Asthma Control: Home-based Multi-trigger, Multicomponent Environmental Interventions

Summary Evidence Tables

Qualifying Studies for Home-based Asthma Interventions: Health Care Utilization Outcomes

Author & Year (Study Period) **Design Suitability: Design** **Quality of Execution: (limitations)** **Implementer**	**Location, Country** **Urbanicity** **Study Population** **Sample Size**	**Intervention** • **Name** • **Definition** • **Components** • **Follow up time** **Comparison**	**RESULTS**		
			Outcome Measure and time period	**Reported Measures**	**Estimated Effect Size**
Brown (2006) (2004) Greatest: RCT Fair (3 limitations) Academic Medical Center and Community Hospital	Grand Rapids, MI, USA Urban Adults and children with moderate or severe asthma, mixed income N=239 (110 adults, 129 children)	Home-based asthma education AE, EA, EE, SM 12 mo Comparison: usual care	% population with asthma acute care visits in last 6 mo	**Pre (post)** Children: I: NR (22.7%) C: NR (38.1%) HR (95% CI): 0.62 (0.33-1.19) p=0.29 Adults: I: NR (23.5%) C: NR (23.7%) HR (95% CI):1.08 (0.50-2.33) p=0.85	**Absolute pct pt change** -15.4 -0.2

Carter (2001) **(NR)** Greatest : Individual RCT Fair (3 limitations) Emory University and University of VA researchers	Location: Atlanta, GA-Grady Clinic Urban African American children with asthma, low income N=104 *Comment: Also includes placebo group in addition to control group (results not shown for placebo)*	Asthma home intervention including allergen avoidance EA, EE, ER 18 mo Control: no home visits until after study completed, routine medical care Placebo: home visits with ineffective ER, EE (ineffective mattress covers, roach traps, etc.)	Total # of hospitalizations/yr Total # of ED visits/yr Total # of UO visits/yr Total # of combined hospitalizations, ED, UO visits/yr	**Pre (post)** I: 1 (1) C: 0 (1) I: 7 (5) C: 5 (14) I: 43 (28) C: 40 (33) I: 51 (34) (Down 33%) C: 45 (48) (Up 6%)	**Absolute Mean Difference** -0.02 0.03 -0.20 -0.51
Eggleston (2005) (2002-2003) Greatest: Individual RCT Fair (3 limitations) Academic Medical Center	Baltimore, MD, US Urban Children with physician-diagnosed asthma, African American, low income N = 100	Home environmental intervention in inner city Reduce environmental pollutants and allergen exposure in homes EA, EE, ER Tailored intervention 12 months Comparison: Delayed intervention	% of children with asthma acute care visits/past 3 mo	**Pre (post)** I: 32 (15) C: 36(13)	**Absolute pct pt change** 6

Evans (1999) (1994-1996) Greatest : Individual RCT Fair (2 limitations) Eight Academic Medical Centers and NIH	8 cities, US Urban 5 – 11 yo children with physician diagnosed moderate to severe asthma, African American, low income N = 1033	National Cooperative Inner- City Asthma Study, NCICAS (Phase II) Interventions to reduce asthma symptoms of inner city children EA, EE, ER, SM, SS Tailored intervention 24 months Comparison: Usual care *Comment: Home visit only for pest control*	Mean # of unscheduled visits/yr at 12 months % of children with hospital visits in the past 12 mo	**Pre (post)** I: NR (2.64) C: NR (2.85) Difference -0.21 (95% CI: -0.62, 0.20) p=0.32 I: NR (14.80%) C: NR (18.90%) Difference -4.19 (95% CI: -8.75, 0.36) p=0.071	**Absolute Mean Difference** -0.21 **Absolute pct pt change** -4.1
Hasan (2003) **(1998 -1999)** Least: Before-After Fair : 4 limitations Academic Medical Center	Flint, MI, USA Urban Children with previous asthma hospitalization N=142	Home-based asthma education program CC, EE, SM 12 mo	Mean # of asthma ED visits/yr Mean # of hospitalizations/yr	**Pre (post)** 0.94 (0.84) p > 0.30 1.2 (0.5) p < 0.05	**Absolute Mean Difference** -0.10 -0.7
Hughes (2001) Greatest (RCT) Fair (2 limitations) Children's Hospital, Health Dept	Nova Scotia, Canada Unknown Children with previous asthma hospitalization N=95	Home-based asthma education program EA, EE, SM Tailored intervention 24 mo	Total # of hospital visits/yr Total # of ED visits/yr Total # of children with asthma acute care visits/past 12 mo	**Pre (post 12mo)** I: NR (20) C: NR (25) I: NR (20) C: NR (27) I: NR (13) C: NR (11)	**Absolute Mean Difference** -0.10 -0.15 **Absolute pct pt change** 6

