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# Development of an Intravenous Skills Module for Graduate Nurses


## ABSTRACT

Graduate nurses (GNs) are a major part of hospital recruitment. Forty-two percent of new hires are likely to be GNs. Many GNs feel ill prepared in intravenous (IV) catheter insertion and central line care. The purpose of this evidence-based practice project was to determine if an IV skills workshop would have a positive impact on GNs' comfort and skills. Casey-Fink Graduate Nurse Experience Survey data indicate that 29% of graduate nurse residents participating in the first cohort of this workshop list IV skills as most challenging. Postsurvey data showed that GN comfort level improved. Supporting the GN in this challenging transition by providing focused education and skills practice may alleviate this discomfort.


**Key words:** evidence-based practice, graduate nurse, intravenous, nursing education

There is a plethora of literature discussing the future nursing shortage. It has been a topic of discussion in the nursing profession for many years. A key area of discussion includes issues related to graduate nurses' (GNs') transition to practice.

According to the US Registered Nurses Workforce Report Card and Shortage Forecast, the nursing shortage will extend across the country between the years 2009 to 2030, with the greatest deficiency in the South and West.[1] Because of this, it has been suggested that the pipeline for future nurses is the GN population. As early as 2003, research from the Health Care Advisory Board estimated that 42% of hospital new hires would be GNs.[2] The 2008 Nurse Executive Center summary also noted that the group will include at least 10% or more of the hospital nursing staff and will continue to grow.[3] Its survey compares nursing school and hospital nurse leaders' beliefs about nursing competencies and the ability to provide safe and effective care. It notes that nearly 90% of academic leaders believe that nursing students are fully prepared compared with only 10% of hospital leaders.

The University HealthSystem Consortium (UHC), in an extensive evaluation of GN residents, questioned residents about the top 3 skills they felt uncomfortable performing independently at (1) the start of their residency, (2) at 6 months into practice, and (3) again at 12 months into practice. At each stage at which GN residents were surveyed, intravenous (IV) starts were 1 of the top 3 responses.[4] Gavlak[5] further supported the premise regarding the need to reinforce these clinical skills during the orientation period. It was suggested that sessions be included during nursing orientation to cover the areas of IV skills, phlebotomy, code blue demonstration, and respiratory therapy.

As early as 2002, The Joint Commission called for the addition of nurse residency programs as a means to provide transition to nursing practice. More recently, the Institute of Medicine also encouraged the implementation of nurse residency programs to help with the transition from nursing school to practice with further skill development.[6] Members of UHC/American Association of Colleges of Nursing (AACN) convened to coordinate the development of a curriculum necessary for a yearlong nurse residency program and to recognize approaches to assist with this transition into practice.[7] As of February 2013, there were 92 sites in 30 states participating in the UHC/AACN Nurse Residency Program, with 26 000 nurses completing the program.[8]

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## INTENDED IMPROVEMENT/STUDY QUESTION

The purpose of this evidence-based practice (EBP) project was to determine if the addition of workshops for IV skills practice would have a positive impact on GNs' knowledge and skills and improve Casey-Fink Graduate Nurse Experience Survey results.[9] Changes in nursing practice are necessary for many reasons but are often difficult. It is important to identify a change theory or model to provide a framework for implementing, managing, and evaluating change.[10]

The Iowa model of EBP was selected for this project. The model begins with a trigger (one that is either knowledge or problem focused), which initiates a process of exploring and evaluating existing scientific evidence. The trigger should also be an organizational priority.[11] The knowledge-focused triggers were evident in relation to the results of the Casey-Fink Graduate Nurse Experience Survey because it concerns a growing workforce in the institution, an organizational priority. Project plans were discussed with major stakeholders (such as nurse educators, nurse managers, the GN program coordinator, and the vascular access team), who provided positive feedback and encouragement to proceed. With a sufficient research knowledge base, the improvement change moved toward implementation (Figure 1).

