

# Development and Evaluation of The Implementation of a Preceptorship Program for The Novice ICU Nurse Intensive Care Unit -A Secondary Publication

Annie Perron, Manon Champagne, Abir El-Haouly\*

University of Quebec in Abitibi-Témiscamingue, Rouyn-Noranda, QC J9X 5E4, Canada

\*Corresponding author: Abir El-Haouly, [abir.elhaouly@uqat.ca](mailto:abir.elhaouly@uqat.ca)

**Copyright:** © 2024 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

**Abstract:** This study focused on the development and evaluation of the implementation of a preceptorship program adapted to ICU practice in the Ab.-T. region to provide preceptors with tools to support novice nurses. This action research was made possible with the involvement of the centers, preceptors, and novice nurses throughout the development and implementation of the program. This approach enabled participants to take ownership of the training content and fully utilize various tools. The program was implemented throughout the CISSS, where this study was subsequently carried out. Several novices mentioned that the program reinforced their sense of security and made them feel more equipped to handle complex care situations. The preceptors said they were better equipped to offer clinical support and novices were better prepared to work in the ICU. It is important to evaluate the development of the novice nurses' skills following their participation in this program and the long-term impact of this preceptorship.

**Keywords:** Preceptorship program; Intensive care unit; Novice ICU nurses

**Online publication:** March 29, 2024

## 1. Introduction

In Canada, a bachelor's in nursing is the standard entry requirement for entering the nursing profession<sup>[12]</sup>. In Quebec, one of the gateways to the nursing profession is the Diploma of Collegial Studies (DCS) in Nursing. In this province, 61% of nurses begin their careers with a college diploma, 22% have graduated outside Quebec, and 17% entered the profession with only a bachelor's degree<sup>[20]</sup>. While newly qualified nurses begin their careers in various care units, a significant proportion of them start in the intensive care unit (ICU), which was the case for 14.9% of nurses in 2020–2021<sup>[20]</sup>. This situation is concerning, considering that college-educated nurses are ill-prepared to handle complex situations in the ICU<sup>[3, 19]</sup>. This is because critical care skills are usually developed in university<sup>[12]</sup>.

The transition from training to clinical practice in an ICU poses a challenge and increases stress for newly graduated nurses<sup>[14,16,17]</sup>. The new nurses would require support and training from their experienced peers<sup>[10]</sup>. The Ministry of Health and Social Services (MSSS) has set up the National Clinical Support Program-Preceptorship

Component, which calls for experienced nurses to act as preceptors. However, the responsibility for training novices, in addition to their work, adds to their burden and reduces the retention of nursing staff <sup>[33]</sup>. Some authors pointed out that the use of a structured preceptorship program supported those who assumed this role while increasing the competence of novice nurses <sup>[16–18,33]</sup>.

In Abitibi-Témiscamingue (Ab.-T.), the problems described above are amplified by three factors specific to this remote region of Quebec: (1) the average growth rate of the nursing workforce (0.3%) was below the provincial average (1.3%) over the past 5 years <sup>[21]</sup>; (2) there was a 6.1% decrease in the hiring of new nurses in 2020–2021 <sup>[21]</sup>; (3) the lack of theoretical content adapted to regional practice, thus limiting preceptorship opportunities.

This study aims to develop a preceptorship program for novice ICU nurses adapted to Ab.-T. practice and to evaluate its implementation. The general objectives include: (1) to develop and collaborate with ICU; (2) to evaluate the effectiveness of the program's implementation in terms of training activities; (3) to evaluate the satisfaction of novice nurses and preceptors with the program; (4) to explore the participant's perceptions of the program's impact on novice learning.

## 2. Context

The International Council of Nurses (ICN), the Canadian Nurses Association (CNA) Association (CNA), and the Order of Nurses of Quebec (OIIQ) have taken a stand in favor of support for the development of novice nurse competencies <sup>[6,9,25]</sup>. The results of various studies were favorable to this movement <sup>[15,28,34]</sup>. In Quebec, the MSSS has set up a clinical support program, which includes a minimum preceptorship period of twelve hours over three months to support any new nurses with less than three years of experience <sup>[11]</sup>. Preceptorship is defined as a formal relationship of pre-determined duration between an experienced nurse and a novice nurse. It serves to acquire of knowledge, techniques, and personal qualities, as well as social integration into the field of practice. In other words, preceptorship fosters the development of novice nurses in a given context. Several definitions of competence have been proposed in the literature <sup>[22]</sup>. Benner defined competence as the appropriate use of knowledge, skills, and attitudes in different contexts <sup>[2]</sup>.

The implementation of a preceptorship program based on recommendations by the MSSS was initiated in 2009 in the remote regions of Quebec. However, there was no structured theoretical program for preceptors in both general and critical care units. The support provided to novice nurses was limited to explanations of how the ICU operated and the handling of equipment. The first author, Perron, was a nurse clinician and a preceptor in one of the region's ICUs. She observed that the preceptors were unsure of the content to cover with the novices, and were caught off-guard. They expressed the need for a structured theoretical program to support their role as preceptors. The implementation of a structured program was also recommended in other literature <sup>[4,17,16,31–33]</sup>. Some programs have been developed in large specialized Quebec centers but were not adapted to the context of the remote region of Ab.-T., where the medical and surgical vocations of ICUs are general rather than specialized.

## 3. Terms of reference

This study finds its frame of reference in the Dreyfus model of skill acquisition as adapted by Benner for the development of expertise, and the interactive program planning model by Caffarella <sup>[2,5]</sup>. Benner's model serves as the basis for several preceptorship programs <sup>[11,27]</sup>. It describes five levels in the development of expertise: novice, advanced beginner, competent, efficient, and expert <sup>[2]</sup>. According to the model, skill acquisition was fostered by the transmission of theoretical knowledge, explicit knowledge, tacit knowledge, and skills acquired

through experience. This model guides the development of the content and activities of the present study. Caffarella's model is flexible and non-sequential and includes 12 components to consider when planning training programs for adults <sup>[2]</sup>. It was also interactive since it called for the collaboration of the participants. These correspond to the action-research strategy we have chosen for our study. This model enabled us to carry out all the actions involved in the development and evaluation of the preceptorship program relevant to the context of this research.

## **4. Method**

### **4.1. Research strategy and ethical considerations**

The action research strategy described by Munhall was chosen for this study <sup>[24]</sup>. It favors the development of innovative actions leading to solutions adapted to the environment and can be applied to program planning. There are four cycles of action research, where the first three led to the achievement of the first specific objective. This study was approved by the research ethics committees of the authors' home university and the Integrated Health and Social Service Center (CISSS) of Saint-Jérôme (2013-282-É), which acted as the research ethics committee on behalf of the CISSS in the region where the study was conducted. Consent was obtained from the participants and they were allowed to withdraw from this program at any time while retaining access to the preceptorship program. Anonymity was preserved by using pseudonyms in all documents.

