Introduction to the Special Issue

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These are challenging times for decision makers in Departments of Health, strategic health authorities and in healthcare organisations. Budgetary constraints, technological change, system reform, immigration and demographic change are putting health services under unprecedented strain. The purpose of this special issue of the ***EURO Journal on Decision Processes (EJDP)*** is to explore how modelling can help better understand these challenges, and aid decision makers in choosing appropriate strategic or policy actions.

The popularity of modelling in the area of healthcare is not in doubt: operational researchers, health economists, medical statisticians, epidemiologists and clinical scientists all make use of models as part of their research strategy. The last few years have seen several special issues (Rauner et al. , 2003; Xie et al., 2010; Brailsford et al., 2012; Weber et al., 2014 and Hans and Vliegen, 2014), review papers (Brailsford and Harper, 2008; Brailsford and Vissers, 2011) and books (Brandeau et al., 2004; Vissers and Beech, 2005; Ozcan, 2005; Zaric, 2013; Hunink et al., 2014) concerned with OR modelling in the healthcare sector. This should not come as a surprise: because of the technical difficulty of assessing the effectiveness of medical interventions, the complexity of understanding the dynamics of infectious disease, the multidimensionality of the healthcare product (and thus of the performance of healthcare organisations), not to mention the critical role played by government in either regulating the market or directly replacing it, decision makers in healthcare face formidable challenges in making wise decisions which reflect evidence and scientific knowledge. Using models is particularly important in this domain, particularly for decisions about the introduction of new drugs and medical technologies, which need to be made now whereas statistical and/or real world evidence will not be accumulated for years - and in some cases it may even be either impossible or unethical to conduct a clinical trial.

The mission of the EJDP specifically is to contribute to understanding of how modelling can support decision making. The four papers included in this special issue directly address that mission. Reddy et al. (2016) present a multicriteria intervention to assist prioritisation of smoking cessation interventions in England, reminding us that decision support models do not need technical sophistication but do require substantial input from stakeholders. Flessa et al. (2016) also present a policy model, but in their case, the model is an infectious disease model of the Human Papilloma Virus (HPV) which causes cervical cancer, and the country concerned is Cambodia. From a more theoretical point of view, Zhang et al. (2016) and Ekin et al. (2016) both provide optimisation modelling frameworks which address critical issues facing healthcare managers and policy makers (interacting stakeholders and risk preference respectively). They use their frameworks to model, respectively, hospital investment decisions in computer tomography and resource allocation decisions in the US Army hospital network.

The papers in this volume cover a range of geographical settings, from Europe to the US, to Asia; use a variety of technical methods; and address problems arising at multiple levels of the healthcare system, from making decisions about specific disease programmes to managing an entire system of hospitals. At the same time, they underscore the importance of focussing on the needs of decision makers in developing model solutions. We commend these papers to readers of EJDP. We hope

that they will receive the attention and interest which they clearly deserve and that this sparks addition research in this area by readers of his journal.

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