Executive Summary

Despite the many acuity/intensity systems that have been applied in the inpatient setting, a review of the literature reveals a limited number of available tools to quantify nursing workload in ambulatory care. Quantifying nursing time in ambulatory care is challenging due to the unpredictability of the patient population. Outpatient treatment centers encounter a variety of disease processes, age groups, and care requirements. In fact, ambulatory care now encompasses everything from routine blood work to very complex procedures and surgeries. Caring for patients in this environment requires astute judgment and meticulous care from the nursing staff, yet nurses often are unable to articulate nursing requirements.

In this three-part series, current literature on acuity/intensity tools will be reviewed, and the rationale for developing an Ambulatory Intensity System (AIS). Based upon a review of the literature and current industry practices, the group pursued the development of a patient intensity system that reflected both the severity of patient illness/need and the complexity of service required in the clinical setting.

Direct and indirect care measures, patient outcomes, performance improvement opportunities, and staff satisfaction were also addressed in the process.

The staff satisfaction data revealed the value that the staff derived through the tool.

Specifically, the staff gained the ability to articulate patient needs and distinguish between system and staffing issues while the charge nurse gained the ability to make dynamic staffing assignments.

Part I will define nursing acuity/intensity, and explain the added value of intensity tools. The development of an AIS and a pilot study conducted in two ambulatory care areas will be described. Part II will describe the ongoing implementation of the system, its incorporation into a computerized appointment system, and related performance-improvement initiatives. Part III will illustrate practical application of the tool in budget planning, resource allocation, patient care assignments and its incorporation into a computerized appointment system, and related performance-improvement initiatives. Part III will illustrate practical application of the tool in budget planning, resource allocation, patient care assignments and
critical thinking skills. (Parts II and III will appear in future issues of Nursing Economic$.) The use of an AIS for quantifying patient care and improving performance will provide nursing leaders and direct care providers with another avenue to ensure adequate staffing and positive patient outcomes. While this study was conducted in an ambulatory oncology research center, the problems experienced and the lessons learned are likely applicable to many other settings, and the tools developed can be adapted for a variety of ambulatory settings.

**Literature Review**

Nursing classification systems were first identified in the 1960s to forecast staffing needs in the hospital setting (Prescott, 1991). Traditionally, they have been used in the inpatient setting to determine staffing needs by shift, and used in the budgeting process to determine nursing hours of care per patient day. In 1998, the American Nurses Association convened a panel of experts to address issues related to safe and appropriate staffing (Gallagher, Kany, Rowell, & Peterson, 1999). The panel proposed that staffing focus on intensity and complexity of care rather than on hours spent with the patient. Critical factors to be considered include number and intensity of patients, architecture and geography of environment, available technology, level of preparation and experience of staff, and unit functions necessary to support delivery of quality patient care (Gallagher et al., 1999).

Hastings (1987) identified three major influences of nursing workload in the outpatient setting: patient volume/census, patient care demands, and the role of the nurse. **Patient census** is the process of counting the number of patients requiring care during a specific time period in a specific work area. **Patient care demands** are factors that dictate the skill level of nursing care needed. Factors include diagnosis, clinical presentation, established plan of care, and patient acuity/intensity. The role of the nurse consists of direct and indirect patient care needs, and clerical and administrative duties. These influences help determine workload, which can be defined as required number of hours of staff time per workload interval (Hastings, 1987).

Workload interval is the amount of time it takes to perform all activities surrounding patient care.

In the ambulatory setting, patient interactions are seen as synonymous with patient visit. However, each patient interaction can be more accurately defined as an encounter. An encounter can be a direct contact between the patient and the nurse or an indirect contact between the nurse and any other person/department/system involving coordination of care around a specific patient. An encounter can be as brief as a 1 minute telephone call to an extensive 6 to 8-hour chemotherapy treatment. A nursing acuity/intensity system can be used to collate encounters and determine workload.

Telephone triage and coordination of care activities are major components in the workload of the ambulatory care nurse. The ambulatory nurse is frequently responsible for initiating and following up with patients who are not physically present. These nurses must become adept in an environment that requires a strong sense of independence and excellent clinical judgment, as well as an increased scope of responsibility for positive patient outcomes (Wheeler, 1993). Frequently, however, nurses are not able to articulate how much time is spent triaging patients and performing coordination of care activities. Capturing this information is essential in defining the workload of the ambulatory care nurse.

Nursing acuity/intensity systems use one of two methods to sort patient encounters into levels to predict nursing care requirements (Haas & Hackbarth, 1995).

The first, referred to as the **proto-type method**, comprises four to five levels, sorting patients according to priority and care requirements with each level containing a brief description correlating with time. Patients are assigned to the level best matching the demand for nursing care. This method is viewed as subjective as it relies on the nurse’s judgment to accurately reflect the care needs from shift to shift (Haas & Hackbarth, 1995).