Kercsmar (2006) Greatest (RCT) Fair (2 limitations) Academic Medical Center	Cleveland, OH, USA Urban African American children, low income N=62 children	Asthma environmental intervention aimed at home moisture sources EA, EE, ER, SM 12 mo Comparison: SM and EE (offered ER at end of study)	Mean # of asthma acute care visits/yr % population with ≥1 ED or inpatient visit	**Pre (post)** I: NR (0.28) C: NR (0.91) p=0.06 I: NR (17.2) C: NR (36.4) p=0.15	**Absolute Mean Difference** -0.63 **Absolute pct pt change** -19.2
Klinnert (2005) (1998-2000 and 2000-2003) Greatest :RCT Fair (3 limitations) Academic Medical Center and Private clinics	Denver, CO USA Urban Low income children ages 9-24mo with wheezing episodes (majority Hispanic) N=181 children	Childhood Asthma Prevention Study (CAPS) Asthma education, ETS and allergen reduction intervention EA, EE, ER, SM, SS 4 years Comparison: Baseline home assessment and usual care; educational videotape about asthma	Mean # of hospitalizations/yr at 12 mo Mean # of ED visits/yr at 12 mo	**Pre (post)** I: 0.68 (0.15) C: 0.52 (0.11) p=0.63 I: 1.91 (0.66) C: 1.52 (0.53) p=0.40	**Absolute Mean Difference** -0.12 -0.26
Krieger (2005) Greatest (RCT) Fair (3 limitations) Public Health Department, Academic Medical Center Community collaboration Comments: Uses community health workers (CHW)	Seattle, WA, USA Urban Low income children age 4-12 with persistent asthma N= 274	Seattle-King County Healthy Homes Project 5-9 home visits EA, EE, ER, SS Tailored intervention 12 mo Comparison: Home visits with EA, low intensity EE, ER (allergen impermeable covers and minor education)	% of children with asthma acute care visits/past 2 mo	**Pre (post)** I: 23.4 (8.4) C: 20.2 (16.4) P=0.026 GEE coefficient (95% CI): -0.97 (-1.8, -0.12) OR (95 % CI): 0.38 (0.16, 0.89) P=0.026	**Absolute pct pt change** -11.2

Krieger (2009) Greatest: (RCT) Fair (2 limitations) Public Health Department Academic Medical Center Community collaboration Comments: Uses community health workers (CHW)	Seattle, WA, USA Urban Low income children age 3-13 with persistent or uncontrolled asthma N=309	Seattle-King County Healthy Homes II Project 4 home visits by CHW CC, EA, EE, ER, SM, SS Tailored intervention 15 mo Comparison: Clinic visits with EE, SM, SS, CC (no home visits)	% of children with asthma acute care visits/past 3 mo	**Pre (post)** I: 47.4 (24.4) Difference (95% CI): -23.1 (-32.6, -13.6) C: 49 (31.4) Difference (95% CI): -17.6 (-27.2, -0.08) OR (95 % CI): 0.69 (0.38, 1.26) P < 0.228	**Absolute pct pt change** -5.4
Levy (2006) Least: Before after, no control (2002 – 2003) Fair (3 limitations) CBPR involving Housing agencies Academic Medical Centers groups Community	Boston, MA USA N = 58 Children with asthma living in public housing;	Boston Healthy Public Housing Initiative CBPR research study of multifaceted in-home environmental intervention; mainly integrated pest management EA, EE, ER, SM, SS 6 mo Comparison: None	Total # of hospitalizations	No change in hospitalizations	-

