

Refractory GERD is a common reason for referral for gastroenterology consultation. Patients with refractory GERD are individuals who experience either only partial response or nonresponse of symptoms despite proton pump inhibitor therapy (El-Serag et al., 2010). It is estimated that up to 40% of patients with GERD have refractory symptoms (Hillman, Yadlapati, Thuluvath, Berendsen, & Pandolfino, 2017). Refractory GERD is associated with significant morbidity as patients with persistently bothersome GERD symptoms have demonstrated reduced physical health, mental health, and overall decreased quality of life due to factors such as increased time off work, decreased work productivity, and increased sleep disturbances (Katz, Gerson, & Vela, 2013; Richter & Rubenstein, 2018). Given the potential complications of inadequately treated GERD and the impact it has on the quality of life of those affected, accurate diagnosis and timely treatment are essential.

The current standard of care for refractory GERD referrals sent to the Esophagus Center in which the first three authors are affiliated with is for chart review to occur any time before the consultation visit, typically the day before or the day of the consultation appointment. Chart review is performed by the attending physician and the nurse practitioner (NP). Diagnostic testing is ordered at the time of the initial consultation visit. This timing can be problematic for many of the patients who travel from a distance as they subsequently must make multiple trips to the Esophagus Center for additional diagnostic testing and follow-up based on appointment availability. Furthermore, because of the volume of patients seen at the Esophagus Center, scheduling for diagnostic testing and follow-up visits may be booked out weeks to months in advance, further prolonging symptom burden and delaying care.

Rationale for nurse practitioner navigators in gastroenterology

Improving access to digestive care is imperative particularly given the projected shortage of at least 1,050 gastroenterologists by 2020 (Moses & McKibbin, 2017a). The Society of Gastroenterology Nurses and Associates (SGNA) published a position statement delineating the roles of advanced practice nurses (APNs) in gastroenterology, which include providing advanced patient assessment, interpreting diagnostic test results, optimizing outcomes through implementation of evidence-based practice, and ensuring continuity in the provision and coordination of patient care ("Role delineation of the advanced practice registered nurse in gastroenterology," 2013). The Institute of Medicine (IOM) emphasized the importance of coordination of care as one of the guiding principles in designing a health system that aims to provide safe, effective, timely, efficient, equitable, and patient-centered care (IOM, 2001). The incorporation of an

NP navigator to expedite care coordination of individuals with refractory GERD referred to the Esophagus Center aligns with both the APN roles outlined by the SGNA position statement and the IOM health care delivery goals.

Available knowledge on nurse practitioner navigators

To establish the available knowledge on NPs functioning as navigators, a systematic review of the literature was conducted in November 2017. The electronic databases searched included PubMed and the Cumulative Index to Nursing and Allied Health Literature. The key words and controlled vocabulary used were "nurse practitioner" and "gastroenterology", "nurse practitioner" and "navigator", "nurse practitioner" and "coordinator", "nurse practitioner" and "multidisciplinary team", "advanced practice nurse" and "outcome", and "nurse practitioner" and "outcome." The search initially yielded 1,620 results. Filters were applied to include only articles available in full text and in English. Filters were also applied to include only research-based studies, systematic reviews, or meta-analyses. Application of filters yielded 1,150 results. After duplicates were removed, there were 1,004 records screened. Titles and abstracts were reviewed to determine relevance. Articles were excluded from review if the role of the NP was not clearly defined. Although no studies were found specifically involving the impact of an NP navigator on access to care for patients with refractory GERD referred to a tertiary academic medical center, there were 16 full-text articles identified that discussed the roles and outcomes of NPs functioning as coordinators or navigators in various other practice settings.

Nurse practitioners have been shown to provide cost-effective care and have demonstrated equivalent levels of patient satisfaction and health-related outcomes when compared with physicians (Dorn, 2010; Hillier, 2001; Moses & McKibbin, 2017b; Newhouse et al., 2011). Utilization of an NP navigator was found to result in timelier patient care and improved patient and staff satisfaction in a systematic review of NPs in the oncology setting (Johnson, 2015). In the gastroenterology setting specifically, case management provided by an APN demonstrated a trend toward shorter length of stay for patients who underwent colonic resection at a tertiary care hospital (Micheels, Wheeler, & Hays, 1995). Dyspeptic patients randomized to follow up with a GI NP after direct access gastroscopy had significantly decreased drug costs, improved health-related quality of life, and better symptom control compared with those who were discharged to see their general practitioner for follow-up (Chan, Harris, Roderick, Brown, & Patel, 2009). An NP-led dysphagia hotline and triage service demonstrated markedly reduced time from referral to first diagnostic test and significantly decreased wait time for gastroscopy (Murray et al., 2013). Taken altogether, the referenced

literature provides objective support for the potential benefits of the proposed quality improvement (QI) pilot study.

