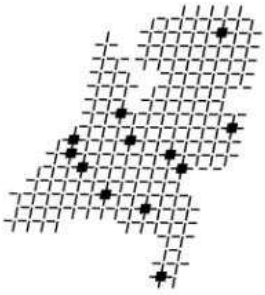


LNMB

Nederlands Genootschap voor Besliskunde

Netherlands Society for Operations Research

Leiden, 29 november 2005

Betreft: NGB/LNMB Seminar Lunteren, 19 januari 2006

Bijgaand treft u de aankondiging en het aanmeldingsformulier aan voor het 8-ste "Lunteren Seminar", georganiseerd door het Nederlands Genootschap Besliskunde (NGB) in samenwerking met het Landelijk Netwerk Mathematische Besliskunde (LNMB). Het thema is dit jaar:

"OPERATIONS RESEARCH AND HEALTH CARE"

Een elftal prominente deskundigen, met uiteenlopende specialiteiten, zal dit onderwerp nader toelichten. Anne Jonkman, programmadirecteur van "Sneller Beter, pijler 3", is de dagvoorzitter. Wij hopen en verwachten dat dit onderwerp en het programma uw interesse hebben.

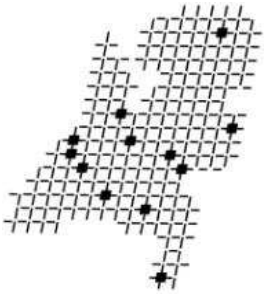
Tevens biedt deze bijeenkomst u de gelegenheid om contacten te leggen en te hernieuwen, niet alleen met de 'professionals', maar ook met personen uit de academische wereld.

Indien u aanwezig wilt zijn, dan ontvangen wij uw aanmeldingsformulier graag zo spoedig mogelijk; de inschrijving sluit op **9 januari 2006**.

Met vriendelijke groet en in de hoop u in Lunteren te mogen verwelkomen,

Namens het NGB,
Hans Bisschop

Namens het LNMB,
Lodewijk Kallenberg,



LNMB

Nederlands Genootschap voor Besliskunde

Netherlands Society for Operations Research

"OPERATIONS RESEARCH AND HEALTH CARE"

Jointly organized by the Landelijk Netwerk Mathematische Besliskunde (LNMB) and the Nederlands Genootschap Besliskunde (NGB), Conference Center "De Werelt", in Lunteren, on January 19, 2006.

The Landelijk Netwerk Mathematische Besliskunde (LNMB) and the Nederlands Genootschap voor Besliskunde (NGB) jointly organize the one-day seminar "Operations Research and health care", in Conference Center "De Werelt" te Lunteren, on January 19, 2006. The seminar is the 8th in a series of annual seminars, following the previous successful seminars on "Operations Research & Enterprise Resource Planning" (1999), "Operations Research in Financial Management"(2000), "E-Commerce & Operations Research" (2001), "Capacity management- How operations research models support decision makers" (2002), "New developments in Operations Research software"(2003), "On-line methods: Challenges for OR in a real-time world"(2004) and "Mathematical Models for Financial Optimization" (2005).

In the past years the last day of the Operations Research (OR) conference in Lunteren was meant specially for applications of OR. In OR there are many techniques and methods to solve problems. New techniques and methods are being discovered but there could be much more implementations of the OR solutions in the various fields. In OR we need a target definition and boundaries in which the optimal solution can be generated. As of 2006 boundaries in the Dutch health care will be defined in the program of the Dutch administration of Health care "Sneller Beter". Due to these clearly set boundaries OR has a bigger change to be implemented in this field. The NGB has chosen a new target in its policy: the generation of markets for the methods and techniques which are available in OR.

Operations Research (OR) is already indispensable in making diagnoses and prognoses in medicine. For instance for optimization of radiation strategy for tumours OR techniques are used. Many OR applications can be used in the logistics of health care. Because of the new policy of the Dutch secretary of Heath Care, from 2006 new and sensitive decisions have to be made. OR can be of great help to make objective and optimal decisions so that professionals can get a clear view what the price is of their preferences. For example: how to make a central decision in what medicine belongs to the publicly financed domain and which company gets the assignment to produce medicines?

