

**We must keep every scrap of nature in and around our cities. Nature holds the key to our aesthetic, intellectual, cognitive and even spiritual satisfaction.**

- E.O. Wilson in *The Biophilia Hypothesis* (1984)

# THE BENEFIT OF NATURE | in High Density Urban Areas

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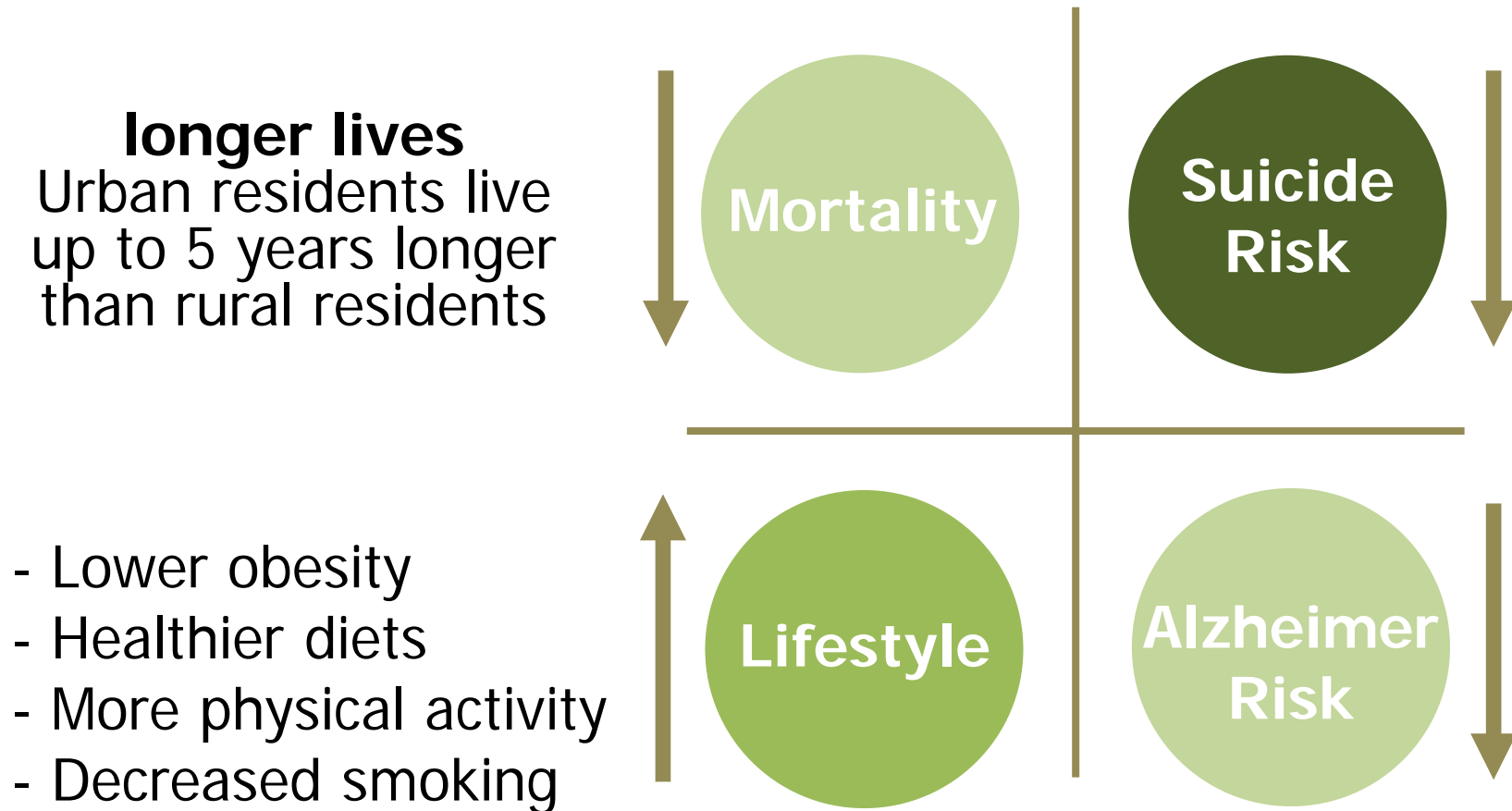
June 26, 2017



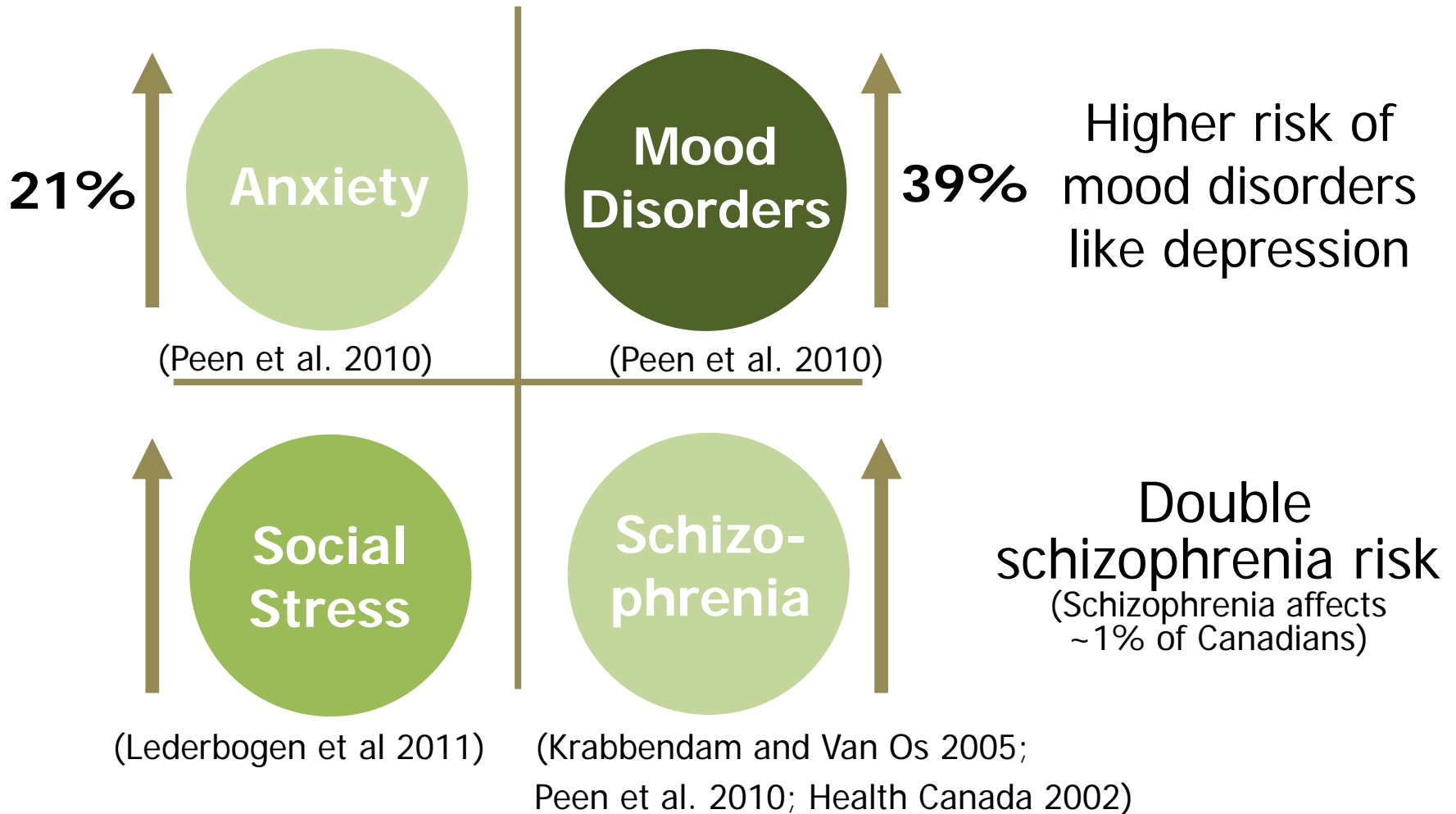
- 
- **Entertainment + culture + events**
  - **Job opportunities**
  - **Education opportunities**
  - **Variety of services + shops**
  - **Public Transit**
  - **Access to healthcare**

## Benefits of Urban Living

# Health Benefits of Urban Living



# Mental Health Implications of Urban Living



# Mental Illness in Canada



1 in 5

Canadians will have a mental illness this year  
Increases to 28% for people aged 20 to 29



1 in 2

Canadians will experience mental illness  
before 40



\$50 billion  
/year

Mental Illness costs Canada almost \$50 billion/year

- \$19.7 billion healthcare costs for dementia care
- \$22.6 billion healthcare costs for other mental illnesses
- \$ 6.3 billion in lost business productivity

# Stress in Canada



Canadians feel high stress most days

Too much stress has many results, including:

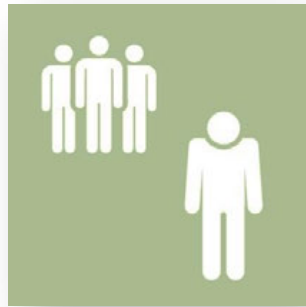
- Negative thinking
- Decline in cognitive performance
- Withdrawal from social circles
- High blood pressure

Stress is a risk factor for obesity, mental illness, asthma, and heart disease



Canadian deaths due to heart disease

# Social Implications of Highrise Living



**Decreased**  
interaction with  
neighbours

(Chu et al 2004; Bonnes et al 1991)

