

Short course

# Systems science & population health

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Dr Abdulrahman El-Sayed  
Associate Director, Arnhold Institute  
Associate Professor, Population Health Science & Policy  
Mount Sinai School of Medicine, New York, USA



What is systems science? How can it help us understand the distribution and determinants of health and disease in populations? What implications does it have for population health interventions? How does one conceptualize and construct a systems model?

This course is intended as a conceptual overview of complex systems science in population health. We will engage the concept of complexity with a focus on asking and answering research questions and applying these insights to conceptualize systems science approaches to answering research questions. We will begin by formalizing the traditional epistemological approach in epidemiology, discussing its strengths and weaknesses. We will then explore the concepts of complexity and systems science and their approaches to population health questions in contrast to our traditional approaches. We will explore a number of systems science methodologies, including systems dynamics modelling, agent-based modelling, microsimulation, and Big Data techniques and how they have been leveraged for population health inquiry.

This course aims to advance the student's understanding of both systems science and population health and to afford students ready, nuanced access to the literature in both areas.

**Session 1 – Systems concepts and Population Health Logic**

**Session 2 – Identifying complex questions**

**Session 3 – Agent-based modelling & microsimulation**

**Session 4 – Social network analysis & systems dynamics**

**Session 5 – Big data & its synergies**

*This course is open to individuals who are completing or have completed Masters-level training (MPH or MSc) in epidemiology or related disciplines. The course will run from 8.30 – 13.00 from Monday to Friday at the Faculty of Health Sciences. For more information, please contact Ms Ncebakazi Jwaqu:*

[ncebakazi.jwaqu@uct.ac.za](mailto:ncebakazi.jwaqu@uct.ac.za)