Morgan (2004) Greatest: RCT Good (1 limitation) 7 sites: Academic medical schools and research centers	NY, MA, TX, AZ, IL, WA, NC; USA Urban Atopic children 5-11 with previous asthma ED visit or hospitalization in past 6mo N= 937	Inner City Asthma Study (ICAS) 5 (+2) home visits EA, EE, ER Tailored intervention 24 mo Comparison: usual care and 2 home visits (measurements only)	Mean # of ED visits/yr at 12 mo Mean # of UO visits/yr at 12 mo Mean # of combined ED, UO visits/yr at 12 mo % of children with $\geq$1asthma hospitalization /yr at 12 mo	**Pre (post)** I: NR (0.93) C:NR (1.08) Difference (p-value) -0.14 (0.17) I: NR (1.28) C:NR (1.49) Difference (p-value) -0.21 (0.11) I: NR (2.22) C:NR (2.57) Difference (p-value) -0.35 (0.04) I: NR (17.1) C: NR (15.5) Difference (p-value) +1.6 (0.56)	**Absolute Mean Difference (CI)** -0.15 -0.21 -0.35 **Absolute pct pt change** +1.6
Nicholas (2005) Least (before-after) Fair (4 limitations) Community center and pediatric hospital Comments: large loss to follow up (N at 12 mo = 70)	Harlem, NYC, USA Urban Children with asthma living in the 60 block radius of Central Harlem N=314	Harlem Children's Zone Project Multiple home visits EA, EE, ER, SM, SS 18 mo Comparison: None	% of children with ED asthma visits/yr	**Pre (post)** 35.0% (14.3%) p<0.001	**Absolute pct pt change** -20.7
Oatman (2007) Least (before-after) Fair (4 limitations) Health Dept and Home Health Agency	Minneapolis, MN, USA Urban Children with persistent asthma N = 64	Reducing Environmental Triggers of Asthma Program (RETA) 1 home visit + 2 f/u visits AE, EA, EE, ER Tailored intervention 12 mo	Mean # of hospital visits/yr at 12 mo Mean # of ED visits/yr at 12 mo Mean # of UO visits/yr at 12 mo	**Pre (post)** 0.07 (0.05) Difference: - 0.3 0.97 (1.8) Difference: +0.8 1.82 (0.10) Difference: -1.35	**Absolute Mean Difference** -2.60 +3.32 -6.88

Parker (2007) Greatest (RCT) Fair (2 limitations) Academic Medical Center	Detroit, MI, USA Urban Children with persistent asthma N= 298	Community Action Against asthma (CAAA) Community-based participatory research 9 home visits by community health workers AE, EA, EE, ER, SS Tailored intervention 12 mo Comparison: Baseline (AE only) and f/u visit (measurement only)	% of children with acute care visits/12 mo	**Pre (post)** I: 65 (59) C: 58 (73) OR (95% CI): 0.40 (0.22, 0.74) p = 0.004	**Absolute pct pt change** -21
Primomo (2006) (2001-2003) Least: (before-after) Execution : Fair (3 limitations) CBPR –Clean Air For Kids	Tacoma, WA, USA Urban Children with caregiver reported asthma N=71	Clean Air For Kids (CAFK) partnership Community-based Asthma Outreach Workers (AOW) program for children EA, EE, ER, SM Tailored intervention 2 mo	% of children with asthma ED visits/yr	**Pre (post)** 50% (45%) (p=0.30)	**Absolute pct pt change** -5
Shelledy (2005) Least (before-after) Fair (4 limitations) Academic Medical Centers	Little Rock, AK, USA Urban Children age 3-18 with asthma and high users of health care N = 18	Pilot study including 8 home visits by respiratory therapists for asthma CC, EA, EE, ER, SM Tailored intervention 12 mo	Mean # of hospitalizations/yr Mean # of ED visits/yr Mean # of UO visits/yr	**Pre (post)** 1.78 (0.33) Effect: -82% reduction (p=0.001) 4.22 (0.61) Effect: -86% reduction (p=0.001) 6.39 (2.17) Effect: -66% reduction (p=0.001)	**Absolute Mean Difference** -1.45 -3.61 -4.22

Stout (1998) Least (before-after) Fair (4 limitations) Academic Medical Center; Public Health Dept	Seattle, WA, USA Urban Majority African-American, low-income children with poorly controlled asthma N=23	Asthma Outreach Project Coordinated care model involving 8 home visits CC, EA, EE, SM, SS Tailored intervention 12 mo	Total # of hospitalizations/yr Total # of ED visits/yr Total # of unscheduled clinic visits/yr	**Pre (post) p value** 18 (8) Effect: -56% reduction p=0.076 20 (7) Effect: -65% reduction p=0.038 40 (22) Effect: -45% reduction p=0.063	**Absolute Mean Difference** -0.42 -0.54 -0.75

