QUEEN'S UNIVERSITY BELFAST

COMPLEX SYSTEMS AND NETWORK SCIENCE FOR PREVENTION AND CONTROL OF NONCOMMUNICABLE DISEASES

*A WHO COLLABORATING CENTRE FOR RESEARCH AND TRAINING*

World Health Organization
REGIONAL OFFICE FOR Europe

# Resources


Table 4. Costs and benefits of systems approaches throughout the NCD prevention policy cycle

| Approach | | Research with a systems lens | Concept mapping | Cognitive mapping | ABM | SDM | CLD | GMB | Network analysis | QCA |
|---|---|---|---|---|---|---|---|---|---|---|
| Systems approaches in action (page numbers) | Problem identification and policy analysis | 25 | 26 | 27 | 28 | 29, 30 | | | | |
| | Policy development | | | | | 32 | 33 | 34 | 35, 36 | |
| | Policy implementation | 38–40 | | | | | | | | |
| | Policy monitoring, enforcement and evaluation | | | | | 42 | | 43 | 44 | 45 |
| Resources required | Time and cost | | | | | | | | | |
| | Access to stakeholders | | | | | | | | | |
| | Other data | | | | | | | | | |
| | Computer resources | | | | | | | | | |
| | Methodological expertise | | | | | | | | | |
| | Stakeholder understanding of systems thinking | | | | | | | | | |
| Benefits | Process easy to communicate (transparency) | | | | | | | | | |
| | Results easy to communicate (interpretability) | | | | | | | | | |
| | Provides quantitative estimates of policy impact | | | | | | | | | |
| | Supports consensus-building | | | | | | | | | |
| | Spatial representation | | | | | | | | | |
| | Temporal representation | | | | | | | | | |
| | Handling uncertainty | | | | | | | | | |

For resources requirements: red: high; orange: medium; green: low.
For benefits: red: low; orange: medium; green: high.

https://www.who.int/europe/publications/i/item/WHO-EURO-2022-4195-43954-61946

# General Reading: Complex Systems


- Rutter H et al. The need for a complex systems model of evidence for public health. Lancet. 2017;390(10112):2602-4. https://spiral.imperial.ac.uk/handle/10044/1/52213.
- Stearman J. Learning from evidence in a complex world. Am J Public Health. 2006;96(3):505-14. https://dx.doi.org/10.2105%2FAJPH.2005.066043.
- UK HM Treasury. Magenta Book 2020. Handling complexity in policy evaluation. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/879437/Magenta_Book_supplementary_guide._Handling_Complexity_in_policy_evaluation.pdf.
- Ladyman J, Wiesner K. What is a Complex System? New Haven: Yale University Press; 2020.
- Sterman J. Business Dynamics: Systems Thinking and Modeling for a Complex World. Boston: Irwin McGraw-Hill; 2000.
- Hovmand P. Community Based Systems Dynamics. New York: Springer; 2014.
- Meadows DH. Thinking in Systems. A Primer. 2008. https://research.fit.edu/media/site-specific/researchfitedu/coast-climate-adaptation-library/climate-communications/psychology-amp-behavior/Meadows-2008.-Thinking-in-Systems.pdf
- Hawe P, Shiell A, Riley T. Theorising interventions as events in systems. Am J Community Psychol. 2009 Jun;43(3-4):267-76. doi: 10.1007/s10464-009-9229-9. PMID: 19390961.

**Core texts for Social Network Analysis:**

- Hanneman, Robert A. and Mark Riddle. 2005. Introduction to social network methods. Riverside, CA: University of California, Riverside (http://faculty.ucr.edu/~hanneman/ )
- Borgatti, S. P., Everett, M. G., & Johnson, J. C. (2013). *Analyzing social networks*. SAGE.
- Thomas W. Valente. Social Networks and Health. Models, Methods, and Applications

