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Impact of the clinical nurse specialist role for the myeloproliferative neoplasm program: Part One – From timeliness of triage to cost-saving

by Verna Cheung, Melanie Powis, Jaime O. Claudio, Greg Lindberg, Andrea Arruda, Cristina Emanuele, Taylor Nye, Marta B. Davidson, Aniket Bankar, Hassan Sibai, Vikas Gupta, and Dawn Maze

ABSTRACT

Myeloproliferative neoplasms (MPNs) are a group of rare clonal disorders of hematopoietic progenitor cells associated with disease-related symptoms, thrombotic events, and risk of transformation to acute myeloid leukemia (Tefferi, 2021). The relative rarity and complexity of care led to the establishment of the MPN program at the Princess Margaret (PM) Cancer Centre. The MPN program utilizes a shared-care model wherein partnering with local hematologists (shared-care partners) ensures that patients have access to an MPN specialist while continuing to receive care close to home (Cheung et al., 2021). The clinical nurse specialist (CNS) role was implemented in late 2016 to support not only the shared-care model, but also to triage new patient referrals, and support consultation and follow-up. Although the CNS roles have been part of the healthcare system since the 1940s, the role and its impact remain unclear at times to the inter-disciplinary team. This paper will describe the process and results from evaluating the CNS role's impact in the MPN program using a multimethod approach. This is part one of two papers; herein the quantitative findings are presented, and part two will discuss the qualitative findings.

AUTHOR NOTES

Verna Cheung, RN, BScN, MN, CON(C), Princess Margaret Cancer Centre; Lawrence S. Bloomberg Faculty of Nursing, University of Toronto

Melanie Powis, MSc, PhD, Princess Margaret Cancer Centre

Jaime O. Claudio, PhD, Princess Margaret Cancer Centre

Greg Lindberg, PMP, BASc, MBA, P. Eng, Princess Margaret Cancer Centre

Andrea Arruda, MSc, Princess Margaret Cancer Centre

Cristina Emanuele, RN, MN, Princess Margaret Cancer Centre

Taylor Nye, RN, MN, CON(C), CHPCN(C), Princess Margaret Cancer Centre

Marta B. Davidson, PhD, MD, FRCPC, Princess Margaret Cancer Centre; University of Toronto

Aniket Bankar, MD, DM, MSc, Princess Margaret Cancer Centre; University of Toronto

Hassan Sibai, MD, FRCPC, Princess Margaret Cancer Centre; University of Toronto

Vikas Gupta, MD, FRCP, FRCPath, Princess Margaret Cancer Centre; University of Toronto

Dawn Maze, MD, FRCPC, MSc, Princess Margaret Cancer Centre; University of Toronto

Correspondence to: Verna Cheung, Princess Margaret Cancer Centre, 700 University Avenue, 6th floor, Toronto, ON, M5G 1Z5 (verna.cheung@uhn.ca)

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INTRODUCTION

The conceptualization of the clinical nurse specialist (CNS) role began in the 1940s and appeared in nursing practice and healthcare sectors in Canada and internationally (United States and United Kingdom) in the 1960s (Canadian Nurses Association [CNA], 2012; Cheung et al., 2022). Over the years, the healthcare sector has continued to utilize this role to meet the needs of different programs and patient populations due to the uniqueness and flexibility of the CNS role. However, due to this uniqueness and flexibility, the role is often confused with other advance practice nursing roles (Cheung et al., 2022; Mitchell et al., 2017; Pollard et al., 2010). There is also a paucity of literature that holistically evaluates the impact of the CNS role.

Herein, we will discuss the methodology of this quality improvement (QI) project and the quantitative outcomes of evaluating the CNS role impact in the myeloproliferative neoplasm (MPN) program; from a program level this evaluation includes timeliness of triaging patients and a cost saving analysis. In part two, we will discuss the qualitative outcomes of the CNS role impact on the team and patient care experience.