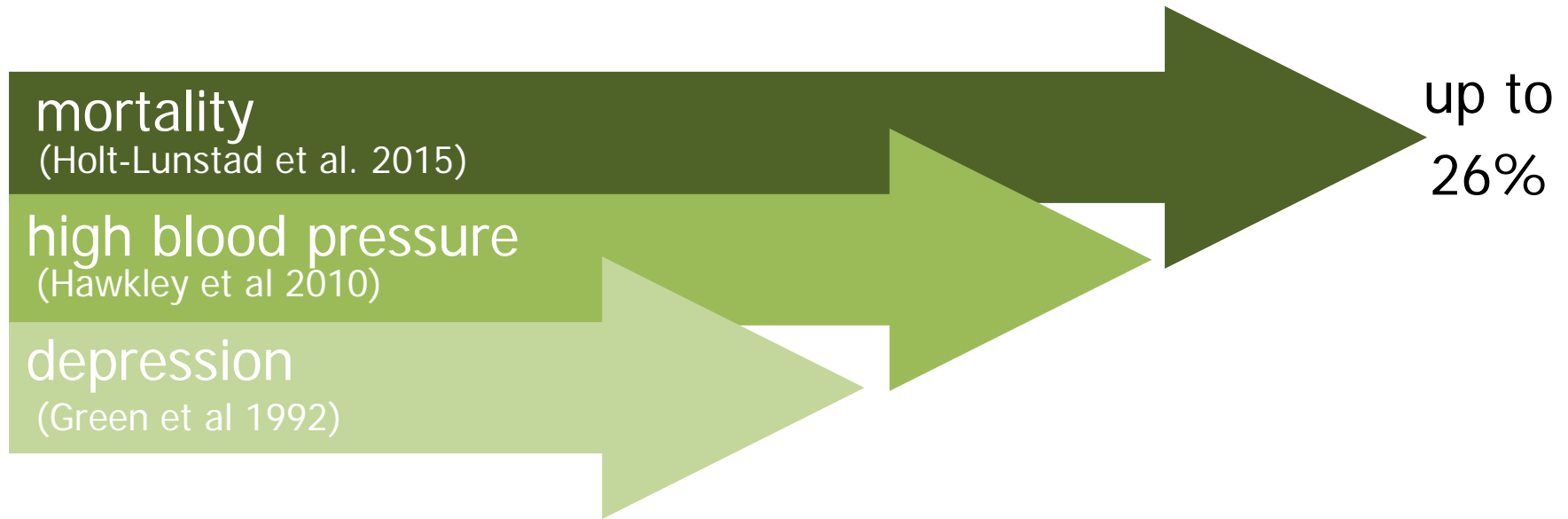


**Increased**  
loneliness

(Chu et al 2004; Bonnes et al 1991)



# Loneliness increases...



+ is as bad for your health as smoking  
15 cigarettes a day  
(Holt-Lundstad et al. 2010)

More information here:  
<http://www.campaigntoendloneliness.org/>

# Factors that Impact Health



Individual factors (genetics, biology, life experiences)



Socioeconomic status



Environment

better design = better health

# Health Inequalities

Health inequality is the health gap between different groups based on income, employment, and education factors.

## In Canada, health inequalities are linked to:

- ↑ 5x Lower self-rated mental health
- ↑ 2x Smoking rates
- ↑ 1.3x Hospitalized heart attacks
- ↑ 1.4x Motor vehicle injury hospitalization
- ↑ 1.5x Higher rates of obesity in women
- ↑ 2x Higher rates of diabetes
- ↑ 2x More alcohol-attributable hospitalization

\*↑#x shows increased rate for lowest income group as compared with highest income group  
More information: Canadian Institute for Health Information <https://www.cihi.ca/en/trends-in-income-related-health-inequalities-in-canada>

