Improving Access to Colorectal Cancer Screening Through Medical Philanthropy: Feasibility of a Flexible Sigmoidoscopy Health Fair for Uninsured Patients

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OBJECTIVES: **Only half of eligible patients in the United States undergo colorectal cancer (CRC) screening as recommended. Hypothesizing that the medical philanthropy platform may be effective in improving access to CRC screening, we aimed to demonstrate the feasibility of a flexible sigmoidoscopy (FS)-based CRC screening "health fair" for uninsured patients.**

METHODS: **Uninsured patients older than 50 years who had not undergone CRC screening in the preceding 10 years were recruited through local free clinics and health fairs. A standard medical clinic was transformed into a fully functional endoscopy unit. Medicolegal protection for volunteers was obtained through the Florida Department of Health's Volunteer Health Care Provider Program. Unsedated FS with polypectomy was performed. Those with high-risk endoscopic features were given instructions on obtaining a full colonoscopy.**

RESULTS: **Fifty-two patients without access to any form of CRC screening underwent FS. Ninety-four percent had an adequate bowel preparation, although 40% required on-site enema. Eighteen patients had a total of 22 polyps, 4 of which were adenomatous. There were no complications. The total cost of the fair, excluding donated resources such as endoscopes and processors, was $6,531.47, amounting to $126 per patient screened.**

CONCLUSIONS: **Health fair–style CRC screening for uninsured patients is feasible. With improved efficiency, widespread application of CRC screening using the medical philanthropy platform may represent a viable approach to reducing the underuse of CRC screening among the uninsured.**

SUPPLEMENTARY MATERIAL is linked to the online version of the paper at http://www.nature.com/ajg

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Colorectal cancer (CRC) is the second leading cause of cancer-related death in the United States (1). Screening for CRC has been shown to reduce mortality associated with this malignancy (2–4), although only about half of eligible patients actually undergo screening as recommended by current clinical practice guidelines (5–7). Inadequate access to health care, most commonly among the uninsured, is a key factor in the underuse of screening for CRC (8). Multiple strategies have been proposed to overcome this barrier (9), although the medical philanthropy platform has not been explored as a potential solution to this health-care disparity.

Once-only flexible sigmoidoscopy (FS) with polypectomy has recently been shown to reduce the incidence and mortality of CRC by 33% and 43%, respectively (10). FS is safe, well tolerated, and time-efficient and does not require a full oral bowel preparation or patient sedation (11–13). Unlike less invasive screening modalities, such as

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Figure 1. A typical examination room at the medical facility used to conduct the flexible sigmoidoscopy health fair.

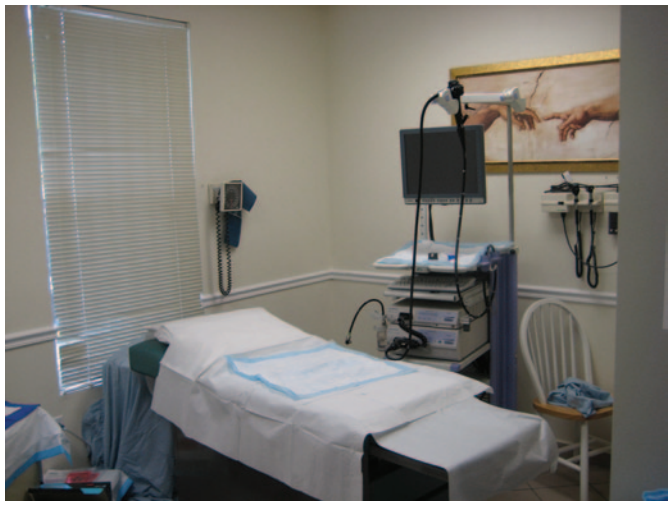

Figure 2. An examination room converted into a fully functional endoscopy suite.

fecal occult blood testing and computed tomographic colonography, FS has been shown to be effective as a one-time intervention in the majority of patients (10) and may be appropriate for delivery through the "health fair" model, which appears effective in delivering meaningful medical services to underserved individuals (14–17).

