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Patient needs and resource intensity weighting in the ambulatory care unit

By Andrea Knox, John Larmet

ABSTRACT

Across British Columbia Cancer (BC Cancer), oncology nurses work as part of an interdisciplinary team in the outpatient ambulatory care unit (ACU) and support patients across the trajectory of their cancer journey. Previous initiatives, which focused on identifying patient needs and nursing role optimization work, have enhanced role clarity, enabling nurses to articulate their scope of practice and specialty competencies required to best meet the needs of patients and families. However, while the patient needs and fundamental practice elements have been identified to optimize the ACU nursing role, a gap still exists in quantifying the staffing resources required to operationalize the current model of care. To address this gap, a quality improvement project was initiated to develop an internally validated ACU Nursing Resource Intensity Weighting (RIW) tool for projecting baseline staffing requirements. The tool can be utilized to inform strategic and operational planning discussions focused on improving the outpatient model of care in oncology.

BACKGROUND

Across British Columbia Cancer (BC Cancer) specialized oncology nurses work as part of an interdisciplinary team in the outpatient Ambulatory Care Unit (ACU) and support patients across the trajectory of their cancer journey. In 2018, a Care Team Design Initiative (CTDI) was piloted at BC Cancer to identify the priority care needs of the oncology outpatient population and at the BC Children and Women's Hospital for the acute or inpatient setting. The results identified that patient needs in the ambulatory care environment are predictable and stable (BC Children's & Women's Hospital et al., 2018; MacPhee et al., 2020). Subsequent to the CTDI, in 2019, the specific role and functional tasks of nurses working

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in the ACU were mapped to the specialty competencies for the oncology nurse at BC Cancer in an effort to optimize the role of the nurse in the ACU (Knox A., 2020). These efforts to identify patient needs (BC Children's & Women's Hospital et al., 2018; MacPhee et al., 2020) and optimize the ACU nursing role (Knox, 2020) have enhanced role clarity and enabled nurses to articulate both the scope of practice and the specialty competencies required to best meet the needs of cancer patients and their families in the ambulatory care context.

While the patient care needs and fundamental practice elements have been identified within BC Cancer to optimize the ACU nursing role, a gap still exists in quantifying the staffing resources required to operationalize the optimized role within the current ACU model of care. Previous work was completed by BC Cancer to develop a resource guideline specific to the systemic therapy treatment context using the methodology employed by Cancer Care Ontario (CCO) in 2012 (Green et al., 2012). The CCO initiative brought together a panel of oncology experts to review the literature and found there were few resources to support an objective, methodological analysis of human resource needs specific to the oncology context (Green et al., 2012). The CCO methodology, which was adopted by BC Cancer, included engagement of oncology experts to identify baseline nursing workload items and determine standardized time allocations for each task, nurse intensity, and regimen variations in systemic therapy treatment (Green et al., 2012). The development of both the CCO and BC Cancer systemic treatment tools have supported managers and nurses to objectively describe nursing resource needs and establish a synchronous funding model that incorporates both cancer nursing care and systemic treatment modalities (Green et al., 2012). The resulting BC Cancer Resource Intensity Weighting (RIW) tool has since been utilized by managers to inform funding requests and nursing resource allocation in BC Cancer systemic therapy treatment units across the province. This previous work set the stage for expanding the methodology into other clinical areas, such as the outpatient ACU, where a standardized approach to determining nursing resource allocation was absent.

GOALS AND OBJECTIVES

The goal of this quality improvement project was to develop a Resource Intensity Weighting (RIW) tool to project baseline nurse staffing in the ACU. The intention was to develop a document that identified the time requirements for ACU nursing activities in accordance with case intensity and the Canadian Association of Nurses in Oncology (CANO/ACIO) Practice Standards and Competencies for the Specialized Oncology Nurse (2006), similar to the CCO tool (Green et al., 2012), and built on the results of the earlier CTDI and role optimization

work in the ACU. The final BC Cancer ACU RIW tool will inform ongoing data-based resource projection modeling for nursing full-time equivalent (FTE) requirements in the ACU. While this project was focused on the ACU at BC Cancer - Kelowna, it is anticipated that internal stakeholders at both the provincial and regional level would be able to extrapolate the results of this project for their own use in strategic and operational planning focused on improving health service delivery model for oncology patients.

