AKERSHUS UNIVERSITY HOSPITAL

Annual Report 2019

Academic Activities

Division of Surgery Akershus University Hospital

UiO : University of Oslo

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Annual report 2019

Contents

ANNUAL REPORT ON ACADEMIC ACTIVITIES IN 2019

Division of Surgery, Akershus University Hospital

This is the ninth annual report on research activities in our Surgical Division (SD). This evaluation is written in exceptional times with the Corona pandemic.

The main task for 2019 was the Ahus evaluation of research groups. We decided to present us as one research group with subgroups in line with the previous evaluation in 2011. The evaluation is now published and the main conclusions for SD was that our general evaluation improved from Weak-Fair to Fair-Good and Good. However, many of the problems mentioned in the 2011 evaluation remain. The main problems are time, resources and external funding for research. One new aspect was also raised in the evaluation. There are limited possibilities at Ahus for academic and research career development.

Partly as a conclusion for the evaluation the head for SD, Anne Karin Lindahl, and the leader group, decided to establish a new department in the SD: Department for research, with start in January 2020.

The other good news was the decision to establish Outpatient unit for research at Ahus with start in 2020. This will improve the possibilities for clinical research in SD.

Our publication rate and funding went somewhat down. This is partly natural variation and partly illustrates the problems mentioned in research evaluation. The other problem related to this is that too many of the journals in the surgical field are ranked as level 1 journals. This is a problem which we have decided to correct and needs an active role from ourselves.

We have decided to improve the quantity and quality of our applications for external funding. However, the results could not be harvested in 2019.

We had the annual PhD seminar in November. The PhD seminar is now proved to be a good forum to practice presentations and to get feedback and to create network. One result is the progress in 3D printer laboratory.

We achieved one international PhD degree in 2019, and we are expecting several dissertations in 2020.

I thank all researchers in SD for the hard and successful job you do mostly in your own time.
Good luck to 2020.

On behalf of the research committee and myself,

Juha Silvola, Associate professor
Department of ENT, Akershus University Hospital
Institute of Clinical Medicine, University of Oslo

Research Committee 2019

Head	**Juha Silvola**
Surgical Division	Anne Karin Lindahl
Dept of Anaesthesiology	Vegard Dahl, Signe Søvik
Dept of Breast and Endocrine Surgery	
Dept of ENT	Harald Hrubos-Strøm
Dept of GI Surgery	Ola Røkke, Johannes Schultz, Tom Øresland
The Operating Department	Lise Smith Jacobsen
Dept of Urology	Stig Müller
Dept of Vascular and Thoracic Surgery	Jarlis Wesche
Palliative Medicine	Olav Magnus Fredheim
Head of Division of Surgery-Campus Ahus	Gregor Bachmann-Harildstad
Research coordinators	Inger Helene Nådland and Merete Helgeland

From left: Harald Hrubos-Strøm, Lise Smith Jacobsen, Jarlis Wesche, Juha Silvola, Johannes Schultz, Merete Helgeland, Signe Søvik, Stig Müller, and Gregor Bachmann-Harildstad

Members are elected for a three-year period. The committee's tasks are to:

- keep track of research within the Division of Surgery
- follow-up and support research projects
- facilitate practicalities related to research
- provide support in grant applications
- keep track on university activities
- promote interdisciplinary research
- initiate common research meetings within the Division of Surgery

Overview of researchers

Department	University positions	Ph.D. Research fellows
Anaesthesiology	3	2
Breast and Endocrine Surgery	0	2
ENT	4	6
GI Surgery	4	6
Urology	1	0
Vascular and Thoracic Surgery	1	2
Total	**13**	**18**

Summary of Research Activity

Publications (peer reviewed) and dissertations in the Division of Surgery

Year	Publications	Dissertations
2015	31	0
2016	62	1
2017	71	1
2018	58	3
2019	41	1

ENT Research Group

Head: Harald Hrubos-Strøm

Photo: University of Oslo

University employees:	Research fellows:
Professor II Magnus von Unge (resigned July 2019)	Kjell-Arild Danielsen
Associate Professor Gregor Bachmann-Harildstad	Øystein Eskeland
Associate Professor Juha Silvola	Thorarinn Olafsson
Senior lecturer Erik S Lie	Tonje Caroline Øverby
Senior lecturer Harald Hrubos-Strøm (Department of Behavioural Medicine, UiO)	Ivar Vølstad
	Andreas Forsmark
	Jan Mikael Gerl
	Ingebjørg Skrindo
	Andreas Steinsvik
	Marit Austeng

The ENT research group has three sub groups: the otology group, the sleep disordered breathing (SDB) group and the rhinology group.

The otology group

Treatments for otitis media have not seen major changes since the 1950s. In chronic otitis media, structural defects - particularly perforations of the tympanic membrane - cause hearing impairment and chronic infections and are still treated with surgery. Our research aims to engineer new autologous tissue, either in vitro for subsequent implantation or directly in vivo. We have identified regenerative centers in the human tympanic membrane and are currently optimizing cultivation methods and assays to assess the properties of cultivated cells, as well as trying to develop in vitro-based activation of these centers. Tympanic stem cells investigations are partly done in close collaboration with the Ear Science Institute Australia.

The sleep disordered breathing (SDB) group

In SDB, current research is based on the Nordsleep Akershus Sleep Apnea (ASAP) cohorts, collaboration with neurosurgeon and professor Per Kristian Eide, University of Oslo and professor Bjørn Bjorvatn, University of Bergen. The sub group has external funding for two PhD students at the doctoral program at the University of Oslo, a research coordinator (20%) and a project leader (40%). The PhD students are supervised in collaboration with the rhinology group and with professor Toril Dammen and Pål Gulbrandsen, University of Oslo, respectively. The research is focused on developing a decision aid tool based on hard outcomes, understanding the role of upper airways in brain metabolite clearance, to evaluate novel sensors or diagnostic devices, to study shared decision making and to develop a personalized self-management tool. A medical student master thesis is co-supervised with professor Eide, and a medical student master thesis is supervised based on a quality register coordinated by the University of Bergen.

The rhinology group

In rhinology, the main focus is on endotype and phenotype of chronic rhinosinusitis (CRS). The projects are designed to investigate relations between CRS and biofilm and between biofilm related CRS and PROM's. Another project will be on the validation of a quality of life SNOT-22 questionnaire. A quality control database on the quality of life and on the outcome of nasal function after nasal septal surgery was established. A third project is on the evaluation of objective assessments of the nasal airway. Peak nasal inspiratory flow as objective parameter and nasal obstruction visual analogue scale as well as SNOT-22 will be performed in a large cohort both pre- and post-surgery. Further studies are planned as an interventional study for the emergency treatment of severe nosebleed and on surgical sites infections of nasal septal surgery. Finally, the group is involved with two large rhinological and allergological projects. One is the "PreventADALL study" and the other is an European collaboration developing "My Sinusitis Coach".

Publications (peer reviewed)

Moene CA, Hauge MBO, **Silvola JT, Bachmann-Harildstad G**. In vitro surface temperature of nasal balloons during hot water inflation* Rhinology Online, Vol 2: 64 -68, 2019.

Musk GC, Kershaw H, Tano K, Niklasson A, **von Unge M,** Dilley RJ. Reactions to Gudair® vaccination identified in sheep used for biomedical research. Aust Vet J. 2019 Mar;97(3):56-60.

Pöyhönen L, Kivekäs I, **Silvola JT**, Poe D, Rautiainen M. Mucociliary function of the Eustachian tube in the eustachian tube dysfunction. Acta Otolaryngol 2019.

Rehbinder EM, Advocaat Endre KM, Lødrup Carlsen KC, Asarnoj A, Stensby Bains KE, Berents TL, Carlsen KH, Gudmundsdóttir HK, Haugen G, Hedlin G, Kreyberg I, Nordhagen LS, Nordlund B, Saunders CM, Sandvik L, Skjerven HO, Söderhäll C, Staff AC, Vettukattil R, Værnesbranden MR, Landrø L; study group, Carlsen MH, Lødrup Carlsen OC, Granlund PA, Granum B, Götberg S, Hilde K, Jonassen CM, Nygaard UC, Rudi K, **Skrindo I,** Sjøborg K, Tedner SG, Wiik J, Winger AJ. Predicting Skin barrier Dysfunction and Atopic Dermatitis in Early Infancy. J Allergy Clin Immunol Pract. 2020 Feb; 8(2):664-673.e5.

Rødvik AK, Tvete O, Torkildsen JVK, Wie OB, Skaug I, **Silvola JT**. Consonant and Vowel Confusions in Well-Performing Children and Adolescents With Cochlear Implants, Measured by a Nonsense Syllable Repetition Test. Front Psychol. 2019 Aug 14;10:1813.

Rönnblom A, Gladiné K, Niklasson A, **von Unge M**, Dirckx J, Tano K. A New, Promising Experimental Ossicular Prosthesis: A Human Temporal Bone Study With Laser Doppler Vibrometry. Otol Neurotol. 2019 Dec 9.

Silvola JT, Sinkkonen ST, Wanscher J, Westman E, Holm NH, Ovesen T. The status of Eustachian tube balloon dilations in Nordic countries. World J Otorhinolaryngol Head Neck Surg. 2019 Oct 19;5(3):148-151.

Volstad I, Olafsson T, Steinsvik EA, Dahl FA, **Skrindo I, Bachmann-Harildstad G.** Minimal unilateral peak nasal inspiratory flow correlates with patient reported nasal obstruction. Rhinology. 2019 Dec 1;57(6):436-443.

Other publication

Skrindo I. Allergisk rhinitt og allergen immunterapi. Utposten 2019;2.

Abstracts and posters

Sleep Disordered Breathing

Hrubos-Strøm H. Persontilpassede behandlingsvalg ved nydiagnostisert søvnapné, oral abstract, SOVno Nasjonal søvnkonferanse, Solstrand, March 15.

Hrubos-Strøm H. Symptoms and significance in patients referred with suspected sleep apnea. Nordic Sleep Congress, Oslo, May 24.

Hrubos-Strøm H. Symptoms and significance in patients referred with suspected sleep apnea. The Norwegian Society of Otorhinolaryngology, Head & Neck Surgery, Annual meeting, Oslo, October 25.

Olafsson T, **Hrubos-Strøm H**. A validation study of an esophageal based polygraph against manually scored polysomnography. World Sleep Congress, Vancouver, Canada, September 22.

Rhinology

Vølstad I, Olafsson T, Steinsvik A, Dahl F, **Skrindo I, Bachmann-Harildstad G**.
Minimal unilateral peak nasal flow correlates with patient reported nasal obstruction.
The Norwegian Society of Otorhinolaryngology, Head & Neck Surgery, Annual meeting, Oslo, October 24-26.

Academic assignments

Opponent/member of adjudication committee
Opponent of the thesis: Pathogenesis of Narcolepsy after H1N1-vaccination - a neuroimaging and immunogenetic study. Hilde Therese Juvodden, University of Oslo, October 18. **Hrubos-Strøm H**.

Opponent of the thesis: "Mechanics of the middle ear: optical measurements and finite-element modeling. Physisist Kilian Gladinés, University of Antwerp, Belgium, September 17. **von Unge M**.

Opponent at mid-term evaluation
Lars Aastebøl Frøjd, mid-term evaluation of the project "Insomnia in coronary heart disease patients". University of Oslo, September 4. **Hrubos-Strøm H**.

Invited lecturer
Førerkort og søvn. To-års erfaring fra klinikken. LHL-konferanse, March 28. **Hrubos-Strøm H**.
Abels tårn. Har A- og B-mennesker forskjellige søvnfaser? NRK2, March 26. **Hrubos-Strøm H**.
Technologies to support Communication. OCHER meeting, January 17. **Hrubos-Strøm H**.

Arranged meetings
Skandinavisk Ørekirurgisk møte, Geilo. **Silvola J**.
Conference session Moderator of the "Young scientist session", Nordic Sleep Congress, Oslo, May 23-25. **Hrubos-Strøm H.**
CSF-leaks, the challenges. Roundtable. CEORL-HNS Brussels, July 3. Jorissen M (B), Kakker A. (US), Saleh H (UK), **Bachmann-Harildstad G**.

Other academic activities
Otology
Main supervisor for Andreas Forsmark, University of Oslo. **Silvola J**.
Main supervisor for Torstein Grønseth, University of Oslo. **Silvola J**.
Main supervisor for Arne Rødvik, University of Oslo. **Silvola J**.
Main supervisor for Atte Sjövall, University of Helsinki. **Silvola J**.
Supervisor for Benedikte Falkenberg-Jensen in her thesis "CT imaging of the cartilaginous Eustachian tube". University of Oslo, September 27. **Silvola J**.
Supervisor for Lena Pöyhönen, University of Tampere. **Silvola J**.
Supervisor for Andreas Forsmark, University of Oslo. **von Unge M**.
Supervisor for Anders Niklasson in his thesis "Malleus fracture. Experimental and clinical aspects". Umeå University, March 29. **von Unge M**.
Supervisor for Torstein Grønseth, University of Oslo. **von Unge M**.
Supervisor for Elnaz Sepehri, Karolinska Institute, Sweden. **von Unge M**.
Supervisor for Anton Rönnblom, Umeå University, Sweden. **von Unge M**.
Reviewer for The International Journal of Pediatric Otorhinolaryngology, Acta Otolaryngologica, Journal of Otology, Uppsala Journal for Medical Sciences och Laryngocope. **von Unge M**.
Editorial board member for The Journal of International Advanced Otology. **von Unge M**.

Sleep Disordered Breathing
Main supervisor for Thorarinn Olafsson, University of Oslo. **Hrubos-Strøm H**.
Supervisor for Tonje Caroline Øverby, University of Oslo. **Hrubos-Strøm H**.
Supervisor for medical student master project, Kaisa Filtvedt, University of Oslo. **Hrubos-Strøm H**.
Supervisor for medical student master project, Benedikte Berge, University of Oslo. **Hrubos-Strøm H**.

Rhinology

Main supervisor for Ivar Vølstad, University of Oslo. **Bachmann-Harildstad G**.
Supervisor for Kjell Arild Danielsen, University of Oslo. **Bachmann-Harildstad G**.
Supervisor for Øystein Eskeland, University of Oslo. **Bachmann-Harildstad G**.
Supervisors for Thorarinn Olafsson, University of Oslo. **Bachmann-Harildstad G**, **Steinsvik A**.

Memberships

Member of Editorial Board for Rhinology. **Bachmann-Harildstad G**.
Member of International Rhinologic Society Standardization Committee on Objective Assessment of the Nasal Airway – ISCOANA. European Rhinologic Society, London, **Bachmann-Harildstad G**.
Member of Deutsche Ärztegesellschaft für Akupunktur. **Bachmann-Harildstad G**.
Assigned member of the board and treasurer of the Norwegian Society for Sleep Research and Sleep Medicine. **Hrubos-Strøm H**.
Member of European Sleep Research Association. **Hrubos-Strøm H**.
Wice chairman NFAI (Norsk forening for allergologi og immunpatologi). **Skrindo I**.
NFA (Nordisk forening for allergologi). **Skrindo I**.
Member of EAACI (Europen Academy of Allergology and Clinical Immunology). **Skrindo I**.
Editorial board member of The Journal of International Advanced Otology and Uppsala Journal for Medical Sciences. **von Unge M**.
Member of the Advisory Board for Journal of International Advanced Otology. **von Unge M**.
Member of the Acta Otolaryngology Society. **von Unge M**.

Ongoing research projects

Otology

The cultivation of epidermal keratinocytes for improved treatment of tympanic membrane perforations
Peder Aabel MD PhD, Tor Paaske Utheim MD PhD (Oslo University Hospital), Torstein Lyberg MD PhD (Oslo University Hospital), Jon Roger Eidet MD PhD, Helge Rask-Anderssen Professor MD PhD (University of Uppsala), Magnus von Unge Professor MD PhD.

Background: Permanent tympanic membrane perforations cause ear draining and hearing impairment. Though the treatment modalities have not evolved in nearly a century, tissue engineering has recently become possible and may become a better modality with cell-based therapy in certain patient groups. However, a more thorough understanding of the normal regeneration of the eardrum is necessary.
Aim: To study cultivated stem cells from human tympanic membranes and assess their phenotype, genetic, proteomics and functional characteristics.
Methods: Cells from the skin and eardrum are grown in cell cultures in optimized growth conditions. The cultured tissue is examined for morphology, phenotypes, viability, and a variety of gene, protein and enzyme expression.
Status: The last publication of this PhD prosject was published in 2019 and the candidate defended his thesis in November 2018.

