Published in final edited form as:

J Asthma. 2016 September ; 53(7): 691–698. doi:10.3109/02770903.2015.1135944.

San Francisco childcare centers' preparedness in the prevention and management of asthma among preschool-aged children

Chelsea A. Young, BS¹, Jodi Stookey, PhD², Anisha I. Patel, MD, MSPH, MSHS^{3,4}, Curtis Chan, MD², Jane Evans, BSN, RN, PHN², Karen Cohn, MS⁵, Luz Agana, MS⁵, Irene H. Yen, PhD, MPH⁶, Alicia Fernandez, MD⁶, and Michael D. Cabana, MD, MPH^{*,3,4,7}

¹University of California, San Francisco, Department of Psychiatry, San Francisco, California

²Maternal, Child and Adolescent Health, San Francisco Department of Public Health, San Francisco, California

³University of California, San Francisco, Department of Pediatrics, San Francisco, California

⁴Philip R Lee Institute of Health Policy Studies, University of California, San Francisco, California

⁵Children's Environmental Health, San Francisco Department of Public Health, San Francisco, California

⁶Internal Medicine, University of California, San Francisco

⁷Department of Epidemiology and Biostatistics, University of California, San Francisco, California

Abstract

Introduction—Asthma is a common health condition for children in childcare. National recommendations for asthma in childcare exist. However, no studies have investigated the extent to which childcare centers adhere to these recommendations. We aimed to assess childcare center adherence to National Asthma Education and Prevention Program (NAEPP) recommendations for asthma care and preparedness and to identify characteristics associated with increased adherence to national asthma recommendations.

Methods—We developed a standardized instrument. Each childcare center received a score of 0 through 7 based on number of recommendations met. We conducted t-tests, chi square tests and linear regression to identify childcare center factors associated with increased asthma preparedness.

Results—36 out of 40 eligible childcare centers (90%) participated. These sites served 1570 children primarily between the ages of 2 to 5 years. On average, centers met 3.8 out of 7 (SD=1.3) recommendations. Staff familiarity caring for children with asthma ($p<0.001$) and the center's asthma prevalence ($p=0.01$) was positively associated with the center's asthma preparedness. The 3

*Address correspondence to: Michael D. Cabana, MD, MPH; University of California, San Francisco, Division of General Pediatrics, Box 0503, 3333 California Street, Laurel Heights #245, San Francisco, CA 94118, cabanam@pediatrics.ucsf.edu, 415-514-2660.

Declaration of interest The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper. Portions of this manuscript were presented at the American Academy of Pediatrics National Conference and Exhibition in San Diego on October 11, 2014.

areas most in need of improvement related to asthma medications, asthma action plans and asthma policies. None of the managers reported being familiar with the NAEPP recommendations.

Discussion—There is room for improvement in the asthma care and preparedness of childcare centers. The 3 areas in which centers performed poorly (appropriate asthma medication management, use of asthma action plans, and presence of appropriate asthma policies) suggest that closer collaboration between clinicians and childcare centers may be a key to improving asthma management for young children.

Keywords

Pediatrics; Prevention

Introduction

Addressing asthma preparedness in childcare centers could improve asthma outcomes for young children because this group has a higher burden of asthma morbidity compared to older children [1] and spends much of their time in childcare centers [2]. As a result, the Department of Health and Human Services states that, “childcare settings should prepare and implement a comprehensive plan to address asthma” [3]. However, in many states, asthma training requirements for childcare center staff are minimal. Previous research has shown that childcare centers are not well-prepared to prevent and manage asthma exacerbations for children in their care [4–10].

