

Aménager la ville de demain: Réalités / Possibilités

Yan Kestens

Chaire Interventions Urbaines et Santé des
Populations

Centre de recherche du CHUM
École de Santé Publique de l'Université de Montréal



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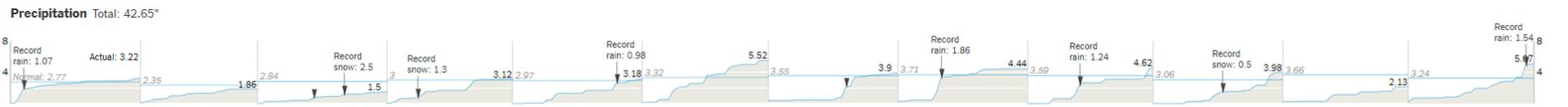
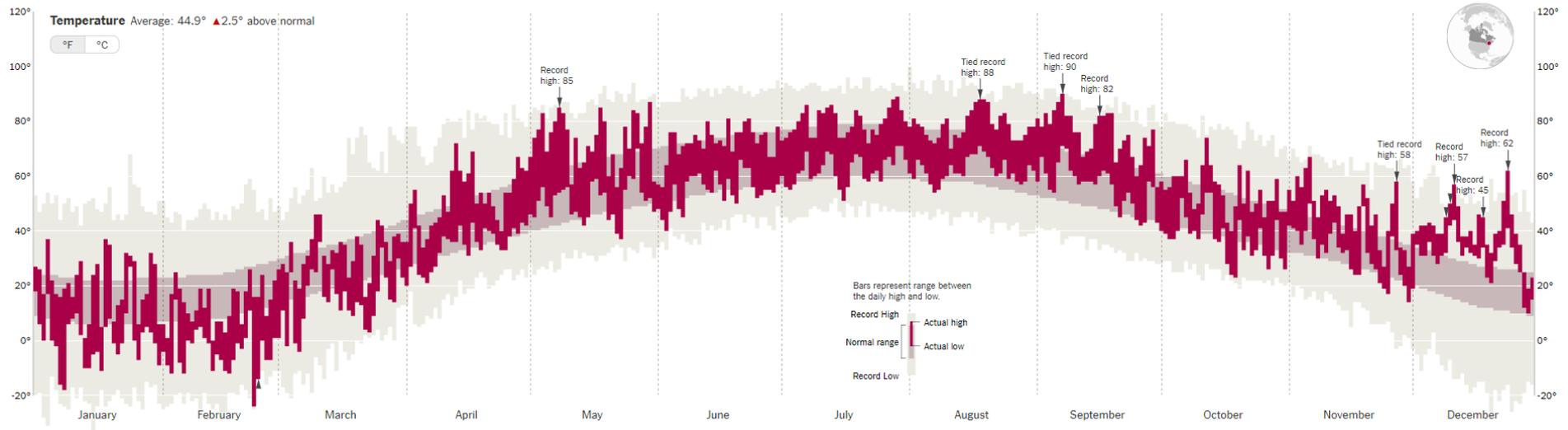
Centre de recherche du CHUM

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Montréal 2015

+2.5 degrés au dessus de la normale

Montreal, Canada



Cumulative monthly precipitation, in inches, compared with normal. Precipitation totals are rainfall plus the liquid equivalent of any frozen precipitation.

Montréal 2016

+2 degrés au dessus de la normale



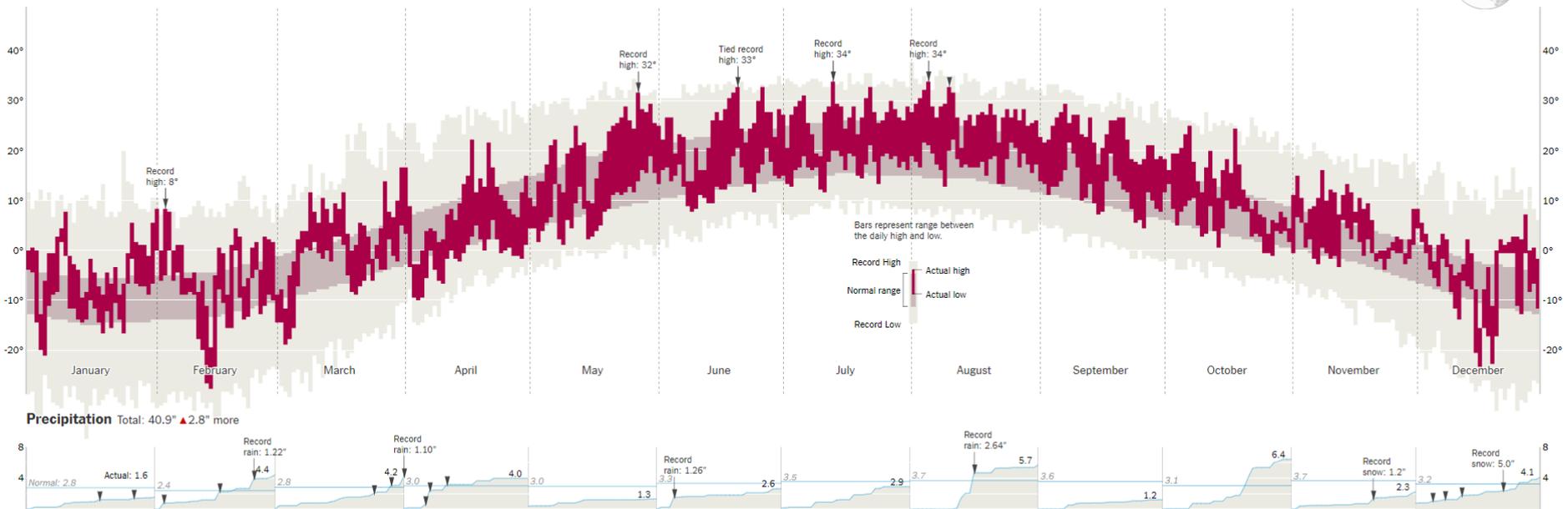
WORLD | How Much Warmer Was Your City in 2016?



Montreal, Canada

Temperature Average: 8.1° ▲ 2° above normal

°F °C



Temperature and precipitation data is provided by AccuWeather. The normal temperature range is determined using the averages of the highs and lows for each day from 1981 to 2010.

Montréal

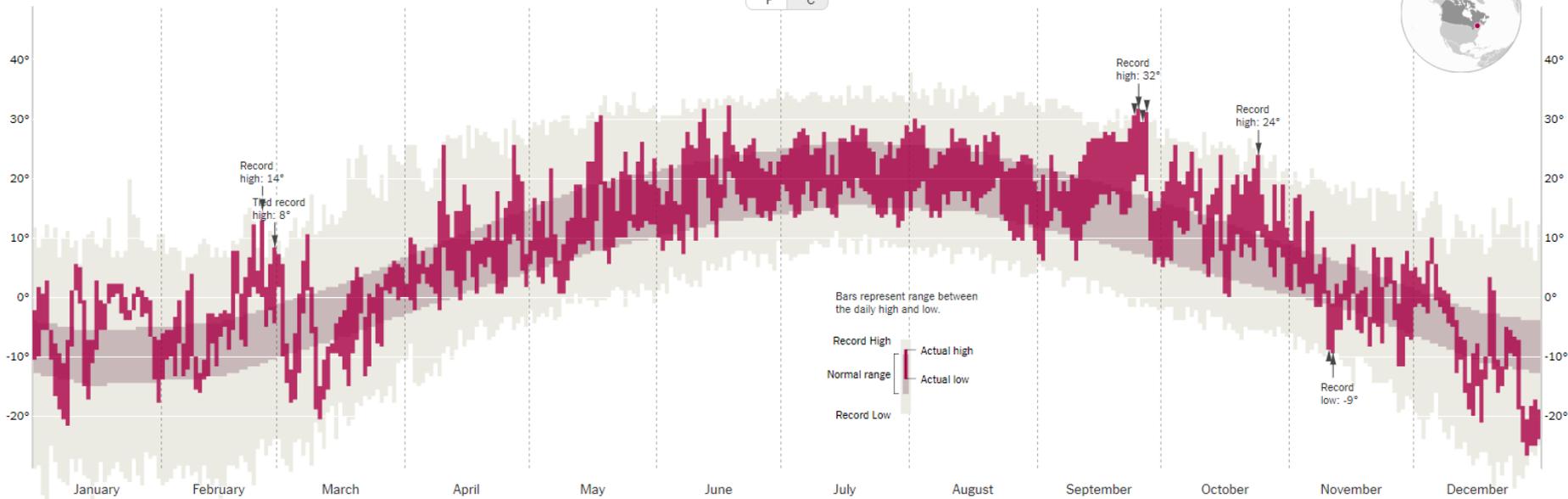
2015

+1.5 degrés au dessus de la normale

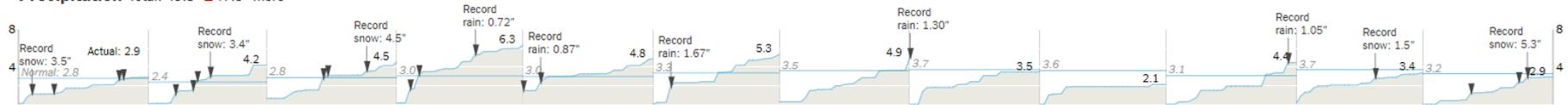
Montreal, Canada

Temperature Average: 7.6° ▲ 1.5° above normal

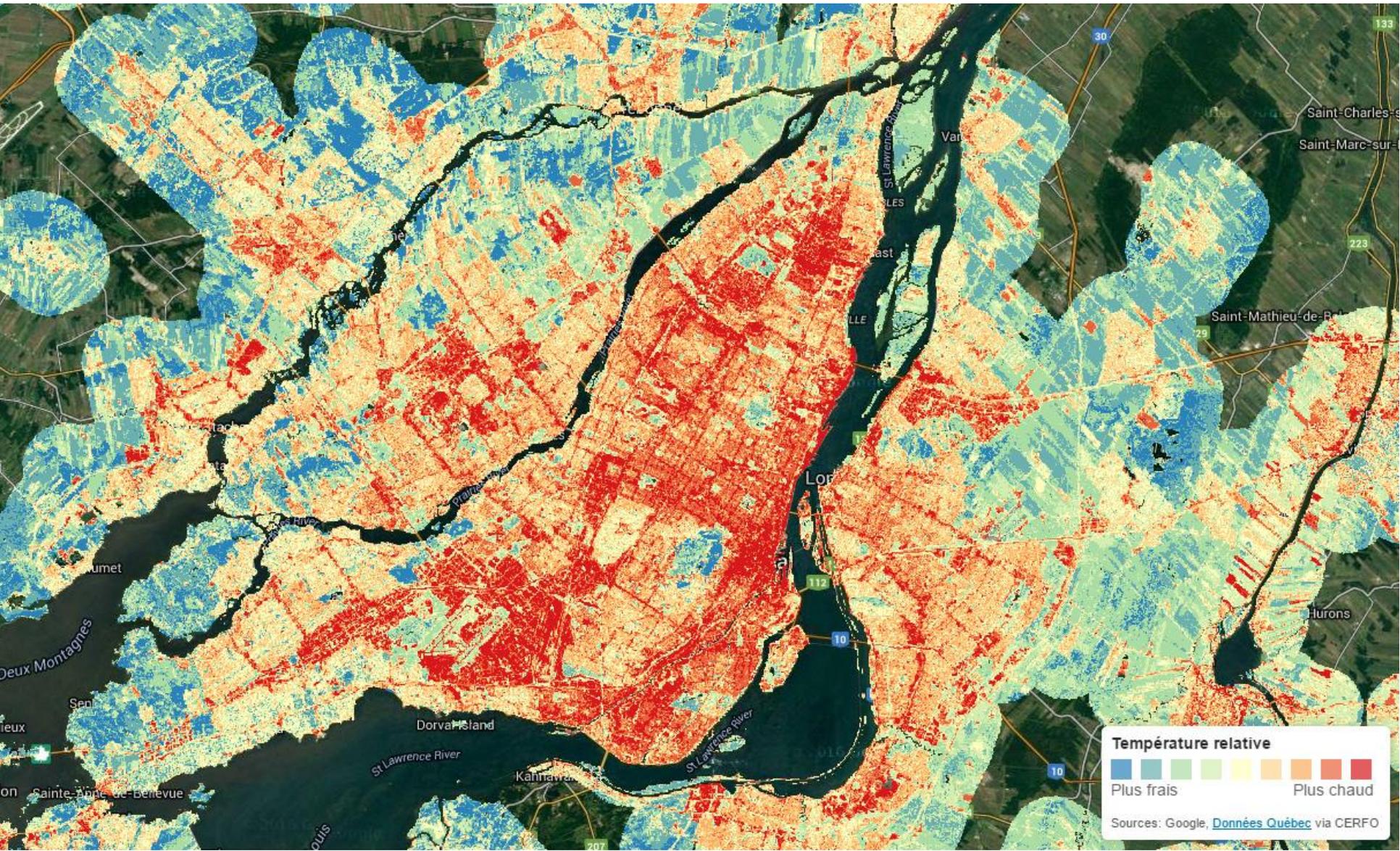
°F °C



Precipitation Total: 49.3" ▲ 47.5" more



Cumulative monthly precipitation, in inches, compared with normal. Precipitation totals are rainfall plus the liquid equivalent of any frozen precipitation.



