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Bridging the Gap in Primary Care of Inflammatory Bowel Disease (IBD) Patients

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Abstract

Problem. Patients in rural or medically underserved areas (MUAs) with inflammatory bowel disease (IBD) have limited access to primary care preventative services, making them even less likely to obtain preventative care, placing them at even greater risk for adverse health outcomes.

Methods. A two-phase retrospective chart review utilizing a convenience sample of patients diagnosed with IBD from a privately-owned gastroenterology office to evaluate the effectiveness of increasing preventative screenings for IBD patients. The first review included 53 patients seen from January to April 2019. A preventative screening evaluation tool (PSET) was developed based on literature recommendations, including the American College of Gastroenterology (ACG) and the Crohn's and Colitis Foundation guidelines and implemented prior to the second review of 57 patients during the same time frame in 2020.

Results: The results of this study indicated that the use of a preventative screening evaluation tool does increase preventative screenings in patients with IBD. The findings of this study demonstrated a statistically significant difference for 17 of the 25 variables pre- and post-implementation of the evaluation tool.

Implications. Due to immunosuppressant medications, IBD patients are already at an increased risk for infections and cancers (Long et al., 2010; Melmed et al., 2006). Screenings for chronic conditions like heart disease, cancer, and vaccination-preventable infections decrease the probability of complications from chronic conditions and reduce the burden that patients face associated with the management of their disease.

Bridging the Gap in Primary Care of Inflammatory Bowel Disease Patients

According to the Centers for Disease Control and Prevention (2019), inflammatory bowel disease (IBD), which includes Crohn's disease and ulcerative colitis, currently affects more than 3 million adults in the United States. Furthermore, the prevalence of IBD has been increasing substantially since 1990 and is at an all-time high worldwide. IBD is a chronic autoimmune disease posing health and economic burdens while substantially reducing patients' quality of life. The world healthcare systems face the continual rising challenges associated with chronic disease management, including primary care for patients with IBD (Institute for Health Metrics and Evaluation [IHME], 2019). Overall, patients with IBD are not obtaining preventative services to the same degree as the general patient population (Farraye, Melmed, Lichtenstein, & Kane, 2017; Selby et al., 2008). Lack of preventative services presents a unique challenge for patients with IBD for many reasons. IBD patients are often treated with immunosuppressant agents such as immunomodulators or biologics. Immunosuppressant agents place IBD patients at an increased risk of developing certain types of cancers and infections. Therefore, preventative services allowing for timely detection are vital in addressing such issues (Farraye et al., 2017; Wasan, Coukos, & Farraye, 2011).

Evidence suggests that primary care is an essential component of care for patients with IBD. There are four main characteristics of primary care: initial care contact, continued care, comprehensiveness of care, and coordination of care with other health entities (Starfield, as cited in Bodenheimer & Pham, 2010). Often barriers to access interrupt one or more of the four main characteristics. However, there are multiple barriers to patients receiving adequate primary care services. One significant barrier

involves geographic location. People in the United States who live in rural or medically underserved areas (MUAs) experience more barriers to healthcare access than those living in urban areas (Logan, Guo, Dodd, Muller, & Riley III, 2013).

Many challenges have been identified in the literature regarding barriers faced by rural and MUA residents. These challenges can be attributed to a shortage of primary care providers (PCP), lack of insurance, financial cost, waiting time to see a PCP, primary care hours of operation, and issues with access to a provider which may be due to either the provider not taking new patients or geographic location (Douthit, Kiv, Dwolatzky, & Biswas, 2015; Spetz & Muench, 2018). According to Bennett, Munkholm, & Andrews (2015), few evaluation tools for the management of IBD exist for PCPs, and little data has been published regarding the usefulness of such tools. The purpose of this evidence-based quality improvement (QI) project is to incorporate an evaluation tool to assess IBD patients for preventative services in a gastroenterologist (GI) office located in an MUA in Missouri (Health Resource and Administration, n. d.) serving patients from the surrounding rural areas. The aim of this QI project is to increase preventative screening in IBD patients in a gastroenterology practice. The study question addressed in this QI project is as follows:

1. Will the implementation of an IBD Preventative Screening Evaluation Tool increase the number of IBD patients evaluated for preventative care services during a three-month period compared to a similar three-month period prior to the implementation of the IBD Preventative Screening Evaluation Tool?

Literature Review

A two-phased review of the literature was conducted. The first phase was

conducted between August and September of 2019 and focused on the routine care for clients with IBD. The EBSCOhost platform was searched using the databases the Medical Literature and Retrieval System Online (Medline) and the Cumulative Index to Nursing and Allied Health Literature (CINAHL). The searches included the keywords *routine care for patients with IBD, Preventative care* AND *inflammatory bowel disease or ibd or ulcerative colitis or Crohn's disease, primary care* AND *inflammatory bowel disease or ibd or ulcerative colitis or Crohn's disease,* and *routine care* AND *inflammatory bowel disease or ibd or ulcerative colitis or Crohn's disease*. The inclusion criteria were articles published between 1999 and 2019, English language, and peer-reviewed. Exclusion criteria included articles not in English, articles written prior to 1999, and articles not pertaining to IBD patients. The initial search yielded 839 articles. Seventeen articles were selected for abstract review based upon a title that focused upon routine or primary care of patients with IBD. Ultimately, nine of the seventeen articles met inclusion criteria and were chosen for the literature review.

The second phase of the literature review was performed between September and October 2019 and focused on rural or medically underserved areas and barriers to primary care access. The EBSCOhost platform was searched using the databases Medline, CINAHL, and PubMed. The searches included the terms *medically underserved areas* AND *rural, Barriers to primary care access* AND *medically underserved areas,* and *barriers to primary care access in medically underserved areas.* The inclusion criteria were articles published between 2009 to 2019 and written in the English language. The initial searches yielded a total of 4195 articles. Sixty-one articles were selected for abstract review based upon the title. Six of the sixty-one articles met

inclusion criteria and were chosen for the literature review (Appendix A).

IBD Burden

According to the IHME (2019), IBD, a chronic autoimmune disease, has significantly increased in prevalence, rising from 79.5 per 100,000 population in 1990 to 84.3 per 100,000 population in 2017. Although the rate of fatality has decreased in IBD patients, most likely due to the increased use of immunomodulators, the rate of disability has risen and continues to grow. IBD occurs during the most productive time of life, typically affecting individuals anywhere from their second to the fourth decade of life. It can impact every aspect of an individual's life (physical, psychological, social, and familial) and may lead to increased rates of anxiety and depression. Further, IBD poses significant challenges to both clients and healthcare providers associated with disease management (IHME, 2019).

Primary Care Barriers

One significant barrier to primary care is a shortage of PCPs. A shortage of more than 20,000 PCPs is predicted by 2025 (Health Resources and Services Administration, as cited in Spetz & Muench, 2018). The shortage of PCPs has significantly increased over the years due to a decline in physicians choosing primary care (Fancher et al., 2011; Spetz & Muench, 2018). Other reasons for a shortage of PCPs is an increase in the geriatric population, an increase in chronic diseases, and an increase in more people having insurance coverage due to the Affordable Care Act (Spetz & Muench, 2018). Another significant factor contributing to the shortage of PCPs is the lack of full practice privileges for nurse practitioners (Ortiz et al., 2018). In addition, many clients experience barriers that stem from the high cost of medical care or the lack of healthcare insurance.