### **4.2. Research environment**

This research took place between June 2014 and August 2016 in the remote region of Ab.-T. Five hospital centers (CH) with distinct vocations, located in five different cities, formed the CISSS in the region where the study took place <sup>[7]</sup>. Given the geographic distance between the centers, nurses must be able to offer all types of care to different types of clients, even those with unstable conditions. All regional hospitals with ICUs initially agreed to participate in the study. However, due to organizational changes, only 2 centers participated in program development (CH-A and CH-B), and 2 centers in the evaluation (CH-A and CH-C).

It is worth pointing out that the preceptorship was carried out differently among the centers, but none had a structured theoretical program. At CH-A, preceptorship consisted of 12 one-hour meetings between a preceptor and novice nurses outside working hours, focused mainly on ICU operations and the handling of the equipment. At CH-C, preceptorship was offered in the form of one-day group meetings once a year. The general operations and policies of the centers were presented. The preceptorship program was developed in collaboration with the preceptors in this study and was implemented according to the preceptorship measures chosen by each center.

### **4.3. Sample**

A convenience sample was used to meet the feasibility requirement. For both program components (development and evaluation), preceptors had to meet the following two inclusion criteria: be a nurse in the ICU of one of the hospitals and be recognized as a preceptor by their employer. Novices had to meet one of the following two inclusion criteria: employed by one of the hospitals for three years or less or had started working in the ICU for less than two years. Novices were also required to work in the ICU throughout the whole preceptorship program <sup>[11]</sup>.

### **4.4. Data collection and analysis**

All the preceptors who agreed to take part in the were invited by the unit heads and participation was voluntary. An initial meeting between each preceptor and the first author was held to explain the study and obtain the preceptor's consent. There were three cycles of action research within which four focus groups took place,

enabling the development of the program and the tools necessary for its implementation. The discussions ranged from 58 minutes to 1 hour and 53 minutes, with an average of 1 hour and 27 minutes. A guide, inspired by Champagne, was used to facilitate the discussion groups <sup>[8]</sup>. There were four preceptors in each group and were led by the first author in a virtual room, on a Web platform that allowed video recording. A subsequent transcription of the discussions was made by the first author.

#### **4.4.1. First research cycle**

In the first focus group, questions were designed to elicit the preceptor's ideas on the objectives, theoretical content, training activities, and learning assessment methods to be included in the program. In this first research cycle, a literature review of two ICU preceptorship programs was also conducted <sup>[6,23]</sup>. Analysis of the discussions in the first group and the two programs was carried out using the grid developed by Gaudreau *et al.* The learning objectives, content elements, training activities, and means of learning assessment methods were compared and analyzed. The specific learning objectives and content elements were then prioritized according to the Criteria of Importance and Feasibility proposed by Caffarella <sup>[5]</sup>.

#### **4.4.2. Second research cycle**

This cycle involved two focus groups. The documents developed during the first research cycle and the discussion guide were sent to the preceptors by e-mail before the two meetings were held. The questions focused on the preceptor's overall view of the program, its orientations, objectives, content elements, training activities, and assessment methods. The preceptors then suggested changes to the program. For example, it was necessary to prioritize the completion of the preceptorship within 12 hours as scheduled in the program. As there were too many objectives, it was necessary to re-prioritize them based on Caffarella's criteria <sup>[5]</sup>. The development of teaching materials was done by the research team, which included two nurses with ICU expertise.

#### **4.4.3. Third research cycle**

The program, all the teaching materials and the tools developed were e-mailed to the preceptors a week before the final focus group. They were instructed to focus on the changes made to the program and the assessment tools. The documents were then revised in line with the suggestions and comments made by the preceptors at the last focus group. Changes, such as the addition of learning activities, were made to better reflect regional practice.

#### **4.4.4. Program evaluation**

During the fourth cycle of action research, the program was evaluated through individual semi-directed interviews with novices and preceptors who participated voluntarily <sup>[30]</sup>. In this study, all four preceptors and 9 out of the 10 novices took part in the interview. The preceptors received a binder and a USB key containing the teaching materials and explanations regarding the implementation of the program. Each preceptor contacted the first author at the end of the preceptorship. The interview guide, inspired by Champagne, was e-mailed to the participants a week before the interview <sup>[8]</sup>. It focused on their satisfaction with the various elements of the program. They were also asked to describe the training and their perceptions of what was learned. The interview guide was available on request by contacting the correspondence author. The duration of the face-to-face interviews ranged from 21 minutes to 1 hour and 16 minutes, with an average of 44 minutes. The interviews were transcribed by two research assistants. A thematic analysis was carried out by the first author at the same time to help enhance the interview guide. This analysis aimed to highlight relevant themes in line

with the research objectives and to document parallels or oppositions between themes <sup>[26]</sup>. A vertical analysis of each interview was carried out using open coding followed by a cross-sectional analysis using a closed coding sequenced thematization approach <sup>[26]</sup>. No qualitative analysis software was used. The cross-sectional analysis was verified by personnel with expertise in qualitative research. A table summarizing the four action-research cycles is presented in **Appendix 1**.

## **4.5. Scientific criteria**

Three of the criteria of rigor according to Savoie-Zajc were credibility, reliability, and confirmation, which were satisfied by the triangulation of data sources (preceptors and novices) and the triangulation of researchers <sup>[30]</sup>. This was made possible through the verifications by different researchers, as well as the verification of results by preceptors during different stages of the research.

## **5. Results**

### **5.1. Program development**

#### **5.1.1. Program development sample**

Four preceptors, two from CH-A and two from CH-B took part in this phase. They had between 7–32 years of nursing experience, with an average of 15.25 years; 4–31 years' experience in the ICU, with an average of 11.25 years. The average age of the preceptors was 37. They all had a degree in nursing (one had a university certificate and three had a bachelor's degree).

#### **5.2. Results of the first research cycle**

A preliminary version of the program including objectives and suggestions for training and evaluation activities were developed during the first research cycle. The research team selected 3 objectives (and the types of knowledge associated) in line with the analysis grid used: (1) objectives for acquiring factual knowledge (19 objectives); (2) intervention skill development objectives associated with a knowledge of intervention practices (23 objectives); (3) a self-help objective associated with knowledge. The 43 specific objectives were grouped under 7 general objectives formulated according to anatomophysiological systems, which was consistent with the critical care literature.

The training activities selected for the program included the viewing of demonstration videos, discussions, and demonstration of care techniques by the preceptor techniques, followed by hands-on practice by the novice. During the first research cycle, an activity in the form of a current clinical situation in the ICU was implemented, which the novice and their preceptor would discuss during a one-hour meeting. Two versions of this activity (presented in **Appendices 2** and **3**) were prepared: one for the preceptor, and the other for the novice.

