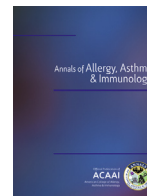




Contents lists available at ScienceDirect



Initiating an online asthma management program in urban emergency departments: the recruitment experience

Christine L.M. Joseph, PhD^{*}; Mei Lu, PhD^{*}; Stephanie Stokes-Bruzzelli, MD[†]; Dayna A. Johnson, PhD^{*}; Elizabeth Duffy, MA[‡]; Michele Demers, MPH[§]; Talan Zhang, MS^{*}; Dennis R. Ownby, MD^{||}; Edward Zoratti, MD[¶]; and Prashant Mahajan, MD[‡]

^{*} Department of Public Health Sciences, Henry Ford Health System, Detroit, Michigan

[†] Department of Emergency Medicine, Henry Ford Health System, Detroit, Michigan

[‡] Pediatric Emergency Medicine, Children's Hospital of Michigan, Detroit, Michigan

[§] Center for Health Communications Research, University of Michigan, Ann Arbor, Michigan

^{||} Division of Allergy and Clinical Immunology, Georgia Regents University, Augusta, Georgia

[¶] Division of Allergy and Clinical Immunology, Henry Ford Health System, Detroit, Michigan

ARTICLE INFO

Article history:

Received for publication June 26, 2015.

Received in revised form September 30, 2015.

Accepted for publication October 19, 2015.

ABSTRACT

Background: The emergency department could represent a means of identifying patients with asthma who could benefit from asthma interventions.

Objective: To assess the initiation of a Web-based tailored asthma intervention in the emergency department of 2 urban tertiary care hospitals.

Methods: In addition to awareness strategies for emergency department staff (eg, attending nursing huddles, division meetings, etc), recruitment experiences are described for 2 strategies: (1) recruitment during an emergency department visit for acute asthma and (2) recruitment from patient listings (mail or telephone). Patient enrollment was defined as baseline completion, randomization, and completion of the first of 4 online sessions.

Results: Of 499 eligible patients 13 to 19 years old visiting the emergency department for asthma during the study period, 313 (63%) were contacted in the emergency department (n = 65) or by mail or telephone (n = 350). Of these, 121 (38.6%) were randomized. Mean age of the study sample was 15.4 years and 88.4% were African American. Refusal rates for emergency department recruitment and mail or telephone were 18.5% (12 of 65) and 16.6% (58 of 350), respectively. On average, emergency department enrollment took 44 to 67 minutes, including downtime. When surveyed, emergency department providers were more positive about awareness activities and emergency department recruitment than were research staff.

Conclusion: Emergency department recruitment was feasible but labor intensive. Refusal rates were similar for the 2 strategies. Targeting patients with acute asthma in the emergency department is one way of connecting with youth at risk of future acute events.

© 2015 American College of Allergy, Asthma & Immunology. Published by Elsevier Inc. All rights reserved.

Introduction

Existing literature is relatively consistent in showing that African American and Latino youth in underserved communities are more likely to use the emergency department (ED) for asthma as a primary source of care.¹ This episodic care impedes the development of a patient's self-regulation skills necessary for asthma

control.² Therefore, acute care settings potentially represent a promising means of identifying patients with asthma with the greatest need for intervention.

Puff City is a Web-based computer-tailored intervention that targets urban teens.^{3,4} The program has been evaluated in high school-based randomized trials. In these school-based trials, students with active asthma (symptoms in past year and/or currently being treated for asthma) were invited to participate, regardless of asthma control, severity, or health care access. Study results showed positive outcomes for students in the intervention group.^{3,4}

There is evidence that Internet access is increasing in US African American, Latino, and low-income communities. In the most recent

Reprints: Christine L.M. Joseph, PhD, OFP, 3E, Henry Ford Health System, Detroit, MI 48202; E-mail: cjoseph1@hfhs.org.

Disclosures: Dr Zoratti has received funding from the National Institute of Allergy and Infectious Diseases.

Funding Sources: The studies reported in this publication were supported by grant R34HL109296 from the National Institutes of Health.

<http://dx.doi.org/10.1016/j.anai.2015.10.021>

1081-1206/© 2015 American College of Allergy, Asthma & Immunology. Published by Elsevier Inc. All rights reserved.

school-based trial of Puff City, 90% of students without computers could complete at least 3 of the 4 online sessions.³ Given the positive results of the Puff City school-based programs, the authors explored the feasibility of initiating Puff City in the ED. This consisted of an online baseline questionnaire in the ED, followed by online sessions that were accessed during and after the ED visit.

