



### Faculty Bedside Ultrasound Credentialing

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29 research

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31 Marina Del Rios: Survey design, statistical analysis and interpretation of data, drafting of  
32 manuscript  
33  
34

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## 1 **Article Summary**

### 2 **Article Focus**

- 3 • To describe a single academic facility's experience with a faculty credentialing process in  
4 bedside ultrasound
- 5 • To discuss the faculty's impressions on motivators and barriers to completion of the  
6 bedside ultrasound requirements
- 7 • To present recommendations on how to design a faculty credentialing program in bedside  
8 ultrasound based on our study results

### 9 **Key Messages**

- 10 • A faculty credentialing program in bedside ultrasound should have clearly defined goals  
11 supported by the emergency medicine departmental leadership
- 12 • Protected time outside of clinical duties dedicated to self-directed education is a  
13 motivator to the bedside ultrasound credentialing process
- 14 • Opportunities for direct supervision of bedside ultrasound technique and mentoring  
15 enhance the credentialing process

### 16 **Strengths and Limitations**

17 The institution where this credentialing program in bedside ultrasound was instituted included  
18 physicians with diverse previous experience in sonography. This descriptive report for an  
19 academic institution may not reflect that of private and community physician groups in non-  
20 academic settings starting a credentialing program for ultrasound.

## 24 Faculty Bedside Ultrasound Credentialing

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### 26 ABSTRACT

27 **Introduction:** There are no standardized training guidelines to credential emergency physicians  
28 who completed residency before the establishment of emergency bedside ultrasound curricula in  
29 residency training programs. The objective of this descriptive report is to illustrate a single  
30 academic facility's experience with a faculty credentialing process in bedside ultrasound and the  
31 faculty's impressions on motivators and barriers to completion of the requirements.

32 **Methods:** Emergency medicine attending physicians underwent training and credentialing in the  
33 applications of aorta and pelvic ultrasound over a 9-month period. After the credentialing period  
34 we conducted a survey to evaluate the faculty's perceptions of this process.

35 **Results:** There were a total of 41 faculty members during the credentialing survey period. 11 of  
36 the faculty members were exempt from ultrasound training. We asked attending physicians  
37 (N=41 exempt and non-exempt) to complete a web-based survey after the completion of the  
38 credentialing period. Questions about potential barriers and incentives were listed and responders  
39 were asked to rank answers on a 5-point Likert scale. Of the 31 respondents, 21 (67.7%)  
40 completed the credentialing requirements by the 9-month deadline. 19/23 emergency medicine  
41 residency trained physicians completed the requirements compared with 2/5 of those that were  
42 not emergency medicine residency trained Our pilot study data suggests an association between  
43 fewer years in practice and completion of the requirements.

44 **Discussion:** This is a report on a single academic institution's experience with a faculty  
45 credentialing program in bedside ultrasound for physicians with a diversity experience in

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3 46 sonography. We describe the success of the credentialing process and identify survey-based  
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6 47 faculty characteristics associated with fulfilling the requirements.  
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10 49 KEY WORDS Bedside ultrasound, Emergency ultrasound, Faculty, Education, Credentialing  
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## 69 INTRODUCTION

70 At present, there is a well-delineated history of the development for emergency medicine  
71 resident training guidelines for bedside ultrasound (BUS). In 1994 Mateer et al. set forth  
72 recommendations for an ultrasound curriculum in residency training programs.[1] This  
73 discussion has evolved and in 2001 the American College of Emergency Physicians (ACEP)  
74 published the *Emergency Ultrasound Guidelines* which outlined the recommendations for  
75 adequate documentation, quality assurance programs, credentialing, and continuing medical  
76 education.[2] More recently, the 2008 ACEP guidelines and the 2009 Core (Level 1) Ultrasound  
77 Curriculum from the College of Emergency Medicine in London, UK set forth more  
78 comprehensive statements which expanded core applications and specifications for US  
79 training.[3, 4]

80 In 2012, the ACGME designated ultrasound as one of twenty-three milestone  
81 competencies for Emergency Medicine residency graduates.[5] With increasing scrutiny of  
82 medical educational programs and their effect on patient safety and healthcare delivery,  
83 standardized ultrasound training and competency assessment is imperative. In contrast, BUS  
84 education and credentialing in community and academic emergency departments where  
85 practicing physicians did not receive training remains a challenge. Moore et al. reported in their  
86 survey results of community emergency departments that lack of training of emergency  
87 physicians is the largest barrier to implementation of bedside ultrasound.[6]

88 The Core (Level 1) Curriculum by the College of Emergency Medicine, UK, presents  
89 guidelines for trainees and the ACEP Policy statement presents a practice pathway that gives  
90 meaningful recommendations for hospitals on how to credential EM attending doctors who  
91 completed residency before establishing emergency ultrasound residency training curricula.[2, 4]

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3 92 Training in bedside ultrasound is particularly unique in that it requires both the hands-on skill of  
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5 93 scanning combined with the cognitive skill of recognizing anatomy and pathological processes  
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8 94 and interpreting images.[7] Learning about the barriers and incentives to bedside ultrasound  
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10 95 training and credentialing as perceived by practicing emergency physicians may aid in the  
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13 96 development of a more successful credentialing standard.

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15 97 This paper describes our institution's experience with faculty training in bedside  
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17 98 ultrasound. Numerous publications address medical student and resident bedside ultrasound  
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20 99 curricula and training.[8-10] This survey addressed faculty opinions of bedside ultrasound and  
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22 100 the perceptions of the ultrasound credentialing process of faculty members required to complete  
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24 101 it. After completion of credentialing in the applications of aorta and pelvic ultrasound, we  
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27 102 conducted a faculty survey to evaluate their previous experience and training in bedside  
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29 103 ultrasound and the perceptions of the credentialing process for those required to complete it.

