Chemotherapy involves an intricate, high-risk, multidisciplinary process of prescribing, dispensing, and administering complex multimedication regimens with narrow therapeutic indices. Chemotherapeutic agents also require safe-handling precautions for patients and healthcare providers. In addition, a number of chemotherapy and targeted therapies have expanded to nononcology populations. This complexity demands standardization of chemotherapy practice for all healthcare providers to ensure safe outcomes. This article describes one organization’s multidisciplinary effort to standardize chemotherapy practice according to the American Society of Clinical Oncology and Oncology Nursing Society’s 31 safety standards for chemotherapy administration. The article also describes how the organization integrated and developed standards of practice using interdisciplinary approaches. The educational processes used during implementation and the lessons learned are discussed to assist healthcare providers involved in standardizing chemotherapy administration. The article equips healthcare professionals with a multidisciplinary process for high-quality clinical standards of practice that may reduce errors and ensure safety.

Anna N. Vioral, MSN, MEd, RN, OCN®, is an oncology quality and education specialist at West Penn Allegheny Health System and Heather K. Kennihan, BSN, RN, OCN®, is a clinical coordinator of oncology service at Allegheny General Hospital, part of the West Penn Allegheny Health System, both in Pittsburgh, PA. The authors take full responsibility for the content of the article. The authors did not receive honoraria for this work. The content of this article has been reviewed by independent peer reviewers to ensure that it is balanced, objective, and free from commercial bias. No financial relationships relevant to the content of this article have been disclosed by the authors, planners, independent peer reviewers, or editorial staff. Vioral can be reached at rvav@consolidated.net, with copy to editor at CJONEditor@ons.org. (First submission April 2012. Revision submitted July 2012. Accepted for publication July 3, 2012.)

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chemotherapy regimens across the treatment trajectory (Jacobson et al., 2009). These two organizations collaborated with other professional associations, such as the American Society of Health System Pharmacists, the American Cancer Society, the Joint Commission, and ISMP to develop guidelines for improved quality and safety of chemotherapy administration in a variety of settings (Jacobson et al., 2009). The final version included 31 standards encompassing seven domains: (a) review of clinical information and selection of treatment regimen, (b) treatment planning and informed consent, (c) ordering of treatment, (d) drug preparation, (e) assessment of treatment compliance, (f) administration and monitoring, and (g) assessment of response and toxicity monitoring (Jacobson et al., 2009). Both ASCO and ONS recommended adherence to these standards as a goal for all providers involved in the administration of chemotherapy (i.e., physicians, physician assistants, advanced practice nurses, RNs, and pharmacists). The current article has four goals: (a) to describe how one organization standardized and integrated the national chemotherapy safety standards using interdisciplinary approaches, (b) to present the developed standards of practice, (c) to discuss the educational processes used during implementation, and (d) to provide lessons learned along with recommendations for healthcare providers involved in standardizing chemotherapy administration processes.

Interdisciplinary Approaches

The literature raised significant concerns about the knowledge and skills of healthcare providers administering chemotherapy (Batty, White, & Miller, 2011; Carrington, Stone, Koczwara, & Searle, 2010; Jacobson et al., 2009; Sheridan-Leos, 2007). If policies do not address safe administration of chemotherapy, and if staff are not provided the knowledge and skills to safely administer and handle these agents, the quality of patient outcomes may be impacted. Therefore, in September 2009, the oncology quality coordinator (OQC) of a large urban healthcare system consisting of five hospitals and 15 outpatient oncology offices established a multidisciplinary interfacility chemotherapy task force council (CTFC) in response to the ASCO and ONS proposed standards for the administration of chemotherapy. The OQC was the leader and facilitator of the project. The participants included pharmacy staff, inpatient and outpatient oncology nursing staff, oncology management and educators, nursing administrators, and physicians from each of the oncology practices within the system. Additional disciplines including human resources, employee health, materials management, and employee safety were recruited to address selected standards.

Assessing the Current State

In September 2009, the OQC initiated a call for oncology experts from across the system to participate on the CTFC. During the first four months, the CTFC established the purpose of the council; developed consensus to standardize practice; gathered policies, procedures, and forms from each facility; reviewed errors related to chemotherapy administration within the system; and identified core concepts for subgroup formation. The CTFC initially had face-to-face meetings. To maximize efficiency, the team agreed to conduct monthly two-hour conference calls. Multidisciplinary system subgroups were established to address the following core concepts: staffing and training (competency); chemotherapy consents; and ordering and prescribing, mixing and dispensing, administration, extravasation, hypersensitivity reactions, monitoring patients, and safe handling. Team leaders of the subgroups were selected based on their areas of expertise to establish new standards of practice (SOPs) and presented their progress at the monthly CTFC conference calls.

Challenges revealed during the first four months included resistance to change; inconsistent processes; reluctance to acknowledge errors; and differing silos related to prescribing, mixing, dispensing, and administering chemotherapeutic agents. Examples of inconsistencies among the various practices included different versions or no preprinted chemotherapy orders, versions of nursing chemotherapy documentation, extravasation protocols, levels of knowledge regarding safe handling, and patient education resources. This level of disparity in process and knowledge underscored the importance of standardizing all aspects of the chemotherapy administration processes across the various practices to improve patient and staff safety.