The pilot study described in the present report is the result of funding from the National Institutes of Health and National Heart, Lung, and Blood Institute PAR-13-002, which “encourages applications proposing pilot studies to obtain data that are critical for the design of robust clinical trials.” The preliminary results of a study were funded through the R34 mechanism and designed to assess the feasibility of conducting a randomized controlled trial (RCT) to evaluate the initiation of Puff City in an urban ED setting. This report describes (1) the engagement of ED staff in the implementation of a recruitment protocol in the ED; (2) recruitment and refusal rates; and (3) an evaluation of the time needed for baseline completion in the ED. Other concerns included acceptability of participation during an acute exacerbation and the authors’ ability to reach marginalized youth. This article represents the first of a 2-phase assessment, in which phase I informs recruitment strategies and phase II evaluates retention and intervention efficacy in this subgroup of youth presenting to the ED for acute asthma.

Setting

Children’s Hospital of Michigan (CHM) of the Detroit Medical Center (academically affiliated with Wayne State University [WSU]) is a tertiary care hospital in urban Detroit that shoulders the bulk of indigent care in Detroit. In 2013, 403 patients 13 to 19 years old made a visit to the CHM ED for asthma.

The Henry Ford Health System (HFHS) is an 802-bed tertiary care hospital, education, and research complex located in Detroit’s New Center area. In 2013, 110 patients 13 to 19 years old visited the HFHS pediatric ED for asthma.

For this study, the University of Michigan Center for Health Communications Research provided technical expertise in Web hosting, interactive Web response, randomization setup, online baseline assessment, computer randomization, control Web site setup, and system updates.

Design

The Puff City intervention

The project was approved by the HFHS, CHM-WSU, and University of Michigan institutional review boards. Parental consent and patient assent were required for participation. The intervention has been described in previous publications.^{3,4} Briefly, Puff City is a Web-based asthma management tool that uses tailoring, defined as the “assessment and provision of feedback based on information that is known or hypothesized to be most relevant for each individual participant of a program.”⁴ Computer algorithms are used to assemble theory-driven feedback based on the user’s characteristics, beliefs, and attitudes, creating an extensive array of message permutations. This allows targeted delivery of health messages and very personalized asthma education.^{3,4} Puff City focuses on controller medication adherence, keeping an inhaler nearby, and smoking decrease or cessation. Also included is information on trigger avoidance, instructions on using medication delivery devices, and basic asthma physiology. Behavioral theories applied in Puff City include the Transtheoretical Model, the Health Belief Model,⁵ and aspects of Motivational Interviewing. Scores for asthma self-regulation are derived using the Asthma Self-Regulation Development Interview, developed by Zimmerman et al,⁶ which describes sequential “phases” of asthma self-regulation, including asthma symptom avoidance, asthma acceptance, asthma compliance, and asthma self-regulation.⁶

Submodules for Puff City were created to apply a more intense tailoring strategy to “resistant adolescents,” defined as adolescents exhibiting no positive change in behavior after the first of 4 consecutive sessions. Values-based strategies and Motivational Interviewing concepts are used to help teens overcome ambivalence to change through empathy and support, as opposed to directives and emotional pulls.^{7,8} In addition to the 4 weekly sessions, a booster session at 6 months was created to sustain positive change and correct early stages of relapse.

The program consists of a baseline survey, followed by 4 weekly online sessions (Fig 1). When signing on for the first session, patients are randomized to a treatment group (tailored Puff City program) or a control group (access to 4 sessions of existing online asthma education programs).^{3,4} Participants are asked to complete 6- and 12-month follow-up vs. For the intervention group, the 6-month survey triggers the booster session for resistant or relapsed participants. Parents or guardians of participating patients are invited to complete a baseline survey and a 12-month follow-up survey. Automated email and short message service or “text message” reminders to complete the online sessions were set up by the University of Michigan Center for Health Communications Research.

Inclusion and exclusion criteria

To participate, subjects had to be 13 to 19 years of age and have a physician diagnosis of acute asthma at the ED visit. Eligibility was confirmed by ED clinical staff. Those younger than 18 years had to be accompanied by a parent or legal guardian (caregiver) who would give written consent. All subjects provided written assent. Subjects were excluded if they had previously participated in Puff City or did not speak English.

Methods

Engaging ED Staff

During start-up, the team met with ED clinicians and research staff at the HFHS and CHM to develop strategies for recruitment. Institutional review board approval was obtained from the HFHS board for the HFHS and from the WSU board for CHM. ED Principal investigators also provided input on inclusion criteria and developed awareness strategies. CHM had research staff in the ED dedicated to patient recruitment for ongoing studies. At the HFHS, research staff and several existing ED clinic staff were trained to recruit and enroll for the study. Research staff at the HFHS implemented a schedule to monitor the ED for eligible patients using the electronic ED surveillance system, and CHM study team members monitored the ED surveillance system when on shift.