As part of the multidisciplinary health care team, NPs in GI can take charge of certain patient care responsibilities to allow physicians the time to focus on more complex cases, manage a larger panel of patients given increasing demand for care, and perform endoscopic procedures (Dorn, 2010; Wagonfeld & Murphy, 2006). A collaborative care model between NPs and physicians is instrumental in today's health care environment given the increasing emphasis placed on reducing health care costs while optimizing patient satisfaction and favorable outcomes. Nurse practitioners are particularly well-suited to serve as care navigators given their assessment skills, diagnostic abilities, prescriptive authority, and clinical knowledge.

Specific objectives

The first and main objective of the study was to evaluate the impact of NP navigation on length of time from initial new patient consultation to diagnostic testing and follow-up with development of a management plan for patients with refractory GERD referred to a tertiary academic outpatient Esophagus Center. A second objective was to determine the amount of time required on the part of the NP navigator for preconsultation chart review and care coordination. A third objective was to measure patient satisfaction with regard to ease of navigating appointments at the Esophagus Center. Demonstrating a favorable reduction in turnaround time in the care continuum while improving patient satisfaction through implementation of the role of an NP navigator has the potential to benefit patients, providers, and organizations alike.

Methods

Context

A myriad of factors influence the timeliness of care delivery. These include appropriateness of the initial referral, scheduling with the right provider, accessibility of clinic appointments, insurance coverage restrictions, and patient preferences and availability to name a few. Numerous team members are involved with navigating a patient through every health care system. Although organizations and clinics may vary, a similarity across all is the multiple points of contact every patient must encounter to access and receive care. This study specifically seeks to evaluate the role and impact of an NP navigator on timeliness of care delivery for patients referred to an Esophagus Center for evaluation of refractory GERD.

Preimplementation

Approximately 1 month before study implementation, the NP navigator (first author) met with the Esophagus Center Clinical Director (second author) to discuss specifics of the project including selection of patients to be included,

decision-making for diagnostic testing, implementation in the clinic setting, and specific data points to be collected. The NP navigator also scheduled a meeting with key team members directly involved with the study rollout, specifically the registered nurse coordinator (RNC), patient care coordinator, and procedure schedulers. The proposed workflows, timelines, and role expectations of each of the team members were outlined and reviewed during this meeting.

This project was formally evaluated using a QI checklist and underwent institutional review board determination and was determined not to meet the definition of human participants research.

Implementation

The NP navigator conducted a preconsultation visit chart review for patients with refractory GERD referred for evaluation by the Clinical Director of a tertiary academic Esophagus Center between August and December 2018. As part of the chart review, the NP navigator created a previsit note in the electronic medical record outlining the patients' previous diagnostic work-up and previously attempted therapies. This previsit note was later used as part of the clinic consultation note. If there were any missing records or questions about patients' medical or surgical histories, the NP would delegate the team's RNC to contact the patients or their referring physician offices to obtain this additional information.

Once chart review was completed, the NP navigator ordered anticipated diagnostic testing in the electronic medical record. The NP navigator would then send a secure staff message through the electronic medical record to inform the appropriate schedulers to contact the patients and arrange the recommended diagnostic testing appointments. The schedulers offered patients the earliest available appointments and if patients elected to delay testing due to scheduling conflicts or preference, the procedure schedulers would notify the NP navigator. The schedulers were also instructed to notify the NP navigator if there were no available appointments for ordered diagnostic tests within 4 weeks of patients' consultation visit.

At the time of consultation at the Esophagus Center, new patients are seen as part of a shared clinic visit with the NP navigator and attending physician who is the Clinical Director. As part of the study and usual care, the NP obtains and verifies the patients' history based on previous record review, discusses on-going patient symptoms, performs a physical examination, reviews proposed diagnostic testing, and discusses next steps. The NP then presents the patient's case to the attending physician. The patient is subsequently re-seen by both the attending physician and NP. This practice emphasizes a team-based approach to care as patients are able to familiarize themselves and establish

relationships with the clinician members of their care team, specifically the attending physician and NP (Nandwani & Clarke, 2019). At the end of every visit, patients are provided with a typed summary outlining recommended diagnostic tests and follow-up dates.

