Do Emergency Medicine Physicians Perform Ultrasound and Conventional Radiography in the Emergency Department? Recent Trends from 1993 to 2001

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Purpose: To examine trends in emergency medicine physicians' participation in diagnostic ultrasound and conventional radiography from 1993 to 2001.

Methods and Materials: The nationwide Medicare Part B Physician/Supplier Procedure Summary Master Files for 1993 and 1996 through 2001 were examined to determine the total number of ultrasound and conventional radiography examinations performed in emergency departments, except for ophthalmic ultrasound and supervision or interpretation claims. Ultrasound examinations were categorized as general, vascular, breast, echocardiography, and obstetrical. Conventional x-ray examinations were categorized as chest, skeletal, abdomen, and gastrointestinal fluoroscopy. The total volume and overall share of the two modalities and nine aforementioned categories were calculated for each year for radiologists, emergency medicine physicians, other nonradiologists, and multispecialty groups using the Medicare provider and location-of-service codes.

Results: The total volume of ultrasound examinations performed in emergency departments increased from 134,533 in 1993 to 355,889 in 2001 (+164.5%). Emergency medicine physicians performed 760 (0.6%) of the examinations in 1993 and 1160 (0.3%) in 2001. Radiologists performed 87,377 (64.9%) in 1993 and 257,479 (72.3%) in 2001, other nonradiologists (primarily cardiologists performing echocardiography and vascular surgeons performing vascular ultrasound) performed 40,501 (30.1%) in 1993 and 76,649 (21.5%) in 2001, and multispecialty groups performed 5895 (4.4%) in 1993 and 20,601 (5.8%) in 2001. The total volume of conventional radiography examinations increased from 5,120,608 in 1993 to 8,054,771 (+57.3%) in 2001. Emergency medicine physicians performed 243,705 examinations (4.8%) in 1993 and 167,968 (2.1%) in 2001, radiologists performed 4,558,933 (89.0%) and 7,478,659 (92.8%), other nonradiologists performed 113,848 (2.2%) and 99,627 (1.2%), and multispecialty groups performed 204,122 (4.0%) and 308,517 (3.8%). The largest volume of examinations performed by radiologists and emergency medicine physicians in emergency departments in 2001 was in chest radiography, with radiologists performing 3,765,209 and emergency medicine physicians performing 98,851. The largest volume for other nonradiologists in emergency departments in 2001 was in echocardiography; they performed 53,943 of these examinations.

Conclusion: Emergency medicine physicians perform a very small percentage of all ultrasound and conventional x-ray examinations performed in emergency departments, with their share decreasing over the 8-year period. The fact that the participation of emergency medicine physicians in ultrasound imaging and conventional radiography in emergency departments is limited and has been decreasing makes their claim of substantial participation highly questionable.

Key Words: Medical economics, radiology, radiologists, departmental management, socioeconomic issues, ultrasound, conventional radiography

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INTRODUCTION

Ultrasound and conventional radiography are diagnostic staples of emergency medicine. Although most hospitals provide on-call ultrasound and x-ray services after business hours, emergency medicine physicians (EPs) claim the need for more immediate availability of these services on a 24-hour basis. Many emergency medicine residency programs include some degree of training in the performance and interpretation of ultrasound and conventional x-rays with the support of the American College of Emergency Physicians [1], yet the perception of the performance and availability of radiology services is markedly different for radiologists and EPs. In a nationwide survey of emergency medicine and radiology department chairs, the availability of ultrasound as assessed by EPs was significantly less than that assessed by radiologists [2], yet the reported percentage of ultrasound performed by EPs was higher when assessed by EPs than radiologists. Another survey of EM residency directors reported that EPs performed clinically relevant readings during nights and weekends at 79% of the sites surveyed, with a median misinterpretation rate of 1.5% during these hours [3]. Additionally, Baker [4] conducted a survey of radiologists that reported that EPs were interpreting 44% of the radiologic studies in the sites polled, and 75% of the nonacademic emergency room sites polled had EPs performing sonography.

Previous studies of nationwide 1997 Medicare data showed that EPs had little participation in conventional radiography and ultrasound in emergency departments (EDs) [5,6]. Because EPs continue to claim substantial participation and the need to perform more, we updated the previous studies. The purpose of this study was to examine trends in the participation of EPs in the use of diagnostic ultrasound and conventional radiography in EDs, using nationwide Medicare data from 1993 to 2001.

MATERIALS AND METHODS

The nationwide Centers for Medicare and Medicaid Services Part B Physician/Supplier Procedure Summary Master Files (the Medicare Part B databases) for 1993 and 1996 through 2001 were evaluated for all Current Procedural Terminology, Version 4, procedure codes related to noninvasive diagnostic imaging. Each claim provides information on the location where the service was performed and the specialty of the physician provider. The most common locations where imaging is provided are coded as hospital inpatient, hospital outpatient, private office, or ED. We determined the total volume of ultrasound and conventional x-ray examinations that were performed in EDs on Medicare fee-for-service enrollees each year. These files cover all Medicare fee-for-service enrollees but do not include those in health maintenance organizations. The Medicare Part B databases are anonymous public files and therefore exempt from institutional review board regulations. Using the provider specialty code designated for each procedure in the Medicare Part B databases, physicians providing ED ultrasound and conventional x-ray services were classified as radiologists, EPs, other nonradiologists, or multispecialty groups (which includes a group of provider codes in which the specialty of the individual physician performing the services could not be determined). The relative share of procedures performed by each specialty group was determined for each year.

The examinations were then classified into nine diagnostic categories as follows: (1) chest radiography, (2) skeletal radiography, (3) abdominal radiography, (4) gastrointestinal fluoroscopy, (5) general ultrasound, (6) vascular ultrasound, (7) breast ultrasound, (8) echocardiography, and (9) obstetrical ultrasound. Obstetrical ultrasound was included in this analysis although it is underrepresented in the Medicare population (in all likelihood, the only obstetrical ultrasound examinations were in patients with chronic renal failure, who are covered by Medicare, and disabled Medicare beneficiaries). Ophthalmic ultrasound and the ultrasound supervision and interpretation codes that are used for guidance during invasive procedures were excluded. We reviewed each of the Current Procedural Terminology, Version 4, codes in the 70000 series and the echocardiographic and vascular ultrasound codes in the 90000 series to assign each code to the appropriate category. SAS 9.0 for Windows (SAS Institute Inc., Cary, NC) was then used to tabulate the number of procedures in each of the categories. The percentage changes in use among radiologists and EPs over the 8-year period between 1993 and 2001 were calculated for each category.

The Medicare Part B databases contain information on the complete Medicare fee-for-service population. This is a large sample of approximately 85% of all older Americans. There is no reason to assume that the use rates in emergency rooms would be different for other populations. For the purposes of this study, we believe that the use rates can be generalized to other populations. Because this is the complete Medicare fee-for-service population, no inferential statistics are required, as would be the case if we were trying to infer population statistics from sample data.

RESULTS

Table 1 shows the ultrasound examination volume in EDs for radiologists, EPs, other nonradiologist physicians, and multispecialty groups in 1993 and from 1996 through 2001. In 1993, of 134,533 ED ultrasound examinations among the Medicare fee-for-service popula-