

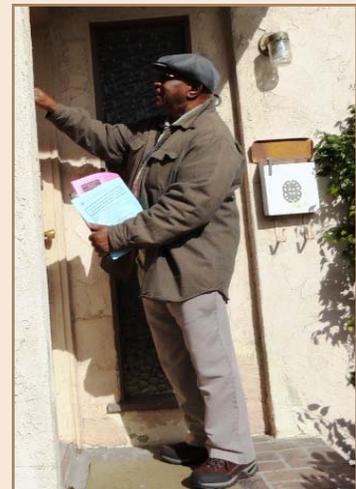


**City of Long Beach**  
Department of Health and Human Services  
Bureau of Environmental Health



**Community Asthma and Air Quality  
Resource Education (CAARE) Program**

In-Home Asthma Case Management Program  
for Adults and Seniors in  
Long Beach, Carson and Wilmington, CA



**April 1, 2008—September 30, 2013**

Funded by:

*The BP/South Coast Air Quality Management District Public Benefits Oversight Committee,  
Community Benefit Programs Addressing Conditions Caused or Exacerbated by Air Pollution*



## Community Asthma and Air Quality Resource Education (CAARE) Program

In-Home Asthma Case Management Program  
for Adults and Seniors in Long Beach, Carson, and Wilmington, CA

April 1, 2008 — September 30, 2013



**Goal:** *To improve the health and well-being of adults and seniors with asthma and assist communities of the BP Settlement area to reduce and/or eliminate indoor and outdoor pollutants that may contribute to asthma, allergies, or respiratory illnesses.*

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# Acknowledgements

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## **Collaborative Partners**

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City of Long Beach DHHS Public Health Nursing Program  
City of Long Beach Housing Inspection Program  
City of Long Beach Parks, Recreation, and Marine  
Long Beach Alliance for Children with Asthma  
The Children's Clinic, Inc.  
Westside Neighborhood Clinic

# Executive Summary

Funded by the BP/South Coast Air Quality Management District Public Benefits Oversight Committee, the Community Asthma Air Quality Resource Education (CAARE) Program provides an intensive asthma education and case management intervention for adults and seniors with asthma in the cities of Long Beach, Carson, and Wilmington. In a geographic area adjacent to the Port of Long Beach, Port of Los Angeles, the rail yards, the truck corridor, and three major freeways, less than optimal air quality is an ongoing challenge for persons with asthma and other respiratory conditions. The CAARE Program began in Long Beach in April 2008 and officially expanded to the cities of Carson and Wilmington in October 2011.

The CAARE Program was developed to improve the respiratory health and well-being of adults with asthma. The primary program component involved an intensive, 6-hour, in-home, educational curriculum on asthma medication use, effective asthma management strategies, and assessment of the home environment for asthma and allergy triggers. The CAARE team of Community Health Workers (CHWs) conducted home visits with 898 adults with asthma. Eight hundred fifty-six (856) residents completed the educational intervention and provided usable, three-month follow-up assessments. Clients with adverse health outcomes at enrollment reported the following outcomes at the three-month follow-up assessment:

## Access to Asthma Care

89% of clients reported having a primary asthma care provider

36% of clients without a care provider began to utilize public clinics

51% fewer clients reported emergency departments as primary care source

## Emergency Services Care Utilization

56% of clients no longer visited emergency departments for asthma care

63% of clients were no longer hospitalized for treatment of asthma symptoms

49% of clients no longer made unscheduled doctor or clinic visits for treatment of acute symptoms

Overall, reliance on emergency asthma care providers decreased 61%

## Asthma Health Outcomes

40% of clients gained good control of daytime and nighttime asthma symptoms

28% fewer clients reported excessive sleep 49% fewer employed clients reported missing one or more days of work

71% fewer employed caregivers reported missing one or more days of work

41% fewer students with asthma reported missing one or more days of school

69% reported improved quality of life with asthma

## Asthma Management Practices

42% of clients began attending asthma wellness visits with a physician

16% of clients began taking an asthma controller medication for the first time.

61% of clients began using quick-relief medications in a controlled manner

50% of clients using a spacer most of or all of the time with inhaled medications

57% of clients began using a peak flow meter

32% of clients developed a written asthma management plan with a physician

26% reduced number of behavior-based asthma triggers in their home

31% eliminated smoking triggers in their home

Community education and outreach efforts included offering workshops to residents to learn about asthma, air quality, and non-toxic cleaning methods. Eight hundred eighty-six (886) area residents attended one of the 41 "Care For Your Air at Home and Outside" workshops facilitated by CAARE team members. More than 90% of participants in these workshops demonstrated increased knowledge of the educational topics and felt empowered to apply their new knowledge to improve their home environment.

The CAARE intervention has yielded multiple positive impacts such as improved symptom control and improved quality of life. Most importantly, successful completion of the CAARE intervention resulted in a conservative estimate of \$5,739,489 or 61% reduction in asthma care costs for persons with chronic asthma.

# Statement of Problem

Asthma is a chronic inflammatory condition that affects the airways of the lungs. Asthma attacks happen when these airways have increased and acute reactions to various airborne agents (e.g., tobacco smoke, air pollution, furry pets, mold) or stressors (e.g., vigorous exercise, cold weather, strong emotions) resulting in inflammation that make it hard to breathe. An asthma attack can include wheezing, breathlessness, chest tightness, and coughing. Estimated annual costs for direct care services for asthma exceed \$50 billion and cost another \$5.9 billion for indirect costs (e.g., missed days of work and reduced productivity).

asthma seems to be a more significant problem in SPA 8 than in the County of Los Angeles as a whole.

## *Air Quality in Long Beach*

Despite ongoing improvements, air quality in the Southern California Air Basin remains problematic. Air quality in the Los Angeles-Long Beach-Riverside area was recently rated among the nation's worst, in the American Lung Association's 2011 and 2010 State of the Air Reports. When paired with evidence that associates asthma prevalence and exacerbation with air pollution, it becomes



## *Adult Asthma Prevalence*

In their 2013 State of the Air Report, the American Lung Association (ALA) estimated that 631,724 adults have an asthma diagnosis in the County of Los Angeles. These adults contribute to the nearly \$1 billion in asthma care costs in the State of California. More locally, there are approximately 140,000 adults diagnosed with asthma who reside in the County of Los Angeles South Bay Service Planning Area (SPA 8). The cities of Long Beach, Carson, and Wilmington are included in SPA 8. A recent report from California Breathing (2013) indicates that approximately 93,150 new adult asthma diagnoses occur each year statewide and the prevalence rate in 2010 was 13.1% of adults. The estimated adult asthma prevalence in SPA 8 is slightly higher than the prevalence for the County of Los Angeles as a whole. Given that the targeted recruitment area for CAARE is adjacent to a geographic area with heavy air pollutant levels from nearby shipping, highways, or oil refineries, it not surprising that adult

imperative that SPA 8 residents with asthma have access to asthma care providers as well as current asthma education and management techniques.