PROJECT CONTEXT

The ACU at BC Cancer - Kelowna was identified as the clinical context for the project, with engagement of a core group of internal stakeholders and support from site leadership. The BC Cancer - Kelowna ACU is staffed by an inter-professional team that provides care for patients attending clinic for new patient consults, active treatment assessments and post-treatment follow-up appointments. Additionally, the ACU clinic is logistically demarcated into radiation and systemic therapy programs. Previous selection of the same clinical context for both the CTDI and role-optimization projects made selection of the ACU appropriate from the perspective of project continuity, and front-line staff engagement.

PROJECT PLANNING

At the onset of the project, factors were proactively identified to support the facilitation of this project at the regional level. Project sponsorship and support within the centre were identified as critical for facilitating access to the ACU clinic and staff. Likewise, support was identified for this work at the provincial level through ongoing conversations related to models of care and operational resources. Provincial support was important to counterpoise any negative impact due to competing organizational priorities. Nurses and other members of the interdisciplinary team working in the ACU also expressed a strong desire to objectively articulate the nursing resources required to best meets patient needs. This expressed desire was viewed as a key factor for facilitating staff engagement in project activities such as the determination of time allotments for clinical tasks. The availability of results from the CTDI pilot (BC Children's & Women's Hospital et al., 2018; MacPhee et al., 2020) and role-competency maps from the role optimization project (Knox, 2020) were also noted to be positive pre-existing factors to facilitate this initiative.

Barriers to completion of the proposed project were also identified at the onset of the project. Key ones included access to front-line staff and competing organizational priorities. With regards to staff accessibility, workload and staffing challenges in the clinic were identified as the primary barriers that could have a negative impact on project outcomes. The primary mitigation strategy employed to overcome this barrier was engagement with the clinical manager to support front-line staff participation in planned focus groups, as well as the utilization of technology platforms to collect feedback. Competing organizational priorities with concurrent timelines, such as ongoing work towards a new electronic health record, also presented as discernible barriers. To avoid

potential overlap that could result in project delays, regular site level project meetings were established with a continuous review of timelines and proposed activities. This afforded the opportunity to remain flexible and adjust the activities and timelines of the project as required to remain on target.

METHODS

ACU nurses were identified as the key stakeholders for inclusion in the project work. Current staffing in the ACU includes a mix of 26 permanent and casual Licensed Practical Nurses (LPNs) and Registered Nurses (RNs) that rotate through the clinic to provide patient care. To gather perspectives from the broader group, multiple engagement strategies were utilized. Focus group exercises and an electronic survey were the primary data collection methods to support tool development, refinement and validation.

The project started with a focus group to identify the workload categories and functional nursing role elements to be included in the ACU RIW tool. The first focus group was attended by six nurses representing a mix of nursing disciplines and employment status. Participants were asked to review the workload categories on the existing systemic therapy treatment RIW tool in relation to the tasks identified on the ACU role-competency map (Knox, 2020) and determine if there were any thematic gaps. The workload categories included prep time, bring in and turn around, assessment, education, intervention, documentation, and infection control practice (see Figure 2 for descriptions). Consensus was reached by the participants that the pre-existing workload categories on the systemic treatment tool would encompass the range of tasks associated with the role of the nurse in the ACU clinic. The focus group participants were then asked to organize each of the nursing tasks presented on the ACU role-competency map (Knox, 2020) into the agreed-upon RIW categories. This organization resulted in the creation of the initial draft of the new ACU RIW tool (Figure 2).