During this day we will cover three themes:
- *OR and logistics in health care*
- *OR and medical treatment*
- *OR and decision making in health care*

SEMINAR PROGRAM:

09.30 – 10.00 Registration and Coffee

10.00 – 10.15 Welcome and introduction by the chairman Anne Jonkman

10.20 – 12.20 *OR and logistics in health care*

Michael Carter:
Operations Research in the health care or Who let the engineer into the hospital?
Mark van Houdenhoven:
Hospital process optimization: where to start?
Gerhard Wullink:
Health care process optimization: mathematics is the easy part!
Erwin Hans:
Operations research based process optimization at Erasmus MC

12.20 Lunch

13.30 – 15.30 *OR and medical treatment*

Dick den Hertog:
Introduction
Eva Lee:
Operations Research Challenges in Medicine and HealthCare
Aswin Hoffman:
Multi-objective fluence map optimization for intensity-modulated radiotherapy
Marjolein van Ballegooijen and Dik Habbema:
Health care efficiency improvement in action: the case of cervical cancer screening in the Netherlands

15.45 – 17.15 *OR and decision making in health care*

Joris van de Klundert:
Introduction
Maarten Rutgers:
Integral improvement of the orthopaedic chain
Etienne Rouwette:
System dynamics modeling on health care: supply and demand of dementia care

17.15 – 18.00 Drinks

The conference language is English. To participate at the seminar, please fill in the attached registration form and return it **before January 9, 2006**. The conference fee is € 75,- Euro for LNMB and NGB members, and € 125,- for others. You will receive an invoice after your registration form has been received. The conference fee covers lunch, coffee, tea, and drinks.

This seminar is organized during the last day of a three days conference on Operations Research. The topics of first two days are more on theory and methods and are mathematically oriented. For information see also www.lnmb.nl/conferences/lunteren2006.

SHORT BIO's

Marjolein van Ballegooijen (Erasmus Medical Center, Rotterdam)

Marjolein van Ballegooijen is a Medical Physician and Epidemiologist and coordinator of the research projects concerning cervical cancer and colorectal cancer screening at the Department of Public Health of Erasmus MC. After completing of her PhD on costs and effects of cervical cancer screening she extended her work field to colorectal screening. She is experienced in public policy issues. She has extensive experience in model (MISCAN) based projects towards recommendations for Dutch policy makers concerning cancer screening.
This work had impact on the practice of the Dutch national cervical cancer-screening program (change in age range and interval for screening rounds) and on the consensus recommendations for surveillance after polypectomy in colon adenoma patients.

Michael Carter (Healthcare Resource Modeling Laboratory, University of Toronto, Canada)

Michael Carter is a Professor in the Department of Mechanical and Industrial Engineering at the University of Toronto. He received his doctorate in Mathematics (Optimization) from the University of Waterloo in 1980. He has worked extensively in university timetabling, production scheduling and healthcare applications. His current research focus is in the area of healthcare resource modeling with a variety of projects in several hospitals, home care and mental health institutions. He was the winner of the Annual Practice Prize from the Canadian Operational Research Society (CORS) three times (1988, 1992 and 1996). In 2000, he received the CORS Award of Merit for lifetime contributions to Canadian Operational Research. He also received an "Excellence in Teaching" Award from the University of Toronto Student Administrative Council. He is on the editorial board for the "Journal of Scheduling" and the journal "Health Care Management Science". He is a member of the "Nursing Effectiveness, Utilization and Outcomes Research Unit" and a mentor in the "Health Care, Technology and Place" Program at the University of Toronto. He was a lecturer with the Project H.O.P.E. international program in Healthcare Quality in Central and Eastern Europe.

Dik Habbema (Erasmus Medical Center, Rotterdam)

Dik Habbema is since 1987 professor of medical decision sciences at the Department of Public Health of the Erasmus MC, University Medical Center Rotterdam. He co-ordinates the decision sciences research programme, which has evaluation of early detection of disease, (tropical) infectious disease control and clinical decision sciences as its three main lines of research. Assessing population health impact of interventions, model building and validation, prediction and evaluation, optimizing the choice of interventions, and cost-effectiveness analysis are important activities. He has (co-) authored several hundreds of scientific publications in these fields.

