Published in final edited form as:

Am J Med Sci. 2012 September ; 344(3): 194–198. doi:10.1097/MAJ.0b013e31823ea5b0.

Scheduled out-patient endoscopy and lack of compliance in a minority serving tertiary institution

Danielle S. Jackson, M.P.H.¹, Nneka Egbuonnu, M.D., M.P.H.², Chukwuma Umunakwe, M.D.³, Terrence M. Fullum, M.D.⁴, Debra H. Ford, M.D.⁴, Kyle B. Anders, M.D.², Shelly McDonald-Pinkett, M.D.², Duane T. Smoot, M.D.², and Adeyinka O. Laiyemo, M.D., M.P.H.²

¹Medical student, Howard University College of Medicine, Washington DC

²Department of Medicine, Howard University College of Medicine, Washington DC

³Howard University Cancer Center, Washington DC

⁴Department of Surgery, Howard University College of Medicine, Washington DC

Abstract

Background—Lack of adherence to appointments wastes resources and portends a poorer outcome for patients. We sought to determine if the type of scheduled endoscopic procedures affect compliance.

Methods—We reviewed the final endoscopy schedule from January 2010 to August 2010 in an inner city teaching hospital that serves a predominantly African American population. The final schedule only includes patients who did not cancel, reschedule or notify the facility of their inability to adhere to their care plan up to 24 hours prior to their procedures. All patients had face to face consultation with gastroenterologists or surgeons prior to scheduling. We identified patients who did not show up for their procedures. We used Poisson regression models to calculate Relative Risks (RR) and 95% Confidence Intervals (CI).

Results—Of 2,183 patients who were scheduled for outpatient endoscopy, 400 (18.3%) patients were scheduled for Esophago-gastro-duodenoscopy (EGD), 1,335 (61.2%) for colonoscopy and 448 (20.5%) for both EGD and colonoscopy. The rate of non compliance was 17.5%, 22.8% and 22.1%, respectively. When compared to those scheduled for only EGD, patients scheduled for colonoscopy alone (RR = 1.47; 95%CI: 1.13-1.92) and patients scheduled for both EGD and colonoscopy (RR = 1.36; 95%CI: 1.01-1.84) were less likely to show up for their procedures.

Conclusions—Our study suggests a high rate of non-compliance with scheduled out-patient endoscopy, particularly for colonoscopy. Since this may be a contributing factor to colorectal cancer disparities, increased community outreach on colorectal cancer education is needed and may help to reduce non compliance.

Keywords

Colonoscopy; compliance; upper endoscopy; out-patient endoscopy

Corresponding author (also for reprint requests): Adeyinka O. Laiyemo, M.D., M.P.H., Division of Gastroenterology, Department of Medicine, Howard University College of Medicine, 2041 Georgia Avenue, NW, Washington DC 20060. Phone: (202) 865 – 7186; Fax: (202) 865 – 6562; adeyinka.laiyemo@howard.edu.

Conflict of interest: None

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

INTRODUCTION

Despite evidence that screening can reduce the incidence of and mortality from colorectal cancer (1-8), a large segment of the population is not up to date with screening recommendations (9-11). Although the use of colonoscopy as a primary screening modality has been increasing in recent years (12, 13), the rate of utilization of colonoscopy among blacks is substantially lower than non Hispanic whites in the United States (14-17). Healthcare access has been suggested as a possible explanation for this, but there is evidence to suggest that even among the insured patients (14, 15) and in equal access systems such as the Military healthcare systems (16) or Veterans Affairs systems (17), the rates of colonoscopy utilization remains lower among blacks when compared with whites. It is noteworthy that healthcare access is not necessarily equivalent to utilization, because it is quite possible for a person to have access (e.g. available healthcare facility, personnel, health insurance etc.) but may still opt not to go to the hospital/clinic because of mistrust or lack of buy-ins in the services provided (18).

Previous studies that have assessed adherence to colonoscopy screening have evaluated the completion rates of colonoscopy among patients who were referred by their primary care physicians without being scheduled for the procedure (19) or scheduled for open access endoscopy without prior contact with a gastrointestinal endoscopist (20, 21). Overall non attendance rate as high as 42% was reported. We sought to determine the rate of non compliance with scheduled out-patient endoscopy in an urban tertiary institution that serves predominantly African Americans where a face-to-face consultation with a gastrointestinal endoscopist occurs prior to every scheduling and also to determine whether the type of endoscopy scheduled affect compliance.