Patients included in the study had diagnostic tests and follow-up clinic visit appointments prearranged so that at the time of the consultation visit, these patients were aware of when to return for testing and follow-up. The team's patient care coordinator was responsible for scheduling patients for a follow-up clinic visit within 2 weeks of completion of the recommended diagnostic testing, according to patient preference, or based on soonest available clinic appointment with either the NP navigator or attending physician (during instances when follow-up appointment within 2 weeks of testing completion was unavailable). Patients in the study who indicated they would be unable to return for follow-up because of distance from the Esophagus Center or for other reasons were either called or sent a message through the secure health portal discussing testing results and next steps by either the attending physician, NP navigator, or RNC under direction of the providers.

Diagnostic testing commonly utilized for the evaluation of GERD at the Esophagus Center include upper endoscopy and ambulatory reflux monitoring. Two types of ambulatory reflux monitoring devices were used for patients included in the study. These consisted of either 24-hr ambulatory pH monitoring (typically done after performing high resolution esophageal manometry to evaluate esophageal motility and identify esophageal landmarks) or wireless pH monitoring (placed during upper endoscopy). Patients unable to tolerate bedside placement of esophageal manometry and 24-hr ambulatory pH catheters underwent endoscopic placement of these catheters. The decision of which diagnostic test to use and whether to perform reflux monitoring "on" or "off" acid suppressive therapy was based on guidelines outlined in the Lyon Consensus and clinician judgment (Gyawali et al., 2018). Patients with complaints of dysphagia scheduled to undergo upper endoscopy also concurrently underwent impedance planimetry utilizing the functional lumen imaging probe (FLIP) technology, which is commercially available as EndoFLIP (Croson, Inc., Galway, Ireland) (Ahuja & Clarke, 2017). Additional testing, such as gastric emptying study, breath testing, and radiologic imaging, was ordered or recommended based on the individual patient's constellation of symptoms. Colonoscopy was ordered to be performed with upper endoscopy (when indicated) based on age-appropriate colon cancer screening guidelines.

Measures

The first objective was assessed by measuring two time-based outcomes. The first time-based outcome of

interest tracked was time (in days) from consultation to completion of diagnostic testing. The second time-based outcome of interest tracked was time (in days) from consultation to establishment of a management plan either during a follow-up clinic visit or through phone call or health portal message for patients unable to return to the clinic. Time-based outcomes were tracked through review of both historic controls' and QI patients' electronic medical records. If testing or follow-up was delayed in the QI pilot project group, the reason for delay was noted. If multiple diagnostic tests were recommended, the time recorded was the date of completion of the final recommended diagnostic test. Time from consultation to completion of testing and establishment of plan was compared with that of historic controls. Historic controls were patients with refractory GERD seen in consultation 5 months before implementation of the project. Data were collected through chart review of patients' electronic medical records.

The second objective was assessed by having the NP navigator document time spent (in minutes) for pre-consultation chart review and patient care coordination. Time spent was indicated in the previsit note prepared by the NP navigator. Because this role did not exist before this QI study, there was no historical data to collect and compare.

The third objective was assessed by requesting that patients complete a brief 10 question patient satisfaction survey. All patients included in the study were handed the survey at their initial consultation clinic visit. The patients were informed that this survey was part of a study and patients were given the option to decline completing the survey. The patient satisfaction survey was collected at the end of the consultation visit. The survey was also provided to historic control patients who were seen for subsequent follow-up visits during the study implementation period. The patient satisfaction survey was adapted from the Visit-Specific Satisfaction Instrument (VSQ-9), which is published online and is available for use without charge (RAND, 2019). Some questions were added and/or modified for purposes of the study. Questions 1 (wait time to get an appointment), 3 (getting through to the office by phone or health portal messaging), 5 (explanation of what was done for you), 6 (technical skills of the provider/health care professional you saw), 7 (the personal manner of the care team), and 10 (the visit overall) were adapted from the VSQ-9. Questions 2 (wait time from consultation appointment to recommended diagnostic testing), 4 (ease of scheduling appointments), 8 (wait time for follow-up visit to discuss treatment plan), 9 (how would you rate the quality of care you received) were added by the primary author for the purpose of assessing the time-based objectives outlined for this study and patient's perception of the quality overall care received.

