ACRONYM: Resilience

Title: Comparative assessment of social-ecological resilience and transformability to limit AMR in one health systems

Keywords: One health, resilience, transformations, social-ecological systems, food systems, integrated assessment model, time series analysis

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Abstract:

Resilience captures the ability of systems to respond to surprise while maintaining vital functions and is an important attribute for health systems in the context of rising global risks such as emerging infectious diseases and growing antimicrobial resistance (AMR). The theoretical and empirical foundation underpinning one-health systems' resilience to AMR, is largely undeveloped. This includes the aspect of transformability; the capacity to undertake fundamental change to achieve a more sustainable or desirable state. In the area of AMR, a transformative intervention could e.g. be the transformation to livestock production without antimicrobial use (AMU) for growth promotion or classes relevant for human use as well as other interventions to ensure human health and sustainable food production systems. We recently introduced and formalized resilience and transformation frameworks for AMR at the global level. Here, we extend these to assess the resilience and transformability of national and regional one health systems and interventions. With the specific focus on resistant Enterobacteriaceae and MRSA, we assess factors governing resilience and transformations in selected high-income (HIC) and lowermiddle income countries (LMIC, focusing on South and East Asia), explicitly considering the link between both agriculture, aquaculture and human health. Using a multi-method approach, we undertake a systematic literature review, case study analysis (WP1) and participatory assessment (WP2) to build a database describing factors determining resilience and transformability. This database is cross-validated by quantitative time-series analyses (WP3). We then seek to identify indicators of resilience and transformability (WP4) with the aim to be able to predict these dynamics in the future. Together, these analyses feed information into a set of integrated assessment models (WP5), which explore the system dynamics of interventions and future scenarios. Together, and through a comprehensive set of outreach activities to practitioners and decision makers these activities

will inform future management and policy to better limit AMU and AMR across animal and human health.