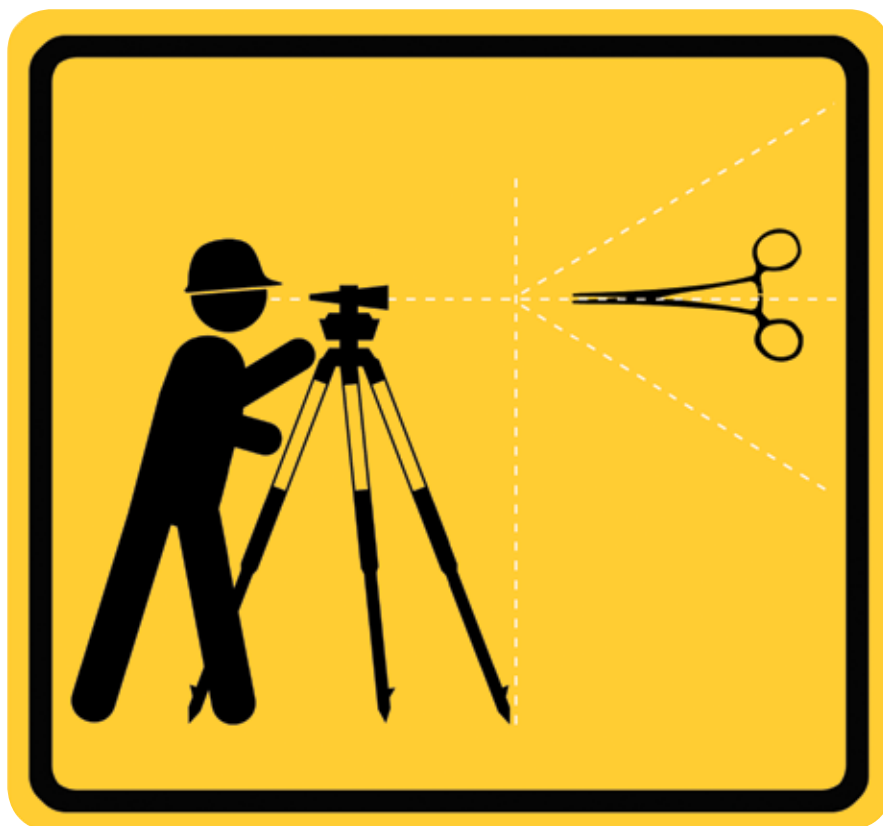


# *ACS Practice Patterns Survey, Part III:* **USE OF SURGICAL INSTRUMENTS AND DEVICES AMONG SURGICAL SPECIALTIES**

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Until now, very little data were available to determine how frequently surgeons use equipment and devices in the operating room and, in turn, which devices are used within each of the surgical specialties. To address this issue, an electronic survey of members of the American College of Surgeons was carried out in fall 2007. The response rate was impressive: 4,207 individuals participated, representing the broad range of practice settings and surgical specialties. Nearly 45 percent of the respondents work in a university/teaching hospital, 39 percent are in private practice, and the remainder provide care in other environments. The survey results



regarding surgeons' prescribing habits have been published in previous issues of the *Bulletin*.\*

The breakdown of surgical subspecialties among survey participants was very similar to that of the ACS membership overall. The largest percentage of respondents (40 percent)

\*See the June and November 2008 issues of the *Bulletin*.

classified themselves as general surgeons, and the other 60 percent represented the majority of surgical specialties. The age groups were spread evenly over the categories, with the largest group represented by surgical respondents in the age range of 55 to 70 years (28 percent), followed by the group representing 45- to 54-year-olds

