The ONE Step Initiative: Quality Improvement in a Pediatric Clinic for Secondhand Smoke Reduction

abstract

BACKGROUND AND OBJECTIVE: Although comprehensive smoking counseling to limit secondhand smoke (SHS) is widely endorsed, it is often not done. Published evaluations of brief and practical systems that improve screening and counseling to reduce SHS are limited. Our objective was to determine if a quality improvement activity around smoking counseling leads to changes in (1) medical assistant and pediatric provider assessment of smoking history and (2) smoking or other behaviors affecting children’s SHS exposure.

METHODS: In a large urban teaching clinic we assessed the ONE Step intervention, which included the following: (1) “Ask” (medical assistant asking whether caregivers smoke); (2) “Advise” (providers advising smoking outside and quitting if ready); (3) “Refer” (providers referring to the Colorado telephone QuitLine); and (4) electronic medical record prompts and required documentation regarding smoking. Medical assistant and provider assessments of smoking were evaluated with a chart review by using a pre-/posttest design. Caregiver behavior change was evaluated with a time-series survey that included assessment at baseline and follow-up via telephone at 6 and 12 months from study entry.

RESULTS: ONE Step was associated with a statistically significant increase in Ask, Advise, and Refer documentation. Caregiver surveys showed that 97% found discussions of SHS with providers acceptable. Six- and 12-month follow-ups, respectively, showed that 14% and 13% of smokers reported quitting and that 63% and 70% of current smokers reported reduced SHS exposure.

CONCLUSIONS: ONE Step was feasible to deliver in a busy outpatient setting, acceptable to families, and appears to have resulted in decreased exposure to SHS in our pediatric population. Pediatrics 2013;132:e502–e511

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KEY WORDS: pediatrics, secondhand smoke, parents/caregiver, smoking, quality improvement, smoking cessation

ABBREVIATIONS: AAR—Ask, Advise, Refer, CEASE—Clinical Effort Against Secondhand Smoke Exposure, CHC—Child Health Clinic, EMR—electronic medical record, IT—information technology, MA—medical assistant, QI—quality improvement, SHS—secondhand smoke

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Deleterious effects of secondhand smoke (SHS) on children’s health are well documented. More than one-third of children live in a home with at least 1 adult smoker. The US Department of Health and Human Services’ Strategic Report Ending the Tobacco Epidemic and the American Academy of Pediatrics have highlighted the importance of tobacco screening and counseling at each pediatric visit. Despite these recommendations, significant gaps in SHS screening and counseling at both well and sick clinical visits remain, with fewer than half of providers asking about smoking in the home and few parents receiving advice to reduce SHS or to quit smoking or being referred to smoking cessation programs. Most parents approve of their child’s provider addressing smoking, and ~60% of parents say they would accept cessation enrollment at their child’s visit if offered.

Finding acceptable opportunities to intervene with caregivers who smoke is a challenge. Time is limited, and clinicians tend to address the issue of tobacco smoke only when it is obviously affecting the health of the child, for example when there is a strong smoke scent on children’s clothes, when children imitate smoking behavior, or when children are often sick. Simply having an office system in place that identifies smokers and provides advice at every visit is known to double cessation rates.

The overall goal of this quality improvement (QI) project was to simplify the more labor- and time-intensive Clinical Effort Against Secondhand Smoke Exposure (CEASE) adult cessation counseling model while incorporating its key elements of the 5 As Behavior Model (Ask, Advise, Assess, Assist, and Arrange) recommended in the Department of Health and Human Services’ Treating Tobacco Use and Dependence: Clinical Practice Guide. CEASE engages parents in smoking cessation through various counseling steps and nicotine replacement therapy. We used a simplified messaging approach for the ONE Step Intervention: “Ask, Advise, Refer” (AAR), leaving out “Assist and Arrange” components, which require providing a prescription for smoking cessation medications, and included prompts within the electronic medical record (EMR) to provide an intervention that could easily be administered in a busy primary care setting. Our objectives were to determine if a QI activity around smoking counseling would lead to changes in the following: (1) medical assistant (MA) and pediatric provider assessment of smoking history and (2) smoking or other behaviors affecting children’s SHS exposure.