METHODS

We extracted data from the final endoscopy schedule from January 2010 to August 2010 at Howard University Hospital, a minority serving tertiary institution in Washington DC that serves predominantly African American population. Our facility is a not-for-profit facility in the District of Columbia. The final schedule is typically published in the afternoon proceeding the day of the procedures, and on Friday afternoons for Monday procedures. We excluded procedures that were cancelled by the endoscopists. Only 2 flexible sigmoidoscopies were performed during the study period and were also excluded from this analysis. Therefore, the present study only focused on patients who were expected for their scheduled procedures the following endoscopy day. These are patients who did not cancel or reschedule or notify the facility of their inability to adhere to the care plan up to 24 hours before their procedures. We do not have open access scheduling. Therefore, all patients scheduled have been evaluated by the gastrointestinal endoscopists (gastroenterologists or surgeons) who scheduled the procedures. The typical interval between clinic consultation and scheduled out-patient procedure date is 2 to 4 weeks. An information booklet to educate patients about their procedures with detailed information about the required preparation for the procedures as well as information about their endoscopists was given to patients after face to face consultations. It also provides instructions for patients to call the facility if they were unable to keep their appointments. Rarely did patients call to cancel their appointments; they simply failed to show up. Nonetheless, an ambulatory surgical center's staff typically called scheduled patients in the evening prior to the procedures using the final endoscopy schedule, but this information was not tracked. We did not have a dedicated patient navigator for our endoscopy suite. We defined compliant patients as those who came to the endoscopy suite for their procedures whether the procedures were eventually performed or not (in a few instances the procedures were not performed because the patient

was medically unstable, had no escort, was not properly bowel prepped, or informed consent could not be obtained).

We abstracted patient information, day and time of the scheduled procedure and type of procedures' scheduled. We categorized procedures as esophago-gastro-duodenoscopy (EGD), colonoscopy or concomitant EGD and colonoscopy. There were only 20 EGD with endoscopic ultrasound or endoscopic retrograde cholangiopancreatography or gastrostomy tube placement performed as an out-patient during the study period, and were included in the EGD category. We used ANOVA for continuous variable (age) and chi square tests to compare categorical variables by the procedure scheduled. We used Poisson regression models to evaluate the association of the scheduled procedure with non compliance and adjusted for patients age (continuous), sex, marital status, day of the week, time of the scheduled procedure (morning versus afternoon), and type of healthcare insurance (commercial or private, Government-sponsored, and uninsured/self pay) for our main analysis. Because the type of insurance is a putative risk factor for non adherence, we also performed a stratified analysis for lack of compliance for endoscopy by insurance type. We calculated relative risks (RR) for non compliance and 95% Confidence Intervals (CI). All reported P-values correspond to two-sided tests. All analyses were performed with STATA statistical software version 11.2 (College Station, Texas). Alpha error was set at 0.05 level.

RESULTS

A total of 2,183 patients were scheduled for outpatient endoscopy. The mean age was 55.0 years, 529 (24.2%) were younger than 50 years old and 1,312 (60.3%) were females (Table 1). Although only 36 (1.7%) were uninsured/self pay, the majority of patients (73.1%) had Government-sponsored insurance coverage such as Medicaid, Medicare and other Government assisted programs (Medical charities and District of Columbia Medical coverage for the needy District residents (DC Healthcare Alliance). Approximately 60% of the procedures were scheduled in the morning. EGD was scheduled for 400 (18.3%) patients, 1,335 (61.2%) for colonoscopy and 448 (20.5%) for concomitant EGD and colonoscopy. Patients scheduled for colonoscopy only were older. Males were more likely to be scheduled for colonoscopy only, but there were no differences in procedure schedule by marital status (Table 1).

Of patients scheduled for EGD, colonoscopy and concomitant EGD and colonoscopy, 70 (17.5%), 304 (22.8%) and 99 (22.1%) patients did not show up, respectively. After adjusting for age, sex, marital status, day and time of scheduled procedure and medical insurance, when compared to patients who were scheduled for only EGD, patients who were scheduled for colonoscopy were less likely to show up for their procedures whether it was part of multiple procedures in one day or not (Table 2).

In our stratified analysis by insurance type, the model for uninsured/self paying patients was unstable because few patients fell into this category ($n = 36$). Overall, the percentage of non compliant patients was slightly higher among those with Government sponsored coverage but a similar pattern of higher rates of no shows for scheduled colonoscopy was observed regardless of type of insurance (Table 3).

