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Preventative care for patients with inflammatory bowel disease in the Veterans Health Administration

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Abstract

Patients with inflammatory bowel disease (IBD) have underlying immune dysregulation. Immunosuppressive medications put them at risk of infection. This study assessed rates of recommended vaccinations and preventative screening in patients with IBD.

Nationwide data on patients diagnosed with IBD in the Veterans Health Administration (VHA) October 2004 to September 2014 were extracted. Variation in vaccination, screenings, and risk of death by demographic factors (age group, gender) were estimated in bivariate and multivariable analyses.

During the 10-year study period, 62,002 patients were treated for IBD. Nonmelanoma skin cancer was found in 2.6%, and these patients more commonly accessed dermatology clinic (22.5% vs 15.2%; chi-square = 66.6; df = 1; $P < 0.0001$). In total, 15% received DEXA scans, especially women (34.7% vs 13.2% men; chi-square = 1415.5; df = 1; $P < 0.0001$). Eye manifestations were noted in 38.3% yet only 31% were referred to ophthalmology. Abnormal Pap smears were found for 15% of women <65 (compared to 5% among normal patient populations); 34% had no record of Pap smear in VHA data. Vaccination rates were modest: pneumococcal 39%; TDAP 23%; hepatitis B 3%; varicella and PPD <0.5%. In an adjusted logistic regression model, 5-year mortality was lower among those using primary care prior to IBD diagnosis (odds ratio [OR] = 0.61; 95% CI 0.55–0.68).

Despite the current IBD guidelines, vaccination and preventative screening rates were unacceptably low among patients diagnosed with IBD. Interventions such as education and increased awareness may be needed to improve these rates.

Abbreviations: 6-MP = 6 mercaptopurine, AZA = azathioprine, CDC = Centers for Disease Control and Prevention, CHF = congestive heart failure, CI = confidence interval, COPD = chronic obstructive pulmonary disease, CPT = current procedural terminology, DEXA = dual-energy x-ray absorptiometry, DF = degrees of freedom, FRAX = fracture risk assessment tool, FY = fiscal year, HIV = human immunodeficiency virus, HPV = human papilloma virus, IBD = inflammatory bowel disease, ICD-9 = International Classification of Disease-9, OR = odds ratio, Pap = Papanicolaou, PCP = primary care provider, PPD = purified protein derivative, SD = standard deviation, STOPP = surgical treatment outcomes for patients with psychiatric disorders; TDAP = tetanus–diphtheria–acellular pertussis, TNF-alpha = tumor necrosis factor-alpha, US = United States, VHA/VA = Veterans Health Administration.

Keywords: inflammatory bowel disease, preventative health, veterans health administration

1. Introduction

Patients with inflammatory bowel disease (IBD) have underlying immune dysregulation felt to be due to several factors, including intestinal dysbiosis, increased intestinal epithelial permeability, and medications. Evidence suggests that the balance between microbes, particularly commensal flora, plays an important role in the pathogenesis of IBD.[1,2] Immunosuppressive medications further predispose these patients to developing a variety of infectious conditions. TNF-alpha inhibitors have been associated with increased risk of reactivation of latent tuberculosis, in large part due to their role in granuloma formation.[3] Thiopurine agents such as azathioprine (AZA) or 6-mercaptopurine (6-MP) have been shown to predispose patients to bacterial and viral infections. Corticosteroids used as monotherapy and dual therapy with either anti-TNF or thiopurines have been shown to increase risk of infections. Although minimizing exposure to corticosteroids and monitoring for leukopenia in patients on thiopurine analogs are important in infection control, vaccination remain one of the hallmarks of preventative care in these patients.[4]

Studies have demonstrated suboptimal rates of vaccination in IBD patients.[5,6] Guidelines for vaccination in IBD patients were published in 2004.[7,8] Despite this, poor vaccination rates persist

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due to several factors, including lack of awareness on the part of clinicians, fear of potential adverse effects, or ambiguity as to which provider should take responsibility for immunizations.[9]

Additionally multiple studies have shown increased risk of nonmelanoma skin cancer, cervical cancer, osteoporosis, and eye manifestations among patients with IBD.[10–15] We sought to expand on the concept of quality improvement within the VA and evaluate for other possible areas that could be addressed to improve the healthcare of IBD patients. Therefore, we assessed rates of recommended vaccinations and preventative screening among patients with IBD using the VA for care, and analyzed the association of these factors with 5-year mortality.