METHODS
Study Setting and Population
Starting in June 2008, the intervention was implemented clinic-wide at all visits (sick and well) in the Child Health Clinic (CHC) at Children’s Hospital Colorado, a large, metropolitan, hospital-based teaching clinic serving low-income families (78% Medicaid/State Children’s Health Insurance Program, 10% uninsured). The clinic averages 23,000 visits per year, with 60% of visits for children from birth to 3 years of age. The population is 56% Hispanic, and 40% of the clinic population identify Spanish as their primary language. Resident, physician assistant, and medical student trainees provide much of the patient care and are supervised by faculty physicians who attend a half day to 3 days per week. A small proportion of faculty have their own faculty practices 1 to 2 times per week in the clinic. Rotating trainees usually include 3 pediatric residents, 2 family medicine residents, 1 medical student, and 2 physician assistant students. In addition, there are 40 pediatric residents who participate in continuity clinics on a weekly basis. An EMR system was implemented within this clinic 4 years before this project began. The study was approved by the Colorado Multiple Institutional Review Board at the University of Colorado as an expedited protocol not requiring informed consent.

ONE Step Intervention
Interim Development and Description
The ONE Step Intervention is a simplified version of the CEASE model, originally created as an intensive adult smoking cessation program. The intervention was first introduced and pilot tested in the Children’s Hospital Colorado emergency department in 2007 under the leadership of a Children’s Hospital Colorado pulmonologist (K.L.C.) and the evaluation team leader/respiratory therapist (D.H.). This pilot test indicated that the ONE Step Intervention was simple for providers and acceptable to patients and families. During a 6-month planning period (December 2007 to May 2008), meetings were conducted to develop a system that would work in the CHC. Meeting attendees included clinical information technology (IT) personnel, MAs, nursing leaders, attending faculty, the medical director (M.B.), a pulmonologist (K.L.C.), and the evaluation team leader/respiratory therapist (D.H.).

ONE Step consists of the MA asking the screening question: “Does anyone who lives in the home or cares for the child smoke?” If the caregiver states “yes,” then the MA documents the caregiver’s response in the intake section of the EMR and gives the ONE Step form, a brochure that provides information about risks of SHS and asks recipients to agree to be contacted by the state-wide QuitLine (which provides tobacco dependence treatment), to the caregiver (see Fig 1). During the visit, the
FIGURE 1
ONE Step form (front, back, and inside).
provider then “Asks” about SHS/readiness to quit; “Advises” about risks of SHS and to “take one step outside your car or home to smoke”; and “Refers” to QuitLine if the smoker is ready to quit. The term “Advise” was felt to better describe the role played by pediatric providers rather than “Assist” (used in the CEASE program), which is considered a more intensive and time-consuming approach and includes prescribing smoking cessation medications. If the screening question is positive and the smoking caregiver is present and ready to quit, he or she is asked to fill out the ONE Step form. When completed, the provider faxes a perforated section of the form to the QuitLine. The QuitLine then attempts to reach the smoker to provide smoking cessation services. Additionally, the ONE Step form includes information about QuitLine for all families to take home with them. The provider’s assessment is documented in the EMR within text fields required for closure of the chart (Fig 2). EMR-based prompts guide the MA to ask the smoking-related questions among their other intake screening questions, such as questions about allergies or immunizations, and reminds the providers to deliver and document the AAR portions.

**Intervention Implementation**

We began the introduction of the ONE Step Intervention to the CHC with 2 staff meetings in January and February 2008, which included providers and MAs. We then had 2 months of weekly meetings (March and April 2008) with the core planning team, which included an evaluation team leader, medical director, nursing director, and all MAs in the CHC. These meetings focused on implementation processes within the clinic that would make the intervention as feasible as possible. Recognizing the essential role of the MA, we rewarded them during the launch phase (May and June 2008) with ONE Step T-shirts, which fostered both MA buy-in and increased awareness among families and staff. The T-shirts were worn during the launch phase of the project to remind staff as well as parents about the ONE Step Intervention. We provided lunches to the MAs on 4 occasions, during which we elicited feedback on the intervention and made adjustments as indicated. The evaluation team leader created the ONE Step Form (Fig 1) with feedback from the team, and it was translated into Spanish. We also had monthly meetings with IT personnel for creation of the required EMR templates, which enabled data extraction and reports (Fig 3).