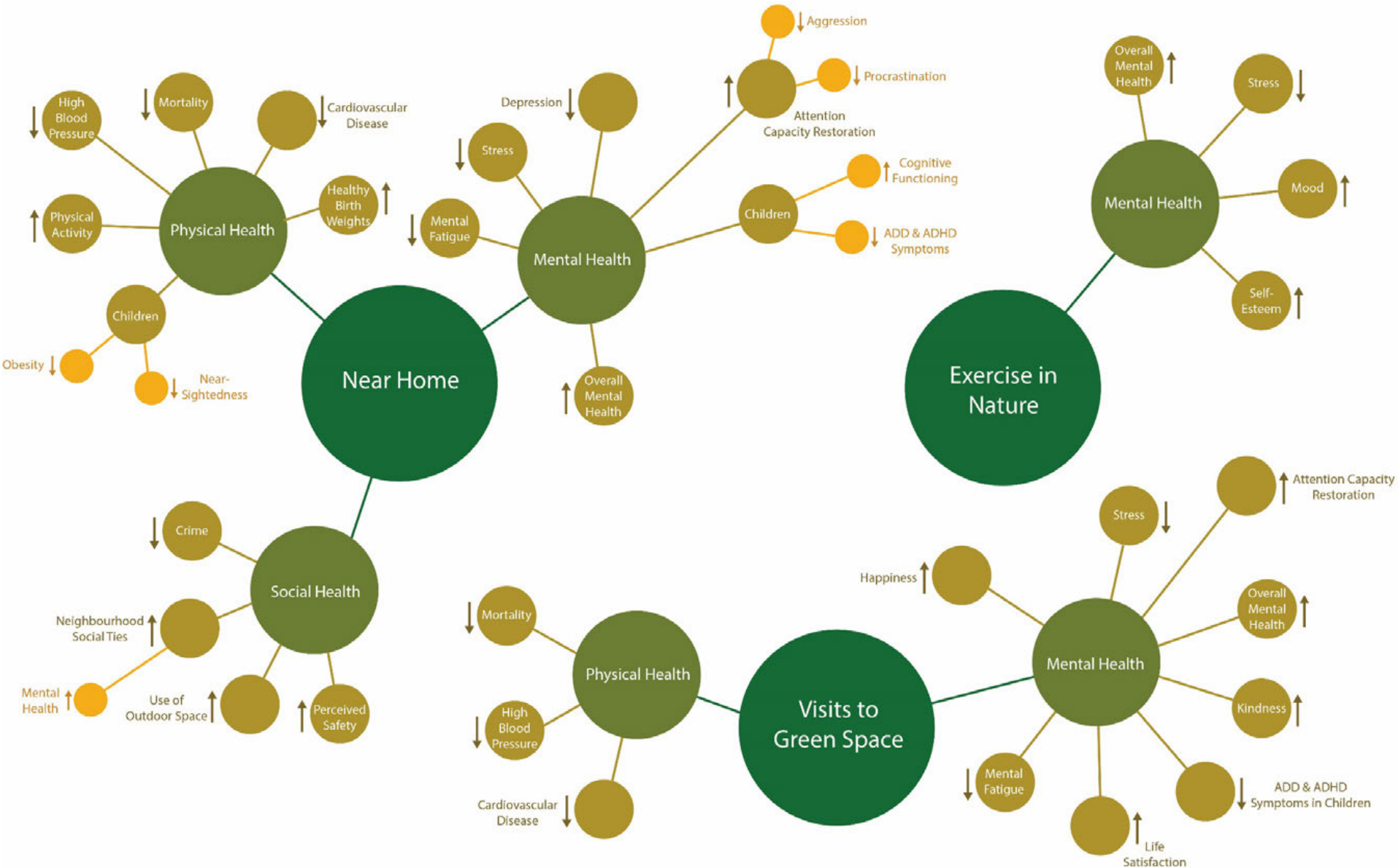


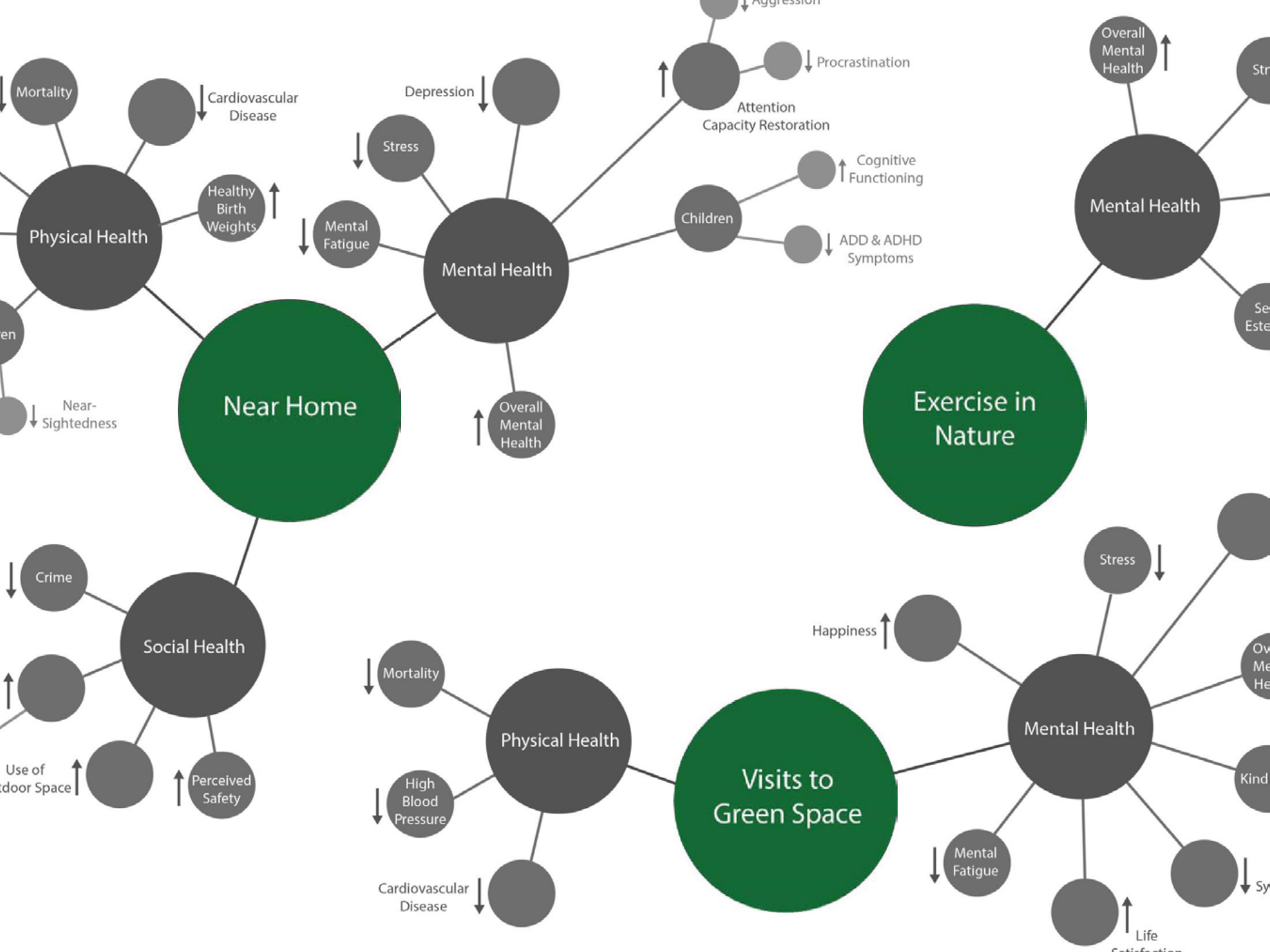
# Green Space the Great Equalizer

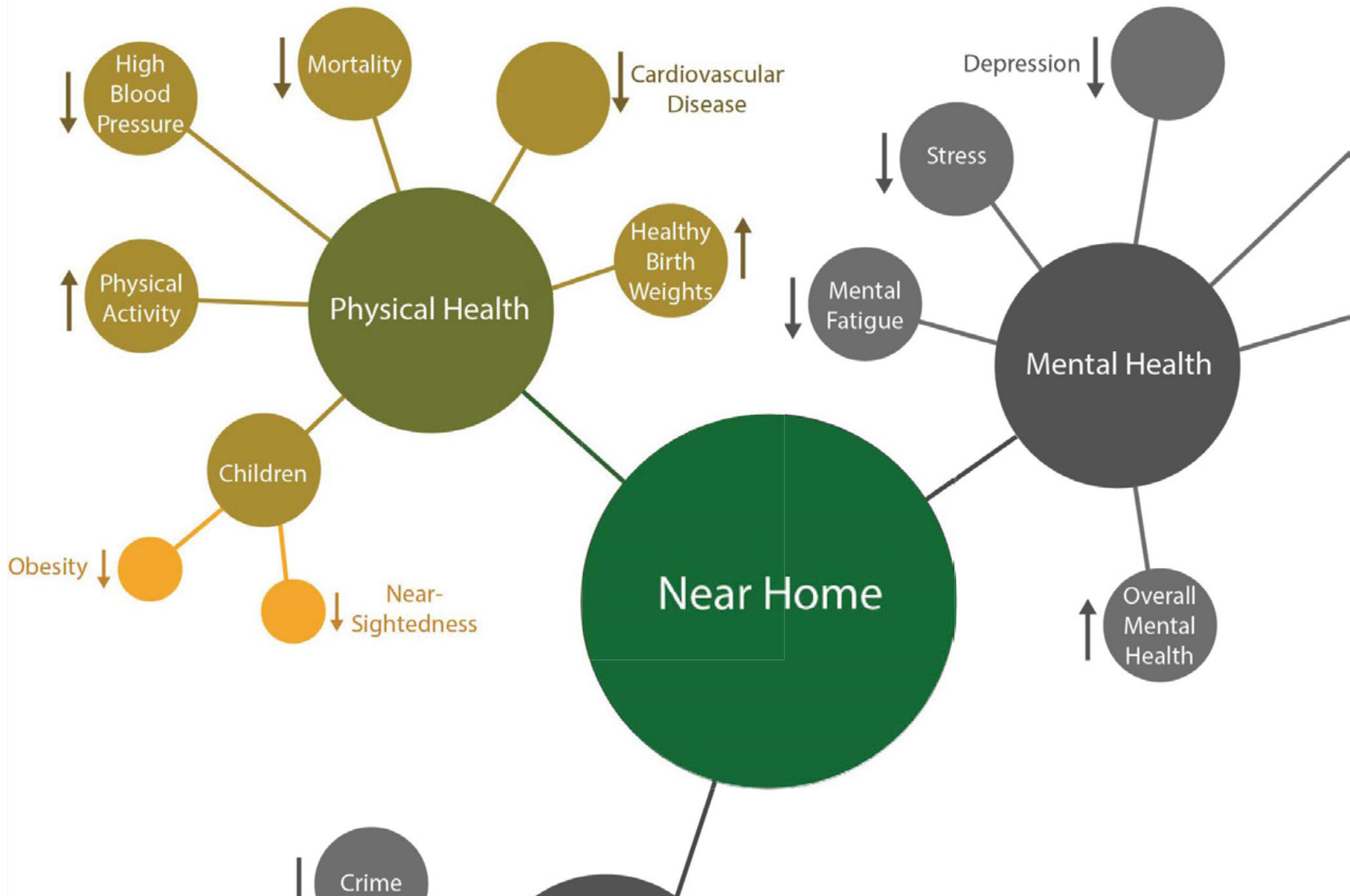
"Populations that are exposed to the greenest environments also have lowest levels of health inequality related to income deprivation."

– Richard Mitchell, University of Glasgow  
& Frank Popham, University of St. Andrew

# Health Benefits of Nature





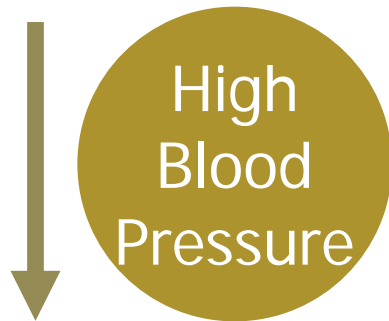




One study showed a 12% lower mortality rate for those living in the greenest areas. (James et al 2015)

Walkable green space is linked to longer lives in seniors.

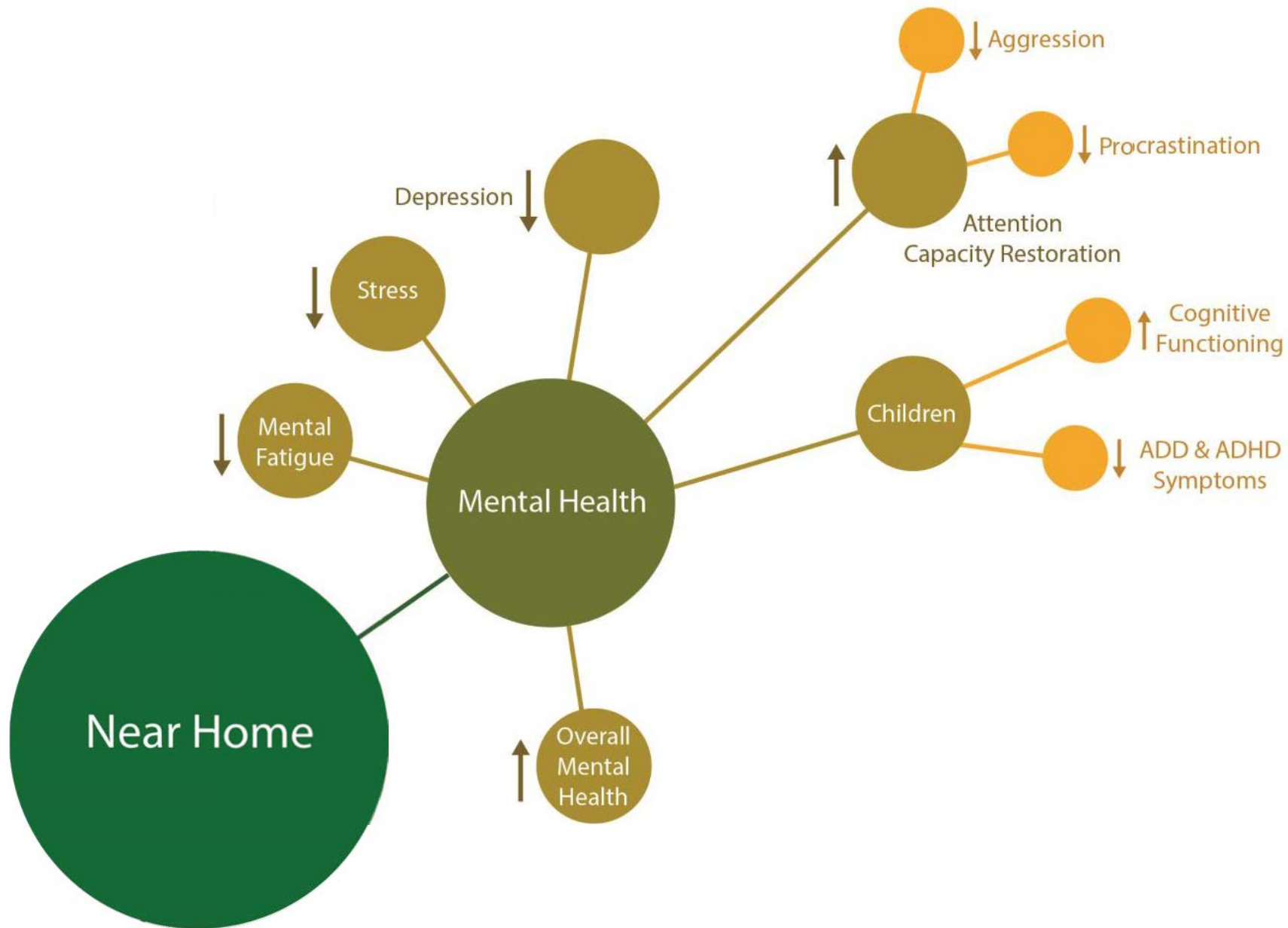
(Takano et al 2002)

