LEED® for
Neighborhood Developments

This talk on LEED-ND will cover:

1. What is LEED-ND?
2. Why, when, and how was ND developed?
3. How is ND being used?
4. How does LEED-ND quantify neighborhood health and sustainability?
5. How can public health research inform LEED-ND?

About Raimi + Associates

- **Comprehensive Planning**
- **Sustainable Development**
  - LEED-ND Faculty
  - Project LEED on 3 ND Gold Projects
  - Wrote sections of LEED-ND Reference Guide
- **Public Health and the Built Environment**
  - LEED-ND Public Health Criteria Study, USGBC
  - How to Create and Implement Healthy General Plans, Public Health Law & Policy
  - South Gate General Plan, South Gate CA
  - Riverside County Public Health Element, Riverside County, CA

raimi+ associates
the nature of community

USGBC

Congress for the New Urbanism

NRDC

What is LEED for Neighborhood Developments?

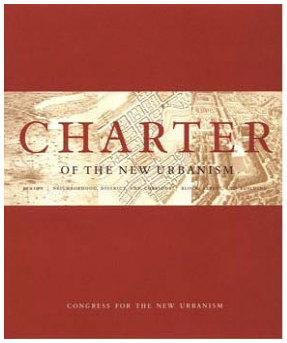
What is LEED?

- LEED = Leadership in Energy and Environmental Design
- Developed by the US Green Building Council
- A leading-edge system for designing, constructing, operating and certifying the world's greenest buildings.
- Goal: TRANSFORM THE MARKET!

LEED Products

- LEED for New Construction
- LEED for Core and Shell
- LEED for Commercial Interiors
- LEED for Existing Buildings Operation & Maintenance
- LEED for Homes
- LEED for Schools
- LEED for Retail
- LEED for Healthcare
- *LEED-ND: LEED for Neighborhood Developments*

What is LEED-ND?

Principles of Smart Growth + 

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- ND = Neighborhood Developments
- A rating system that combines elements of smart growth, urbanism, and green building

U.S. Green Building Council

Mission: To transform the way buildings and communities are designed, built, and operated, enabling an environmentally and socially responsible, healthy and prosperous environment that improves the quality of life.

The Ten Principles of Smart Growth (1996)

SETTLE IN THE RIGHT LOCATION

1. Preserve Open Space, Farmland, Natural Beauty and Critical Environmental Areas
2. Strengthen and Direct Development Towards Existing Communities

DEVELOP COMPACT CONNECTED AND COMPLETE PLACES

1. Take Advantage of Compact Building Design
2. Create Walkable Neighborhoods
3. Mix Land Uses
4. Foster Distinctive, Attractive Communities with a Strong Sense of Place