Table 1. Patient characteristics

Variable	Historic Control Patients (n = 30)	QI Pilot Project Patients (n = 30)	p-Value
Age (years), mean (SD)	53 (13.8)	50 (19.9)	.540 ^a
Gender, n (%)			
Male	8 (26.7)	15 (50)	.110
Female	22 (73.3)	15 (50)	
Race, n (%)			
Non-Hispanic non-Latino	23 (76.7)	25 (83.3)	.747
Hispanic Latino	5 (16.7)	3 (10.0)	
Unknown	2 (6.7)	2 (6.7)	

Note: QI = quality improvement.

^ap-Value for unequal variances assumed is reported due to deviations from homogeneity

Analysis

A between-subjects pre-post design with two independent groups was utilized for the QI project. An independent samples *t*-test was conducted for age, Fisher exact Test was applied to evaluate for any potential differences in gender between the groups, and a Pearson chi-square test was used to analyze race. Patients who did not require or elected to defer diagnostic testing and/or preferred optimization of medical therapy only were not included in data analysis for the two primary time outcomes of consultation to testing completion and consultation to establishment of management plan. Data for the two time-based outcomes were assessed for normality using Shapiro–Wilk tests and the outcomes were not normally distributed; therefore, the Mann–Whitney *U* Test was applied. As such, median time outcomes were compared between patients who underwent NP navigation through the QI pilot project versus historic controls. The mean amount of time spent by the NP navigator for chart review and care coordination for patients included in the QI pilot project was reported. The median response to each survey question item was reported for both QI pilot project patients and historic controls.

Results

There were 30 patients in each of the two groups (historic controls vs. QI pilot project group). Patient characteristics are summarized in **Table 1**. There were no statistically significant differences between groups with regard to age, gender, or race. Two patients in the historic control group and four patients in the QI pilot project group either preferred optimization of medical therapy and/or elected to defer or did not require diagnostic testing. These patients were excluded during analysis of the two primary

time-based outcomes of interest (consultation to testing completion and consultation to establishment of plan).

The data demonstrated a significant decrease in the median number of days from consultation to testing completion (**Table 2**) and days from consultation to establishment of a plan (**Table 3**) in the QI pilot project group as compared with historic controls. The mean amount of time spent by the NP navigator for chart review and care coordination before the consultation clinic visit for patients included in the QI pilot project (*n* = 30) was 17.5 minutes.

It is worth noting that of the 26 patients in the project group who were scheduled to undergo diagnostic testing, nine underwent delayed testing because of personal preferences/schedule conflicts despite earlier testing appointments offered. One of these patients underwent delayed testing due to insurance coverage restrictions. Of the 30 patients included in the project, 10 had delayed follow-up clinic visits or establishment of management plan. Seven patients preferred to defer their follow-up appointments despite earlier clinic availability, 1 patient was unable to be reached through phone or health portal messaging despite several attempts, 1 patient was a no-show during their scheduled follow-up appointment, and 1 patient had some of the recommended diagnostic testing done at an outside facility with delayed communication of these results.

A patient satisfaction survey was also collected. All patients (*n* = 30) included in the QI pilot project completed the survey during their initial consultation visit. Historic control patients who were seen for subsequent follow-up visits during the QI pilot project implementation period were also given the patient satisfaction survey to complete (*n* = 5). Scores ranged from 1 to 5, with 1 indicating a poor level of satisfaction and 5 indicating an

Table 2. Days from consultation to diagnostic testing completion

	Historic Control Patients (n = 28)	QI Pilot Project Patients (n = 26)
Mean	76.6	38.3
Median	64.5 ^a	33.5 ^a
SD	54.4	28.6
Minimum	10	2
Maximum	210	96

Note: QI = quality improvement.

^ap = .005 utilizing Mann–Whitney U test

Table 3. Days from consultation to establishment of plan

	Historic Control Patients (n = 28)	QI Pilot Project Patients (n = 26)
Mean	107.6	60.2
Median	97 ^a	52 ^a
SD	61.6	33.6
Minimum	29	2
Maximum	241	126

Note: QI = quality improvement.

