



## Workshop of the ÖGOR-Working Group

### "Operations Research in Health Care & Disaster Management"

During the EURO Working Group on Operational Research Applied to Health Services (ORAHS) at the Technical University of Graz, Austria

(<https://oegor-hcdm.univie.ac.at/>)

The 49th Annual Meeting of the EURO Working Group on Operational Research Applied to Health Services (ORAHS) at the Technical University of Graz, Austria (July 15<sup>th</sup> – 21<sup>st</sup>, 2023), welcomed contributions taking a holistic view on health systems and encourages researchers, academics, practitioners and students to present research covering aspects of integrated planning and provision of services (<https://www.tugraz.at/events/orahs2023/home>). Nikolaus Furian and Siegfried Vösser were the main local chairmen of the conference, supported by a local organisation committee and an international committee, the ORAHS Board.



More than 120 researchers and many accompanying persons from all over the world joined the ORAHS 2023 meeting. They enjoyed the inspiring conference and the extraordinary social programme, such as the conference dinner at the Schlossberg, Graz.



On Thursday, Siegfried Vössner chaired a healthcare panel discussion with local policymakers, including the head of the Austrian National Institute for Health Services Research, Herwig Ostermann.



On Friday, July 21<sup>st</sup>, 2023, the OEGOR working group "Operations Research in Health Care & Disaster Management" held a hybrid workshop on current topics in health and disaster management. The Technical University of Graz hosted the workshop as an integral part of the ORAHS Conference 2023, which the university organised. Since the hybrid nature of past workshops has proven successful, this event also offered in-person or online attendance.

Marion Rauner, co-head of the working group, opened the workshop, which numerous participants, including those of the ORAHS conference, attended. The diverse workshop program demonstrated the close connection between the working group and practice. The workshop included three talks, each in the health and disaster sessions.

**Marion Rauner and Benjamin Swyter** presented the first health lecture on "The Potential of the Community Paramedic Strategy for the Ambulance Rescue System in the City of Hamburg, Germany". The authors examined the drivers for the 10 per cent increase in ambulance services in Hamburg, primarily due to a 20% increase in non-critical operations. They identified demographic changes, increased waiting times in primary care, and a decline in extramural services as contributing factors and suggested the introduction of community paramedics to counsel potential patients before calling ambulance services as a remedy.

**Lerzan Ormeci** gave the second talk on "Appointment Scheduling Under Patient Choices with Walk-In Behaviour and Cancellations", co-authored by **Feray Tuncalp and Erhun Ozkan**. Their model optimised a clinic's expected net profit, allowing the clinic to dynamically decide on the daily number of appointments for walk-in patients and the number of appointment days offered to a patient, and the patients to choose between appointments for one of the days offered or other days, risking not receiving service in the latter case. Additionally, the clinic may compensate for patients cancelling their appointments or not showing up.

In their talk "Automated Medical Resident Scheduling in Austria", **Wolfgang Dummer and Alexander Daal** presented a scheduling problem that involved assigning medical residents to training facilities. To optimise the current scheduling, the authors proposed a solution tailored to the Austrian context that requires transferring about 8,000 residents to the hospitals. Their approach, which combined evolutionary metaheuristics and rule-based heuristics, addressed planning efficiency and fairness concerns. The results were consistently superior to what human decision-making suggested.

The disaster session started with **Larissa Schachenhofer** presenting the "Consequences of an Extensive and Prolonged Internet Blackout on Selected Areas of the Healthcare Sector: A System Dynamics Analysis", co-authored with **Manfred Gronalt and Patrick Hirsch**. The authors employed a System Dynamics approach and examined the cascading consequences of an internet blackout, envisioning system-wide failures and an escalating workload for healthcare professionals. A causal loop diagram illustrated the complex cause-effect relationships and feedback loops and identified vulnerabilities and mitigation opportunities, offering valuable insights for disaster management and healthcare researchers.

In their talk on "Modelling of Opportunistic Salpingectomy to Prevent Ovarian Cancer in Austria", the authors (**Florian Schierlinger-Brandmayr, Heidrun Sagmeister, Diether Kramer, Philipp Url, Elisa Sieghartsleitner, Mario Mauberger, Sigurd Lax, Karl Tamussino, Siegfried Voessner**) addressed the lack of a reliable early detection method of ovarian cancer, which is a leading cause of gynecologic and overall cancer-related death in women, including Austria. With salpingectomy (tube removal) being a recommended and effective strategy, particularly during gynecologic surgeries, the author applied modelling and simulation approaches to assess the potential of incorporating salpingectomy in non-gynecologic procedures within the Austrian population. Building on multiple data sources, the model aimed to determine the potential impact of opportunistic salpingectomy during non-gynecologic surgeries on reducing ovarian cancer incidence and mortality in Austria.

The third talk in the disaster session, presented by **Raimund Kovacevic** and co-authored by **Doris Behrens**, delved into the "P&L Sharing for Primary Healthcare Centres" issue. Primary healthcare centres, which have recently been increasingly promoted in Austria, face the challenge of establishing

fair profit and loss-sharing rules, impacted by varying contributions, among potential owners. These issues may hinder the initiation of primary healthcare projects. The authors proposed optimisation and game theoretic approaches to determine equitable distributions of profits and losses.

Lively discussions followed each presentation and delved into methodological issues and healthcare system-related challenges.

At the end of the workshop, the session chairs, Marion Rauner and Patrick Hirsch, thanked the presenters and workshop participants for making the workshop a success.

Marion Rauner, University of Vienna,

Patrick Hirsch, University of Natural Resources and Life Sciences Vienna,

Margit Sommersguter-Reichmann, University of Graz,

Tina Wakolbinger, Vienna University of Economics and Business,

and Walter Gutjahr, University of Vienna.