The second method, referred to as the **factor method**, considers the most visible activities and correlates them with time. The sum of the activities designates the patient category, with the more visible tasks indicating a higher acuity level (Haas & Hackbarth, 1995).

Haas and other authors have identified some inconsistencies in using the factor system. Haas and Hackbarth (1995) believe that the factor system does not capture levels of nursing judgment, complexity of care, or combination of activities performed simultaneously. They also believe that it does not account for changes in technology. Shaha and Bush (1996) identified factor systems as dictatorial and rigid, expensive to create, audit, and maintain, and as time consuming and disruptive to routine functioning of a nursing unit. A survey by Intermountain Health Care demonstrated that traditional factor systems discourage professional judgment, fail to encompass the complexities of nursing care, and often provide redundant information by requiring completion of another form based on data already in the patient chart (Shaha & Bush, 1996). These authors also identified setbacks with traditional nursing acuity systems. “Acuity creep” occurs when patient classifications are increased over time, thereby increasing costs associated with staffing. This sometimes occurs when nursing staff become more adept at using the instrument to their best benefit.

An ideal classification system would focus on the processes associated with providing professional...
nursing care, be quick and easy to complete, flexible, inexpensive, and of tangible value to caregivers (Shaha & Bush, 1996). Other considerations in tool development include knowledge base of the model of care delivery, organization of work, and the role of the professional nurse when working with ambulatory care patients (Haas & Hackbarth, 1995).

To determine length of patient encounters, time and motion studies or a consensus approach can be used to determine how much time, on average, is spent performing a particular task (Alward, 1983; Fagerstrom & Rainio, 1999; Shaha & Bush, 1996). Fagerstrom and Rainio (1999) support the use of professional nursing judgment in assessing the need for nursing staff resources. Rather than the expensive and time-consuming method of performing time and motion studies, utilizing a consensus approach between management and staff to develop prototype levels of nursing intensity can be developed faster, at less expense, and correlate at reasonable levels to time and motion study results.

**Conceptual Model**

The FOCUS/PDCA Model served as a problem-solving method for developing and implementing the Ambulatory Intensity System (Hoskins, Sayer, & Westman, 2002). The following steps were used for performance improvement in the FOCUS portion: identifying the problem (Find); gathering a team with process expertise (Organize); delineating the knowledge of the current process (Clarify); understanding the reasons for process variation (Understand); and choosing one or more solutions for the problem (Select). For the PDCA portion: an improvement strategy was developed (Plan); a pilot was conducted to test improvement strategies (Do); data were collected, analyzed, and presented to appropriate individuals (Check); improvement strategies were redesigned, new improvement strategies were developed, and a continual monitoring process was instituted for continued improvement (Act).

**Clinical Trials Environment**

The Warren Grant Magnuson Clinical Center is a 314-bed hospital solely dedicated to biomedical research. Nurses at the clinical center (CC) care for patients on a variety of research studies including natural history, phase I and II clinical trials: Patients on phase I and II clinical trials require frequent monitoring and pharmacokinetic sampling. They also have multiple research data points that must be met to maintain protocol integrity. Nurses in the outpatient cancer center (OCC) provide care to patients who are on protocols sponsored by the National Cancer Institute and National Heart, Lung and Blood Institute. Patients receive complex cancer therapies with high clinical care requirements. Nurses in the outpatient radiation clinic (ROC) provide treatment and consultation to patients from all institutes receiving radiation in the CC.

Based on the review of the literature, nursing leadership at the CC chose the prototype system for the AIS. In addition to the decision to adopt a prototype system, another decision was reached surrounding nomenclature for the system. The terms nursing acuity, patient classification, and nursing intensity system are all referred to in the literature. Patient classification is an older term rarely used today. Because the traditional acuity system centers on the degree of illness of the patient, patient intensity was selected to represent the patient’s degree of illness, as well as the complexity of the tasks required to provide care. Operational definitions for the CC AIS are included in Table 1.

**Find**

Nursing leadership for ROC and the OCC recognized that the patient intensity was increasing and wanted to quantify the nursing care requirements for these units. In both areas, there was a perceived insufficient nurse/patient ratio, an inadequate qualitative intensity system, and an impractical quantitative system. In the current system, patient census data were used to count patient visits. There was no consideration of intensity or time spent with patients. Staffing was based on intuition, work experience, and knowledge regarding workload.