The Constitutive Migration of the Tympanic Keratinocytes
Andreas Hassel Forsmark MD, Juha Silvola Associate Professor MD PhD, Hilde Nilsen Professor (EpiGen), Magnus von Unge Professor MD PhD, Peder Aabel MD PhD.

Background: Permanent tympanic membrane perforations cause ear draining and hearing impairment. The TM keratinocytes migration is critical in reparation of the perforations. By studying the migrational properties on a macroscopic and molecular level we hope to obtain a better understanding of their function and subsequently help develop a less invasive treatment.

Aim: Characterize the tympanic membrane (TM) keratinocyte's migration in terms of speed, linearity and collective migration behavior. Demonstrate the effectors and upstream regulatory molecular mechanisms responsible for the constitutive migration of the TM keratinocytes. Explore how growth substrate and bioactive supplements influence the migration of cells TM keratinocytes.
Methods: Tympanic membrane cells and control cells from skin will be cultured in vitro, and migration will be assessed using live imaging facilities at EpiGen at Campus Ahus. By knocking in/out suspected genes and using different substrates their effect on migration will be evaluated.
Status: The project has obtained approval from the Regional Ethics Committee. The PhD-student, Andreas Forsmark, has set up the live imaging equipment and started training in the cell lab. He has also enrolled in the PhD-program at the University of Oslo and started on courses. The candidate has his obligatory resident training at Oslo University Hospital and is back in 2020.

Assessment of the epithelial regeneration centers in the human tympanic membrane in normal and activated conditions
Elnaz Sepehri MD (Karolinska Institute and University of Oslo), Peder Aabel MD PhD, P.O. Eriksson MD PhD (University of Uppsala), Hilde Nilsen Professor (EpiGen), Magnus von Unge Professor MD PhD.

Background: This is a structural and functional study of the regeneration centers in the epithelium of the human tympanic membrane. Please see the background in the study description above.
Aim: To create a basis of knowledge for tissue engineering.
Methods: Fresh human material and immunohistochemical and ultra structural methods are used to identify regeneration centers and assess their activation patterns in response to experimental trauma.
Status: Manuscript showing early cellular signs of activation in the tympanic membrane epithelium is published. The project is transferred to EpiGen, Akershus University Hospital. The candidate has maternal vacation and the project will go on in 2020.

Laser-Doppler vibrometry: Intra-operative measurement of hearing bone mobility, development of a minimally invasive intraoperative vibrometry method (MIVIB)
Jeremy Wales MD PhD (Karolinska University Hospital), Juha Silvola Associate Professor MD PhD, Joris Dirckx Professor PhD (University of Antwerp), Magnus von Unge Professor MD PhD.

Background: Intra-operative assessment of hearing ossicle mobility in a partial fixation situation may help to direct the surgeon in choosing the most favourable technical solution in regards to the hearing outcome of the surgery.
Aim: To develop an intra-operative device to measure hearing bone mobility.
Methods: A laser-Doppler vibrometry method was evaluated in animal skulls and human temporal bones. An electromagnetic system was developed and software adjusted to simulate the outermost hearing bone (i.e., the hammer) with calibrated signals. The vibration velocity was measured at various points on the chain of hearing bones. Eventually was a floating mass transducer introduced into the model to replace the electromagnetic stimulation system.
Status: Final adjustments of the hardware and software are ongoing in the in vitro situation performed on fresh human temporal bones. A methods development has been successful in the design of a clinically practical vibrometry method. Recently published in Hearing Research. Results have been presented at several international conferences and in articles. The study is ready for the clinical phase in 2020.

Fractures of the ossicular bones – an experimental study on the healing processes
Anders Niklasson MD, PhD-student, Krister Tano MD PhD, Magnus von Unge Professor MD PhD.

Background: Fractures on the handle of malleus are rare and therefore sometimes misjudged in the clinic. They cause hearing impairment. In experimental temporal bone studies different surgical repair methods were performed and the optimal surgical methods identified. Ossicular bone differs in some respects from common cortical bone and their repair processes are not clarified.
Aim: The healing process of experimental fractures on ossicles an an animal model will be assessed and compared with common type of bone.
Methods: Experimental fractures were made in sheep middle ear ossicles and on nasal and mandibular bone at the Veterinarian faculty of the University of Western Australia in Perth. The animals withstood the surgery well. After an observation time of 4 weeks biopsies were harvested from fracture sites. Assessment with micro-CT scan, optical coherence tomography and histology is ongoing. Then specific markers for repair processes in bone are studied in the specimen.
Status: Results under analysis. Dissertation in March 2019 at Umeå University, Sweden.

Staphylococcus biofilm in otitis media chronica
Torstein Grønseth MD, PhD-student, Magnus von Unge Professor MD PhD, Juha Silvola Associate Professor MD PhD.

Background: Biofilms can be the main source of recidivism for infections in otitis media chronica and cholesteatoma. These are often difficult to treat with systemic or even with local antimicrobial agents. This can lead to development of multiresistent bacterial strains. The two main bacteria are Staphylococcus aureus and Pseudomonas aeruginosa. The main research objective is St.aureus and three articles which will lead to academic dissertation.
Aim: To investigate different treatment methods against biofilm in otitis media chronica.
Methods: Growth of biofilm from otitis media chronica and to test other methods than antibiotics to eradicate biofilm.
Status: The first article is published, the second is submitted and the third will be completed in 2020. The animal study part started in December 2019.

Nonsense words as a hearing test for cochlear implanted adults and children
Arne Rødvik CI, PhD-student, Ona Bøe Wie Professor (Institute for Special pedagogic, University of Oslo), Janne von Koss Torkildsen Associate Professor (Institute for Special pedagogic, University of Oslo), Juha Silvola Associate Professor MD PhD.

Background: Nonsense words are little used but very effective way to investigate hearing on the phoneme level.
Aim: The aim is to investigate how nonsense words can be used as a hearing measurement tool for pediatric and adult cochlear implanted patients. The goal is three articles that make the PhD thesis.
Methods: First article is a review and meta-analyze on nonsense words. The goal for the second article is to test nonsense words as a hearing test for adults. The goal for the third article is to test nonsense words as a hearing test for children.
Status: Review and meta-analyze article is published, adult article is submitted, and pediatric article is complete manuscript. The candidate has submitted the thesis to the University of Oslo in October 2019.

Sleep Disordered Breathing

Akershus Sleep Apnea Diagnostic and Treatment Evaluation (ASADaTE), diagnostic part
Thorarinn Olafsson MD, Eivind Andreas S. Steinsvik MD PhD, Svetislav Mitic MD, Gregor Bachmann-Harildstad Associated Professor MD PhD, Harald Hrubos-Strøm Associated Professor MD PhD.

Background: Diagnostic properties of the ApneaGraph Spiro have not been validated.
Aims: To compare diagnostic properties of «Apneagraph Spiro» with automatically and manually scored polysomnography. To explore differences in objective sleep registrations between patients with and without chronic rhinosinusitis.
Methods: Consecutive patients referred because of suspected OSA (male or female, aged 18–80 yrs) were eligible for inclusion. Eighty three patients have been examined by double sleep registration with polysomnography and Apneagraph Spiro. Polysomnography data have been scored by a rater blinded for patient characteristics. Chronic rhinosinusitis was assessed by the Sino Nasal Outcome Test (SNOT) 22 and clinical evaluation.
Status: Data acquisition completed for the diagnostic study, manuscripts are in progress.

Nord Sleep Akershus Sleep Apnea Personalized medicine (ASAP) cohorts
Svetislav Mitic MD, Gunnar Einvik MD PhD, Anna Randby MD PhD, Pål Gulbrandsen Professor MD PhD, Toril Dammen Professor MD PhD, Harald Hrubos-Strøm Associated Professor MD PhD.

Background: There is a need for novel treatment methods for sleep onset insomnia, a disorder often co-morbid with sleep apnea. There is a potential value of sleep registrations in predicting continuous positive airway pressure (CPAP) adherence, cardiovascular events and sleepiness related traffic incidents. Shared decision making between doctors and patients with sleep apnea may increase treatment adherence with CPAP.
Aims: To conduct a feasibility study of a novel treatment method for sleep onset insomnia. To explore baseline sleep characteristics associated with cardiovascular events and traffic accidents.
To assess the relation between shared decision making and CPAP adherence and to develop a personalized risk communication tool.
Methods: Participants with sleep onset insomnia will be invited to try a novel treatment device based on electroencephalographic neurofeedback. The materials consists of 535 persons included in the Akershus Sleep Apnea Project between 2006-2008 and a sample of 276 persons included in the Akershus Sleep Apnea Diagnostic and Treatment Evaluation between 2015-2016. A sub sample of the 100 first, consecutive persons with BMI >30 and AHI ≥ 5 included in the latter were video filmed during the discharge consultation. Outcomes will be assessed after approximately 12-13 months and 4 years respectively. Independent variables will be explored with artificial intelligence.
Status: A PhD student and a research nurse are employed. Data collection is coordinated in collaboration with the Division of medicine. First patient included in January 2020.

Rhinology

The distribution and prevalence of biofilm in chronic rhinosinusitis with or without polyposis nasi
Kjell-Arild Danielsen MD, Øystein Eskeland MD, Katrin Fridrich MD PhD, Vivian Orszagh MD, Gregor Bachmann-Harildstad MD PhD, Espen Burum-Auensen MD PhD.

Background: Since biofilm presents a relatively new explanatory model for chronic infectious diseases, its role in chronic rhinosinusitis is still unresolved.
Aim: To assess the correlation between the presence of biofilm in different types of chronic rhinosinusitis and signs of chronic inflammation in the nasal sinuses.

Methods: Biopsies were harvested and stored, thereafter studied with confocal microscopy. The findings were correlated with clinical symptom scores, follow-up data at 6 months, and histologic parameters for inflammation.
Status: The candidate wrote and corrected the thesis according to the comments of the first evaluating committee. A second evaluation committee approved the manuscript and the candidate defended the thesis on June 11th 2020 with Tom Øresland as representative for the dean.
One of the candidates lacks one paper only; however, we have a challenge to organize research time and further motivation for him in writing the last article.

Thermal balloon treatment for epistaxis. A prospective, randomized interventional study in emergency hospital care
Lise Carine Moene Johansen MD, Mats Hauge MD, Juha Silvola Associated Professor MD PhD, Gregor Bachmann-Harildstad Associated Professor MD PhD.

Background: About 24.6 % of all emergency hospital admissions at an Ear-nose and throat (ENT) unit are related to acute epistaxis. The incidence has risen over the last 15 years.
Aim: To determine the lengths of hospital stay, the rate of invasive surgical interventions, the rate of RBC transfusions and the rate of re-admissions with hot water vs cold water nasal balloon as emergency treatment for posterior epistaxis.
Method: This prospective and controlled study will include adult patients admitted to hospital care because of posterior epistaxis. As randomized intervention hot water vs standard temperature nasal balloon emergency treatment is given.
Status: The regional ethical committee did not approve the study, further risk factors needs to be clarified. The candidate now works at Lovisenberg hospital.

The assessment of the nasal airway by PNIF and quality of life in patients with nasal obstruction
Ivar Vølstad MD, Eivind Andreas Svabøe Steinsvik MD PhD, Ingebjørg Skrindo MD PhD, Gregor Bachmann-Harildstad Associated Professor MD PhD.

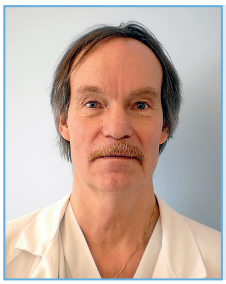
Background: The assessment of the nasal airway is complex and connected to both objective and subjective factors.
Aim: To determine the value of bilateral and unilateral as well as decongested peak nasal inspiratory flow.
Method: This prospective and controlled study will include data from the nasal and paranasal register at ENT-department, Ahus.
Status: The regional ethical committee approved the study and we published a first paper. We work on the second paper on the effect of nasal septal surgery. The candidate now works at Lovisenberg hospital.

PreventADALL: Is asthma or rhinitis in young children reduced in children subjected to primary prevention of atopic dermatitis and/or food allergy?
Anine Lie MD (Oslo University Hospital), Ingebjørg Skrindo MD PhD, Karin Lødrup Carlsen Professor MD PhD (Oslo University Hospital), Håvard O. Skjerven MD PhD (Oslo University Hospital).

Background: The atopic march suggests that atopic dermatitis and/or sensitization to food allergens may lead to development of other allergic diseases in childhood.
Aim: To determine if asthma and rhinitis in pre-school children is reduced in children subjected to primary intervention of the two commonly earlies manifestations of allergic diseases; namely atopic dermatitis (AD) and food allergy.
Method: Data from the first three years of the children in the PreventADALL study will provide the basis for analyses.
Status: 36-months examinations ongoing.

Granted Funding

Project	Source	Amount
Printers for 3D printer lab. In collaboration with Department of Orthopaedic Surgery and Department of Digestive Surgery *Silvola J.*	University of Oslo	600,700 NOK
Holomonitor *Silvola J, von Unge M.*	University of Oslo	600,000 NOK
Nord Sleep ASAP *Hrubos-Strøm H.*	Forskningsrådet (2019-2023)	7,200,000 NOK



Gastrointestinal Surgery Research Group

Head: Professor Ola Røkke

Department of GI surgery

University employees:	Research fellows:
Professor I Tom Øresland (Resigned July 2019)	Yngve Thorsen
Professor II Ola Røkke	Robin Gaupset
Professor II Dejan Ignjatovic	Gurpreet Singh Banipal
Professor emeritus Arne Olav Bakka	Kourosh Piroozmand
Lecturer Javier Luzon	Yasir Malik
	Anne Helene Lilleaas

At the department of digestive surgery there are 45 doctors, 14 have doctorial thesis at the end of 2019: Tom Øresland, Arne Bakka, Ola Røkke, Dejan Ignjatovic, Rolf Aamodt, Arne Færden, Nazir Naimy, Geir Arne Larsen, Marianne Merok, Lars Eftang, Odd Langbach, Lara Pasovic, Andreas Habberstad, Johannes Schultz.

We consider research as an important part of our clinical practice. Science should be a conscious part of the clinical work for all employees at our department. Doctors not directly involved in research programs should be aware of the importance of ongoing project and contribute when possible. The plans for 2020 will be to continue to promote scientific work through regular discussions in clinical practice, regular meetings, attendance on scientific meetings and seminars, increase the efforts to obtain external financial resources, and initiation of PhD-projects, with a special focus on three subjects:

1) Cancer: colorectal, gastric, small bowel
2) Development of surgical techniques and virtual anatomic equipment
3) Pancreatic diseases, especially acute pancreatitis
4) Surgical management of inflammatory bowel disease and diverticulitis

Dissertation

Catherine Joyce P. Teig
Translation and application of condition-specific health-related quality of life questionnaires for women with pelvic organ prolapse and pelvic floor dysfunction in the Norwegian context
Supervisors: Marie Ellstrøm Engh, Tom Øresland and Angelita Martini
Graduation: December 17, 2019

Introduction: The goal was to translate to Norwegian, and validate, short versions of the Pelvic Floor Distress Inventory (PFDI-20) and Pelvic Floor Impact Questionnaire (PFIQ-7) using a sample of women with symptomatic POP and pelvic floor dysfunction. For translation and cross-cultural adaptation of the PFDI-20 and PFIQ-7, a new methodology was developed using the Delphi method approach with a bilingual expert panel.
Method: The PFDI-20 and PFIQ-7 were first translated from English into Norwegian using a multistep translation and cultural adaptation method. This new method combined the European Organisation for Research and Treatment of Cancer (EORTC) Quality of Life Group guidelines, the Delphi method, and an expert panel review. It involved two independent forward and back-translations, with the addition of the Delphi method (anonymous voting, controlled feedback, statistical group response) to establish consensus on translated items among a bilingual pelvic floor expert panel. The translated instruments were then pilot tested through face-to-face semi-structured interviews with 20 women with symptomatic POP. A total of 205 Norwegian women with symptomatic POP (with or without urinary or bowel dysfunction) completed the questionnaires; 50 completed them again after 1 to 3 weeks, and 76 completed them again 6 months after surgery. The median age of the sample was 61 years (range, 27–82 years). Reliability, validity, and responsiveness were evaluated. Additionally, interpretability, smallest detectable change, standard error of measurement, floor and ceiling effects, and percentage of missing items were reported.
Results: This new translation and cultural adaptation method produced a Norwegian PFDI-20 and PFIQ-7 Intermediate Version 2.0 that demonstrated semantic, conceptual, idiomatic, and experiential equivalence with the original versions. This Intermediate Version 2.0 was then ready for pilot testing. During the pilot test minor discrepancies were identified and amended to produce a Norwegian PFDI-20 and PFIQ-7 Intermediate Version 3.0 that was ready for validation. Cronbach's alpha ranged from 0.66 to 0.93, and intraclass correlation coefficients ranged from 0.85 to 0.94. Both construct validity and responsiveness were noted to be adequate. Responsiveness was further supported for PFDI-20 with areas under the curve above 0.70. Estimates were lower for PFIQ-7. Smallest detectable change at the individual level constituted 15% to 21% and 17% to 27% for the PFDI-20 and PFIQ-7, respectively. The absolute value for Minimal Important Change for total scores was 48 and 47 for the PFDI-20 and PFIQ-7, respectively. No floor or ceiling effects were evident in the PFDI-20 and PFIQ-7 total score distributions.
Conclusions: Efforts to ensure a good translation and cross-cultural adaptation of the PFDI-20 and PFIQ-7 resulted in the development of a new study methodology, which used the Delphi method with a bilingual expert pelvic floor panel. The controlled feedback approach, the iterative nature and internal logic of the Delphi consensus method appeared to contribute to improving translation results and ensuring good cross-cultural adaptation of the questionnaires. The translated questionnaires provided adequate reliability, validity and good responsiveness to change. These short versions of the Pelvic Floor Distress Inventory (PFDI-20) and Pelvic Floor Impact Questionnaire (PFIQ-7) are robust measuring instruments that will enable symptom severity and health-related quality of life to be evaluated in the Norwegian context.

