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Reducing Turnaround Time from Pathology Collection to Patient Awareness in Gastroenterology Practice

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Abstract

Background: Means of improving the turnaround time from specimen completion to the patient being notified of results are not well known or researched. The aim of this study is to decrease the turnaround time (TAT) from when the specimen is collected to the time the patient is notified from 4 weeks to 2 weeks. This quality improvement project took place in a privately owned gastroenterology office in southern Indiana.

Methods: An exhaustive literature review was completed to determine the best means of improving pathology TAT. The Plan Do Check Act (PDCA) method of quality improvement was used for this project. A total of 633 retrospective charts in which physicians and nurse practitioners completed the pathology letters were reviewed. Time was measured in days for the specimen being collected to completed by pathology, the provider being tasked the results, task received to letter written, letter written to mailed, and the overall TAT from specimen collected to letter mailed.

Intervention: A team of nurse practitioners (ACNPs and FNPs) took over reviewing and writing pathology letters within a defined amount of time for completion. A chart review was completed for each of the twelve providers (MD, DO, NP), consisting of 50 charts each. Thirty-three charts were not included in the data interpretation due to missing information.

Results: When comparing the TATs between the team of NPs and the team of physicians, it was revealed the NP team completed the pathology letters 4.83 days sooner than the physician team. NP was team faster in all categories related to provider-completed actions. NPs were slower in the written to mailed category which is completed by an office staff member not a provider.

Conclusion: Utilizing a NP team to write and send pathology letters led to a pronounced reduction in TAT. Further areas to investigate related to decreased TAT include improved patient satisfaction and

decreased workload for ancillary staff. This quality improvement project has initiated the much-needed investigation into improving TAT related to patients' awareness of pathology results.

Keywords: turnaround time, TAT, gastroenterology, quality improvement

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Reducing Turnaround Time from Pathology Completion to Patient Awareness in a Gastroenterology Practice

Introduction

Problem Description

Patient satisfaction is a major driver of healthcare reimbursement. Given the increased connectivity between patients and their health care delivery systems via options such as patient portals and the corresponding increased expectations that this access has created, having prolonged wait times for pathology results would likely decrease patient satisfaction. Additionally, having prolonged turnaround times (TAT), the time from when the specimen is collected to the time the patient is made aware of the result, is diminishing the amount of possible reimbursement at many private offices and increasing ancillary staff workload.

Beyond patient satisfaction, prolonged TATs extend the time providers are waiting to treat medical conditions. White et al. (2015) reported that providers commonly base their medical decision making on laboratory and pathology results not exam findings alone. Extended TATs are not only slowing providers from treating simple infections they are also increasing patient anxiety regarding possible diagnoses. Patients deserve timely treatments.

While there has been extensive research on improving TAT on specimens, there has been little research on improving TAT for patients to receive results. The current system needs improvement. It is unacceptable for patients to have extended wait times to know the results of their pathology even if it is a benign finding. As TATs decrease, patient satisfaction will increase, time to treat will decrease, and office productivity will increase.

Available Knowledge

Previous studies have examined various specimen collections to laboratory pathology completion processes to increase efficiency which are the basis of this proposal (White et al., 2015; Gupta et al.,

2018; Cromwell et al., 2018; Khan et al., 2016; Hewer et al., 2018; Inal et al., 2018). Inal et al. (2018) demonstrated that the application of the define, measure, analyze, improve, and control (DMAIC) method which is based in Six Sigma methodology can lead to improved patient and physician satisfaction by refining systems in place regarding laboratory results. Improvements were achieved by eliminating unnecessary steps in the process, re-educating staff, and encouraging use of an electronic ordering method (P=.0000).

Cromwell et al. (2018) improved hospital-consented autopsy times by using Lean principles of Six Sigma methodology. Implementation of Lean principles improved the percentage of reports completed within 90 days from 37% to 74%. In terms of days, this is associated with a decrease in mean from 78 days to 15 days ($P < .0001$, Fisher exact test). These measures were achieved by an interprofessional team performing an audit of current and historical TATs which lead to the creation of a value stream map documenting the steps involved in constructing an autopsy report.