Although the School Asthma Subcommittee of the National Asthma Education and Prevention Program (NAEPP) developed recommendations as a one page checklist for asthma preparedness in childcare settings in 2000, with updates in 2008, no studies to date have comprehensively evaluated childcare centers' preparedness based on these recommendations [11]. Nor have studies examined the extent to which centers are aware of these recommendations and whether or not they have incorporated them into their practices. Further, it is not clear if center demographic characteristics and childcare center managers' attitudes toward asthma are associated with asthma preparedness. Therefore, in collaboration with the county health department and the childcare community, we designed an observational study to assess the ability of licensed childcare centers in San Francisco to meet NAEPP recommendations for preventing and managing asthma exacerbations using a 43-item, standardized checklist that we developed for this purpose [12]. The full methods describing development and details of our checklist were published previously [12]. We also sought to identify center, staff and manager-level characteristics associated with increased ability to meet to recommendations.

Methods

Selection of Childcare Centers

The study was conducted between April 2013 and May 2014 in partnership with the San Francisco Department of Public Health (SFDPH). The Committee for Human Research of the University of California, San Francisco (UCSF), approved the study. A childcare center was defined as any non-home facility in which non-medical care and supervision are

provided to children in a group setting [13]. The sample included all 40 San Francisco childcare centers serving children primarily over age 2 and participating in the SFDPH's Child Care Health Program (i.e., CCHP, a group of public health nurses and health workers who provide ongoing health and safety consultation to low-income childcare centers not supported by other organizations, such as San Francisco Unified School District or Head Start). This was a convenience sample for our study given that the SFDPH had existing relationships with this community. We focused on children from low-income families at the request of the SFDPH because of preliminary data demonstrating that asthma prevalence and asthma morbidity are higher among this population.

Sites eligible for CCHP services are primarily state-contracted Title 5-funded centers caring for children from families below 70% of state median income or eligible for assistance through CalWORKS (a state welfare program that gives cash aid and services to eligible needy California families). Centers were excluded if they primarily cared for children less than 2 years or if they did not receive regular services from CCHP.

Study Measures

Data was collected using the Preparing for Asthma in Child Care (PACC) Instrument, a standardized checklist we developed using the NAEPP recommendations “How Asthma-Friendly Is Your Child-Care Setting?” as a framework and incorporating information from the Expert Panel Report [14], childcare asthma checklists [15, 16], peer-reviewed literature [4–6, 17], state licensing requirements [18, 19, 20], guidelines for caring for children in early education [21, 22], and interviews with experts in the fields of children's environmental health and asthma. The checklist involves an interview with the childcare center manager, an environmental assessment, and a file and medication review at each center. The checklist has 43 items and covers the 7 domains specified by the NAEPP (Table 1) [11]. The number of questions per domain ranges from 2 questions (Smoking, Asthma Action Plans, Physical Activity) to 18 questions (Ventilation and Allergens). Items are weighted so that those deemed more significant by research team consensus and literature review are more influential [12]. Cut-offs for adherence were set at 100% for areas with 2 items and 66% for items with more than 2 items. Formal reliability and validity testing were not conducted. Full methods and a description of the instrument were previously published elsewhere [12].

Structured Interview—At each childcare center, the manager (i.e., the person present at the center who is primarily responsible for daily decisions at the center) was invited to participate in an interview. If a manager was not present, the manager's designee was interviewed. All interviews were conducted in English by the lead author. We assessed manager attitudes toward caring for children with asthma using methods similar to those described previously [23, 24]. To assess self-efficacy, manager familiarity, staff familiarity, agreement, and outcome expectancy, respectively, we asked “How confident are you in your center's ability to care for children with asthma?”; “How familiar are you personally caring for children with asthma?”; “How familiar are staff with caring for children with asthma?”; “How much do you agree that your center is responsible for helping in the overall process of caring for children with asthma?”; and “How much of an effect do you think your center can have in the overall process of caring for children with asthma?” A 5-point scale was used for

respondents to indicate their level of agreement, self-efficacy, and familiarity (i.e., 1=not at all familiar; 5=extremely familiar). A 4-point scale was used for respondents to indicate their level of outcome expectancy (1=no effect; 4=large effect). Awareness of the recommendations was measured using a dichotomous response (yes/no) to the question, “Have you ever seen or heard of these guidelines before today?” while providing a copy of the NAEPP recommendations to the interviewee.

