Health Beyond Healthcare
The Chronic Disease Impacts of Neighborhood Design

Erik J. Aulestia, AICP
Principal, Torti Gallas + Partners
Prior to 20th Century – How should a city look and function?

Architects
City as Built Environment
L’Enfant Plan of Washington
New York City Grid

Public Health Officials
Infrastructure (for Disease Prevention)
Potable Water
Garbage

Social Workers
Improve the Lives of People
Cleaner Tenements
Light and Air

At first Urban Planning Conference in 1898 a British planner asked “...are we striving for beautiful people or beautiful cities?...is it about physical design or about making things easier for people who live in our urban spaces?”

based on article by Amanda Erickson

TORTI GALLAS + PARTNERS
Urban Planning

Late 19th C. Rapid Industrialization
City Beautiful Movement
Birth of Planning

Chicago School

Modernism
Suburbanization & Urban Crisis
Environmentalism

Post Modernism
Sustainability
Zoning

**Village of Euclid v. Ambler Realty**

1926

US Supreme Court ruled that zoning’s police power stemmed from four criteria – **Public Health**, Safety, Morals, and General Welfare
How have we done?
A Health Crisis in America

As of 2012, nearly half of all adults had one or more chronic health conditions.

117 million people

 Adults with Chronic Health Conditions

 Adults without Chronic Health Conditions
A Health Crisis in America

Chronic diseases are responsible for 7 of 10 deaths each year*

*https://www.cdc.gov/chronicdisease/index.htm
A Health Crisis in America: Chronic Diseases*

I. Cardiovascular/Heart Disease
   33% of adults (92.1 million people) have at least one type of cardiovascular disease

II. Type 2 Diabetes
   30.3 million people (9.4%) - 84.1 million pre-diabetes

III. Obesity
     36% (84 million adults)

IV. Arthritis
    Over 54 million adults

V. Cancer
   Care cost $157,000,000,000 in 2013

VI. Stroke

VII. Mental Illness
     50% of Pop. at some point in life – 1 in 5 in a year

Chronic Diseases are Preventable
What Makes Us Healthy?

- Clinical Care: 10%
- Genetics: 20%
- Environment: 20%
- Healthy Behaviors: 50%

Source: “Health Beyond Healthcare” Robert Wood Johnson Foundation
The Risk Factors for Chronic Disease

- Physical inactivity
- High blood pressure
- High body mass index
- Diets low in fruits and vegetables and high in sodium and saturated fats
- Tobacco smoking and secondhand smoke exposure
- Alcohol use
CDC Recommendations for Physical Activity

“Sitting is the new smoking”

Avoid Inactivity. Some physical activity is better than none.

- 50% of Adults did not meet recommendations for physical activity
- 79% did not meet for both aerobic & muscle-strengthening

TORTI GALLAS + PARTNERS
CDC Recommendations for Physical Activity

Adults
For substantial benefits:
- 150 mins./week moderate or
- 75 mins./week vigorous
- More extensive benefits 2x
- Muscle strengthening 2+ days/week

Children
For substantial benefits:
- 150 mins./week moderate or
- 75 mins./week vigorous
- More extensive benefits 2x
- Muscle strengthening 2+ days/week
Would We Have a Healthcare Crisis?

The chronic disease price tag in the U.S. is 86% of our annual healthcare expenditures = $2,700,000,000,000/year
Extensive Research Shows that Community Design Affects your Behavior & Health
Unintended Consequences of Urban Sprawl

Residents of Urban Sprawl:

• Walk Less
• Have a Higher Incidence of Obesity
• Have Higher Levels of Hypertension

Relationship Between Urban Sprawl and Physical Activity, Obesity, and Morbidity
Reid Ewing, Tom Schmid, Richard Killingsworth, Amy Zlot, and Stephen Raudenbush
A Community’s Design Can Improve Your Health

Atlantic Station – Atlanta, GA

46% - 54% Increase in Walking for Recreation

44% - 84% Increase in Walking for Transportation

Mueller – Austin, TX

Significant Increase in Walking

Largest Increase in Low Activity Group


Source 2: Calise, TV, et al. “Peer Reviewed: Do Neighborhoods Make People Active, or Do People Make Active Neighborhoods? Evidence from a Planned Community in Austin, Texas.” Preventing Chronic Disease 10 (2013)
Compact Walkable Mixed-Use Places are Healthier

