Incorporating Health Into Transportation Decisions

Urban Design 4 Health & the National Public Health Assessment Model (N-PHAM)
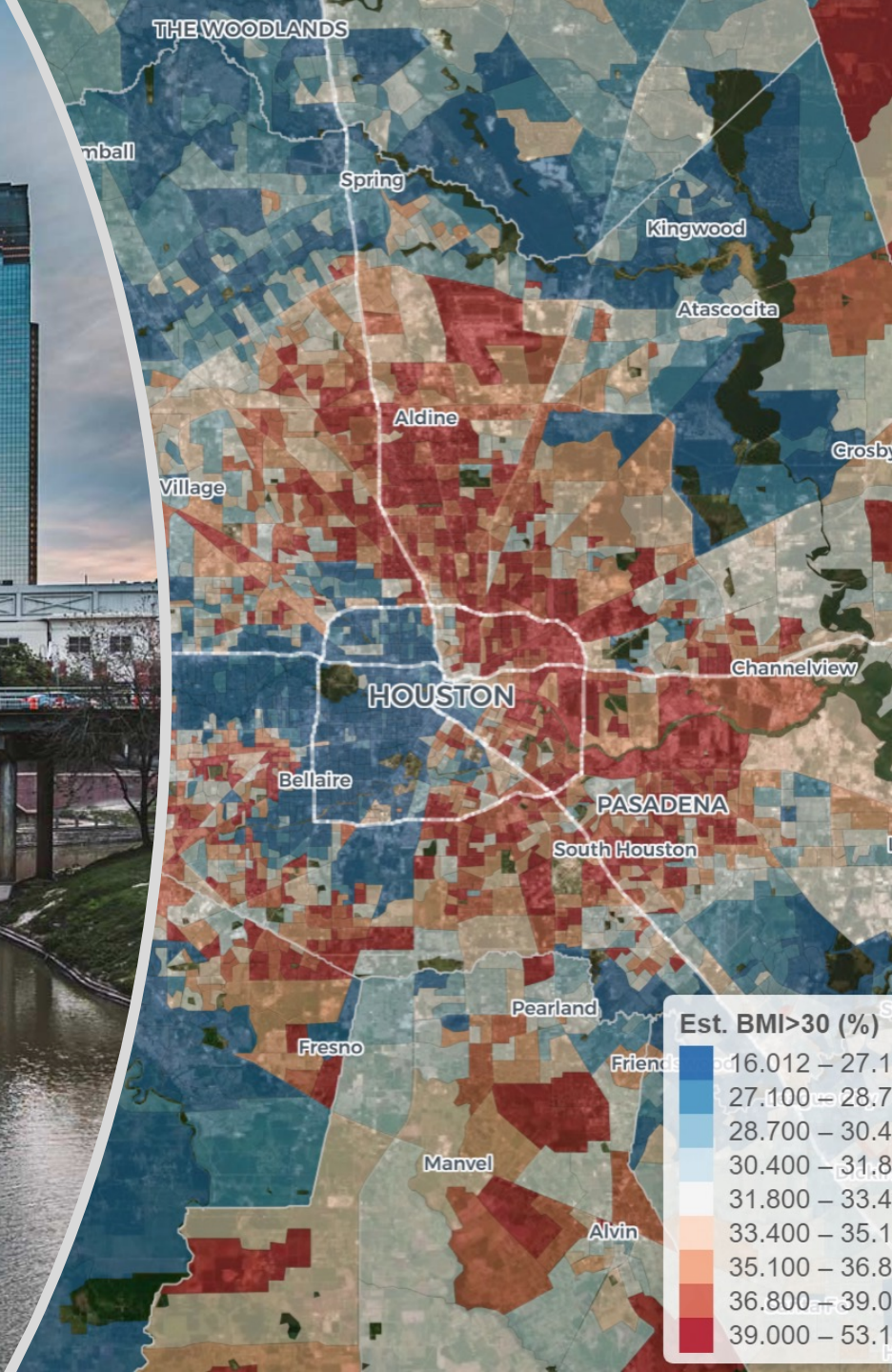
December 15, 2022

Urban Design 4 Health – www.ud4h.com

Lawrence Frank, PhD

Professor - University of California San Diego

President - Urban Design 4 Health

Call to Action to Promote Walking

2020 Federal Government Initiative to support Environmental Justice

- Goal of 40% of overall benefits of certain federal investments to go to disadvantaged communities
- Communities that are underserved and overburdened by the impacts of pollution and climate change

U.S. Surgeon General's *Call to Action* to Promote Walking & Walkable Communities

- Initiated the HHS **Step it Up!** Campaign
- Urges city officials, developers and communities to:
  - Build walkable communities
  - Invest in infrastructure to promote walking for healthy living

Growth in Cardiovascular Disease Across Ethnicity

Figure 3-2. Stated Projected Prevalence of Any CVD by Race/Ethnicity, 2015–2035
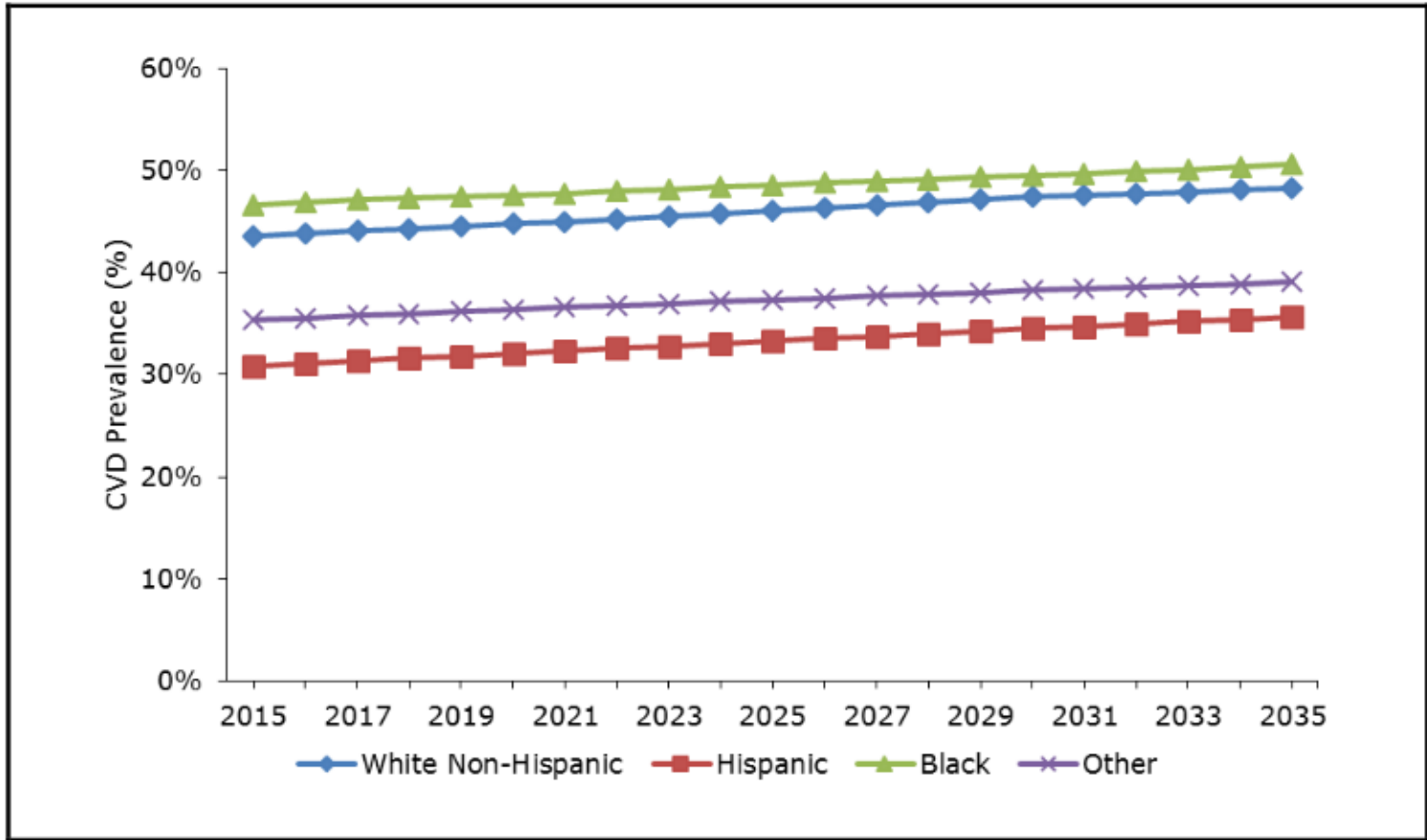
Khavjou, O., et al., **Projections of Cardiovascular Disease Prevalence and Costs: 2015–2035. 2016 American Heart Association.**

Chronic Disease Burden

Condition	Prevalence (US)	Health Care Costs, Annual ($Billions)
Obese	33.9	$173**
Cardiovascular Disease	42.6 (estimated)	$555*
Diabetes	11.1	$327**

* 2015, ** 2021

Khavjou, O., et al., Projections of Cardiovascular Disease Prevalence and Costs: 2015–2035. 2016 American Heart Association. RTI Project Number 0214680.003.001.001. https://www.heart.org/-/media/Files/About-Us/Policy-Research/Fact-Sheets/Public-Health-Advocacy-and-Research/Projections-of-CVD-Prevalence-and-Costs-2015-2035.pdf

Re-Appropriating Road Space: Taking Back the Streets


Normal Street Promenade
Source: Fox 5 San Diego

Proposed Gaslamp Promenade
Source: SanDiegoDowntownNews.com

2021 Infrastructure Investment and Jobs Act – $2+ Trillion

REAUTHORIZATION OF TRANSPORTATION SPENDING *PLUS* INCREASES FOR EQUITY-DRIVEN AND CLEAN ENERGY TRANSPORTATION SOLUTIONS


"Repair and rebuild our roads and bridges with a focus on climate change mitigation, resilience, **equity**, and **safety** for all users."

"Improve transportation options for millions of Americans and reduce greenhouse emissions through the **largest investment in public transit in U.S. history**."
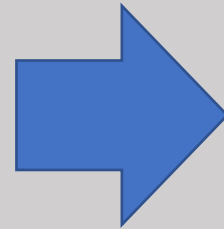
➢ Repair/maintenance of what is already in place
➢ Multi-modal accessibility
➢ Clean energy
➢ Bicycle and Pedestrian Safety
➢ Ensure investment in underserved and vulnerable communities

Quantifying the Pathways
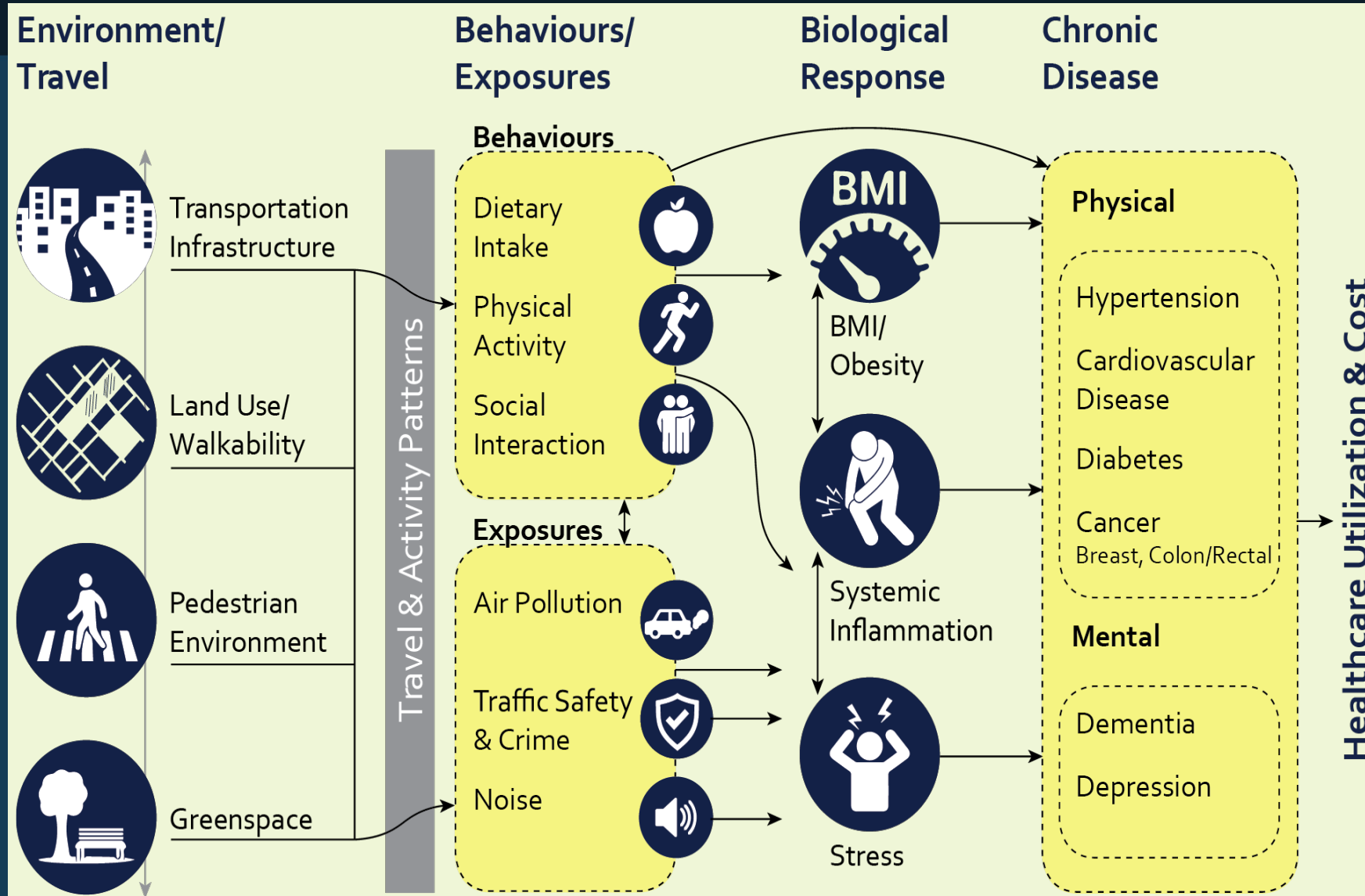
Frank, L. D., Iroz-Elardo, N., MacLeod, K. E., Hong, A. The pathways from built environment to health: Connecting behavior and exposure-based impacts. 2019. Journal of Transport and Health.

BUILT ENVIRONMENT ELEMENTS & SCALE

MACRO

Transportation Accessibility

Complete Communities
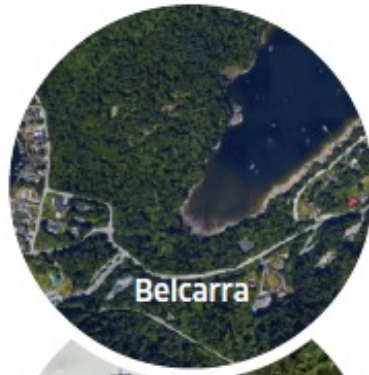
MICRO

Pedestrian Environment

- Sidewalk, Road Buffering
- Pedestrian Crossings
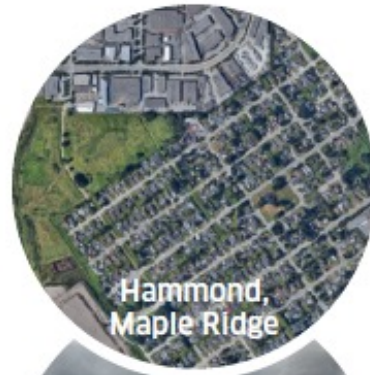- Trees, Lighting, Seating

Place Types by Walkability

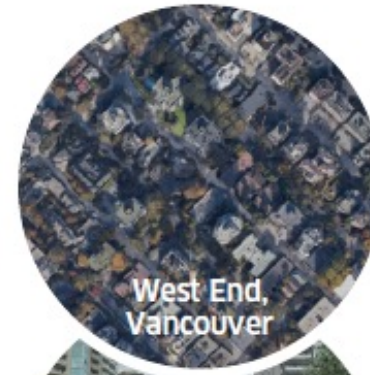| Car dependent	Somewhat car dependent	Somewhat walkable	Moderately walkable	Walkable
Exurban 0-5 dwellings per acre	**Suburban** 5-10 dwellings per acre	**Semi-urban** 10-15 dwellings per acre	**Town Centre** 15-25 dwellings per acre	**Urban Core** 25-60 dwellings per acre
Belcarra	Hammond, Maple Ridge	Cloverdale, Surrey	Suter Brook Village, Port Moody	West End, Vancouver

Walkability and Diabetes

Car Dependent | Somewhat car dependent | Somewhat walkable | Moderately walkable | Walkable

-27% **-39%**
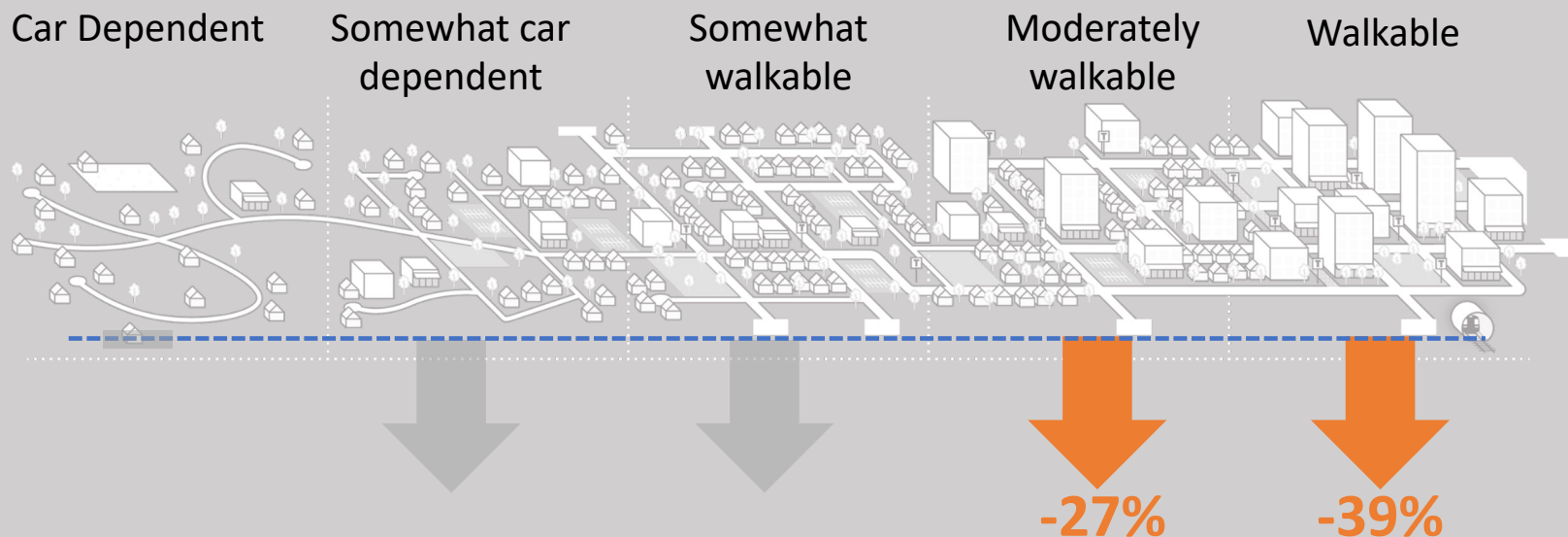
People living in a moderately walkable area are 27% less likely to have diabetes and people in a walkable area are 39% less likely to have diabetes compared to those living in a car dependent area.