### Table 1: Ambulatory Intensity System Operational Definitions

<table>
<thead>
<tr>
<th>Ambulatory Intensity System</th>
<th>Mechanism to measure the amount of direct and indirect care required to provide comprehensive care to the ambulatory patient.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Care</td>
<td>Amount of time spent in direct care activities (specimen collection, chemotherapy, supportive care, blood product administration, physical assessment, patient teaching, consults, preoperative/postoperative care, and telephone triage).</td>
</tr>
<tr>
<td>Indirect Care</td>
<td>Amount of time spent in preparing and completing patient care (setting up tubes, ordering supplies, communicating with other departments, documentation, clinic preparation time, coordination of care).</td>
</tr>
<tr>
<td>Therapeutic Indicators</td>
<td>Clinical center policies, procedures, and standards of practice representing patient care activities.</td>
</tr>
</tbody>
</table>

---

**Table 1. Ambulatory Intensity System Operational Definitions**
Census data collection could only be captured on the day of the patient visit. If staff were unavailable to perform data entry real time, the data were lost. Most staff were unable to articulate the intensity of patient care or system issues influencing care. They were also expressing poor morale related to the perceived increase in workload. At the time of the pilot, the OCC was assuming responsibility for a new patient population. This meant an additional increase in the patient volume and workload.

Organize

A team of nurses from the OCC was organized to review the current workload and delineate issues that affect staffing. The group consisted of the nurse manager, clinical nurse specialist, and two senior nurses on the unit with combined ambulatory nursing expertise of over 30 years.

Clarify

In addition to reviewing the literature, the OCC team benchmarked several large research institutions for use of intensity systems. A few centers had tools in place, but many centers had moved away from intensity tools reportedly due to complexity of tools, inflation of numbers, and lack of quality assurance measures. Institutions stated that they were using intuition and retrospective analysis to staff their ambulatory care areas.

Understand

To have a thorough understanding of the reasons for process variation, the group conducted brainstorming sessions led by the clinical nurse specialist (CNS) and nurse manager (NM). Potential areas of improvement were identified and potential solutions were discussed.

Select

After a thorough review of the literature and benchmarking, the next step was to develop a system with an ultimate goal of improving

### Table 2. Ambulatory Intensity System Pilot

<table>
<thead>
<tr>
<th>Level</th>
<th>Time</th>
<th>Activities</th>
</tr>
</thead>
</table>
| Level 1 | < 30 minutes | - Blood work — Peripheral or central venous access device  
- Chemotherapy cassette change  
- Coordination of care  
- Dressing change — Wound or venous access device  
- Intramuscular, subcutaneous, or intradermal injection  
- Intravenous catheter placement  
- Intravenous catheter removal  
- Ordering supplies  
- Simple patient teaching  
- Port access  
- Routing assessment  
- Telephone triage  
- Tracheostomy care  
- VAD removal |
| Level 2 | 30-60 minutes | - Simple antibiotic therapy  
- Blood work with venous access device (VAD) dressing change  
- Blood work with VAD removal  
- Bone marrow biopsy without sedation  
- Simple chemotherapy infusion  
- Consult  
- Initial assessment  
- Intravenous catheter placement  
- Patient teaching  
- Paracentesis  
- Psychosocial support  
- Thoracentesis  
- Tube feeding  
- Venous access device troubleshooting |
| Level 3 | 1-2 hours | - Complex antibiotic therapy  
- Chemotherapy infusion  
- Conscious sedation procedures or recovery  
- Biopsy  
- Bone marrow aspiration/biopsy  
- Bronchoscopy/Colonoscopy  
- VAD insertion  
- Donor lymphocyte infusion  
- Lumbar puncture  
- Complex patient teaching (C1D1 chemotherapy)  
- Platelet transfusion  
- Psychosocial support |
| Level 4 | 2-4 hours | - Apheresis catheter removal  
- Complex medication/chemotherapy administration without pharmacokinetics  
- Fever/neutropenia workup with antibiotics/liquids with or without admission  
- Packed red blood cells  
- Procedure recovery  
- Liver biopsy  
- Renal biopsy |
| Level 5 | > 4 hours | - Complex medication/Chemotherapy administration requiring frequent vital signs, pharmacokinetics, or prolonged hydration (IVIG, amphotericin, rituximab, VEGF)  
- Packed red blood cells and platelets |
patient care delivery. The ideal system would reflect true patient care intensity, project accurate staffing patterns and protocol intensity requirements, be user friendly, facilitate collaboration on administrative and clinical decisions, adapt to multiple settings, and increase staff satisfaction. As noted earlier, a prototype model was chosen. The OCC and ROC developed a list of services provided in their respective areas. Individual staff members collaborated to describe patient encounters, correlating workload parameters and intensity levels with a time factor. Each level combined direct and indirect nursing activities required to administer patient care (see Table 2). Operational definitions for the system’s components were created (see Table 1). Tools for data collection were developed, including the Ambulatory Intensity Tool, an instruction sheet, and a staff satisfaction survey. Performance improvement indicators were created, implemented, and reviewed frequently.