Khan et al. (2016) studied issues leading to prolonged TAT for neurophysiology reports in a Saudi Arabian specialty hospital. FOCUS (find, organize, clarify, understand, and select) PDCA (plan, do, check, and act) methodology aided in determining the root cause of an issue to implement the solution. With the use of FOCUS PDCA, researchers were able to increase the amount of reports completed within a 2-week span from 6% to 92% (Khan et al., 2016). Khan et al., determined the issues leading to delayed TAT were based in transcriptionists' work schedules, a need for consulting physicians, and reports not being generated in a timely manner. Corrections to these issues led to a decrease report TAT and improved patient and physician satisfaction.

A knowledge gap exists on improving the process of notifying the patient of their results. Communication of results varies by discipline and setting. Per the American College of Radiology (ACR) in the case of Radiation Oncology (2020, p. 2) "…consultation notes, progress notes, letters, follow-up notes, and treatment summaries should be in the medical record within 1 to 2 weeks". However, in the case of diagnostic imaging results the ACR states that radiologist should report the results in a timely manner and follow institution guidelines if they exist (American College of Radiology, 2014).

National guidelines for reporting results are variable or non-existent in some cases. For reporting urgent diagnoses and significant, unexpected diagnoses in surgical pathology and cytology, the College of American Pathologists "recommend that communication occur within the same day the diagnosis is made…but pathologists may exercise their judgement as to appropriate timing of communication" (Nakhleh et al., 2012, p.7). It is noted that the American College of Gastroenterology (ACG) and the American Association for the Study of Liver Diseases do not provide guidelines on the timing of pathology results to patients. It is felt by this project manager that a lack of guidelines in this area has led to a gap in patient care.

Rationale

Use of Six Sigma Lean methodology is effective in quality improvement projects and was utilized for this quality improvement project. The Lean concept is a quality improvement tool that has been used to assist in providing value and improving performance by systematic changes to eliminate waste and improve patient satisfaction and outcomes (Inal et al., 2018). The review of articles discussed demonstrates that the use of Lean and Six Sigma methodologies is beneficial to healthcare. All of the studies demonstrated statistically significant improvements in TATs in their respective locations. As Lean methodologies and FOCUS PDCA have led to vast improvements in the TAT of neurophysiology and autopsy reports it was felt they would be useful in improving the TAT of gastroenterology pathology reports. Benefits from these methodologies were due to the examination of a process, removing redundancy, and implementing a focused solution. Analysis of the process ensured a good fit for the problem identified and it was effective in rectifying the issue. If it had not been effective, the process could have been repeated until optimum improvement was achieved via repeated PDCA cycles.

Specific Aims

Specifically, this project aimed to decrease the TAT of pathology completion to patient awareness from 4 weeks to 2 weeks. Not only is this measure expected to be achieved but other expected outcomes include decreased time to treatment, improved patient satisfaction scores, and decreased workload for

ancillary staff allowing them time to increase their own productivity. This patient centric project has the potential to set standards for others to follow who may be struggling in similar areas.

Methods

Context

The setting for the quality improvement project was a private gastroenterology office in a large urban setting in Indiana. This partner-owned practice has been providing care to the region for forty years. On staff there are seven physicians and eleven nurse practitioners (NPs). There is a mix of Acute Care Nurse Practitioners and Family Nurse Practitioners which comprises the NP pool. The NP team tasked with completing pathology letters was comprised of clinicians trained specifically in gastroenterology care utilizing office-based treatment algorithms. ACG guidelines were followed for the timing of repeat endoscopy for both benign and malignant results.

Care is provided not only in-office but at three hospital locations, a private ambulatory endoscopy center, and an in-office urgent care for established and walk-in patients. On average between the office and inpatient settings, slightly over 400 patients are cared for per week. Additionally, an average of 150 endoscopic procedures is performed weekly.

It was felt the interventions in question would be successfully implemented in this setting due to multiple factors. NPs already completed patient-based tasks such as serological results, imaging, and general plan of care questions in a timely manner. This office is known for the successful collaboration between physicians and NPs. Crucially, a patient-centered culture exists that is supported by all team members. Additionally, the physicians at the office have agreed to compensate the NPs for completing pathology letters (Table 1).