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3 115 **METHODS**  
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5 116 XXXXX hospital center is comprised of two separate urban teaching hospitals with a combined  
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8 117 volume of 170,000 visits a year. Attending physicians attended a 16-hour training course upon  
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10 118 joining the XXXXX faculty. The credentialing process is as follows: For each bedside  
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12 119 ultrasound application, faculty are asked to submit 25 technically adequate ultrasound scans of  
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15 120 which a certain number should be positive studies (in the case of aorta, at least 2-3 abdominal  
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17 121 aneurysms and for pelvic ultrasound, at least 12 intra-uterine gestations). Each faculty member  
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19 122 then completes a written examination comprised of multiple choice and image identification  
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21 123 questions pertaining to the respective bedside ultrasound application. Subsequently, one of the  
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23 124 ultrasound division faculty members then reviews the examination with the faculty member and  
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25 125 oversees a hands-on competency examination with bedside real-time scanning of a volunteer  
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27 126 patient or model. With successful completion of the delineated steps, a credentialing letter  
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29 127 specific to that application is sent to the department chairperson and the hospital credentialing  
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31 128 committee for emergency procedures. Upon completion, the physician is considered  
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33 129 “credentialed” and permitted to make clinical decisions based upon their bedside ultrasound  
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35 130 examinations and interpretations.  
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41 131 There were a total of 41 faculty members during the credentialing and survey period. 11  
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43 132 of the faculty members were considered exempt: those who were credentialed while faculty  
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45 133 members at our institution by completion of the requirements we described above prior to our  
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47 134 survey, those who received ultrasound training during their EM residency training at XXXXX  
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49 135 and the physician who worked solely as an urgent-care (fast track) provider.  
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53 136 Under the direction of the chairman and bedside ultrasound director, all non-exempt adult  
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55 137 emergency medicine faculty members were required to complete credentialing in aorta and  
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3 138 pelvic ultrasound. These applications were chosen due to the immediacy of these ultrasound  
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6 139 examinations roles in patient care decision-making. Pediatric emergency physicians were asked  
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8 140 to complete credentialing in pelvic ultrasound only. Faculty members were given nine months to  
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10 141 complete the credentialing requirements for these applications.  
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13 142 We asked all 41 of our attending physicians (exempt and non-exempt) to complete a web-  
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15 143 based survey at the end of the 9-month period. The purpose of the survey was to assess their  
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17 144 prior experience with bedside ultrasound and their opinions of the faculty credentialing process.  
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19 145 Questions focused on credentialing barriers and incentives and responders were asked to rank  
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21 146 answers on a 5-point Likert scale (where 1 was most important and 5 was least important). The  
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23 147 survey included an open-ended question where responders were asked to give suggestions on  
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25 148 how to improve the program. Institutional Review Board approval was obtained for the web-  
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27 149 based survey and no participant identifying data was collected. Descriptive statistics,  
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29 150 frequencies and crosstab analyses were performed using R Project for Statistical Computing.  
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161 **RESULTS**

162 31 out of 41 faculty members participated. The majority of respondents (26/31) were residency-  
 163 trained in emergency medicine (EM). The remaining 5 respondents trained in other specialties  
 164 and had not received dedicated ultrasound training prior to arriving to our institution. When  
 165 asked how interested they were in bedside ultrasound (Table 1), most of our faculty members  
 166 responded positively with 27/31 (87%) indicating that they use ultrasound “at least sometimes.”

168 Table 1: Faculty interest in bedside ultrasound

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|   |        |            |
|---|--------|------------|
| How interested would you say you are in bedside ultrasound? | N = 31 | 170        |
| I use it all the time                                       | 13     | 171        |
| Sometimes, if there might be an interesting finding         | 14     | 172        |
| Only when I have to, during off hours                       | 2      | 173<br>174 |
| Leave this to the radiologists                              | 1      | 175        |
| No answer   | 1      | 176        |

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178 Of the 31 respondents, 21 (67.7%) reported completion of the credentialing requirements  
 179 in the 9-month period, 3 (9.6%) did not specify, and, 7 (22.6%) did not complete the  
 180 requirements. Characteristics that may be associated with the completion of the credentialing  
 181 requirements are summarized in Table 2. Residency training in EM and formal training in BUS  
 182 during residency were correlated with a successful completion of the credentialing program:  
 183 19/23 EM residency trained physicians completed the requirements compared with 2/5 of those  
 184 that were not EM residency trained . The mean postgraduate year (a surrogate measure for

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3 185 average number of years in practice) was higher in the group that did not complete the  
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6 186 credentialing. Seniority within our EM faculty had no impact on successful completion of the  
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8 187 credentialing process with the average number of years in practice at XXXXX being similar  
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10 188 amongst the two groups (8.8 vs. 9.1).  
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15 190 Table 2: Potential predictors of credentialing program completion  
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|                            | Requirements completed<br>N = 21<br>Mean (median, range) | Requirements not completed<br>N = 7<br>Mean (median, range) | Did not specify | Totals |
|----------------------------|--|---|-----------------|--------|
| EM Residency trained       | 19   | 4   | 3               | 26     |
| Non-EM residency trained   | 2  | 3   | 0               | 5      |
| US curriculum in residency | 6  | 0   | 0               | 6      |
| PGY                        | 9 (8, 7-12)  | 15 (15, 8-21)   |                 |        |
| Years of practice at XXXX  | 8.8 (7, (6.2-11.5))                                      | 9.1 (7, 3.0 – 15.3)   |                 |        |

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32 192 The faculty who successfully fulfilled the credentialing requirements graded the  
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34 193 importance they placed on certain motivators to completion. Concern for discipline from the  
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37 194 departmental leadership (10/21), increasing clinical competence to improve patient care (11/21)  
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39 195 and improving the ability to disposition patients faster (10/21) were among the most important  
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196 motivators identified. Personal interest and resident education were an important motivator in  
 197 only 28% (6/21).

198 The 7 physicians who did not complete the requirements answered questions on barriers  
 199 faced during the credentialing process (Table 3). Too many other demands on their time (5/8)  
 200 was a more important barrier than lack of knowledge in ultrasound (2/8). The steps towards the  
 201 credentialing process appeared to be burdensome to some of our faculty, with 3/8 ranking the  
 202 amount of work entailed in obtaining credentialing outweighing the benefits and 3/8 ranking  
 203 obtaining the required number of scans as important barriers. None of the survey respondents  
 204 indicated that unawareness of the requirements was a barrier.

206 Table 3. Barriers for those who did not complete requirements

| Barrier to completion                                  | N = 7 |
|--|-------|
| Couldn't get the scan numbers                          | 3     |
| Amount of work outweighed benefits                     | 3     |
| Too many other demands on time                         | 5     |
| Didn't know how to ultrasound and not enough education | 3     |
| Didn't know about the program                          | 0     |

207 Respondents who did not complete the credentialing requirements were asked to rank the above  
 208 barriers on a 5 point Likert scale, with 1 being most important and 5 least important. The  
 209 numbers in this table represent the responders who ranked a given barrier 1 or 2.

211 We asked all of our respondents to grade overall obstacles towards completion of the  
 212 requirements (Table 4). The majority of survey respondents (20/31) indicated that clinical shifts

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3 213 were too busy to complete the credentialing requirements. The number of scans required for  
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5 214 credentialing was viewed as an important obstacle for a large minority (10/31) of our faculty.  
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8 215 Having ultrasound services from the radiology department available for patient referrals from the  
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10 216 ED was also viewed as a barrier to obtaining the number of required scans (10/31). A smaller,  
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12 217 although not negligible, number ranked medico-legal risks of incorrect interpretation as a  
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14 218 deterrence to completing the credentialing program (8/31).  
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19  
20 220 Table 4. Overall obstacles to Credentialing

| Obstacle                                       | N = 31 |
|--|--------|
| Too many scans required                        | 10     |
| Too many true positives required               | 10     |
| Medico-legal risks of incorrect interpretation | 8      |
| Shifts are too busy                            | 20     |
| Radiology is readily available                 | 10     |