Awards

Javier Luzon: Awarded Akershus University Hospital's "Fremragende forskningspris 2019" for the publication: Luzon JA, Kumar RP, Stimec BV, Elle OJ, Bakka AO, Edwin B, Ignjatovic D. Semi-automated vs. manual 3D reconstruction of central mesenteric vascular models: the surgeon's verdict. Surg Endosc. 2019 Nov 19.

Javier Luzon: Awarded participation at the research management and supervision course in 2019, organized by the University of Oslo.

Lara Pasovic: Awarded best video presentation "Bedre enn Leonardo". The Norwegian Surgical Society Annual Meeting, Oslo, October 2019.

Javier Luzon (second from left) was awarded Outstanding Research Award 2019.

Publications (peer reviewed)

Augestad KM, Butt K, **Ignjatovic D**, Keller DS, Kiran R.Video-based coaching in surgical education: a systematic review and meta-analysis. Surg Endosc. 2020 Feb;34(2):521-535. Epub 2019 Nov 20. Review.

Azhar N, Kulstad H, Pålsson B, **Schultz JK**, Lydrup ML, Buchwald P. Acute uncomplicated diverticulitis managed without antibiotics - difficult to introduce a new treatment protocol but few complications. Scand J Gastroenterol. 2019 Jan;54(1):64-68.

Dickson EA, Penna M, Cunningham C, Ratcliffe FM, Chantler J, Crabtree NA, Tuynman JB, Albert MR, Monson JRT, Hompes R; International TaTME Registry Collaborative (including **Faerden AE**). Carbon Dioxide Embolism Associated With Transanal Total Mesorectal Excision Surgery: A Report From the International Registries. Dis Colon Rectum. 2019 Jul;62(7):794-801.

GlobalSurg Collaborative (including **Banipal GS**, **Schultz JK**). Pooled analysis of WHO Surgical Safety Checklist use and mortality after emergency laparotomy. Br J Surg. 2019 Jan;106(2):e103-e112.

GlobalSurg Collaborative (including **Banipal GS**, **Schultz JK**). Global variation in anastomosis and end colostomy formation following left-sided colorectal resection. BJS Open. 2019 Feb 28;3(3):403-414.

Luzon JA, Kumar RP, Stimec BV, Elle OJ, **Bakka AO**, Edwin B, **Ignjatovic D**.
Semi-automated vs. manual 3D reconstruction of central mesenteric vascular models: the surgeon's verdict. Surg Endosc. 2019 Nov 19.

Nesgaard JM, Stimec BV, Edwin B, **Bakka AO**, **Ignjatovic D**. The Right Colectomy for Cancer (RCC) Study Group. CT and operative images for evaluation of right colectomy with extended D3 mesenterectomy anterior and posterior to themesenteric vessels. Eur Surg
https://doi.org/10.1007/s10353-019-0604-y.

Nesgaard JM, Stimec BV, **Bakka AO**, Edwin B, Bergamaschi R, **Ignjatovic D.** Right Colectomy with Extended D3 Mesenterectomy: Anterior and Posterior to the Mesenteric Vessels. Surg Technol Int. 2019 Nov 10;35:138-142.

Oresland T, **Faerden AE**. The transcutaneous implant evacuation system, the TIES device.
Colorectal Dis. 2019 Jun;21(6):723-724.

Penna M, Hompes R, Arnold S, Wynn G, Austin R, Warusavitarne J, Moran B, Hanna GB, Mortensen NJ, Tekkis PP; International TaTME Registry Collaborative (including
Faerden AE). Incidence and Risk Factors for Anastomotic Failure in 1594 Patients Treated by Transanal Total Mesorectal Excision: Results From the International TaTME Registry.
Ann Surg. 2019 Apr;269(4):700-711.

Sylla P, Knol JJ, D'Andrea AP, Perez RO, Atallah SB, Penna M, Hompes R, Wolthuis A, Rouanet P, Fingerhut A; International taTME Urethral Injury Collaborative (including **Faerden AE**). Urethral Injury and Other Urologic Injuries During Transanal Total Mesorectal Excision: An International Collaborative Study. Ann Surg. 2019 Sep 17.

Thorsen Y, Stimec BV, Lindstrom JC, **Ignjatovic D**. The effect of vascular anatomy and gender on bowel function after right colectomy with extended D3-mesenterectomy. Ann Laparosc Endosc Surg 2019;4:71.

Thorsen Y, Stimec BV, Lindstrom JC, Nesgaard JM, **Oresland T**, **Ignjatovic D**. Bowel Motility After Injury to the Superior Mesenteric Plexus During D3 Extended Mesenterectomy. J Surg Res. 2019 Jul;239:115-124.

2015 European Society of Coloproctology (ESCP) collaborating group (including **Brun M**, **Helgeland M**, **Ignjatovic D**, **Yousefi P**, **Øresland T**). Patients with Crohn's disease have longer post-operative in-hospital stay than patients with colon cancer but no difference in complications' rate. World J Gastrointest Surg. 2019 May 27;11(5):261-270.

Wasmuth HH, **Faerden AE**, Myklebust TÅ, Pfeffer F, Norderval S, **Riis R**, Olsen OC, Lambrecht JR, Kørner H, Larsen SG; Norwegian TaTME Collaborative Group, on behalf of the Norwegian Colorectal Cancer Group, Forsmo HM, Baekkelund O, Lavik S, Knapp JC, Sjo O, Rashid G. Transanal total mesorectal excision for rectal cancer has been suspended in Norway. Br J Surg. 2020 Jan;107(1):121-130. Epub 2019 Dec 5.

Abstracts and posters

Christensen NH, **Larsen GA**, **Schultz J**. Kan bruk av Triclosan-dekkede suturer i fascienivå redusere antall postoperative sårinfeksjoner? The Norwegian Surgical Society Annual Meeting, Oslo, October 2019.

Gaupset R, **Eftang L.** Collis plastikk ved kort øsofagus – en glemt prosedyre? The Norwegian Surgical Society Annual Meeting, Oslo, October 2019.

Pasovic L, **Eftang L**, Fridrich K, **Gaupset R**. Glomustumor i ventrikkel: En kasusrapport. The Norwegian Surgical Society Annual Meeting, Oslo, October 2019.

Pasovic L, **Ignjatovic D**. Bedre enn Leonardo! The Norwegian Surgical Society Annual Meeting, Oslo, October 2019.

Volden M, Bøhler H, **Granheim T**, Årstein HM, Nygård T. Older workers give the Organization Quality and Safety. International Forum on Quality and Safety in Healthcare, Glasgow, March 2019.

Wasmuth HH, **Færden AE**, Myklebust TÅ, **Riis R**, Pfeffer F, Olsen OC, Lambrecht J, Knapp JC, Norderval S, Larsen SG. Transanal total mesorektal eksisjon (TaTME) i Norge. Audit. The Norwegian Surgical Society Annual Meeting, Oslo, October 2019.

Academic assignments

Opponent/member of adjudication committee
Opponent on the thesis: Towards a more individualised treatment of patients with gastrointestinal stromal tumour. Ivar Hompland, Oslo University Hospital, October 26. **Røkke O**.

Opponent on the thesis: Follow-up and survivorship after colorectal cancer. Ida Hovdenak Jacobsen, Aarhus University, Århus, September 7. **Øresland T**.

Invited lecturer
Personalized colon cancer surgery with medical holograms. The HoloCare Conference: A paradigm shift in personalized medicine. Oslo Science Park, March 2019. **Luzon J**.

Personalized colon cancer surgery with anatomic holographic images as an innovative visual tool for surgeons. Vitalis conference-Nordic leading E-health meeting, Gothenburg, May 2019. **Luzon J**.

Javier Luzon presenting at the Vitalis E-health conference in Sweden.

ESCP Update. The Norwegian Surgical Society Annual Meeting, Oslo, October 2019. **Schultz J**.

IBD surgery then, now and tomorrow. IBD symposium, The Norwegian Surgical Society Annual Meeting, Oslo, October 2019. **Øresland T**.

Arranged meetings

The 9th Ahus Colorectal Symposium. «It's all about the mesentery...». Akershus University Hospital, January 24-25. **Ignjatovic D.**
Postgraduate course in bowel diseases. Akershus University Hospital, April 1-3. Jahnsen J, **Schultz JK**.
The 4th IBD Nordic Conference. Malmø, November 28-29. **Øresland T**.

Other academic activities

Main supervisor for Jens Marius Næsgaard, Vestfold Hospital Trust. **Ignjatovic D**.
Main supervisor for Yngve Thorsen, Akershus University Hospital. **Ignjatovic D**.
Main supervisor for Javier A. Luzon, University of Oslo. **Ignjatovic D**.
Main supervisor for Gurpreet Singh Banipal, Akershus University Hospital. **Ignjatovic D**.
Main supervisor for Anne Helene Lilleaas, Akershus University Hospital. **Ignjatovic D**.
Main supervisor for Robin Gaupset, Akershus University Hospital. **Røkke O**.
Main supervisor for Kourosh Piroozmand, Akershus University Hospital. **Røkke O**.
Main supervisor for Olof Vinge-Holmquist, Akershus University Hospital. **Røkke O**.
Main supervisor for Yasir Malik, Akershus University Hospital. **Schultz J**.
Co-supervisor for Javier A. Luzon, University of Oslo. **Bakka AO**.
Co-supervisor for Gurpreet Singh Banipal, Akershus University Hospital. **Bakka AO**.
Co-supervisor for Jens Marius Næsgaard, Vestfold Hospital Trust. **Bakka AO**.
Co-supervisor for Robin Gaupset, Akershus University Hospital. **Eftang L**.

Co-supervisor for Yasir Malik, Akershus University Hospital. **Færden AE**.
Co-supervisor for Robin Gaupset, Akershus University Hospital. **Ignjatovic D**.
Co-supervisor for Yasir Malik, Akershus University Hospital. **Ignjatovic D**.
Co-supervisor for Najia Azhar, Lund University. **Schultz J**.
Co-supervisor for Catherine Planke Teig, Akershus University Hospital. **Øresland T**.
Co-supervisor for Yngve Thorsen, Akershus University Hospital. **Øresland T**.
Co-supervisor for Mathilde Risopatron, University of Oslo. **Øresland T**.
Co-supervisor for Anders Telle Hoel, University of Oslo. **Øresland T**.
Editor of IBD Congress News. **Øresland T**.
Editorial Advisory board member Colorectal Disease. **Øresland T**.
Editorial board member Scandinavian Journal of Gastroenterology. **Øresland T**.
Member of Steering Committee, ALASCCA. **Øresland T**.
Reviewer for Diseases of the Colon & Rectum and Colorectal diseases. **Ignjatovic D**.
Reviewer for Br J Surgery, Scand J Gastroent, Colorectal Disease. **Schultz J**.
Reviewer for Br J Surgery, Scand J Gastroent, JCC, Colorectal Disease, Alimentary Pharmacology and Therapeutics. **Øresland T**.

Memberships
Elected member of the International Surgical Group (ISG). **Bakka AO**.
S-ECCO consensus participant. **Færden AE**.
Member of the Norwegian Gastrointestinal Cancer Group – Colorectal. **Færden AE**.
Member of the group responsible for the revised national colorectal strategy plan. **Færden AE**.
Member of the Research Committee European Association of Endoscopic Surgery EAES. **Ignjatovic D**.
Members of the Norwegian National Registry for Anal Incontinence (NRA). Naimy N, Teig CP, **Øresland T**.
European Society of Coloproctology National representative. **Schultz J**.
Editorial Advisory board member Colorectal Disease. **Schultz J**.
Member of the Norwegian Research Network Group for Incontinence and Pelvic Floor Dysfunctions. **Teig CP**.
Elected member of The International Society for the study of IBD (IOIBD) and the Swedish SOIBD. **Øresland T**.
Editorial Advisory board member Colorectal Disease. **Øresland T**.
Editorial board member Scandinavian Journal of gastroenterology. **Øresland T**.

Ongoing research projects

Scandinavian Diverticulitis Trial (www.scandiv.com)
Johannes Kurt Schultz MD PhD, Sheraz Yaqub MD PhD (Oslo University Hospital), Tom Øresland Professor MD PhD, et al.

Background: Urgent sigmoid resection for acute perforated diverticulitis with purulent peritonitis has a high morbidity and mortality. Previous, non randomized patient series have reported a better outcome for patients treated by laparoscopic peritoneal lavage.
Aim: To compare primary sigmoid resection with laparoscopic lavage as treatment for acute perforated diverticulitis.
Methods: The design is pragmatic. 21 Swedish and Norwegian hospitals participate. All patients presenting with CT-confirmed perforated diverticulitis were eligible. We intend to include 150 patients divided in the two arms. The main end-point is severe postoperative complications within 90 days.
Current status: The primary outcome and other main 90-day results have been published in JAMA in 2015. One-year results have been published in BJS in 2017. These two publications were a central part of Johannes Schultz' PhD thesis published in 2018. Long-term follow-up with a median follow-up time of 59 months was presented as one of the six best abstracts at the European society of coloproctology (ESCP)

meeting in Vienna. This long-term follow-up is part of a PhD project at the University of Malmö were Johannes Schultz is co-supervisor. Additionally, a spin-off project investigating all CT scans taken during the study are conducted in collaboration with Västerås Lasarett. Data collection for this project is complete. Another collaboration with the university of Malmö and the University of Amsterdam was started which will merge data from the SCANDIV trial and the similar Dutch Lola trial with the aim to identify factors predicting bad outcome with laparoscopic lavage.
The follow-up project SCANDIV II, conducted together with the collaborators from the SCANDIV trial, is a prospective observational study to look at all stages of perforated diverticulitis and the final version of the protocol has been approved by the Regional Ethics Committees in Norway and Sweden. The first patients have been enrolled in SCANDIV II in Sweden in 2018. In Norway we have been working on the online CRF solution which is now up and running and inclusion has started at Ahus.

What is the value of colonoscopy or CT colography after uncomplicated diverticulitis?
Najia Azhar MD (Lund University), Sheraz Yaqub MD PhD (Oslo University Hospital), Tom Øresland Professor MD PhD, Tommy Schyman (Skåne University Hospital, Malmø), Pamela Buchwald MD PhD (Skåne University Hospital, Malmø), Johannes Kurt Schultz MD PhD.

Background: Abdominal computed tomography (CT) has become the investigation of choice for suspected colon diverticulitis mainly to confirm the diagnosis. It might be that this CT examination also can rule out colorectal cancer (CRC) which is the feared differential diagnosis.
Aim: To evaluate the necessity of traditional colon examination after one episode with CT-confirmed acute uncomplicated diverticulitis.
Methods: Medical records of all patients in Norway diagnosed with CRC within one year after hospitalization for diverticular disease between 2007 and 2010 were reviewed to calculate the frequency of misdiagnosed CRC in patients with CT-confirmed acute diverticulitis.
Current status: The project was completed in 2019 together with collaborators in Malmø and a manuscript with the results was submitted in 2019. The paper has now been published in Colorectal disease.