Preparatory readings were first proposed to the novices to allow them to review the knowledge needed to achieve the objectives. Then, the novices were allowed to read about the clinical situation questions in preparation for the meeting, during which the clinical situation was discussed with the preceptor. The preceptor's plan included indications of the knowledge required to cover all content elements. Suggestions for further reading to cover more complex elements were also provided. A USB key containing the digitized articles was given to the preceptors and novices for reading. At various points during the presentation, the preceptors were invited to perform certain activities, such as manipulating equipment or role-playing. At the end of the session, the novice was asked to summarize what they learned and indicate three objectives. One indicated "not acquired," one indicated they were "in the process of being acquired," and one indicated that all objectives were "acquired." A variety of tools were also used.

### **5.3. Results of the second research cycle**

Improvement of the preceptorship program and developing materials (preceptor training plan, novice workbook, and evaluation tools) were carried out in the second research cycle. Ten clinical scenarios were developed according to the model presented in the first cycle and then integrated into the training plan and the novice's workbook. The preceptors made several suggestions for improvement and asked for the expected answers to the questions addressed to the novice. As far as evaluation is concerned, only the objectives of developing intervention skills were included in the evaluation and self-assessment tools. The preceptors appreciated the novice's self-assessment scale, borrowed from the MSNB program (2000), which provided them with information on the novice's learning.

The novice was asked to record the level of achievement of the objectives and their needs on whether the targeted intervention had been carried out and whether they felt the need to deepen their knowledge, etc. The preceptors requested a mid-course evaluation, where five scenarios were chosen to be carried out during the first 6 hours of preceptorship, followed by the 5 remaining scenarios before the final evaluation. However, no pre-established order of clinical situations was determined within these groupings. This flexibility was appreciated by the preceptors, as it allowed them to better adapt to the novice's needs and the specific clientele on the care unit.

### **5.4. Results of the third research cycle**

The preceptorship program, preceptor training plan, novice workbook, preceptorship follow-up document, preceptor's formative evaluation of the novice, and the novice's self-assessment, namely the documents, were necessary to implement the program. These were completed in the third cycle. The answers to the questions raised during the clinical situations were also added, reducing the stress of preceptors having to have answers. In addition, the preceptors commented that the answers were complete, relevant, and detailed, yet precise and easily understandable.

On more than one occasion, the preceptors mentioned that the clinical situations were representative of what they encountered in their practice. They also pointed out that, in the region, ICU nurses frequently act as resource persons for interpreting electrocardiograms for other units. Several participants reported that they had learned a great deal by participating in the first 3 research cycles. One of the preceptors pointed out that each of the discussion groups was an opportunity for knowledge exchange. Another said that the quality of care provided by the novice gradually improved. The preceptors emphasized that they also felt better equipped to provide clinical support to novices with this program.

### **5.5. Program evaluation**

The results of the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> specific research objectives include: (1) evaluation of program implementation; (2) evaluation of the satisfaction of novice nurses and preceptors with the program; (3) to explore the preceptor's perceptions of the novice's learning.

#### **5.5.1. Program evaluation sample**

Five preceptors participated in this phase, three from CH-A and two from CH-C. Two of them participated in the program development phase. The preceptors' nursing experience ranged from 7–32 years, with an average of 19.2 years; and 6–31 years in the ICU, with an average of 12.6 years. Their average age was 42.2 years. One of the preceptors had a bachelor's degree in nursing, two had a university certificate and two had a college diploma (DEC) in nursing.

Nine novices took part in the program evaluation, 4 from CH-A and 5 from CH-C. They had between 10

months to 11 years of nursing experience, with an average of 3.38 years. Their ICU experience ranged from 0–18 months, with an average of 8.6 months. The average age of the novices was 27.1 years old. Five of the novices were enrolled in the Bachelor of Science during the preceptorship program, 3 had completed their bachelor's degree and 1 had a DEC in nursing.

### **5.6. Program implementation**

At CH-A, individual preceptorship meetings were spread over 6–10 months and took place outside working hours. At CH-C, group preceptoring was offered over 2 full days, for a total of 15 hours. Participants were required to prepare for the meetings, but only the preceptors were free to do so. Hence, during the 2 days of preceptorship, the preceptors and novices were excluded from work.

### **5.7. Program satisfaction**

Satisfaction was assessed in terms of factors facilitating program implementation, difficulties encountered, general impressions, and overall general satisfaction, with a particular focus on objectives and content elements, available resources, training activities, novice and preceptor responsibilities, and evaluation methods.

### **5.8. Facilitating factors**

More than half the novices perceived their preceptor as someone who facilitated their learning. Releasing work to attend meeting days not only facilitates schedule management but is considered essential to the completion of the program by almost all of the CH-C participants.

### **5.9. Difficulties encountered**

At CH-C, 4 of the 5 novices felt that the training period was too short, while others considered the duration to be adequate and realistic. One of the CH-C novices had not received arrhythmia training before the preceptorship, which was a fact considered undesirable by a majority of the participants. At the time of the interviews, 3 full-time undergraduate novices voiced out the difficulty of balancing the program and their studies. All CH-A participants reported difficulty balancing the program and their work schedules. Three participants felt that the duration of the preceptorship was too long. Finally, a meeting duration of 1 hour was considered adequate and realistic by four participants.

## **6. Overall impression of the program**

Eight participants viewed the program as comprehensive and 3 of them described it as fostering links between theory and practice. During the interviews, a few participants said they wished they had access to this training earlier in their careers. This shows the novice's acquisition of a greater sense of security through this training, which was a point shared by some of the other participants as well.

### **6.1. Program satisfaction**

Preceptors and novices rated their satisfaction on a scale of 0–10 (0 = not at all satisfied and 10 = totally satisfied). All participants rated their satisfaction between 8–10. Next, participants were asked to report what they thought of the objectives and content elements. Some preceptors and novices described the objectives as comprehensive, realistic, and “connected to the field.” The need to adapt the content to the novice's level of training and experience was raised by 2 of the participants in the preceptorship group. However, group training may not be conducive to individualized training, since not all novices have the same knowledge or experience

background.

Several digital resources have been made available to preceptors and novices (preceptor's training plan, novice workbook, preparatory and supplementary readings). Nearly half the participants considered these resources to be complete. However, some additions were suggested to clarify two clinical situations. A few preceptors also expressed in having more complementary readings on more complex care issues.