**Table 1: SURVEY RESPONDENTS—BREAKDOWN BY SPECIALTY AND AGE\***

Specialty	Younger than 35	35–44 years	45–54 years	55–70 years	Older than 70
General Surgery	23.41%	25.35%	23.74%	25.22%	1.61%
Otolaryngology–Head and Neck Surgery	7.06%	29.80%	33.33%	26.67%	2.35%
Vascular Surgery	8.02%	25.00%	35.85%	28.77%	1.42%
Colon and Rectal Surgery	9.52%	30.16%	36.51%	21.16%	1.59%
Urology	7.56%	19.77%	30.81%	38.37%	2.33%
Trauma/Critical Care	7.06%	48.82%	26.47%	17.06%	0.59%
Cardiothoracic Surgery	3.59%	20.96%	34.73%	35.33%	4.79%
Pediatric Surgery	4.29%	34.36%	37.42%	22.09%	1.84%
Plastic and Maxillofacial Surgery	8.33%	27.56%	30.13%	30.77%	1.92%
Breast Surgery	2.40%	32.80%	32.80%	29.60%	2.40%
Surgical Oncology	8.13%	43.09%	26.02%	17.89%	3.25%

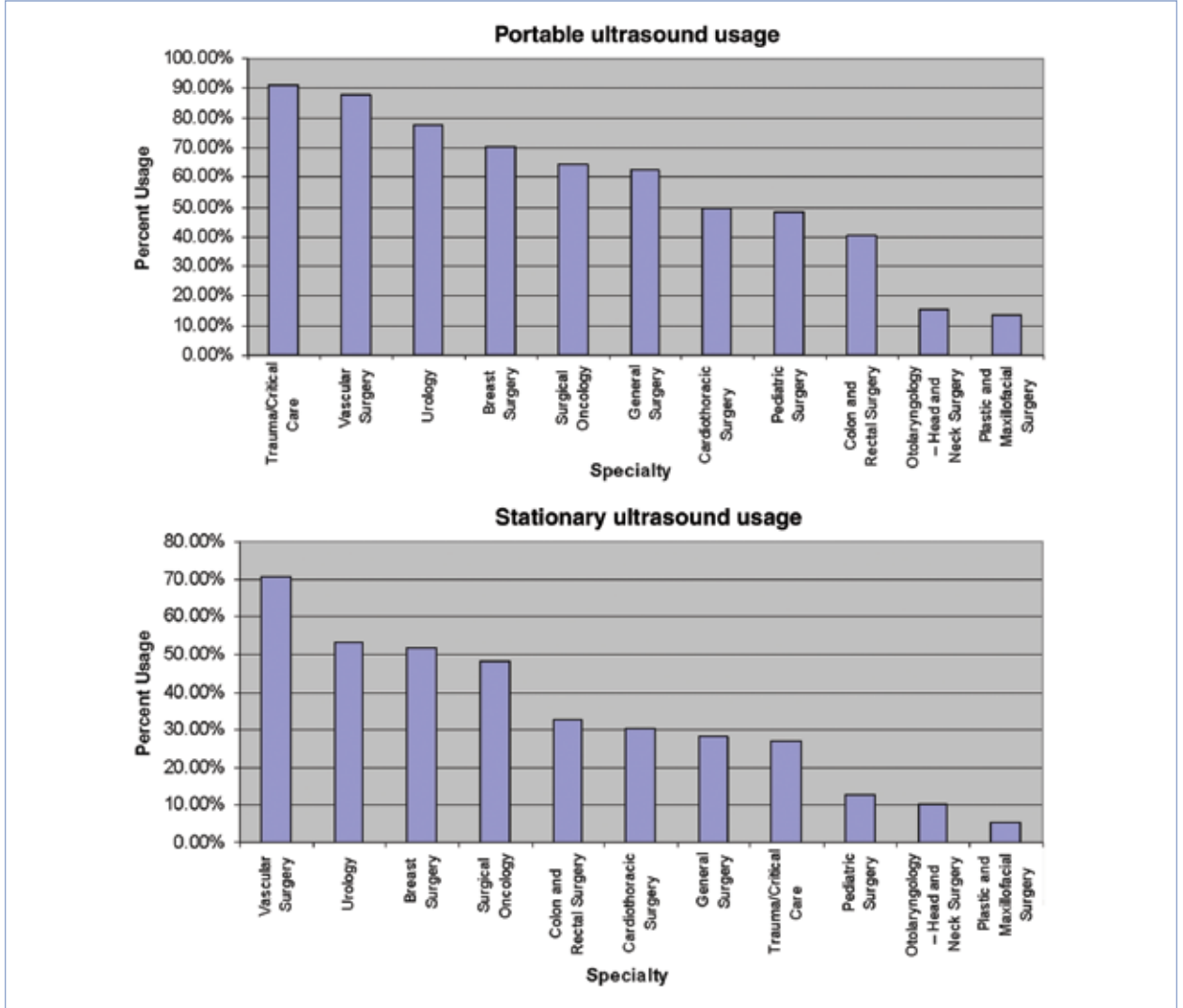
\*Data apply to results described in this report and the previously published results on the survey responses to prescribing habits.