After generating the initial draft of the new ACU RIW tool, a survey was developed using the institutional survey platform and distributed to all 26 nursing staff members. The purpose of the survey was to gather data on the time required to complete each of the RIW categories in the ACU. Organizational policies and procedures regarding the use of electronic surveys for data collection were followed to ensure compliance with the Freedom of Information Protection of Privacy legislation in British Columbia (BC Government, 2019).

The survey was organized into three appointment type categories: (1) by new patient, (2) follow-up and (3) active treatment, to gather more information on the potential impact of the patient care trajectory on nursing time required. As patients receiving active treatment are only seen in the Systemic Therapy-ACU (ST-ACU) clinic, survey questions for this appointment type were only answered by nurses working in the ST-ACU. Nurses were instructed to assign an average length of time spent per patient for each RIW category. Data from the surveys were then collated and analyzed to inform the time required for nurses to complete each of the workload categories on the RIW tool.

ANALYSIS

A total of 14 completed and an additional seven incomplete surveys were received representing an overall response rate of 81%. However, as the survey link was generic and did not identify unique respondents, we could not confirm whether each individual accessed the survey only once. Therefore, for the purposes of analysis only complete surveys were reviewed. As a result, the final response rate was reduced to 54%. For each workload category and appointment type, staff responses regarding average times were reviewed and the median determined for each category and appointment type (Table 1). Responses were also reviewed for each category and appointment type to determine a range in times based on the majority of respondents' answers to each item (Table 1). This information was then reviewed in relation to the pre-existing RIW tool for systemic therapy and recommended timings were assigned to each category on the new ACU RIW tool. The information extrapolated from the survey data, including category details (See Figure 1), were presented to the frontline staff at a final focus group to validate the proposed ACU RIW median timings using a consensus driven approach.

After assigning validated timings for staff to each of the categories, the patient care needs data from the CTDI Pilot (BC Children's & Women's Hospital et al., 2018; MacPhee et al., 2020) were merged with the new RIW tool to build out the FTE calculator (Figure 2 lines H, I, J, K, L). In the original CTDI, BC Cancer clinicians worked with the research team to customize and adapt patient needs assessment tools to the oncology context (Figure 3) (BC Children's & Women's Hospital et al., 2018; MacPhee et al., 2020). The oncology adaptation of the tool guided nurses in the identification and scoring of care needs as low (1-2), moderate (3) or high (4-5) across

Table 1

RIW Nurse Time Survey Results

Category	Appointment Type	Median Time (minutes)	Time Range** (minutes)	Recommended RIW Time
Prep Time	New Patient	20	5-15	15 minutes
	Follow-up	12.6	2-15	
	Active Treatment*	17.3	5-10	
Bring in and Turnaround	New Patient	15	5-10	5 minutes
	Follow-up	11.6	2-10	
	Active Treatment*	13	5-12	
Assessment	New Patient	25	10-25	20 minutes
	Follow-up	14	5-15	
	Active Treatment*	12.5	5-15	
Education	New Patient	13.5	5-15	15 minutes
	Follow-up	12.6	3-15	
	Active Treatment*	12.6	3-15	
Intervention	New Patient	20	10-30	20 minutes
	Follow-up	17.2	5-20	
	Active Treatment*	23	3-30	
Documentation	New Patient	13	5-15	15 minutes
	Follow-up	18	5-15	
	Active Treatment*	15	5-15	
Infection Control Practices (ICP)	New Patient	12	5-15	5 minutes
	Follow-up	10.8	4-18	
	Active Treatment*	22	3-5	

*Active treatment responses collected from nurses working only in the systemic therapy ACU
** Determined from timings entered by majority (70%) of respondents