Environmental Assessment—The observation was completed in a single classroom. If there were multiple eligible classrooms, then the manager or manager's designee was asked to select a classroom based on convenience.

File and Medication Review—To identify children diagnosed with asthma, health information, such as proportion of children with medications and asthma action plans, was obtained by review of children's files at the center. A trained study team member looked for quick-relief medication, an asthma action plan, a form from the parent allowing childcare providers to administer inhaled medication [18], and a medication administration log [21] for each child with known asthma. Children were classified as having asthma if a form in their medical chart at the center reported asthma.

Analysis

All statistical analyses were performed using RStudio version 0.97.55. We used two-sample t tests to compare mean differences and the Chi-square test for independence to compare percentage differences. Simple and multivariable linear regression models were employed to assess factors associated with higher asthma preparedness scores. P values of <0.05 were considered statistically significant.

Each item on the PACC Instrument was categorized as “adherent” or “non-adherent.” All “adherent” responses were assigned a value of 1 and all “non-adherent” responses were assigned a value of 0. Based on predetermined cut-offs within each of the 7 domains, centers were determined to either meet or not meet each of the 7 recommendations. Therefore, each center could receive an asthma preparedness score of whole number values between 0 through 7.

Centers were categorized as high performers (5 to 7 recommendations met), moderate performers (3 to 4 recommendations met), or low performers (0 to 2 recommendations met) for analysis. For dichotomous analyses, centers were dichotomized as meeting 5 or more recommendations versus fewer than 5 recommendations. Asthma prevalence was dichotomized at greater than 10% of total children at the center diagnosed with asthma based on chart review versus 10% or less. This cut-off was selected because just under half of centers (17 out of 36) have asthma prevalence over 10% so centers were split evenly using this prevalence. For analysis of Likert-scale items, responses were dichotomized at 5 (extremely prepared) versus less than 5 for 5-point scale items (preparedness to administer medications, confidence, familiarity and self-efficacy) and 4 versus less than 4 for 4-point scale items (outcome expectancy). For analysis of continuous variables, the proportion of possible points achieved within all of the 7 recommendations was summed for each center.

Results

Demographics and Overall Performance

Forty childcare centers were contacted and 36 centers participated in all study procedures (90% participation rate) (Figure 1). The 4 declining centers cited a lack of time. Centers were located in 15 different zip codes and served a total of 1570 children. An average of 44 children (range 13–96) were enrolled. Children's ages ranged from 1.5 months to 72 months. The average manager age was 44 years (range 26–70). The majority (94%) of managers were women. Asthma prevalence was 7.8% (0–23.8%) on chart review and 9.1% (0–35.3%) by manager estimate. None of the managers reported being familiar with the NAEPP recommendations.

The average number of recommendations met was 3.8 out of 7 (SD 1.3) (Figure 2). The recommendations that were least often met were Medication Management (28% of centers), Presence of a Consultant and Policies (39%), and Presence of Asthma Action Plans (47%) (Figure 3). There were 10 high-performing centers (>4 recommendations met) and 7 low-performing centers (<3 recommendations met). The greatest difference between high-performing centers and low-performing centers was seen in the area of Consultant and Policies (70% difference). None of the low-performers met the Consultant and Policies recommendation.

Exposure to Smoking

Forty seven percent of childcare managers reported smelling smoke at least once per month (Table 2). Averaged across all centers, managers reported smelling smoke 3 times per month (range 0–40). The smoke originated primarily from neighbors and outside passers-by and secondarily from secondhand smoke from parents during pickup and drop-off.

Management of Ventilation and Triggers

A majority of centers had curtains and drapes, non-washable stuffed animals, upholstered furnishings, and potted plants in childcare areas. Six out of 36 managers reported having noticed mold at the center within the last year, although the investigator never encountered mold during the environmental assessment.