Lack of insurance may prevent many clients from being seen by a PCP. This can be even further compounded by clients in MUAs who also do not have the means for reliable transportation (Hefner, Wexler, & McAlearnery, 2015).

Rural and MUA

Rural Americans experience a greater amount of chronic disease and poorer health outcomes than their urban counterparts (Douthit et al., 2015). An increase in chronic disease and poorer health outcomes are partly due to the unique challenges that rural residents face in seeking primary care. Residents living in rural areas often face other factors that contribute negatively to their health status. These factors include low educational level, poverty, lack of employment or being underemployed, and not having insurance or being underinsured. Rural areas often have a higher rate of minority populations and a higher poverty rate than those residing in urban areas (Logan et al., 2013). Patients in rural or MUAs with IBD have limited access to primary care preventative services, making them even less likely to obtain preventative care; placing them at even higher risk for adverse health outcomes

Missouri

More than 38% of Missouri's population lives in rural areas (Missouri Hospital Association [MHA], 2018). A rural area is defined by the Rural Development Act of 1972 (as cited in Douthit et al., 2015) as an area with 10,000 or fewer residents, and a rural county has less than 150 people per square mile (MHA, 2018). Missouri has 101 rural counties, and 99 of them are designated as primary medical care health professional shortage areas (HPSA). An HPSA indicates that the county has a shortage of PCPs and either dental or mental health providers (Missouri Department of Health and Senior

Services as cited in MHA, 2018). Many counties in Missouri are also designated as a MUA. To be designated as an MUA, the area must have an insufficient number of PCPs, a high mortality rate of infants, and either an increased poverty rate or a large population of elderly or both (MHA, 2018).

Primary Care Needs

Need for primary care with chronic disease. The prevalence of chronic disease is costly. Many common chronic diseases, such as diabetes, cardiovascular disease, cancer, and arthritis, are preventable (Logan et al., 2013). Patients with chronic conditions are less likely to receive preventative services than the general population, and IBD patients are no exception. Selby et al. (2008) demonstrated that IBD patients received fewer preventative services than the general population regarding 10 generally recognized, available, and beneficial preventative services. The 10 preventative services that were evaluated were blood pressure screening, non-fasting HDL, cholesterol, and total cholesterol, diabetes screening of hypertensive and hyperlipidemia patients, osteoporosis screening in women older than 65 years, mammograms in women 40 or older every one to two years, and pap smears every three years for ages 21 through 65, colon screening in those 50 years or older, dietary counseling in patients with cardiovascular disease, and annual flu vaccines and pneumococcal vaccine for those who are 65 years of age or older.

Need for Primary Care with IBD. IBD patients are at an increased risk of infections due to treatment with long-term immunosuppressant medications. Immunosuppressant patients are not being adequately vaccinated despite guidelines to the contrary. Melmed et al. (2006) found in their survey study of 169 participants that even

though 80% of the participants saw a PCP, most did not receive adequate vaccination coverage. Eighty-six percent of the participants (146/169) were exposed to immunosuppressant medications. However, only 28% of them had received the flu vaccine, and eight percent had received the pneumococcal vaccine. The study also revealed substandard vaccination rates for varicella, hepatitis, and tetanus (Melmed et al., 2006).

Long et al. (2010) found in their retrospective cohort study that non-melanoma skin cancers (NMSC) were significantly increased for IBD patients. Patients with IBD are at an increased risk for non-melanoma skin cancers due to the immunosuppressant therapies used to treat the IBD. Long et al. (2010) found 733 cases of NMSC per 100,000 compared to 447 cases of NMSC per 100,000 in the control group, thus demonstrating the need for IBD patients to receive full skin assessment screenings.

The question is then raised as to why IBD patients are not receiving preventative services such as vaccinations at the same rate as general medical patients. The answer may be two-fold, due to uncertainty on the gastroenterologist's part as well as the uncertainty on the part of the PCP. Wasan et al. (2011) found that only 12% of the gastroenterologists surveyed correctly recommended the appropriate vaccine to both their immunocompromised and immunocompetent patients. Sixty-four percent of the gastroenterologists responded that it was the PCP's responsibility to determine which vaccine to administer, and 83% answered that it was the PCP's responsibility to administer the vaccine (Wasan et al., 2011). Selby, Hoellein, and Wilson (2010) found that PCPs are uncomfortable recommending vaccines to IBD patients, stating unfamiliarity with IBD medications as the primary reason for being uncomfortable.

Interventions and Guidelines for IBD Patients

IBD patients often think of their gastroenterologist as their primary care provider. In order to increase access to preventative care, the ACG guidelines recommend that IBD patients be co-managed by both the gastroenterologist and the PCP (Farraye et al., 2017). The guidelines recommend that IBD patients should receive the appropriate vaccines based on age and immunocompetency status. Furthermore, whenever possible, the client should be vaccinated before receiving immunosuppressive therapy. The Crohn's and Colitis Foundation (2019) recommends the following vaccines:

- Influenza vaccines for all patients annually
- Pneumococcal Prevnar © (PVC13) to all patients 65 years of age, followed by the pneumococcal Pneumovax © (PPSV23) one year later
- For patients 19 and older who are immunosuppressed PVC13 vaccine followed eight weeks later by the PPSV23 with the second dose of PPSV23 given five years after the initial dose
- Tetanus and diphtheria toxoids with acellular pertussis (Tdap) vaccine to all patients 19 years of age or older if not vaccinated previously
- Booster of tetanus and diphtheria toxoid (Td) every 10 years
- Human papillomavirus (HPV) for all males and females 9-26 years of age in a two-three dose series
- Group B meningococcal meningitis for ages 16-23 for patients at high risk
- Hepatitis A and B for all patients

- Measles, mumps, and rubella (MMR) and varicella vaccines both; two-dose series vaccines given four weeks apart for all non-immune patients prior to initiation of immunosuppressant therapy

The Crohn's and Colitis Foundation has specific recommendations for female clients. It is recommended that all women have annual cervical cancer screenings. DEXA scans are recommended for women 65 and older or for any age who are at high risk for osteoporosis. Purified protein derivative (PPD) or interferon-gamma release assay (IGRA) is recommended for any patient prior to the initiation of anti-TNF or anti-IL-12/23. Further, it is recommended that all clients are screened annually for anxiety and depression and have skin cancer screenings. Any patients who smoke are encouraged to quit.

Implementation of an IBD Preventative Care Assessment Tool

Although IBD patients have an increased risk of complications, they are less likely to receive preventative services. Previous studies have demonstrated hesitation on both the part of the PCP and the gastroenterologist in taking responsibility for preventative care for IBD patients. Valluru, Kang, and Gaidos (2018) demonstrated that the implementation of a health maintenance template in an outpatient GI clinic significantly improved compliance of documentation of preventative care services.

Theoretical Framework

This quality improvement project was guided by the Plan Do Study Act (PDSA) framework. The PDSA method is a framework that directs an approach to quality improvement through a four-step process. The first step is the *Plan* step, which mainly involves the aim of the project, what is being changed, and how the change is measured.

The second step is the *Do* step which consists of the implementation of the plan. The third step in the framework is the *Study* step, which consists of evaluating the change. What part of the change was successful, what part of the change is sustainable, and what interventions need to be reevaluated. The fourth and final step in the framework is the *Act* step, which consists of looking at the results and determining if any revisions are necessary (Bollegala et al., 2016).

