

This study was designed to overcome the limitations of the studies noted previously. It is a multi-institutional, multiyear design in which programs serve as their own controls by comparing the number of pediatric surgery cases performed by general surgery residents before and after establishment of associated pediatric surgery programs. A comparison of the number of pediatric surgery operations done by residents in general surgery programs associated with pediatric surgery fellowship programs with those in programs not associated with pediatric surgery programs

Table 1. Fellowship Programs in Derivative Subspecialties of General Surgery

ACGME-accredited
Colon and rectal surgery
Complex general surgical oncology
Hand surgery
Pediatric surgery
Plastic surgery
Surgical critical care
Thoracic surgery
Vascular surgery
Accredited by other agencies
Abdominal transplant surgery (American Society of Transplant Surgeons)
Acute care surgery (American Association for the Surgery of Trauma)
Advanced colon and rectal surgery (The Fellowship Council)
Advanced gastrointestinal (The Fellowship Council)
Advanced thoracic surgery (The Fellowship Council)
Breast oncology (Society of Surgical Oncology)
Endocrine surgery (American Association of Endocrine Surgeons)

was, quite purposely, not performed. We previously used an analogous study design to examine the effects on the associated general surgery programs of establishment of new vascular surgery fellowship programs.[25]

The mean number of pediatric surgery cases performed by general surgery residents nationally declined steadily at a rate of approximately 2.6% per year throughout the period of this study (2002−2003 through 2016−2017). Quite in contrast to that national trend, the number of pediatric surgery cases done by residents in the general surgery programs in this study was significantly increasing at a rate greater than 6.5% per year before establishment of associated pediatric surgery fellowship programs. After these fellowship programs were established, the rate of decrease in the number of pediatric surgery cases done by residents in the associated general surgery programs (>3.4%/year) exceeded the national rate of decline. Therefore, this study demonstrates that establishment of a new pediatric surgery fellowship program diminishes the number of pediatric surgery cases done by residents in the associated general surgery program. It is important to clearly state, though, that the diminution of pediatric surgery cases performed by residents in general surgery programs associated with new pediatric surgery fellowship programs, while statistically significant, did not result in a deficiency of pediatric surgery cases for those residents. Each of the residents met the required minimum of 20 pediatric surgery cases and the mean number of pediatric surgery cases performed by the group far exceeded the national average.

The effect on the number of pediatric surgery cases performed by residents in associated general surgery program is clearly an important aspect of the impact of the establishment of a new pediatric surgery fellowship program. Other effects that remain to be elucidated include the types of pediatric surgery operations done by the general surgery residents in the setting of an associated pediatric surgery fellowship program, the satisfaction of the general surgery residents with their training in pediatric surgery in such a setting, the performance of residents from such programs in the board certification examination sequence, the educational benefits that accrue to residents from the complex pediatric surgery cases that an institution with a fellowship program may attract, and the potential value of near-peer teaching by fellows. A question that certainly invites long-term study is the impact on patient care of individuals performing fewer pediatric surgery operations as residents, who then enter practice in areas that lack ready availability of fellowship-trained pediatric surgeons. Finally, it must be affirmatively stated that the results of this study reflect only the establishment of new pediatric surgery fellowship programs and cannot necessarily be generalized to establishment of new fellowship programs in other subspecialties.

This study has several limitations. An element that clearly confounds interpretation of this study is the steady decline in the number of pediatric surgery cases performed by general surgery residents nationally. Factors obviously contributing to that decline are the number and proportion of pediatric surgery cases performed by pediatric surgery fellows (Figs. 7 and 8). Figure 7 also indicates that the number of pediatric surgery cases done by individuals in ACGME-accredited programs (residency and fellowship) may have peaked, while the number of residents and, to a lesser extent fellows, continues to increase. There are other factors that may contribute to the decline in pediatric surgery cases performed by residents nationally and in the programs in this study. One such factor is ACGME duty hour restrictions. In considering that possibility, though, it must be noted that the total number of major cases performed by general surgery residents has steadily risen in the era of duty hour restrictions. It is also possible that general surgery residents are assigned to fewer rotation months on pediatric surgery than before, that the rotations they perform are at a lower postgraduate year level than before, or both. Unfortunately, there is no good source of data by which those possibilities can be explored.

There are other limitations. The ACGME case log data are self-reported by residents, which may result in under- or over-reporting of case numbers, under- or overstating of the role played by the resident in any given operation, and even incorrectly recording the type of operation performed. Another limitation of ACGME case log data is that they reflect only cumulative data on completion of the program. As such, it is not possible to determine in which postgraduate year the pediatric surgery cases recorded by an individual were performed. It is also not possible to determine how many pediatric surgery cases were performed by residents under the supervision of fellows acting as "teaching assistant" after establishment of the fellowship programs. No attempt was made to identify changes in the number of pediatric surgery faculty members, the number of hospital admissions to the pediatric surgery service, the number of pediatric surgery fellows, the number of clinical sites at which pediatric surgical cases were performed, or the number or length of pediatric surgery rotations by general surgery residents in the programs included in the study. Furthermore, it is not possible to discern the desired fellowship or ultimate career plans of each resident included in the study and the impact that may have had on their desire to pursue greater or lesser operative experience in pediatric surgery. Finally, the date that the first pediatric surgery fellow actually matriculated into each PSF program was not available for every program, but the date on which that fellow completed the program was always available.

For those programs without a known matriculation date for their first fellows, the assumption was made that those fellows matriculated 2 years before completion of the programs.