During our weekly team meetings, EMR reports were reviewed to evaluate progress as part of the Plan-Do-Study-Act cycle. For example, we found that 1 faculty member was using templates in the EMR that she had created but did not include the SHS drop-downs, so those were added. We also found that providers were identifying smokers who were not identified during MA intake questions, so brochure holders were placed in all of the examination rooms to prompt caregivers to initiate discussions with providers about SHS. New trainees to the clinic were educated on the ONE Step Intervention by the medical director (M.B.), during monthly orientation sessions. A respiratory therapist (D.H.) acted as the team leader, making daily or twice daily “rounds” to check in with staff and answer questions, provide support, and promote compliance with ONE Step.

![Flow chart for ONE Step SHS initiative](figure2.png)
Evaluation Methods
The evaluation focused on implementation of the ONE Step Intervention and the primary outcomes of reported smoking cessation and reduction in SHS exposure to children. Data were extracted from the EMR electronically and through manual chart reviews of text fields to assess MA and provider delivery of the intervention. Surveys of caregivers were used to assess program satisfaction, smoking cessation, and reduction in SHS exposure to children.

EMR Assessment of SHS Screening Rates
Data were extracted from concept-enabled fields in the EMR to determine the overall SHS screening rates by MAs and providers for all visits between June 2008 and September 2009. Because the ONE Step Intervention was designed to increase the frequency with which both MAs and providers ask caregivers about their and other caregivers’ smoking behaviors, we compared the percentage of children exposed to smoke identified by the MAs with those identified by the providers.

Chart Review of AAR Intervention Delivery
Manual chart reviews of EMR text fields were used to determine pre- and post-intervention rates of assessment of SHS exposure and delivery of advice. Our IT staff selected every 10th chart from the EMR for visits to the clinic in 2 separate months: May 2007, before ONE Step was implemented (n = 151, 12% of patient charts), and May 2008, 1 month after ONE Step was implemented (n = 150, 10% of patient charts).

Caregiver Surveys
Self-administered baseline surveys were provided to a convenience sample of caregivers of clinic patients starting in June 2008, ~2 months after initiation of ONE Step. Caregivers completing the baseline survey served as the sample to receive telephone follow-up calls. The surveys were distributed and collected by MAs. The surveys were not anonymous, required 2 to 5 minutes to complete, and assessed smoking in the home. The number of surveys distributed varied over time depending on clinic flow and patient volume. To motivate increased survey distribution, we instituted a contest with a cash gift card for the MA who distributed and collected the most surveys (January 2009).

From June 2008 to September 2009, 1 week after their clinic visit, we attempted to contact all families with a smoking caregiver to ask whether they recalled the provider discussing SHS exposure at the visit and the acceptability of the intervention (eg, “Did you feel it is ok for a medical provider to talk to you about tobacco smoke or secondhand smoke?”).

At 6 and 12 months after their visit, we attempted to reach all families who reported a smoking caregiver in the baseline survey to assess changes in smoking behaviors including smoking outside the home or car, the decrease in number of cigarettes smoked, and smoking cessation (see Fig 4 for sample survey questions). Research assistants conducted follow-up telephone interviews in English or Spanish. Five attempts per working phone number were made.

QuitLine Referrals
To protect confidentiality, QuitLine referrals could not be directly linked to...
individual patients. However, QuitLine provided statistics on the number of faxed referral forms and the proportion successfully reached.

### Data Analysis

Frequencies were examined for caregivers’ 1-week recall of SHS discussions and their acceptability and for smoking behaviors at 6 and 12 months. $\chi^2$ Tests were used to assess changes from pre- to posttest for the chart review.

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**FIGURE 4**

Sample survey questions.
RESULTS

EMR Assessment of SHS Screening Rates

Overall, 80% (n = 20,065/25,081) of caregivers of children visiting the CHC were screened by either a provider or an MA during the entire 16-month study period (May 2008 to September 2009). We were able to assess outcomes for providers during the entire period, but due to a problem with the EMR, we were not able to assess outcomes for MAs during a 5-month period at the beginning of the study (June 2008 to October 2008). Because of this situation, denominators for the 2 groups are different. This technical issue only applied to this 1 set of data and not subsequent analyses. Although 11% (n = 1799/16981) were identified as smokers by MAs, 17% (n = 3376/20,065) of caregivers were identified as smokers when screened by providers. The monthly run chart used for following MA screening is shown in Fig 5.