Presence of a Medical Consultant and Policies

Ninety-two percent of managers reported having access to a “medical or nursing consultant to help with asthma-related issues.” A minority of centers had policies about reducing asthma allergens and irritants (36% of centers), promoting physical activities for children with asthma (33%), or planning field trips for children with asthma (31%).

Medication Management

Managers at 58% of centers and staff at 33% of centers were extremely prepared (5 on 5-point Likert scale) to administer asthma medications to a child if necessary. A minority (42%) of centers had unexpired albuterol for all children with asthma. 89% of managers required asthma action plans to be updated annually for each child with asthma. On file

review, half of centers (50%) had up-to-date asthma action plans for all children with asthma.

Staff Training

Fifty-six percent of managers reported that they or staff had received asthma training within the last year.

Encouragement of Physical Activity

Fifty percent of managers strongly agreed that children with asthma are able to participate in physical activities in the same way as children without asthma at the center. All managers stated that children with asthma were encouraged to participate in physical activity.

Manager Attitudes and Factors Associated with Increased Adherence

None of the managers were aware of the NAEPP guidelines. Manager attitudes were the following: staff familiarity was 3.69 (1=not at all familiar, 5=extremely familiar), manager familiarity 4.08 (1=not at all familiar, 5=extremely familiar), self-efficacy 4.25 (1=not at all confident, 5=extremely confident), agreement 4.44 (1=strongly disagree, 5=strongly agree) and outcome expectancy 3.33 (1=no effect, 4=large effect).

In bivariate analyses, increased staff familiarity caring for children with asthma was associated with increased asthma preparedness ($p<0.001$). Increased asthma prevalence at the center – measured as the percentage of children with asthma divided by the total number of children – was also associated with increased preparedness ($p=0.01$). No other characteristics were found to be associated with increased preparedness (i.e., educational attainment of manager, Child and Adult Care Food Program or Preschool for All funding status, or receipt of tuition or state subsidy). In a multivariate model, both staff familiarity and asthma prevalence were significantly associated with adherence to recommendations (asthma prevalence $p=0.04$, staff familiarity $p=0.002$).

Discussion

In this mixed methods, pilot study that included direct observation of childcare centers, a structured interview and file and medication review, we found considerable variation in the ability of low-income childcare centers to adhere to NAEPP recommendations. Of the 36 participating centers, only one met all 7 recommendations. This is consistent with previous work showing that childcare centers caring for low-income children may be unprepared for prevention and management of asthma [4–10,17]. In this study, we identified 3 domains most needing improvement, as well as characteristics associated with increased asthma preparedness.

The specific areas in which childcare centers demonstrated the most potential for improvement include being prepared to administer quick-relief asthma medications, having up-to-date asthma action plans at the center, and having access to asthma policies. These 3 areas are notable because their success depends on collaboration with local health care providers, and the development of a connection with the child's primary care medical home.

For example, medical practices should ensure that a copy of the asthma action plan is available at the child's childcare center. Medical providers should be cognizant about which children may require extra prescriptions for medications, spacers and masks for the childcare setting. Finally, childcare centers or local health departments could collaborate and consult with health care providers to develop child health-related policies that are relevant, feasible and tailored for specific childcare settings. The importance of involving clinicians in childcare-based asthma interventions has been previously documented [25].

The reason for centers' variable performance may be multifactorial. For example, it is not clear from our study whether the problems we observed stem from a failure of clinicians to provide asthma action plans or prescribe medications or a failure of parents to bring the plans or medications to childcare. Physician failure to provide asthma action plans to patients has been previously documented [26, 27]. Requiring childcare providers to request updated asthma action plans and medications annually is one approach to increase the number of children receiving quality asthma care. That the greatest difference between high-performing and low-performing centers in our study was related to child health policies further highlights this need.