2. Methods

Data were extracted from the administrative data repository maintained by the VA and accessible for research.[16–19] Included patients were veterans diagnosed with IBD per ICD-9 diagnosis codes (555.0, 555.1, 555.2, 555.9, 556.0, 556.2, 556.3, 556.5, 556.6, 556.9) during fiscal year 2005 to 2014 (FY05–FY14; October 2005–September 2014) with prior-year use including comorbid diagnosis data. Veteran status was determined by a valid VA Priority code in the range 1 to 8 indicating why the patient was eligible for VA care based on military experiences, disability, and poverty. VA Priority 1 veterans are highly disabled (50–100%) and have no copays. Veterans with VA Priority 2–6 have lesser levels of disability or special military circumstances and pay copays for pharmacy benefits only. Priority 7 to 8 are veterans who agreed to copayments for both pharmacy and care.[20,21] The source files are extracts of VA's all-electronic medical records system and capture all care episodes. We used inpatient and outpatient data on encounters, lab tests, procedures, and pharmacy fills as contained in the STOPP Research Data Repository.[22] Demographics included age, marital status, and gender. Comorbidity was assessed by the Selim Chronic Disease score counting 30 physical conditions and 6 mental illnesses.[23] Selim conditions are anemia, cancer, skin cancer, cataract, hepatitis, chronic obstructive pulmonary disease (COPD), chronic heart failure (CHF), diabetes, diverticula of the colon, colitis or enteritis, enlarged prostate, inflammatory disease of the prostate, gall bladder disease, gout, osteoarthritis, hip problems, other arthropathies, rheumatoid arthritis, hypertension, heart attack, angina, arrhythmia, peripheral vascular disease, transient ischemic attack, stroke, low back pain, ulcers, seizures, thyroid disorders, and urinary tract infection; anxiety, depression, bipolar disorder, schizophrenia, post-traumatic stress disorder, and alcohol use disorder. Additional conditions were osteoporosis and osteopenia (ICD9 codes 733), nonmelanoma skin cancers (basal cell carcinoma, squamous cell carcinoma: 173), and eye disorders (360.11, 365.00–05, 365.20–24, 366.00–04, 366.10–18, 370, 371.23, 371.43, 371.49, 379, 710.2x). Preventative care was operationalized by procedure codes for vaccinations and screenings. Vaccines included pneumococcal (CPT codes 90732, 90669, 90670, G0009), varicella (CPT 90716), and TDAP (CPT 90715, 90700) as well as hepatitis B vaccination (CPT codes 90739, 90740, 90746, 90747) and PPD (CPT code 90585). Specialty care was captured by clinic type (ophthalmology; dermatology; women's health) and screenings by CPT codes or ICD9 visit/diagnosis codes (eye: CPT 92225, 92226; Papanicolau test: CPT 87621, 88164, 88141, 88142, 88143, 88174, 88175; HPV: ICD9 V73.1, 795.0x, 795.1x, 622.1x; gynecological exam: ICD9 V72.31; DEXA scan: CPT 77080), whereas abnormal dermatology results were indicated by ICD9 codes V76.2, V76.47, V76.49. Indicators were created for each patient.

The study was approved prior to initiation by the Institutional Review Board of the Central Texas Veterans Health Care System using expedited procedures; consent was waived.

Analyses included descriptive means and frequencies, gender comparisons, and a multiple logistic regression of 5-year mortality as a function of demographics, comorbidity, corticosteroid use, pre-/post-IBD primary care and pneumococcal vaccination with an indicator for truncated follow-up for those with <5 years of follow-up. Results were reported as odds ratios and their 95% confidence intervals (95% CI). Odds ratios <1 indicate protective effects; those >1 indicate risk factors.

3. Results

During the 10-year study period, 62,002 patients were treated for IBD. The sample included 4076 women (6.6%); 26,719 (43%) patients were over the age of 65 (45% of men and 13% of women were >65; see Table 1). Most (62%) patients used VA care each of the 10 years of the observation period (mean 8.4; SD 2.5). Reflecting patients with IBD diagnosed in prior years, 36% entered the study cohort in the first fiscal year, then 7% to 8.5% each year thereafter, and only 6% in FY2014.