CONCLUSIONS

Establishment of a new pediatric surgery fellowship program results in decreased operative experience as surgeon for residents in the associated general surgery program. The general surgery program director, department chair, and pediatric surgeons should carefully weigh this outcome when considering establishment of a new pediatric surgery fellowship program. Furthermore, in each institution with an extant pediatric surgery fellowship program, the program directors of the general surgery residency and the fellowship program must actively and cooperatively work to maintain a meaningful and productive operative experience in pediatric surgery for the general surgery residents.

REFERENCES

1. ACGME Surgery Case Logs National Data Reports. Available at: https://www.acgme.org/Data-Collection-Systems/Case-Logs-Statistical-Reports. Accessed August 17, 2018.
2. ACGME Program Requirements for Graduate Medical Education in General Surgery. Available at: https://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/440GeneralSurgery2018.pdf?ver=2017-10-03-110315-270. Accessed August 17, 2018.
3. The American Board of Surgery Booklet of Information Surgery 2017-2018. 2017; Philadelphia. Available at: http://www.absurgery.org/xfer/BookletofInfo-Surgery.pdf. Accessed August 17, 2018.
4. Accreditation Council for Graduate Medical Education Data Resource Book Academic Year 2016-2017. Available at: https://www.acgme.org/About-Us/Publications-and-Resources/Graduate-Medical-Education-Data-Resource-Book. Accessed August 17, 2018.
5. Number of accredited programs and on-duty residents for the academic year 2002-2003. Available at: https://apps.acgme.org/ads/Public/Reports/Report/3. Accessed August 17, 2018.
6. The Fellowship Council Matching Process Statistics 2019-2020 Advanced GI, Bariatric, Flexible Endoscopy, HPB and Advanced GI MIS Matching Process. Available at: https://fellowshipcouncil.org/wp-content/uploads/2018/06/FC-Matching-Process-Statistics-06-12-18-AM.pdf. Accessed August 17, 2018.
7. The Fellowship Council Advanced Colorectal and Thoracic Surgery Matching Process Statistics. Available at: https://fellowshipcouncil.org/wp-content/uploads/2012/02/2017-2018-CT-Matching-Process-Statistics.pdf. Accessed August 17, 2018.
8. Society of Surgical Oncology Approved Breast Oncology Fellowship Training Programs. Available at: http://www.surgonc.org/training-fellows/fellows-education/breast-oncology/program-list. Accessed August 17, 2018.
9. The American Association of Endocrine Surgeons 2017 Match Information. Available at: https://www.endocrinesurgery.org/Fellowships/Match-Program. Accessed August 17, 2018.
10. The American Association for the Surgery of Trauma List of AAST Approved Programs & Information. Available at: http://www.aast.org/list-of-aast-approved-programs. Accessed August 17, 2018.
11. The National Resident Matching Program Results and Data Specialties Matching Service 2018 Appointment Year. Available at: http://www.nrmp.org/wp-content/uploads/2018/02/Results-and-Data-SMS-2018.pdf. Accessed August 17, 2018.
12. Borman KR, Vick LR, Biester TW, Mitchell ME. Changing demographics of residents choosing fellowships: longterm data from the American Board of Surgery. J Am Coll Surg 2008;206:782–789.
13. Yeo H, Viola K, Berg D, et al. Attitudes, training experiences, and professional expectations of US general surgery residents. J Am Med Assoc 2009;302:1301–1308.
14. Friedell ML, VanderMeer TJ, Cheatham ML, et al. Perceptions of graduating general surgery chief residents: Are they confident in their training? J Am Coll Surg 2014:695–706.
15. Klingenamith ME, Cogbill TH, Luchette F, et al. Factors influencing the decision of surgery residency graduates to pursue general surgery practice versus fellowship. Ann Surg 2015:449–455.
16. Stitzenberg KB, Sheldon GF. Progressive specialization within general surgery; Adding to the complexity of workforce planning. J Am Coll Surg 2005;201:925–932.
17. Bankhead-Kendall B, Slama E, Truitt MS. Common attributes of high/low performing general surgery programs as they relate to the QE/CE pass rates. Am J Surg 2016;212:1248–1250.
18. Potts JR III. You can't blame the wreck on the train. Am J Surg 2017;214:974–978.
19. Potts JR III. Shifting sands of surgical education. J Am Coll Surg 2018;227:151–162.
20. Kothari SN, Cogbill TH, O'Heron CT, Mathiason MA. Advanced laparoscopic fellowship and general surgery residency can coexist without detracting from surgical resident operative experience. J Surg Ed 2008;65:393–396.
21. Hallowell PT, Dahman MI, Stokes JB, et al. Minimally invasive surgery fellowship does not adversely affect general surgery resident case volume: a decade of experience. Am J Surg 2013;205:307–311.
22. Linn JG, Hungness ES, Clark S, et al. General surgery training without laparoscopic fellows: the impact on residents and patients. Surgery 2011;150:752–758.
23. Snyder RA, Phillips SE, Terhune KP. Impact of implementation of a pediatric surgery fellowship on general surgery resident operative volume. J Surg Ed 2012;69:753–758.
24. Hanks JB, Ashley SW, Mahvi DM, et al. Feast or famine? The variable impact of coexisting fellowships on general surgery resident operative volumes. Ann Surg 2011;254:476–485.
25. Shannon AH, Robinson WP, Hanks JB, Potts JR III. The impact of new vascular fellowship programs on vascular surgery operative volume of residents in associated general surgery programs. J Am Coll Surg 2019;228:525–535.

Discussion

DR BENJAMIN JARMAN (LaCrosse, WI): Dr Potts analyzed Accreditation Council for Graduate Medical Education (ACGME) general surgery resident case logs from 2002 to 2017 in those institutions that incorporated a pediatric surgery fellowship. He