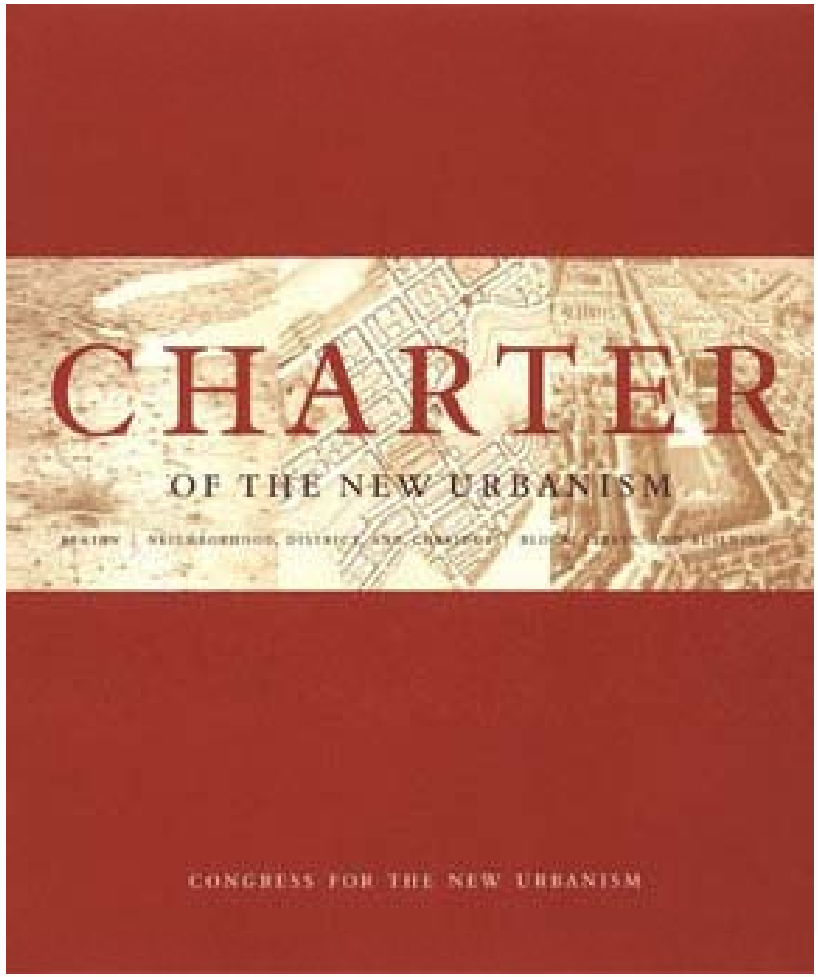
OFFER CITIZENS ROBUST CHOICES

1. Create a Range of Housing Opportunities and Choices
2. Provide a Variety of Transportation Choices

CONDUCT A FAIR AND TRANSPARENT DEVELOPMENT PROCESS

1. Make Development Decisions Predictable, Fair and Cost Effective
2. Encourage Community & Stakeholder Collaboration

The Charter of the New Urbanism (1996)



The Congress for the New Urbanism views disinvestment in central cities, the spread of placeless sprawl, increasing separation by race and income, environmental deterioration, loss of agricultural lands and wilderness, and the erosion of society's built heritage as one interrelated community-building challenge.

LEED-ND Partner Motives

- **Smart Growth wanted to make the 10 Smart Growth Principles operational**
- **CNU wanted an endorsement to defend its projects against NIMBY's posing as environmentalists**
- **USGBC wanted to address multi-building projects**

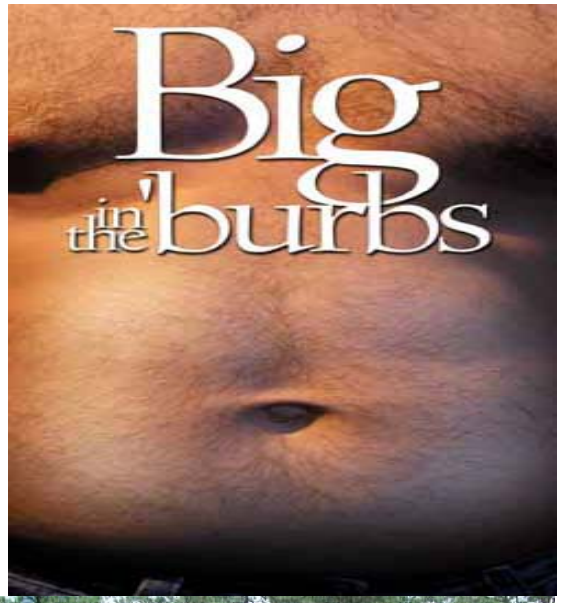
Why, When and How was LEED-ND Developed?

How Green Are These Buildings?

Why Is LEED-ND Needed?

Environmental Impacts of Land Development

- Land consumption
- Driving
- Air Pollution
- Climate Change
- Water use
- Energy use
- Ecological Footprint
- Public Health



LEED-ND Highlights

- National certification for sustainable land developments
- Market is both development teams and government
- Can “certify” at 3 stages: plan, entitled plan or development
- 12 Pre-Requisites that can preclude certification
- 100 Base Credits: Minimum of 40 to Certify, 50, 60, 80
- 6 Innovation Credits, 4 Regional Credits

LEED & ND Development Timeline

Who wrote LEED-ND?

