



Epidemic risk in urban areas: development of a concept map as a risk assessment tool.



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BACKGROUND

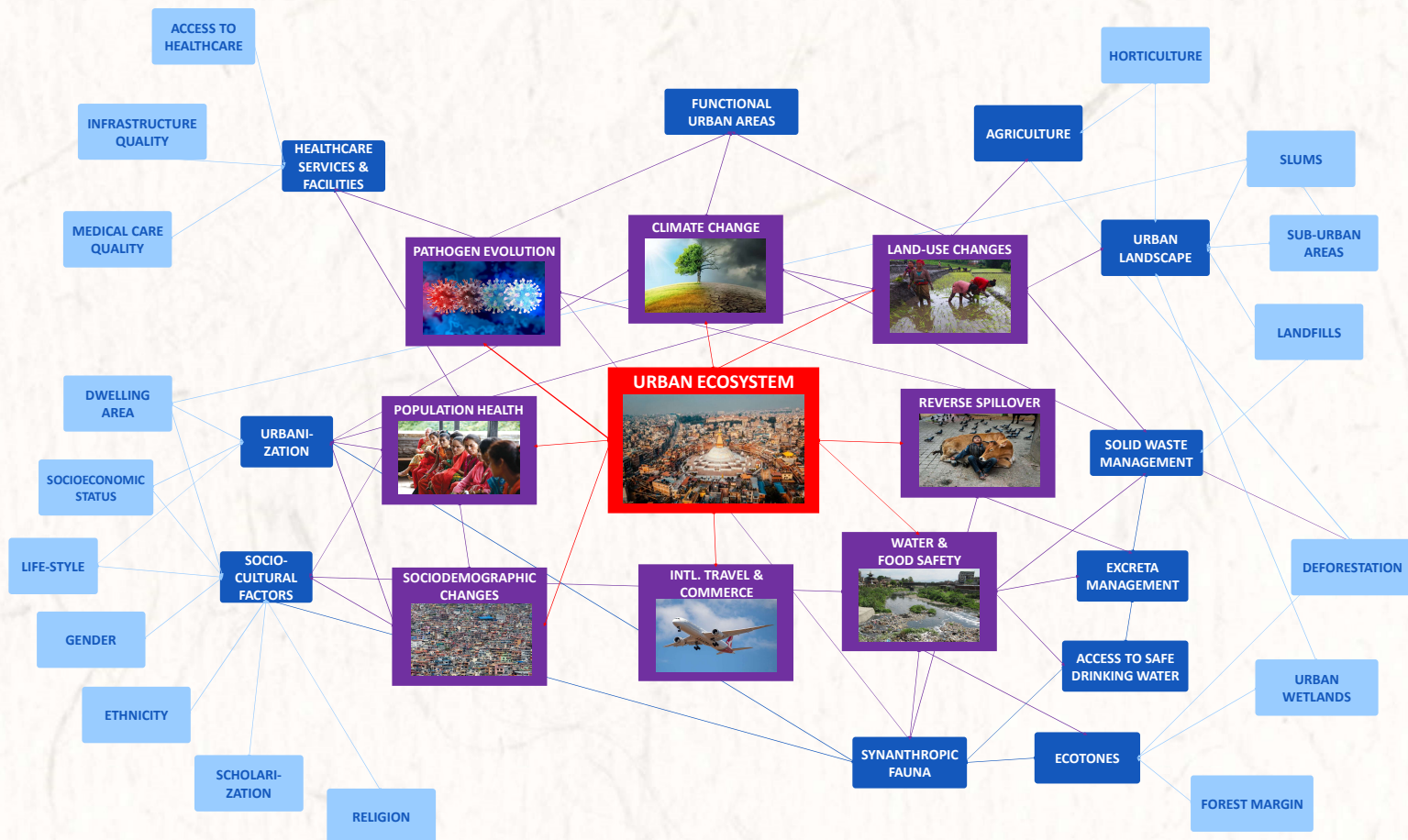
The “One Health” approach assesses the **emergence of novel pathogens** by prioritizing the dynamics occurring at the human/wildlife interface, on the background of the biophysical environment. Under the perspective of the ongoing SARS-CoV-2 pandemic, it seems necessary to increase the resolution of this approach, investigating emergence mechanisms also at urban ecosystems level, where the ecological complexity (i.e. the trinomial human / synanthropic fauna / urban substrate) suggests a potential combination of predisposing factors for the triggering of local outbreaks and, eventually, for the risk of international spreading of the pathogen.

MATERIALS & METHODS

To this purpose, an evidence-based concept map was developed to be used as an experimental tool for assessing **epidemic risk in urban areas**. A critical literature review on the Scopus, PubMed, Google Scholar, JoVE and EBSCO Global Health databases lead to the identification of the specific risk factors. After their ranking by relevance, a **spider-type hierarchical concept map** was created with the CmapTools software. It graphically summarizes the (re)emergence and spillover factors.

THE CONCEPT MAP

The literature review led to the identification of **8 specific mechanisms of (re)emergence and spillover of pathogens** in the context of urban ecosystems. The resulting concept map comprises $n = 1$ **focus question** and 3 levels of **concept terms**. **Areas at greatest risk resulted the vast urban and suburban areas of metropolises in low-income countries**. Accordingly, the risk assessment tool was experimentally applied to two real urban ecosystems, i.e. Padua (Italy) and Kathmandu (Nepal), thus allowing a preliminary assessment of possible emergence and diffusion of novel pathogens, with particular emphasis on the role of the **synanthropic fauna** and the possible occurrence of a **reverse spillover**.



CONCLUSIONS & PERSPECTIVES

This survey supports the need for new **multidisciplinary approaches** to investigate, as a preventive measure, the emergence and spread of infectious diseases in urban ecosystems. These approaches should further shift the investigation focus from the pathogen to the understanding of the processes underlying the dynamics of emergence and spreading. The development of new theoretical and field investigation guidelines ought to play a key role in the development of an **up-to-date global surveillance network for infectious diseases**.



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