Our hypothesis is that coordinated medical philanthropic efforts focusing on the widespread delivery of one-time screening FS may be effective in improving access to CRC screening among the uninsured. As a preliminary step in testing this hypothesis, we aimed to demonstrate the feasibility of an FS-based CRC screening health fair.

Methods

The FS screening fair was conceived and organized by the MedPals Foundation (http://medpals.org), a nonprofit organization dedicated to providing health-care professionals with a platform through which to donate their time and expertise in their communities. Two members of the board of directors of this foundation are board-certified academic gastroenterologists. The MedPals Foundation formed an affiliation with the University of Miami Department of Community Service (UM DOCS), which helped execute the fair and provided access to underserved patients (through local free clinics and fairs) and medical-student volunteers. The FS screening fair took place over one weekend in Miami, Florida. Institutional review board approval was obtained for the collection and reporting of patient data. Subjects signed formal consent for their potential involvement in clinical research.

Equipment. An inventory of equipment used in this fair is provided in **Supplementary Table 1** online. Twenty colonoscopes (CF-Q180AL and PCF-Q180AL) and four mobile workstations, each carrying a video processor, light source, and monitor, were lent to the fair by Olympus. Three electrosurgical generators (Beamer System CE600) were lent by ConMed Endoscopic Technologies. All flexible endoscopic devices, including forceps, snares, retrieval nets, and hemoclips, were donated by Olympus and ConMed. Portable suction generators and disposable materials, including personal protection equipment and endoscope reprocessing solution, were purchased for the fair by the MedPals Foundation and UM DOCS.

Facilities. The fair was conducted at the San Juan Bosco Clinic, a community medical clinic that provides primary care and specialty services to uninsured patients in Miami, Florida. The facility comprises a reception and waiting area, four examination rooms (**Figure 1**), three restrooms, office space, a kitchen, and a storage and waste disposal area. The San Juan Bosco Clinic is not specifically equipped for flexible endoscopy, nor had endoscopic procedures previously been performed at this facility. Each examination room was transformed into a fully functional endoscopy suite (**Figure 2**), with the patient positioned on the existing examination table for the FS. The physician's desk was draped and used as a surface for the electrosurgical generator and all disposable equipment. The suction generator was placed on the floor adjacent to the mobile workstation. The schema for each endoscopy suite is illustrated in **Supplementary Figure 1** online.

Medicolegal considerations. Since clinicians' standard malpractice insurance does not extend to clinical activities performed at off-site charitable health fairs, comprehensive medicolegal protection for volunteers was obtained through the Florida Department of Health's Volunteer Health Care Provider Program (section 766.1115, FS), which provides sovereign immunity protection for uncompensated medical services rendered to eligible patients at qualified facilities. Accordingly, the FS fair was conducted at a Florida Department of Health contract facility (San Juan Bosco Clinic), and volunteers executed individual provider contracts with the Florida Department of Health.

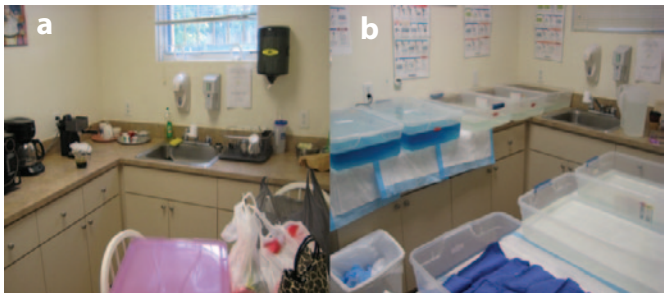

Figure 3. (**a**) A kitchen in the San Juan Bosco Clinic. (**b**) The same kitchen transformed into an endoscope reprocessing unit.