BACKGROUND

Overview of the CNS role

The CNS role in oncology has been explored, evaluated, and discussed in various journal articles and guidance documents (CCO, 2018a, 2018b; Dempsey et al., 2016; Kerr et al., 2021; Kilpatrick, DiCenso et al., 2014; Kilpatrick, Kaasalainen et al., 2014b; Mitchell et al., 2017; Morgan & Tarbi, 2016; Pollard et al., 2010). Several publications highlight the value of the CNS role in promoting coordination and continuity of care for patients and their caregivers, and maintaining communication with the various members of the interdisciplinary team (CCO, 2018a, 2018b; Cheung et al., 2021; Cook et al., 2019; Dempsey et al., 2016). The CNS role also fosters improved patient and caregiver understanding of their diagnosis and treatment through providing health teaching and creating patient education material (Kerr et al., 2021; Mayo et al., 2017). Clinical nurse specialists also improve patient safety through effective and timely triaging of new patient referrals, and providing follow-up (Cheung et al., 2021; Cook et al., 2019; Moore & McQuestion, 2012). Collectively, the literature highlights, that CNS roles are often developed to meet specific gaps in the healthcare system and/or the needs of a specific patient population. It is the uniqueness and flexibility in the CNS role that not only allows the CNS to adapt to the needs of the patient

population and the team they work with, but also to identify and address gaps in care needs (Cheung et al., 2022; Cooper et al., 2019; Donald et al., 2010; Kilpatrick et al., 2013; Mitchell et al., 2017; Pollard et al., 2010). This flexibility also contributes to increased patient and family caregiver satisfaction (Cook et al., 2019; Moore & McQuestion, 2012). Furthermore, Jordan et al., (2017), in an economic evaluation study, compared patients who received post-radiation care from a CNS versusa physician. This study found that patient reported the symptom management and improvements were not statistically different, but receiving care from a CNS was more cost-effective compared to a physician (£895 in comparison with £1,101).

Several articles highlighted how the CNS expertly identified and addressed psychosocial concerns, reducing feelings of uncertainty for patients and caregivers through counselling, and connecting them to appropriate resources (CCO, 2018b; Cheung et al., 2022; Cook et al., 2015; Kerr et al., 2021). However, it is also this uniqueness, flexibility, and adaptability of the role that often leads to poorly defined roles and role confusion with other advanced practice nursing roles, thus creating role clarity issues (Cooper et al., 2019; Cheung et al., 2022; Donald et al., 2010; Kilpatrick et al., 2013; Parker & Hill, 2017; Pollard et al., 2010). Therefore, capturing the flexibility, adaptability, and impact of the role in using both quantitative and qualitative measures are important from the standpoint of a program and clarity of the CNS role. This article will describe the methodology for evaluating the impact of the CNS role, and provide the quantitative outcomes.

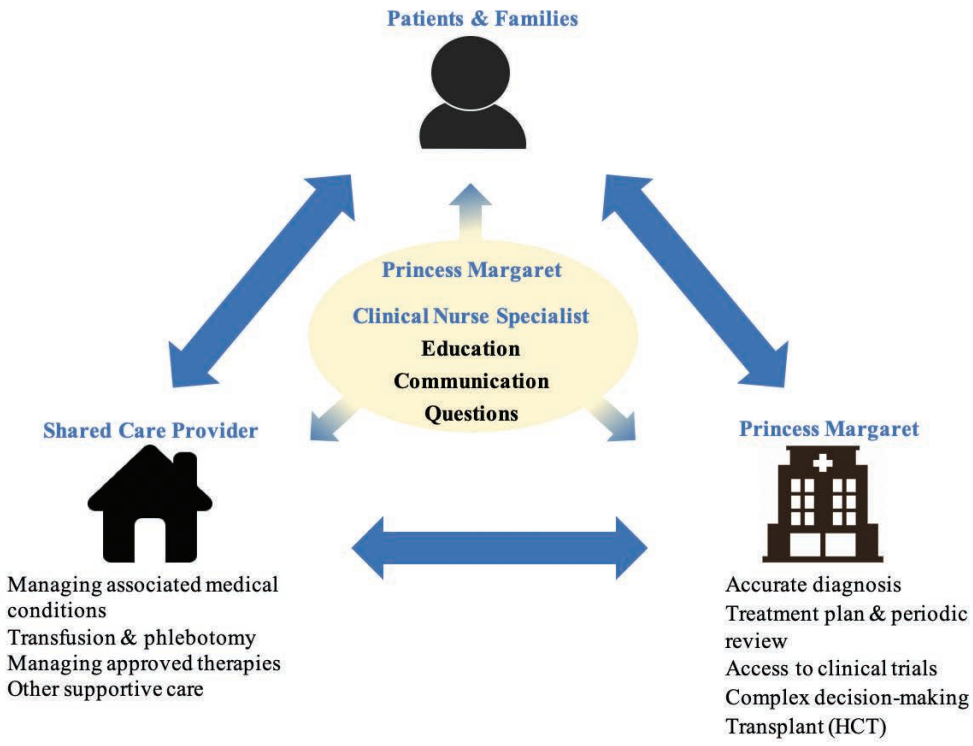
CNS role in the MPN program at Princess Margaret Cancer Centre

Myeloproliferative neoplasms are a group of rare clonal disorders of hematopoietic progenitor cells that are associated with morbidity from disease-related symptoms, thrombotic events, and risk of transformation to acute myeloid leukemia (Tefferi, 2021). Due to the rarity and complexity of MPN, not all local hospitals have the expertise or experience to care for such patients. The MPN program at Princess Margaret (PM) Cancer Centre is a national resource and referral program for MPN patients. The MPN program at PM offers enhanced diagnostic abilities to help support complex clinical cases and provides a wide range of treatment options including allogeneic bone marrow transplant, clinical trials, and supportive therapy to patients with MPN (Cheung et al., 2021).