DISCUSSION

We evaluated the association between the type of scheduled out-patient endoscopy and the risk of non compliance among a predominantly African American population in an urban tertiary institution. Our study suggests that the type of scheduled procedure influences adherence to endoscopic procedures with an unacceptably high rate of no shows in general,

and for colonoscopy in particular. Previous studies have evaluated the rate of completing a recommended colonoscopy when patients were referred or scheduled for their procedure by their primary care physicians in an open access system (19-23) and reported a non compliance rate of approximately 40% among African American populations. Denberg et al. (19) reported low adherence even when patients had face-to-face discussions with and received referrals for screening colonoscopy from their primary care physicians. In our minority serving institution in which all patients have the opportunity for a face-to-face consultation with their endoscopists prior to scheduling, we observed a better rate of adherence even though one in five patients were still non adherent. Compliance was better for scheduled EGD alone than when concomitant EGD and colonoscopy was scheduled. There was no difference in adherence when only colonoscopy was scheduled when compared with when concomitant EGD and colonoscopy was scheduled. Based on these findings, we surmise that the high intensity of the preparation for colonoscopy such as the requirement for clear liquid diet the day before the procedure and the need for laxative intake prior to the procedure may be a predominant contributory factor to the higher rate of no shows for colonoscopy since the other factors such as time off from work and need for escort is the same for EGD and colonoscopy. Another possibility is out-of-pocket expenses. The direct cost to patients varies based on the type of insurance coverage and individual plans subscribed to by the patients. We could not assess this with any certainty due to the retrospective nature of the current study. However, apart from Medicare patients, all patients with government based coverage in this study did not have co-pays. It is noteworthy that patients who were scheduled for out-patient procedures already had access and an available mechanism to pay for the services to be rendered before they were scheduled for their procedures.

The extent to which lack of adherence to scheduled procedures (screening and diagnostic) contributes to health disparities among minority populations is unknown. We are not aware of any prior study that has evaluated compliance with scheduled out-patient EGD only for a direct comparison with our study. However, Kazarian et al. (21) evaluated colonoscopy completion rates among 817 patients in a large safety net system with open access schedule; the overall nonattendance rate was 41.7%. The authors reported that race-ethnicity and procedure indication were not associated with non attendance but compliance was higher among patients who were scheduled for concomitant EGD and colonoscopy. In our study, patients scheduled for both EGD and colonoscopy were less likely to show up for their appointments similar to patients scheduled for colonoscopies alone. Although, the 22% non compliance rate for colonoscopy found in our study is better than the 41.7% reported by Kazarian et al. (21), this still represents a substantial waste of resources. This is even more obvious when one considers the fact that these patients were not scheduled in an open access system. They were all evaluated by the endoscopists who scheduled them who would have created a “bond” with the patient, spent valuable time discussing the procedures with the patient, as well as waited for them in vain on the day the procedures were to be performed. When put in context that unlike regular office appointments which could be overbooked in anticipation of no shows (24), it is not feasible to overbook endoscopic slots because of the need for dedicated resources for the patient encounter.

It is well known that minority serving institutions have more limited resources, cater to a less affluent population and have low insurance reimbursement since most of their clientele have Government-based insurance coverage. Recent reviews have demonstrated significant under representation of minorities in academic medicine, particularly among African Americans (25, 26). Non compliance of patients’ wastes limited resources, prevents other patients from being scheduled earlier, dampens the morale of the staff and reduces the productivity of care providers which then reflects poorly on the services they provide. This can only be foreseen to further reduce the motivation of care providers to work with

underserved populations as we move into the “reimbursement based on quality of service era”. This is particularly problematic in minority serving academic centers where care providers have to meet certain Relative Value Units (RVU) as a mark of their productivity. When patients do not show up, the time commitment of providers is not taken into account for RVU calculations, and this produces a deleterious effect on the careers of these physicians who ultimately become frustrated. Therefore, retention in these positions can be quite challenging whereas increasing the pool of minorities in biomedical research as investigators and patients is believed to be a mechanism that could potentially contribute to reduction in health disparities.

There appears to be a need for the use of patient navigators in minority serving institutions that should be dedicated to the ambulatory surgery center. Patients may benefit from interaction with a patient navigator or someone trained to help them navigate the healthcare system and understand their insurance benefits. This is a worthy consideration particularly for institutions that caters to minorities and underserved populations (27, 28). Although, this will constitute additional manpower cost, this tailored intervention is anticipated to be beneficial for these institutions and their patients. However, the adoption of this strategy has been slow in implementation. In response to our review, we have recently hired an administrative staff personnel who is charged with the responsibility of calling scheduled patients one week before their procedures and also to make a reminder call two days before the procedure to answer questions and address procedure-related concerns that patients may have and communicate with the scheduling endoscopist. We plan to evaluate the effect of this intervention on adherence in the near future.

