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Indhold

Exceptional Young Scientist

Abstract: #i-vii

i: From bench to bedside: Developing novel and safe chimeric antigen receptor (CAR) T cell therapy to treat lymphoma patients

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Abstract text
Chimeric antigen receptor (CAR) therapy targeting CD19 has been successful in treating haematological malignancies, but some patients relapse with CD19-negative cancer cells. Additionally, CAR-T therapy is currently under-utilized in Denmark. It is therefore of interest to develop and deliver novel CAR therapies to Danish patients via an academic hospital-based centre.

BAFF receptor (BAFF-R) play an important role in B-cell survival and is expressed on malignant B cells. We find BAFF-R an attractive target for CAR therapy and therefore developed a BAFF-R-specific CAR and bispecific CARs targeting both CD19 and BAFF-R.

Materials and methods:
Monoclonal antibodies against BAFF-R were generated, specificity tested, binding domains identified and inserted into lentiviral vectors. T cells were transduced using a lentiviral system, expanded, and used for experiments in vitro and in vivo. Spectral flow cytometry, RNAseq, and advanced microscopy were used for analysis. Clinical-grade CAR-T products were generated in dedicated clean rooms using closed-loop systems.

Results
Single-cell RNAseq and high-dimensional flow cytometry confirmed that BAFF-R was found on normal B-cell and lymphomas. We generated monoclonal antibodies against BAFF-R and identified one with little cross reactivity towards other proteins and cell-types. BAFF-R-specific and bispecific CD19/BAFFR CARs were constructed. Extensive examination of T cell activation and direct killing of cancer cells showed that our in-house developed CARs performed as well as a commercially available CD19-specific CAR. In a murine lymphoma model, we show that both BAFF-R- and CD19-specific CARs control tumour-growth. Furthermore, a safety-switch was developed to allow termination of CAR T cells in case of off-target effects. T cells could be generated in sufficient quantality for clinical use in humans.

Conclusion
BAFF-R and CD19/BAFF-R bispecific CARs represent an exciting therapy to test in phase I clinical studies.

ii: Risks and benefits of a national adoption of sentinel node mapping in low and intermediate risk endometrial cancer

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Abstract text
Introduction: Surgical staging of endometrial cancer (EC) serves to allocate women with lymph node metastases to adjuvant therapy. Sentinel lymph node (SLN) mapping is a sensitive staging procedure that identifies small-volume metastases. SLN mapping has shown high accuracy in women with EC with low- or intermediate-risk (LR or IR) of lymph node metastases. It remains unknown, whether a national adoption of SLN mapping with several centers and surgeons involved, to all women with LR and IR EC, prompts more benefits than harms.

Materials and methods:
We undertook a national prospective study of SLN-mapping in women with LR and IR EC from March 2017-February 2022. The study was performed in a real-life clinical setting. SLN detection rate and the incidence of isolated tumor cells, micro- and macro-metastases were investigated. Peri- and postoperative complications were registered and classified according to Clavien-Dindo. Lymphedema was evaluated by validated patient-reported outcome measures at baseline and three months postoperatively. Lymphedema was assessed as a mean difference score and as an incidence of swelling and heaviness.

Results:
627 women were included in the analyses, 458 with LR- and 169 with IR EC. The overall incidence of lymph node metastases was 9.3% (58/627); 4.4% (20/458) in the LR- and 22.5% (38/169) in the IR group. Only 0.3% (2/627) experienced an intraoperative complication associated with SLN mapping. The incidence of postoperative complications was 8% (50/627). The mean difference score of lymphedema was below the threshold for importance 4.3/100 CI: (2.6-5.9), and the incidence of swelling and heaviness was 5.2% and 6.1%, respectively.

Conclusion:
SLN mapping is a safe staging procedure in women with EC of LR and IR, carrying a very low risk of early lymphedema, peri- and postoperative complications. The study has led to a national change in clinical practice and contributed to a more correct treatment allocation for both groups.

iii: Stage-specific risk of recurrence and death from melanoma in Denmark from 2008 to 2021: A national observational cohort study of 25,720 stage IA-IV patients

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Abstract text
Introduction: To ensure optimal treatment and surveillance in melanoma, knowledge of the stage-specific risk of recurrence, mortality, and recurrence patterns is needed. This study aimed to estimate stage-specific recurrence and melanoma-specific (MS) mortality rates, predict absolute stage-specific risks of recurrence and mortality and to describe stage-specific recurrence patterns, including conditional rates.

Materials and methods:
We included all patients diagnosed with first-time cutaneous melanoma in 2008-2019 from the national Danish Melanoma Database (DMD). Data regarding recurrence and mortality were included from the DMD and Danish national health registries. Patients were followed from primary treatment until December 31st, 2021.

Results:
We followed 25,720 patients for a median of 5.9 years. Stage IIB-IIC patients had higher age and more comorbidities at diagnosis. A total of 10.6% of patients developed recurrence; first recurrence was distant in 56.6% of patients. For stages IIIA and IIIB, the risk of recurrence was comparable to stages IIB and IIC, respectively (29.7% vs. 33.2% and 35.9% vs. 36.8%), and melanoma-specific mortality was comparable to stages IIA and IIB, respectively (13.0% vs. 13.6% and 18.4% vs. 22.0%). Risk patterns persisted in Cause-specific Hazards models.

Conclusions:
This nationwide, population-based cohort study found that the current staging system does not accurately reflect the risk of recurrence and mortality in melanoma. The high proportion of distant recurrences suggests that hematogenous spread is a more common metastatic pathway than previously assumed and surveillance with routine functional/cross-sectional imaging should be considered for stages IIB-IV. High age and comorbidity index in stage IIB-IIC patients could challenge eligibility for adjuvant treatment. Future efforts should be put towards developing new tools for risk-stratification and determining the survival effect of routine imaging in surveillance.

iv: Circulating tumor DNA detection by whole-genome sequencing enables recurrence prediction in colorectal cancer

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Abstract text
Introduction: The detection of circulating tumor DNA (ctDNA) indicates the presence of cancer. Many ctDNA detection methods rely on the detection of a few genomic targets, which can be challenging at low ctDNA copy numbers, as it becomes stochastic whether the sample contains ctDNA from the targeted loci. To address this challenge, we developed C2inform; a whole-genome sequencing (WGS) approach, which identifies ctDNA based on thousands of genomic alterations. In this study, we evaluated the performance and reproducibility of C2inform.

Materials and methods:
The study involved 144 patients with colorectal cancer with serial plasma samples (n=1283) for up to three years. WGS of tumor and normal DNA was used to establish a mutational signature for each patient. Enhanced by an error suppression model, this signature was then used to screen 20x WGS plasma cfDNA profiles for the presence of ctDNA. To assess the reproducibility, paired samples (n=2x172) were processed in two independent laboratories, while bioinformatics processing was identical.

Results:
We found a strong association between shorter recurrence-free survival (RFS) and ctDNA detection after surgery (HR 6.6, 95% CI 3.1-13.9, p<0.0001) and after adjuvant chemotherapy (HR 29.2, 95%-CI 10.2-83.8; p<0.0001). Likewise, serial ctDNA analysis after the end of definitive treatment was associated with shorter RFS (HR 23.5, 95%-CI 14.3-38.7, p<0.0001). The cumulative incidence of ctDNA detection in recurrence patients was 95%, meaning that ctDNA was eventually detected in nearly all recurrence patients. Analysis of paired samples showed excellent reproducibility with a high agreement between both ctDNA detection (Cohens Kappa=0.9) and the estimated ctDNA levels (r2=0.99).

Conclusion:
C2inform is a promising tool for predicting recurrence and guiding clinical decision-making during the postsurgical management of colorectal cancer patients. Furthermore, C2inform demonstrated excellent inter-lab reproducibility.

v: Klinik for Senfølger efter Kræft i Region Sjælland – et års kliniske erfaringer

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Abstract text
Introduktion: Mange kræftoverlevere lever med betydelige senfølger. Hidtil er danske kræftoverlevere ikke blevet udredt eller behandlet for generelle senfølger i hospitalsregi. Regional Klinik for Senfølger efter Kræft (KSK) åbnede i november 2021 ved Sjællands Universitetshospital, Roskilde, og data fra et års kliniske erfaringer præsenteres.

Materialer og Metoder:
Kliniske og socioøkonomiske data samt patientrapporterede data om senfølger (EORTC QLQ-SURV100) er opgjort.

Resultater:
Blandt alle patienter med forløb i klinikken (n= 136) var hovedparten kvinder (87%), 61% havde en videregående uddannelse, hvilket gælder 36% af den generelle danske befolkning. Patienter med senfølger efter brystkræft var overrepræsenteret (63%) men også patienter med senfølger efter lymfom, lunge, hoved-hals, colorectal, ventrikel, cervix, prostata, ovarie, endometrie cancer, malignt melanom, leukæmi og sarkom havde forløb i klinikken. Patienterne rapporterede mediant 6 forskellige senfølger, hyppigst fatigue (71%), kognitive vanskeligheder (66%), påvirket arbejdsevne (53%), kemoterapi-induceret perifer neuropati (51%), lokoregionale gener (51%), og søvnproblemer 41%). I KSK tilbydes afklaring af, hvilke symptomer, der er senfølger, iværksætte/justere analgetika, psykoedukation ved sygeplejerske og/eller ergoterapeut, individuelle samtaleforløb mhp. empowerment, gruppeforløb med kognitiv terapi for insomni og mindfulness, samt henvisning til øvrige behandlingsmuligheder tværsektorielt. Vi har patientrapporterede data på 75 af de første 136 patienter, men endnu ingen evaluering af effekten 6, 12 og 24 måneder efter afsluttet forløb. På Danske Kræftforskningsdage 2023 præsenteres de første effektmålinger.

Konklusioner:
Patienter henvist til KSK er belastet af mange samtidige senfølger, og forskellige interventioner afprøves og udvikles iht. generelle senfølger. Kvinder med senfølger efter brystkræft samt mennesker med videregående uddannelser ser ud til i højere grad at blive henvist.

vi: Hvordan støtter den praktiserende læge bedst op om kræftpatienter, som også er i en socialt sårbar livssituation?

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Abstract text
Der er social ulighed i bl.a. rehabilitering og overlevelse efter kræft; en ulighed som er stadig stigende. Patienter i socialt sårbare positioner er ekstra tids- og ressourcekrævende, blandt andet fordi deres livssituation ofte er præget af komplekse problemer. Der er derfor et stort behov for at vi støtter ekstra op om de patienter, som kan have sværest ved at navigere i sundhedsvæsenet.

Metode:
Et kvalitativt udviklingsstudie, hvor 8 praktiserende læger, 7 patienter samt 2 onkologer har deltaget. Projektet har bestået af 4 faser: afdækning, udvikling, afprøvning og evaluering. Der er anvendt semistrukturerede interviews, workshop og observation.

Resultater:
Patienterne vil ikke forstyrre i almen praksis, og samtidig ved de ikke nødvendigvis hvad de kan forvente af sundhedsvæsenet når de bliver alvorligt syge. Samarbejde på tværs af hospital og almen praksis er ifølge patienterne vigtigt, da kræftopfølgning ved egen læge efter endt behandling er svær, hvis egen læge ikke har været en del af kræftforløbet. De praktiserende læger oplever at mangle overblik over patienternes kræftforløb. Det forhindrer dem i at være proaktive og direkte overfor patienterne. De mangler information om ny diagnose, afsluttet behandlingsforløb og overgang fra kurativ til pallierende behandling. Samtidig mangler de også information om tilbud til socialt sårbare patienter.

Konklusion:
Patienternes fokus er på relationelle aspekter, hvor de praktiserende lægers fokus er på organisatoriske udfordringer, som begrænser deres muligheder for at støtte patienterne, og være opdaterede og nærværende, som patienterne efterspørger. På tværs af de praktiserende læger og onkologerne ønskes et tættere samarbejde om socialt sårbare patienter. Ved kræftforskningsdagene vil det være muligt at præsentere støttemodellen som en del af en poster, med perspektiver fra læger og socialt sårbare patienter ift. behov og udfordringer ifm. støtte igennem et kræftforløb.

vii: Shared Decision Making with breast cancer patients - does it work?

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Abstract text
Shared decision making (SDM) is a patient-engaging process advocated especially for preference-sensitive decisions, such as adjuvant treatment after breast cancer. The objective of this trial was to investigate whether the Decision Helper (DH), an in-consultation patient decision aid, increases patient engagement in decisions regarding adjuvant irradiation.

Methods:
This was a multicenter, randomized, open-label, active-controlled, phase III trial from the Danish Breast Cancer Group (Clinicaltrial.gov identifier: NCT04177628). Oncologists at four radiotherapy units were randomized to either practice SDM using the DH or usual practice. Candidates for adjuvant whole-breast irradiation after breast-conserving surgery were eligible for inclusion. The primary endpoint was patient-reported patient engagement in the decision process assessed with the Shared Decision Making Questionnaire 9 tool (SDM-Q-9). Other endpoints included oncologist-reported patient-engagement, decisional conflict, and fear of cancer recurrence.

Results:
Of the 674 included patients, 635 (94.2%) completed the SDM-Q-9 (range 0-100): Patients in the SDM cohort (N:400) reported higher level of engagement (median = 80; IQR= 68.9:94.4) than the control group (N:274) (71.1; IQR=55.6:82.2; p< 0.0001). Oncologist-reported patient engagement was also higher in the SDM group (93.3; IQR=82.2:100) than in the control group (73.3; IQR=60.0:84.4) (p < 0.0001). Patients in the SDM group reported significantly less decisional conflict after the consultation compared to controls. No between-group differences in fear of cancer recurrence was found.

Conclusion:
Patient engagement in medical decision-making is significantly improved with the use of an in-consult patient decision aid. The present trial may help pave the way for future implementation of SDM in oncology and beyond. The DH on adjuvant whole-breast irradiation decision making may be recommended as standard care.

Flash Talks:

Poster #I-VII

l: Detection of lung cancer based on smoking history and standard blood sample analyses

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Abstract text
Lung cancer (LC) is the leading cause of cancer death due to late-stage diagnosis, and screening programs are gradually introduced in several countries. Several AI-based risk models have been presented to refine LC screening criteria, but most are based on unrepresentative populations, or data difficult to obtain from general practice. This study presents a risk model based on standard blood sample analysis as well as smoking history from a population at risk.

Materials and Methods:
All patients undergoing examinations due to a risk of LC in the Region of Southern Denmark within 2008-2019 were included. Several AI-based models were validated on a subset of patients with complete results. To create a gold standard, five LC specialists, presented with the same information, classified 200 patients.

Results:
From a total of 38,944 patients, data on smoking and results of at least 17 analyses were available on 9,940 patients, 2505 (25%) with LC and 7435 (75%) without LC. The best performance was obtained with a light gradient-boosting machine, with an F1-score of 54% on the validation dataset and an ROC-AUC of 77%. The model outperformed the LC specialists with a sensitivity of 72% compared to 67% for the specialists, at a matched specificity of 70%. The most important predictors of LC were active/former smoking status, high age, and an elevation of neutrophils, LDH and calcium.

Conclusion:
This study presents a prediction model based on smoking status and regular blood sample analyses, generated on a relevant population at risk. The model demonstrates moderate performance, and outperformed doctors presented with the same information. This emphasizes the relevance to consider both clinical and laboratory data in future risk assessment models. A high performing risk model able to provide decision support to the general practitioner would be of great value, facilitating earlier referral of potential LC-patients.

ll: Compassion training for oncology staff: A pilot study to alleviate high emotional distress

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Abstract text
We assessed compassion as a means to alleviate high emotional healthcare worker distress.

Material and Methods:
Staff at two oncology departments had four weeks of compassion training (CT). At baseline and at end of training, participants anonymously completed Self-Compassion and ProQOL Health questionnaires. Two focus-group interviews (FGI) were conducted using Interpretive Description. Wilcoxon signed-rank test and Mann-Whitney test were used, as appropriate.

Results:
A total of 22 staff participated. Participants with only baseline data (N=9) vs completed training dataset (N=13) had statistically significantly lower scores for the following Self-Compassion items (mean scores): Self-Kindness (2.8 vs 3.7; P=0.04), Common Humanity (3.0 vs 3.9; P=0.036), Self-Judgment (2.9 vs 3.7; P=0.036), Isolation (2.9 vs 4.1; P=0.001), Over-Identification (2.9 vs 3.4; P=0.030), overall Self-Compassion Score (3.0 vs 3.8; P=0.004); and for the following ProQOL Health items (mean scores): Compassion Satisfaction (22.7 vs 26.9; P=0.011), Perceived Support (19.6 vs 24.8; P=0.007); and higher scores for Burnout (19.2 vs 12.7; P=0.001), Secondary Traumatic Stress (14.0 vs 10.6; P=0.036), and Compassion Fatigue (15.4 vs 11.6; P=0.001), respectively.
Four weeks of CT resulted in significantly improved Self-Compassion Items (mean): Self-Kindness (3.7 vs 4.0; P=0.028), Common Humanity (3.9 vs 4.1; P=0.013), Self-Judgment (3.7 vs 4.0; P=0.05) and overall Self-Compassion Score (3.8 vs 4.0; P=0.019).
FGI revealed that CT resulted in a calm presence; leader support and persistence were essential for CT success; staff had misconceptions of the professional role.

