Memorandum

DATE September 19, 2018

TO Honorable Members of the Quality of Life, Arts & Culture Committee: Sandy Greyson (Chair), Mark Clayton (Vice Chair), Rickey D. Callahan, Jennifer S. Gates, Scott Griggs, B. Adam McGough, Omar Narvaez

SUBJECT Project Highlight: Breathe Easy Dallas

On Monday, September 24, 2018, you will be briefed on the Project Highlight: Breathe Easy Dallas. The briefing materials are attached for your review.

Please feel free to contact me if you have any questions or concerns.

Joey Zapata
Assistant City Manager

C: T.C. Broadnax, City Manager
Chris Caso, City Attorney (I)
Craig Kinton, City Auditor
Billera Johnson, City Secretary
Preston Robinson, Administrative Judge
Kimberly Bizor Tolbert, Chief of Staff to the City Manager
Majed A. Al-Ghafry, Assistant City Manager
Jon Fortune, Assistant City Manager
Nadia Chandler Hardy, Assistant City Manager and Chief Resilience Officer
M. Elizabeth Reich, Chief Financial Officer
Directors and Assistant Directors

“Our Product is Service”
Empathy | Ethics | Excellence | Equity
• Project overview
  • Goal
  • Partners and stakeholders
  • Ph I and Ph II

• Research context and design

• Questions
**Breathe Easy Dallas** brings together The Nature Conservancy (TNC), the City of Dallas (the City), Dallas Independent School District (DISD), Texas A&M Transportation Institute (TTI), and public health and other community leaders to improve health, educational, and social outcomes for Dallas children at high risk for asthma-related absenteeism.

- The project will study the impact of selected interventions—reduced idling, school-based health initiatives, and tree plantings—on air quality and asthma-related absenteeism at select schools.

- Gather high quality local data.

- Integrate stakeholders into process & share lessons.

- Project emerged from a collaborative situational analysis of environmental health challenges facing Dallas, facilitated by The Nature Conservancy in 2017.
In cities, TNC brings **science, collaboration, and nature-based solutions** to build cities where both nature and people can thrive.
In 2017, The Nature Conservancy facilitated a collaborative situational analysis

- opportunities for widespread, impactful, and scalable solutions
  - air quality
  - urban heat
  - water quality and quantity
  - access to green space
• Dallas has a persistent problem with poor air quality and pediatric asthma.

• The region consistently fails to meet regulatory limits on ozone pollution.

• According to health researchers, DFW “far exceeds both the state and national rates” for childhood asthma.¹

• Dallas County leads the region for hospitalizations from childhood asthma.²

• Respiratory issues are a leading cause of absenteeism among Dallas Independent School District (DISD) students.

² Texas Department of State Health Services (2011) in Asthma statistics and facts from Children’s Medical Center Dallas. Retrieved online May 18,
Research indicates that not all children are impacted equally.

The Center for Disease Control finds that in the U.S., black children are twice as likely as white children to have asthma, and with greater severity—experiencing higher-than-average rates of hospitalization, emergency room visits and deaths from asthma.  

Recent research further demonstrates “a link between asthma and an increased risk of falling into poverty.”

Local government, education, non-profit and health care leaders in Dallas are eager to improve outcomes for asthmatic children but have lacked the data to most effectively direct programs and resources to address both health and air quality.


• **Phase I:**
  - Identify schools- high % students with asthma; high risk;
  - Engage Texas A&M Transportation Institute - research design
    - Center of Advancing Transportation Emissions, Energy, and Health (CARTEEH)
  - Install air quality monitors & connect to COD Smart Cities platform.
  - Work with DISD staff to track asthma-related absenteeism
  - Baseline measures collected for SY 2018-2019.
  - Stakeholders involved in implementation design (Ph II)

