

# Reducing Standard Work to Increase Nursing Care Time in a Clinic Setting

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## Introduction

The Radiation Oncology Clinic of the University of North Carolina Hospitals faces major changes as it moves to a new facility, increases physician staffing and adjusts to new leadership and cares for patients with cancer in a clinic rather than hospital setting. Like other oncology clinics in the United States, the shift in treatment to the outpatient setting has created a new paradigm in caring for patients with cancer<sup>1</sup>. The uneven, often frenzied pace of work in the clinic brought requests from the nurses for more help. Because nursing tasks require on average only two minutes, time spent on interruptions, reworks, or systems failures can easily be incorporated into patient care<sup>2</sup>. Clinic administrative staff saw opportunities for improving clinic efficiency using Toyota Production System (TPS) approach<sup>3-7</sup>. The purpose of the nursing project was: 1) to determine whether more nursing staff were needed, 2) to eliminate waste, thus decreasing time per standard work cycle.

## Methods

- 1) Followed patients, therapists, nurses and physicians, observing processes.
- 2) Mapped the value stream.
- 3) Documented nursing standard work (as well as interruptions to that work).
- 4) Timed the patient flow and nursing processes.
- 5) Collected data on number of nurses, minutes nurses work per day, the number and types of patients per day and the minutes spent from check-in to discharge.
- 6) Carried out intervention: took control of queuing process.
- 7) Compared patient clinic minutes and the nursing care minutes before and during the intervention.
- 8) Calculated weighted average cycle times for patients and nurses to determine staffing needs (Table 2)

## Results

A standard work cycle for each type patient was identified and quantified (see Table 1). Nurse staffing changed from 1.29 to .9 nurses per 50 patients after the pilot project (see Table 2 & 3).

## Discussion

The project demonstrated how TPS management concepts could be used in nursing and to improve a cancer clinic's efficiency. The pilot documented standard work and reduced the work cycle time for nurses. It clarified the nursing work and identified interruptions and irregularities of work flow that could be addressed with future pilots (see Table 4). By dedicating an administrative position to the queuing computer, the project decreased nursing minutes of work

per patient without reducing value added time. The associated change in full-time equivalent units (FTEs) from nurse to clerk could reduce cost to the clinic without reducing nursing value added time with the patient.

1. Tucker, A.L. “The Impact of Operational Failures on Hospital Nurses and their Patients”, *Journal of Operations Management*, vol. 22; pp. 151–169, 2004.
2. Williamson, T. S. “The Shift of Oncology Inpatient Care to Outpatient Care: The Challenge of Retaining Expert Oncology Nurses”, *Clinical Journal of Oncology Nursing*, 12(2), 186-189, 2008.
3. Mazur, L.M. and Chen, S.-J. “Understanding and Reducing Waste Due to Medication Errors via Systems Mapping and Analysis”, *Health Care Management Science*, vol. 11; pp. 55-65, 2008.
4. Mazur, L.M. and Chen, S.-J. “An Empirical Study for Medication Delivery Improvement Based on Healthcare Professionals’ Perceptions of Medication Delivery System,” *Health Care Management Science*, vol. 12; pp. 56-66, 2009.
5. Sobek, D.K., and Jimmerson, C. “A3 Reports: Tool for Process Improvement, Paper Presented in the Industrial Engineering Research Conference, Houston, Texas, 2004.
6. Spear, S.J. “Fixing Healthcare from the Inside, Today,” *Harvard Business Review*, vol. 83, no. 9; pp. 78-91, 2005.
7. Spear, S.J., and Bowen, H.K. “Decoding the DNA of the Toyota Production System,” *Harvard Business Review*, vol. 77, no. 5; pp. 97-106, 1999.

Table 1  
Nursing Standard Work for Clinic Patients

Work before Pilot:	Time			Work after pilot	Time		
	Status Check	New	FU		Status Check	New	FU
Look at computer		1	1				
Identify physician		1	1				
Find an open room		1	1				
Talk with other nurses about assigning room		1	1				
Walk to front desk		1	1				
Pick up yellow record		1	1				
Walk back to computer		1	1				
Print off patient picture and information		2	0	Get information sheet, room from coordinator	1	1	1
Walk to waiting room	1	1	1	Walk to waiting room	-	1	1
Call patient's name	-	-	-	Call patient's name	1	-	-
Walk to scale and weigh patient	1	3	3	Walk to scale and weigh patient	1	3	3
Walk to room	1	1	1	Walk to room	-	1	1
Find vital sign machine	-	-	-	Find vital sign machine	1	-	-
Take Vital Signs	1	1	1	Take Vital Signs		1	1
Type in computer		1	1	Type in computer		1	1
Take history		2	0	Take history		2	0
Enter history in computer		1	0	Enter history in computer		1	0
Reconcile medications on computer		1	0	Reconcile medications on computer	1	1	0
Page the physician with room number	1	1	1	Page the physician with room number		1	1
Give teaching packet		1		Give teaching packet		1	0
More Experienced nurses talk/teach		5	0	More Experienced nurses talk/teach	1	5	0
Walk out of room	1	1	1	Walk out of room	1	1	1
<b>TOTAL</b>	<b>6</b>	<b>28</b>	<b>16</b>		<b>6</b>	<b>20</b>	<b>10</b>

Table 2 Calculations for Staffing in Clinic (HDR and Cyberknife Excluded)

	Patients	Percent Of Time	Time_1 Patient minutes ( Table 1)	Weighted Average Cycle Time_1	Time_2 Patient minutes ( Table 1)	Weighted Average Cycle Time_2
	A	B=A/50 pts	C	B*C	D	B*D
Patients: New	2	4%	28 min	1.12 min	20 min	0.8 min
Patients: Follow-up	20	40%	16 min	6.40 min	10 min	4.0 min
Patients: Status Check	28	56%	6 min	2.80 min	6 min	2.8 min
<b>Total</b>	<b>50</b>			<b>10.32</b>		<b>7.6</b>

Table 3. Staffing Recommendation

Available Nurse Time	Patients per day	Nurse WACT Time (Average/pt)	Patient WACT/ Nurse WACT	Recommended Staffing T_1	Patient WACT/ Nurse WACT	Recommended Staffing T_2
420 min./day	50	8.4 min	10.32/8.4	1.29 nurses	7.6/8.4	.9 nurse

Table 4. Irregularities and disruptions outside standard work

Phone calls other than patient needs
Patients get sick in radiation treatment area
Patient in another room needs pain medication
People ask for other staff
Lab requests need paperwork, clerk not available
MD filled out improper paperwork: nurse troubleshoots
Discuss other nurse's patient room assignments
MD work expectations not clear, nurse called back to room
Patients out in hall (waiting) stop nurse for a need
Take patient to x-ray or other area (transport not available)
Wait time not filled with work
Patients converse as they leave the clinic, stop nurse.
Printing other than patient ID or education

- The clinic schedule averages 20-25 patient appointments a day plus 25-30 status checks.
- Not included in above chart are the specialty nurses in HDR and Cyberknife. These patients require continual monitoring for conscious sedation, when patients are not in the clinic, the nurse coordinates the patient scheduling of treatments. (2 nurses/day per Head Nurse.)