The *Plan* step for this project consists of developing a Preventative Screening Evaluation Tool (PSET) for IBD patients. The second step of *Do* consisted of the implementation of the tool and collecting the data. The third part is the *Study* step, which involved analyzing the data collected. The last step of *Act* is dependent on the data collection but involved making recommendations based upon the data findings.

Methods

Design

A pre- and post-intervention evaluation using a retrospective chart review was used to evaluate the effectiveness of increasing preventative screening evaluation for IBD patients. The retrospective chart review was conducted in two phases. The first retrospective review of patients diagnosed with IBD was collected for the time period prior to the implementation of the PSET. The second review occurred after the implementation of the PSET.

Setting

The setting for this project was a privately-owned gastroenterology clinic located in an MUA in Southeast Missouri serving rural patients from Missouri, Illinois, Kentucky, and Tennessee. The clinic has approximately 2500 patients and conducts

approximately 4,000 visits annually. Roughly 20 percent of these patients have been diagnosed with IBD. The clinic has one board-certified internal medicine physician with a subspecialty in gastroenterology and two family nurse practitioners.

Sample

A convenience sample of 110 patients diagnosed with IBD from this gastroenterology office was used for this project. Inclusion criteria were any patient age 18 or older who had a diagnosis of IBD and was a patient of the gastroenterology office seen between the time frames during which data was collected. Exclusion criteria were any patients not diagnosed IBD, under the age of 18, or patients not seen within the time frames in which data was collected (See Table 1).

Procedures

A planning team was formed, which consisted of a practicing NP at the gastroenterology office and a DNP student who was the primary investigator (PI) interested in studying preventative care screenings in IBD patients. Several meetings were conducted in August 2019 to discuss the process. The screening tool was adapted from Cornerstones Health's (2018) IBD Checklist for Monitoring and Prevention and the guidelines from the ACG and the recommendations of Crohn's and Colitis Foundation (Farraye, 2017 & Crohn's & Colitis Foundation Professional Education Committee, 2018). After consulting with the providers, guidelines from the American Academy of Family Physicians [AAFP] (2019) which are based on recommendations from the United States Preventative Services Task Force were included for mammograms, alcohol screenings, and cardiovascular screenings (diabetic and lipid panels) due to their importance in preventative care and ease of screening. In December of 2019, the PSET

was introduced, and the staff was trained on its use during a one-on-one session with the investigator.

Approval Processes

Institutional Review Board (IRB) approval was obtained from the University of Missouri-St. Louis (UMSL). The project qualified for exempt review. Additionally, permission was obtained from the gastroenterology office.

Data Collection

The evaluation tool was implemented on January 16th, 2020. A retrospective (whole) chart review was conducted from January through March of 2020 to collect data from patients' charts for the period of January 16th, 2019, through April 15th, 2019. A total of 53 patients' charts were reviewed for the pre-implementation group. The following demographic data were collected: the age range of the patient, the gender of the patient, and the ethnicity of the patient, type of IBD diagnosis the patient had (ulcerative colitis or Crohn's Disease), whether or not the patient had a PCP, time frame of the last visit with PCP. Other data collected included a screening of what type of preventative health maintenance the patient had received. This study looked at 25 preventative health variables (See Appendix B), and whether or not the preventative health maintenance was up to date according to the guidelines. Only the data available during this timeframe was used for this project.

The second retrospective (whole) chart review was conducted for the post-implementation group at the end of April 2020 for the proceeding period of January 16th, 2020, through April 15th, 2020. A total of 57 patients' charts were reviewed for the post-implementation group. The same data and inclusion and exclusion criteria were used for

the post-implementation group as for the pre-implementation group. No personal identifiers were collected during the conduction of the chart reviews. The data collection tool was coded using a four-digit code known only to the primary investigator and stored on a password-protected flash drive.

Data Analysis

The dataset was analyzed using the Statistical Package for the Social Science (SPSS) version 26 and Intellectus Statistics (IS) was used for data interpretation. For each subject in the pre-implementation group, the total number of screenings that they received was tallied using the Data Collection Tool (Appendix B). This process was repeated for each subject in the post-implementation group. The data was cleaned to ensure that all of the variables have valid and usable values and to address any missing data.

The patients' demographic characteristics were analyzed using descriptive statistics (Table 1). Whether or not each individual preventative screening measure was completed was compared between the pre-implementation and post-implementation groups for each preventative screening measure in the Data Collection Tool (Appendix B). The appropriate statistical test for analyzing each individual preventative screening variable was cross-tabulations, and the statistical significance determined through Chi-square. For cases not meeting parametric assumptions, a Fisher's exact test was conducted. Typically, an independent t-test is appropriate when comparing two population means in uncorrelated samples. Therefore, an independent t-test was deemed appropriate to compare the means of all variables, collectively, pre- and post-

implementation of the screening tool. However, one or more of the required parametric assumptions were violated, and the Mann-Whitney Rank-Sum test was performed.

Results

A total of 110 patients' charts (N=110) were reviewed for this study. The participants' ages ranged from 18 to greater than 70 years of age, with the most common age range being 50-59. The participants consisted of 66.4% female (N=73), 32.7% male (N=36) and one (N=1, 0.09 %) not identified. The most common frequency of ethnicity noted in this study was Caucasian (N=101, 91.8%). African-Americans accounted for 4.5% (N=5) of the participants seen. There were 4 (N=4, 3.6%) patients who did not have ethnicity identified on the chart. The most frequently observed IBD diagnosis at 71.8% was Crohn's disease (N=79). Frequencies were also obtained for years of diagnosis, whether or not the patient had a PCP, the last visit to PCP, and immunosuppression status. See Table 1 for details of these variables.

A Chi-square analysis was performed on the six demographic variables (age, gender, years of diagnosis, PCP status, last visit to PCP, and the patient’s status for immunosuppression) for both pre and post groups to determine if there was a statistical significance between the groups. There was no statistical significance noted in the pre and post groups based on an alpha value of 0.05. Two of the demographic variables (ethnicity and diagnosis) did not meet the parametric assumptions required for a Chi-square test. The assumption requiring that 80% of the expected cells have a value of five was violated. Therefore, the non-parametric Fisher's exact test was used to determine statistical significance, and there was no statistical difference noted.

The Chi-square analysis was performed on 14 variables both pre and post tool (varicella, MMR, Tdap/Td, hepatitis A and B vaccine, vitamin D level, a prescription for calcium and vitamin D, colonoscopy exam, Pap smear, full skin assessment, depression screening, vitamin B_{12} level, iron panel, and PPD or IGRA). Thirteen of the 14 variables analyzed using the Chi-square were statistically significant based on an alpha value of 0.05. The only variable not significant was the depression screening with a *p*-value of .782; (Table 2).

Eleven of the variables (Herpes zoster, influenza, HPV, meningococcal, pneumococcal, DEXA scan, mammogram, tobacco use and cessation screening, alcohol screening, lipid panel, and diabetic screening) did not meet the parametric assumptions required for a Chi-square test. The assumption requiring adequate cell size was violated either by having a cell value of zero or less than 80% of the expected cells had a value of less than five. Therefore, the non-parametric Fisher's exact test was used to determine statistical significance. The variables DEXA scan, mammogram, lipid panel, and diabetic screening were all statistically significant based on an alpha value of 0.05. See Table 3 for details of the other variables.