Table 1

Intervention Budget

Item	Cost

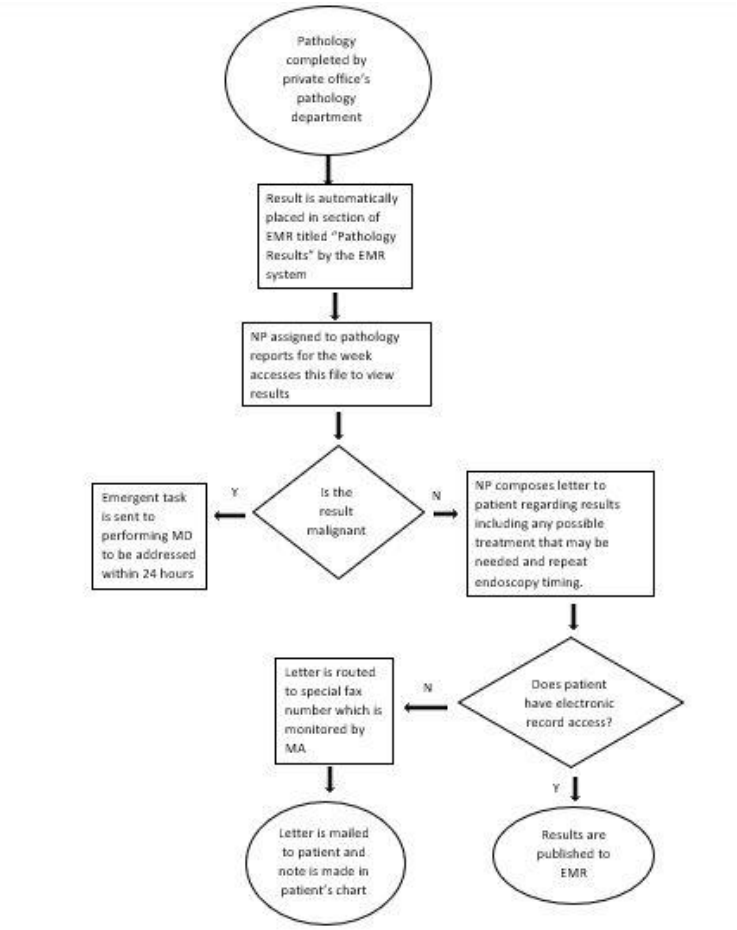
Poster to demonstrate current workflow.	$10.00
Poster to demonstrate improved workflow.	$10.00
Paper products for various project updates to be placed throughout the office.	$20.00
Nurse Practitioner payout for completing pathology letters for 1 year.	$26,000
Total	$26,040.00

Note. Table 1 describes the funding for this project.

Interventions

Figure 1

Proposed Process Flow Chart for In-Office Pathology Completion to Letter Production



Note. Figure 1 depicts the process flow chart with steps needed for letter production.

NPs were placed on a weekly rotating schedule. Previously when physicians were completing pathology letters, the office manager accessed the pathology results and tasked the results to the provider; in the project NPs accessed the pathology file to view resulted pathologies (Figure 1). The NP reviewed the pathology results and informed the patient of the result and the timing of a repeat esophagogastroduodenoscopy and colonoscopy, if applicable. If any additional interventions were required, the NP then tasked the assigned physician's nurse to order any medications/referrals that were warranted. Patients were made aware of results either via the electronic communication service in place at the office or via a mailed letter if the patient opted out of the electronic communication service. NPs were instructed to access the pathology file and write a letter informing the patient of the results within a 2-week span from the time the pathology task was assigned to them. To ensure completion within the proposed time frame, the quality manager monitored each NP's TAT. If the TAT was not made in the allotted time the NP was notified and an opportunity for improvement was provided.

In the case of malignancy, the NP sent the pathology result as an emergent task to the performing physician for them to address within a 24-hour period. At that juncture notifying the patient of the results rested with the physician. Patients were notified via a phone call to schedule an in-person office appointment to discuss the results and future care.

Study of the Interventions

The TAT of endoscopic procedure pathologies for the physician group consisted of 283 patient charts which were randomly reviewed in the pre-intervention period. This avoided times when certain providers were out of the office which would have the potential to impact results. The physician group times were then compared to the TATs of the NP pool. Each NP's TATs were reviewed for the pathology letters they received during their assigned week. TATs from the pre-intervention physician pool and post-intervention NP pool were then compared.

Pre- and post-intervention analysis was completed once the interventions were initiated. Time was measured in days. Improvement occurred on average by 4.83 days; overall TAT for physicians was

8.72 days and overall TAT for NPs was 3.89 days. By measuring TAT in the pre- and post-intervention periods it can be assumed improvement in this area was due to the implemented interventions.