Conclusion:
Four weeks of CT significantly improved staff Self-Compassion. Staff that did not complete CT had significantly lower Self-Compassion and Professional quality of life. For further progress, leader support are critical, as well as a staff mindset, where focus on own mental health is acceptable.

lll: National consensus based automatic delineation of thoracic organs at risk

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Abstract text
Introduction
Manual delineation of organs at risk (OAR) in radiation therapy (RT) planning is timeconsuming and subject to variation. We developed an algorithm for automated delineation of thoracic OAR based on national consensus.

Methods:
Ten oncologists and two radiographers from different RT departments reached national consensus on delineation of nine thoracic OAR (trachea, bronchi, heart, aorta, left/right lung, esophagus, spinal cord and canal). Ground truth OAR sets were manually delineated on contrast enhanced 4D-CTs from 10 lung cancer patients: 5 independent sets per patient. From these, STAPLE average contours were derived. Further, a training set of thoracic OAR was delineated on 100 lung cancer patients. A U-Net AI algorithm (AI) was trained in collaboration with MIM software. The AI auto-delineated OAR on the same initial 10 scans. Both manual and AI OARs were evaluated visually by 5 oncologist/radiographers blinded to the OAR source. Additionally, manual and AI OARs were compared to the STAPLE contour using several metrics. Here surface Dice 1mm (SD1) were reported as median[range] of all delineators and all 10 patients.

Results:
Visual evaluation showed no or few corrections were needed for 88 % of all 90 AI OARs, while that was only the case for 80% of the manual OARs. Metrics comparing AI/Manual to a STAPLE structure based on the manual delineations showed similar median values for the AI and manual, but a larger variation in the manual. Median SD1 values for AI/Manual were 0.95[0.79-0.97]/0.94[0.74-0.99] for bronchi, 0.84[0.72-0.86]/0.88[0.62-0.97] esophagus and 0.88[0.59-0.9]/0.91[0.76-0.98] heart.

Conclusions:
We produced an AI for OAR delineations from national consensus. Visual evaluations show better performance of the AI algorithm compared to manual, while comparing metrics gave comparable results and generally high SD1 values. The AI will be implemented clinically to ensure consistent and fast OAR delineation under a strict national QA program.

lV: Outpatient laser ablation of recurrent NMIBC, a prospective feasibility study

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Abstract text
Introduction:
Non-muscle invasive bladder cancer (NMIBC) has a high yearly recurrence rate. Today, these tumors are treated with Trans Urethral Resection of Bladder Tumor (TURBT), in general anaesthesia. In general, patients with NMIBC tolerate repeat general anesthetics poorly due to morbidity and age. The need for less burdensome treatment modalities is imminent. The aim of this study is to investigate the feasibility and tolerability of the Thulium Fiber Laser in treatment of recurrent NMIBC in an outpatient setting.

Materials & Methods:
Patients with recurrent NMIBC were included prospectively from the department of urology at Aarhus university Hospital. The Laser Ablation (LA) is performed under local anaesthesia, which was instilled in the bladder one hour prior to the LA. The number, size and localization of the tumors are registered. Primary endpoint is the fraction of completed procedures without the need for TURBT. On the same day, the patient is asked to score the perioperative pain using the Visual Analogue Score. The 4- and 12-months recurrence rate are the secondary endpoints.

Results:
Until March 2023, 130 patients has been treated, 97 patients has undergone the 4 months follow up after the LA. The most advanced histology since the diagnosis of bladder cancer was Ta low grade accounting for approx. 65 %, Ta high grade for 16 %, CIS for approx. 10 % and PTa1a for approx. 9 %. Ta low grade accounts for approx. 77 % of the most recent histology prior to the LA in the 97 patients. Mean tumor size is 7 mm. 5 % of the patients had perioperative pain and 98 % of the procedures was completed as LA. Further, 2 patients were admitted to the hospital due to hematuria. The 4 months recurrence rate was 37 % and of these 31 % was “on site” recurrences.

Conclusions:
Our preliminary results show that, outpatient laser ablation of NMIBC using the Thulium Fiber Laser is feasible and well tolerated with 4 months recurrence rates comparable to conventional TURBT.

V: Bone marrow biopsy is no longer needed as a part of the diagnostic work-up of CNS lymphoma of DLBCL origin: Danish population-based retrospective study in the PET-CT era

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Abstract text
Introduction: Primary central nervous system (CNS) lymphoma (PCNSL) is a rare and aggressive disease. More than 90% of PCNSL belong to diffuse large B-cell lymphoma (DLBCL). Current diagnostic and staging guidelines recommend performing bone marrow (BM) biopsy (BMB) as a part of the initial work-up in patients with presumed PCNSL. However, the utility of BMB in the era of positron emission tomography (PET-CT) has been challenged over the years. It is not part of the initial staging in some lymphoma subtypes. We aimed to analyze BM findings in patients with presumed CNS lymphoma in whom PET-CT did not show signs of disease outside of CNS.

Methods:
A comprehensive Danish population-based registry search was performed to identify all patients with presumed CNS lymphoma of DLBCL histology. Our study included only patients with DLBCL in CNS with available BMB results and negative PET-CT for systemic lymphoma.
Results: In the final analysis of 1238 patients identified through the Danish Pathology Register, we included 300 patients meeting the inclusion criteria. Of them, 48 (16%) had a previous history of lymphoma, while 252 (84%) were diagnosed with PCNSL. No patients had DLBCL in the BMB, while 25 (8.3%) had discordant BMB findings without treatment influence. Thirteen patients (4.3%) had low-grade lymphoma, and nine (3%) had monoclonal B-cell lymphocytosis in the BMB. Singular cases were diagnosed with MGUS, smoldering myeloma, and an abnormality not B-cell-associated.

Conclusions:
The risk of overlooking clinically significant BM results in patients with CNS lymphoma of DLBCL histology and negative PET-CT scan is negligible. As we did not find any patient with DLBCL in the BMB, we recommend that BMB can be safely omitted in the diagnostic work-up in these patients. Therefore, optimizing healthcare resources by omitting BMB in diagnostic work-up of patients with CNS lymphoma is needed, and consecutive changes in (inter)national diagnostic recommendations are expected.

VI: Using a clinicopathologic and gene expression model to predict sentinel lymph node metastasis in primary cutaneous melanoma could reduce the rate of sentinel lymph node biopsies with >70%: a multicentre Danish cohort study

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Abstract text
Introduction:
Sentinel lymph node biopsy (SLNB) is the standard procedure for staging in primary cutaneous melanoma and is used to guide subsequent management. It is, however, an invasive procedure with associated risks and proper patient selection for SLNB remains a challenge; approx. 80% of SLNB are negative, with even higher negative rates in thin melanoma (T1) which account for the majority of cases. The clinicopathological and gene expression profile (CP-GEP) model was developed to identify low risk melanoma patients who may safely forgo SLNB. The model combines Breslow thickness and patient age with the expression of eight genes to classify patients as high or low-risk for nodal metastasis. This study presents data from an independent validation of the CP-GEP model in a multicentre Danish cohort.

Materials and Methods:
Archived FFPE primary melanoma tissue from 537 T1-T3 cutaneous melanoma patients was collected and analysed with CP-GEP. The patients had undergone SLNB between 2010 and 2015 at either of two university clinics in Denmark. The CP-GEP result was compared with the SLNB result, calculating the diagnostic value of CP-GEP for SLNB metastasis.

Results:
Median age at diagnosis was 58 years (interquartile range [IQR] 44-70) and median Breslow thickness was 1.3mm (IQR 0.95-1.82). The distribution of T1, T2 and T3 melanoma was 32.8%, 46.9% and 20.3%, respectively. The SLNB positivity rate was 18.1%. The CP-GEP model identified 219 (40.8%) patients as having a low risk for nodal metastasis with a NPV of 91.3%. When analysing the T1 subgroup (n=176) the CP-GEP low risk rate was 72.7% with a NPV of 94.5%.

Conclusion:
Results are in line with previous validation studies on European and US cohorts. However, this study contains the largest T1 subgroup validation with a potential very high SLNB reduction rate. The CP-GEP is a promising risk stratification tool for melanoma patients, potentially preventing unnecessary surgery in a large group of patients.

Clinical Trials I

#1-11

#1. Treatment of peritoneal metastasis with Pressurized IntraPeritoneal Aerosol Chemotherapy – Results from the prospective PIPAC-OPC2 study

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Abstract text

Introduction
Pressurized IntraPeritoneal Aerosol Chemotherapy (PIPAC) is a local treatment of peritoneal metastasis (PM). Prospective data are scarce. Evaluation of treatment response remains difficult. This study evaluated the use of Peritoneal Regression Grading Score (PRGS) and its prognostic value.

Materials and Methods
Prospective, controlled phase II trial in patients with PM from gastrointestinal, gynaecological, hepatopancreatobiliary, primary peritoneal, or unknown primary cancer. Patients in performance status 0-1, a non-obstructed gastrointestinal tract, and maximum one extraperitoneal metastasis were eligible. Colorectal or appendiceal PM had PIPAC with oxaliplatin, other primaries had PIPAC with cisplatin and doxorubicin. Biopsies were taken at each PIPAC, and evaluated using the PRGS. Quality of life questionnaires at baseline and after three PIPACs.

Results
110 patients were treated with 336 PIPACs (median 3, range 1-12). One hundred patients had prior palliative chemotherapy, 45 patients received bidirectional treatment. Complete or major histological response to treatment (PRGS 1-2) was observed in 38 patients (61%) who had three PIPACs, which was the only independent prognostic factor in a multivariate analysis. The mOS from PIPAC 1 was 10 months, patients with PM from gastric, colorectal, and pancreatic cancer had a mOS of 7.4 months, 16.7 months, and 8.2 months. Global health scores were significantly reduced, but patients were less fatigued, nauseated, constipated, and had better appetite after three PIPACs.

Conclusions
PIPAC with oxaliplatin or cisplatin and doxorubicin was able to induce a major or complete histological response during three PIPACs, which may provide significant prognostic information, both at baseline and after treatment.

#2 DaBlaCa-16: Retrosigmoid versus conventional ileal conduit in robot-assisted radical cystectomy, a randomized controlled trial – 90-day postoperative complications in the MOSAIC trial

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Abstract text
Introduction:
Radical cystectomy (RC) with ileal conduit is the gold standard when treating muscleinvasive bladder cancer. Up to 15% of patients undergoing RC develop benign ureterenteric strictures within two years, especially on the left side where the ureter is passing behind the sigmoid colon. A modified retrosigmoid ileal conduit has been associated with reduced rate of left-sided strictures. The retrosigmoid ileal conduit has never been investigated in a randomized controlled setting. This study aims to evaluate the safety of robot-assisted RC with the retrosigmoid ileal conduit compared with the conventional ileal conduit in bladder cancer treatment.

Methods:
The MOSAIC study is a randomized multicenter trial. Patients were randomized 1:1 between intracorporeal conventional ileal conduit ad modum Bricker or retrosigmoid ileal conduit, where the ileal segment was elongated to go behind the sigmoid, making it possible to shorten the left ureter to the same level as on the right side. The primary endpoint is left-sided strictures within two years, pending results. This study reports the secondary outcome of 90-day postoperative complications using the Clavien Dindo (CD) Classification system. Patients' individual pre and postoperative renal function was assessed using serum-creatinine and renography.

Results:
Recruitment was completed (august 2022) with 303 patients included. Retrosigmoid ileal conduit was performed in 137 patients. The RR of CD III or higher was 1.124 [0.964;1.311] (P=0.365) in the retrosigmoid group compared with the conventional group. Intention-to-treat analyses showed no statistically significant difference in operating time, bleeding, bowel function, length of stay or effect on renal function within 90 days.

Conclusion:
The intracorporeal retrosigmoid ileal conduit with robot-assisted RC was technically feasible and there were no differences in 90-day complications compared with the conventional ileal conduit ad modum Bricker

#3 The use of laparoscopic ultrasound during PIPAC directed treatment of unresectable peritoneal metastasis.

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Abstract text
Introduction:
Peritoneal metastasis (PM) represents end stage disease in many solid tumors. Pressurized intraperitoneal aerosol chemotherapy (PIPAC) directed treatment has shown promising results in the treatment of PM. We performed laparoscopic ultrasound (LUS) during each PIPAC procedure to liver or retroperitoneal disease progression lesions missed during pre-operative, non-invasive imaging. Previous studies have shown that LUS may detect up to 13% additional liver metastases, compared to pre-operative CT. LUS has, however, never been used during PIPAC procedures. We present our experience with LUS in patients undergoing PIPAC directed therapy.

Methods:
Descriptive, retrospective study of LUS findings from the prospective PIPAC-OPC2 trail including ten months of follow-up after the last treatment.

Results:
A total of 143 patients with PM had 426 PIPACs, of which 285 (67%) procedures included LUS. The mean LUS time was 5 minutes (1-14 minutes). One patient had a splenic capsule rupture related to the LUS itself. This was managed conservatively. LUS found liver metastases that were undetected by pre-operative CT in 8 patients (5.6%). However, these findings changed the surgical approach in only 2 (1.4%) patients due to multiple liver metastases. We suspected liver metastases in three patients of these 8 patients during the LUS. This suspicion, however, was not underscored by CT. In 2 of the 8 patients, we found sclerotic plaques, which were defined as inactive metastases rather than active disease. One of the patients had small, superficial metastases, which in all three cases did not change the surgical approach.

Conclusion:
This is the first study to describe the safety and potential impact of LUS during PIPAC directed therapy. We found that LUS is a safe procedure that detected additional liver metastases in 8/143 patients (5.6%). However, the clinical impact of these findings was limited to only two cases.

#4 A comparison of estimated and measured glomerular filtration rate during platinum treatment for urothelial carcinoma with different estimation formulas.

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Abstract text
Introduction
This study evaluated the accuracy of four estimated glomerular filtration rate (eGFR) methods; MDRD, Cockcroft Gault, CKD-EPI, and Wright, compared to measured GFR (mGFR) using Tc99m-DPTA in patients undergoing chemotherapy(CTP) for urothelial carcinoma.

Method:
A retrospective study of 151 patients receiving platinum CTP for urothelial carcinoma in the metastatic and neoadjuvant settings. The accuracy of each eGFR method was evaluated in terms of the percentage of eGFR values within 10%, 20%, and 30% of mGFR (p10, p20, and p30), as well as mean absolute percentage error (MAPE) and mean percentage error (MPE). Pearson's correlation coefficients between eGFR and mGFR were also calculated. BSA was calculated using the Mosteller equation, and normalization was removed from eGFR.

Results
CKD-EPI consistently demonstrated the highest percentage of eGFR values within 10% (p10 = 40.00%), 20% (p20 = 73.91%), and 30% (p30 = 87.25%) of mGFR, while Cockcroft Gault showed the lowest accuracy at p10 (34.49%) and p20 (67.83%) levels. The CKD-EPI method displayed the strongest Pearson correlation with mGFR at baseline (r = 0.8776), while Wright showed the highest correlation for all measurements (longitudinal) (r = 0.8381). All eGFR estimation methods had statistically significant correlations with mGFR. CKD-EPI also demonstrated the highest average accuracy in eGFR estimation, with the lowest MAPE (16.4%) and MPE (3.5%) values among the four estimation methods.

Conclusion
The CKD-EPI method is the most accurate of the four methods for estimating kidney function in urothelial carcinoma patients undergoing CTP. This eGFR estimation method displayed the highest accuracy regarding the percentage of values within specified accuracy levels, the strongest correlation with mGFR at baseline, and the highest average accuracy based on MAPE and MPE. The CKD-EPI eGFR may often be adequate for monitoring kidney function in patients with urothelial carcinoma receiving CTP.

#5 Impact of Partial Nephrectomy and Percutaneous Cryoablation on Health-related Quality of Life Two Years After Treatment – A prospective Comparative Cohort Study

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Abstract text
Introduction
Partial nephrectomy (PN) is the gold standard for treating renal cell carcinoma (RCC) stage cT1. However, alternative minimally invasive treatments, such as percutaneous cryoablation (PCA), have been proposed to minimize the adverse effects on patient's health-related quality of life (HRQoL). We aimed to evaluate and compare the HRQoL of patients treated with PN or PCA for RCC stage cT1 two years after treatment.

Materials & Methods
Patients treated with PN or PCA for RCC stage cT1 between 2019 and 2021 at two university hospitals in Denmark were offered inclusion. Exclusion criteria: insufficient understanding of the Danish language, cognitive deterioration, conversion to nephrectomy, or salvage procedures. The EORCT QLQ C30 questionnaire was distributed before treatment and at one- and two-years post treatment. A linear mixed-effect model was used to analyze changes from baseline to follow-up between the groups.