The MPN program at PM was established in 2014 with the CNS role implementation in late 2016. The MPN program has seen more than 1,800 patients since its inception, with approximately 334 MPN patients being actively followed annually. The program sees patients from both within and out of province, and has implemented a shared-care model (Figure 1), which partners with local hematologists (shared-care partners) to provide ongoing management, and supportive care for MPN patients closer to home (Cheung et al., 2021). This model of care decreases patient travel burden, while maintaining high-quality patient-centred care. The CNS plays a role to assist and facilitate the shared-care process. The CNS is a masters' prepared nurse with advanced clinical assessment skills

Figure 1

MPN Shared-Care Model



*Surveys were returned anonymously to mitigate risk of response bias

and extensive MPN knowledge, and is involved in all aspects of patient care, working collaboratively with the MPN physician team. The role involves triaging new MPN patient referrals, engaging in initial consultations and follow-up of MPN patients in the clinic or virtually, and providing health teaching and education to patients and caregivers regarding MPN diagnosis, treatment options, supportive care, family planning, and symptom management. The CNS is also instrumental in coordinating the transition of care from the MPN program to an interdisciplinary team closer to the patient's home. Given the CNS's broad scope of practice, the CNS continues to be a resource for the patient and the external interdisciplinary team regarding MPN-related symptoms and treatments (Cheung et al., 2021).

METHODS

Quantitative component: Evaluating CNS role impact to the MPN program

In this QI project, we utilized a multimethod approach to evaluate the impact of the CNS role within the MPN program. The MPN CNS is involved in triaging and prioritizing new MPN patient referrals, and evaluating the timeliness of the triage, the number of referrals, and the appropriateness of the referral. These evaluations serve as an indirect measure of the efficiency and cost-effectiveness of the CNS role. The variables were measured through data extracted from a new patient referrals department at PM using a program called PatientTracker© (version 1.3.8; Ontario, Canada). The timeframe selected for the evaluation measurement was from January 2018 to June 2022. The end point was selected due to the introduction of a new electronic charting system that would change the workflow process. For this reason, it was decided to look at the data before the changes. Data extracted included the number of new referrals, response time from referral received to triage, number of referrals accepted, and number of referrals re-directed. These parameters were chosen as measures that reflected timeliness, efficiency, appropriate resource utilization, and cost-effectiveness (Figure 2).