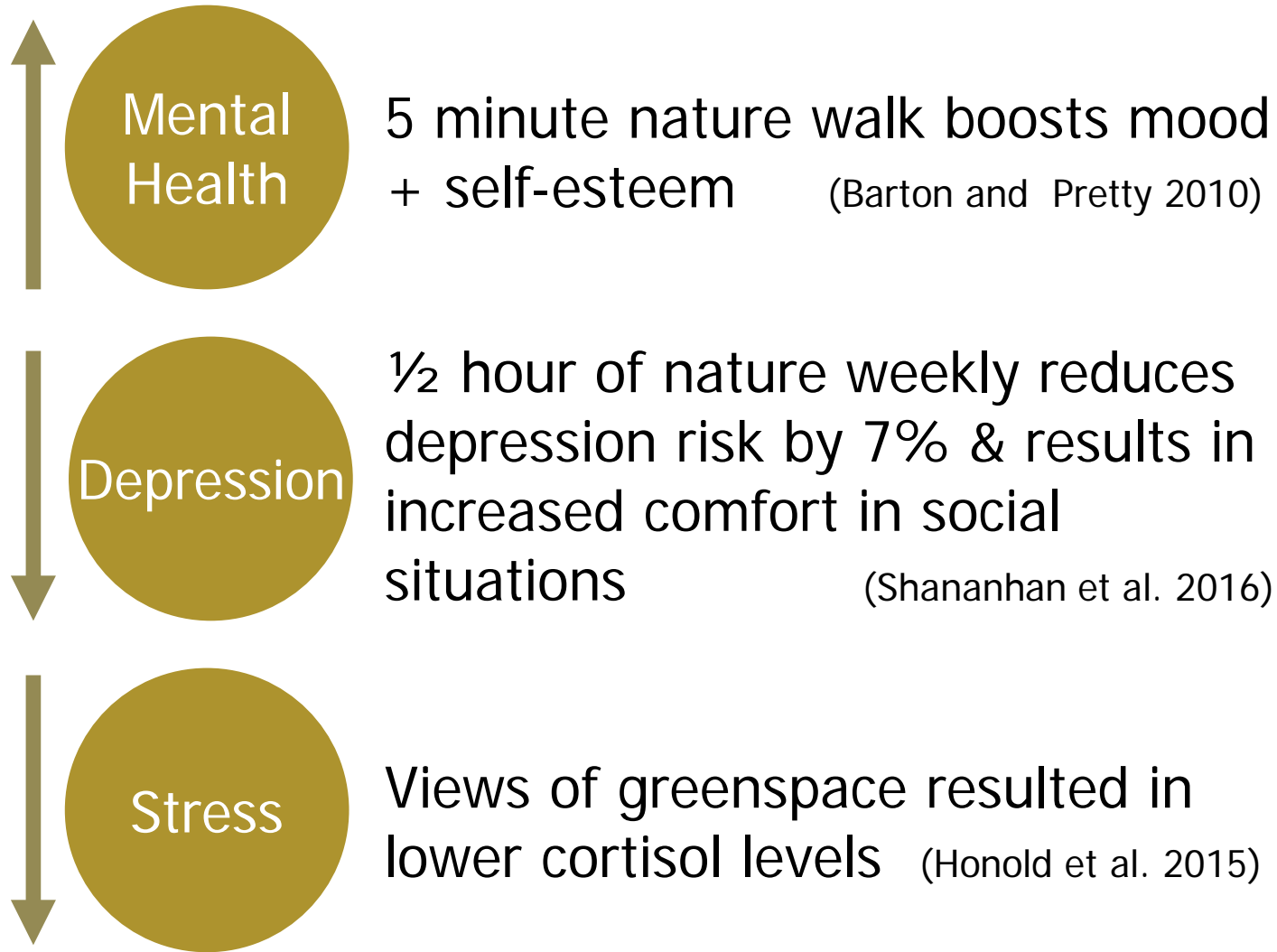


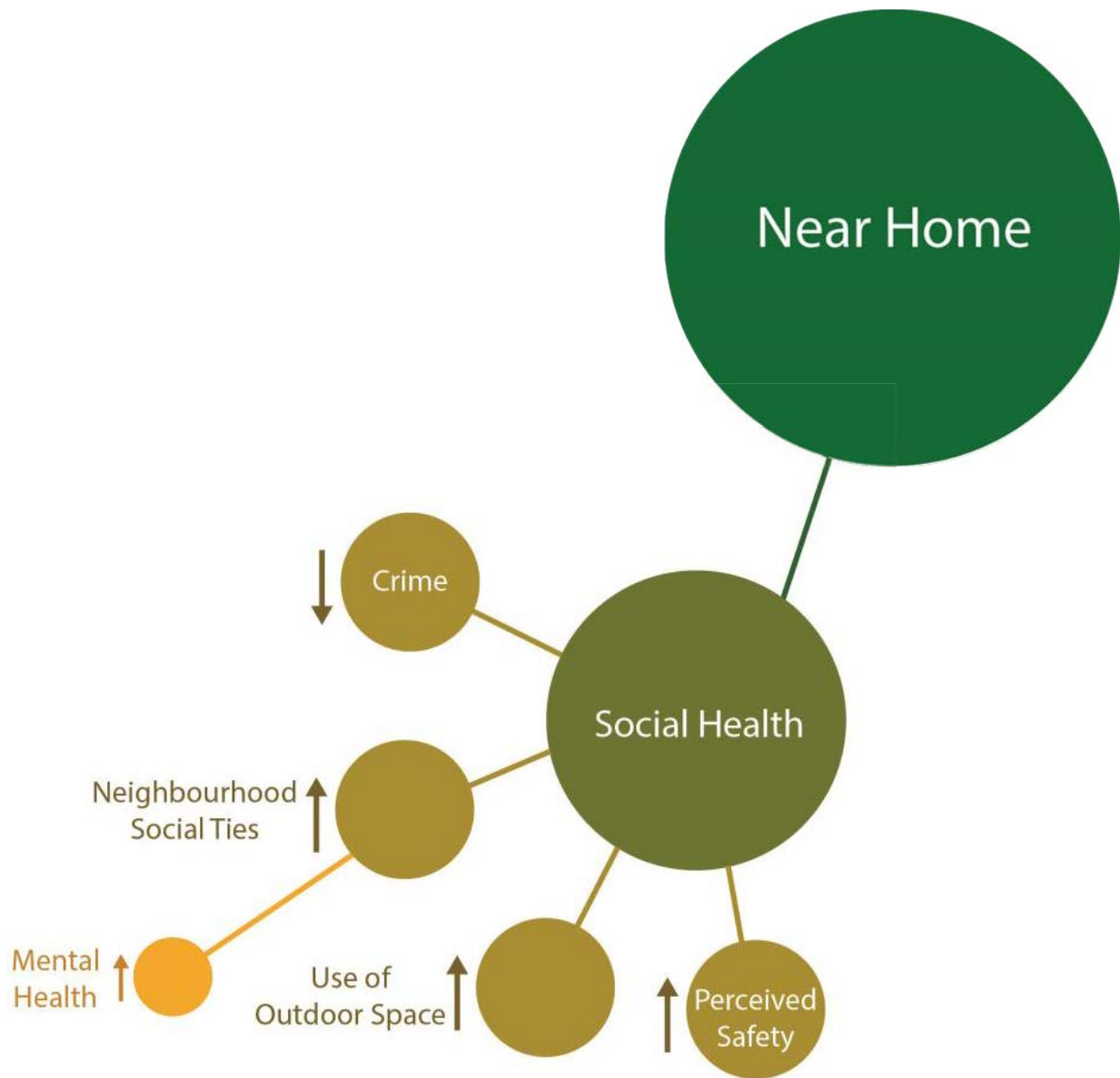
½ hour weekly in nature linked to a 9% decrease in high blood pressure rates

(Shanahan et al. 2016)











More Neighbourhood Social Ties & Social Interaction

(Kuo et al. 1998; Halpern 1995; Hartig 2014)



Decreased property crime & aggression

(Kuo and Sullivan 2001a, 2001b; Hartig 2014)



One study found 2x use of green common spaces for play than common spaces without grass and trees

(Taylor et al. 2002)

# Health Benefits of Near-Home Green for Children

- Healthier Birth Weights (James et al. 2015)
- Increased Cognitive Functioning (Wells 2000)
- Lower Obesity (Nielsen and Bruun Hansen 2007)
- Decreased ADD & ADHD symptoms (Kuo and Taylor 2004)
- Lower Stress (Wells + Evans 2003)



Greener School Grounds

Better Academic Outcomes

- Enhanced focus
- Increased academic success
- Increased enthusiasm and engagement with learning