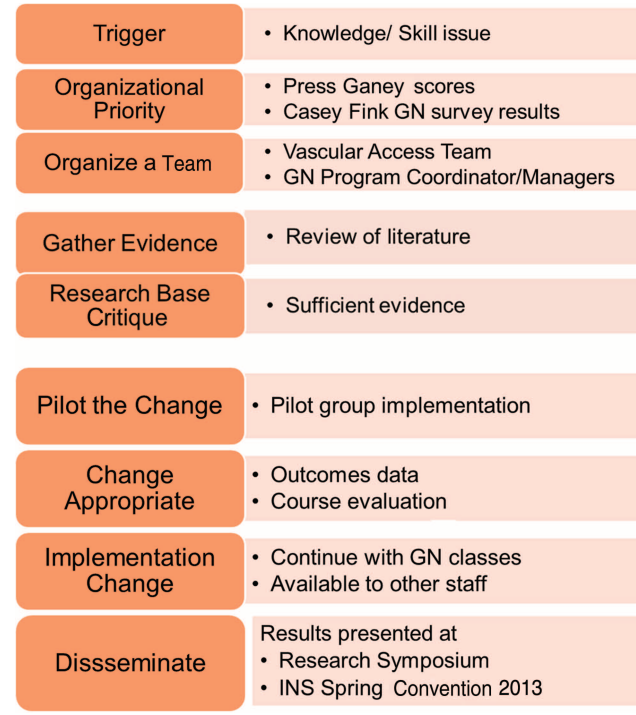



**Figure 1** Developmental steps for the peripheral intravenous skills course. Adapted from the Iowa Model of EBP.[11] Used with permission from the University of Iowa Hospitals and Clinics and Marita G. Titler, PhD, RN, FAAN. Copyright 1998. For permission to use or reproduce the model, please contact the University of Iowa Hospitals and Clinics at (319) 384-9098.

## SETTING

The academic medical center holds an American Nurses Credentialing Center Magnet® designation and employs approximately 1500 clinical registered nurses (RNs). Its postbaccalaureate nurse residency program is accredited by the Commission on Collegiate Nursing Education.

In the 10-year history of the residency program, almost 50% of inpatient RNs are graduates of the program. The yearlong program has 2 phases: (1) the first 6 months focus on the unit-based precepted experience, monthly seminars, required specialty courses, and skill acquisition; and (2) the second 6 months include monthly workshops, clinical narratives, and a greater focus on critical thinking, the development of leadership skills, the integration of skills with outcomes, and the completion of an EBP final project. The typical acute medical/surgical and women's care units provide a precepted orientation experience that lasts about 12 weeks; the critical care, emergency department, and postanesthesia care unit precepted orientation is about 24 weeks. Because the primary focus of phase 1 is on skill acquisition, it was the perfect setting for implementation of this EBP project targeting a "novice nurse" group.

## INTERVENTION

The pilot project was initiated with an October 2008 cohort of GNs (N = 32). The Casey-Fink Graduate Nurse Experience Survey was one of the outcomes tools used. The survey measures GNs' experiences through the various stages of their first year of the program (baseline, 6 months, and 12 months). The survey question targeted for the project was "List the top 3 skills/procedures you are uncomfortable performing independently at this time." The initial question in the survey only asked for the skill that was "uncomfortable." Because the question was very broad, it was determined that further information was needed to learn what part of the process made GNs uncomfortable with this skill acquisition. A presurvey was developed with the help of the medical center's research nurse scientist to elicit additional information, which included demographics and feedback regarding the skills they found "difficult" to perform (Figure 2). When the information was compiled, it was used to develop the curriculum for the IV skills course. A box plot graph was created from the data displaying the number of attempted IV starts for all of the GNs before the course was implemented. For example, the range of IV start attempts of 1 cohort ranged from 10 to 50, with a median of 8. Another cohort ranged from 0 to 40 attempted IV starts, while a third ranged from 2 to 10.

11/18/08
UNIT:

According to results from the Casey-Fink Graduate Nurse Experience Survey, IV starts and skills, medication administration, and IV pumps are listed as 1 of the top 3 skills you are uncomfortable performing independently. The Vascular Access Committee is preparing an IV therapy course to pilot with the October 2008 graduate nurse residency class.

We would like to ask for your input to determine your specific needs for this course. Thank you for completing the following questions.