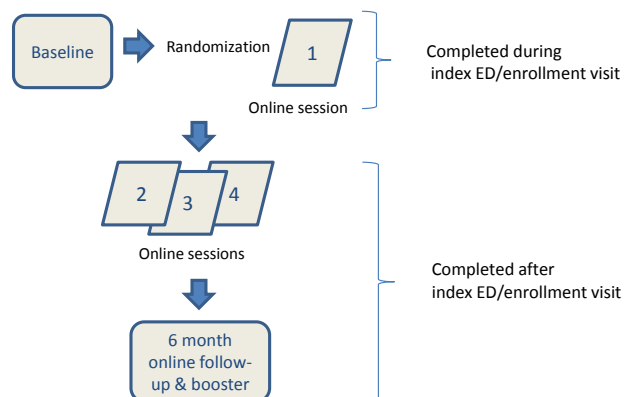


Figure 1. Puff City emergency department (ED) intervention: feasibility study.

Before study onset at the HFHS, fliers were posted in the ED and an informational letter was emailed to the ED physicians describing Puff City, the eligibility criteria, and the recruitment start dates. Research staff also attended nursing “huddles” to give a brief description of the study and provided updates to physicians, fellows, and residents during monthly divisional meetings. At CHM, monthly status updates were provided during the ED divisional meetings attended by physicians, fellows, and residents and at monthly ED registered nurse (RN) practice council meetings attended by RNs, student nurses, and RN leadership. In addition, white boards posted in each ED pod (5 locations) and updated at the start of each research assistant shift listed the names of ongoing studies, including basic eligibility criteria and the pager or office number of recruitment staff. Investigators and research coordinators at the 2 sites assisted in identifying and enlisting the help and cooperation of physicians, RNs, and key ED staff.

Recruitment Strategies

ED recruitment

Eligible patients were recruited during presentation to participating EDs for acute asthma (index visit). Research staff conducted recruitment using remote electronic surveillance and triage systems (EMSTAT and FIRSTNET) to identify patients potentially eligible for the study. At CHM, if a potentially eligible patient presented, then the research assistant or recruiter would flag the patient to notify the ED staff, go to the ED, review eligibility with the treating clinicians, and, if eligible, a clinician would first inquire if the family wanted to hear about a research study. If yes, the research assistant or recruiter would complete the eligibility form and introduce the study to the patient and caregiver and begin the informed consent and assent process, including Health Insurance Portability and Accountability Act authorization. At the HFHS, research staff used EMSTAT to identify potentially eligible patients and then approached patients after obtaining clearance from a clinician. A process similar to that described for CHM was followed. Caregivers could opt to refuse the caregiver portion of the study and provide permission for the patient to participate. Research staff requested an email address for email reminders and a phone number for short message service or text message reminders. Owning a computer was not a requirement for participation. After receiving written assent from the patient and written consent from the caregiver, some patients chose to return to the ED at a later date and complete the enrollment process.

Recruitment from patient listings or “mail or telephone”

The HFHS used the patient encounter databases to obtain listings of patients who had made recent visits to an HFHS ED with a primary or secondary *International Classification of Diseases, Ninth Revision* code for asthma during the recruitment period. At CHM, a daily log including all presentations for age-eligible patients was screened to identify patients who presented to the CHM ED with an asthma-related presentation that had not already been approached in the ED by recruiters. At the 2 sites, a letter was mailed to the patient’s home, followed by a phone call to explain the study. Interested caregivers and patients were asked to come to the HFHS or CHM for an enrollment visit. At that time, research staff initiated the consent and enrollment process described earlier.

Components of Study Enrollment

Baseline and session 1

After obtaining consent and assent, patients completed an online baseline questionnaire from a laptop or a mobile in-house computer. Items on the baseline questionnaire included current asthma care, current medications used, continuity of care, patient–provider communication, and the patient’s smoking

behavior. Questions on asthma control and symptom frequency asked about recent periods (past 2 weeks or past 30 days). For this pilot, the first of 4 sessions was delivered in the ED (if the patient was being enrolled there) or at the enrollment visit. Before leaving the ED, patients were given an exit packet containing instructions on how to access the program from any computer with Internet access and information on computer resources in the area. Caregivers were interviewed by the recruiter while the patient completed the Web-based baseline questionnaire on the computer. The caregiver baseline questionnaire included questions about the patient’s asthma medications, health care encounters, and functional status.

Exit information

After the enrollment process was complete, the patient was given a packet containing information on how to access Puff City from any computer, numbers to call if there were problems, a schedule of incentives, and information on computer resources in the area.

