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Not applicable.

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All authors report no conflicts of interest.

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### Current use and training needs of point-of-care ultrasound in emergency departments: A national survey of VA hospitals



Point-of-care ultrasound (POCUS) is being increasingly used to rapidly diagnose and manage acute illnesses in different healthcare settings [1]. POCUS use has been considered a core emergency medicine (EM) application since 2001 [1,2]. Given the variability of ED staffing and individual provider skills, current POCUS usage and training needs among physicians working in EDs is largely unknown. Though a few studies have reported POCUS usage patterns, [3,4] a national survey of multiple hospital EDs has not been conducted.

*Abbreviations:* ACEP, American College of Emergency Physicians; COS, Chiefs of Staff; EDs, Emergency Departments; EM, Emergency Medicine; HAIG, Healthcare Analysis and Information Group; POCUS, Point-of-care ultrasound; VA, Veterans Affairs.

We sought to better understand the current usage, barriers to use, and training needs for POCUS in EDs to guide development of a national POCUS training program for the VA healthcare system. We conducted a prospective observational nationwide study of all VA facilities using an electronic survey in collaboration with the VA's Healthcare Analysis and Information Group (HAIG). The study was deemed to be non-research by the Investigational Review Board of the University of Texas Health Science Center (Protocol Number: HSC20160445N). The web-based survey was distributed to the chiefs of staff (COS) at all VA Medical Centers nationwide (n = 144) between April and July 2016.

We classified facilities as “POCUS users” if the ED Service Chief endorsed usage, or “POCUS non-users” as reported by the COS or the ED Service Chief. We compared POCUS users' and non-users' utilization of 20 common EM POCUS applications based on the ACEP Ultrasound Guidelines [4].

We analyzed data from 115 facilities with EDs [5]. The COS response rate was 100% (n = 115) and Service Chief response rate was 81% (67 of 83) among those Service Chiefs that were provided surveys. Sixteen of the 115 ED facilities were excluded because the COS stated that POCUS was not used in the ED, and there was no survey response from the ED Service Chief to confirm or deny usage. Thus, the final data set included 99 EDs for analysis (Fig. 1).

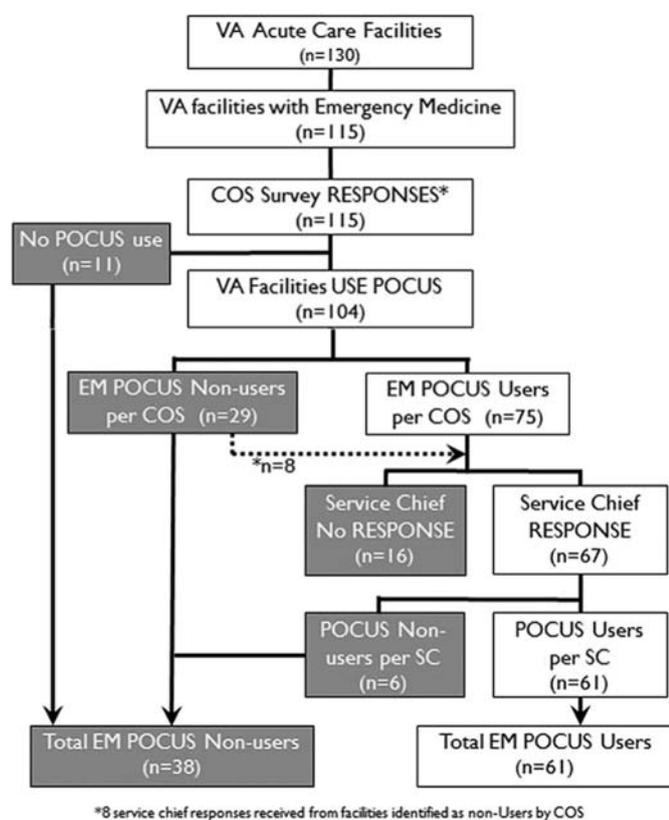
The current use vs. non-use of the 20 common EM POCUS applications in our survey is summarized in Fig. 2. The majority of EDs reported using POCUS for 4 applications: central line placement (84%), pericardial effusions (69%), peritoneal free fluid (57%), and urinary retention (66%). Of the other 16 EM POCUS applications, facilities reported the least usage for assessment of optic nerve sheath (3%), fractures (10%), cellulitis (15%), and pulmonary edema (16%).

Greater POCUS use was seen in EDs affiliated with an EM residency or fellowship and facilities with higher numbers of hospital beds, ED beds, and annual patient ED visits. Across all POCUS users, we found high rates of support (>70%) from ED Service Chiefs to obtain POCUS training for their physicians. For all diagnostic and procedural POCUS applications, the percentage of POCUS users desiring additional training was consistently higher than POCUS non-users (Fig. 3). Among POCUS users, additional training in diagnostic applications was most desired for assessing volume status (92%), deep venous thrombosis (88%), abdominal aortic aneurysm (87%), and gallbladder/bile ducts (85%).