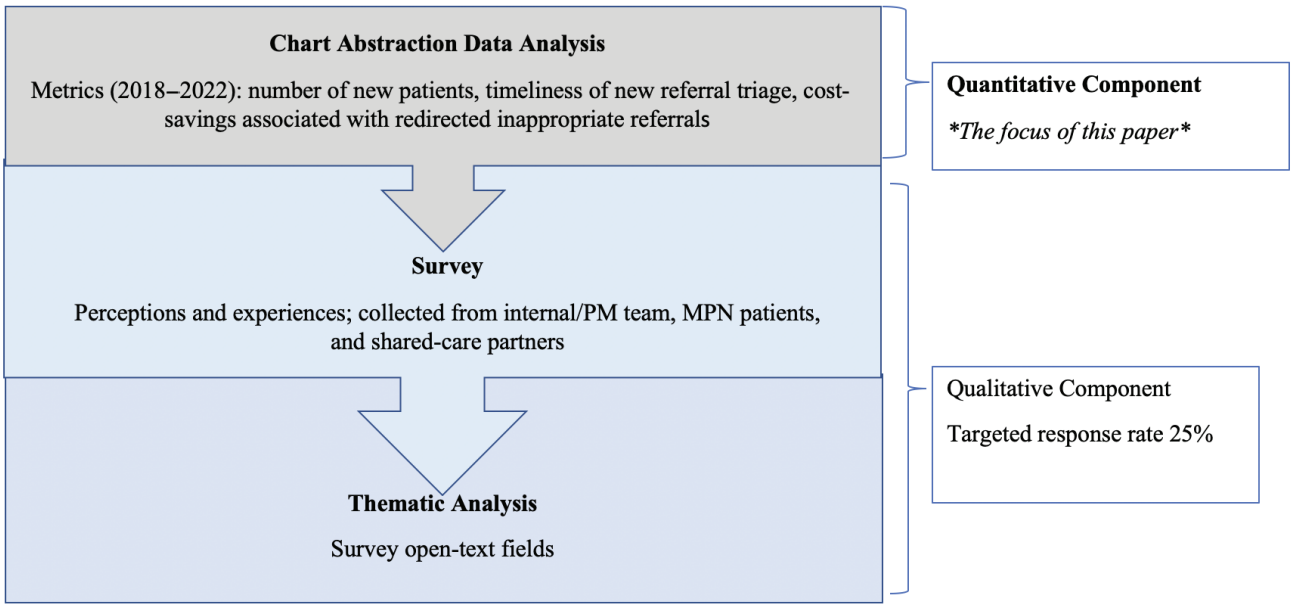
Costs for the initial visit were calculated by combining the costs related to an initial consultation fee and bloodwork. The cost of an initial consult fee was provided by the billing office at University Health Network, and bloodwork cost, which includes a processing fee, was found through multiple sources, including Ministry of Health Ontario Health Insurance Plan Laboratories and Diagnostic Branch (2023), Grey Bruce Health Service (2017), and Hale (2015). This is an approximation of total costs, as other costs, such as salaries for nursing staff, laboratory technician, administrative support staff, and patient travel costs, were not included in our calculations. Further details are provided in the discussion section and appendix.

RESULTS AND DISCUSSION

The MPN program has continued to expand over the years, the number of new patient referrals exceeded 200 in 2023. Figure 3A illustrates the number of new patient referrals on a quarterly basis between 2018 to 2022. The blue columns indicate the number of new referrals received and triaged on a quarterly basis; the grey columns indicate the number of referrals accepted into the program after triage. The orange line graph illustrates the number of days it can require for a referral to be completely triaged. A completed triage is dependent on receiving information from the referring physician and

Figure 2

Method for Evaluating CNS Role Impact to Patient Care and MPN Program



*Surveys were returned anonymously to mitigate risk of response bias

investigational studies. The average number of days for a triage to be completed is 7.23 days. The yellow line graph indicates the average number of days before the patient is seen for the initial consultation.

The MPN program categorizes urgency of new patient referrals into three categories: Level 1 – seen in 0–72 hours, Level 2 – seen in 3-14 days, and Level 3 – seen within two months (Figure 3B). Shown with the yellow line graph, the MPN program has been able to see patients within 60 days from time of referral triaged, and the median average wait time for new patients to have an initial consultation is 37.75 days. These numbers have been impacted by the pandemic, as there was a decrease in the number of referrals during the peak of the pandemic, which, in turn, decreased the wait time for initial consultation.

Figure 4 shows three-line graphs illustrating the average days by quarter, and different time points in the triage process from referral received to initial consultation appointment for new referrals. The green line graph highlights the response time from when a referral is received to being triaged by the CNS. This graph highlights that triage begins the day the referral is received. Triage is completed by the MPN CNS. The initial triage process consists of reviewing all the information that has been sent including recent bloodwork. The triage process determines if the referral is appropriate for the program, and if there are any urgency or critical

Figure 3A

Quarterly Average of New Referral Triages, Initial Consults, Triaging Time from 2018 to 2022