Qualifying Studies for Home-based Asthma Interventions: Quality of Life Outcomes

Author & Year **(Study Period)** **Design Suitability: Design** **Quality of Execution** **Implementer**	**Location, Country** **Urbanicity** **Study Population** **Sample Size**	**Intervention** • **Name** • **Definition** • **Components** • **Follow up time** • **Comparison**	**RESULTS**		
			Outcome Measure and time interval	**Reported Measures**	**Estimated Effect Size**
Barton (2007) (1999 – 2000) Greatest: Group RCT Fair (4 limitations) Government Public Health and Community Partnership *Comment: randomized by house*	Torbay, UK Rural Children and adults Residents of Watcombe houses, white, mixed income N =126 (45 adults, 81 children)	Watcombe Housing Study Improving housing conditions EA, ER (major) 12 months Comparison: Delayed intervention	Mean Symptom score in past 1 month *(decreased=improved)*	**Pre (post)** Children: I: 12.9 (11.8) C: 14.6 (12.2) Difference I: -1.8; C: -1.0 (p=0.17) Adults: I: 16.4 (14.7) C: 15.0 (15.4) Difference I: -2.3; C: +1.1 (p=0.006)	**Relative % change** +8 -13
Eggleston (2005) (2002-2003) Greatest: Individual RCT Fair (3 limitations) Academic Medical Center	Baltimore, MD, US Urban Children with physician-diagnosed asthma, African American, low income N = 100	Home environmental intervention in inner city Reduce environmental pollutants and allergen exposure in homes EA, EE, ER Tailored intervention 12 months Comparison: Delayed intervention	% of children reporting any daytime symptoms in the previous 2 weeks at 12 months Quality of Life Score *(increase=improved)*	**Pre (post)** I: 58% (55%) C: 50% (59%) I: 3.69 (4.7) C:4.01 (5.0) Difference: I:+1.01 C: +0.99 (p =NS)	**Absolute pct pt change** -12 **Relative % change** +3

Evans (1999) (1994-1996) Greatest : Individual RCT Fair (2 limitations) Eight Academic Medical Centers and NIH	8 cities, US Urban 5 – 11 yo children with physician diagnosed moderate to severe asthma, African American, low income N = 1033	National Cooperative Inner-City Asthma Study, NCICAS (Phase II) Interventions to reduce asthma symptoms of inner city children EA, EE, ER, SM, SS Tailored intervention 24 months Comparison: Usual care *Comment: Home visit only for pest control*	Mean # of symptom days in previous 2 weeks at 12 months	**Pre (post)** Children: I: 5.1 (3.51) C: 5.1 (4.06) Difference (95% CI) - 0.55 (-0.92, -0.18) (p =0.004)	**Absolute mean difference** - 0.6
Hasan (2003) (1998-1999) Least : Before-After Fair: 4 Limitations Academic Medical Center	Flint, MI, USA Urban Inner City children with previous asthma hospitalization N=142	Home-based asthma education program EE, CC, SM 12 mo	% of children with $\geq$ 8 days of activity limitation in the last 1 year	**Pre: (post)** 35 (13) (p<0.001)	**Absolute pct pt change** -
Kercsmar (2006) Greatest: RCT Fair (2 limitations) Academic Medical Center	Cleveland, OH, USA Urban African American children, low income N=62 children	Asthma environmental intervention aimed at home moisture/mold sources EA, ER, EE, SM 12 mo Comparison: SM and EE (offered ER at end of study)	mean # asthma symptom days in last 12 months	**Pre (post)** I:3.2 (1.3) (p=0.053) C: 4.5 (3.1) (p=NS)	**Absolute mean difference** -0.5

Klinnert (2005) (1998-2000 and 2000-2003) Greatest: RCT Fair (3 limitations) Academic Medical Center and Private clinics	Denver, CO, USA Urban Low income children ages 9-24mo with wheezing episodes (majority Hispanic) N = 181 children	Childhood Asthma Prevention Study (CAPS) EA, EE, ER, SM, SS 4 years Comparison: Baseline home assessment and usual care; educational videotape about asthma	% of children with ≥ 1 symptom day in the last 12 wks at age 4 years (2007) Total caregiver QOL scores at 12 mo *(increase = improved)*	**Pre (post)** I: NR (39.4) C: NR (37.7) OR 1.12 (CI 0.6-2.3) (p= 0.76) I: 5.69 (6.47) C:5.61 (6.34) (p=0.72)	**Absolute pct pt change** +1.7 **Relative % change** +0.6
Krieger (2005) Greatest: RCT Fair (3 limitations) Public Health Department, Academic Medical Center Community collaboration	Seattle, WA, USA Urban Low income children age 4-12 with persistent asthma N= 274	Seattle-King County Healthy Homes Project 5-9 home visits EA, EE, ER, SS Tailored intervention 12 mo Comparison: Home visits with EA, low intensity EE, ER (allergen impermeable covers and minor education)	mean number of asthma symptom days in last 2 wks Caregiver QoL score *(increase = improved)*	**Pre (post)** I : 8.0 (3.2) C: 7.8 (3.9) GEE Coeff (95% CI) -1.24 (-2.9, 0.4) p = 0.138 I: 4.0 (5.6) C: 4.4 (5.4) GEE Coeff (95% CI) 0.58 (0.18, 0.99) p = 0.005	**Absolute mean difference** - 0.9 **Relative % change** +17

