Addendum: Pharmacology
Contents

- Introduction 3

- Pharmacology vSim Pedagogical Considerations 3
  - Formative Assessment 3

- vSim Teaching Strategies 4
  - Utility as a Teaching Tool 4
  - Learning Objectives 5
  - Curriculum Approaches 7
    - Flipping the Classroom 8
    - Small Group Conversations 8
    - Small Group Concept Mapping 9
    - Post-Clinical Learning 9

- Effectiveness of vSim Compared to Other Teaching Methods 9

- Resources and References to Support Simulation 9
  - Resources 9
  - References and Further Reading 9
Introduction

This addendum provides strategies for use of the vSim Pharmacology product in nursing programs. It provides faculty with ideas to integrate vSim Pharmacology into existing curricula and offers ways to develop and/or enhance current teaching strategies. The addendum is based on data collected from faculty who were early adopters or trialers of the vSim Pharmacology scenarios during Fall 2015. Faculty included those providing instruction in classroom, clinical, lab, and simulation settings. Based on their feedback, submitted to the National League for Nursing through focus groups and a quantitative survey, this addendum will focus specifically on formative assessment and teaching strategies related to pharmacology course content. It is important for faculty to review the primary vSim Curriculum Integration Guide. This will provide specific information on practical preparation for use of vSim and vSim pedagogical considerations.

vSim Pedagogical Considerations

Formative Assessment

vSim provides an opportunity for faculty to engage students contextually through the use of story. The problems encountered in these patient stories focus the student on achieving goals as those goals relate to an evolving patient context. Used as a means of formative assessment, the stories focus the participant’s progress toward goal attainment and provide constructive feedback for improving performance (Bourke & Ihrke, 2012; INACSL, 2013; Prion, 2016).

Faculty in the Pharmacology pilot utilized vSim as a formative assessment in the following ways:

- As a benchmark for students to work toward. Among the pilot schools that instructed students to meet a target percentage score on the vSim Pharmacology scenarios, most specified a target percentage of 80%. Similar to the Medical-Surgical vSim scenarios, slightly more than half of students were likely to repeat the scenarios until achieving higher scores (most frequently 85% or higher). Pharmacology faculty reported that they required students to complete each scenario two times to assure follow-through with corrections from the debriefing log regardless of the percentage achieved.

- As a dose-response measure (i.e., does increasing the number of vSim attempts change the student’s level of content knowledge or reasoning and decision making?). Students used the Pharmacology series as both preparation for and remediation with standardized testing. The feedback log provides specific rationale for the order of decision making as well as inclusion and/or omission of activities in error. Students get concrete feedback on their thinking in action.

- As a way to direct student remediation. The feedback provides students with textbook references and SmartSense links to direct and focus their remediation activities.
Figure 1 summarizes the evaluation of the vSim scoring features by Pharmacology faculty who participated in the pilot study.

![Percentage “Excellent” and “Excellent/Very Good” Ratings: vSim Pharmacology Feedback Components](image)

**FIGURE 1**

### Teaching Strategies Specific to Pharmacology

Faculty in the Pharmacology pilot viewed vSim as offering more value and utility than other teaching methods (e.g., case studies on paper, care plans). Students readily embraced the vSim activity, providing an opportunity for faculty to focus their teaching efforts in other ways (e.g., engaging students to use the content vs. lecturing to provide the content). A variety of strategies may be used to integrate vSim into curricula.