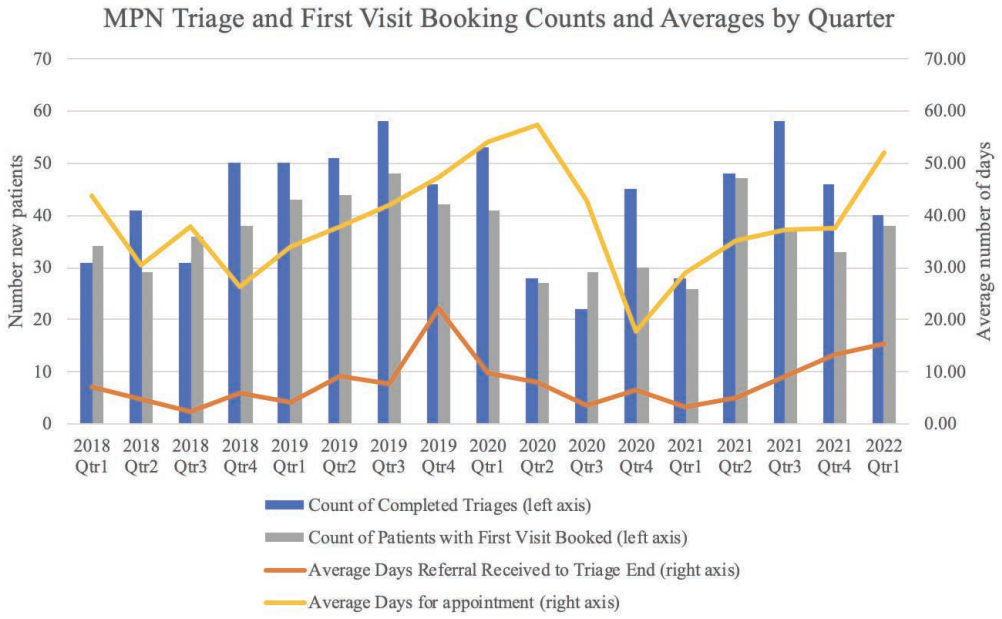


Figure 3B

MPN Triage Workflow

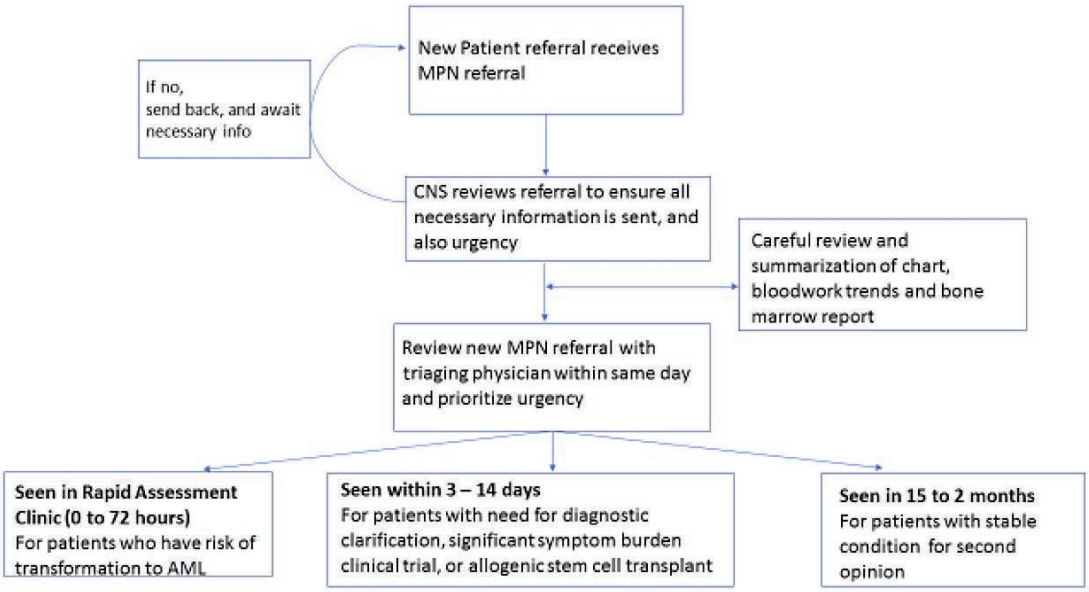
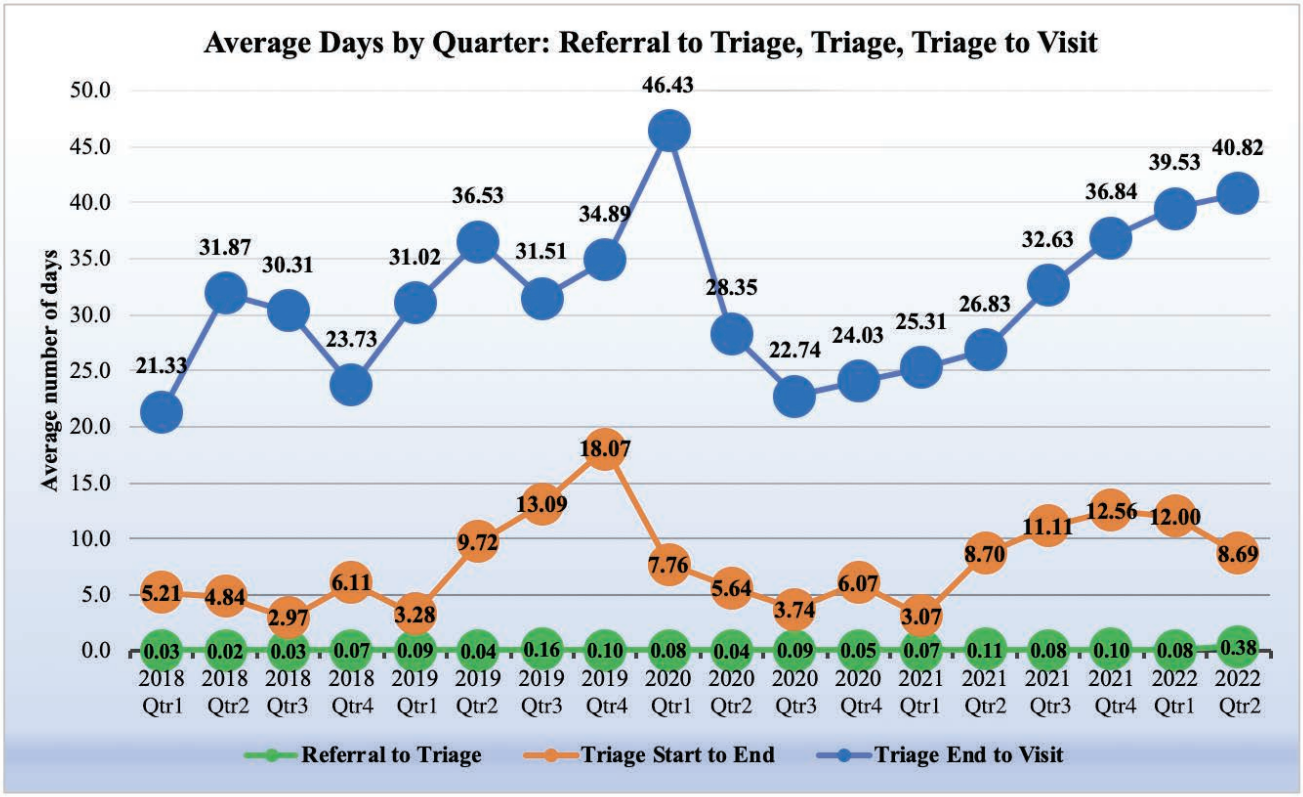