Frank, L.D., Adhikari, B., White, K.R., Dummer, T., Sandhu, J., Demlow, E., Hu, Y., Hong, A., Van Den Bosch, M. (2022).
Chronic Disease and Where You Live: Built and Natural Environment Relationships with Physical Activity, Obesity, And Diabetes. Environment International.

Walkability and Sense of Community

+24%   +47%

Car Dependent   Somewhat car dependent   Somewhat walkable   Moderately walkable   Walkable
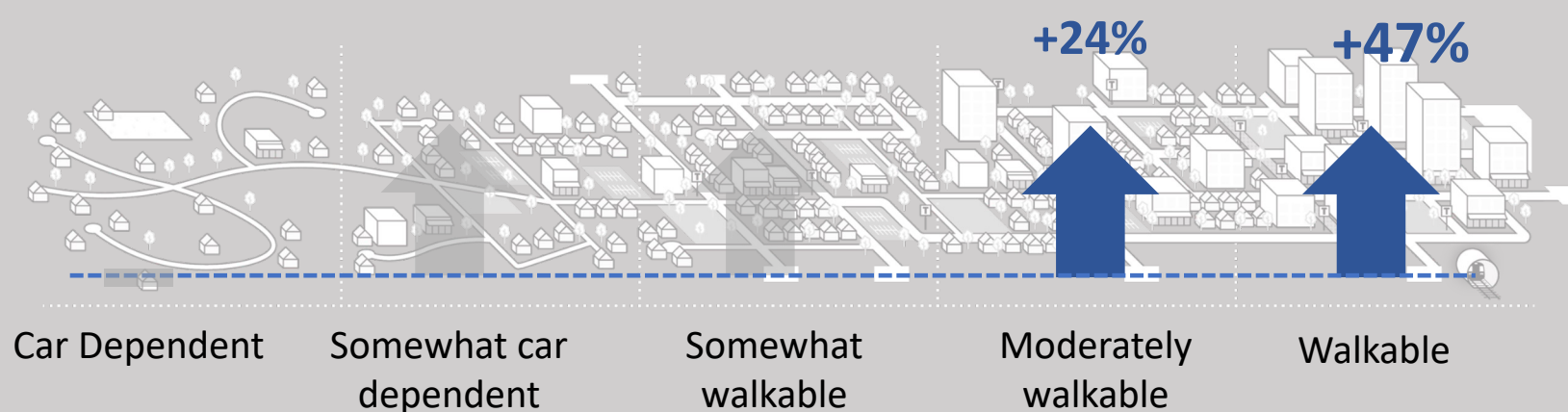
People living in a moderately walkable area are 24% more likely to have a strong sense of community belonging and people in a walkable area are 47% more likely compared to those living in a car dependent area.

West End Boundary

Stanley Park

Burrard Inlet

West Georgia Street

Coal Harbour

Comox-Helmcken Greenway

English Bay

Triangle West

Central Business District

Gastown

West End

Burrard Street

Downtown South

Burrard Bridge

Northeast False Creek

Yaletown

Comox Corridor Greenway Vancouver, BC

DOCUMENTING CAUSAL HEALTH AND
CLIMATE CHANGE IMPACTS:
A NATURAL EXPERIMENT IN VANCOUVER
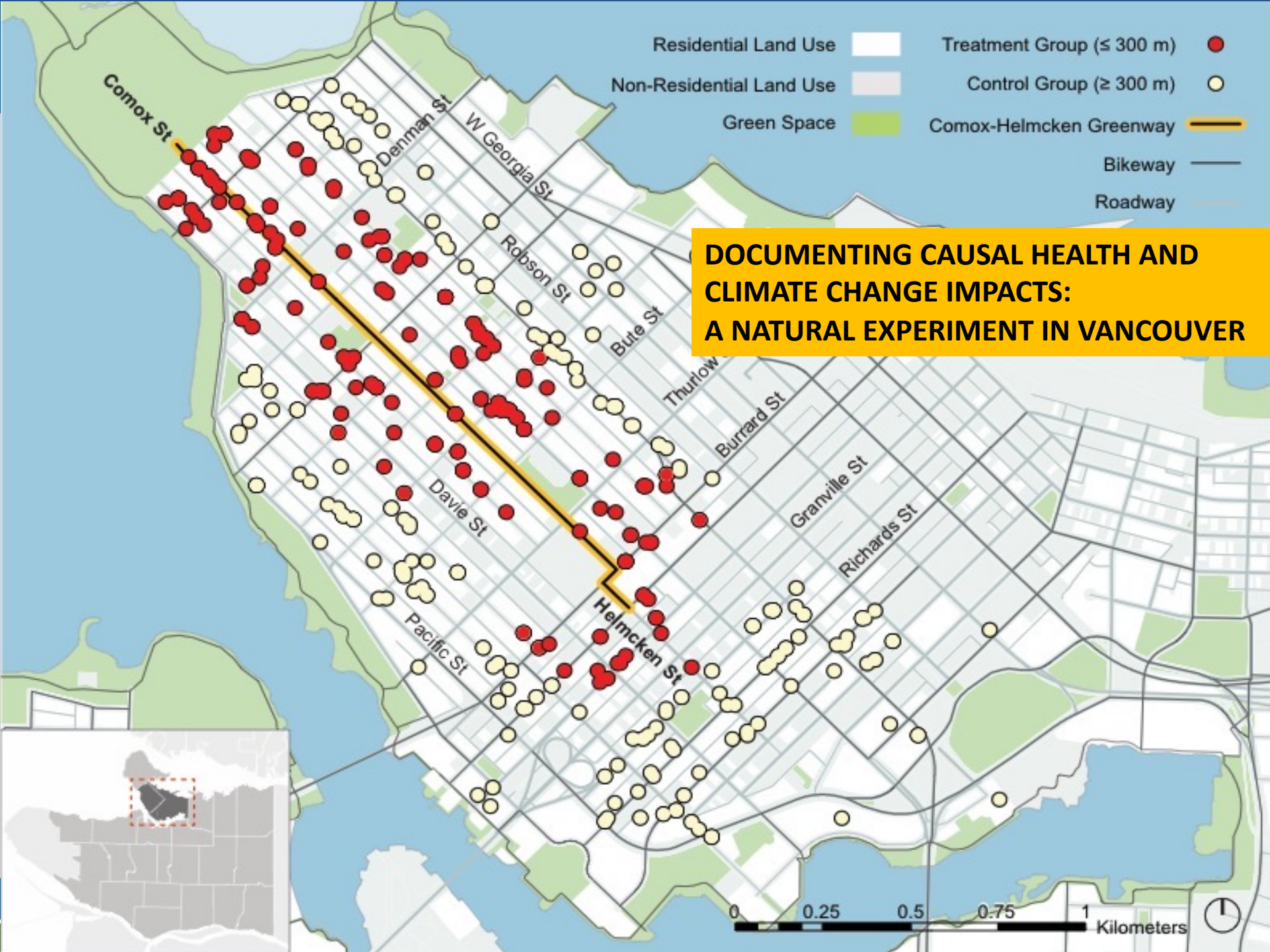
Before

After (Counterflow Lanes)

Documenting GHG & Health Impacts

- Those within 300 Meters of the greenway reduced their transport GHG emissions by 21%
  - Those further away drove and generated more GHG emissions due to emergence of car sharing
    - Transportation Research Part D: Ngo, Hong, and Frank, 2018
- Those within 300 Meters of the greenway where twice as likely to meet recommended physical activity levels Those further were less likely to meet this target
    - Preventive Medicine: Frank, Ngo, Hong, 2019
- Those within 300 Meters of the greenway showed a 5 fold(251 %) increase in # of reported cycling trips
  - International Journal of Transportation Policy: Frank, Ngo, Hong, 2021

Environment & Obesity: Literature Review

- Dixon BN, Ugwoaba UA, Brockmann AN, Ross KM. **Associations between the built environment and dietary intake, physical activity, and obesity: A scoping review of reviews**. 2021.
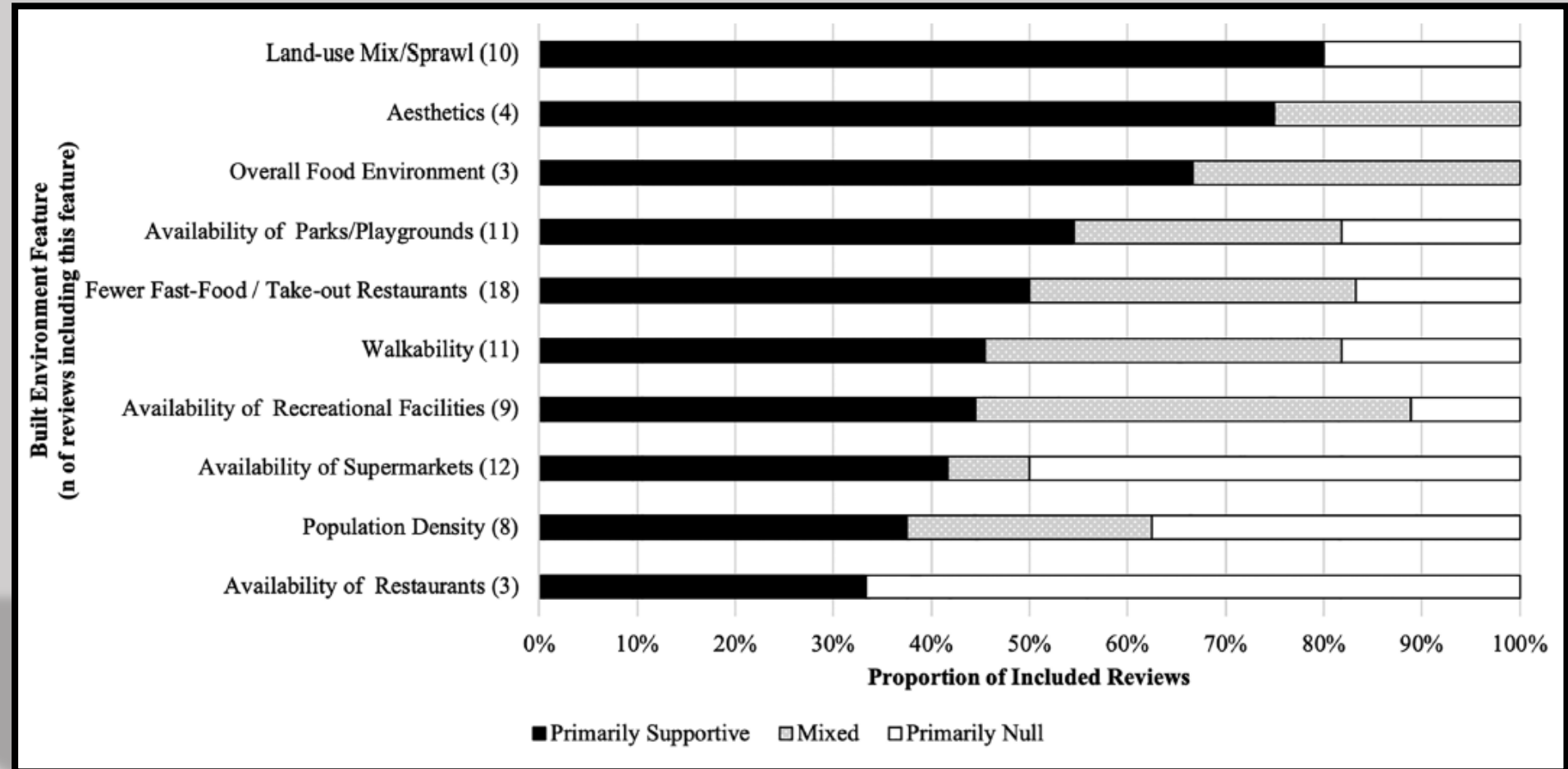
National Public Health Assessment Model (NPHAM)

Purpose:
➢ Built to address a major gap in uniform health outcome measurement
➢ Tool to forecast future health conditions of alternative investments
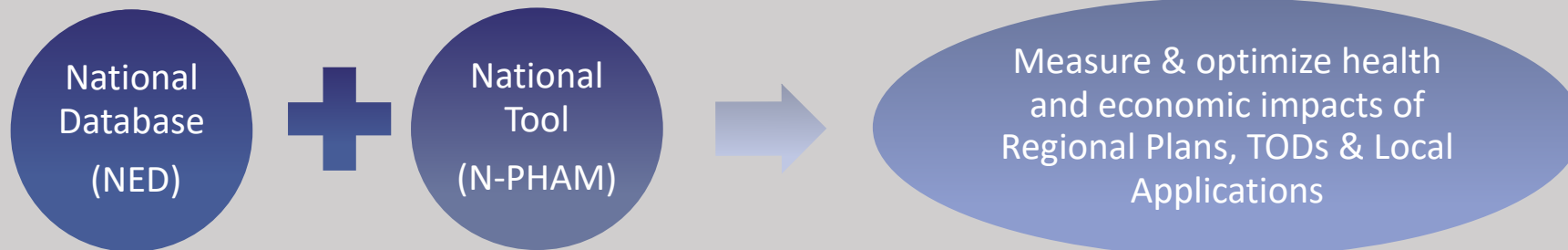
Development:
➢ Created by Urban Design 4 Health
➢ Supported by the U.S. Environmental Protection Agency (EPA)

Environmental Indicators:
➢ National Environmental Database (NED): built, natural & social environmental measures
➢ Supported by the Robert Wood Johnson Foundation

National Database (NED) **+** National Tool (N-PHAM) → Measure & optimize health and economic impacts of Regional Plans, TODs & Local Applications

