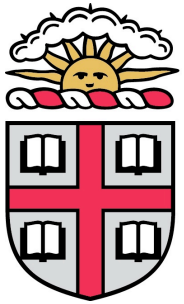
HEALTHY HOMES

Reducing asthmatic hospitalizations of young black males in Providence, RI



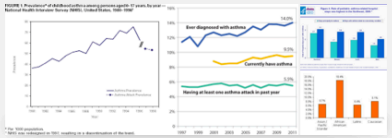
BROWN
School of Public Health

What does asthma look like?

Google childhood asthma

Sign in

Web News Images Videos Shopping More Search tools SafeSearch


Statistics


Pediatric

Attack Clipart

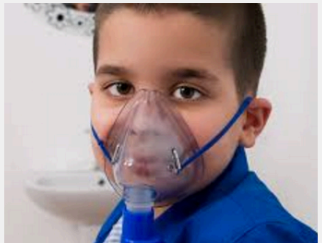


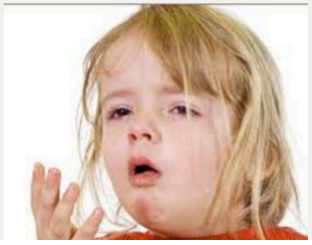


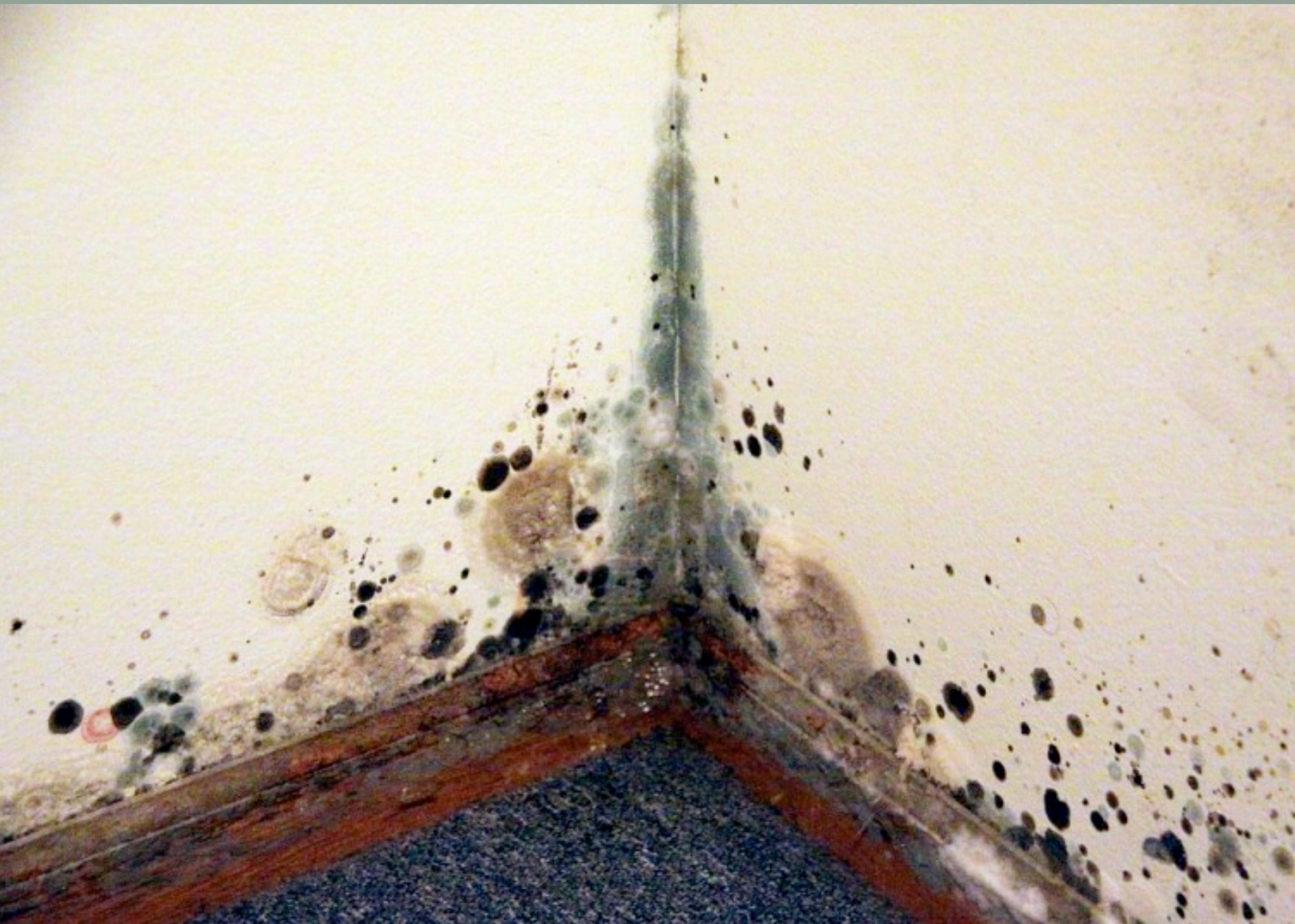












Outline

1. Purpose
2. Background + Significance
3. Intervention
4. Evaluation + Research Design
5. References

PURPOSE

Reducing asthmatic hospitalization in young Black males.

Purpose

42%→30% [1]

Purpose

Medication vouchers

Building remediation

Specific Aims

- Equip children with management techniques
- Establish home and school asthma management plans
- Identify environmental triggers in homes and schools
- Reduce cost of medication
- Reduce cost of home remediation

Specific Aims

- Conduct formative research
- Connect research insights towards intervention design