#### Utility as a Teaching Tool

vSim enables students to build and test their knowledge before virtual simulation through reading assignments and pre-simulation quizzes. Engaging in the virtual simulation scenario, students integrate new knowledge as they care for the patient. Prioritization and decision-making are central to the vSim design. Faculty adopting or trialing the vSim Pharmacology product found that the cases provided a strong scaffolding component. An example of this was the ability to utilize specific scenarios in different courses throughout the nursing curriculum. The pharmacology scenarios can be leveled across the curriculum from beginning nursing interventions courses (e.g., Pain Medication) to courses that focus on more complex medication management situations (e.g., Anticoagulation Bridging). Students were able to build on their knowledge beginning with more fundamental pharmacology issues and moving to more complex issues. Students commented that after using the scenarios, they understood the meaning of clinical reasoning in context. Students were able to see how physiologic responses unfolded in real time as the scenario progressed, highlighting the necessary thinking processes required of the nurse. Pharmacology scenarios...
utilized most frequently were treatment of hypoglycemia (Juan Carlos) and treatment of angina (Junetta Cooper). These were followed by managing adverse effects of medication interaction (Jermaine Jones) and anticoagulation bridge therapy (Rachael Heidebrink). See Figure 2.

<table>
<thead>
<tr>
<th>vSim Pharmacology Scenarios Used</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Management of Nitroglycerin Administration for the Treatment of Angina Pectoris (Junetta Cooper)</td>
<td>41%</td>
</tr>
<tr>
<td>2 Managing Inhalation Medication for a Patient with COPD (Toua Xiong)</td>
<td>24%</td>
</tr>
<tr>
<td>3 Managing Pain Medication for Chronic Low Back Pain (Danielle Young Bear)</td>
<td>29%</td>
</tr>
<tr>
<td>4 Management of Morphine Overdose in a Hospitalized Patient (Yoa Li)</td>
<td>24%</td>
</tr>
<tr>
<td>5 Management of Digoxin Toxicity in a Patient with Heart Failure (Mary Richards)</td>
<td>29%</td>
</tr>
<tr>
<td>6 Managing IV Antibiotic Therapy in the Hospitalized Patient with Reduced Renal Function (Harry Hadley)</td>
<td>24%</td>
</tr>
<tr>
<td>7 Managing Adverse Effects of Antidepressants, Anxiolytics, and Alcohol (Jermaine Jones)</td>
<td>35%</td>
</tr>
<tr>
<td>8 Management of Gastrointestinal Infection Due to Adverse Effect of Peptic Ulcer Treatment (Suzanne Morris)</td>
<td>18%</td>
</tr>
<tr>
<td>9 Treatment of Hypoglycemia in a Hospitalized Patient with Type II Diabetes (Juan Carlos)</td>
<td>59%</td>
</tr>
<tr>
<td>10 Anticoagulation Bridge Therapy for Patient with aPulmonary Embolism (Rachael Heidebrink)</td>
<td>35%</td>
</tr>
</tbody>
</table>

**FIGURE 2**

**Learning Objectives**

Faculty reported that “improving clinical reasoning and prioritization” is the strongest learning objective for the Pharmacology series. For only one scenario, Jermaine Jones (Antidepressants), was a different objective more important—i.e., deepening understanding of a specific nursing concept (mood alterations and associated medication management and interactions). Use of vSim Pharmacology enabled a more thoughtful approach with curriculum integration and teaching strategies to achieve specific learning objectives. The pharmacology series can be used throughout the curriculum and leveled for use, starting with beginning pharmacology learning outcomes and advancing to more complex ones. The scenarios can also be utilized together in meeting learning outcomes outlined in a specific pharmacology course. Experiencing the same patient encounter through different technologies (i.e., vSim and full-scale manikin simulation) helped to reinforce theoretical content knowledge and gradually build confidence and competence. Finally, post-simulation quizzes, guided reflection questions, and documentation assignments complete the learning experience.
Figure 3 summarizes the primary learning objectives for utilization of the Pharmacology scenarios.

