

# 2022 Texas Pedestrian Safety Forum

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August 18, 2022



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# Transportation System & Health

## Beneficial to Health

- Physical activity opportunities
- Access to community resources
- Mental health benefits

## Harmful to Health

- Traffic noise
- Risk of vehicle crashes
- **Traffic-related air pollution (TRAP)**

# Traffic-Related Air Pollution (TRAP)

- Particulate matter (PM)
- Carbon monoxide (CO)
- Nitrogen oxides (NOx)
- Ultrafine particles (UFPs)
- Polycyclic aromatic hydrocarbons (PAHs)
- Non-combustion sources
- Secondary pollutants



# Health Impacts from TRAP

- Cardiovascular disease
- Respiratory complications
  - Airway inflammation
  - Reduced lung function
  - Asthmatic symptoms
- Oxidative stress
- Premature mortality
- More frequent and costly healthcare visits

# Vulnerable Road Users (VRUs)

- Increased susceptibility due to the lack of a protective external shield
- Experience disproportionate impact from transportation-related exposures, such as TRAP

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Pedestrians

2

Bicyclists

3

Motorcyclists

# Pedestrian Impacts & Risk Factors

- Close proximity to motor vehicles
- Higher breathing and ventilation rates can increase exposure dosage
- Trip purpose (commuter vs. non-commuter) can alter routes and travel times, resulting in varying exposure levels
- “Pollution hotspots” (intersections, bus stops, urban street canyons)

# High-Risk VRUs: Pedestrian Subgroups

Children

Older Adults

Pregnant Women

Individuals Experiencing Homelessness (IEHs)

# Vulnerabilities & Health Impacts

Children

- Crucial period of development
- High susceptibility to environmental exposures
- Negative Health Impacts:
  - Increased asthma incidence
  - Allergy sensitivities
  - Acute respiratory illnesses
  - Mental and behavioral problems
  - Metabolic effects



# Vulnerabilities & Health Impacts

Older Adults

- Growing demographic segment of U.S. population
- Physical and cognitive declines
- Higher rates of chronic disease
- Negative Health Impacts:
  - Increased blood pressure
  - Increased risk of heart attacks
  - Depressive symptoms
  - Genotoxic effects
  - Progression of Alzheimer's Disease

# Vulnerabilities & Health Impacts

Pregnant Women

- Physiological changes and higher necessary energy expenditure
- Ability of environmental pollutants to pass through placental barrier
- Negative Health Impacts:
  - Impaired fetal growth
  - Low birth weight or preterm births
  - Perinatal mortality
  - Gestational diabetes
  - Preeclampsia
  - Potential development of later childhood disorders

# Vulnerabilities & Health Impacts

Individuals  
Experiencing  
Homelessness (IEHs)

- Understudied and overlooked
- Higher rates of mental health issues, drug or alcohol dependencies, and physical disabilities
- Higher prevalence of poorly controlled chronic conditions
- Less access to healthcare and fewer opportunities to practice healthy behaviors
- Compounded health impacts for children, older adults, and pregnant women

# Potential Solutions

Traffic management strategies (TMS)

Improved, segregated pedestrian infrastructure

Improved access to public transportation

Mixed land-use patterns

Vegetation barriers & green space

# Questions?

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