Congress for the New Urbanism

NRDC

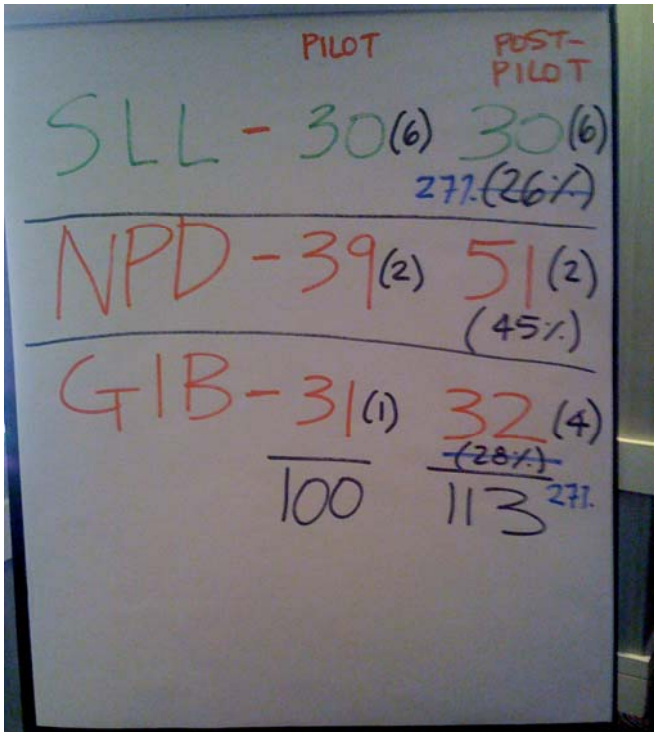
Public Comments – Log and Response

LEED for Neighborhood Development 1st Public Comment

Credit	Credit Description	Submitted By	Organization	Date Entered	Comments	Response
SLLp1	Smart Location	Peter Henry	BP Realty	11/17/08 17:53	**Do you believe that this prerequisite/credit is appropriate for sustainable neighborhoods (e.g., technical rigor, market usability, environmental performance)? Please explain.** this is why I dont like the LEED program -- despite having a washington DC area 180 acre TOD in montgomery county with an existing MARC station and CCT station proposed, and despite winning the NAIOP Smart Growth Award for 2008, we dont qualify except if we pretend to meet the LEED criteria. On Well...on to the next certificate.	Thank you for your comment. We hope that LEED will be better able to serve your needs in the future.
SLLp1	Smart Location	David Smith	Barton Malow Co.	11/17/08 17:54	**Do you believe that this prerequisite/credit is appropriate for sustainable neighborhoods (e.g., technical rigor, market usability, environmental performance)? Please explain.** all options given are necessary for sustainable neighborhoods. **Do you have any suggestions on how to improve the technical requirements of this prerequisite/credit? Please explain, providing citations to data and research where possible.** I see there are 5 options given, and I would like to suggest that this credit must achieve at least 2 of the options. Also, I strongly believe that the Assests Option should be mandatory. This would significatly reduce dependance on transportation, and increase overall community impact and moral of the residents **Do you have other comments about this prerequisite/credit that were not captured in the first two questions?** Of all other subsections of community development, i feel this subset is the most lenient of them all.	Thank you for your comment. Prerequisites are designed to set a minimum level of performance for projects seeking to participate in LEED for Neighborhood Development, and each option is designed to independently assure that the minimum has been met. It is therefore unnecessary that projects comply with more than one option path. However, each option path within SLLp1 covers topics that are dealt with in greater detail in credits. Projects must complete credits in addition to complying with prerequsites in order to have enough points to achieve certification.
SLLp1	Smart Location	David Gerard	Charter House Innovations	11/17/08 16:28	**Do you have other comments about this prerequisite/credit that were not captured in the first two questions?** The "general comments" section doesn't seem to be working, so I'll enter this here. It would be nice if the acronyms were consistent with the other rating systems. At the very least, having them 2 letters. Let's not reinvent the wheel here. Also: the "smart" in SLL seams trite and silly. Couldn't we simply have SS again?	Thank you for your comment. The LEED for Neighborhood Development core committee feels that the current titles are an appropriate representation of the content of each section, and will retain them at this time.

How was LEED-ND weighted?

Strategically



Scientifically

National Institute of Standards and Technology

TRACI

Tool for the Reduction and Assessment Of Chemical and Other Environmental Impacts

USGBC

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LEED-ND Public Health Criteria Study (2005)