• **Phase II:**
  - Continue to collect measures on air quality and asthma-related absenteeism for SY 2019-2020.
  - Implement 3 practical measures: trees/vegetation, anti-idling, school based health.
  - Analyze results and make recommendations.
• **Air quality benefits of trees & vegetation**
  - Global analyses cooling and air quality benefits of trees; localized studies on impacts and cost-benefits.
  - Trees remove air pollution by the interception of particulate matter on plant surfaces and the absorption of gaseous pollutants through the leaf stomata.
  - PM and cooling benefits documented- *localized* benefits most clear for PM.
  - Smart siting of trees important to maximize benefits
  - TNC’s [Green Heart Project](#) in Louisville, KY. Pilot school tree planting:
    - Found 60% less PM behind buffer
    - Immune system function increased, inflammation levels decreased
**Phase I: Baseline Measures**

- Aeroqual AQY1; O₃, NO₂, PM 2.5, 10; temperature, relative humidity

**Phase II: Intervention**

- *Note: 9 total schools*
• 228 k-12 schools
  • 14,622 students, 9.5% student body, identified with asthma
  • (2.1% - 28.8%) [US mean is 8.3% (<18)]
  • 54% DISD schools have higher than district average rates of students with asthma.
  • 18 k-12 schools (8%) have > 17% of students ID’s with asthma.
  • of those 18 schools, 17 (89%) are located below I-30.

• Design a study to collect local data to improve the health and educational outcomes for the many Dallas children suffering from asthma.
• Research context
• Research design considerations
• Next steps

Haneen Khreis, Ph.D.
Assistant Research Scientist
Center for Advancing Research in Transportation Emissions, Energy & Health
Texas A&M Transportation Institute
H-khreis@tti.tamu.edu
979-458-9857
https://www.carteeh.org
What we know:
Air Quality & Childhood Asthma

• Sufficient evidence that air pollution is associated with the exacerbation of childhood asthma

• Sufficient evidence that traffic-related air pollution is associated with the onset of childhood asthma
How Urban Environment Impacts our Health

**Air pollution**
- Dementia
- Cognitive impairment
- Neurodegenerative diseases
- Mental health problems
- Stroke
- Cardiovascular diseases
- Autism and child behaviour problems
- Tinnitus or deafness
- Reduction of cognitive performance

**Noise**
- Myocardial infarction
- Arrhythmia
- Heart congestive failure
- Cardiovascular diseases

**Heat**
- Obesity
- Diabetes
- Metabolic syndrome
- Nuisance, stress
- Sleep disorder
- Injuries from work and traffic accidents
- Colon cancer
- Systemic inflammation
- Worse general health
- Increase in mortality

**Lack of physical activity**
- Premature birth
- Reduced weight at birth
- Preeclampsia
- Reduction in sperm quality

**Lack of natural spaces**
- Hypertension
- Deep venous thrombosis
What we do not know:

- Scarce literature on health effects of implementation measures.
- Few studies have documented health improvements resulting from specific real-life interventions.
- “Future research needs to better monitor, evaluate and build a new evidence base for the effectiveness and feasibility of healthy urban and transport interventions as they happen.”

Health impacts of urban transport policy measures: A guidance note for practice

Haneen Khreis, Mark J. Nieuwenhuijsen, Anthony D. May

Background: Urban transport related exposures are a leading cause of morbidity and premature mortality across the world. Evidence is accumulating that urban transport policies can improve health by reducing pollution, noise, physical activity levels, and promoting healthy diets and active travel. However, the evidence base is not yet fully comprehensive and further research is needed to better monitor, evaluate and build a new evidence base for the effectiveness and feasibility of healthy urban and transport interventions as they happen.
Breathe Easy Dallas:

• Measured (rather than modeled) air pollution data at schools where kids pick up exposure

• Measured (rather than modeled) health data related to asthma exacerbations

• Real-world, practical and feasible interventions which can be transferable

• Stakeholder engagement and public concerns

• Focusing on vulnerable populations in high risk areas

Improve the health and quality of life for Dallas’s most vulnerable kids and families
Basis for school selection:

How effective are the three proposed interventions/practical solutions in reducing childhood asthma related absenteeism; especially in high risk schools?
Schools selection criteria:

- Elementary schools (ages 5-10).
  - Retention of same pool of kids
  - Diagnosis relatively reliable at 6 years old
  - Younger kids are more susceptible to air pollution

- School is amongst schools with highest number of asthmatic kids as determined by the school records.
  - 11 out of 16 suggested schools were in the red and orange category based on the asthma prevalence/percentage metric

- Design considerations for each of the interventions. (cont.)
**Intervention design considerations:**

- School has the potential for implementing at least one (ideally more than one) of three proposed:
  - **Vegetation:** the school has physical space to plant trees in a suitable location, not very green already, downwind from a major roadway or major industry
  - **Anti-idling:** the school has a high number of students which was considered as a proxy for a high number of school buses and/or passenger vehicles which will be impacted by the anti-idling intervention, the school is close to a major roadway (in the red road category)
  - **Health intervention:** the school has no or minimal health interventions in place and the research team has adequate access to monitoring staff and existing health intervention teams to ensure good coordination
Schools selection criteria (cont.):

- Elementary schools (ages 5-10).
  - Retention of same pool of kids
  - Diagnosis relatively reliable at 6 years old
  - Younger kids are more susceptible to air pollution

- School is amongst schools with highest number of asthmatic kids as determined by the school records.
  - 11 out of 16 suggested schools were in the red and orange category based on the asthma prevalence/percentage metric

- Design considerations for each of the interventions.

- Supplementary quantitative analysis to determine most influential risk factors that impact number and percentage of kids with asthma in schools.

- The identified list of schools was shared with multiple stakeholders in the city of Dallas including Dallas Independent School District, City of Dallas, Texas Trees Foundation, Positive Breathing, Children’s Health, and Parkland. The stakeholders provided further valuable insight based on on-the-ground information.
**Recommended schools:**

<table>
<thead>
<tr>
<th>Asthma prevalence category</th>
<th>% Asthma ID Students</th>
<th># Student with Asthma</th>
<th># Students</th>
<th>% Poverty</th>
<th>Identified statistically as high risk group?</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>21.81%</td>
<td>89</td>
<td>408</td>
<td>39.90</td>
<td>Yes – group 9</td>
</tr>
<tr>
<td>2</td>
<td>21.61%</td>
<td>94</td>
<td>435</td>
<td>44.60</td>
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<tr>
<td>3</td>
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<td>102</td>
<td>509</td>
<td>38.40</td>
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<tr>
<td>4</td>
<td>19.22%</td>
<td>104</td>
<td>541</td>
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</tr>
<tr>
<td>5</td>
<td>17.10%</td>
<td>59</td>
<td>345</td>
<td>44.60</td>
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</tr>
<tr>
<td>6</td>
<td>15.45%</td>
<td>85</td>
<td>550</td>
<td>30.90</td>
<td>Yes – group 7 (medium risk category)</td>
</tr>
<tr>
<td>7</td>
<td>13.67%</td>
<td>70</td>
<td>512</td>
<td>30.90</td>
<td>Yes – group 8</td>
</tr>
<tr>
<td>8</td>
<td>13.04%</td>
<td>54</td>
<td>414</td>
<td>44.60</td>
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</tr>
<tr>
<td>9</td>
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<td>10</td>
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<td>11</td>
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<tr>
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<td>16</td>
<td>8.33%</td>
<td>62</td>
<td>744</td>
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</tbody>
</table>
Status:
• With stakeholder input, 152 schools refined to 16.
• Health measures, training and data collection process refined with DISD Health Services.
• 12 monitors co-located at COD Hinton site.
• Initial calibration completed.

Next Steps:
• Final site selection with DISD.
• Installation of monitors at study sites & connect to City’s Open data portal.
• Training of DISD staff.
• Begin data collection.
• Refine implementation design.
• Baseline year analysis.
Thank You.

Questions?