Source: <http://www.childrenandnature.org/>

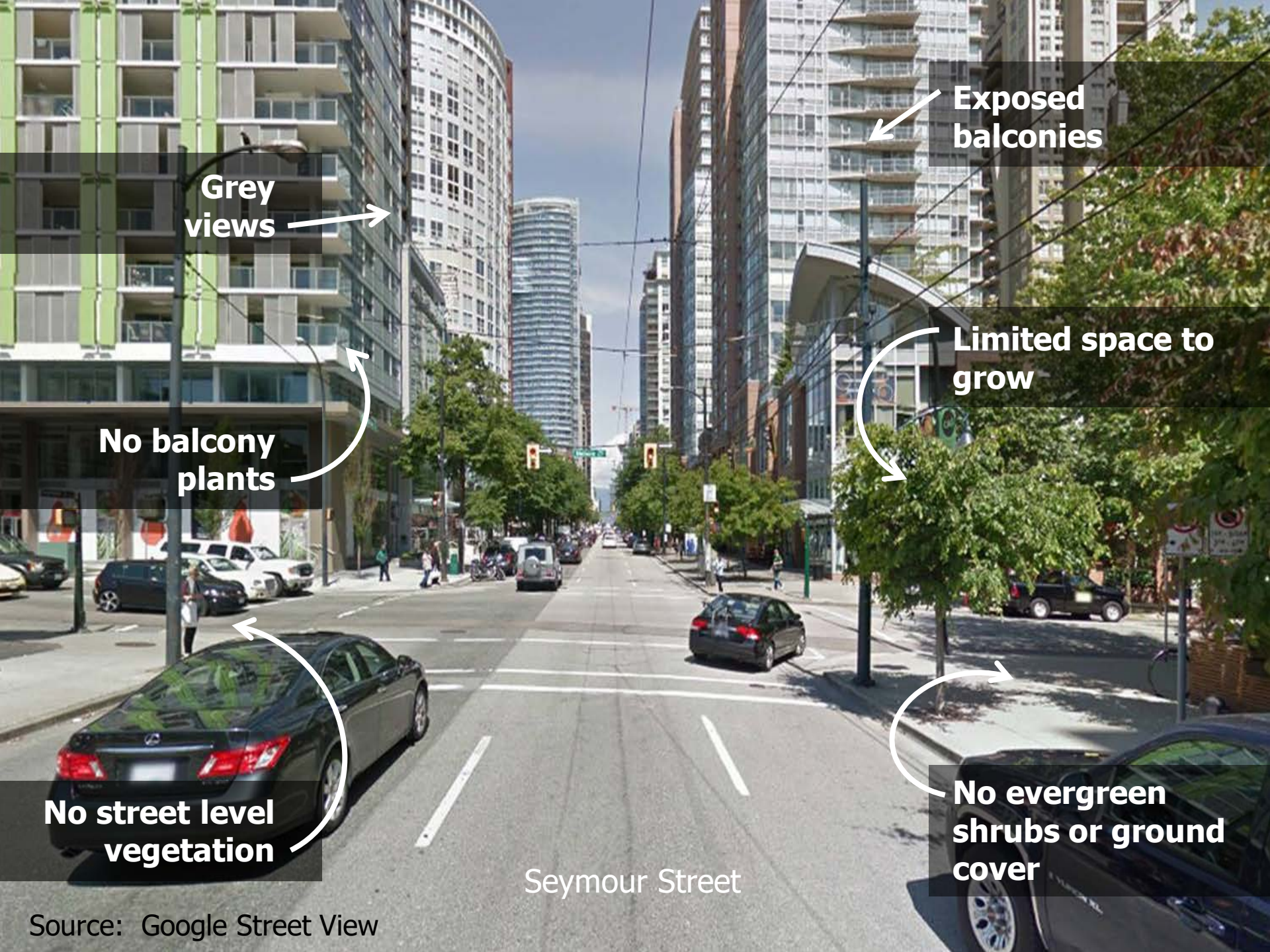
Note: We did not focus specifically on children, but the benefits of nature on children are well documented. More information: *Last Child in the Woods* by Richard Louv, [www.childrenandnature.org](http://www.childrenandnature.org)

A wide-angle street view of Seymour Street in Vancouver, showing modern high-rise buildings, trees, and cars. The street is lined with tall, modern buildings, some with green accents. There are trees and a clear sky. A semi-transparent black box with white text is overlaid on the upper part of the image.

# Typical Vancouver Streetscape

Seymour Street

Source: Google Street View



**Exposed balconies**

**Grey views**

**Limited space to grow**

**No balcony plants**

**No street level vegetation**

**No evergreen shrubs or ground cover**

Seymour Street

Source: Google Street View

# Near-Home Green Opportunities





# Streetscape



# Considerations

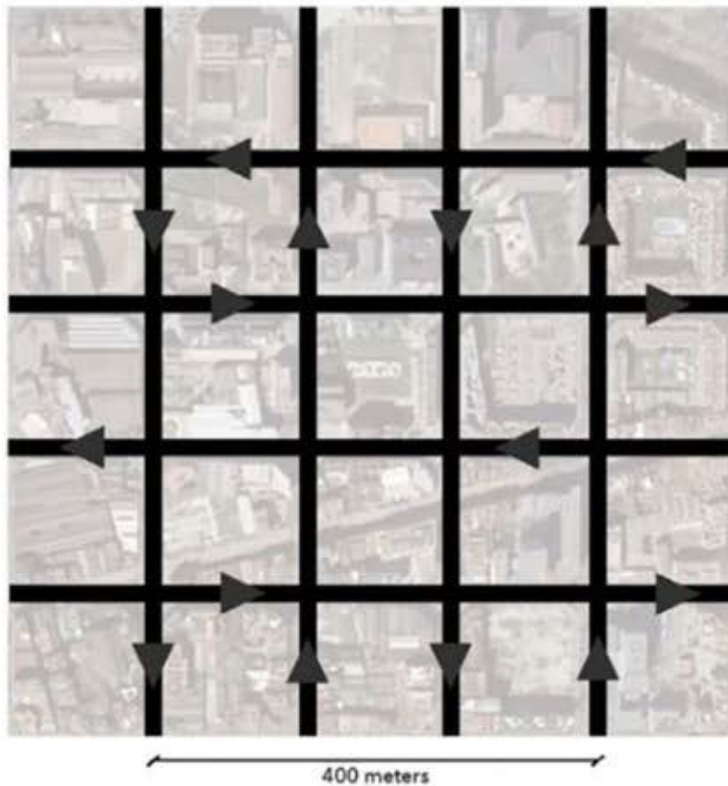
- Larger set-backs and more parklets
- Buffer sidewalks with green shrubs and perennials on both sides
- Use evergreen shrubs to provide year-round green





Bute Street Pedestrian Walkway, Vancouver  
Source: Google Street View

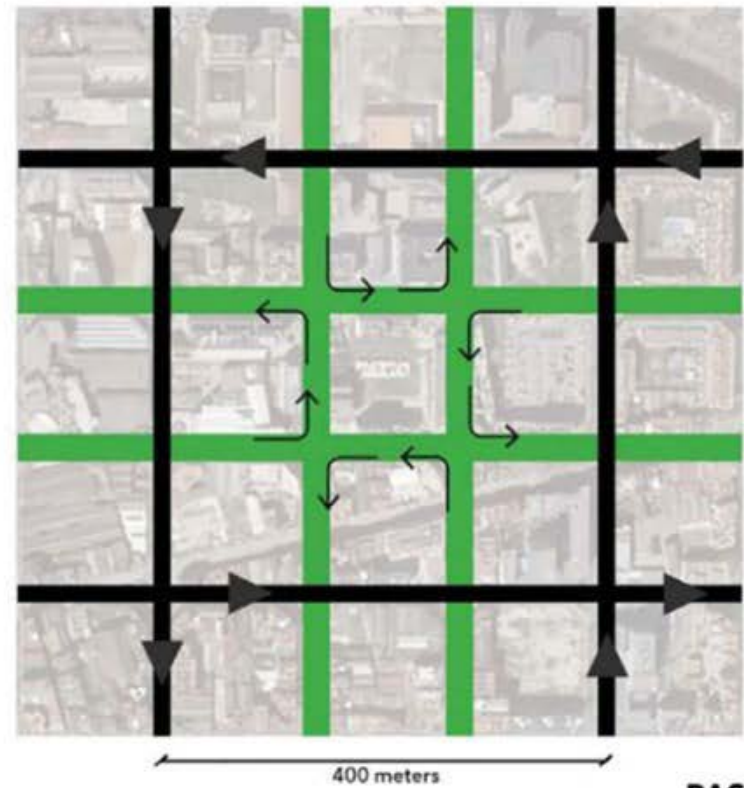
## CURRENT SITUATION



Basic network: 50 km/h



## SUPERBLOCK



Local network: 10 km/h



**PASSING  
VEHICLES  
DO NOT GO  
THROUGH**

## Green Streets

## Eixample Neighbourhood, Barcelona – Super blocks

Source: <http://inhabitat.com/how-barcelonas-pedestrian-friendly-superblocks-reduce-pollution-and-return-streets-to-the-people/>

## Green Streets Program

City of Vancouver partners with volunteers to plant gardens in boulevards, traffic circles and corner bulges