Erwin Hans (Operational Methods for Production and Logistics, University of Twente)

Erwin Hans is Assistant Professor at the department "Operational Methods for Production and Logistics" of the University of Twente (School of Business, Public Administration and Technology). After his study of Applied Mathematics, specialization Operations Research, he did a Ph.D. research on the development of models and techniques for tactical capacity planning in manufacturing. Since his promotion he remains active in this field, a.o. through supervising Ph.D. students. Since 2003 he also performs research in health care. In collaboration with Erasmus MC and AMC he focuses on applying operations research techniques for process optimization in hospitals. Beside research, he is responsible for a number of master lectures in the "Industrial Engineering & Management"-master at the University of Twente.

Dick den Hertog (Tilburg University)

Dick den Hertog is a full professor of Operations Research at CentER and the Department of Econometrics at the Tilburg University. He received his Ph.D. (cum laude) from the Technical University Delft in 1992. From 1992 till 1999 he has been an Operations Research consultant at CQM in Eindhoven. His main research focus is nonlinear programming, and in particular deterministic simulation-based optimization methods.

Aswin Hoffman (Radboud University, Nijmegen)

Aswin L. Hoffmann received the MSc degree in Electrical Engineering from the Eindhoven University of Technology in 1996. He has been a Junior Researcher at the Department of Applied Physics at the Delft University of Technology from 1996 through 1998. From then to 2002 he was a Research Scientist at the Biomedical Engineering Research Centre of the Department of Urology of the Radboud University Nijmegen Medical Centre.
Since 2002 he is in training to become a Clinical Physicist, specialized in Radiotherapy Physics at the Department of Radiation Oncology within the same institute. There, he currently also holds a position as a Research Scientist working on optimization of radiotherapy treatment planning. His research interests include medical decision making and multi-objective optimisation of inverse treatment planning for intensity-modulated radiotherapy.

Mark van Houdenhoven (Erasmus Medical Center, Rotterdam)

Mark van Houdenhoven is an economist of background and has worked for more than 12 years as a manager in healthcare. Nowadays, he is the manager of the OR-department, ICU and Anesthesiology department of the Erasmus MC in Rotterdam. He has a particular interest in logistical concepts in health care. In this context he implemented an innovative way of planning surgical procedures and dealing with medical variability at the OR-department of the Erasmus MC. For this innovative planning concept he received the KIVI speurwerkprijs from the Dutch Society for Engineers. He is also interested in the application and development of Operations Research in Hospitals, and performs research in this particular field of health logistics.

Joris van de Klundert (Maastricht University)

Joris van de Klundert received his Masters degree in Computer Science from Erasmus University Rotterdam in 1991, and his Ph.D. in Operations Research in 1996 at Maastricht University. He is currently employed as associate professor of operations research at Maastricht University, and as director of Mateum. Mateum is an operations research solutions provider specialized in health care industry. Joris van de Klundert has worked on numerous operations research projects in the service industry.

Eva Lee (Georgia Institute of Technology, USA)

Eva Lee is an associate professor with a joint appointment in IsyE at Georgia Institute of Technology and the Department of Radiation Oncology at the Emory University School of Medicine. She is also Director of the Center for Operations Research in Medicine. Dr. Lee earned a Ph.D. at Rice University in the Department of Computational and Applied Mathematics. She was awarded a NSF/NATO postdoctoral fellowship and a postdoctoral fellowship from Konrad-Zuse-Zentrum Informationstechnik Berlin in 1995. In 1996, she received the NSF CAREER Young Investigator Award for research on integer programming and parallel algorithms. In 2005, she receives the INFORMS Pierskalla Best Paper Award for research excellence in HealthCare Management Science for her work on emergency treatment response and real-time staff allocation for bioterrorism and infectious disease outbreak.

Dr. Lee works in the area of mathematical modeling and computational algorithms with a primary emphasis on medical/healthcare decision analysis and logistics operations management. In healthcare, she has developed clinical decision-support systems to help analyze large-scale biological, DNA/genomic and clinical data to assist in disease diagnosis and prediction, optimal treatment and drug delivery, healthcare outcome analysis and prediction, and healthcare operations logistics.

Dr. Lee has received five patents on innovative medical systems and devices, Her research has been featured and discussed in New York Times, London Times, Urology Times, the Atlanta Business Chronicle, and the Homeland Security IAIP Directorate Daily Report.