One particularly concerning finding of this study is that childcare managers report regular exposure to tobacco smoke at their centers. A 2002 survey of 950 California childcare managers and staff reported smoke exposure at 7% of childcare centers [5]. Our finding of 47% of managers reporting smoke exposure at least once a month was much higher. The large difference may be due to the wording of the question or the location of our study in an exclusively urban setting. There are existing laws designed to protect children from smoke exposure in childcare settings [19], but this study suggests that additional work is needed, as any amount of smoke exposure is detrimental to a child's development [28]. Unfortunately, the majority of smoke reported in our study originated from neighbors or passing pedestrians, which could make enforcement of smoke prevention strategies challenging because existing interventions target childcare staff and parents rather than passers-by [29].

Our secondary finding is that centers with a higher prevalence of asthma and greater reported staff familiarity with asthma were better able to meet recommendations. This finding is in agreement with a study in a similar population [6]. The fact that the relationship between staff familiarity and ability to meet recommendations remained significant even when we controlled for asthma prevalence suggests that training could be efficacious even at centers with few children with asthma.

Another finding was that none of the childcare center managers reported being familiar with the NAEPP recommendations and checklist for asthma preparedness in childcare settings. The checklist was developed in 2000 by the NAEPP for an intended general public audience, as well as health care providers. That none of the managers were familiar with the document suggests that this resource has been underutilized in the population we studied. Although the checklist is available on the NHLBI website [30], we are not aware of any further programs to actively disseminate the recommendations by the San Francisco Department of Public Health (SFDPH) or other entities. Similar to previous studies regarding provider adherence to asthma guidelines, passive dissemination of NAEPP asthma guidelines dose not seem to

be an effective strategy from improving childcare manager awareness [23]. A combination of strategies, such as active dissemination and endorsement of the guidelines by professional organizations relevant to childcare managers, hands-on asthma care education to managers and staff, use of opinion leaders or feedback and audit may help improve childcare manager awareness of and adherence to these recommendations [24].

One of our study's limitations is the small sample size of 36, however, this was sufficient for an exploratory study. A second limitation is a potential lack of generalizability. The childcare centers included in this study are unique in that they serve low-income, inner-city children and are supported by a group of professional public health nurses; the majority of centers serving low-income children may be less prepared to manage asthma than those in our study. Similarly, our results may not be generalizable to family childcare homes or other childcare settings. Third, because we determined asthma prevalence using records kept at the childcare center, our estimates may not be accurate. Fourth, the tool that we used to calculate asthma preparedness was not validated, however, no such tool currently exists. Our preliminary study represents a first step in this direction. Finally, further work is needed to identify checklist items that are most important for improving health outcomes.

Conclusions

Despite its limitations, our study provides an important description of asthma preparedness in a sample of urban childcare centers serving children from low-income families. It highlights the ability of some centers to meet children's asthma needs and specific areas where childcare centers require increased support. Of note, areas needing the greatest support – asthma action plans, medication management, and asthma policies – were those areas that might benefit from collaboration between clinicians and childcare providers. Higher asthma prevalence and greater staff familiarity with asthma were associated with increased preparedness, suggesting that enhancing asthma education for childcare providers could be effective. Future work should focus on ways in which public health officials, clinicians and community organizations can partner with childcare centers to promote asthma-friendly practices.

Acknowledgements

The authors would like to acknowledge the San Francisco Department of Public Health Child Care Health Program nurses and health workers – Peter Vaernet, Jaleila King, Carol Thrailkill, Ivy Steverson, Yan Oi Wong, Tito Arana and Lisa Tao-Lew – for making this project possible and the providers at the San Francisco General Hospital Pediatric Asthma Clinic for support and feedback. This project was supported by the Clinical and Translational Research Fellowship Program (CTRFP), a program of UCSF's Clinical and Translational Science Institute (CTSI) that is sponsored in part by the National Center for Advancing Translational Sciences, National Institutes of Health, through UCSF-CTSI Grant Number TL1 TR000144 and the Doris Duke Charitable Foundation (DDCF). The contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH, UCSF or the DDCF.

This publication was made possible by the National Institute on Minority Health and Health Disparities, National Institutes of Health, through Grant Number R25MD006832.

