

# Urban Strategy; using an interactive urban planning tool in creating activity-friendly neighborhoods for children

TNO | Knowledge for business



Luuk Engbers, PhD

Sanne de Vries, PhD

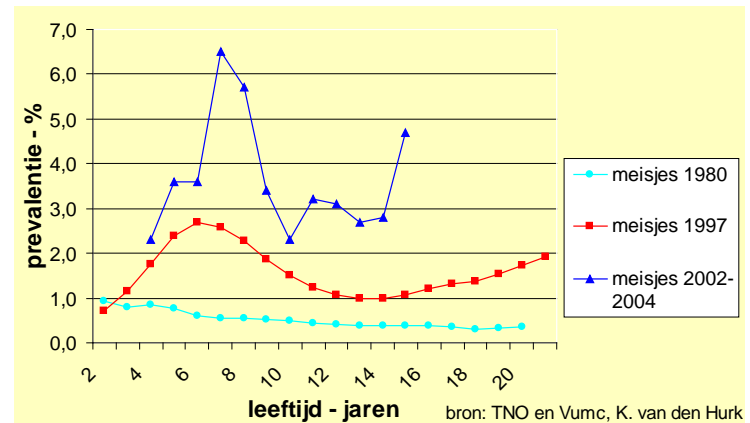
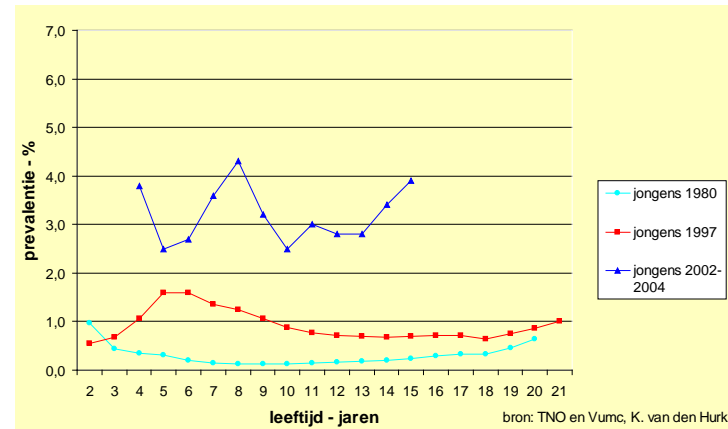
Frank Pierik, PhD

TNO, The Netherlands



# Background

- Rapid increase in the prevalence of overweight and obesity in The Netherlands
- No effective strategy to prevent obesity or to increase children's physical activity level at the population level
- (Re)modeling neighborhoods into 'activity-friendly' neighborhoods may be an effective strategy



*It must be possible, convenient, and safe  
for children to be physically active in  
their neighborhood*

# The Netherlands

- The Netherlands is one of the most densely populated countries in the world (491 people/ km<sup>2</sup>)
- Building offices, houses, and shopping centers often get higher priority in urban planning than realizing playgrounds (Wendel-Vos et al., 2005)
- Sports facilities have been moved out of city centers to their boundaries (Wendel-Vos et al., 2002)



# SPACE study: purpose

Spatial Planning and Children's Exercise (SPACE) study

- To examine the association between factors of the built environment and children's physical activity level

# SPACE study: setting and sample

6 Dutch cities (> 70.000 inhabitants)

- Amersfoort, Haarlem, Hengelo, Rotterdam, Schiedam/ Vlaardingen

10 neighborhoods:

- 5 neighborhoods that will be restructured in the near future
- 5 matched neighborhoods

20 elementary schools:

- 2 schools per neighborhood

2004-2005: 1228 6- to 11-yr old children

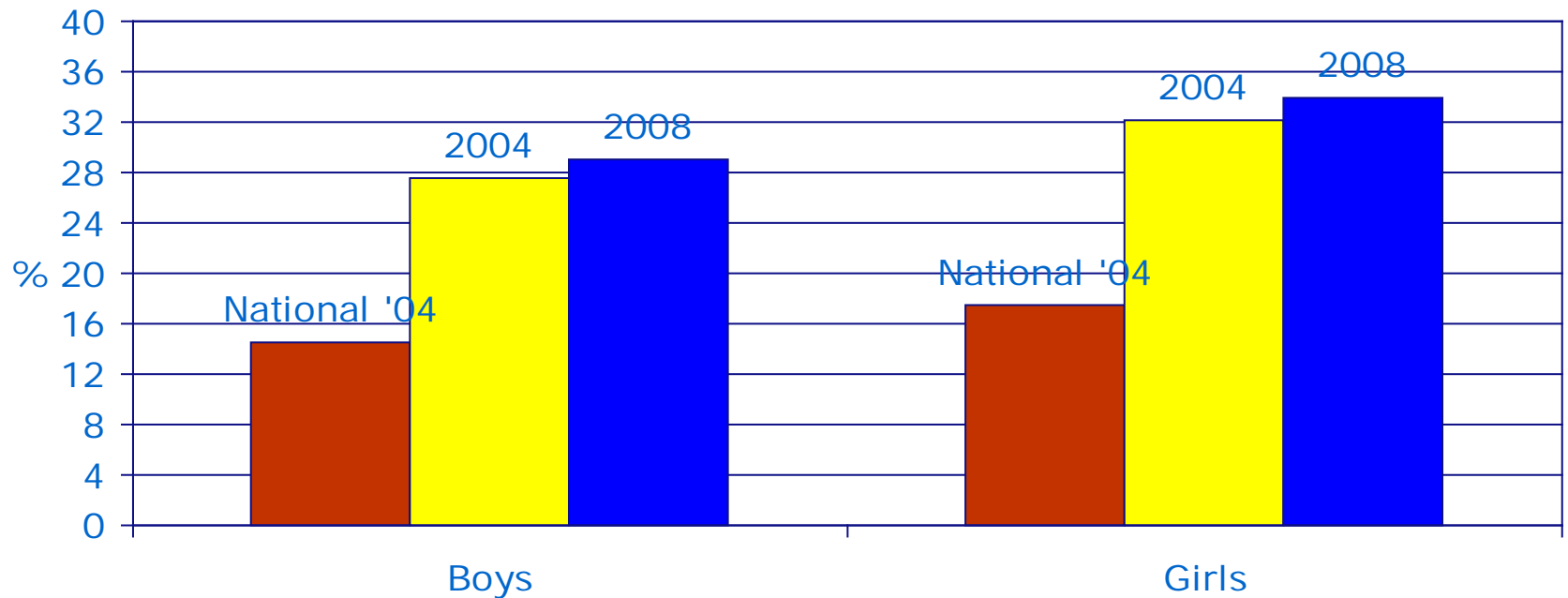
2008-2009: 927 6- to 11-yr old children

# SPACE study: methods

- Body mass index (BMI): body height and weight
- Physical activity:
  - 7-day physical activity diary
  - Sub group: ActiGraph accelerometer and Travel recorder X GPS
- Built environment:
  - Neighborhood observation using a checklist of 54 items in 8 categories
    - Type of residences
    - Sports facilities
    - Recreation facilities and playgrounds
    - Green space and water
    - Garbage and dirt
    - Walking and cycling facilities
    - Traffic safety
    - General impression of activity-friendliness of the neighborhood
  - Geographic information system (GIS), objective geo-data
- Focusgroup interviews