Given our high response rates from COSs and ED Service Chiefs, we believe these data accurately represent the current status of POCUS use within VA EDs nationally and may be representative of non-VA hospital EDs since many physicians work in multiple EDs. Our study demonstrated that most VA EDs (62%) are using some POCUS applications, compared to studies of non-academic EDs that have reported 29–43% of EM physicians using POCUS [6,7]. Our data demonstrated that VA EDs with relatively fewer operational beds and patient visits were less likely to use POCUS which is similar to other studies comparing rural versus urban ED POCUS usage [8,9].

For all EM POCUS applications, we found that current usage was associated with a desire for additional training in that application. It is unclear why EDs that use more POCUS applications desired more training. Perhaps initial exposure to POCUS facilitates a better understanding of its potential benefits, resulting in recognition of the need for additional training. Our study revealed the two most commonly reported barriers to POCUS use were lack of trained physicians and lack of ultrasound equipment, similar to other studies reporting barriers to POCUS usage in non-VA EDs [8,10–12].

In summary, our findings demonstrate that the majority of VA EDs are using POCUS. POCUS use is more prevalent in EDs affiliated with an EM residency or fellowship program and less prevalent in smaller, lower volume hospitals and EDs. Active POCUS use is associated with an increased desire for further training in POCUS for



**Fig. 1.** Survey Responses of POCUS User vs. Non-user VA EDs. VA, Veterans Administration; COS, chief of staff; EM, Emergency Medicine; SC, service chief.

common EM POCUS applications. Lack of trained physicians and lack of ultrasound equipment are the top barriers to POCUS use in VA EDs, akin to the same challenges seen in non-VA EDs.

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## Data statement

Data is available and has been uploaded.

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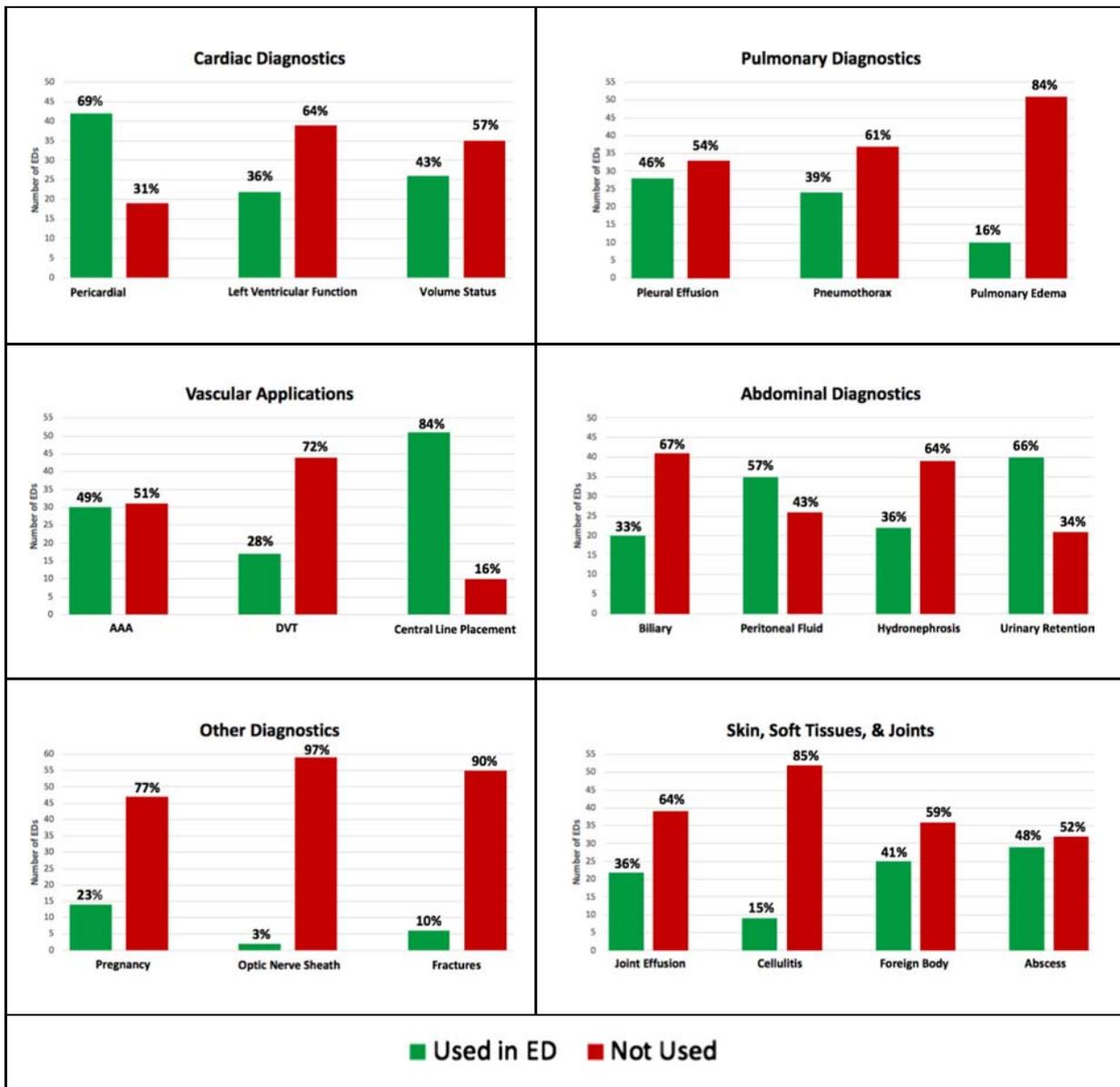