When assessing the satisfaction with training activities, differences were noted between individual and group training. In the individual training group, more than half of the participants wanted the opportunity to simulate clinical situations in a group setting. One of the CH-A preceptors indicated that she would have liked to offer the preceptorship the way it was offered at CH-C where novices and preceptors work together to solve a clinical situation. The CH-C participants emphasized the fact that group training fosters the development of bonds within the team. Two novices who took part in group training express the wish to have more time to handle each device individually. The handling activities included in the program were described as essential. The CH-C preceptors have then added a learning activity in collaboration with a respiratory therapist to enable the use of a respirator.

If we focus on the responsibilities of the preceptor and the novice, preparation is perceived as demanding by many novices, both in individual and group preceptorship. Several had to balance the program with their studies. Some novices would have liked more time to prepare for the meeting. However, the majority of the fourteen participants considered this preparation essential. All preceptors also emphasized that preparation was demanding, but that future meetings would require lesser investment of time on their part. Eight out of nine novices had completed university studies in nursing or were in the process of pursuing such studies. One of the novices viewed the lack of university studies as a difficulty in progressing through this program.

The means of assessment were not used and understood in the same way in the two centers as they were designed for individual preceptorship. The exploration of the participant's satisfaction with the assessment tools focused solely on the novice's self-evaluation during the middle and end of the training course. As for the novice's self-assessment at the end of the meeting, half of the participants said it encouraged introspection and allowed them to focus on what needed to be fixed. Two of the five preceptors found this self-assessment useful in targeting content for revision. Eight participants expressed difficulty in evaluating themselves (middle and end of course) and had difficulty understanding the scale. Participants also suggested adding a knowledge assessment and simplifying the self-assessment scale.

The perceptions of novices and preceptors about novice learning were explored. Perceived learning can be grouped into five categories: (1) intervention; (2) linkage between theory and practice; (3) manipulation of equipment; (4) interpretation of laboratory analyses; (5) scientific knowledge. Intervention-related learning was most frequently reported by novices.

## **7. Discussion**

The first objective of this study was to develop a preceptorship program (and the necessary tools) in collaboration with ICU preceptors. The program, aimed at nurses new to the ICU, was to be adapted for practice in the remote region of Ab.-T. Forty-three specific objectives were identified for this program, with the majority being intervention skills. This was in line with Benner, according to whom the novice must be able to apply the knowledge acquired during practice to be able to demonstrate a progression in her skills <sup>[2]</sup>. All the elements deemed important by the preceptors for inclusion in the program can be found in the orientation programs of the CSSSTR (2012) and the MSNB (2000). In addition, the program objectives were grouped according to anatomophysiological systems, as is the case in the two aforementioned programs.



Among the training activities selected, clinical situations were a logical choice for skills development. According to Benner, exposing novices to real-life situations is conducive to skill development <sup>[2]</sup>. Novices must link their theoretical knowledge to a real-life situation for effective intervention <sup>[2]</sup>.

Establishing a support structure for the preceptor is one of the conditions for the success of preceptorship as recommended by the Communications Directorate of the MSSS in Quebec and other literature <sup>[11,14,16,17,33]</sup>. Moreover, tools to facilitate the preceptor's work, such as USB keys containing preparatory readings for the novice and collections of complementary readings were created after focus groups. The addition of expected novice responses to the training plan was highly appreciated by the preceptors.

Various aspects of the program have aided centers in adapting to regional realities, particularly the duration and course of the preceptorship. The preceptorship in the centers that participated offers clinical support for around twelve hours after the orientation period. These are two of the reasons why the CSSSTR (2012) orientation program could not be fully implemented in the region. This 12-week full-time program includes theoretical modules of seven hours each, where preceptors transfer theoretical knowledge to more than one novice at a time outside of work. This program, which also includes the orientation period, exceeds the time allotted for the preceptorship in Ab.-T. Even the 150-hour MSNB program could not be fully implemented. The program developed as part of this study proposes twelve hours of preceptorship as suggested by the MSSS (2008), thus meeting the requirements relating to the duration of the clinical environment.

In addition to the different duration of the programs, the content also differs. For example, the CSSSTR (2012) program features content related to invasive neurological interventions. These elements were not included in the program developed in this study, as these interventions are not performed in CISSS hospitals where the study took place. The comments made by the preceptors during the first three focus groups showed the importance of adapting the program to this region's hospital environment. The participants also mentioned that the clinical situations used as training activities were representative of their clinical practice. The results thus confirm the achievement of the study's first objective.

The other 3 objectives of this study were to evaluate the implementation of the preceptorship program, measure satisfaction, and explore the preceptor's perceptions of the novice's learning progress. The results suggested that the program developed in our study promoted the acquisition of practical skills. Additionally, some of the results indicated that group training facilitated better schedule management compared to individual precepting. These results were congruent with those of a systematic review, which highlighted the variety of formulas used for clinical support for new nurses entering ICU practice <sup>[16]</sup>. Group training proves to be an interesting approach, as schedule management poses a challenge for preceptors and novices who participated in individual training. Those who took part in the group preceptorship also stressed that this type of training fosters the creation of bonds between members of the team. This is an interesting observation, since according to the Canadian Nurses Association (AIC), preceptorship should also promote integration into the community <sup>[1]</sup>.

Several results relating to training activities are worth noting. At one of the centers, one of the preceptors replaced the video presentation with a respiratory therapist demonstrating how to operate the ventilator. This result was concordant with Benner's model, where a new nurse can intervene appropriately by referring to real-life situations <sup>[2]</sup>. Two systematic reviews on clinical support for new nurses starting their ICU practice also emphasized the importance of simulation in skill development <sup>[16,17]</sup>.

The National Clinical Support Program (2008) suggests developing tools for tracking the learning progress through formative evaluation. While some of the evaluation tools were rarely used during the program's implementation, other evaluation activities proposed in the program were utilized, thereby complying with the MSSS (2008) recommendation. At the end of each meeting, novices were asked to report on their learning

objectives, on whether they were achieved. Half of the participants emphasized the usefulness of this evaluation as it enables the preceptor to focus on the content that needs reviewing. Verbal feedback, as suggested by some participants, could be an avenue to consider to allow a formative evaluation of the novice.

As noted above, the majority of participants noted that novices have grasped the concept of intervention through this program. Half of them felt that the program had facilitated the creation of links between theory and practice by the novice. Several preceptors and novices pointed out that the training enabled them to increase their dexterity in handling different equipment. Thus, it is not surprising that some participants suggested incorporating device handling during training. These results were in line with other literature <sup>[13,16,17]</sup>. This indicates that preceptorship is effective, among other things, for the development of practical skills. Considering what novices had learned, the training activities provided for in the program appear to be well-suited to the acquisition of skills and development of competencies required to work in the ICU.

University studies are widely recognized for their ability to enable nurses to fully engage in their field of practice by acquiring the knowledge and developing the skills catered to the scope and complexity of healthcare issues <sup>[12]</sup>. It is also recognized that the preceptorship program, by providing clinical support to novices and access to a role model, helps in the development of the nurses' skills <sup>[12]</sup>. This program serves as a facilitating factor in achieving common goals alongside university studies.