## *Emergency Medical Care Utilization*

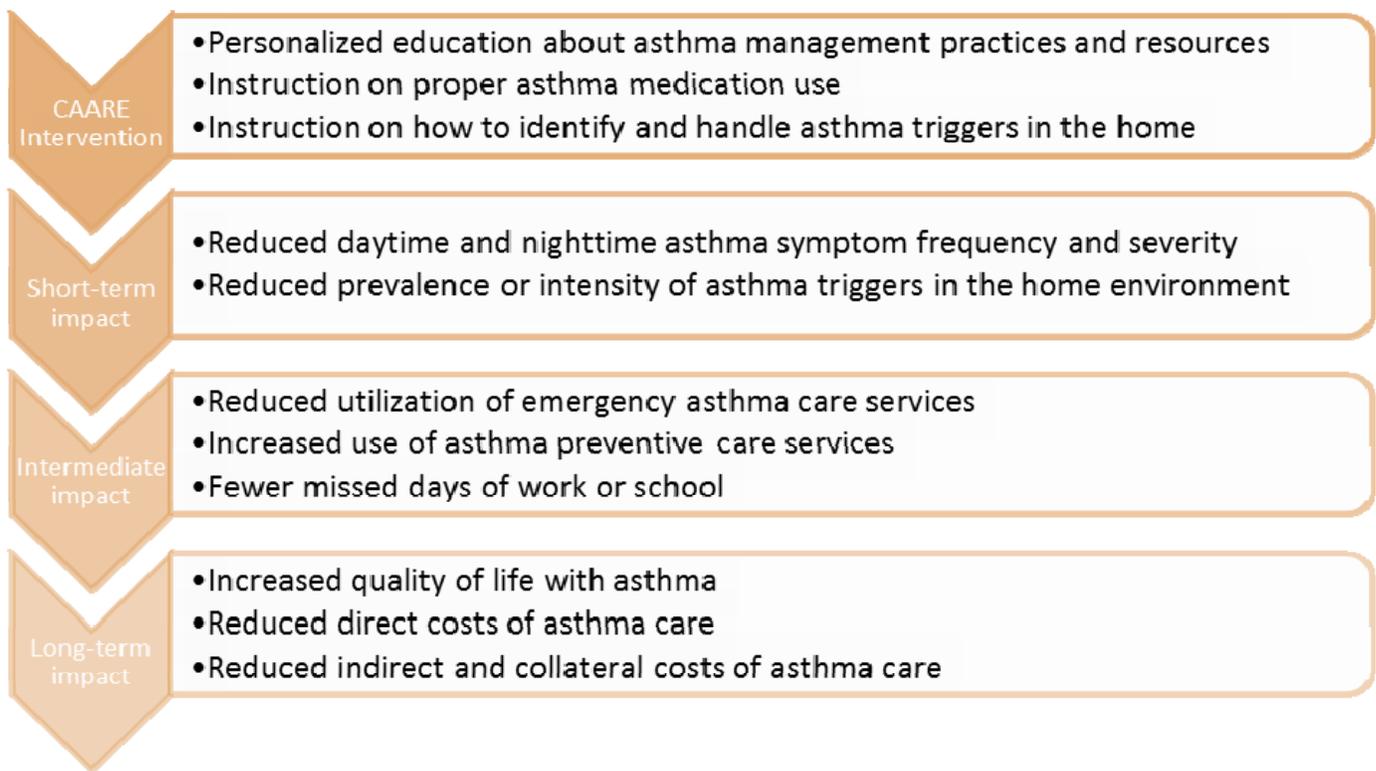
Proper asthma management practices can prevent many emergency department visits and hospitalizations. In a 2007 study by California Breathing and the California Department of Health Services, there were an estimated 39.1 emergency department visits and 10 hospitalizations per 10,000 California residents. Each of these rates has been consistently two-thirds higher than the overall U.S. rate. The prevalence of uninsured and underinsured California residents positions many emergency departments and inpatient service providers as primary asthma care providers for a significant portion of the population. However, treatment of asthma in emergency settings is considerably more expensive than implementation of effective management practices.

# Program Impact Theory

In their Guidelines for Diagnosis and Management Asthma, the National Heart Lung and Blood Institute (NHLBI) suggested that all persons with asthma should:

- ◇ Receive education on how to avoid asthma triggers
- ◇ Receive education on how to identify and manage asthma attacks
- ◇ Receive a written asthma self-management plan from a healthcare provider
- ◇ Have a routine asthma wellness visit with a health care provider at least every six months.

The home visitation and case management components of the Community Asthma and Air Quality Resource Education (CAARE) Program provides clients with the necessary tools to meet the guidelines specified by the NHLBI. The CAARE Program operates on the following logic model:



*“I, Jesus, am very pleased with the program. Receiving so much information from cleaning supplies was a blessing.”*

- Jesus, CAARE Participant



# The Path to Wellness

The CAARE Program seeks to help adults and seniors with asthma to get on a path to wellness with asthma. Below are descriptions of asthma morbidity (i.e., poorly controlled asthma) and asthma wellness (i.e., well controlled asthma). Many CAARE clients reported symptoms that mirrored poorly controlled symptoms and were able to transition to a state more consistent with asthma wellness by the end of their participation in the program.

## POORLY CONTROLLED ASTHMA

1. Frequent hospitalizations and/or emergency department visits
2. Asthma symptoms more than two days per week or two nights per month
3. Frequent missed days of work or school
4. Abundant asthma triggers in home environment
5. Frequent use of quick-relief asthma medication
6. No or infrequent controller medication use
7. No access to a medical provider
8. No asthma wellness visits with a medical provider
9. No written asthma management plan
10. Diminished quality of life

## WELL CONTROLLED ASTHMA

1. No hospitalizations and/or emergency department visits
2. Asthma symptoms two or fewer days per week or two nights per month
3. No missed days of work or school
4. Minimal asthma triggers in home environment
5. Infrequent use of quick-relief asthma medication
6. Daily controller medication use
7. Stable access to a medical provider
8. Biannual asthma wellness visits with a medical provider
9. Written asthma management plan
10. Optimal quality of life



# Program Methodology

The CAARE Program team adapted and modified the American Lung Association (ALA) “Breathe Well, Live Well Asthma Management Program for Adults” to fit a customizable, one-on-one education model. The “Breathe Well, Live Well” program is a proven curriculum where adults with asthma learn real hands-on skills to effectively manage their asthma and focuses on reducing illness and disability due to asthma by improving asthma knowledge and self-management skills. All CAARE Program staff are certified by ALA to implement the “Breathe Well, Live Well” curriculum with the following adjustments:

Visit	Duration	Curriculum Activities	Forms and Supplies
1 - Enrollment	1 Hour	Program Overview Enrollment and Intake	Informed Consent HIPPA Certification BWLW Asthma Questionnaire Asthma Home Environment Checklist Client Assessment Survey Mini Asthma Quality of Life Questionnaire
2 - Education	1.5 Hours One week later	Course Overview Lesson 1: Asthma & Breathing Lesson 2: Getting Help from the Pros Lesson 3: Learning about Asthma Medicines	BWLW Participant Workbook Asthma Medicines Chart Placebo Inhalers
3 - Education	1.5 Hours One week later	Review of Lessons 1, 2 & 3 Lesson 4: Asthma, Medicine Use & Other Health Conditions Lesson 5: Daily Self-Management Lesson 6: Good Health Practices	BWLW Participant Workbook Sample Peak Flow Meters BWLW Asthma Questionnaire BWLW Participant Evaluation BWLW Facilitator Evaluation
4 - Follow-Up Assessment	1 Hour Three months after enrollment	Question & Answer Session Guided review of course material, as needed	BWLW Asthma Questionnaire Asthma Home Environment Checklist Client Assessment Survey Mini Asthma Quality of Life Questionnaire
CAARE Alumni Reunion		Question & Answer Session Review of course material based on participant needs	BWLW Participant Workbook Asthma Medicines Chart Placebo Inhalers Sample Peak Flow Meters CAARE Certificate of Completion

Evaluation of the CAARE Program utilized a quasi-experimental design that compared health outcomes and practices at enrollment and the follow-up assessment (i.e., Exit). A key emphasis was the percent of those clients exhibiting characteristics of poorly controlled asthma at the enrollment assessment who progressed to well controlled asthma at the exit assessment.

The CAARE Community Health Workers (CHW) are responsible for conducting one-on-one tenant outreach and in-home health education sessions. CHWs reflect the diversity, language and cultural needs of the adults served in Long Beach, Carson, and Wilmington.

### ***Home Visit One – Recruitment and Enrollment***

The CHW either recruits participants by door-to-door visits in local neighborhoods, or contacting people that have been referred to us by our community partners.

At the initial visit, the CHW introduces themselves and gives an overview of the CAARE Program. If the participant is interested, the CHW walks a client through the informed consent statement and HIPPA guidelines. Then, the CHW begins to fill out the Client Assessment Survey to gather pertinent information on the participant. The CHW tours the home environment to gather data to complete the Asthma Home Environment Checklist and assess certain asthma triggers that may exist in the home. The participant is then asked to complete the American Lung Association's Breathe Well, Live Well (BWLW) Asthma Questionnaire and the Mini Asthma Quality of Life Survey. As incentive for participating, the client may be given a bottle of Murphy's Oil Soap, Boric Acid or Baking Soda. At the end of the first visit, the CHW schedules the next visit with the participant.

### ***Home Visit Two – Introduction to BWLW and Health Education I***

During the second visit, the participant receives their copy of the BWLW *An Asthma Management Program for Adults* Participant Workbook. This workbook will be used during the second and third visits. It is the primary health education tool that the participant will receive. At this visit, the CHW goes over Lessons 1-3, which covers Asthma and Breathing, Getting Help from the Pros and Learning about Asthma Medicines. The CHW also reviews the Asthma Medicines Chart and gives instruction on using peak flow meters and spacers. As an additional incentive, the participant may receive their choice of peak flow meter or spacer.

### ***Home Visit Three – Health Education II***

At this visit, the CHW completes lessons 4 through 6 in the BWLW *An Asthma Management Program for Adults* workbook. The lessons covered include Asthma, Medicine Use and other Health Conditions, Daily Self Management, and Good Health Practices. The participant also completes the second BWLW Asthma Questionnaire, along with the BWLW Participant Evaluation Form. Additionally, the participant may receive information on cleaning with non-toxic cleaning supplies to reduce the allergen triggers in their home, along with information on smoking, smoking cessation and possible referrals to other city departments as appropriate.

### ***Follow-Up Visit – Three months post-enrollment***

The follow-up visit consists of data gathering three months post-enrollment. At this time, the health outcomes section of the Client Assessment Survey are completed. The CHW asks permission to do the Asthma Home Environment Checklist to determine any changes that may have been made. The client is asked to complete the BWLW Asthma Questionnaire and the Mini Asthma Quality of Life Survey. If a client expresses an interest in reviewing any of the BWLW lessons, the CHW provides a review and answers any questions. As a thank you for their participation, clients are given a gift card to a local supermarket or discount store.



# Description of Clients

## Client Enrollment and Attrition

Since April 1, 2009, 942 adult and senior residents of Long Beach were recruited and enrolled into the CAARE home visitation intervention (see Figure 2). The 5% attrition rate during implementation of the home visitation intervention resulted in 898 clients completing the Breathe Well, Live Well educational curriculum and home environment assessment exercises. The attrition rate between the end of the home visitation and three-month follow-up assessment decreased to 3% with 874 clients completing the three-month follow-up assessment. Ultimately, 856 clients provided complete datasets and they are the focus of subsequent analyses in this report.

## Client Demographics

Client ages ranged from 17 years to 93 years with an average age of 42 years. The average age at time of asthma diagnosis was 23 years, meaning that clients had been living with asthma an average of 19 years when they enrolled in the CAARE intervention. Women comprised 72% of our client sample with men accounting for 26% and the remaining 2% declining to disclose their gender identification. Hispanic/Latino persons were the largest represented ethnic group with African American/Black, White/Caucasian, Asian American/Pacific Islander, and other comprising the remainder of our respondent sample (see Table 1).

The educational level of our client population was fairly diverse with a slight majority being high school graduates and the smallest educational groups were college graduates and persons with graduate degrees (see Table 2). An overwhelming majority of clients were recruited into CAARE by CHWs during door-to-door (79%) canvassing of neighborhoods in West Long Beach. Friends (20%) of clients were also a notable recruitment source and reflect the snowball sampling that is common to many community-based interventions. Nearly 53% of our client sample was employed and approximately 28% were attending classes at an educational institution.

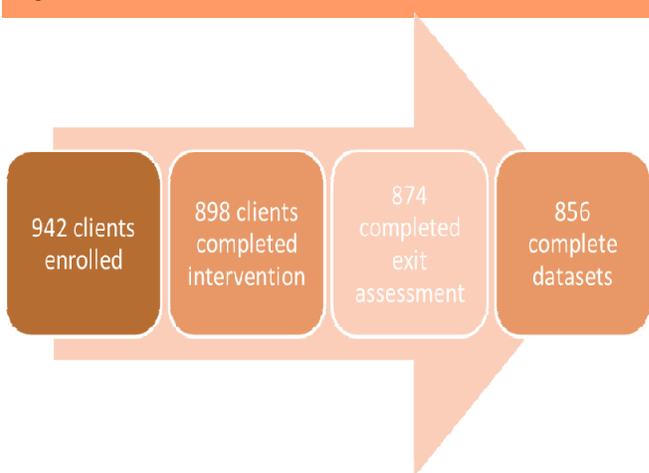
**Table 1. Client ethnic identification**

African American/Black	21%
Asian American/Pacific Islander	4%
Hispanic/Latino	65%
White/Caucasian	8%
Other	2%

**Table 2. Highest level of education**

Elementary school	22%
Some high school	20%
High school graduate	28%
Some college	22%
College graduate	3%
Graduate degree	1%

**Figure 2. Client Enrollment and Attrition**



*“The program is very informative, I’ve learned additional information that I was not aware of. I recommend the program to others.”-Linda*

## Senior Cohort



Targeted enrollment of senior citizens, persons aged 55 years and older, into the CAARE Program began in October 2010. To date, 212 senior citizens have participated in the CAARE intervention. The majority of this senior cohort identified as female (70%) and Hispanic/Latino (65%) with many reporting elementary school (40%) or high school graduation (21%) as their highest education level. The average age at asthma diagnosis was 41 years and they have lived with an asthma diagnosis for an average of 24 years. Their partnership with CAARE has resulted in improved health outcomes and behavior changes.

