

# To Train or Not to Train the Dialysis Access Team

How to implement a successful team-based strategy and avoid the pitfalls of ineffective training.

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There is a void in the appropriate training for dialysis access, including proper selection of the dialysis modality (ie, hemodialysis vs peritoneal dialysis), type and surgical site selection, timing of access placement, staff authorized to train for dialysis access, and the institutional setting in which to perform the procedures. The rapidly developing and competing technologies, socioeconomic forces, wide spectrum of professional experience, and bias make the need for a comprehensive and accepted training curriculum imminent and highly desirable.

In general, dialysis access care is multidisciplinary, poorly coordinated and executed, complex, and fragmented in nature. It is a major burden for the overall health care system, exceeding \$40 billion a year,<sup>1,2</sup> with an average of \$80,000 per patient undergoing dialysis. The prevalence of chronic kidney disease in these patients has steadily increased due to the obesity epidemic, an aging population, and other factors contributing to higher rates of hypertension and diabetes. Ten percent of the United States population has some degree of chronic kidney disease, with more than 900,000 patients being treated for end-stage renal disease (ESRD), including 400,000 patients on chronic dialysis, 60% who are older than 60 years, and with a prevalence that is three times higher among African American than among white patients. Non-English-speaking patients and those in lower socioeconomic groups are also especially vulnerable.<sup>3-6</sup> Until effective preventive measures can be instituted, teaching all those involved in ESRD treatment is the only way to achieve better outcomes and quality of life.

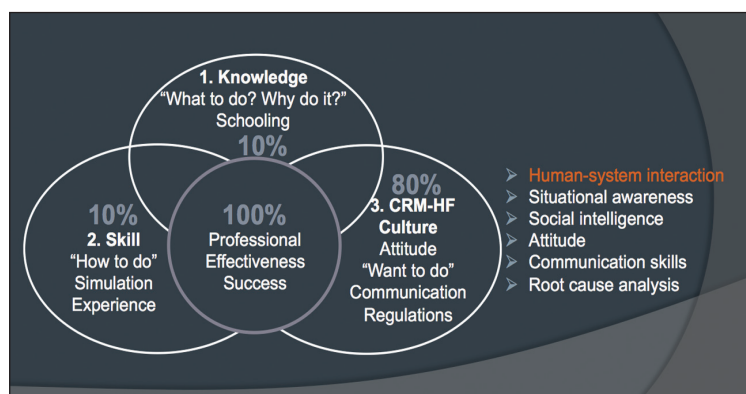


Figure 1. Three components of vascular access expertise.

The human factor (HF) teaching approach, also known as *crew resource management* (CRM), trains the entire dialysis access team to optimize coordination of care and maximize communication between care providers. The philosophy is to educate the trainee so that he or she will commit to train new team members coming into the dialysis access field. This article outlines a training model by which this can be accomplished in a consistent, effective, and customized fashion.

## THE DIALYSIS ACCESS TEAM TRAINING CONCEPT

Three basic components constitute team-based dialysis access safety training (Figure 1). First, team members must have knowledge about dialysis access from formal medical reading material and postgraduate residency training. Second, workplace safety comes from skills, experience from practice on the job, and by incorporating simulation as part of skills training.<sup>7</sup> There is no

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substitute for knowledge and skills to achieve safety. The third component deals with the HF role in contributing to work effectiveness and safety. It entails many things related to human nature, such as the incentive to work, interpersonal skills, behavior, and drive.<sup>8,9</sup>

Since 1970, there has been a shift in the emphasis on root causes of accidents and consequently what can be done to improve safety.<sup>10-12</sup> In the past, high-liability industries were concentrated on mechanical (hardware) failure, often for good reasons. From the period of 1980 to about 1990, the emphasis shifted to blaming an individual for accidents arising from mistakes.