Etienne Rouwette (Radboud University, Nijmegen)

Etiënne Rouwette received his PhD from Radboud University in Nijmegen in 2003. His research interests focus on the effects of system dynamics, group model building and other participative approaches on group decision making. He teaches at Radboud University and Sioo and is involved in applied projects for a range of public and private organizations. He is a member of the System Dynamics Society and International Association of Facilitators, and organizing chair for the International System Dynamics Conference in Nijmegen in 2006.

Maarten Rutgers (General Director Wilhelmina Hospital Assen)

Maarten Rutgers finished his medical study at Groningen University in 1973. He specialized in neurology and clinical neurophysiology at the University Hospital Rotterdam, now Erasmus Medical Centre. He received his Ph.D. in epidemiology in 1984 at Erasmus University Rotterdam. Since 1986 he is employed in various management positions, mostly in healthcare. Currently he is general director of Wilhelmina Hospital Assen. He is involved in decision making on the portfolio of hospitals and the organization of chains with other healthcare organisations at the strategic level, including mergers.

Gerhard Wullink (Erasmus Medical Center, Rotterdam)

Gerhard Wullink is a researcher at the operating room department of the Erasmus MC. After his study of Mechanical Engineering, specialization Production Planning and Management, he did a Ph.D. research on the development of models and techniques for solving tactical capacity planning problems in manufacturing. The focus of the research was to take into account the variability that is typical for Engineer-To-Order environments. Since his promotion, in March 2005, he works as a researcher in the Erasmus MC on the field of application of operations research techniques in hospitals. Besides his research position, he also works as an internal advisor on the area of process improvement and analysis in the Erasmus MC.

ABSTRACTS

Marjolein van Ballegooijen & Dik Habbema
Erasmus Medical Center, Rotterdam

Health care efficiency improvement in action: the case of cervical cancer screening in the Netherlands

Cervical cancer is a serious health problem, but it is not one of the big cancer killers, at least not in the more wealthy regions of the world. Early detection and treatment is possible by the Pap-smear test. This procedure is effective, but costs and risks (because of false and unclear test results) are considerable. Therefore, the balance between costs and health effects is easily disturbed in this preventive health service. Scientific monitoring and evaluation has therefore been integrated in the Netherlands screening program from the start onwards.

A first, and major step in improving the efficiency of cervical cancer screening was by extending the age range for screening while at the same time enlarging the interval between screenings, leaving the number of screenings per women the same, with 7. This change in schedule was based on a detailed cost-effectiveness study. Other evidence-based changes in the last decade include the reduction of the number of Pap-smears outside the schedule; reducing the number of women which have to undergo diagnostic workup after borderline Pap-test results and a simpler regimen for women with smears which did not satisfy quality criteria.

By these improvements, the cervical cancer screening program in the Netherlands is probably by now one of the most cost-effective programs in the world, even though the costs of the thorough quality assurance are considerable. For the future, careful evaluation and decision making on incorporation in the screening of vaccination for and detection of HPV-virus, which has been shown to be a necessary cause of cervical cancer, is the main challenge and opportunity.

Michael Carter
Healthcare Resource Modeling Laboratory, University of Toronto, Canada

Operations Research in the Health Care or Who Let the Engineer Into the Hospital?

Health Care is the number one industry in North America; bigger than automotive, telecommunications or steel. Total spending in 2001 was $106 billion up ($3,416 per person) or close to 10% of the Gross Domestic Product (GDP). In 2001 in the U.S., spending was $1.4 trillion dollars US ($5,021US per person), over 14% of the GDP. The US spends far more than any other country (as a percent of GDP). Health care systems all over the world are in the midst of a serious financial crisis, and the situation will likely get worse in the next few years. Demand is going up as the population ages, and costs are increasing as the drugs and technologies continue to get more complex and expensive.

Of course, it would help if there were more money available. However, I also firmly believe that the health care industry could be run a lot more efficiently. Operations Management is planning, coordinating, controlling and evaluating the use and allocation of health care resources. The goals are quality improvement, cost containment, greater effectiveness and increased efficiency. Over the past 15 years, I have supervised over 100 engineering students on projects in health care. In the past four years, hospitals have hired over 30 of my students. In this talk, I will describe a few examples, discuss opportunities, and outline where I believe that we need to go in the future.