N-PHAM History - Case Study Locations

- 12 applications in 10 different cities
- Long Range Transportation Plans
- Environmental Justice focus
- Scenario planning
- Health & transportation
- Health & freight
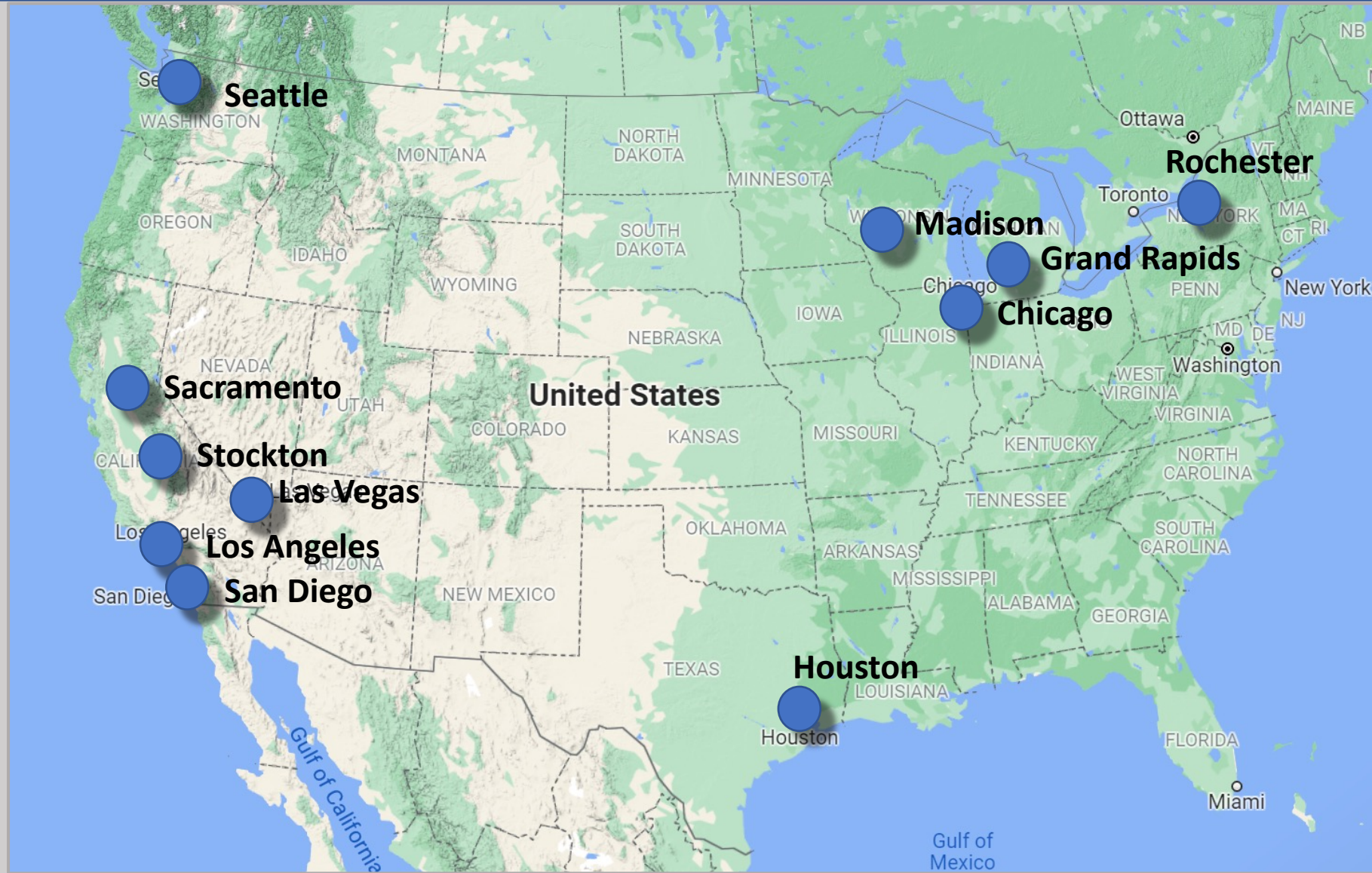
N-PHAM Built Environment Data Sources

N-PHAM comes preloaded with:

2020 American Community Survey 5-year Data:
- ➢ Age
- ➢ Race/ethnicity
- ➢ Income
- ➢ Vehicles
- ➢ Family type
- ➢ Employment

2020 National Environmental Data:
- ➢ Population and employment density
- ➢ Access to jobs, shopping, restaurants
- ➢ Parks and greenspace access
- ➢ Transit service
- ➢ Bicycle and pedestrian infrastructure access

(USEPA, USGS, OpenStreetMaps)

➢ **Health Outcomes**
  ➢ California Health Interview Survey (CHIS)
  ➢ N= 54,481

➢ **Travel Behavior/Physical Activity**
  ➢ National Household Travel Survey (NHTS)
  ➢ N=40,887
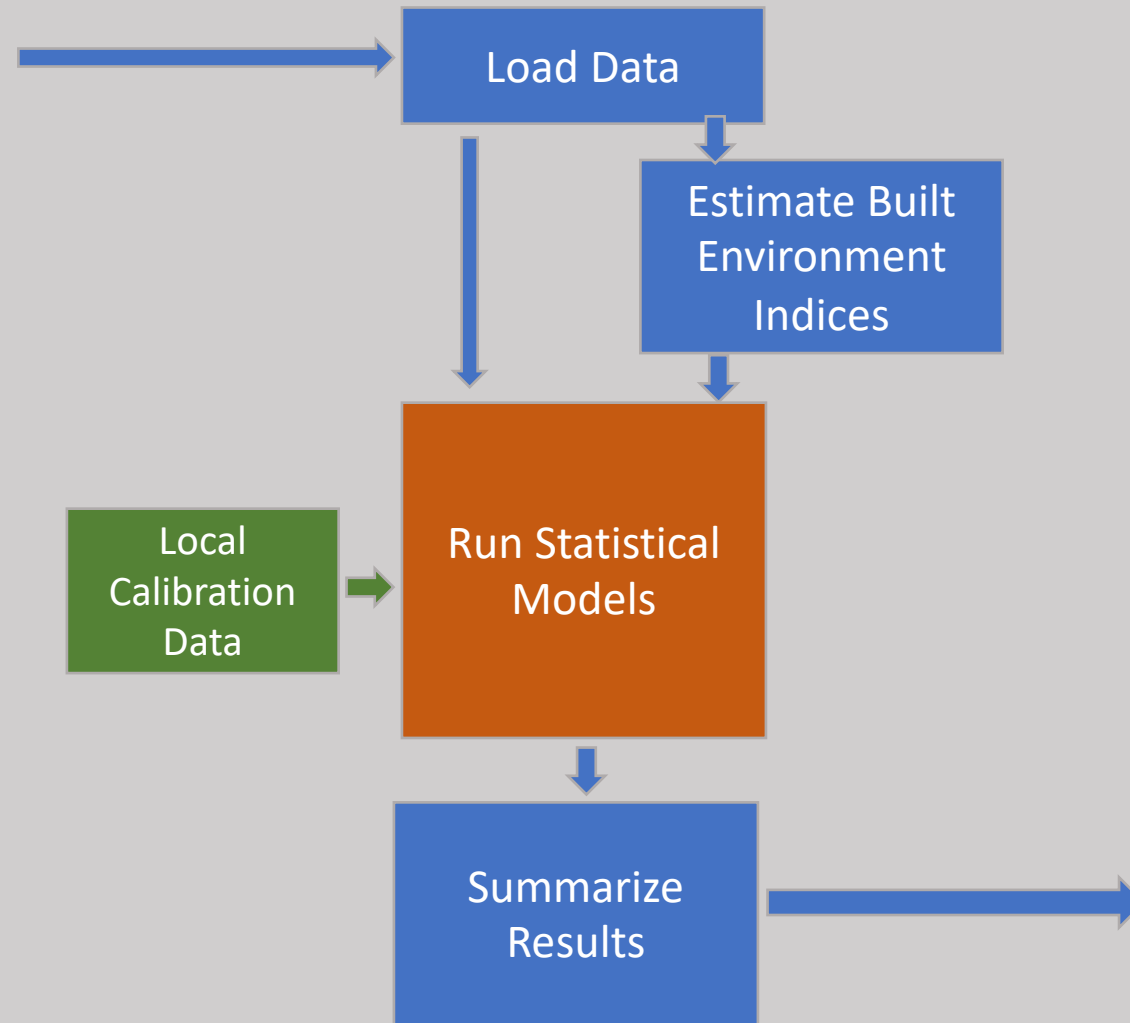
N-PHAM Application Process

Geospatial Inputs
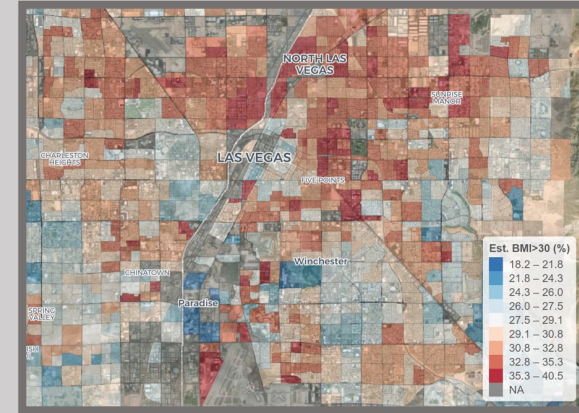

35 Social/Cultural Metrics
(Demographics - Census)
- Age
- Race
- Income
- Vehicles
- Family type
- Employment

22 Built/Natural Environment Metrics
- Density
- Accessibility
- Greenspace
- Transit
- Bike/ped

Process Flow

- **Load Data**
- **Estimate Built Environment Indices**
- **Local Calibration Data**
- **Run Statistical Models**
- **Summarize Results**

Geospatial Outputs

Est. BMI>30 (%)
- 18.2 – 21.8
- 21.8 – 24.3
- 24.3 – 26.0
- 26.0 – 27.5
- 27.5 – 29.1
- 29.1 – 30.8
- 30.8 – 32.8
- 32.8 – 35.3
- 35.3 – 40.5
- NA

- **Body Mass Index**
- **Physical Activity**
- **% Overweight**
- **% Obese**
- **% Type 2 Diabetes**
- **% Hypertension**
- **% Coronary heart disease**
- **Depression**
- **Annualized cost of illness**

Health conditions and covariates

Health and activity surveys

Participants Linked With Home Environmental Data

Built and natural environment data
(Density, accessibility, transit, greenspace, bike/ped)

Resulting database of survey participants:
➢ Health characteristics
➢ Covariates (age, race, gender, education, etc.)
➢ Home environment (density, accessibility, transit, greenspace, and bike/ped)

➢ *Other Environments: Work, School, Street Design, Social Cohesion, Sense of Community*
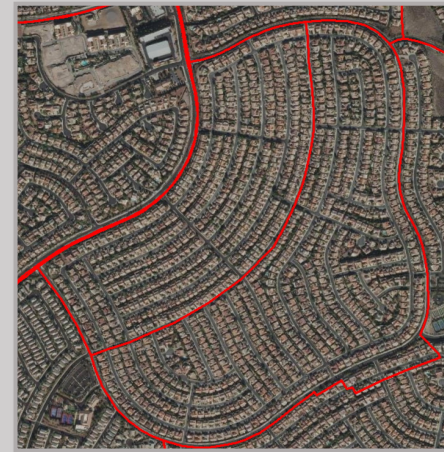
N-PHAM: Mean rates by neighborhood

Walkable communities
- Higher density
- Diverse land use
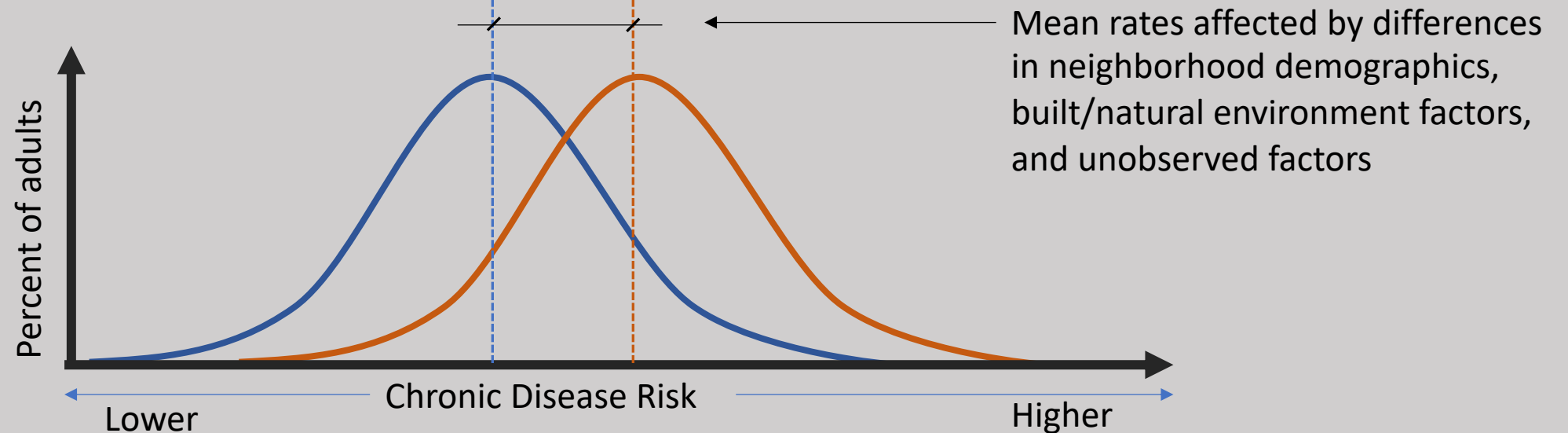- Travel mode options
- Shorter trips

Neighborhood 1
Mean

Neighborhood 2
Mean

Auto-dependent communities
- Lower density
- Low land use variability
- Limited modal options
- Longer trips

Mean rates affected by differences in neighborhood demographics, built/natural environment factors, and unobserved factors

Percent of adults

Chronic Disease Risk

Lower

Higher

Estimated Type 2 Diabetes Prevalence

Scenario: CMAP Region Base

Import UF or NPHAM Scenario CSV file (csv or zip)
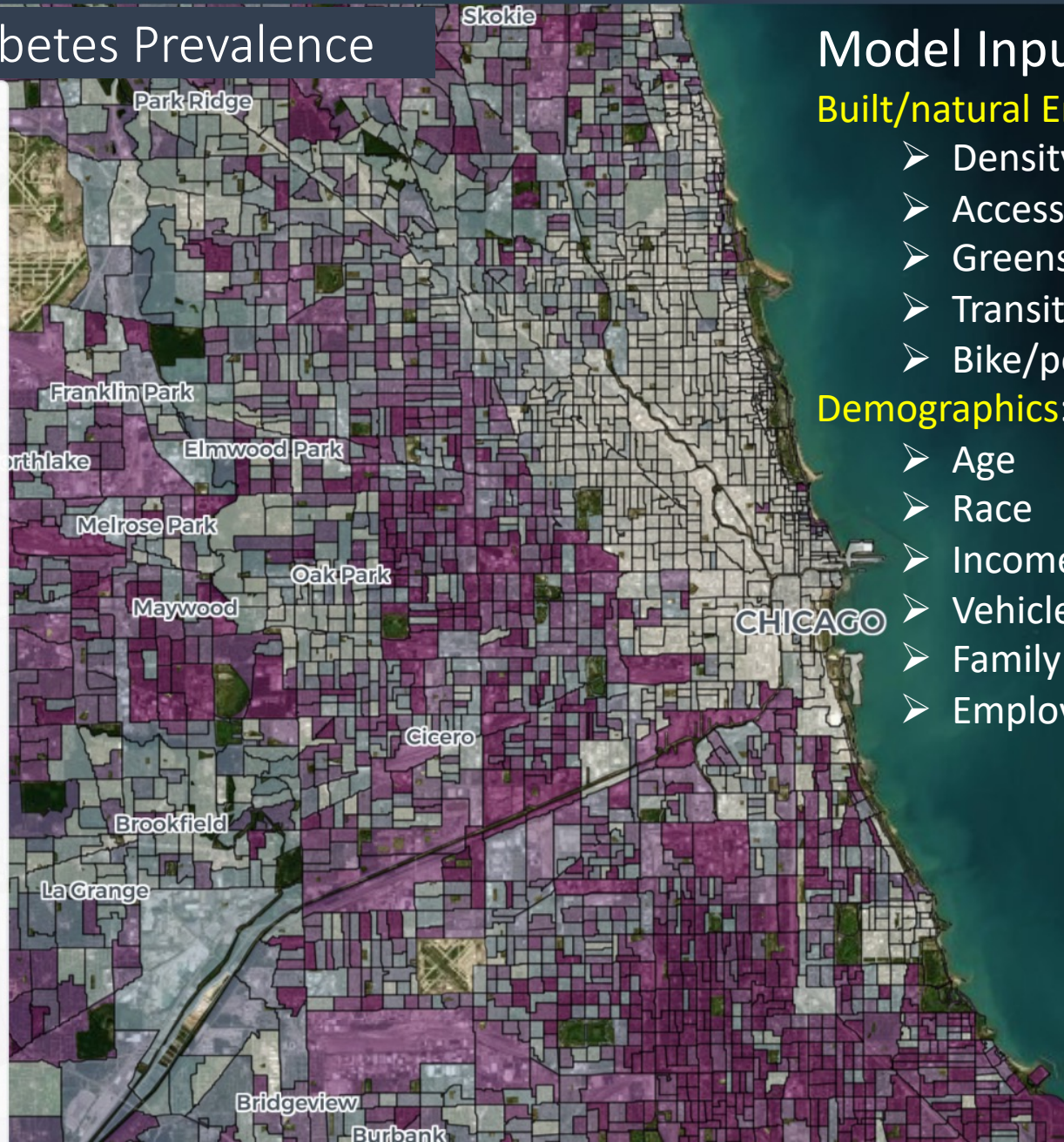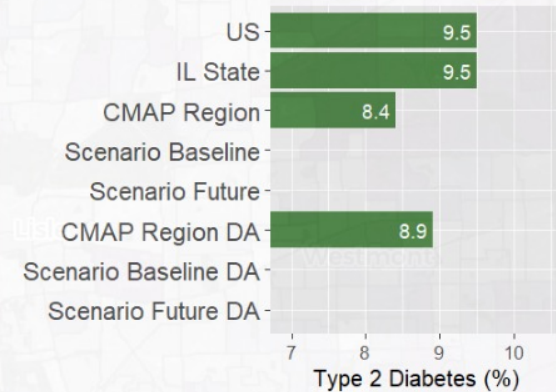
| Browse... | No file selected |

Estimated Annual Health Costs (Type 2 Diabetes, Hypertension, Coronary Heart Disease)

CMAP Region: $12 (billion)

Select Outcome

Type2 Diabetes (%)   ▼

Bar chart — Type 2 Diabetes (%):
- US: 9.5
- IL State: 9.5
- CMAP Region: 8.4
- Scenario Baseline: (none)
- Scenario Future: (none)
- CMAP Region DA: 8.9
- Scenario Baseline DA: (none)
- Scenario Future DA: (none)