Krieger (2008) Greatest: (RCT) Fair (2 limitations) Public Health Department Academic Medical Center Community collaboration	Seattle, WA, USA Urban Low income children age 3-13 with persistent or uncontrolled asthma N=309	Seattle-King County Healthy Homes II Project 4 home visits by CHW EA, EE, ER, CC, SM, SS Tailored intervention 15 mo Comparison: Clinic visits with EE, SM, SS, CC (no home visits)	mean number of asthma symptom days in last 2 wks *Comment: not reported-derived from symptom free days gained* Symptom Free Days gained in the last 2 weeks Caregiver QoL score *Comment*: increase = improved	**Pre (post)** - I: 9.3 (11.3); Difference (95%CI) 1.9 (1.1, 2.8) C: 9.5 (10.8) Difference (95%CI) 1.3 (0.5, 2.1) OR (95% CI) 0.94 (0.02, 1.86) p < 0.046 I: 5.6 (6.2) Difference (95% CI) 0.6 (0.4, 0.8) C: 5.6 (6.0) Difference (95% CI)0.4 (0.3, 0.6) OR (95% CI) 0.22 (0.00, 0.44) p < 0.049	**Absolute mean difference** -0.7 **-** **Relative % change** +4

Levy (2006) Least: Before after, no control (2002 – 2003) Fair (3 limitations) CBPR Housing agencies Academic Medical Centers Community groups	Boston , MA, USA Urban Children aged 4 – 17 with self reported asthma and living in one of the targeted housing developments N = 58	Boston Healthy Public Housing Initiative CBPR research study of multifaceted in-home environmental interventions for children with asthma living in public housing; mainly integrated pest management EA, EE, ER, SM, SS 5 months Comparison: None	% children with more than one symptom day in the last 2 weeks Caregiver QoL score at 5mo *Comment*: increase = improved	**Pre (post)** 76 (40) 4.86 (5.66) Change: 0.80 pts	**Absolute pct pt change** - 36 **Relative % change** +16.8
Morgan (2004) Greatest: RCT Good (1 limitation) 7 sites: Academic medical schools and research centers	NY, MA, TX, AZ, IL, WA, NC; USA Urban Atopic children 5-11 with previous asthma ED visit or hospitalization in past 6mo N= 937	Inner City Asthma Study, (ICAS) 5 (+2) home visits EA, EE, ER Tailored intervention 24 mo Comparison: usual care and 2 home visits (measurements only)	Mean number of asthma symptom days in the last 2 weeks at 12 mo	**Pre (post)** I: 6 (3.4) C: 6 (4.2) Difference: - 0.82 (p< 0.001)	**Absolute mean difference** - 0.8
Nicholas (2005) Least : before-after Fair (4 limitations) Community center and pediatric hospital Comments: large loss to follow up (N at 12 mo = 70)	Harlem, NYC, USA Urban Children with asthma living in the 60 block radius of Central Harlem N=314	Harlem Children's Zone Project Multiple home visits EA, EE, ER, SM, SS 18 mo Comparison: None	% of children with more than one symptom day in the past 2 weeks at 12 mo	**Pre (post)** 61.5 (42.8) (p < 0.001)	**Absolute pct pt change** -18.7

Oatman (2007) Least: before-after Fair (4 limitations) Health Dept and Home Health Agency	Minneapolis, MN, USA Urban Children with persistent asthma N = 64	Reducing Environmental Triggers of Asthma Program (RETA) 1 home visit + 2 f/u visits AE, EA, EE, ER Tailored intervention 12 mo	mean asthma symptom scores (ITG Child Asthma Short Form) *Comment:* *Increase = improved*	**Pre (Post)** 51.8 (70.1)	**Relative % change** +35
Parker (2007) Greatest (RCT) Fair (2 limitations) Academic Medical Center	Detroit, MI, USA Urban Children with persistent asthma N= 298	Community Action Against asthma (CAAA) Community-based participatory research 9 home visits by community health workers AE, EA, EE, ER, SS Tailored intervention 12 mo Comparison: Baseline (AE only) and f/u visit (measurement only)	Mean Symptom Score at 12 mo *Comment:* *decrease = improved* Cough: Cough With Exercise Wheeze, shortness of breath, chest tightness, sleep disturbance	**Pre (Post)** I: 3.81 (3.36) C:3.48 (3.44) P = 0.034 I: 4.27 (3.69) C: 3.80 (3.66) P = 0.017 no change over control	 - - -
Primomo (2006) (2001-2003) Least: (before-after) Execution : Fair (3 limitations) CBPR –Clean Air For Kids	Tacoma, WA, USA Urban Children with caregiver reported asthma N=71	Clean Air For Kids (CAFK) partnership Community-based Asthma Outreach Workers (AOW) program for children EA, EE, ER, SM Tailored intervention 2 – 26 weeks	 Mean Caregiver QoL score at 1 mo post intervention *Comment*: *increase = improved*	**Pre (Post)** 4.65 (6.06)	**Relative % change** 30