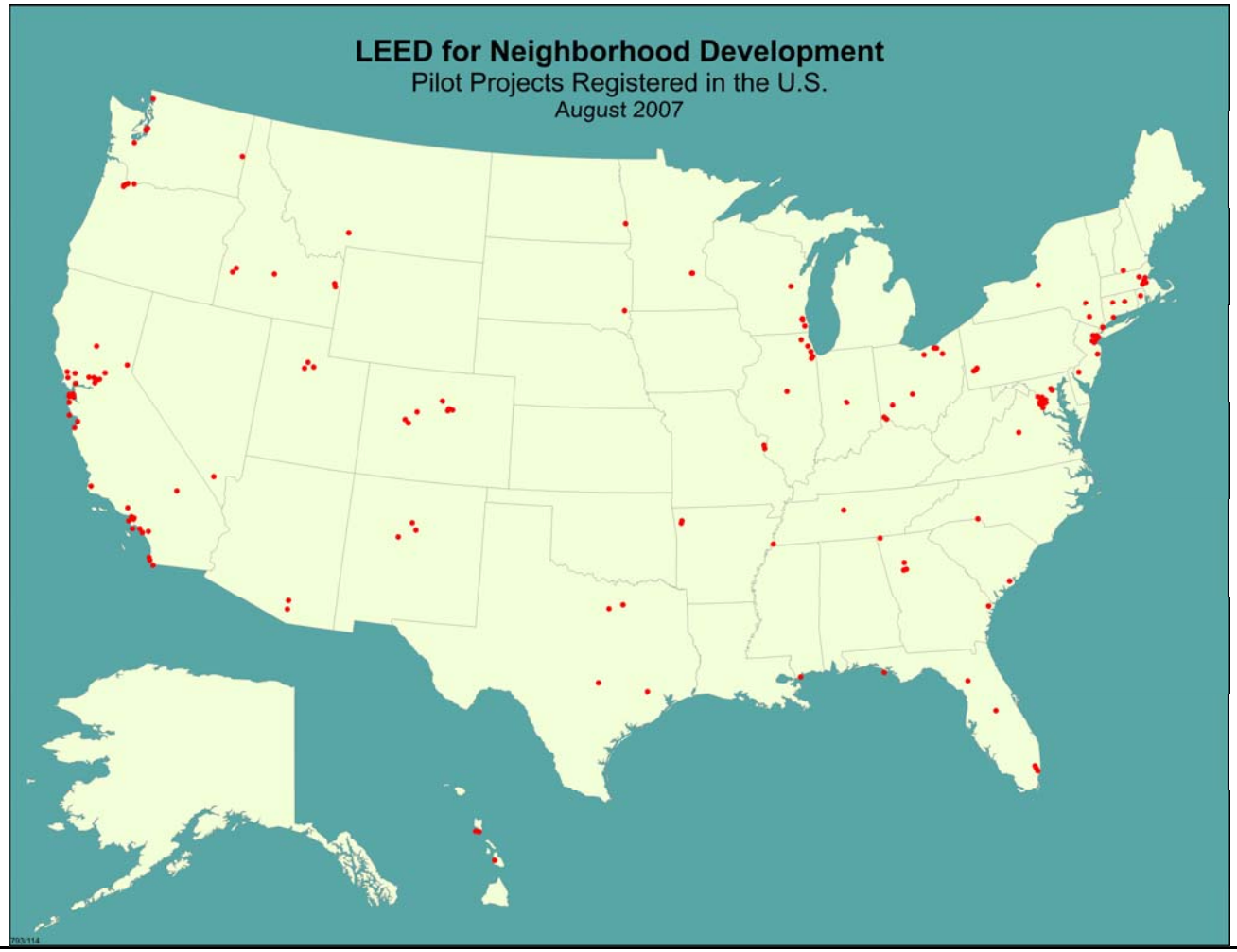
- Comprehensive analysis of the characteristics of the built environment that impact health
- Health topics addressed:
  - Respiratory and cardiovascular health
  - Fatal and non-fatal injuries
  - Social capital
  - Mental health
  - Special populations
- Included recommendations for metrics for LEED-ND

LEED-ND Pilot Status

- 371 Applications
- Representing DC, 42 states, 8 countries
- 238 Registered projects
- Paid $8,000 to 20,000 in fees up front
- 104 sq. mi, “bigger than Boston”
- Smallest is .17 acre, largest is 1,000’s
- 80% brownfield, infill or redevelopment

Registered LEED-ND Pilot Projects

(208 US + 29 Canadian)



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How does LEED-ND quantify neighborhood health and sustainability?

How is LEED-ND Organized?