Abbreviations

PACC Preparing for Asthma in Child Care

SFDPH	San Francisco Department of Public Health
UCSF	University of California, San Francisco
CCHP	Child Care Health Program

References

1. Akinbami LJ, Moorman JE, Garbe PL, Sondik EJ. Status of childhood asthma in the United States, 1980–2007. *Pediatrics*. 2009; 123(Suppl 3):S131–45. [PubMed: 19221156]
2. [Accessed October 15, 2014] Federal Interagency Forum on Child and Family Statistics. America's children: key national indicators of well-being. 2013. Available at: http://www.childstats.gov/pdf/ac2013/ac_13.pdf
3. US Department of Health and Human Services. [Accessed June 11, 2014] Schools and Childcare Settings. Available at: <http://www.nhlbi.nih.gov/health/prof/lung/asthma/naci/audiences/schools-childcare.htm>. Updated February 2011
4. Salo PM, Sever ML, Zeldin DC. Indoor allergens in school and day care environments. *J Allergy Clin Immunol*. 2009; 124(2):185–192. 192 e1–9. quiz 193–4. [PubMed: 19577284]
5. Goveia MG, Shaikh N, Windham G, Bembom O, Feldman K, Kreutzer R. Asthma-related environmental practices and asthma awareness in California child care centers. *Pediatr Asthma Allergy Immunol*. 2005; 18:12–24.
6. Perry TT, Vargas PA, Bufford J, et al. Classroom aeroallergen exposure in Arkansas head start centers. *Ann Allergy Asthma Immunol*. 2008; 100(4):358–363. [PubMed: 18450122]
7. Juhn YJ, Sauver JS, Shapiro ED, McCarthy PL. Child care program directors' level of knowledge about asthma and factors associated with knowledge. *Clin Pediatr (Phila)*. 2002; 41(2):111–116. [PubMed: 11931327]
8. Walders N, McQuaid E, Dickstein S. Asthma knowledge, awareness, and training among head start and early head start staff. *J Sch Health*. 2004; 74(1):32–34. [PubMed: 15022374]
9. Huss K, Winkelstein M, Calabrese B, et al. Asthma management practices and education needs of head start directors and staff. *J Sch Health*. 2002; 72(8):329–333. [PubMed: 12389373]
10. Alley S, Cicutto L. Exploring the supportiveness and preparedness of child care settings for children with asthma: a needs assessment. *J Asthma*. 2009; 46(5):512–516. [PubMed: 19544174]
11. How Asthma Friendly Is Your Child-Care Setting?. National Heart, Lung and Blood Institute; National Asthma Education and Prevention Program; NAEPP School Asthma Education Subcommittee; Bethesda, MD: 2008. Available at: http://www.nhlbi.nih.gov/health/public/lung/asthma/chc_chk.pdf [Accessed December 9, 2012]
12. Young CA, Chan C, Stookey J, et al. Development of a tool to evaluate asthma preparedness and management in childcare centers. *Pediatr Allergy, Immunol and Pulmonol*. 2015; 28(2):121–128. [PubMed: 26155370]
13. California Department of Social Services. [Accessed August 1, 2013] Manual of Policies and Procedures: Childcare Centers. 2006. Available at: <http://www.dss.cahwnet.gov/getinfo/pdf/cccl.pdf>
14. National Heart, Lung and Blood Institute. Guidelines for the Diagnosis and Management of Asthma: Expert Panel Report 3. US Department of Health and Human Services, National Institutes of Health; Bethesda, MD: 2007. Available at: http://www.nhlbi.nih.gov/health/public/lung/asthma/chc_chk.pdf [Accessed December 9, 2012]
15. Respiratory Health Association. [Accessed June 12, 2014] Asthma Friendly Childcare Environmental Checklist. 2008. Available at: http://www.lungchicago.org/site/files/487/77078/284892/431513/Resource_Guide_chapter_3.pdf
16. Asthma and Allergy Foundation of America, New England Chapter. [Accessed June 12, 2014] Asthma-Friendly Child Care: A Checklist for Parents and Providers. 2001. Available at: <http://www.pacnj.org/spanish/pdfs/asthmafriendlychildcare.pdf>