Measures

Turnaround time is defined as the amount of time between the pathology samples being collected to the results letter being mailed to the patient. Time was measured in days. The pre-intervention physician TATs were compared to the post-intervention TAT of the NP pool. By comparing the two directly, decrease in time can be inferred to be an effect of the interventions. It is felt these means of measuring improvement are valid as decreasing the amount of time required for this task to be accomplished is the focus of this project.

Additional possible improvements achieved through the intervention include improved patient satisfaction and increased overall productivity of office staff. Patient satisfaction has been tracked at the office for the past decade so pre-intervention results are known. While patient satisfaction scores are in the 90th percentile already, satisfaction scores still could improve. Improvement in this area in the post-intervention period could not be assessed due to time constraints related to introducing new questions to the current patient satisfaction survey.

Overall productivity of ancillary office staff was expected to improve due to decreased workload. Prior to the intervention phone nurses were tasked with answering questions about pathology results along with generalized inquiries and changes in patient status. A factor in the number of phone calls received by the nurses may have been affected by staff reporting patients stating, “I was told they (pathology results) would be available in a few days”, “I should receive a letter in a 2-3 weeks”, and “I was told someone would contact me regarding the results”. Though staff did not record the number of calls or the type of call it was felt by ancillary staff that since the intervention fewer calls regarding pathology results have occurred.

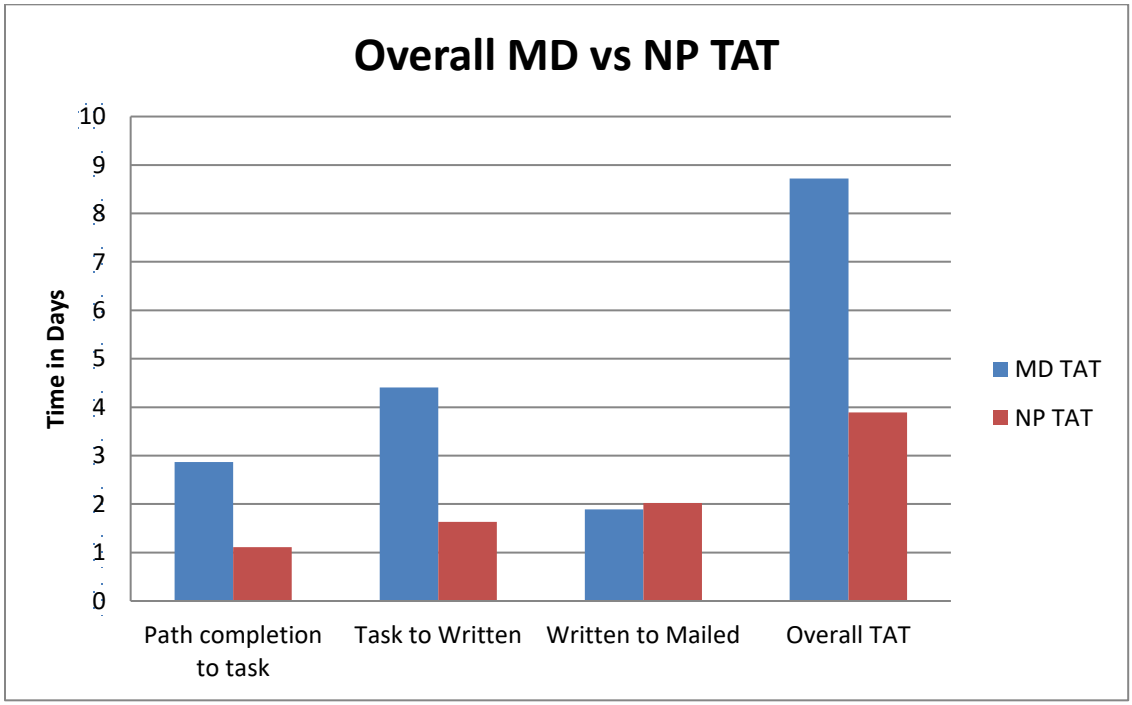
Analysis

Each provider's TAT was examined in days with an average of each provider type recorded. TATs were compared between the pre-intervention and post-intervention phases. Days of improvement were noted.

Additional analysis ensued due to trends noted during data collection. Additional analysis measures include TAT from the results being received to the provider being tasked, TAT from task received to letter written, and TAT of letter written to mailed. These unplanned measures arose when prolonged periods of time were noted to occur during these steps which would contribute to the overall TAT (Figure 2).