Where? **Smart Location and Linkage** **5 Pre-Reqs, 27 Points**

- Locate in or near existing urban and built areas
- Avoid sensitivelands and bad locations

What? **Neighborhood Pattern and Design** **3 Pre-Reqs, 44 Points**

- Compact, connected, & complete places

How? **Green Infrastructure and Building** **4 Pre-Reqs, 29 Points**

- Project construction and maintenance
- High Performance Infrastructure

Smart Location and Linkage

- Locates in or near existing development and transit
- Avoids endangering sensitive natural areas (i.e., wetlands, critical wildlife habitat)
- Does not fragment habitat
- Minimizes impact on agricultural land

Source: Ellen Greenberg

Source: Chino, DC&E

Smart Location and Linkage

Prerequisites

- Smart Location
- Imperiled Species and Ecological Communities
- Wetland and Water Body Conservation
- Agricultural Land Conservation
- Floodplain Avoidance

Smart Location and Linkage

- Preferred Locations
- Brownfields Redevelopment
- Locations with Reduced Automobile Dependence
- Bicycle Network and Storage
- Housing and Jobs Proximity
- Steep Slope Preservation
- Site Design for Habitat or Wetland and Water Body Conservation
- Restoration of Habitat or Wetlands and Water Bodies
- Long-Term Conservation Management of Habitat or Wetlands and Water Bodies

Smart Location and Linkage

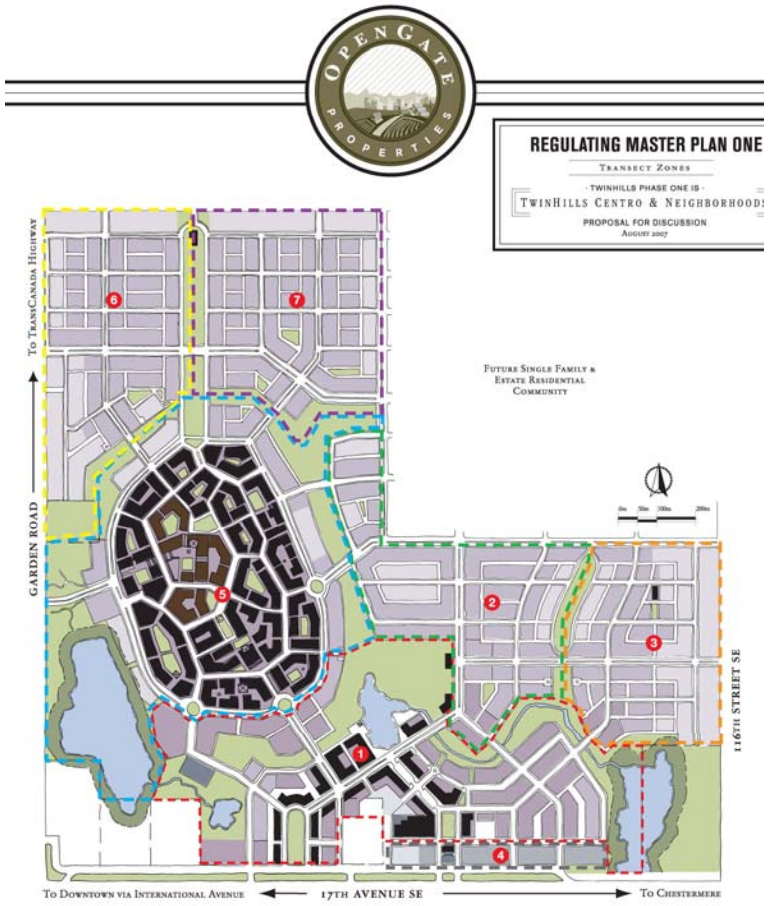
Example Metrics

- Walking distance to transit – 50% of dwelling units and business entrances withing ¼ or ½ mile of transit service
- Connectivity (measured as intersection density per sq. mi (e.g., 200+ intersections per sq. mi)
- Bicycle network (e.g., Existing bike network of 5 miles within ¼ mile of project)

Neighborhood Pattern and Design

After determining where, identify:

- How people connect to place and to one another
- Shared public spaces
- Nearby goods and services
- Walkable streets



Neighborhood Pattern and Design

Prerequisites

- Walkable Steets
- Compact Development
- Connected and Open Community

Credits

- Walkable Streets
- Compact Development
- Mixed-Use Neighborhood Centers
- Mixed-Income Diverse Communities
- Reduced Parking Footprint

Neighborhood Pattern and Design

- Street Network
- Transit Facilities
- Transportation Demand Management
- Access to Civic and Public Space
- Access to Recreation Facilities
- Visitability and Universal Accessibility
- Community Outreach and Involvement
- Local Food Production
- Tree-Lined and Shaded Streets
- Neighborhood Schools

Neighborhood Pattern and Design

Example Metrics

- Street design and building location
  - Distance of building from property line
  - Spacing of building entrances
  - Street width to building height ratio
  - Sidewalk width
  - Building frontage
- Density of development (DU/ac and FAR)
- Proximity to a mix of uses
  - ¼ mile walk distance to a diversity of uses