Another consideration would be for open access endoscopy, but the presence of higher comorbidities and irregularities in primary care clinic visits by the patients may not make open access easy to accomplish. This is especially true for patients who are not referred from within the same healthcare system. Previous studies have suggested that patients who were non compliant with their regular clinic visits were more likely to be non compliant with scheduled colonoscopy or sigmoidoscopy (20). However, Nash et al (27) reported that a substantial system overhaul including hiring patient navigators, endoscopic suite enhancements and Direct Endoscopic Referral System (open access) can led to a dramatic improvement in adherence. Another important reason for lack of adherence is lack of buy in. This may be due to economic reasons (9, 29, 30), distrust of the medical systems (18), or lack of education (9, 31, 32).

Our study has limitations. Our study was a single institution experience. We did not have information on the income of the patients and we could not assess the out-of-pocket expenses to the patients. Moreover, we did not have a measure of educational level. Higher level of education was associated with a higher rate of colonoscopy screening in the Black Women’s Health Study (31) and following through with colonoscopy after an abnormal flexible sigmoidoscopy (32). We also did not distinguish screening from diagnostic colonoscopy. It is quite possible that procedure indication may affect adherence. We also could not ascertain the specific interval between the clinic encounter and the date of the scheduled procedure for each patient.

In conclusion, we found a high rate of non adherence among patients scheduled for out-patient endoscopy, particularly for colonoscopy in a minority serving tertiary institution. Multilevel approach including the use of patient navigators may be a worthy manpower investment as well as increased outreach education programs to promote health, particularly for colorectal cancer prevention. Healthcare literacy is a key issue that may promote adherence and reduce health disparities. Targeted intervention aimed at educating the

underserved minority population on colorectal cancer and the importance of screening may improve adherence rates.

Acknowledgments

Financial disclosure: Dr Laiyemo is supported by the National Cancer Institute's new faculty recruitment supplement to the Comprehensive Minority Institution/Cancer Center Partnership between Howard University Cancer Center and Sidney Kimmel Comprehensive Cancer Center of Johns Hopkins University (5U54CA091431-09 S1).