![Primary Learning Objective by Scenario: vSim Pharmacology](image)

Respondents were asked to rate the challenge level of the vSim products with respect to a number of skill requirements. In terms of clinical reasoning, the vast majority of vSim Pharmacology users (71%) reported that the challenge level was “about right,” as illustrated in Figure 4.
Curriculum Approaches

The use of simulation in the classroom continues to grow as an effective interactive teaching strategy, engaging students in learning through the use of doing (Skiba, Connors, & Jeffries, 2008). Using vSim as a classroom approach to demonstrate thinking in action provides an opportunity for immediate feedback. This helps to strengthen student thinking to enhance course learning outcomes. Faculty piloting the Pharmacology scenarios reported that thoughtful integration of the scenarios in conjunction with active teaching strategies outweighed the use of vSim as an “add on” learning activity. Faculty involved in the pilot commented that thoughtfully integrating vSim into specific courses and settings (post-clinical, lab, simulation) can extend thinking and learning beyond the classroom into the clinical experiences in real life to achieve specific learning outcomes. Several scenarios were frequently assigned as homework—i.e., those focused on inhalation medication (Toua Xiong), morphine management (Yoa Li), and antidepressants (Jermaine Jones).
Figure 5 represents faculty reporting of primary method of use

![Primary Method of Using vSim Pharmacology During Trial Period by Scenario](image)

**Flipping the Classroom**

vSim can be used to facilitate an active classroom approach to engage a dialogue with students on content knowledge using an interactive patient story that unfolds within context.

**EXAMPLE:** Examine the pathophysiology and care management strategies of a patient (Rachael Heidebrink) following a pulmonary embolism and use of anticoagulants as she transitions from acute care to home, or examine the adverse effects of medication combinations in the treatment of peptic ulcer disease (S. Morris).

**Small Group Conversations**

vSim can be completed as small group activities in the classroom with faculty role modeling their thinking in dialogue with students on care management strategies and rationales for action. A group setting can also provide an opportunity for students to think cooperatively through a situation and help them assess both the what and the why surrounding patient care decisions.

**EXAMPLE:** Examine a group vSim feedback log of care management activities surrounding digoxin toxicity experienced by patient Mary Richards, or care complications in the use of antibiotics and declining renal function with patient Harry Hadley. The associated debriefing questions can be used to uncover student content knowledge and rationale for action.
Small Group Concept Mapping

Concept mapping for concept-based curricula can target important physiologic concepts in conjunction with pharmacology, such as metabolism and medication management of hypoglycemia (patient Juan Carlos) or oxygenation and medication management of angina (patient Junetta Cooper). These conversations can be structured to emphasize important pharmacologic and care management considerations highlighted through the use of an active concept map. vSim provides context that can bring the concept map to life.

Post-Clinical Learning

Extend the classroom introduction of a specific nursing concept, such as pain, into the post-clinical conversation.

**EXAMPLE**: Discuss pain management for vSim Pharmacology patient Danielle Young Bear in the classroom. To solidify learning, students can then examine the thinking and reasoning when intervening to manage pain, followed by direct application of their new knowledge as homework after class. Reintroduce pain during the post-clinical conference in conjunction with the differences and similarities in the students’ vSim homework feedback logs, extending the conversation to thinking and learning within the context of the students’ varied clinical experiences.

### Effectiveness of vSim Compared to Other Teaching Methods

Figure 6 illustrates vSim Pharmacology users’ views on the overall effectiveness of vSim when compared to other teaching methods. Faculty in the pilot reported that it was essential to bring the scenarios into the classroom and begin to demonstrate how to use different approaches to enhance thinking and learning. The more students demonstrated effective use of vSim in the classroom, the more readily they used the vSim resources outside of the classroom. A majority of users found the Pharmacology scenarios to be as effective as training manikins and simulation labs:

![Perceived Effectiveness of vSim Pharmacology in Comparison with Other Teaching Methods](image)
Resources and References to Support Simulation

Resources

- vSim Instructor Resources—Take advantage of the materials available for faculty on the vSim product page on thePoint, including a Professional Competency Map, Scenario Overviews, and Debriefing Guides (see Instructor’s User Guide).
- Wolters Kluwer Customer Success Training
  - SIRC Courses
    - Teaching and Learning Strategies
    - Curriculum Integration
    - Debriefing Foundations
    - Evaluating Simulations
  - SIRC Annotated Bibliography –Simulation literature

References and Further Reading