^ap = .005 utilizing Mann–Whitney U test

excellent level of satisfaction. Survey results are displayed in **Table 4**. Median scores for getting through to the office by phone or health portal messaging and ease of scheduling appointments were higher for historic controls as compared with those patients in the QI pilot project. The median score for the survey question addressing wait time to follow-up visit to discuss treatment plan was higher in the study group as compared with historic controls. The study group and historic group and historic control group otherwise had equivalent median scores for the remainder of the survey questions.

Discussion

This QI pilot project demonstrated that patients who underwent NP navigation had significantly fewer days from consultation to completion of diagnostic testing and establishment of a management plan. This finding is of particular significance because unresolved GERD symptoms negatively affect patients' quality of life and can be associated with serious sequelae (El-Serag et al., 2010; Katz et al., 2013; Richter & Rubenstein, 2018). Prompter diagnostic testing and establishment of a management plan are therefore particularly crucial given the significant morbidity and potential complications associated

with refractory GERD. Furthermore, identifying alternative diagnoses for refractory symptoms is equally important so patients receive the necessary and appropriate treatment. These findings highlight care navigation as one of the many important roles NPs contribute toward facilitating and optimizing patient care delivery. To the authors' knowledge and based on prior systematic review of the available literature, this is the first publication specifically evaluating and demonstrating the benefit of the role of an NP navigator in a tertiary academic Esophagus Center. Findings of this project also further supplement and validate the findings of the previously referenced oncology and gastroenterology literature supporting the role of NP navigation in timelier care (Chan et al., 2009; Johnson, 2015; Micheels et al., 1995; Murray et al., 2013).

This project was simple, in that it only required a change in the NP's workflow, specifically, restructuring when the NP spent time for chart review. The project required the NP navigator to review patient records shortly after patients were scheduled for a consultation visit instead of the day before or the day of the consultation visit (usual care). Reviewing patient records in advance allowed the NP navigator to identify any

Table 4. Median responses to patient satisfaction survey questions

Question	Historic Control Group Response (n = 5)	QI Pilot Project Group Response (n = 30)
1. Wait time to get an appointment	4	4
2. Wait time from consultation appointment to recommended diagnostic testing	4	4
3. Getting through to the office by phone or health portal messaging	5	4
4. Ease of scheduling appointments	5	4
5. Explanation of what was done for you	5	5
6. Technical skills (thoroughness, carefulness, competence) of the provider/health care professional you saw	5	5
7. The personal manner (courtesy, respect, sensitivity, friendliness) of the care team	5	5
8. Wait time to follow-up visit to discuss treatment plan	3	5
9. How would you rate the quality of care you received	5	5
10. The visit(s) overall	5	5

Note: 1 = poor, 2 = fair, 3 = good, 4 = very good 5 = excellent. QI = quality improvement.

potential missing data and request for these for review before the patient's consultation visit. This also allowed the NP navigator to formulate a plan ahead of time based on earlier review of available information. Similarly, instituting the role of an APN navigator in a Veterans Affairs Health Care System facilitated process changes that improved timelier care delivery for patients with lung cancer resulting in reduced turnaround time from suspicion of cancer to treatment from a mean of 117 days in 2003 to a mean of 52.4 days in 2010 (Hunnibell et al., 2012). In the gastroenterology setting, establishing an NP-led dysphagia telephone consult and triage service reduced the mean time from referral to investigation from 33 to 13 days and the maximum time for endoscopic evaluation from 18 months in 2004 to 6 weeks in 2009 (Murray et al., 2013).

One concern about implementing a model like this is whether there would be an additional time burden and subsequent personnel cost associated with time spent for NP navigation. A detailed cost analysis was not within the scope of this QI project. The authors note, however, that time spent by the NP navigator on chart review is the same as for routine care as this is a necessary function for providing patient care. The only difference is that the NP

navigator performed chart review several weeks before the patient consultation visit for this QI pilot project. Although chart review did not require additional time, the NP navigator spent additional time for care coordination. Care coordination consisted of ordering anticipated diagnostic tests, communicating with the RNC or patient care coordinator to request additional patient records when necessary, and delegating to procedure schedulers when tests were ordered. Ordering and scheduling diagnostic testing after earlier chart review eliminated the lag time from when a patient was referred to clinic and when they were actually seen in consultation. This facilitated sooner completion of diagnostic testing and formulation of a management plan as illustrated in the time-based findings of the project patients when compared with historic controls. The scheduling staff performed their routine responsibilities with the only change being that scheduling of procedures was done before rather than after the visit. No additional resources or staff members were required to execute the QI pilot project and therefore there was inherently no added cost. As a specific cost analysis was not performed, potential cost savings to the patient (from reduced visits or earlier symptom improvement) and organizational profit (from

more new patients seen) are not known and would be beneficial information to measure in the future.