Figure 1

Example of an Extrapolated Data Slide
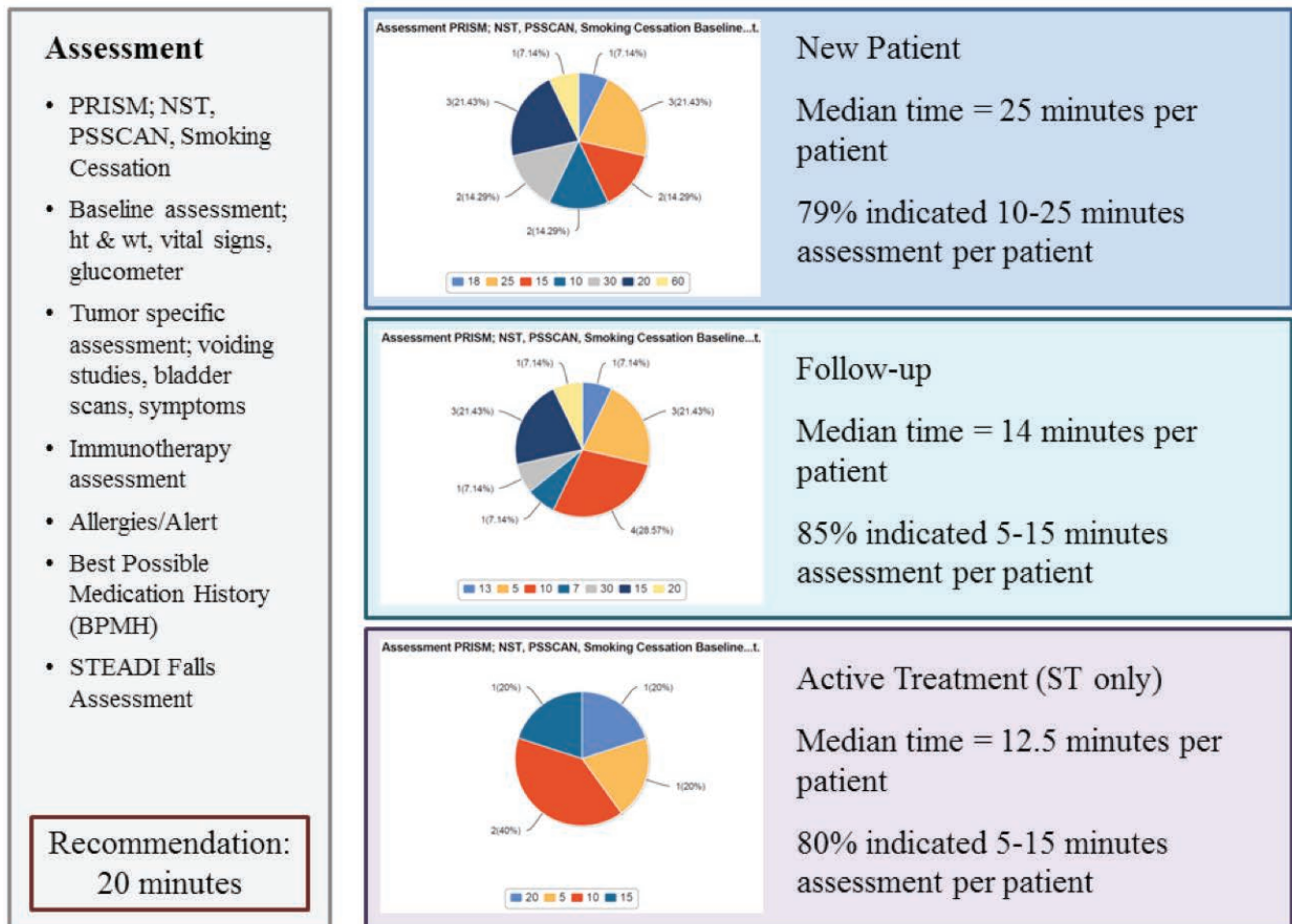
seven patient characteristic categories after completion of a nursing assessment in clinic (Figure 3). Results of the CTDI pilot showed that 85% of the new patient group and 90% of the follow-up group could be classified as low care needs, with the remainder in both groups classified as having moderate care needs; no patients were identified as high care needs in the ACU context during the pilot (BC Children's & Women's Hospital et al., 2018; MacPhee et al., 2020).