Out of the 25 variables evaluated, 17 of the variables showed a statistical significance either through the Chi-square or Fisher's exact test. Table 4 shows the percentages obtained for the variables, both pre and post tool implementation. Although only 17 of the 25 variables showed a statistical significance, Table 4 shows that screening for 23 out of the 25 variables increased after implementation of the PSET.

The pre and post PSET implementation groups were compared with an independent t-test to evaluate any difference in the total number of variables screened.

There were 53 charts reviewed in the pre-group (M = 5.60, SD = 1.26) compared to the 57 charts reviewed in the post-group (M = 11.18, SD = 7.24). Because all of the assumptions were not met, the non-parametric Mann-Whitney Rank-Sum Test was conducted to compare the mean number of the 25 variables screened for pre- and post-implementation of the tool. The p-value was < .001, indicating that the results were significant based on an alpha value of 0.05.

Discussion

Explanation of significance

There was no statistical significance noted in the demographic variables between the pre and post tool groups. The lack of statistical significance between the pre and post groups, indicates that both groups were similar. Thus, validating the statistical significance noted with the screening variables.

A review of the analysis indicated that the implementation of a PSET in a gastroenterology office did increase the number of preventative screenings obtained in IBD patients. The mean value (11.18) of variables screened post-tool was significantly higher than the mean value (5.60) of variables screened pre-tool.

Eight of the 25 variables did not show statistical significance. Of the eight variables that were not statistically significant, six of the variables depression screening, alcohol screening, tobacco use and cessation counseling, and evaluation of the vaccinations for herpes zoster, influenza, and pneumococcal were screened for pre-tool implementation at very high rates. The remaining two variables, HPV and meningococcal, had a diminutive sample size of N=3 and N=4, respectively. Therefore, the small sample size affected the ability to obtain valid results.

Implications for practice

The use of this tool is significant because it has shown an increase in the number of preventative screenings. The increase in preventative screenings is clinically significant because patients with IBD are already at an increased risk for infections and cancers due to the use of immunosuppressant medications (Long et al., 2010; Melmed et al., 2006). Screening for chronic conditions such as heart disease, cancer, diabetes, and vaccination-preventable infections reduces the probability of complications from chronic conditions and reduces the burden that IBD patients face associated with the management of their disease (IHME, 2019). Although a statistical significance was noted in screenings between the pre- and post-implementation groups, more than half of the patients in the post-implementation group still did not receive screenings making this clinically significant.

Providers need to consider this when assessing their already high-risk IBD patients. If IBD patients are screened for these preventative measures, and it is determined that the patient is missing these preventative measures, it allows the provider the opportunity to educate the patient. Education should not only take place on the importance of preventative care in general but also the importance of preventative care concerning high-risk conditions like IBD.

Limitations

There were several limitations to this study noted. First, the sample size was smaller than anticipated. The pre-implementation group n=53 was lower than expected because the gastroenterologist, although a long-standing physician in the community, had just recently opened up his own private practice. The post-implementation group n=57

was impacted by COVID 19. From mid-march until the end of the study in mid-April, the office was closed for a week. Once the office reopened, they were only operating two days a week for the next few weeks. Additionally, several patients canceled on the days that the office was opened.

A second limitation noted was that the chart did not always distinguish between the PSV23 or the PCV13 pneumococcal vaccination assessed; therefore, they were combined for the purpose of this study. The third limitation noted was that only one of the three providers in the gastroenterology office was consistent with completing the screening form while the other two providers were inconsistent in completing the form. The fourth limitation was time-constraint. The providers voiced difficulty trying to fit the PSET into the time allowed for office visits.

Recommendations

AAFP (2020) conducted a survey in which 80% of 8774 physicians indicated they were either overextended or at their capacity to see patients. Providers indeed have a limited amount of time to see patients, and assessing for 25 preventative screening variables is time-consuming. Furthermore, it adds to the already pressed time that providers feel. Therefore, one recommendation is that the PSET is included in new patient packets. Other suggestions are that further studies be conducted to determine the best way for PCPs and specialists like gastroenterologists to collaborate on preventative care measures for their shared IBD patients. Another area for study is to establish which preventative measures are most clinically significant for IBD patients. Then the number of preventative screening variables that the gastroenterologist assesses for could be reduced.

In discussion with one of the providers, it was mentioned by the provider that they had not had the opportunity to use the screening forms because they had not seen any patients for IBD. Upon further investigation, it was noted that several of the patients had a history of IBD, but that was not the reason the patient was seeking care. Therefore, another recommendation was that a box is added to the paperwork a patient fills out when checking in, asking if the patient has a history of IBD. If the patient has a history of IBD, then the office staff or the person rooming the patient can place a screening form on the patient's chart for the provider.

Conclusion

The results of the study demonstrated that the use of a PSET increased the number of IBD patients being screened for preventative care measures in a gastroenterology office. Patients with IBD are already at a high risk of developing chronic conditions such as infections and some cancers. The development of these chronic conditions, along with other potential preventative, chronic problems can lead to adverse health outcomes and complicate the management of their care. The implementation of a screening tool to evaluate preventative care, especially in rural or MUAs where access to primary care preventative services are limited, has the potential to minimize the effects of chronic conditions on an already vulnerable population. To ensure that vulnerable patient populations such as patients with IBD are receiving preventative screening evaluations, it is essential that PCPs and specialists such as gastroenterologists work together to co-manage their patients' care.

The practice sees the value of this project but recognized the time-constraint. Due to the limited amount of time, the practice has decided to have all IBD patients come in

for a wellness specific visit once a year. During this visit, the PSET will be completed, and any additional screenings will be performed. The practice has created a letter to send to the PCP, letting them know how their office is partnering with them to take better care of their shared patients. The office plans to send a copy of PSET to the PCP for their records; this will help all providers be on the same page with managing patient care. Another positive outcome of this project expressed by one of the practitioners was that although it took longer for their visit, patients were very appreciative that the PSET had been added to their care, and not one patient complained.

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Table 1. *Frequency Table for Demographic Characteristics*

Variable	Pre-Group		Post-Group		Total	
	n (53)	%	n (57)	%	n (110)	%
Gender						
Female	33	62.3	40	70.2	73	66.4
Male	20	37.7	16	28.1	36	32.7
Missing	0	0.00	1	1.8	1	0.9
Age						
18-29	6	11.3	3	5.3	9	8.2
30-39	8	15.1	11	19.3	19	17.3
40-49	8	15.1	14	24.6	22	20.0
50-59	15	28.3	14	24.6	29	26.4
60-69	7	13.2	10	17.5	17	15.5
≥ 70	9	17.0	5	8.8	14	12.7
Ethnicity						
African American	4	7.5	1	1.8	5	4.5
Caucasian	47	88.7	54	94.7	101	91.8
Other	2	3.8	2	3.5	4	3.6
Diagnosis						
Crohn's	39	73.6	40	70.2	79	71.8
Ulcerative Colitis	13	24.5	15	26.3	28	25.5
Both	1	1.9	2	3.5	3	2.7
Year of Diagnosis						
Unknown	31	58.5	39	68.4	70	63.6
< 8 years	6	11.3	6	10.5	12	10.9
≥ 8 years	16	30.2	12	21.1	28	25.5
Immunosuppressed						
No	20	37.7	24	42.1	44	40.4
Yes	32	60.4	33	57.9	65	59.1
Missing	1	1.9	0	0.00	1	0.9
Primary Care Provider (PCP)						
No	11	20.8	8	14.0	19	17.3
Yes	42	79.2	49	86.0	91	82.7
Last Visit to PCP						
Unknown	51	96.2	40	70.2	91	82.7
≤ 1 year	2	3.8	17	29.8	19	17.3