Tailoring chemotherapy and surgical treatment for colon cancer to the patient and not vice versa
PhD Project Yasir Malik MD.
Main supervisor: Johannes Kurt Schultz MD PhD.
Co-Supervisors: Dejan Ignjatovic MD PhD, Arne Engebreth Færden MD PhD.

The project consists of three studies:

1) Does better quality surgery have the potential to replace adjuvant chemotherapy in a selected group of Dukes C patients?

Introduction: The evidence found in favor of adjuvant chemotherapy is relatively old. Surgery has evolved since the 80's when the two previously mentioned studies were published. It is likely that this evolution of surgery (improved techniques combined with more radical lymphadenectomy) and more dedicated pathological examination of the specimen have led to a considerable stage migration. It is uncertain whether the increased lymph node harvest has had any impact on the overall survival for Stage III cancer patients and whether the role of adjuvant chemotherapy in this patient group should be reconsidered.
Aim: To compare recurrence rates and survival after surgery for stage III colon cancer in patients who did/did not receive adjuvant chemotherapy. Further the impact of quality of surgery, tumor stage and vascular invasion will be assessed.
Methodology: Data for this single center cohort study is collected from electronic patient files. Dukes C patients were identified through the pathologist's code register. All patients with the code for Colon (T67) and either adenocarcinoma (M81403) or mucinous adenocarcinoma (M84803) codes treated from

31.12.2005 to 31.12.2015 were identified. All of these patients who at the same time period were registered with Lymph node (T08) and metastasis of adenocarcinoma (M81406) or mucinous adenocarcinoma (M84803) were included in the trial.
Study status: The study is completed and a paper has been published in September 2020 in the "Journal of cancer research and clinical oncology".

2) Long-term effects of adjuvant chemotherapy on Quality of life (QoL) in recurrence free patients operated for colon cancer

Introduction: Surgery alone can cure colorectal cancer for the majority of Stage I and stage II patients. Trials from the late 80's and early 90's showed a considerable improvement in survival after adjuvant chemotherapy in stage III colon cancer. Adjuvant chemotherapy has since been standard of care for this patient group. FOLFOX (leucovorin, fluorouracil, and oxaliplatin) were introduced after the MOSAIC trial showed increased overall survival. Despite the efficacy of FOLFOX treatment for stage III colon cancer, this treatment is associated with a significant increase of cost, toxicity and changes in QoL. Common short-term side effects include hair loss, mouth ulcerations, loss of appetite, nausea and vomiting, diarrhoea, immune suppression, bleeding tendency, allergic or sensitivity reactions and hand-foot syndrome whereas fatigue and neuropathy can be long term side effects. In particular, oxaliplatin-induced cumulative dose-dependent neurotoxicity is a very relevant issue. Peripheral neuropathy was reported for 92.1% of patients receiving treatments, and the incidence of grade 3 neurotoxicity 1 year after completion was estimated to be 12% in the MOSAIC trial. Approximately 50% of patients suffered from grade 1 or 2 neurotoxicity in the second post-treatment year.
For rectal cancer there is less support in the literature for adjuvant chemotherapy and this has not been standard in Norway until now. However, chemotherapy in combination with radiation is often used in a neoadjuvant setting for rectal cancer with the aim to reduce local recurrences.
Aim: To investigate short-term and long-term QoL after curative treatment of colon cancer and rectum cancer to explore the impact of chemotherapy on QoL.
Methodology: All patients operated in Norway for colorectal cancer between 31.09.2007 and 01.10.2015 up to 75 years of age will be identified through the Norwegian cancer registry and invited to complete a QoL survey. Initially only patients with colon cancer will be invited due to financial restrictions, with a possibility to also invite rectal cancer patients later if more funding is available. Patients with distant metastases and/or recurrence will be excluded. The Norwegian cancer registry will forward the list of patient IDs to Evry AS which has the possibility to match patient IDs with addresses registered in the Norwegian population registry. Evry AS will merge the addresses with the invitation letter and post the invitation to all participants. The data collection will be done securely using the "Tjenester for Sensitive Data" (TSD) service, which is a national platform for secure data collection, storage and analysis, including a custom online or mobile application for surveys, developed and maintained by the University of Oslo. The TSD solution allows for safe log in by the patient using two factor authentication (bank ID). Patients will give their consent to participate online. If the patient is unable to use the online application there will be a possibility to send in the Questionnaire and written consent on paper. TSD generates a code key linking the patient ID to the stored sensitive data. The code ID is stored separately from the patient information.
Data for all those who consented to participate will be matched with data stored about their disease in the Norwegian quality registry for colorectal cancer and with data in the Norwegian patient registry (NPR) using the code key. NPR data is necessary to confirm information about chemotherapy, as this information is not very reliable in Norwegian cancer registry. Gastrointestinal Quality of life index (GIQLI) together with the RAND 36-Item Short Form Health Survey (SF-36) and the Scale for chemotherapy-induced long-term neurotoxicity (SCIN) will be used to collect data on quality of life. Further the Low Anterior Resection Score (LARS) will be collected for all patients. Additional questions about completion of chemotherapy, dose reduction and change of regime will be added to the surveys. Data about disease stage and treatment will be collected from the Norwegian quality registry for colorectal cancer and from NPR.

Study status: We have the REC approval (2018/1938/REK sør-øst A.) and the necessary funds to send the consent letters to potential participants. The web form is also complete but we need to fine-tune some small details. Next step is patient lists from Norwegian cancer registry which will be sent to EVRY AS and they will then send consent letters to the potential participants so they can consent and answer the questionnaire on internet.

3) Long-term survival rates for two cohorts: D2 vs. D3 right colectomy for cancer

Introduction: A meta-analysis conducted from 66 studies that included 1437846 patients with a median follow-up of 65 months showed that left sided primary tumor location was associated with a significantly reduced risk of death (HR, 0.82; 95% CI, 0.79-0.84; P< .001) independent of stage, race, adjuvant chemotherapy, year of study, number of participants, and quality of included studies. One reason may be a lower quality of the surgery performed in right-sided colon cancer compared to surgery for left sided tumors, due to complex anatomical relations between the right and transverse mesocolon and the root of the small bowel mesentery. The clinical trial "Safe Radical D3 Right Hemicolectomy for Cancer through Preoperative Biphasic Multi-Detector Computed Tomography (MDCT) Angiography" with ethical approval: Regional ethical committee, South-East Norway (REC South East) no. 2010/3354 investigates more extensive lymphadenectomy than the standard procedure in a large patient cohort.
Aim: The aim of this study is to compare long-term survival after right colectomy with extended D3 mesenterectomy to that after conventional right hemicolectomy.
Methods: Survival of patients included in the above-mentioned trial will be compared to that of a matched control group (1:2) derived from the national cancer registry, matched for preoperative tumor stage, age, gender and operation date. Patients operated in the three trial hospitals in Norway or in low volume hospitals (<30 colon cancer procedures per year) will not be considered when generating the control group.
Study status: This study will be the first survival analysis of the ongoing clinical trial "Safe Radical D3 Right Hemicolectomy for Cancer through Preoperative Biphasic Multi-Detector Computed Tomography (MDCT) Angiography" which is a multicenter cohort study including patients operated for right sided colon cancer with a new technique. This trial is approved by the ethical board (REC South East) and has already included more than 500 patients. The present study will compare survival data for the first 250 patients of this clinical trial with data for a matched cohort in the Norwegian cancer registry not operated with the new method.

What is the risk of intestinal dysfunction after small bowel denervation during modern surgery for right-sided colon cancer? The study concerns: alterations in bowel function; compensatory mechanisms; development of a bowel function prediction model; anatomical evidence.
Yngve Thorsen MD, Tom Øresland Professor MD PhD, Morten Tandberg Eriksen MD PhD (Oslo University Hospital), Dejan Ignjatovic Professor MD PhD.

Introduction: A substantial segment of the superior mesenteric nerve plexus is included in the surgical specimen in D3 right colectomy. The consequences of denervation are not entirely understood and are mostly related to bowel motility. The hypothesis behind the syndrome (postoperative diarrhea) is that sympathetic denervation results in a stable and high-level small bowel and right/transverse colon peristaltic activity.
Methods: Patients included in the "Safe Radical D3 Right Hemicolectomy for Cancer through Preoperative Biphasic Multi-detector Computed Tomography (MDCT), a multicenter trial, are interviewed and compared with a control group operated with a traditional right hemicolectomy (Project 1). Project 2 is a clinical trial using the wireless motility capsule (Smartpill®). Project 3 represents data collected prospectively through a stool-diary lead by the patient. Project 4 is a post-mortem study.
Aim: To identify bowel function alterations (and their etiology) that occur after D3 right colectomy; this will be achieved through six articles:

Article 1 (published): Bowel function and quality of life after superior mesenteric nerve plexus transection in right colectomy with D3 extended mesenterectomy. Tech Coloproctol. 2016 Jul;20(7):445-53 27.
Article 2 (published): Detecting the non-physiological, surgically tailored ileocolic anastomosis using the wireless motility capsule. A pre- and post-operative, prospective, within-subject trial. J Neurogastroenterol Motil. 2017 Oct 30;23(4):585-591.
Article 3 (published): Bowel Motility After Injury to the Superior Mesenteric Plexus During D3 Extended Mesenterectomy. J Surg Res 2019 Jul. (Epub 2019 Feb 27).
Article 4 (published): The effect of vascular anatomy and gender on bowel function after right colectomy with extended D3-mesenterectomy. Ann Laparosc Endosc Surg 2019.
Article 5 (submitted): Early postoperative changes in the bowel habits after extended mesenterectomy with consecutive extrinsic denervation of the small bowel. (Based on stool-diaries the first 2 months after surgery. 45 patients included).
Article 6 (in manuscript): What is the extent of superior mesenteric nerve plexus excision at D3 right colectomy? Which part of the plexus remains? A post-mortem study.

Applying emerging three-dimensional (3D) visualization technologies to macro and micro anatomical datasets, for the improvement of operative planning, performance and outcomes in colon cancer surgery
Javier Luzon MD, Arne Bakka Professor MD PhD, Bjørn Edwin Professor MD PhD (Oslo University Hospital), Ole Jakob Elle Associate Professor PhD (Oslo University Hospital), Dejan Ignjatovic Professor MD PhD.

A. Macroanatomy study:
Article 1: Implementation of 3D printed superior mesenteric vascular models for surgical planning and/or navigation during right colectomy with extended D3 mesenterectomy. Comparison of virtual and physical models to the anatomy found at surgery.
Status: Study completed. Published as original article at the journal Surgical Endoscopy.
Article 2: Augmented reality and image processing/fusion in surgery: 3D visual assistance for a safer surgical navigation of the mesenteric vasculature. CTrue project.
Status: Manuscript is completed and already under peer-review process on an international journal.
Article 3: Semiautomatic vs manual 3D reconstruction of central mesenteric vascular models; the surgeons verdict.
Status: Study completed. Study published as original article at the journal Surgical Endoscopy.

B. Microanatomy study:
Article 4: Defining the spatial 3D relations between lymphatic glands and vessels, nerves and blood vessels within the D3 area by using MicroCT imaging for the digital reconstruction of its microanatomy and Article 5: 3D reconstruction of histological slides: Manual segmentation and 3D volume reconstruction of microanatomy structures on histology slides. Providing architectural data on D3 extended mesenterectomy area.
Status: Studies 4 and 5 merged to create an article. Data collection incompleted. Data analysis and manuscript will be completed in 2020.

Assessing right colon cancer patients with metastatic central (D3) lymph nodes. Identifying the group benefiting from extended mesenterectomy and evaluation of radiological and pathological diagnostic procedures

Gurpreet Singh Banipal MD, Dejan Ignjatovic Professor MD PhD.

Introduction: Patients suffering from right sided colon cancer with metastasis to the central lymph nodes are still in a curable phase of the disease and can be identified prior to surgery through radiology, genetic and epigenetic markers. This knowledge will enable additional treatment (chemotherapy, immunotherapy) before surgery in this patient group, as well as changes in operative technique (micro metastases and isolated cancer cells), in this way improving survival rates.
Methods: This is a reanalysis of patients included in "Safe Radical D3 Right hemicolectomy for Cancer through Preoperative Biphasic Multi-Detector Computed Tomography (MDCT) with positive nodes in the D3 volume. Article 1 represents a reanalysis of preoperative CT scans to establish spreading patterns. Article 2 is impact of surgical strategy on lymphatic dissemination patterns (isolated cancer cells, micro-metastases) and to determine if "medial to lateral" surgical access is superior to the "lateral to medial" in surgery for cure of right sided colon cancer. Article 3 is to identify cancer genes and epigenes in tumor and lymphatic nodes to identify patients who can benefit of this surgery. Article 4 is to find short and long term results.
Aim: To identify the patient group at risk of lymph node metastasis in the D3 volume of the right colon from the radiological and immunohistopathological aspect as well as to present the short and long-term outcomes of the patient group. This will be achieved through 4 articles:
Article 1. To study lymph nodes in D3 volume by preoperative CT scans, and try to establish spreading patterns in this patient group.
Article 2. To study disseminated patterns of isolated cancer cells and micro metastases relative to level of dissection and surgical technique.
Article 3. Establish better understanding of epigenetic cancer markers in this patient group, which will help in identifying group of high-risk patients in preoperative analysis.
Article 4. Determine the short- and long-term results of this patient group.
Current status: Project is approved by regional ethical committee. Data collection is in final stages. Article 2 is expected to be published in autum 2020. This project will part of PhD thesis for Gurpreet Singh Banipal. Collection of data and analysis for the project will be done at Akershus University Hospital.

The introduction of advanced treatment principles for gastric cancer focused on the significance of chemotherapy and laparoscopic approach

Robin Gaupset MD, Lars Eftang MD PhD, Dejan Ignjatovic Professor MD PhD, Ola Røkke Professor MD PhD. Co-workers: Kathrin Friedrich (Department of Pathology), Jonn Terje Geitung and Arne Borthne (Department of Radiology), Sutharsan Sutharalingam (Department of Oncology), Jurathe Saltyte-Benth (Department of Statistics).

Background: Gastric cancer is still one of the deadliest forms of cancer in the gastrointestinal system. Although declining in incidence in the latter years due to better hygiene and lower incidence of Helicobacter Pylori among other reasons, some 500 new cases are seen every year in Norway. The introduction of standardized operative approach, laparoscopy and chemotherapy may have had an impact on survival after treatment for this disease. Preoperative staging has improved with the development of high resolution CT.
Aim: To compare morbidity and survival before and after introduction of the above mentioned parameters. To evaluate the sensitivity and specificity of CT with regard to preoperative staging.
Methods: 185 patients operated for gastric cancer at Akershus University hospital in the period 2000 to 2016 are reviewed with regards to changes in treatment principles and impact on morbidity and survival. 50 patients in the latter period including some patients in 2017, all of who got chemotherapy preoperatively, are studied with regards to preoperative staging by CT and compared to the postoperative pathological findings. Finally several aspects of the treatments introduced will be studied with regards to side effects and quality of life.

Current status:

- The first article was published January 2018:
  - Improved survival after implementation of multidisciplinary team meetings, perioperative chemtherapy, extended lymphnode dissection and laparoscopic surgery in the treatment of advanced gastric cancer. Journal of cancer therapy, Vol. 09 No. 02(2018)
- All data collected for the second and third article and work on statistics has begun
- Mandatory courses in Statistics and the first introductory course have been completed
- Presentation at national meeting

Defining new explanations for bad outcome after necrotizing pancreatitis using CT-scans
PhD Project under preparation. Candidate: Kourosh Piroozmand MD.
Supervisors: Ola Røkke Professor MD PhD, Odd Langbach MD PhD.
Co-workers: Olof Vinge-Holmquist MD, Ask Boe Klakegg MD, Øystein Arnø MD, Vibecke Sørensen MD, Lars Aabakken Professor, Jurathe Saltyte-Benth PhD.