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36 221 All survey respondents were asked to rank the above obstacles on a 5 point Likert scale, with 1  
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38 222 being most important and 5 least important. The numbers in this table represent the total number  
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40 223 of responders who ranked a given obstacle 1 or 2.  
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46 225 For the purposes of increasing the ease and efficiency of the credentialing process faculty  
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48 226 were encouraged to offer subjective comments. Only two faculty members stated that there was  
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50 227 no need for a change in our credentialing program. Another 15 faculty members offered their  
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52 228 ideas. The two most important themes in the answers to this question were a need for more  
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54 229 mentorship and time. The most common requests were more one-on-one and hands-on training  
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3 230 sessions and more immediate feedback on performance. Several faculty expressed concern over  
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6 231 the time investment required to complete the steps towards credentialing. Several of our faculty  
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8 232 believe that clinical shifts are too busy suggesting that time outside of scheduled clinical duties  
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10 233 would be required to complete the requirements.  
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3 253 **DISCUSSION**  
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5 254 We report a single academic institution's experience with a credentialing program in  
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8 255 bedside ultrasound for a faculty with varied prior experience with ultrasound. The insight gained  
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10 256 from this pilot data is being incorporated into the design of a curriculum for faculty credentialing  
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13 257 in bedside ultrasound.  
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15 258 This descriptive report for an academic institution may not reflect that of private and  
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17 259 community physician groups in non-academic settings starting a credentialing program for  
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20 260 ultrasound. An important factor present in the academic setting is the presence of residents and  
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22 261 their enthusiasm for learning new technologies. This is a likely motivator for the more senior  
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24 262 physicians who supervise the residents and their new technologies.  
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27 263 Likewise the barriers faced by the non-academic emergency physician may be different  
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29 264 from those of attending physicians in academic centers. Specifically, a lack of knowledge in  
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31 265 ultrasound was cited by only two of our physicians as an important barrier, perhaps because of  
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33 266 the routine exposure to the technology. We suspect that knowledge in ultrasound may  
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35 267 be a more important barrier for the community physician who is without the benefit of regular  
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37 268 educational opportunities such as lectures and conferences on ultrasound.  
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41 269 Despite the stated limitations, we believe that this paper can provide valuable insight to  
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43 270 physicians interested in developing a credentialing program for their faculty regardless of the  
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45 271 setting (academic versus non-academic). A number of the respondents to our survey stated  
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47 272 concerns about the need for more hands on-training and mentoring suggesting that the truncated  
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49 273 training experience may not be sufficient for experienced EM clinicians to feel they can perform  
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51 274 and interpret scans independently. These concerns are likely echoed by our colleagues in non-  
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53 275 academic centers who may not have dedicated personnel for training and quality assurance.  
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3 276 Some of the other barriers echoed by several of our faculty members, such as lack of time during  
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5 277 clinical shifts to practice ultrasound and the need for more protected time in order to complete  
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8 278 the requirements, are likely also experienced by the non-academic physician who has little or no  
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10 279 compensated non-clinical time.  
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15 281 **CONCLUSION**

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17 282 Based upon the experience at XXXXX Hospital and the web-based survey responses, we  
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19 283 recommend the following:

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- 23 • A focused credentialing process with clearly defined goals
  - 24 285 • Requirements outlined, supported, and endorsed by the EM departmental leadership
  - 25 286 • Protected time outside of clinical duties dedicated to self-directed education
  - 26 287 • Opportunities for direct supervision of bedside ultrasound technique
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32 288 We consider the following questions as opportunities for future study:

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- 35 • How can we modify the credentialing process to facilitate successful completion of the  
36 requirements?  
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  - 38 291 • How can we modify the bedside ultrasound training curriculum and credentialing  
39 process so that non-credentialed faculty members become interested in learning this  
40 modality?  
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  - 42 293 • What motivators can be used to increase successful completion of credentialing  
43 requirements?  
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3 299 **Funding**  
4

5 300 None  
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8 301 **Competing Interests**  
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10 302 None  
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12 303 **Data sharing**  
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14 304 There is no additional data available  
15  
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17 305 **Contributorship**  
18

19 306 Resa E Lewiss: Study conception and design, drafting of manuscript, general supervision of  
20  
21 307 research  
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24 308 Turandot Saul: Survey design, data acquisition, drafting of manuscript  
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27 309 Marina Del Rios: Survey design, statistical analysis and interpretation of data, drafting of  
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29 310 manuscript  
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For peer review only

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3 June 27, 2013  
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8 To: Editors of BMJ Open:  
9

10 Please find attached our article entitled "Faculty Bedside Ultrasound Credentialing". This  
11 manuscript was previously submitted to the Emergency Medicine Journal and underwent  
12 revisions but was rejected by the full editorial hanging committee. We appreciate the  
13 opportunity to submit our paper to BMJ Open for consideration.  
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15

16 I am serving as the corresponding author. Please feel free to contact me with any  
17 questions.  
18

19 Thank you,  
20

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**Acquiring credentials in bedside ultrasound: a cross sectional survey**

|                                 |   |
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3 July 21, 2013  
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5 Title: Acquiring credentials in bedside ultrasound: a cross sectional survey  
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39 KEY WORDS: Bedside ultrasound, Emergency ultrasound, Faculty, Education, Credentialing  
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## 1 Article Summary

### 2 Article Focus

- 3 • To describe a single academic facility's experience with a faculty credentialing process in  
4 bedside ultrasound
- 5 • To discuss the faculty's impressions on motivators to completion of the bedside  
6 ultrasound requirements
- 7 • To discuss the faculty's impressions on barriers to completion of the bedside ultrasound  
8 requirements

### 9 Key Messages

- 10 • A faculty credentialing program in bedside ultrasound should have clearly defined goals  
11 supported by the emergency medicine departmental leadership
- 12 • Protected time outside of clinical duties dedicated to self-directed education is a  
13 motivator to the bedside ultrasound credentialing process
- 14 • Opportunities for direct supervision of bedside ultrasound technique and mentoring  
15 enhance the credentialing process

### 16 Strengths and Limitations

17 The institution where this credentialing program in bedside ultrasound was instituted included  
18 physicians with diverse prior experience in bedside ultrasonography. This descriptive report for  
19 an academic institution may not reflect that of private and community physician groups in non-  
20 academic settings starting a credentialing program for ultrasound.

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3 24 **Acquiring credentials in bedside ultrasound: a cross sectional survey**  
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8 26 **ABSTRACT**  
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10 27 **Objective:** Although there are training guidelines to credential emergency physicians in bedside  
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12 28 ultrasound, many faculty groups have members who completed residency without a mandatory  
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14 29 curriculum. These physicians are therefore required to learn bedside ultrasound while out in  
15  
16 30 practice. The objective of this descriptive report is to illustrate a single academic facility's  
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18 31 experience with acquiring credentials for emergency physicians in bedside ultrasound and the  
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20 32 faculty's impressions on motivators and barriers to completion of the requirements.  
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24 33 **Design:** Cross sectional survey  
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27 34 **Setting:** Two urban teaching hospitals with a combined volume of 170,000 visits a year  
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29 35 **Participants:** 41 emergency medicine attending physicians  
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32 36 **Intervention:** Emergency medicine attending physicians underwent training and credentialing in  
33  
34 37 the applications of aorta and pelvic ultrasound over a 9-month period.  
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36 38 **Outcome Measure:** After the credentialing period we conducted a survey to evaluate the  
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38 39 physicians' perceptions of this process.  
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41 40 **Results:** There were 41 faculty members during the credentialing survey period. 11 of the  
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43 41 faculty members were exempt from ultrasound training. We asked attending physicians (N=41  
44  
45 42 exempt and non-exempt) to complete a web-based survey after the completion of the  
46  
47 43 credentialing period. Questions about potential barriers and incentives were listed and responders  
48  
49 44 were asked to rank answers on a 5-point Likert scale. Of the 31 respondents, 21 (67.7%)  
50  
51 45 completed the credentialing requirements by the 9-month deadline. 19/26 emergency medicine  
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53 46 residency trained physicians completed the requirements compared with 2/5 of those that were  
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3 47 not emergency medicine residency trained Our pilot study data suggests an association between  
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6 48 fewer years in practice and completion of the requirements.  
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8 49 **Conclusions:** This is a report on a single academic institution's experience with a faculty  
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10 50 credentialing program in bedside ultrasound for physicians with a diversity of prior experience in  
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12 51 bedside ultrasonography. We describe the success of the credentialing process and identify  
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14 52 survey-based faculty characteristics associated with fulfilling the requirements.  
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## 70 INTRODUCTION