Note. Due to rounding errors, percentages may not equal 100%. Adapted from "Intellectus Statistics [Online computer software]." (2020). Intellectus Statistics. https://analyze.intellectusstatistics.com

Table 2. *Frequencies & Statistical Significance of Variables Pre & Post Screening Tool*

Variables	Screened		Chi-Square Test Statistics	Degrees of Freedom	*p*-value Significance
	No	Yes	X^2	df	p
Varicella					
Pre	5[44.33]	0[8.67]	20.01	1	<.001
Post	39[47.67]	18[9.33]			
MMR					
Pre	52[43.33]	0[8.67]	20.06	1	<.001
Post	38[46.67]	18[9.33]			
Tdap/Td					
Pre	53[43.85]	0[9.15]	21.36	1	<.001
Post	38[47.15]	19[9.85]			
Hep A					
Pre	51[42.40]	2[10.60]	16.83	1	<.001
Post	37[45.60]	20[11.40]			
Hep B					
Pre	51[41.44]	2[11.56]	19.52	1	<.001
Post	35[44.56]	22[12.44]			
Vit. D Level					
Pre	53[42.88]	0[10.12]	24.13	1	<.001
Post	36[46.12]	21[10.88]			
Rx Ca^{+}/Vit. D					
Pre	47[35.08]	1[12.92]	27.96	1	<.001
Post	29[40.92]	27[15.08]			
Colonoscopy					
Pre	12[6.36]	30[35.64]	10.22	1	<.001
Post	3[8.64]	54[48.36]			
Pap					
Pre	21[14.80]	0[6.20]	16.85	1	<.001
Post	10[16.20]	13[6.80]			
Full Skin Assess.					
Pre	33[23.91]	0[9.09]	24.04	1	<.001
Post	17[26.09]	19[9.91]			
Depression Scr.					
Pre	34[34.69]	19[18.31]	0.08	1	.782
Post	38[37.31]	19[19.45]			
Vit. B_{12} Level					
Pre	11[6.55]	1[5.45]	9.170	1	.002
Post	13[17.45]	19[10.36]			
Iron Panel					
Pre	52[42.88]	1[10.12	19.60	1	<.001
Post	37[46.12]	20[10.88]			
PPD or IGRA					
Pre	50[39.99]	3[13.01]	19.70	1	<.001
Post	33[43.01]	24[13.99]			

Note. Values formatted as Observed [Expected].

Key – **MMR**: measles, mumps, and rubella; **Tdap:** tetanus and diphtheria toxoids with acellular pertussis **Td:** tetanus and diphtheria; **Hep A:** Hepatitis A; **Hep B**: Hepatitis B; **Vit.**: Vitamin; **Rx:** Prescription; **Ca^{+}**: Calcium; **PAP**: Papanicolaou; **Assess.**: Assessment; **Scr.**: Screening; **PPD**: purified protein derivative; **IGRA:** Interferon Gamma Release Assay.

Adapted from "Intellectus Statistics [Online computer software]." (2020). Intellectus Statistics. https://analyze.intellectusstatistics.co

Table 3. *Observed and Expected Frequencies of Variables Screened Pre and Post Tools*

	Screened			95% CI		
Variable	No	Yes	OR	LL	UL	*p*
Herpes Zoster						
Pre-Tool	6[4.34]	47[48.66]	2.298	.544	9.699	.309
Post-Tool	3[4.66]	54[52.34]				
Influenza						
Pre-Tool	2[1.45]	51[51.55]	2.196	.193	24.951	.608
Post-Tool	1[1.55]	56[55.45]				
HPV						
Pre-Tool	2[1.5]	0[0.50]	2.000	.500	7.997	1.00
Post-Tool	1[1.50]	1[0.50]				
Meningococcal						
Pre-Tool	1[0.80]	0[0.30]	1.500	.674	3.339	1.00
Post-Tool	2[2.30]	1[0.80]				
Pneumococcal						
Pre-Tool	2[1.98]	41[41.02]	1.024	.138	7.620	1.00
Post-Tool	2[2.02]	42[41.98]				
DEXA Scan						
Pre-Tool	29[24.70]	0[4.30]	1.324	1.121	1.563	.005
Post-Tool	34[38.30]	11[6.70]				
Mammogram						
Pre-Tool	23[18.16]	0[4.84]	1.545	1.206	1.981	<.001
Post-Tool	22[26.84]	12[7.16]				
Tobacco Use/Cessations						
Pre-Tool	0[0.50]	53[52.50]	1.018	.983	1.054	1.00
Post-Tool	1[0.50]	56[56.50]				
Alcohol Screening						
Pre-Tool	2[1.45]	51[51.55]	2.196	.193	24.951	.608
Post-Tool	1[1.55]	56[55.45]				
Lipid Panel						
Pre-Tool	10[6.10]	0[3.90]	2.067	1.437	2.973	.003
Post-Tool	15[18.90	16[12.10]				
Diabetic Screening						
Pre-Tool	10[6.10]	0[3.90]	2.067	1.437	2.973	.003
Post-Tool	15[18.90]	16[12.10]				

Note. Values formatted as Observed [Expected]. OR = odds ratio; CI = confidence interval; LL = lower limit; UL = upper limit.
Key – **HPV**: Human Papilloma Virus; **Pneumococcal**: Pneumococcal conjugate vaccine (PVC13) and pneumococcal polysaccharide vaccine (PPSV23); **PAP**: Papanicolaou; **DEXA**: dual-energy X-ray absorptiometry**.**
Adapted from "Intellectus Statistics [Online computer software]." (2020). Intellectus Statistics. https://analyze.intellectusstatistics.com

Table 4. Variables percentage screened Pre and Post Tool with *P*-values

Variables	% Screened Pre-Tool	% Screened Post-Tool	P-Value
Immunizations			
• *Hep A*	3.8	35.1	<.001
• *Hep B*	3.8	38.6	<.001
• *MMR*	0	31.5	<.001
• *Tdap/Td*	0	33.3	<.001
• *Varicella*	0	31.6	<.001
• *Herpes Zoster*	88.7	94.7	.309
• *HPV*	0	50	1.00
• *Influenza*	96.2	98.2	.608
• *Meningococcal*	0	33.3	1.00
• *Pneumococcal*	95.3	95.5	1.00
Bone Health			
• *Vit. D Level*	0	36.8	<.001
• *Rx Ca^{+}/ Vit. D*	2	48.2	<.001
• *DEXA Scan*	0	24.4	.005
Cancer Screenings			
• *Colonoscopy*	71.4	94.7	<.001
• *Full Skin Assessment*	0	52.8	<.001
• *Mammogram*	0	35.2	<.001
• *Pap*	0	56.2	<.001
Other Screenings			
• *Alcohol Screening*	96.2	98.2	.608
• *Depression Screening*	35.8	33.3	.782
• *Diabetes Screening*	0	51.6	.003
• *Lipid Panel*	0	51.6	.003
• *Vitamin B_{12} Level*	8.3	59.3	.002
• *Iron Panel*	1.9	35.1	<.001
• *PPD or IGRA*	5.7	42.1	<.001
• *Tobacco Use / Cessation*	100	98.2	1.00

Note. Variables with only the blue screened post-tool line had 0% screened in the pre-tool.
Key – **Hep A:** Hepatitis A; **Hep B**: Hepatitis B; **MMR**: measles, mumps, and rubella; **Tdap:** tetanus and diphtheria toxoids with acellular pertussis **Td:** tetanus and diphtheria; **HPV**: Human Papilloma Virus; **Vit.**: Vitamin; **Rx:** Prescription; **Ca^{+}**: Calcium; **DEXA**: dual-energy X-ray absorptiometry **PAP**: Papanicolaou; **PPD**: purified protein derivative; **IGRA:** Interferon Gamma Release Assay.