**Table 2: USE OF SURGICAL INSTRUMENTS AND DEVICES AMONG SURGICAL SPECIALTIES**

	General Surgery (1,663)	Otolaryngology-Head and Neck Surgery (274)	Vascular Surgery (227)	Colon and Rectal Surgery (204)	Cardiothoracic Surgery (201)	Urology (182)	Trauma/Critical Care (179)	Pediatric Surgery (178)	Plasti and Reconstructive Surgery (167)	Breast Surgery (132)	Surgical Oncology (134)
Biopsy instruments	82%	66%*	19%	76%	65%	93%*	45%	77%	36%*	90%*	92%*
Minimally invasive surgical instruments	95%*	66%*	46%	90%*	84%*	73%*	82%*	94%*	42%*	44%	85%*
Surgical stapling products	97%*	55%*	57%	98%*	92%*	81%*	95%*	95%*	64%*	56%*	95%*
Access and trocar products	94%*	11%	40%	87%*	76%*	66%	86%	94%*	17%	47%	83%
Portable ultrasound	63%	16%	88%*	40%	50%	77%*	91%*	49%	13%	70%*	64%
Stationary ultrasound	28%	10%	71%*	33%	31%	54%	27%	13%	5%	52%	48%
Self-retaining retractors	90%*	50%*	83%*	89%*	83%*	75%	87%*	85%*	35%*	41%	88%*
Venous access devices	66%	9%	84%*	41%	57%	15%	81%	79%*	10%	54%	68%
Gamma probes	46%	15%	3%	7%	3%	1%	5%	7%	6%	88%*	69%
Liver resection equipment	17%	<1%	4%	7%	2%	2%	18%	41%	1%	2%	66%
Robotic Instruments	5%	5	2%	7%	10%	27%	2%	14%	2%	1%	8%

\*Indicates the four highest frequency of instruments used.