Figure 4

Triaging and Waiting Times from 2018 to 2022



concerns, such as risk of leukemic transformation. If a critical concern is identified, the referral will be prioritized and the patient will be seen within 72 hours. If blood counts are stable, the next step is to see if there is information missing and, if so, the new patient referral team is notified, so that missing information can be requested in a timely manner (Figure 3B).

Despite the fluctuation in referral numbers from 2018 to 2022, the timeframe from referral received to initial triage remains unchanged, as shown in Figure 4. This highlights the timeliness of triage performed by the MPN CNS. This timeliness of triage is important, as outlined above, to prioritize and escalate patient consultation when needed.

Proper triaging not only prioritizes referrals, but also involves identifying and redirecting referrals that are not appropriate for the program. For the MPN program, inappropriate referrals include referrals that are missing appropriate work-up (i.e., molecular testing and/or bone marrow biopsy not performed), and not having an MPN diagnosis. This process ensures that all referrals are directed to the most appropriate team, which, in turn, prevents inappropriate use of resources (Cheung et al., 2021). Figure 5A highlights this prioritization and redirecting of referrals. In figure 5B, among the referrals deemed as inappropriate, the proportion that are re-referred and seen in consultation was only 17% (N = 19), suggesting that 83% of the referrals were deemed as inappropriate for the program, were properly managed by other teams, and did not require quaternary care.

Re-directing inappropriate referrals is cost saving. A cost-saving analysis was conducted by calculating consultation fees and the cost of laboratory investigations for an initial MPN consultation, which is $2,426.15 per patient (Figure 6). This cost is absorbed by the Ministry of Health, the PM Cancer Centre, and the MPN program, but these are public dollars. Taking into account the total number of re-directed referrals that did not generate a re-referral, total estimated cost saving is $230,484.25 for the healthcare system between January 2018 to June 2022. This amount is a conservative estimate, as it does not include salary costs for staffing or other testing that may be required for specific patient situations. This also does not take into account the costs incurred by the patient and caregiver, such as transportation and time away from work.

These findings are similar to the findings highlighted in the broader literature review that explored the cost-effectiveness of the CNS role (Kilpatrick, Kaasalainen et al., 2014; Pollard et al., 2010). This QI project also highlights that there is a cost-effectiveness to the CNS role, and timeliness in access to and prioritization of care through having a CNS as part of the interdisciplinary team. The uniqueness of this QI project is that we are able to capture, in one project, parameters mentioned above.