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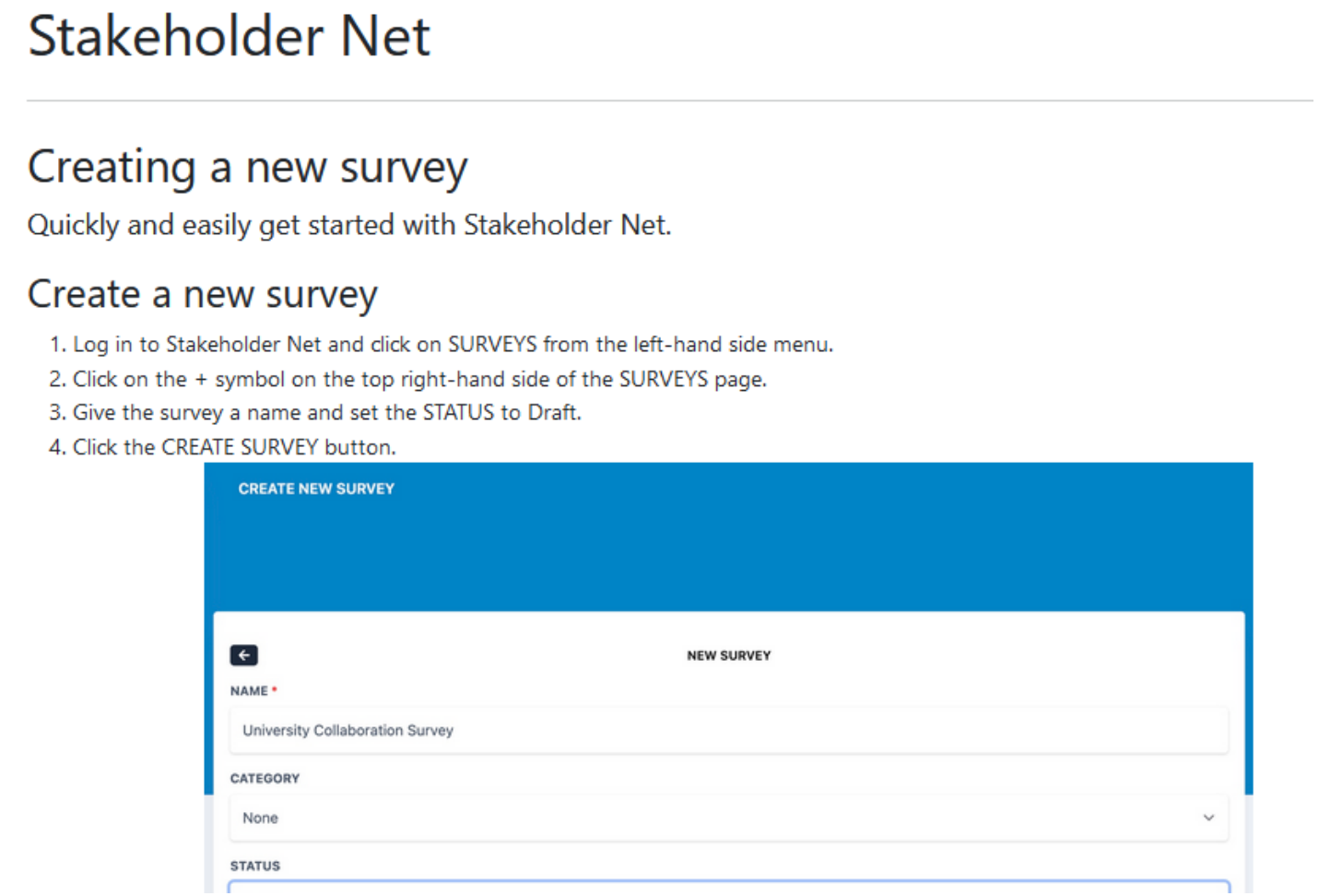
# Stakeholder network analysis toolkit

- http://stakeholdernet.org/
- Supporting manual

**Workshop 2: Tuesday 29th October 2024**

- Practical session
- Survey development
- Visualising and analysing data
- Interpreting data



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***Thank you***

**WHO Collaborating Centre for research and training on complex systems and network science for NCD prevention and control**

**Website:** https://www.qub.ac.uk/sites/who/