Patient satisfaction survey data showed an improvement in the median score for question 8 (wait time to follow-up visit to discuss treatment plan) in the QI pilot project group when compared with the historic control group. Scores for question 3 (getting through to the office by phone or health portal messaging) and question 4 (ease of scheduling appointments) were higher for the historic control group when compared with the QI pilot project group. Potential rationale for these findings are discussed below.

The QI pilot project has a few noteworthy limitations. First, the patient population included in the project group was small and comprised only patients with refractory GERD as the primary referral diagnosis. This patient population was selected as refractory GERD is a common reason for referral and these patients typically require multiple diagnostic tests that are offered at the Esophagus Center. This may limit the generalizability of findings to other patient populations with different diagnoses who are seen in nonacademic medical centers. That said, the overall premise of the QI project, specifically reduction of turnaround time from consult to plan through NP navigation, may still be useful for other patient populations but may require modified workflows and different diagnostic tests. Second, some patients cancelled or rescheduled their consultation visit which affected subsequent diagnostic testing appointments as these also needed to be cancelled or rescheduled. This was not problematic as these appointment spots were typically filled given the long wait list for procedures to be scheduled. Third, the NP navigator spent a considerable amount of time (mean time spent was 17.5 min) for chart review and care coordination. If patients rescheduled or cancelled, this time was lost. The authors concluded, however, that time spent by the NP navigator would have nonetheless been expended for patients who rescheduled their consultations to a different date, as chart review is a necessary component of evaluation and management. Furthermore, the previsit note created as part of the preconsultation chart review was later used for the clinic note, therefore saving the NP time for documentation on the day of the consultation appointment. Fourth, the patient satisfaction survey showed that historic controls' median rating for getting through to the office by phone or health portal messaging (question 3) and ease of scheduling appointments (question 4) was higher than that of patients included in the QI pilot project. This finding may be due to the fact that only five surveys were collected for historic control patients as compared with 30 surveys collected for project patients. Furthermore, project patients completed the patient satisfaction survey at their initial

consultation visit whereas historic control patients' surveys were collected during follow-up appointments and therefore could have been affected by recall bias. Finally, this QI pilot project was conducted in a tertiary academic Esophagus Center where patients are often seen for a second, third, or fourth opinion and where specialized diagnostic testing is available. This QI pilot project approach may therefore not have the same utility in other settings.

Conclusion

In this QI pilot study, NP navigation demonstrated a positive impact on reduction of turnaround time from consultation to diagnostic testing and establishment of a management plan for patients with refractory GERD referred to a tertiary academic Esophagus Center. The intervention is simple and replicable. Findings support the available literature on the advantages of NP navigation while also providing new information specific to this role being implemented in an academic Esophagus Center.

There are several potential benefits of widespread implementation and sustained success of this intervention. From a patient perspective, these include prompter care delivery, earlier improvement of symptoms and quality of life, and more comprehensive and coordinated care. From a provider perspective, benefits include closer follow-up, reduced message or health portal burden from persistently symptomatic patients, and more new patients if established patients are able to be discharged from care due to symptom resolution. From an organizational perspective, benefits include the potential for increased practice revenue from more patients seen and improved reputation as a center of excellence.

Acknowledgments: *The authors would like to acknowledge Mallory Callahan, RN, Melissa Chahin, and Kara Barron for their contributions toward execution of the QI pilot project. The authors would also like to thank Julie Thompson for her expertise and assistance with statistical analysis.*

Authors' contributions: *All authors conceptualized the QI pilot project. M. Nandwani, E. Stevenson, and J. O. Clarke developed the project methodology. M. Nandwani and J. O. Clarke executed the QI project. M. Nandwani and E. Stevenson collected and interpreted the data. All authors drafted, reviewed, and revised the manuscript for final submission.*

Competing interests: *M. Nandwani was a member of the Salix Pharmaceuticals Speaker Bureau. The remaining authors report no conflicts of interests.*

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