

A. COVER PAGE

Project Title: An Innovative Approach to Improving Asthma Control for World Trade Center Rescue and Recovery Workers through Telehealth Enriched Asthma Management (WTC-TEAM)	
Grant Number: 5R21OH012253-02	Project/Grant Period: 07/01/2021 - 06/30/2023
Reporting Period: 07/01/2022 - 06/30/2023	Requested Budget Period: 07/01/2022 - 06/30/2023
Report Term Frequency: Final	Date Submitted: 09/21/2023
Program Director/Principal Investigator Information: ERIN THANIK , MD MPH Phone Number: 716-432-9432 Email: erin.thanik@mssm.edu	Recipient Organization: ICAHN SCHOOL OF MEDICINE AT MOUNT SINAI ICAHN SCHOOL OF MEDICINE AT MOUNT SINAI 1 GUSTAVE L. LEVY PL NEW YORK, NY 100296574 DUNS: 078861598 UEI: C8H9CNG1VBD9 EIN: 1136171197A1 RECIPIENT ID:
Change of Contact PD/PI: NA	
Administrative Official: JESSICA RUTH MOISE One Gustave L. Levy Place Box 1075 1 GUSTAVE L. LEVY PL, BOX 1075 NEW YORK, NY 10029 Phone number: (212) 824-8300 Email: jessica.moise@mssm.edu	Signing Official: JESSICA RUTH MOISE One Gustave L. Levy Place Box 1075 1 GUSTAVE L. LEVY PL, BOX 1075 NEW YORK, NY 10029 Phone number: (212) 824-8300 Email: jessica.moise@mssm.edu
Human Subjects: NA	Vertebrate Animals: NA
hESC: No	Inventions/Patents: No

B. ACCOMPLISHMENTS

B.1 WHAT ARE THE MAJOR GOALS OF THE PROJECT?

The goal of this study was to address the unique needs of the World Trade Center (WTC) responder cohort and to overcome barriers to asthma self-management by developing an innovative approach to optimizing asthma care, the Telehealth Enriched Asthma Management (TEAM) program. This program built on the successes of published asthma self-management programs in the general population that cover a spectrum of intensities and components, including written asthma action plans, trigger reduction education, and inhaler technique instruction to improve asthma medication adherence. At the same time, our clinical intervention took an innovative approach, leveraging the robust telehealth and clinical infrastructure of the World Trade Center Health Program (WTCHP) to augment existing asthma care. We implemented a series of virtual telehealth visits to provide asthma self-management education to guide the reduction of exacerbating factors while coordinating care with other components of the WTCHP—Treatment Program and Mental Health Program—via a multifactorial approach to promote uptake and adherence. Our study goals were as follows:

Aim 1: Develop an intervention (TEAM program) that will expand telehealth capabilities to improve asthma care. We will utilize telehealth services to meet the needs of a vulnerable population at increased risk for respiratory disease.

Aim 2: Collect and analyze a variety of subjective and objective asthma outcome measures to evaluate the effectiveness of the TEAM program.

Aim 3: Evaluate current barriers to utilizing telehealth platforms and satisfaction with virtual encounters to understand how to improve telehealth delivery for the WTCHP.

B.1.a Have the major goals changed since the initial competing award or previous report?

No

B.2 WHAT WAS ACCOMPLISHED UNDER THESE GOALS?

File Uploaded : B.2 Accomplishments_Final RPPR.pdf

B.3 COMPETITIVE REVISIONS/ADMINISTRATIVE SUPPLEMENTS

For this reporting period, is there one or more Revision/Supplement associated with this award for which reporting is required?

No

B.4 WHAT OPPORTUNITIES FOR TRAINING AND PROFESSIONAL DEVELOPMENT HAS THE PROJECT PROVIDED?

NOTHING TO REPORT

B.5 HOW HAVE THE RESULTS BEEN DISSEMINATED TO COMMUNITIES OF INTEREST?

NOTHING TO REPORT

B.6 WHAT DO YOU PLAN TO DO DURING THE NEXT REPORTING PERIOD TO ACCOMPLISH THE GOALS?