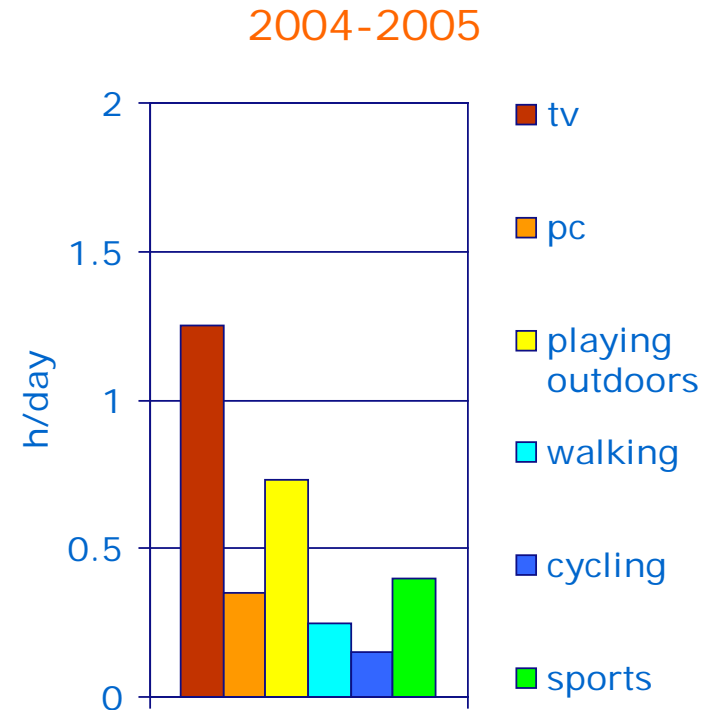
# SPACE study: results BMI

- 2004-2005: 31% overweight, 9% obese
  - Boys: 28%; girls: 33%
- 2008-2009: 31% overweight, 9% obese
  - Boys: 29%; girls: 34%



# SPACE study: results physical activity

Min/day	2004-2005	2008-2009
MVPA	140	143
Playing outdoors	45	43



# Activity-friendly neighborhoods

- Water
- Cycle-tracks
- 30-km speed zones
- Parallel parking spaces



# Cyclable and walkable neighborhoods

- Pedestrian crossings
- Roundabouts
- Parallel parking spaces
- Cycle-tracks
- Sidewalks