Estimated Enrollment Time

The time needed to complete enrollment was taken from recruitment logs and averaged across recruiters. For this estimate, recruitment activities included monitoring electronic triage units, calling patients from patient listings, mailing introductory letters, enrollment of patients returning to the clinic specifically for the study, and actual enrollment during an ED visit.

Randomization

Randomization was stratified by sex, ED visits for asthma in the past 12 months, and Asthma Control Test (ACT) score. The ACT is a 5-question patient-based tool designed to help physicians identify patients with poorly controlled asthma, assess frequency of asthma symptoms, use of rescue medications, and impact of asthma on daily functioning over the course of the previous 4 weeks.⁹ Because this was a study conducted in patients with acute asthma exacerbations, randomization was stratified by an ACT score lower than 15 vs at least 15 instead of lower than 19 vs at least 19.

Statistical Analysis

Descriptive analyses were used to describe participant and nonparticipant characteristics and ED staff responses to a survey on the recruitment process. A 2-sample *t* test was used for continuous variables, and a χ^2 test was used for categorical variables when comparing differences between 2 groups (eg, enrollees vs nonparticipants and ED enrolled vs mail or phone).

Results

Recruitment and Refusal Rates

Patients were recruited at the HFHS from October 2012 through October 2013 and at CHM-WSU from December 3, 2012 through October 1, 2013. Recruitment dispositions are presented in [Figure 2](#). An estimated 499 patients meeting the eligibility criterion (ED visit for acute asthma) presented during the recruitment period. They authors estimate that they had actual contact in the ED or over the phone with 313 (63%) of these patients (refused + appointment made + enrolled + no appointment made; this latter group spoke with a recruiter but never committed to an appointment).

[Table 1](#) presents a comparison of enrolled (and randomized) and nonparticipants. A total of 126 patients completed a baseline assessment, of which 121 were randomized (96%). Of these, most participants were African American (88.4%), with a mean age of 15.4 years (SD 1.7). Of the 16 subjects at least 18 years of age, 2 (12.5%) had a caregiver accompany them to the ED and complete

