# Two Approaches to Understanding Norovirus Foodborne Transmission: A study for the Food Standards Agency

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This talk concerns modelling work for UK's Food Standards Agency (FSA). Norovirus causes infectious intestinal disease in humans via person-to-person contact (P2P) and foodborne (FB) transmission. The FSA commissioned a study to increase understanding of FB mechanisms, and of where to target its efforts. An existing P2P model with an exogenous parameter for FB transmission was transformed into a System Dynamics model of the FB vectors. Modelling involved expert interviews and a facilitated group modelling session. Vectors included were: bi-valve shellfish; sludge; some fruits and vegetables; other foodstuffs. This new model demonstrated that an account of the underlying causal mechanisms could be given. It also allowed parameters to be categorised in a way that was useful in future research agenda-setting and in identifying policy levers. Data and steady state analysis then made it possible to calibrate a P2P model for the first time. The resulting sensitivity analysis indicated that small changes in human behaviour could explain the observed x10 seasonal variations in Norovirus cases, and gave insight into the relative importance of FB and P2P vectors. The consequences of the study included an increased understanding by the FSA of the different means of trying to control Norovirus, practical actions and ideas for further work.

**David C Lane** is Professor of Business Informatics at Henley Business School. He specialises in strategic analysis using system dynamics and systems thinking. He works interactively with groups of senior managers to help them express their ideas in the form of a system dynamics-based simulation model. The model and the facilitated process help managers to think through the long-term policies of their organisation. His theoretical work concerns the contribution that system dynamics can make to the formalisation of certain concepts arising in social theory. His practical interests include: healthcare management; the creation of marketing strategies for cinema films, child protection and the dynamics of project management.

David Lane has mathematics degrees from Bristol and Oxford Universities and a Doctorate in mathematical modelling also from Oxford. He was a consultant in Shell International and a marketing manager in Shell UK. Before joining Henley he was a faculty member at City University Business School and then London School of Economics and Political Science. He has consulting and executive education experience in a wide range of commercial and public sector/government organisations. He is a member of the Home Office Science Advisory Council (HOSAC) in which role he provides independent advice on the use of operational research and systems thinking approaches with the aim of improving the quality of the science and research that is used to inform strategic delivery and policy development.

In 2005 David Lane received an LSE award for outstanding performance and innovation in teaching and in 2008 he received a student-nominated LSE Students' Union Teaching Excellence Award.

In 2004 he was elected Fellow of the Operational Research Society for "outstanding contributions to the theory and practice of OR", and in 2007 was awarded the System Dynamics Society's Jay Wright Forrester Award "for the best contribution to the field of system dynamics in the preceding five years". In 2010 he was appointed as an Advisor to the Munro Review of Child Protection for the Department for Education. In 2011 David Lane served as President of the System Dynamics Society. In 2014 he received the Operational Research Society's President's Medal for the application of systems modelling approaches in the child protection sector.