1. What portion of the IV start process makes you feel "uncomfortable"? (Circle all that apply.)
   a. Choosing the vein site
   b. Locating and palpating the vein
   c. The IV start technique (using a tourniquet, getting the patient ready, etc.)
   d. The actual IV insertion (puncturing the skin, threading the cannula)
   e. Evaluation of infiltration or phlebitis
   f. "Hard sticks" (tough skin; thin, small, or rolling veins, etc.)
   g. Lack of experience
   h. Other, please specify. _____
2. Where have you practiced your IV skills? (Circle all that apply.)
   a. Nursing school simulation labs
   b. Nursing school practicum or clinical
   c. Nurse intern or advance care partner programs
   d. Previous experience as a medical assistant or EMT
   e. "I have never started an IV"
   f. Other, please specify. _____
3. Estimate how many IVs you have ever attempted. _____
4. Of the number of IVs attempted, how many were:
   a. Successful _____
   b. Unsuccessful _____
5. Have you ever drawn blood?
   a. Yes
   b. No
6. If yes (Question 5), estimate how many times have you have attempted. _____
7. How many were:
   a. Successful _____
   b. Unsuccessful _____
8. Rate your comfort level with administering IV push medications (0 = not comfortable at all to 10 = totally comfortable). (Circle your score.)

   0 1 2 3 4 5 6 7 8 9 10

   (Not comfortable at all) (Totally comfortable)
9. Rate your comfort level with the Alaris® infusion pumps (0 = not comfortable at all and 10=totally comfortable. (Circle your score.)

   0 1 2 3 4 5 6 7 8 9 10

   (Not comfortable at all) (Totally comfortable)
10. Rate your comfort level with the CADD® patient controlled pain pump (0 = not comfortable at all to 10 = totally comfortable). (Circle your score.)

    0 1 2 3 4 5 6 7 8 9 10

    (Not comfortable at all) (Totally comfortable)

*Abbreviations: IV, intravenous; EMT, emergency medical technical; CADD®, brand of portable infusion pump.*

**Figure 2** Peripheral intravenous skills evidence-based practice course presurvey.

A wide range of experience was noted and included at least 5 GNs who had never started an IV before entering the nurse residency program.

A peripheral IV therapy course was created using the survey findings noted above and incorporated policies and procedures of the Infusion Nurses Society. The 2.5-hour session included a didactic portion and 30 minutes of basic technique practice using simulation arms to replicate patient care. Facility supplies were used and mentors were present, providing real-time feedback. Course materials included handouts, diagrams, and simulation supplies for hands-on practice. Course content targeted:

- peripheral venous anatomy
- site and selection, osmolality of infusates
- infection-control measures
- peripheral or central device algorithms
- site complications, such as phlebitis, infiltration, infection, and bleeding
- tips for specific populations, such as obese and elderly patients

Among the groups, a wide range of GNs had infusion experience. Some practiced previously in the role of advanced care partners (ACPs), health technicians, and emergency medical technicians (EMTs) and were often more experienced, while others had no infusion experience at all. It was determined that a real-life scenario would be helpful for the GNs who needed the extra experience. During the class, participants were offered a practicum to expand this training.

To successfully implement this portion of skill acquisition, it was vital to receive stakeholder approval. The baseline data and project were presented to the Nurse Manager Council to discuss the opportunity for a 2- to 4-hour practicum in the emergency department, outpatient infusion center, cancer center lab, and early-admission unit. The Nurse Manager Council supported this paid orientation time to better meet the identified needs of the GN population. The clinical nurse educators from the specific units identified preceptors and times available for practice sessions. It was made clear to the units that the staff member was not sent to assist in patient care but, rather, to have an opportunity to practice as many IV insertions and blood specimen draws as possible in the time provided.

Course dynamics have changed because of changes in the size of the postbaccalaureate nurse residency program. At the start of the course, the average class size was approximately 20 to 30 participants. Over the past year, the class size has grown substantially to about 60 to 80 participants because of the large increase in cohort size of the nurse residency program.