Pacific Blvd, Under Burrard Bridge, Vancouver

# Semi-Private / Courtyard Spaces



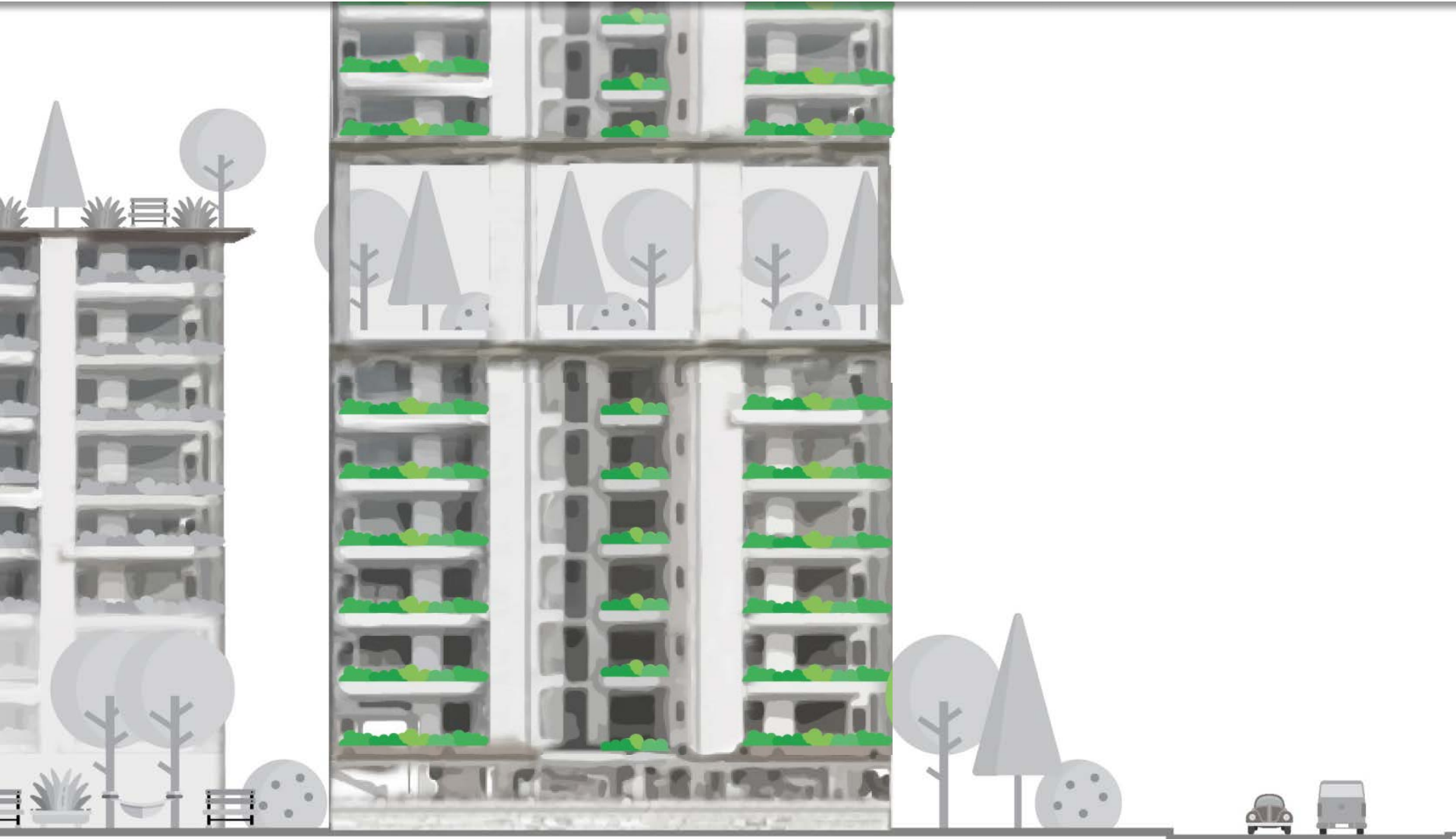


## **Shared Gardening Space**

**Toccata Townhouses, 2929 156th Street, Surrey, BC**

Courtesy of Jill Deuling

# Green Balconies







**Vijayawada Garden Estate, India**  
Penda Architects

Courtesy of Penda Architects



**Vertical Balcony Gardens**  
Penda Architects

Courtesy of Penda Architects



**Nanjing Green Towers, Nanjing, China**  
Stefano Boeri Architects

Courtesy of Stefano Boeri Architects

## Balcony & Private Outdoor Spaces

*As sites get smaller, the quality of outdoor spaces is even more important.*

*- Auckland Design Manual*

## *Notable Recommendations*

- Utility:** Every apartment should have usable private outdoor space
- Size:** Create balconies with enough space for circulation and furniture
- Privacy:** Recessed outdoor spaces are most private
- Outdoor Taps:** Consider resident's desires for outdoor taps
- Safety:** Ensure balconies do not provide climbing access to units.



## Also consider

- Microclimatic analysis to determine best placement for balconies and outdoor spaces.
- Opaque railings instead of transparent glass