17. Dautel PJ, Whitehead L, Tortolero S, Abramson S, Sockrider M. Asthma Triggers in the Elementary School Environment: A Pilot Study. *J Asthma*. 1999; 36(8):691–702. [PubMed: 10609624]
18. California Health and Safety Code §1596.798.
19. California Health and Safety Code §1596.795.
20. California Code of Regulations, Title 22, Social Security, Division 9, Prehospital Emergency Medical Services, Chapter 1.1, §100000.17.
21. American Academy of Pediatrics: Caring For Our Children: National Health and Safety Performance Standards. 3rd Edition. American Academy of Pediatrics; Elk Grove Village, IL: 2011.
22. American Academy of Pediatrics, Committee on Environmental Health: Pediatric Environmental Health. 2nd ed.. American Academy of Pediatrics; Elk Grove Village IL: 2003.
23. Cabana MD, Rand CS, Becher OJ, Rubin HR. Reasons for pediatrician nonadherence to asthma guidelines. *Arch Pediatr Adolesc Med*. 2001; 155(9):1057–1062. [PubMed: 11529809]
24. Cabana MD, Rand CS, Powe NR, et al. Why don't physicians follow clinical practice guidelines? A framework for improvement. *JAMA*. 1999; 282(15):1458–1465. [PubMed: 10535437]
25. Findley SE, Thomas G, Madera-Reese R, McLeod N, Kintala S, Andres Martinez R, Ortiz B, Herman E. A community-based strategy for improving asthma management and outcomes for preschoolers. *J Urban Health*. 88(Suppl 1):85–99.
26. Milet, M., Lutzker, L., Flattery, J. Asthma in California: A Surveillance Report. California Department of Public Health, Environmental Health Investigations Branch; Richmond, CA: 2013.
27. [Accessed June 5, 2014] Respiratory Diseases. Healthy People Objectives. 2020. Available at: <https://www.healthypeople.gov/2020/topics-objectives/topic/respiratory-diseases/objectives>
28. A Report of the Surgeon General. Centers for Disease Control and Prevention; Atlanta, GA: 2006. The Health Consequences of Involuntary Exposure to Tobacco Smoke.
29. Tobacco Education Clearinghouse of California. “Fresh Air for Little Noses.”. Available at: https://www.youtube.com/watch?v=_ERo7c_h_z8
30. National Heart, Lung and Blood Institute. [Accessed November 11, 2015] How Asthma Friendly Is Your Childcare Setting?. <http://www.nhlbi.nih.gov/health/resources/lung/asthma-child-care>

Figure 1.
Childcare center participation in the Preparing for Asthma in Child Care Project

Figure 2.
Number of centers meeting national asthma recommendations (n=36 centers)

Figure 3.
Percentage of centers meeting individual asthma recommendations

Table 1

Verbatim text from the National Asthma Education and Prevention Program recommendations for an asthma-friendly childcare setting

Smoking	Is the child-care setting free of tobacco smoke at all times?
Ventilation and Triggers	Is there good ventilation in the child-care setting? Are allergens and irritants that can make asthma worse reduced or eliminated? Check if any of the following are present: Cockroaches, Dust mites (commonly found in humid climates in pillows, carpets, upholstery and stuffed toys), Mold, Furry Pets, Strong odors or fumes from art and craft supplies, pesticides, paint, perfumes, air fresheners, and cleaning chemicals.”
Consultant and Policies	Is there a medical or nursing consultant available to help child-care staff write policy and guidelines for managing medications in the child-care setting, reducing allergens and irritants, promoting safe physical activities, and planning field trips for students with asthma?
Medications	Are child-care staff prepared to give medications as prescribed by each child's physician and authorized by each child's parent? May school-aged children carry their own asthma medicines when appropriate? Is there someone available to supervise children while taking asthma medicines and monitor correct inhaler use?
Asthma Action Plan	Is there a written, asthma action plan for each child in case of a severe asthma episode (attack)? Does the plan make clear what action to take? Whom to call? When to call?
Training	Does a nurse, respiratory therapist, or other knowledgeable person teach child-care staff about asthma, asthma management plans, reducing allergens and irritants, and asthma medicines? <i>Does someone teach all the older children about asthma and how to help a classmate who has it?</i>
Physical Activity	Does the child-care provider help children with asthma participate safely in physical activities? For example, are children encouraged to be active? <i>Can children take or be given their medicine before exercise?</i> Are modified or alternative activities available when medically necessary?