Green Construction and Technology

Use design techniques and systems to reduce environmental impacts based on:

- Site
- Water
- Energy
- Materials
- Buildings
- Infrastructure

Green Construction and Technology

Prerequisites

- Certified Green Building
- Minimum Building Energy Efficiency
- Minimum Building Water Efficiency
- Construction Activity Pollution Prevention

Credits

- Certified Green Buildings
- Building Energy Efficiency
- Building Water Efficiency
- Water-Efficient Landscaping
- Existing Building Reuse
- Historic Resource Preservation and Adaptive Reuse

Green Construction and Technology

- Minimized Site Disturbance in Design and Construction
- Stormwater Management
- Heat Island Reduction
- Solar Orientation
- On-Site Renewable Energy Sources
- District Heating and Cooling
- Infrastructure Energy Efficiency
- Wastewater Management
- Recycled Content in Infrastructure
- Solid Waste Management Infrastructure
- Light Pollution Reduction

How is LEED-ND being used?

Project Certifications

LEED-ND Certified: Whistler Crossing, Riverdale, IL

Government RFQ's
(Below Issued January 7, 2010)

INVITATION

The Chicago Housing Authority ["CHA"] and The Habitat Company LLC ["Habitat"] in its official capacity as Receiver for the development of new, non-elderly public housing, invite submissions of qualifications to become the development and property management team ["Master Developer"] to lead the multi-year, multi-phase revitalization of the Julia C. Lathrop Homes, in order to achieve the vision of the Lathrop Homes Working Group for **sustainable affordability and opportunity in the heart of Chicago, becoming the first large scale, affordable community in the U.S. to achieve LEED-ND Gold or Platinum.**

Sustainability Audits of Local Codes

1. Make LEED-ND **legal**
2. Make LEED-ND **easy**
3. Make LEED-ND **required**

Referenced by Other Standards

How Can Public Health Research Inform LEED-ND?

Some Study Conclusions Are Too General

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J Epidemiol Community Health 2006;**60**:587-592 doi:10.1136/jech.2005.043125

Evidence based public health policy and practice

Green space, urbanity, and health: how strong is the relation?

Jolanda Maas[1], Robert A Verheij[1], Peter P Groenewegen[1], Sjerp de Vries[2], Peter Spreeuwenberg[1]

Author Affiliations

Correspondence to: J Maas, Netherlands Institute for Health Services Research, PO Box 1568, 3500 BN Utrecht, Netherlands; j.maas@nivel.nl

green space in people's living environment and their perceived general health. This relation is analysed for different age and socioeconomic groups. Furthermore, it is analysed separately for urban and more rural areas, because the strength of the relation was expected to vary with urbanity.

Design: This study includes 250 782 people registered with 104 general practices who filled in a self administered form on sociodemographic background and perceived general health. The percentage of green space (urban green space, agricultural space, natural green space) within a one kilometre and three kilometre radius around the postal code coordinates was calculated for each household.

Methods: Multilevel logistic regression analyses were performed at three levels—that is, individual level, family level, and practice level—controlled for sociodemographic characteristics.

Main results: The percentage of green space inside a one kilometre and a three kilometre radius had a significant relation to perceived general health. The relation was generally present at all degrees of urbanity. The overall relation is somewhat stronger for lower socioeconomic groups. Elderly, youth, and secondary educated people in large cities seem to benefit more from presence of green areas in their living environment than other groups in large cities.

Conclusions: This research shows that the percentage of green space in people's living environment has a positive association with the perceived general health of residents. Green space seems to be more than just a luxury and consequently the development of green space should be allocated a more central position in spatial planning policy.

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Conclusion:

"…the development of green space should be allocated a more central position in spatial planning policy."

Public Health Expert Review of LEED-ND

LEED-ND Expert Review: Summary

An Expert Review on the Strength of the Data in Support of Proposed Community Design Standards in LEED for Neighborhood Development

The LEED-ND Pilot Criteria consist of credits covering 47 different topic areas that can contribute to earning up to 100 points toward a project certification. The credit topics are diverse rewarding a broad range of initiatives from increased density to affordable housing, and high performance infrastructure. A total of 21 were considered to be relevant to this expert review. These twenty-one credits, and their compliance paths, were individually reviewed by the assembled experts. Of these 3 were judged to be supported by data, 9 were consistent with data, 7 were supported by expert opinion and 2 were judged to have no or insufficient data and therefore opportunities for future research. In summary, 57% (12 of 21) were either supported by or consistent with data, 33% (7 of 21) were supported by expert opinion and 9% (2 of 21) had insufficient data. Stated another way, approximately 90% of the credits reviewed were either supported by or consistent with data or by expert opinion.