Results
We included 168 patients (PN: 79; PCA: 89). The response rate was 100% at baseline and 88% and 74% after one and two years, respectively. Patients receiving PCA were significantly older (median 69.0 vs. 62.1 years), had a significantly higher score on the Charlson Comorbidity Index (3 vs. 2), and were treated for significantly smaller tumors (3.06 vs. 3.75 cm) compared to PN. Patients treated with PCA had lower baseline scores on physical ($p < 0.001$), role ($p = 0.004$), and social functioning ($p=0.044$) compared to PN. A significant difference from baseline to one-year followup was found for emotional functioning ($p=0.006$), favoring PCA over PN as the only HRQoL scale. No significant changes from baseline to the two-year follow-up were found for any HRQoL scales.

Conclusions
We found significant differences between baseline HRQoL between patients treated with PCA and PN. However, no significant differences between the treatment groups were observed in any HRQoL scales from baseline to two-year follow-u

#6 Quality of life and symptom burden after rectal cancer surgery. A randomised controlled trial comparing patient-led versus standard follow-up

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Abstract text
Introduction
After curatively intended rectal cancer (RC) surgery, new follow-up strategies are warranted, seeking more individualised care and targeting health-related quality of life (HRQoL) and functional outcomes. The FURCA trial aimed to investigate the effect of patient-led follow-up on HRQoL and symptom burden three years after surgery.

Materials and methods
RC patients from four Danish centres were randomised 1:1 to intervention (patient-led follow-up with patient education and self-referral to a specialist nurse) or control (standard follow-up with five routine doctor visits). Patients in both groups had a computed tomography (CT) at one and three years. The primary outcome (HRQoL) was assessed by the Functional Assessment of Cancer Therapy – colorectal (FACT-C) score [1]. Secondary outcomes were functional measures, patient involvement and satisfaction, and cancer recurrence at three years.

Results
From Feb 2016 to Aug 2018, 336 patients were included of whom 248 completed three years of follow-up. Between-group differences were found neither for the primary endpoint, nor for functional outcomes. The recurrence rate did not differ between the groups. Patient involvement and satisfaction were higher in the intervention group with statistical significance in almost half of the items.

Conclusions
We found no effect on HRQoL and symptom burden from patient-led follow-up, although it may improve patient-perceived involvement and satisfaction. The findings in this study suggest that patient-led follow-up is a more tailored approach to meet cancer survivors' needs and might improve their ability to cope with survivorship

#7 Quality adjusted progression-free-period of Carfilzomib-dexamethasone maintenance therapy for patients with multiple myeloma treated for first relapse – findings from a Nordic Myeloma Study Group randomized phase II trial

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Abstract text
Introduction: Decisions regarding maintenance therapy in patients with multiple myeloma (MM) includes the treatment efficacy and the impact on the patients´ health-related quality of life (HRQL). In the CARFI trial, this was investigated for carfilzomib-dexamethasone (Kd) maintenance in MM patients treated for first relapse. Assessed by EORTC QLQ-C30 Summary (QLQ-C30-sum) score, Kd maintenance revealed no impact on HRQL compared to observation. The aim of this analysis was to estimate quality adjusted progression-free-period (QAPFP) of Kd maintenance relative to observation.
Materials and methods: MM patients treated with autologous stem cell transplantation for first relapse were randomized to Kd maintenance therapy or observation. The cancer specific questionnaire, EORTC QLQ-C30, was completed by patients at randomization and every second month during follow-up. QAPFP from randomization to progression/death/end of study was calculated using two quality-adjustment metrics derived from the EORTC QLQ-C30: QLQ-C30 Sum score and EORTC Quality of Life Utility Measure-Core 10 dimensions (QLU-C10D) using the Kaplan-Meier method. P-values <0.05 were defined as statistically significant.
Results: In total, 168 patients were randomised, n=82 allocated to Kd maintenance, n=86 to observation. Progression-free-survival (PFS) for the Kd maintenance group was superior with 2.5 months (95% CI 0.47; 4.5, p-value 0.016) compared to observation. When quality-adjusting the PFS based on QLQ-C30-sum the Kd maintenance group had significant longer QAPFS of 3.0 months (CI 95% 0.78; 5.28, p-value 0.008) compared to observation. Similar findings were found for QAPFP based on the QLU-C10D, where Kd maintenance significantly extended QAPFP by 3.5 months (95% CI 1.2; 5.9, p-value 0.004).
Conclusions: Kd maintenance significantly extended the time in remission with good quality of life for patients with MM treated for relapse. PFS should be quality adjusted for clinical decision making.

#8 Improve Pilot – Improving Quality of Life in Frail, Older Patients with Hematological Cancer through Geriatric Assessment and Treatment – A Pilot Study

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Abstract text
Introduktion
Skrøbelighed blandt ældre med kræft øger risikoen for tab af fysisk funktion og livskvalitet, toksicitet og suboptimalt behandlingsrespons. Internationalt anbefales, at ældre med kræft screenes for skrøbelighed, fx med Geriatric 8 (G8), samt at skrøbelige ældre (G8-score ≤14) tilbydes geriatrisk helbredsvurdering – comprehensive geriatric assessment (CGA). Viden om effekt af CGA til hæmatologiske kræftpatienter er sparsom, og da patienterne ofte er akut syge med behov for hurtig behandlingsstart, kan udførelse af CGA være udfordret.I Improve Pilot testes gennemførligheden af CGA og afledt intervention integreret i opstarten af hæmatologisk kræftbehandling for 15 ældre og skrøbelige patienter.

Metode
Forsøgsdeltagere er identificeret blandt ældre patienter med forløb på hæmatologisk afdeling, Odense Universitetshospital. Inklusionskriterier er alder ≥ 70 år, start af systemisk behandling for hæmatologisk kræft inden for 6 uger fra inklusion, forventet restlevetid > 3 måneder og G8-score ≤ 14. Forsøgsdeltagere modtager CGA og følges i 12 uger med livskvalitetsspørgeskemaer, fysiske tests, registrering af kræftbehandling og ændringer, bivirkninger, akutte indlæggelser og overlevelse.

Resultater
23 patienter er inkluderet, 8 er udgået før CGA, 4 pga. mors, komplikationer eller overgang til terminalforløb og 4 grundet trukket samtykke. 13 har gennemført CGA, heraf 11 inden for 6 uger. 2 afventer CGA. Ved CGA fandtes interventionskrævende skrøbelighed blandt 12 af 13 patienter (92%).

Konklusioner
CGA integreret i opstarten af kræftbehandling for ældre, skrøbelige patienter med hæmatologisk kræft er gennemførlig, men kan forsinkes af akutte komplikationer. Ved CGA fandtes interventionskrævende skrøbelighed blandt næsten alle. Resultater fra pilotstudiet anvendes i planlægning af et nationalt RCT, hvor vi vil undersøge effekten af CGA og afledt intervention integreret i hæmatologiske kræftbehandling på fysisk funktion og livskvalitet hos målgruppen

#9 Dyspnea in patients with multiple myeloma receiving Carfilzomib-based consolidation after standard first-line treatment – presentation of the statistical analysis plan

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Abstract text
Introduction
In multiple myeloma (MM), time to progression for patients in remission after first-line treatment (PFS1) is a predictor of overall survival. Patients in remission with abnormal PET/CT after first-line treatment have reduced PFS1 compared to patients with negative PET/CT. The CONPET trial showed that 33% of patients, PET/CT positive after first-line treatment with high-dose chemotherapy and autologous stem-cell transplantation, achieved PET/CT negativity after 4 28-day cycles of Carfilzomib-Lenalidomide-dexamethasone (KRd). This is expected to improve PFS. In previous studies, physicians registered dyspnea in 18-23% of patients treated with Carfilzomib (Bringhen 2019). This study investigates patient-reported dyspnea and recovery during KRd consolidation.

Material and Methods
CONPET was a non-randomized phase II study run by the Nordic Myeloma Study Group at 6 sites in Norway, Denmark and Portugal from Apr. 2018 to Sept. 2021. Patients completed the Functional Assessment of Cancer Therapy – Pulmonary Symptom Index (PSI) questionnaire at day 1 and 15 in all cycles and 1 and 3 months after cycle 4. Dyspnea and recovery will be analyzed in time-to-event analyses and displayed using Kaplan Meier plots with 95% confidence intervals. For dyspnea, decrease in PSI score compared to cycle 1 day 1, drop out due to dyspnea, starting diuretics or increasing dose of diuretics are considered events. For recovery, increase in PSI score compared to first time reporting of dyspnea or decrease in diuretics are considered events.

Results
Fifty patients (18 females) with a median age of 62 (range 54-67) initiated KRd treatment, 46 completed consolidation. Questionnaire completion rate was 97%. Time-to-event results are presented at the conference.

Conclusion
The project delivers knowledge on development and recovery of dyspnea during KRd consolidation in patients with MM. This will provide valuable information on expected symptoms during KRd treatment in clinical practice.

#10 Determining the angiosome and localizing the perforator in oncoplastic breast surgery using ICG-angiography.

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Abstract text
Introduction
Peroperative assessment of tissue perfusion by ICG-A is well-known for breast reconstructive surgery, but its clinical use in oncoplastic breast surgery (OBCS) has not yet been investigated. We conducted a prospective trial including volume displacement- and replacement OBCS to determine the angiosome and localize perforators intraoperatively. Furthermore, to investigate and correlate results of the peroperative ICG-A to postoperative surgical site infection, skin necrosis, epidermolysis and timely onset of adjuvant therapy.

Methods
ICG-A was performed 3 times during surgery; after removing the cancer, upon dissection of possible perforators and after wound closure. All patients were followed with clinical evaluations before surgery, 4 weeks, 4-6 and 12 months postoperatively.

Results
Of 11 included patients, 7 had volume displacement and 4 volume replacement OBCS (3 lateral intercostal artery perforator flaps and 1 muscle sparing latissimus dorsi flap). ICG-A was sufficient in localizing angiosomes and perforators and corresponded to clinical assessment demonstrating sufficient perfusion in all cases. No patients developed postoperative necrosis or loss of reconstruction. One patient developed postoperative infection and seroma of the breast and was treated conservatively. During follow-up 36.4% developed breast edema and was treated with compression therapy and manual drainage, all had undergone adjuvant radiotherapy.

Conclusion
We demonstrated the feasibility of applying ICG-A for OBCS assessing the peroperative perfusion and identifying perforators. Recent studies have shown survival benefit of breast conserving surgery compared with mastectomy, possibly resulting in an increased patient population suitable for OBCS. Future studies applying ICG-A for OBCS in high-risk breast cancer patients could be a field of interest

#11 Optimizing preoperative planning for lymphovenous anastomosis in breast cancer lymphedema

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Abstract text
Introduction
Lymphovenous anastomosis (LVA) is an increasingly popular procedure for treatment of lymphedema, with several surgical centres demonstrating that the operation can be performed. However, finding applicable vessels for anastomosis remains a challenge. The aim of this pilot study is to investigate and test if the combination of ultra-high frequency ultrasound and indocyanine green (ICG) lymphography, can resolve this obstacle, and improve LVA planning and optimize surgical success.

Materials & Method
Six female patients with breast cancer related lymphedema in their upper extremity have undergone LVA surgery planned with ultra-high frequency ultrasound and ICG lymphography. The number of identified vessels were noted and compared to the number rediscovered during surgery. Likewise, the number of anastomoses performed were compared to the number planned prior to surgery. Secondary outcome measures of arm volume differences, health-related quality of life, body composition, and L-Dex score were assessed prior-to and three months after surgery.

Results
All targeted vessels were identified during surgery, and successful anastomoses were accomplished, using ultra-high frequency ultrasound and ICG lymphography. The patients' post-operative courses were uneventful with no severe adverse events. Regarding the secondary outcome measures of arm volume differences, an improvement was registered in two patients at three months follow-up. Moreover, two patients reported an improvement in psychological function and all patients experienced a greater dissatisfaction with the compression sleeve after surgery.
This is an ongoing study with an inclusion target of 10 patients. Results for more patients will be presented at the conference as the patients complete their follow-up.

Conclusion
Ultra-high frequency ultrasound and ICG lymphography has so far successfully targeted and identified venules and lymphatic vessels in close proximity for LVA surgery in all patients

Clinical Trials II

#12-22

#12 Barriers to Participation in Proton Therapy Trials for Patients with Head and Neck Cancer: Identifying Decision Support Needs

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Abstract text
Introduction
Proton therapy (PT) is offered to patients with head and neck cancer (HNC) participating in a randomised controlled trial (RCT). The treatment is only available in one national treatment centre. Patients living far away have to be accommodated during the six-week treatment trajectory. An inventory showed that approximately 80% of patients with HNC assessed for participation in the RCT did not proceed to randomisation.This study explored patient and physician barriers to participation in a RCT comparing side effects of photon and proton radiotherapy in patients with HNC to identify potential needs for decision support regarding participation.

Materials and methods
Semi-structured interviews were conducted with 14 patients declining RCT participation, and seven oncologists. Furthermore, 10 observations in six radiotherapy clinics were performed to observe the dialogue regarding the RCT.Data was systematically analysed within the methodological framework of interpretive description.

Results
The main patient barriers to RCT participation was existential distress due to fear of dying and pre-treatment stressors, which affected patients' ability to comprehend trial information. Moreover, worries in being away from family and familiar surroundings and thus feeling isolated with the disease. Additional barriers included postponed treatment due to trial activities and uncertainty due to the experimental nature of the treatment. Physician barriers comprised obligations due to cancer guidelines and workflow as well as attitudes to avoid burdening patients with RCT participation. Furthermore, dilemmas considering postponed treatment was identified as a barrier to the RCT.

Conclusion
Multiple patient and physician barriers to a RCT involving PT, were identified. A need for decision support has been identified. Such intervention should aim to convey relevant trial information to eligible patients concise, consistent and timely to qualify an informed decision

#13 Assessing Organ at Risk Contouring Consistency by Radiation Oncologists and Artificial Intelligence in Head and Neck Cancer Patients

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Abstract text
Introduction:
In the Danish Head and Neck cancer group (DAHANCA) 35 trial, patients with head and neck (H&N) cancer are selected for proton treatment based on the expected risk of complications to Organs at Risk (OAR) with proton treatment compared to photon treatment at referring departments. Immobilisation, scanning, contouring and planning are then repeated at the national proton centre. Contours of OARs are the foundation for estimations of risks calculations, and thus they are essential for the selection process, as inconsistencies in OAR contouring can lead to discrepancies in risk estimates, potentially lowering the quality of the selection process for the trial.This study aimed to assess the consistency of 12 OARs delineated by both radiation oncologists and Artificial Intelligence (AI) for 63 patients from the DAHANCA 35 pilot trial.
Materials and Methods:
A convolutional neural network (nnUNet) was used to contour OARs, with each patient having a scan from the local centre and one from the national proton centre. MIM software was used to perform deformable image registration and transfer local contours to the proton centre scan. Consistency in contours was measured using the Dice index and Mean Surface Distance (MSD) comparing AI to AI and oncologist to oncologist, respectively.
Results:
The AI contours showed significantly better consistency than the contours created by radiation oncologists. The median Dice index for AI contours was 0.85 (interquartile range [0.78,0.90]), compared to 0.68 [0.51,0.80] for the oncologists. The median MSD was also better for AI contours, measuring 0.9mm [0.7,1.1], compared to 1.9mm [1.5,2.6] for oncologist contours.
Conclusions:
This study demonstrated that AI contours were more consistent than those created by radiation oncologists for 12 OARs in H&N cancer patients

#14 Benefit of AI-assisted organ-at-risk contouring in head-and-neck cancer: A global randomised study

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Abstract text
Introduction
Global roll-out of artificial intelligence-assisted (AI-assisted) contouring has great potential for the access and quality of radiotherapy. However, most of the evidence is from high-income countries.The purpose of this study was to compare inter-observer variation (IOV), contouring bias (CB) and contouring time (CT) between radiation oncologists (ROs) in low- and middle-income countries (LMICs) using either manual or AI-assisted contouring for organs-at-risk.

Materials and method
The study was carried out in collaboration with the International Atomic Energy Agency, IAEA. 97 ROs from 23 institutions in 22 nations across 5 continents were invited to the study. Institutions were randomised to either manual or AI-assisted contouring of 8 common organs-at-risk of headneck cancer. Deep learning-based auto-contours were made with MVision AI Oy, Helsinki, Finland. Contouring was performed online in EduCase™ (RadOnc eLearning Center, Inc). ROs were informed about the contouring guidelines used in the study, that they should “generate clinically acceptable contours” and to complete in a short survey on professional backgrounds.IOV and CB were quantified with Dice coefficients and Hausdorff distances 95th percentile by respectively comparing contours of the ROs to a median contour within groups and to contours of expert oncologists. CT was measured automatically by EduCase.