REFERENCES

1. Mandel JS, Church TR, Bond JH, et al. The effect of fecal occult-blood screening on the incidence of colorectal cancer. *N Engl J Med*. 2000; 343(22):1603–1607. [PubMed: 11096167]
2. Kahi CJ, Imperiale TF, Juliar BE, et al. Effect of screening colonoscopy on colorectal cancer incidence and mortality. *Clin Gastroenterol Hepatol*. 2009; 7(7):770–775. [PubMed: 19268269]
3. Atkin WS, Edwards R, Kralj-Hans I, et al. UK Flexible Sigmoidoscopy Trial Investigators. Once-only flexible sigmoidoscopy screening in prevention of colorectal cancer: a multicentre randomised controlled trial. *Lancet*. 2010; 375(9726):1624–1633. [PubMed: 20430429]
4. Mandel JS, Bond JH, Church TR, et al. Reducing mortality from colorectal cancer by screening for fecal occult blood. Minnesota Colon Cancer Control Study. *N Engl J Med*. 1993; 328(19):1365–1371. [PubMed: 8474513] *N Engl J Med*. 1993; 329(9):672. Erratum in:
5. Singh H, Nugent Z, Demers AA, et al. The reduction in colorectal cancer mortality after colonoscopy varies by site of the cancer. *Gastroenterology*. 2010; 139(4):1128–1137. [PubMed: 20600026]
6. Baxter NN, Goldwasser MA, Paszat LF, et al. Association of colonoscopy and death from colorectal cancer. *Ann Intern Med*. 2009; 150(1):1–8. [PubMed: 19075198]
7. Newcomb PA, Norfleet RG, Storer BE, et al. Screening sigmoidoscopy and colorectal cancer mortality. *J Natl Cancer Inst*. 1992; 84(20):1572–1575. [PubMed: 1404450]
8. Selby JV, Friedman GD, Quesenberry CP Jr, et al. A case-control study of screening sigmoidoscopy and mortality from colorectal cancer. *N Engl J Med*. 1992; 326(10):653–657. [PubMed: 1736103]
9. Doubeni CA, Laiyemo AO, Young AC, et al. Primary care, economic barriers to health care, and use of colorectal cancer screening tests among Medicare enrollees over time. *Ann Fam Med*. 2010; 8(4):299–307. [PubMed: 20644184]
10. Zimmerman RK, Nowalk MP, Tabbarah M, et al. Predictors of colorectal cancer screening in diverse primary care practices. *BMC Health Serv Res*. 2006; 6:116. [PubMed: 16970813]
11. Centers for Disease Control and Prevention (CDC). Vital signs: colorectal cancer screening among adults aged 50–75 years - United States, 2008. *MMWR Morb Mortal Wkly Rep*. Jul 9; 2010 59(26):808–12. [PubMed: 20613704]
12. Doubeni C, Laiyemo AO, Reed G, et al. Socioeconomic and Racial Patterns of Colorectal Cancer Screening among Medicare Enrollees 2000–2005. *Cancer Epidemiol Biomarkers Prev*. 2009; 18(8):2170–2175. [PubMed: 19622721]
13. Subramanian S, Amonkar MM, Hunt TL. Use of colonoscopy for colorectal cancer screening: evidence from the 2000 National Health Interview Survey. *Cancer Epidemiol Biomarkers Prev*. 2005; 14(2):409–416. [PubMed: 15734966]
14. Doubeni CA, Laiyemo AO, Klabunde CN, et al. Racial and ethnic trends of colorectal cancer screening among Medicare enrollees. *Am J Prev Med*. 2010; 38(2):184–191. [PubMed: 20117575]
15. Shokar NK, Carlson CA, Weller SC. Factors associated with racial/ethnic differences in colorectal cancer screening. *J Am Board Fam Med*. 2008; 21(5):414–426. [PubMed: 18772296]
16. Brounts LR, Lehmann RK, Lesperance KE, et al. Improved rates of colorectal cancer screening in an equal access population. *Am J Surg*. 2009; 197(5):609–612. [PubMed: 19306971]
17. Walter LC, Lindquist K, Nugent S, et al. Impact of age and comorbidity on colorectal cancer screening among older veterans. *Ann Intern Med*. 2009; 150(7):465–473. [PubMed: 19349631]

18. Fyffe DC, Hudson SV, Fagan JK, et al. Knowledge and barriers related to prostate and colorectal cancer prevention in underserved black men. *J Natl Med Assoc.* 2008; 100:1161–1167. [PubMed: 18942277]
19. Denberg TD, Melhado TV, Coombes JM, et al. Predictors of nonadherence to screening colonoscopy. *J Gen Intern Med.* 2005; 20:989–995. [PubMed: 16307622]
20. Turner BJ, Weiner M, Yang C, et al. Predicting adherence to colonoscopy or flexible sigmoidoscopy on the basis of physician appointment-keeping behavior. *Ann Intern Med.* 2004; 140(7):528–532. [PubMed: 15068980]
21. Kazarian ES, Carreira FS, Toribara NW, et al. Colonoscopy completion in a large safety net health care system. *Clin Gastroenterol Hepatol.* 2008; 6(4):438–442. [PubMed: 18304886]
22. Turner BJ, Weiner M, Berry SD, et al. Overcoming poor attendance to first scheduled colonoscopy: a randomized trial of peer coach or brochure support. *J Gen Intern Med.* 2008; 23(1): 58–63. [PubMed: 18030540]
23. Denberg TD, Coombes JM, Byers TE, et al. Effect of a mailed brochure on appointment-keeping for screening colonoscopy: a randomized trial. *Ann Intern Med.* 2006; 145(12):895–900. [PubMed: 17179058]
24. Murdock A, Rodgers C, Lindsay H, et al. Why do patients not keep their appointments? Prospective study in a gastroenterology outpatient clinic. *J R Soc Med.* 2002; 95(6):284–286. [PubMed: 12042374]
25. Merchant JL, Omary MB. Underrepresentation of underrepresented minorities in academic medicine: the need to enhance the pipeline and the pipe. *Gastroenterology.* 2010; 138(1):19–26. [PubMed: 19944787]
26. Abreu MT, Okolo PI 3rd. Re: underrepresentation of underrepresented minorities in academic medicine. *Gastroenterology.* 2010; 139(1):359. [PubMed: 20639091]
27. Nash D, Azeez S, Vlahov D, et al. Evaluation of an intervention to increase screening colonoscopy in an urban public hospital setting. *J Urban Health.* 2006; 83(2):231–243. [PubMed: 16736372]
28. Chen LA, Santos S, Jandorf L, et al. A program to enhance completion of screening colonoscopy among urban minorities. *Clin Gastroenterol Hepatol.* 2008; 6(4):443–450. [PubMed: 18304882]
29. Frederiksen BL, Jørgensen T, Brasso K, et al. Socioeconomic position and participation in colorectal cancer screening. *Br J Cancer.* 2010; 103(10):1496–1501. [PubMed: 20959827]
30. Power E, Miles A, von Wagner C, et al. Uptake of colorectal cancer screening: system, provider and individual factors and strategies to improve participation. *Future Oncol.* 2009; 5(9):1371–1388. [PubMed: 19903066]
31. Adams-Campbell L, Makambi K, Mouton CP, et al. Colonoscopy utilization in the Black Women's Health Study. *J Natl Med Assoc.* 2010; 102(3):237–242. [PubMed: 20355353]
32. Laiyemo AO, Doubeni C, Pinsky PF, et al. Race and colorectal cancer disparities: health-care utilization vs different cancer susceptibilities. *J Natl Cancer Inst.* 2010; 102(8):538–546. [PubMed: 20357245]