Fig. 2. Use vs. Non-use of Core EM POCUS Applications in VA EDs with POCUS. POCUS, Point-of-care ultrasound; VA, Veterans Administration; ED, Emergency Department; AAA, Abdominal Aortic Aneurysm; DVT, Deep Venous Thrombosis.

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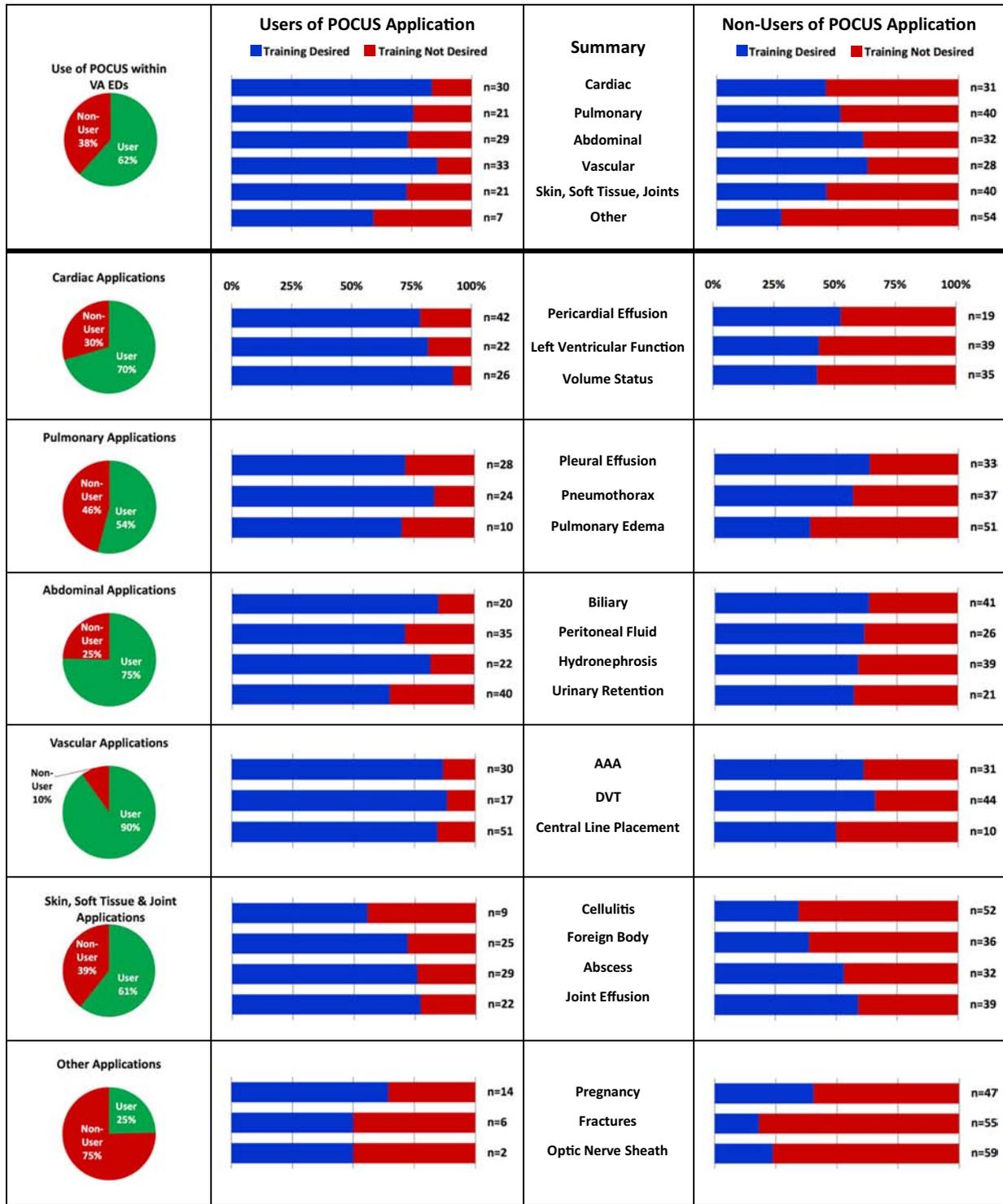


Fig. 3. Desire for Training in Core EM POCUS Applications. POCUS, Point-of-care ultrasound; VA, Veterans Affairs, ED, Emergency Department; AAA, Abdominal Aortic Aneurysm; DVT, Deep Venous Thrombosis.

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