Results
89 ROs handed in the contours and 74 completed the survey. AI-assisted contouring significantly reduced IOV for 8/8, CB for 5/8 and CT 8/8 organs-at-risk.

Conclusion
AI-assisted contouring significantly reduced inter-observer variation and contouring bias and contouring time across multiple institutions located in LMICs globally. The results favour adoption of AI-assisted contouring worldwide. To the best of our knowledge, this is the largest study ever performed on the effects of auto-contouring, and it is the first time LMICs has been the primary focus

#15 Target coverage under the influence of respiratory motion for 50 lung tumors treated with stereotactic body radiation therapy at Vejle Hospital

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Abstract text
Introduction
When planning stereotactic body radiation therapy (SBRT) of lung tumors, different approaches regarding dose prescription and reporting are in use throughout the world. The treatment is often planned on the mid-position phase of the 4D planning CT. We wanted to examine whether our intended dose distribution was still achieved under the influence of respiratory motion.

Materials and Methods
We retrospectively recalculated and analyzed the treatment plans on all 10 respiratory phases for all patients treated with SBRT between 01-09-2021 and 31-08-2022 with a prescribed dose of 66 Gy in 3 fractions at Vejle Hospital (n=50). Dose was prescribed to the Gross Tumor Volume (GTV) with the aim of reaching D95% = 62.7 Gy. For the Planning Target Volume (PTV) we aimed for D98% = 45 Gy. For tumors located near the thoracic wall, risk adapted treatment planning ensured that the thoracic wall did not receive more than 45 Gy (aiming for D0.05cm3 < 35 Gy).

Results
The median GTV D50% was 70.9 Gy and D95% was 64.3 Gy across all respiratory phases for all patients, which is higher than the aimed dose of 62.7 Gy. 19 out of the 50 patients had a median GTV D95% < 62.7 Gy due to tapering off the dose near the thoracic wall. The median PTV D50% was 58.0 Gy and D98% was 44.8 Gy across all patients, which is very close to the aimed dose of 45 Gy. Half the patients had a median PTV D98% < 45 Gy, also owing to tapering off. GTV motion amplitude was up to 1.4 cm, largest in cranio-caudal direction.

Conclusion
Our treatment approach ensured a high median dose to a moving tumor even when the tumor was located close to the thoracic wall. Although planning was performed on the mid-position CT, a high dose was delivered on all phases. This confirms that our approach is robust with respect to respiratory motion. We are currently recruiting in the Robust Lung SBRT trial, to investigate if the intended dose is actually delivered to the tumor, by acquiring imaging during SBRT treatment

#16 Implications of Intra-Fractional Target Shifts in Stereotactic Radiotherapy for Central Lung Lesions

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Abstract text
Introduction
Former trials with stereotactic radiotherapy (SRT) on centrally located lung lesions have shown high toxicity levels including grade 5. In the STRICT-lung trial (NCT05354596), central lung lesions are treated with SRT, using an inhomogeneous dose distribution to the target. The mean dose to the GTV is escalated up to 85Gy in 8 fractions. However, both target coverage and dose escalation are restricted by the constraints on organs at risk. The steep dose gradient close to OAR makes this treatment vulnerable to intra-fractional shifts.

Material and Methods
Eighteen patients (pts) have been treated in/ad modum the STRICT-lung trial. The PTV margin was 4mm. The pts were set up based on daily cone beam CT (CBCT) by matching the target position to the planning CT (pCT). After treatment delivery, a second CBCT image was obtained for investigation of intra-fractional target shifts. Retrospectively, the intra-fractional target shift between the two CBCTs was calculated. For each fraction, contours delineated on the pCT were deformably transferred to both CBCTs. The dose was calculated on both CBCTs and the difference in GTV mean dose and max dose to the OAR was evaluated.

Results
The median [range] target shift was 2.9mm [0.1, 14.2]. The target shifts were primarily in the cranial and dorsal directions. The median change in mean GTV dose was 0.44Gy [-14.11, 5.61], meaning that some of the pts received far less target dose than planned. For most of the pts, the OAR closest to the lesion was shifted towards the high-dose region. Both target shift and how it influenced the dose to the target and OARs were highly pt-specific.

Conclusion
Intra-fractional movements of the target and OAR may result in a risk of increased toxicity, and for some pts under-dosage of the target. To ensure the safe delivery of SRT to centrally located lung lesions, it is necessary to monitor and correct for the intra-fractional target shift of the treated pts.

#17 DAHANCA 30 - Et randomiseret non-inferiority studie af hypoxi-profilvejledt nimorazolbehandling i forbindelse med primær strålebehandling af planocellulære hoved-halskarcinomer (NCT02661152)

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Abstract text
Introduktion
Tumorhypoxi medfører stråleresistens og dårligere outcome ved behandling af iltfattige kræftknuder i hoved-halsområdet med stråleterapi. Nimorazol er en hypoxisk radiosensitizer, som, givet sammen med stråleterapi, reducerer stråleresistensen og dermed forbedrer stråleeffekten i iltfattige kræftknuder. Præparatet gives i dag til en stor del af strålebehandlede patienter med hoved-halskræft, velvidende at det formentlig kun er virksomt hos undergruppen med de mest ilt-fattige svulster. Med en hypoxi gen-profil tyder det på, at man kan udpege såvel de iltfattige svulster, der har gavn af nimorazol (respondere), som de iltrige svulster, hvor nimorazol ikke har væsentlig betydning (non-respondere). Ved at undlade brug af nimorazol hos gruppen af non-respondere kan disse patienter spares for bivirkninger til præparatet. Disse er især kvalme og madlede, hvilket har relevans da ernæringssituation i forvejen ofte er belastet hos disse patienter. Formålet med studiet er, at eftervise, hvorvidt hypoxi gen-profilen kan udpege patienter som ikke har gavn af nimorazol under strålebehandling.

Materiale og metoder
Patienter med planocellulær hoved-halskræft, hvor der er indikation nimorazol under strålebehandling kan inkluderes. Studiet er et randomiseret non-inferiority studie med planlagt 1262 randomiserede patienter. Hos inkluderede patienter foretages hypoxi profil. Hvis denne tyder på en iltrig kræftknude, randomiseres til behandling +/- nimorazol. Hvis profilen tyder på en iltfattig kræftknude får patienten standardbehandling (incl. nimorazol).

Resultater
Pr. april 2023 er der 1305 inkluderede patienter, hvoraf 982 er randomiserede.

Konklusion
Inklusionen i studiet er stabil og det fortsætter som planlagt. Der er til dato ikke set uventet toksicitet hos de patienter der indgår i studiet

#18 An interim analysis from a randomized, phase III trial of esophagus sparring radiotherapy for metastatic spinal cord compression.

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Abstract text
Background
The phase III ESO-SPARE trial investigates the effect of esophagus sparring VMAT with any fractionation in patients with metastatic spinal cord compression (MSCC) in the cervical/thoracic spine. Dose to the esophagus is spared by compromising dose to the anterior spine. Co-primary endpoints are peak patient reported dysphagia (PRO-CTC-AE) within 5 weeks and ability to walk (EQ-5D) at 9 weeks after treatment start.
Due to the fragile patient population, we anticipated low compliance. According to power calculation 124 of 200 planned patients had to complete 9 weeks follow-up. We performed a planned interim analysis of dosimetry, compliance, re-irradiation within 90 days, and mortality after inclusion of 100 patients.

Methods
Only dose plans from the initial 34 patients were evaluated.
In the experimental arm, sparring of the esophagus was achieved by prioritizing strict esophageal constraints (Dmax=8 Gy in EQD2) over PTV and CTV coverage.
Patients reported dysphagia daily for 5 weeks and compliance required ≥ 4 completed reports per week. EQ-5D and EORTC-QLQ-C30 were reported weekly for 9 weeks.

Results
Half the dose plans were esophagus sparing. Esophagus constraints were respected in all 17 plans and three patients had PTV V90% < 90%. Median esophagus dose was 10 Gy (range, 5-14 Gy) in the experimental arm and 26 Gy (8-31 Gy) in the standard arm.
From May21 – Nov22, 100 patients were included from 2 centers. Compliance was 51% and 41% at 5 and 9 weeks. One in five patients had died before completing 9 weeks follow-up. No patients needed re-irradiation.

Conclusion
Sparring of the esophagus while maintaining reasonable CTV and PTV coverage was possible. Compliance was lower than anticipated and an expansion of the study cohort is needed to ensure the required number of evaluable patients

#19 DAHANCA 37:Gen-bestråling af hoved-halskræft med proton-strålebehandling (NCT03981068)

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Abstract text
Introduktion: Hvis man én gang er strålebehandlet mod hoved-halsområdet er det problematisk at give en ny strålebehandling for et tilbagefald eller en ny kræftknude, pga. risikoen for alvorlige, inklusiv livstruende, bivirkninger. Hvis genbestråling er patientens eneste mulighed for at blive rask, kan strålebehandling med protoner nedsætte den samlede stråledosis til patienten, og måske nedsætte risikoen for alvorlige bivirkninger.

Materialer og metoder: DAHANCA (den Danske Hoved-Halskræft Gruppe) har startet en fase II genbestrålingsprotokol med vide inklusionskriterier. Den oprindelige stråleplan skal være til rådighed således at man kan lave en samlet dosisplan for både den oprindelige og den aktuelle dosisplan. Patienterne diskuteres på en national videokonference før henvisning. Egnede patienter vil blive tilbudt hyperfraktioneret accelereret strålebehandling med 60 Gray på 50 behandlinger, 10 behandlinger om ugen. Det primære endepunkt er alvorlige bivirkninger (CTC grad ≥ 3). Det er planlagt at inkludere 20 patienter.

Resultater: 11 patienter er behandlet i protokollen siden 1. kvartal 2020. Alle centre har henvist. Patienterne fordeler sig ligeligt på recidiver og nye primær tumorer. alle patients undtagen en havde planocellulært carcinom. Fem yderligere patienter blev diskuteret på videokonference og blev ikke tilbudt behandling i protokollen, enten fordi der ikke var dosimetriske fordele eller fordi strålebehandling ikke blev anbefalet. Der er en patient der er død af blødning, sandsynligt behandlingsrelateret.

Konklusion: Med de tilgængelige samlede dosisplaner og adgang til strålebehandling med protoner mener vi at kunne tilbyde patienten skånsom strålebehandling. De tidligste erfaringer viser at det er produktivt at diskutere patienterne nationalt, og udvikle mere ens kriterier for patient udvælgelse. Med studiet får vi ny viden om de forventede bivirkninger og den optimale udvælgelse af patienterne

#20 Multi-center auto-segmentation model for internal mammary nodes using clinical data: A DBCG study

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Abstract text
Purpose: We developed a deep learning (DL) based segmentation model for internal mammary lymph nodes (CTVn_IMN) for left-sided breast cancer (BC) pts. The model was trained on clinical delineations from all seven RT centres in DK.

Material: We included CT scans and clinical CTVn_IMN delineations from 778 high-risk left-sided BC pts from the Danish Breast Cancer Group (DBCG) RT Nation database, treated with adjuvant RT in DK during 2015-16. Delineations were crudely sorted to eliminate obvious deviations from DBCG guidelines and delineations beyond intercostal room 3. Pts were randomly split into a training (90%) and test set (10%). CT scans were cropped to the posterior and caudal part of the heart and cranial part of the lungs and were used as input along with CTVn_IMN in a 3D full resolution nnUNet with five-fold (1000 epochs) cross-validation and default parameters. The test-segmentations were evaluated with Dice coefficient (DSC), Hausdorff distance 95th (HD95) and mean surface distance (MSD) and compared to clinical ground truth (CGT) delineations. Difference in cranial and caudal (cc) extension was measured.

Result: In total 424 pts were excluded during the sorting process, leaving 319/35 pts to train/test the model. The model performed with median DSC=0.70, HD95=4.83mm and MSD=1.45mm. The largest variation between CGT and predictions were in caudal extension, varying up to 18 slices. The two lowest DSC scored pts, showed large disagreements in both cranial and caudal part of the CTVn_IMN. However, from a clinical perspective, these two DL-based delineations adhere better to the DBCG guidelines than the CGT. Median scored pts shwed minor isagreements in the cc extension, varying 1-2 slices.

Conclusion: We demonstrated the feasibility of developing a DL model for CTVn_IMN based on real world clinical delineations. The model exhibited minor for most pts. In pts with major deviations, model predictions were closer to DBCG guidelines than clinical ground truth

#21 Artificial Intelligence in radiotherapy: High accuracy deep learning-based automated segmentation of organs at risk in CT images of the thorax

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Abstract text
Introduction
Delineation of organs at risk (OAR) is an essential procedure in radiotherapy treatment planning and is presently a manual time-consuming procedure prone to inter-observer variability. In this study, we investigated the potential of using a deep learning algorithm, trained on high-quality curated data, for automated delineation of OAR in the thorax region.

Materials & Methods
The dataset included 96 patients with the following OAR delineated on CT images: aorta, heart, lungs (left & right), trachea, esophagus, bronchi, spinal cord, and spinal canal. All OAR were delineated with the intention of training a deep learning model, in accordance with consensus guidelines, and were approved by an independent observer. We trained a 3D nnUNet on a dataset consisting of 9 merged labels, one for each organ. The 3D nnUNet was trained with Stochastic Gradient Descend and Dice Cross-Entropy as optimizer and cost function, respectively. The dataset was split into 71 patients for training, 18 for validation and 7 for testing. Dice Similarity Coefficient (DSC) and 95 percentile Hausdorff distance (HD95) were used as evaluation metrics. The DSC and HD95 were averaged across all 7 test patients.

Results
The average DSC and HD95(mm) were between 0.85-0.98 and 1.46-4.61, respectively. The highest DSC was observed in both lungs (0.98 & 0.98, respectively) and the lowest for the spinal cord (0.85). The smallest HD95(mm) was observed for the spinal canal (1.46) and the greatest for bronchi (4.61). The 3D nnUNet was able to obtain the following DSC and HD95(mm); aorta=0.93/4.27, bronchi=0.88/4.61, esophagus=0.87/2.71, heart=0.96/3.54, left lung=0.98/1.74, right lung=0.98/2.79, spinal canal=0.86/1.46, trachea=0.95/2.15, spinal cord=0.85/1.82.

Conclusion
This study demonstrated that a 3D nnUNet trained on a high-quality curated dataset for organs at risk in the thorax region, can achieve accurate segmentations and has the potential of being used in a clinical setting.

#22 Thyroid function is decreased in patients with early breast cancer after chemotherapy

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Abstract text
Introduction
In patients with breast cancer, either neoadjuvant or adjuvant ((neo)adjuvant) chemotherapy is often used in combination with other treatments, reducing recurrence and mortality. Weight gain is a common observation during (neo)adjuvant chemo-, targeted drug- and anti-oestrogen treatment, being related to a poorer prognosis of breast cancer and the occurrence of other comorbidities. Different causes of weight gain are considered. We hypothesized that the development of hypothyroidism due to (neo)adjuvant chemotherapy might partly explain the observed weight gain in postmenopausal women with early breast cancer.

Materials and methods
Sixty-nine postmenopausal women diagnosed with early breast cancer at the Department of Oncology, Rigshospitalet were included in this prospective controlled study. The median age of patients was 59 years (range 50-69). Measurement of thyroid-stimulating hormone (TSH), free-thyroxine (FT4), and body mass index (BMI) was performed before and after the course of (neo)adjuvant chemotherapy (mean duration 3.87 months (SD 1.22)).

Results
Our preliminary data indicate that chemotherapy might induce significant changes in thyroid hormones. We found a trend of TSH increase (p=0.06), and a significant reduction in FT4 (p=0.001), indicating a thyroid impairment due to chemotherapy. Furthermore, a significant BMI gain in our investigated chemotherapy-treated patients of a mean of 26.93 kg/m2 (95%CI [18,40], (p=0.02)) has been observed.

Conclusion
(Neo)adjuvant chemotherapy treatment in postmenopausal women with early breast cancer might contribute to weight gain during cancer treatment due to decreasing thyroid function as evaluated by TSH and FT4. Additional studies are needed to further investigate thyroid function as a possible cause of weight gain during breast cancer treatments

Personalised medicine, biomarkers & diagnostics I

#23-33

#23 Circulating tumor DNA monitoring reveals molecular progression before radiologic progression in a real-life cohort of patients with advanced Non–small Cell Lung Cancer

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Abstract text
Introduction
The clinical potential of liquid biopsy in patients with advanced cancer is real-time monitoring for early detection of treatment failure. Our study aimed to investigate the clinical validity of circulating tumor DNA (ctDNA) treatment monitoring in a real-life cohort of patients with advanced Non–Small Cell Lung Cancer (NSCLC).

Materials and methods
Patients with advanced or non-curative locally advanced NSCLC were prospectively included in an exploratory study (NCT03512847). Selected cancer-specific mutations were measured in plasma by standard or uniquely designed droplet digital PCR assays before every treatment cycle during first-line treatment until progressive disease (PD). Correlation between an increase in ctDNA (= molecular progression) and radiologic PD was investigated, defined as lead time, and the corresponding numbers of likely futile treatment cycles were determined. Utility of ctDNA measurements in clarifying the results of non-conclusive radiologic evaluation scans was evaluated.