Erwin Hans
Operational Methods for Production and Logistics, University of Twente

Operations research based process optimization at Erasmus MC

Since two years, doctors and managers from Erasmus MC and operations research experts from University of Twente have intensive research collaboration with respect to hospital process optimization using operations research techniques. Up to now, the primary focus of this research has been the planning and scheduling of the Operating Room department, and subsequent departments like Intensive Care. This research addresses various managerial areas, and various hierarchical levels of control. This presentation gives an overview of the problems we have studied, and discusses the OR-techniques we have applied to solve the problems. These include techniques like integer programming, queuing networks, combinatorial optimization, and discrete event simulation.

Aswin Hoffman
Department of Radiation Oncology, Radboud University Nijmegen Medical Centre

Multi-objective fluence map optimization for intensity-modulated radiotherapy
Development of multi-leaf collimators (MLCs) in combination with inverse approaches for intensity-modulated radiotherapy (IMRT) have enabled new possibilities of radiation therapy for cancer treatment. These complex techniques require numerical optimization tools to find a treatment configuration to irradiate the patient that is optimal with respect to clinical and physical objectives and constraints. In this talk, a multi-objective optimization model is presented for the computation of optimal beamlet intensity levels in fluence maps. With this approach Pareto optimal treatment plans can be calculated that fulfil the contradictory objectives to give a high dose to the tumor while sparing surrounding normal tissue as much as possible. By generating Pareto surfaces the physician and physicist can analyse the trade-offs between the conflicting objectives. This allows them so select an optimal treatment plan that is tuned to their preferences. It is shown that sandwich algorithms provide efficient and effective means to generate Pareto surfaces for convex fluence map optimization problems.

Mark van Houdenhoven
Erasmus Medical Center, Rotterdam

Hospital process optimization: where to start?
Worldwide, costs of health care are high and rising, despite efforts to counteract this development. A major portion of the health care expenditure is caused by hospitals. In recent years, an increasing effort of research is being done to improve processes in hospitals. Logistical managers in hospitals tend to take success stories from manufacturing industry, like Toyota's Just-In-Time, as an example for their hospital. A hospital is, in many ways, very different than a manufacturing firm. As a result, logistical concepts from industry cannot be copied without impunity. To cope with this problem we present a classification framework to typify health care organizations based on their case mix. This framework can be used to select appropriate mechanisms for control (for example from operations research and management science) that comply with the characteristics of the underlying system. Furthermore, based on this framework, this presentation addresses the logistical problems that are currently the focus of our research, and problems that need to be addressed.

Joris van de Klundert
Maastricht University

Introduction
It is widely recognized that the health care industry in western countries has a tendency to grow rapidly, due to improvements in treatments, and an increase of the number and percentage of elderly people. The financial consequences place a severe burden on individual and national budgets, and hence the frequent call for increased effectiveness and efficiency. However, due to the complex nature of the health care industry, and indeed of health itself, the effects of decision making on effectiveness and efficiency of health care are oftentimes difficult to foresee. Nevertheless, many such decisions are made, for instance regarding the portfolio of medicaments and treatments covered by insurance, and the treatments provided by the various players in the health care chain. In the third session we consider integral effects of decision making in health care at a strategic and tactical level. This includes views from a national perspective, and from the perspective of collaborating organizations in the health care industry. The introduction identifies problems and models. The two subsequent presentations describe applications from a practical perspective.

Eva Lee
Georgia Institute of Technology, USA

Operations Research Challenges in Medicine and HealthCare
Operations Research has long been a cornerstone for advancement of various industrial, government, and military applications. In particular, computational and modeling technologies play an increasingly important role in modern medicine, life sciences and healthcare. Many problems arising in these domains can be formulated into mathematical models and can be analyzed using sophisticated optimization, simulation, and computational techniques. In this talk, we will review some healthcare, medical and biological applications in which operations research methodologies can be applied. Applications include medical treatment design, disease modeling and prediction, genomic analysis, and healthcare systems modeling and operations management.