Smith (2005) (1999-2003) Greatest (RCT) Fair (3 limitations) Academic Medical Centers and Private Clinics	Norfolk and Suffolk, UK Not specified Adults with severe asthma nonadherent to usual therapy N=92 *Comment: Adults only study*	Six mo psycho educational intervention targeting asthma education and management AE, EE (minor), SM, SS 12mo	Mean asthma QOL score at 12 mo (Living with Asthma questionnaire) *Comment: decrease = improved*	**Pre (Post)** I: 1.20 (1.01) C: 1.14 (1.02) Difference (95 % CI) 0.05 (-0.16, +0.26) p=0.66	**Relative % change** 5.3
Somerville (2000) Least (before-after) Fair (3 limitations) Health Department and Health Authority	Cornwall, UK Not specified Children with moderate to severe asthma N = 114	Housing improvements (heating/moisture control) tailored to exposure EA, ER (major) 11.7 mo (average)	Median symptom score (wheeze by day) in the last 4 wks	**Pre (post)** 2 (1) p<0.001	**Relative % change** -20
Thyne (2006) (1999-2001) Least (before-after) Fair 4 limitations Academic Medical Centers, Community partnerships, Government organizations	San Francisco, CA, USA Urban Low income children, majority African American and Hispanic CC, EA, EE, SM, SS N=65	Yes We Can Urban Asthma Partnership Provider education, clinic education, and home visits (medical/social model)	Mean number of asthma symptom days in last 2 wks	**Pre (post)** 5.1 (2.8) p<0.01	**Absolute mean difference** -2.3

Qualifying Studies for Home-based Asthma Interventions: Physiologic Outcomes

Author & Year **(Study Period)** **Design Suitability: Design** **Quality of Execution** **Implementer**	**Location, Country** **Urbanicity** **Study Population** **Sample Size**	**Intervention** • **Name/** • **Definition** • **Follow up time** **Comparison**	**RESULTS**		
			Outcome Measure and time period	**Reported Measures**	**Estimated Effect Size**
Barton (2007) (1999 – 2000) Greatest: Group randomized trial Fair (4 limitations) Government Public Health and Community Partnership *Comment: randomized by house*	Torbay, UK Rural Children and adults Residents of Watcombe houses, white, mixed income N =126 (45 adults, 81 children)	Watcombe Housing Study Improving housing conditions EA, ER (major) 12 months Comparison: Delayed intervention	% predicted FEV1/FVC and peak flow	No changes from baseline	-
Eggleston (2005) (2002-2003) Greatest: Individual randomized controlled trial Fair (3 limitations) Academic Medical Center	Baltimore, MD, US Urban Children with physician-diagnosed asthma, African American, low income N = 100	Home environmental intervention in inner city Reduce environmental pollutants and allergen exposure in homes EA, EE, ER Tailored intervention 12 months Comparison: Delayed intervention	FEV 1 % predicted	**Pre (post)** I: 101 (94) C:100 (101) No change from baseline	-

Hughes (2001) Greatest (RCT) Fair (2 limitations) Children's Hospital, Health Dept	Nova Scotia, Canada Unknown Children with previous asthma hospitalization N=95	Home-based asthma education program EA, EE, SM Tailored intervention 24 mo	FEV1, FEV1/FVC, RV/TLC, exp flow 50% and 25%,, peak flow (% predicted)	Expiratory flow rates at 50% and 25% were significant at 12 mo (p=0.0001, p=0.001) but differences disappeared by 24 mo	-
Klinnert (2005) (1998-2000 and 2000-2003) Greatest :RCT Fair (3 limitations) Academic Medical Center and Private clinics	Denver, CO USA Urban Low income children ages 9-24mo with wheezing episodes (majority Hispanic) N=181 children	Childhood Asthma Prevention Study (CAPS) Asthma education, ETS and allergen reduction intervention EA, EE, ER, SM, SS 4 years Comparison: Baseline home assessment and usual care; educational videotape about asthma	FEV 0.5 (liters) FVC (liters) FEV0.5/FVC	**Pre (post)** I: NR (0.62) C: NR (0.63) -0.01 (CI: -0.06 to +0.04) (p=0.59) I: NR (0.74) C: NR (0.79) -0.04 (CI: -0.11 to +0.02) (p=0.15) I:NR (0.85) C: NR (0.81) +0.02 (CI: -0.03 to +0.07) (p=0.52)	- - -