Patients used primary care before their IBD diagnosis (91%); after diagnosis, this increased to 96% (chi-square = 31.6; df = 1; $P < 0.0001$) with a median of 3 primary care visits within 6 months of diagnosis. Few patients utilized a dermatology clinic (9,525; 15.4%) during the 10-year period. Nonmelanoma skin cancer was found in 2.6% of patients (1,637) and was associated with using dermatology clinic (22.5% vs 15.2%; chi-square = 66.6; df = 1; $P < 0.0001$). Fifteen percent of IBD patients received DEXA scans in the 10-year study period; DEXA scans were more common among women (34.7% women vs 13.2% men; chi-square = 1415.5; df = 1; $P < 0.0001$). Osteoporosis or osteopenia was diagnosed before IBD onset in 13% of women and 4.8% of men (chi-square = 512.5, $P < 0.0001$), and after IBD in 24.0% of women and 11.2% of men (chi-square = 587.6, $P < 0.0001$). Eye manifestations were noted in 38.3% of the sample (18.7% before IBD; 31.2% after) yet only 31% of IBD patients were referred to ophthalmology clinic at some time during the study period (16.5% pre-IBD; 24.3% post-IBD). Among women, 73.1% had gynecological exams and 16.7% were tested for HPV in the VHA. Among women under 65 years of age, 36.6% had Pap tests before IBD diagnosis and 50.8% after; over the entire period of study, 66.6% had at least 1 Pap test. Abnormal Pap smears were found for 15.1% of women with IBD (compared to 5% among normal patient populations). Vaccination rates were modest: pneumococcal 38.6% overall; TDAP 23.0%; hepatitis B 2.9%; varicella and PPD: both < 0.5%. See Tables 2–5 for details on utilization.

Before IBD diagnosis, patients on AZA (10.1%; 6280) were as likely to use dermatology clinic as those not on AZA (14.9% on AZA vs 15.4%; chi-square = 1.37; df = 1; $P = 0.24$) but much more likely to do so after diagnosis with IBD (36.5% vs 24.4%; chi-square = 431.1; df = 1; $P < 0.0001$).

In the adjusted logistic regression model of 5-year mortality post-IBD diagnosis controlling for age in years, gender, race, Hispanic ethnicity, being married and prescribed corticosteroids as well as Selim prior-year comorbidity score, risk of death was lower for those with primary care before IBD (OR = 0.59; 95%CI 0.51–0.70; see Table 6). Corticosteroids were associated with increased odds of death (OR = 1.51; 95%CI 1.35–1.70). A model

Table 1

Veterans treated for inflammatory bowel disease (IBD) during FY2005 to FY2014 (N = 62,002).

	All veterans		Males N = 57,926		Females N = 4076	
Cohort characteristics	**N or mean**	**% or SD**	**N or mean**	**% or SD**	**N or mean**	**% or SD**
Age in years (range 20–103)*	61.1	15.2	62.0	14.9	48.5	14.5
Selim Mental Comorbidity Score (range 0–6)*	0.4	0.8	0.4	0.8	0.7	1.0
Selim Physical Comorbidity Score (range 0–15)*	2.3	2.1	2.0	2.1	1.6	1.9
Survival since IBD (in years; range 0–11)	6.29	3.43	6.29	3.43	6.30	3.35
Female	4076	6.6				
65 or older at time of IBD diagnosis*	26,719	43.1	26,217	45.3	502	12.3
Race						
White*	47,619	83.6	44,892	84.5	2727	71.3
African American*	7830	13.7	6863	12.9	967	25.3
Other*	1525	2.7	1392	2.6	133	3.5
Missing race data*	5028	8.1	4779	8.3	249	6.1
Hispanic	2955	5.2	2744	5.2	211	5.5
Married*	37,489	60.5	36,044	62.2	1445	35.5
Divorced*	12,034	19.4	10,725	18.5	1309	32.1
Census Region of Residence*						
Northeast	10,483	16.9	9993	17.3	490	12.0
Midwest	13,848	22.3	13,098	22.6	750	18.4
South	24,801	40.0	22,850	39.5	1951	47.9
West	11,778	19.0	10,929	18.9	849	20.8
Puerto Rico, Virgin Islands	1092	1.8	1056	1.8	36	0.9
VA Priority Status						
Priority 1: 50–100% service-connected disability*	15,099	24.4	13,633	23.5	1466	36.0

IBD = inflammatory bowel disease, FY = fiscal year, VA = Veterans Health Administration, SD = standard deviation.
* Significant difference by gender.

including vaccination and primary care after IBD showed strong protective effects although such a model is confounded by the fact that persons who died also had less chance of receiving care or a vaccination after the index date of IBD diagnosis (OR[primary care pre] = 0.71 [0.63–0.79]; OR[primary care post] = 0.14 [0.12–0.16]; OR[pneumococcal vaccine pre] = 0.89 [0.84–0.96]; OR[pneumococcal vaccine post] = 0.26 [0.24–0.28]).