Table 1

Selected demographic factors of the study population by type of scheduled out-patient procedure

Characteristics	EGD only (n = 400)	Colonoscopy (n = 1,335)	EGD plus colonoscopy (n = 448)	P value *
Mean age (SD)	50.0 (14.0)	57.1 (11.1)	53.3 (11.2)	<0.001
Female, n (%)	265 (20.2)	760 (57.9)	287 (21.9)	0.001
Male, n (%)	134 (15.5)	572 (66.1)	159 (18.4)	
Unmarried, n (%)	297 (18.9)	955 (60.9)	317 (20.2)	0.652
Married, n (%)	89 (17.1)	324 (62.3)	107 (20.6)	
Day of the week, n (%)				
Monday	143 (27.5)	291 (56.0)	86 (16.5)	
Tuesday	97 (17.0)	331 (57.9)	144 (25.2)	
Wednesday	54 (16.5)	200 (61.0)	74 (22.5)	<0.001
Thursday	69 (16.0)	265 (61.5)	97 (22.5)	
Friday	37 (11.2)	247 (74.6)	47 (14.2)	
Time of procedure, n (%)				
Morning	196 (15.0)	846 (64.8)	263 (20.2)	<0.001
Afternoon	196 (22.8)	481 (55.9)	184 (21.4)	
Insurance coverage				
Commercial	119 (21.6)	359 (65.0)	74 (13.4)	
Government-based †	274 (17.2)	954 (59.8)	367 (23.0)	<0.001
Uninsured/self pay	7 (19.4)	22 (61.1)	7 (19.4)	

* P value for comparison across the out-patient procedure categories

† Government-sponsored insurance coverage such as Medicaid, Medicare and other Government assisted programs (Medical charities and District of Columbia Medical coverage for the needy District residents (DC Healthcare Alliance)

Table 2

Association of the type of scheduled endoscopic procedure with lack of adherence

Procedure	N	n, (%) of non adherent patients	Univariate RR (95% CI)	Multivariate* RR (95%CI)
EGD	400	70 (17.5)	Reference	Reference
Colonoscopy	1335	304 (22.8)	1.30 (1.03-1.65)	1.47 (1.13-1.92)
EGD plus colonoscopy	448	99 (22.1)	1.26 (0.96-1.66)	1.36 (1.01-1.84)

* Adjusted for age, sex, marital status, day and time of scheduled procedure and insurance characteristics

Table 3

Association of the type of scheduled endoscopic procedure with lack of adherence by insurance type^{*}

	Commercial insurance (N = 552)		Government-based insurance [†] (N = 1,595)	
Procedure	% of non adherent patients	RR (95% CI)	% of non adherent patients	RR (95%CI)
EGD	14.3	Reference	18.3	Reference
Colonoscopy	18.1	1.52 (0.81-2.86)	23.6	1.44 (1.07-1.94)
EGD plus colonoscopy	16.2	1.26 (0.59-2.68)	22.3	1.38 (0.99-1.93)

^{*} Adjusted for age, sex, marital status, day and time of scheduled procedures

[†] Government-sponsored insurance coverage such as Medicaid, Medicare and other Government assisted programs (Medical charities and District of Columbia Medical coverage for the needy District residents (DC Healthcare Alliance)