- Design and execute 2x2 intervention
- Evaluate intervention

2

SIGNIFICANCE

Background on racial disparity in asthma

Background

Asthma is...

- A respiratory disease [2]
- Environmentally activated [3]
- Manageable with medication [3]

and it costs Rhode Island

- **$35 million per year** in hospitalizations [1]

Costs

Morbidity

- 53% report annual attacks [4][16]
- 2.1 million ED visits, [1][5][17]
  - 6,995 of which in RI
- 3.6 days average length of stay [6]
- Diagnosed below seven years, follows into adulthood [18]
- Primarily male in childhood, female in adulthood [18]

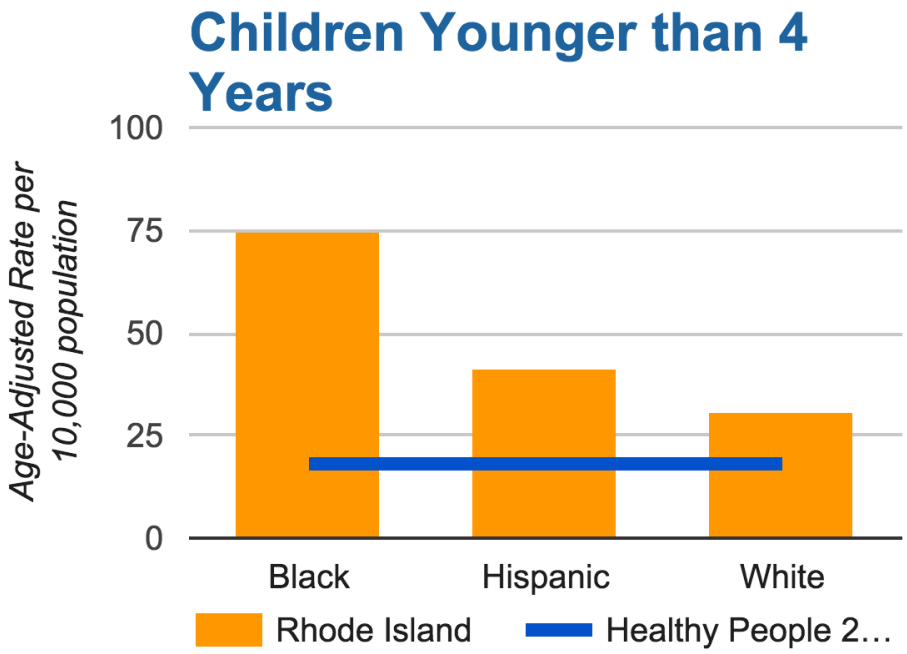
Background

Asthma rates in Rhode Island

- **2.3% above national average** [1]
- Resisting national goal [7][8][16]
  - US: 18.2/10000 hospitalizations goal by 2020
  - RI: 31.2/10000 hospitalizations in 2012

Significance

[6][8][9]



Source

Target Population

- Black males under seven-years-old in Providence, RI

Literature

Major barriers

- Cost [8]
- Incentives [4]
- Community infrastructure

[10][11][12][13]