71 At present, there is a well-delineated history of the development for emergency medicine  
72 resident training guidelines for bedside ultrasound (BUS). In 1994 Mateer et al. set forth  
73 recommendations for an ultrasound curriculum in residency training programs.[1] This  
74 discussion has evolved and in 2001 the American College of Emergency Physicians (ACEP)  
75 published the *Emergency Ultrasound Guidelines* which outlined the recommendations for  
76 adequate documentation, quality assurance programs, credentialing, and continuing medical  
77 education.[2] More recently, the 2008 ACEP guidelines and the 2009 Core (Level 1) Ultrasound  
78 Curriculum from the College of Emergency Medicine in London, UK set forth more  
79 comprehensive statements which expanded core applications and specifications for US  
80 training.[3, 4]

81 In 2012, the Accreditation Council for Graduate Medical Education (ACGME)  
82 designated ultrasound as one of twenty-three milestone competencies for Emergency Medicine  
83 residency graduates.[5] With increasing scrutiny of medical educational programs and their  
84 effect on patient safety and healthcare delivery, standardized ultrasound training and competency  
85 assessment is imperative. In contrast, BUS education and credentialing in community and  
86 academic emergency departments where practicing physicians did not receive training remains a  
87 challenge. Moore et al. reported in their survey results of community emergency departments  
88 that lack of training of emergency physicians is the largest barrier to implementation of bedside  
89 ultrasound.[6]

90 The Core (Level 1) Curriculum by the College of Emergency Medicine, UK, presents  
91 guidelines for trainees and the ACEP Policy statement presents a practice pathway that gives  
92 meaningful recommendations for credentialing emergency medicine attending physicians in

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3 93 bedside ultrasound who completed residency before established emergency ultrasound residency  
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5 94 training curricula.[2, 4] Training in bedside ultrasound is particularly unique in that it requires  
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8 95 both the hands-on skill of scanning combined with the cognitive skill of recognizing anatomy  
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10 96 and pathological processes and interpreting images.[7] Comprehending the barriers and  
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12 97 incentives to bedside ultrasound training and credentialing as perceived by practicing emergency  
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14 98 physicians may aid in the development of a more successful credentialing standard.

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17 99 This paper describes our institution's experience with faculty training in bedside  
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20 100 ultrasound. Numerous publications address medical student and resident bedside ultrasound  
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22 101 curricula, training and experiences with the process.[8-10] This survey addressed faculty  
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24 102 opinions of bedside ultrasound and the perceptions of the faculty members required to complete  
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27 103 the process of acquiring credentials in ultrasound. After completion of our institution's  
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29 104 credentialing process for the applications of aorta and pelvic ultrasound, we conducted a survey  
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31 105 to evaluate our faculty member's prior experience and training in bedside ultrasound and their  
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34 106 perceptions of the credentialing procedure.

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3 116 **METHODS**  
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5 117 St. Luke's - Roosevelt (SLR) Hospital Center is comprised of two separate urban teaching  
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7 118 hospitals with a combined volume of 170,000 visits a year. In 2008, attending physicians without  
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9 119 training in bedside ultrasound attended a 16-hour training course upon joining the SLR Hospital  
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11 120 Center faculty. The credentialing process was as follows: For each bedside ultrasound  
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13 121 application, faculty were asked to submit 25 technically adequate ultrasound scans of which a  
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15 122 certain number were positive studies (in the case of aorta, at least 2-3 abdominal aneurysms and  
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17 123 for pelvic ultrasound, at least 12 intra-uterine gestations). Each faculty member then completed a  
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19 124 written examination comprised of multiple choice and image identification questions pertaining  
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21 125 to the respective bedside ultrasound application. Subsequently, one of the ultrasound division  
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23 126 faculty members reviewed the examination with the faculty member and oversaw a hands-on  
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25 127 competency examination with bedside real-time scanning of a volunteer patient or model. With  
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27 128 successful completion of the delineated steps, a credentialing letter specific to that application  
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29 129 was sent to the department chairperson and the hospital credentialing committee for emergency  
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31 130 procedures. Upon completion, the physician was considered "credentialed" and permitted to  
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33 131 make clinical decisions based upon their bedside ultrasound examinations and interpretations.  
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36 132 There were a total of 41 faculty members during the credentialing and survey period,  
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38 133 from January, 2009 to September, 2009. 11 of the faculty members were considered exempt:  
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40 134 those who were credentialed while faculty members at our institution by completion of the  
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42 135 requirements we described above prior to our survey, those who received ultrasound training  
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44 136 during their EM residency training at SLR Hospital Center and the physician who worked solely  
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46 137 as an urgent-care (fast track) provider.  
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3 138 Under the direction of the chairman and bedside ultrasound director, all non-exempt adult  
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6 139 emergency medicine faculty members were required to acquire credentials in aortic and pelvic  
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8 140 ultrasound. These applications were chosen due to the immediacy of these ultrasound  
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10 141 examination interpretations in patient care decision-making. Pediatric emergency physicians  
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12 142 were asked to complete the credentialing requirements in pelvic ultrasound only. Faculty  
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15 143 members were given nine months to complete the requirements for acquiring credentials in these  
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17 144 two applications.

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20 145 We asked all 41 of our attending physicians (exempt and non-exempt) to complete a web-  
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22 146 based survey at the end of the 9-month period. The purpose of the survey was to assess their  
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24 147 prior experience with bedside ultrasound and their opinions of the faculty credentialing process.  
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27 148 Questions focused on barriers and incentives to acquiring credentials, and responders were asked  
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29 149 to rank answers on a 5-point Likert scale (where 1 was most important and 5 was least  
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31 150 important). The survey included an open-ended question where responders were asked to give  
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34 151 suggestions on how to improve the program. Institutional Review Board approval was obtained  
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36 152 for the web-based survey and no participant identifying data was collected. Descriptive  
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38 153 statistics, frequencies and crosstab analyses were performed using R Project for Statistical  
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41 154 Computing.

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161 **RESULTS**

162 31 out of 41 faculty members participated. The majority of respondents (26/31) were residency-  
 163 trained in emergency medicine (EM). The remaining 5 respondents trained in other specialties  
 164 and had not received dedicated ultrasound training prior to arriving to our institution. When  
 165 asked how interested they were in bedside ultrasound (Table 1), most of our faculty members  
 166 responded positively with 27/31 (87%) indicating that they use ultrasound “at least sometimes.”