RÉGION DE MONTRÉAL

199 805

Nombre de voitures de plus en 5 ans

387 382

Nombre de voitures de plus en 10 ans

2016

2 918 646

2011

2 718 840

2007

2 531 264

+15%

LAURENTIDES

2016

415 636

2011

378 901

2007

344 761

+21%

LANAUDIÈRE

2016

347 971

2011

321 040

2007

288 563

+21%

LAVAL

2016

259 699

2011

243 028

2007

220 131

+18%

MONTÉRÉGIE

2016

1 029 138

2011

958 066

2007

877 695

+17%

ÎLE DE MONTRÉAL

2016

866 202

2011

817 805

2007

800 114

+8%

AUTRES RÉGIONS

Abitibi-Témiscamingue

2016 ▶ 108 842

2011 ▶ 103 803

2007 ▶ 95 457

Bas-Saint-Laurent

2016 ▶ 142 713

2011 ▶ 136 549

2007 ▶ 128 092

Capitale Nationale

2016 ▶ 472 429

2011 ▶ 439 457

2007 ▶ 394 347

Centre-du-Québec

2016 ▶ 175 850

2011 ▶ 163 346

2007 ▶ 152 003

Chaudière-Appalaches

2016 ▶ 304 337

2011 ▶ 287 231

2007 ▶ 266 779

Côte-Nord

2016 ▶ 61 544

2011 ▶ 62 003

2007 ▶ 56 739

Estrie

2016 ▶ 214 784

2011 ▶ 200 473

2007 ▶ 187 635

Gaspésie-Îles-de-la-Madeleine

2016 ▶ 70 076

2011 ▶ 67 706

2007 ▶ 63 278

Mauricie

2016 ▶ 183 526

2011 ▶ 175 501

2007 ▶ 165 815

Nord-du-Québec

2016 ▶ 16 135

2011 ▶ 14 931

2007 ▶ 13 534

Outaouais

2016 ▶ 246 758

2011 ▶ 231 618

2007 ▶ 209 011

Saguenay-Lac-Saint-Jean

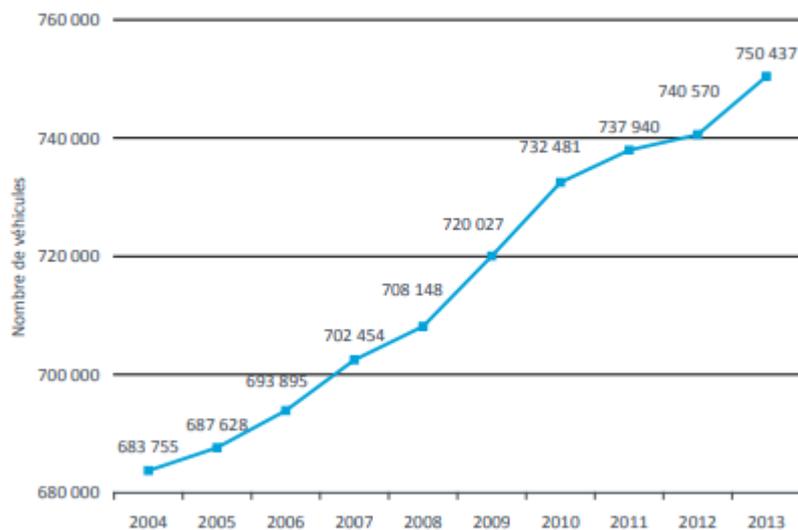
2016 ▶ 194 992

2011 ▶ 188 582

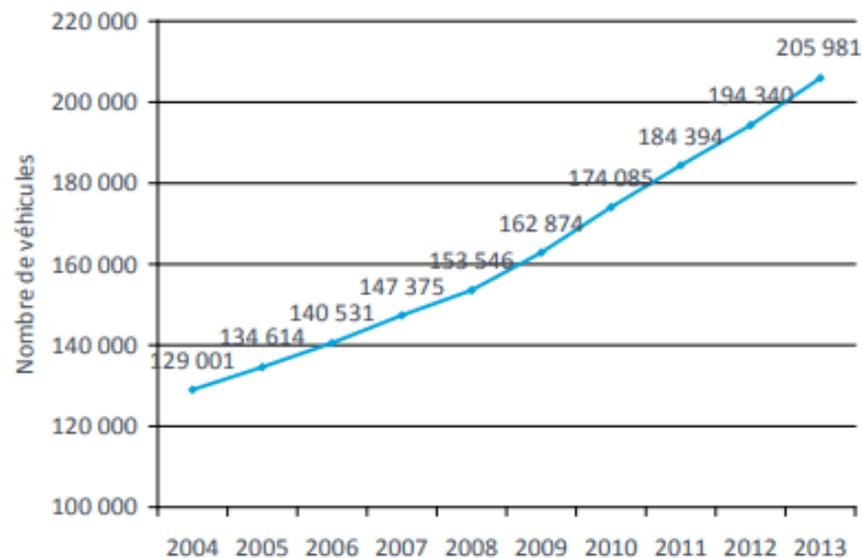
2007 ▶ 174 613

Journal de
Montréal,
21 mars 2017

Nombre total de véhicules de promenade en circulation, agglomération de Montréal, 2004-2013

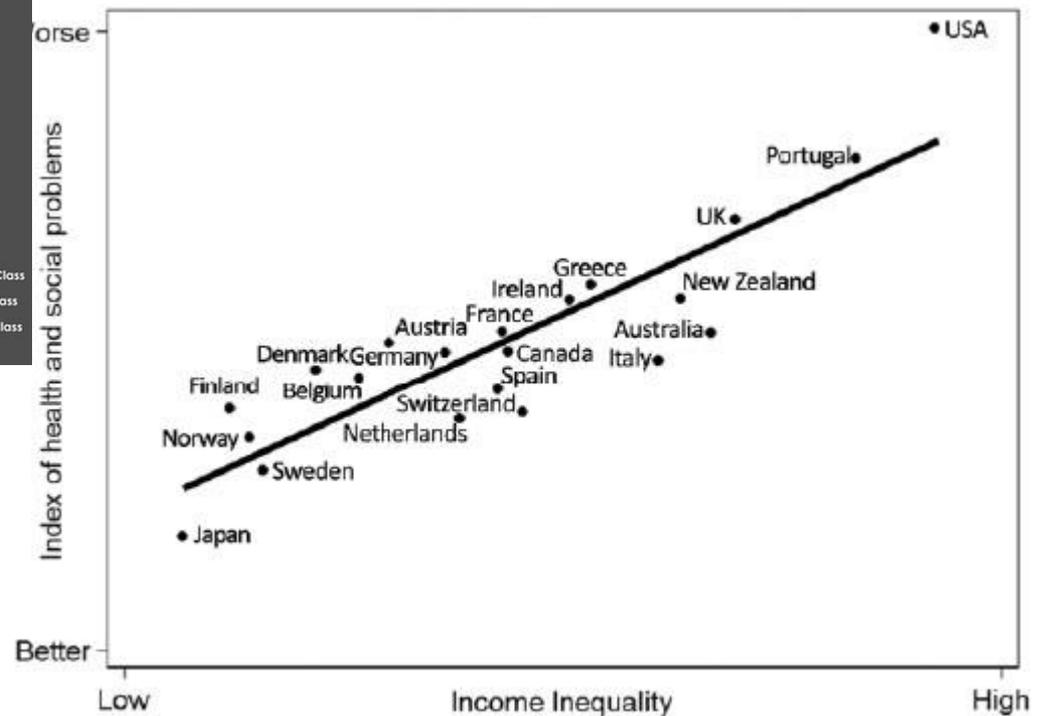
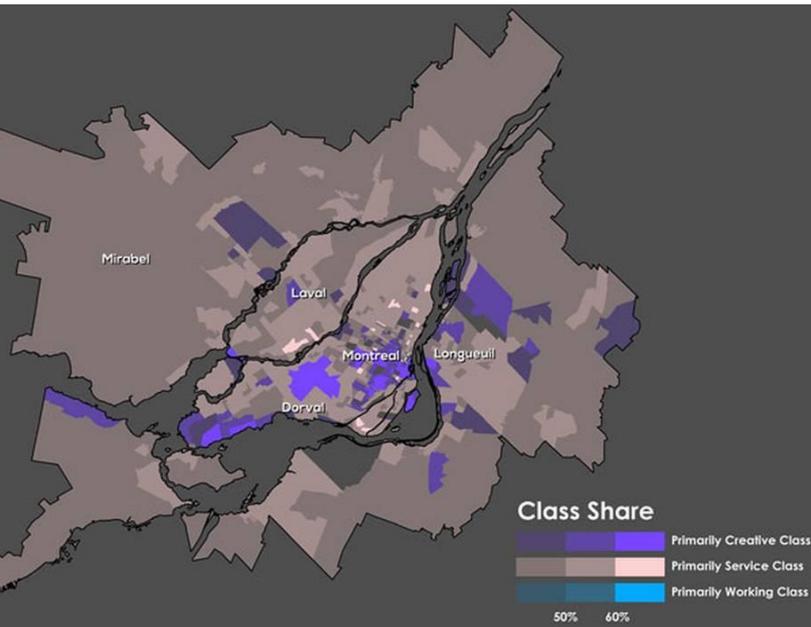


Camions légers



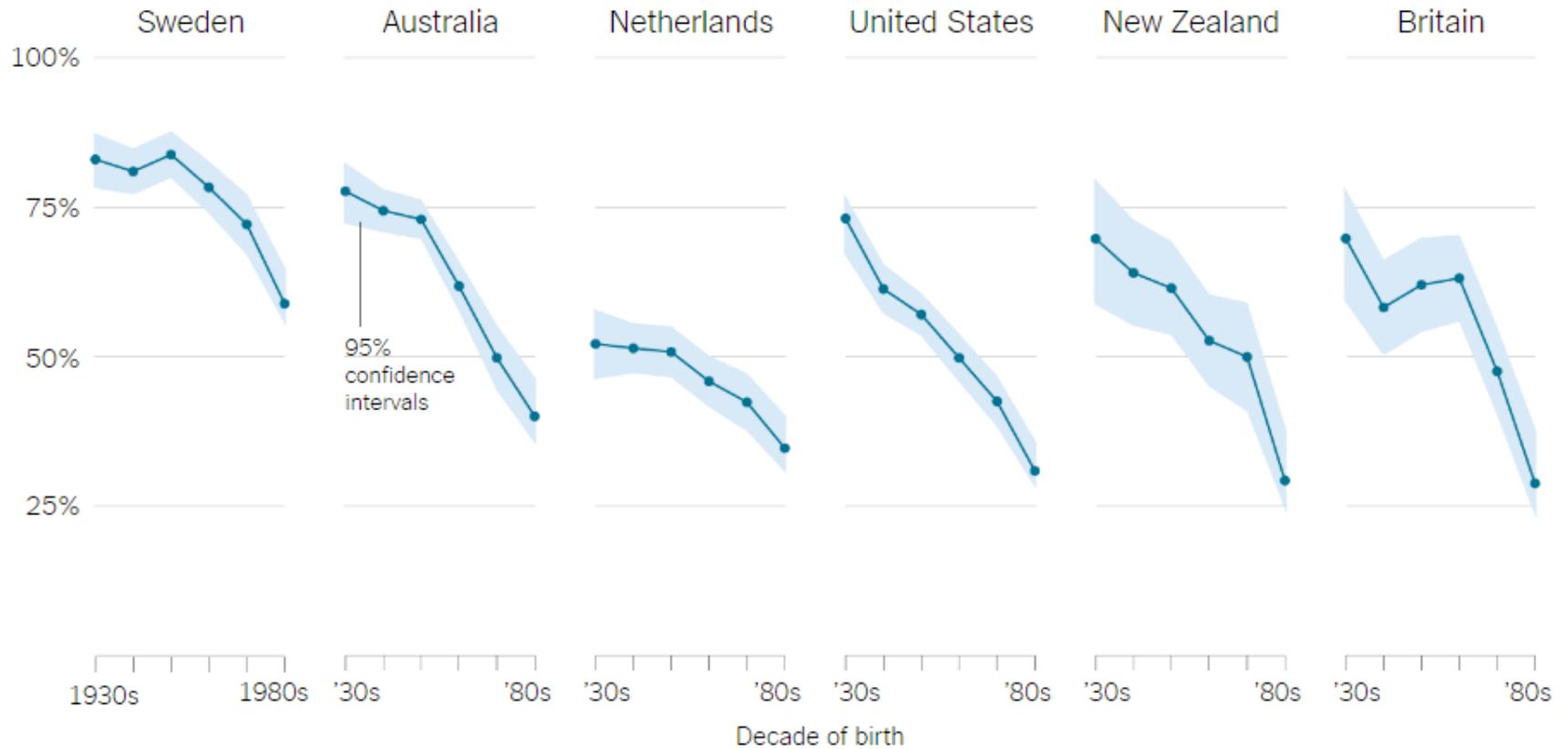
Source : Société de l'assurance automobile du Québec.