Results
Cancer-specific mutations and longitudinal plasma sampling were present in 132 of 150 patients. ctDNA was detectable in 88 (67%) of 132 patients treated by respectively chemotherapy (n=41), immunotherapy (n=43), or combination treatment (n=4). In 66 (90%) of 73 patients experiencing PD, a ctDNA increase was observed with a median lead time of 1.5 months before radiologic PD. Overall, 119 (33%) of 365 treatment cycles were administered after molecular progression. In addition, ctDNA measurements could clarify the results in 38 (79%) of 48 nonconclusive radiologic evaluations.

Conclusions
ctDNA monitoring leads to earlier detection of treatment failure, and clarifies the majority of non-conclusive radiologic evaluations, giving the potential of sparing patients from likely futile treatments and needless adverse events

#24 Genome-scale CRISPRa and CRISPRi screening for lncRNA drivers of prostate cancer progression

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Abstract text
Introduction
Overtreatment of indolent prostate cancer (PC) and delayed treatment of aggressive PC is common due to suboptimal risk stratification tools, warranting identification of novel prognostic biomarkers. We hypothesized that strong biomarker candidates have a functional role in driving PCprogression in addition to their expression being linked to PC prognosis, and we therefore combined functional CRISPR screening with transcriptome profiling of PC patients to identify novel long non-coding RNA (lncRNA) biomarker candidates.

Materials and methods
Total RNA sequencing (RNAseq) data was generated from 15 adjacent normal and 118 tumor samples from 124 clinically localized PC patients. Raw reads were mapped to the hg38 reference genome and quantified with kallisto. CRISPR activating (CRISPRa) and CRISPR interference (CRISPRi) screens were performed in the LNCaP PC cell line. Cells were transduced in duplicate with custom single guide RNA (sgRNA) libraries targeting 20,306 and 20,474 lncRNA transcripts of interest. DNA was extracted from cells at an early (day 4 posttransduction) and a late (day 17-21) timepoint and sequenced. MAGeCK was used for data analysis

Results
To discover lncRNAs with biomarker potential, we performed statistical analyses of the RNAseq data, identifying 6,928 lncRNAs. To investigate if these had a functional role in driving PC progression, we performed CRISPR screens. Candidates with the most prominent screen phenotypes were selected for individual validation. This included 8 (CRISPRa) and 9 (CRISPRi) negative hits (decreased cell proliferation) along with 5 (CRISPRa) and 2 (CRISPRi) positive hits (increased cell proliferation). Individually activated/inhibited LNCaP cell lines have been established for the 24 candidate lncRNAs and proliferation assays are performed to validate their functional role in PC progression.

Conclusions
We identified numerous lncRNAs with biomarker potential and a possible driver role in PC progression.

#25 DNA methylation markers for sensitive detection of circulating tumor DNA in patients with gastroesophageal cancers

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Abstract text
Introduction: Patients with gastric and gastroesophageal junction adenocarcinomas (G-GEJ AC) have a poor 5-year survival of only 20%. Even patients with resectable disease have a high recurrence rate and a 5-year survival of less than 50%. Therefore, sensitive biomarkers for diagnostics and surveillance of G-GEJ AC are highly warranted. Detection of circulating tumor DNA (ctDNA) in plasma using DNA methylation biomarkers is a highly sensitive approach for detection of cancer. If this method can provide sensitive detection of G-GEJ AC, it could potentially improve the clinical management. Here, we explored the potential of a test targeting DNA methylation to detect ctDNA in patients with resectable and advanced G-GEJ AC.

*Materials and methods:*Tumor DNA isolated from 29 fresh frozen surgical specimens from patients resected for G-GEJ AC; and circulating cell-free DNA from 17 patients with advanced- and 17 patients with resectable G-GEJ AC, and from 10 healthy controls were analyzed. A tumor-agnostic DNA methylation-based digital PCR test, TriMeth, was performed. TriMeth targets the promoter regions of the gastrointestinal cancer-specific methylated genes C9orf50, KCNQ5, and CLIP4. Using a pre-defined cut-off, the test scored positive if two or more markers showed signal.

Results: All 29 tumor samples were TriMeth positive. The allele frequency correlated with tumor cell density (R=0.56, P=0.0016). TriMeth detected ctDNA in plasma from 13/17 (76%) of patients with advanced disease, 7/17 (41%) of patients with resectable disease, and in 0/10 (0%) of healthy controls.

Conclusions: This case-cohort study demonstrates that TriMeth may have potential as a biomarker for identification of ctDNA in patients with G-GEJ AC. The study has set the scene for ongoing larger clinical studies investigating the performance of TriMeth in different clinical settings for GGEJ AC patients

#26 Potential clinical utility of circulating tumor DNA detected by digital PCR in a nationwide Danish cohort of high-risk colorectal cancer patients

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Abstract text
Introduction: Increasingly, circulating tumor DNA (ctDNA) is proposed as a tool with the potential to guide postoperative cancer patient management. Digital PCR for ctDNA detection offers low analysis costs and short turnaround times, making it a good candidate for clinical implementation. With this study, we aimed to assess the potential clinical utility of monitoring ctDNA using a tumor-informed digital PCR strategy in a large colorectal cancer cohort.

Materials and methods: Stage II-III colorectal cancer patients (n=744) treated with curative intent were recruited. Whole exome sequencing was conducted on matched tumor and buffy coat from all patients. After thorough clonality assessment, a mutational target was chosen for digital PCR analysis. Plasma samples (8mL) were collected within 60 days after surgery and, for a patient subset, every 3-4 months for up to 36 months. Single-target digital PCR was used for ctDNA detection.

Results: Both postoperative and serial ctDNA detection was prognostic of recurrence (HR=10.3, 95%CI 7.0-15, P<0.001; HR=34, 95%CI 22-53, P<0.001). The time to recurrence was significantly shorter for postoperatively ctDNA positive patients (median 11 months, interquartile range (IQR) 6-12 months) compared to ctDNA negative patients (median 13 months, IQR 12-26 months, P<0.001), indicating a higher postoperative disease burden for ctDNA positive patients. The ctDNA growth rate was prognostic of survival after recurrence (HR=2.6, 95%CI 1.5-4.4, P=0.001).

Conclusions: These results from one of the largest ctDNA detection cohorts of stage II-III colorectal cancer patients demonstrate that our personalized digital PCR approach effectively risk stratifies patients immediately after surgery and shows promise for serial recurrence surveillance. With digital PCR being a widespread and cost-effective method, clinical implementation of ctDNA analysis may be more forthright using this method over cost-intensive sequencing-based methods

#27 Dynamic NK cell activity as a prognostic biomarker in non-small cell lung cancer patients treated with curative surgery

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Abstract text

Introduction
Surgery holds curative potential in non-small cell lung cancer (NSCLC), but around 50% of the patients will still experience disease recurrence. Natural Killer (NK) cells are important as a part of the host immune defense against cancer, and NK cell activity (NKA) has been suggested as a prognostic biomarker.

Materials and Methods
Patients with NSCLC eligible for surgery with curative intent were prospectively enrolled. Blood was sampled at baseline, 2-7 weeks post-operatively, and at the first follow-up. Interferon gamma (IFNg) as a surrogate for NKA was measured using the NK Vue® assays (NKMAX, Seongnam-si, South Korea). A cutoff of ≥250 pg/mL was used to define a normal test according to the manufacturer's instructions.

Results
We enrolled 78 patients, who received curatively intended surgery for NSCLC. The median NKA was 569 pg/mL, 357 pg/mL, and 784 pg/mL, respectively, at baseline, 2-7 weeks post-surgery, and follow-up (1-10 months post-surgery). There was no significant difference in NKA between the time-points. A division of the patients into two groups according to NKA cut-off at baseline resulted in a statistically significant difference in overall survival (OS) (p=0.014) but not in recurrence free survival (RFS) (p=0.548). A further division according to NKA dynamics resulted in three groups: The NKA-low group had NKA <250 pg/mL at all available time-points (n=19). The NKA-mixed group had NKA of varying levels (n=21). The NKA-high group had NKA ≥250 pg/mL at all available time-points (n=38). This grouping had a statistically significant prognostic impact on OS (p=0.027), but not on RFS (p=0.728). The hazard ratio was 5.36 (95% CI 1.39-20.64) for the NKA-low group compared to the NKA-high group.

Conclusions
The dynamics of NK cell activity may be used for a prognostic subclassification of NSCLC patients undergoing surgery with curative intent.

#28 Heterogeneity of risk markers between the primary tumour and matched lymph node metastasis of patients with colon cancer

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Abstract text
Introduction
The initial management of localized colon cancer relies on biopsies of the primary tu
mour (PT). Studies have reported intra- and intertumoral heterogeneity, thus complicating the evalu
ation. We aimed to investigate heterogeneity between PT and matched lymph node metastases (LN
Ms) in patients with colon cancer and whether any specific pattern was associated with survival out
comes.

Materials and Method
We stratified patients with T3 and T4 colon cancer including an equal num
ber of patients with proficient and deficient mismatch repair (pMMR and dMMR) protein status. On
e representative slide from the resection specimen was selected from the PT and the LNM and tissu
e blocks retrieved for immunohistochemical staining with CDX2, and Next Generation Sequencing
targeting hot-spots in 22 genes. The overall concordance rate (variants present in PT and matched L
NM / total variants), and PT- and LNM-specific discordance rates (variants present in PT or LNM /
total variants) were computed, and each patient was defined as having high or low concordance. Ha
zard ratios for Overall Survival (OS) were calculated.

Results
We included 14 patients with pMMR and 14 patients with dMMR. The overall concordanc
e rate of variants for patients with pMMR and dMMR were 69% and 59%, the PT-specific discorda
nce rates were 22% and 20%, while the LNM-specific discordance rates, 9% and 21%, differed signi
ficantly. For all patients and for patients with dMMR, a low concordance between variants in PT an
d LNM was significantly associated with longer OS than a high concordance. 14% of PTs had reduc
ed CDX2 expression compared with 54% of LNMs. Reduced CDX2 expression was significantly as
sociated to dMMR status and pathogenic BRAF-variants.

Conclusions
Patients with heterogeneity between PT and LNM had a significantly longer OS. We f
ound high heterogeneity of reduced CDX2 expression between PT and LNM. Heterogeneity's impa
ct on prognosis warrants studies in larger cohorts

#29 Detection of methylated circulating tumor DNA predicts recurrence following resection of gastro-esophageal cancer

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Abstract text
Introduction
Patients with localized gastric and gastroesophageal junction (GEJ) adenocarcinomas are treated with perioperative chemotherapy and surgical resection. Despite curative intent, the risk of recurrence is high, and the 5-year survival rate is only 45 %. Thus, there is a strong need for sensitive biomarkers to identify patients at risk of recurrence. Novel, minimal invasive technologies, can detect circulating tumor DNA (ctDNA) in plasma, with high sensitivity and specificity. In this study, we explore a tumor-agnostic test targeting DNA methylation in patients with resectable gastric and GEJ adenocarcinomas, treated with curative intent.

Materials and methods
In this prospective study, patients with resectable gastric and GEJ adenocarcinomas scheduled for perioperative 5-FU, leucovorin, oxaliplatin, and docetaxel (FLOT) were eligible. Serial plasma samples were collected at baseline; after one cycle of FLOT; prior to surgery; and 4-6 weeks after surgery. A tumor-agnostic DNA methylation-based digital PCR test, TriMeth, was used to detect ctDNA in plasma. TriMeth targets the promoter regions of the C9orf50, KCNQ5, and CLIP4 genes. A pre-defined cut-off was used: a sample scored positive if two or more markers showed a positive signal.

Results
We analyzed 229 plasma samples from 89 included patients. ctDNA was detected at baseline in 54% (44/81) of the samples; after one cycle of preoperative chemotherapy in 38% (27/71) of the samples; prior to surgery in 25% (6/24) of the samples; and 4-6 weeks after surgical resection in 15% (8/53) of the samples. Detection of ctDNA after one cycle of chemotherapy and after surgical resection was associated with shorter recurrence-free survival (hazard ratio (HR): 2.21, P<0.003 and HR: 5.78; P<0.001, respectively).

Conclusion
Lack of clearance of ctDNA detected by the TriMeth assay during preoperative

#30 Concentration-dependent prognostic impact of SFRP1 promoter hypermethylation in stage IV pancreatic ductal adenocarcinoma

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Abstract text
Introduction: Pancreatic ductal adenocarcinoma (PDAC) is a leading cause of cancer death worldwide. We have recently demonstrated that promoter hypermethylation (ph) of SFRP1 in cell-free DNA
is linked to poor prognosis in stage IV PDAC patients. This study aimed to further explore the effects of phSFRP1 in a larger cohort using an updated, digital droplet PCR (ddPCR) based methodology.

Materials and methods: A single strand assay was used for the reference gene EPHA3. Dual-strand ddPCR assays were designed for SFRP1. ddPCR was performed following bisulfite treatment. The
concentration of SFRP1 was normalized according to the concentration of the reference gene. Patients were divided into 3 groups accordingly: High concentration of phSFRP1 (phSFRP1high), low concentration of phSFRP1 (phSFRP1low) and unmethylated SFRP1 (umSFRP1). Survival was assessed with Kaplan-Meier curves. Generalized linear regressions were performed using the pseudo-observation method to obtain absolute risk of death (AR) at 3, 6 and 12 months.

Results: Stage IV PDAC patients (n=365) were included. Patients with phSFRP1high (n=147) had a median overall survival of 2.9 months, compared to 6.9 months in phSFRP1low (n=78), and 8.7 months in patients with umSFRP1 (n=140). phSFRP1high was associated with an increased AR at both 3 (32%, 95%CI:22, 43), 6 (41%, 95%CI:30, 51) and 12 months (25%, 95%CI:15, 34). phSFRP1low was associated with an increased AR at 12 months (17%, 95%CI:5, 29), but not at 3 (4%, 95%CI:-14, 7) or 6 months (5%, 95%CI:-9, 19).

Conclusions: Patients with phSFRP1high had a substantially worse prognosis compared to phSFRP 1low or umSFRP1. This indicates the prognostic effect is proportional to the concentration. There was no prognostic difference between phSFRP1low and umSFRP1 at either 3 or 6 months. However, phSFRP1low had worse prognosis at 12 months. This indicates a minimum concentration threshold to be clinically relevant and that the concentration may change over time.

#31 Infiltration of lymphocytes assessed by deep learning-based algorithms and the association with pathological response to neoadjuvant therapy in rectal cancer

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Abstract text
Introduction
The standard treatment strategy in locally advanced rectal cancer (RC) is neoadjuvant chemotherapy (nCRT) followed by surgery. Patients with RC receiving nCRT achieve varying pathological response. The ability to differentiate complete from other responders could potentially save patients from an ineffective treatment. Furthermore, organ sparing in RC is an emerging goal and tools to predict complete responders are warranted. This study aimed to investigate potential differences in histopathological features between complete responders vs. all other groups.

Material and Methods
We included 50 patients with RC treated with nCRT. Deep learning-based digital algorithms were developed to assess the epithelium tumor area percentage (ETP) based on hematoxylin and eosin-stained slides, and to quantify the density of CD3+ and CD8+ lymphocytes in immunohistochemically stained slides, from the diagnostic tumor biopsies. The ETP, and density of CD3+, CD8+ lymphocytes as well as the CD8/CD3-ratio were compared according to the Mandard tumor regression grade in the surgical specimens.

Results
When comparing the complete responders (n=7) to all other groups of response (n=43), there were no significant differences in the ETP ($P>0.05$). Densities of both CD3+ and CD8+ lymphocytes and the CD8/CD3-ratio in the biopsies were significantly higher in the group of complete responders ($P\leq0.05$).

Conclusions
It is well-known that the infiltration of CD3+ and CD8+ lymphocytes in colorectal cancer is a prognostic marker. In the future, assessment of infiltration of CD8+ and CD3+ lymphocytes in diagnostic biopsies of patients with RC may be useful in predicting complete response to nCRT

#32 Diagnosis and management of cancer patients with immediate drug hypersensitivity reactions to antineoplastic treatments

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Abstract text
Introduction
Rapid Drug Desensitization is the cornerstone when managing patients suffering from immediate drug hypersensitivity reactions to critical drugs. Rapid Drug Desensitization to chemotherapeutics and biologicals (including cancer immunotherapy) is not implemented in Denmark nor anywhere else in Northern Europe. The objective of this ongoing study running from June 2022 through June 2024 is to investigate if Danish cancer patients with significant (severe or recurrent) immediate drug hypersensitivity reactions to critical antineoplastic treatments may benefit from an allergy evaluation and Rapid Drug Desensitization.