Previous Resources

Asthma State Plan 2009-2014

Asthma State Plan 2014-2019

- Both plans target educational goals
- Establishing “community network”

Asthma Control Coalition

Allergy and Asthma Centers of Rhode Island

3

INTERVENTION

Formative research, theoretical framework, methods

Formative Research

Focus groups

- Target Population Families
- Public Schools
- Government + Hospitals

Surveys

Toll-free hotline

Methods

Previous intervention methods

- Asthma management plan
- Asthma management training

Methods unique to this intervention

- Medication discount vouchers
- Home remediation
- School remediation

Key components

Community Health Workers (CHWs)

- Trained from Department of Health, or recruited
- Implements program across different parties
  - Works in homes with families
  - Evaluates family progress, distributes vouchers
  - Liaisons with Housing Authority on remediation

Asthma Management Plans (AMPs)

- Primary record for program
- Forms calendar in family home
- Functions as checkpoint

Outcomes

1. Children in target population successfully avoid asthmatic triggers.

2. Parents remove asthmatic triggers from homes.

3. Schools comply with healthy air quality standards.

4. Rhode Island government alleviates financial burden of asthma on low-income families.

Performance Objectives

Outcome 1: Children avoid asthmatic triggers.

- *Children identify their personal asthmatic triggers.*
- *Children demonstrate asthma management techniques by reporting triggers to adults and peers.*

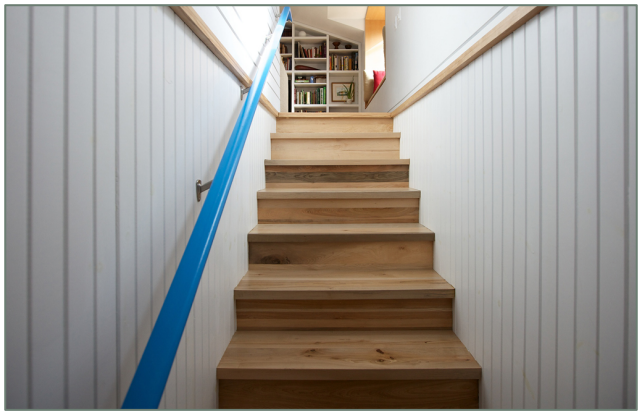
Change Matrix: Outcome 1

Outcome 1: Children in the target population avoid exposure to triggers.		**Determinants**						
		SSE. Skills and Self-Efficacy	*OE. Outcome Expectations*	*K. Knowledge*	*SR. Self-Regulation*	*IM. Incentive Motivation*	*F. Facilitation*	*EB. Environmental Barriers*
Performance Objectives	*1. Children identify their personal asthmatic triggers.*	SSE.1. Children express confidence in identifying their triggers and symptoms.	OE.1.a. Children expect that their vigilance about triggers will allow them to avoid hospital visits. OE.1.b. Children describe a positive outlook about their asthma.	K.1. Children recognize their asthma triggers accurately in a physical environment.	SR.1.a. Children demonstrate the ability to monitor their breathing. SR.1.b. Children connect changes in breathing with the presence of triggers in the environment.	IM.1. Children connect the sight of triggers with difficulty breathing (averse stimulus).	F.1. Schools and the Department of Health develop asthma education programming for students.	EB.1. Children alert adults to the presence of asthma triggers when they are immobile in an environment. (ex: school)
	2. Children demonstrate asthma management techniques by reporting triggers to adults and peers.	SSE.2. Children express confidence in their ability to report triggers to adults.	OE.2. Children expect that communicating the presence of triggers in their environment to adults will result in an avoided hospital visit.	K.2. Children practice speaking with adults quickly and clearly about the presence of triggers.	SR.2. Children immediately report presence of triggers and changes in breathing to adults.	IM.2. Children connect trigger removal with alleviated asthma symptoms (negative reinforcement).	F.2.a. Adults physically separate child and trigger when trigger is acknowledged. F.2.b. Teachers practice trigger identification/ management with students in the classroom.	EB.2. Adults comply with children and remove triggers when alerted.

Performance Objectives

Outcome 2: Parents remove triggers from home.

