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The daycourse of place

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ABSTRACT

The present paper aims to contribute to the debate about the temporal relationships between place and health. It explores the notion of 'daycourse of place' echoing the discussion which recently occurred in this journal about the 'lifecourse of place' (Andrews, 2017; Lekkas et al., 2017a, b). When highlighting the importance of time in shaping health within places, most of studies focus either on the trajectories of places over a matter of years or the daily trajectories of people in link with their activity space. However, *daily* trajectories of *places* remain a poor cousin in place and health literature. This paper is intended to overcome 'jetlag', which places suffer when they are labelled with frozen attributes over a 24-h period. It explores the values and feasibility of exploring daily trajectories of places to investigate place effects on health or to design area-based interventions for public health action. More than just a metaphor, the 'daycourse of place' appears to be an inspiring framework to elaborate the importance of daily temporal relationalities for research and action in place-based health inequalities.

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Echoing the recent debate about the 'lifecourse of place' published in this journal (Andrews, 2017; Lekkas et al., 2017a, b), this paper discusses the notion of 'daycourse of place' as an inspiring framework to strengthen knowledge about place dynamics and their health geographies. When speaking of lifecourse of place, it makes sense to include various time granularities without limiting long-term trajectories to the order of years: places change over a course of years but also over the course of a day. In their respective papers, Lekkas et al. (2017a, b) and Andrews (2017) have only paid attention to trajectories of places over long periods in the wake of research aiming to reconstruct historical landscapes of health resources (e.g. Moon et al., 2002; Pearce, 2015). The present paper aims to discuss the relevance of adding a daycourse perspective within the 'lifecourse of place' framework when one aims to align the phases/stages of places and the phases/stages of humans (Andrews, 2017).

1. Daily trajectories of places matter when investigating place effects on health

The daycourse of place would first benefit from being more considered in literature about place effects. A careful reading of the

well-known framework proposed by Macintyre et al. (2002) about the five types of local features which might influence health leads us to think that each of these five 'opportunity structures' can be affected by daily variations:

- Physical features of the environment (e.g. quality of air and water) are commonly known to be subject to daily variations. Air pollution changes within hours or even minutes, in connection with industrial pollution and automobile traffic, for example. Among the five types of local features, physical aspects are the most explored within a daycourse perspective (e.g. Nyhan et al., 2016; Park and Kwan, 2016) probably because sensors covering territories may provide data with high temporal precision.
- Provision of decent, secure and non-hazardous environments (at home, work and play) may also vary during the day. For example, children's outdoor play areas may be safe during the day but unsafe during the night if they are not fitted with public lighting. Some mechanisms through which social ties influence fear of crime likely may also differ from day to night (Boessen et al., 2017).
- Availability of publicly or privately provided services to support people in their daily lives (e.g. education, transport, street cleaning and lighting, policing, health and welfare services) vary over a 24-h period. Some temporal components, such as the

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opening and closing times of services and the changing number of potential users (residents and non-residents), could to be productively considered (Neutens et al., 2010).

- Socio-cultural features of a neighbourhood (e.g., norms and values, degree of community integration and networks of community support) differ over the years but also within a single day. Such daily cycles are strongly related to different combinations of resident and non-resident populations (Nuvolati, 2003) and to their behaviour. For example, cigarette consumption can be locally stigmatised or not according to the time of day and depending on the behavioural backgrounds and practices of the different combinations of resident and non-resident populations.
- Finally, the reputation of a place may also be subject to variations. Residents and non-residents, service or amenity planners and providers may change their mind about a place according to the time of the day. For example, some areas perceived as being safe during the day may be seen as risky during the night. Concepts such as a ‘high-crime neighbourhood’ or ‘safe neighbourhood,’ may be experienced and perceived completely differently over the course of the day.

Some place attributes can of course remain the same around the clock; this stability should be considered as information in itself. Rather than considering places as necessarily frozen over a 24h period, it is thus useful to remove ‘clock blinders’ and to explicitly ‘timestamp’ place attributes when exploring place effects in health.