# Urban Strategy (US)

## Instrument for interactive Spatial Planning

Facilitating intersectoral planning, by

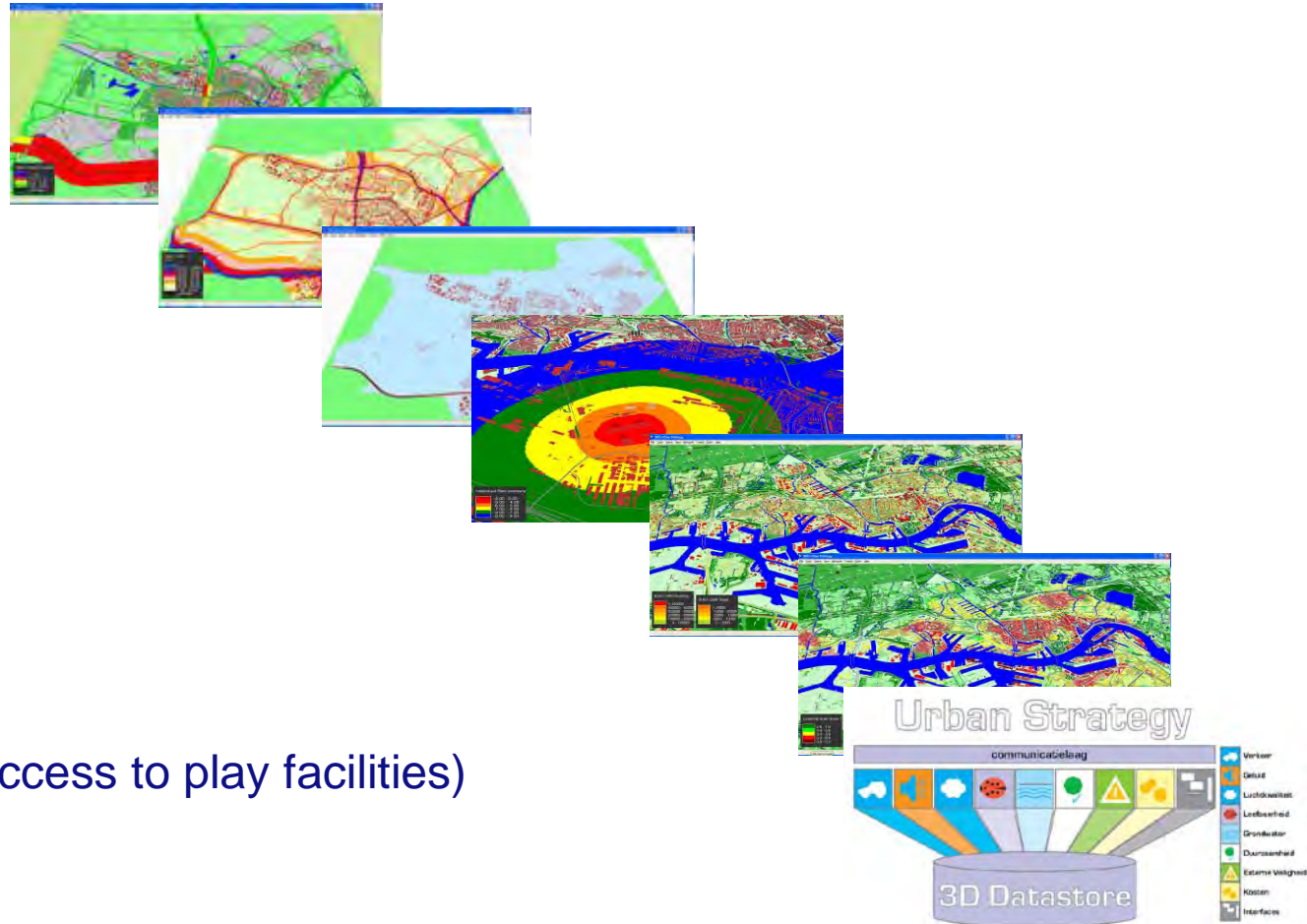
- Linking, various knowledge domains by high-tech computer models
- 3D visualisation

# Linking TNO expertise

- Traffic
- Sound
- Air
- External safety
- Ground water
- Sustainability

AND:

- PA-friendliness (access to play facilities)



# How?

US shows:

- A 3D representation of the surroundings enhancing the interaction between the specialists
- 
- A 2D map to insert changes in the urban structure
- In 1D charts and graphs (key summary indices and indicators)

# Urban Strategy: 'cockpit'





Noise Industrie  
Lden



**Noise Pollution  
industry**



Road Intensity/Capacity

Blue	> 1.00
Red	0.75 - 1.00
Yellow	0.50 - 0.75
Green	0.00 - 0.50
Black	unknown

# Physical activity module

Module visualizes:

- Where children live (demographic data on P.O. box level)
- Action radius (i.e. estimated distance children aged 1-5y, 6-12y, 13-18+ are able to cross)
- Location of play elements (swing, sandbox, climbing frame)?
- Reach ability/resistance factors (i.e. water, traffic, buildings)

# Physical activity module

Answers:

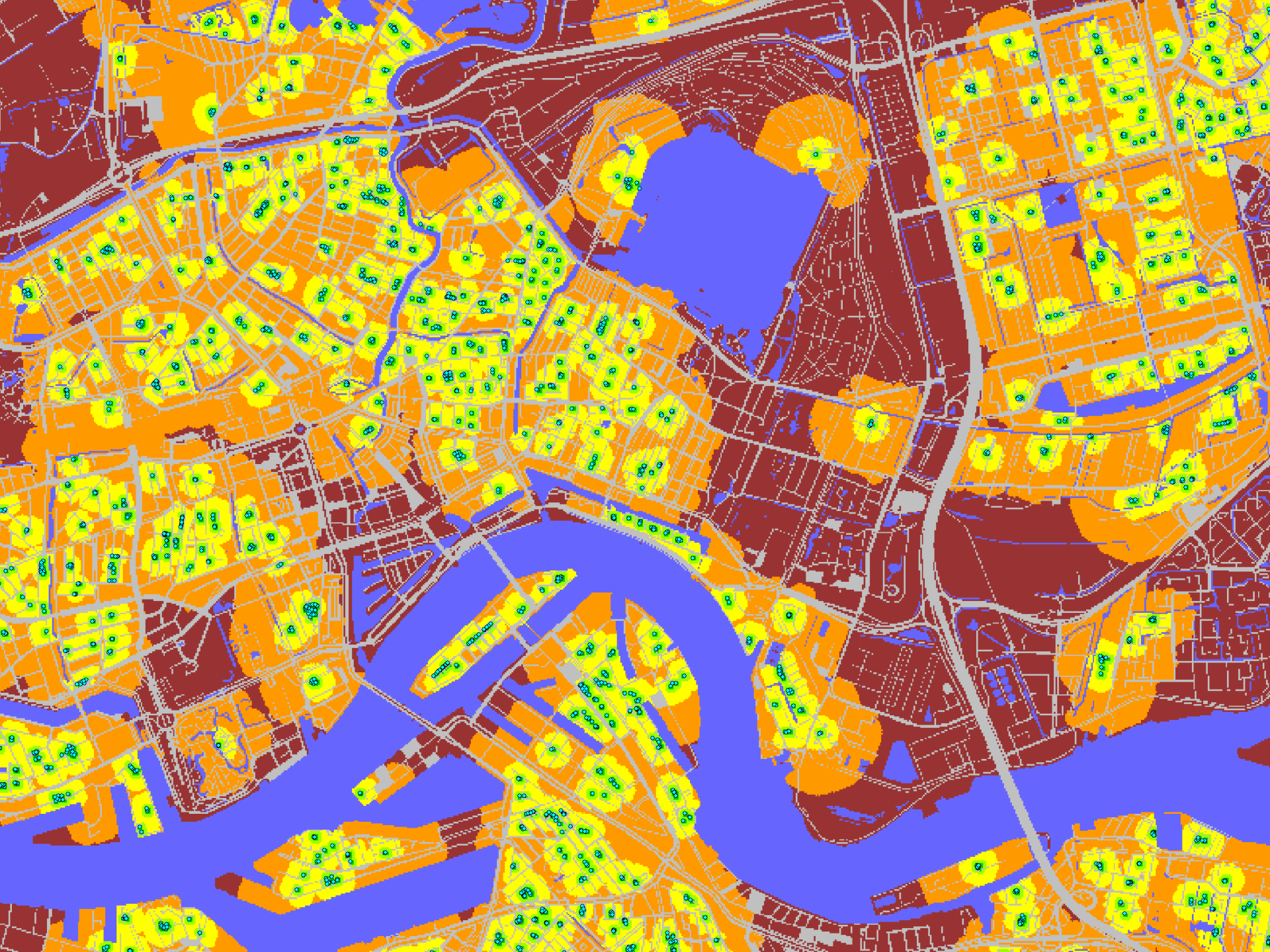
- How well do playgrounds cover the neighborhood?
- Where do children live with insufficient access to playgrounds?
- Where to place new facilities (linked to other US modules) and demographic developments?