Appendix A

CITATION Author(s), Date, Title, Journal Information, doi	**PURPOSE / BACKGROUND** Purpose & Outcome Measures or Goals (Aims)	**PARTICIPANTS / SETTING** Sample & Setting	**METHODS / DESIGN** Study Design & Interventions	**RESULTS / LIMITATIONS / RECOMMENDATIONS** Results, Strengths/Weaknesses, Limitations, & Recommendations
Bennett, Munkholm, & Andrews, 2015 Tools for Primary Care Management of Inflammatory Bowel Disease: Do They Exist? World Journal of Gastro-enterology doi:10.3748/wjg.v21.i15.4457	To explore what readily searchable tools, action plans, or guides exist for non-specialist for the care of IBD in comparison to other chronic diseases	A literature search using PubMed, EMBASE, and Ovid Medline databases	A systematic review	Results • Almost no tools exist to help primary care manage IBD patients • A gap exists in tools needed by primary care Recommendations • Tools need to be developed to help assist primary care in the management of IBD patients
Bodenheimer and Pham, 2010 Primary Care: Current Problems and Proposed Solutions https//doi.org/10.1377/hlthaff.2010.0026	To review the status of primary care in the United States and to discuss the projected primary care shortage	Review	Not a study, supporting article	Results • Primary care providers are geographically maldistribution • We are in an era of primary care shortage Recommendations • Increase access to primary care by adding hours (weekend and evening hours), institute open-access scheduling, use phone visits, and e-visits
Douthit, Kiv, Dwolatzdy, & Biswas, 2015 Exposing Some Important Barriers to Health Care Access in the Rural USA Public Health doi:10.1016/j.puhe.2015.04.001	To identify barriers in seeking or accessing health care in the rural USA	Studies focusing on disparities in access to healthcare. Differences between healthcare-seeking behaviors between urban and rural areas.	Literature Review	Results • Barriers in access significantly affect the health outcomes of rural residents Recommendation • Better representation of rural needs at the state and national level
Fancher et al., 2011	The authors describe the efforts	NA	Not a study, supporting	Results • Primary care careers are

An Academic-Community Partnership to Improve Care for the Underserved doi:10.1097/ACM.0b013e31820469ba	of the University of California, Davis School of Medicine's efforts to increase interns' interest in working with the underserved population through their TEACH program		article	declining
Farraye, Melmed, Lichtenstein, & Kane, 2017 ACG Clinical Guideline: Preventative Care in Inflammatory Bowel Disease The American Journal of Gastro-enterology doi:10.1038/ajg.2016.537	Review preventative care for IBD patients	Reviewed trials, meta-analyses, systematic reviews, and current guidelines	Clinical Guidelines	Results • IBD patients receive preventative care at a lower rate than general medical patients Recommendations • Annual flu vaccine, non-live for immunocompromised patients and their household members • Receive the PCV 13 and PPSV23 according to guidelines • Those > 50 (even some immunosuppressed groups) need the herpes zoster vaccine • Receive the varicella vaccine if no previous exposure before immunosuppressive therapy is initiated • Those immunosuppressed and traveling to areas where yellow fever are prevalent need an infectious disease specialist consultation • Adolescents with IBD should receive the meningococcal vaccine • Immunosuppressed patients' household members can receive live vaccines with caution • Need to receive appropriate vaccines for age prior to taking immunosuppressant agents • Need to receive Tap, HAV, HBV, and HPV per vaccination guidelines • Annual cervical cancer screening for women on

				immunosuppressant agents • Depression and anxiety screening for all patients • All patients regardless of their use of biologics need to be screened for melanoma • Patients on immunomodulators should be screened for non-melanoma squamous cell cancer • Screening for osteoporosis • Crohn's Disease patients should be counseled on smoking cessation
Hefner, Wexler, Scheck, & McAlearnery, 2015 Primary Care Access Barriers as Reported by Nonurgent Emergency Department Users: Implications for the US Primary Care Infrastructures doi: 10.1177/10628606.	To explore patient-reported barriers to accessing primary care by insurance status	Two hospital EDs within a large academic medical setting using a convenience sample of 349 patients presenting to the ED	Anonymous survey	Results • Self-reported barriers to accessing primary care 1. No insurance 2. No income / Financial / cost 3. Transportation 4. No PCP 5. Poor health condition 6. No time 7. Waiting time 8. Convenient hours of operation 9. Sent to ER by PCP 10. Difficulty finding a provider 11. Location inconvenient 12. Not fully outfitted • Barriers different for the insured (7-12) versus the uninsured (1-6) Limitations • Nonresponse bias by insurance status • Higher response rate by insured versus the non-insured • Location of study in a single area Recommendations • Enhance the primary care infrastructure
Institute for Health Metrics and Evaluations, 2019 The Global, Regional, and National, Burden of	Report the burden of IBD disease globally, regionally, and nationally	Vital registrations searched for mortality rates. Non-fatal burdens were searched using primary studies, hospital discharges, and claims data	Systematic review	Results • Increase in prevalence of IBD disease since 1990 • The death rate of IBD decrease since 1990 • Approximately doubling of the disability-adjusted life years from 1990 to 2017

Inflammatory Bowel Disease in 195 Countries and Territories, 1990-2017: A Systematic analysis for the Global Burden of Disease Study 2017 https://doi.org/10.1016/S2468-1253(19)30333-4				
Logan, Guo, Dodd, Muller, & Riley III, 2013 The Burden of Chronic Disease in a Rural North Florida Sample doi.org/10.1186/1471-2458-13-906	Characterize the prevalence of four major chronic diseases (diabetes, cardiovascular, cancer, and arthritis)	Telephone survey interviewing 2,526 respondents age 25 and older	Survey with professional interviewers	Results • Health disparities are a continual and significant problem among rural US residents Limitations • Oversampling of black males in order to represent the population demographics of rural Florida • Chronic disease was self-reported
Long et al., 2010 Increased Risk for Non-Melanoma Skin Cancer in Patients with Inflammatory Bowel Disease National Institutes of Health doi:10.1016/j.cgh.2009.11.24	To evaluate the risk of Non-melanoma skin cancer (NMSC)in IBD patients	Cohort Study consisted of 53,377 patients with IBD Nested Case-Control Study consisted of 742 cases of NMSC and 2968 controls.	Retrospective cohort and nested case-control studies	Results • Incidence of NMSC was significantly higher in the cohort study compared to the control group Strengths • Large sample size • Geographic diversity Limitations • Use of administrative data, therefore, a risk of misclassification of data • Elderly and uninsured not representative of the population studied
Melmed et al., 2006 Patients with Inflammatory Bowel Disease Are at Risk for Vaccine-Preventable Illnesses American Journal of	Assess exposure risk and immunization status among patients receiving care in an IBD specialty clinic	169 patients at an IBS specialty clinic	Survey	Results • IBD patients are under-vaccinated for preventable illnesses • 86% (146) currently or previous taking immunosuppressive medications • 45% recalled a tetanus vaccine within the last ten years • 28% (41) regularly received the flu vaccine