# Green Floor

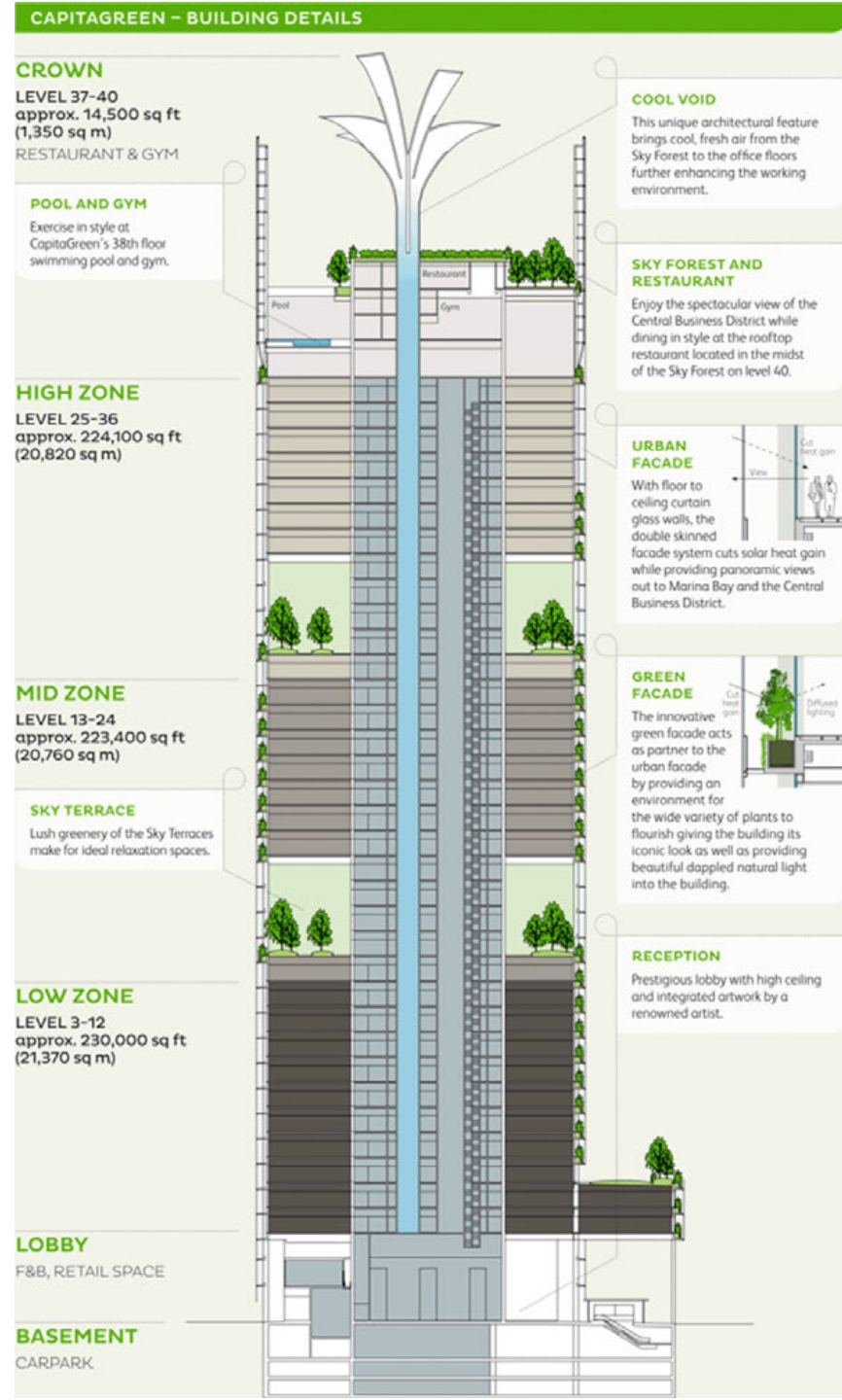


# Capitagreen, Singapore

## Toyo Ito & Associates, Architects

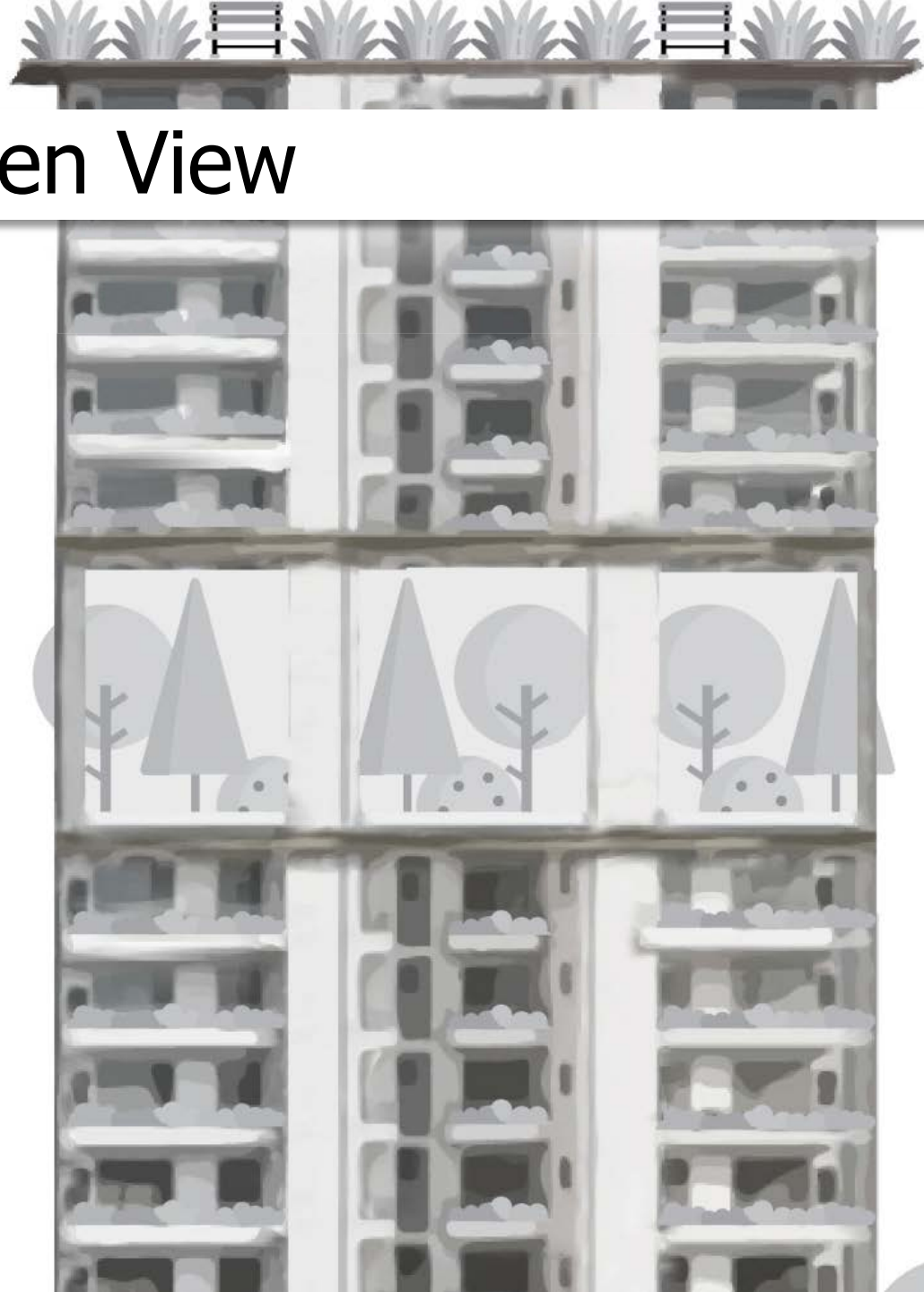


Courtesy of CapitaLand Commercial Trust





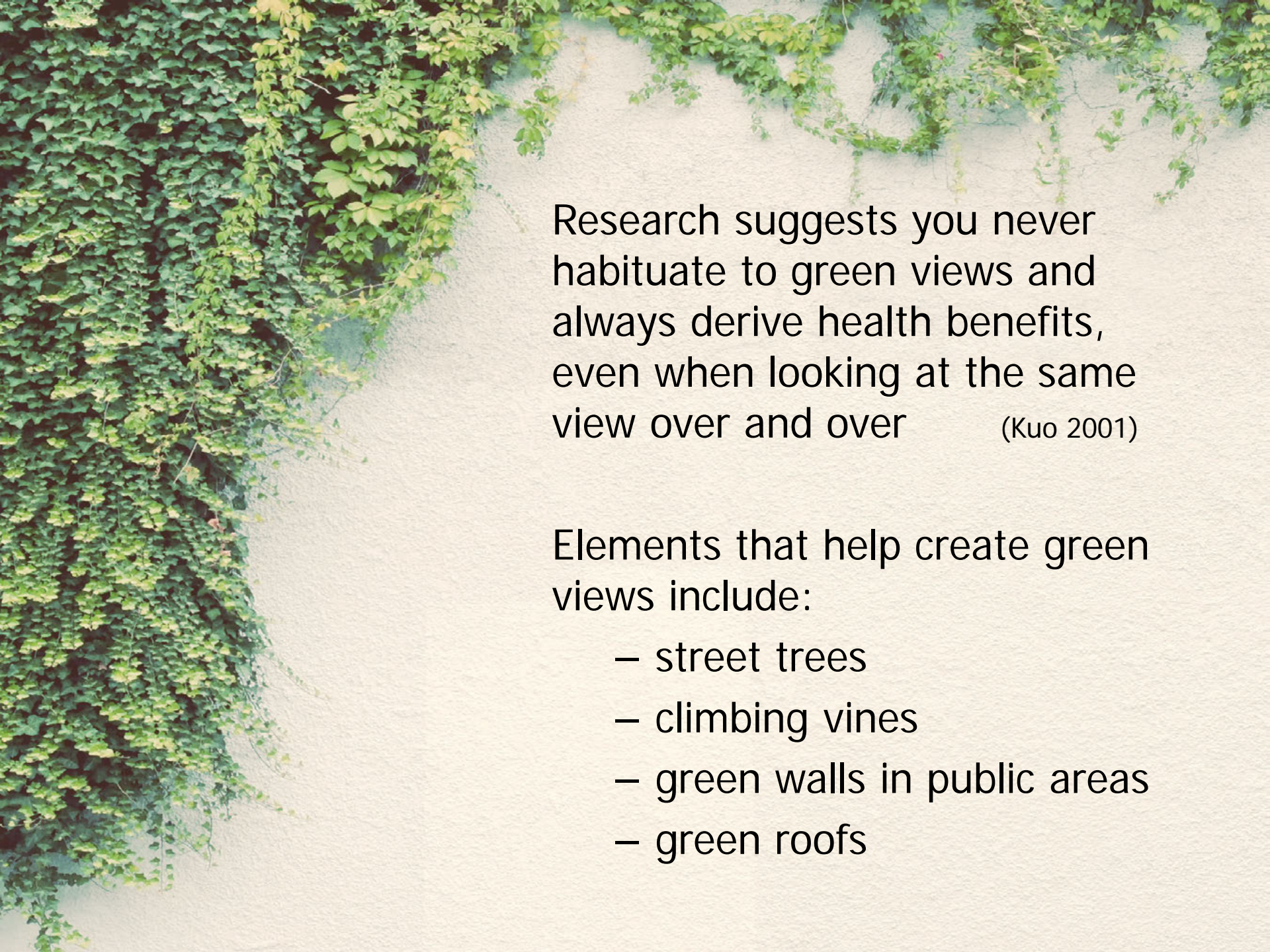
# Green View





Green Window Views provide micro-restorative moments that are linked with:

- **Speedier Recovery Times**  
(Ulrich 1984)
- **Lower stress**  
(Honold 2015)
- **Increased directed attention**  
(Kaplan 2001)
- **Increased well-being**  
(Kaplan 2001)
- **Increased residential satisfaction**  
(Kaplan 2001)



Research suggests you never habituate to green views and always derive health benefits, even when looking at the same view over and over (Kuo 2001)

Elements that help create green views include:

- street trees
- climbing vines
- green walls in public areas
- green roofs

# Green Roof





Habitat 67, Montreal, Canada  
Moshe Safdie, Architect

Source: Brian Pirie via Flickr

# Sky Habitat, Bishan, Singapore

Safdie Architects



Source: Edward Hendricks, Photographer



Courtesy of Safdie Architects

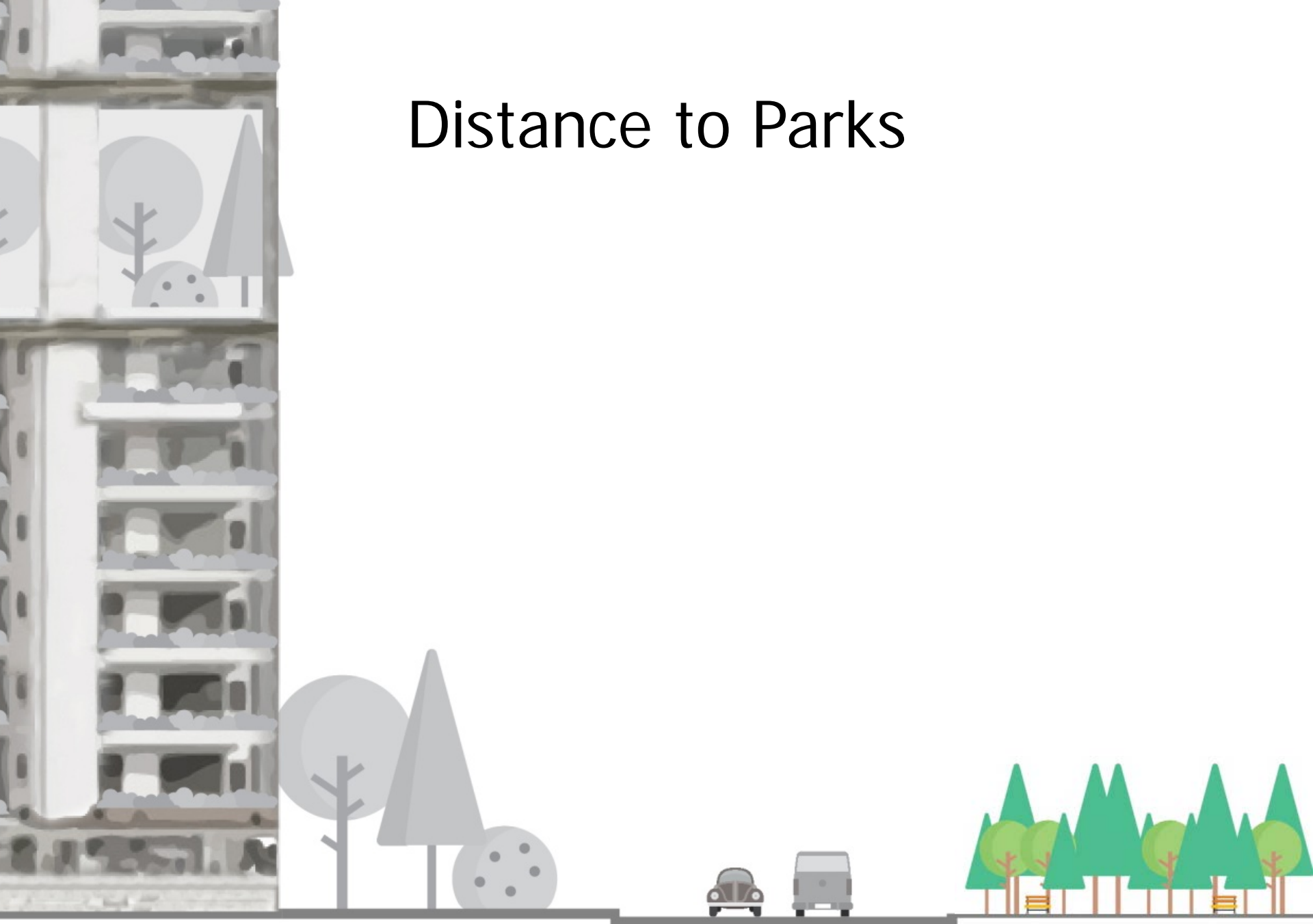


# Parkroyal on Pickering, Singapore

WOHA Architects

Courtesy of WOHA, Photographer: Patrick Bingham-Hall

# Distance to Parks







## World Health Organization Recommendation

Every resident to have a freely visitable green space (0.5ha+) within 300m (5 min walk) of their home



A person is sitting cross-legged in a lush green field, meditating. They are wearing a white tank top and light-colored pants. Their hands are resting on their knees in a mudra. The background is a soft-focus green field with trees in the distance.