Model Inputs:

Built/natural Environment
➢ Density
➢ Accessibility
➢ Greenspace
➢ Transit
➢ Bike/ped

Demographics:
➢ Age
➢ Race
➢ Income
➢ Vehicles
➢ Family type
➢ Employment
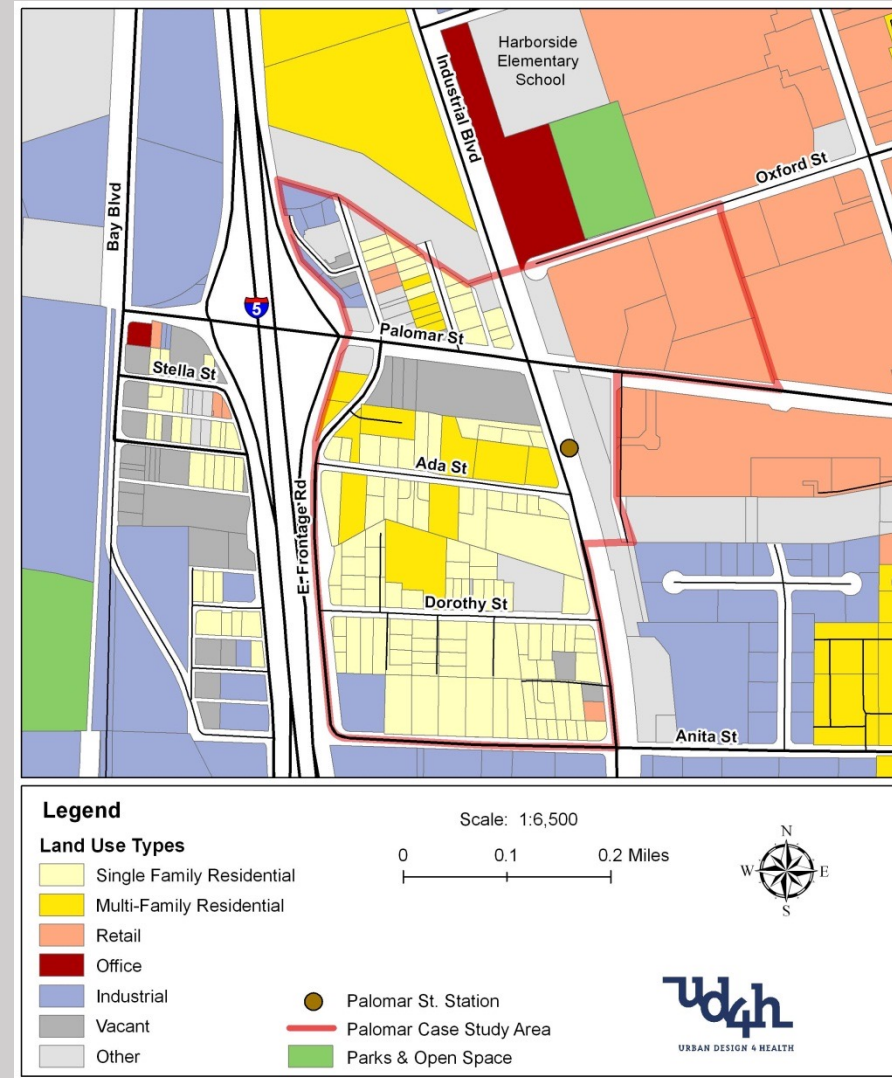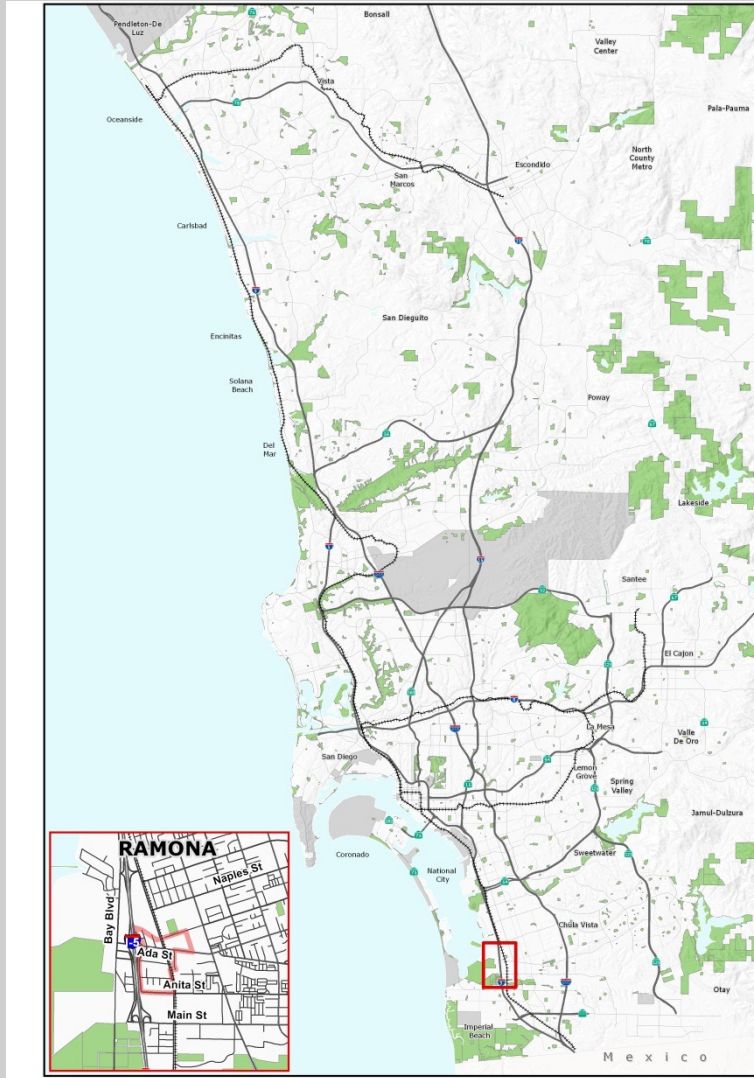
Model Outputs:

➢ Body Mass Index overweight, obese
➢ Type 2 Diabetes
➢ Hypertension
➢ Coronary heart disease
➢ Depression
➢ Distress
➢ Covid-19 Risk Index
➢ Transport –related physical activity
➢ Annualized cost of illness

Est. Type 2 Diabetes (%)
- 0.0 – 5.4
- 5.4 – 6.8
- 6.8 – 7.8
- 7.8 – 8.8
- 8.8 – 9.8
- 9.8 – 11.2
- 11.2 – 13.8
- 13.8 – 100.0
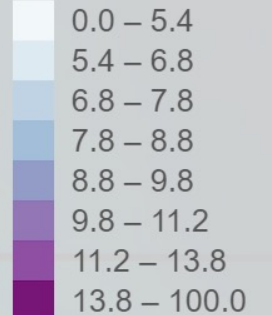
Case study 1 – Palomar Gateway

All adult health metrics improved

- 68% increase minutes of daily transportation walking

- 15.4% reduction in high blood pressure

- 9.6 % reduction in type II diabetes

Frank, L.D., Fox, E., Ulmer, J., Chapman, J. & Braun, L. (2022). Quantifying The Health Benefits of Transit-Oriented Development: Creation and Application of The San Diego Public Health Assessment Model (SD-PHAM). Journal of Transport Policy.

HEALTH IMPACT RESULTS

- Adults:
  - 68% increase in daily minutes of transport walking
  - 15% reduction in prevalence of high blood pressure
  - 10% reduction in prevalence of type 2 diabetes
- Children/Teens:
  - 29% increase in walking to school
  - 18% increase in daily minutes of transport walking
  - Predicted increases in asthma

UD4H.com
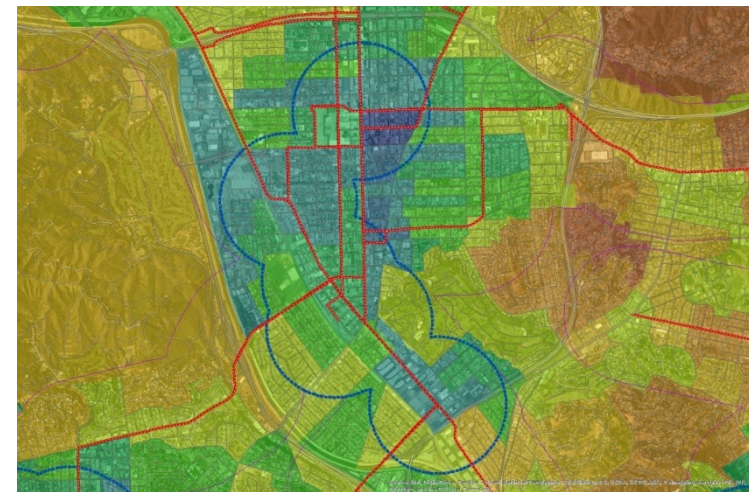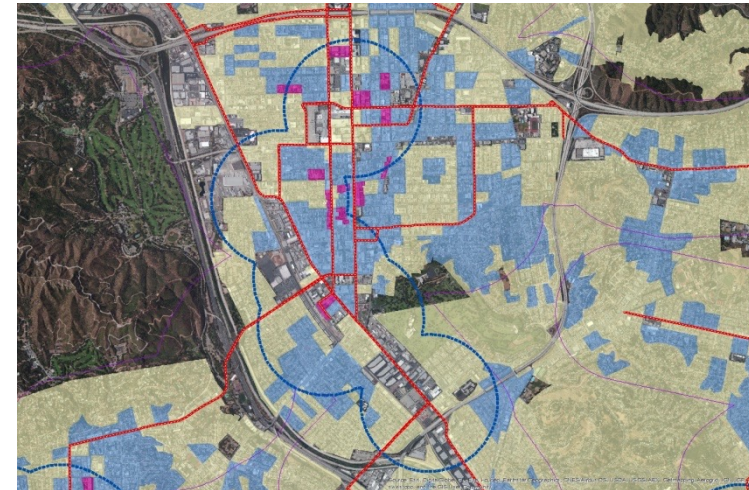
PREDICTED HEALTH IMPACTS

NEGATIVE | | | POSITIVE
1-10% | 10-12% | OVER 25% | 1-10% | 10-12% | OVER 25%

CHANGE

HEALTH INDICATOR	BASE SCENARIO	CHANGE SCENARIO	% CHANGE
TRAVEL-RELATED PHYSICAL ACTIVITY OUTCOMES			
Daily minutes transportation walking—adults	6.1	10.24	67.87%
Daily minutes transportation walking—children/teens	4.39	5.16	17.54%
Percent walking to school—teens	43.65	46.06	5.52%
Percent walking to school—children	18.81	24.17	28.50%
RECREATIONAL PHYSICAL ACTIVITY OUTCOMES			
Daily minutes recreational walking—adults	8.42	8.87	5.34%
Daily minutes moderate recreational activity—adults	17.33	18.38	6.06%
Days per week of 60+ minutes physical activity—teens	3.87	3.91	1.03%
BODY WEIGHT OUTCOMES			
Body mass index—adults	28	27.65	-1.25%
Body mass index—children	20.94	20.68	-1.24%
Body mass index—teens	23.19	23.05	-0.60%
CHRONIC DISEASE OUTCOMES			
Percent of adults with high blood pressure	30.92	26.16	-15.39%
Percent of adults with Type 2 diabetes	8.63	7.8	-9.62%
ASTHMA			
Percent of adults with asthma	5.69	5.43	-4.57%
Percent of teens with asthma	15.43	18.17	17.76%
Percent of children with asthma	16.66	18.48	10.92%
OTHER OUTCOMES			
Pedestrian/cyclist collision risk factor (1-100, lower is better)	46.71	47.65	2.01%
General health status (1-5, higher is better)—adults	3.21	3.28	2.18%

Modeling Los Angeles Region- Predictions

Adults: Ages 18-64	2040 Trend	Adopted Plan	Glendale
Recreation Physical Activity - Minutes Daily	14.6 min	+ .4%	+ 9%
Walking - Minutes Daily	12.1 min	+ 33%	+ 10%
Biking - Minutes Daily	1.6 min	+ 26%	+ 12%
Auto - Minutes Daily	64.8 min	- 4.4%	- 6%
Obese Population (%)	26.3%	- 1.3%	-3%
High Blood Pressure (%)	21.5%	- 1.2%	- 1%
Heart Disease (%)	4.4%	- 1.0%	0%
Diabetes - Type 2 (%)	6.1%	- 1.0%	- 11%

MORE HIGH QUALITY TRANSIT AREAS, GLENDALE (LA COUNTY)

California Public Health & Activity Model –
Scenario Planning for Southern California Association of Governments

H-PHAM baseline model – Updated with local baseline data

Geographic Visualization

Chart & Table Outputs

Many Monetized Benefits of Active Travel

- Capital Construction

- Maintenance
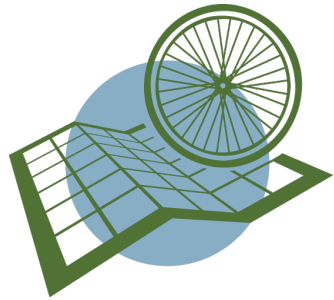
- Equipment & Services

- Tourism

- **Healthcare**

- **Less Employee Absenteeism**

- Evidence suggests transportation investments can have **broad-reaching implications for health and economies**.

- Health benefits of active transportation & transit investments **receive less attention** in the regional planning process.

- **Economic benefits** associated with transportation investments, **including health-related impacts** and productivity gains, are **significant**

Health Cost/Benefits from Scenarios

Land use and transportation affect community health

TRANSPORTATION INVESTMENTS → LAND USE PATTERNS → TRAVEL BEHAVIOR → HEALTH → COSTS
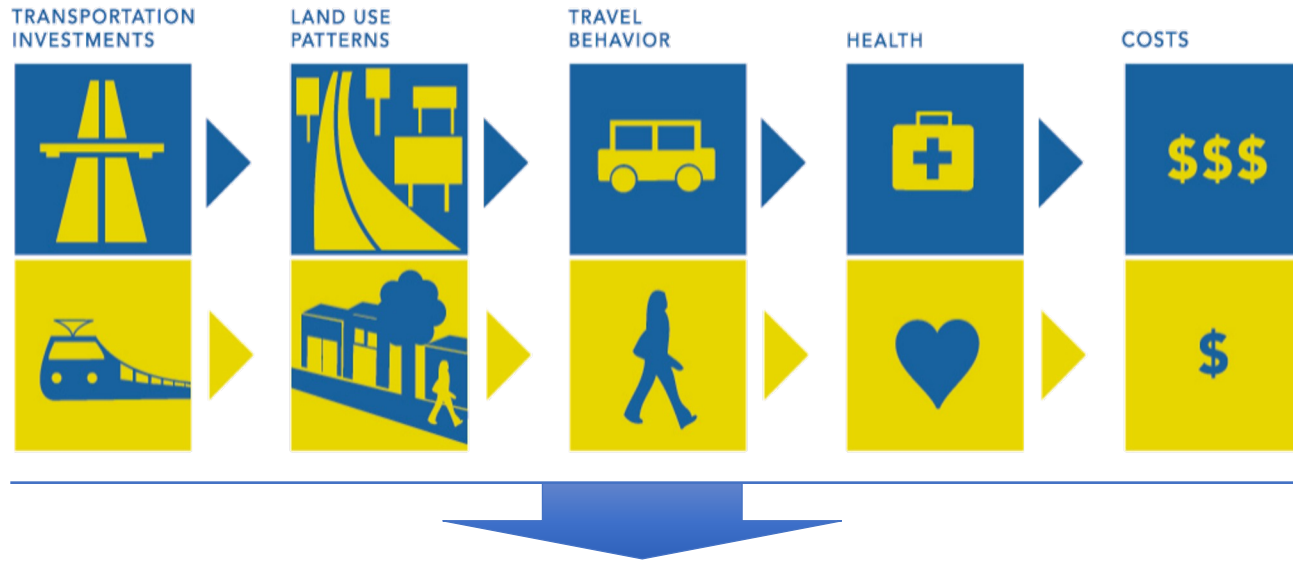
UD4H's suite of Public Health Assessment Models
➤ UD4H/USEPA supported web-based application
➤ Estimate changes in chronic disease prevalence and associated cost of health care