## METHODS OF EVALUATIONS

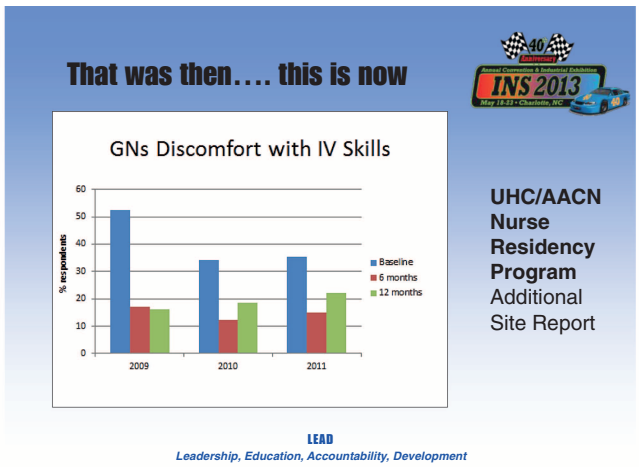
Following the Iowa EBP model (Figure 1), the Peripheral IV Therapy course was implemented and data were collected. The baseline data, drawn from the Casey-Fink Graduate Nurse Experience Survey that was collected with the October 2008 cohort before course implementation, indicated that 29% of participants listed IV skills as 1 of the top 3 skills they found most challenging. The data collected from the Casey-Fink Graduate Nurse Experience Survey in 2009 at the 6-month mark (following the Peripheral IV Therapy course and practicum) indicated that GN discomfort level decreased from 52.4% to 16.1% at

the 12-month completion. The course evaluations indicated that the objectives were met and included positive narrative responses, such as:

- "A nice reminder of anatomy and how it applies to IV insertion."
- "It was helpful practicing with the needles and veins."
- "Hands-on practice was helpful."
- "I am experienced with IVs but learned several reasons why I use the techniques I do."
- "Excellent handouts with photos and tips."

With such positive improvement in not only the Casey-Fink Graduate Nurse Experience Survey but also course evaluations from the GNs, the information was presented to stakeholders, and the Peripheral Intravenous Therapy course was added to the curriculum of the postbaccalaureate nurse residency program. The class continues to be offered 3 times a year in the first months of the program's orientation period.

The medical center's postbaccalaureate nurse residency program has been in place for 11 years and has more than 1000 graduates. Since its inception, the institution's retention rates have been substantial, with approximately 60% of program graduates continuing to work at the institution. Approximately 500 RNs have participated in the project since late 2008. UHC continues to collect institution-specific data using the Casey-Fink Graduate Nurse Experience Survey. Figure 3 describes the most recent results of the surveys. Each cohort experienced a decrease at the 6-month period from their baseline in years 2009, 2010, and 2011. A slight spike in the data for discomfort at the 12-month mark occurs in 2010 and 2011, but at this point in their nursing careers, all residents are functioning independently and could be experiencing added stress as a result of practicing independently. Regardless, the data reflect a decrease in discomfort when compared with baseline data.




*Abbreviations: GN, graduate nurse; IV, intravenous; UHC, University Health System Consortium; AACN, American Association of Colleges of Nursing.*

**Figure 3** GNs' discomfort with IV skills.

Data are collected over a 1-year period and reported to the facility in the following year. Data for 2012 have been submitted, but the reporting data have changed according to UHC, and this does not allow the same correlation as in past years noted on the graph. For that reason, recent data have not been added to Figure 3.

## LIMITATIONS

The medical center has an ACP program that provides nursing students with opportunities to practice nursing skills as employees of the organization. Some of the GN residents had experience as either phlebotomists or EMTs before transitioning into nursing. As many ACPs, phlebotomists, and EMTs are hired into the postbaccalaureate nurse residency program, the decrease in the "uncomfortable" skill ranking could be a reflection of their increased previous work experience and may be reflected in the baseline data.

It cannot be completely inferred that the program as opposed to clinical experience is the cause for the decrease in discomfort level. The academic medical center has a nurse residency program, so these findings may not be generalizable to other health care settings.

## IMPLICATIONS AND SUMMARY

The initial EBP project has progressed from a pilot program to a successful, established course. Goode et al[12] recently published an article describing the lessons learned from 10 years of research from the UHC/AACN nurse residency program. The article noted that IV skills are 1 of the top 3 skills GNs are uncomfortable performing, but they have now dropped to the seventh most uncomfortable skill. The decrease in the ranking may be the result of the change in the unit acuity favoring end-of-life care and code blues as some of the most "uncomfortable" skills. The transition from GN to professional nurse continues to be a challenge. Supporting the GN in this transition by providing focused education and skills practice, such as the peripheral IV therapy course, seems to alleviate discomfort with skill performance. Health care institutions are encouraged to consider these data when planning nurse residency programs to support GNs, who are rapidly becoming a majority in the workforce of RNs.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