# Asthma Symptoms

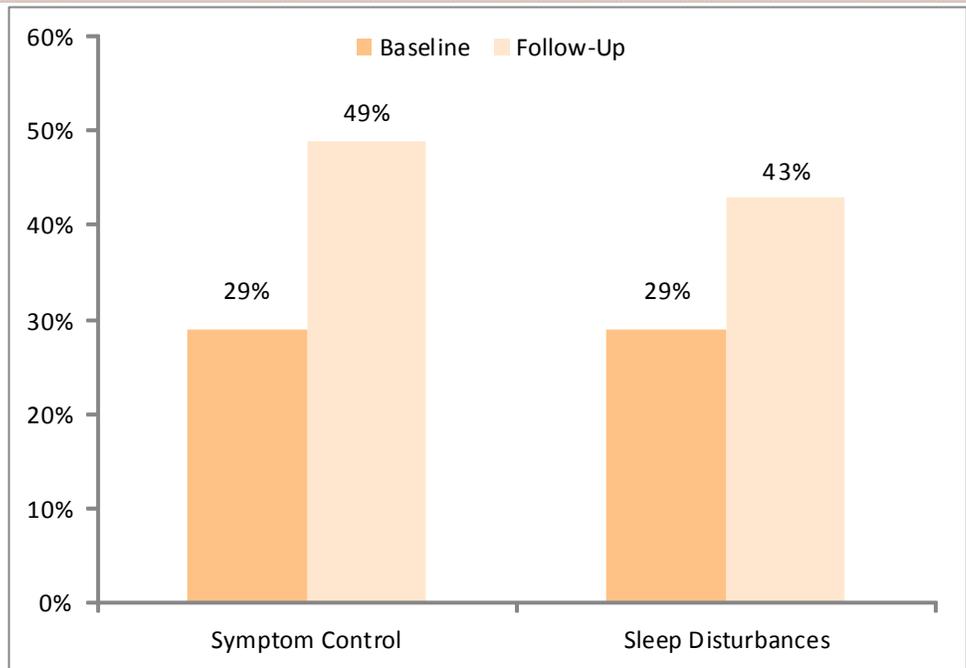
## Asthma Symptom Frequency

Daytime and nighttime asthma symptoms are said to be under good control when symptoms are experienced two or fewer days per week and two or fewer nights per month, respectively. Less than one-third of clients (30%) reported good control of all symptoms at Baseline. Of these clients, 75% gained control of their asthma symptoms by the Follow-up assessment.

Ultimately, nearly 51% of clients exhibited good control of daytime and nighttime asthma symptoms at Baseline (see Figure 7). An additional indicator of symptom control was the frequency of sleep disturbances resulting from asthma symptoms. Approximately 32% of clients reported two or fewer sleep disturbances during the month prior to enrollment and this figure increased to 44% at Follow-up. Of those clients with excess sleep disturbances, 27% reported an improvement that met the threshold of good control at Follow-up.

Exacerbated asthma symptoms include collateral impacts such as missed days of work for persons with asthma and their caregivers. Table 7 illustrates the significant reduction in collateral health impacts over the course of the intervention.

**Figure 7. Percent of clients with good control of asthma symptoms and minimal sleep disturbances resulting from nighttime asthma symptoms**



**Table 7. Collateral impacts of asthma symptoms**

<i>Collateral Impact</i>	<i>Baseline</i>	<i>Follow-Up</i>	<i>% Stopped</i>
Missed work days	39% (177 of 454)*	17.2% (17 of 408)*	49%
Missed caregiver work days	10.9% (51 of 469)*	4.1% (18 of 443)*	41%
Missed school days	18.4% (44 of 239)*	11.6% (25 of 216)*	41%

\* Reflects the number of persons or caregivers that work or attend school at the time of the assessment.

# Asthma Triggers

## *Asthma Triggers in the Home Environment*

The CAARE intervention was designed to motivate clients to change their behavior to reduce or eliminate behavior-based triggers. The behavior-based asthma triggers assessed included allowing furry pets inside of the home, using consumer products with noxious or scented fumes, and keeping stuffed toys in the primary sleeping area. In addition, smoking inside of the home and in the car were assessed under a smoking triggers category.

Analysis of the impact of behavior change on the home environment must go deeper than the bigger picture (see Table 8). While few clients were able to eliminate the behavior-based triggers evident at the enrollment assessment, nearly 26% were able to reduce them at the three-month follow-up assessment. Clients were more successful with eliminating smoking triggers evident at enrollment. Specifically, 32% eliminated the smoking triggers at follow-up and an additional 6% reduced their smoking based hazards. The structural triggers found in clients' home environments remained largely constant throughout their enrollment.

These findings highlight a major issue in chronic disease management. People with chronic disease have varying levels of resistance to behavior change. Acquiring knowledge is one part of the equation, but

application of that knowledge is another matter entirely. Within the four month window that CAARE team members interact with clients, clients are constantly exposed to best practices and other health promotion strategies. The use of consumer products that exacerbate asthma symptoms is an example. The non-toxic cleaning demonstration is one of the most popular components of the CAARE intervention and our community education initiative. Clients and workshop attendees rave about this part of our curriculum, yet the percent of clients using consumer products with irritants increased. One explanation for this finding is that people have in fact embraced the non-toxic cleaning methods; however, they are less willing to give up items like scented candles, potpourri, perfumes, colognes, and other products with equally strong scents. These items have the same potential to inflame nasal passageways, but their scents tend to be more palatable than bleach or ammonia and be viewed "less serious". Similarly, a small number of clients were resistant to confining their pets to outdoor areas or removing stuffed animals from their sleeping area. In some cases clients seemed to "draw a line in the sand" on these particular issues, although their stance was beginning to soften following consultation with the CHWs at the three-month follow-up assessment. Perhaps, a longer intervention period may be necessary to coach clients through the behavior change process.