## 8. Limitations

The primary limitation of this study is the impossibility of generalizing results, which was intrinsic to action research. Nonetheless, it should be noted that this study aimed to develop and evaluate the implementation of a program adapted to the practice of nurses and novice ICU nurses in the Ab.-T. region. However, some of the results are transferable to other settings that are similar in geographical location and organizational context.

A small sample size was included in this study; hence data saturation was not achieved. The fact that one of the researchers is a nurse clinician in one of the centers may have introduced a bias. This may have unconsciously led novices to want to please her by emphasizing positive points of the program during the interview. To lessen the effects of social desirability, all participants were told that the interviews were intended for program and training and that their comments would not be interpreted as criticism of the researcher. Finally, not all centers in the region participated in all stages of the research. Although the CH-C preceptors were not involved in the program development, they mentioned that the program was adapted to their clinical practice. Even so, we cannot accurately claim that the program corresponds to the reality of all these centers.

## 9. Conclusion

This study focused on the development and evaluation of the implementation of a preceptorship program adapted to ICU practice in the Ab.-T. region and has provided preceptors with tools to support novice nurses. This action research was made possible with the involvement of the centers, preceptors, and novice nurses throughout the development and implementation of the program. This approach enabled participants to take ownership of the training content and fully utilize various tools.

The program was implemented throughout the CISSS, where this study was subsequently carried out. Several novices mentioned that the program reinforced their sense of security and made them feel more equipped to handle complex care situations. The preceptors said they were better equipped to offer clinical support and novices were better prepared to work in the ICU. It would be relevant to evaluate the development of the novice nurses' skills following their participation in this program and the long-term impact of this preceptorship.

## Disclosure statement

The authors declare no conflict of interest.

## References

- [1] Canadian Nurses Association, 2004, *Achieving Excellence in Professional Practice-A Guide to Preceptorship and Mentoring*, Canadian Nurses Association, Ottawa, 49.
- [2] Benner P, 2001, *From Novice to Expert: Excellence and Power in Clinical Nursing Practice*. Pearson, United Kingdom.
- [3] Bérubé M, Touchette S, and Brien LA, 2008, Optimal preparation. *Nursing Perspective*, 5(6): 25–27.
- [4] Broadbent M, Moxham L, Sander T, 2014, Supporting Bachelor of Nursing Students Within the Clinical Environment: Perspectives of Preceptors. *Nurse Education in Practice*, 14(4): 403–409.
- [5] Caffarella RS, 2002, *Planning programs for Adult Learners: A Practical Guide for Educators, Trainers, and Staff Developers (Second Edition)*, Jossey Bass, 403.
- [6] Trois-Rivières Health and Social Services Center, 2012, Orientation program Medical-Surgical Intensive Care, unpublished document.
- [7] Integrated Health and Social Services Center of Abitibi-Témiscamingue, 2022, Medical Specialties Available in Abitibi-Témiscamingue. <https://www.cisss-at.gouv.qc.ca/specialites-medicales-accessibles-en-abitibi-temiscamingue/>
- [8] Champagne M, 2003, *The Training Experience Experienced by Interns In Educational Services*, thesis, University of Quebec in Montreal.
- [9] International Council of Nurses, 2014, *Nurses: A Force for Change-A vital Resource for Health*, 62.
- [10] DeGrande H, Liu F, Greene P, et al., 2018, The Experiences of New Graduate Nurses Hired and Retained in Adult Intensive Care Units. *Intensive and Critical Care Nursing*, 49: 72–78.
- [11] Communications Directorate of the Quebec Ministry of Health and Social Services, 2008, National Clinical Support Program: Preceptorship Component. Terms of reference. Ministry of Health and Social Services of Quebec, 19.
- [12] Ducharme F, Salois R, 2021, Report of The Commissioners on The General Conditions of The Nursing Profession, Recognizing and Transforming Nursing Practice in Québec: A Change with A Future. Order of Nurses of Quebec. <https://www.oiiq.org/documents/20147/2943421/rapport-EG-2021.pdf>
- [13] Edwards D, Hawker C, Carrier J, et al., 2015, A Systematic Review of The Effectiveness of Strategies and Interventions to Improve The Transition From Student to Newly Qualified Nurse. *International Journal of Nursing Studies*, 52(7): 1254–1268.
- [14] Feddeh SA, Darawad MW, 2020, Correlates to Work-Related Stress of Newly Graduated Nurses in Critical Care Units. *International Journal of Caring Sciences*, 13(1): 507–516.
- [15] Hampton KB, Smeltzer SC, Ross JG, 2021, The Transition from Nursing Student to Practicing Nurse: An Integrative Review of Transition to Practice Programs. *Nurse Education in Practice*, 52: 103031.
- [16] Innes T, Calleja P, 2018, Transition Support for New Graduate and Novice Nurses in Critical Care Settings: An Integrative Review of The Literature. *Nurse Education in Practice*, 30: 62–72.
- [17] Ke YT, Kuo CC, Hung CH, 2017, The Effects of Nursing Preceptorship on New Nurses' Competence, Professional Socialization, Job Satisfaction, and Retention: A Systematic Review. *Journal of Advanced Nursing*, 73(10): 2296–2305.
- [18] Kennedy J, Astroth KM, Woith WM, et al., 2021, New Nurse Graduates and Rapidly Changing Clinical Situations: The Role of Expert Critical Care Nurse Mentors. *International Journal of Nursing Education Scholarship*, 18(1): 1–11.
- [19] Lalonde M, Smith CA, Wong S, et al., 2021, Part 2: New Graduate Nurse Transition into The Intensive Care Unit: Summative Insights from A Longitudinal Mixed-Methods Study. *Research and Theory for Nursing Practice*, 35(4).