The approach to incorporate patient needs into the RIW tool was based on the assumption that low needs patients would require less nursing time per interaction than those with moderate or high needs. To align with this assumption, patient needs adjustments of 85% for low needs and 15% for moderate needs were applied to the total fixed time (Figure 2, line H) for the new patient and follow-up appointment types (Figure 2, line I). The use of the CTDI data as a calculation variable represented a purposeful deviation from the original CCO methodology which did not include timing adjustments based on patient needs.

After refining the time allotments based on the CTDI data (BC Children's & Women's Hospital et al., 2018; MacPhee

et al., 2020), the decision was made to further refine the low needs patient times up by 50% to account for the additional resource draw on nurses when engaging in multiple tasks with multiple patients. The decision to apply a multi-task adjuster was in line with the original CCO methodology where a 33% multi-task adjuster was employed to account for the impact of nursing resource allocation (Green et al., 2012). In our project, the foundational CCO 33% multitask adjustor (Green et al., 2012) was increased by an additional 17% to account for the estimated drop in clinical productivity expected with the imminent implementation of a new Electronic Health Record (EHR) (Cheriff et al., 2010; CST Project, 2020). The inclusion of an adjusting variable to account for EHR implementation (i.e., change from a paper-based care environment in the ACU context) was an organizational requirement to support more accurate advance human resource planning. No additional adjustments were made to the timing for moderate needs patients given the smaller volume of patients in this category combined with the discovery that the proposed multitask adjuster value of 50% would push the result above the original total fixed time (Figure 2, line H).

Figure 2

Ambulatory Care Unit RIW Tool

	Workload Item	Description and Methodology for Regimen Workload (to be reviewed every annually??)	
A	Prep Time = *15 minutes*	• Review of orders, blood work, tests, allergies, clinic assessment, chart • Review last treatment • NP review – history, med rec, consultation • Coordinate translation services • Room allocation and clinic flow coordination • Videolink set-up/coordination	• Identify/gather necessary equipment • Arrange/coordinate patient transportation • Support/coordinate for cancellation, no show or wrong day appointments • Equipment & forms; weekly QA checks, restocking, scope reprocessing, ordering
B	Bring in and Turnaround = *5 minutes*	• Paging / calling patient to room • Cleaning chair-equipment • Accompanying patient to designated room	• Patient verification/identification • Patient comfort items • Disposal of all equipment
C	Assessment = *20 minutes*	• PRISM; NST, PSSCAN, Smoking Cessation • Baseline assessment; ht & wt, vital signs, glucometer • Tumor specific assessment; voiding studies, bladder scans, symptoms (NCI toxicity)	• Immunotherapy assessment • Allergies/Alert • Best Possible Medication History (BPMH) • STEADI Falls Assessment
D	Education = *15 minutes*	• New patient package • Medications/protocols • Supportive care; nutrition, pfc, other • Patient Symptom Diary • (Additional time for interpreter = *15mins*)	• Side effect prevention & management; dilator use, anti-emetics, other • Complementary and Alternative therapies • Treatment planning (RT); IV contrast • Restarting Treatment (ST); new protocol
E	Intervention = *20 minutes*	• Advanced Care Planning • Serious Illness Conversations • MAiD • Referrals; Community, Hereditary Cancer Program, QuitNow • Palliative Care Referrals • Care Planning	• Coordinate direct admit to hospital/ER • Patient related calls; report, external clinic coordination, checklists, 24 hr transfer • Medication administration • Wound care, ADLs • Specimens and samples
F	Documentation = *15 minutes* *(paper or electronic)*	• PRISM • DARP • Symptom presentation/toxicities • Nursing interventions	• Telephone calls with MD/allied health • Response to treatment • Patient education • Immunotherapy assessment

