The role of contextual socioeconomic circumstances and segregation on mortality: analysis of time variations in the city of Turin, Northwest Italy

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Background

- Health disadvantage of residents in socio-economically deprived neighbourhoods, independently on individual socioeconomic conditions (Pickett, 2001; Chaix, 2006)
- Heterogeneity of the associations between contextual deprivation and mortality (Van Lenthe, 2005)
- Estimating impact of both material infrastructure and social relations indicators was suggested (Macintyre, 2002; Cummins, 2007), to inform different sectors of policy interventions
Background

- Individual and contextual socioeconomic conditions independently and significantly affected mortality of Turin residents

- Impact of neighborhood deprivation, stable in the period between 1971 and 2000, among people aged less than 65 (Marinacci et al., 2004)
Objective

To re-analyse mortality distribution in the period between 1971 and 2000 across Turin areas, trying:

- To disentangle effects of
  - individual socioeconomic circumstances,
  - neighbourhood socioeconomic deprivation
  - socioeconomic segregation at the wider area-level

- To evaluate mutual interactions between neighbourhood deprivation and socioeconomic segregation

- To estimate time variations of socioeconomic segregation
Material and methods

Data from Longitudinal Study of Turin

Three cohorts of persons aged 15-64 years, recorded in censuses of 1971, 1981, and 1991 and followed up for 10 years after each census.

Multilevel Poisson models for general mortality as a function of time and individual covariates:

- age, area of birth
- education (upper secondary or higher, lower secondary, primary or less)
- housing conditions (large dwelling, small owned, small rented, no indoor bathroom or heating)
contextual covariates

92 statistical zones

23 neighbourhoods

10 wards

Neighbourhood socioeconomic deprivation

cumulating data on education, occupational class, lone-parent families, household ownership, poor house conditions and crowding
contextual covariates

92 statistical zones

23 neighbourhoods

10 wards

Neighbourhood socioeconomic deprivation

Ward level of socioeconomic segregation of individual disadvantage at censuses (lower education & poorer housing) across statistical zones

Firenze, November 8th 2010
Ward segregation

We referred to unequal (vs. overall) distribution of social groups (disadvantaged vs. advantaged) across statistical zones.

**dissimilarity**

$$D_k = 0.5 \times \sum_{i}^{n_k} \left| \frac{y_{ij} - y_i - y_{ij}}{y_.j - y_.} \right|$$

**isolation**

$$I_k = \sum_{i}^{n_k} \frac{y_{ij} \times y_{ij}}{y_.i \times y_.j}$$

- $k=1, 2, \ldots$ to 10 wards,
- $i = 1, \ldots, n_k$ sub-ward units (in our case statistical zones within ward $k$),
- $j = 1, 2$ (1=disadvantaged 2=advantaged)

Range for both indices $0 \rightarrow 1$

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Results

1991 deprivation

1991 segregation indices

Isolation
(range: 0.01-0.12)

Dissimilarity
(range: 0.06-0.59)

very advantaged
advantaged
medium
deprived
very deprived

very advantaged
advantaged
medium
deprived
very deprived

I quintile
II quintile
III quintile
IV quintile
V quintile

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Results
Mortality 1971-2000 by neighbourhood deprivation and ward segregation: females aged 15-64

- RR*
- 0.5
- 0.7
- 0.9
- 1.1
- 1.3
- 1.5
- 1.7
- 1.9

medium vs. rich
- deprived vs. rich
- isolation
- adjusted by deprivation
- dissimilarity

- deprivation
- deprivation adjusted by isolation
- deprivation adjusted by dissimilarity

*RRs adjusted by time, age, area of birth, education and housing conditions
Results

Mortality 1971-2000 by neighbourhood deprivation and ward segregation: males aged 15-64

*RRs adjusted by time, age, area of birth, education and housing conditions
Limitations

✓ use of administrative boundaries may not reflect the appropriate scale for deprivation and segregation

✓ ignored individual biographies on exposures to multiple contexts over time and place
Conclusions

✓ Significant increase in death risk with increasing socioeconomic segregation, with time variations among males

✓ Significant 9% higher mortality was confirmed for residents in deprived neighbourhoods, compared to resident in rich areas

✓ Higher impact of segregation than material infrastructures, more investments on policies affecting relations among social groups