Morgan (2004) Greatest: RCT Good (1 limitation) 7 sites: Academic medical schools and research centers	NY, MA, TX, AZ, IL, WA, NC; USA Urban Atopic children 5-11 with previous asthma ED visit or hospitalization in past 6mo N= 937	Inner City Asthma Study (ICAS) 5 (+2) home visits EA, EE, ER Tailored intervention 24 mo Comparison: usual care and 2 home visits (measurements only)	<u>FEV1 (% predicted)</u> <u>FVC (% predicted)</u> <u>Peak Flow (L/min)</u>	**Pre (post at 12 mo)** I: 88.3 (87.0) C: 87.3 (87.4) Difference: -0.4 p=0.69 I: 96.5 (97.3) C: 96.9 (98.1) Difference: -0.8 p=0.48 I: 202.3 (216.7) C: 205.4 (219.3) Difference: -2.61 p=0.51	- - -
Parker (2007) Greatest (RCT) Fair (2 limitations) Academic Medical Center	Detroit, MI, USA Urban Children with persistent asthma N= 298	Community Action Against asthma (CAAA) Community-based participatory research 9 home visits by community health workers AE, EA, EE, ER, SS Tailored intervention 12 mo Comparison: Baseline (AE only) and f/u visit (measurement only)	FEV1(% predicted) at 12 mo Peak Flow(% pred) at 12 mo	**Pre (post)** I: 76.7 (83.1) C: 79.5 (75.6) Difference(95% CI): 10.0 (0.9, 19.1) p=0.032 I: 79.6 (94.1) C: 82.7 (85.1) Difference(95% CI): 8.2 (1.1, 15.2) p=0.023	- -

Thyne (2006) (1999-2001) Least (before-after) Fair 4 limitations Academic Medical Centers, Community partnerships, Government organizations	San Francisco, CA, USA Urban Low income children, majority African American and Hispanic CC, EA, EE, SM, SS N=42	Yes We Can Urban Asthma Partnership Provider education, clinic education, and home visits (medical/social model)	FEV1(% predicted) at 6 mo (for children > 4 yr)	**Pre (post)** 82 (91) p=0.27	-

Qualifying Studies for Home-based Asthma Interventions: Productivity Outcomes

Author & Year (Study Period) Design Suitability: Design Quality of Execution Implementer	**Location, Country Urbanicity Study Population Sample Size**	**Intervention** • **Name/** • **Definition** • **Follow up time** **Comparison**	**RESULTS**		
			Outcome Measure and time period	**Reported Measures**	**Estimated Effect Size**
Brown (2006) (2004) Greatest: RCT Fair (3 limitations) Academic Medical Center and Community Hospital	Grand Rapids, MI, USA Urban Adults and children with moderate or severe asthma, mixed income N=239 (110 adults, 129 children)	Home-based asthma education AE, EA, EE, SM 12 mo Comparison: usual care	% of adults and children that missed ≥ 1 day of work or school (reason unspecified)/ 6mo	**Pre (post)** I: NR (58.1) C:NR (54.9) (p=0.62)	**Absolute pct pt change** + 3
Hasan (2003) (1998-1999) Least : Before-After Fair: 4 Limitations Academic Medical Center	Flint, MI, USA Urban Inner City children with previous asthma hospitalization N=142	Home-based asthma education program CC, EE, SM 12 mo	% children missing ≥8 school day from asthma /yr	**Pre (post)** 35 (12) (p<0.01)	**Absolute pct pt change** -23
Hughes (2001) Greatest (RCT) Fair (2 limitations) Children's Hospital, Health Dept	Nova Scotia, Canada Unknown Children with previous asthma hospitalization N=95	Home-based asthma education program EA, EE, SM Tailored intervention 24 mo	Mean # school days missed from asthma/yr	**Pre (post 12mo)** I: 10.8 (5.8) C:10.4 (8.8)	**Absolute Mean Difference** -3.4