Materials and methods
Patients with significant immediate drug hypersensitivity reactions to antineoplastic treatments will be included. Participants are offered diagnostic allergy work-up followed by a multidisciplinary team identification of the optimal treatment option. Options include identification of a safe and efficient drug alternative or the facilitation of continued treatment with the culprit drug by performing a drug provocation test and/or Rapid Drug Desensitization.

Results
These are interim results as the study is still ongoing. Sixteen patients have until January 2023 been included. A safe and efficient drug alternative was identified in two patients. Hypersensitivity was ruled out by drug provocation test in additionally two. Three patients discontinued treatments after referral; two due to progression, one due to complete response. In the remaining nine patients, we performed 22 Rapid Drug Desensitization procedures. All patients were able to receive full treatments. Four of the patients experienced a mild or moderate break-through reaction.

Conclusion
These interim results suggest that allergy evaluations and Rapid Drug Desensitization are feasible in a Danish setting and can be effective tools to maintain patients in the most effective antineoplastic treatment

#33 Serum Macrophage Biomarkers sCD163 and sSIRPα are Associated with Advanced Disease and Poor Prognosis in Prostate Cancer Patients

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Abstract text
Introduction
In recent years, major improvements have been made in the therapeutic options for metastatic prostate cancer (PC) patients, including both metastatic hormone-sensitive PC (mHSPC) and metastatic castration-resistant PC (mCRPC). However, despite life-prolonging effects, high rates of primary and acquired resistance remain. Thus, there is an urgent need for novel biomarkers to guide a more personalized management of mHSPC and mCRPC.

Materials and Methods
We measured the concentrations of two macrophage biomarkers (sCD163 and sSIRPα) in serum samples collected from 278 PC patients prior to radical prostatectomy (RP) and from 222 mCRPC patients at time of mCRPC diagnosis and starting first-line mCRPC treatment. mCRPC patients were dichotomized based on median concentration of sCD163 and sSIRPα, and sCD163 and sSIRPα were evaluated as prognostic markers to predict progression-free survival (PFS) on first-line androgen signaling inhibitor (ARSI) treatment of mCRPC patients.

Results
sCD163 and sSIRPα levels were significantly higher in mCRPC patients compared with RP patients ($p<0.0001$). For mCRPC patients starting first-line ARSI treatment, patients with high sCD163 and sSIRPα levels had significantly shorter PFS, respectively (sCD163: median 8.0 vs 14.7 months, $p=0.0006$; sSIRPα: 10.1 vs 13.9 months, $p=0.034$). Further, a high sCD163 level was identified as an adverse prognostic predictor of PFS on first-line ARSI, independent of baseline clinical characteristics (HR: 1.63, $p=0.004$). mCRPC patients with high sCD163 levels also had significantly worse PSA response during first-line ARSI compared with patients with low sCD163 levels (50% PSA response: 79.6% vs 90%, $p=0.038$).

Conclusions
Together, our results suggest that serum levels of the macrophage marker sCD163 could potentially be used as a minimally invasive prognostic biomarker in mCRPC patients starting first-line ARSI treatment. Analyses are ongoing, and further validation studies are warranted.

Personalised medicine, biomarkers & diagnostics II

#34-43

#34 Circulating tumor DNA analysis in urothelial carcinoma: insights from biological analysis and extended clinical follow-up

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Abstract text
Introduction:
Standard treatment for localized muscle invasive bladder cancer is neoadjuvant chemotherapy (NAC) followed by radical cystectomy (RC); however, only 40-50% respond to NAC and ~50% experience relapse. Early detection of relapse and effective monitoring of treatment response are therefore critical to improve patient outcomes.

Methods:
We present full clinical follow-up (FU; median: 68 months) of a previously described cohort of 68 NAC-treated patients (Christensen, JCO 2019) together with evaluation of a retrospectivey selected cohort of 108 patients who did not receive NAC (median FU: 71 months). Patients were monitored longitudinally with circulating tumor DNA (ctDNA) testing (NAC cohort, n=712; no-NAC cohort, n=157). RNA-seq was erformed on 176 tumors.

Results:
Presence of ctDNA was highly associated with worse recurrence-free survival (RFS) using the updated clinical FU: before NAC (HR=12.7, 95%CI=2.9-56.5, p=0.0008) and after RC (HR=30.2, 95%CI=6.8-134.9, p<0.0001). Of the 55 patients who were ctDNA negative after NAC, 80% achieved pathological downstaging, whereas none of the ctDNA-positive patients had downstaging. For the no-NAC cohort, presence of ctDNA was also associated with worse RFS: before RC (HR=3.6, 95%CI=1.8-7.1, p=0.0003) and after RC (HR=17.8, 95%CI=3.9-81.2, p=0.0002). Transcriptomic profiling and gene set enrichment analysis revealed more tumors of the Ba/Sq subtype (p<0.0001) and an enrichment of oncogenic pathways, namely EMT and hypoxia (q<0.0001), in tumors from ctDNA-positive patients (N=62/142). When using clinical recurrence as endpoint instead of ctDNA status, we found enrichment of EMT in patients with recurrence (N=59) whereas anti-tumor immune pathways were observed among patients without recurrence (N=80).

Conclusion:
Our results document the clinical potential of ctDNA assessment in patients followed >5 years after RC for early risk assessment, treatment response prediction and early detection of metastatic relapse

#35 Prediction of distant recurrence in glioblastoma patients treated with standard

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Abstract text
Background:
Infiltrative growth is a hallmark of glioblastoma (GBM) and is a major factor in therapeutic failure. We aimed to identify clinical and molecular factors associated with distance recurrence in glioblastoma patients treated with standard therapy (radiotherapy with concomitant and adjuvant temozolomide).

Methods:
Two prospective cohorts of consecutive, non-selected GBM patients administered standard therapy as primary treatment between year 2005-2016 (Cohort 1) and 2016-2021 (Cohort 2) at Rigshospitalet, Copenhagen were included. Distant recurrence was defined as a new contrastenhancing tumor > 2 cm from the gross tumor volume. Clinical and molecular factors were screened for association with time to distant recurrence using univariate Cox regression analysis. The final model was generated employing multivariate analysis.

Results:
Cohort 1 and 2 included 628 and 395 patients, respectively. Out of the recurrence pattern evaluable patients, distant recurrence was observed in 117 patients (23%) in Cohort 1 and 73 patients (22%) in Cohort 2. In Cohort 1, multivariate analysis showed that corticosteroid use, age, multifocal disease, ECOG performance status and degree of tumor resection were not associated ($p>0.10$) with distant recurrence. Two factors were independently associated with a higher likelihood of distant recurrence, namely non-methylated promoter of the MGMT gene (HR=1.93; 95% CI: 1.27-2.95; $p=0.002$) and positive expression of Epidermal Growth Factor Receptor (EGFR) (HR=3.70; 95% CI: 1.61-8.33; $p=0.002$). In Cohort 2, the EGFR status was not available but the association of non-methylated MGMT with distant recurrence was validated (HR=2.67; 95% CI: 1.62-4.42; $p=0.0001$).

Conclusion:
Non-methylated MGMT and positive EGFR expression were independent predictors of distant recurrence. Non-methylated MGMT was validated in Cohort 2 and can be used for risk stratification and to enrich clinical trials aiming at improved local or distant tumor control.

#36 Olaparib treatment for solid tumors in a Phase 1 Unit

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Abstract text

Introduktion:
Defekter i BRCA1/2 og andre homolog rekombinationsmekanismer (HRR) er hyppigt forekommende i nogle kræftformer, hvilket kan medføre, at kræften er følsom overfor behandling med PARP-hæmmere såsom olaparib. Olaparib er godkendt af EMA of FDA til æggestokkræft, HE R2-negativ, BRCA1/2-muteret brystkræft, BRCA1/2-muteret bugspytkirtelkræft samt metastatisk, k astrationsresistent prostatakræft med mutationer i udvalgte HRR-gener. I dette studie undersøges, h vordan effekten af olaparib, hænger sammen med gen- og/eller kromosomforandringer i patienter m ed avanceret kræft.

Materiale og metode:
41 patienter (ptt) modtog i årene ’15 til ’22 behandling med olaparib i Fase 1-enheden på Rigshospitalet, København på baggrund af deres DNA-profil. 18 kræftdiagnoser var rep ræsenteret, med prostatakræft (n=15) og æggestokkræft (n=9) som de hyppigste. Kliniske data samt DNA-profiler blev indsamlet og analyseret mhp. progressionsfri overlevelse (PFS) ved hjælp af Ka plan-Meier-statistik.

Resultater:
Den hyppigste årsag til olaparibbehandling var kromosomale forandringer tydende på ho molog rekombinationsdefekt (HRD) hos 18/41 patienter. De resterende 23 fik behandling på baggru nd af en mutation i et HRR-gen: BRCA1, BRCA2, ATM, RAD51B eller CHEK2. BRCA1/2-mutati oner eller udregnet HRD-score kunne ikke adskille populationen med henblik på PFS. Ptt med samt idig mutation i TP53 tenderede mod kortere PFS end ptt med intakt TP53 (p = 0,066). De mest bety dningsfulde prædiktorer for gavnlig effekt af behandling var dog hhv. primær kræftdiagnose samt fr avær af tidligere behandling med platinholdig kemoterapi (HR = 4,14; 95%CI (1.9 - 9.0), p = 0,000 17).

Konklusion:
Samlet set tyder disse data på, at populationen ikke kan opdeles yderligere i forhold til PFS, når vi kigger på genomiske data. Der er dog en trend imod længere PFS for ptt, uden samtidig mutation i TP53. Studiet bekræfter til gengæld, at tidligere behandling med platiner er en negativ pr ædiktiv markør for effekt af olaparib

#37 Longitudinal analysis identifies Latent Immune Glioblastoma patients associated with therapy response after immunotherapy

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Abstract text
Introduction: Glioblastoma is a highly aggressive type of brain tumour for which there is no curative treatment available. Immunotherapies have shown limited responses in unselected patients, and it is currently not well understood what characterises the few responders from non-responders. Here we investigated the phenotypic and transcriptional evolutionary dynamics at single-cell resolution during nivolumab immune checkpoint treatment of glioblastoma patients enrolled in a translational phase I/II clinical trial.

Materials and Methods: In collaboration with the phase I trials unit at Rigshospitalet, we performed single-cell RNA-seq and genome sequencing on paired tumour tissue from primary and relapse surgery from eight patients who received nivolumab prior to the elective surgery of recurrent GBM. We integrated our findings with comparable published cohorts of immunotherapy-naïve patients in order to assess the consequences of immunotherapy.

Results: We identify distinct evolutionary trajectories and find that immunotherapy is associated with a marked shift towards mesenchymal stem-like cells at relapse. A subset of treated patients also display increase in cytotoxic T cell and tumour associated macrophages and prolonged progression-free survival. By integrating our single-cell data with bulk expression data, we identify a distinct subset of glioblastoma patients with patterns of latent immune activation including increased TAM/microglia ratio and expression of CD274 (PD-L1). Lastly, we develop a machine learning-based signature to classify latent immune glioblastoma patients from bulk RNAsequencing data as an approach to aid in stratification of glioblastoma patients for treatment response to immune checkpoint inhibitors.

Conclusion: We uncover both tumour cell and tumour microenvironment dynamics during immunotherapy treatment, which we use to develop a signature classifier to aid in stratification of glioblastoma patients that could benefit from immunotherapy

#38 Neuron-to-Brain Tumor-Synaptic-Communications in glioblastoma patients – uncovering a potential gamechanger for new therapeutic avenues

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Abstract text
Introduction
Glioblastoma (GBM) is a lethal form of cancer with a low treatment success rate due to its complex interaction with brain tissue and heterogeneity. Recent studies have shown that glioma cells receive neuron-to-brain tumor-synaptic-communications (NBTSCs) in xenograft animal models, which play a role in GBM progression and tumor-induced epilepsy. Our research aims to use novel methods available only in a few labs around the world to investigate the role of NBTSCs and GBM physiological diversity in human patients.

Methods
We established a unique workflow for preparing human GBM-infiltrated brain slice cultures. Using a virus-assisted gene delivery technique, we selectively labeled neurons or glioma cells with fluorescent tags. Combining electrophysiology, optogenetics, and immunohistochemistry, we characterized the physiological features of glioma cells and NBTSCs in human brain slice.

Results
We observed that 14% of glioma cells received spontaneous excitatory postsynaptic currents in human brain slices. By expressing light-activated channelrhodopsin in neurons, we documented the neuron-to-glioma transmission in glioma cells upon blue light activation. Glioma cells exhibited depolarized resting membrane potential (Rm) and either spikelets or distorted action potentials. Neurons within the tumor-infiltrated area had altered physiological properties such as depolarized Rm and spikelet generation.

Conclusions
Our study provides proof-of-concept for advanced electrophysiological investigation of NBTSCs using human tumor-infiltrated brain slices. Our preliminary optogenetic results provide pioneering evidence of NBTSCs in human brain slices. We found that glioma cells exhibit neuronlike excitability in human slices, challenging current understanding of their non-excitability in animal model. This study has significant translational value in advancing our understanding of GBM and offers a new pre-clinical platform for developing innovative therapies

#39 Exploring new prognostic biomarkers in Mantle Cell Lymphoma: A comparison of the circSCORE and the MCL35 score

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Abstract text
Introduction: Mantle cell lymphoma (MCL) is characterized by heterogenous disease courses ranging from indolent cases to highly aggressive disease with a poor prognosis and early relapse. The search for clinically fit and biologically relevant biomarkers to guide risk-adapted treatment regimens has led to the proposal of two new NanoString-based, proliferation-associated prognostic biomarkers: the mRNA-based MCL35 score (Scott et al. 2017) and the circular RNA-based circSCORE (Dahl et al. 2021). Both biomarkers have shown promising prognostic potential, but a comparison has never been done before.

Materials and methods: We included 149 patients from the Nordic patient cohorts MCL2 (70 patients) and MCL3 (79 patients) with sample data on both circSCORE and MCL35 along with long-term follow up data including progression free survival (PFS) and overall survival (OS). Gene expression analysis had been obtained with the NanoString nCounter technology after RNAisolation from diagnostic lymphoid and non-lymphoid biopsies. Individual analyses on the MCL3 cohort only were also performed to eliminate the potential risk of overfitting, since the circSCORE is trained upon the MCL2 cohort.

Results: We report that both circSCORE and MCL35 in the MCL3 only survival analyses displayed significant, prognostic potential in stratifying high and low risk groups. These analyses also revealed inability to significantly stratify the MCL35 standard risk group from the MCL35 highand low risk groups. In the multivariable Cox regression models, the circSCORE retained significant prognostic value for PFS, but not for OS. Furthermore, circSCORE added significant prognostic value to MIPI in the pooled cohort (MCL2 and MCL3) for PFS and OS, and for PFS in MCL3 alone, outperforming Ki67 and MCL35.

Conclusion: We suggest a new, combined MIPI-circSCORE with improved prognostic value, and with potential for future clinical implementation, if validated.

#40 Precision medicine for late-stage cancer patients at the Department of Oncology, Aalborg University Hospital

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Abstract text
Introduction: In 2020 a precision medicine program based on in-house sequencing was initiated at Aalborg University Hospital. The interdisciplinary workflow, the genomic, pathological, and clinical features of 163 included patients, as well as the clinical impact in the first two years of the program has been described in a recent publication (1).

Materials and methods: Approx. 230 eligible patients with late-stage cancer are included from June 2020 to present in the Aalborg Proseq Cancer precision medicine trial. Molecular profiling of new or fresh frozen tumor biopsies is done by WES and RNAseq with parallel sequencing of nontumoral DNA as individual reference. Cases are presented at a National Molecular Tumor Board (NMTB) for discussion of targeted treatment.

Results: Prior analysis (1) showed that 80% of patients had a successful analysis done, disclosing at least one pathogenic or likely pathogenic variant in 96%. A strongly or potentially druggable variant was found in 19% and 73% of patients, respectively. Median time from trial inclusion to NMTB decision was one month. One third of patients who underwent molecularly profiling were matched with a targeted treatment, however, only 16% were either treated or were waiting for treatment, deteriorating performance status being the primary cause of failure. The response rate of targeted treatments was 40%, and the clinical benefit rate 53%. 23% of patients presented at NMTB were recommended clinical trial participation unrelated to biomarkers

Conclusion: Precision medicine in end-stage cancer patients is feasible in a regional academic hospital but should continue within the frame of clinical protocols as few patients benefit. Close collaboration with comprehensive cancer centers ensures expert evaluations and equality in access to early clinical trials and modern treatment. An update of clinical results will be presented at the meeting.
1. Ladekarl et al. Acta Oncologica (2023), 62:3, 261-271

#42 Data Infrastructure for Automated Molecular Tumor Board Reporting Leveraging REDCap

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Abstract text
Introduction
To automate Molecular Tumor Board (MTB) reporting in oncology and hematology in the North Denmark Region, we have built a data infrastructure that automates the dataflow, data storing, and MTB report generation.