Personnel. The fair met or exceeded minimum staffing requirements for the performance of gastrointestinal endoscopy (18). All personnel were unpaid volunteers. Four board-certified gastroenterologists performed FS in each of four endoscopy suites. Two gastrointestinal endoscopy nurses rotated between suites to assist the physicians with abdominal pressure and use of endoscopic devices. Two endoscope reprocessing specialists were present to oversee the process of equipment cleaning. Sixteen medical students performed all other tasks, including registration and checkout, suite turnover, scope cleaning, and assisting the physician during procedures.

Patients and preparation. Patients were considered eligible if they were uninsured and at least 50 years of age and had not undergone any form of CRC screening in the preceding 10 years. Eligible patients were identified and recruited by medical students through free clinics and health fairs conducted by UM DOCS. Patients were excluded from participation only if they had standard clinical contraindications to endoscopy with polypectomy or if they were unable to provide a reliable telephone number (in the event they would need to be contacted after the fair with pathology results). One week before the FS fair, patients were contacted by telephone and given an appointment time as well as instructions to purchase a sodium phosphate enema and administer it 2 hours before their procedure. Patients with a known history of renal failure were instructed to purchase an empty enema bulb and administer a tap water enema 2 hours before their procedure.

Procedures. Even though the intent was to perform an FS, participants were informed that a full colonoscopy would be performed if patient tolerance and preparation quality permitted. Informed consent for a colonoscopy was therefore obtained from each participant. After changing into a gown, patients were placed in the left lateral decubitus position on a standard examination table. Sedation was not administered. Sigmoidoscopy was performed in standard fashion. Vital signs were obtained intraprocedurally only at the discretion of the endoscopist if there was any change in the patient's clinical status. The colonoscope was advanced to the top of the sigmoid colon or more proximally if patient tolerance and bowel preparation permitted. When polyps were encountered, they were removed by standard technique. To avoid the unlikely possibility of colonic gas explosion, endoscopists were instructed not to use electrocautery in the event of poor bowel preparation.

Postprocedure and follow-up. After completion of the sigmoidoscopy, patients were observed in the waiting area for 30 minutes and discharged only if they had no signs or symptoms of an early complication. In the event of an early complication, patients would have been transported to the local county hospital emergency department. All patients were provided with a copy of their endoscopy report as well as written discharge instructions that included reasons to seek emergency evaluation. In addition, patients were provided with a telephone number to contact FS fair personnel regarding non-emergent questions or issues that might arise in the weeks following the procedure. Pathology specimens were reviewed free of charge by a University of Miami volunteer pathologist. All patients who underwent polypectomy were contacted by telephone within 2 weeks of their procedure to discuss pathology results and convey follow-up recommendations. Patients with three or more adenomas, adenomas with villous histology or high-grade dysplasia, or a polyp of at least 1 cm were provided with instructions on obtaining a full colonoscopy through the local public hospital.

Endoscope cleaning and reprocessing. All endoscopes were manually reprocessed before the fair and after each use as specified by manufacturer recommendations. This process was overseen by a certified endoscope cleaning specialist and endorsed by a consultant from the manufacturer. Briefly, after transport from the procedure suite in marked and covered containers, endoscopes underwent leak testing, aspiration of enzymatic cleaner, initial rinsing, and brushing of channels at the first cleaning station (a transformed restroom). They were subsequently transported to the second cleaning station (a transformed kitchen; **Figure 3**), where they underwent one glutaraldehyde soak followed by three tap water rinses, with the water replaced entirely after each rinse. The scopes were then air-dried after flushing of the channels and wiping of the external surfaces with isopropyl alcohol. The scope cleaning and reprocessing schemata are illustrated in **Supplementary Figure 1** online.

Results

Patients. One hundred sixty potential patients were approached at local clinics and fairs, of whom 131 were deemed eligible and recruited. Of these, 76 were contacted by telephone the week prior to the fair and were scheduled for an FS. The remainder could not be contacted because of disconnected phone numbers. Of the 76

scheduled patients, 47 presented to the fair and underwent FS. An additional 5 patients who were not originally recruited underwent "walk-in" sigmoidoscopy; two were family members accompanying recruited patients, and three presented without an appointment on the second day of the fair after being recruited by patients who had had a favorable experience on the day prior. In total, 52 patients underwent FS.