168 Table 1: Faculty interest in bedside ultrasound

169

|   |        |            |
|---|--------|------------|
| How interested would you say you are in bedside ultrasound? | N = 31 | 170        |
| I use it all the time                                       | 13     | 171        |
| Sometimes, if there might be an interesting finding         | 14     | 172        |
| Only when I have to, during off hours                       | 2      | 173<br>174 |
| Leave this to the radiologists                              | 1      | 175        |
| No answer   | 1      | 176        |

177

178 Of the 31 respondents, 21 (67.7%) reported completion of our institution’s credentialing  
 179 requirements in the 9-month period, 3 (9.6%) did not specify, and, 7 (22.6%) did not complete  
 180 the requirements. Characteristics that may be associated with the completion of the credentialing  
 181 requirements are summarized in Table 2. Residency training in EM and formal training in BUS  
 182 during residency were correlated with successful completion of the program: 19/26 EM  
 183 residency trained physicians completed the requirements compared with 2/5 of those that were  
 184 not EM residency trained. The mean postgraduate year (a surrogate measure for average number

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3 185 of years in practice) was higher in the group that did not complete the credentialing  
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6 186 requirements. Seniority within our EM faculty had no impact on successful completion of the  
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8 187 credentialing process with the average number of years in practice at SLR Hospital Center being  
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10 188 similar amongst the two groups (8.8 vs. 9.1).  
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13 189

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15 190 Table 2: Potential predictors of credentialing program completion  
16

|                            | Requirements completed<br>N = 21<br>Mean (median, range) | Requirements not completed<br>N = 7<br>Mean (median, range) | Did not specify | Totals |
|----------------------------|--|---|-----------------|--------|
| EM Residency trained       | 19   | 4   | 3               | 26     |
| Non-EM residency trained   | 2  | 3   | 0               | 5      |
| US curriculum in residency | 6  | 0   | 0               | 6      |
| PGY                        | 9 (8, 7-12)  | 15 (15, 8-21)   |                 |        |
| Years of practice at SLR   | 8.8 (7, (6.2-11.5))                                      | 9.1 (7, 3.0 – 15.3)   |                 |        |

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46 192 The faculty who successfully fulfilled the requirements for acquiring credentials in BUS  
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48 193 graded the importance they placed on certain motivators to completion. Concern for disciplinary  
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50 194 action by the chairman (10/21), increasing clinical competence to improve patient care (11/21)  
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52 195 and improving the ability to disposition patients faster (10/21) were among the most important  
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196 motivators identified. Personal interest and resident education were important motivators for  
 197 only 28% (6/21).

198 The 7 physicians who did not complete the requirements answered questions on barriers  
 199 faced during the credentialing process (Table 3). Too many other demands on their time (5/7)  
 200 was a more important barrier than lack of knowledge in ultrasound (2/7). The steps towards the  
 201 credentialing process appeared to be burdensome to some of our faculty, with 2/7 ranking the  
 202 amount of work entailed in acquiring credentials outweighing the benefits and 3/7 ranking  
 203 obtaining the required number of scans as important barriers. None of the survey respondents  
 204 indicated that unawareness of the requirements was a barrier.

206 Table 3. Barriers for those who did not complete requirements

| Barrier to completion                                  | N = 7 |
|--|-------|
| Couldn't get the scan numbers                          | 3     |
| Amount of work outweighed benefits                     | 2     |
| Too many other demands on time                         | 5     |
| Didn't know how to ultrasound and not enough education | 2     |
| Didn't know about the program                          | 0     |

207 Respondents who did not complete the credentialing requirements were asked to rank the above  
 208 barriers on a 5 point Likert scale, with 1 being most important and 5 least important. The  
 209 numbers in this table represent the responders who ranked a given barrier 1 or 2.

211 We asked all of our respondents to grade overall obstacles towards completion of the  
 212 requirements (Table 4). The majority of survey respondents (20/31) indicated that clinical shifts



213 were too busy to complete the credentialing requirements. The number of scans required for  
 214 credentialing was viewed as an important obstacle for a large minority (10/31) of our faculty.  
 215 Having ultrasound services from the radiology department available for patient referrals from the  
 216 ED was also viewed as a barrier to obtaining the number of required scans (10/31). A smaller,  
 217 although not negligible, number ranked medico-legal risks of incorrect interpretation as a  
 218 deterrence to completing the credentialing program (8/31).

220 Table 4. Overall Obstacles to Acquiring Credentials

| Obstacle                                       | N = 31 |
|--|--------|
| Too many scans required                        | 10     |
| Too many true positives required               | 10     |
| Medico-legal risks of incorrect interpretation | 8      |
| Shifts are too busy                            | 20     |
| Radiology is readily available                 | 9      |

221 All survey respondents were asked to rank the above obstacles on a 5 point Likert scale, with 1  
 222 being most important and 5 least important. The numbers in this table represent the total number  
 223 of responders who ranked a given obstacle 1 or 2.

225 For the purposes of increasing the ease and efficiency of the credentialing process faculty  
 226 were encouraged to offer subjective comments. Only two faculty members stated that there was  
 227 no need for a change in our program for acquiring credentials. Another 15 faculty members  
 228 offered their ideas. The two most important themes in the answers to this question were a need  
 229 for more mentorship and time. The most common requests were more one-on-one and hands-on

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3 230 training sessions and more immediate feedback on performance. Several faculty expressed  
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6 231 concern over the time investment required to complete the steps towards acquiring credentials.  
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8 232 Several of our faculty believe that clinical shifts are too busy suggesting that time outside of  
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10 233 scheduled clinical duties would be required to complete the requirements.  
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3 253 **DISCUSSION**  
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5 254 We report a single academic institution's experience with a program to acquire  
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8 255 credentials in bedside ultrasound for a faculty with varied prior experience with ultrasound. The  
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10 256 insight gained from this pilot data is being incorporated into the design of a curriculum for  
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13 257 faculty credentialing in bedside ultrasound.  
14

15 258 This descriptive report for an academic institution may not reflect that of private and  
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17 259 community physician groups in non-academic settings starting a credentialing program for  
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20 260 emergency bedside ultrasound. An important factor present in the academic setting is the  
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22 261 presence of emergency medicine residents and their enthusiasm for learning new technologies.  
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24 262 A second factor is the existence of an ultrasound fellowship with fellows and dedicated faculty.  
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27 263 These are likely motivators for the more senior physicians who supervise the residents and work  
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29 264 clinically with fellows.  
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31 265 Likewise the barriers faced by the non-academic emergency physician may be different  
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34 266 from those of attending physicians in academic centers. Specifically, a lack of knowledge in  
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36 267 ultrasound was cited by only two of our physicians as an important barrier, perhaps because of  
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38 268 the now routine exposure to the technology. We suspect that knowledge in ultrasound may  
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41 269 be a more important barrier for the community physician who is without the benefit of regular  
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43 270 educational opportunities such as lectures and conferences on ultrasound.  
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46 271 Despite the stated limitations, we believe that this paper can provide valuable insight to  
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48 272 physicians interested in developing a credentialing program for their faculty regardless of the  
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50 273 setting (academic versus non-academic). A number of the respondents to our survey stated  
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53 274 concerns about the need for more hands on-training and mentoring suggesting that the truncated  
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55 275 training experience may not be sufficient for experienced EM clinicians to feel they can perform  
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3 276 and interpret scans independently. These concerns are likely echoed by our colleagues in non-  
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5 277 academic centers who may not have dedicated personnel for training and quality assurance.  
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8 278 Some of the other barriers echoed by several of our faculty members, such as lack of time during  
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10 279 clinical shifts to practice ultrasound and the need for more protected time in order to complete  
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12 280 the requirements, are likely also experienced by the non-academic physician who has little or no  
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14 281 compensated non-clinical time.  
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## 19 20 283 **CONCLUSION**