Introduction: Acute pancreatitis is an acute inflammation of the pancreas. 20% of the patients develop severe pancreatitis, with necrosis of pancreatic gland and/or peripancreatic tissue. Survivors are disposed for reduced quality of life. Little is known about the long-term incidence and severity of these complications.
Aims:
1) To determine the results of treatment of acute necrotizing pancreatitis
2) Determine the development of necrotizing pancreatitis as determined by CT-scans
3) Determine function of pancreas and patients after necrotizing pancreatitis
Material and methods: Patients admitted to Akershus University Hospital from 2000-2018 with acute necrotizing pancreatitis. Study 1: Identify predictors for survival in treatment of patients with acute necrotizing pancreatitis. Study 2: Review of all CT-scans of all patients admitted with acute necrotizing pancreatitis in the time period, and describe the type of necrosis as a function of time. Study 3: Follow-up of 130 surviving patients (100 eligible) and relate the degree of endocrine and exocrine pancreas insufficiency to the type of necrosis at the hospital stay.
Status: Study 1: All necessary data are collected, and data analyses is ongoing. Study 2: All CT-scans have been reviewed, all data have been retrieved and registered, and data analyses is ongoing. Study 3: 38 of the 100 eligible patients have been followed up.

Identification of microbial agents as a novel cause of acute pancreatitis using next-generation sequencing
PhD Project under preparation. Candidate: Olof-Vinge-Holmquist MD.
Supervisors: Ola Røkke Professor MD PhD, Odd Langbach MD PhD, Truls M Leegaard Professor.
Co-workers: Kourosh Piroozmand MD, Ask Boe Klakegg MD, Øystein Arnø MD, Vibecke Sørensen MD, Øyvind Kommedal Professor (Department of Microbiology, Haukeland University Hospital), Erling Bringeland (St Olavs Hospital), Rimantes Konstera MD (Orkdal sykehus), Jurathe Saltyte Benth PhD.

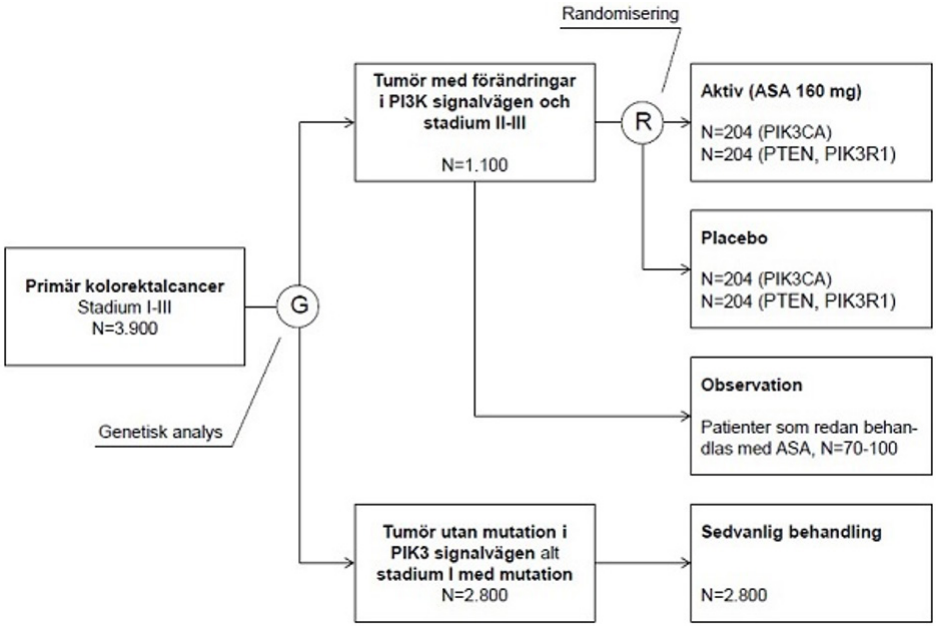
Introduction/Aim: The project aims to define two classes of pancreatitis: Acute pancreatitis, which is an acute inflammation of the pancreas, and Autoimmune pancreatitis, which is an inflammation of pancreas with less defined characteristics. The incidence of acute pancreatitis is reported to be increasing, and the results of treatment improving. Autoimmune pancreatitis is thought to be infrequent, possible because of lack of consensus of diagnostic criteria.
Material and methods: Patients for the study of acute pancreatitis: 1500 patients admitted to Akershus University Hospital from January 2000 until December 2018 with first attack of acute pancreatitis. Patients for the study of autoimmune pancreatitis: 1000 patients collected from a European database.
Study 1: Calculate the incidence of first time acute pancreatitis. Compare the treatment results of patients treated from 2000 – 2009 with patients treated from 2010 until 2018.

Study 2: Identify clinical, laboratory and imaging predictors for favorable long-term results after discharge for acute pancreatitis. Study 3: Analyze all relevant clinical, laboratory- and imaging data in patients registered as autoimmune pancreatitis in the European pancreas database, and crystallize reliable diagnostic criteria for a European standard for the disease autoimmune pancreatitis.
Status: Study 1: Data for 1500 patients with first time acute pancreatitis have been collected, and analyzed. The writing of the paper is ongoing. Study 2: Data for 1500 patients with first time acute pancreatitis have been collected, follow-up with regard to life/death have been performed, and is now ready for analyses. Study 3: Data-collection have been performed, and analyzes is ongoing. A paper describing the plans and methods for characterization of autoimmune pancreatitis have been published. Several "Next generation technology platforms" are at present under evaluation. Pilot studies of 20 patients are currently under analyses.

A randomized double-blind placebo-controlled study with ASA treatment in colorectal cancer patients with mutations in the PI3K signaling pathway

We are participating in the multi centre study initiated from Karolinska sjukhuset.
Tom Øresland Professor MD PhD, Nora W. Christensen MD, Muhammad Shafique MD, Heidi Miltvedt RN, Mari Næss RN, Merete Helgeland MSc, Marianne Merok MD PhD.

Background: ALASCCA is a prospective, randomized, double blinded, placebo controlled, multicenter, biomarker-based study of adjuvant treatment with ASA in colorectal cancer. A total of 3,900 patients will be screened.
Objective: The primary objective of ALASCCA is to determine whether adjuvant treatment with 160 mg ASA once daily for 3 years can improve time to recurrence in patients with colorectal cancer with somatic alterations in the PI3K signaling pathway.



The study is initiated from Karolinska sjukhuset and involves centers in all Nordic countries. In Norway also Stavanger, St Olav and Tromsø is participating. Ahus is the PI for Norway.
Current status: Recruiting ongoing. Ahus has the best recruiting rate. The study expects end of recruiting by the end of 2020.

"Watch and Wait" in patients with complete clinical response (cCR) after neo-adjuvant chemoradiotherapy for primary locally advanced rectal cancer

Open population-based observational study on behalf of the Norwegian Gastro-Intestinal Cancer Group – Colorectal (NGICG-CR)

Hartwig Körner Professor MD PhD, and Jan Hallvard Træland MD (Stavanger University Hospital), Arne E Færden MD PhD, Stig Norderval MD PhD, and Petter Gjessing MD PhD (University Hospital of Northern Norway, Tromsø), Hans Wasmuth MD PhD, and Gerd Tranø MD PhD (St. Olavs Hospital), Frank Pfeffer MD PhD, and Håvard Forsmo MD (Haukeland University Hospital), Gro Wiedswang MD PhD, Stein Gunnar Larsen MD PhD, Marianne G. Guren MD PhD, and Ellen Viktil MD (Oslo University Hospital), Christian Kersten MD, and Joakim Hauss MD (Sørlandet Hospital), Inger Kristin Larsen (Cancer Registry of Norway).

Background: Treatment of rectal cancer has undergone subtantial improvements during the past three decades with introduction of total mesorectal excision (TME), preoperative radiotherapy (RT) and chemo-radiotherapy, improved preoperative imaging and treatment decisions in the multi-disciplinary team (MDT). Local recurrences, historically reported to be 30%, are now reported to be <5% nationwide, and relative five-year survival of rectal cancer patients has been shown to be higher as compared to colon cancer. The introduction of preoperative CRT was accompanied by the observation that the tumour had disappeared at clinical examination 6-10 weeks after completed treatment in a subgroup of about 15-20% of the patients depending on size and T-stage of the tumour, i.e. clinical complete response (cCR). Further, Habr-Gama showed that patients with cCR could avoid surgery, and only be followed by close clinical monitoring, and introduced the concept of Watch & Wait (W&W) for patients with cCR after preoperative chemoradiotherapy. Most patients with cCR are cured, and thus avoid a major surgical procedure, but there are about 20-30% who will experience regrowth of the tumour and need surgical treatment, with comparable chance of cure for their cancer as with primary surgery. The reports from the Habr-Gama group evoked great interest in the W&W concept, and several study groups, such as the Maastricht group in the Netherlands, and the Vejle group in Denmark have published results for this concept. A recent systematic review and meta-analysis also concluded that the W&W approach appeared to be safe and resulted in comparable long-term survival as surgical treatment.

Aim: The NORWAIT trial is a national cohort study of patients with cCR after neoadjuvant treatment for rectal cancer who follow the Norwegian W&W protocol in the setting of the Norwegian Colorectal Cancer Registry. The aim of the NORWAIT trial is to estimate the rate of regrowth among patients with locally advanced rectal cancer treated with neoadjuvant radiotherapy or chemo-radiotherapy, where clinical complete response has been obtained, and thus to determine the positive predictive value of cCR in a national cohort.

Method: The current study is designed as an open prospective population-based study. All patients diagnosed and treated with radiotherapy or chemo-radiotherapy for rectal cancer in Norway will be eligible for this study. All patients will be diagnosed according to national guidelines, and treatment decisions with regard to the need for neo-adjuvant chemo-radiation therapy will be made according to national guidelines in the setting of multidisciplinary team (MDT) meetings. Patients with complete clinical respons 6-12 weeks after radiochemotherapy, and wish to participate in the study, will be included and followed closely without surgery for 8 years. Patients diagnosed with regrowth during follow-up will be scheduled for surgical resection.

Current status: Recruiting.

Molecular drivers and inhibitors of colorectal cancer in inflammatory bowel diseases
Stephan Brackmann MD PhD, Tom Øresland Professor MD PhD, Solveig Norheim Andersen Professor MD PhD, Jørgen Jahnsen Professor MD PhD, Anna Frengen Dr Scient, Morten Vatn Professor MD PhD, Hilde Nilsen Professor.

Aim: The principal objective of the project is to improve the diagnosis and the prognosis of malignancy in inflammatory bowel disease by analysing the relationship between molecular biomarkers in the mucosa, blood and faeces and genomic instability, inflammation, and pre-malignant (dysplasia) or malignant changes of the colon in a well-defined cohort of CRC in IBD including controls.
The project is part of a collaborative research network comprising several clinical divisions and departments at Akershus University Hospital (Ahus) including Gastroenterology, Surgery, Pathology, and Clinical Molecular Biology. The partners have access to unique historical retrospective CRC-IBD material complementary to the present prospective study biobank that will allow necessary proof of concept and in depth-studies.
The results of the project may contribute to an improved understanding of the mechanisms involved in the development of malignancy in IBD and may help to improve surveillance strategies in these patients. The results may also give insight in factors related to the prognosis of cancer in IBD.
Current status: Recruiting.

Anorectal Malformations and Hirschsprung Disease. What are the problems, needs and expectations in young adults operated for Anorectal Malformations and Hirschsprung Disease in childhood? A Scandinavian multicenter project.
Akershus University Hospital: Tom Øresland, Catherine Planke Teig. Oslo University Hospital (RH): Kristin Bjørnland, Anders Telle Hoel. Skåne University Hospital: Pernilla Stenstrøm (Lund); Antoni Zawadzki (Malmø), Louise Tofte (Lund), Sara Johansdottir (Lund).

A study where we use qualitative methods, focus group interviews, to identify possible problems that these people might face when they transition from childhood to young adults. They will no longer be cared for by pediatric surgeons who operated on them when they were infants. The adult healthcare system has very scarce knowledge of their backgrounds and bowel function. What are their expectations and how can colorectal surgeons and the Pelvic floor center support them? What more do we have to learn, can we develop a structured care and better methods? These questions are of interest both for pediatric surgeons and for colorectal surgeons since knowledge of their lifelong bowel function and problems related to this largely is missing. We hope that this initial survey will give input for further patient driven studies. Two papers on these problems are accepted for publication and we note that there is a demand for better transfer and access to adult pelvic floor care. Further collaborative projects are expected.

Master degree study being undertaken

Senior workers, can good leadership keep them in work longer?
Master in Public Administration, OsloMet
Hanne Bøhler and Marianne Volden

Abstract: In this study we examine if leader`s social relationship to the employees (SLMX) affect the intended retirement age. We have tested two hypotheses. This has been done by conducting a survey at a university hospital. We have used validated questions to test if a good leader-employee-relation affects the intended retirement age. We have also tested if the leader-employee-relation is affected by mediating factors as selection, optimization and compensation strategies and by extension, influence the intended retirement age. Our survey does not support our hypotheses. As we discuss in the thesis, the decision regarding retirement age is probably very complex and consist of many factors. The survey supports that selection, optimization and compensation strategies strengthens the relation between manager and employee in a positive way. Finally, we discuss practical implications, the study`s limitation and suggestion for future research.
Background: Our task started with a concern about a large drop in good competence in a high-tech hospital. We experienced a loss of valuable skills and work capacity (resource) when the experienced and oldest employees chose to retire on a contractual pension (AFP).
Research Question: Is there a connection between a good manager-employee relationship and the employee's desire to be professionally active longer, and can this connection in that case be explained by the fact that good manager-employee relationships provide an increased experience of available mastery resources?
Methodology: We have carried out a cross-sectional survey that forms a snapshot, and do not follow the respondents over time. We used an electronic questionnaire to obtain data for the survey. We used Questback for this purpose. We have used SPSS to analyze our data material. Where it was natural, the variables were converted to average variables. We performed a descriptive analysis to gain insight into the variables' averages, frequency, and standard deviations. In addition, we performed a correlation analysis to examine any correlations between our variables. We also examined the reliability level of the variables.

Granted funding

Project	Source	Amount
Surgery with extended (D3) mesenterectomy for small bowel tumors *Ignjatovic D, Lilleaas AH*	Helse Sør-Øst (2019-2024)	3,288,000 NOK
Assessing right colon cancer patients with metastatic central (D3) lymph nodes. *Ignjatovic D, Banipal GS*	Akershus University Hospital "Publication money"	80,000 NOK
A randomized double-blind placebo-controlled study with 5ASA treatment in colorectal cancer patients with mutations in the PI3K signalling pathway *Øresland T, Miltvedt H*	Akershus University Hospital "Publication money"	150,000 NOK

Department of Anaesthesia and Intensive care

University employees:	Research fellows:
Professor II Vegard Dahl	Felix Haidl
Associate Professor II Signe Søvik	Vladimir Kuklin
University Lecturer Jørgen Dahlberg	Will Morton

Research activity and research ambitions
All three university positions in our department are filled, as is the department's 50% research position for junior doctors. Moreover, one consultant anaesthesiologist will soon be entering a 50-50% research-clinical position for running two clinical trials, which will constitute his PhD work. Research activity is increasing in the department, also for staff in non-academic positions.
Academic staff in our department run Ahus-based research projects as well as projects in co-operation with research groups at the Division of Emergencies and Critical Care at Oslo University Hospital, the Centre for Medical Ethics, University of Oslo, and the Institute of Basic Medical Sciences, University of Oslo. Several new projects are being planned for 2020, when a new university lecturer will take up position. A continuing aim in our department is that the majority of research projects undertaken by medical students should result in published scientific work in referee-based journals. High-quality research also in smaller projects is an important tool for increasing the interest for, and ultimately the recruitment to and funding of, more demanding research projects. We aim to partake in relevant clinical trials.

Publications

Dahlberg J, **Dahl V**, Forde R, Pedersen R. Lack of informed consent for surgical procedures by elderly patients with inability to consent: a retrospective chart review from an academic medical center in Norway. Patient Saf Surg. 2019 Jun 22;13:24.

Haines RW, Harrois A, Prowle JR, **Søvik S**, Beitland S. Deserved attention for acute kidney injury after major trauma. Intensive Care Med. 2019 Jun;45(6):907-908.

Kuklin V, Akhatov N, Kondratiev T, Konkayev A, Baigenzhin A, Konkayeva M, Karibekov T, Barlow N, Tveita T, **Dahl V**. The influences of morphine or ketamine pre-treatment on hemodynamic, acid-base status, biochemical markers of brain damage and early survival in rats after asphyxial cardiac arrest. BMC Anesthesiol. 2019 Nov 20;19(1):214.

Skytioti M, Elstad M, **Søvik S**. Internal Carotid Artery Blood Flow Response to Anesthesia, Pneumoperitoneum, and Head-up Tilt during Laparoscopic Cholecystectomy. Anesthesiology. 2019 Sep;131(3):512-520.