Ségrégation socio-spatiale



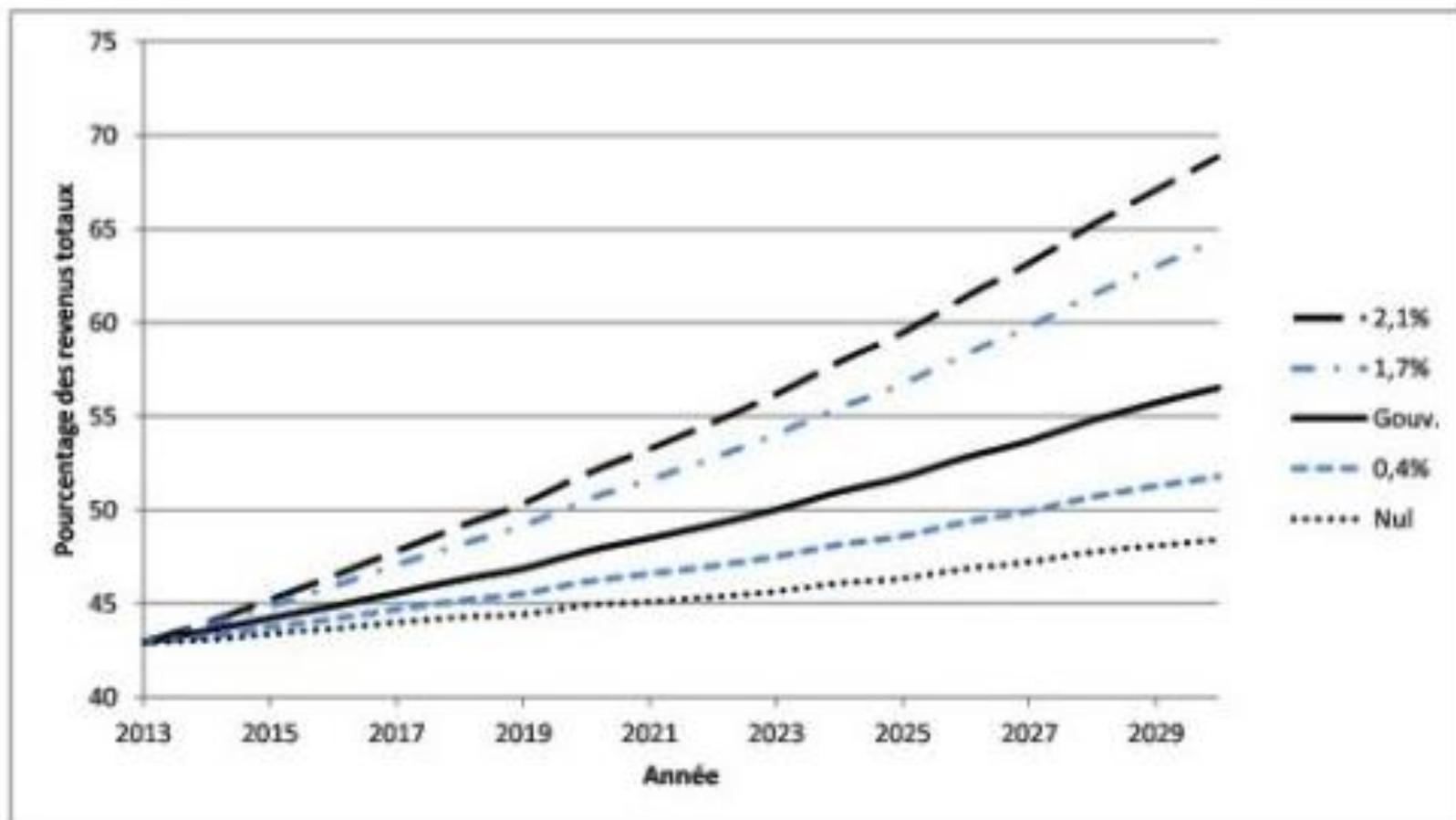
Source:
<https://www.theglobeandmail.com/opinion/the-new-class-divide/article21456139/>

Percentage of people who say it is “essential” to live in a democracy



Source: Yascha Mounk and Roberto Stefan Foa, “The Signs of Democratic Deconsolidation,” *Journal of Democracy* | By The New York Times

Graphique 2: Projection des dépenses publiques de santé en pourcentage des revenus totaux du gouvernement du Québec entre 2013 et 2030 selon différents taux de croissance des coûts structurels



Divers enjeux dans la ville

‘La ségrégation *dans* la ville peut mener à une fragmentation *de* la ville’ (Hamman 2013)

Périurbanisation – étalement urbain

Gentrification

Inégalités sociales &
environnementales

Infrastructures

Mobilités

La ville 'durable'

Développement
économique

Développement
social

Développement
environnemental

Accès aux ressources

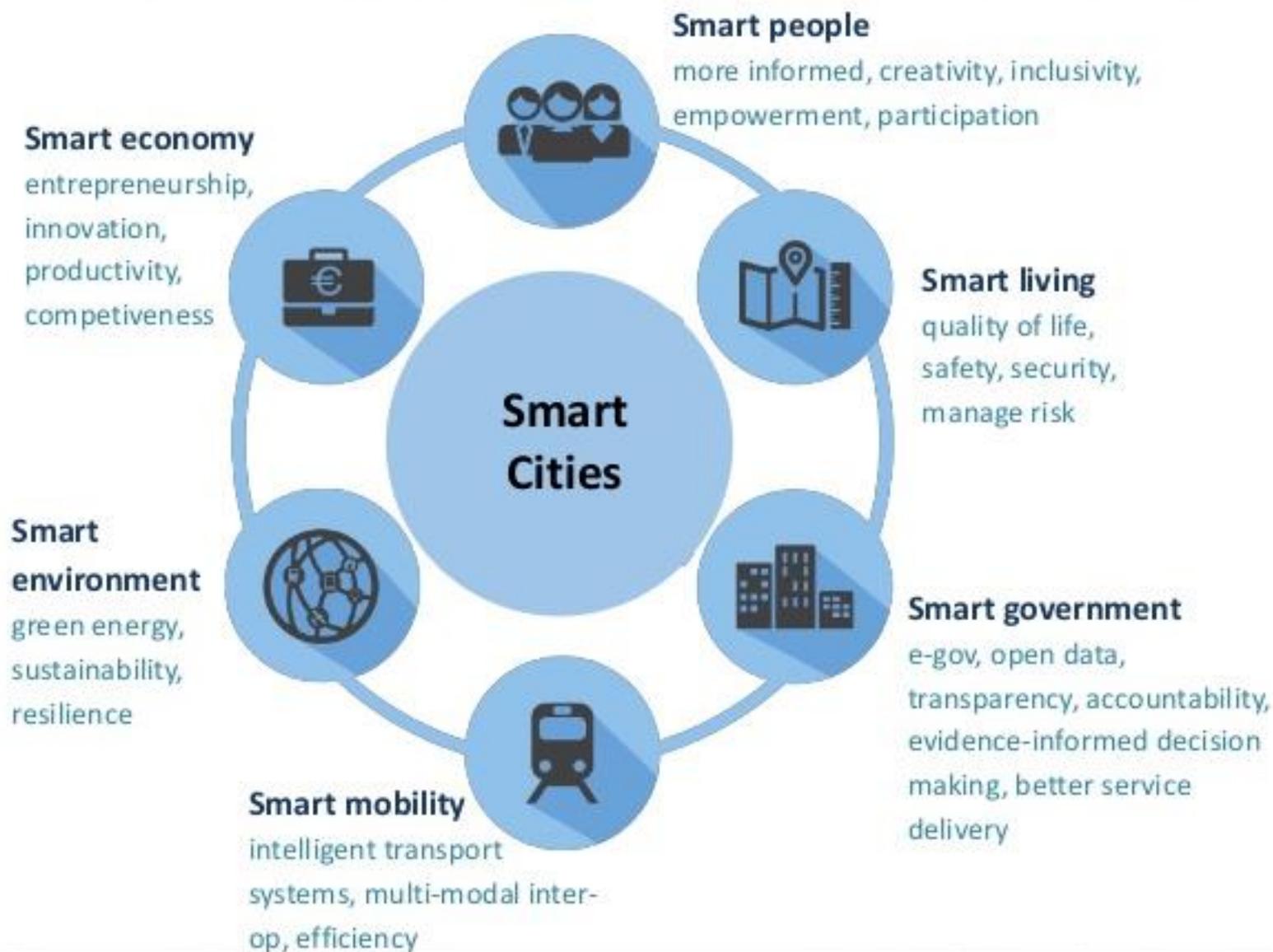
Mobilités

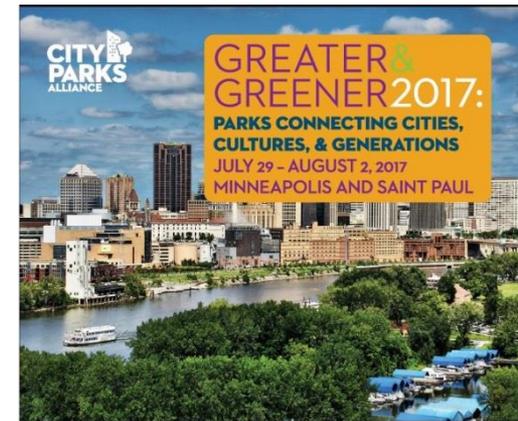
Systemes de transport

Liens spatiaux,
liens sociaux

Ville intelligente

Promise of smart urbanism/cities





Convergences

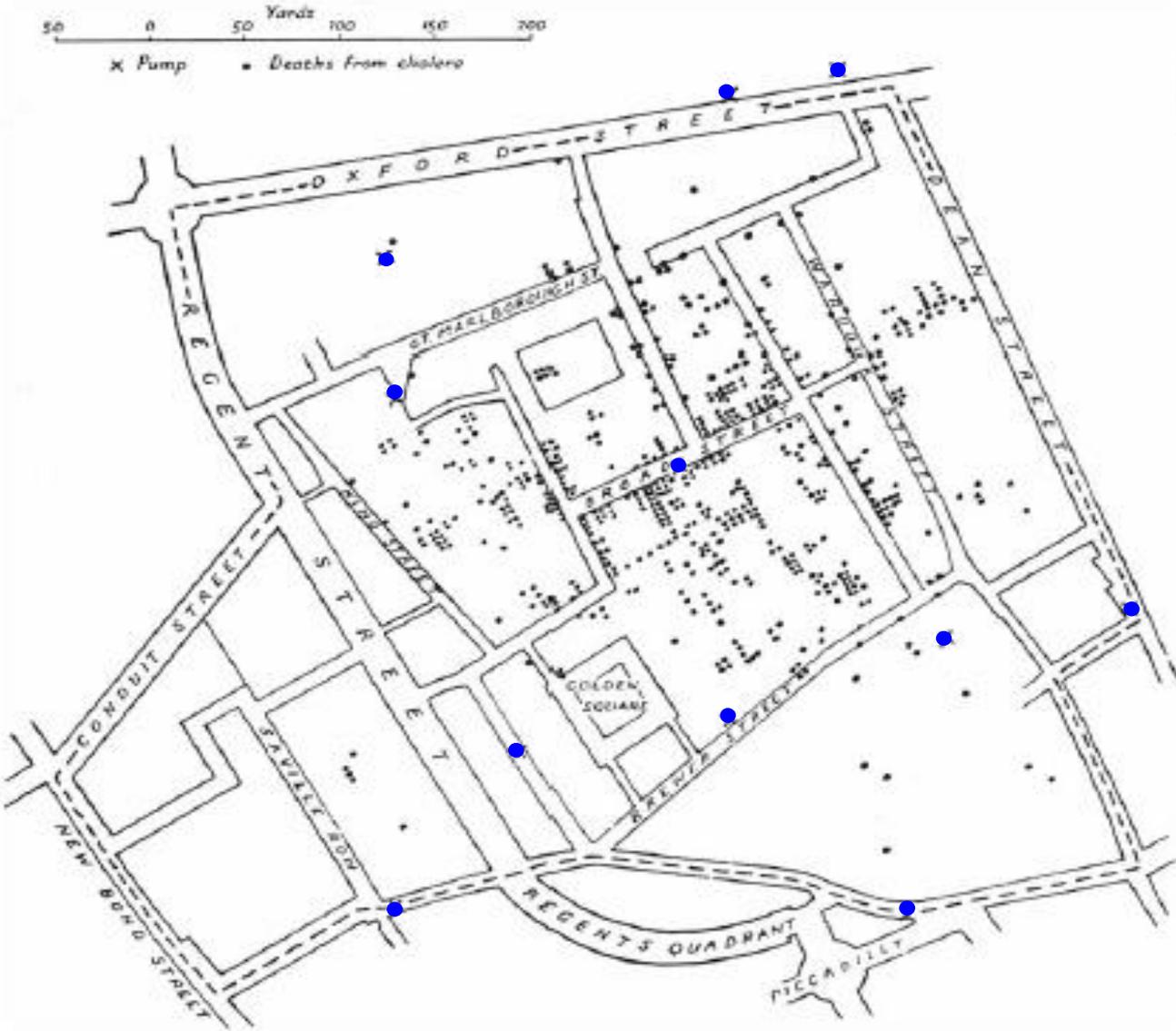
*“Cities are an immense laboratory of trial and error, failure and success, in city building and city design. This is the laboratory in which city planning should have been learning and forming and testing its theories” **Jane Jacobs, The Death and Life of Great American Cities (1961).***

‘De la science du problème
à la science des solutions’