- *Parents organize asthma management plans for each asthmatic child with a community health worker.*
- *Parents fulfill individualized removal checkpoints in management plans over a two-year period.*



Change Matrix: Outcome 2

Outcome 2: Parents of asthmatic children remove asthmatic triggers from their homes.		**Determinants**						
		SSE. Skills and Self-Efficacy	*OE. Outcome Expectations*	*K. Knowledge*	*SR. Self-Regulation*	*IM. Incentive Motivation*	*F. Facilitation*	*EB. Environmental Barriers*
Performance Objectives	*1. Organize asthma management plans for each asthmatic child of participant families.*	SSE.1.a. Parents commit to trigger removal planning and recognize the function of a trigger removal schedule. SSE.1.b. Parents express confidence in accurately identifying triggers.	OE.1. Parents expect that removing asthma triggers will lessen their child's chance of hospitalization, and increase their quality of life.	K.1.a. Parents identify triggers around the home and connect them to their child's specific triggers. K.1.b. Parents demonstrate the ways in which they can remove triggers.	SR.1. Parents state and set dates for incremental trigger removal.	IM.1. Parents indicate the necessary financial assistance for medication and remediation, to be provided by the Department of Health and the Housing Authority.	F.1.a. Community health worker expresses understanding of supervisory role. F.1.b. Parents seek help from community health worker in completing management plan.	EB.1. Housing Authority reminds parents that they coordinate landlord relations and assist financially with remediation.
	2. Fulfill individualized checkpoints in family asthma management plans over a two-year period.	SSE.2.a. Parents remove triggers effectively and regularly. SSE.2.b. Parents express confidence over two years that removal is achievable.	OE.2. Parents expect that trigger removal will lessen their child's chance of hospitalization.	K.2.a. Parents identify new triggers as they arise, should they not be listed in original removal plan. K.2.b. Parents locate and check with remediation services in the area or Housing Authority.	SR.2. Parents accept progress reports on their removal efforts from a community health worker.	IM.2.a. Parents anticipate financial assistance with medication upon completion of trigger removal checkpoints. IM.2.b. Department of Health records families in need of assistance and allocates funds accordingly.	F.2.a. Community health workers demonstrate ability to conduct reviews every other month. F.2.b. Housing Authority resolves costs of remediation beyond family financial means.	EB.2. Landlords understand they must comply with remediation schedules and living standards set by Housing Authority.

Performance Objectives

Outcome 3: Schools comply with air quality standards.

- *Teachers locate triggers in classrooms with community health workers.*
- *School administrators organize the removal of mold, dust, and other triggers from classrooms.*

Change Matrix: Outcome 3

Outcome 3: Schools comply with healthy air quality standards.		**Determinants**						
		SSE. Skills and Self-Efficacy	*OE. Outcome Expectations*	*K. Knowledge*	*SR. Self-Regulation*	*IM. Incentive Motivation*	*F. Facilitation*	*EB. Environmental Barriers*
Performance Objectives	*1. Teachers locate triggers in classrooms for removal.*	SSE.1. Teachers express confidence they can accurately identify triggers in their classroom.	OE.1. Teachers expect by identifying triggers in the classroom, school administrators will remove triggers.	K.1.a. Teachers accurately identify asthmatic triggers. K.1.b. Teachers demonstrate ways to separate children from triggers during the time it takes to permanently remove triggers.	SR.1. Teachers report triggers both from the outset of the program and as new triggers appear over the course of the program.	IM.1. Teachers connect lessened trigger presence to higher student attendance and productivity.	F.1. Teachers meet and collaborate with community health workers appointed to their cases to identify triggers.	EB.1. Teachers seat asthmatic children away from windows and chalkboards in areas where remediation will not affect student exposure to triggers.
	2. School administrators remove mold, dust, and other triggers from classrooms.	SSE.2.a. School administrators express confidence they can remediate buildings. SSE.2.b. School administrators describe the resources they can use for remediation.	OE.2. School administrators expect that removal of triggers will result in improved attendance, reduced student hospitalizations	K.2. School administrators demonstrate knowledge of asthma by developing school-wide programming.	SR.2.a. School administrators chart problem trigger areas in their buildings. SR.2.b. School administrators schedule removal and regular times for monitoring triggers thereafter.	IM.2. Compliant school administrators will not be reported to the Department of Education.	F.2. Schools indicate that they can rely on the Department of Education for financial assistance, resource allocation for remediation.	EB.2.a. Staff express understanding that smoking on campus can no longer be allowed. EB.2.b. Staff can provide indoor alternatives for on high-risk days.