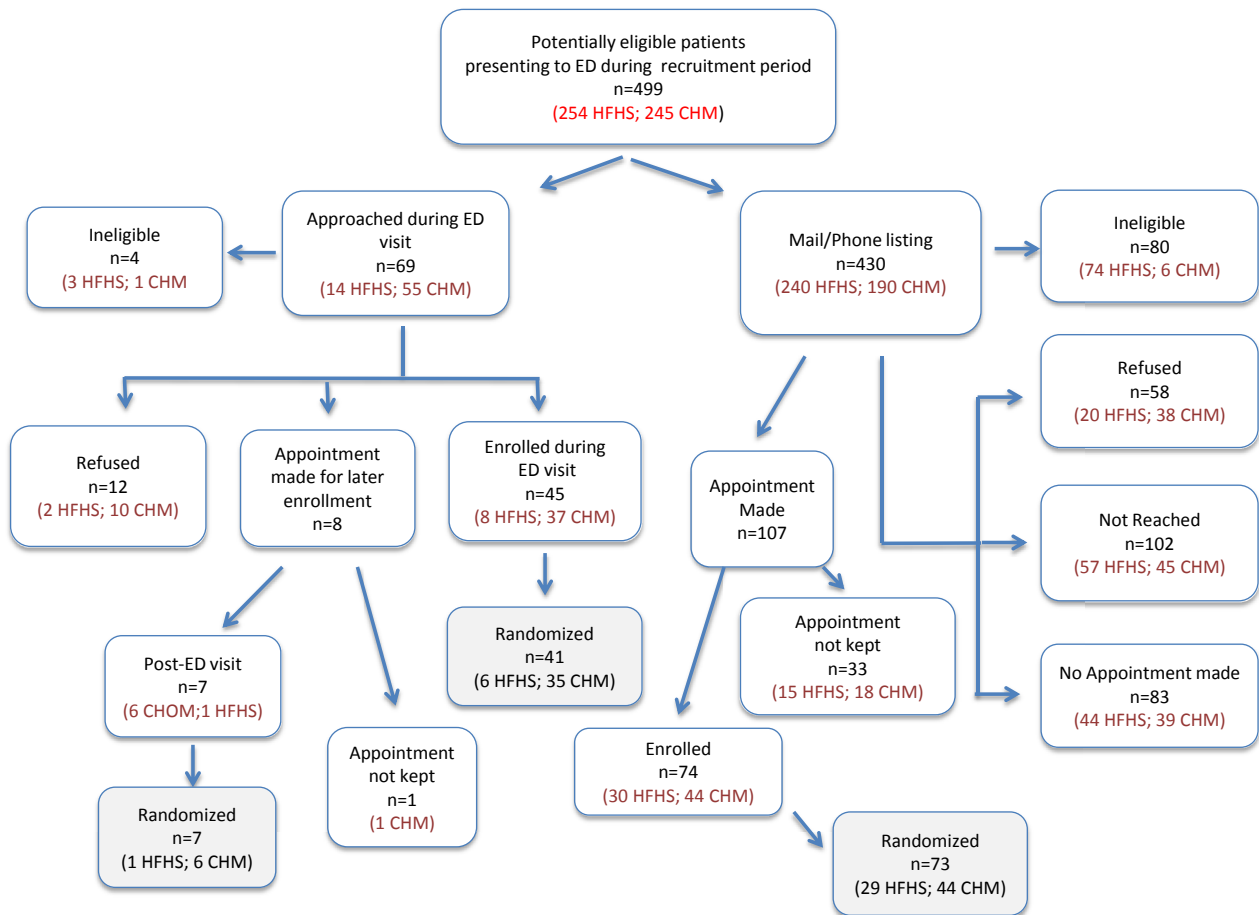


Figure 2. Contact and enrollment disposition for the targeted population. CHM, Children's Hospital of Michigan; ED, emergency department; HFHS, Henry Ford Health System.

the caregiver assessment. For the remaining 105 subjects younger than 18 years, 98 (93.3%) opted to complete a caregiver baseline assessment. Enrolled patients did not differ from nonparticipants with respect to mean age, proportion at least 18 years of age, race, or ethnicity. A larger percentage of African Americans were enrolled, although this was of borderline significance ($P = .08$). Patients with Medicaid insurance were more likely to enroll in the study than those with other types of insurance or without insurance (77% vs 36.5%, $P < .01$).

Table 2 presents a comparison of the study sample by recruitment strategy. Patients recruited through the mail or phone

method were more likely to be Latino ($P = .05$) and have Medicaid ($P < .01$). Fewer enrollees recruited during an ED visit reported having a computer at home (61% ED recruitment vs 76% mail or phone recruitment, $P = .09$), and these patients had a lower mean ACT score (14.3 vs 16.1, $P = .06$), although these comparisons did not reach statistical significance.

When comparing ED recruitment with mail or phone recruitment, enrollment was accomplished for 81.5% of those eligible and presenting to the ED during staffed hours (53 of 65), of which 90.6% were randomized. The refusal rate for ED recruitment (excluding ineligible) was 18.5% (12 of 65). For mail or phone recruitment,

Table 1
Characteristics of eligible population for combined sample (N = 340)

Factor	Enrolled (n = 121)	Nonparticipant (n = 219)	P value
Age (y), mean (SD)	15.4 (1.7)	15.6 (1.9)	.36
>18 y old, n (%)	16 (13.2)	39 (17.8)	.27
Hispanic or Latino, n (%)	8 (6.6)	7 (3.2)	.15
African American, n (%)	108 (89.3)	179 (81.7)	.08
Medicaid, n (%)	73 (60.3)	80 (36.5)	<.0001
>1 ED visit before index visit ^a , n (%)	63 (52.1)	129 (58.9)	.22
Computer at home, n (%)	86 (71.1)		
ACT score, mean (SD)	15.5 (4.8)		
Provided SMS, n (%)	104 (86.0)		

Abbreviations: ACT, Asthma Control Test; ED, emergency department; SMS, short message service or text message.

^aTwelve months before index visit date.

Table 2
Comparison of study sample by recruitment strategy

Factor	ED (n = 41)	Mail or telephone (n = 80)	P value
Age (y), mean (SD)	15.1 (1.5)	15.6 (1.8)	.13
Boys, n (%)	18 (43.9)	36 (45.0)	.91
>18 y old, n (%)	3 (7.3)	13 (16.3)	.26
Hispanic or Latino, n (%)	0 (0.0)	8 (10.0)	.05
African American, n (%)	38 (92.7)	70 (87.5)	.54
Medicaid, n (%)	23 (56.1)	50 (62.5)	<.0001
>1 ED visit before index visit ^a , n (%)	20 (48.8)	43 (53.8)	.61
Computer at home, n (%)	25 (61.0)	61 (76.3)	.09
ACT score, mean (SD)	14.3 (5.1)	16.1 (4.6)	.06
Provided SMS, n (%)	38 (92.7)	66 (82.5)	.17

Abbreviations: ACT, Asthma Control Test; ED, emergency department; SMS, short message service or text message.

^aTwelve months before index visit date.