Table 2

Center performance in individual items in the Preparing for Asthma in Child Care Instrument (n=36 centers)

Item	Method	Centers Meeting Item (%)
Smoking Exposure recommendation met		53
No smoke noted at center during visit.	A ^a	97
Smoke noted less than 1 time per month or not at all.	I ^b	53
Ventilation and Trigger recommendation met		81
Ventilation		
Classroom smells fresh during visit (e.g., no strong scents or stuffy air).	A	67
Classroom has overhead ventilation and/or operable windows.	A	97
Center has not felt stuffy, smelly or poorly ventilated in last 2 weeks.	I	67
Pests		
No cockroaches at center in last 1 year.	I	78
Dust		
Main floor type is not carpet.	A	66
No curtains or drapes present in center in childcare areas.	A	44
No non-washable stuff animals present in childcare areas.	A	31
No upholstered furnishings present in childcare areas.	A	42
No piles of paper/clutter on the floor.	I	81
No fabric wall hangings other "dust catchers" in childcare areas (i.e. large light fixtures or canopies).	A	36
Mold		
No water damage visible on floors, walls or ceilings.	A	86
No indoor plants in childcare areas.	A	8
No mold within last 1 year.	I	83
Other Allergens/Irritants		
No furry or feathered pets present during visit.	A	100
No furry pets at center within last 1 year.	I	97
No strong odors/fumes from arts and crafts supplies, pesticides, paint, perfumes, air fresheners, and cleaning chemicals or disinfectants within last 1 year.	I	47
No air freshener or other fragrance noted during visit.	A	58
No pesticide sprays or bombs used during school hours.	I	89
Consultant and Policies recommendation met		39
Medical or nursing consultant available to help with asthma-related issues.	I	92
Center has policies for...		
Managing asthma medications at the day care.	I	78
Reducing asthma allergens and irritants at the site.	I	36
Promoting safe physical activities for children with asthma.	I	33
Planning field trips for children with asthma.	I	31
Medication Management recommendation met		28

Item	Method	Centers Meeting Item (%)
Manager extremely prepared to administer asthma medications.	I	58
Staff extremely prepared to administer asthma medications.	I	33
Parents required to talk to staff about asthma medications.	I	89
All children have unexpired albuterol.	FMR ^c	42
All children have spacers and masks, if applicable.	FMR	36
All children have nebulizer consent form or equivalent.	FMR	25
A medication administration log is present.	FMR	27
Asthma Action Plan recommendation met		47
Manager requires asthma action plan at center.	I	97
Manager requires asthma action plan to be updated at least annually.	I	89
All children with asthma have updated (within 1 year) asthma action plans.	FMR	50
Training recommendation met		78
Asthma training provided.	I	83
Training is for both manager and staff.	I	78
Last training was within one year.	I	56
The following topics have been covered in trainings:		
Asthma Basics (Causes of Asthma, Signs of Flare-Ups)	I	67
Asthma Management Plans	I	69
Reducing Allergens and Irritants	I	61
Asthma Medication (Using Them, Different Types)	I	72
Physical Activity recommendation met		50
Manager strongly agrees that children with asthma are able to participate in physical activities the same way as children without asthma at the center.	I	50
Children with asthma are encouraged to participate in physical activities.	I	100

^a A=assessment of environment;

^b I=structured interview with childcare center manager;

^c FMR=file and medication review by trained public health nurse