



● The “Right” Nurse Staffing Model

The debate continues over the “right” nurse staffing model for oncology nursing especially in hospital-based community cancer centers. Studies by the Oncology Nursing Society (ONS), the Association of Community Cancer Centers (ACCC), and many others look at various models for nurse staffing in an ambulatory outpatient oncology setting. The elusive goal: a “good fit” model that can be adapted to work with a cancer center’s staff mix and patient population.

Multiple complex issues surround and affect this debate:

- **The nursing shortage.** This shortage is projected to continue over the next decade or more. One ONS survey found that the average age for an oncology nurse is 44 years old with 20 years of nursing experience (14 of those being in oncology).¹ As the RN pool ages and retires, the shortage will continue to be an important issue in all aspects of care.
- **Decline in reimbursement.** As the Centers for Medicare & Medicaid Services (CMS) continues its downward pressure on reimbursement for oncology services, staffing mix and efficiency will be key factors in the

sustainability of your cancer program. The downward trend in reimbursement will continue to cause private practices to be very selective about those patients they treat and those they will refer to a hospital-based cancer program.

- **An aging population.** The good news is that American’s are living longer than ever before. With advanced age, however, comes an increasing likelihood of being diagnosed with some form of cancer. Additionally, older patients often have existing co-morbidities, such as diabetes and heart disease.
- **A continued emphasis on quality.** Measures of quality care continue to be a focus of CMS, the National Comprehensive Cancer Network (NCCN), the American Society of Clinical Oncology (ASCO), and other organizations. Currently, many initiatives focus on pay-for-reporting, but most in the oncology community have come to understand that the quality of care provided will eventually be tied to reimbursement. Quality care can be tied to a program’s staffing mix as well, i.e., the safety of patient care and safety of the work environment for nurses correlates to the staffing mix (number of highly trained and exper-

Table 1. Infusion Chair Utilization

Number of Chairs	Cancer Center A 24	Cancer Center B 12	Cancer Center C 16
1. Daily hours of operation	11	8	9
2. Days open per week	5	5	5
3. Total weekly hours per chair (#1 multiplied by #2)	55	40	45
4. Total occupied hours per chair at 100% efficiency (#3)	55	40	45
5. Ideal chair utilization adjusted for turnover	90%	90%	90%
6. Adjusted occupied hours per chair (#4 multiplied by #5)	49.5	36	40.5
7. Average occupied hours per chair* per day	9.5	6.2	7.1
8. Days open per week	5	5	5
9. Total weekly occupied hours per chair (#7 multiplied by #8)	47.5	31	35.5
10. Weekly chair downtime (#6 subtracted by #9)	2	5	5
11. Additional weekly hours gained by minimizing “downtime” (#10 multiplied by number of chairs)	48	60	80
12. Additional patients gained by minimizing chair “downtime” (#11 divided by average infusion time)**	9.2	12.8	17.1
13. Additional daily patients gained by minimizing chair “downtime” (#12 divided by #8)	1.8	2.6	3.4

*Calculate by doing an audit of current operations to track and determine average occupied hours per chair.

**Average infusion time is calculated by average infusions per day divided by average hours infusion center operates.

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rienced nurses and the number of nurses with less experience and expertise). Quality care means fewer medication errors and work-related injuries.²

Nurse Recruitment and Retention

Community cancer centers developing nurse staffing models are challenged by nurse recruitment and retention efforts. In general, outpatient ambulatory oncology departments serve older populations and require nurses to have specialized skills and experience. As such, these clinical areas tend to be more vulnerable to nurse recruitment and retention.³ Looking at the total nurse population, oncology nurses are few in number. Experienced oncology nurses are an even rarer subset. Retention of oncology nurses should be a top priority for every cancer program.

Buerhaus and colleagues studied the current state of oncology nursing by surveying oncology nurses, oncologists, and nurse executives.³ The data analysis revealed differences in oncology nurses working on adequately staffed units versus nurses working on inadequately staffed units. The study found that nurses on inadequately staffed units shared less satisfaction with working conditions and voiced more concerns for quality of patient care.

Another study examined the intent of nurses to stay in their jobs and found that patient outcomes are at risk with nursing turnover.⁴ Turnover impacts the staffing mix of experienced versus non-experienced RNs and can result in established professional standards of care not being followed. Add increased workloads due to vacant FTE nursing positions, and you can understand why patient safety and quality of care can be compromised.

Nurses need to be committed to their patients, jobs, and the organization for which they work. Variables that reduce nurses' commitment include high work load, organizational constraints, and mandatory overtime. On the other hand, "satisfiers" for commitment to an organization include autonomy, supervisory support, work group cohesion, promotional opportunities, and collegial relations between team members.