Gastro-enterology Doi:10.111/j..1572-0241.2006.00646.x				• 9% (13) received the pneumococcal vaccine • Reasons for not receiving the flu vaccine was unawareness (49%) and fear of side effects (18%) • 44% (75) at risk for HBV but only 28% (47) had been vaccinated Recommendation • Vaccinate against preventable illnesses
Selby et al., 2008 Receipt of Preventative Health Services by IBD Patients is Significantly Lower Than by Primary Care Patients Inflammatory Bowel Disease Doi:10.1002/ibd.20266	Assess the rate of IBD patients receiving 10 widely recommended preventative services	117 IBD patients from the University of Kentucky and 125 IBD patients from the University of Chicago's IBD outpatient clinic	Survey	Results • IBD patients receive preventative health services at a lower rate than general primary care patients. • Insurance coverage alone could not account for the difference in the preventative screenings between groups Limitation • The survey was based on recall; therefore, the ability to recall may have affected the results • IBD patients receive such complex services that it is possible they may not recall some preventative services in comparison to primary care patients who receive fewer services
Selby, Hoellein, & Wilson, 2010 Are Primary Care Providers Uncomfortable Providing Routine Preventative Care for Inflammatory Bowel Disease Patients? Digestive Diseases and Sciences Doi:10.1007/s10620-010-	Assess primary care providers attitudes and comfort levels toward preventative care of IBD patients	61 primary care providers at a family medicine review course	Survey	Results • Family medicine practitioners often are uncomfortable delivering preventative care to IBD patients Limitations • Unable to assess responder bias Recommendation • Clinical reminders may be beneficial in providing preventative care for the IBD patient in the PCP setting

1329-8				
Spetz and Muench, 2018 California Nurse Practitioners Are Positioned to Fill the Primary Care Gap, But They Face Barriers to Practice	To examine employment and practice barriers of California nurse practitioners	1,271 California Nurse Practitioners and Certified Nurse-Midwives	Survey	Results • Most nurse practitioners live in areas with a high ratio of physician providers • 40% of NP are 55 and older • Only 8 of 23 NP schools are in primary care shortage areas • Many NPs plan on moving out of state Limitations • Data is self-reported • A causal relationship cannot be interpreted due to analyses being cross-sections • Categorization of counties above or below statewide averages for a provider to patient ratio was arbitrary
Wasan, Coukos, & Farraye, 2011 Vaccinating the Inflammatory Bowel Disease Patient: Deficiencies in Gastroenterologist Knowledge doi:10.1002/ibd.21667	Assess gastroenterologists' knowledge of vaccinating the IBD patient. Assess the barriers preventing vaccination. Defining the role of the gastroenterologist in vaccinations.	108 gastroenterologists Members of the American College of Gastroenterology	Survey (19 questions)	Results • 52% (56) asked about vaccination status most or all the time • 64% (69) believed it was PCP responsibility to inquire about vaccination • 83% (90) believed it was the PCP responsibility to vaccinate • 66-88% recommended the appropriate vaccinations for IBD patients not on immunosuppressant therapy • 20-30% incorrectly recommended live vaccines to their immunocompromised IBD patients • 24-35% incorrectly did not give three queried live, attenuated vaccines to the immunocompetent patient • 66% (71) recommended the HPV to their immunocompetent patients • 47% (51) recommended the HPV to their immunosuppressed patient • 12% (13) correctly identified vaccines for both immunocompetent

				and immunosuppressed Limitations: • Rate of survey response (11%) Biases • Response bias • Prize offered • Possible underestimation of gastroenterologist knowledge of vaccines • No differentiation between a pediatric and adult gastroenterologist Recommendation • Educational programs on vaccination preventable illnesses for gastroenterologists who prescribe immunosuppressant agents
Valluru, Kang, & Gaidos, 2011 Health Maintenance Documentation Improves for Veterans with IBD Using a Template in the Computerized Patient Record System doi: 10.1007/s10620-018-5093-5	To assess if the implementation of a health maintenance template would improve preventative care measures	139 GI outpatients in the Hunter Holmes McGuire VA Medical Center in Richmond, Virginia	Retrospective chart review	Results • All preventative care recommendation improved except for that of HPV screening

Appendix B

Data Collection Tool

Chart Review Items	Which Patients	How Often	Categories
Age	All Patients	NA	18-29 (1) ☐ 30-39 (2) ☐ 40-49 (3) ☐ 50-59 (4) ☐ 60-69 (5) ☐ ≥ 70 (6) ☐
Gender	All Patients	NA	Female (1) ☐ Male (2) ☐ Other (3) ☐
Ethnicity	All Patients	NA	A. American (1) ☐ Asian (2) ☐ Caucasian (3) ☐ Hispanic (4) ☐ N. American (5) ☐ Other (6) ☐
Diagnosis	All Patients	NA	Crohn's (1) ☐ U. Colitis (2) ☐ Both (3) ☐
Years of Diagnosis			Unknown (0) ☐ < 8 years (1) ☐ ≥ 8 years (2) ☐
PCP	All Patients	NA	No (1) ☐ Yes (2) ☐
Last Visit to PCP	All Patients	NA	Unknown (0) ☐ ≤1 year (1) ☐ >1 year (2) ☐
Immunosuppressed	All Patients		No (1) ☐ Yes (2) ☐
Varicella	All Patients	One time (2-dose series)	No (1) ☐ Yes (2) ☐
Herpes Zoster	All Patients	One time (2-dose series)	No (1) ☐ Yes (2) ☐
MMR	All Patients	One time (2-dose series)	No (1) ☐ Yes (2) ☐
Tdap	All Patients	One time	No (1) ☐ Yes (2) ☐
Td	All Patients	Every 10 years (After Tdap)	No (1) ☐ Yes (2) ☐
Influenza	All Patients	Annually	No (1) ☐ Yes (2) ☐
HPV	Age 9-23	One time (3-dose series)	NA (0) ☐ No (1) ☐ Yes (2) ☐
Hepatitis A	All patients	One time (2 or 3-dose series)	No (1) ☐ Yes (2) ☐
Hepatitis B	All patients	One time (2 or 3-dose series)	No (1) ☐ Yes (2) ☐
Meningococcal Meningitis	Age 16-23	One time (2-dose series)	NA (0) ☐ No (1) ☐ Yes (2) ☐