21  
22 284 Based upon the experience at our urban academic hospital center and the web-based  
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24 285 survey responses, we report a single academic institution's experience with a credentialing  
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26 286 program in bedside ultrasound. Insight gained from these results may be incorporated into the  
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28 287 design of a curriculum for acquiring credentials in bedside ultrasound.  
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34 289 We consider the following questions as opportunities for future study:

- 35  
36 290 • How can the curriculum for credentialing in bedside ultrasound be modified to insure the  
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38 291 successful completion of the requirements?  
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41 292 • What motivators can be identified to increase successful completion of credentialing  
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43 293 requirements?  
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46 294 • What is the best means of training the emergency physicians in practice who did not learn  
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48 295 bedside ultrasound during residency however need to learn this due to patient safety  
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50 296 standards.  
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3 299 **Funding**  
4

5 300 None  
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8 301 **Contributorship**  
9

10 302 Resa E Lewiss: Study conception and design, drafting of manuscript, general supervision of  
11  
12 303 research

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14  
15 304 Turandot Saul: Survey design, data acquisition, drafting of manuscript  
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17 305 Marina Del Rios: Survey design, statistical analysis and interpretation of data, drafting of  
18  
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20 306 manuscript

21  
22 307 **Data sharing**  
23

24 308 No additional data available.  
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27 309 **Competing Interests**  
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3 | ~~June 27~~July 21, 2013  
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5 | Title: Acquiring credentials in bedside ultrasound: a cross sectional survey Faculty Bedside  
6 | Ultrasound Credentialing  
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30 research, critical editing of manuscript

31 Turandot Saul: Survey design, data acquisition, drafting of manuscript, critical editing of  
32 manuscript  
33

34 Marina Del Rios: Survey design, statistical analysis and interpretation of data, drafting of  
35 manuscript, editing of manuscript  
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37

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41 There is no additional data available  
42  
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## 1 Article Summary

### 2 Article Focus

- 3 • To describe a single academic facility's experience with a faculty credentialing process in  
4 bedside ultrasound

- 5 • To discuss the faculty's impressions on motivators ~~and barriers~~ to completion of the  
6 bedside ultrasound requirements

- 7 • To discuss the faculty's impressions on barriers to completion of the bedside ultrasound  
8 requirements

9 ~~To present recommendations on how to design a faculty credentialing program in bedside~~  
10 ~~ultrasound based on our study results~~

### 11 Key Messages

- 12 • A faculty credentialing program in bedside ultrasound should have clearly defined goals  
13 supported by the emergency medicine departmental leadership
- 14 • Protected time outside of clinical duties dedicated to self-directed education is a  
15 motivator to the bedside ultrasound credentialing process
- 16 • Opportunities for direct supervision of bedside ultrasound technique and mentoring  
17 enhance the credentialing process

### 18 Strengths and Limitations

19 The institution where this credentialing program in bedside ultrasound was instituted included  
20 physicians with diverse prior experience in bedside ultrasonography. This descriptive report for  
21 an academic institution may not reflect that of private and community physician groups in non-  
22 academic settings starting a credentialing program for ultrasound.

23

24

**Acquiring credentials in bedside ultrasound: a cross sectional survey**

**Faculty Bedside Ultrasound Credentialing**

27

**ABSTRACT**

**IntroductionObjective:** [Although there are training guidelines to credential emergency physicians in bedside ultrasound, many faculty groups have members who completed residency without a mandatory curriculum. These physicians are therefore required to learn bedside ultrasound while out in practice.](#) The objective of this descriptive report is to illustrate a single academic facility's experience with [acquiring credentials for emergency physicians](#) in bedside ultrasound and the faculty's impressions on motivators and barriers to completion of the requirements.

**Design:** [Cross sectional survey](#)

**Setting:** [Two urban teaching hospitals with a combined volume of 170,000 visits a year](#)

**Participants:** [41 emergency medicine attending physicians](#)

**MethodsIntervention:** Emergency medicine attending physicians underwent training and credentialing in the applications of aorta and pelvic ultrasound over a 9-month period.

**Outcome Measure:** After the credentialing period we conducted a survey to evaluate the physicians' perceptions of this process.

**Results:** There were 41 faculty members during the credentialing survey period. 11 of the faculty members were exempt from ultrasound training. We asked attending physicians (N=41 exempt and non-exempt) to complete a web-based survey after the completion of the

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3 46 credentialing period. Questions about potential barriers and incentives were listed and responders  
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6 47 were asked to rank answers on a 5-point Likert scale. Of the 31 respondents, 21 (67.7%)  
7  
8 48 completed the credentialing requirements by the 9-month deadline. 19/26 emergency medicine  
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10 49 residency trained physicians completed the requirements compared with 2/5 of those that were  
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13 50 not emergency medicine residency trained Our pilot study data suggests an association between  
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15 51 fewer years in practice and completion of the requirements.  
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18 52 **Discussion/Conclusions:** This is a report on a single academic institution's experience with a  
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20 53 faculty credentialing program in bedside ultrasound for physicians with a diversity of prior  
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22 54 experience in bedside ultrasonography. We describe the success of the credentialing process and  
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24 55 identify survey-based faculty characteristics associated with fulfilling the requirements.  
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29 57 KEY WORDS Bedside ultrasound, Emergency ultrasound, Faculty, Education, Credentialing  
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## 73 INTRODUCTION

74 At present, there is a well-delineated history of the development for emergency medicine  
75 resident training guidelines for bedside ultrasound (BUS). In 1994 Mateer et al. set forth  
76 recommendations for an ultrasound curriculum in residency training programs.[1] This  
77 discussion has evolved and in 2001 the American College of Emergency Physicians (ACEP)  
78 published the *Emergency Ultrasound Guidelines* which outlined the recommendations for  
79 adequate documentation, quality assurance programs, credentialing, and continuing medical  
80 education.[2] More recently, the 2008 ACEP guidelines and the 2009 Core (Level 1) Ultrasound  
81 Curriculum from the College of Emergency Medicine in London, UK set forth more  
82 comprehensive statements which expanded core applications and specifications for US  
83 training.[3, 4]

84 In 2012, the [Accreditation Council for Graduate Medical Education \(ACGME\)](#)  
85 designated ultrasound as one of twenty-three milestone competencies for Emergency Medicine  
86 residency graduates.[5] With increasing scrutiny of medical educational programs and their  
87 effect on patient safety and healthcare delivery, standardized ultrasound training and competency  
88 assessment is imperative. In contrast, BUS education and credentialing in community and  
89 academic emergency departments where practicing physicians did not receive training remains a  
90 challenge. Moore et al. reported in their survey results of community emergency departments