Cholera Epidemic, London, 1852

Map by John Snow



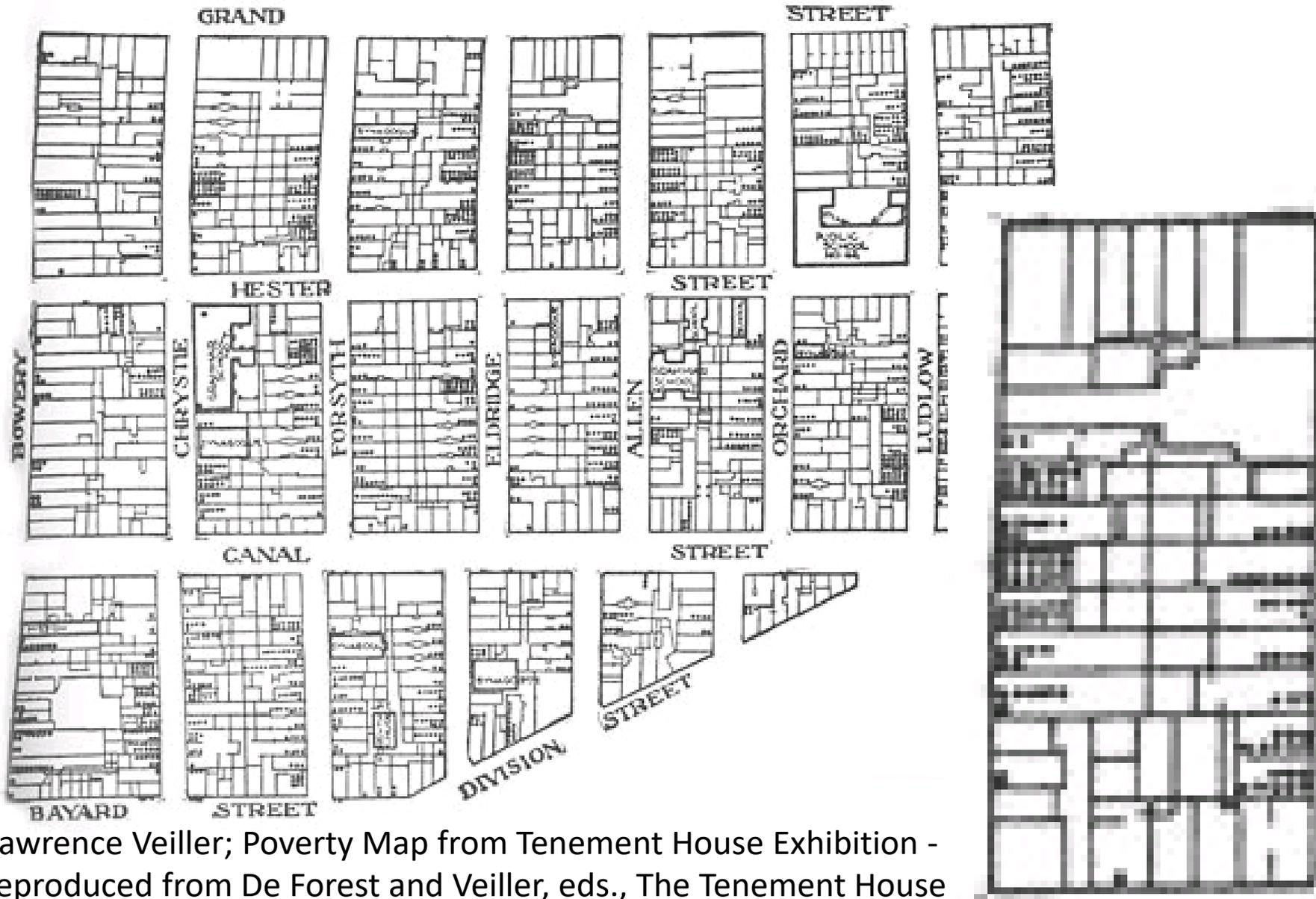
Areal Aggregations and Density Symbols

Three small maps illustrating different types of areal aggregations and density symbols. The first map shows a single dark square in a light gray area. The second map shows a cluster of dark squares. The third map shows a dark square surrounded by a ring of light gray squares.

POVERTY MAP FROM TENEMENT HOUSE EXHIBITION.

Prepared by Lawrence Veiller.

Each dot represents 5 families who have applied for charity in 5 years, either to the Charity Organization Society or to the United Hebrew Charities.



Lawrence Veiller; Poverty Map from Tenement House Exhibition - reproduced from De Forest and Veiller, eds., The Tenement House

Jacob Riis (1890) How the Other Half Lives: Studies among the Tenements of New York

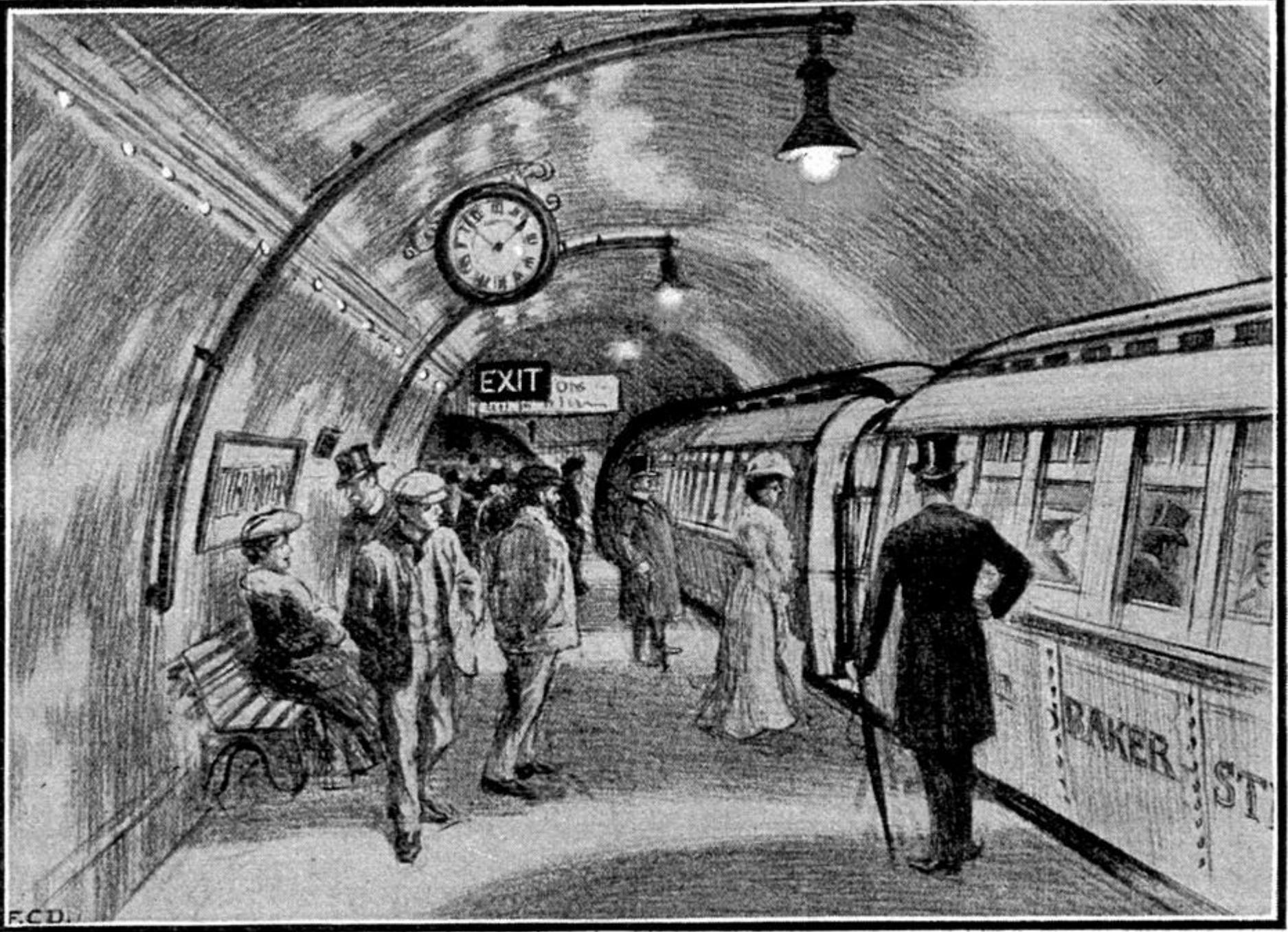




Gaston Brun, 1901, Les travaux du métro, tranche de l'Étoile



Construction of St-Michel Station, Paris, 1900





Montreal Street Car – 'The Rocket' - 1892





MUSEE McCORD MUSEUM

Handwritten signature or mark in the bottom left corner of the photograph.

EFFICACE

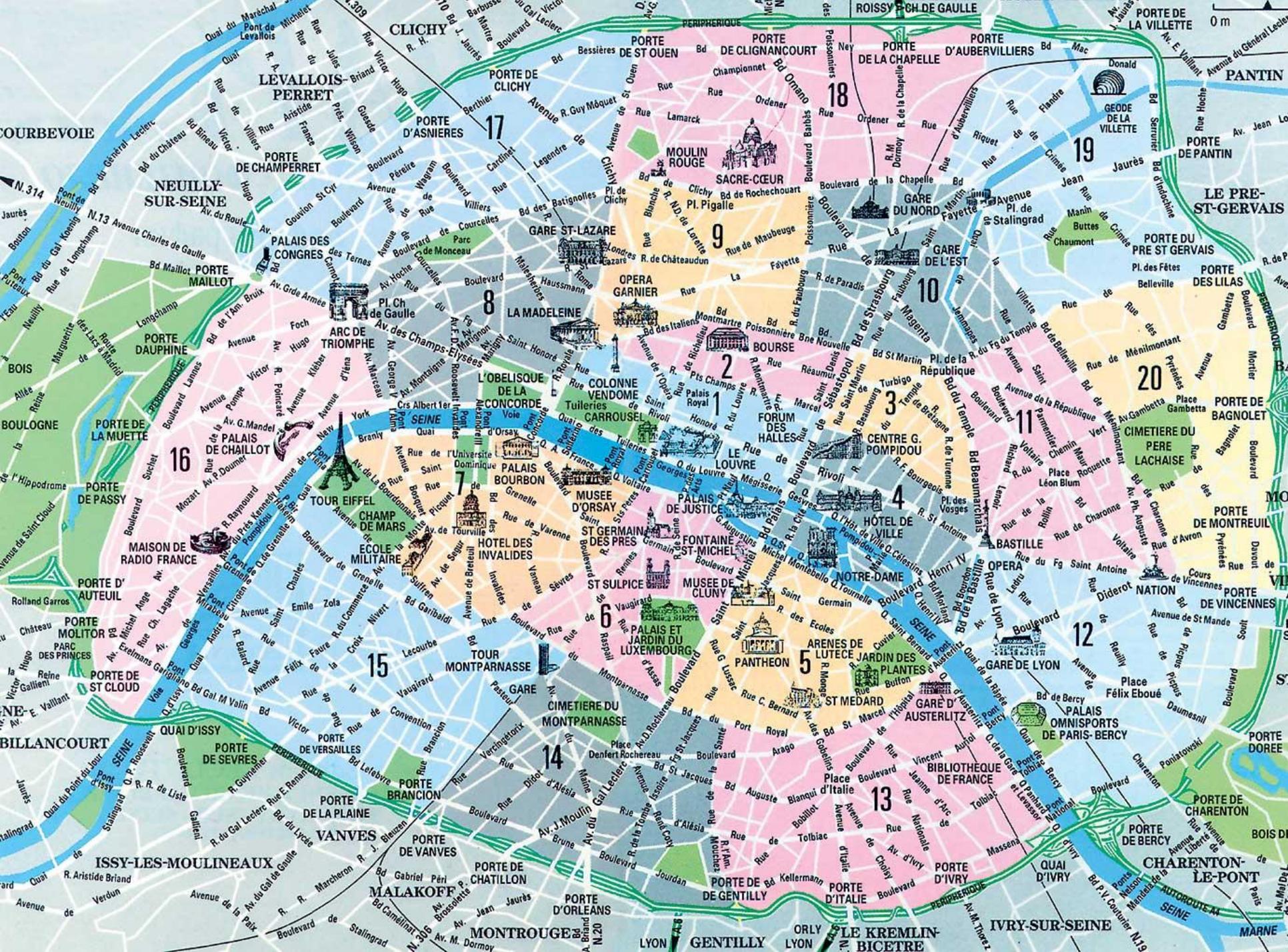
Emprise au sol bâtie et densité urbaine



Paris, quartier Opéra - lat. 48.5699° / long. 2.3419°

Coefficient d'emprise au sol du bâti (%)