Performance Objectives

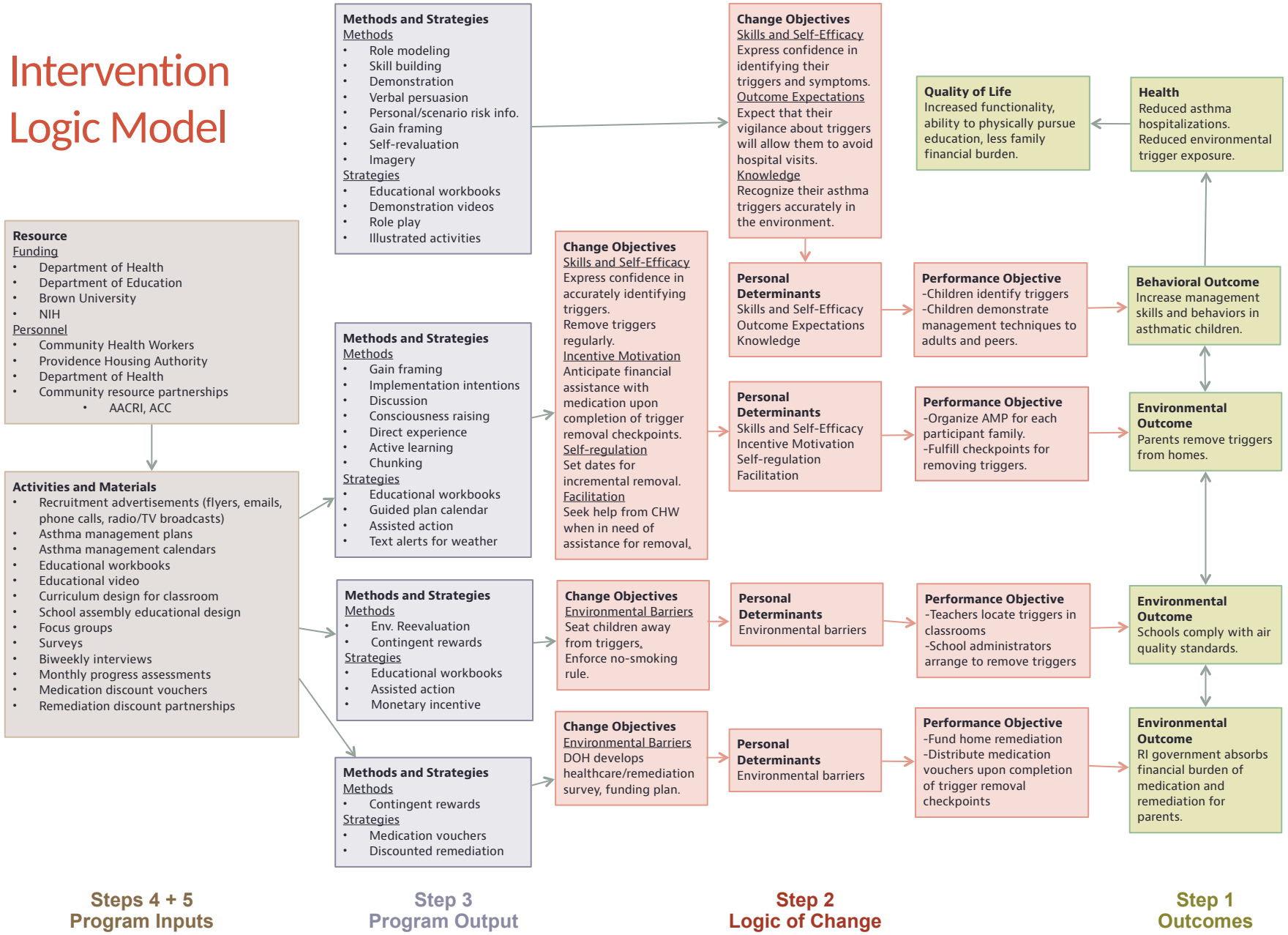
Outcome 4: Rhode Island assists with financial burden.