4. Discussion

Significant advances have been made in the treatment of inflammatory bowel disease. The advent of biologic drugs has ushered in a new era in which more patients can achieve long-term remission. Current pharmacologic therapies act by suppressing the immune system at various levels, and therefore predispose patients to infections and malignancies. Combined with acquired infectious microbes that cause gastrointestinal infection, suppressed immune response may be especially threatening to the patient with IBD. Chronic steroid use can also predispose to osteoporosis and other complications. Due to these unique issues facing IBD patients, current guidelines mandate specific preventative care strategies aimed at reducing morbidity and mortality. In this study, we examined the frequency with which preventative care measures are being appropriately implemented in IBD patients within the VA healthcare system.

Only 39% of IBD patients in our study had a documented pneumococcal vaccine compared to 86.9% in a survey of elderly VA patients between 2000 and 2003.[24] Data from the Centers for Disease Control and Prevention (CDC) show that 56% to 62% of adults age 65 years or older reported having received the pneumococcal vaccine.[24] This suggests that pneumococcal

Table 2

Vaccination rates among patients with IBD in the Veterans Health Administration FY2005 to FY2014 (N = 62,002).

	All veterans		Males N = 57,926		Females N = 4076	
Cohort characteristics	**N**	**%**	**N**	**%**	**N**	**%**
Varicella before IBD	31	0.0	28	0.0	3	0.0
Varicella after IBD	152	0.2	141	0.2	11	0.3
Hepatitis B before IBD	544	0.9	495	0.9	49	1.2
Hepatitis B after IBD	1338	2.2	1231	2.1	107	2.6
PPD before IBD	6	0.0	5	0.0	1	0.0
PPD after IBD	13	0.0	13	0.0	0	0
Pneumococcal vaccine before IBD	11,150	18.0	10,576	18.3	574	14.1
Pneumococcal vaccine after IBD	14,621	23.6	13,731	23.7	908	22.3
TDAP before IBD	2245	3.6	2036	3.5	209	5.1
TDAP after IBD	12,046	19.4	11,111	19.2	935	22.9

IBD = inflammatory bowel disease, FY = fiscal year, PPD = purified protein derivative, TDAP = Tetanus–Diphtheria–Acellular Pertussis.

Table 3

Metabolic bone disease and ophthalmology, dermatology data among veterans with IBD FY2005 to FY2014 (N = 62,002).

	All veterans		Males N = 57,926		Females N = 4076	
Cohort characteristics	**N or mean**	**%**	**N**	**%**	**N**	**%**
Osteoporosis before IBD*	2101	3.4	1747	3.0	354	8.7
Osteoporosis after IBD*	4383	7.1	3807	6.6	576	14.1
Osteopenia before IBD*	1555	2.5	1292	2.2	263	6.5
Osteopenia after IBD*	4532	7.3	3892	6.7	640	15.7
Nonmelanoma skin cancer before IBD*	835	1.3	264	0.5	571	14.0
Nonmelanoma skin cancer after IBD*	1002	1.6	231	0.4	771	18.9
Ophthalmologic clinic before IBD	10,220	16.5	9557	16.5	663	16.3
Ophthalmology clinic after IBD	15,049	24.3	14,080	24.3	969	23.8
Eye disorders						
Cataracts before IBD*	9283	15.0	8877	15.3	406	10.0
Cataracts after IBD*	16,427	26.5	15,614	27.0	813	20.0
Glaucoma before IBD	4034	6.5	3813	6.6	221	5.4
Glaucoma after IBD	6687	10.8	6299	10.9	388	9.5
Scleritis before IBD	104	0.2	80	0.1	24	0.6
Scleritis after IBD	216	0.3	186	0.3	30	0.7
Keratoconjunctivitis sicca before IBD	221	0.4	182	0.3	39	1.0
Keratoconjunctivitis sicca after IBD*	377	0.6	308	0.5	69	1.7
Episcleritis before IBD	8	0.0	6	0.0	2	0.0
Episcleritis after IBD	21	0.0	19	0.0	2	0.1
Uveitis before IBD	15	0.0	14	0.0	1	0.0
Uveitis after IBD	3	0.0	3	0.0	0	0.0
Keratopathy before IBD*	645	1.0	572	1.0	73	1.8
Keratopathy after IBD*	1227	2.0	1110	1.9	117	2.9

IBD = inflammatory bowel disease, FY = fiscal year.