66



CLICHY

LEVALLOIS PERRET

NEUILLY-SUR-SEINE

PORTE DE CHAMPERRET

PORTE DAUPHINE

PORTE DE LA MUETTE

PORTE DE PASSY

MAISON DE RADIO FRANCE

PORTE D'AUTEUIL

PORTE MOLITOR

PORTE DE ST CLOUD

BILLANCOURT

ISSY-LES-MOULINEAUX

PORTE DE SEVRES

ISSY-LES-MOULINEAUX

PORTE DE CLIGNANCOURT

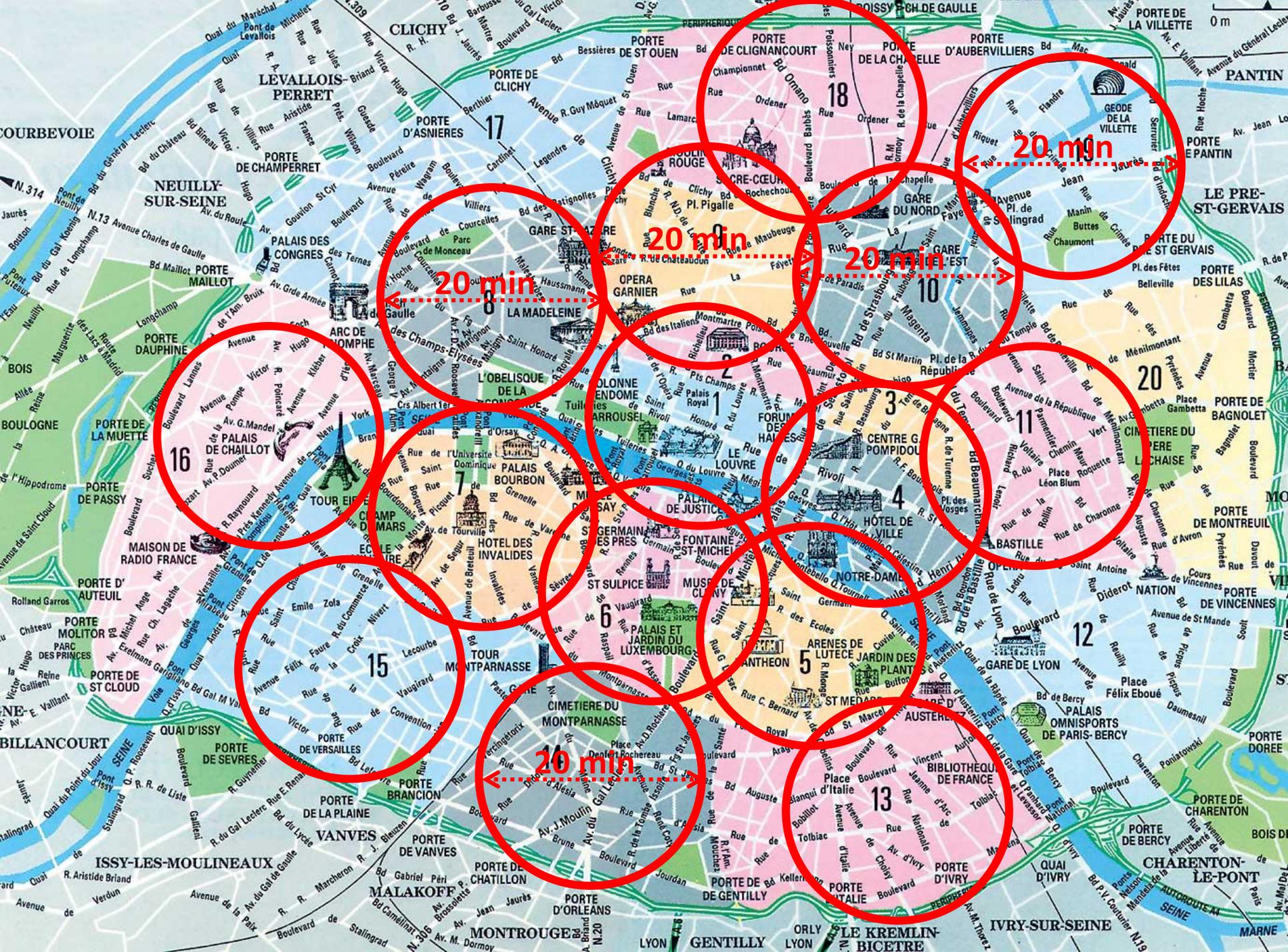
PORTE D'ASNIERES

PORTE DE CLICHY

PORTE DE LA MADELEINE

PORTE DE LA CONCORDE

PORTES DES SAINTS PERES



16

20 min

20 min

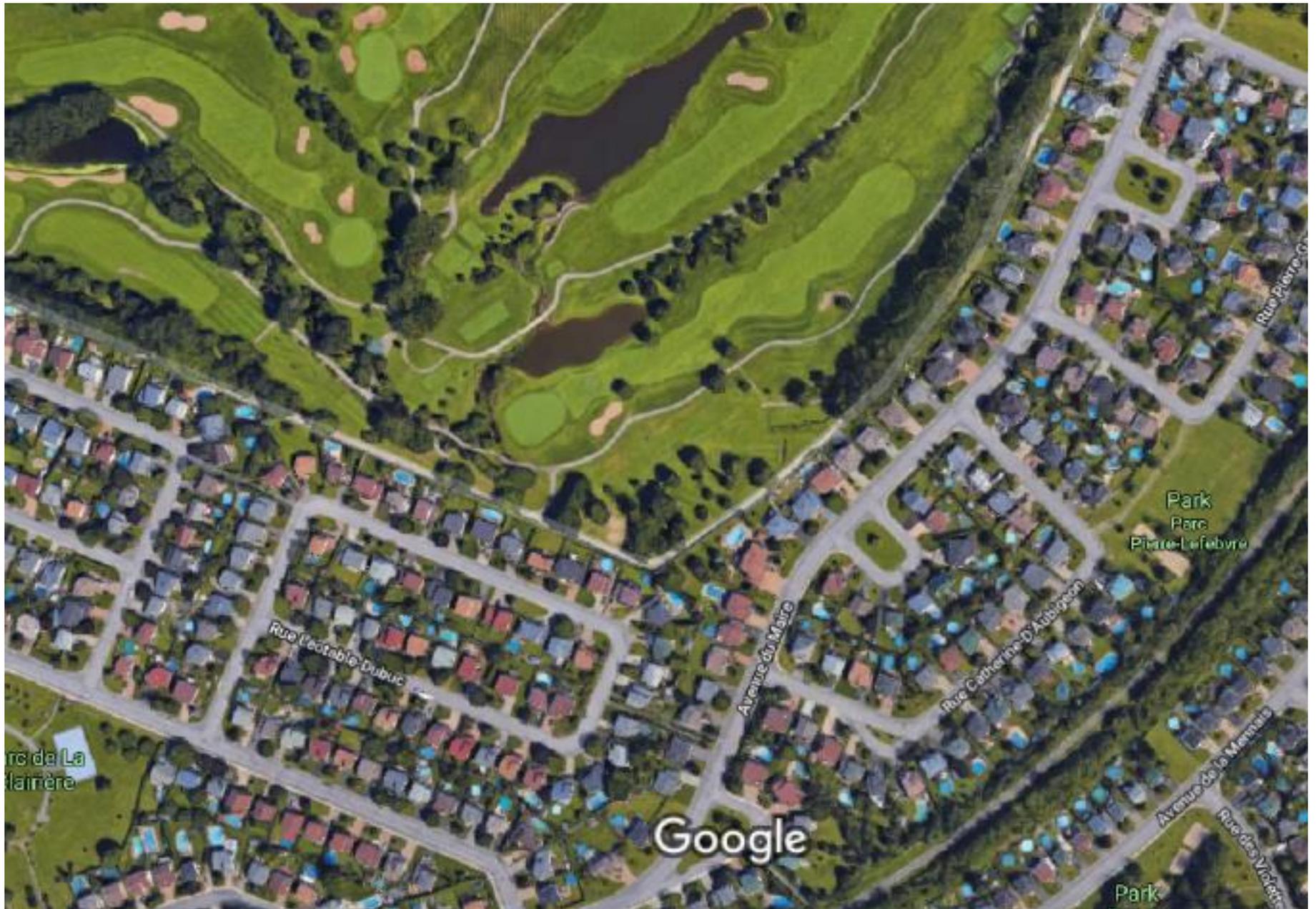
20 min

20 min

20 min

13





rc de La
lairière

Rue l'écablie Dubuc

Avenue du Maire

Rue Catherine D'Amignon

Park
Parc
Pierre-Lefebvre

Avenue de la Mennais
Rue des Volants

Park

Google

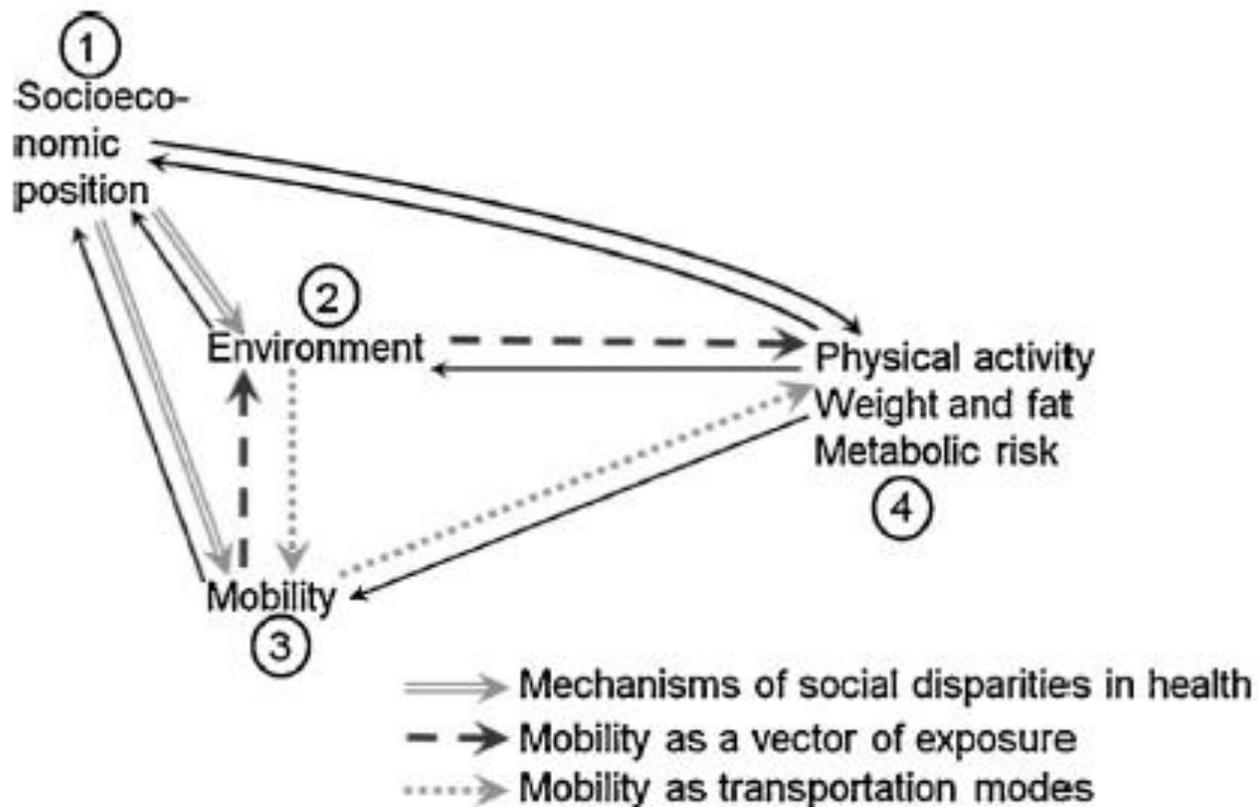
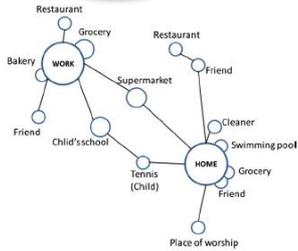


Fig. 1. Conceptual framework for incorporating daily mobility in neighborhood and health research.

Chaix et al (2013) Neighborhood environments, mobility, and health: towards a new generation of studies. *Revue d'épidémiologie et de santé publique*, 61 Suppl 3: 139-45.

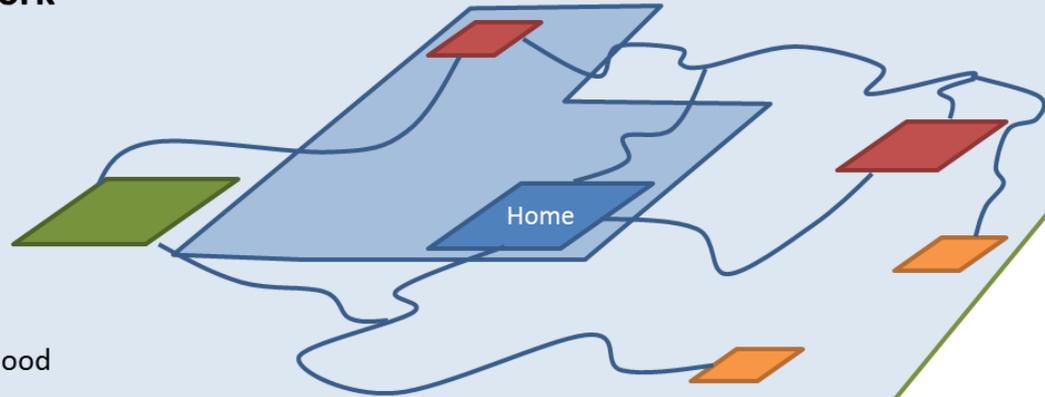
AS

Network of usual places (Flamm 2006)



Spatial Network

- Ego's home
- Work destinations
- Food destinations
- Leisure destinations
- Size: Frequency of visit
- Routes
- Limits of perceived neighbourhood



Perchoux et al (2013) Conceptualization and measurement of environmental exposure in epidemiology: Accounting for activity space related to daily Health and Place, 21, 86-93

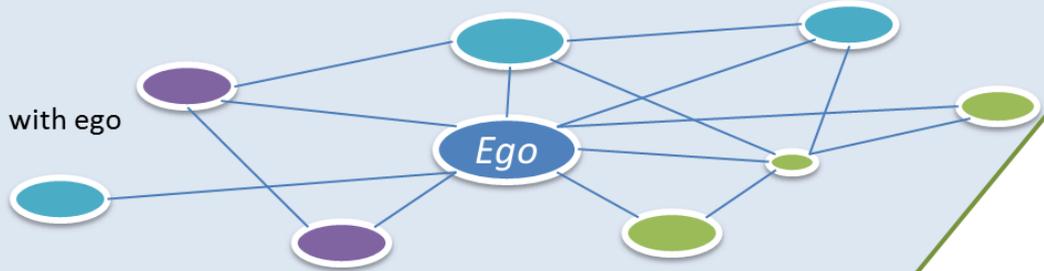
Social Network

-  Ego
-  Family member
-  Colleague
-  Friend

 Size: Frequency of contact with ego

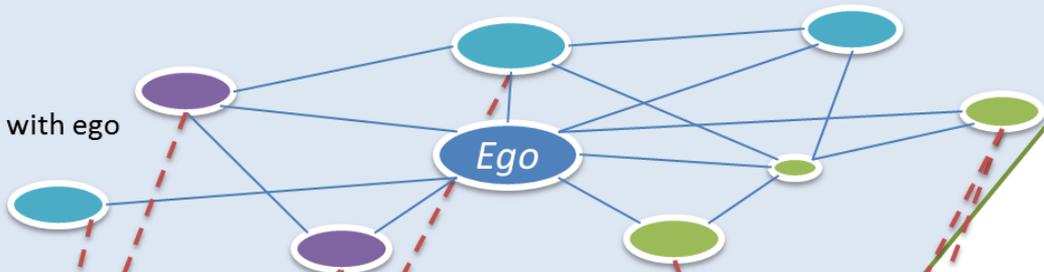
 Links: Who knows whom?