Figure 1: PORTABLE AND STATIONARY ULTRASOUND—USAGE BY SPECIALTY

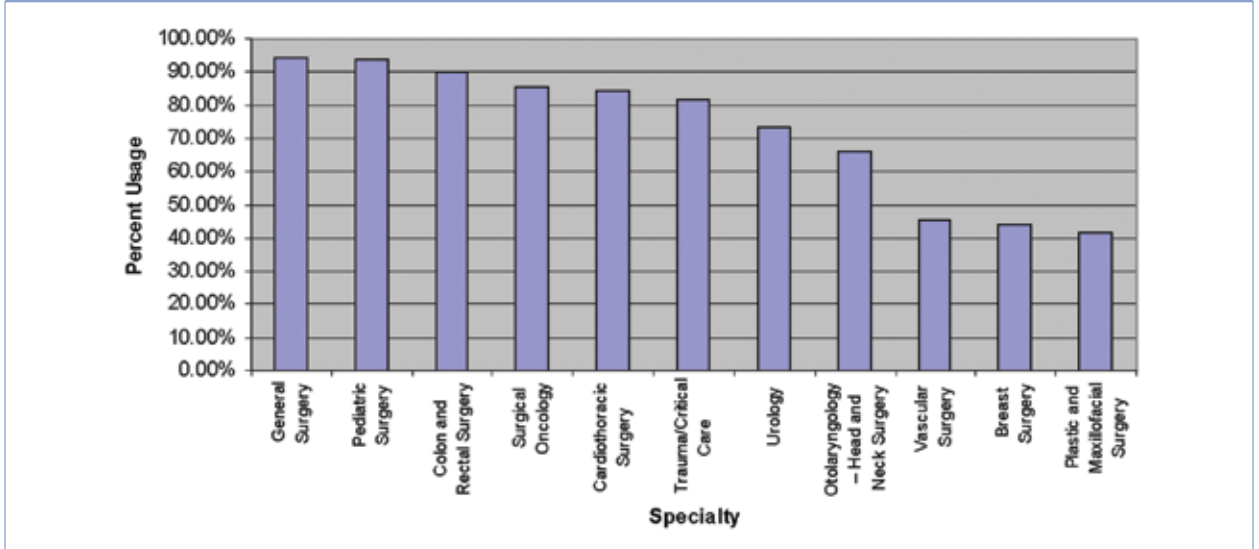


(27 percent), and the group representing the 35- to 44-year-olds (26 percent). Interestingly, younger surgeons (that is, surgeons younger than 45 years) who responded to the survey were in the specialties of trauma/critical care, general surgery, and surgical oncology, whereas older surgeons (that is, surgeons ages 55 years and older) were more commonly in the specialties of urology and cardiothoracic surgery (see Table 1, page 25).

### Use of surgical devices

This study, the largest ever published on this subject, clearly indicates that surgeons in a range of settings and specialties use a variety of devices and surgical instruments. The vast majority of respondents (70 percent) said that, on average, they or trainees working under their supervision use suction or drainage devices, surgical stapling devices, or some type of minimally invasive instrument, a trocar product, or a biopsy instrument.

Figure 2: MINIMALLY INVASIVE SURGICAL INSTRUMENTS—USAGE BY SPECIALTY



The specific breakdown of instrument use is as follows:

- Suction and drainage devices: 87 percent (3,410 respondents)
- Surgical stapling products: 85 percent (3,299 respondents)
  - Minimally invasive surgical instruments: 81 percent (3,146 respondents)
    - Access and trocar products: 72 percent (2,828 respondents)
    - Biopsy instruments: 71 percent (2,778 respondents)
    - Portable ultrasound: 56 percent (2,204 respondents)
    - Venous access devices: 53 percent (2,061 respondents)
    - Stationary ultrasound: 38 percent (1,204 respondents)
      - Gamma probes: 27 percent (1,055 respondents)
      - Liver resection equipment: 15 percent (596 respondents)
      - Robotic instruments: 7 percent (279 respondents)