**Table 8. Percent of home environments with asthma triggers**

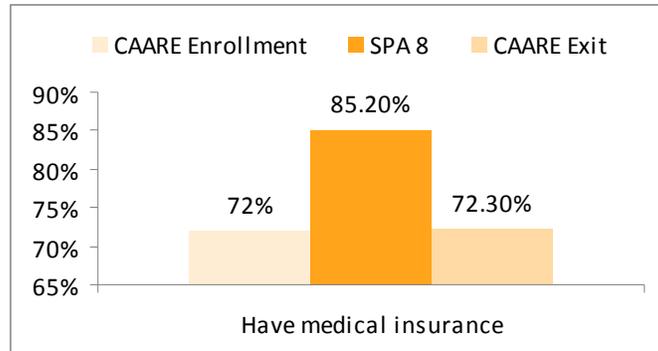
<i>Trigger Classification</i>	<i>Baseline</i>	<i>Follow-Up</i>	<i>% Change</i>
<b>Behavior-Based Triggers</b>	97.5%	96.9%	-1%
Stuffed toys in sleeping area	44.9%	36.1%	-20%
Odorous consumer product use	84.8%	80.7%	-5%
Furry pets inside the home	46.6%	45.4%	-3%
<b>Smoking Triggers</b>	22.4%	19.2%	-14%
Smoking inside the home	22%	17.2%	-22%
Smoking inside the car	21%	16.8%	-20%

# Asthma Management

## Access to Affordable Asthma Care

Access to care involves two key components: enrollment in a medical insurance plan and a relationship with a care provider. CAARE CHW referred clients without insurance to eligibility workers to assist with application for government-sponsored care options. CAARE team members also worked with collaborative agents in the greater Long Beach area to direct clients to low-cost and no-cost medical care service providers. Nearly three-quarters of clients were enrolled in a medical insurance plan with a slightly less than one-third relying upon government-sponsored care plans (e.g., Medicaid, Medi-Cal). This enrollment pattern remained largely unchanged at the exit

assessment. The insured rate for the CAARE client cohort fell below the insured rate for the Los Angeles County Service Planning Area (SPA) 8 (South Bay) that encompasses the City of Long Beach. This finding indicates a heightened health risk for adults with asthma in the cities of Long Beach, Carson, and Wilmington. With implementation of the Affordable Care Act on the horizon, this barrier to healthcare is expected to disappear.

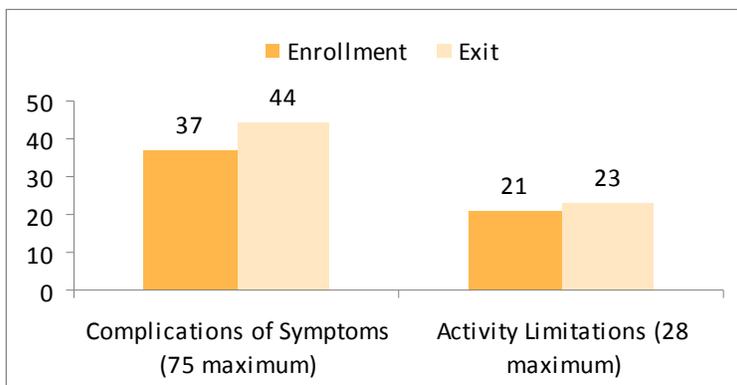


More than 81% of clients reported access to an asthma care source at the enrollment assessment and 83% reported access at the exit assessment. Approximately 44% and 31% of clients that reported no care provider at enrollment were able to engage a private physician or a public clinic, respectively, at the exit assessment.

## Quality of Life and Asthma Management Strategies

CAARE clients partnered with CAARE CHWs to learn effective asthma management strategies and received support as they worked to make use of these strategies habitual. As clients embraced these strategies, their quality of life with asthma increased over the course of the intervention (see Figure X). Nearly 70% of clients improved their score on this quality of life assessment. A closer look at specific asthma management practices provides more detail about these behavior changes (see Table X). Asthma wellness visits with a physician following an asthma attack or every six months are helpful in managing medications and seasonal variance in symptoms. More than half of clients reported one or more

of these visits during the six months prior to their enrollment and nearly two-thirds reported one or more visits during the intervention. More importantly, 42% of persons that reported no wellness visits at enrollment reported one or more visits at the exit assessment. Client access to and proper usage of asthma medications increased. Client compliance with a daily controller medication has considerable room for improvement, although this pattern is consistent with medication adherence to treat other chronic conditions. Similarly, client reliance on quick-relief or rescue inhalers to treat acute asthma symptoms reflects progress with room for improvement.



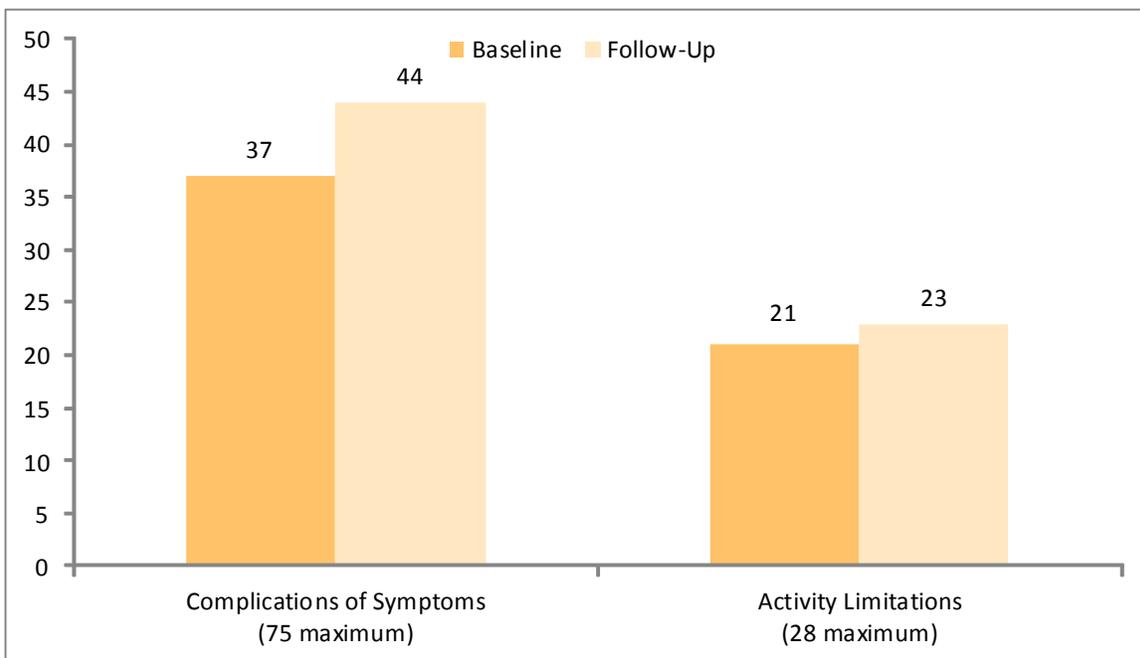
**Table 6. Prevalence of asthma medication and self-management behaviors**

<i>Management Behavior</i>	<i>Baseline</i>	<i>Follow-Up</i>	<i>% Change</i>
Has written action plan from physician	2.8%	32.7%	+1068%
Has controller medications	37.4%	41.2%	+10%
Take controller medications daily	30%	35.2%	+17%
Has quick-relief medications	75.9%	79.4%	+5%
Take quick-relief meds two or fewer times weekly	51.6%	63.7%	+23%
Refills inhaler two or fewer times per year	59.2%	55.1%	-7%
Uses a spacer all or most of the time	7.1%	53%	+646%
Uses a peak flow meter	8.3%	58.1%	+600%

At the enrollment assessment, clients' consistent use of a spacer with their inhaled medications and monitoring of lung function with a peak flow meter was rare. These practices were commonplace for more than half of clients at the exit assessment. Through their relationships with a CAARE CHW and their asthma care provider, CAARE clients have developed an effective set of tools to manage their asthma and live a healthier life.