Daily trajectories of place would also benefit from being considered in the context of the emerging literature concerning people’s activity spaces and multiple exposures. Following calls to avoid a ‘local trap’ (Cummins, 2007), and acknowledging studies that show differences in exposure between residential and non-residential destinations, the literature on people’s daily trajectories has emerged using travel diaries, go-along methods, GPS, mobile phone data, etc. However, in many studies integrating people’s activity space, great precision in people’s trajectories does not fit with omission of trajectories of places. To take some examples of empirical studies exploring people’s activity spaces, but neglecting daily trajectories of places, one can cite those exploring (i) air pollution data aggregated annually (Setton et al., 2008); (ii) density or distance to health services (Vallée et al., 2010), food services (Kestens et al., 2012; Zenk et al., 2011), green spaces (Chaix et al., 2016), tobacco retailers (Shareck et al., 2016) or alcohol outlets (Basta et al., 2010) computed without considering the opening and closing times of these services; (iii) area-level social profile computed only from resident population through census based information (Chum and O’ Campo, 2013; Inagami et al., 2007; Kimbro et al., 2017; Perchoux et al., 2015; Shareck et al., 2014b; Vallée et al., 2011); (iv) incidence of violence aggregated annually (Chum and O’ Campo, 2013). In these empirical studies (my own included), there is a strong discrepancy between the high degree of accuracy in daily trajectories of *people* and the low degree of accuracy in daily trajectories of *places*, as though place attributes suffer from a kind of ‘jetlag’ or ‘clocklag’.

Some efforts have been made to define erroneous conclusions which can emerge in contextual health studies when one ignores people’s daily trajectories, and as a result, the true causally relevant spatial contexts. It has been conceptually explored by Kwan (2012) with the notion of ‘Uncertain Geographic Context Problem’ as an extension of Openshaw’s ‘Modifiable Areal Unit Problem – MAUP’ (1984), by Shareck et al. (2014a) in relation to social health inequalities, and by Perchoux et al. in relation to environmental exposure in epidemiology (2013). Some scholars have also highlighted the theoretical importance of considering time and space in tandem (An et al., 2015), and have drawn attention to ‘the

modifiable spatiotemporal unit problem’ to emphasize that “*analysis that is spatially detailed but temporally coarse might be just as likely to impair analysis as that which is temporally detailed but spatially coarse*” (Martin et al., 2015). However, only few studies have been devoted to quantifying how measures of neighbourhood effects on health can be wrong when neglecting daily trajectories of places. The pollution domain is currently at the forefront. For example, a recent paper (Nyhan et al., 2016) has compared home population exposure to air pollution in New York City (evaluated using a static population distribution) with active population exposure (evaluated both using spatiotemporal pollution levels and population activity patterns from cellular network). Areas of relatively higher population exposures were found to be concentrated in different districts in both scenarios.

One could conclude this first section by saying that contextual health studies should investigate not only the daycourse of individuals and their activity space, but also the social and economic daily trajectories of the places where they live, work and play. Such an approach, inspired from time-geography, may help balance the recent enthusiasm observed in the health literature towards daily trajectories of people with the relative indifference towards the daily trajectories of places and improve measures of place effects on health.

2. Daily trajectories of places matter when tackling geographic health inequalities

Besides the relevance of adopting a daycourse perspective of place to explore contextual effects on health, the daycourse perspective is also relevant when one aims to design area-based interventions to tackle health problems that are spatially concentrated and cumulative. Geographic health inequalities are traditionally studied from the spatial concentration of people *residing* in areas. But, as Martin et al. (2015) expressed, “*an important but rarely acknowledged deficiency of census and administrative sources is that they not only relate to a particular date but are primarily based on ‘nighttime’ residential location assumptions; in other words, they represent a notional time when all members of the population are at their residential address*”. Real-time populations estimates (specifically if they are socially informative) can advantageously assist planners and policy-makers when they design area-based interventions or urban time policies, or when they need baseline to conduct experiments and to measure their efficiency around the clock (Kontokosta and Johnson, 2017). When adopting a residential time to tackle geographic health inequalities, daytime interventions (such as health promotion campaigns or screening programmes) intended for more socially deprived populations may be ineffective if they are implemented during the day in areas where deprived people are highly concentrated during the night but are absent during the day, and if, inversely, they do not target the areas which deprived people visit during the day without residing there (Vallée, 2017). As shown recently, Paris neighborhoods with similar social composition during the night can differ deeply in their social composition during the day because of socially selective daily trips (Le Roux et al., 2017). Neglecting change in population composition around the clock, conventional area-based interventions may wrongly target areas (‘false positives’) or wrongly ignore other areas (‘false negatives’). A link may be drawn here to the question of the critical representation of targeted groups in targeted areas, i.e. the effectiveness of area-based targeting in reaching priority populations. Surprisingly, the assumption behind critical representation has rarely been empirically tested (Sharpe, 2013). When it was done, for example in England (Tunstall and Lupton, 2003), it only concerned the number of targeted people *residing* in the target areas as a percentage of the total

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