## 1. Serene

Spaces that are calm, peaceful and quiet.

# Qualities of Greenspace that Support Mental Health

(Grahn and Stigsdotter 2010; Annerstedt et al. 2012)

A photograph of a park setting. In the foreground, a wooden park bench with a dark metal frame is partially visible on the left. A paved path made of rectangular stones leads from the foreground into the distance on the right. The path is flanked by lush green trees and bushes. In the background, a building with a dark roof and a fence are visible under a clear blue sky.

## 2. Space

Greenspace which provides room to move and where elements are logically connected.

# Qualities of Greenspace that Support Mental Health

(Grahn and Stigsdotter 2010; Annerstedt et al. 2012)

A woman with blonde hair and sunglasses is shown in profile, holding a smartphone up to take a photo of a city skyline. The background features tall skyscrapers and a lush green park in the foreground. The scene is brightly lit, suggesting a sunny day.

### 3. Nature

Greenspaces that look as close as possible to undisturbed natural landscapes

# Qualities of Greenspace that Support Mental Health

(Grahn and Stigsdotter 2010; Annerstedt et al. 2012)


A photograph of a forest with tall, slender trees and sunlight filtering through the canopy. The scene is peaceful and natural.

#### 4. Refuge

Sheltered, safe space that one can lookout from.

# Qualities of Greenspace that Support Mental Health

(Grahn and Stigsdotter 2010; Annerstedt et al. 2012)



**5. Rich in Species:**  
Landscapes that display living nature in as many ways as possible (birds, butterflies, colourful flowers, etc.)

## Qualities of Greenspace that Support Mental Health

(Grahn and Stigsdotter 2010; Annerstedt et al. 2012)

# 5 Strategies for Planting



**Plant Vistas:** plant with the window in mind – create peaceful places to look out at. Green roofs, green walls and green balconies all provide opportunities in the city.



**Seasonality:** select species that attract birds, bees and other insects all year long. Birds and insects help us engage with nature and leaving our thoughts & emails behind for a moment.



**Larger trees:** plant larger trees and give trees space to grow big and to grow old. People consistently prefer landscapes with larger trees (Kaplan). Larger trees are linked with decreased neighbourhood crime (Troy et al.)



**Evergreen shrubs:** use evergreen shrubs and ground cover for year round health benefits to increase green gardens along sidewalks and increased air quality.



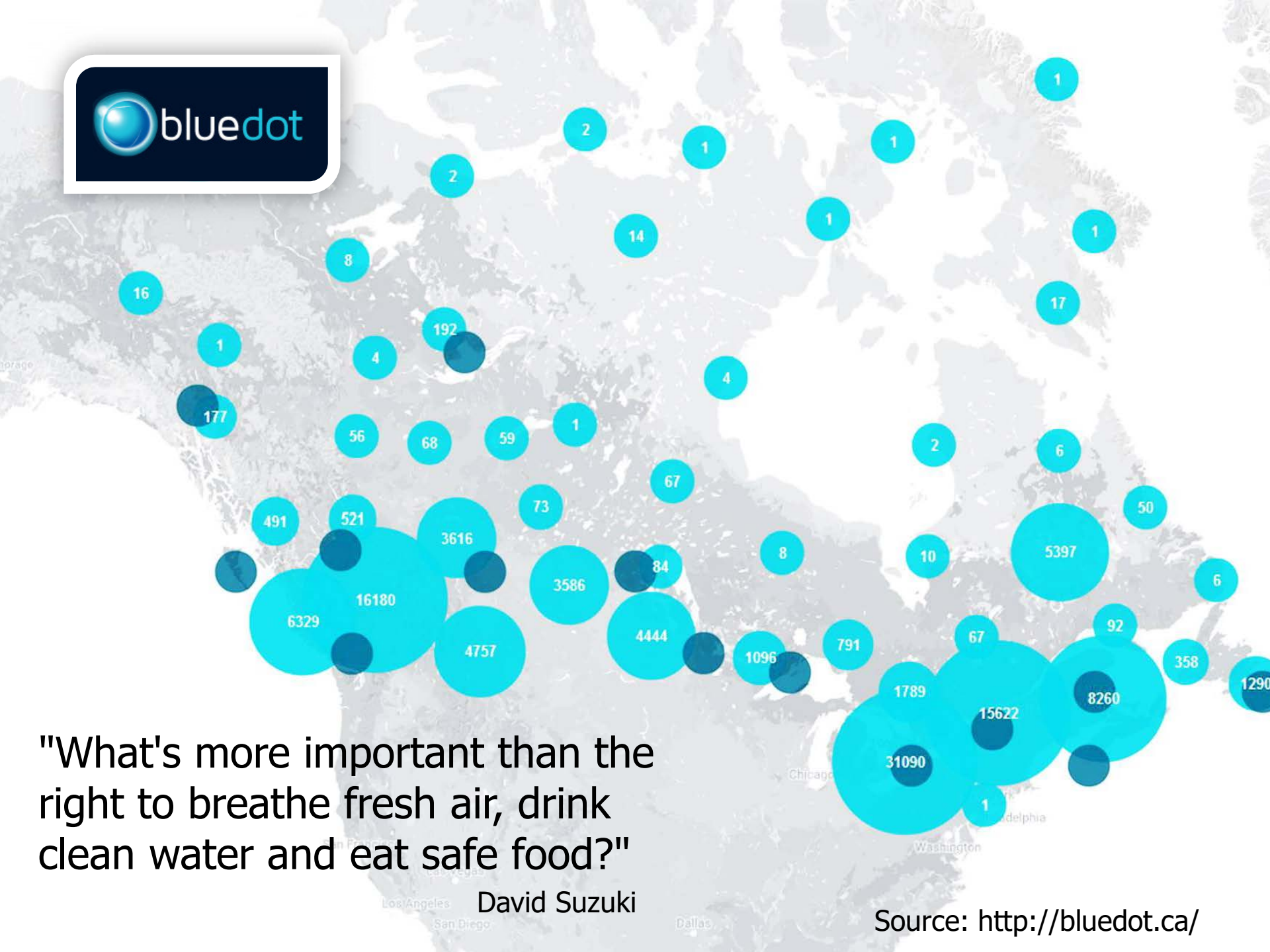
**Small relaxation pockets:** create mini-gardens with benches nestled in trees and shrubs where people can look out onto nature and be visually hidden from the busy city.

# Policy

"I've spoken to a lot of architects and urban planners about the [Urban design for mental health] framework, and they say, **'Sure, that sounds great, but the client has to want it.'** So it has to come from the top down. This is an **opportunity for leaders such as mayors and other politicians to make it a policy.** Physical health is becoming a standard policy, and mental health should be part of that policy, too."

- Layla McCay, Centre for Urban Design and Mental Health





"What's more important than the right to breathe fresh air, drink clean water and eat safe food?"

David Suzuki

Source: <http://bluedot.ca/>

# Greening Strategies

## **Greenest City Action Plan**

Vancouver (2010-2020)

## **Greening the City**

Paris (2014-2020)

## **Sustainable Singapore**

**Blueprint** (2015-2030)

- Every home within a 5 min walk to a greenspace
- Restore or enhance 25ha of natural areas

- 30ha of additional public park
- 20,000 trees planted
- 200 public greening projects
- 100 ha of green roofs and walls, including 33 ha dedicated to urban agriculture

- 200 ha of skyrise greenway (1/2 the size of Stanley park)
- 400km of park connectors
- 0.8ha of parkland / 1,000 residents





# Green Roof Requirements

## **Toronto:**

- New building over 2000m<sup>2</sup> must have green roof coverage of 20-60% or cool roof.

## **Port Coquitlam:**

- Commercial & Industrial Buildings over 5000m<sup>2</sup> required to have 75% roof coverage.

## **Singapore:**

- 100% replacement of building footprint as greenspace in sky terraces, landscaped terraces, and roof gardens.

# Hopeful Signs

**Terrace House**  
**Vancouver**  
Shigeru Ban  
Architects

Courtesy of PortLiving





# Thank you

Questions/Comments:  
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**Special thanks to:**  
Jason Jang (presentation/visual support)  
Sandy James (project guidance)



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<https://www.asla.org/healthbenefitsofnature.aspx>

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<http://www.childrenandnature.org/learn/research/>

World Health Organization's

**Urban Green Spaces and Health a Review of Evidence**

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