Etienne Rouwette
Radboud University, Nijmegen

System dynamics modeling on health care: supply and demand of dementia care
This presentation will address the use of system dynamics models to analyze complex problems in health care. System dynamics has been used on health related issues since at least the 1960s and in the Netherlands since the 1980s. In this approach a group of experts and stakeholders participates in developing a model of a concrete problem. Topics that have been addressed in the past are epidemics, burnout, supply and demand of hospital care, dementia care, referral behavior of general practitioners, access to general practitioners, work pressure of doctors in training, costs of national health care and interventions in national health care systems.
This presentation focuses on the assumptions underlying the approach and the limitations and benefits of participant involvement. A case on supply and demand of dementia care is used as an example of the process and results of system dynamics modeling.

Maarten Rutgers
General Director Wilhelmina Hospital Assen

Integral improvement of the orthopaedic chain
Many elderly people have problems with hips and knees which are treated by hip and knee surgery, e.g. to replace the bone by an artificial substitute. The group of patients for such treatments is large, and usually the treatment can be planned in advance. Typically, the patients receive some kind of care before treatment in a hospital, for example they receive painkillers and get physiotherapy while living at home or they live in an elderly home. All patients need care after leaving the hospital. Hence effective and efficient treatment of these patients typically requires alignment of care processes among several organizations. Making effective use of bottleneck resources is of key importance in this field. In his presentation, Maarten Rutgers, will present several real life improvement projects in this domain.

Gerhard Wullink
Erasmus Medical Center, Rotterdam

Health care process optimization: mathematics is the easy part!
When it comes to hospital process optimization, some say mathematics is the easy part. Before mathematics can be applied, data must be collected, which is cumbersome. After mathematics has been applied, the hardest part of the research is to convince the doctors, nurses and other parties involved to adapt their way of working. This presentation addresses the issues that surround the application of mathematics in a complex organization such as a hospital. In addition we look at the planning and control functions where mathematics can play an important role. For this purpose we present a framework for health care planning and control functions. This framework aids to optimize all managerial areas in coherence, and enables a common dialogue between doctors and managers.

REGISTRATION FORM

I hereby register for the LNBM/NGB seminar "**Operations Research and Health Care**", which will be held in Conference Center "De Werelt", Lunteren, January 19, 2006.

Family name: ……

First name: ……

Title: ……

Company/Institute: ……

Address: ……

Postal Code: …… City: ……

Telephone number: …….. E-mail: ……

Date: …… Signature: ……

Below, please tick the appropriate box:

I am:

LNMB/NGB member (Registration fee € 75): ☐

Other (Registration fee € 125): ☐

FEE PAYMENT INSTRUCTIONS WILL BE SENT TO YOU AFTER REGISTRATION

Send the registration form before January 9, 2006 by regular mail or e-mail or by fax to

Prof.dr. L.C.M. Kallenberg
Director LNMB
Mathematical Institute
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PO Box 9512
2300 RA Leiden
Tel: 071 – 5277130
Fax: 071 - 5277101
E-mail: kallenberg@math.leidenuniv.nl

ADDRESS SEMINAR:

Conference Center `De Werelt'
Westhofflaan 2
Lunteren
The Netherlands
Tel: 0318 - 484641
www.congrescentrum.com

HOW TO GET THERE:

TRAIN:
Lunteren can be reached by train from Amersfoort and by train or taxi from Ede-Wageningen.
There is a taxi stand at the railway station Ede-Wageningen. Taxi drivers know "De Werelt".
For a taxi at railway station Lunteren call 0318 - 484555.
The walk from the railway station in Lunteren to "De Werelt" takes about 15 minutes.

CAR:
From A1 Amsterdam-Apeldoorn
Exit Barneveld/Ede A30 (N30) direction Ede
Exit Lunteren - follow direction from * Lunteren

From A12 Utrecht-Arnhem
Exit Ede-Noord/Barneveld (A30)
Exit Lunteren - follow direction from * Lunteren

From A15 Rotterdam-Nijmegen
Exit Kesteren N233 direction Rhenen/Veenendaal
Direction Veenendaal, than direction Veenendaal West (N224)
Direction Lunteren A30
Exit Lunteren - follow direction from * Lunteren

From * Lunteren: follow ANWB signposting “De Werelt”:
Keep driving until Dorpsstraat (shoppingstreet);
turn right direction Ede;
after the church turn left into the Boslaan;
cross the railroads; straight on;
enter the forest until the crossroads;
turn right Molenweg;
first road left (Westhofflaan), there you find signs to “De Werelt”.