Krieger (2005) Greatest: RCT Fair (3 limitations) Public Health Department, Academic Medical Center Community collaboration Comments: Uses community health workers (CHW)	Seattle, WA, USA Urban Low income children age 4-12 with persistent asthma N= 274	Seattle-King County Healthy Homes Project 5-9 home visits EA, EE, ER, SS Tailored intervention 12 mo Comparison: Home visits with EA, low intensity EE, ER (allergen impermeable covers and minor education)	% children missing ≥1 school day from asthma /2 wks	**Pre (post)** I: 31.1 (12.2) C: 28.4 (20.3) GEE: -0.77 (-1.7, 0.16) OR: 0.46 (0.18, 1.18) P<0.105	**Absolute Pct Pt Change** -10.8
Krieger (2008) Greatest: (RCT) Fair (2 limitations) Public Health Department Academic Medical Center Community collaboration Comments: Uses community health workers (CHW)	Seattle, WA, USA Urban Low income children age 3-13 with persistent or uncontrolled asthma N=309	Seattle-King County Healthy Homes II Project 4 home visits by CHW CC, EA, EE, ER, SM, SS Tailored intervention 15 mo Comparison: Clinic visits with EE, SM, SS, CC (no home visits)	% children missing ≥1 school day from asthma/2 wks	**Pre (post)** I: 16.7 (9) Difference (95% CI): -7.7 (-15.1, 0.00) C:18.3 (11.8) Difference (95% CI): -6.5 (-13.4, 0.00) OR (95% CI): 0.81 (0.35-1.88) P < 0.624	**Absolute Pct Pt Change** -1.2
Morgan (2004) Greatest: RCT Good (1 limitation) 7 sites: Academic medical schools and research centers	NY, MA, TX, AZ, IL, WA, NC; USA Urban Atopic children 5-11 with previous asthma ED visit or hospitalization in past 6mo N= 937	Inner City Asthma Study ICAS 5 (+2) home visits EA, EE, ER Tailored intervention 24 mo Comparison: usual care and 2 home visits (measurements only)	# school days missed from asthma in last 2 wks	**Pre (post 12mo)** I: 1.1 (0.65) C: 0.9 (0.82) Difference: -0.17 (p=0.003)	**Absolute Mean Difference** -9.6

Nicholas (2005) Least : before-after Fair (4 limitations) Community center and pediatric hospital Comments: large loss to follow up (N at 12 mo = 70)	Harlem, NYC, USA Urban Children with asthma living in the 60 block radius of Central Harlem N=314	Harlem Children's Zone Project Multiple home visits EA, EE, ER, SM, SS 18 mo Comparison: None	% children missing ≥1 school day from asthma/2 wks at 12 mo	**Pre (post)** I: 23.3 (7.1) P<0.001	**Absolute Pct Pt Change** -16.2
Oatman (2007) Least (before-after) Fair (4 limitations) Health Dept and Home Health Agency	Minneapolis, MN, USA Urban Children with persistent asthma N = 64	Reducing Environmental Triggers of Asthma Program (RETA) 1 home visit + 2 f/u visits AE, EA, EE, ER Tailored intervention 12 mo	Mean # of school days missed (reason unspecified)/3 mo at 12 mo	**Pre (post)** 7.3 (0.1) Difference: -6.7	**Absolute Mean Difference** -31.2
Shelledy (2005) Least (before-after) Fair (4 limitations) Academic Medical Centers	Little Rock, AK, USA Urban Children age 3-18 with asthma and high users of health care N = 18	8 home visits by respiratory therapists CC, EA, EE, ER, SM Tailored intervention 12 mo	Mean # of school days missed (reason unspecified)/ 12 mo	**Pre (post)** I: 19 (6.69) Effect: -65% change p = 0.002	**Absolute Mean Difference** -12. 3
Somerville (2000) Least (before-after) Fair (3 limitations) Health Department and Health Authority	Cornwall, UK Not specified Children with moderate to severe asthma N = 114	Housing improvements (heating/moisture control) tailored to exposure EA, ER (major) 11.7 mo (average)	Mean # days lost from school due to asthma/ 3 mo	**Pre (post)** I: 5.8 (1.6)	**Absolute Mean Difference** -18.2

Notes:

1. BL=Baseline, I=Intervention, C=Control, P=Placebo
2. ER = Environmental Remediation, EA = Environmental Assessment, EE = Environmental Education, SM = Self management education, SS + Social Services
3. NR = Not reported, NS = Not significant
4. Outcomes:
    - QOL = Quality of Life
    - HCU = Health Care Utilization
    - PRO = Productivity
    - PHYS = Physiologic Measures
    - AL = Allergen Levels
    - AC = Asthma Control
    - AMB = Asthma Management Behaviors
    - TRB = Trigger Reduction Behaviors
5. CBPR= Community Based Participatory Research
6. RCT = Randomized Controlled Trial