- [20] Marleau D, 2021, Statistical report on the nursing workforce 2020-2021. Order of Nurses of Quebec.
- [21] Marleau D, 2016, Portrait of The Next Generation of Nurses 2015–2016. Order of Nurses of Quebec. [https://numerique.banq.qc.ca/patrimoine/details/52327/1947930?docref=\\_sUCUFK0vIvOCl-TjovGVA](https://numerique.banq.qc.ca/patrimoine/details/52327/1947930?docref=_sUCUFK0vIvOCl-TjovGVA)
- [22] Milhomme D, 2010, Descriptive Study of Factors Facilitating and Constraining the Development of Critical Care Nurses' Competency, thesis, Laval University.
- [23] New Brunswick Department of Health, 2000, New Brunswick Critical Care Nursing Program, unpublished document.
- [24] Munhall PL, 2012, Nursing research: A Qualitative Perspective (Fifth Edition). Jones and Bartlett Learning, United States, 606.
- [25] Order of Nurses of Quebec, 2007, A New Approach to Nursing Workforce: Choices to be Made Urgently! [https://www.oiiq.org/documents/20147/237836/233\\_doc\\_0.pdf](https://www.oiiq.org/documents/20147/237836/233_doc_0.pdf)
- [26] Paillé P, Mucchielli A, 2008, Qualitative Analysis in Human and Social Sciences (Second Edition). Armand Collin, France.
- [27] Park MO, Park HA, 2010, Development of A Nursing Practice Guideline for Pre and Postoperative Care of Gastric Cancer Patients. *Healthcare Informatics Research*, 16(4): 215–223.
- [28] Powers K, Herron EK, Pagel J, 2019, Nurse Preceptor Role in New Graduate Nurses' Transition to Practice. *Dimensions of Critical Care Nursing*, 38(3): 131–136.
- [29] Savoie-Zajc L, 2004, Qualitative/Interpretive Research in Education, *Educational Research: Stages and Approaches* (Third Edition), 142–148.
- [30] Savoie-Zajc L, 2009, The Semi-Structured Interview, *Social research. From The Problem to Data Collection* (Fifth Edition), University of Quebec Press, Quebec, 337–360.
- [31] Short K, Freedman K, Matays J, et al., 2019, Making The Transition: A Critical Care Skills Program to Support Newly Hired Nurses. *Clinical Nurse Specialist*, 33(3): 123–127.
- [32] Valizadeh S, Borimnejad L, Rahmani A, et al., 2016, Challenges of The Preceptors Working with New Nurses: A Phenomenological Research Study. *Nurse Education Today*, 44: 92–97.
- [33] Whittam S, Torning N, Patching J, 2021, A Narrative Inquiry Approach to Understanding Senior Intensive Care Nurses' Experiences of Working with New Graduate Nurses. *Journal of Clinical Nursing*, 30(21–22): 3314–3329.
- [34] Yonge O, Luhanga FL, Foley VC, et al., 2018, Challenges and Opportunities in Rural Nursing Preceptorship: What Multimedia Participant Action Reveals. *Quality Advancement in Nursing Education*, 4(1).

**Publisher's note**

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

## Appendix

Appendix 1. Summary table of the four research cycles

| <b>Cycles</b>   | <b>Observation date</b>             | <b>Reflection date</b>  | <b>Action date</b>  |
|---|-------------------------------------|---|---|
| <b>First</b>  | <b>June 2014</b>                    | <b>June to July 2014</b>  | <b>August to September 2014</b>   |
| Start of development program  | First discussion                    | -Analysis of transcript of the first focus group discussion and formulation of objectives                         | Development of tools:<br>-Program<br>-Teaching material (1 clinical situation)                          |
| Preceptors for CH-A and CH-B  | Literature of 2 programs            | -Comparison of analysis of the first focus group and literature analysis  |   |
| <b>Second</b>   | <b>October 2014 to January 2015</b> | <b>November 2014 to January 2015</b>  | <b>December 2014 to January 2015</b>  |
| Development program preceptors for CH-A and CH-B  | Second and third discussion         | -Analysis of transcription of the second and third discussion groups<br>-Prioritization of objectives and content | Development of tools:<br>-teaching materials (9 clinical situations)<br>-assessment and self-assessment |
| <b>Third</b>  | <b>February 2015</b>                | <b>February 2015</b>  | <b>March 2015</b>   |
| End of development for preceptors of CH-A and CH-B  | Fourth discussion                   | Analysis of transcript of the fourth focus discussion group   | Modifications to tools  |
| <b>Fourth</b>   | <b>October 2015 to March 2016</b>   | <b>March to June 2016</b>   | <b>July to August 2016</b>  |
| Evaluation of implementation and satisfaction and exploration of perception of learning of the novice preceptors at CH-A and CH-C | 14 one-on-one meetings              | Thematic analysis of interview transcripts  | Drafting of a preliminary report and summary of suggested modifications                                 |

## Objectives

At the end of the session, the novice nurse will be able to:

- (1) Understand the pathophysiology of the heart
- (2) Understand hemodynamic assessment
- (3) Select appropriate interventions to correct alterations in cardiovascular perfusion
- (4) Perfusion, cardiac output, and rhythm
- (5) Perform cardiovascular assessment and care
- (6) Perform cardiovascular care
- (7) Perform respiratory assessment and care
- (8) Perform a respiratory assessment
- (9) Provide care for patients with impaired respiratory function
- (10) Understand the use of hemodynamic monitoring devices (arterial line and Pvc)
- (11) Use hemodynamic monitoring equipment (arterial line and cvt)
- (12) Provide care to a patient with urinary system impairment
- (13) Collaborate with the interdisciplinary team
- (14) Organize work effectively

### Clinical situation: heart failure

#### Material:

Nitroglycerine protocol, arterial line, central venous catheter, blood sampling kit

#### Appendix 2. Activity - preceptor version of heart failure

| Training activities  | Key content elements targeted  |
|--|--|
| (1) The novice reviews the week's events with the preceptor (5 minutes)<br>(2) The preceptor reviews the novice's readings (5 minutes)   | -The novice must have sufficient understanding of anatomophysiology of the heart.<br>-Prior reading for the novice: Marieb and Hoehn (2010) chap. 18       |
| Based on the clinical situation, the trainer discusses answers with the novice (45 minutes). "Heart failure" was given as a supplementary reading as needed.   |  |
| Clinical situation: Mr. Laflamme presents to the emergency department with dyspnea and increasingly frequent reflex sympathetic dystrophy (RSD) for the past week. At 6 p.m., he is admitted to the ICU for cardiac failure. He is a 68-year-old man who had suffered an infarction 15 years ago. Mr. Laflamme was seen in the emergency department by Dr. Hoteccœur, his attending physician. Following transfer to his bed, Mr. Laflamme appeared to be in pain.<br>(1) What information is important to obtain in assessing chest pain?<br>Assessment of RSD using the PQRSTU tool: provocation/palliation/aggravation; quality/quantity; region/irradiation; associated symptoms/severity; time/duration; understanding meaning for the user (understanding) | Assessment of thoracic thoracic/retrosternal pain<br><br>Further reading:<br><b>Table 12.1</b> , Urden, Stacy and Lough (2014)                             |
| Upon questioning him, you learn that he's been in pain for the past 15 minutes, which is something for him. The pain, which he rates at 4/10, is in the form of tightness in the thorax, radiating to the left arm. You perform a brief physical examination. Considering this patient's diagnosis, what is the plausible data on the level of:  | Assessment and classification of edema<br>Evaluation of cardiac rhythm<br>Cardiac and respiratory<br>Respiratory<br>Evaluation data physical: heart sounds |
| (1) Cardiac auscultation? B1 B2 normal or muffled or abnormal noises, B3 B4.<br>(2) Pulmonary auscultation? Vesicular and crepitus.<br>(3) Examination of jugular veins? Jugular venous distension (JVD)<br>(4) Presence of edema? Evaluation of edema with a scale.   | Further reading:<br>box 12.2, <b>figures 12.5 and 17.8</b> , and tables <b>17.3 and 25.1</b> (Urden, 2014, pp. 243–247)                                    |