US Census Block Group Estimates

- **Body Mass Index, overweight, obese**
- **Type 2 Diabetes**
- **Hypertension**
- **Coronary Heart Disease (CHD)**
- **Depression**
- **Distress**
- **Covid-19 Risk Index (CVD Index)**
- **Walk for Transport**
- **Bike for Transport**
- **Transit Use**
- **Personal Vehicle Use**
- **Annualized cost of illness**

ud4h
URBAN DESIGN 4 HEALTH

Methods for Health Monetization

Value of Statistical Life

➢ Applications to avoided **mortality**

➢ Tool Example: WHO's Health Economic Assessment Tool

Cost of Illness

➢ Applications to avoided **morbidity**

➢ Tool Examples: Input-Output Modeling
  - ➢ REMI TranSight
  - ➢ IMPLAN
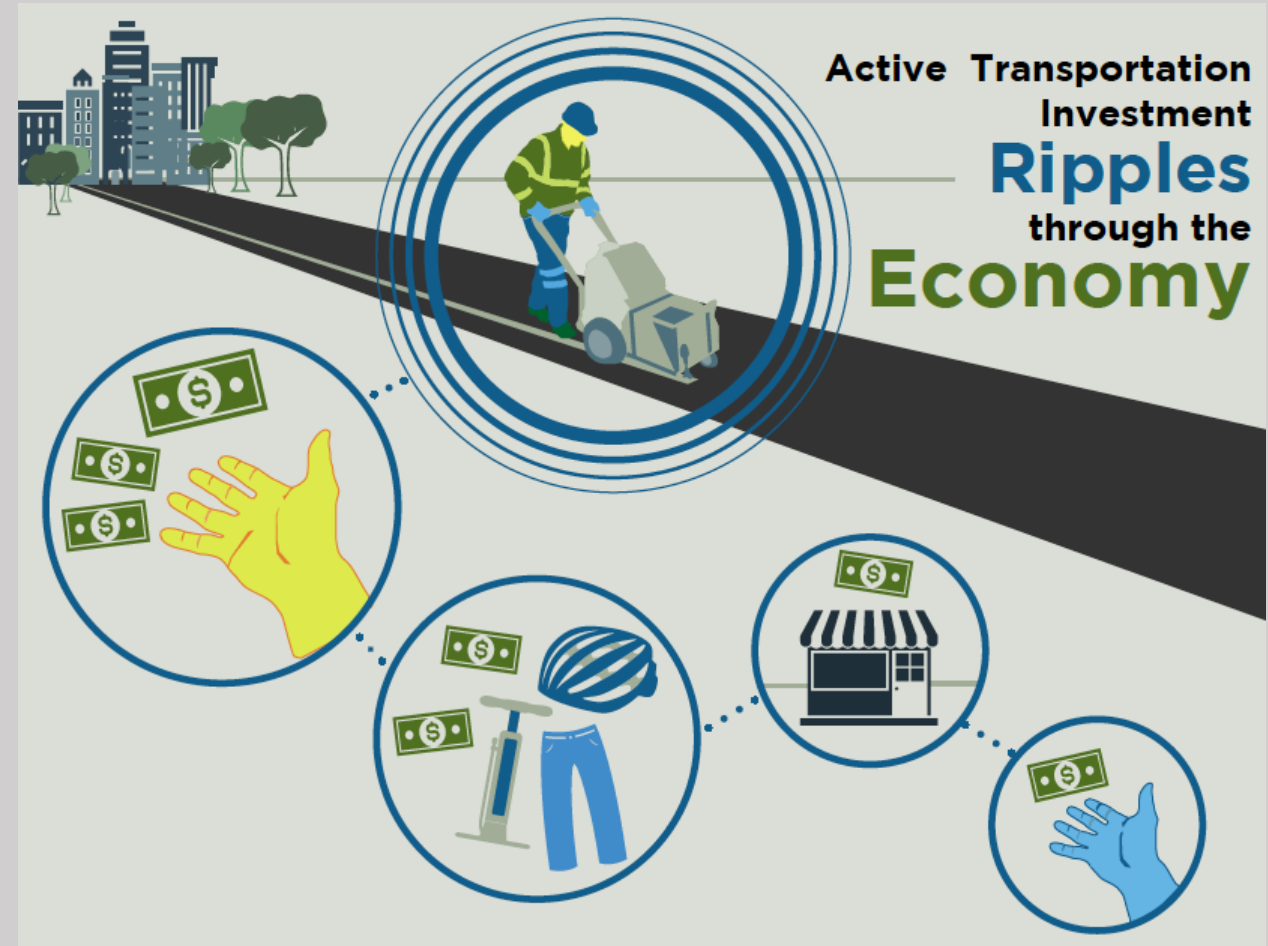
Cost of Illness to Monetize Morbidity

Cost of Illness:

➢ National "cost" attributable to a disease

➢ Elevates health as an important active transport co-benefit

Direct Costs: Healthcare Expenditures

➢ Money exchanged for healthcare (doctor visits & hospitals) and pharmaceuticals

Indirect Costs

➢ Absenteeism, reduced productivity, early disability

➢ Reduced productivity for those with more disease:

  ➢ More worked missed | More disability | Increased Mortality

MONETIZING HEALTH OUTCOMES

N-PHAM)

Input-Output Model

| Characterize Built Environment | Model Physical Activity | Model Public Health | Apply Cost Of Illness | Monetized Health Outcome (Direct & Indirect) | Input-Output Model |
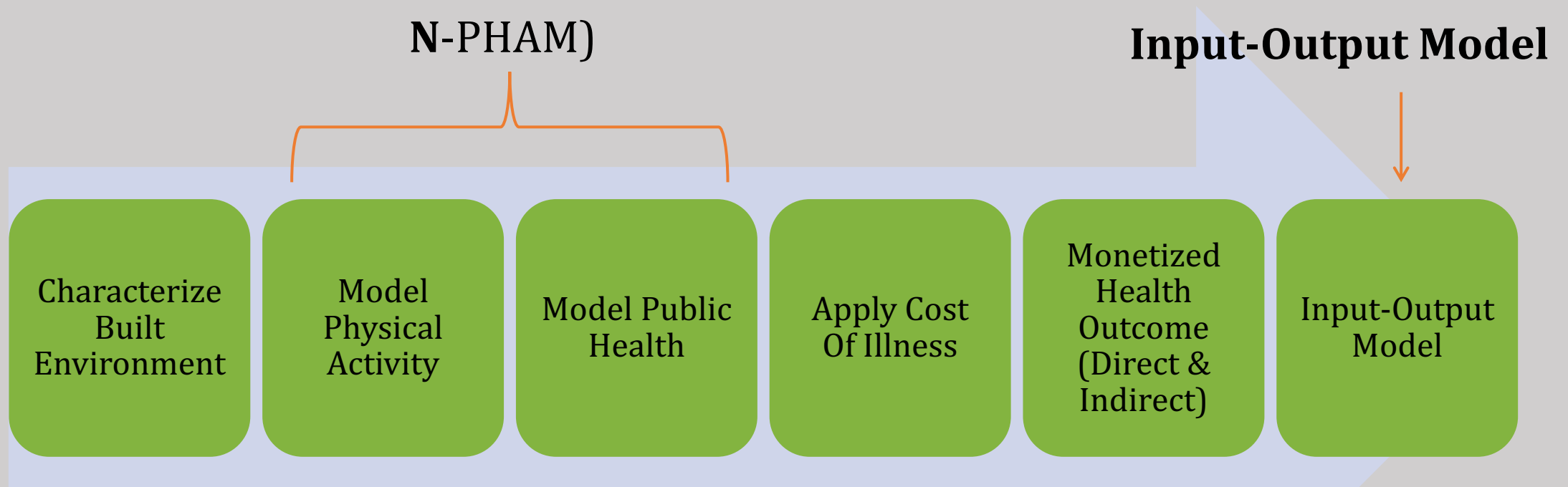
Use published **Cost Of Illness Literature**
- Direct (Healthcare Expenditures)
- Indirect (Workforce Productivity)

Per $1 Spent on Active Transportation Infrastructure 2016-2040

Construction and Strategy — $1.97
Household Travel Savings — $.05
Mobility — $.38
$8.41 Total
$5.96 — Health (Fewer Expenditures + Increased Productivity)
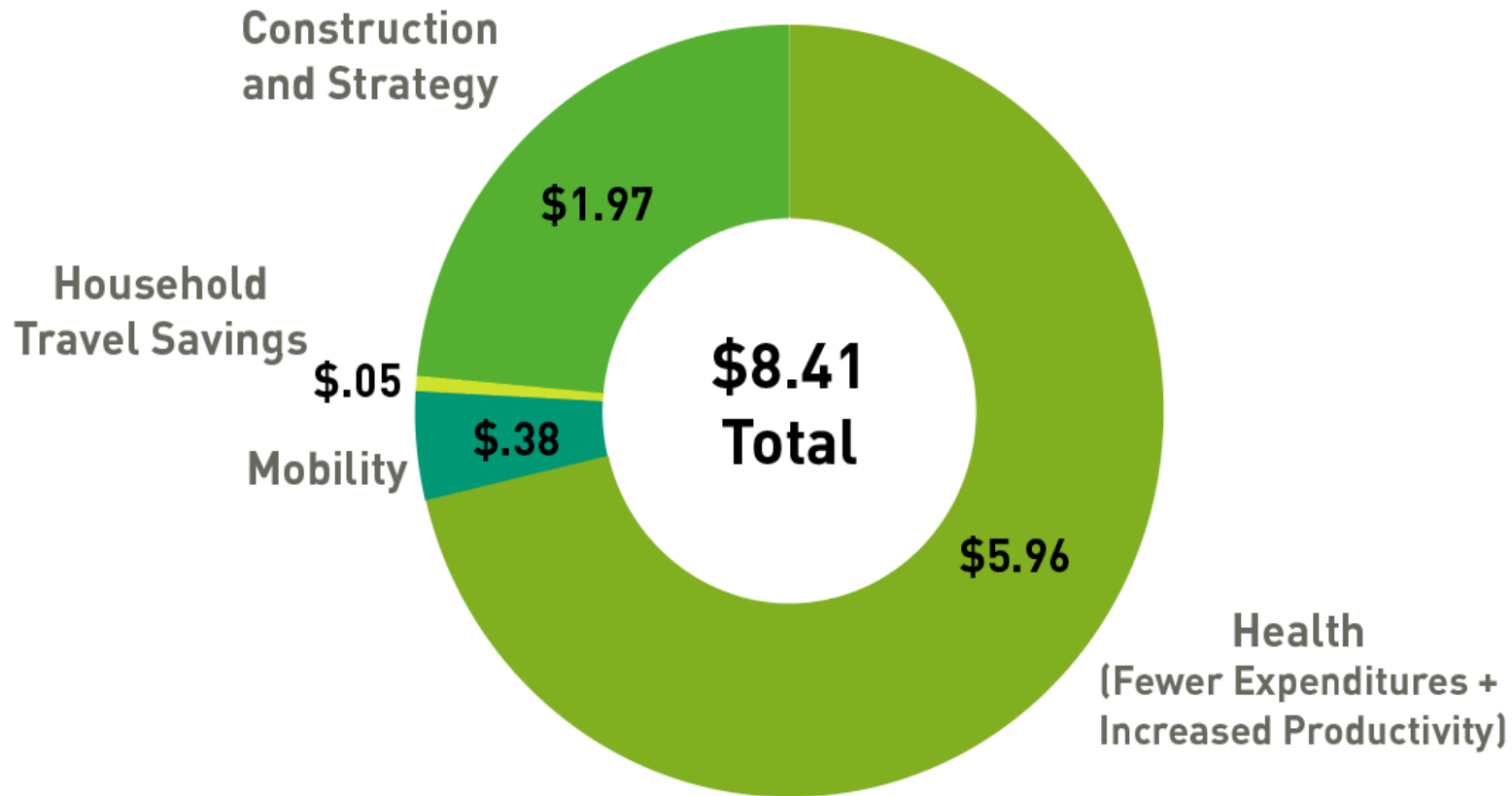
RESULTS FROM THIS WORK HELPED TO PROTECT $13 BILLION EARMARKED FOR ACTIVE TRANSPORTATION

USED SAME COST-BENEFIT TOOL CREATED TO JUSTIFY ROADWAY EXPENDITURES BASED ON RETURN ON INVESTMENT AND THE MONETIZATION OF DELAY DUE TO CONGESTION

AECOM APPLIED "REMI" MODEL AS SUB-CONTRACTOR TO UD4H CLIENT : SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

$12.8 Billion Spent Will Generate $113 Billion Over Life of the Plan

Opportunity to estimate health costs of long range plans

Use health modeling tool like the California Public Health Assessment Model (C-PHAM)

Use Input-Output model
- REMI Transight
- IMPLAN
- REDYN
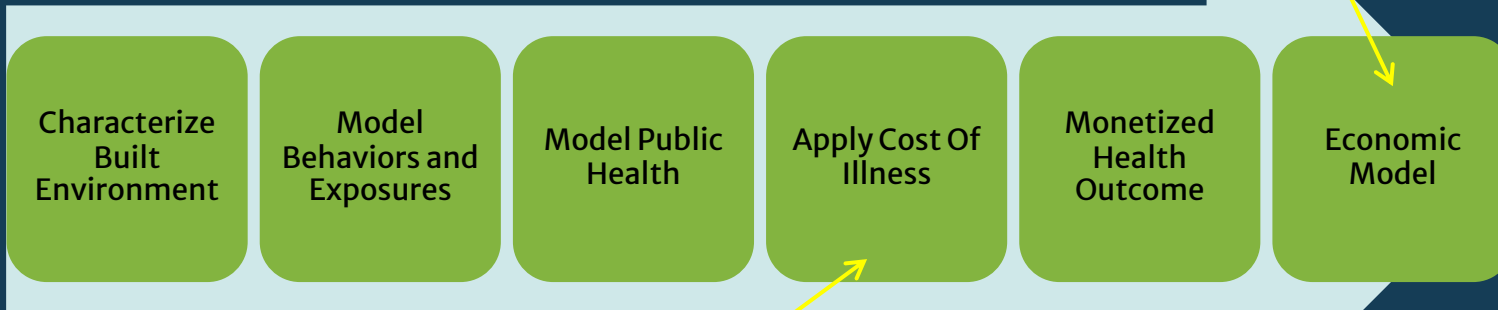
2016 Analysis by UD4H/AECOM
- Greater LA Region
- $8.41 benefit per $1 invested in active transportation
- From
  - Labor force productivity
  - Reduced health care costs
  - Reduced travel expenditure
  - Increased mobility
  - New construction

Characterize Built Environment	Model Behaviors and Exposures	Model Public Health	Apply Cost Of Illness	Monetized Health Outcome	Economic Model

Use published Cost Of Illness Literature
- Direct (Healthcare Expenditures)
- Indirect (Productivity)

N-PHAM: WebApp Capabilities

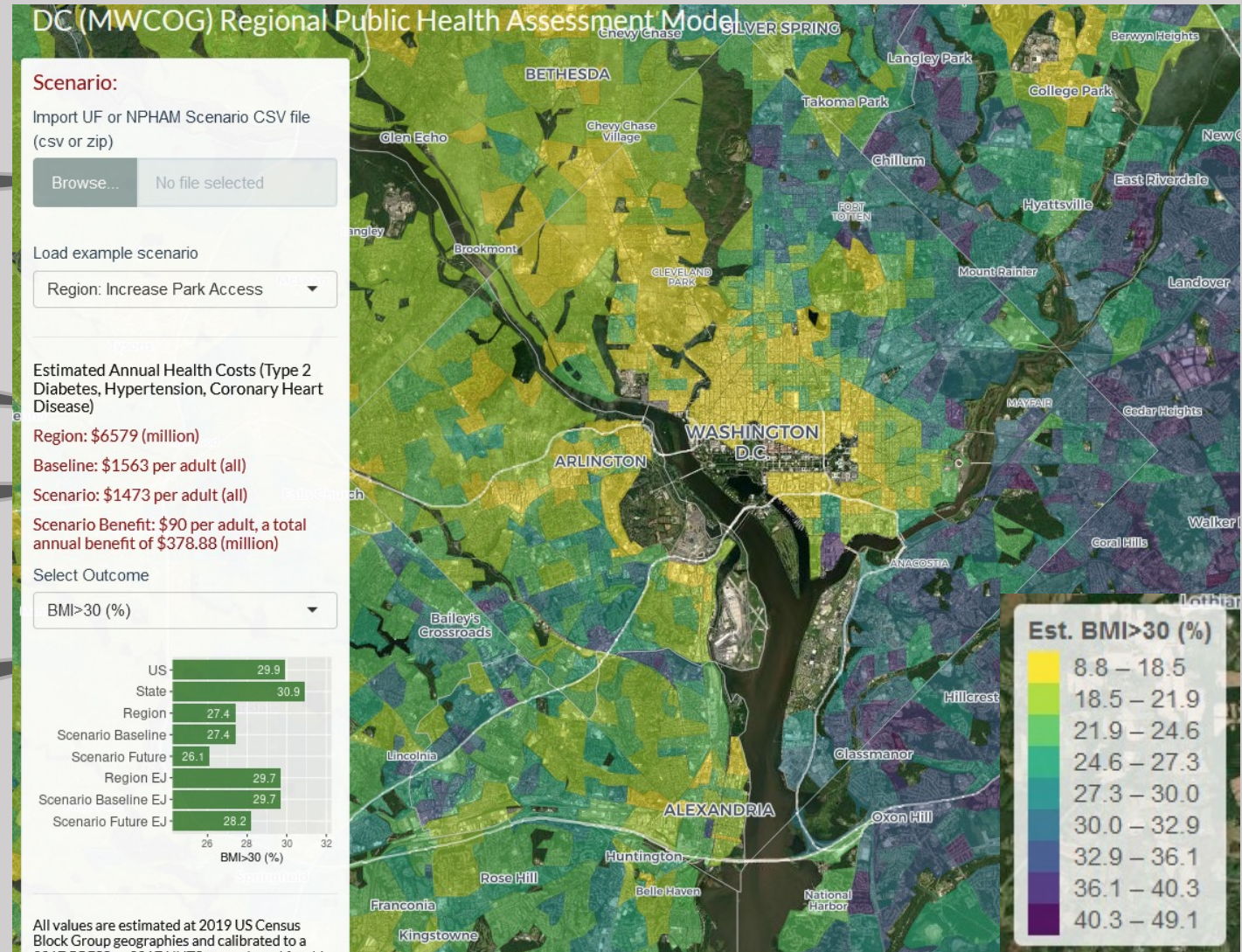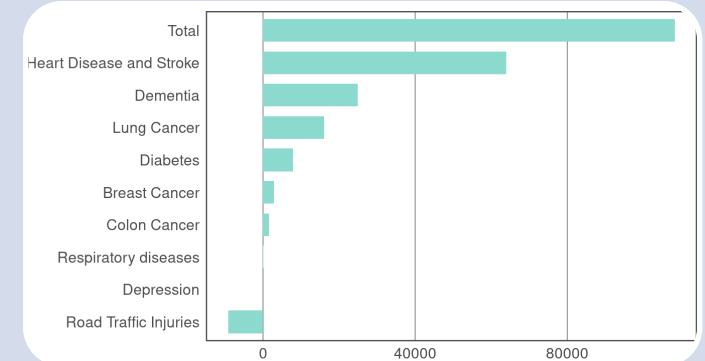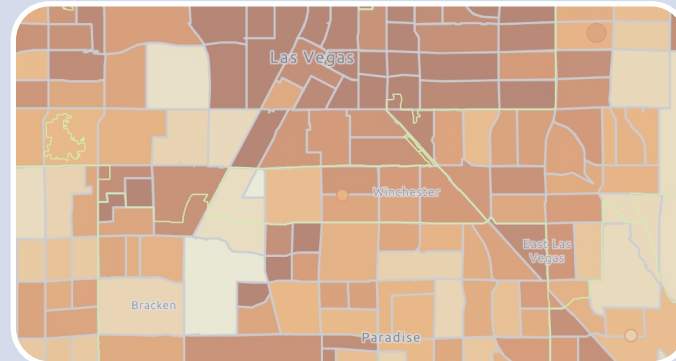Load future scenarios from native NPHAM file or scenario planning software