The mean age of participants was 61 years. Thirty-four patients were women and 18 were men. Forty-four participants (85%) were Hispanic, seven were Haitian, and one was non-Hispanic white. Sixteen patients had undergone prior endoscopic CRC screening, but none were up to date.

Thirty patients had undergone appropriate bowel preparation on arrival to the fair. The remaining patients were unprepared at the time of arrival and underwent a single sodium phosphate enema immediately before their procedure. In these cases, the enema was administered in the endoscopy suite and retained by the patient for 15 minutes. After having a bowel movement in one of the restrooms, the patient returned to the suite for the procedure.

Procedures and findings. All sigmoidoscopies were complete to at least the level of the proximal sigmoid colon. Eight patients underwent evaluation of the entire colon. In 49 patients (94%), the bowel preparation was deemed good or excellent in the left colon on the basis of accepted standards (19). There were no early or delayed complications.

Eighteen patients (35%) had a total of 22 polyps, all but one of which were completely removed and retrieved. Of these, four were subcentimeter adenomas and the rest were hyperplastic. There were no advanced adenomas. One of these patients had a 2-cm hyperplastic polyp that was biopsied but not resected, and another had a 1.2-cm hyperplastic polyp that was resected. Both of these participants were referred for full colonoscopy on the basis of having a polyp of at least 1 cm.

Cost. The itemized costs of equipment used in this fair are listed in **Supplementary Table 1** online. All endoscopy equipment, including colonoscopes, workstations, and disposable devices, was lent or donated by industry partners. Additionally, all volunteers were uncompensated, and there was no charge for use of the San Juan Bosco facility. After accounting for these donations, the total cost of the fair was $6,531.47. This cost was composed of approximately $3,500 for endoscopy suite equipment, $1,500 for endoscope reprocessing materials, and $1,500 in pathology processing expenses. Based on these values, the direct cost of screening each patient was $125.61.

Discussion

In this proof-of-principle project, we demonstrated the feasibility of health fair–style CRC screening for uninsured patients. The methods used to conduct this FS screening fair appear to be reproducible and portable and may be used as a template for widespread application of this initiative. Even though FS does not provide complete evaluation of the colon, this accepted method of screening can be delivered at low cost to patients without any other screening options. Our experience suggests that, with additional development, barriers to CRC screening can be overcome through medical philanthropy.

Given its novelty, ongoing critical evaluation of the appropriateness and potential disadvantages of this initiative is an important element of responsible widespread implementation. Concerns regarding the safety of this endeavor, such as in the adequacy of the procedures, the handling of acute patient complications, and the ensuring of endoscope reprocessing of the highest standards, must be continually examined. Moreover, the perception that this type of "free" CRC screening will deliver substandard quality of care must be addressed. We believe the clinical services delivered during this fair were of the highest quality, ensured by the vested interest and expertise of the endoscopists, the top-notch equipment available, the efficient management plan for potential complications, and the rigorous endoscope cleaning process. Affiliation with well-respected academic gastroenterology divisions and one of the largest endoscope manufacturers in the world added legitimacy to this endeavor. Maintaining similar quality measures and affiliations, as well as obtaining formal endorsement by national gastroenterology societies, will be critical in the future success of this initiative.

In planning and conducting this fair, we identified several areas of improvement that would allow safer screening of a larger number of patients in a more time-efficient manner. The first is improved patient identification and recruitment. Participants were identified through a limited set of clinics and recruited several months before the event, leading to loss of contact in more than 40% of initially recruited patients. Recruiting through a larger network of clinics and identifying patients in the weeks immediately preceding the fair would have increased the number of participants. The second area of improvement is bowel preparation adherence and logistics. While 94% of patients in this fair had an adequate preparation, approximately 40% had not self-administered the enema before arrival. The process of on-site enema administration took place within the endoscopy suite, leading to significant delays in patient flow. Additional pre-fair education and patient mailings might have improved adherence. For those who present unprepared, facilities with a dedicated preparation room would be valuable in freeing up an endoscopy suite and improving patient flow. With these two adjustments, we believe that 80–100 patients can undergo FS during a 2-day health fair. Finally, future FS fairs should employ carbon dioxide insufflators during endoscopy to decrease the intraluminal concentration of potentially combustible methane and hydrogen, thereby eliminating the risk of colonic gas explosion (20,21).