Form Matters
Case Study: A Community Health Report Card for King Farm
Community Health Report Card

A Case Study and Tool for Comparing the Chronic Disease Impacts of a Community’s Design
Healthy Communities Predictive Tool

A. Performed Scientific Literature Review to Glean Research-Based, Statistically Supported, Peer Reviewed, Verifiable Metrics (Meta-Analysis Preferred)

B. Correlated Research Findings to Derive Health Impacts

C. Measured Baseline Projects for Comparison

D. Measured Case Study Projects for Comparison

E. Developed Community Health Report Card
The Communities

King Farm, MD

Massapequa, NY

Lake Glen Hills, MD

TORTI GALLAS + PARTNERS
Specific community form can promote increases in the amount of walking. Increased walking can reduce the rate of chronic diseases. It can also mitigate complications of chronic disease to optimize quality of life. In addition, it has also been found that physically active children have better grades in school.

Air quality contributes to our cardiovascular health. Walkable communities reduce vehicle travel and resultant emissions/particulate matter. Street trees also reduce particulate matter and can reduce the rate of chronic diseases.

Access to high quality food promotes a diet that includes fruits and vegetables and can reduce the rate of chronic diseases.

Convenient access to health services promotes timely behavioral changes and clinical care that can reduce the rate of chronic diseases and slow the progression of existing disease.

Social interaction and access to nature have been shown to reduce the incidence of depression and the need for mental health care.
Base Measurements Combined with Health Metrics to Calculate Comparative Health Outcomes

Population Density
Particulate Matter
Vehicle Emissions
Character of Development
Vehicle Miles Traveled
Mix of Uses
Retail Character
Location of Retail
Chain Supermarket Availability
Distance to Food Source
Quantity of Open Space
Quantity of Usable Open Space
Distance to Open Space
Presence, Number, and Spacing of Street Trees
Rate of Overweight Population
Obesity Rates
Costs Associated with Obesity and Overweight
Walk Score
Intersection Density
Rates of Walking
Accident Incidence
Hospital Admissions
Researchers suggest that a sedentary lifestyle is more deadly than smoking! Even a small amount of physical activity versus inactivity has health benefits. However, the CDC has established minimum levels of physical activity to achieve the greatest health benefits. Our busy lifestyles can seem to get in the way of exercise, but simply walking more has been shown to have dramatic health benefits that reduce rates of chronic disease or improve existing chronic disease conditions. Research has shown that some types of communities result in greater walking than others - in short, people walk more in mixed-use pedestrian-oriented communities. Based on research, we can measure the likely increase in walking from one community to another and then correlate those statistics with the measured health benefits of increases in walking. This allows us to calculate the specific improvements (or worsening) rates of chronic health conditions from one community to another.

Projected increases in resident walking use Street Smart Walk Scores (that measure walking routes and distances to specific types of amenities, block lengths, and intersection density) as a starting point and then pair those results with research findings. In addition, pedestrian accident incidence is reduced when there is an increase in density combined with a pedestrian scaled urban form as found at King Farm. The following benefits have been calculated for King Farm:

- **7.2% Reduction**
  - **HYPERTENSION**
  - Due to an increase in resident walking

- **29% Reduction**
  - **HOSPITAL EXPENSES**

- **.3% Reduction**
  - **TYPE 2 DIABETES**
  - Due to an increase in resident walking

- **30% Reduction**
  - **HOSPITAL ATTENDANCE**
  - The likely increase in resident walking results in a 30% reduction in hospital attendance and a 25% reduction in hospital expenses.

- **14% Reduction**
  - **TRAFFIC RELATED ACCIDENTS**
  - The compact development pattern (density) and retail configuration results in a 14% decrease in traffic related accidents.

- **$378,535 Reduction**
  - **OBESITY**
  - The increase in resident walking results in a 8.2% reduction in obesity.

The reduction in obesity results in a $378,535 reduction in obesity related costs for the community per year.
Outdoor air quality and water quality can have a significant effect on our health. The EPA has identified six pollutants that it regulates based on the effects on human health. These include the following: Carbon Monoxide, Lead, Nitrogen Oxides, Ozone, Particulate Matter, and Sulfur Dioxide.