Planning Stages

During the first six months of 2010, the OQC created a document with the 31 ASCO and ONS standards and a section for the proposed universal language for each standard. The subgroups required expertise from other disciplines, including the legal department to address pregnancy and consents; human resources to develop competency language, staff education guidelines, and oncology-specific job descriptions; and employee health to develop medical surveillance questionnaires. Vibrant discussions occurred on each CTFC call in an attempt to reach a consensus on universal language for each of the standards. Each subgroup presented its finalized language to the CTFC. After the CTFC reached consensus, the OQC added the language to the universal language section of the master document. The OQC maintained the universal file with changes to monitor and advance progress in developing new system standards.

After reviewing the ASCO Quality Oncology Practice Initiatives outcomes and the 31 standards during the second half of 2010, additional gaps were identified. The CTFC recognized that oral chemotherapy was not consented or documented, patient treatment summaries were not being comprehensively dictated, and National Cancer Institute toxicity grading often was not recorded. To address the gaps, the CTFC developed 11 new forms, revised four previous forms, and developed four new references related to chemotherapy administration. Figure 1 provides the list of new and revised forms along with staff references developed by the CTFC. These new references were formatted using laminated pocket cards and online PDF files for the staff.

Despite the accomplishments that occurred in 15 months, the CTFC lost momentum and members expressed concerns that the project would not come to fruition. The CTFC members verbalized that as one hurdle was overcome, another surfaced. For example, they overlooked standardizing mixing and administering specialty routes of chemotherapeutic agents. However, selected members’ enthusiasm and persistence inspired the CTFC to refocus on the goals to improve safety and outcomes.
## New Forms

- Chemotherapy simulation laboratory administration competencies
- Chemotherapy unit-specific administration competencies
- Chemotherapy specialty administration competencies
- Chemotherapy mixing competencies and examination
- Outpatient daily assessment sheet
- Discharge instructions
- Inpatient and outpatient chemotherapy flow sheets
- Oral chemotherapy flow sheets
- Patient treatment summary
- Patient teaching education sheets for home
- Hypersensitivity protocol and orders

## Revised Forms

- Chemotherapy consents
- Patient education flow sheets
- Hazardous signage
- Extravasation orders and documentation forms

## Reference Sheets

- Drug calculation formulas
- National Cancer Institute grading reference cards
- Chemotherapy and targeted therapy medications to be ordered on chemotherapy orders
- Safe handling and hazardous resources

## FIGURE 1. Standardized Forms and Reference Sheets for Chemotherapy and Targeted Therapy

During the first six months of 2011, the OQC developed 16 new SOPs for chemotherapy and targeted therapy as universal language from the working policy grid. Figure 2 provides the titles of the 16 standards.

Throughout the remainder of 2011, the SOPs and new forms required approval through various hospital committees. Because of the system dynamics, each facility had to have its medical records department, pharmaceutical committee, and medical executive committee’s approval. Although changes to the forms were made to meet regulations of each facility, the CTFC simultaneously established an education, implementation, and evaluation plan.

### Educational Processes

In May of 2011, the CTFC discussed the potential options to effectively and efficiently deliver consistent standardized education to employees. The CTFC believed that delivering consistent education of the new SOPs was imperative to changing practice. To ensure that employees received the same message on the new standards, the CTFC recommended that all employees receive a one-time mandatory educational overview of these changes. The Simulation, Teaching, and Academic Research (STAR) Center offered an option to assist in the development of simulated vignettes. The CTFC believed that using simulation with visual and auditory scenarios would provide improved retention and learning outcomes compared to traditional educational strategies (e.g., self-learning packets, Microsoft® PowerPoint® presentations). The format would accommodate staff flexibility, use multimedia, and provide education in multiple learning domains.

After consensus was reached, the 16 new SOPs were transformed into 10 educational vignettes. Figure 3 provides the title of the vignettes and the numbers assigned to each. One expert from the CTFC and from the STAR Center were assigned to lead the simulation initiative. The leaders organized the simulation production using multidisciplinary staff from across the organization. Each vignette provided a high-level overview of the changes in practice, simulated scenarios that demonstrated the new standards, initiated audible discussions, and provided computer access. Summary slides were incorporated at the end of each vignette to recap the major changes and display pictures of the new forms.

A three-step editing process was performed and included content, process, and education experts from the STAR Center and CTFC. Reliability and validity were carefully assessed during a two-week period. The simulation process of planning, filming, and editing took about 80 hours during a four-month time frame. Administrative commitment was imperative during this process to ensure successful completion. Various standards applied to other system employees based on their job descriptions. For example, the Occupational and Safety Health Administration along with the U.S. Department of Health require that all employees receive education on the management of hazardous spills. Two vignettes were developed to address these safe-handling standards for both clinical and nonclinical settings. The CTFC also standardized systemwide gowns, gloves, hazardous signage, spill kits, and contact information for continuity across the system.