Søvik S, Isachsen MS, Nordhuus KM, Tveiten CK, Eken T, Sunde K, Brurberg KG, Beitland S. Acute kidney injury in trauma patients admitted to the ICU: a systematic review and meta-analysis. Intensive Care Med. 2019 Apr;45(4):407-419.

Abstracts and posters

Holme NLA, Lehre MA, **Søvik S**, Elstad M. Cerebral Autoregulation Fails to Maintain Cerebral Blood Flow During Arterial Blood Pressure Oscillations at Respiratory Frequency. Conference paper at Experimental Biology, April 2019.

Brekke IF, **Søvik S**. TTP – En sjelden men viktig hematologisk tilstand anestesileger kan bli involvert i. Conference proceedings, Norsk Anestesiologisk Forenings Høstmøte, Oslo, October 2019.

Skytioti M, Elstad M, **Søvik S**. Blodflow i arteria carotis interna faller parallelt med cardiac index under laparoskopisk cholecystectomi, uavhengig av blodtrykket. Conference proceedings, Norsk Anestesiologisk Forenings Høstmøte, Oslo, October 2019.

Ongoing and planned research projects in 2019

What is the optimal infusion rate of remifentanil for children undergoing adeno-tonsillectomy?
Will Morton MBChB FRCA MSc, Signe Søvik Associate Professor MD PhD.

Background: Pain after tonsillectomy is notoriously difficult to control and is long-lasting. The choice of anaesthetic agents affects the incidence of postoperative nausea and vomiting. For other surgical procedures in children and adults, the dosing of the opioid remifentanil during surgery has been shown to affect post-operative pain levels.
Aims: To assess the effects of peroperative remifentanil dosing on duration and intensity of postoperative pain and well-being, in healthy children aged 1–16 years undergoing adeno-tonsillectomy as day surgery patients.
Design: Prospective, interventional, randomised, double blinded study.
Methods: Four different remifentanil concentrations infused at fixed rate. All groups will receive same dose of the anaesthetic agent propofol and other analgesic medication. Manual/electronic data retrieval from patient records and curves. Repeated pain scoring (FLACC scale in the PO unit, POPMP scale in telephone interviews with parents) up to day 28 and then day 256 post-operatively.
Current status: Approved by all relevant regulatory bodies in 2019. Patient recruitment will commence in early 2020.

Evaluation of level and duration of postoperative pain in children undergoing tonsillectomy
Medical student David Hui (University of Oslo), Signe Søvik Associate Professor MD PhD.

Background: Pain after tonsillectomy is notoriously difficult to control and is long-lasting. Most children undergo this surgical procedure as day patients; thus neither their postoperative use of analgesic medication or its degree of effectiveness is followed up by the treating institution.
Aims: To assess the duration and intensity of postoperative pain in healthy children aged 1–12 years undergoing tonsillectomy as a day surgery procedure.
Design: Prospective, observational study.
Methods: Patients are recruited in the day surgery PO-unit before or immediately after tonsillectomy. The children's pain and pain behaviour are scored before hospital discharge (3-5 h postoperatively) and by telephone interviews 1, 3, 7 and 14 days later. Pain is scored by the Faces Pain Scale (handed out to parents) and by the Chambers' POPMP (Postoperative Pain Measure for Parents). Use of analgetic medication is noted.
Current status: Master degree was completed in 2019. Publication in manuscript.

Prediction and prevention of healthcare-associated infections, using high-dimensional regression methods on big data

Chi Zhang[1] MSc, Magne Thoresen[1] Professor MSc PhD, Arnoldo Frigessi[1] Professor MSc PhD, Torsten Eken[2] MD Professor II, Jan-Erik Berdal[2,3] Associate professor MD PhD, Silje Bakken Jørgensen[4] MD PhD, Signe Søvik[2,5] Associate professor MD PhD.
[1]Instiute for Biostatistics, University of Oslo, [2]Institute of Clinical Medicine, University of Oslo, [3]Department of Infectious Diseases, Ahus, [4]Department of Infection Control, Ahus and [5]Department of Anaesthesia and Intensive Care, Ahus.

Background: Patients admitted to healthcare institutions may be subject to adverse factors that increase morbidity or even cause death. Examples are falls, medication errors, complications of surgery, and health-care-associated infections (HAI). In recent years, a number of statistical and machine learning methods utilising "big data" have been developed to predict rare or difficult-to-predict outcomes. A common feature of these mathematical methods is their "black box" approach, which does not offer insight regarding the actual effect of each predictor.
This project aims to develop new statistical methods to predict increased prevalence of HAI in a specific hospital ward. Uniquely, our project will use high-dimensional regression methods to build a statistical model where the impact of each risk factor on the prevalence of HAI will be evident. This will allow for practical intervention.
Methods: We will use anonymized structured data from the electronic patient journal system (DIPS) and the electronic patient curve (MetaVision) and summarised data on staffing for patient wards to develop a statistical algorithm able to predict an increased prevalence of HAI in the near future. Initially, many predictors will be used to build a number of candidate models, which will then be compared for efficiency of prediction. The development and "training" of models is done on individual anonymized patient data, while the final model will only need aggregated data on hospital ward level. We plan to evaluate the final model on a new dataset.
Current status: Approval of all regulatory bodies is obtained. Data are transferred to TSD and analyses are underway.

Pharmacokinetic interaction effects of combined fentanyl and adrenaline in epidural analgesia during childbirth

Main researchers: Vegard Dahl Professor MD PhD, Felix Haidl MD, Signe Søvik Associate Professor MD PhD. Co-workers: Renate Häger MD (Department of Gynaecology and Obstetrics, Ahus), Leiv Arne Rosseland Professor MD PhD, and Tore Henriksen Professor MD PhD (Department of Gynaecology and Obstetrics, Oslo University Hospital).

Background: Around 50% of first-time parturients in Norway receive epidural analgesia (EDA), containing a local anaesthetic and an opioid, most frequently fentanyl. We assess whether addition of adrenaline, working as an analgesic and a vasoconstrictor in the epidural space, 1) affects maternal cardiovascular responses during labour, 2) reduces fentanyl transfer to the fetal circulation. Fentanyl has been suspected to negatively affect early infant-mother interaction.
Methods: In a controlled, randomised, double blinded study in healthy first-time parturients, we compare effects of two different compositions of epidural analgesia (EDA) administered during labour: The Department's standard EDA, containing bupivacain, fentanyl and adrenaline versus EDA containing only bupivacain and fentanyl. Response variables are fentanyl concentration in maternal blood (time-profile) and umbilical cord blood at birth, course of labour, and fetal and maternal cardiovascular variables measured continuously by non-invasive techniques.
Current status: Data collection and analysis is completed. One paper was published in 2018, one was published in 2019.

Information given to women receiving epidural analgesia for labour pain
Main researcher: Felix Haidl MD.
Co-workers: Anne Marit Rørvik MD, Vegard Dahl Professor MD PhD, Signe Søvik Associate Professor MD PhD.

Parturients receiving epidural analgesia at our hospital are not informed about the procedure and its possible side-effects before the epidural is requested, typically by a midwife. In an open questionnaire study we registered the amount of knowledge about epidural analgesia among parturients, where they had gathered information, and what information they ideally would have wanted. Our open recruitment resulted in a non-representative study population, heavily skewed towards well-educated, ethnically Norwegian parturients. We are now repeating and extending the study, and we will change our recruitment method to structured interviews of all eligible women. Several hospitals will participate.
Current status: Development and validation of a new questionnaire is underway. Data collection ongoing.

Peroral oxycodone as analgetic regime in the immediate postoperative period after caesarean section
Vegard Dahl Professor MD PhD, Ellen Fjuk RN.

Introduction: All patients operated with a caesarean section in regional anaesthesia at Akershus University Hospital receive peroral, slow-release oxycodone as routine prophylactic analgesia, immediately after they are transferred to the postoperative care unit. The gastrointestinal uptake of peroral opioids may be uncertain in this period. The aim of this study is to analyse the uptake of oxycodone and register whether the individual uptake of oxycodone is related to the actual pain as expressed by a Numeric Rating Scale.
Methods: Serum analysis of oxycodone will be obtained by blood samples at regular intervals. The parturients' level of experienced pain will be registered simultaneously.
Current status: Data collection ongoing.

Assessing competence to consent to somatic health care
Jørgen Dahlberg MD, Reidar Pedersen MD PhD, and Reidun Førde MD PhD (Centre for Medical Ethics, University of Oslo), Vegard Dahl Professor MD PhD.

Background: Informed consent is generally required before healthcare is provided. Such consent requires that the patient is competent. Lack of competence may be caused e.g. by reduced cognitive function. This project aims to study whether and to what extent physicians at intensive care and surgical departments assess patient competence prior to providing healthcare, and whether intervention through guidelines and education may improve lack of such assessment.
Methods: The project is a mixed method (quantitative and qualitative) interventional study on patients admitted to intensive care and surgical departments.
First, we will study whether patients showing reduced competence to consent had been assessed pursuant to the mandatory process. We assess this by investigating patient records in a time series analysis. Then, we collect additional data through focused group interviews. Last, interventions will be implemented and new investigations of patient records will be conducted to assess effects of the intervention.
Current status: Data collection for Phase I completed. Data collection for Phase II ongoing. First paper published in 2019.

Effects on cerebral blood flow of anaesthesia, positive pressure ventilation, and pneumoperitoneum during laparoscopic surgery

Maria Skytioti MD (Institute of Basic Medical Sciences, University of Oslo), Signe Søvik Associate Professor MD PhD, Maja Elstad MD PhD (Institute of Basic Medical Sciences, University of Oslo).

Background: During surgery and anaesthesia, cerebral blood flow (CBF) will be affected by both circulatory and ventilator changes. CBF may be compromised by dehydration, haemorrhage, peripheral vasodilation, anaesthetic agents, mechanical ventilation, pneumoperito-neum, and surgical position. CBF is not easily monitored.
Aims: To assess internal carotid artery blood flow (ICA-BF) in relation to central circulatory changes in day surgery patients during anaesthesia, positive pressure ventilation, and surgical procedures known to reduce venous return to the heart.
Methods: In patients undergoing laparoscopic cholecystectomy we will measure beat-by-beat internal carotid artery blood flow (ICA-BF) by Doppler ultrasound, before anaesthesia, after induc¬tion, with pneumoperito¬neum, and during combined head-up-tilt (HUT) and pneumoperito¬neum. Heart rate, non-invasive continuous arterial pressure, respiratory frequency, end-tidal CO2, and all medications will be recorded. Effects on cardiac stroke volume (SV), cardiac index (CI), and ICA beat volume (BV) and blood flow (BF) will be analysed with linear mixed-effects regression.
Current status: Study completed in 2018, included in Skytioti's PhD project. Paper published in 2019.

The Influences of Pretreatment with Morphine or Ketamine on Hemodynamic, Acid-base Status, Biochemical Markers of Brain Damage and Early Survival in Rats after Asphyxial Cardiac Arrest

Kuklin V, Akhatov N[1,2], Kondratyev T[3], Baigenzhin A[2], Karibekov T[2], Shaimardanova G[2], Konkayeva M[1], Barlow N, Tveita T[3], Konkaev A[1], Dahl V.
[1]Astana Medical University, Astana, Kazakhstan, [2]National Scientific Medical Center, Astana, Kazakhstan, [3]Anesthesia and Critical Care Research Group, UiT The Arctic University of Norway.

Background: In different animal models of acute hypoxia, blocking of opioid or NMDA receptors have cardio- and neuroprotective effects and increase survival.
Aim: To assess effects of morphine and ketamine on hemodynamics, acid-base status, biochemical markers of brain damage, and early survival after asphyxial cardiac arrest (ACA) in rats.
Methods: Wistar rats were randomly assigned to Morphine 5 mg/kg iv (n=14), Ketamine 40 mg/kg iv (n=14), or NaCl 0,9% iv (Control, n=14), given 10 min before ACA. Asphyxia was induced by 5-min blocking of tracheostoma. Resuscitation comprised epinephrine (0.02 mg/kg, iv), thoracic compressions (180/min) and mechanical ventilation (air, 80 breaths/min). Invasive mean arterial pressure (MAP) was recorded, and blood gas samples taken at baseline and 10 min post-resuscitation. Early survival was evaluated 20 min after ACA.
Results: Pre-treatment with ketamine reduced MAP before ACA and prevented pH disturbances 10 min post-resuscitation. Early survival was 13/14 in the ketamine group vs. 10/14 and 7/14 in the morphine and control groups, respectively (P=0.034). Biochemical markers of brain damage did not differ.
Conclusion: Pre-treatment with ketamine before asphyxial cardiac arrest improved early survival.
Current status: Results published in 2019.

Master degree study being undertaken

Accuracy of thermometers in general anesthesia
Anne Haugo and Anne Sofie Melleby

Background: Hypothermia occurs in patients undergoing general anesthesia and can give unfortunate consequences. For examples risk of infections, increased bleeding, myocardial ischemia and delayed awakening from general anesthesia. Research recommends measurement of core temperature with pulmonal artery catheter, oesophagus-, nasopharynx- and tympanic membrane with "thermocouple" in general anesthesia. Several individual studies have been done with different thermometers, but no systematic review of which temperature measurement tool is preferred for patients undergoing general anesthesia. Purpose: The purpose of this systematic overview is to find a temperature measurement tool near core temperature, of adults undergoing general anesthesia. It is positive if it is safe and user-friendly.
Method: The study has been done on accordance with recommendations from PRISMA- checklist. We searched in Cinahl, Cochrane Library, Embase and Medline, and got 360 citations from 2008-2018. Nine studies were included in the systematic review, they had longitudinal design, and comprised 595 patients. Both authors review the methodical quality in accordance with the checklist from Helsebiblioteket.
Results: Oral, temporal artery, zero-heat-flux, infrared tympanic membrane "earphonetype", axilla- and bladder thermometer were within clinical acceptable value of 0,5 degrees Celsius. Infrared tympanic membrane and skin thermometer was outside the clinical acceptable value. Five studies were rated to low risk of bias, and four studies to unclear risk of bias.
Conclusion: Zero-heat-flux seems to give accurate core temperature of patients undergoing general anesthesia. The thermometer can be used perioperative, but it may not follow the core temperature during rapid thermal perturbations. At present time, tympanic membrane-, temporal artery-, and skin thermometer may lead to inaccurate core temperature, according to results from the study undertaken in this thesis.

The Operating Department

Academic assignments

Arranged meeting
2 day training program for OR nurses working with robotic surgery at Akershus university hospital including theoretical and practical training (cadavers). **Lervik N**, **Skråmm SH**.

Ongoing research projects

Non-technical skills in operating room nursing. A collaborative project between Clinical Nursing practice at the Operating Departement and Lovisenberg Diaconal University College
Ingrid Hanssen Professor, Inger Lise Smith Jacobsen RN, ORN, MSc, Sisilie Skråmm RN, ORN, MSc.

Background: Non-technical skills are cognitive and interpersonal skills underpinning technical proficiency.
Aim:
1. To learn what ethical issues operating room nurses perceive as important regarding non-technical skills.
2. To explore how operating room nurses experience operating room team communication in means of non-technical skills.
3. To learn how operating room nurses utilise their non-technical skills situation awareness and coordination/task management to secure patient safety.

Methods: Qualitative individual in-depth interviews were conducted. The interviews were analysed using Braun and Clarke's six phases for thematic analysis.
Current status: The project will publish three articles in 2020.

Department of Breast and Endocrine Surgery

University employees:	Research fellows:
	Berit Gravdehaug
	Joel Touma
	Nazli Bahrami

The ongoing research activity in the department consists of two PhD projects. In addition, three clinicians are active and productive. Our research projects occur in collaboration with Departments of Oncology and Pathology and are a part of the hospital´s Translational Breast Cancer Research Group.

Publications (peer reviewed)

Costa H, **Touma J**, Davoudi B, Benard M, Sauer T, Geisler J, **Vetvik K**, Rahbar A, Söderberg-Naucler C. Human cytomegalovirus infection is correlated with enhanced cyclooxygenase-2 and 5-lipoxygenase protein expression in breast cancer. J Cancer Res Clin Oncol. 2019 Aug;145(8):2083-2095.

Geisler J, **Touma J**, Rahbar A, Söderberg-Nauclér C, **Vetvik K**. A Review of the Potential Role of Human Cytomegalovirus (HCMV) Infections in Breast Cancer Carcinogenesis and Abnormal Immunity. Cancers (Basel). 2019 Nov 22;11(12).