Plan

The plan consisted of piloting the tool in a small and large ambulatory care area. The OCC population serves adult hematology/oncology patients and has approximately 1,500 patient visits per month. The ROC serves as not only a consult service for all inpatients and outpatients, but conducts its own clinical trials on patients requiring radiation as a treatment modality. It has approximately 400 visits per month.

Do

The pilot was conducted in the OCC and ROC ambulatory care areas for 1 month. Detailed educational sessions were held for staff on completion of the tool. The CNS was responsible for reviewing all nursing documentation to verify that the charting was reflective of the intensity level. The CNS and NM clarified questions regarding the pilot to promote quality assurance. Daily feedback was provided to the staff to ensure consistent use of the tool and support the process. Staff satisfaction surveys were given at the completion of the pilot.

Check

Data analysis and staff satisfaction survey results were presented to the staff, NM, service chief, and director of nursing and patient care services (see Table 3). Overall, staff recognized the value of the AIS. The AIS assisted staff to articulate patient care needs and differentiate between system issues and staffing delays. The tool provided a snapshot view for charge nurses to make appropriate assignments, and can be easily modified to meet a changing clinical picture. The categories accurately reflected the workload. The system assisted with delineating coordination of care activities appropriate for nursing, and activities that were appropriate to delegate to other ancillary departments/personnel. In the OCC, most coordination of care activities have been assumed by the charge nurse and research support assistant. In the ROC, coordination of care activities are performed by the nursing staff. However, over 50% of the activities could appropriately be delegated to other ancillary services.

A brief survey was provided at the completion of the pilot to collect data regarding ease of use of the tool, time involved, and an ability to capture direct and indirect care activities. Data indicated that the directions were clearly explained prior to implementation and that the tool was easy to use and required minimal time to complete.

The performance improvement auditing process also provided unanticipated, additional useful information. There were several instances of missing documentation in the OCC and in the ROC. In the OCC, missing documentation occurred with regard to telephone triage, hydration, blood work, medication charting, and chemotherapy administration. The ROC had missing documentation with regard to telephone triage, routine assessments, patient teaching, and hydration.

Recommendations were shared with the nurse manager, staff, and service chief regarding a review of charting guidelines. Areas of improvement and delegation of coordination of care activities were shared with staff. The ROC staff had requested additional nursing staff. The tool identified many tasks for which nursing had assumed responsibility. However, these tasks can be delegated to other ancillary staff, thereby affording the nurses more time for performing appropriate nursing activities. Recommendations were made for them to consider hiring a research support assistant to assist with clinic flow. In addition, the tool identified several tasks for which nursing had assumed

<table>
<thead>
<tr>
<th>Level</th>
<th>OCC</th>
<th>Radiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level I</td>
<td>27%</td>
<td>89.6%</td>
</tr>
<tr>
<td>Level II</td>
<td>21%</td>
<td>5.7%</td>
</tr>
<tr>
<td>Level III</td>
<td>22%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Level IV</td>
<td>17%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Level V</td>
<td>13%</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

Table 3. Pilot Results
responsibility. These tasks could have been delegated to other members of the interdisciplinary team. In the OCC, staffing patterns were justified and additional FTEs analyzed.

Limitations of the tool included intensive manual analysis during the pilot. The pilot requires dedicated monitoring for quality assurance. Initial training for use of tool was time intensive, but time well invested in providing information to assist with workload requirements.

Act

The AIS was redesigned based on data analysis. A sixth level was added to delineate telephone encounters and coordination of care activities occurring in less than 15-minute intervals. Performance improvement strategies have been developed and a continual monitoring process is in place. The AIS has remained in use beyond the pilot phase in the outpatient cancer center for FTE budgeting and allocation, and as a tool for critical thinking for the charge nurse. The system is also being piloted in other ambulatory care areas throughout the institution.

Conclusion

The use of an Ambulatory Intensity System for quantifying patient care and improving performance gives nursing leaders a tool to assist them in objectively identifying the work, examining and planning staffing patterns, appropriately allocating resources, empowering staff nurses with a methodology to enhance their critical-thinking skills, and promoting positive outcomes by optimizing patient care. Part II of this series will discuss the ongoing implementation of the AIS in the ambulatory care setting, incorporation of the system in the hospital’s computerized appointment system, and performance improvement systems that may be used for continuous monitoring. One item that was not factored into the tool was variance tracking (the process of recording nursing duties that are not a part of the predetermined direct and indirect care activities, but that affect overall patient outcomes). This will be addressed in Part III of the series.

REFERENCES