Displays cost-of-illness for diabetes, hypertension, heart disease)

Thematic mapping of all outcomes

Comparison of selected outcome prevalence rates for US, state, region, baseline, scenario, and EJ areas

DC (MWCOG) Regional Public Health Assessment Model

Scenario:

Import UF or NPHAM Scenario CSV file (csv or zip)

Browse... | No file selected

Load example scenario

Region: Increase Park Access ▼

Estimated Annual Health Costs (Type 2 Diabetes, Hypertension, Coronary Heart Disease)

Region: $6579 (million)

Baseline: $1563 per adult (all)

Scenario: $1473 per adult (all)

Scenario Benefit: $90 per adult, a total annual benefit of $378.88 (million)

Select Outcome

BMI>30 (%) ▼

	BMI>30 (%)
US	29.9
State	30.9
Region	27.4
Scenario Baseline	27.4
Scenario Future	26.1
Region EJ	29.7
Scenario Baseline EJ	29.7
Scenario Future EJ	28.2

All values are estimated at 2019 US Census Block Group geographies and calibrated to a

Est. BMI>30 (%)
- 8.8 – 18.5
- 18.5 – 21.9
- 21.9 – 24.6
- 24.6 – 27.3
- 27.3 – 30.0
- 30.0 – 32.9
- 32.9 – 36.1
- 36.1 – 40.3
- 40.3 – 49.1

Community Health Modeling – Different Approaches
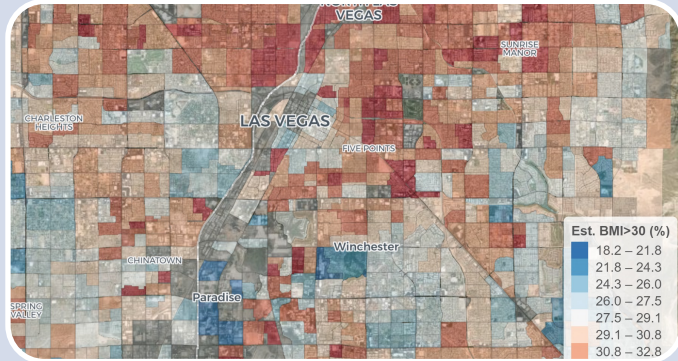
N-PHAM

Approach: Multi-level models

Primary Input: Demographics, Built & Natural Environment

Geography: Fine Grain / Scalable (Parcel, Census Block Group, Tract, Corridor, Regional)

Mediators: Physical activity, BMI
Outputs: Chronic disease prevalence, economic impact

CDC PLACES

Approach: Multi-level models

Primary Input: Demographics

Geography: US Census Tract

Outputs: Existing chronic disease prevalence (no future scenario modeling offered)

ITHIM / HEAT

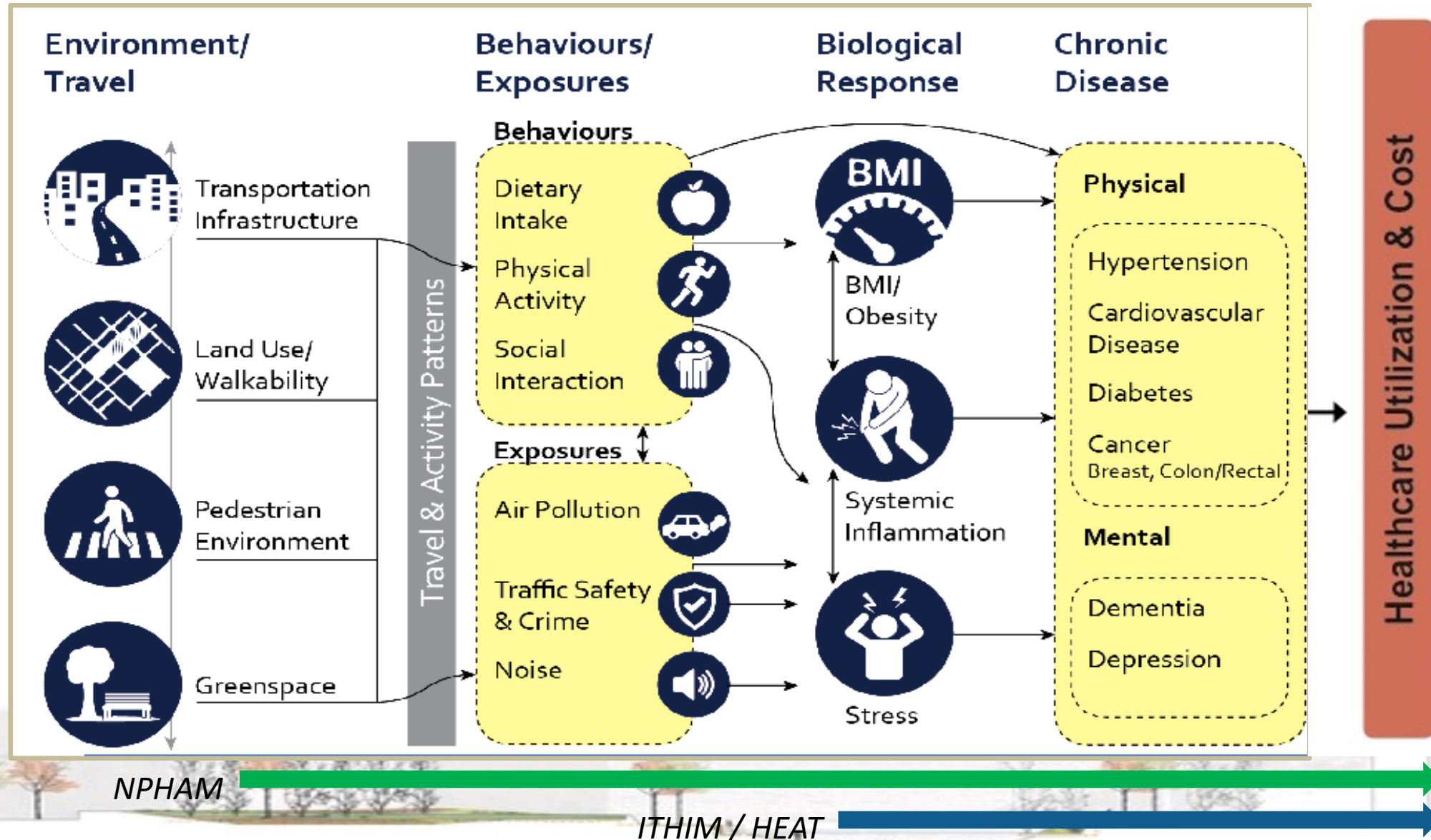**Approach:** Use published data relationships on disease burden and / or mortality

Primary Input: Change in physical activity, air pollution, crash rates

Geography: Typically County or Regional Scale

Outputs: Chronic disease prevalence, mortality, economic impact

UD4H
URBAN DESIGN 4 HEALTH

Predictive Modeling Approaches

- **Las Vegas Transportation Health Study**
  - ➤ Partner: Regional Transportation Commission of S. Nevada
  - ➤ Metropolitan Las Vegas, NV

- **Genesee-Finger Lakes Public Health Assessment Model**
  - ➤ Partner: Genesee Transportation Commission
  - ➤ Metropolitan Rochester, NY

- **South Stockton Promise Zone**
  - ➤ Partner: San Joaquin Council of Governments
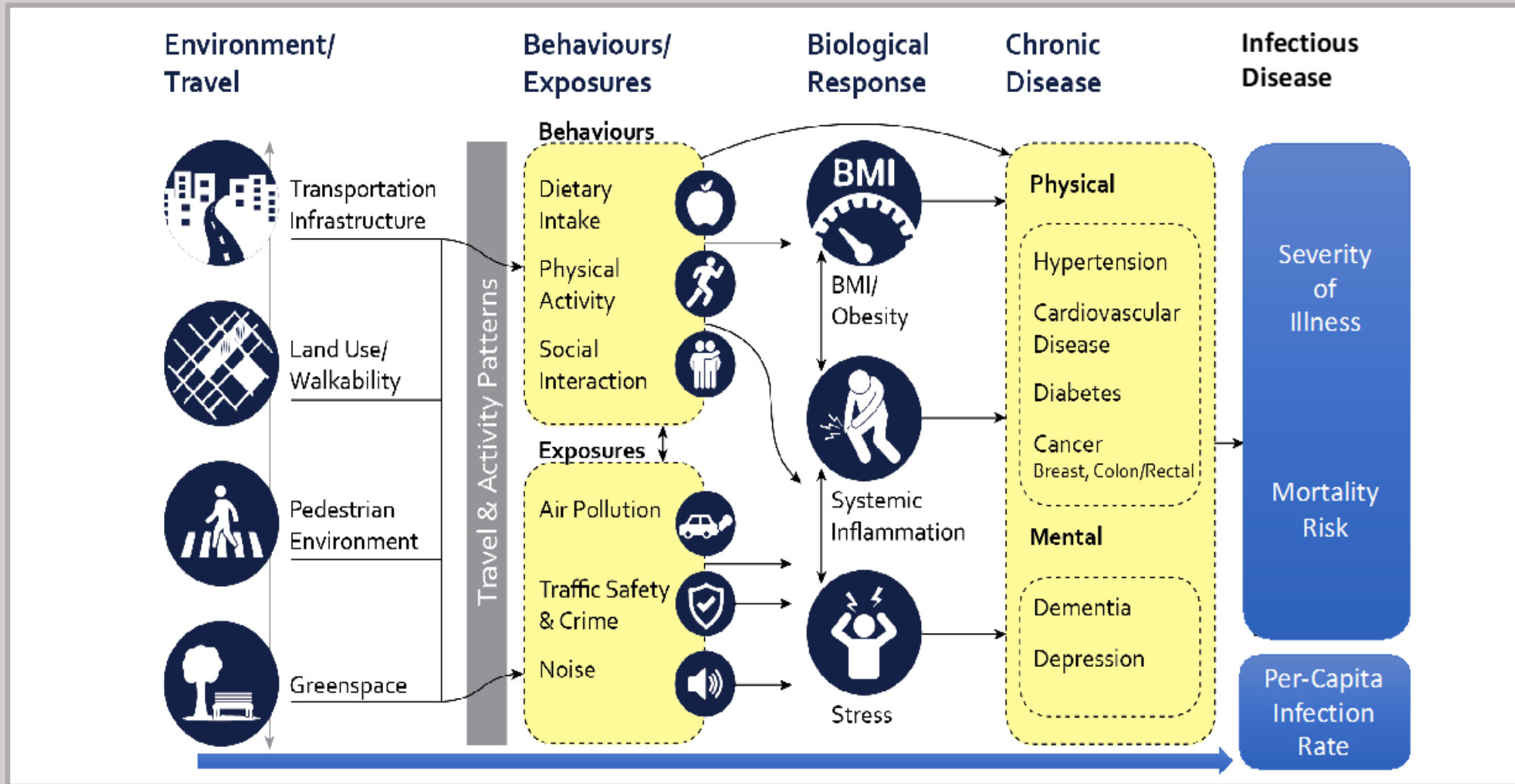 - ➤ Metropolitan Stockton, CA

Urban Design 4 Health

Thank you

Lawrence Frank, PhD, President – ldfrank@ud4h.com

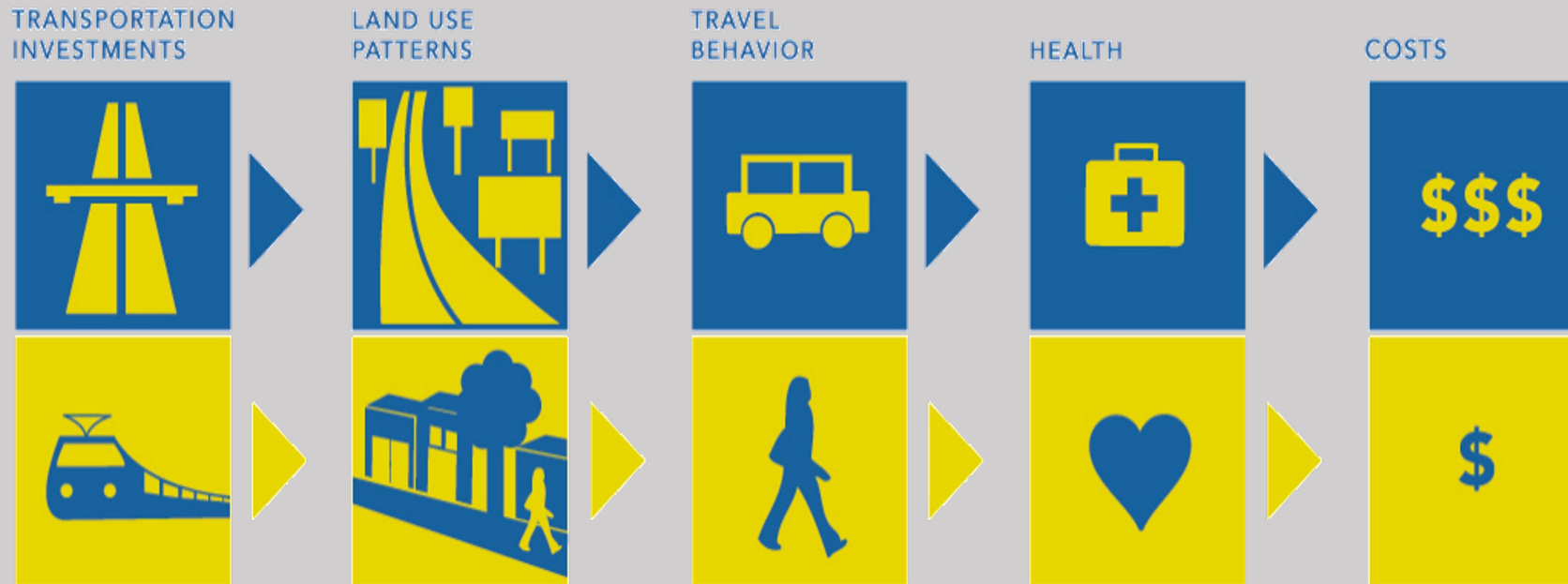**ud4h**
URBAN DESIGN 4 HEALTH

Causal Pathway

Frank, L. D., Iroz-Elardo, N., MacLeod, K. E., Hong, A. (2019). The pathways from built environment to health: Connecting behavior and exposure-based impacts. Journal of Transport and Health. Vol 12. March 2019. Pages 319-335
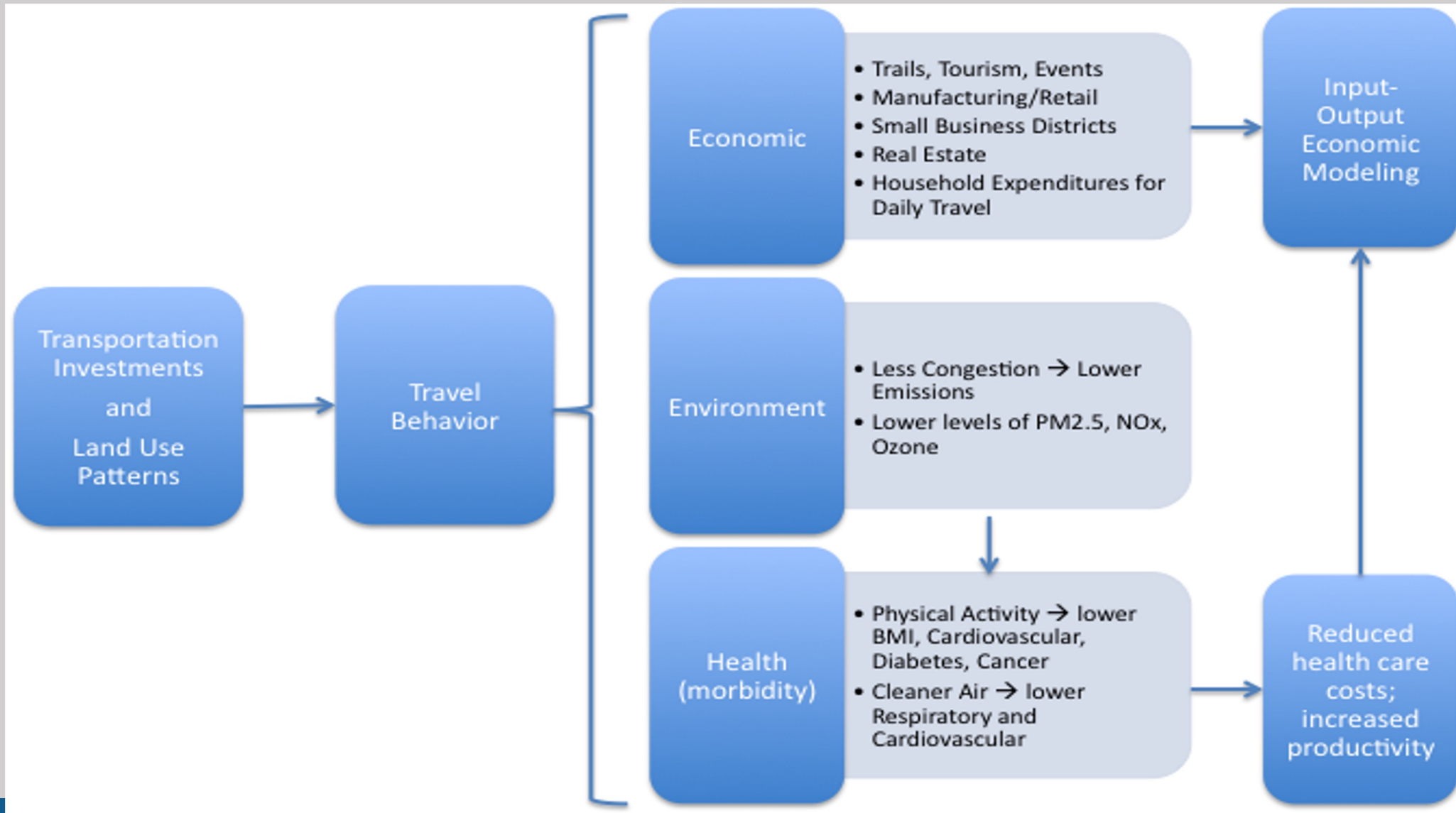
N-PHAM: Past, Current, and Next Steps