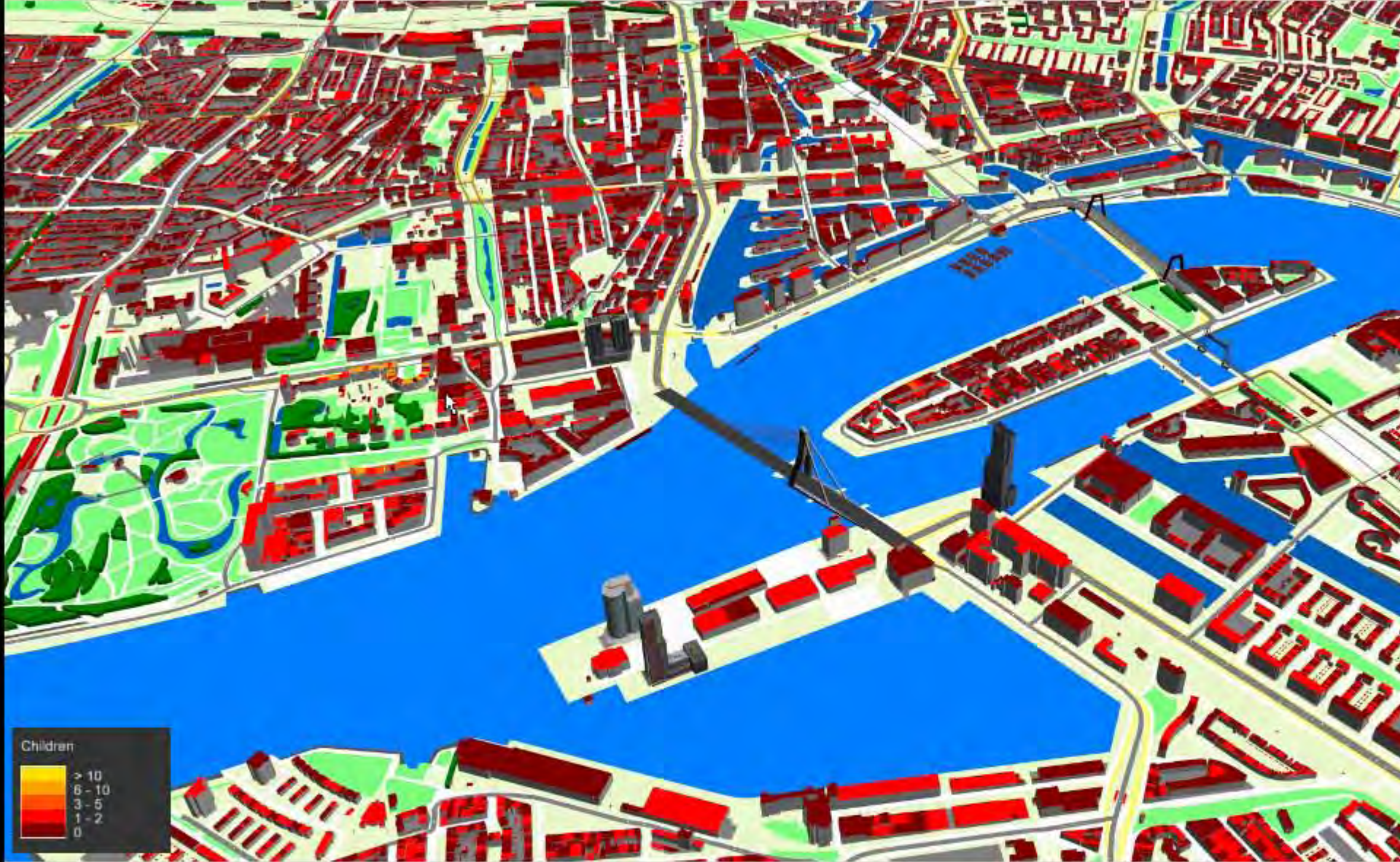




Playground Objects

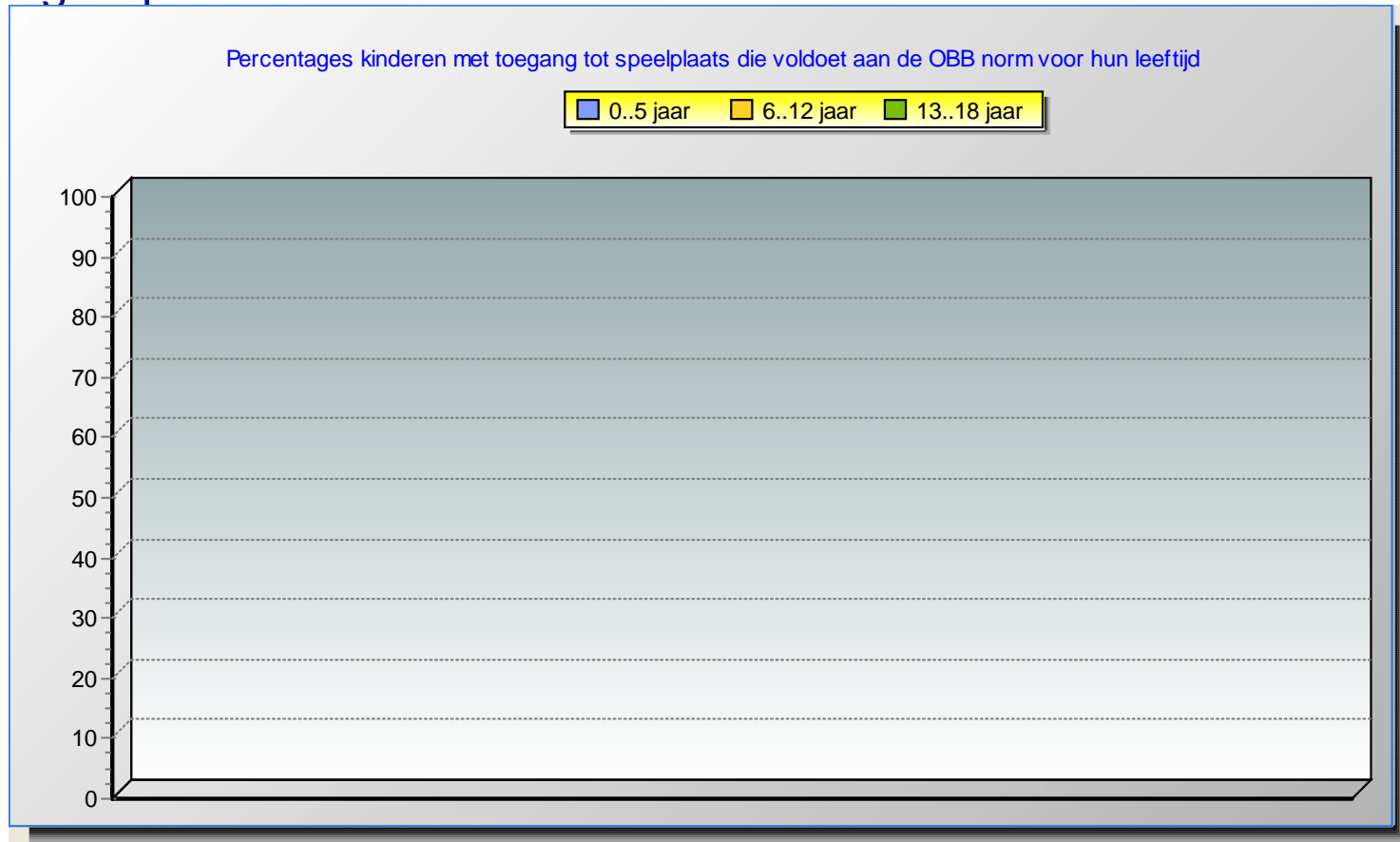
Dark Green	Range 12-18+
Yellow	Range 6-11
Light Green	Range 0-5
Red	Playground Object





# 1D overview

- % children with access to playgrounds suitable for their age group



# Future plans

More indicators of PA friendliness:

- Traffic safety (speed reducing measures)
- Quality of play facilities (e.g. supervision, organised activities)
- Sportsfacilities/schools
- More specific resistance factors (e.g. SPACE study; roundabouts vs. cross sections, etc.)
  
- Accessibility of health care institutions

Thank you for your attention!

**luuk.engbers@tno.nl**  
**sanne.devries@tno.nl**

**[www.tno.nl/gezondewijk](http://www.tno.nl/gezondewijk)**  
**[www.tno.nl/urbanstrategy](http://www.tno.nl/urbanstrategy)**