* Significant difference by gender.

Table 4

Gynecologic care among women veterans with IBD FY2005 to FY2014.

	Females N = 4076	
Cohort characteristics	**N**	**%**
Gynecological exam	2529	62.1
Pap test (women of all ages)	2531	62.1
HPV diagnosis	679	16.7
Women <65 years	N = 3574	
Pap test before IBD, <65 years	1309	36.6
Pap test after IBD, <65 years	1816	50.8
Pap test among those <65 years	2381	66.6
HPV diagnosis	662	18.5

IBD = inflammatory bowel disease, FY = fiscal year, HPV = human papilloma virus, Pap = papanicolaou.

Table 5

Primary care and comorbidity data for veterans with IBD FY2005 to FY2014 (N = 62,002).

	All veterans		Males N = 57,926		Females N = 4076	
Cohort characteristics	**N**	**%**	**N**	**%**	**N**	**%**
Primary care before IBD	56,405	91.0	52,733	91.0	3672	90.1
Primary care after IBD	59,687	96.3	55,755	96.3	39 332	96.5
Primary care within 30 days of IBD diagnosis*	48,877	78.8	45,701	78.9	3176	77.9
Other comorbidity						
Diabetic prior year*	11,867	19.1	11,446	19.8	421	10.3
COPD prior year*	7743	12.5	7232	12.5	511	12.5
Hypertension prior year*	28,057	45.3	26,917	46.5	1140	28.0
Depression prior year*	10,667	17.2	9417	16.3	1250	30.7
Died within 1 year of IBD diagnosis*	2774	4.5	2699	4.7	75	1.8
Died within 2 years of IBD diagnosis*	4664	7.5	4537	7.8	127	3.1
Died within 5 years of IBD diagnosis*	9285	15.0	9050	15.6	235	5.8

COPD = chronic obstructive pulmonary disease, IBD = inflammatory bowel disease, FY = fiscal year.

* Significant difference by gender.

Table 6

Factors associated with 2-year mortality among veterans diagnosed with inflammatory bowel disease FY2005 to FY2014 (N = 62,002).*

Characteristic	Odds ratio	95% Confidence interval
Age in decades†	2.05	1.99–2.11
Female†	0.73	0.61–0.89
Hispanic†	1.18	1.02–1.37
African American†	0.89	0.75–<1.00
Asian/Native peoples	0.94	0.75–1.17
Missing data on race†	1.60	1.45–1.77
Married†	0.68	0.63–0.72
VA Priority 1	1.02	0.94–1.10
Selim comorbidity score year prior to IBD†	1.23	1.21–1.24
Primary Care before IBD†	0.58	0.50–0.66
Corticosteroids before IBD†	1.52	1.35–1.70
Pneumococcal vaccine before IBD	0.94	0.87–1.01

IBD = inflammatory bowel disease, FY = fiscal year, VA = Veterans Health Administration.
* Model controlled for truncated follow-up.
† Indicates statistically significant effect.

vaccination is more common among the elderly at-risk population than among IBD patients in the VA healthcare system; however, patients in the VA may be receiving this vaccination in other healthcare settings, so this conclusion is only speculative.

Melmed et al completed a study in which patients with IBD were given a questionnaire regarding their recollection of several vaccinations.[25] Out of 145 patients who had previously been exposed to immunosuppressive medication, 28% recalled yearly influenza vaccinations, 9% reported pneumococcal vaccination, 45% recalled tetanus vaccination, and only 31% had been vaccinated for hepatitis B.[5] A study of 49,350 Veterans Health Administration (VA) patients showed similarly dismal rates of vaccination for pneumovax, with only a 20% rate of vaccination recorded in VA data.[6]