Initial concept development	Expert panel review and direction	Random parameter modeling	Expanding Outcomes and Improved Measures

Past → **Current** → **Next Steps**

First generation
- Los Angeles, Houston, San Joaquin
- API / Envision Tomorrow
- Peer reviewed & Published

Second generation
- Fixed Parameter Models
- Cost of Illness
- Las Vegas, Rochester, Houston Chicago
- EnviroAtlas Coordination
- Basic WebApp development
- Scenario Platform Integration

Third generation
- Random Parameter Models
- More use cases
- USEPA peer review
- API / EnviroAtlas integration
- Improved WebApp
- Publications

Fourth generation
- Air Pollution Exposure
- Full Monetization
- Pedestrian Environment
- Additional Outcomes
  - COVID-19
  - Cancer
  - Injury Risk / Safety

Source: "The Hidden Health Costs of Transportation" APHA. Written by UD4H, Inc. 2010.

GENESIS OF TOOL DEVELOPMENT

- **2005:** INDEX: Livable Community Initiative: Atlanta (SMARTRAQ)
- **2007:** I-PLACE3S: King County, added health module
- **2011:** UrbanFootprint: Vision California
- **2012:** CommunityViz: San Diego, & Toronto, Ontario & Surrey, BC—added health module
- **2015**: California Public Health Assessment Module (CPHAM) for Urban Footprint 2.0
- **2016-present**: National Public Health Assessment Model (NPHAM)

Health Monetization of Active Transportation (Southern CA)
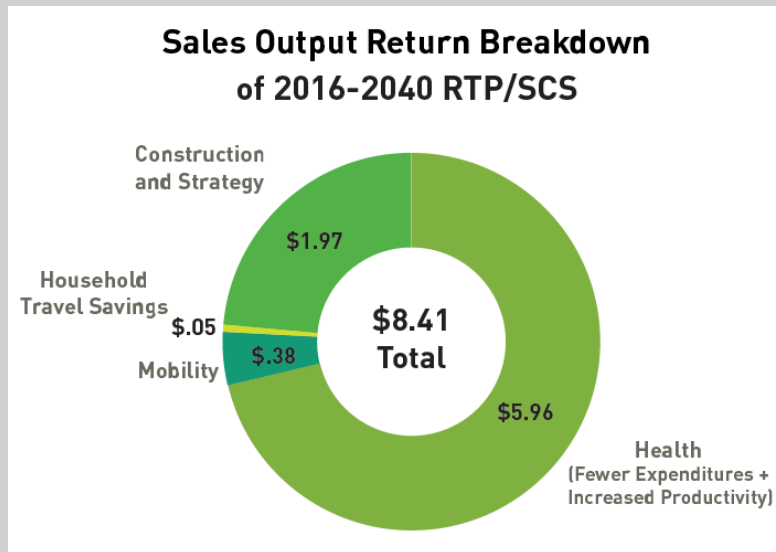
Utah Active Transportation Study
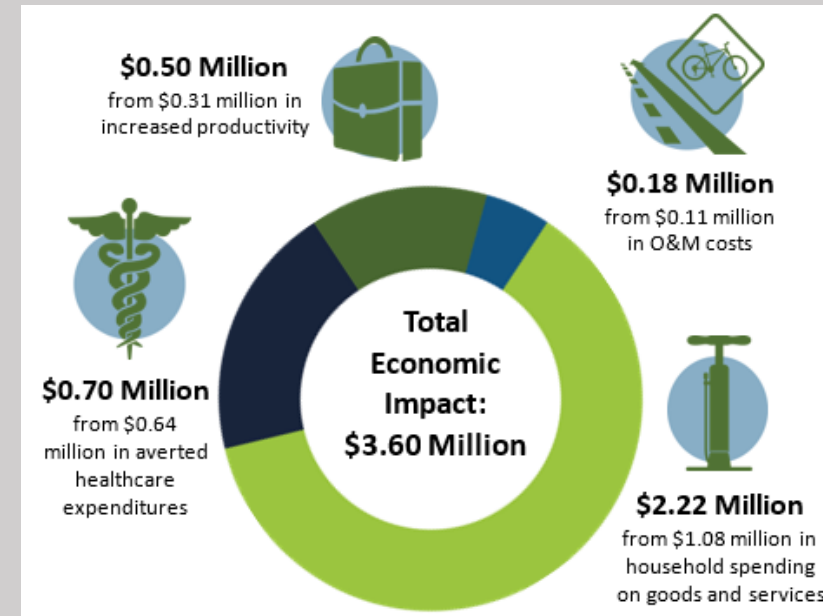
Case Study Application: South Stockton Promise Zone

HEALTH EQUITY STUDY

- **Integrating Health Into Regional Transportation Planning**
  - San Joaquin Council of Governments (SJCOG) is a metropolitan planning organization and responsible for regional transportation plans and programming of local, state, federal funds

  - Required to address environmental justice (EJ) in Regional Transportation Plans (RTPs)

  - More Intentional Focus on Health and Active Transportation

## South Stockton Promise Zone

- For the region, the neighborhoods in the SSPZ represent the most disadvantaged communities
  - Compared to the overall City population, SSPZ residents are more likely to experience poverty, be burdened by housing costs
  - There is also a higher concentration of communities of color in the SSPZ
  - Residents are more likely to come from a limited English-speaking household
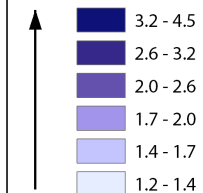
2035 FORECASTED CHANGES IN UTILITARIAN WALKING

Most Change

- Downtown Core
- Airport Way Corridor
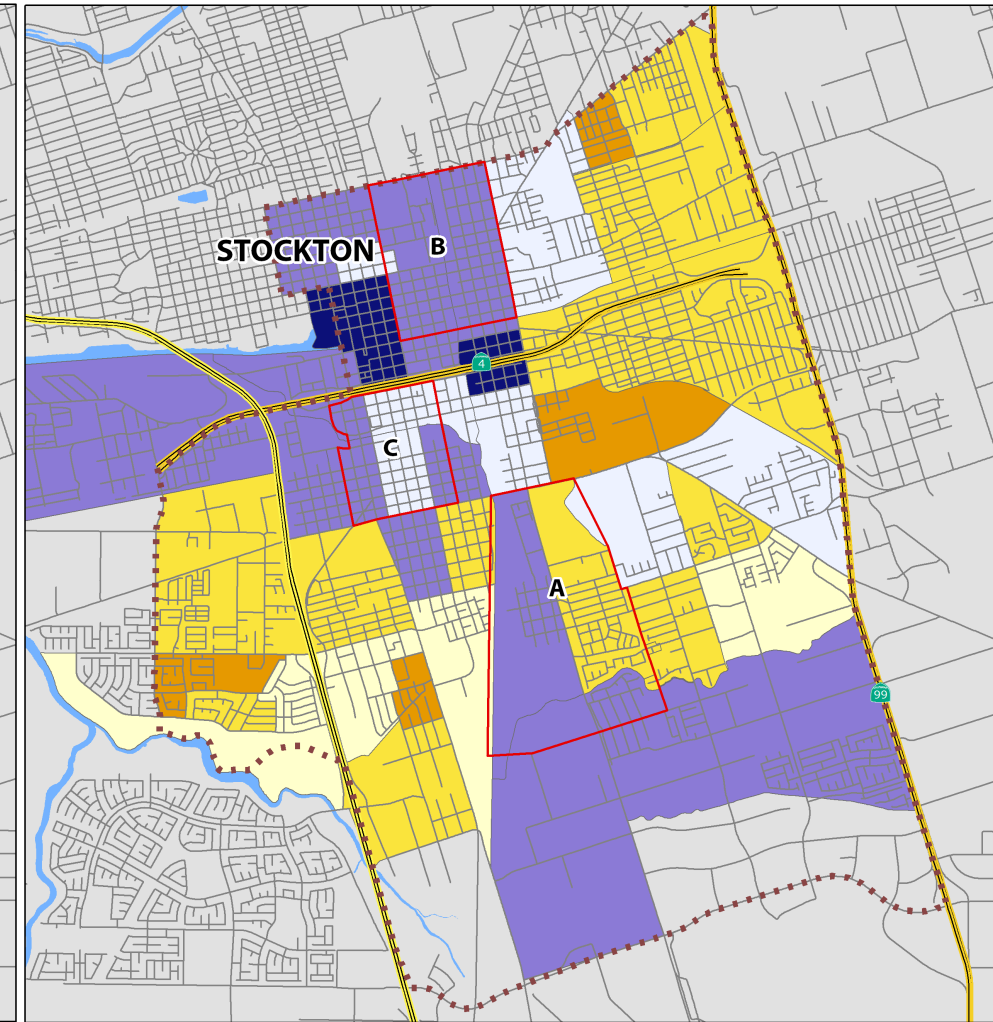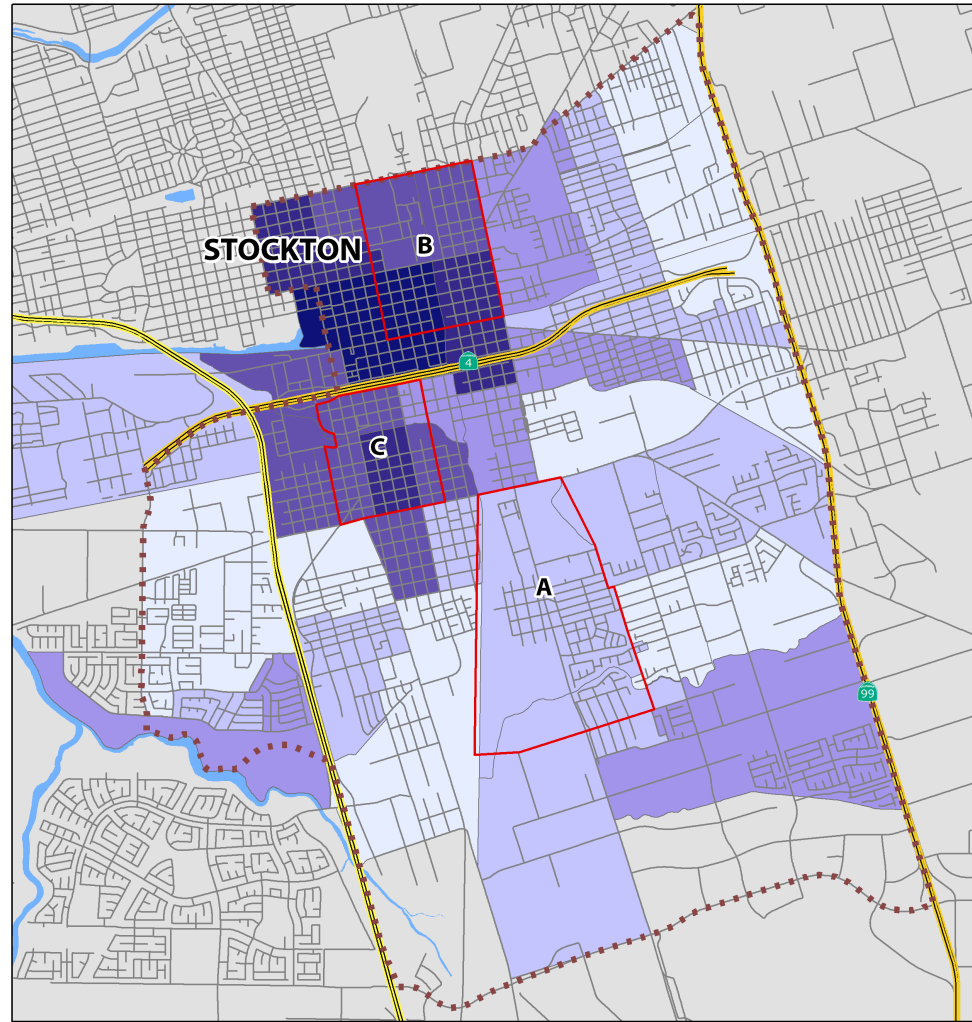
Walking for Transport¹ (min.) (2035)
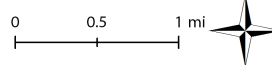
- 3.2 - 4.5
- 2.6 - 3.2
- 2.0 - 2.6
- 1.7 - 2.0
- 1.4 - 1.7
- 1.2 - 1.4

Scale: 1:45,000

0   0.5   1 mi

¹ Average daily 2035 minutes of walking per person for utilitarian transportation (predicted, N-PHAM health survey model) for Scenario 4.

Source: UD4H, 2020; American Community Survey (5-Year Estimates), Census Bureau, 2014-2018; California Health Interview Survey, 2015-2017; National Household Travel Survey (California Add-On Only), 2017.

Walking for Transport¹ (% Change: 2015-2035)

- 51.0% - 99.2%
- 36.7% - 51.0%
- 22.6% - 36.7%
- 5.6% - 22.6%
- 0.0% - 5.6%
- 0.0% - 0.0%

Scale: 1:45,000

0   0.5   1 mi

¹ Average daily 2035 minutes of walking per person for utilitarian transportation (predicted, N-PHAM health survey model) for Scenario 4.

Source: UD4H, 2020; American Community Survey (5-Year Estimates), Census Bureau, 2014-2018; California Health Interview Survey, 2015-2017; National Household Travel Survey (California Add-On Only), 2017.