## Appendix 2 (Continue)

| Training activities   | Key content elements targeted  |
|---|--|
| <p>You examine the medical prescriptions:</p> <p>(1) Lasix® 20 mg iv q12h (received at 5 p.m.)</p> <p>(2) Start infusion of nitroglycerin iv if resumption of DRS, maintain TAs &gt; 120 mm Hg</p> <p>(3) Fraction of inspired oxygen (FiO<sub>2</sub>) for saturation &gt; 94</p> <p>What will be the order of your interventions? Answer: First, adjust oxygen in the presence of desaturation, as this may contribute to cardiac ischemia. Secondly, start the nitroglycerin infusion as this is the intervention that will relieve cardiac ischemia. Finally, administer Lasix®.</p> <p>The preceptor explains to the novice the purpose of each treatment and the associated monitoring and examines the facility's nitroglycerin IV protocol.</p>   | <p>-Administration of pharmacological agents to optimize afterload (vasodilators)</p> <p>-Administration of medication related to urinary function</p> <p>-Administration of oxygen</p> <p>-Assessment and prioritization of tasks</p> <p>-Usual ICU medication in relation related to the cardiovascular system</p> <p>Further reading: (Urden, 2014), p. 418-419</p> |
| <p>The results of the laboratory tests were:</p> <p>-Troponin I &lt; 0.01 ng/L</p> <p>-Troponin T &lt; 0.01 ng/L</p> <p>- Creative Kinase (CK) = 101 IU/L</p> <p>-CKMB = 0.05 IU/L</p> <p>-Creatinine = 140 mmol/L</p> <p>-Lactate = 1.2 mmol/L</p> <p>-Potassium (K) = 3.1 mEq/L</p> <p>-B-type natriuretic peptide (BNP) = 520 pg/L</p> <p>Interpret these results:</p> <p>(1) Negative troponins and normal CK and CKMB demonstrate the absence of myocardial damage.</p> <p>(2) An increase in creatinine above 125 mmol/L is a sign of reduced glomerular filtration, possibly indicating renal failure.</p>   | <p>-Interpretation of laboratory results</p> <p>Further reading:<br/><b>Figure 13.78</b> (Urden, 2014).</p>  |
| <p>(3) As this is a venous sample, a serum lactate level of less than lactate level below 1.3 mmol/L is normal, indicating adequate cellular oxygenation.</p> <p>(4) The potassium level here is too low, which is a risk for cardiac arrhythmia, especially in users with cardiac pathologies.</p> <p>(5) A BNP result over 400 pg/L is a highly probable sign of heart failure.</p>   |  |
| <p>Mr. Laflamme presents with BP 190/101, HR 120, FR at 42/min, SpO<sub>2</sub> 86% with 50% ventimasque. Rales are audible and he has perioral cyanosis. You wish to inform the physician of the deterioration of the patient's condition.</p> <p>(1) What should you tell the doctor?</p> <p>physician? It is important to inform the physician of the deterioration of vital signs and the increased need for FiO<sub>2</sub>. The physical examination data (rales and cyanosis) should also be mentioned, as well as laboratory values. The preceptor conducts a role-play with the novice once the novice has a clear understanding of the necessity for the doctor's assessment of the situation. The preceptor takes on the role of the physician and questions the novice if they forget anything.</p>   | <p>Effective verbal and written methods adapted to the different professionals</p>   |
| <p>Dr Hotecœur asks for the bi-level positive airway pressure (BPAP) to be installed and prescribes repeat Lasix (40 mg) IV STAT and administers a dose of morphine (2.5 mg) IV repeatable in 15 min. He also prescribes a 0.9% saline solution with KCl (40 mEq) at 50 mL/h. The doctor asks you to prepare the equipment for the installation of a central venous catheter for cerebral venous thrombosis (CVT) measurement and an arterial line.</p> <p>(1) What is the significance of CVT and what is the usefulness of this measurement? Answer: It is the central venous pressure. This measurement, in conjunction with other indices, enables us to assess the state of the circulating volume.</p> <p>(2) What are the normal value limits for CVT? Answer: 2–6 mm Hg.</p> <p>(3) What is the purpose of an arterial line? Answer: For the continuous measurement of blood pressure and arterial access for frequent measurement of blood gases.</p> <p>(4) What are the normal values for invasive systolic, diastolic, and mean arterial pressure? Answer: Normal values for systolic blood pressure are 100–140 mm Hg and diastolic blood pressure from 50–90 mm Hg. Mean arterial pressure is considered normal between 70–100 mm Hg.</p> <p>(5) What to watch out for during potassium chloride (KCl) infusion? Answer: It is important to monitor blood potassium levels. In addition, an infusion of greater than 10 mEq/h via the peripheral may cause pain and be a risk factor for phlebitis (Mount, 2014). The preceptor explains the role of morphine in the PAO and walks the novice through the administration. The preceptor explains and demonstrates the use of hemodynamic monitoring equipment (set-up, pressure curve, normal value). The preceptor then explains the facility's KCl infusion protocol.</p> | <p>-Knowledge of hemodynamic monitoring equipment</p> <p>-Knowledge of normal and abnormal values</p> <p>-Main cardiac pathologies (OAP, cardiac heart failure)</p> <p>-Use of invasive lines</p> <p>-Administration of medications related to urinary function (electrolytes)</p> <p>Further reading:<br/><b>Table 13.1</b> and <b>Table 31.2</b> (Urden, 2014)</p>   |