Getting Started

To help define staffing needs, the American Nurses Associations' (ANA) *Utilization Guide for the ANA Principles for Nurse Staffing* suggests identifying the following:²

- Volume of patients treated
- Intensity levels of all patients treated
- Characteristics of the work environment, including architecture and available technology
- Experience and expertise of the nursing staff.

Patient volume can be easily accessed from your infusion center's monthly or annual statistics. The intensity level of all patients treated can be measured by the length of the infusion treatment requiring the services of a registered nurse to administer. Work environment features to consider include the size of the work area and existing barriers to efficiency and safety of patients and staff. For example, lack of technology can increase workload. Staffing mix can provide a snapshot of the number of experienced, certified oncology nurses working with less experienced, non-certified nurses or assistive personnel.

Taken together, this information provides a snapshot of the cancer program's current status. In order to move forward with any type of staffing tool or model, a cancer center must first know where it stands. At a minimum, you will need to have the following information about your program:

- Number of infusion chairs
- Hours of operation per day
- Average infusion time
- Infusions per chair per day
- Average occupied hours per chair
- Number of infusions per day
- Patients per RN per day
- Drugs mixed per day by pharmacy.

This information lets you see how your program is currently operating and where it needs to go to operate more efficiently for both staff and patients. Table 1 on page 26 shows how to calculate your infusion chair utilization.

As you begin, keep in mind that a 1999 ANA expert panel warned against institutions establishing minimal staffing levels. The panel explains in *Principles for Nurse Staffing* that because patient needs are ever changing, static minimums are meaningless and often place patients at risk in the poorly staffed healthcare facility. Instead, the panel supported the concept that staffing levels should be based on: 1) quality of care measurements, 2) patient safety, 3) maintaining a quality work environment for staff, and 4) meeting the outcomes established by the organization.

Patient Classification and Acuity Tools

Community cancer centers can use patient classification and acuity systems to help establish appropriate nurse staffing levels for their patient population. Further, patient classification and acuity systems based on assessment and intervention are easily understood by nurses.² When Buerhaus and colleagues looked at nurses who would recommend nursing as a profession, oncology nurses who

would *not* recommend nursing were those who had a decrease in staffing. The authors went on to say that staffing levels influenced the satisfaction an RN had as a member of the profession. Intensity tools that are created by nurses and used by nurses to measure workload allow nurses to have some say about staffing levels. A happier nurse workforce benefits patients, staff, and the organization.

When establishing patient classification and acuity systems, leverage the expertise of your oncology nurses. Using an experienced nurse to enter the assessment and interventions needed for patients is more likely to result in data that accurately projects the number and skill mix of staff needed to care for patients. Nurses entering these data need to consider:

- The layout and design of the unit
- Work shifts
- Seasonal considerations, including vacation schedules and holidays
- Institutional policies and procedures.

All of these issues can affect staffing levels and may need to be adjusted to ensure adequate staffing and safe, quality patient care. Other factors or variations to consider in the oncology unit include:⁵

- Staff skill and experience
- Availability of technology
- Support of a multidisciplinary staff
- Presence or absence of research clinical trials.

Because of variations and differences in practice settings for oncology care (large academic medical centers vs. small office practices, for example), nurse staffing levels for patient care should be based on patient acuity, the care setting, skill of the registered nurse, the presence of other team members, and the availability of technology, as suggested by the ANA.⁵

The Magnuson Model

The Warren Grant Magnuson Clinical Center, an ambulatory research center at the National Institutes of Health, developed a patient intensity tool that may be useful for

community cancer centers. After a literature search that revealed few tools for measuring nursing workloads in ambulatory care centers, Cusack and colleagues developed a patient intensity system that met their needs [in determining nurse staffing levels] better than the traditional nursing acuity and patient classification systems. The intensity system represents the patient's degree of illness as well as the complexity of the nursing tasks to measure the necessary care required by the patient. The end result: an intensity measurement tool that takes only 30 seconds to complete (see Tables 2 and 3, page 28 and 29).

In a three-article series published in 2004, Cusack and colleagues provide an in-depth discussion of the development and piloting of the tool, lessons learned, and exploration of the daily use of the system.⁶ An important factor in the pilot's success was a leadership team that kept staff members committed and engaged in the project. This goal was accomplished by providing ongoing education, as well as avenues for staff involvement in all aspects of project design and implementation.