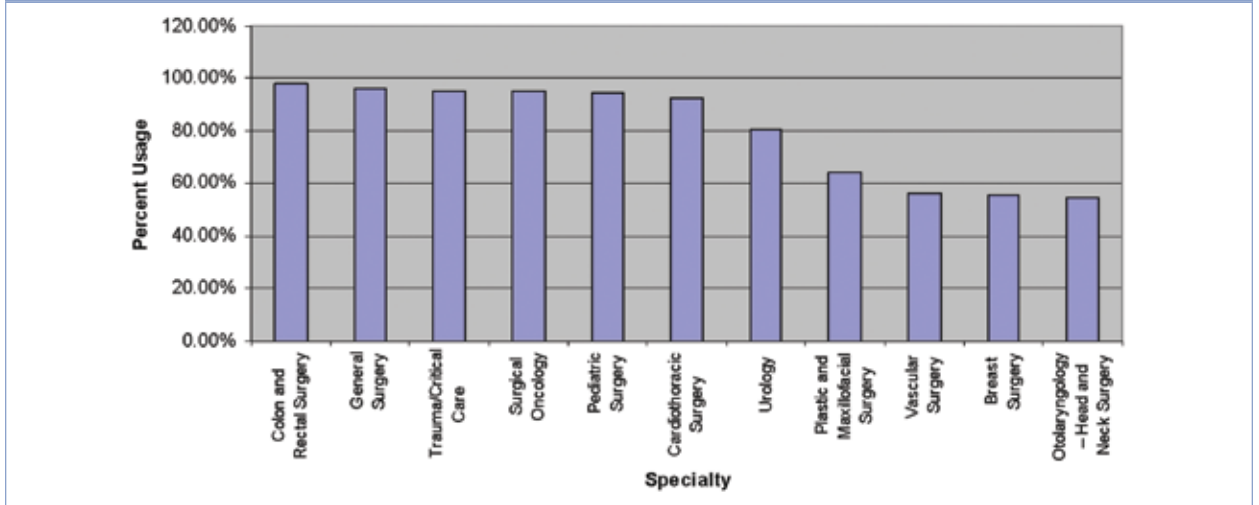
Among the surgical specialties, there were notable trends in the use of the 11 instruments or devices on the survey that were distinctive to each of the surgical specialties as listed in

Table 2 (page 25), which describes the use of surgical instruments and devices among surgical specialties. Clearly, there were different patterns of use among the surgical specialties. For example, general surgeons, colon and rectal surgeons, surgical oncologists, and pediatric surgeons reported the highest use and breadth of instruments used, especially minimally invasive instruments and stapling devices. Vascular surgeons, breast surgeons, surgical oncologists, and urologists reported the highest use of ultrasound devices (both portable and stationary ultrasound), whereas 91 percent of trauma/critical care surgeons reported use of a portable ultrasound device. More than 90 percent of surgical oncologists, breast surgeons, and urologists used biopsy instruments. Some instrument use was quite specialty-specific; for example, the primary specialists to use a gamma probe (as part of the sentinel lymph node biopsy procedure) were breast surgeons 89 percent, surgical oncologists (69 percent), and general surgeons (46 percent), whereas urologists were the prime users of robotic devices.

### *Use of ultrasound equipment*

In the survey, respondents were asked separate questions about use of portable and stationary ultrasound equipment. Vascular surgeons were

Figure 3: SURGICAL STAPLING PRODUCTS—USAGE BY SPECIALTY



unquestionably the most frequent users of both types of equipment. Otherwise, there is likely an overlap of utilizing stationary versus portable ultrasound equipment by the specialties listed below, so the survey results are reported separately.

Portable ultrasound was used most frequently by trauma/critical care surgeons (91 percent responded that they had used the device during the past year), followed by vascular surgeons (88 percent), urologists (77 percent), breast surgeons (70 percent), surgical oncologists (64 percent), and general surgeons (63 percent). Stationary ultrasound was used most frequently during the past year by vascular surgeons

(70 percent), urologists (54 percent), breast surgeons (52 percent), and surgical oncologists (48 percent) (see Figure 1, page 26).

### ***Minimally invasive instruments***

Widespread use of minimally invasive equipment was common among the surgical specialists who responded to the survey in greatest numbers. Practitioners in general surgery (95 percent), pediatric surgery (94 percent), colon and rectal surgery (90 percent), surgical oncology (85 percent), cardiothoracic surgery (84 percent), and trauma/critical care (82 percent) were the major users of minimally invasive equipment. The majority of urologists (73 percent) and otolaryngologists—head and neck surgeons (66 percent) also reported that they used minimally invasive equipment (see Figure 2, page 27).

Although robotic devices are a relatively new form of minimally invasive instruments, they are being used with some frequency by urologists (27 percent of respondents), pediatric surgeons (14 percent), cardiothoracic surgeons (10 percent), surgical oncologists (8 percent), and colon and rectal surgeons (7 percent).