5 classes ofconclusion:

- **Supported by Data**
- **Consistent with Data**
- **Supported by Expert Opinion**
- **Insufficient Data**
- **Opportunity for Further Research**

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Conclusions of Expert Review

- 21 of LEED-ND prerequisites and credits had an association with health outcomes
  - 3 were supported by data
  - 9 were consistent with data
  - 7 were supported by expert opinion
  - 2 had no or insufficient data

Conclusion: Supported by Data

LEED-ND Standard Requirements	Expert Vote	Citations
Locate the **project** in one of the following locations that also earn at least one point for **street grid density** according to the calculation below: • An **infill site** that is also a **previously developed site** (6 points) • An infill site that is not a previously developed site (4 points) • An **adjacent site** that is also a previously developed site (3 points) • A previously developed site that is not an adjacent or infill site (2 points) • An adjacent site that is not a previously developed site (1 point) AND Calculate the street grid density (in street centerline miles per square mile) within a 1 mile radius from the perimeter of the site boundary. Points are added to the above points according to the following street grid density: • 40 centerline miles per square mile or greater • 30-39 centerline miles per square mile • 20-29 centerline miles per square mile • 10-19 centerline miles per square mile	**Supported by Data**	1) Rodríguez, D.A., Targa, F. and Aytur, S. Transportation implications of urban containment policies - A study of the largest 25 U.S. metropolitan areas, Urban Studies, 40 pages. 2) Ryan, Sherry and James Throgmorton. 2003. Sustainable Transportation and Land Development on the Periphery: A Case Study of Freiburg, Germany and Chula Vista, California. Transportation Research Part D: Transport and Environment, v.8,1: 37-52. *Transcript Quotes* 1) *Kenneth Rose*: Infill sites may improve social capital…. social capital is more direct. 2) *Emil Malizia*: I think there are a lot of measures but not ones that we can grab a hold of nationally easily. I mean employment density is traditional center in places like Atlanta where there are multiple centers. 3) *Lawrence Frank*: If you do that I hope that intersection density is defined somewhere. 4) *Lawrence Frank*: Regional susceptibility. The thing that mattered most was accessibility to urban centers.

Conclusion: Supported by Expert Opinion

NPD Credit 7: Walkable Streets

Intent: Provide appealing and comfortable pedestrian street environments in order to promote pedestrian activity. Promote public health though increased physical activity.

LEED-ND Standard Requirements	Expert Vote	Citations
Design and build the **project** such that all of the following are achieved (4 points): **a.** A principal **functional entry** of each building has a front façade that faces a public space such as a street, square, park, paseo, or plaza. **b.** A minimum of 30% of all street frontages located *within* the project, if any, are planned for development that complies with the minimum building-height-to-street-width proportions of 1:3; and where building sites are planned along streets *bordering* the project, a minimum of 15% of the total street frontage of such sites contains (or is dedicated to) development that will produce a building-height-to-street-width proportion of 1:3. Street frontages are to be measured in linear feet. **c.** Continuous sidewalks or equivalent provisions for walking are provided along both sides of all streets within the **project**. New sidewalks must be at least 4 feet wide. Equivalent provisions for walking include ***woonerfs*** and footpaths. **d.** All streets along exclusively residential blocks within the **project**, whether new or existing, are designed for a maximum speed of 20 mph. **e.** All streets along non-residential or mixed use blocks within the project, whether new or existing, are designed for a maximum speed of 25 mph. If the above measures are achieved, the project may earn additional points as follows: 1 point for designing and building the project such that any three measures on the list below are accomplished (up to 4 additional points): **f.** The front façades of at least 80% of all buildings are no more than 25 feet from front property line. **g.** The front facades of at least 50% of all buildings are no more than 18 feet from the front property line. **h.** The front facades of at least 50% of mixed-use and non-residential buildings are contiguous to the sidewalk. **i.** Functional building entries occur every 75 feet, on average, along non-residential or mixed use blocks.	**Supported by Expert Opinion**	1) Day, Kristen. Boarnet, Marlon., Alfonzo, Mariela., Forsyth, Ann. The Irvine Minnesota Inventory to Measure Built Environments: Development, American Journal of Preventive Medicine 30, 2: 144-152. 2006 2) Day, Kristen. Boarnet, Marlon. Alfonzo, Mariela. Forsyth, Ann. Oakes, J. Michael. The Irvine Minnesota Inventory to Measure Built Environments: Reliability Tests. American Journal of Preventive Medicine 30, 2: 153-259. 2006 3) Forsyth, Ann. Urban Centers in Universities: Institutional Alternatives for Urban Design. Journal of Urban Design 11, 1: 73-79. 4) Loukaitou-Sideris A, Eck JE. Crime prevention and active living. Am J Health Promot. 2007 Mar-Apr;21(4 Suppl):380-9,iii. *Transcript Notes* 1) "Rappaport" mentioned as possible citation for environmental psychology. Specific publication unknown. 2) "John Lange University of New South Wales" mentioned as possible citation. Specific publication unknown. 3) The reference " www.hphp.us NPD C 7-M" was mentioned but no specific publication found.