Not Applicable

Goal 1. Develop an intervention (TEAM program) that will expand telehealth capabilities to improve asthma care. To achieve the goals of our intervention, we conducted 4 telehealth visits over a 6 month period (baseline, 1, 3 and 6 months). At all study visits, asthma self-management concepts were taught (inhaler technique, symptoms recognition, how to interpret an asthma action plan). Visit 2 (V2) also focused on mitigation strategies to decrease exposure to indoor environmental triggers, while Visit 3 (V3) focused on outdoor asthma triggers, including how to interpret the Air Quality Index. Visit 4 (V4) reviewed asthma self-management skills and included program and telehealth satisfaction evaluations.

To support the asthma education curriculum, each participant received a personalized asthma action plan, an asthma educational booklet and when indicated, a spacer prescription. The booklet was developed by the PI and consisted of publicly available asthma education tools from the SAMBA (Supporting Asthma Management Behavior in Aging Adults) study, which was specifically designed for older adults, as well as trigger infographics published by the Environmental Protection Agency. Stress has been shown to play a role in asthma control, therefore, a telehealth visit with the Mental Health (MH) Team was scheduled after V2 completion. The MH team also reviewed breathing exercises and mindfulness techniques and participants were offered MH support or case management if indicated.

Goal 2. Collect and analyze a variety of subjective and objective asthma outcome measures to evaluate the effectiveness of the TEAM program. Adult WTCHP members of the Mount Sinai CCE who were certified for asthma and met criteria for persistent asthma were eligible for participation. Eighty-three members completed V1, with 56 participants completing all 4 study visits. To collect subjective asthma outcomes, we developed a research survey incorporating a variety of questions and validated surveys to assess the asthma outcomes outlined in the study proposal. One **primary outcome measure** collected at each time point included asthma control as measured by the Asthma Control Test (ACT), a validated 5 question survey widely used in clinical practice and research. The second primary outcome measure evaluated health-related quality of life using the Juniper mini-AQLQ (Asthma Quality of Life Questionnaire) also a widely used research tool. Both primary outcome measures (asthma control and asthma-related quality of life) showed statistically significant improvement by the third study visit, and the effect was sustained at the final study visit (Table 1).

Table 1. Primary Outcome Measures

Variable	Mean Score (SD)	Mean Δ From Baseline (SD)	p-value
Asthma Control Test (N=56)			
Baseline (V1)	16.1 (3.8)	REF	
1 Month (V2)	16.8 (4.1)	0.7 (3.3)	0.13
3 Months (V3)	18.6 (3.4)	2.4 (3.8)	<0.0001
6 Months (V4)	17.8 (4.2)	1.7 (0.6)	0.006
Mini-AQLQ (N=48)			
Baseline (V1)	4.2 (1.2)	REF	
3 Months (V3)	4.9 (1.2)	0.7 (1.0)	<0.0001
6 Months (V4)	4.9 (1.0)	0.7 (1.0)	<0.0001

There were several **secondary outcome measures** collected and analyzed. Symptom frequency was evaluated using a 2-week recall and both daytime and nocturnal symptoms, as well as rescue inhaler use, improved from baseline at each time point (**Figure 1**).

Baseline data was collected regarding previous asthma self-management experience. Prior to the asthma self-management intervention, only a small number of participants (9%) had ever received an asthma action plan and only 15% had a spacer to use with inhaled asthma medications (**Table 2**). Just over half of participants reported ever being taught inhaler technique by a medical provider. Most participants did not use a spacer at baseline (7.69%), but more than half of the participants used a spacer by the end of the study period (**Figure 2**).

Table 2. Baseline Asthma Education

	N (%)
Ever received an Asthma Action Plan	7 (9%)
Has a Spacer	13 (15%)
Inhaler technique has been taught by medical provider	38 (57%)