70.8% of patients on the listing were reached (248 of 350). Of those, 74 (29.8%) were enrolled, of which 98.6% were randomized. Using the denominator of 248 patients reached for mail or phone recruitment, refusals amounted to 23.4% of those reached (58 of 248). These figures are taken from Figure 2.

The authors compared selected data for refusals with those of enrollees. These data were available for only for the HFHS and are listed in Table 3. At the HFHS, enrolled and refused were similar; however, as determined by the electronic medical record, 9% of patients who refused enrollment had Medicaid insurance compared with 42% of those who elected to enroll in Puff City ($P < .01$). Fewer refusals than enrolled had an ED visit in the past 12 months (not including the index visit; $P = .09$), and fewer enrolled patients had no insurance (2.8% vs 9.1% for enrolled vs refusals, respectively, $P = .08$.)

Time Needed for Recruitment and Enrollment

On average, the amount of time needed to enroll the patient, including completion of the baseline assessment, was 44.3 minutes at the HFHS and 67.0 minutes at CHM. CHM staff spent 1,162.5 hours recruiting, which corresponds to 13.67 hours per participant randomized. Almost half (48.2%) the CHM participants randomized were enrolled during a non-ED scheduled research appointment (41 of 85). HFHS staff spent 948.72 hours recruiting, which corresponds to 26.35 hours per participant randomized. At the HFHS, hours per participant were calculated by recruitment type. For ED enrollment ($n = 6$ HFHS patients randomized), 81.75 hours were spent in recruitment, or 13.62 hours per participant randomized. For mail or phone enrollment ($n = 29$ HFHS patients enrolled from listings + 1 patient enrolled after an ED visit), 863.97 hours were spent in recruitment, or 28.80 hours per participant randomized. The no-show rate for scheduled appointments was 30.8% for mail or phone vs 12.5% for ED recruitment. The approached-to-randomized ratio for mail or phone was 20.9 (ie, of 100 patients approached, approximately 21% were eventually enrolled and randomized) vs 74.8% (48 of 65) for ED recruitment.

Eleven ED and research staff members were surveyed about the recruitment process (Figure 3). Providers gave relatively high marks for awareness activities (mean score of 5 of a possible 6) and seemed to believe the interaction and activities were appropriate. In contrast, research staff believed that awareness activities needed to be repeated periodically, to update new ED staff, and to remind current staff of the ongoing study (mean score of 3 of a possible 6). Scores were similar for the consent process (4.67 for providers and 4.17 for research staff), but the provider score was higher than that of the staff for recruitment in the ED setting (4.33 vs 2.83, respectively).

Discussion

This pilot study used the National Institutes of Health R34 mechanism to assess the feasibility of implementing successful

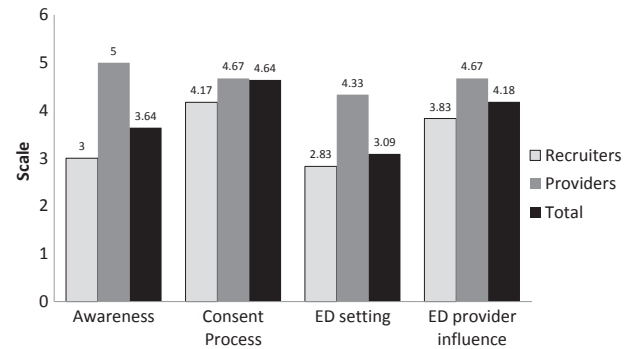


Figure 3. Results of self-administered questionnaire on study barriers and facilitators given to participating research and emergency department (ED) staff.

recruitment strategies for the conduct of an RCT in the ED setting. Important factors included acceptability by ED staff and patients and participation and refusal rates. Several published studies since 2000 also have explored the conduct of research in the ED. Horowitz et al¹⁰ conducted a feasibility study to screen for suicidal ideation, in which parents and youth (10–21 years old) were approached during an ED visit. Data collection required only 12 minutes and was accomplished while the patient was waiting for the physician; however, the refusal rate for this study was 40%. Another study on prevention of alcohol misuse in youth entailed youth presenting to the ED to access an interactive program installed on a laptop.¹¹ Refusal rate was 14.5%, and the intervention, which took 15 to 30 minutes, reportedly fit well into the ED operation. Mahabee-Gittens and Gordon¹² conducted a tobacco cessation intervention in an ED setting, consisting of a survey and advice on smoking cessation from trained research staff. Acceptability was high, with only 3% of staff reporting any interference with patient care. Zorc et al¹³ initiated a program in the ED that consisted of screening surveys and a 12-minute video; however, the article did not discuss any problems associated with recruitment strategies and protocols in the ED setting. The present study is somewhat different from those studies, in that the authors were recruiting during an acute exacerbation and used Web-based tools not installed on a computer.