Material and Methods
Baseline, clinical, pathological, and targeted treatment data for each patient were manually registered into a dedicated REDCap database. Clinical data includes treatment history, stage of disease, performance status, and cancer risk factors such as smoking status, alcohol consumption, and family cancer history. The Department of Molecular Diagnostics at Aalborg University Hospital conducts the molecular profiling and the variant interpretation. As part of the bioinformatics pipeline, clinical data from REDCap for the specific patient is fetched through the REDCap API. The genomic and clinical data is then merged and formatted to an HTML template which is used to generate a PDF for the MTB. Subsequently, the genomic data is automatically uploaded through the REDCap API to a separate REDCap database. Automation scripts were written in Python.

Results
We have built a data infrastructure to 1) store clinical and genomic data, 2) reduce manual work for genomic data management, 3) standardize the MTB report. Clinical data for 255 cancer patients have been manually collected and stored in the clinical REDCap database. 667 genomic data records have been automatically uploaded to the genomic REDCap database. 67 MTB reports have been automatically generated.

Conclusion
This infrastructure allowed the MTB reporting to improve efficiency in data management and increase data quality by automating manual work. It could pave the way for standardized presentation of patient cases at a national MTB. Furthermore, it can be used for research purposes in precision oncology and hematology by facilitating the findability, accessibility, interoperability, and reusability of data, according to the FAIR data principles.

#43 Patient-derived ovarian cancer organoids for understanding and overcoming treatment resistance

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Abstract text
Introduction
High-grade serous ovarian cancer (HGSC) is the most common and lethal form of ovarian cancer. Despite initial response to the treatment, 80% of patients relapse and become chemoresistant, but the mechanisms of resistance are not understood. The lack of good reproducible translational models has hampered the study and identification of resistance mechanisms, and the therapeutic strategy for most HGSC patients has remained the same for almost three decades. Our research thus focuses on developing and applying patient-derived HGSC organoid models to study chemoresistance-driving cell populations. In addition, we make these models available to the scientific community to enable more rapid therapeutic discoveries.

Materials and methods
We have developed a robust protocol for the efficient establishment and long-term culture of HGSC tumor organoids. With our method, we have established 17 organoid cultures from 10 patients and we are currently expanding the biobank.

Results
We have conducted high-throughput drug screens to determine the drug sensitivities of individual patients. We have also transduced organoids with Cas9, DNA barcodes, and luciferase to conduct CRISPR screenings, lineage tracing studies, and pre-clinical validation of relevant drugs and findings in vivo. We have proof-of-concept for developing a multi-culture model with organoids, stroma, and immune cells to investigate how the tumor microenvironment influences treatment responses. Lastly, several of the established organoid models have been made available in a public biobank and can be requested by other researchers.

Conclusions
Our method has allowed us to establish a living biobank of patient-derived organoids.
We are currently using these organoids in novel applications involving genetic engineering, highthroughput assays, and multi-cellular cultures. It highlights the models' potential for studying individual patient tumors in vitro to find unique hallmarks and treatment approaches

Patient involvement, Palliation and psychosocial support

#44-53

#44 Diagnostic flow and outcomes for patients referred to a Danish diagnostic centre based on non-specific symptoms of cancer

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Abstract text
Introduction
We describe the diagnostic flow for all patients referred from 1 January to 30 June 2020 to the Cancer Patient Pathway for Non-specific Signs and Symptoms of cancer (NSSC-CPP) in the Diagnostic Centre in Farsø (DC-F), Denmark.

Material and methods
By reviewing electronic patient files, we describe in which setting the diagnostic work-up was carried out; the primary symptoms leading to referral; use of diagnostic imaging together with malignant and serious non-malignant diagnoses for all patients referred to the NSSC-CPP in DC-F. Diagnoses were assessed after completed diagnostic work-up and additionally at a 6-months follow-up. We describe if patients were redirected to other hospital departments or general practice (GP) after DC-F consultation.

Results
Of the 314 referrals (307 patients) to DC-F, 227 had diagnostic work-up in DC-F. The remaining were redirected to a) other organ specific pathways (n=11); b) other out-patient hospital clinics (n=45); c) had acute admission to hospital before out-patient work-up could be initiated (n=6) or d) redirected to referring GP (n=25). In total, 25 (8%) of all 314 referrals were diagnosed with the following malignancies: Gastrointestinal tract 9; lung 8; breast 2; lymphoma 2; renal, sarcoma, seminoma, and polycythaemia vera each 1. Within a six-month period after DC-F work-up two (1%) additional malignancies were diagnosed: esophageal cancer and cervical cancer with carcinomatosis. Additionally, 30 (10%) were diagnosed with a non-malign but relevant disease.

Conclusion
By tracking all patients referred to the NSSC-CPP in DC-F and those redirected to other hospitals departments and GPs, this is the first study to describe the diagnostic flow for all patients referred.to a diagnostic centre in Denmark. Eight percent of referrals ended with an incident malignant diagnosis of which the gastrointestinal tract and lung were most prevalent sites.

#45 Adherence to follow-up and resource use after abnormal FIT-screening: An evaluation of the implementation of the Danish colorectal cancer screening program

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Abstract text
Introduction
The effectiveness of screening programmes is highly dependent on the appropriateness of the surveillance, both in terms of detecting cancer and precursor lesions, as well as ensuring healthy individuals undergo as few unnecessary endoscopic procedures as possible. This study aimed to evaluate adherence to the recommended surveillance after positive colorectal cancer screening and to estimate the real-life resources employed by the screening programme.

Materials and Methods
In this register-based cohort study, we included individuals with a positive FIT screening test during the prevalence screening in 2014-2017 and followed them until June 2022. All endoscopic procedures, imaging, and surgical procedures performed at public and private hospitals/clinics were identified. Adherence to national protocols for follow-up and surveillance was analysed and the use of diagnostic and surveillance procedures during a four-year period after screening was estimated.

Results
After exclusions 82,221 individuals with a positive FIT test was included. The majority (84.1%) had a colonoscopy performed within one month. Among residents recommended surveillance after removal of intermediate or high-risk adenomas, 12% and 6%, respectively, did not have any follow-up registered. Only 51% and 55% had timely surveillance, with delays as the most frequent cause of non-adherence to recommendations. Adherence to the second surveillance, was even lower, ranging between 32-53% depending on the referral diagnosis. In addition, 12% with normal colonoscopy had a second colonoscopy within four years.

Conclusions
High adherence to baseline colonoscopy after positive FIT-screening does not necessarily continue throughout the adenoma surveillance program, as we found decreasing adherence from baseline to first and second surveillance. Focusing on following the guidelines could potentially improve the future effectiveness and feasibility of the screening programme.

#46 False positive risk among FIT screening-participants with IBD or high colorectal cancer risk: a register based cohort study

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Abstract text
Introduction
FIT-based colorectal cancer (CRC) screening is not intended for residents with a higher than average colorectal cancer risk, nor for residents with Inflammatory bowel disease (IBD). Therefore, Danish IBD and high-risk residents are advised not to participate in the national FIT-based screening programme or to discuss participation with their doctor. A recent study showed that many of these residents nevertheless participate in the Danish FIT screening program. However, it is unknown whether this led to more false-positive or true-positive cases. This study aimed at estimating the risk of a false positive test among IBD and high-risk residents who had a positive FIT screening within the Danish FIT screening programme.

Materials and Methods
We included all participants who had a positive index FIT, between 2014-2017 and participated in the subsequent colonoscopy within 3 months. The outcome of the FIT screening was establish by following the participants for 180 days using the national registers. We estimated the odds ratio of a false-positive FIT adjusted for sex and age.

Results
We included 71.871 participants with a positive index FIT who attended the subsequent colonoscopy. A total of 40.704 participants had a false-positive FIT. The odds of having a false-positive FIT were significantly higher among participants with CRC, ulcerative colitis, and Crohn's disease than among average-risk participants.

Conclusions
Residents with IBD or a higher than average risk of CRC had a significantly higher risk of getting a false-positive FIT than the average-risk population. The result indicates a need to update the recommendations, as too many screening-related colonoscopies are performed among residents with IBD or a higher than average risk of CRC

#47 Participation in colorectal cancer screening is associated with self-reported abdominal symptoms – A cross-sectional study

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Abstract text
Introduction
To reduce the significant burden of colorectal cancer, organised screening for asymptomatic (wo)men has been implemented in most Western countries. However, abdominal symptoms are frequent in the general population as well as in the screening eligible population. To analyse whether there was an association between experiencing abdominal symptoms and participating in screening for colorectal cancer, subsequent to analyse the association between abdominal symptoms and test result for those participating.

Methods
The study was conducted as a cross-sectional study using survey and register data. The study population consisted of 11,537 women and men in the age group 50-74 years living in Central Denmark Region and about to be invited for CRC screening in the period 9-23 September 2019 which was three standard weeks in the screening program. Abdominal pain, mucus in stool, fresh blood in stool and dark/black stool occurring at least once a week were defined as presence of symptoms. Unexplained weight loss within the last months and unexplained tiredness within the last four weeks were defined as present if it was experienced some or a lot.

Results
A total of 5,488 men and women (49% and 51%, respectively) were included in the analyses. Preliminary results indicate an association between symptoms and screening participation, especially among men whereas there seem to be no association between symptoms and test result. Final results will be presented at the conference.

Conclusion
If abdominal symptoms leads to participation in screening for colorectal cancer, it may on the one hand be better than doing nothing and on the other hand symptoms should prompt consulting a doctor. Yet again, abdominal symptoms are frequent in the eligible population and may not all need medical attention. This paradox requires careful considerations when communicating that screening is for asymptomatic people.

#48 Health literacy and healthcare-seeking behavior with lung cancer symptoms among individuals with different smoking status in the general population

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Abstract text

Introduction
Timely diagnosis is important for the stage of disease at diagnosis and prognosis of lung cancer. Health literacy may influence healthcare-seeking, particularly among high-risk groups. This study aims to 1) estimate the prevalence of lung cancer symptoms and proportions of contact to the General Practitioner (GP), and 2) analyse the associations between health literacy and GP contact among individuals with different smoking status.

Methods
A nationwide survey with 22,077 individuals aged ≥40 years. Questions about symptoms, GP contact, health literacy, and smoking status were included. Descriptive statistics and multivariate regression models were applied.

Results
Overall, 23% reported at least one lung cancer symptom, and of those 45% had contacted their GP. GP contact varied from 60% (shortness of breath) to 34% (prolonged hoarseness). Only 42% of individuals reporting hemoptysis had contacted their GP. Being a woman and increasing age were significantly associated with a higher proportion of GP contacts whereas individuals who currently smoked had lower odds of GP contact (OR: 0.80, 95% CI: 0.68-0.95). Health literacy was associated with GP contact in different ways. “Feeling understood and supported by healthcare professionals” increased the odds of GP contact (OR 1.48, 95%CI: 1.30-1.68, while “Having sufficient information about health” decreased the likelihood of GP contact. Stratifying analyses on smoking status did not change the association between health literacy and contact to general practice.

Conclusion
Among individuals with lung cancer symptoms far from all contacted their GP.
Gender, age, smoking status, and aspects of health literacy significantly influenced the healthcare-seeking behavior. The ability to self-care is a key element for citizens' actions and management of their health and illness. Re-organisation of the healthcare systems in a more health literacyresponsive direction may improve timely diagnoses of lung cancer.

#49 Comparison of the geriatric screening tools G8 and modified G8 in older patients with lung cancer: A validation study.

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Abstract text
Introduction
Oncologists are treating an increasingly aging and more frail population of patients with lung cancer (LC). Comprehensive geriatric assessment (CGA) is a multidisciplinary process to identify, quantify, and intervene against modifiable domains of frailty. The G8 screening tool (G8) and mG8 were developed to identifying older patients who may benefit from CGA. The primary aim of this study is to compare G8 and mG8 according to accuracy in patients with lung cancer to select who may benefit from CGA. The secondary aim is to identify the accuracy of the screening tools in patients with advanced disease (stage IIIb-4), as patients with advanced disease has a poorer prognosis and is assumed to suffer from a more significant burden of disease.

Methods
We conducted a predictive validation study of G8 and mG8 applied in older patients with lung cancer. Data were collected prospectively in electronic health records by a multidisciplinary team consisting of geriatricians and trained geriatric nurses at the Department of Geriatrics, Aarhus University Hospital.

Results
In total, 210 patients with LC any stage were included, 68% (N=143) had advanced disease. In patients with LC any stage G8 had a sensitivity of 90% (95% Confidence Interval (CI), 86; 94), a specificity of 39% (95% CI, 33; 46). The mG8 had a sensitivity of 87% (95% CI, 82; 92), a specificity of 37% (95% CI, 30; 43). In patients with advanced disease G8 had a sensitivity of 91% (95% CI, 87; 96), a specificity of 34% (95% CI, 26; 42.The mG8 had a sensitivity of 90% (95% CI, 85; 95), a specificity of 34% (95% CI, 26; 42).

Conclusion
We found that G8 was slightly more accurate than mG8 when identifying patients with lung cancer all stages and advanced disease, who may benefit from CGA. Both tools can be used as screening tools, are easy to perform in everyday clinical work, and can provide clinicians with important information to improve the care of older patients with lung cancer and frailty

#50 The durability of previous examinations for cancer: Danish nationwide cohort study

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Abstract text
Introduction
Some patients have symptoms or signs indicative of cancer but a prior negative examination result. We aimed to explore the risk of being diagnosed with cancer after a negative examination result of respectively computer tomography (CT) of thorax for lung-, gastroscopy for upper gastrointestinal -, colonoscopy for colorectal-, cystoscopy for bladder-, and clinical mammography for breast cancer.

Materials and methods
We conducted a register-based time-to-event analyses of the risk of the cancers encompassing all 30-85-year-old Danish citizens not diagnosed with the specific cancer during the past 10 years. For each pair of cancer and examination, we classified each person by the time since their most recent examination date. Following up one year, we calculated the age- and sex-adjusted hazard ratios of being diagnosed with the cancer using not examined persons as reference.

Results
During the last ten years before the start of follow-up, 11.0% of the population had a CTthorax, 10.6% a colonoscopy, 8.0% a gastroscopy, 4.6% a cystoscopy, and 14.5% of the women a clinical mammography. Ranging from 1.6% (bladder) to 5.3% (lung) of those who were diagnosed with the cancer during follow-up had a negative examination 6-23 months before the start. For patients examined 6-11 months before start, the hazard ratios (95% confidence interval) were: CTthorax 0.98 (0.74-1.19), clinical mammography 1.26 (0.92-1.71), and colonoscopy 0.53 (0.38-0.74), and 6-23 months before index: gastroscopy 1.51 (0.97-2.34), and cystoscopy 0.70 (0.36-1.36).

Conclusion
Great caution should be taken when considering using a previous negative examination result to rule out future cancer

#51 Tracking Down Early Stage Cancer in Southern Denmark (TRADESCAN) -a retrospective cohort study of the Non-specific Symptoms and Signs of Cancer-Cancer Patient Pathway (NSSC-CPP) in the area of Funen from 2014 to 2021

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Abstract text
Introduction
Denmark has for several years had lower cancer survival rates than comparable countries. To improve cancer survival, the cancer patient pathways (CPP) for organ-specific symptoms and the non-specific symptoms and signs of cancer (NSSC) were implemented in 2008-2009 and 2012, respectively. Nearly half of symptomatic patients who will go on to be diagnosed with cancer do not present with alarm symptoms. The routes to diagnosis and local differences in the utilisation of the NSSC-CPP for this group is unknown.

Materials and methods
This is a retrospective cohort study of all patients referred through the NSSC-CPP to the Diagnostic Centre in Svendborg, Denmark (catchment area: 499,000). Data was collected by manual review of the electronic hospital records. Follow-up for each patients was 6 months where a final diagnosis was given.

Results
A total of 6720 patients were referred from 2014-2021. Of these patients, 20% had malignant disease, while 24% had serious non-malignant disease. The referral rate increased from ~300 in 2014 to a stable ~1100 in 2018-2021. Proportion of malignant disease decreased from >35% in 2014 to a stable 16-20% in 2017-2021. Local differences exist in the utilisation of the NSSC-CPP between each municipalities as measured by crude referrals.

Conclusions
The number of patients referred to the NSSC-CPP grew significantly from 2014 to 2021 to a final crude referral rate of approx. 220 per 100,000 per year. The proportion of patients with cancers within 6 months has now stabilised to around 16-20%. The combination of an overall high crude referral rate and cancer conversion rate has resulted in the NSSC-CPP in Diagnostic Centre in Svendborg today having a cancer detection rate of the total yearly new cancer cases of Funen of approx. 6%. However, it appears that local variation still exists in the utilisation of the NSSC-CPP between the municipalities of Funen, which is a potential target of further research and optimisation.