G	Infection Control Practices = *5 minutes*	• Isolation	• Cleaning room bed/chair
H	Total fixed time	Rows: -A+B+C+D+E+F+G = *95 minutes*	
I	Multitask adjuster Total Fixed time X % of patient needs per visit type	**New Patient** (Rows: A+B+C+D+E+F+G) = 95 min X 85% = *14.25 Minutes* = 95 min X 15% = *80.75 minutes*	**Follow Up** (Rows: A+B+C+E+F+G) = 95 min X 90 % = *9.5 minutes* = 95 min X 10% = *85.5 minutes*
J	Multitask adjuster x 50% increase in time	**New Patient** Low Needs = *14.25 min x 50%= 21.40 Minutes* Moderate Needs = *No Adjustment*	**Follow Up** Low Needs = *9.5 min x 50% = 14.25 minutes* Moderate Needs = *No Adjustment*
K	Multitask adjuster x ACU Volume (NP & FU) = Total Nursing Time (in minutes)	**Total New Patient (NP) Appointments:** _____ **Low Needs** Total NP x 85%=_____ x 21.40 min= {____} min/60 min = {____} hrs {_____} hrs / 1950 (1.0 equivalent annual hrs) = {____} **FTE** **Moderate Needs** Total NP x 15%=_____ x 80.75 min= {____} min/60 = {____} hrs {_____} hrs / 1950 (1.0 equivalent annual hrs) = {____} **FTE**	**Total Follow-up (FU) Appointments:** _____ **Low Needs** Total NP x 90%=_____ x 14.25 min= {____} min/60 min = {____} hrs {_____} hrs / 1950 (1.0 equivalent annual hrs) = {____} **FTE** **Moderate Needs** Total NP x 15%=_____ x 85.5 min= {____} min/60 = {____} hrs {_____} hrs / 1950 (1.0 equivalent annual hrs) = {____} **FTE**
L	Total FTE	New Patient FTE + Follow-up FTE = _____	

PROJECT OUTCOMES

Once refinement of the timing calculations was completed, the tool was utilized to project current nursing FTE needs for the BC Cancer – Kelowna ACU. The resulting FTE projection generated by the new tool was 0.25 higher than the current FTE count in the ACU clinic. This difference can be accounted for by the inclusion of the 17% multitask adjuster for EHR productivity mitigation; additional staffing will be required to support the implementation of the new EHR into the clinical space (Cheriff et al., 2010; CST Project, 2020).

Results of the validation testing were shared with all permanent front-line ACU nurses in a series of staff meetings and clinical huddles to elicit any further feedback and to comment on the overall accuracy of the tool prior to endorsing the tool for site-level use. The feedback from the nursing staff indicated that the final tool successfully incorporated both the patient needs and nurses' perception of clinical time to provide care. They indicated that, because the current workload matched the current FTE allocation in the clinic, the close match in projected FTE provided validation of the new RIW tool for the ACU context. As a result, the ACU RIW Tool (Figure 2) has been formally adopted for use in calculating nursing staff FTE requirements at BC Cancer – Kelowna.

Figure 3

Example of categorization of patient needs using CTDI-adapted synergy tool

BC Cancer Kelowna- **NEW PATIENT Data Collection Tool [Project ID #_____]***record project number on clinic schedule & database