Nauclér CS, Geisler J, **Vetvik K**. The emerging role of human cytomegalovirus infection in human carcinogenesis: a review of current evidence and potential therapeutic implications. Oncotarget. 2019 Jul 2;10(42):4333-4347.

Ongoing research projects

Human Cytomegolovirus infection in Breast Cancer
Joel Touma MD, PhD student, Katja Vetvik MD PhD, Jürgen Geisler Professor (Department of Oncology), Torill Sauer Professor (Department of Pathology), Cecilia Söderberg-Nauclér Professor, and Afsar Rahbar Associate Professor (Karolinska Institutet, Sweden).

Introduction: Proteins specific for Human Cytomegalovirus (HCMV) are expressed in primary breast cancers (BC) as well as in 94 % of sentinel lymph node metastases of BC and in 98 % of brain metastases in BC patients. HCMV specific protein expression is strictly confined to tumour cells in both primary breast tumours and BC metastases while surrounding stroma cells are consistently HCMV protein negative. Earlier studies indicate that targeting HCMV in patients with glioblastoma and potentially other HCMV-positive tumours may be a feasible treatment option to improve patient outcome.

Aims: Our main goals are to evaluate the role and significance of HCMV in BC pathogenesis and to better understand the mechanisms by which CMV is involved in development and progression of the disease. In addition, we aim to explore the oncogenic and metastatic properties of the HCMV in human triple negative breast cancer.
Material and Methods: Several cohorts consisting of patients treated for BC at Ahus are used to study the scale and impact of HCMV infection for the prognostic markers and disease characteristics in addition to in vitro studies investigating the potential disease mechanisms.
Current status: Joel Touma is currently writing his thesis.

An interdisciplinary translational approach for patients with locally advanced breast cancer
Nazli Bahrami MD, PhD student, Jürgen Geisler Professor (Department of Oncology), Torill Sauer Professor (Department of Pathology), Vessela Kristensen Professor (EpiGen).

Introduction: The aromatase inhibitor letrozole (Femar®/Femara®) and the aromatase inactivator exemestane (Aromasin®) are currently used as standard care for breast cancer in all the clinical settings of the disease. A lack of cross-resistance has been demonstrated, providing the rationale for a sequential use of these compounds in the setting of metastatic breast cancer.
Aims: To study and compare the direct intra- and anti-tumor effects, and potential mechanisms of adaptation and resistance of non-steroidal aromatase inhibitor letrozole and steroidal aromatase- inactivator exemestane.
Material and methods: NEOLETEXE is a randomized, open-label, intra-patient, cross-over trial. Selected patients with locally advanced breast cancer will be randomized to therapy with either letrozole or exemestane for 2 months followed by a cross-over to the alternative drug for another 2 months following (all in all 4 months) of presurgical treatment. Open tumor biopsies and blood samples will be used to perform a comprehensive exploration of the consequences of each drug therapy. The influence on plasma and tissue steroids will be compared. In addition, whole genome and exome sequencing, epigenetics and plasma analysis (cytokines, tumor DNA fragments etc.) will be performed.
Current status: Ongoing.

Granted Funding

Project	Source	Amount (NOK)
HCMV Infections in Breast Cancer Patients *Jürgen Geisler, Katja Vetvik*	Helse Sør-Øst 2016-2019	3,000,000
An interdisciplinary translational approach for patients with locally advanced breast cancer *Jürgen Geisler (Medical division)*	Helse Sør-Øst 2018-2021	3,000,000

Vascular and Thoracic Surgery Research Group

Head: Associate Professor Jarlis Wesche

University employee:	Research fellows:
Associate Professor Jarlis Wesche	Mads Tønnes Helgeland
	Ai Van Thuy Ho
	Other research staff:
	Inger Helene Nådland (Research coordinator)
	Anne Rigmor Holten (Research nurse)

At the Department of Vascular and Thoracic Surgery there are eleven consultants, two senior residents in vascular surgery, and four residents in general surgery. One surgeon has a doctoral thesis (Jarlis Wesche). One MSc. has a PhD (Inger Helene Nådland). One nurse in the outpatient clinic has a 10% position as research nurse (Anne Rigmor Holten).

During 2019, we have continued the ongoing projects on endovascular and open treatment for abdominal aneurysms and on hyperhidrosis and thoracoscopic sympathectomy treatment, The Quality of Life assessment study (the VascuQoL-6 study) in patients with peripheral atherosclerotic occlusive disease in collaboration with Østfold Hospital, Kalnes, was finished. We continued our collaboration with researchers at Oslo University Hospital in a project on "the vulnerable carotid plaque". We are participating in a national study on Abdominal aortic aneurisms and diabetes (Abandia study), which was initiated by the Research Board of the Norwegian Society for Vascular Surgery and is coordinated from Haukeland University Hospital. Due to extraordinary circumstances, Jarlis Wesche has been acting PI from August 2019.

Mads T. Helgeland (MD) continues his PhD project on aspects of endovascular treatment (EVAR) of abdominal aortic aneurysms, and will send in his application to become a board certified vascular surgeon in 2020.

PhD candidate Ai Van Thuy Ho (MD) has continued her project on "Sweat activity and cardiovascular responses at rest and during physiological strain in healthy subjects and in hyperhidrosis patients". She has published one paper and revised paper two was submitted December 2019. She is writing on a third paper, and a fourth paper is being written. She plans to finish her thesis in a year.

Anne Sofie Larsen, a consultant interventional radiologist at Østfold Hospital, Kalnes (Jarlis Wesche co-supervisor) defended her PhD thesis in 2018 on patients (recruited from Kalnes and Ahus) with peripheral atherosclerotic occlusive disease. Another paper from this patient cohort has been submitted, and the project is concluded.

The Head Nurse of the Department, Hanne Haug Bøhler defended her master's degree at OsloMet University 2019 (Fakultet for samfunnsvitenskap) on " Kan god leder-medarbeider-relasjon føre til bevaring av senior i arbeid?".

Abstracts and posters

Eggum R, Reier-Nilsen F, Aamodt H. Robot-assistert torakoskopisk (RATS) lobektomi ved Akershus universitetyssykehus. The Norwegian Surgical Society Annual Meeting, Oslo, October 2019.

Eggum R, Reier-Nilsen F, Aamodt H. Robot-assistert (RATS) Thymektomi. The Norwegian Surgical Society Annual Meeting, Oslo, October 2019.

Eggum R, Reier-Nilsen F, Aamodt H. Robot-assistert (RATS) Diafragmaplikasjon hos en pasient med symptomatisk diafragmaparese. The Norwegian Surgical Society Annual Meeting, Oslo, October 2019.

Volden M, **Bøhler H**, Granheim T, Årstein HM, Nygård T. Older workers give the Organization Quality and Safety. International Forum on Quality and Safety in Healthcare, Glasgow, March 2019.

Academic assignments

Invited lecturer

Experiences in implementing Robot Assisted Surgery at Akershus University Hospital. Seminar on Robotics in surgery. The Norwegian Surgical Society Annual Meeting, Oslo, October 2019. **Eggum R**.

Surgical Treatment of lung cancer. Postgraduate course in Pulmonal Diseases.
Bærum Sykehus/University of Oslo. **Eggum R**.

Robot Assisted Thoracic Surgery. «Åpen dag», Akershus University Hospital. **Eggum R**.

Emergency seminar for x-ray nurses in training. Emergency team simulation and practice.
OsloMet University, January 2019. **Haukvik JT**.

Mini-invasiv Thoracic Surgery. Lecture for The Norwegian Lung Cancer Group, 2019. **Reier-Nilsen F**.

Emergency seminar for x-ray nurses in training. Emergency team simulation and practice.
OsloMet University, January 2019. **Østrem F**.

Lung Surgery. Postgraduate course in Pulmonal Diseases. Oslo University Hospital,
Ullevål/University of Oslo 2019. **Aamodt H**.

Other academic activities
Main supervisor for Mads Tønnes Helgeland, University of Oslo. **Wesche J**.
Main supervisor for Ai Van Thuy Ho, Campus Ahus, University of Oslo. **Wesche J**.
Acting PI of the National Study on The prevalence of diabetes and the morbidity and mortality among patients operated for abdominal aortic aneurysms in Norway (the Abandia study). **Wesche J**.
Local investigator of the Abandia Study. **Helgeland MT**.

Memberships
Member of the Quality group of the Norwegian Association for Cardiothoracic Surgery. **Eggum R**.
Member of the Board, the Norwegian Society for thoracolaparascopy. **Eggum R**.
Councilor, UEMS Division and Board of Vascular Surgery. **Wesche J**.
Member of the Research Board of The Norwegian Society for Vascular Surgery. **Wesche J**.
Member the Research Committee, Surgical Division, Akershus University Hosptal. **Wesche J**.
Member of the Examination committee (M8), The Medical Faculty, University of Oslo. **Wesche J.**
Member of the National Committee for a Common final Digital Exam (M8) for all Medical Faculties in Norway. **Wesche J**.

Ongoing research projects

National Study on the prevalence, morbidity and mortality of diabetes in patients operated for AAA (the Abandia study)
Mads Helgeland MD, Inger Helene Nådland MSc PhD, Anne Rigmor Holten RN, Jarlis Wesche MD PhD.

Background: There has been traditionally a consensus that the incidence of abdominal aortic aneurism among diabetics is low. However, a recent study from Haukeland University Hospital suggests that the incidence might be higher, but there were too few patients in the study.
Aim: To investigate the prevalence of diabetes and the morbidity and mortality among patients operated for abdominal aortic aneurysms in Norway.
Method: Observational study. Data from National Patient Registry (NPR), Cause of Death Registry (DÅR), and the Norwegian Vascular Surgery Registry (NORKAR) together with blood tests, urine samples (taken preoperatively and one year after operation) from all Norwegian Hospitals operating AAA patients.
Current status: Inclusion started April 2018 and will end autumn 2020. Follow-up will end 2021, and final data analyzed and published 2022-2023.

Sweat activity and cardiovascular function at rest and during physiological strain in healthy subjects
Ai Van Thuy Ho, PhD student, Karin Toska MD PhD, Jarlis Wesche MD PhD.

Background: There is currently a lack of knowledge on the dynamics of sweat activity in healthy subjects in the thermoneutral zone, and its association with cardiovascular dynamics. Increased knowledge in this area is important in order to improve diagnosis and treatment of patients with hyperhidrosis/excessive sweat production, which is generally considered to be a subjectively perceived disease.
Aim: To investigate sweat activity and cardiovascular variables/dynamics in response to minor physiological and mental stimuli, and the reproducibility of these responses.
Methods: Thirteen healthy subjects were included in the study. Sweat activity at five skin areas were measured continuously with a skin conductance method for 30 minutes, including in a resting supine and sitting positions, followed by a period performing deep inspirations, mental challenge and exposure to a

sudden sound stimulus. Cardiovascular variables such as blood pressure, heart rate, skin perfusion and radial artery blood flow were also measured simultaneously with sweat activity. Each individual was exposed to two separate days of measurements with 1-18 days between the two experimental days.
Current status: Data-analysis is finished, and a manuscript has been written and resubmitted 2019 (published in 2020).

Improved diagnosis and treatment of hyperhidrosis
Ai Van Thuy Ho, PhD student, E Øvensen MD, Karin Toska MD PhD (Oslo University Hospital), Jarlis Wesche MD PhD. Co-workers: Erik Fosse Professor MD PhD (Oslo University Hospital/University of Oslo), Odd Grenager MD, Knut Kristiansen MD.

Background: Approximately 50 to 100 patients annually are operated on for hyperhidrosis in Norway, most of them at Akershus University Hospital. Hyperhidrosis diagnosis is based on subjective patient information. A number of treatment options are available for these patients, including surgical treatment (thoracoscopic sympathectomy). Several possible side effects of the operation are reported and, in some cases, lead to serious problems for the patients. There is thus a strong need for objective measurements of hyperhidrosis and tools to facilitate patient selection for the various treatment options.
Aim: To objectively measure sweat excretion and sympathetic physiologic responses in patients with hyperhidrosis before and after thoracoscopic sympathectomy, as well as to investigate possible side effects and cardiovascular responses to such treatment.
Methods: Observational study. Patients admitted to the Department of Vascular and Thoracic Surgery for hyperhidrosis have been included. A multichannel device (i.e., a SudoLogger) was used to measure sweat activity in five different skin areas (e.g., face, palm and dorsal hand, the back, and abdomen). Measurements were obtained over a total period of 30 minutes with patients in both the supine and sitting positions, followed by a period performing deep inspirations, mental challenge and exposure to a sudden loud sound.
Current status: Data has been analyzed, a paper is being written and will be submitted in 2020.

Endovascular treatment of abdominal aortic aneurysms (EVAR) in Norway, 2000–2013
Mads Tønnes Helgeland MD, PhD student, Jarlis Wesche MD PhD.

Background: Abdominal aortic aneurysm is an age-related disease and one of the 10 most frequent causes of death among men. Elective repair prior to rupture provides the mainstay of treatment and is usually instituted when the aneurysm diameter reaches 55 mm or more. Since its introduction in Norway in 1995, the use of endovascular treatment of abdominal aneurysms (EVAR) has increased rapidly and now constitutes more than half of the repairs performed worldwide. For patients with aneurysm anatomy compatible with this treatment modality, EVAR provides less periprocedural morbidity and mortality, though strong evidence of long-term benefits is lacking so far.
Aim: To investigate the outcome (i.e., morbidity, 30-day mortality, survival, and secondary procedures) following EVAR in Norway in the period 2000–2013. We limit our analysis to the period following 2000, when the currently used second-generation endografts were introduced. We will investigate to what extent EVAR is used in Norway, in elderly patients, if there are regional and sex differences, and whether our practice differs from neighboring countries.
Methods: A registry study will be performed in which data are provided by the Norwegian Vascular Surgery Registry (NORKAR) and its local registries are linked to Norway's National Patient Registry (NPR) and Cause of Death Registry (DÅR). The Regional Ethics Committee has approved the study and its use of the registries.
Current status: Data from all registries were received late 2016. There has been extensive work to improve the quality of the datasets. Data analyses is ongoing and results are being analyzed and a paper is being written and will be submitted 2020.

Has results after open and EVAR treatment for AAA in Norway changed?
Results and trends of AAA treatment in Norway 20 years after the introduction of EVAR (2013-2019)
Mads Tønnes Helgeland MD, PhD student, Jarlis Wesche MD PhD.

Background: In January 2012, Reporting data into the Norwegian Vascular Surgery Registry (NORKAR) was made compulsory for all units performing vascular surgery.
Aim: To investigate incidence, trends and results after AAA treatment in Norway 20 years after EVAR treatment was introduced.
Methods: Registry study. Data from the following registries: National Patient Registry (NPR), NORKAR, Cause of Death Registry (DÅR) and Cancer Registry will be analyzed and compared to the data before 2012.
Current status: REK and PVO is granted as well as the permission to get access to the registries. The data from DÅR, NPR, NORKAR and the Cancer Registry for this period will be complete and the analyses will then start in October 2020.

Does Endovascular treatment and follow-up after treatment of abdominal aortic aneurysms (EVAR) increase the risk of developing cancer?
Mads Tønnes Helgeland MD, PhD student, Jarlis Wesche MD PhD.

Background: Abdominal aortic aneurism is an enlargement of the abdominal aorta, that may expand to rupture, and cause bleeding and death. Treatment may be open surgery or endovascular treatment (EVAR), the latter carrying a lower early morbidity and mortality. However EVAR treated patients needs surveillance postoperatively with CT scans and/or contrastenhanced ultrasound. It is suggested that these patients thus may carry an increased cancer risk due to such CT surveillance.
Aim: To investigate if AAA patients treated with EVAR in Norway carry an increased cancer risk.
Method: Registry study. Data from the following registries: National Patient Registry (NPR), NORKAR, Cause of Death Registry (DÅR), and the Cancer Registry will be analyzed.
Current status: REK and PVO is granted as well as the permission to get access to the registries. The data from Cause of Death Registry (DÅR), National Patient Registry (NPR), NORKAR, and the Cancer Registry for this period will be complete and the analyses will then start in October 2020.

Validation of a disease-specific quality of life questionnaire (VascuQoL-6) for patients with peripheral occlusive arterial disease (PAOD) in a Norwegian population
Anne Sofie Larsen MD PhD (Østfold Hospital, Kalnes), Camilla Larsen MD, Inger H. Nådland MSc PhD, Anne Rigmor Holten RN, Jarlis Wesche MD PhD.