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3 91 that lack of training of emergency physicians is the largest barrier to implementation of bedside  
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5 92 ultrasound.[6]  
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8 93 The Core (Level 1) Curriculum by the College of Emergency Medicine, UK, presents  
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10 94 guidelines for trainees and the ACEP Policy statement presents a practice pathway that gives  
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12 95 meaningful recommendations for [credentialing emergency medicine attending physicians in](#)  
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14 96 [bedside ultrasound](#) who completed residency before established [ed](#) emergency ultrasound residency  
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17 97 training curricula.[2, 4] Training in bedside ultrasound is particularly unique in that it requires  
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19 98 both the hands-on skill of scanning combined with the cognitive skill of recognizing anatomy  
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21 99 and pathological processes and interpreting images.[7] [Comprehending](#) the barriers and  
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23 100 incentives to bedside ultrasound training and credentialing as perceived by practicing emergency  
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25 101 physicians may aid in the development of a more successful credentialing standard.  
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29 102 This paper describes our institution's experience with faculty training in bedside  
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31 103 ultrasound. Numerous publications address medical student and resident bedside ultrasound  
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33 104 curricula, [training and experiences with the process](#). [8-10] This survey addressed faculty  
34  
35 105 opinions of bedside ultrasound and the perceptions of the [faculty members required to complete](#)  
36  
37 106 [the process of acquiring credentials in](#) ultrasound. After completion of [our institution's](#)  
38  
39 107 credentialing [process for](#) the applications of aorta and pelvic ultrasound, we conducted a survey  
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41 108 to evaluate [our faculty member's prior](#) experience and training in bedside ultrasound and their  
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43 109 perceptions of [the credentialing procedure](#).  
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## METHODS

St. Luke's - Roosevelt (SLR) Hospital Center~~XXXXX~~ is comprised of two separate urban teaching hospitals with a combined volume of 170,000 visits a year. [In 2008](#), attending physicians [without training in bedside ultrasound](#) attended a 16-hour training course upon joining the ~~XXXXX~~-SLR Hospital Center faculty. The credentialing process was as follows: For each bedside ultrasound application, faculty were asked to submit 25 technically adequate ultrasound scans of which a certain number were positive studies (in the case of aorta, at least 2-3 abdominal aneurysms and for pelvic ultrasound, at least 12 intra-uterine gestations). Each faculty member then completed a written examination comprised of multiple choice and image identification questions pertaining to the respective bedside ultrasound application. Subsequently, one of the ultrasound division faculty members reviewed the examination with the faculty member and oversaw a hands-on competency examination with bedside real-time scanning of a volunteer patient or model. With successful completion of the delineated steps, a credentialing letter specific to that application was sent to the department chairperson and the hospital credentialing committee for emergency procedures. Upon completion, the physician was considered "credentialed" and permitted to make clinical decisions based upon their bedside ultrasound examinations and interpretations.

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3 136 | There were a total of 41 faculty members during the credentialing and survey period,  
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5 137 | from January, 2009 to September, 2009. 11 of the faculty members were considered exempt:  
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8 138 | those who were credentialed while faculty members at our institution by completion of the  
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10 139 | requirements we described above prior to our survey, those who received ultrasound training  
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12 140 | during their EM residency training at XXXXXX-SLR Hospital Center and the physician who  
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15 141 | worked solely as an urgent-care (fast track) provider.  
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18 142 | Under the direction of the chairman and bedside ultrasound director, all non-exempt adult  
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20 143 | emergency medicine faculty members were required to acquire credentials in aortic and pelvic  
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22 144 | ultrasound. These applications were chosen due to the immediacy of these ultrasound  
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24 145 | examination interpretations in patient care decision-making. Pediatric emergency physicians  
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26 146 | were asked to complete the credentialing requirements in pelvic ultrasound only. Faculty  
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28 147 | members were given nine months to complete the requirements for acquiring credentials in these  
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30 148 | two applications.  
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34 149 | We asked all 41 of our attending physicians (exempt and non-exempt) to complete a web-  
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36 150 | based survey at the end of the 9-month period. The purpose of the survey was to assess their  
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38 151 | prior experience with bedside ultrasound and their opinions of the faculty credentialing process.  
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40 152 | Questions focused on barriers and incentives to acquiring credentials, and responders were asked  
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42 153 | to rank answers on a 5-point Likert scale (where 1 was most important and 5 was least  
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44 154 | important). The survey included an open-ended question where responders were asked to give  
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46 155 | suggestions on how to improve the program. Institutional Review Board approval was obtained  
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48 156 | for the web-based survey and no participant identifying data was collected. Descriptive  
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50 157 | statistics, frequencies and crosstab analyses were performed using R Project for Statistical  
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52 158 | Computing.  
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165 **RESULTS**

166 31 out of 41 faculty members participated. The majority of respondents (26/31) were residency-

167 trained in emergency medicine (EM). The remaining 5 respondents trained in other specialties

168 and had not received dedicated ultrasound training prior to arriving to our institution. When

169 asked how interested they were in bedside ultrasound (Table 1), most of our faculty members

170 responded positively with 27/31 (87%) indicating that they use ultrasound “at least sometimes.”

171

172 Table 1: Faculty interest in bedside ultrasound

173

|   |        |            |
|---|--------|------------|
| How interested would you say you are in bedside ultrasound? | N = 31 | 174        |
| I use it all the time                                       | 13     | 175        |
| Sometimes, if there might be an interesting finding         | 14     | 176        |
| Only when I have to, during off hours                       | 2      | 177<br>178 |
| Leave this to the radiologists                              | 1      | 179        |
| No answer   | 1      | 180        |

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4 182 Of the 31 respondents, 21 (67.7%) reported completion of our institution's credentialing  
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6 183 requirements in the 9-month period, 3 (9.6%) did not specify, and, 7 (22.6%) did not complete  
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8 184 the requirements. Characteristics that may be associated with the completion of the credentialing  
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10 185 requirements are summarized in Table 2. Residency training in EM and formal training in BUS  
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12 186 during residency were correlated with successful completion of the program: 19/26 EM  
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14 187 residency trained physicians completed the requirements compared with 2/5 of those that were  
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16 188 not EM residency trained. The mean postgraduate year (a surrogate measure for average number  
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18 189 of years in practice) was higher in the group that did not complete the credentialing  
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20 190 requirements. Seniority within our EM faculty had no impact on successful completion of the  
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22 191 credentialing process with the average number of years in practice at ~~XXXXXX~~ SLR Hospital  
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24 192 Center being similar amongst the two groups (8.8 vs. 9.1).  
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Table 2: Potential predictors of credentialing program completion

|                            | Requirements completed<br>N = 21<br>Mean (median, range) | Requirements not completed<br>N = 7<br>Mean (median, range) | Did not specify | Totals |
|----------------------------|--|---|-----------------|--------|
| EM Residency trained       | 19   | 4   | 3               | 26     |
| Non-EM residency trained   | 2  | 3   | 0               | 5      |
| US curriculum in residency | 6  | 0   | 0               | 6      |
| PGY                        | 9 (8, 7-12)  | 15 (15, 8-21)   |                 |        |
| Years of practice at       | 8.8 (7, (6.2-  | 9.1 (7, 3.0 – 15.3)   |                 |        |

|                     |       |  |  |  |
|---------------------|-------|--|--|--|
| <del>XXXX</del> SLR | 11.5) |  |  |  |
|---------------------|-------|--|--|--|

195

196 The faculty who successfully fulfilled the requirements [for acquiring credentials in BUS](#)  
 197 graded the importance they placed on certain motivators to completion. Concern for disciplinary  
 198 action by the chairman (10/21), increasing clinical competence to improve patient care (11/21)  
 199 and improving the ability to disposition patients faster (10/21) were among the most important  
 200 motivators identified. Personal interest and resident education were important motivators for  
 201 only 28% (6/21).

