Paula T. Rieger, RN, MSN, CS, AOCN®, FAAN
Associate Editor

The Creation of a Patient-Classification System in an Outpatient Infusion Center Setting

Gerri Chabot, RN, MA, OCN®, and Mary Fox, RN, MPH

The administration of chemotherapy in the outpatient setting has the inherent challenge of time constraints, thus requiring efficient use of nursing time. With the implementation of the Medicare Modernization Act, quantifying nursing time is necessary to obtain adequate reimbursement for the full range of services provided to patients by oncology nurses (Halpern, 2004). Tower Hematology Oncology Medical Group (THOMG) is a nine-physician private practice in southern California. The physicians and staff see an average of 150 patients a day in the office, including about 50–60 patients requiring treatment. The volume of patients and the diversity of treatments led us to develop a more efficient way to schedule patient visits. We developed a patient-classification system that we believe accurately addresses the patient care and staffing needs for our professional practice model.

Background

The implementation of diagnosis-related groups stimulated design of patient-classification systems in the inpatient setting by forcing healthcare providers to become more fiscally accountable for the cost of care. Early efforts to quantify repetitive tasks that could be standardized, measured, and timed led to a wave of attempts to measure the nursing time involved in patient care (Malloch & Conovaloff, 1999).

Since 1990, chemotherapy administration has shifted from primarily the inpatient setting to physicians' offices and the outpatient setting. In addition, changes have affected the complexity of chemotherapy administration, including

- An explosion of new chemotherapy agents
- Complicated treatment regimens and protocols that require multiple premedications
- Newer targeted therapies that cause infusion-related side effects, requiring closer monitoring.

As a result of this transition from inpatient to outpatient care, where time constraints have to be taken into consideration, a patient-classification system is essential for planning and providing safe and effective care. An abundance of literature addresses inpatient-classification systems and staffing guidelines. However, very little has been published for the outpatient setting.

Defining the Problem: A Need for Scheduling Guidelines

In the summer of 2001, in our roles as the newly appointed nurse manager and clinical director at THOMG, we identified the pressing need for the implementation of a relevant patient-classification system that would improve scheduling of chemotherapy for patients in our busy ambulatory practice. Although data about patient wait times, nursing staff overtime, and patient and physician complaints had not been collected prior to the implementation of the project, subjective information highlighted the pressing need. Frustration levels were high among staff, and job satisfaction was at risk (Gruber et al., 2003).

THOMG had a scheduling system that consisted of a grid with five columns, each representing a 10-hour nursing shift and allowing for scheduling patients at 15-minute intervals. This was a "fixed" system in that it did not reflect the actual number of nurses working on a given day or their actual hours worked. In an attempt to regulate the number of patients to be seen by a single nurse, the schedule was limited to 10 patients in a 10-hour shift, thus the schedule was "closed" when all nurses had 10 appointments each. Additionally, some days four to six nurses were scheduled to work, and several nurses worked 8-hour versus 10-hour shifts. A major problem was that the differences between the types of treatments and the timing of visits were not addressed in the fixed schedule. Patients routinely were double-booked and given whatever appointment times they requested. Scheduling of patients in no way matched the available resources. Patients sometimes waited as long as several hours for their treatments or were late for their scheduled appointments. The noon hour was blocked off in all of the columns despite the fact that patients remained in the treatment center during those times. Nurses seldom got a dedicated lunchtime and often did not leave the treatment center for more than a 15- to 30-minute break.

The system resulted in aggravation and inefficiency on many levels. The physicians, patients, and staff were frustrated that the patients were delayed. The physicians could not schedule patients when the treatment center schedule was closed to additional appointments, and staff could not determine easily whether openings were available. The nurses could not plan effectively and safely for the care they would provide and often did not get a lunch break.

Getting Started

In October 2001, the nurse manager attended the Oncology Nursing Society's Leadership Development Institute (LDI) and chose the scheduling problem as her project. The efforts for change were supported strongly by the physicians and employees at THOMG. The *Leadership Challenge Planner* (Kouzes & Posner, 1999), the workbook used at the LDI, served as a resource for planning the project. One of the exercises in the workbook requires identification of the stakeholders in the project. In completing this exercise, the nurse manager realized that almost everyone at THOMG had a stake in the project's success. The nurses would be able to complete their jobs safely and more efficiently. The patients would be treated in a more timely manner, which would result in improved satisfaction. Having more satisfactory experiences would make patients more likely to participate in their care and recommend the physicians and services to others in need. Efficient and thoughtful planning

Gerri Chabot, RN, MA, OCN®, is a nurse manager and Mary Fox, RN, MPH, is clinical director, both at Tower Hematology Oncology Medical Group in Los Angeles, CA.