Figure 1: Symptom and Medication Use, Two Week Recall

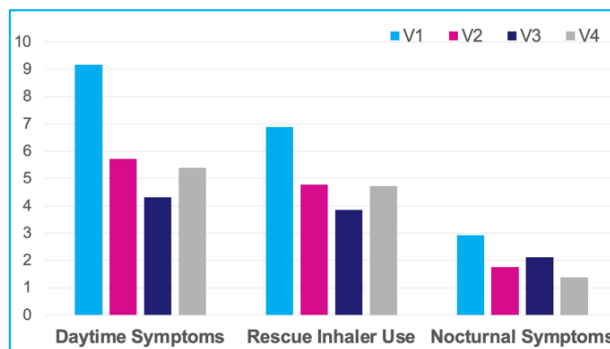


Figure 2: Spacer Utilization

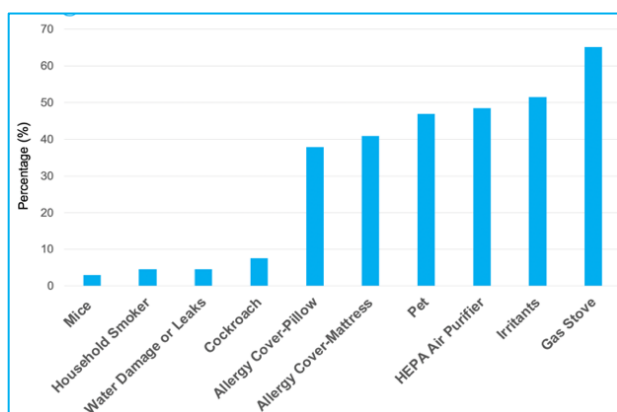
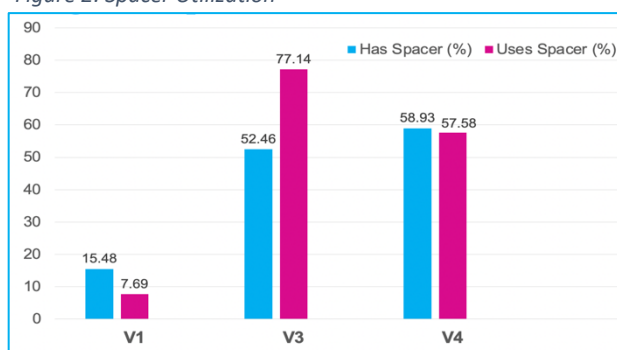


Figure 3: Home Environment

Data regarding environmental exposures were collected during study visit 2 (**Figure 3**). The most common environmental exposures reported in the home were the presence of gas stoves, irritants (strong cleaning agents, candles, plug-ins) and pets, while less than half of all participants reported using allergy encasements for their bedding or a HEPA air purifier.

Data analysis is currently underway to evaluate remaining secondary outcome measures. Asthma medication adherence data were collected using the Medication Adherence Report Survey (MARS). Data were requested from the WTC General Responder Data Center on enrolled participants to evaluate exacerbations, specifically claims data for ED visits, hospitalizations, and oral steroid use. We are also planning to use claims data to calculate the Asthma Medication Ratio (ratio of controller medication to total asthma medication), which illustrates how well individuals use their controller medications to prevent symptoms.

Goal 3. Evaluate current barriers to utilizing telehealth platforms and satisfaction with virtual encounters to understand how to improve telehealth delivery for the WTCHP.

A questionnaire evaluating satisfaction with both the asthma program and telehealth visits was administered during V4. We also documented objective measures, such as time to connect to the telehealth encounter and the ability to sustain connectivity, and this data analysis is ongoing.

C. PRODUCTS**C.1 PUBLICATIONS**

Are there publications or manuscripts accepted for publication in a journal or other publication (e.g., book, one-time publication, monograph) during the reporting period resulting directly from this award?

No

C.2 WEBSITE(S) OR OTHER INTERNET SITE(S)

NOTHING TO REPORT

C.3 TECHNOLOGIES OR TECHNIQUES

NOTHING TO REPORT

C.4 INVENTIONS, PATENT APPLICATIONS, AND/OR LICENSES

Have inventions, patent applications and/or licenses resulted from the award during the reporting period? No

If yes, has this information been previously provided to the PHS or to the official responsible for patent matters at the grantee organization? No

C.5 OTHER PRODUCTS AND RESOURCE SHARING

NOTHING TO REPORT

D. PARTICIPANTS

D.1 WHAT INDIVIDUALS HAVE WORKED ON THE PROJECT?