Background: Peripheral arterial occlusive disease may substantially impact the daily activities of patients with this condition. Therapy options include conservative, endovascular and open surgical treatment. It has been suggested that patient reported outcome measures such as disease-specific quality-of-life (QoL)-questionnaire should be used to measure the effect of treatment, in addition to various clinical parameters. The VascuQoL-6 is a vascular QoL-questionnaire. It is a short version of the English VascuQoL-25, and the questionnaire in Norwegian is adapted from a Swedish version.
Aim: To evaluate the VascuQol-6 questionnaire in a Norwegian population by testing against a Norwegian version of SF-36, a questionnaire for health-related QoL, as well as to evaluate results against clinical results as ankle-brachial index (ABI) and walking distance (i.e., claudication distance) at one month and one year after conservative or invasive (open surgery or endovascular) treatment.
Methods: 171 patients admitted to the outpatient/inpatient clinics of Akershus University Hospital and Østfold Hospital, Kalnes due to PAOD, all of whom are claudicants or patients with chronic critical limb ischemia, have been included. Patients have completed both questionnaires. Background data on medication, comorbidity, and tobacco smoking will be recorded as well as measurements of ABI and treadmill walking distance and status of the arteries by MR/CT angiography.

Current status: Two papers have been published in 2016 and 2017. Data for a third paper has been analyzed, and a paper was submitted in 2019.
The validated Vascuquol-6 questionnaire has been implemented and is a part of the Norwegian Vascular Surgery Registry (NORKAR).

The vulnerable plaque
We have been collaborating with researchers at the Department of Neurology, Nuclear medicine, Physics, Thoracic Surgery (Oslo University Hospital) in a study on "the vulnerable carotid plaque".
K Skagen MD, K Johnsrud MD, K Evensen MD, H Scott MD PhD, K Krohg-Sørensen MD PhD, F Reier-Nilsen MD, A Skretting PhD, JG Fjeld MD PhD, M Skjelland MD PhD, D Russell MD PhD, J Wesche MD PhD.

Background: Thrombo-embolic strokes due to atherosclerotic plaques at the carotid bifurcation are effectively preventable by carotid endarterectomy. In current clinical practice patient selection for carotid endarterectomy is based on the severity of luminal stenosis. However, there is increasing evidence that the degree stenosis alone is not the best predictor of stroke risk. Plaque inflammation is thought to be an important marker of plaque vulnerability and increased stroke risk. There is therefore growing interest in imaging inflammation and metabolic activity within the atherosclerotic plaques using 2-deoxy-2- [18F] fluoro-D-glucose (18F-FDG) positron emission tomography/computed tomography (PET/CT).
Aim: The aim of this study was to assess the level of agreement between 18F-FDG uptake, cerebrovascular symptoms, plaque ultrasound echogenicity and histological assessments of plaque inflammation
Methods: Thirty-six consecutive patients with ≥70% carotid stenosis scheduled for carotid endarterectomy were included. Plaques were defined as symptomatic when associated with ipsilateral cerebral ischemic symptoms within 30 days prior to inclusion. All patients underwent a clinical neurological examination, Colour Duplex ultrasound, 18F-FDG PET/CT and blood tests less than 24 hours prior to endarterectomy. Plaques were assessed histologically following endarterectomy with regard to the amount of inflammation. The level of agreement between 18F-FDG uptake quantified by maximum standardized uptake values (Mean SUVmax and SUVmax) and target-to-background ratio (TBR), symptoms, plaque echolucency on ultrasound, and histological evidence of inflammation were assessed.
We have also started preparation for new related projects on the relationship between the vulnerable carotid plaque and the role of oral and gut bacteria.
Current status: Papers were published in 2015 and 2016. Inclusion of patients for the gut and oral bacteria study started fall 2018 and is ongoing.

Master degree study being undertaken

Senior workers, can good leadership keep them in work longer?
Master in Public Administration, OsloMet
Hanne Bøhler and Marianne Volden

Abstract: In this study we examine if leader`s social relationship to the employees (SLMX) affect the intended retirement age. We have tested two hypotheses. This has been done by conducting a survey at a university hospital. We have used validated questions to test if a good leader-employee-relation affects the intended retirement age. We have also tested if the leader-employee-relation is affected by mediating factors as selection, optimization and compensation strategies and by extension, influence the intended retirement age. Our survey does not support our hypotheses. As we discuss in the thesis, the decision regarding retirement age is probably very complex and consist of many factors. The survey supports that selection, optimization and compensation strategies strengthens the relation between manager and employee in a positive way. Finally, we discuss practical implications, the study`s limitation and suggestion for future research.
Background: Our task started with a concern about a large drop in good competence in a high-tech hospital. We experienced a loss of valuable skills and work capacity (resource) when the experienced and oldest employees chose to retire on a contractual pension (AFP).
Research Question: Is there a connection between a good manager-employee relationship and the employee's desire to be professionally active longer, and can this connection in that case be explained by the fact that good manager-employee relationships provide an increased experience of available mastery resources?
Methodology: We have carried out a cross-sectional survey that forms a snapshot, and do not follow the respondents over time. We used an electronic questionnaire to obtain data for the survey. We used Questback for this purpose. We have used SPSS to analyze our data material. Where it was natural, the variables were converted to average variables. We performed a descriptive analysis to gain insight into the variables' averages, frequency, and standard deviations. In addition, we performed a correlation analysis to examine any correlations between our variables. We also examined the reliability level of the variables.

Urology Research Group

Head: Associate Professor Stig Müller

University employee:	Research fellows:
Associate Professor Stig Müller	Karol Axcrona
	Anja Løvvik
	Tor Erik Sand
	Manuela Estop-Garanto
	Frode Nilsen

Publications (peer reviewed)

Carm KT, Hoff AM, Bakken AC, Axcrona U, **Axcrona K**, Lothe RA, Skotheim RI, Løvf M. Interfocal heterogeneity challenges the clinical usefulness of molecular classification of primary prostate cancer. Sci Rep. 2019 Sep 19;9(1):13579.

Kravdal G, **Helgø D**, Moe MK. Kidney stone compositions and frequencies in a Norwegian population. Scand J Urol. 2019 Apr - Jun;53(2-3):139-144.

Page EC, Bancroft EK, Brook MN et al (including **Axcrona K**), IMPACT Study Collaborators. Interim Results from the IMPACT Study: Evidence for Prostate-specific Antigen Screening in BRCA2 Mutation Carriers. Eur Urol. 2019 Dec;76(6):831-842.

Abstracts and posters

Løfsgaard L, **Sand TE**, **Løvvik A**, **Lund RL**, **Kornbak OJ.** Bladder pain caused by after contractions successfully treated with sacral neuromodulation. The Norwegian Surgical Society Annual Meeting, Oslo, October 2019.

Ongoing research projects

Reproducibility of multiparametric MRI in men with elevated PSA
Stig Müller Associate Professor MD PhD, Jonn Terje Geitung MD, Clare Allen MD (University College Hospitals, London), Jonatan Engman MD (Skåne University Hospital, Malmø).

Background: Since January 2015, all men referred to our department due to elevated or other suspicion of prostate cancer undergo MRI. During the first 6 months, 126 patients were referred to another center for MR-targeted biopsies. Before these, a new MRI was performed at the other center.
Aims: Evaluate the level of agreement between two MRIs before biopsy.
Methods: The analysis of the MRI reports showed very poor level of agreement. The MRIs of the 126 patients will be reviewed in a blinded fashion by 3 independent radiologists. Collaboration with Skåne University Hospital, Malmø, and University College Hospital London.
Current status: Ongoing.

Erectile Dysfunction and Urgency incontinence in the Normal Population (The Tromsø 7-study)
Stig Müller Associate Professor MD PhD, Anja Løvvik MD, Erling Aarsæther Associate Professor MD PhD (University Hospital North Norway), Hitendra Patel MD PhD (University Hospital North Norway).

Background: Erectile dysfunction and Urgency Incontinence are common urological bothers and incidence data in Norway are lacking. Both erectile dysfunction and urgency incontinence are associated with other disease.
Aims: Investigate the incidence and association with other disease e.g. cardiovascular disease for erectile dysfunction and urgency incontinence.
Methods: In the seventh edition of the Tromsø Study, a large epidemiological study of Tromsø´s population, 40000 subjects have been invited to participate. Standardaized questionnaires for erectile dysfunction and voiding problems were included in the study and will be analyzed with respect to demographical data and interactions with other symptoms and disease.
Current status: Ongoing.

Molecular profiling of human renal cell cancer
Jan Oldenburg MD PhD, Glenny Cecilie Alfsen Associate Professor MD PhD, Jürgen Geisler Professor MD PhD, Daniel Heinrich MD, Stig Müller Associate Professor MD PhD, Frode Nilsen MD, Vahid Bemanian PhD, Katarina Puco MD, Andliena Tahiri PhD.

Background: Metastatic Renal cell cancer (mRCC) portends a poor prognosis. Novel insights in basic tumor biology are urgently needed in order to improve treatment outcomes. Tumor kinases have become attractive targets for intervention and currently constitute the treatment basis of mRCC. This project is a collaboration between the Departments of Urology, Oncology, Pathology, Gene Technology and EPIGEN.
Methods: Our department established a biobank for renal cancer in 2012. Using formaline-fixed paraffin-embedded and/or fresh, frozen kidney biopsies from kidney tumors and normal kidney tissue, the project will utilize Tyrosin Kinome analysis, Next generation sequencing, Immune profiles of renal cancer and Virus infections in renal cancer.
Aims:
1: Corroboration of recently described different genotypes of clear-cell (cc) RCC.
2: Identification of pathogenetic driver lesions by comparing gene (sequence, expression, regulation) of normal, i.e. non malignant tissue, with malignant RCC from the same patient.
3: Assessment of the association between the kinome and gene: sequence, expression, regulation.
Current status: Ongoing

Department of Palliative Medicine

University employee:

Olav Magnus Fredheim (NTNU)

Two of the nine senior consultants employed through 2019 (Siri Steine and Olav Fredheim) have research experience above PhD-level. Belal Aljabri also holds a PhD.

From January 2014 the department has used 15-20% of a senior consultant position for research. This position has been filled by Olav Fredheim who also holds a position as professor of anaesthesiology and pain medicine at NTNU.

During 2019 four original papers with affiliation to the department were published. Three of these papers were in level-2 publications. At the end of 2019 one original paper based on data collected in Department of Palliative Medicine was submitted for publication. This was the first publication based on clinical data collected at Department of Palliative Medicine, and three of four authors are employed at Department of Palliative Medicine.

Publications (peer reviewed)

Birke H, Sjøgren P, **Fredheim O**, Ekholm O, Clausen T, Skurtveit S. Tramadol use in Norway. A register based study. Pharmacoepidemiology and Drug Safety 2019; 28: 54-61.

Fredheim OM, Skurtveit S, Handal M, Hjellvik V. A complete national cohort study ofprescriptions of analgesics and benzodiazepines to cancer survivors in Norway 10 years after diagnosis. Pain. 2019 Apr;160(4):852-859.

Fredheim OMS, Kaasa S, Borchgrevink PC. Smertebehandling ved kronisk kreftsykdom. Tidsskr Nor Laegeforen. 2019 Sep 23;139(13).

Fredheim OMS, Magelssen M. Ethical dilemmas concerning suicidality in patients with short life expectancy. Tidsskr Nor Laegeforen. 2019 Nov 4;139(16).

Nøstdahl T, Bernklev T, **Fredheim OM**, Paddison JS, Raeder J. Defining the cut-off point of clinically significant postoperative fatigue in three common fatigue scales. Qual Life Res. 2019 Apr;28(4):991-1003.

Ongoing and planned research projects

- Olav Fredheim conducts pharmacoepidemiological studies of analgesics in cooperation with National Institute of Public Health (FHI), NTNU and UiO. For pharmacoepidemiological research there is also cooperation with professor Per Sjøgrens' research group in Copenhagen.
- In 2017 we developed a protocol for a clinical randomized controlled study comparing intravenous and subcutaneous morphine for patient controlled analgesia in cancer pain. This protocol was used for application for Strategic research funding at Ahus, but in spite of high quality scores the project did not receive funding. In 2019 we submitted an application for funding of this study to the Dam-fundation. The application was supported by Norwegian Cancer Society, but did not receive funding. We are still working on funding for this project.
- **Do not resuscitate orders and end of life decisions**
  Participants: Olav Fredheim MD PhD (project leader), Siri Steine MD PhD (supervisor), Torstein Michelet MD, Hans van der Werff MD.
  The study is a descriptive study of the clinical practice regarding do-not-resuscitate orders and life prolonging treatments during the last days of life in patients dying at Ahus. A death cohort of 600 patients will be studied. Focus will be on whether decisions not to start life-prolonging treatment are made at the time such treatments would be futile or whether such treatment limitations are not decided until the patient is dying.
  The study received NOK 50,000 from "publication money" at Surgical Division, Ahus. Data collection has been completed and data analysis has started.

Research group for quality and patient safety
Division of Surgery

Head: Anne Karin Lindahl

University employee:	Research fellows:
Professor II Anne Karin Lindahl	Hirut Mergarsa, Ethiopia (Saccade project, University of Oslo)
Professor II Marie Elstrøm Engh	Rebecka Normann (Lovisenberg diakonale høyskole)
Professor II Asbjørn Årøen	Mona Haugum (Norwegian Institute for Public Health)
Associate Professor Juha Silvola	
Associate Professor Jarlis Wesche	

Other members at Akershus University Hospital:

Ellen Catharina Deilkås	Health Services Research Unit
Astrid Marie Berg	Department of Anaesthesia and Intensive care
Hege Krippendorff	Department of Anaesthesia and Intensive care
Pernille Schjønsby	Department of Obstetrics and Gynecology
Anne Werner	Health Services Research Unit
Morten Glasø	Department of Collaboration and Health Promotion
Gunnvor Marum	Department of Quality and Patient Safety
Marie Brudvik	Department of Quality and Patient Safety
Marit Kise	Medicine and Health Sciences
Lena Bjerknes Larsen	Surgical Division

Members outside of Akershus University Hospital:	
Researcher Anne-Kari Johannessen	Oslo Metropolitan University
Associate Professor Lisbeth Thoresen	Department of Medical Ethics, University of Oslo
Researcher Jon Helgeland	Norwegian Institute for Public Health
Head for department Øyvind Andresen Bjertnæs	Norwegian Institute for Public Health
Knut Magne Augestad	Helse Nord, and Department of Surgery, Columbia Presbyterian Hospital, New York, USA
Researcher Olaf Holmboe	Norwegian Institute for Public Health
Researcher Katrine Damgård Skyrud	Norwegian Institute for Public Health
Øystein Flesland	Norwegian Directorate of Health

The research group was established late in 2018. There is great interest in research for quality and patient safety across the hospital, and the research group is therefore multidisciplinary. There are several ongoing projects, regarding Surgical global trigger tool, effects of emergency outreach teams, quality indicators for surgery, patient experiences especially with surgical services, and patient safety in maternity wards in Ethiopia. Cooperation with researchers within Akershus University Hospital, University of Oslo and Oslo Metropolitan University, as well as external partners, will develop further.

Publications (peer reviewed)

Haugum M, Iversen HH, Helgeland J, **Lindahl AK**, Bjertnaes O. Patient experiences with interdisciplinary treatment for substance dependence: an assessment of quality indicators based on two national surveys in Norway. Patient Prefer Adherence. 2019 Apr 5;13:453-464.

Helgeland J, Tomic O, Hansen TM, Kristoffersen DT, Hassani S, **Lindahl AK**. Postoperative wound dehiscence after laparotomy: a useful healthcare quality indicator? A cohort study based on Norwegian hospital administrative data. BMJ Open. 2019 Apr 3;9(4):e026422.

Abstracts and posters

Augestad KM, Helgeland J, Skyrud K, Keller D, **Lindahl AK**. Benchmarking av bløtdelskirurgi ved bruk av HARM score. The Norwegian Surgical Society Annual Meeting, Oslo, October 2019.

Academic assignments

Arranged meeting
Research symposium, Akershus University Hospital, May 2019.

Other academic activities
Main supervisor for Hirut Mergarsa, University of Oslo. **Lindahl AK**.
Co-supervisor for Mona Haugum, Norwegian Institute for Public Health. **Lindahl AK**.
Co-supervisor for Rebecka Maria Norman in her thesis “Measuring nursing practices in Norwegian nursing homes. Identification, modifications and evaluation of instruments”, University of Oslo, September 2019. **Lindahl AK**.

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