

SPATIAL MOBILITY, SOCIAL NETWORKS AND EXPOSURE TO RISK

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How much we are exposed to risk agents ?





Kwan, M.-P. (2012) The uncertain geographic context problem. *Annals of the Association of American Geographers*, 102(5): 958-968.



Objective:

- to measure exposure of urban population to risk agents during all daily activities.
 - How often people access risk zones?
 - Duration of exposure?
 - Social differences in exposure rates?

DATA & METHODS

Mobile positioning data:

- **Sample:** 5200 citizens of Tallinn, sampling according to census 2000
- Call detail records (CDR) for 2010 year
- Calculated home, work anchor points
- Additional features: age, gender, nationality, number of calling partners

Risk agents: Risk Manual for Tallinn 2012:

- 1. Danger zone
- 2. High danger zone
- 3. Highest danger zone
- Mobile location data:
 - Spatial units: Network Cells of EMT
 - Time units: 3 h aggregates



RESULTS





Populations in risk zones:

- Home \rightarrow 20,3 % of population has home in risk zone
- Work place \rightarrow 24.5 % of population has work in risk zone
- 3 other "most regularly visited" places
 - \rightarrow 43,9% at least one "most regularly visited" place in risk zone
 - \rightarrow 15,5% at least two in risk zone
 - \rightarrow 3,8% all three in risk zone

Exposed to risk agents:



Exposure to risk agents by population groups – business day:



Weekend:



Social networks: persons with more unique contacts



 Home not & work not in risk zone

Home in risk zone

Conclusions I:

- Location of home and work in/out of risk zones is still most important feature
- Time spent in out of home and out of work areas have significant impact on exposure rates



Tracking data helps to solve "The uncertain geographic context problem."

Conclusions II:

- Size of personal social network influences significantly exposure to risk agents.
- Is it acceptable that 25-30% of population is every day present in risk zone?
- Smartphone based individual "riskmeters"





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THANK YOU !

Silm, S. & Ahas, R. 2014. Social Science Research 47: 30-43.

Silm, S. & Ahas, R. 2014. *Annals of Association of American Geographers* 104(5): 542-559.