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affects the overall satisfaction of the physicians and other employees. At the LDI, the nurse manager practiced presenting the idea, focusing on positive outcomes and the need for change.

Challenges

As with any change in practice, this project would have its challenges.

- The physicians needed assurance that patients would be accommodated, even with the newly established guidelines.
- The nurses needed assurance that the new guidelines accurately reflected the amount of time needed to take care of patients safely and effectively. The nurses needed to know that a break was built into their schedules and that the breaks were staggered so that adequate coverage was planned.
- The patients, accustomed to getting appointments at the times they requested, needed assurance that the new system was developed with their safety in mind and that they would be seen and treated in a more timely manner.
- The schedulers needed support and encouragement to implement the new scheduling guidelines, often despite patient protestations.
- The executive director needed assurance that the revised scheduling system would allow the practice to see more patients with improved safety and revenue capture.

Implementation

The vision of the success of the project was very clear. We knew that even a rudimentary estimate of the time needed for each treatment, if taken into consideration in scheduling, would improve time management. All stakeholders were kept aware of components of the project that related to their roles.

The first change was to schedule all visits for a minimum of 30 minutes and to eliminate double bookings. The second change was to have each column in the scheduling log represent a specific nurse. The columns then were labeled with the name of each nurse on the schedule for a given day. In addition, the schedule reflected the hours the nurses actually worked (i.e., 8 or 10 hours). Nurses' schedules also included one hour for a lunch break. The lunchtimes were staggered, allowing coverage for patients who remained in the treatment area. As a result of these few changes, the patients were scheduled evenly throughout the day (see Figure 1).

Important to the success of the project was determining the actual nursing time required to care for patients. Obviously, the length of time required for administration of a single agent was significantly less than that for a complex treatment regimen requiring several premedications. The model of care at THOMG is based on the interdisciplinary team, which made focusing on actual nursing time easy. Pharmacy technicians mix chemotherapy drugs, and nurses mix premedications. Medical assistants greet and escort patients to the infusion area, take vital signs, administer injections, and provide supportive and comfort measures as needed. Schedulers arrange all appointments for future treatments, physicians' visits, and other diagnostic tests and consultations; obtain insurance authorizations as needed; and maintain outside correspondence as needed. Nurse practitioners provide immediate consultation and intervention for more complex symptom management and perform telephone triage.

Estimates of the actual nursing time required to provide specific treatments included the number of premedications, type of drug or infusion and administration details, special observations related to administration, and rate titration (see Table 1). To maximize nurses' involvement in the success of the project, their input based on their experiences was sought and incorporated. We looked at the regimens scheduled over a week's time and divided them into two categories: those with premedications and those without. The categories then were presented to the nurses for their input. Regimens with only one agent and one or no premedications generally were given a 30-minute acuity level. Regimens with more than one agent or requiring more than one premedication generally were given a 60-minute acuity level. Certain regimens required more nursing care time because of the complexity of administration and the assessments needed (e.g., use of vesicants, observation and rate titration required for certain drugs). The 90-minute acuity level is a measurement of a nurse's time to get a patient started and to monitor for an initial reaction. The chair time, which is different than the nursing care time, indicates that a patient still may be under the care of a nurse but does not necessarily require interventions. Schedulers were given guidelines that listed each treatment, the expected length of time in the chair, and the acuity level for each treatment.

When the system was applied to actual patient situations, a nurse might be scheduled to see more than 10 patients a day. In addition, some nurses saw more patients than others. The nurses were assured that the acuity system, as designed, would ensure a degree of fairness despite the seeming inconsistency in actual numbers of patients assigned. The nurse manager demonstrated this by taking a full assignment and successfully completing it. Over time, the daily experience of the nurses confirmed that the acuity system accurately reflected patient care needs and nursing care time requirements. The nurses routinely were relieved for lunch and regularly finished on time.

Timing Is an Important Element

The success of the scheduling system depended on patients arriving on time for their appointments. Previously, appointment times were based on patient request or proximity to physician appointments. An appointment was not based on a nurse's actual availability. This lack of coordination often resulted in a patient waiting for a nurse who was taking care of someone else and was not yet available. In an effort to examine the element of timing, we looked at the reasons patients arrived late and found that patients who had appointments with physicians prior to treatment often were scheduled for treatment within 15 minutes of their appointments with doctors. Logistically, patients could not realistically be on time for both appointments. Schedulers were instructed to schedule patients for treatment a minimum of 45 minutes after their appointments with doctors. This would allow them time to see their doctors and travel to the treatment center, taking into consideration that the minimum appointment time was 30 minutes.