	1-2 (High Needs)	3 (Moderate Needs)	4-5 (Low Needs)
Stability	☐ Coming from hospital or care home ☐ Labile vital signs ☐ Uncontrolled pain ☐ Considering a transfer to ED ☐ Emotionally labile such as increasing anxiety, agitation, aggression, suicide risk. ☐ Critical lab levels ☐ Anorexia NCI grade 3/ 4 ☐ Fatigue NCI grade 3	☐ Decreased mobility/falls risk ☐ Dyspnea-breathing issues ☐ Cancer pain-controlled ☐ Poly-pharma (traditional or complementary) ☐ Worsening labs (e.g., increased Ca, decreased O2) ☐ Hx or presentation with anxiety and/or depression ☐ Anorexia NCI grade 2 ☐ Fatigue NCI grade 2 ☐ ECOG 2	☐ Asymptomatic ☐ No pain ☐ No dyspnea ☐ No signs of other common symptoms (i.e. fatigue, nausea, anorexia, depression/anxiety) ☐ Appears to be coping ☐ Normal vital signs ☐ ECOG 0-1
Complexity	☐ Multiple co-morbidities ☐ Memory impairment/ memory loss ☐ Major sensory impairment such as aphasia ☐ Active substance use ☐ Unmanaged psychiatric/mental health disorder ☐ Immunosuppressed ☐ Presenting with signs/symptoms of oncological emergency ☐ Differing expectations re tx plan ☐ Limited or no support system (e.g., isolated, abusive relationship)	☐ 1-2 underlying co-morbidities ☐ Mild memory impairment ☐ Psychiatric diagnosis ☐ Unaccompanied by family/friend ☐ Presents with a wound or bleeding ☐ Unclear expectations re tx plan ☐ Complex family dynamics (discord, estrangement)	☐ No co-morbidities ☐ No memory impairment ☐ Clear expectations re tx plan ☐ Supportive relationships within family, friends, community

LIMITATIONS

Limitations noted for this project include the project scope, the ACU context and resulting generalizability of the ACU RIW tool outside of BC Cancer. With respect to the overall project scope, each of the six BC Cancer regional centres operates an ACU clinic, albeit with different models of care and nursing resources. As the results of this project are reflective of the nursing tasks and intensity specific to the Kelowna context, it is acknowledged that the tool requires validation at the remaining BC Cancer regional centres prior to assuming internal generalizability. The ACU context has also been identified as a limitation in this project, as several of the workload items identified exist to nursing roles outside of the ACU clinic at BC Cancer - Kelowna. This clinical role cross-over was also noted in the ACU role optimization project that preceded this work and resulted in a recommendation to expand the methodology to other clinical areas (Knox, 2020). Similarly, the development of RIW tools to support staff resource projection in other clinical areas has been identified as an area of focus for future phases of RIW work.

IMPLICATIONS FOR NURSING ADMINISTRATION

Based on the close alignment with current FTE resourcing in the ACU and the use of foundational role competencies and patient needs in the ACU to inform tool development, it is recommended that the new ACU RIW tool be used to inform operational and strategic planning that requires objective projections of ACU nursing staff requirements moving forward.

It is also suggested that the ACU RIW tool undergo validation in the ACU clinics at the remaining BC Cancer regional centres to support widespread adoption of a standardized staff projection tool. Utilizing the approach employed in this project to develop RIW tools for the remaining BC Cancer - Kelowna nursing clinics is also recommended for operational consistency. Stakeholders at both the provincial and regional level can utilize the results of this project in strategic and operational planning discussions that are focused on improving health services for patients.

CONCLUSION

Quantifying the staffing resources required to operationalize the current model of care in outpatient oncology continues to be a gap for many healthcare organizations. The ACU RIW tool presented here serves to fill this gap and has already been adopted for use at one BC Cancer site. Recognizing its potential to inform strategic and operational planning discussions focused on improving the outpatient model of care in oncology, further work is planned to validate the ACU RIW tool for use in other nursing clinics across BC Cancer. Scaling and translation of this methodology to other health disciplines is also recommended to support advancing the model of care in oncology both from a resourcing and skill mix perspective. By employing this novel approach of quantifying and aligning patient needs with optimized oncology nursing roles to inform resource allocation, healthcare leaders can work towards resourcing outpatient models of care that better support the needs of cancer patients.

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