- *Housing Authority covers remediation of trigger-infested homes for costs beyond demonstrated family means.*
- *Distribute medication discount vouchers upon completion of AMP removal checkpoints.*

Change Matrix: Outcome 4

Outcome 4: Rhode Island government alleviates financial burden of asthma in low-income families.		**Determinants**						
		A. Skills and Self-Efficacy	*B. Outcome Expectations*	*C. Knowledge*	*D. Self-Regulation*	*E. Incentive Motivation*	*F. Facilitation*	*G. Environmental Barriers*
Performance Objectives	*1. Fund remediation of trigger-infested homes in situations beyond family means.*	SSE.1. Housing Authority expresses confidence that financially assisted remediation will reduce exposure to triggers and reduce pediatric hospitalizations.	OE.1. Policy makers expect that financial assistance will lead to lessened hospitalization through improved access to medication and improved living.	K.1. Housing Authority locates channels through which to allocate financial assistance funds for remediation.	SR.1. Housing Authority tracks remediations for participant families across Providence. SR.2. Housing Authority communicates with families on uptake of remediation.	IM.1. Housing Authority expresses that increased real estate value leads to increased economic value in residentially segregated areas of Providence.	F.1.a. Housing Authority becomes the standards enforcer with landlords. F.1.b. Community health workers from Dep. of Health assist families with reporting triggers to Housing Authority.	EB.1. Department of Health develops survey for pediatric healthcare information and links remediation to family financial information.
	2. Distribute medication discount vouchers upon completion of checkpoints in asthma management plans.	SSE.2. Low-income families express confidence that they can obtain necessary financial assistance for medication.	OE.2. Dep. of Health expects that financial assistance will lead to lessened hospitalization through improved access to medication and improved living.	K.2. Policy makers locate the channels through which to allocate financial assistance funds.	SR.2.a. Department of Health monitors usage of vouchers. SR.2.b. Department of Health develops assessment means for effectiveness of financial assistance.	IM.2. Families utilize discounts on medication, lessening budgetary burden of asthma and lessening frequency of hospitalization.	F.2. Dep. of Health proliferates access to treatment by reducing cost of medication.	EB.2. Department of Health develops survey for pediatric healthcare information and links this to family financial information.

Intervention Logic Model



Theoretical Framework

Social Cognitive Theory (SCT)

- Incentive motivation [10]
- Facilitation [10][14][15]
- Skills and self-efficacy [15]
- Outcome expectations [10][15]
- Knowledge [4]
- Self-regulation [10]

Transtheoretical Model (TTM)

- Environmental reevaluation [12][13]

Methods + Strategies

At school

Skills and self-efficacy (behavioral/children)	* Role modeling * Skill building	A videotape of children (black, under seven) learning about and practicing asthma management is shown in a physical education class. In an in-class activity, children demonstrate management skills and identify pictures of triggers with a teacher and community health worker.
Outcome expectations (behavioral/children)	* Personal risk info. * Scenario risk info. * Self reevaluation * Gain framing * Imagery	An in-class workbook activity, complete with pictures, assures children they will be listened to when they report symptoms and triggers to adults. The informational video also features a taped scenario of adults valuing children's observations. These also demonstrate that vigilance will result in fewer asthma flare-ups.

Methods + Strategies

At school (cont'd)

Knowledge (behavioral/children)	* Active learning * Discussion * Imagery	As part of the in-class skills activity, informational videos teach children about asthma symptoms and triggers. Brief questionnaires and a "raise-your-hand" class demonstration assess informational recall through role-play.
Environmental barriers (environmental/teacher)	* Environ. reevaluation * Stimulus control * Contingent rewards	Teachers complete a workbook identifying triggers to remove in their classroom. Teachers edit seating arrangements to seat asthmatic children away from windows and chalkboard. By opting in to the intervention and agreeing to perform an educational program about asthma management at school, school administrators receive remediation vouchers from the Housing Authority.

Methods + Strategies

At home

Skills and self-efficacy (environmental/parents)	* Demonstration * Verbal persuasion	Community health workers meet face-to-face with opt-in participant parents and use a prepared informational packet to present asthma as a manageable condition and motivate parents towards medication adherence and home remediation.
Self-regulation	* Goal-setting * Stimulus control * Self-monitoring * Tailoring * Difficulty gradient	An asthma management plan takes the form of a calendar-based graphic, available digitally but posted in a place of high visibility in the family's home. This calendar describes a specific trigger removal schedule for that family. Example: "*X* trigger must be removed by *Y* date." The family's assigned community health worker writes on the calendar with each visit, documenting progress and adherence with the plan. Later goal dates may involve the removal of more complex triggers involving more invasive remediation.