Figure 2

Overall MD vs NP TAT for all measures



Note. Figure 2 shows the comparison of MD vs NP TATs for each measure included in the quality improvement project.

TATs from specimen results being collected to the provider being tasked with the result to initiating letter writing was noted. Averages of these TATs were calculated and then compared for both provider types as well. Overall, the time frame for the physicians was 2.87 days compared to the NP's of 1.11 days. One causative factor for the extended time was the collection of esophageal specimens which were sent for wide-area transepithelial sampling with three-dimensional computer-assisted analysis (WATS) examination of possible Barrett's esophagus. Use of WATS on average increases the detection rate of Barrett's esophagus by 88.5% and dysplasia by 83% over traditional forceps biopsy alone (Gross, S., et al., 2018). It is noted that the average time from specimen collection to WATS results being received was 7 days. This cannot be greatly impacted by the collecting office as the sample is sent to another facility, that facility then completes their testing, before the result is reported to the office of origin.

Analyses on the TAT from providers being tasked with pathology results to the pathology letters being written were variable both between providers and within provider types.
Differences between provider types were measured in days. Overall TAT from tasked to letter written for the physician pool was 4.41 days while the NP pool averaged 1.63 days. This demonstrates an average of 2.78 days saved by having the NPs access the pathology results themselves.

The time it took for the letter to be drafted to the time the letters were mailed also varied between the physician and the NP groups. Overall, it took 1.89 days for the physician group's letters to be mailed while the NP group's letters were mailed on average in 2.02 days. While data was being collected it was noted that this TAT was partially determined by who was mailing the letters. In general, a single person was tasked with mailing pathology letters, but different names were periodically noted in the mailing addendum and were often associated with prolonged TATs. Upon discussion with the office manager these discrepancies were due to the main mailer being out of the office.

There were 24 occurrences where letters were written but not mailed. Two letters were regarding esophagogastroduodenoscopy results while the other 22 regarded colonoscopy results. Thirteen of these

letters were written by the same provider all regarding colonoscopy results. The causative factor for this was unable to be determined.

COVID 19 may be considered to be a confounding variable for results as the post-intervention dates occurred during a pandemic. Fewer patients underwent endoscopic procedures and fewer patients were seen in the office. It could be postulated that due to decreased in-office visits, the NPs had more time during the day to complete pathology associated tasks contributing to their overall decreased TATs.

Ethical Considerations

Approval for this quality improvement project to be completed in an ethical manner was received from the Board of Directors at the gastroenterology clinic and was received from the University of New Hampshire. No human subjects will be involved in the study.

Conflict of Interest: Project manager is employed at the facility where the study took place. There was no financial incentive associated with this study for the project manager.

Results

Over the course of this quality improvement project a total of 633 patient charts were reviewed which met the criterion of having undergone an endoscopic procedure during which specimens were taken. A total for 383 charts comprised the physician pool while 250 charts comprised the NP pool. It was felt 50 charts per provider provided an adequate representation of the provider's average TAT and would prevent skewing from any outliers. The remaining 33 charts were not part of the TAT data due to missing information. TAT was tracked and the number of days it took for pathology letters to be mailed decreased on average by 4.83 days; TAT for physicians was 8.72 days and overall, for NPs was 3.89 days. This well exceeded our 2-week goal.

Interventions were tested at the end of a 10-week period as it allowed each NP to go through the process twice. During the analysis phase possible areas for future studies were noted and will be

investigated in future iterations. Additional cycles were not pursued due to time constraints faced by the project manager.

Success of this project is multifactorial. One factor is the patient centric culture which exists at this office. NPs did not hesitate to address tasks and reach out to physicians on complicated cases to ensure optimal patient care. A second factor is the compensation NPs received for the taking over writing pathology letters. It is the combination of these factors which led to optimal project results.

Comparisons to the results of similar QI projects were not available. A literature review did not reveal other QI projects aimed to decrease TAT related to pathology letter completion or the amount time it took for patients to be made aware of results. Many QI projects aimed at decreasing specimen and report TAT however they did not incorporate the patient awareness aspect.

Though the improvement in TAT is significant it is unclear if this has improved patient satisfaction or decreased the workload for the ancillary staff. Proof of patient satisfaction improvement could not be provided due to outstanding circumstances at the study office in regard to introducing a new question to the current patient survey. An additional constraint was the timing of this project and the calendar year of the office. It can be inferred however that with a shorter TAT patient satisfaction is likely to improve.