We also realized that if patients were expecting to wait every time they came, they were less likely to show up on time. We realized that if we expected patients to be on time for their appointments, we also had to see them on time. We identified the patients who, for whatever reasons, were kept waiting more than 15 minutes beyond their appointment times. The nurse manager or the float nurse would be notified and start a patient's treatment, including IV access, laboratory tests, order confirmation, premedications, and entire treatments if the assigned nurse remained unavailable.

As patient flow began to improve, other challenges became more obvious. We noticed that we needed more time with new patients, so a "new patient visit" type was created and added to the initial treatment to allow for additional education and psychosocial support. The new patient visit was assigned an additional 30-minute acuity level, and the patient actually was given two appointments, one for new patient teaching and the other for the actual treatment.

Another unexpected challenge revealed itself in the impact of the scheduling of patients on workflow for pharmacy technicians. Indeed, some of the regimens requiring only a 30-minute acuity level for nursing actually required more time from the pharmacy. For example, an infusion that requires reconstitution of 15 vials of drug is time consuming for a pharmacist, but for the nurse it is only a simple, uncomplicated infusion to administer, especially if premedication is not needed. This challenge was met by identifying, often in advance, when a pharmacy technician would need assistance from a second pharmacy technician or nurse.

Project Evaluation and Outcomes

Three years of experience with the patient-classification system have demonstrated that it realistically reflects patient care needs and nursing care time necessary to meet such needs. The system organizes the daily patient-scheduling log by matching nurses' scheduled hours with patient care time requirements. The impact of the changes has been very positive.

Time	Gene (7:30 am–6 pm)	Norma (7:30 am–6 pm)	Patty, Float RN (7:30 am–6 pm)	Lisa (7:30 am–6 pm)	Vickie (8:30 am–5 pm)	Sally (7:30 am–6 pm)
8 am	Mr. Close Cisplatin and irinotecan (2)	Mrs. Betsy FEC (3)	Mr. Pat Rituximab: first treatment (2)	Mr. Simple Rituximab next (1)		Mrs. Little Imiglucerase (1)
8:30 am				Mr. Kline Rituximab and CHOP (3)	Ms. Sing MIME (2)	Mr. Glen Irinotecan (2)
9 am	Blood two units (1)		Mr. Slight Hydration (1)			
9:30 am	Mrs. Jones Paclitaxel and carboplatin (2)	Mr. Pib Hydration (1)	Mr. Pat New patient (1)		Mr. Smith Cisplatin and gemcitabine (2)	Mrs. Parker Rituximab and CHOP (3)
10 am		Mr. Life IVIG (1)	Mr. Bond Blood: two units (1)	Mrs. Hill Carboplatin and gemcitabine (2)		
10:30 am	Mr. Long Rituximab next (1)	Mrs. Short Trastuzumab next (1)	Available		Mrs. Tom Trastuzumab and gemcitabine (2)	
11 am	Mr. Money Phlebotomy (1)	Mrs. Funny Carboplatin (1)	Available	Mr. Mad Flush (1)		Mrs. Tiny Interferon injection (1)
11:30 am	Mr. Fair Methotrexate (1)	Mrs. Line Fludarabine (1)	Mr. Minor Carboplatin (1)	Mr. Hall Irinotecan, 5-FU, and leucovorin (2)	Mrs. Slim Iron: first treatment (2)	Available
12 pm	Lunch	Lunch	Lunch			Mr. Bald ABVD (2)
12:30 pm				Mrs. Miles Blood: two units (1)	Mr. Dale Dressing change (1)	
1 pm	Mr. Smiley Ifosfamide and mesna (2)	Mrs. Longly Fludarabine (1)	Available	Lunch	Lunch	Lunch
1:30 pm		Available				
2 pm	Mrs. Lesly Methotrexate (1)	Mr. Dobbs 5-FU and leucovorin (1)	Available	Mr. Miller Blood: one unit (1)	Mr. Town Cetuximab next (1)	Mrs. Walter Irinotecan, 5-FU, and leucovorin (2)
2:30 pm	Mr. Big 5-FU and leucovorin (1)	Mrs. Late Methotrexate (1)	Available	Mr. Early Vinorelbine (2)	Mr. Dance DC pump (1)	Available
3 pm	Mrs. Palmy Pamidronate (1)	Mr. Lucky Phlebotomy (1)	Mr. Spencer Dressing change (1)		Mrs. Drake Irinotecan, 5-FU, and leucovorin (2)	Mrs. Walker New patient (1)

(Continued on next page)

Figure 1. Sample Nurses' Schedule

5-FU—fluorouracil; ABVD—doxorubicin, bleomycin, vinblastine, and dacarbazine; CHOP—cyclophosphamide, doxorubicin, vincristine, and prednisone; DC pump—discontinuation of ambulatory pump; FEC—fluorouracil, epirubicin, and cyclophosphamide; flush—flushing of central line; IVIG—IV immune globulin; MIME—mesna, ifosfamide, mitoxantrone, and etoposide

Note. The schedule lists the patient name, regimen or chemotherapy drug to be administered, and acuity level. Each acuity level has 30-minute increments (1 = 30 minutes, 2 = 60 minutes, and 3 = 90 minutes). The numbers in parentheses are acuity levels. "Available" represents a time slot that is available for another appointment.