Chart Review of AAR Intervention

MA documentation of screening in the EMR improved from none in the pre-intervention period to 80% after ONE Step implementation. Increases in provider delivery of ONE Step were as follows: (1) “Asked” whether a child was exposed to smoke (24% in 2007 vs 70% in 2008; P < .001); (2) “Advised” the parent/caregiver to reduce the child’s exposure to SHS (8% in 2007 vs 96% in 2008; P < .001); and (3) “Referred” the caregiver to the Colorado QuitLine (8% in 2007 vs 48% in 2008; P < .001).

Caregiver Surveys

Of 1993 caregivers asked to participate in the baseline survey, 1888 (95%) completed the survey. Among respondents, 36% (n = 683) were smokers and formed the sample for the 1-week, 6-month, and 12-month follow-up surveys. At 1 week, 266 (39%) of smoking caregivers were reached, whereas 234 (34%) were reached at 6 months and 530 (48%) were reached at 12 months (Fig 6).

One-week follow-up surveys (n = 266) were conducted for purpose of ONE Step recall and acceptability. When surveyed 1 week after the target child’s visit to the CHS, a majority of caregivers who smoked recalled talking to their medical provider about the effects of SHS (n = 175/266; 66%) and resources to help quit (n = 153/266; 58%), as well as receiving the ONE Step brochure (n = 182/266; 68%). Nearly all respondents (97%; n = 259/266) reported that it was “ok for a medical provider to talk to you about tobacco or secondhand smoke.”

The 6 and 12 month caregiver follow-up surveys assessed behavior change and are described as follows. The most frequently cited specific changes were either “Only smoke outside” (48% at 6 months; 39% at 12 months) or “Cut back on smoking” (34% at 6 months; 36% at 12 months). Of those who did not make changes, 52% at 6 months and 44% at 12 months indicated at baseline that the child is never present when the smoker is smoking, and 83%

FIGURE 5

Run chart showing percentage of caregivers screened for SHS by an MA during visit, by month (total caregivers screened over study period, n = 20,065).

FIGURE 6

Survey study sample.
at 6 months and 75% at 12 months indicated at baseline that the smoker already smoked outside.

When 6-month responders and non-responders were compared, there were no statistically significant differences in the following baseline characteristics: primary language, smoking caregiver (mother/father), interest in quitting, location of smoking, number of cigarettes smoked per day, and frequency of child’s exposure to smoke. At the 12-month follow-up, respondents were more likely to be a nonsmoking mother compared with nonrespondents (49% vs 40%, respectively; P < .05).

**QuitLine Referrals**

During the study period, the Colorado QuitLine received 362 fax referrals from our clinic. Using a conservative denominator of 3376 smokers (obtained from the provider screening rate) over the study period would yield a fax rate of 11% (n = 362/3376). In addition, QuitLine reported that when this group of caregivers was called back by QuitLine staff, 23% (n = 83/362) enrolled, 6% (n = 20/362) received information only, 3% (n = 11/362) declined, and 68% (n = 248/362) were not reachable. Our QuitLine contact rate (32%) was comparable to the overall contact rate for the Colorado QuitLine.

**DISCUSSION**

The ONE Step program implemented at Children’s Hospital Colorado was a successful QI intervention that can serve as a model for other large pediatric clinics. Through ONE Step, 80% of children were screened for SHS exposure and reported smoking cessations rates in caregivers (7% to 13% depending on assumptions) appeared to be higher than for similar populations (5% for low-income adults in Colorado in 2008). In addition, SHS exposure of children was reportedly reduced through changes in smoking locations, as revealed in other studies of brief parental smoking interventions. Consistent with the literature, the intervention was highly acceptable to families. This effort required broad collaboration among clinic and hospital personnel over several months, use of electronic data systems for implementation and evaluation, and partnership with an outside entity, the Colorado QuitLine.