## Appendix 2 (Continue)

| Training activities  | Key content elements targeted  |
|--|--|
| <p>The respiratory therapist sets up the BPAP with the following parameters: inspiratory positive airway pressure (IPAP) = 15; expiratory positive airway pressure (EPAP) = 5; <math>FiO_2 = 60\%</math>.</p> <p>(1) Explain what these figures represent. Answer: IPAP is the pressure exerted by the BPAP on inspiration and EPAP is the exhalation pressure.</p> <p>(2) What role does the BPAP play in OAP? Answer: The BPAP optimizes oxygenation, while at the same time reducing <math>FiO_2</math>.</p> <p>The preceptor explains the care to be given when a patient user is on BPAP.</p> | <p>Providing care to patients under non-invasive ventilation (BPAP)</p>  |
| <p>When the arterial line is installed, a sample is taken for blood gas analysis. The results are as follows: pH 7.50; <math>PCO_2 = 232</math> mm Hg; <math>PO_2 = 88</math> mm Hg; <math>HCO_3 = 24</math> mEq/L.</p>  | <p>-Interpretation of laboratory analyses (arterial gas)<br/>-Arterial line and CVC blood and CVC blood for diagnostic diagnostic purposes</p> |
| <p>The novice is asked to interpret this result: This is a result demonstrating uncompensated respiratory alkalosis. This result is a consequence of Mr. Laflamme's hyperventilation. The novice prepares and manipulates an arterial line for sampling and monitoring.</p>  | <p>Further reading:<br/><b>Table 18.4</b> (Urden, 2014)</p>  |
| <p>The next day, the internal medicine specialist decides to perform a cardiac ultrasound.</p> <p>(1) What information does this test provide? Answer: Ultrasound images and measurements of anatomical structures blood flow.</p> <p>(2) What is the purpose of this test? Answer: In this situation, ultrasound is used to evaluate Mr. Laflamme's heart failure.</p>  | <p>Indication for transesophageal and transthoracic</p> <p>Further reading:<br/>(Urden 2014), p. 365-368</p>                                   |
| <p>Closing activity in the "Preceptorship follow-up."</p>  |  |

Following this meeting, you will be able to:

- (1) Understand the pathophysiology of the heart
- (2) Understand hemodynamic assessment
- (3) Select appropriate interventions to correct alterations in cardiovascular perfusion
- (4) Perfusion, cardiac output, and rhythm
- (5) Perform cardiovascular assessment and care
- (6) Perform cardiovascular care
- (7) Intervene to correct alterations in cardiovascular perfusion, flow, cardiac rhythm
- (8) Perform respiratory assessment and care
- (9) Provide care for patients with impaired respiratory function
- (10) Understand the use of hemodynamic monitoring devices (arterial line and pvc)
- (11) Use hemodynamic monitoring equipment (arterial line and cvt)
- (12) Provide care to a patient with urinary system impairment
- (13) Collaborate with the interdisciplinary team
- (14) Organize work efficiently

To achieve these objectives, you are required to understand the anatomophysiology of the cardiovascular system. To do so, you will need to read chapter 18 of Marieb (2010) and complete the exercises related to the following situations. This is a prerequisite to meeting your preceptor. During the week, you may have experienced a situation you would like to discuss with your preceptor (critical incident or integration into the community). Make a note of what you would like to discuss.

---



---



---



### Appendix 3. Activity - novice version of heart failure

| Setting the scene  | Answer |
|--|--------|
| <p>Mr. Laflamme presents to the emergency department with dyspnea and increasingly frequent RSD for the past week. At 6 p.m., he is admitted to the ICU for heart failure. He is 68 years old and suffered a heart attack 15 years ago. Mr. Laflamme was seen in the ER by Dr. Hotecoeur, his attending physician. Following the transfer to his bed, Mr. Laflamme appeared to have pain in his chest.</p> <p>(1) What information is important to obtain in the assessment of chest pain?</p>   |        |
| <p>Upon questioning, you learn that he's been in pain for the past 15 minutes, which is a common occurrence for him. The pain, which he evaluates at 4/10, is in the form of oppression under his left arm. You perform a brief physical examination. Considering this user's diagnosis, what data might plausibly be found about:</p> <ul style="list-style-type: none"><li>-cardiac auscultation</li><li>-pulmonary auscultation</li><li>-chinstrap examination</li><li>-the presence of edema</li></ul>   |        |
| <p>You examine the medical prescriptions:</p> <p>(1) Lasix (20 mg) IV q12h (received at 5 p.m.)</p> <p>(2) Start an infusion of nitroglycerin IV if resumption of DRS, maintain BP &gt; 120 mmHg</p> <p>(3) FiO<sub>2</sub> for saturation &gt; 94</p> <p>What will be the order of your interventions?</p>  |        |
| <p>The results of the laboratory tests is:</p> <ul style="list-style-type: none"><li>-Troponin I &lt; 0.01 ng/L</li><li>-Troponin T &lt; 0.01 ng/L</li><li>-CK = 101 IU/L</li><li>-CKMB = 0.15 IU/L</li><li>-Creatinine = 140 mmol/L</li><li>-Lactate = 1.2 mmol/L</li><li>-K 3.1 = mEq/L</li><li>-BNP = 520 ng/L</li></ul> <p>Interpret these results.</p>  |        |
| <p>Mr. Laflamme presents with BP 190/101 HR, 120/FR at 42/min and SpO<sub>2</sub> 86% with a ventimasque of 50%. Rales are audible and cyanosis around the mouth. You wish to inform the physician of the patient's deteriorating condition.</p> <p>What is relevant to tell the doctor?</p>   |        |
| <p>Dr. Hotecœur asks for a BPAP to be installed and orders repeat administration of Lasix (40 mg) IV STAT and morphine (2.5 mg) IV repeatable in 15 min when necessary. He prescribes a 0.9% saline solution with KCl (40 mEq) at 50 mL/h. The doctor prepares the equipment for installing a central venous catheter and an arterial line.</p> <p>(1) What is the significance of CVT and what is the usefulness of this measurement?</p> <p>(2) What are the normal value limits for TVC?</p> <p>(3) What is the purpose of an arterial line?</p> <p>(4) What are the normal values for invasive systolic, diastolic, and mean arterial pressure?</p> <p>(5) What kind of monitoring will be carried out in conjunction with KCl infusion?</p> |        |
| <p>The respiratory therapist sets up the BPAP with the following parameters: IPAP = 15; EPAP = 5; FiO<sub>2</sub> 60%.</p> <p>Explain what these figures represent.</p> <p>What role does BPAP play in OAP?</p>  |        |
| <p>When installing the arterial line, a sample for blood gas analysis is performed. is taken. The results are as follows: pH 7.50; PCO<sub>2</sub> = mmHg; PO<sub>2</sub> = 88 mmHg; HCO<sub>3</sub> = 24 mEq/l.</p> <p>Interpret these results.</p>   |        |
| <p>The next day, the internal medicine specialist performs a cardiac ultrasound.</p> <p>(1) What information can we obtain obtain?</p> <p>(2) What is the purpose of this test?</p>  |        |

Following this scenario, write down any questions for your preceptor.

---

---

---

Personal notes from the meeting with the preceptor:

---

---

---

---

Indicate one skill acquired, one in the process of being acquired and one not acquired concerning the clinical situation discussed today with your preceptor:

Acquired: \_\_\_\_\_

In the process of acquisition: \_\_\_\_\_

Unearned: \_\_\_\_\_

A reminder of readings and exercises to do before the next meeting. Situation for the next meeting: \_\_\_\_\_

Date of next meeting: \_\_\_\_\_