Cusack and colleagues showed that intensity level was the time required to deliver direct and indirect patient care.⁶ Their tool established an "average time" for the care to be provided. They based staff requirements for the intensity level on the time required for an RN to provide patient care. This time was reflected as a fraction of an eight-hour shift (480 minutes).

The tool includes a column that gives the calculation of the staff requirement in caring for one to ten patients at intensity levels ranging from I to VI. This tool allows a charge nurse to readily assess if assignments need to be changed as the shift progresses. In the Intensity Tool, 1.0 equals 1 RN FTE. According to the tool, not one nurse should have more than one patient in level VI for a total of 0.75 required care time. By spreading out the severity of the patients and matching the level of care needed to the RN's abilities, safer patient care with equal distribution of workload occurs. For example, using this tool, 1 nurse could take care of 6 level III patients for 0.56 time, plus 2 level IV patients for 0.38, for a total care time of

Table 2. Intensity Tool Staffing Requirements: Based on Number of Patient Encounters¹

Intensity Levels ²	Average Time ³	Number of Patient Encounters										
		1 Patient	2 Patients	3 Patients	4 Patients	5 Patients	6 Patients	7 Patients	8 Patients	9 Patients	10 Patients	
I	0-15	7.5 minutes	0.01	0.03	0.04	0.06	0.07	0.09	0.10	0.12	0.13	0.15
II	16-30	22 minutes	0.05	0.09	0.14	0.18	0.23	0.28	0.32	0.37	0.41	0.46
III	31-60	45 minutes	0.09	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.84	0.94
IV	61-120	90 minutes	0.19	0.38	0.56	0.75	0.94	1.13	1.31	1.50	1.69	1.88
V	121-240	180 minutes	0.38	0.75	1.13	1.50	1.88	2.25	2.63	3.00	3.38	3.75
VI	>240	360 minutes	0.75	1.50	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50

¹RN time required to see a patient given intensity level, reflected as a fraction of 480 (minutes in an 8 hour shift)

²Time (minutes) required to deliver nursing care

³Average nursing time for each intensity level

Source: Jones A, Cusack, G, Chisolm L. Patient intensity in an ambulatory oncology research center: a step forward for the field of ambulatory care—part II. *Nurs Econ.* 2004;22(3)120-123.



Top, the entrance to the John B. Amos Cancer Center; Above, the infusion area.

0.94, or 1 RN FTE. In other words, this nurse would be assigned to care for 8 patients during an 8-hour shift.

Reliability was measured using inter-rater reliability, e.g., more than one nurse agreeing with the level of intensity for the patients. The tool's reliability—that is, the tool's completion by the nurse—was affected by the nurse's motivation to complete the tool. The leadership team closely monitored this process so that staff would stay on track. The leadership team was also available to all staff for any questions or concerns that arose. All staff was involved in staying informed about the status of the project's validity. Data collected during the pilot year supported the need for two additional nursing FTEs for the department. Implementing a patient intensity tool that is developed and used consistently produces mineable data that supports justification for the number of FTEs and the appropriate staff mix to satisfy patients and nurses.

Utilization of the data collected about the intensity tool also showed areas for process improvements, including:

- Nursing documentation
- Time management skills
- Better use of resources
- Organization and prioritization skills.

Nurses were able to define their roles, reassigning non-nursing tasks to appropriate team members. An added benefit in terms of staff satisfaction was an improved inter- and intra-department collegiality.

In the Magnuson model, the experienced charge nurse used critical thinking skills to measure patient intensity and how that intensity impacted the patient care processes. The charge nurse identified: 1) needed changes in the patient care assignment, 2) nurse educational needs, and 3) delays in service. In other words, data gathered during the pilot helped develop tools that improved quality in patient care and staff abilities to provide needed care.

Developing an Acuity Tool

An acuity tool, which accounts for patient intensity and determines the hours of FTE needed, allows clinical staff and administrative staff to discuss staffing using the same language (i.e., FTEs needed to staff the clinic on any given day). With this tool, both clinical and administrative staff can review schedules and see the “true” workload of the

Table 3. Sample Nurse Staffing Using Intensity Tool in Table 2

Nurse A	
1 Level II patient	0.05
5 Level IV patients	0.94
	0.99 FTE Needed
Nurse B	
1 Level VI patient	0.75
2 Level III patients	0.19
	0.94 FTE Needed
Nurse C	
1 Level V patient	0.38
3 Level IV patients	0.56
	0.94 FTE Needed
Nurse D	
2 Level V patients	0.75
3 Level III patients	0.28
	1.03 FTE Needed

unit, as opposed to merely patient volume in the unit.