202 The 7 physicians who did not complete the requirements answered questions on barriers  
 203 faced during the credentialing process (Table 3). Too many other demands on their time (5/7)  
 204 was a more important barrier than lack of knowledge in ultrasound (2/7). The steps towards the  
 205 credentialing process appeared to be burdensome to some of our faculty, with 2/7 ranking the  
 206 amount of work entailed in acquiring credentials outweighing the benefits and 3/7 ranking  
 207 obtaining the required number of scans as important barriers. None of the survey respondents  
 208 indicated that unawareness of the requirements was a barrier.

209

210 Table 3. Barriers for those who did not complete requirements

| Barrier to completion                                  | N = 7 |
|--|-------|
| Couldn't get the scan numbers                          | 3     |
| Amount of work outweighed benefits                     | 2     |
| Too many other demands on time                         | 5     |
| Didn't know how to ultrasound and not enough education | 2     |
| Didn't know about the program                          | 0     |

211 Respondents who did not complete the credentialing requirements were asked to rank the above  
 212 barriers on a 5 point Likert scale, with 1 being most important and 5 least important. The  
 213 numbers in this table represent the responders who ranked a given barrier 1 or 2.

214

215 We asked all of our respondents to grade overall obstacles towards completion of the  
 216 requirements (Table 4). The majority of survey respondents (20/31) indicated that clinical shifts  
 217 were too busy to complete the credentialing requirements. The number of scans required for  
 218 credentialing was viewed as an important obstacle for a large minority (10/31) of our faculty.  
 219 Having ultrasound services from the radiology department available for patient referrals from the  
 220 ED was also viewed as a barrier to obtaining the number of required scans (10/31). A smaller,  
 221 although not negligible, number ranked medico-legal risks of incorrect interpretation as a  
 222 deterrence to completing the credentialing program (8/31).

223

224 Table 4. Overall Obstacles to [Acquiring Credentials](#)

| Obstacle                                       | N = 31 |
|--|--------|
| Too many scans required                        | 10     |
| Too many true positives required               | 10     |
| Medico-legal risks of incorrect interpretation | 8      |
| Shifts are too busy                            | 20     |
| Radiology is readily available                 | 9      |

225 All survey respondents were asked to rank the above obstacles on a 5 point Likert scale, with 1  
 226 being most important and 5 least important. The numbers in this table represent the total number  
 227 of responders who ranked a given obstacle 1 or 2.

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6 229 For the purposes of increasing the ease and efficiency of the credentialing process faculty  
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8 230 were encouraged to offer subjective comments. Only two faculty members stated that there was  
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10 231 no need for a change in our program for acquiring credentials. Another 15 faculty members  
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12 232 offered their ideas. The two most important themes in the answers to this question were a need  
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15 233 for more mentorship and time. The most common requests were more one-on-one and hands-on  
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17 234 training sessions and more immediate feedback on performance. Several faculty expressed  
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20 235 concern over the time investment required to complete the steps towards acquiring credentials.  
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22 236 Several of our faculty believe that clinical shifts are too busy suggesting that time outside of  
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25 237 scheduled clinical duties would be required to complete the requirements.  
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17 257 **DISCUSSION**

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20 258 We report a single academic institution's experience with a program [to acquire](#)  
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22 259 [credentials](#) in bedside ultrasound for a faculty with varied prior experience with ultrasound. The  
23  
24 260 insight gained from this pilot data is being incorporated into the design of a curriculum for  
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26 261 faculty credentialing in bedside ultrasound.

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29 262 This descriptive report for an academic institution may not reflect that of private and  
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31 263 community physician groups in non-academic settings starting a credentialing program for  
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33 264 [emergency bedside](#) ultrasound. An important factor present in the academic setting is the  
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35 265 presence of [emergency medicine](#) residents and their enthusiasm for learning new technologies.  
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37 266 [A second factor is the existence of an ultrasound fellowship with fellows and dedicated faculty.](#)  
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39 267 [These are likely motivators](#) for the more senior physicians who supervise the residents [and work](#)  
40  
41 268 [clinically with fellows.](#)

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44 269 Likewise the barriers faced by the non-academic emergency physician may be different  
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46 270 from those of attending physicians in academic centers. Specifically, a lack of knowledge in  
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48 271 ultrasound was cited by only two of our physicians as an important barrier, perhaps because of  
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50 272 the now routine exposure to the technology. We suspect that knowledge in ultrasound may  
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3 273 be a more important barrier for the community physician who is without the benefit of regular  
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5 274 educational opportunities such as lectures and conferences on ultrasound.  
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8 275 Despite the stated limitations, we believe that this paper can provide valuable insight to  
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10 276 physicians interested in developing a credentialing program for their faculty regardless of the  
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12 277 setting (academic versus non-academic). A number of the respondents to our survey stated  
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14 278 concerns about the need for more hands on-training and mentoring suggesting that the truncated  
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16 279 training experience may not be sufficient for experienced EM clinicians to feel they can perform  
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18 280 and interpret scans independently. These concerns are likely echoed by our colleagues in non-  
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20 281 academic centers who may not have dedicated personnel for training and quality assurance.  
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22 282 Some of the other barriers echoed by several of our faculty members, such as lack of time during  
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24 283 clinical shifts to practice ultrasound and the need for more protected time in order to complete  
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26 284 the requirements, are likely also experienced by the non-academic physician who has little or no  
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28 285 compensated non-clinical time.  
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## 35 36 287 CONCLUSION

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39 288 Based upon the experience at our urban academic XXXXX-hospital center and the web-  
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41 289 based survey responses, we report a single academic institution's experience with a credentialing  
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43 290 program in bedside ultrasound. Insight gained from these results may be incorporated into the  
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45 291 design of a curriculum for acquiring credentials in bedside ultrasound.

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48 292 recommend the following:

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50 293 A focused credentialing process with clearly defined goals

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52 294 Requirements outlined, supported, and endorsed by the EM departmental leadership

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54 295 Protected time outside of clinical duties dedicated to self-directed education  
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3 296 | ~~Opportunities for direct supervision of bedside ultrasound technique~~  
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6 297 | We consider the following questions as opportunities for future study:  
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8 298 • How can the curriculum for credentialing in bedside ultrasound be modified to insure the  
9  
10 299 successful completion of the requirements?  
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12  
13 300 | • What motivators can be identified to increase successful completion of credentialing  
14  
15 301 requirements?  
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18 302 • What is the best means of training the emergency physicians in practice who did not learn  
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20 303 bedside ultrasound during residency however need to learn this due to patient safety  
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22 304 standards.  
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For peer review only