Limitations

The findings from this QI project are specific to the CNS role in the MPN program, but the methodology in measuring

Figure 5A

Referral Outcomes 2018 to 2022

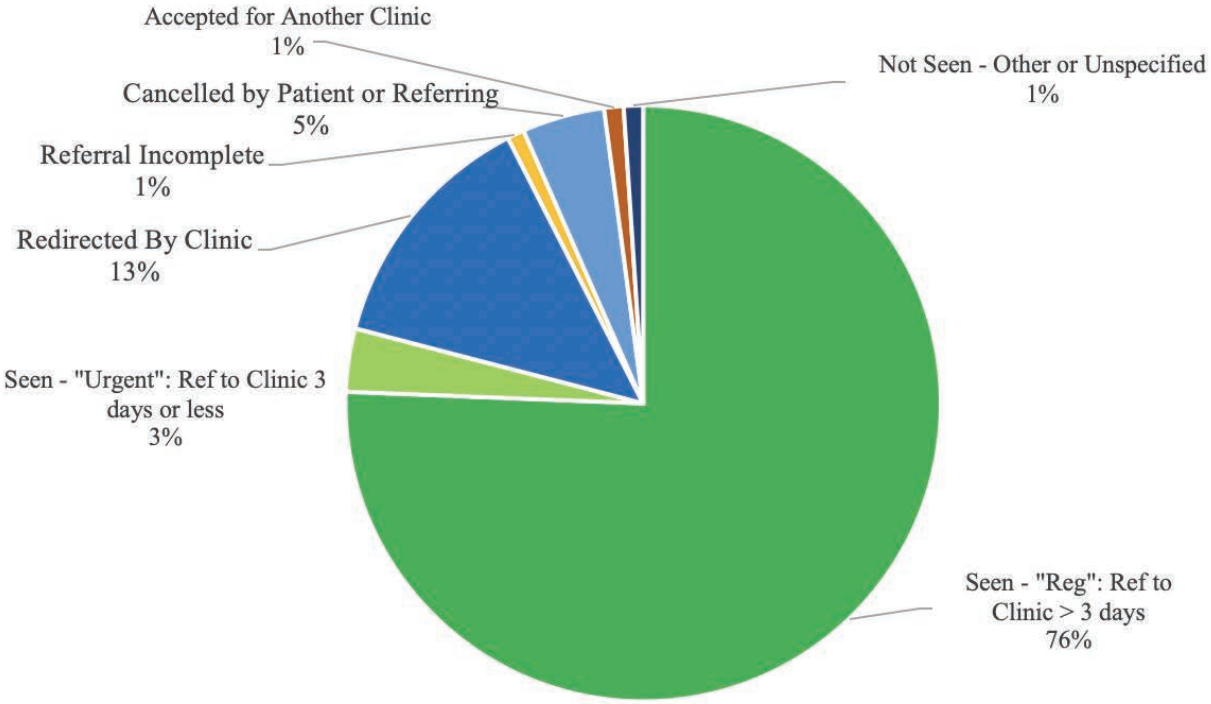


Figure 5B

Status of Referred Patients that were Initially Re-directed

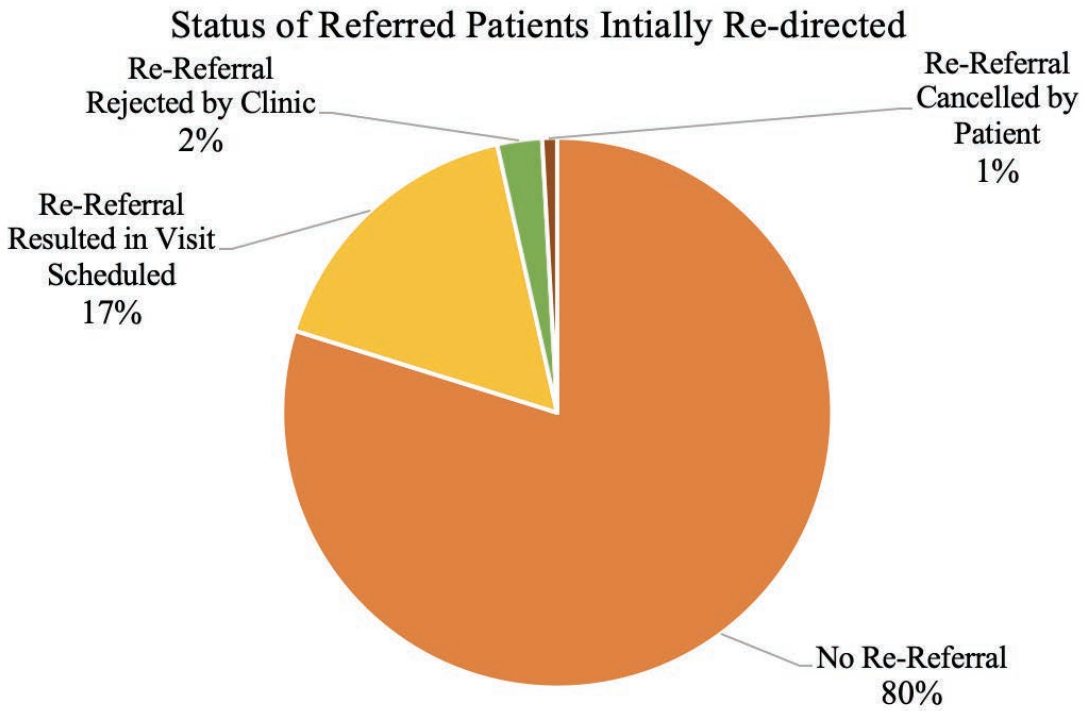


Figure 6

Cost-Saving Analysis Through Triaging

Cost related to initial consultation					
Test/Billing	**Fee**	**Test/Billing**	**Fee**	**Test/Billing**	**Fee**
Initial Consultation	$172.29	Phosphate	$1.28	Group and Screen	$8.03
Albumin	$1.55	Potassium	$1.16	Cross Match	$5.17
Bilirubin (total)	$1.28	Reticulocyte	$3.30	Next Generation Sequencing	$848.40
Bicarbonate	$1.28	Sodium	$1.16	Molecular: JAK2/CALR	$421.66
Blood film	$5.70	Urate	$1.16	Molecular: BCR ABL	$343.00
CBC with differentials	$3.98	Vit B12	$3.58	HIV	$71.49
Calcium	$1.16	Aspartate Aminotransferase (AST)	$1.16	Hep B surface antigen	$10.25
Chloride	$1.28	Alkaline Phosphatase (ALP)	$.128	Hep B surface antibody	$10.25
Creatinine	$13.44	Alanine Aminotransferase (ALT)	$1.28	Hep B Core antibody	$10.25
C-reactive protein	$3.72	Lactate Dehydrogenase (LDH)	$1.28	Hep C	$10.25
Erythropoietin (EPO)	$65*	PT/INR	$2.66	CMV IgG	$9.21
Ferritin	$2.97	APTT	$2.66	Tissue banking[1]	$3751
Magnesium	$1.28	Fibrinogen	$6.28		
				Total initial consult cost = $2426.15[2]	

Note. Estimated saving calculation
[Number of inappropriate referral[3] (Number of incomplete referrals + number re-directed referrals + re-directed to another clinic) – (number of re-referrals seen)] x [Total initial consultation cost] = estimated saving[4]
(114 – 19) x ($2226.15) = $230,484.254

[1]Tissue banking cost is an average cost that includes salary of technician and coordinator, cost of actual test and storage of specimen