 Distance to ego: Strength of tie



Social Network

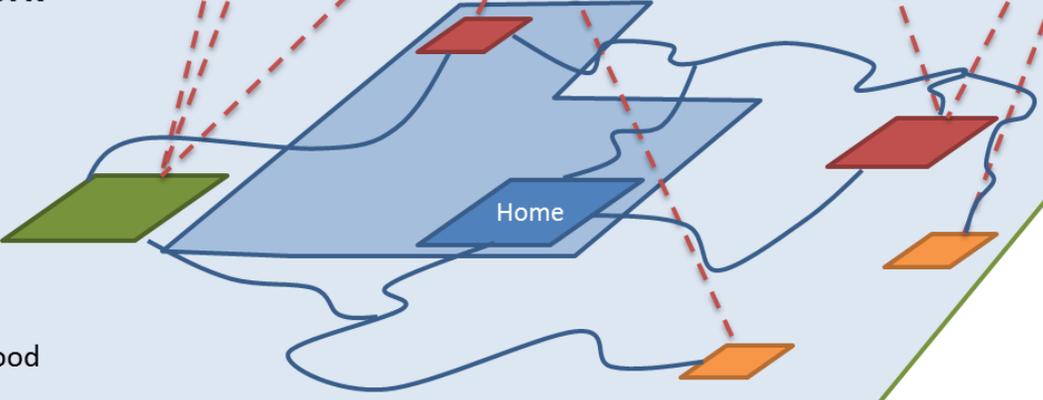
- Ego
- Family member
- Colleague
- Friend
- Size: Frequency of contact with ego
- Links: Who knows whom?
- Distance to ego: Strength of tie



Socio-spatial ties: Who and where does ego meet with?

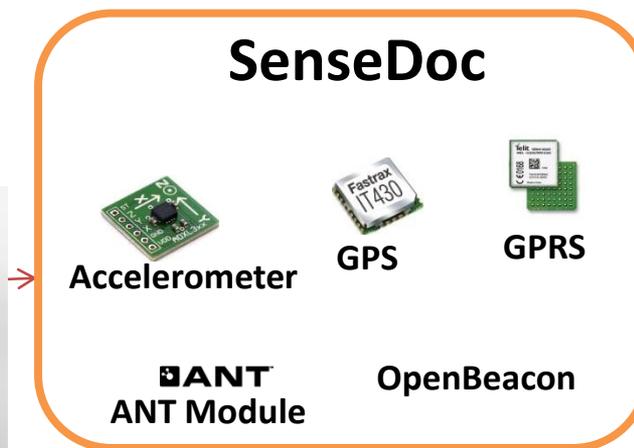
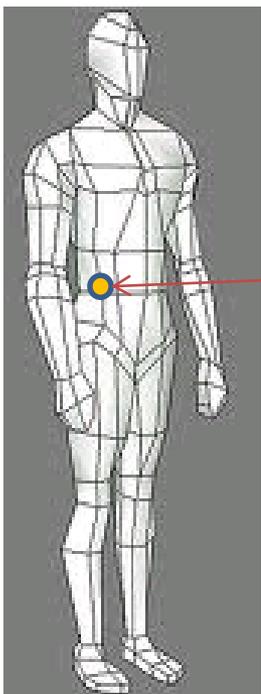
Spatial Network

- Ego's home
- Work destinations
- Food destinations
- Leisure destinations
- Size: Frequency of visit
- Routes
- Limits of perceived neighbourhood



GPS tracking with SenseDoc

DATA
CAPTURE



GPS 1 sec
Accel 50 Hz



Monitoring by application for smart phone

- Collect sensor data from smartphones using Ethica app
- Accelerometer, GPS
- Real time data collection and analysis





Interventions, Recherche et Actions pour des villes durables et en santé

Projet INTERACT

Yan Kestens, Meghan Winters, Daniel Fuller
Louis Drouin, Danielle Lussier

CRCHUM
CENTRE DE RECHERCHE

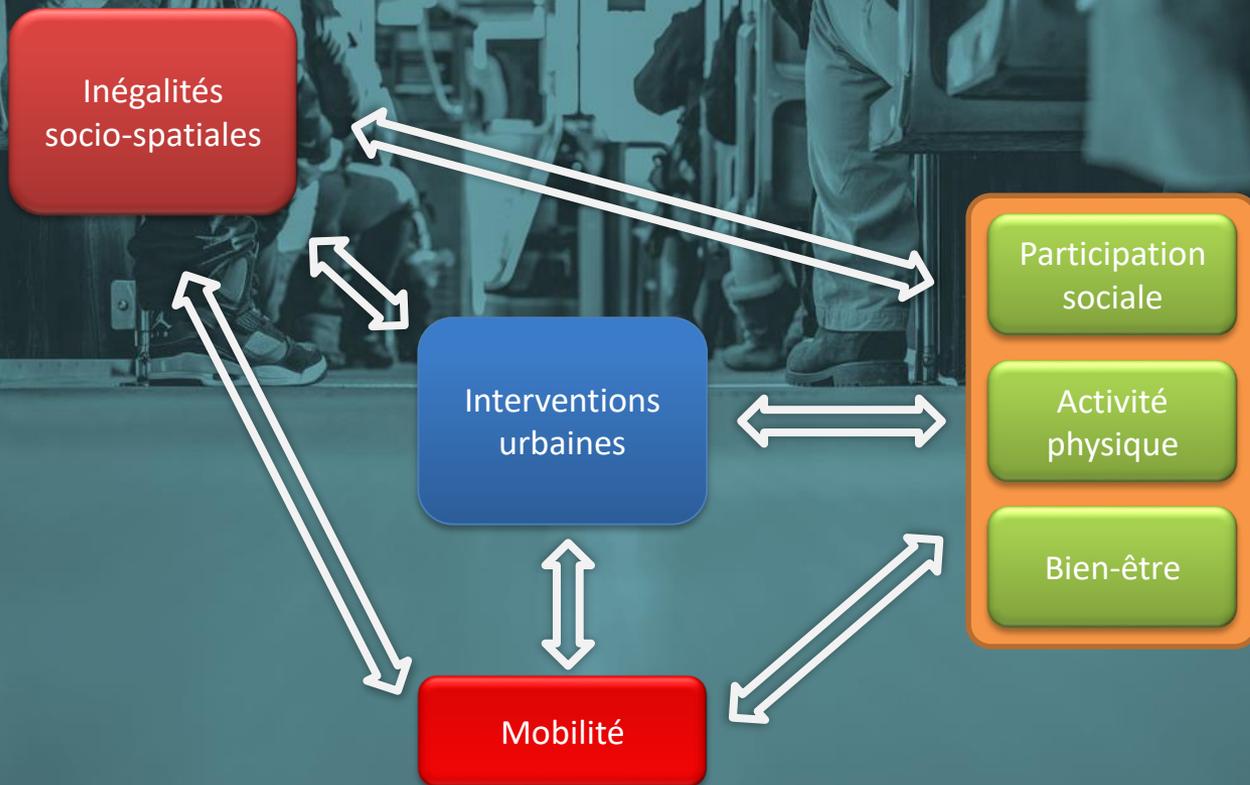
SFU
SIMON FRASER
UNIVERSITY
ENGAGING THE WORLD

MEMORIAL
UNIVERSITY


CIHR IRSC
Canadian Institutes of Health Research
Instituts de recherche en santé du Canada

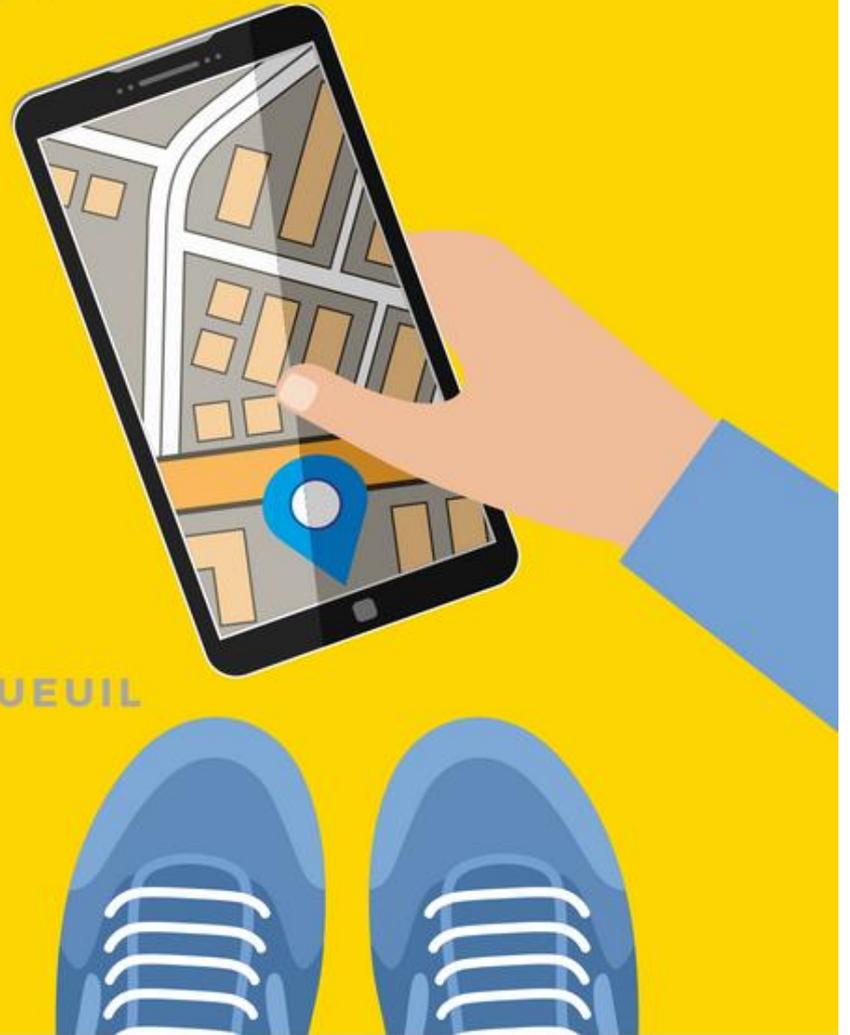
INTERACT

INTERVENTIONS URBAINES, RECHERCHE-
ACTION, COMMUNAUTÉS ET SANTÉ



Cadre conceptuel liant changements urbains, profils socio-économiques, mobilité, et santé (Adaptation de Chaix et al. 2013)