Our data are also consistent with recent evidence showing that overall rates of screening measures are lower in IBD patients compared to the general population.[26] The rate of Pap smears among women in our study was significantly lower (66%) than the national average for all women under age 65. Statistics from the Centers for Disease Control and Prevention show that in the United States in 2005, between 80% and 84% of women under age 65 had undergone a Pap smear in the previous 3 years.[27] Likewise, a report from the VA Office of Inspector General showed that in a sample of >2000 women veterans from 2011 and 2012, 91% had documentation of cervical cancer screening or refusal.[28] In our study, only 66% of women had undergone a Pap smear in the previous 10 years. The latest 2013 guidelines from the American College of Obstetricians and Gynecologists recommended cervical cancer screening with pap tests every 3 years or 5 years with human papilloma virus (HPV) testing for women with no risk factors.[12] Notably, however, guidelines for HIV-infected patients recommend annual screening without HPV testing and have been applied to all immunocompromised patients regardless of the cause of their immunocompromised state. The increased risk of cervical dysplasia among immunocompromised patients is felt to be due to prolonged persistence of HPV infection compared to the general population.[29] In a 2015 meta-analysis by Allegretti et al, there was an increased risk of cervical high-grade dysplasia/cancer among patients with IBD on any immunosuppressive medication, with an overall odds ratio of 1.34.[13]

Patients on thiopurine analogs, particularly azathioprine, have consistently shown the highest risk of nonmelanoma skin cancer. In 2010, Long et al showed over a 4-fold increased risk in patients who had been on azathioprine for over 1 year.[10,11] In our study, only 11% of the patients had utilized dermatology clinic.

Lastly, the side effects resulting from prolonged exposure to corticosteroids have been well documented, including osteoporosis, glaucoma, and cataracts. Studies on glucocorticoid induced osteoporosis have shown that a prednisone dose of 5 mg per day for a total of 3 months increases fracture risk.[11] The American College of Rheumatology has suggested osteoporosis screening with dual x-ray absorptiometry (DEXA) scan based on the World Health Organization Fracture Risk Assessment Tool (FRAX), taking into account corticosteroid use. Screening for higher risk individuals is recommended as early as <50 years of age. Although we did not have data on dose or duration of prescription of glucocorticoids, our findings do accord with these previously noted risks of corticosteroid exposure.

In addition to cataracts and glaucoma induced by corticosteroids, rare complications including uveitis and episcleritis are also more prevalent among the IBD patient population.[15] Given these risks, patients with IBD should be closely monitored for osteoporosis and considered for DEXA scan and should be closely monitored by an ophthalmologist.

We do have some limitations in our study. The rate of preventative care in this study may have been underestimated. Patients with private insurance, Medicare, or Medicaid may seek care in the community. As such they may have gotten screening and preventative care in the community with VA PCP documenting them as compliant; we were unable to ascertain this. Not all vaccines are for immunological regulation; some may be remedial. We were unable to differentiate between these indications. Our study did not review clinical notes, but our patients used the VA an average of 8 out of the 10 years studied. Another limitation of this study is our data collection over a 10-year interval. Information on lifetime vaccination status or screening data was not available. It should also be noted that not all patients with IBD require all the screening tests examined in this study. Guidelines recommend screening for osteoporosis in IBD patients with ongoing steroid use, cumulative prior steroid use greater than 3 months, history of low trauma fractures, age over 60, or in postmenopausal females.[29]

Our data should be interpreted in this context, realizing that not all patients in our study required a DEXA scan or the other screening tests. We were also unable to obtain dose and frequency data on the immune mediators, and had no information on sources and tissue types of infections. This also contributes to uncertainty about whether the observed rate of DEXA scans was low, as we have no data on long-term steroid use. Another inherent limitation in studies conducted through the VA healthcare system is that the patient population is predominantly male; thus, conclusions may not generalize to the general population.

Various explanations for the low rates of preventative care measures in IBD patients have been proposed.[26] One possibility is that there is uncertainty about which physician is responsible for preventative care in IBD patients. Primary care physicians may be hesitant to order routine vaccinations and screening tests due to lack of awareness of IBD-specific guidelines. Gastroenterologists, on the other hand, may assume that the primary care physicians are ordering vaccinations and routine screening. Another possibility is that in patients with complex medical problems such as IBD, primary care physicians, as well as

subspecialists invest more energy in planning out management of the disease and therefore are more prone to neglect routine preventative care.

5. Conclusions

In conclusion, our study suggests that preventative care rates for IBD patients in the VA healthcare system lag behind national standards. Rates of both vaccinations and screening tests show significant room for improvement. Future research should be aimed at identifying interventions that may improve these rates, such as standardized patient intake processes, template notes, and patient surveys.

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