[2]Average laboratory cost obtained from Grey Bruce Health Services (2017), Hale (2015) and Ministry of Health Ontario Health Insurance Plan Laboratories and Genetics Branch (2023).
• 8 averaged costs for EPO obtained from coming Grey Bruce Health Services (2017) and Non-OHIP Insured Test (2017)
[3]Number of inappropriate referrals after removal of patients with multiple referrals
[4]Note this number is a conservative number that does not include salary cost for blood lab technician + nursing + administrative assistant) and also some patients may have additional bloodwork completed as part of initial consultation based on clinical presentation

quantitative outcomes can be transferable to other programs, such as looking at triage time and time from triage to initial appointment. Similarly, the strategy of measuring cost saving through redirecting inappropriate referrals, despite being a conservative estimate, is also transferrable.

CONCLUSION

From an operational standpoint, this quantitative component of evaluating the impact of the CNS role in the MPN program highlights the timeliness of triaging referrals. Having a CNS in the program indirectly translates to prompt access to care through the proper triage and prioritization of referrals based on urgency. Proper triaging and re-directing of inappropriate referrals also ensure that patients that do need to be seen in the program have timely access, and prevents unnecessary visits to patients that can be managed locally or do not require the level of care offered by the MPN program. The triaging process, in turn, translates into the proper utilization of taxpayer's dollars within the public healthcare budget. During times of economic uncertainties, this underscores the value of the CNS role, not only to a program, but to the organization as a whole.

CONFLICT OF INTEREST

The authors have no conflicts of interest to disclose.

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