Methods + Strategies

At home

Incentive motivation (environmental/parents)	* Contingent rewards * Tailoring	Medication discount vouchers are distributed to parents upon write-up of asthma management plan, and stepped completion of calendar goals. Remediation discount vouchers, tax write-offs offered to families with demonstrated financial need upon write-up of asthma management plan.
Facilitation (environmental/parents)	* Improving emotional states (lessening landlord intimidation) * Argument (Housing Authority and landlords)	Community health worker partners with Housing Authority to mediate landlord-tenant communications specific to remediation, emailing and calling landlords directly to uphold a family's remediation schedule.

4

EVALUATION

Research design and process evaluation

Experimental Design

Four randomized, controlled groups receive:

- Management training at school (children)
- Asthma management plan specifying triggers to remove (parents)
- School remediation (schools funded by DOE)

	Medication voucher (M✓)	Medication voucher (M✗)
Home remediation (H✓)	**Group MH** Receiving home remediation and medication voucher	**Group H** Receiving home remediation but no medication voucher
Home remediation (H✗)	**Group M** Receiving medication voucher but no home remediation	**Control*** Receiving no home remediation or medication voucher

*Control group receives medication for two years at the conclusion of program

Experimental Design

Quantitative

Measures

- Hospitalizations (2017-2019)
  - # hospitalizations
  - Hospitalization duration
  - Total cost of hospitalization
- Medication vouchers (2017-2019)
  - # redeemed
  - Total discounts distributed
- Home remediation (2017-2019)
  - # remediated
  - Total costs

Measured against

- Hospitalizations (2014-2016)
  - # hospitalizations
  - Hospitalization duration
  - Total cost of hospitalization
- Medication vouchers (2017-2019)
  - # distributed
  - Total costs of hospitalization
- Home remediation (2017-2019)
  - # offered
  - Total costs of hospitalization

redeemed incentives measures incentive motivation, facilitation

Experimental Design

Qualitative

Measures for mediating variables

- Bimonthly check-ins, family interviews with community health workers
  - Skills and self-efficacy
  - Outcome expectations
  - Knowledge
  - Self-regulation
- Surveys distributed biweekly to families on challenges/successes
- Asthma management plan
  - Weekly “diary” notes about house and lives

Pre-intervention

- Entry (baseline) interviews
  - Families
- Focus group information
- Community surveys in target population

Impact + Outcome Measures

Outcome Measures

- # pediatric asthmatic hospitalizations
  - Reported by parents, CHW
  - Local hospital records
- Frequency of inhaler use

Impact Measures

- # Redeemed vouchers
  - Medication discount
  - Remediation discount
- Consumed medication
  - Pharmacy refill information
- Costs of remediation
- Proportion of completed management plans
- # Completed lessons

Process Evaluation

Fidelity

- Responsiveness
  - Scheduled completion of AMPs
- Participant engagement
  - Voucher usage
  - Children's scores on management lessons
- Dose
  - AMPs started ÷ AMPs completed
  - Medication vouchers redeemed ÷ Medication vouchers issued
  - Remediations redeemed ÷ Remediations offered
  - School lesson plans completed ÷ Lesson plans created

Reach

- # families enrolled ÷ # target population families w/ asthma

Adherence

- CHW oversight by PI, research group

Anticipated Results (Effect Evaluation)

Because research indicates environments as the greatest contributor, we expect a significant difference between Group H and Group M

	Medication voucher (M✓)	Medication voucher (M✗)
Home remediation (H✓)	**Group MH** Greatest reduction in hospitalizations, greater than Group MH, Group H, Group M, and Control	**Group H** Second greatest reduction in hospitalizations, less than Group MH but more than Group M or Control
Home remediation (H✗)	**Group M** Less reduction in hospitalizations than Group M or Group H, but greater than Control	**Control*** Least reduction in hospitalizations, close to baseline

*Control group receives medication discount at conclusion of program

Dissemination

- Academic publication
- Coordinate with journalists to produce a segment

  (i.e. local, Nightly News, or Dateline)
- Adapt program to Boston, city of larger scale
- Create modular asthma management plans as mail-outs
- Develop mail-out guides to “quick fix” housing architecture

Anticipated limitations

- Maintaining communication
- Pressure to comply
- Did changes occur because of
  - Social support? (CHW effectiveness)
  - Planning? (AMP presence)
  - Financial motivation (Vouchers/Remediation)

Overall

5

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