The metric included here assesses the impact of Particulate Matter Pollution. The size of particles is directly linked to their potential for causing health problems. Small particles less than 10 micrometers in diameter pose the greatest problems, because they can get deep into your lungs, and some may even get into your bloodstream. Exposure to such particles can affect both your lungs and your heart. Numerous scientific studies have linked particle pollution exposure to a variety of problems. Negative health impacts include:

- premature death in people with heart or lung disease
- lung cancer mortality
- nonfatal heart attacks
- irregular heartbeat
- aggravated asthma
- decreased lung function
- increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.

King Farm is considered a TND (Traditional Neighborhood Development) which results in fewer vehicle miles traveled and an accompanying decrease in emissions and particulate matter. Research has also shown that street trees act to intercept and absorb particulate matter. Since the effect of particulate matter on cardiopulmonary mortality, lung cancer mortality, and all-cause mortality has been measured, we can correlate the specific reduction in particulate matter with the health benefits for residents at King Farm. Here we assess the health impacts of PM_{2.5}. These are fine inhalable particles 30 times smaller than the diameter of human hair and that are composed of combustion particles, organic compounds, metals, etc. The following benefits have been calculated for King Farm:


Exercise makes you live longer.

- **.4% Reduction** in **ALL-CASE MORTALITY**
- **.6% Reduction** in **CARDIOPULMONARY MORTALITY**
- **.7% Reduction** in **LUNG CANCER MORTALITY**

Due to reduction in vehicle miles traveled and presence of street trees to remove particulate matter.
The Dietary Guidelines for Americans, 2010 recommends that Americans eat more fruits and vegetables as part of a healthy diet. Fruits and vegetables have important nutrients for the human body. Eating fruits and vegetables lowers the risk of developing many chronic diseases and can also help with weight management. The State Indicator Report on Fruits and Vegetables, 2013 shows that fruit and vegetable consumption is higher in some states than others, but overall consumption of fruits and vegetables in the United States is low. Studies show that bringing morechain groceries (versus small convenience stores) to a community increases the access and likelihood of consumption of high-quality foods such as fruits and vegetables. This improvement in diet leads to a reduction in obesity, reductions in overweight adolescents, and cost savings associated with these reductions. Using the number of groceries in a zip code, the distance to groceries, reductions in obesity, and costs associated with obesity we calculate the health benefits for King Farm.

Determinants of Health and their Contribution to Premature Death
- Schroeder (2007)

40% Behavior
50% Environment
10% Healthcare
15% Social
30% Genetics

More physically fit children have higher grades in school.
Mental health includes our emotional, psychological, and social well-being and affects how we think, feel, and act. It also helps determine how we handle stress, relate to others, and make healthy choices. Mental health is important at every stage of life, from childhood and adolescence through adulthood. Mental and physical health are equally important components of overall health. Mental illness, especially depression, increases the risk for many types of physical health problems, particularly long-lasting conditions like stroke, type 2 diabetes, and heart disease. Similarly, the presence of chronic conditions can increase the risk for mental illness. Mental illnesses are among the most common health conditions in the United States.

- More than 50% will be diagnosed with a mental illness or disorder at some point in their lifetime.
- 1 in 5 Americans will experience a mental illness in a given year.
- 1 in 5 children, either currently or at some point during their life, have had a seriously debilitating mental illness.

Researchers have found that in urban environments one factor contributing to mental health is the presence and access to open space. Studies have shown that decreased distances to usable green space and increased proportion of green space in a neighborhood are associated with a decrease in anxiety/mood disorder treatment. Calculating the quantity and distances to green spaces at King Farm and correlating this with research, we are able to calculate the likelihood of a reduction in anxiety/mood disorders as follows:

22.6% Reduction

ANXIETY/MOOD DISORDER TREATMENT
The increased availability and location of green spaces results in a 22.6% decrease in anxiety/mood disorder treatment compared to Massapequa, NY.

Researchers suggest that a sedentary lifestyle is more deadly than smoking.
A Slightly Different Sustainability Model: Spectrum

**NATURAL SYSTEMS**
- Ecology
- Water
- Food

**BUILT ENVIRONMENT**
- Shelter & Form
- Energy & Resources
- Mobility

**PEOPLE**
- Economy
- Education & Traditions
- Health & Happiness
Health Beyond Healthcare
The Chronic Disease Impacts of Neighborhood Design

Erik J. Aulestia, AICP
Principal, Torti Gallas + Partners