Call for Papers
Special Issue of the *European Journal of Operational Research (EJOR)*
The role of Operational Research in the future epidemics/ pandemics

Background

In 1918-19, the Spanish flu (known as the 1918 influenza pandemic) infected around 500 million people across the world, which was one-third of the world's population at the time. At least 50 million people died, including about 675,000 people in the United States[1]. The recent disease outbreaks, including SARS between 2002 and 2004, H1N1 in 2009, Ebola between 2014 and 2016, Cholera (after Haiti earthquake between 2010 and 2019) and COVID-19 proved that our societies are not as resilient as perceived and definitely not prepared for such disasters. One century after the 1918 influenza, COVID-19 emerged in late 2019 in Wuhan, China. By April 9, 2020, over 1.6 million people were infected and approximately 95,000 people died.

Are we going to experience another catastrophe like the 1918 influenza? Can we anticipate the trajectory of the outbreak? Are there any ways to mitigate its impact? If this disaster is over, do we have any comprehensive plan to guarantee we can prevent a similar disaster again? How can models help us minimize economic impacts and relaunch the economy in such circumstances? In such an exceptional situation, many scientists are trying to contribute to the global effort to fight the pandemic in various disciplines such as healthcare, pharmaceutical, social, economic, operations, etc. *How can Operations Research (OR) techniques contribute?*

Over recent decades, OR techniques have proven their abilities in making appropriate decisions at strategic, tactical and operational levels. Any public, private, service and manufacturing sector can take advantage of OR techniques to optimize its performance. While OR has already made a significant contribution to disaster management and humanitarian operations (Van Wassenhove 2006; Altay & Green III 2006; Gupta et al. 2016), it seems the nature of epidemic outbreaks and pandemics are significantly different from other disasters in terms of their dynamic nature, global scale and length. This special issue (SI) aims at publishing rigorous research based on the application of OR to epidemics and pandemics.

Objective

"The *European Journal of Operational Research (EJOR)* publishes high quality, original papers that contribute to the methodology of **operational research** (OR) and the practice of **decision making**.[2]" Following this mission of EJOR, this SI focuses on epidemics and pandemics. Our observation in OR-related journals shows that there are some relevant research studies in the area (see Dasaklis et al. 2012), but additional work is needed. In this SI, we urge academics to come up with innovative OR-based ideas without limitation in areas and scope (e.g., social, logistics, resource allocation, supply chain, healthcare, agriculture, retail, energy, medicine, technology, and epidemiology) to prescribe impactful insights to academics, practitioners and policy makers.

Scope

EJOR, within the OR field, is a generalist journal that publishes papers on the *theory of OR*, on the *methodology of OR*, and on *innovative applications of OR*. OR is all about real-world applications: complex and challenging real-world needs, requiring advanced methods to be solved, based on new theoretical developments. As a result, the SI is seeking for Innovative Applications of OR with strong methodological advancements. Case studies are especially welcomed, provided that they are not simple case studies or direct applications of known methodologies and techniques to known problems.

Techniques: While using OR techniques is a necessity following the scope of EJOR, an academic contribution will involve the rigorous use of such techniques, without necessarily focusing on the development of new mathematical models and techniques (Corbett and Van Wassenhove 1993). Any traditional, modern, exact or heuristic techniques is fine as is the development or extension of OR methodology fit for epidemic/ pandemic contexts.

Application: Usually, disasters can be managed through the emergency management cycle comprising four sequential phases: mitigation, preparedness, response, and recovery (Van Wassenhove 2006; Gupta et al. 2016;

[1] https://www.cdc.gov/flu/pandemic-resources/1918-pandemic-h1n1.html
[2] https://www.journals.elsevier.com/european-journal-of-operational-research

Altay & Green III 2006). While these phases also apply to the outbreak, the WHO (World Health Organization) introduces a more practical phasing for managing epidemics and pandemics which are Anticipation, Early detection, Containment, Control and mitigation, and Elimination or eradication (WHO, 2018). OR models and techniques can serve in all of these stages. For example, Anticipation and Early detection are mainly based on surveillance and forecasting techniques that provide input for other phases. As another example, resource allocation ideas can significantly help in Containment, Control and mitigation when it comes to healthcare resource planning or the related supply chains.

Multi-disciplinary: The existence of real data or a case study is not necessary but it is an advantage. The authors are encouraged to validate their achievements, either analytically or empirically, through real data and case studies. Conceptual models, experimental works, empirical research, examples with real or generated data, empirical/econometric work, experimental work, case-based work, actual examples with real data and implementation, position/opinion papers, and operations management studies can be considered provided that the value of OR techniques are clearly showcased.

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