From conversations with office staff, it appeared patients has continued to call a few days post procedure looking for results. This may be due to some endoscopists informing patients that their results will be back in a few days which while true does not serve to improve office productivity. Improvement in this area may be examined at a later date with the intervention simply being the endoscopists phrasing result time in a different manner.

Missing data did occur during this project. It was noted that of the 633 charts reviewed there were 33 instances where a specimen was taken, pathology was reported, a provider was tasked with the results and either a letter was not written or was not mailed. Of the 33 instances, 9 letters were not written, and 24 letters were not mailed. In the non-written letters, two patients had small bowel aspirates, two had colonoscopies with benign findings, four had esophagogastroduodenoscopies, and two had specimens

return positive for adenomas. Those with adenomas had been contacted by phone to discuss results and additional referrals had been made. As for the other patients it is unclear whether or not they were contacted about their results.

Discussion

Pathology letter TAT was successfully decreased from 8.72 days to 3.89 days for an overall decrease of 4.83 days. While this did not meet the specific aim of decreasing TAT from 4 weeks to 2 weeks, it did decrease the TAT overall and it should be noted that the baseline TAT was not as prolonged as it was believed to be. It can be inferred that patient satisfaction will improve from the decrease in time as patients did not have to wait as long for their results. This was not measured due to time constraints related to the timing of the project and the office's new business calendar.

Additionally, it is unclear if this project decreased office staff's workload improving overall efficiency. Prior to project onset calls were tracked at the office, however, this was discontinued shortly before the project started. Though staff report fewer calls this cannot be specifically proven. It is felt that having endoscopists relay the timing of results in a different manner would be beneficial to achieving this aim.

Interpretation

Post intervention analysis illuminates the value of compensating providers for taking on additional work. Though this change could have been without compensation it is unlikely that it would have been as well received. Without compensation it is possible that the NP pool may have been less prompt in completing tasks. Additionally, lack of compensation has the possibility of decreasing office morale which would have made success less likely. It is for this reason compensation is felt to have contributed to the success of this project. If patient satisfaction does improve as does office productivity it will have been money well spent.

Compensation per week could be easily changed to accommodate a smaller office's budget. Changing which group of providers is responsible for writing pathology letters within a defined timeline is a simple intervention which led to a vast decrease in TAT. Replication of this project is felt to be feasible for offices of all sizes. Stakeholders felt this initiative was worthwhile and having NPs complete pathology letters will continue.

Limitations

It cannot be ignored that this project occurred during the COVID-19 pandemic. A possible confounding variable for the projects massively improved TAT could be the pandemic itself. Fewer endoscopy procedures were completed due to CDC guidelines regarding quarantine for those with COVID 19 symptoms, a backlog of patients which had to be rescheduled due to the initial cancelling of non-emergent procedures, and a public's fear of exposure. It can be assumed that due to fewer in-office patients, and multiple COVID 19 related factors, NPs had more time to complete pathology letters during downtime which could have skewed results. Continued tracking of TATs will help clarify any confounding which may have occurred due to this situation.

Some offices may not be able to compensate their NPs or Physician Assistants which may make buy-in a challenge. Amount paid per week can be adjusted to meet this need. However, attempting to make this change without compensation does run the risk of decreasing morale and avoid the improvement in TAT being sought.

Conclusions

A simple intervention has led to a dramatic decrease in TAT. While improvements in patient satisfaction and office productivity were not demonstrated, one can assume these have taken place as patients are aware of their results sooner. Patients have voiced their pleasure at being made aware of results in a timely manner. If they are aware of their pathology results, they will not have a need to contact the office to ask about their results.

Investigation into corroborating these two assumptions is the next step. It is felt that examining ways to improve getting the results to the provider and getting the letters mailed once written could further decrease TATs. An idea expressed by multiple NPs for the future was to create physician/NP teams, so NPs were only writing pathology letters for a single physician. This is felt to have the potential to further expedite TATs and decrease the anxiety associated with writing the letters as NPs would have a steady stream of letters as opposed to an intermittent increase in work.

This project is felt to be sustainable with implications for the timely report of pathology results of other offices. Other offices can easily replicate the workflow process demonstrated in Figure 1 and modify it to better fit their needs. Knowledge in this area is lacking and this project has started the much-needed conversation of improving office practices related to notifying patients of their pathology results.

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