**Figure 5. Average Scores on Mini Asthma Quality of Life Questionnaire**



# Emergency Care Utilization

## *Economic Benefits and Cost Savings of the CAARE Intervention*

Reduced utilization of emergency medical services to treat acute asthma symptoms is an effective means of reducing asthma care costs. The CAARE intervention was designed to promote asthma management strategies and behavior changes that would result in less frequent and severe asthma symptoms.

Meredith Millet and her colleagues (2013) at California Breathing reviewed asthma hospitalization data from 1998 to 2010 and concluded that the average length of stay was 3.4 days and the average cost per hospitalization has more than doubled to \$33,749. While the average length of stay has remained constant, the rate of hospitalizations has decreased over the past 6 years. It is reasonable to consider the \$33,749 hospitalization cost to be a conservative estimate of this direct cost. In addition, estimated care

costs presented by Aetna HMO averaged \$600 for an emergency department visit and \$500 for an unscheduled office visit. These cost estimates will be used to calculate medical services utilization costs and to compute cost savings resulting from successful implementation of the CAARE intervention.

Completion of the CAARE intervention coincided with significant declines in emergency services usage to treat acute asthma symptoms (see Table 5). Reduced usage of direct medical services resulted in 63%, 59%, and 45% cost decreases for hospitalizations, emergency department visits, and unscheduled visits at doctor's offices and clinics, respectively. Collectively, completion of the CAARE intervention coincides with an conservative estimate of \$5,739,489 or 61%, decrease in asthma care costs.

**Table 5. Emergency services utilization frequency and costs at Baseline and Follow-Up**

<i>Health Outcomes</i>	<i>Baseline Utilizations</i>	<i>Baseline Costs</i>	<i>Follow-Up Utilizations</i>	<i>Follow-Up Costs</i>	<i>% Cost Change</i>
Hospitalizations	256	\$8,639,744	95	\$3,206,155	-63%
Emergency department visits	428	\$256,800	174	\$104,400	-59%
Unscheduled visits	680	340,000	373	\$186,500	-45%
<b>Total services utilization</b>	<b>1364</b>	<b>\$9,236,544</b>	<b>642</b>	<b>\$3,497,055</b>	<b>-61%</b>

# Community Education

## Community Education Workshops

As part of our community education and outreach initiative, the CAARE team facilitated a series of workshops to engage and connect the community to available asthma care and air pollution resources. These workshops provide an opportunity for those who are not enrolled in the in-home case management program to learn more about asthma, air pollution, and its health effects. Thus far, 886 area residents have attended one of the 41 “Care For Your Air at Home and Outside” workshops implemented at multiple locations throughout the cities of Long Beach, Carson, and Wilmington. The workshop is designed to educate and empower residents to reduce environmental hazards in the interior and exterior of their home that may contribute to or exacerbate asthma, allergies, and respiratory illnesses. The workshop provides information about:

- ◆ Indoor and outdoor air quality issues
- ◆ Indoor and outdoor environmental health hazards
- ◆ Non-toxic cleaning agents and methods
- ◆ Basic information about asthma and allergies
- ◆ Tenant’s rights and responsibilities
- ◆ Available city programs and services

Workshop attendees completed a pre-workshop and a post-workshop knowledge and attitude survey to assess the impact of the workshop on knowledge about the pertinent issues and assess their belief in their ability to utilize the

ideas and methods presented during the workshop. In addition, attendees also completed a workshop evaluation program to provide feedback on workshop content and the facilitators. Analyses of survey results indicate that attendees increased their knowledge and empowerment by attending the workshops. Approximately 75% of attendees increased or retained their knowledge of asthma, air quality and other workshop topics and 85% reported feeling empowered to apply the knowledge and techniques learned during the workshops. Evaluations of these workshop were highly favorable (see Table 9).

**Table 9. Community Workshop Ratings**

Workshop rating criteria	1-10, 10 highest
Workshop presenters	9.4
Workshop content	9.5
Overall experience	9.6



## Community Education Spotlight

In 2010, CAARE team members pilot tested a self-directed community education opportunity. One hundred twenty-two (122) persons completed the educational modules to learn about asthma and its triggers, indoor air quality, outdoor air pollution, environmental health issues, and non-toxic cleaning methods. One hundred persons passed the knowledge assessment and received a 30-day bus pass for Long Beach Transit. Of the 100 bus pass recipients, 22 reported being diagnosed with asthma, 15 reported living with a child that has asthma, 23 reported living with another adult who has asthma, and 2 reported living with a senior citizen who has asthma. Nearly 95% demonstrated knowledge increases and 80% were satisfied with the information they received. This opportunity is now thriving as a part of the Asthma Life Skills Academy for Adults (ALSAA) program and is currently funded by the Port of Long Beach.



*“(The training was) very informative and people need to educate themselves about these issues.”*

— Cindy, Bus Pass Recipient

### Want a **Free** Bus Pass???

Be a part of the solution to Air Pollution & give the bus a chance!



Receive **ONE** free monthly bus pass!

Just complete a short survey on Asthma and Air Pollution!!!

Go to: [http://www.longbeach.gov/health/eh/healthy\\_homes/alsaa.asp](http://www.longbeach.gov/health/eh/healthy_homes/alsaa.asp)



**Want more Information?**  
Contact: Victoria Chavez  
562-570-4168

City of Long Beach Department of Health and Human Services ALSAA Program  
The Asthma Life Skills Academy for Adults (ALSAA) Program is Funded by the Port of Long Beach Mitigation Grants Program and focuses on providing educational services to adults and seniors with asthma in the Long Beach Community.



*“(An) effective way of educating people about pollution and our environment.”*

—Veronica, Bus Pass Recipient

## ***Summative Evaluation and Recommendations***

The CAARE Program has been the main provider of an in-home, intensive asthma case management program for adult residents of Long Beach, Carson, and Wilmington. In a geographic area adjacent to major air pollution vectors such as major shipping ports, oil refineries, and multiple freeways; the demand for asthma resources and services will continue to grow. Despite the wide-ranging improvements in asthma health outcomes, asthma care cost reductions, and improved quality of life with asthma; multiple challenges remain.