As planning progressed, a communication plan was created by the CTFC in collaboration with the system communication department. Weekly flyers for 16 weeks and mass e-mails informed the staff of the upcoming mandatory chemotherapy and safe-handling programs. In addition, two weeks prior to implementation, the OQC attended as many staff meetings and education sessions as possible to inform participants of the upcoming programs.

### Implementation

The OQC worked with the system communication department to convert the completed vignettes to YouTube videos. The OQC also worked with the information technology (IT) department to create a course in the learning management system (LMS) offered by the health system. The development of the Chemotherapy and Targeted Therapy Standards of Practice
Course took about 48 hours in a two-week time frame. Each of the 10 simulations included a vignette, follow-up assessment, program evaluation, and an automated verification of completion. The programs had to be completed sequentially and RNs received 4.5 continuing education (CE) credits from a state-approved organization. The CE credits could be applied to professional licensure requirements. The physicians were eligible for 2 continuing medical education credits. Criteria was not met for pharmacists to receive CE credits.

The systemwide education took place during the first three months of 2012. The course was available on computers throughout each facility. A concern arose with sound availability; therefore, headphones or speakers were suggested for designated computers. Staff was provided work time to complete the vignettes as mandatory education. The estimated time required to complete the vignettes varied from 20 minutes to 4.5 hours based on job descriptions. A chemotherapy administration error vignette was opened to chemotherapy-competent RNs for two weeks prior to systemwide education as a smaller trial for outcome data collection. Systemwide education then was opened for six weeks for all staff to complete their assigned required vignettes. Finally, the chemotherapy RNs had two weeks to complete a post-assessment vignette to measure their knowledge after the education. On completion of the education, the new forms were distributed systemwide and the CTFC anticipated an additional three months for complete transition to occur. The CTFC continued to meet monthly to log issues and lessons learned from the project.

Lessons Learned

Many challenges arose throughout the development and implementation processes of the 31 standards. Members of the CTFC presented barriers to completing the assigned tasks, did not prioritize the undertakings, and often did not agree. The simulation filming was disorganized at times, primarily related to inadequate preparation prior to filming. Although the e-learning simulated vignettes were more efficient than online PowerPoint and self-learning packets, and provided cost savings to the system, the biggest challenge to the project involved technology. The vignettes were originally uploaded as YouTube videos. During a two-week trial, the videos often froze while staff was viewing, causing frustration. Eventually, the IT department resolved the problem and identified that the YouTube videos were not compatible with the LMS. The IT department converted the YouTube videos to a Windows® media video file for the remainder of the education.

However, staff remained frustrated because of the inconvenience.

In addition, the staff was not provided the tools to effectively complete the education. A breakdown in communication during planning resulted in many of the computers lacking audio capability. Audio was imperative for this education, so the clinical sites scrambled to obtain headphones and speakers. Therefore, staff evaluated this as unsatisfactory. Further compounding the technological barriers, the LMS was a change in learning style for the employees. Unfortunately, the health system did not train staff on this LMS prior to the mandatory education requirements, and the CTFC did not address this during planning. The CTFC and OQC underestimated the amount of resources and support required by the IT department once the course was initiated. The CTFC calculated more than 500 hours of technology intervention during implementation. The CTFC made the following recommendations.

- Involve more clinical staff in the planning stages to operationalize the SOPs.
- Increase staff discussions and education more than the four months before implementation.
- Include both the system communication and IT departments at the inception of the project.
- Ensure sufficient preparation and practice by the vignette subgroups prior to videotaping.
- Secure a leader from the IT department to validate the technology functionality and compatibility across the system.
- Train all staff on the LMS before the deployment of any new program.

FIGURE 2. Standards of Practice for Chemotherapy and Targeted Therapy

FIGURE 3. Education Vignettes
Implementing a project of this scale required enormous resources and support at each facility. Keeping the council focused, on task, and driven required a strong persistent leader continuously reviewing the patient and staff safety goals. Gain- ing commitment from all disciplines as well as administration was vital to successful implementation.

Since implementation, ASCO and ONS have reconvened to revise the standards. Jacobson et al. (2011) stressed the importance and challenges involved in multidisciplinary collaboration when implementing these standards. Based on the new revisions, the CTFC plans to continue to meet monthly, perform random observations for compliance, and finalize standardization of preprinted chemotherapy orders. The CTFC also plans to review the SOPs every six months, conduct a retrospective chemotherapy error review, and begin addressing phase two of the standards in nononcology settings.

Conclusion

A project of this magnitude requires multidisciplinary commitment, dedication, resources, and a strong leader with effective project management skills. During a three-year period, the CTFC condensed 31 standards, 40 forms, and 30 policies and procedures into 16 SOPs, 11 new forms, 4 revised forms, and 4 new reference sheets, and disseminated these changes across five hospitals and 15 outpatient facilities. Although this article provides one organization’s experience of standardizing national chemotherapy safety guidelines, the description contributes significant processes and lessons to equip healthcare providers implementing the multidisciplinary standards. The authors of this article anticipate that these experiences may apply in other settings.

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