Outpatient oncology centers looking to develop their own acuity tool should involve staff in the design of the tool and its use with the patient population. This involvement will not only engage staff, it will also foster staff commitment to the overall improvement of the cancer program.

Begin by identifying those nurses with a strong understanding of outpatient oncology care. If relevant to your staffing mix, include both those nurses who are nationally certified and those who may not be certified but who have years of oncology experience. Involve nurses who work daily with patients to have a full understanding of the content for each level of intensity when assigning assessments and interventions.


Write down assessments and interventions according to the amount of time that it takes for a nurse to complete the patient's care. Categorize the assessments and interventions into like groups, for example, groups might range from tasks requiring less than 30 minutes to tasks taking more than 4 hours. If your cancer center has patient treatments that require more than 4 hours, start another level of intensity.

The literature supports a process that allows all nurses to provide input into the content for each level of intensity. To foster buy-in from staff and their continued interest in this process, you should list nursing tasks—from those requiring the least amount of time to those taking the greatest amount of time. Compile these lists and ensure that all nurses have some input as to what constitutes each intensity level. When changes are made to these intensity levels, be sure to inform staff. Be consistent with the methodology used to implement the acuity tool. This consistency bolsters the tool's reliability and usefulness, according to Jones and colleagues.⁶ Reliability refers to the degree to which nurses agree with the choice of intensity level assigned by Jones et al. The level of reliability is also important for workload measurement. Remember that this process is an evolving one.

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Be Flexible

To grow in their jobs and profession, nurses need opportunities to be involved in job-related committee work, as well as oncology-specific professional endeavors. The charge nurse responsible for assigning patient care should consider these types of professional commitments. When a nurse needs to be away from the oncology unit for an hour or so, the charge nurse will need to assign coverage for those patients receiving treatment from that nurse. To do so, the charge nurse must closely monitor the availability of nurses assigned to cover this nurse's patient load in addition to their own care load. Certain days or certain hours may present particular difficulties with nurse coverage. Ask for input from your outpatient nurses to understand how the patient care assignment is handled and help identify those days and times that are likely to be best for scheduling meetings and other professional activities.

Hospital-based outpatient oncology programs can employ an acuity-based nurse staffing system to establish optimum nurse staffing levels. Developing and implementing such a system takes time, effort, and continual monitoring. However, the potential benefits for patients and staff are great. Effective managers (both clinical and non-clinical), together with input from staff members who are directly involved in providing patient care, can use models such as the pilot program at the Magnuson Clinical Center to craft an intensity and acuity tool that is tailored to fit their particular center. Table 4 at right shows the ambulatory intensity tool used by our program. In the end, intensity and acuity tools will not only help justify staffing to the administrative team, they will enhance staff and patient satisfaction. 

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Table 4. Ambulatory Intensity System

Level 1 <30 Minutes

- Blood work—peripheral or central venous access device
- Chemotherapy cassette change
- Dressing change
- Intramuscular, subcutaneous, or intradermal injection
- Intravenous catheter removal
- Ordering supplies
- Simple patient teaching
- Port access
- Routing assessment
- Telephone triage
- Tracheotomy care
- VAD removal

Level II 30-60 minutes

- Simple antibiotic therapy
- Blood work with venous access device dressing change
- Bone marrow biopsy without sedation
- Simple chemotherapy infusion
- Consult
- Initial assessment
- Intrathecal administration
- Intravenous catheter placement
- Patient teaching
- Paracentesis
- Thoracentesis
- Tube feeding

Level III 1-2 hours

- Complex antibiotic therapy
- Chemotherapy infusion
- Conscious sedation procedures or recovery
- Donor lymphocyte infusion
- Lumbar puncture
- Complex patient teaching
- Platelet transfusion
- Psychosocial support

Level IV 2-4 hours

- Apheresis catheter removal
- Complex medication/chemotherapy administration w/o pharmacokinetics
- Fever/neutropenia workup with antibiotics/fluids w/ or w/o admission
- Packed red blood cells
- Procedure recovery

Level V 4-6 hours

- Complex medication chemotherapy administration requiring vital signs or prolonged hydration (IVIG, rituximab)
- Packed red blood cells and platelets

Level VI >6 hours

- Complex medication/chemotherapy administration w/ blood products
- Any patient whose level may increase due to adverse reactions
- BMT (bone marrow transplantation)

Source: Jones A, Cusack, G, Chisolm L. Patient intensity in an ambulatory oncology research center: a step forward for the field of ambulatory care—part II. *Nurs Econ*. 2004;22(3):120-123.