African Working Group 🌐 **Healthcare Systems**

AFROS - African Federation of Operations Research Societies

4ᵗʰ Healthcare Systems Seminar

ONLINE FREE SEMINAR

December 21, 2022 , 4:00 pm Tunis/ 10:00 am Canada

Decision support tools for patients' prioritization

Analysis and Resource Allocation Approaches for Muti-Specialty Outpatient Clinics

Angel Ruiz
Full professor at the faculty of business administration, University Laval, in Canada Member of the Interuniversity Research Center on Enterprise Networks, Logistics, and Transportation (CIRRELT).

Najla Aissaoui
Assistant professor of Industrial Engineering at the National Engineering School of Carthage Member of OASIS Lab at the National Engineering School of Tunis, Tunisia.

Q&A Session and Open Debate

The seminar is free but the registration is mandatory via https://forms.gle/N47yRhiLVVnLTwA48
The zoom link will be sent by email after the registration.
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Decision support tools for patients' prioritization

Angel Ruiz
Full professor at the faculty of business administration, University Laval, in Canada
Member of the Interuniversity Research Center on Enterprise Networks, Logistics, and Transportation (CIRRELT).

Bio:

Angel Ruiz, Ph.D., is full professor at the Faculty of business administration, Université Laval, in Canada. He earned his doctoral degree in control systems at the University of Technology of Compiegne, France. He is a member of the Interuniversity Research Center on Enterprise Networks, Logistics, and Transportation (CIRRELT).

His main research interests are operations research applied to healthcare systems and emergency logistics management. He has studied diverse topics such as the development of decision support tools for waiting lists management and patient prioritization, the design of logistics plans for the control of contagious or non-contagious diseases, the transportation of patients and the management of emergency medical services, and other applied problems on healthcare logistics including the transportation and supply of goods, and the optimization of logistics processes such as surgery or homecare activities.

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Decision support tools for patients' prioritization

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Abstract: During the last years the imbalance between offer and demand for healthcare services have negatively impacted waiting lists so that waiting times have become a serious issue in OECD countries. In many medical procedures, these long waiting times directly affect the patients' health and quality of care. Patients' prioritization on waiting lists and their access to treatment based on various factors can play an important role in diminishing undesirable outcomes, such as patients' injury or mortality. Patients' prioritization is challenging. Higher priority patients should be treated ahead of those with a lower priority, regardless of when they were added to the list. The question is therefore how to elect the factors on which the patient priority should be based and how to evaluate an individual's priority with respect to other in a rigorous, homogeneous, and equitably manner.

This talk proposes a general 3-step decision framework to prioritize patients. The first step, Design, seeks to identify a set of criteria considered as relevant to evaluate the importance of a given service for the patient. Then, it is necessary to quantify the relative importance of each criterion to the others. In the second step, Evaluation, each patient on the waiting list is evaluated with respect to all the criteria by one or several experts using common scales, and a global score is computed. The waiting list is sorted according to the score produced for each patient, a higher score indicating that the service has a higher value/urgency for that patient. The third and last step, Operation, translates the sorted list into schedules for the service delivery. Indeed, practical and administrative constraints make it almost impossible to treat patients in the exact order established by the patients' scores, so an optimization tool is needed to elaborate service delivery schedules see.

The talk will be divided into two parts. The first part will introduce the proposed framework and the challenges associated to patients' prioritization in several contexts. The second part will focus on specific technics and approaches that can support the framework steps. It will briefly describe qualitative consensus technics such as TRIAGE and DELPHI, and multicriteria decision making approaches (analytical hierarchy process – AHP – and its fuzzy version Fuzzy – AHP).

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Najla Aissaoui
Assistant professor of Industrial Engineering at the National Engineering School of Carthage
Member of OASIS Lab at the National Engineering School of Tunis, Tunisia.

Bio:
Najla Aissaoui received her Industrial Engineering degree, her MS and Ph.D. from the National Engineering School of Tunis (ENIT). She is currently an assistant professor of Industrial Engineering at the National Engineering School of Carthage and a member of OASIS Lab at the National Engineering School of Tunis, Tunisia. Her area of expertise and interest are production planning and control, supply chain optimization, lean healthcare, health systems and performance measurement systems.

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Assistant professor of Industrial Engineering at the National Engineering School of Carthage
Member of OASIS Lab at the National Engineering School of Tunis, Tunisia.

Abstract: Outpatient clinics relieve patient crowding in emergency and inpatient departments by providing scheduled cares for patients that do not need to stay overnight. Demand for these services has been steadily increasing since the 2000s, especially with the ageing of the population, the emphasis on preventive medical practices and the increasing complexity of cares. Unfortunately, this leads to long wait times for patients and delays in obtaining appointments as well as heavy workloads and overtime for staff. Multidisciplinary outpatient clinics are even more complex and are in a greater need for a better organization. As they regroup a large number of medical disciplines and specialized units, their processes are multi-stage and highly complex. Also, requiring multiple interacting human resources, these are often influent inputs to operations management activities.

Thus, in such hospital settings, process efficiency and human behavior comprehension are key factors in any planning and control decision. Success requires not only effective decisions that take into consideration real-world aspects to guarantee their applicability, but also a combination of several organizational measures to identify and overcome multiple interrelated issues related to patient, material and information flows. The aim is to ensure that patients are timely cared for and that they are present at every point of care they need.

The talk will be divided into two parts. Given the great need to understand with accuracy how processes are carried out and to recognize factors affecting patient flows to identify improvement opportunities, we propose first a systematic process analysis approach. It combines and adapts several tools usually applied separately to model, map, and analyze the entire Patient Care Delivery Process. The second part of the talk is focused on resource allocation decisions. The study proposes a human behavior-based approach to allocate exam rooms to medical specialties while minimizing patients' waiting times. First, a stress model is developed for physicians, as the most critical resource in outpatient settings. Then, the resulting relationships are integrated into a discrete event simulation framework.

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