Simplification was a key element of our successful effort. Previous work has found that providers typically counsel about caregiver tobacco use only when signs are present. Unfortunately, if such signs are not present, which is often the case when children are being exposed to SHS, then the opportunity may be lost. Evidence in the literature supports a provider-led, systematic approach that incorporates the “5 A’s” behavioral change model. In a comprehensive systematic review, Pbert et al found that any system that addresses SHS can have a positive impact on influencing the behaviors of smokers. We simplified the “5 A’s” to 3, and compared with previous studies our study showed higher rates of AAR practices: 80% Ask, 90% Advise to take 1 step outside, and 10% to 50% Refer by faxing a referral form to QuitLine. We used a simple but colorful form that caregivers remembered, and the intervention was implemented at all clinic visits so that it became routine for MAs and providers. In addition, the message was reinforced for caregivers over repeated visits. In a teaching clinic with a high monthly turn-over of provider trainees, the simple approach was critical.

The successful development and implementation of ONE Step can be largely attributed to the cooperative effort of the multidisciplinary team. In planning the intervention, our team met over a 6-month period to develop a system that would work in our setting. Providers welcomed a systematic way to approach SHS with caregivers, which had previously been variable and often lengthy. MAs were enthusiastic participants who were responsible for asking the SHS question at intake and providing families with the ONE Step form. ONE Step simultaneously addressed the needs of 3 populations: pediatric health care providers whose practice did not include a systematic approach for addressing SHS exposure, children exposed to SHS in the home and/or by a person who cares for them regularly, and caregivers who smoke. As with most QI projects, the evaluation team leader was the “champion” who made rounds and ensured MA and provider buy-in and compliance.

An unexpected finding of this project was that families were more likely to report smoking to the provider than to the MA, suggesting that we should not rely on MAs alone for screening. To address this, we placed additional ONE Step forms in the clinic rooms so they would be readily available to the provider. It is unlikely that this discrepancy was due to training of the MAs, because the SHS question appeared in the EMR as part of the intake process. In our clinic, intake is performed in a small room at the front of each hallway, and it is possible that caregivers felt uncomfortable providing information in this setting. Caregivers may have felt more comfortable revealing smoking information in the examination room with the provider. Alternatively, the difference in reporting behavior may have been due to the different relationship caregivers had with the provider as compared with the MA.

EMR data were mostly helpful in the QI process, although not completely reliable. We had a short period in which we could not generate consistent reports for unknown reasons despite investigation. Run chart data were particularly helpful for monitoring MA screening. Through this method we identified problems with baseline...
survey distribution and with EMR capture of the screening question by MAs; we were then able to take actions to correct these problems.

As we adopt certified EMR technology as part of Meaningful Use Smoking Objective, these early challenges have been instrumental in our learning and planning processes. The Meaningful Use Smoking Objective requires that eligible professionals must record smoking status of >50% of patients aged 13 years or older. It may be useful for practices to simultaneously incorporate a systematic approach to SHS in their population by using our ONE Step plan. Our evaluation of the implementation of ONE Step has important limitations. It was a single-group, pre-/posttest chart review, and time-series survey design, a design that was necessitated by our clinic-wide implementation as a QI effort. A randomized trial was not practical and not desirable to our providers. Our evaluation of smoking behavior changes by caregivers is limited by our low response rate to the follow-up surveys (eg, 34% at 6 months), which has been described in other studies with smokers by lack of a comparison group; and by reliance on self-report to assess smoking behavior changes. To be conservative, we computed cessation rates by using the assumption that nonrespondents had not quit smoking.

Through team discussions and informal conversations with clinic staff, we reached consensus that 4 main QI lessons were learned in this process: (1) engaging MAs as important team members and motivating them with T-shirts, food, and regular contact and meetings worked well and should be considered when budgeting for similar efforts; (2) EMR templates are key to prompting the intervention for providers while building consistency in documentation, but generating accurate reports requires time and close liaisons with IT; (3) in a clinic with monthly turnover of new trainees, it is critical to incorporate ONE Step procedures into the initial orientation for all trainees; and (4) caregivers did not always report SHS when asked by the MA, so combining MA and provider screening is important for maximizing the identification of children exposed to SHS.

CONCLUSIONS

The ONE Step Intervention resulted in marked increases in documented SHS history and advice. Most caregivers found the intervention acceptable and reported increased smoking cessation and reductions in smoking behaviors after the intervention. Although it required considerable effort to implement, ONE Step has now been part of our regular clinic operation for over 3 years.

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