Abstract:

In contrast to adult emergency medicine, bedside ultrasound has not been widely used in pediatric emergency medicine. Recent literature suggests that bedside ultrasound may have multiple uses for pediatric emergency care. This review will provide an overview on how to implement this tool into a pediatric emergency department and the integration of ultrasonography into a fellowship curriculum. In addition, this article will highlight evidence derived from the technology and business literature regarding the development of this technology for pediatric emergency medicine. Special emphasis will be placed on practical evidence to identify barriers to adoption as well as strategies to overcome these barriers.

Keywords:

bedside ultrasonography; pediatric emergency medicine; fellowship curriculum

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Eight Secrets to Implementing Bedside Ultrasonography in Pediatric Emergency Medicine

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"I will change after I retire."—anonymous pediatric emergency medicine physician

B edside ultrasonography (US) is a useful tool in pediatric emergency medicine (PEM). This article will provide an overview on how to adopt and implement this tool into a PEM division as well as how to integrate this into a

fellowship curriculum. Barriers to adoption of this technology as well as strategies to overcome these barriers will be addressed.

BACKGROUND

During the past decade, bedside US has emerged as an important tool for PEM physicians in various settings: rapid assessment of trauma patients,[1-20] foreign body removal,[21-26] central line placement,[27-38] regional nerve block placement,[39,40] evaluation of intravascular volume status,[41,42] bladder evaluation before catheterization,[43-48] assessment of difficult peripheral intravenous access,[49-53] and assessment of cardiac function during resuscitations.[54-56] For some PEM divisions, the use of bedside US has become almost a routine in the emergency department (ED). Although it may take several years as well as an investment from multiple faculty and fellows to achieve a culture of regular US use, the long-term benefits can be significant for patients and physicians.

As is frequently the case with most technologies that require further training, the adoption of US has been slow in the PEM setting.[57,58] Figure 1 illustrates a standard technology adoption S-curve that is readily applicable to US.[59] Common reasons for slow US adoption include lack of personnel with US experience,[60] lack of time to train, lack of familiarity with equipment, unclear benefits or benefits that only accrue with experience, and lack of funding for a US machine.[57] Based on our experience, we propose 8 strategies to help implement this technology into a PEM division and fellowship:

1. Identify a champion;
2. Surround the champion with a support team;
3. Seek help from local and regional experts;
4. Target 1 or 2 high-yield applications first;
5. Encourage fellow scholarly projects to expand the US footprint;
6. Allow ample time for an US culture to take root and mature;
7. Identify and address resistance to change and barriers to adoption of US; and
8. Avoid common pitfalls.

Secret Number 1: Identify a Champion

Early on in the process, identify a junior or midlevel faculty member to champion the use of US in the ED. A faculty member (as opposed to a fellow) provides enough experience and positional power on institutional committees (ie, trauma, radiology) to lay the foundation for an US culture. If hiring this champion to the division, a director or chairperson
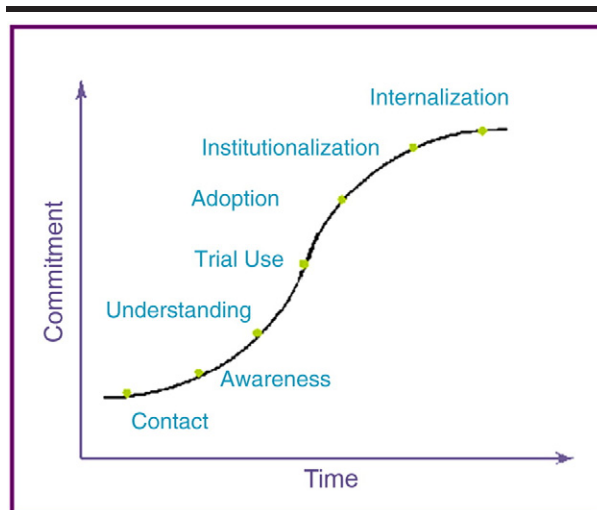

Figure 1. Standard technology adoption S-curve.[59]

may consider protecting the champion's time because culture building is a time-consuming and labor intensive process.[61] Similar to the way we consider informational technology support critical for introducing new hardware and software, one could view the champion as the future support person for the division to assist training, troubleshoot potential problems, and lead quality assessment initiatives. Ideally, this leader would have both a clinical and research interest in developing US skill sets.

Secret Number 2: Surround the Champion with a Support Team

Creating a new culture is rarely achieved by a single individual. It typically requires a team to lay the foundation for a new culture.[61-63] Based on our experience, a 3-person team (including the champion) is the critical mass to create a culture supportive of US.[64,65] Optimally, a senior member of the faculty and a fellow (or another junior faculty member) could be the 2-person support team for the champion. The senior member should have a recognized leadership role within the division, such as the division or research director. The rationale for this characteristic is that future roadblocks may be more effectively overcome by an experienced faculty member who is familiar with the interdepartmental politics and policies or practices related to the adoption of new technology. We recommend anticipating resistance to change, and it may require a team member with seniority or positional power to influence decision making.[66]