DEVENEZ CITOYEN SCIENTIFIQUE

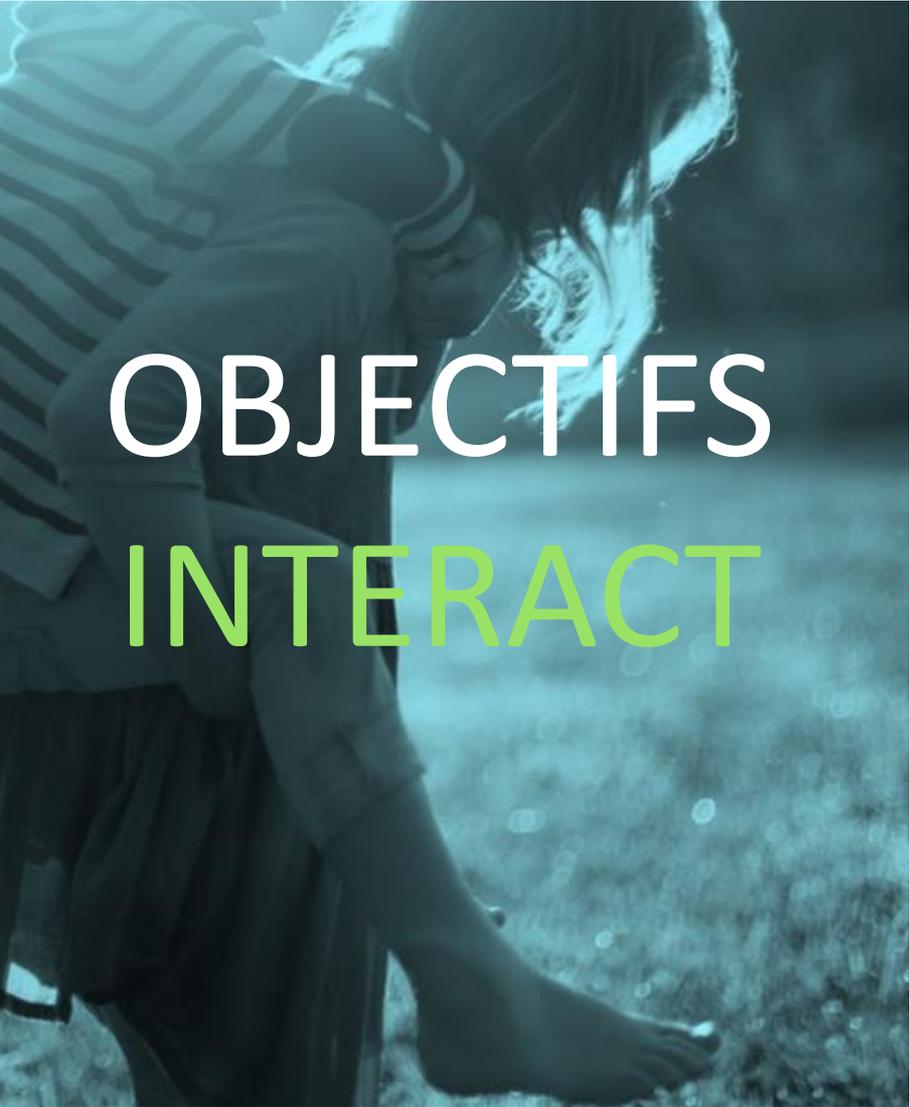


POUR EN SAVOIR PLUS, VISITEZ
WWW.EQUIPEINTERACT.CA/LONGUEUIL

CRCHUM

INTERACT

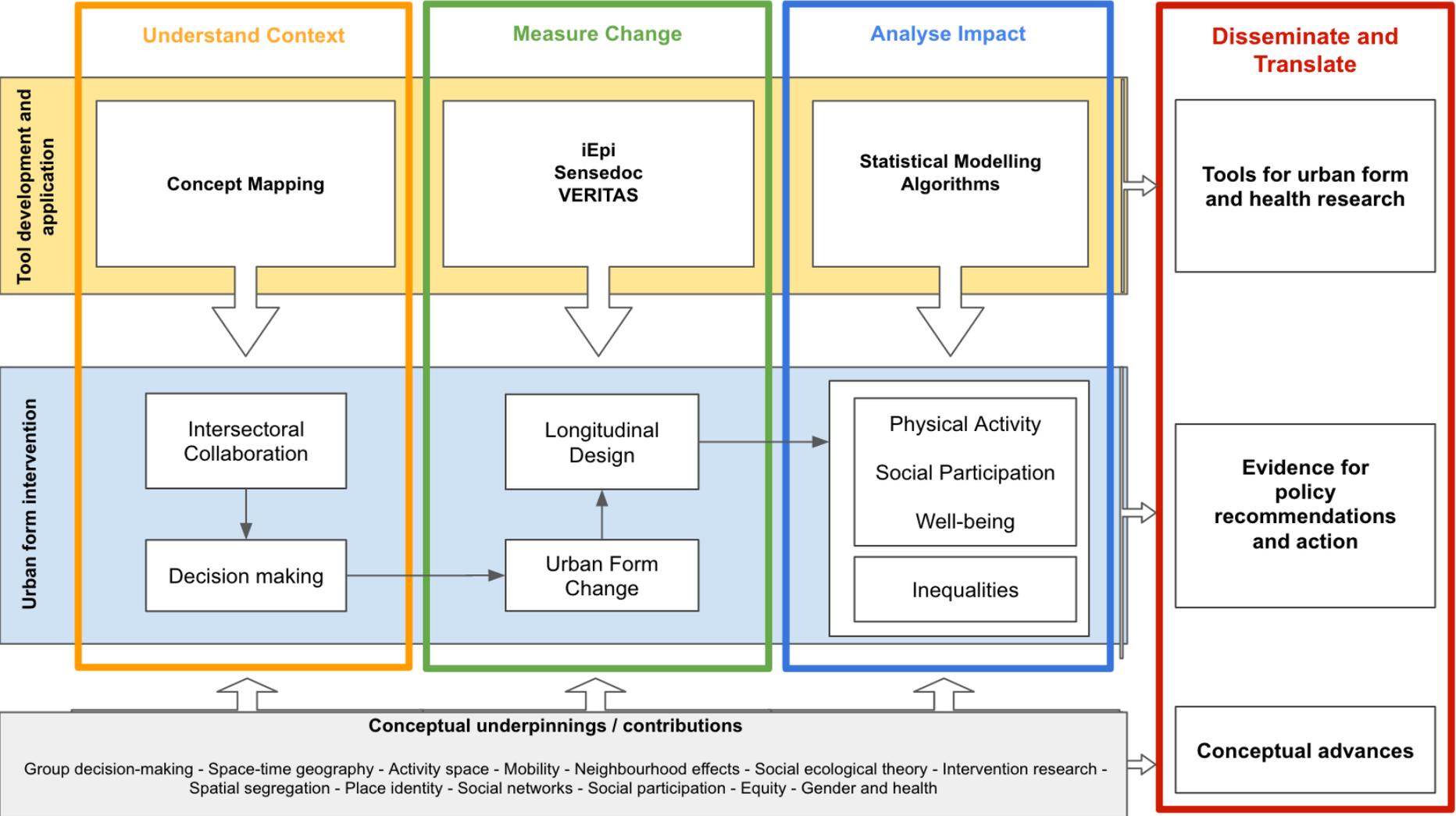

CIHR IRSC
Canadian Institutes of Health Research / Instituts de recherche en santé du Canada



OBJECTIFS INTERACT

Mesurer l'impact des changements urbains sur l'activité physique, la participation sociale, le bien-être, la santé et les inégalités sociales de santé.

Créer une suite d'outils pour faire le monitoring des interventions urbaines et de leurs impacts.





INTERACT MONTRÉAL

COLLECTER
DES DONNÉES
PERTINENTES

1. **Portrait** de la vision collective et du réseau d'acteurs
2. **Monitoring** des changements du cadre bâti
3. **Mise en place d'une cohorte populationnelle** pour observer les impacts sur la santé

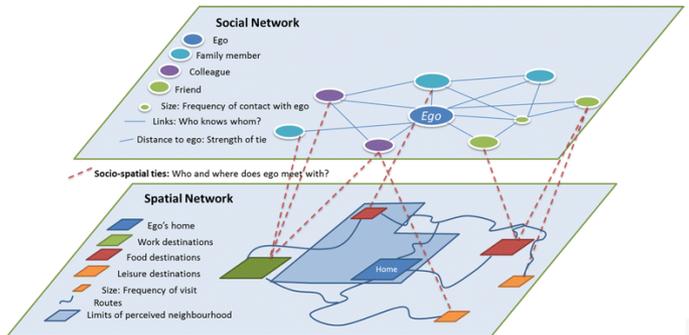
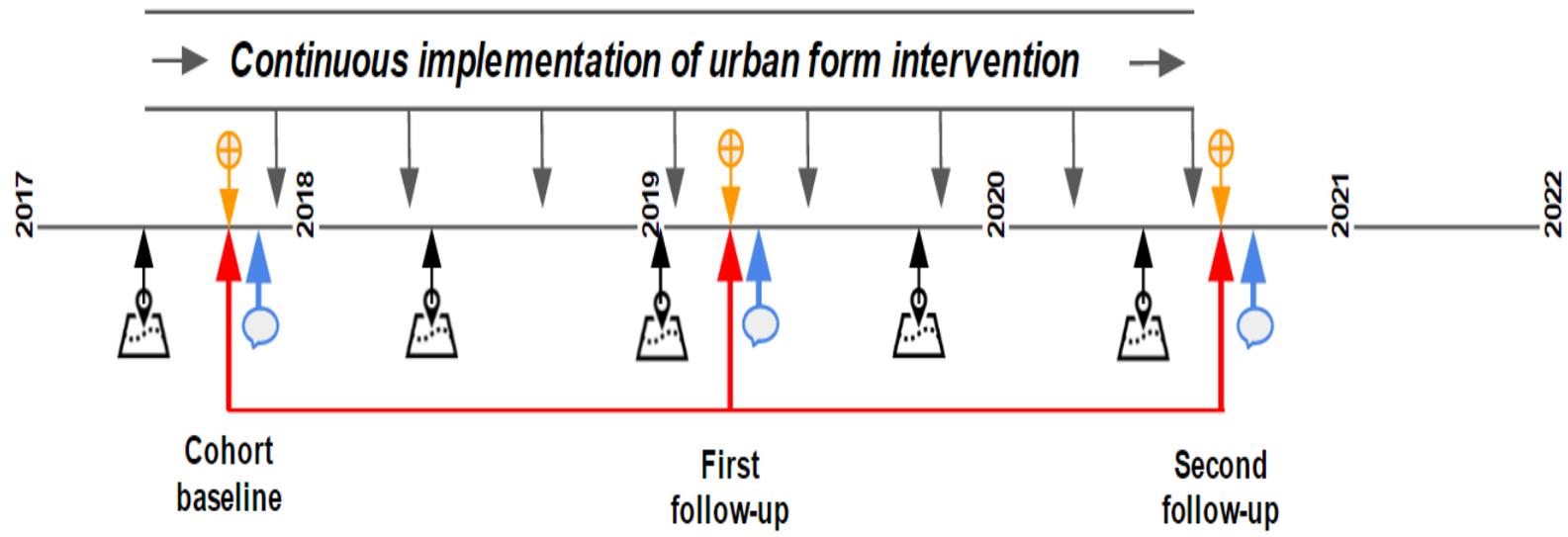
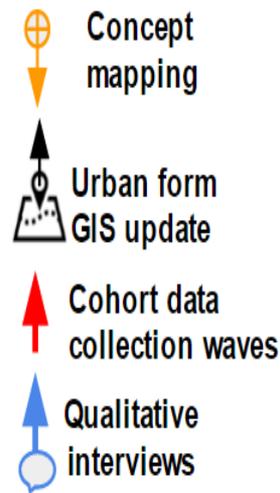
Cartographie conceptuelle: Quelle vision commune du développement urbain pour demain?

- Application web de cartographie conceptuelle
- Documente et fait la synthèse des opinions et perceptions des groupes
- Identifie des divergences entre les opinions des sous-groupes
- Assiste à l'identification des priorités et des stratégies pour la planification et la mise en œuvre des interventions urbaines



De nombreux **indicateurs urbains** pertinents pour le développement durable et la santé dans la région de Montréal

EXEMPLES D'INTERVENTIONS D'INTÉRÊT	EXEMPLES D'INDICATEURS
PLAN VÉLO	Km de piste cyclable par type
BIXI	Densité de stations – densité de vélos
AUTOPARTAGE	Densité de stations – densité de véhicules
OFFRE DE TC	Densité de stations / fréquence des lignes
APAISEMENT DE LA CIRCULATION	Présence de trottoir en saillie, dos d'âne
MODIFICATIONS AU RÉSEAU ROUTIER	Km de voies par type
PIÉTONNISATION	Présence de secteurs piétonnisés
CORRIDOR TRANSPORT ACTIF	Présence de tronçons protégés
PARCS ET INFRASTRUCTURES DE LOISIR	Densité de parcs, présence d'installations
VERDISSEMENT / RUELLES VERTES	Densité de la canopée, ruelles vertes
ESPACES PUBLICS	Présence d'installations de socialisation
...	