Commons ID	S/K	Name	Degree(s)	Role	Cal	Aca	Sum	Foreign Org	Country	SS
ERINTHANI	Y	Thanik, Erin	MPH,MD	PD/PI	3.6	0.0	0.0			NA
	N	Smirnoff, Margaret		project coordinator	1.0	0.0	0.0			NA
	N	Harris, Jessica		asthma educator	1.0	0.0	0.0			NA

Glossary of acronyms:

S/K - Senior/Key

Cal - Person Months (Calendar)

Aca - Person Months (Academic)

Sum - Person Months (Summer)

Foreign Org - Foreign Organization Affiliation

SS - Supplement Support

RS - Reentry Supplement

DS - Diversity Supplement

OT - Other

NA - Not Applicable

D.2 PERSONNEL UPDATES

D.2.a Level of Effort

Not Applicable

D.2.b New Senior/Key Personnel

Not Applicable

D.2.c Changes in Other Support

Not Applicable

D.2.d New Other Significant Contributors

Not Applicable

D.2.e Multi-PI (MPI) Leadership Plan

Not Applicable

E. IMPACT**E.1 WHAT IS THE IMPACT ON THE DEVELOPMENT OF HUMAN RESOURCES?**

Not Applicable

E.2 WHAT IS THE IMPACT ON PHYSICAL, INSTITUTIONAL, OR INFORMATION RESOURCES THAT FORM INFRASTRUCTURE?

NOTHING TO REPORT

E.3 WHAT IS THE IMPACT ON TECHNOLOGY TRANSFER?

Not Applicable

E.4 WHAT DOLLAR AMOUNT OF THE AWARD'S BUDGET IS BEING SPENT IN FOREIGN COUNTRY(IES)?

NOTHING TO REPORT

G. SPECIAL REPORTING REQUIREMENTS SPECIAL REPORTING REQUIREMENTS

G.1 SPECIAL NOTICE OF AWARD TERMS AND FUNDING OPPORTUNITIES ANNOUNCEMENT REPORTING REQUIREMENTS

NOTHING TO REPORT

G.2 RESPONSIBLE CONDUCT OF RESEARCH

Not Applicable

G.3 MENTOR'S REPORT OR SPONSOR COMMENTS

Not Applicable

G.4 HUMAN SUBJECTS

G.4.a Does the project involve human subjects?

Not Applicable

G.4.b Inclusion Enrollment Data

File(s) uploaded:

CumulativeInclusionEnrollmentReport_Final RPPR.pdf

G.4.c ClinicalTrials.gov

Does this project include one or more applicable clinical trials that must be registered in ClinicalTrials.gov under FDAAA?

G.5 HUMAN SUBJECTS EDUCATION REQUIREMENT

NOT APPLICABLE

G.6 HUMAN EMBRYONIC STEM CELLS (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)?

No

G.7 VERTEBRATE ANIMALS

Not Applicable

G.8 PROJECT/PERFORMANCE SITES

Not Applicable

G.9 FOREIGN COMPONENT

No foreign component

G.10 ESTIMATED UNOBLIGATED BALANCE

Not Applicable

G.11 PROGRAM INCOME

Not Applicable

G.12 F&A COSTS

Not Applicable

Cumulative Inclusion Enrollment Report

This report format should NOT be used for collecting data from study participants.

Study Title:

Comments:

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/ Alaska Native										
Asian										
Native Hawaiian or Other Pacific Islander										
Black or African American										
White										
More Than One Race										
Unknown or Not Reported										
Total										

I. OUTCOMES

I.1 What were the outcomes of the award?

Asthma self-management education encompasses a variety of tools to teach people with asthma how to best take care of their chronic condition. Topics range from how to use inhalers properly, reduce exposure to asthma triggers, recognize asthma symptoms and use an asthma action plan. The goal of this study was to address the unique needs of World Trade Center first responders and to overcome some of the barriers to asthma self-management by developing a tailored approach to optimizing asthma care, the Telehealth Enriched Asthma Management (TEAM) program.

This study provided asthma self-management education over 4 virtual visits and at baseline, only a small percentage of participants reported ever receiving an asthma action plan (9%) or a spacer to use with their inhaler (15%). Just over half were ever shown how to use their inhaled asthma medications properly. The participants who received the TEAM self-management education showed an improvement in asthma control and quality of life by the 3rd visit, which was sustained throughout the study. Other findings also included a reduction in both daytime and nighttime asthma symptoms, as well as decreased rescue inhaler use compared to baseline. The percentage of participants who used a spacer with their inhaler increased 7-fold by the end of the study period.

The TEAM study demonstrated the need for asthma self-management education in World Trade Center first responders and the effectiveness of an education program delivered in a series of telehealth encounters in improving asthma control and asthma-related quality of life.