The first challenge is motivating adults with asthma to access the existing medical care providers. We recommend incorporating medical service providers into the CAARE intervention. Specifically, a CAARE CHW could accompany clients (or those without a primary care physician) to an asthma wellness visit as part of the educational intervention. In this situation the CHW and nurse could walk a client through what happens during an asthma wellness visit and provide more detailed information on those tests and assessments that a physician conducts (e.g., peak flow meter, pulmonary functioning test, etc.). Because fear of the unknown or an overly negative, yet expected, medical diagnosis are significant barriers to people visiting a physician, having a partner to escort them and provide support may help to overcome this barrier. Coordination of this type of partnership will present logistical challenges, but the potential benefits far outweigh these challenges.

A second challenge is creating habits that include effective asthma management strategies and manifest a healthier home environment. Despite the information and encouragement of our CHWs, some clients were not able to change their behaviors. The prevailing knowledge suggests that it takes up to 3 months for environmental changes to manifest in measurable symptom changes. For this reason, we believe that a longer intervention timeline (i.e., at least 6 months) may be necessary to allow fuller implementation of the behavior changes and to observe the positive impact of any implemented changes. The Stages of Change Model posits that people progress through multiple stages (i.e., pre-contemplation, contemplation, and planning) before they actually *attempt* to change a problematic behavior.

Although their illness and the adverse health impacts are salient evidence that something that they are doing is not

in their best interest, committing to durable behavior change is a process of trial and error. In addition, some people need time to mourn the loss of familiar, yet problematic, behaviors. Therefore, an investment of additional resources to extend the intervention window and include additional contacts with CHWs is recommended.

The third challenge is correcting asthma triggers that result from structural deficits in the residential environment. Home environment assessments include pest infestation, mold and moisture intrusion, heating and cooling systems, and ventilation. The current configuration of the CAARE Program does not provide resources to correct or eliminate these residential hazards. Elimination or reduction of behavior-based asthma triggers rely upon behavior change. However, the elimination of some structural hazards in home environments require coordination with property owners and managers or a significant financial invest from residents. Given that more than 75% rent their residence and nearly 25% do not have (and likely cannot afford) medical insurance, a logical assumption is that financial resources are relatively limited amongst our client population. Prevailing research indicates that prolonged exposure to these structural hazards contributes to chronic asthma symptom exacerbation and increased asthma care costs. Therefore, removing these hazards is imperative for the health and wellbeing of adults with asthma. The cost of making these repairs may provide a considerable financial burden on homeowners, whereas persons who rent their home do not possess ultimate decision making authority on structural changes in their home environment. Implementing an intervention program that integrates remediation of residential hazards with asthma case management is a prudent course of action.

Therefore, we recommend an intervention based on the Healthy Homes Demonstration Program developed by the City of Long Beach. This model integrated residential structural hazard reduction with asthma case management for children with asthma. This program yielded positive impacts on health outcomes for children that recently completed an asthma case management program. This model would likely yield similar results for adults; however, a larger financial investment is needed to make this program a reality.

## Our Stories...

*“I feel like the CAARE Program has helped me understand my asthma condition and has briefly explained to me how to prevent future sickness. I am very glad and thankful of having a program like this available for local people in the community with similar problems. Thank you very much; I really appreciated your program and staff’s kindness.”*

—Jesus, CAARE Participant





## Community Health Worker at Work

Jesus' mother was actually the way that we got in contact with him. She called me one day to ask about, and ultimately request, our services for her 19-year-old son. Jesus has had asthma since birth and his mother has always been the one to manage and care for his asthma. Jesus' mother felt that, now that he is an adult, Jesus would do well learning to manage and take charge of his own asthma. She was also concerned that the chemicals he exposed himself to at his job were causing him to flair up.

Often times when a parent asks us to enroll their child they can be reluctant to listen and you can tell they're only participating out of respect for their parent's wishes. Jesus agreed to participate in the CAARE program with little hesitation. He was very attentive during our visits and asked many questions throughout the lessons. Jesus was so quick to act on his newly learned information that by the time we showed up for his second set of lessons he had already made a number of changes.

The room Jesus had been sleeping in during our first two visits was not ideal for someone with asthma. It had no windows and a thick shag carpet that trapped a lot of dust. Jesus moved from that room into a new one with windows and thinner carpeting. He said that he kept the windows open frequently and noticed he was able to sleep easier than when he had in the old room. He also washed his sheets and pillows and told us during our 3-month follow up that he is still washing them regularly.

On top of all of this, Jesus also now wears a mask while working with the cleaning agents that his mother (and us) were concerned about. He and his mother both said they noticed a difference when Jesus comes home from work.

Seeing Jesus go from being apathetic about asthma management to really taking charge of his health was one of those moments that make you glad to be a CHW. Jesus epitomizes what it means to participate with the CAARE program. It's our job to educate and inform people about their asthma, triggers, and the changes they can make in their lives to significantly improve their health. We can't force people to make those changes, we can only hope that they, like Jesus, care enough about themselves to take the next step in asthma self management. — Estela and David, CAARE Community Health Workers

# The Snowball Effect

Recruiting community residents to participate in a program like CAARE can be challenging despite the benefits of participation. CAARE CHWs go door-to-door in targeted neighborhoods and are able to identify and enroll a number of adults with asthma into the program. However, word-of-mouth referrals are powerful recruitment tool as well. Word-of-mouth recruitment, also called “snowball sampling”, can help to boost enrollment because people tend to be more willing to try something new if someone that they know is or has tried it as well. The story below indicates why community education remains a valuable part of the CAARE program.



*“Me gustó la referencia a la clínica, tuve la oportunidad de recibir los inhaladores y medicamentos para el asma. Estela me dio una buena educación sobre el asma.”*

—Laura, CAARE  
Participant

*“I liked the referral to the clinic; I was able to receive inhalers and medications for my asthma. Estela gave me good asthma education.”*

Laura is a neighbor of Jesus (from page 9) that he referred to the CAARE program. She wanted to know about asthma because she was diagnosed with asthma six years ago. Despite her diagnosis, she really did not know anything about it. She enjoyed our services, all the information and education was really helpful to her. We also referred Laura to The Children’s Clinic, Inc. (TCC) on the Long Beach Memorial Hospital campus. The clinic referral was much appreciated by Laura. When she visited TCC, Laura was able to get care and direction from an asthma specialist, get her inhalers and an allergy medication. Laura plans to tell the people that she knows about the CAARE Program. —Estela, Community Health worker

Gabriela Lopez is a stay at home mom who enjoys her kids and is very active with them. Even though she has asthma, she still takes part in dance exercise classes. She was very excited to learn more about the different triggers and how to use the non-toxic products to keep her asthma under control. There are many services that the Health Department offers but this may be the best program that serves the public's needs. Learning about the different triggers an asthmatic goes through and the use of non-toxic cleaning products have definitely improved life.

