**Housing & Neighborhood Working Group - Call**

**Summary**

Date: 11/12/2020

Chaired by G. Adamkiewicz, Y. Long

**Agenda**

1. **Neighborhood and health risk factors**, presentation by Ying Long

Current version of summary for neighborhood

1. **Measurement and Simulation of City-Scale Building Environment**, presentation by Xiaomeng Chen

Work from Prof. Xudong Yang Group on housing at the city scale in Beijing

1. **Discussion/input from city partners**
2. **Next meeting**

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**I. Neighborhood and health risk factors**, presentation by Ying Long

* overview of where we are on the neighborhood domains, and start the conversation about how we're going to turn the domains into measurement goals.
* current preliminary consideration for neighborhood work

Data and method to measure risk factors

* for neighborhood define the boundary, where how risk affect us and I think of all we also have asked our city partners for sharing the destination

Need spatial data to measure the neighborhood - point data, line data, polygon data

* hundreds to thousands of neighborhoods, highly automatic methodology needed, we are discussing in big data working group
* Data available:
  + Satellite imagery
  + street view: image classification, object identification, semantic segmentation

Measurement tools – GIS software

Mapping boundary of neighborhood and risk factors

Plan to work together with our partners, policy makers, real estate developer, designer, planners working on renovation and developing new or designing new neighborhoods

**Feedback & comments:**

* (Majid) is using the word neighborhood helpful? we want to characterize a city's environment, but not the homes for a moment, just assume that the house and the neighborhood are separate, what's the right scale?,
  + Need to operationalize approach, generalizable rules?
  + For example, the influence of crime doesn’t stop at a neighborhood boundary
* (Gary) What about getting to a finer scale? literature might not reflect the finer scaler.
* (Majid) The scale would depends on the risk factor
* (Mike) In some cities we have identified neighborhoods, in Vancouver it's a mix of self-identifying and census boundaries, but we don’t have to stick with that.
  + In the past it has been more hypothesis driven, in terms of mechanistic pathways– on a particular health outcome for a particular population.
  + Good example is walkability operational definition, a network where can you actually physically go walking within a 15 minute radius, can also be done with cycling
  + It will differ by population, for example in Emiliy’s work, playability, a very young child the distance differs, cannot go that far
* Suggested paper reference: <https://doi.org/10.1016/j.envint.2020.106003> this paper did some of this for 3 cities in Canada and just decided on the most appropriate measure for each "exposure"
* (Jill) Nancy Ross neighborhoods researcher, the discussion has been shifted to what is the appropriate size of buffers, what is the right buffer. She looked at this in a number of environmental measures, including the ones we are looking, concluded that:
  + It didn’t make a big of a difference for Canadian cities, using 1 km buffer was no different from using a lot more computationally intensive measures
  + What do we want to measure, what is the health outcome?
* (Majid) It could be issues specific, and it will be perhaps places specific, factor specific
* (Mike) suggests that best approach might be to put forward a hypothesis, and how you're going to address that.
  + Race and ethnicity also play a role in neighborhood dynamics
* (Kavi) safety– how far I'm willing to let my kid go depends on how safe the neighborhood is
* Suggested paper: Herrmann, Thomas, William Gleckner, Rania A. Wasfi, Benoit Thierry, Yan Kestens, and Nancy A. Ross. "A pan-Canadian measure of active living environments using open data." Health reports 30, no. 5 (2019): 16-26.

**II. Measurement and Simulation of City-Scale Building Environment**, presentation by Xiaomeng Chen

* Work from Prof. Xudong Yang Group on housing at the city scale in Beijing

Work can be mainly divided into two parts:

1. to establish our residential indoor environment database to analyse whole Beijing region
2. to assess the indoor environments to a health impact and to find some correlations
   1. Correlation between **indoor environment** (overheating, overcooling, indoor pollutant exposure, etc.) and **health risks**

**Goal**: to obtain housing temperature in a quick and batch way (from outside)

**Method:** IRT scan the housing envelop from outdoor side & Program to identify the images and analyze the indoor air temperature

* We can use window temperature from the window open areas, then do temperature correlations to get indoor air temperature information
* opening window approach and window close approach

**Housing data collection -** Housing Data Collection (Infrared thermal imaging)

* IRT Scan building envelopes
* Identify surface temperature, window area, if window is open or not
* Pilot test in nearby community in November
* December application and big data sampling

If the window opening is > 35% possible to obtain the interior wall temperature (associated with air temperature) from outside through window opening by IRT method with acceptable accuracy

Estimated winter and summer temperature for all Beijing

1. first, we want to generate a hybrid model to simulate both indoor air temperatures
   1. we are still thinking about scale, neighborhood or city scales
   2. now setting indoor environment sensors to monitor in some households,
   3. trying to put 10 monitoring sensors in the households.

**III. Discussion/ input from city partners:**

(Gary) proposed work on lighting domain in Dhaka- and have a discussion on plan, use of available data (using building footprints and building heights) and be able to model lighting at the scale at a city wide level, and look at disparities and other factors that are relevant for the policy analysis.

(Majid) - Beijing has decided largely not to work on transport, housing is an issue in Vancouver, it's not as such a policy relevant.

Some options:

1st - To look at housing or neighborhood in a particular city, one option is to say a topic is not on the agenda of a city

2nd maybe we try to measure every feature- for housing and neighborhood in Vancouver, or look through the lens of a particular demographic, like children

3rd option to be opportunistic, like lighting in Dhaka, can be particularly unequal. It can be addressed within reasonable timeframes and based on policy resources.

We want to be explicit about what we are doing, making discussions exclusive to cities

(Gary) Once you have got a survey as map or a building footprint, you can have multiple questions. There is a chance to marry data sets.

with each specific focused research activity, it opens the doors to some other parallel issues

e.g. thermal comfort modeling (to be done in Beijing) could be attempted after we built a model of Dhaka

(Mike) Vancouver main issue is affordability, where you live is an affordability issue, something we want to tie in and think and across the cities

(Gary) affordability and access came up in the Accra workshop

(Ying) many be difficult in the timeframe to measure all the factors in 1-2 years in Beijing,

How about focusing on 1 or 2 factors may make sense considering: green spaces and walkability

Also playability, a problem in Beijing

(Majid) Suggested to include safety, is understudied in environmental health scientists

(Zahid) Gender in Dhaka, safety . Also the northern part is expanding, green space is lacking

**IV. Next meeting**:

* Transition these meetings into more of a city specific presentations on work that is happening at the city level
* Next meeting we’ll present overview of proposed work on lighting domain in Dhaka