Research Opportunity: The list of criteria for walkable streets

Conclusion: Opportunity for Future Research

LEED-ND Standard Requirements	Expert Vote	Citations
Include a residential component in the **project** that constitutes at least 25% of the project's total building square footage; and locate or design the project so that at least 50% of the project's dwelling units are within ½ mile **walk distance** of an existing or planned school.	**Opportunity for future research**	1) Falb, MD, Kanny D., Powell KE, Giarrusso, AJ. Estimating the proportion of children who can walk to school. Am J Prev Med. 2007 Oct: 33(4):269-75 2) Kerr, J., Rosenberg, D., Sallis, J.F., Saelens, B.E., Frank, L.D., and Conway, T.L. (2006). Active commuting to school: Associations with built environment and parental concerns. Medicine and Science in Sports and Exercise, 38, 787-794. *Transcript Quotes* 1) *Lawrence Frank*: A student of mine, Jennifer did her thesis based on the characteristics of the route by 10 ½ year olds – I had her run her analysis again and came out very significant based on 10 ½ year olds. 2) *Lawrence Frank*: Based on literature we know distance matters and age matters. 3) *Andrew L. Dannenberg*: Ken Powell has a paper, which does separate it by age. 4) *Emil Malizia*: I think we are recommending one mile. That is supported by data and consistent with data.

Research Opportunity: Adding housing near a school

Conclusion: No or Insufficient Data

NPD Prerequisite 1: Open Community

Intent: Promote communities that are physically connected to each other. Foster community and connectedness beyond the development.

LEED-ND Standard Requirements	Expert Vote	Citations
Designate all streets and sidewalks that are built as part of the project or serving the project directly as available for general public use and not gated. Gated areas and enclaves are NOT considered available for public use, with the exception of education and health care campuses where gates are used for security purposes.	**No or insuf-ficient Data**	

Research Opportunity: Public Health Effects of Gated Communities

Recommendations for Research (Overall)

- Majority of criteria were supported by expert opinion but not by data.
- Need to identify and/or justify exact built environment thresholds for health outcomes.
- Identify causation rather than association
- Many details of urban design have had little research
- More research needed on health benefits of nature-enhancing strategies.

The NEED for research to test the ND metrics

Recommendations for Research

- Building placement and streetscape design
  - 1:3 ratio of building height to street width
  - Length of blank walks
  - Spacing of building entrances
  - Amount and height of glass on storefronts
- Street network design
  - Metrics and thresholds for connectivity (intersections per square mile)
  - Block length
- Open space design
  - Spacing of street trees (every 40')
  - Size ,dimension of park green space
  - Role of plazas and other small-scale public spaces

Recommendations for Research

- Bicycle network
  - Length of bike network and ability to bike to schools and services
- Diversity of uses
  - Can additional research support the list of uses, categories and threshold?
- School access and proximity
  - Distance to school
  - Size of school

Overall

- ***Are the metrics correct?***
- ***Are the thresholds correct?***
- ***Is there an optimum combination of factors that improve health outcomes?***

Applied Research

- Research needs to be applied to support decision-making process
- Tools needed to evaluate physical alternatives and quantify health outcomes

To Respond to this Opportunity:

Download the LEED-ND standard:
www.usgbc.org

Download the Expert Review of LEED-ND:
http://www.cdc.gov/healthyplaces/projects.htm

for additional information

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the nature of community