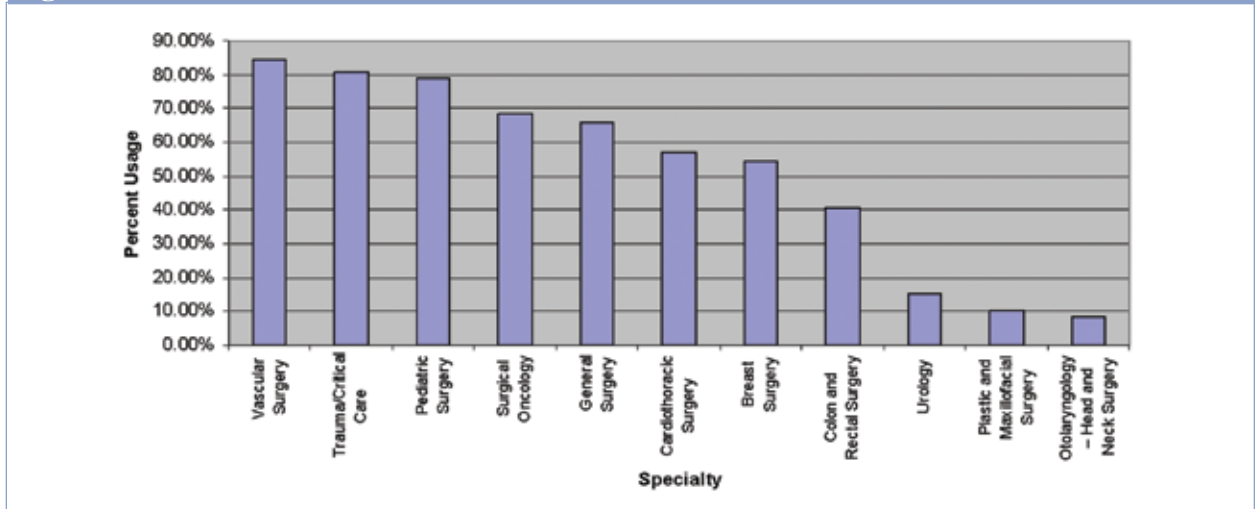
### ***Surgical stapling products***

Virtually all surgeons, regardless of specialty, used surgical stapling equipment. More than 90 percent of surgeons reported that they use sta-



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Figure 4: VENOUS ACCESS DEVICES—USAGE BY SPECIALTY



pling equipment. Represented in that group were colon and rectal surgeons (98 percent), general surgeons (97 percent), surgical oncologists (95 percent), trauma/critical care surgeons (95 percent), pediatric surgeons (94 percent), and cardiothoracic surgeons (92 percent)—whereas a majority of surgeons who used stapling devices were urologists (81 percent) or plastic/maxillofacial surgeons (64 percent) (see Figure 3, page 28).

#### Use of venous access devices

The surgical specialists who responded to the survey in greatest numbers were more selective use of venous access devices. The vast majority of surgeons using venous access devices were vascular surgeons (84 percent), trauma/critical care surgeons (80 percent), and pediatric surgeons (79 percent). Surgical oncologists (68 percent), general surgeons (66 percent), and cardiothoracic surgeons (57 percent) were also major users, whereas plastic/maxillofacial surgeons reported only occasional use (10 percent) (see Figure 4, this page).

#### Conclusion

These data provide new insights into the practice habits of surgeons caring for their patients. There were differences in both the types of instruments and devices used as well as the frequency of using them among the various surgical specialties. Most notable was the high frequency with which

all surgeons used ultrasound equipment in the management of their surgical patients.

The data described in this report reflect the practice patterns of surgeons who responded to the College-sponsored Internet-based survey; it is uncertain whether this reflects the usage patterns of all surgeons among all of the specialties. If anything, there might be a bias toward those surgeons who are major users of drugs and devices in their practice and who would be more inclined to respond to a survey about this topic. Nevertheless, the distribution of respondents based on age and surgical specialty is similar to that of the American College of Surgeons' membership profile. <sup>9</sup>

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