The 2 participating EDs had sizeable differences in the number of patients presenting and used different research staffing models for recruitment, one of which was clearly more successful for recruitment in the ED. At CHM, to increase the number of staff recruitment hours in the ED, more than 1 recruiter per shift was avoided. A drawback to this type of shift scheduling meant that if the recruiter was with another patient or a scheduled appointment, then ED coverage was sacrificed, unless the patient could be contacted by recruitment letters or phone calls. Although 3 times as many patients could be reached using phone listings, this strategy was associated with more time spent in enrollment activities, such as arranging cab transport, no-shows, and rescheduling. As a result, only 20.9% of patients contacted were randomized using mail or phone compared with 74.8% for ED recruitment.

In assessing feasibility, the authors believed that patients would be more motivated to participate during an ED visit for acute asthma than over the phone. This was not supported by the present results. Another concern was that patients would be too sick to participate in the study. Anecdotal, the staff perception was that patients might have been more amenable to participating under different circumstances.

Disruption of clinic flow also was proposed as a potential challenge. The goal was to have enrollment take no longer than 30 minutes. According to the records, the amount of time needed to enroll the patient, including completion of the baseline assessment,

Table 3
Comparison of enrolled and refusals for 1 site^a

Factor	Enrolled (n = 36)	Refused (n = 22)	P value
Age (y), mean (SD)	16.6 (1.9)	15.7 (2.0)	.10
Boys, n (%)	15 (41.7)	11 (50.0)	.54
≥18 y old, n (%)	15 (41.7)	5 (22.7)	.17
Hispanic or Latino, n (%)	2 (5.6)	1 (4.5)	.99
African American, n (%)	32 (88.9)	19 (86.4)	.99
Medicaid, n (%)	15 (41.7)	2 (9.1)	<.01
≥1 ED visit (asthma) in 12 mo ^b , n (%)	34 (94.4)	17 (77.3)	.09
Uninsured, n (%)	1 (2.8)	2 (9.1)	.08

Abbreviation: ED, emergency department.

^aHenry Ford Health System only.

^bTwelve months before index visit date.

ranged from 44.3 (HFHS) to 67 (CHM) minutes. Patients in the ED were generally willing to participate, although recruitment staff judged that the process for recruitment in the ED was “rushed.”

The authors have 3 suggestions for streamlining the conduct of this RCT in the ED. The first would be to reconfigure the data collection systems. Two separate data systems were used to complete enrollment. The first was the online Web intervention used to collect patient-reported data necessary for enrollment and patient-reported outcomes for the study. The second was an integrated clinical data management and remote data capture system used to collect and integrate clinical data abstracted from the medical record. Jointly, this robust process created a working framework for conducting the RCT in the ED. However, it was laborious for staff who were required to log in to 2 systems. Second, allowing patients to return to the ED to complete enrollment can shorten the time needed in the ED. Of course, there is the potential for loss of participants between consent (in the ED) and patient completion of the first session. To alleviate this, the authors opted to ask consenting patients to be randomized and access session 1 while in the ED. The third suggestion would be to shorten the length of consent and assent forms and baseline and enrollment forms. These options for streamlining the process are based on conducting an RCT in the ED and must be weighed against research needs.

There were several reasons for exploring the initiation of Puff City in the ED, including reaching teens with uncontrolled asthma, reaching teens with poor access to care, and the potential for increased uptake of the asthma intervention. According to ACT scores, youth who enrolled had uncontrolled asthma. ACT scores were higher for mail or phone recruitment, as might be expected, because this recruitment occurs days after the index acute event; however, mean scores still indicated uncontrolled asthma for mail or phone recruits. The authors also hoped to reach teens with limited access to care. Approximately 11.7% of caregivers of enrolled youth reported a gap in health care coverage for the youth in the past 12 months. According to a 2012 report, the percentage of 6- to 17-year-olds without health insurance in the City of Detroit was approximately 7% to 8%.¹⁴ Most youth enrolled in this study were insured through Medicaid. Medicaid insurance has been associated with poor asthma control and ED use.² Although the difference in Medicaid was the only statistically significant comparison, a larger percentage of refusals were older than 18 years and were uninsured, and a smaller percentage had ED visits in the past 12 months. This might suggest that refusals were mostly older teens or young adults with milder disease. Youth this age often are uninsured.¹⁵

Compared with a school-based setting, participation was increased. In the school-based trials, the authors struggled to reach targeted enrollment, enrolling an estimated 30% of those eligible for the study.^{3,4} Recruitment in the ED resulted in an enrollment rate of 80%. Mail or phone recruitment from patient listings was very similar to the school-based trials in which 43.1% of those contacted made appointments, whereas 29.8% actually enrolled. Moreover, there was a concern that youth would be too sick to participate. According to the records, only 1 patient (5%) gave this as a reason for refusal.