Time	Gene (7:30 am–6 pm)	Norma (7:30 am–6 pm)	Patty, Float RN (7:30 am–6 pm)	Lisa (7:30 am–6 pm)	Vickie (8:30 am–5 pm)	Sally (7:30 am–6 pm)
3:30 pm	Mrs. Paul Flush (1)	Mrs. Love Vinorelbine (2)	Mr. Snooze Hydration (1)	Mr. Willy DC pump (1)	Mrs. Drake continued	Available
4 pm	Mr. Peter Zoledronic acid (1)		Available	Mrs. Smart Trastuzumab next (1)	Available	Mrs. Patsy Flush (1)
4:30 pm	Available	Available	Available	Mrs. Wilson Paclitaxel low dose (1)	Available	Available

Figure 1. Sample Nurses' Schedule *(Continued)*

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- The number of patients treated by the same size staff has increased by 10%.
- Treatment visits are spread throughout the day according to acuity level.
- All of the nurses get a lunch break.
- The number of patients arriving late (more than 20 minutes) for appointments has decreased from 25% to 9%.
- Positive feedback from the nurses indicates that they have increased job satisfaction and are able to complete their assignments and leave on time.
- Patient satisfaction surveys indicate that the patients notice the improved efficiency and experience more personal care from the staff.
- The overall impact of a more manageable pace is felt throughout the office.

Lessons Learned

We learned that a positive attitude and strong leadership were essential in keeping the changes moving in the right direction. Each challenge was met with a solution because of the vision of success and a focus on solutions, not on problems. Including the nursing staff in the development of the acuity levels inspired their commitment to its implementation and success. The philosophical and financial support from the physicians and administration was essential to the success of the project.

Table 1. Sample Treatments With Determining Elements

Treatment Description	Determining Elements	Nursing Care Time	Treatment/ Chair Time	Acuity Level
Gemcitabine	Single agent Low risk for side effects No special monitoring required Infused in less than 60 minutes	30 minutes	2 hours	1
Rituximab, first dose	Potential for hypersensitivity reactions Requires more than routine vital signs and observation Requires titration every 30 minutes	60 minutes	8 hours	2
5-fluorouracil, epirubicin, and cyclophosphamide	Multidrug regimen Vesicant administration protocol in multiple syringes	90 minutes	2 hours	3
New patient visit	Initial assessment Patient education Patient and significant other support	30 minutes	30 minutes	1
Rituximab and CHOP (cyclophosphamide, doxorubicin, vincristine, and prednisone)	Multidrug regimen Vesicant administration protocol in multiple syringes Potential for hypersensitivity reactions Requires more than routine vital signs and observation Requires titration every 30 minutes	90 minutes	8 hours	3

Implications for Oncology Nurses

Establishing an acuity system and scheduling guidelines for outpatient chemotherapy can have a tremendous impact on the delivery of patient care in the outpatient setting. With reimbursement challenges and the nursing shortage, healthcare providers must define the parameters for the number and types of patients to be cared for safely by any one nurse while still meeting the demands and expectations of patients and physicians. This also demonstrates the development of a more collaborative relationship with physicians and nurses as a result of the implementation of this project.

Author Contact: Gerri Chabot, RN, MA, OCN®, can be reached at chabotg@toweroncology.com, with copy to editor at rose_mary@earthlink.net.

References

Gruber, M., Kane, K., Flack, L., Abbotoy, J., Recchio, J., Williamson, K., et al. (2003). A "perfect day" work redesign in a chemotherapy and infusion center. *Oncology Nursing Forum, 30,* 567–568.

Halpern, I.M. (2004, November). ONS closely monitors the Medicare Modernization Act. *ONS News, 19*(7), 11.

Kouzes, J., & Posner, B. (1999). *Leadership challenge planner.* San Francisco: Jossey-Bass Pfeiffer.

Malloch, K., & Conovaloff, A. (1999). Patient classification systems, part 1: The third generation. *Journal of Nursing Administration, 29*(7–8), 49–56.