Currently, safety improvement experts are focusing on HF and how people interact with complex systems and cultural issues.<sup>12,13</sup> The health care industry is now also beginning to discuss often hidden or ignored system problems.<sup>14</sup> Secondary benefits of an HF approach are improved morale and enhanced efficiency of operations. Operating room safety is an interdependent process carried out by teams of individuals with advanced skills training in different roles. The use of checklists and briefings must be an integral part of any dialysis access invasive procedure.<sup>15</sup>

### DIALYSIS ACCESS SIMULATION

Dialysis access simulation improves safety and introduces new techniques in dialysis access through a variety of hands-on experiences, yet operating room teams do not routinely engage in simulation training. Dialysis access simulators range from simple suturing technique learning devices, to pressurized tunneled graft conduit systems for central vein catheter insertion and cannulation of the access, to computer-designed simulators to teach interventional procedures and video case simulation learning.<sup>7</sup> Also, the use of effective customized checklists and briefing of all invasive access procedures are key components of safety. For example, debriefing after a procedure is a uniquely effective safety improvement tool, wherein the lead operator conducts a discussion of problems encountered, as well as reinforces excellent team performance.

### THREE EXAMINATION QUESTION TYPES

1. Multiple-choice-style written questions. There should be more than one acceptable answer, but one that is the most appropriate.
2. Multiple-style written questions. Only one answer is correct based on hard data from published literature and statistical facts.
3. Judgment and reasoning are tested in an oral examination about specific patient cases and scenarios presented.

### BARRIERS TO IMPLEMENTING EFFECTIVE TRAINING

The greatest single barrier to effective training is the widespread skepticism about the HF and the team training concept. Effective training will improve if the access teams learn and train together, embracing the communication and system techniques embodied in the HF teaching concepts. A second drawback to traditional dialysis access safety training is fragmentation, where each professional trains independently from each other. To be effective, training must be done in teams. The cost of education and training is also a perceived barrier. Future research must therefore demonstrate that education makes a difference in dialysis access outcomes.

### CUSTOMIZING YOUR DIALYSIS ACCESS TRAINING PROGRAM

Because there are no standards for a dialysis access training curriculum, the authors propose the following approach. As several dialysis access professionals are directly involved at great variation in knowledge and skill levels, training must be designed to meet individual needs. For example, a surgeon who has minimal dialysis access experience, coming from a residency or even vascular fellowship program, may benefit from 4 weeks of vascular access only hands-on skills training. In contrast, a surgeon with many years in practice may need just 1 week of refreshing exposure.

Skill training might include dialysis access simulators, such as the recently developed dialysis access surgical arm simulator, in addition to other available dialysis access simulation techniques.<sup>16</sup> Other specialists, such as nephrologists or radiologists, may only need interventional procedural skill updates in this rapidly developing field. Others still may only want to observe and have the didactic (knowledge) update. Dialysis access cannulation skill training will also be offered in the

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future. Reading requirements may be delivered electronically, such as by email, or via handouts on site.

The training curriculum should instill judgment about decision making in selecting the appropriate mode of dialysis and type of access. In general, as previously suggested, there will be two separate tracts of training. First, the total access surgeon will be expected to have the skills and knowledge about all access procedures, including peritoneal dialysis, and to diagnose and correct all access complications and failures. The total access surgeon will also be expected to master endovascular procedures, such as central vein balloon angioplasty, Hero graft (Hemosphere, Inc., distributed by CryoLife, Inc.) placement, and access thrombectomy procedures. Second, the interventional tract curriculum will mainly train nephrologists, and possibly radiologists, in the same interventional procedures as the total access surgeon.

After completing customized training, a rigorous oral and written multiple choice examination will follow to ensure competency (see the *Three Examination Question Types* sidebar). Questions will include pictorial representation of external anatomy and interpretation of ultrasound examinations, as well as venography and angiography, to assess the examinee's judgment ability in choosing the appropriate access at that particular time in a patient's life. The examinee's knowledge will also be tested to assess modes of access failure in regard to access inflow, outflow, and conduit issues.

After completion of training and examination, a certificate specifying the individual's competencies should be issued. The trainees will have access to consultation for skills and knowledge retention.<sup>17</sup> For a dialysis access training program to be successful, broad-based support from and participation in ESRD and dialysis access societies will be required. Also, training sites must be expanded as the training curriculum develops and matures.

## SUMMARY

Knowledge, skills, and an appropriate attitude are the mainstays for a successful dialysis access practice and are

at the core of the HF training philosophy. The dialysis team must train together using simulation to eliminate gaps in knowledge, technical skills, and communication before exposing patients to procedures. Root cause analysis simulation is a powerful tool to prevent adverse outcomes. A continuously improving dialysis access safety program must change its culture of error management to a "just culture,"<sup>11</sup> implying a workplace environment where balancing safety and accountability recognizes the human contribution to failure in the complex ESRD dialysis access system. ■

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