—Joe, Community Health Worker



*'I learned how to clean without toxic products or chemicals. I love to know more about how to control my asthma. I also learned what causes an asthma attack.'* —Gabriela, CAARE Participant



Rosalinda Fraga was a referral from a participant who met her at a bus stop. This participant was very concerned for Rosalinda's health. When I first met Rosalinda, she was very concerned with her asthma care. She had constant symptoms of asthma and was always worried about having an asthma attack in a public place with no one to help her. Although she went to doctor visits regularly she was not able to get the translation services she needed which left many of her questions unanswered. Rosalinda was very eager to learn more about her asthma care.

After the education, Rosalinda had the confidence to take matters into her own hands. She was not going to let her asthma take control of her life. She was no longer afraid to take the bus and run her errands because she knows what symptoms to be aware of when her asthma is about to flare up. She now makes sure that she has a scarf to wrap around her mouth and nose in case of any cold air, a whiff of perfume, or any other triggers she could possibly come into contact with while walking outside or riding the bus. —Teresea, Community Health

*"I have learned so much in this program and I have been doing well with my asthma. I learned how to start my day without my triggers that may cause me to flare up. The program has also taught me how to use non-toxic cleaning supplies that won't alter my asthma, how to use my medication adequately, and so much more information that I didn't know about my asthma. Estela has helped me and gave me good advice."*

- Bertha, CAARE Participant



Issues with substandard housing are common for our participants, but often times they simply can't do anything about it. It was nice to see someone be able to move out and get away from a poor housing situation for a change. Bertha's story goes to show you that no matter how much you know about asthma if you can't escape low quality housing and the triggers that come with it, you may never be able to fully control your asthma.

—David, Community Health Worker



Bertha Morales *knows* about asthma. She has had it since she was only one year old and management has been a struggle for her ever since. She also has two children with asthma and has been struggling to help them control it as well. Bertha was also a participant in an asthma program for children called “LBACA” (Long Beach Alliance for Children with Asthma) when we visited her. As a result she already had a good understanding of asthma and her families various triggers.

Bertha’s real problem was her home. She lived in substandard housing conditions that lead to a number of unavoidable asthma triggers. The very first time we visited Bertha’s home the first thing to greet us was a smell that seemed to be a combination of an out of control mold problem and a cockroach infestation. While doing our home environment assessment we walked into the kitchen and could see roaches crawling along the wall in the middle of the day and the bathroom had mold on pretty much every surface. Bertha had also allowed her house to become disorganized and cluttered. It was impossible to get to the back part of the house without stepping over heaps of boxes, toys, and clothing.

We couldn’t be sure of how much of the problem could be attributed to Bertha, the apartment had plenty of holes and gaps for roaches and other pests to get in through and in places like this it isn’t uncommon for mold to simply be painted over or allowed to continue to grow under floors and behind walls. As for the clutter, some of it, but not all, could be the result of having a lot of people living in a one-bedroom apartment. Needless to say we weren’t very confident that basic education would be of much help in a situation like this. No amount of vinegar and boric acid was going to tackle the problems facing Bertha and her family.

Then Bertha and her husband made a decision that not all of our participants have the luxury of making. After our education they decided that they could not continue to live in their apartment and they found and rented a new place. Their new apartment had easy to clean shades, no carpeting, they only brought leather furniture with them, and to top it all off the apartment was bigger which will hopefully help keep down the clutter.

Her decision to move out was triggered by things mentioned to her during the education and she chose a new place accordingly. She is incredibly happy with her new apartment and isn’t going to let her fresh start go to waste. Since the move she and her children have had fewer problems with asthma and are now fully in control. For her children this is the first time in their whole lives where they can make that claim. - Estela and David, Community Health Workers

*“Wow, the teams were awesome. Especially Samantha Castillo. She took her time and took extra time to help me understand asthma, as I was never told by my “doctors” anything. I asked so many questions and she answered every one of them and helped me with my goals: the peak flow meter, which does help me to “breathe better”, I noticed that and she has taught me triggers. I’ve been able to identify those too. I did not realize how smells affect me and the toxicity of cleaning products and stress, wow that’s a big one in today’s society too. So, I’ve already met some of the goals, thank you for this wonderful program and outstanding people, especially Samantha. As we went through the book putting me at ease, the handouts, and booklet were great too. Thank you again for all this great information too. Especially to the CAARE “Caring Team”. God Bless you!”*



When I first met Rachel, she was very eager to learn about asthma. She was not aware of all the trigger provoking her asthma. As we began assessing her home using the Home Environmental Checklist, we concluded that there were many triggers in her home provoking her asthma. Rachel’s triggers in her home were: roaches, mold, dust, dust mites, toxic cleaning products and lack of ventilation. Rachel lived a block away from the beach and the dust from the sand was always entering her apartment, so Rachel never kept the doors or windows opened to avoid the sand and dust exposure. By keeping the doors and windows closed this exacerbated the poor indoor air quality. Rachel had constant symptoms of asthma. Although Rachel had asthma medicine she did not believe in taking drugs and chose to give her medication away. Prior to giving Rachel health education she was unaware of all the triggers and how to take control of her asthma.

Rachel was very eager to learn as much as possible to battle the daily obstacles she has with her asthma. She was one of the very few participants that actually read the book, cover to cover, and took notes of all the questions she had for me. She took notes during each lesson too, always asking question to make sure she was understating the material. After each visit Rachel would tell me all the changes she has made to better her asthma. She was very grateful for all of the knowledge and empowerment the program gave her. She was surprised by the amount of information she was receiving from the lessons that she didn’t know about her health before.

After Rachel’s education she was so empowered and moved by the knowledge that she began informing close friends and family of the new revelation she had learned. Rachel has made many changes in her life to keep her asthma under control. She decided that her poor living condition in that apartment that she lived in was not suitable for her asthma condition so she decided to move. Rachel still practices all the information she learned from the program and still passes on the information to close loved ones. -Sam, CAARE Community Health Worker



When we first met Virginia, her asthma was out of control. She has always seen her doctor for check-ups and routine visits, but never really knew how to take her asthma medication. She suffered from a cough and wheeze that never really went away despite taking over the counter medications. We informed Virginia that those were all asthma symptoms and there were things in her home that were causing her symptoms. When we first walked into Virginia's home you could smell the candle scents and notice the cat fur on her couches.

With the education and lessons Virginia has learned how important it is to take her long-term inhaler. However, Virginia still has her beloved cat, but maintains her house by vacuuming up her couches and vertical blinds. Now she doesn't let her cats sleep with her at night and cleans with a mask. Her asthma is now under control because she takes her medications correctly.

—Nina and Teresa, Community Health Workers

*"I am very grateful for the asthma education I received from the Community Workers. I have made changes in my asthma care and it has really benefited my health! I appreciate the time and effort they put into following up with me! Thank you."*

—Virginia, CAARE Participant

*I learned how to control my asthma and also make a change in my household with cleaning products. Due to the changes is my asthma is now under control, everything seems to be better. The people that helped me were kind and helpful."*

- Juan, CAARE Participant



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