INTERACT Montréal
Ratio des participants sur la population de 15 ans et plus réparti selon les FSA
1 108 participants en date du 31 août 2018

Participants/Population 15 ans et plus

■ Densité population < 500 km²

■ Aucun participant

Quantile

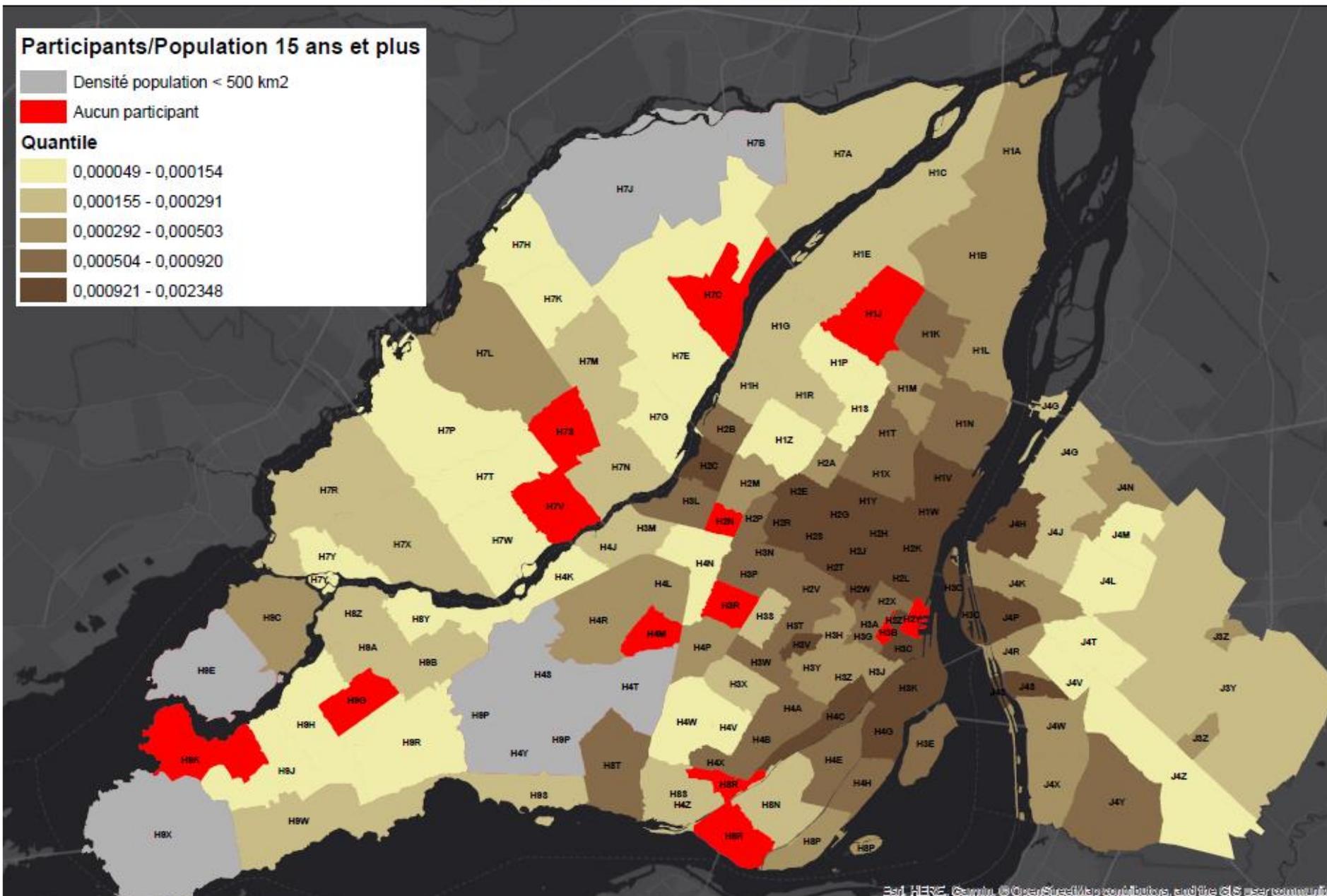
■ 0,000049 - 0,000154

■ 0,000155 - 0,000291

■ 0,000292 - 0,000503

■ 0,000504 - 0,000920

■ 0,000921 - 0,002348



Retombées

- Documenter et comprendre l'impact des aménagements sur les populations, la santé et l'équité
- Fournir des recommandations pour des aménagements et des quartiers durables demain

**Votre code postal est un
meilleur indicateur de santé
que votre code génétique.**

www.equipeinteract.ca/montreal



Aménager la ville **en santé** de demain: Réalités / Possibilités

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École de Santé Publique de l'Université de Montréal

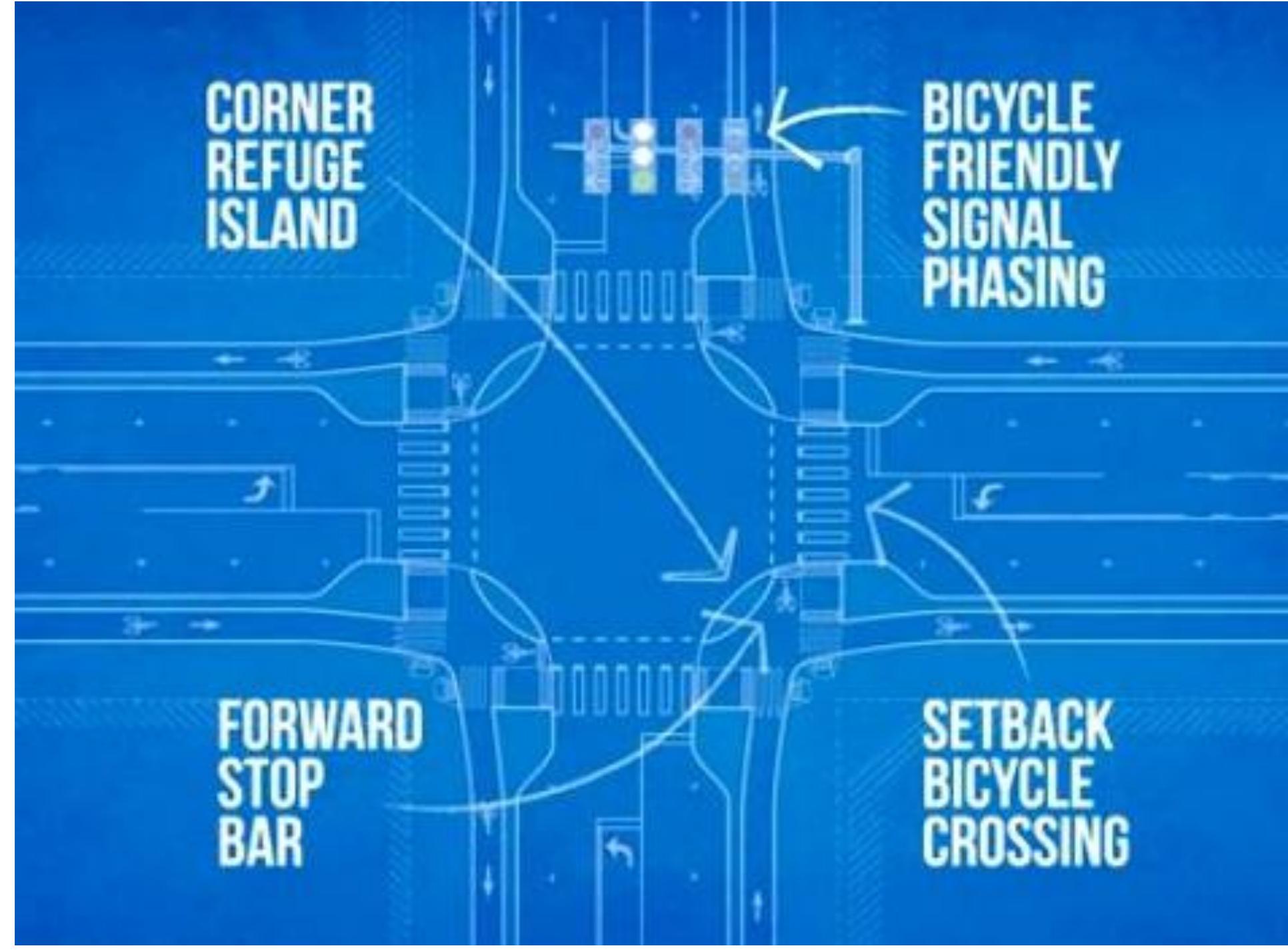
www.equipeinteract.ca/montreal

**CORNER
REFUGE
ISLAND**

**BICYCLE
FRIENDLY
SIGNAL
PHASING**

**FORWARD
STOP
BAR**

**SETBACK
BICYCLE
CROSSING**



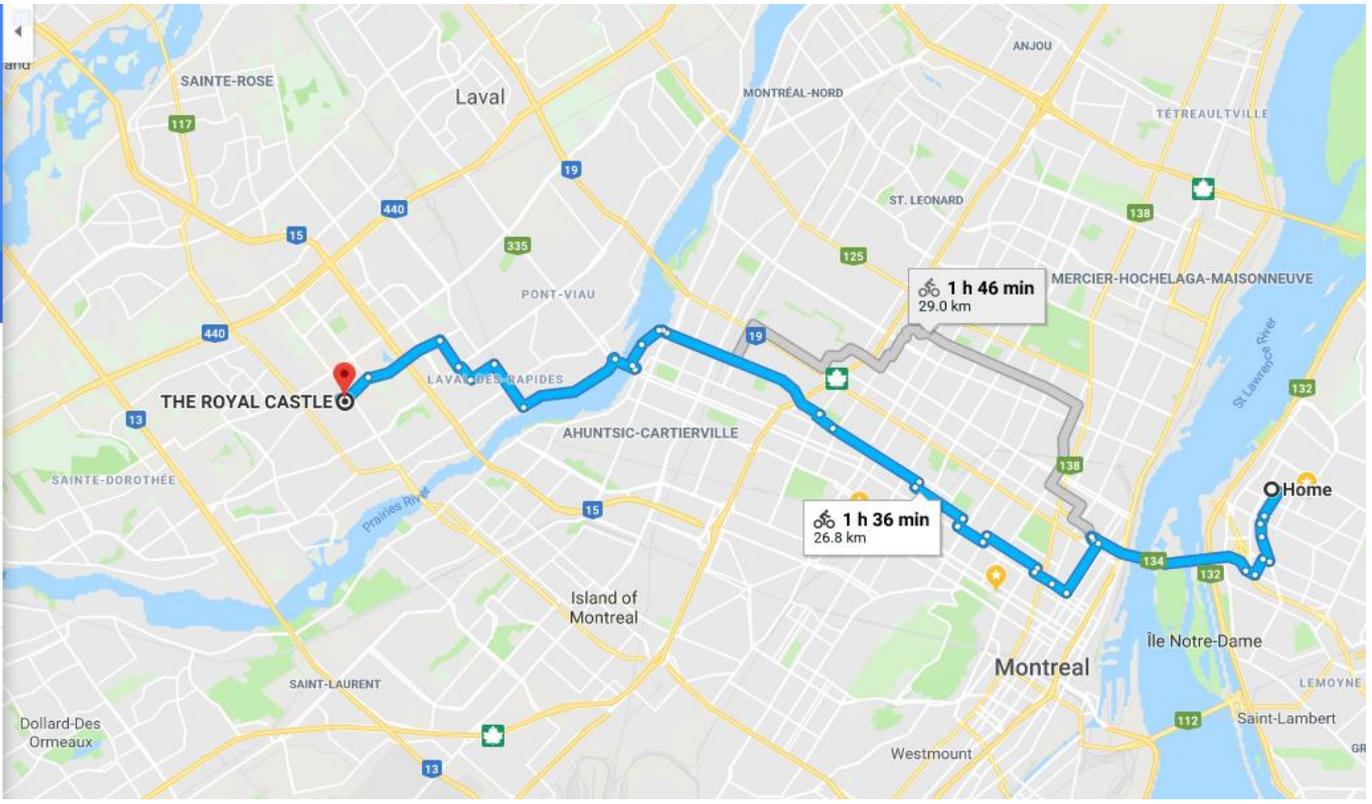
Home (410 Rue Guilbault)
 THE ROYAL CASTLE, 3500 Chemin du S
 Add destination

OPTIONS

Send directions to your phone

via Ave Christophe-Colomb DETAILS	1 h 36 min 26.8 km
via 16e Avenue	1 h 46 min 29.0 km

† 77 m · † 59 m



Piste cyclable Desaulniers, Longueuil

The screenshot displays a navigation application interface for cycling. On the left, a blue sidebar contains a menu with icons for various transport modes (car, bus, walking, cycling, airplane) and a list of destinations: "Home (410 Rue Guilbault)", "THE ROYAL CASTLE, 3500 C", and "Add destination". Below the list are options to "Send directions to your phone" and two route suggestions: "via Ave Christophe-Colomb" (with a "DETAILS" link) and "via 16e Avenue". At the bottom left, a profile view shows an elevation of "↑ 77 m · ↓ 59 m".

The main content area is split into two parts. On the left is a photograph of a wide, paved bicycle path lined with trees in autumn, with a bench on the grassy shoulder. On the right is a map of the Montreal area. A blue line indicates the cycling route from the city center towards the east. Two callout boxes provide route details: "1 h 46 min 29.0 km" for a longer route and "1 h 36 min 6.8 km" for a shorter route. The map labels various neighborhoods including ANJOU, TETREAUUVILLE, ST. LEONARD, MERCIER-HOCHELAGA-MAISONNEUVE, île Notre-Dame, and Saint-Lambert, as well as the St. Lawrence River and major roads like 125, 138, 134, and 132.

Piste cyclable du Pont Jacques Cartier

The image is a composite of three elements related to cycling in Montreal:

- Navigation App Interface (Left):** Shows a blue sidebar with navigation options. The selected route is labeled "via Ave Christophe-Col" and "via 16e Avenue". It includes a "Send directions to your phone" button, a "DETAILS" link, and an elevation profile showing a 77m ascent and 59m descent.
- Bridge Photo (Center):** A photograph of the Jacques Cartier Bridge, showing the green steel truss structure and a dedicated wooden cycling path with a metal railing. A cyclist is visible on the path.
- Map (Right):** A map of Montreal showing two cycling routes. The first route is 29.0 km and takes 1 h 46 min. The second route is 26.8 km and takes 1 h 36 min. The map includes labels for various neighborhoods like Montréal-Nord, Mercier-Hochelaga-Maisonneuve, and Île Notre-Dame.

Piste cyclable boulevard Maisonneuve