2035 Forecasted Changes in PA
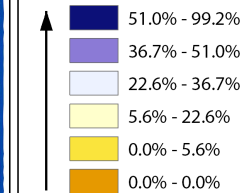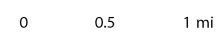
Utilitarian & Leisure Physical Activity

Physical Activity	Baseline (2015)		Adopted Scenario (2035)		Bold Scenario (2035)		
	Weighted Mean (Weighted SD)		Absolute Change	Percent Change	Weighted Mean (Weighted SD)	Absolute Change	Percent Change
	Baseline	Future			Future		
Walking for transport (daily minutes)	1.56 (0.36)	1.76 (0.53)	+0.20	+12.8%	1.94 (0.71)	+0.38	+24.4%
Walking for transport (participation)	17.0% (6.6%)	20.8% (9.2%)	+3.8%	+22.4%	22.9% (11.1%)	+5.9%	+34.9%
Walking for leisure (weekly minutes)	13.42 (0.74)	13.67 (0.78)	+0.25	+1.9%	13.94 (1.05)	+0.51	+3.8%
Walking for leisure (participation)	57.8% (1.1%)	58.2% (1.2%)	+0.4%	+0.7%	58.5% (1.5%)	+0.7%	+1.2%
Bicycling for transport (daily minutes)	1.04 (0.03)	1.05 (0.04)	+0.01	+1.0%	1.06 (0.05)	+0.03	+2.6%
Bicycling for transport (participation)	0.9% (0.4%)	1.2% (0.6%)	+0.3%	+33.3%	1.4% (0.7%)	+0.4%	+45.2%

2035 FORECASTED CHANGES IN HEALTH OUTCOMES

Chronic & Cardiovascular Disease

Health Outcome	Baseline (2015)		Adopted Scenario (2035)		Bold Scenario (2035)		
	Weighted Mean (Weighted SD)		Absolute Change	Percent Change	Weighted Mean (Weighted SD)	Absolute Change	Percent Change
	Baseline	Future			Future		
% Obesity (>30 BMI)	36.0% (3.2%)	34.5% (3.6%)	-1.5%	-4.2%	33.6% (4.1%)	-2.4%	-6.5%
% Overweight or obese status (>25 BMI)	70.9% (3.1%)	69.4% (3.8%)	-1.5%	-2.1%	68.5% (4.4%)	-2.4%	-3.3%
% Coronary heart disease	4.2% (0.8%)	4.0% (0.7%)	-0.2%	-4.8%	4.0% (0.8%)	-0.2%	-5.4%
% High blood pressure	29.7% (4.3%)	28.4% (4.1%)	-1.3%	-4.4%	27.6% (4.4%)	-2.1%	-7.0%
% Type 2 diabetes	11.1% (3.1%)	10.4% (2.8%)	-0.7%	-6.3%	10.1% (2.8%)	-1.0%	-9.4%

Mental & General Health Status

Health Outcome	Baseline (2015)		Adopted Scenario (2035)		Bold Scenario (2035)		
	Weighted Mean (Weighted SD)		Absolute Change	Percent Change	Weighted Mean (Weighted SD)	Absolute Change	Percent Change
	Baseline	Future			Future		
% Fair or poor general health	30.3% (4.9%)	29.8% (4.7%)	-0.5%	-1.7%	29.6% (4.6%)	-0.7%	-2.4%
% Depression	32.8% (2.8%)	32.4% (2.7%)	-0.4%	-1.2%	32.2% (2.7%)	-0.6%	-1.9%
% Psychological distress	6.1% (0.8%)	5.9% (0.7%)	-0.2%	-3.3%	5.8% (0.7%)	-0.4%	-6.2%

2022 RTP/SCS
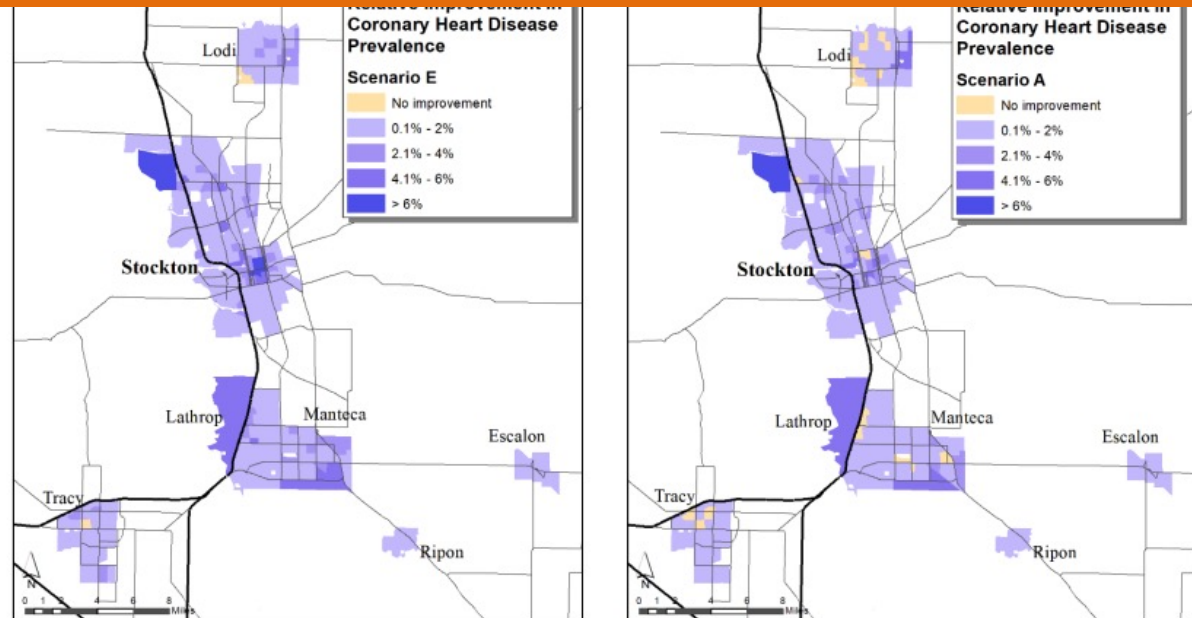
TCAC Opportunity Area	Baseline	Scenario A	Scenario E
High Segregation & Poverty	2.6%	2.6%	2.6%
Low Resource	2.8%	2.6%	2.6%
Moderate Resource	2.9%	3.0%	2.9%
High Resource	2.9%	2.8%	2.8%
Highest Resource	3.0%	2.9%	3.0%
Total	2.9%	2.8%	2.8%
Absolute difference from baseline		-0.09%	-0.09%
Relative difference from baseline		-3.02%	-3.18%

FIGURE 34: TOTAL SJCOG REGION'S POPULATION-WEIGHTED AVERAGE FOR CORONARY HEART DISEASE PREVALENCE FOR EACH SCENARIO BY OPPORTUNITY AREA CLASSIFICATION

OUTCOMES & NEXT STEPS

- Jurisdictions initiated neighborhood level assessments for project development

- Sustainable Transportation Equity Program (STEP) – Stockton Mobility Collective

- Consideration of health metric use for active transportation scoring

- Consideration of health metric use for Regional Early Action Program (REAP) planning and implementation grants

THANK YOU

Kim Anderson

Deputy Director for Planning

SJCOG

anderson@sjcog.org

GTC Nine-County Planning Region & Rochester Metropolitan Planning Area

Regeneration for Small Growth Region

Challenges ⟶ Opportunities

Challenges

- Slow population growth

- Change in employment

- Job sprawl

- Persistent poverty and environmental justice

Opportunities

- Strong urban and regional cores

- Growth in multiple industries

- Investment in transit and active transportation

- Partnership across public, private, and civic sectors

Need for Scenario Planning

1. Broaden the conversation about long-range issues and plans
   - Change the conversation from regional decline to future opportunities
   - Reach more audiences through visualizations and public involvement
   - Facilitate bringing multiple jurisdictions to the table
2. Provide technical resources to enable planning
   - MPO financial support and leadership for developing a scenario planning platform
   - Let local partners lead initiatives

Need for Scenario Planning

3. Foster collaboration among existing <u>and new</u> partners
   - Lay foundation for multi-jurisdictional land use plans, polices, and agreements
   - Create opportunities for new interdisciplinary studies and plans

4. Preparation for future issues and regulations
   - New York State Climate Leadership and Community Protection Act
   - County Housing and Farm Protection plans
   - Integrate health impacts as a key performance measure

Analysis Modules

Land Consumption

- Measure impacts on natural and agricultural lands by land developed/redeveloped

Energy and Water

- Electricity/natural gas and water use for residential and commercial buildings based on building type and climate zone.

Transportation

- Assess and map vehicle miles traveled, fuel use, and emissions for current and future scenarios.
- Transit and walking accessibility Measure and map walk access to transit stops, parks and schools, services, and other key amenities.

Analysis Modules

URBAN FOOTPRINT

Emissions

- Carbon and pollutant emissions associated with energy use, water use, and transportation.

Fiscal Impacts

- Analyze annual household expenses associated with energy, water, and transportation use.
- Public sector costs relating to infrastructure maintenance and providing services

Genesee-Finger Lakes Health Assessment Module

- Based upon National Public Health Assessment Module
- Post-processing of UrbanFootprint scenarios

Health Impact

- Project rates of physical activity and changes in chronic disease rates.
- Responsive to changes in built environment types and air emissions.

Case Study: West Main Street & Bull's Head

The **Genesee-Finger Lakes Public Health Assessment Module** (GFL-PHAM) was used to evaluate existing community health and physical activity conditions in the W. Main Street and Bulls Head Brownfield Opportunity Area.

West Main Street Community Study Area
Ten US Census block groups within 400 meters of the West Main Street Corridor and south of I-490
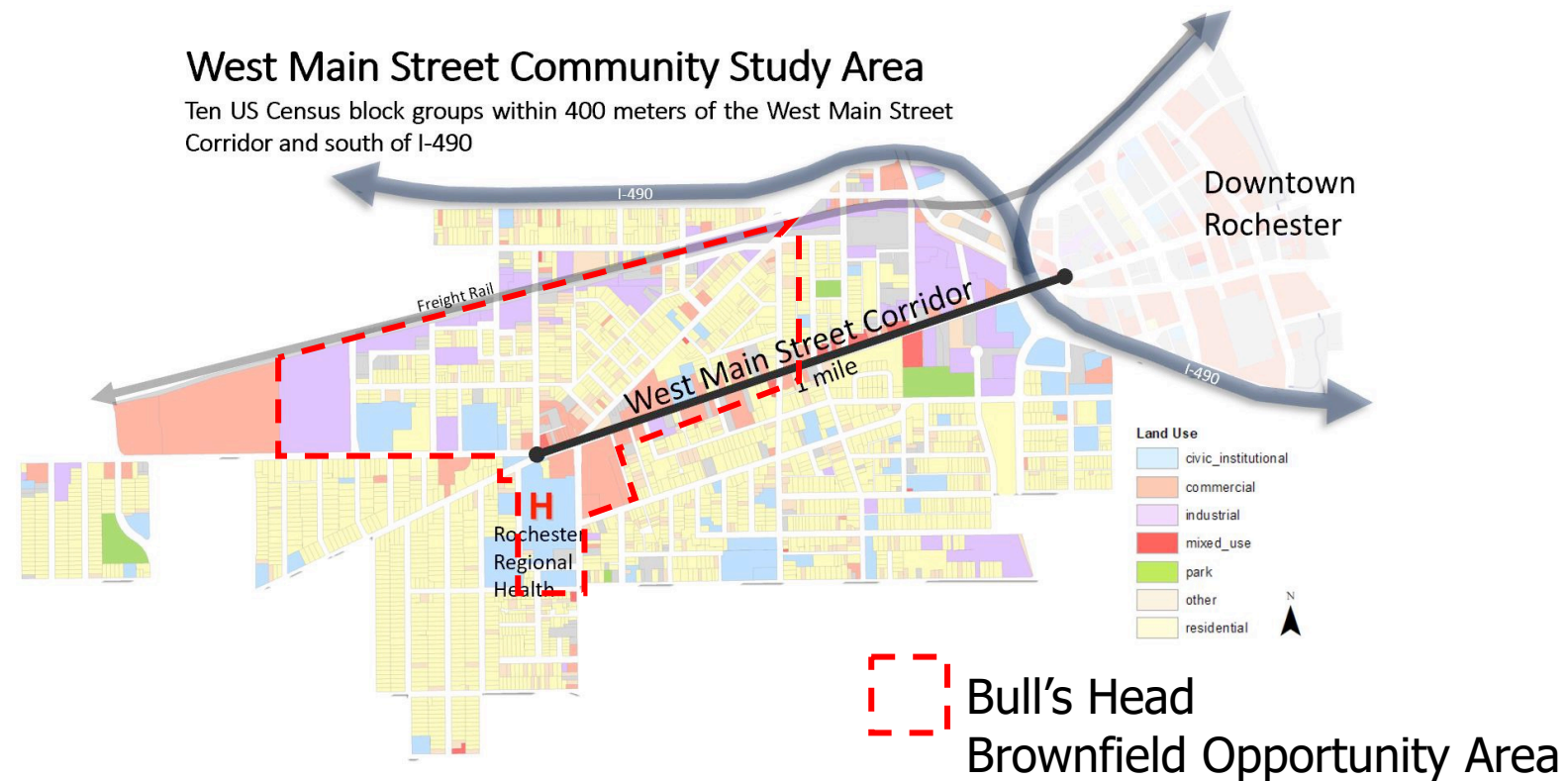
Case Study: West Main Street & Bull's Head

The **Genesee-Finger Lakes Public Health Assessment Module** (GFL-PHAM) was used to evaluate existing community health and physical activity conditions in the W. Main Street and Bulls Head Brownfield Opportunity Area.

West Main Street Community Study Area
Ten US Census block groups within 400 meters of the West Main Street Corridor and south of I-490

Downtown Rochester

Freight Rail

West Main Street Corridor

1 mile

I-490

I-490

H
Rochester Regional Health

Land Use
- civic_institutional
- commercial
- industrial
- mixed_use
- park
- other
- residential

N

Bull's Head
Brownfield Opportunity Area

Existing Conditions – West Main Street

Walking Space: 5 to 8 feet

Driving Space: 40-50 feet (10-12.5 feet per lane, depending on location and presence of parking lane)

Parking Space: 0 to 10 feet, depending on location

Walking Space: 5 to 8 feet

Figure 10. Existing Allocation of Space on West Main
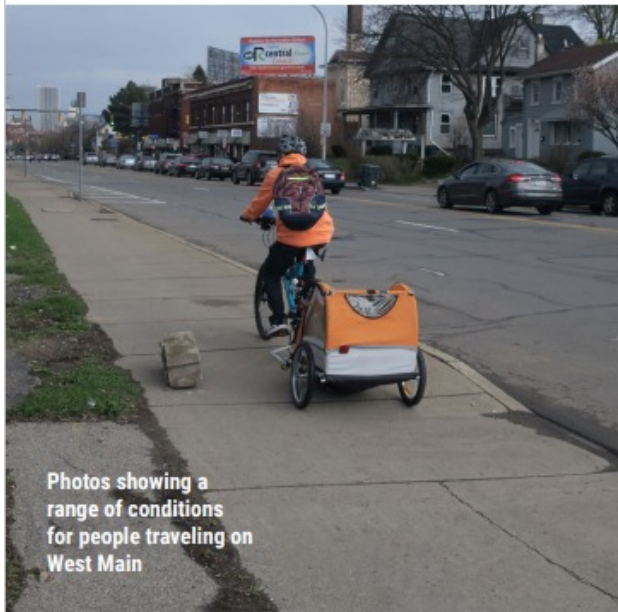
Photos showing a range of conditions for people traveling on West Main

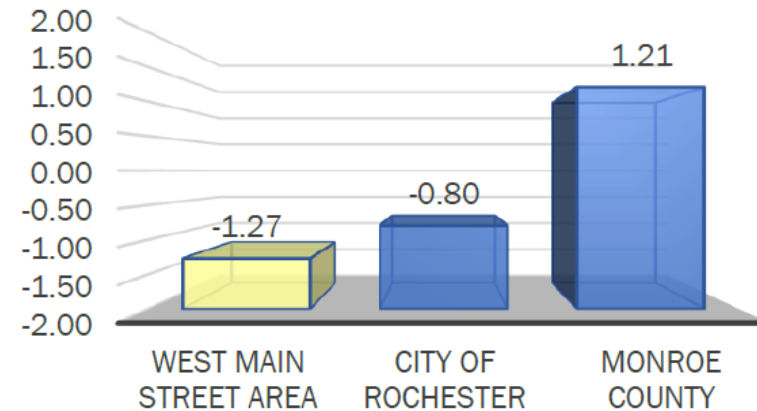# Case Study: West Main Street & Bull's Head

Existing Conditions

Outcome	Monroe County	City of Rochester	West Main Street
BMI>25 (%)	61.2	65.5	71.8
Type 2 Diabetes (%)	9.4	13.1	20.9
Hypertension (%)	26.7	26.4	30.6
Coronary Heart Disease (%)	5.3	4.3	4.4
Depression (%)	19.4	25.5	28.8
Distress (%)	3.9	5.6	6.4
Walk for Transport (%)	19.1	26.6	28.8
Bike for Transport (%)	1.5	2	2
Transit Use (%)	9.4	18.2	26.5

Greenspace Index

Cost of Illness
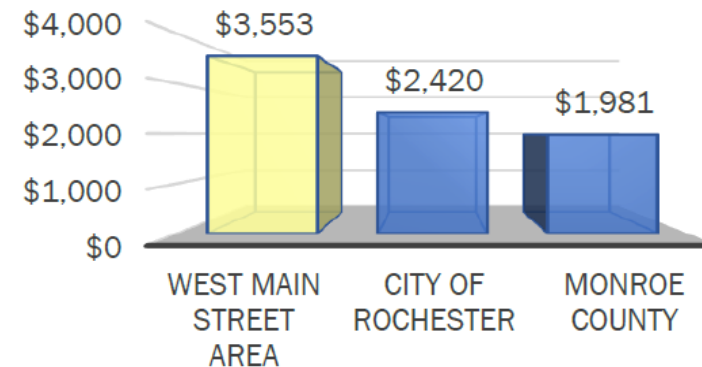
West Main Street Multi-Modal Transporation and Placemaking Plan

A rendering showing West Main with expanded sidewalks, furnished and accessible bus stops, separated bike lanes, on-street parking, and a narrowed vehicle travelway

Bull's Head Redevelopment Vision Plan

New York State, Maxar

Case Study: West Main Street & Bull's Head

Scenario Analysis

Increase Bull's Head to match Monroe County averages:

Metric	Existing	Scenario
Accessible Park Area	0.5 acres	5.0 acres
Tree Canopy	17%	27%

- ➤ **5% reduction** in obesity prevalence
- ➤ **2% reduction** in coronary heart disease prevalence
- ➤ **3% reduction** in high blood pressure prevalence
- ➤ **7% reduction** in type 2 diabetes

Future Directions

1. Training for both staff and other stakeholders
2. Support (financial and technical) for more local planning initiatives
   - Integrate with air
3. Use N-PHAM for *2050 Long-Range Transportation Plan*
4. Get the word out !!!

For more information
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(585) 232-6240