In summary, this pilot study provided valuable information to inform future trials involving recruitment and initiation of an on-line intervention in the ED. Results suggest that such a program can

reach patients in need of strategies for improving their asthma management and might reach those who have limited access to health care. According to the authors' assessment, the best method for reaching urban adolescents with uncontrolled asthma seems to be to approach them in the ED. This method is labor intensive and enrollment activities must avoid competing with other priorities in the delivery of care. However, if research strategies and protocols can be further streamlined, ED staff members seem willing to adjust. Phase II of this pilot will show whether the benefits of targeting youth in the ED setting are worth the hurdles encountered.

Acknowledgments

The authors acknowledge the participating youth and their families and the work of the following research staff members, without whom this study would have not been possible: Dan McLaren, Brittany McKinnon, Jia Li, Dana Larkin, Michael Sheehan, Renee Bourgeois-Williams, Christina Melkonian, LaSalle McKenzie, Brianna Costello, Cyrus Farahani, Belinda Parr, and Cheryl Miree.

References

- [1] Akinbami LJ, Moorman JE, Bailey C, et al. Trends in asthma prevalence, health care use, and mortality in the United States, 2001–2010. *NCHS Data Brief*. 2012;94:1–8.
- [2] Riera A, Walker DM. The impact of race and ethnicity on care in the pediatric emergency department. *Curr Opin Pediatr*. 2010;22:284–289.
- [3] Joseph CL, Ownby DR, Havstad SL, et al. Evaluation of a web-based asthma management intervention program for urban teenagers: reaching the hard to reach. *J Adolesc Health*. 2012;52:419–426.
- [4] Joseph CL, Peterson E, Havstad S, et al. A web-based, tailored asthma management program for urban African-American high school students. *Am J Respir Crit Care Med*. 2007;175:888–895.
- [5] Prochaska JO, DiClemente CC, Norcross JC. In search of how people change. Applications to addictive behaviors. *Am Psychol*. 1992;47:1102–1114.
- [6] Zimmerman BJ, Bonner S, Evans D, Mellins RB. Self-regulating childhood asthma: a developmental model of family change. *Health Educ Behav*. 1999;26:55–71.
- [7] Velicer W, Prochaska J, Fava J, Norman GJ, Redding C. Smoking cessation and stress management: applications of the Transtheoretical Model of behavior change. *Homeostasis*. 1998;38:216–333.
- [8] Dijkstra A, De VH. Clusters of precontemplating smokers defined by the perception of the pros, cons, and self-efficacy. *Addict Behav*. 2000;25:373–385.
- [9] Jia CE, Zhang HP, Lv Y, et al. The Asthma Control Test and Asthma Control Questionnaire for assessing asthma control: systematic review and meta-analysis. *J Allergy Clin Immunol*. 2013;131:695–703.
- [10] Horowitz L, Ballard E, Teach SJ, et al. Feasibility of screening patients with nonpsychiatric complaints for suicide risk in a pediatric emergency department: a good time to talk? *Pediatr Emerg Care*. 2010;26:787–792.
- [11] Gregor MA, Shope JT, Blow FC, Maio RF, Weber JE, Nypaver MM. Feasibility of using an interactive laptop program in the emergency department to prevent alcohol misuse among adolescents. *Ann Emerg Med*. 2003;42:276–284.
- [12] Mahabee-Gittens EM, Gordon J. Acceptability of tobacco cessation interventions in the pediatric emergency department. *Pediatr Emerg Care*. 2008;24:214–216.
- [13] Zorc JJ, Chew A, Allen JL, Shaw K. Beliefs and barriers to follow-up after an emergency department asthma visit: a randomized trial. *Pediatrics*. 2009;124:1135–1142.
- [14] Data Driven Detroit (D3) for the Skillman Foundation. State of the Detroit Child: 2012 Report. datadrivendetroit.org/wp-content/uploads/2013/02/D3_2012_SDCReport.pdf. Published 2012. Accessed November 11, 2015.
- [15] National Center for Health Statistics, US Census Bureau. Comparison of the prevalence of uninsured persons from the National Health Interview Survey and the Current Population Survey, 2014 and 2015. www.cdc.gov/nchs/data/nhis/health_insurance/NCHS_CPS_Comparison092015.pdf. Published September 2015. Accessed November 11, 2015.