The inability to ensure follow-up colonoscopies for patients with high-risk lesions detected during FS will be a challenge for the widespread implementation of this initiative. In this index fair, both patients who met criteria for a follow-up colonoscopy underwent this procedure free of charge, one at the local county hospital and the other at a local private practice. Public hospitals are generally able to provide free colonoscopies to a limited number

of patients with clear therapeutic indications (such as removal of a large polyp) but would not be able to provide screening procedures to the local population at large. In addition, private practices are often willing to provide *pro bono* procedures to a limited number of needy patients. Even if not all patients with high-risk lesions undergo colonoscopy, this endeavor would still be worthwhile through the detection of invasive cancers at an earlier stage or the removal of smaller polyps that may eventually become malignant. Indeed, in the aforementioned once-only FS study (10), the clinical benefits of FS exceeded what would be expected from simple selection of patients likely to benefit from full colonoscopy.

The direct cost of screening one patient in this health fair was approximately $126. We speculate that this cost can be reduced to $65 per patient if the efficiency of the fair is increased such that 100 patients are screened over a 2-day period. The advantage of using the medical philanthropy platform to address this problem is that personnel salaries, which are believed to account for the majority of costs associated with screening the underserved (22), are not applicable. In addition, industry partners may be particularly enthusiastic about supporting such endeavors because of the associated positive publicity.

On the basis of these economic advantages, organizations with a vested interest in long-term health should consider supporting such medical philanthropic CRC screening initiatives through grant support and/or other funding mechanisms.

The minimum requirements to conduct an FS fair during which 100 patients are screened for CRC are listed in **Supplementary Table 2** online. These requirements include obtaining medicolegal protection for volunteers through state-specific legislation equivalent to Florida's Volunteer Health Care Provider Program. Forty-three states and the District of Columbia have charitable-immunity legislation that affords liability protection to health-care providers involved in medical philanthropic endeavors. These laws achieve protection by either changing the negligence standard of care for volunteers from simple negligence to gross negligence, or indemnifying the volunteer as a public employee (23,24). Most states, however, qualify charitable immunity by restricting it to designated settings or specific medical services (23,24).

An additional related requirement involves selecting an appropriate venue for conducting an FS fair. Our group initially considered a model using existing endoscopy units to perform free sigmoidoscopies in uninsured patients; however, these facilities are generally not afforded government-mandated medicolegal immunity and would have incurred the risk of litigation without any financial incentive, a scenario that is unlikely to be accepted, particularly in large scale. For this reason, the San Juan Bosco Clinic and similar department-of-health-designated clinics across the country appear to be better suited for an FS initiative.

The recently enacted Patient Protection and Affordable Care Act will cover all preventive services recommended by the US Preventive Services Task Force at zero copay for more than 90% of the population, thereby substantively reducing the underuse of CRC screening in the United States. Nevertheless, even if 5% of eligible patients (ages 50–64) remain without access to CRC screening (approximately 1.5 million individuals), the screening model proposed in this article could be of substantial value. Indeed, the medical philanthropy platform may be best suited to screen those patients who never fully enfranchise into the new health-care system.

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CONFLICT OF INTEREST

Guarantor of the article: B. Joseph Elmunzer, MD.
Specific author contributions: B. Joseph Elmunzer, Amar Deshpande: conception and design, planning and conducting the study, analyzing the results, and drafting the manuscript. Mark T. O'Connell, Stefania Prendes, Daniel A. Sussman: planning and conducting the study, analyzing the results, and drafting the manuscript. Sameer D. Saini, Michael L. Volk: analyzing the results and drafting the manuscript. All authors approved the manuscript.
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RESULTS

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