Pneumococcal PVC13	Age ≥ 65 or 19 ≥ & immunosuppressed	One time	NA No Yes	(0) (1) (2)	☐ ☐ ☐
Pneumococcal PPSV23	Age ≥ 65 or 19 ≥ & immunosuppressed	One time	NA No Yes	(0) (1) (2)	☐ ☐ ☐
Vitamin D 25-OH Level	All patients	One time	No Yes	(1) (2)	☐ ☐
DEXA Scan	Women 65 ≥ and All at high risk	Every 2 years	NA No Yes	(0) (1) (2)	☐ ☐ ☐
Rx of Calcium & Vitamin D	All patients on oral steroids or deficient	As needed	NA No Yes	(0) (1) (2)	☐ ☐ ☐
Colonoscopy	All patients with extensive disease for > 8 yrs	Every 1-3 years	NA No Yes	(0) (1) (2)	☐ ☐ ☐
Pap Smear	All women on immunosuppressants	Annually	NA No Yes	(0) (1) (2)	☐ ☐ ☐
Full Skin Assessment	All patients on immunosuppressants	Annually	NA No Yes	(0) (1) (2)	☐ ☐ ☐
Mammogram	All women age 40-74 All women Age ≥ 75 (if life expectancy is ≥ 10 yrs)	Annually	NA No Yes	(0) (1) (2)	☐ ☐ ☐
Tobacco Use and Cessation	All patients at each visit	At each visit	No Yes	(1) (2)	☐ ☐
Depression Screening	All patients	Annually & PRN	No Yes	(1) (2)	☐ ☐
Alcohol Use Screening	All patients	At each visit	No Yes	(1) (2)	☐ ☐
B12	All patients with ileal disease or resection	Annually	NA No Yes	(0) (1) (2)	☐ ☐ ☐
Iron Panel	All patients	Annually	No Yes	(1) (2)	☐ ☐
Lipid Panel	All patients with HTN & HLD	Annually	NA No Yes	(0) (1) (2)	☐ ☐ ☐
Diabetes Screening	All patients with HTN & HLD	Annually	NA No Yes	(0) (1) (2)	☐ ☐ ☐
PPD or IGRA	All patients once	Once (Annually if exposed or high-risk area)	No Yes	(1) (2)	☐ ☐

Appendix C

Preventative Screening Evaluation Tool for IBD

Name: _____ DOB: _____

Primary Care Provider: _____ Last Appointment w/ PCP: _____

Diagnosis: _____ Immunosuppression: _____

Immunosuppression (Corticosteroids, immunomodulators, biologics, and thiopurines)

Vaccine Preventable Illnesses (Non-Live)	Ordered	Referred	Date Done
Herpes Zoster (Shingles – Non-Live Recombinant Vaccine RZV) Recommended for all patients> 50 or any taking immunosuppressive therapy or starting tofacitinib. (2 dose series @ least 4 weeks apart)			
Tetanus, Diphtheria, and Pertussis (Non-Live Vaccine) All patients not vaccinated should be given Tdap, followed by a Td booster every 10 years.			
Influenza (Non-Live Vaccine) Annually one dose to all patients during flu season. Avoid live intranasal vaccine in immunosuppressed patients.			
HPV (Non-Live Vaccine) Given to all patients (male and female) regardless of immunosuppression for the prevention of cervical and anal cancer. Three doses series approved for females and males ages 9-26.			
Hepatitis A (Non-Live Vaccine) Check HAV IgG. Give to all patients not immune. (2-dose series: Havrix or Vaqta or 3-dose series: Twinrix [HepA-HepB])			
Hepatitis B (Non-Live Vaccine) Before initiating anti-TNF therapy, check hepatitis B surface antigen, hepatitis B surface antibody, hepatitis B core antibody, and if the patient is non-immune, consider vaccinating with non-live hepatitis B vaccine (3 doses). Withhold anti-TNF treatment and check PCR if active viral infection or core Ab positive until an active infection is ruled out or treated appropriately. (2-dose Heplisav-B; 3-dose Engerix-B, Recombivax HB, or Twinrix [HepA-HepB]).			
Meningococcal Meningitis Group B (Non-Live Vaccine) Vaccinate at-risk patients such as college students age 16-23 if not formerly vaccinated regardless of immunosuppression.			
Pneumococcal Pneumonia (Non-Live Vaccine) All patients ≥ 65 years of age and not immunosuppressed: Consider vaccination with PSV23 (Pneumovax®). If on or planning immunosuppression therapy and are ≥ 19, vaccinate with PCV13 (Prevnar®) followed by PSV23 (Pneumovax®) ≥ 8 weeks later. Then after five years, follow with the PSV23 booster.			
Live Vaccines (Not recommended with immunosuppression)	**Ordered**	**Referred**	**Date Done**
Varicella (Chicken Pox Live Vaccine) For all patients, not immune. Check Varicella-Zoster Virus IgG. And if negative, consider vaccinating (2-dose series 4-8 weeks apart). Can be considered in patients on "low-dose" immunosuppression (prednisone ≤ 20 mg/day or MTX, 6-MP, azathioprine), BUT not patients on Biologics. May give > 4 weeks before starting biologics.			

MMR (Live Vaccine) All patients. **Contraindicated in immunosuppressed** patients. Vaccinate ≥ 4 weeks of initiating immunosuppressants			
Bone Health	**Ordered**	**Referred**	**Date Done**
Vitamin D 25-OH Level Check once in all patients and supplement if level deficient/insufficient			
DEXA Scan for bone density Assess bone density for women ≥ 65 or for the following patients **1.** Those with > 3 months steroid use **2.** Inactive disease with • Past chronic steroid use of ≥ 1 year within the past 2 years • Maternal history of osteoporosis • Malnourished or very thin • Amenorrheic • All postmenopausal women, irrespective of disease status.			
Prescription of Calcium & Vitamin D A prescription of calcium and vitamin D for all patients with each treatment of oral corticosteroids and if levels of vitamin D are deficient			
Cancer Screening	**Ordered**	**Referred**	**Date Done**
Colonoscopy for Cancer For all extensive disease (ulcerative colitis beyond the rectum or Crohn's in at least 1/3 of the colon) > than 8 years every 1-3 years.			
Pap Smear for Cervical Cancer Annual Pap smear for all women on immunosuppressive therapy.			
Full body assessment by a dermatologist for skin cancer A yearly visual exam of the skin by a dermatologist if Immunocompromised. Recommend sun exposure safety measures.			
****Mammogram for Breast Cancer** Women age 40-74 should receive yearly mammograms. Age ≥ 75 if the life expectancy of 10 years or >.			
Other Screenings	**Ordered**	**Referred**	**Date Done**
Tobacco Use and Cessation: Review at each visit			
Depression Screening: PHQ 2 at each visit			
****Alcohol Screening:** Review at each visit			
Nutritional Assessment: Obtain a B12 level if ileal disease or resection, and iron panel.			
****Lipid Panel:** Annually for hypertensive and hyperlipidemia patients			
****Diabetes Screening:** Annually for hypertensive and hyperlipidemia patients			
PPD or IGRA: Once for all patients before initiating anti-TNF or anti-IL-12/23 and then repeat annually if potential exposure to TB or in a high-risk region.			

Adaptive from Cornerstones Health IBD Checklist for Monitoring & Prevention. Retrieved from https://www.cornerstoneshealth.org/wp-content/uploads/2019/05/Checklist-for-Monitoring-Prevention-2018.pdf, and the Crohn's & Colitis Foundation Retrieved from https://www.crohnscolitisfoundation.org/sites/default/files/2019-09/Health%20Maintenance%20Checklist%202019-3.pdf with recommendations from the American College of Gastroenterology Clinical Guidelines.

** These screenings are part of general preventative screenings but were included due to importance in preventative care and ease of screening. **RZV:** Recombinant Zoster Vaccine; **MMR**: measles, mumps, and rubella; **Tdap:** tetanus and diphtheria toxoids with acellular pertussis **Td:** tetanus and diphtheria; **HPV**: Human Papilloma Virus; **PVC13:** pneumococcal conjugate vaccine; **PPSV23:** pneumococcal polysaccharide vaccine **DEXA**: dual-energy X-ray absorptiometry; **PAP**: Papanicolaou; **PHQ 2:** Patient Health Questionnaire; **PPD**: purified protein derivative; **IGRA:** Interferon Gamma Release Assay.

Signature: _____ **Date: _____**