#52 Outcomes at second fecal-based colorectal cancer screening - A cohort study on different screening intervals

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Abstract text
Introduction
In many countries, colorectal cancer(CRC) screening participants with low-risk adenomas(LRA) or a negative Fecal Immunochemical Test(FIT) are recommended a FIT after two years. In the implementation period of the Danish CRC screening program, screening intervals of up to four years were allowed, allowing the evaluation of longer intervals. We aimed at comparing FIT-positive rates and positive predictive value(PPV) for CRC between groups with former LRA or a negative FIT and between regular and late screened.

Materials & methods
This register-based cohort study followed participants with LRA or negative screening results from the first CRC screening in 2014 - June 2017 until their second screening participation. We compared FIT- and colonoscopy results at the second screening across results at the first screening (negative=ref) and across different screening intervals: <2.5 years(ref) vs >3 years. The primary outcome was PPV for CRC. Current results are preliminary.

Results
Results from 2014-2019 will be presented at the conference Results: Among the 716,716 participants with former negative results, 4.4% had a positive FIT at the second screening, while it was 15.7% of the 8,489 participants with LRA, RR 3.6 (95%CI 3.4;3.8). The PPV was 3.1% for the LRA and 4.0% for the former negative group, Ratio between the PPVs where though non-significant (0.77 (0.57;1.05)). The PPV at the regular and late screening was 1.9% and 3.2% for the LRA group, RR 1.66(0.67;4.12), and 4.0% and 4.1% for the negative group, RR 0.98 (0.85;1.22).

Conclusions
The LRA group had a significantly higher risk of a positive FIT at second screening and a non-significant lower PPV for CRC. Increasing the screening interval did not change the PPV for the negative group, while there was a non-significant increased PPV for the LRA. Our results support the notion of prolonging the interval, but the study needs a larger population size and further analysis to look into cancer stage distribution.

#53 The association between health literacy and low combined participation in the national screening programmes for breast, colorectal and cervical cancer for women.

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Abstract text
Abstract Introduction
The association between participation in cancer screening and health literacy has been investigated with diverging results. This study aimed to investigate the association between level of health literacy and low combined participation in the public funded screening programmes for breast, colorectal and cervical Cancer for women living in Denmark.

Material and Methods
In a cross-sectional study 1,541 women aged 53-65 years completed a health literacy questionnaire (the European Health Literacy Survey Short Scale 16-item, HLS-EU-Q16) and their cancer screening participation was collected from nationwide registries. These data were combined with selected register data about sociodemographic variables from Statistic Denmark. Health literacy was dichotomised into adequate vs. inadequate/problematic and combined screening participation was defined as complete if they participated in all three programmes and low if they participated in none or one of the programmes. The association was assessed in adjusted logistic regression analyses.

Results
Twelve percent of the participants had low combined participation and 41% had inadequate/problematic health literacy. The adjusted odds ratio (aOR) for screening participation was 1.48 (CI: 1.06-2.05) for women with inadequate/problematic health literacy compared to women with adequate health literacy. The association was not modified by any of the sociodemographic characteristics.

Conclusion
Surprisingly an association between inadequate/problematic health literacy and higher probability of screening participation was found. However, our results should be interpreted with caution due to insecurities in the measurement of health literacy. Still the existing evidence is divergent and this may lead to the conclusion that low health literacy may not be the most dominant barrier towards participation in cancer screening

Morbidity, late effects & rehabilitation

#54-64

#54 'You are dealing with the bottom here…' A qualitative study about faecal based colorectal cancer screening among men visiting a drop-in centre in Denmark

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Abstract text
Background
Colorectal cancer (CRC) screening can reduce both CRC incidence and mortality, and faecal immunochemical testing (FIT) based screening programmes are therefore now being implemented in many countries. However, social inequality in FIT based screening participation is well documented, and initiatives to address this challenge are understudied. We explored the perceptions about CRC screening and perceived barriers and facilitators towards FIT based CRC screening among men visiting a drop-in centre for people with severe social problems in Denmark.

Materials and methods
The study was a qualitative interview study using a phenomenological approach. Participants were sixteen men visiting a drop-in centre in Denmark. A local staff member provided supplementary information and helped with the recruitment process. The interviews were transcribed verbatim followed by an inductive content analysis.

Results
The men were often dealing with health and social problems, and they often had a low self-esteem. At first they stated that they did not think much about cancer and their own risk for being diagnosed with it. They argued that they had little time, energy and resources for participating in for example CRC screening programmes, and barriers for participating were facts of life such as comorbidity and cognitive difficulties. Further, they were not sure how to participate, and some misunderstood the concept of screening. However, during the interviews the main part of the participants became very keen to participate, and they suggested in the future they would like to receive regular information in a face to face interaction with someone who cared and was interested in helping them.

Conclusion
Men in a vulnerable position visiting a drop-in centre were interested in CRC screening. If we intervene in a way meeting the needs among these vulnerable citizens, it may contribute to reduce social inequality in FIT based CRC screening programmes.

#55 Viden om kvalitet i multidisciplinære teamkonferencer med fokus på inddragelse af patientens synspunkter, præferencer og generelle livsforhold ved lungekræft

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Abstract text
Introduktion
Multidisciplinære team (MDT) konferencer er et væsentligt element i kræftpatientforløbet. I den nationale vejledning fremgår det, at målet med MDT-konferencen er at behandle patienten som en hel patient, herunder medtage patientens synspunkter, præferencer og generelle livsforhold. Studier finder variation i kvaliteten af MDT-konferencer. Denne undersøgelses formål var at belyse, hvorvidt og hvordan klinikere oplever, at patienters synspunkter, præferencer og generelle livsforhold inddrages i forbindelse med lungekræft MDTkonferencen, og hvilke overvejelser og forslag klinikere har til kvalitetsmonitorering og udvikling
af konferencerne.

Materiale og metode
Fra november 2021 til marts 2022 blev der foretaget individuellesemistrukturerede interviews med 22 klinikere, der deltog i lungekræft MDT-konferencer. Alle hospitaler, der afholdt lungekræft MDT-konferencer, og alle involverede specialer og faggrupper var repræsenterede. Interviewene blev lydoptaget, transskriberet og tematisk analyseret.

Resultater
Ved analysen fremkom syv temaer: 1) Forskelle på rammer for afholdelse af lungekræft MDT-konferencer på tværs af landet, 2) fordele og forbehold for at kende patienters præferencer ved MDT-konferencen, 3) patientinformation og patientinddragelse i forbindelse med MDT-konferencen, 4) klinikernes beslutning om behandlingstilbud på MDT-konferencen, 5) diskrepans mellem patientbeskrivelsen og den sete patient, 6) klinikernes forslag til udvikling af MDT-konferencen og 7) klinikernes forslag til kvalitetsopfølgning af MDT-konferencen.

Konklusion
Inddragelse af patientpræferencer i forbindelse med MDT-konferencen sker ikke systematisk og varierer på tværs af landet. Kvaliteten af MDT-konferencer kan følges systematisk ved at følge op på, hvorvidt behandlingstilbuddet, der besluttes på MDT-konferencen, er den behandling, patienten modtager. Derudover at sammenligne MDT-beslutninger på tværs af landet for at sikre samme behandlingstilbud uanset geografi.

#56 Are we practicing meaningful Patient and Family Caregivers Involvement in Danish research?

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Abstract text
Introduction: Patient and public involvement (PPI) in health research are gaining popularity on a global scale. The Patient Engagement in Research Scale (PEIRS-22) measures meaningful patient and caregiver involvement in research. This study aimed to translate PEIRS-22 into Danish, conduct pilot testing, and explore the user perspectives of PPI among three patient advisory boards across cancer diagnoses.

Materials and methods: A multi-method study consisting of three stages: 1) translation, linguistic validation, and cultural adaptation of the PEIRS-22 from English to Danish, following international evidence-based guidelines, 2) a pilot test of the Danish version of PEIRS-22, and 3) focus group interviews to explore the perspectives of being a research partner in cancer research.

Results: The translation process resulted in a Danish version of PEIRS-22, conceptually and culturally equivalent to the English version. During pilot testing members of three distinct patient advisory boards (n=15) achieved an average Danish PEIRS-22 total score of 85.2 (range 0-100), with higher scores indicating higher meaningful involvement. Further, research partners (n=9) participated in three focus group interviews. The analysis yielded four themes: 1) internal motivation as a driver for involvement, 2) positive user experiences of PEIRS-22, 3) trustful atmosphere and social interaction as key elements, and 4) personal benefit of involvement.

Conclusions: The PEIRS-22 questionnaire has undergone translation, linguistic validation, and cultural adaptation for use among Danish populations. Overall, the pilot study showed that research partners experienced meaningful involvement and that this was corresponding to the findings in the focus group interviews. This study contributes to the growing emphasis on PPI in research by quantifying the user perspective and broadening the understanding through qualitative research.

#57 Patientinvolvering i kliniske retningslinjer

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Abstract text
Introduktion
Patientinvolvering i udviklingen af kliniske retningslinjer er internationalt anbefalet, men forskning i patienters ønsker til involvering er begrænset. Formålet er at undersøge, hvordan kræftpatienter ønsker at blive involveret i udviklingen af kliniske retningslinjer.

Materialer & Metoder
Der er foretaget et fokusgruppeinterview med seks informanter, der havde eller havde haft en kræftsygdom. Informanterne er rekrutteret fra patientforeninger og Kræftens Bekæmpelse. Til analysen er Kirsti Malteruds analysestrategi; systematisk tekstkondensation anvendt.

Resultater
Der er fundet fire centrale temaer i datamaterialet, som belyser kræftpatienters ønsker til patientinvolvering i udviklingen af kliniske retningslinjer. 1) Barrierer for patientinvolvering. Informanterne anbefalede forståelig tale og imødekommende klinikere i retningslinjegrupper til at overkomme barrierer og øge patienters motivation og engagement i retningslinjeudvikling. 2) Informanternes forberedelse. Grundig forberedelse, brug af patientdagbøger og sparring med andre patienter forud for involvering blev beskrevet som facilitatorer for vellykket patientinvolvering. 3) Sammensætning af retningslinjegruppen. Informanterne anbefalede heterogene retningslinjegrupper med involvering af minimum to patienter. 4) Rammerne for deltagelse. Mulighed for virtuel deltagelse blev foreslået til at øge fleksibiliteten. Informanterne ønskede, at tidspunkt for rekruttering skulle være efter endt sygdomsforløb og foretrak at blive kontaktet på mail.

Konklusioner
Dette studie giver danske kræftpatienter en stemme i forskningen om patientinvolvering i kliniske retningslinjer. For at imødekomme informanternes anbefalinger til patientinvolvering er der behov for omtanke, planlægning og samarbejdsvillighed, men ikke væsentlige ekstra omkostninger. Implementering af dette studies resultater kan derfor på let tilgængelig vis hjælpe retningslinjeudviklere med at opnå meningsfuld involvering af patienter.

#58 Acute toxicity trajectories for patients with prostate cancer at the MR-linac: How regular patient-reported outcomes improve data quality

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Abstract text
Introduction
Frequent assessments of patient-reported outcomes (PROs) ensure the detection of changes in patient symptoms over time. The current study aimed to investigate how weekly PROs in the acute phase of adaptive online MR-guided radiotherapy (MRgRT) can provide adequate monitoring of adverse event (AE) trajectories in the treatment of prostate cancer (PCa).

Material & Methods
Patients with PCa referred for treatment at the 1.5 T Unity MR-linac were eligible. Weekly electronic PROs (ePROs) were to be reported until four weeks following treatment and follow-up (FU) weeks eight and 12. Clinicians had access to real-time monitoring of the ePROs. The primary endpoint was a clinically relevant increase in urinary frequency. Weekly assessments were compared with standard intervals of PRO assessment; end of treatment, weeks four and 12.

Results
Fifty patients were analysed; 25 with localised PCa (60 Gy/20 Fx) and 25 with low-volume metastatic disease (36 Gy/6 Fx). A higher incidence of a two-level increase in urinary frequency was reported for the 60 Gy vs 36 Gy cohort (28% vs 12%), but baseline scores were not equivalent (16% vs 24% moderate/severe symptoms). Weekly assessments detected the highest mean changes in adverse events (AEs) in week three for the 60 Gy cohort and the first two FU weeks for bowel and urinary obstructive AEs in the 36 Gy cohort. Worsened urinary frequency (16%) and rectal pain (12%) persisted in week 12 in the 60 and 36 Gy cohorts, respectively. Weekly PRO assessments captured more severe symptoms than standard intervals for almost all AEs reported (2-16% increase).

Conclusions
Our study is the first to provide timely reports of the acute AE trajectories of PCa patients treated with online adaptive MRgRT. Weekly PRO assessments detected more severe symptoms than standard intervals. These findings suggest that frequent PRO monitoring could improve the accuracy of toxicity monitoring in future trials and facilitate timely supportive care

#59 Datadeling som vej til at mindske ulighed for kræftramte: Erfaringer og perspektiver fra SAMBLIK-diabetes - en tværsektoriel it-løsning til diabetesbehandling

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Abstract text
Introduktion
Borgere med kræft oplever i høj grad forløb som går på tværs af sektorer. Når region, kommune og praksissektor ikke kan dele alle relevante data, bliver det patienten selv, som skal overdrage relevant information mellem sektorerne. Det er typisk de resursestærke patienter, som bedst evner dette, hvilket skaber ulighed i sundhed. En digital tværsektoriel datadeling vil kunne afhjælpe dette problem. Det afspejles i en allerede udviklet it-løsning på diabetesområdet, som har potentiale til at blive udvidet til kræftområdet.

Materialer og Metoder
I 2019 begyndte vi at udvikle it-løsningen SAMBLIK-diabetes, som giver sundhedsfaglige fra forskellige sektorer det samme overblik over patienter med type-2 diabetes. Målet er at styrke sammenhæng og aflaste patienten fra at skulle være bærer af information. Løsningen er baseret på en national infrastruktur for datadeling. Sundhedsfaglige slutbrugere har været inddraget for at udpege relevante data og give feedback på brugerfladen. Løsningen har været i en pilot-afprøvning i 2021.

Resultat
Udviklingen og pilotafprøvningen af SAMBLIK-diabetes viser, at det (trods tidligere juridiske og tekniske barrierer) i dag er muligt at udvikle patientoverblik baseret på tværsektorielle datasæt, som kan bidrage til bl.a. bedre sammenhæng og mindsket ulighed. SAMBLIK er samtidigt tænkt som et bredt koncept, der kan udbredes til andre sygdomsområder. På kræftområdet fremstår en lignende tværsektoriel it-løsning yderst relevant i flere typer af forløb og scenarier, fx præhabilitering, rehabilitering og palliative forløb. Her ville det være muligt at trække på erfaringer fra SAMBLIK-diabetes, samt bruge platformen til teknisk fprøvning.

Konklusion
For at styrke sammenhæng og mindske ulighed i kræftpatienters forløb, er det relevant at udvikle nye datadelings-løsninger til de sundhedsfaglige. SAMBLIK kan her være både inspiration og en teknisk platform til afprøvning og eventuelt implementering af sådanne løsninger

#60 Attitude towards risk-based breast cancer screening: a survey among 5,000 Danish women

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Abstract text
Introduction
In Denmark, women aged 50-69 are offered a mammography every second year. The program is one-size-fits-all, but today we have the technology and tests to make a tailored program based on a woman's individual risk (IR) of developing breast cancer (BC). The objective of this study was to measure Danish women's attitude towards risk-based BC screening.

Materials and methods
Attitude towards risk-based BC screening was mapped from qualitative interviews and surveys conducted in other countries. This information fed into a survey, which was validated by the target group. The survey was sent out through a web panel to Danish women aged 52-67 years. We applied survey quotas on age and region. Almost half of the women (44 %) responded to all 17 questions. We used logistic regression analyses to assess how personal characteristics were associated with attitude towards IR calculation of BC.

Preliminary results
In total, 5,001 women completed the survey of which 74 % thought it was a good idea to calculate IR to alter frequency of BC screening. However, only 42 % would be positive about less frequent screening (every fourth year vs. biennially) if they were found to be at low risk of BC, while 89 % would be positive about more frequent screening (annually vs. biennially) if at high risk. Logistic regression analyses showed that higher age, lower education, non-participation in screening, no personal or family history of BC and low perceived BC risk were all associated with higher odds of having a negative attitude towards IR calculation (all p-values <0.01). Rarely or never worrying about getting BC also increased odds of a negative attitude compared to those worrying always or often (p=0.02).

Conclusion
Most women are positive towards risk-based BC screening, especially if they imagine being at high risk and getting more frequent screenings. Attitudes are also associated with age, education, history of BC, BC worry and perceived risk of BC.

#61 ”Når mor har brystkræft” - en identificering af unges oplevelser og behov under moderens brystkræftforløb

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Abstract text
Introduktion
At være ung og pårørende til en kræftramt er forbundet med særlige udfordringer.
Alligevel ved vi ikke særlig meget om, hvordan unge oplever det, når deres mor går igennem et brystkræftforløb, og hvad deres behov for støtte og information er. Formålet med dette studie er at undersøge unges oplevelser og behov under deres mors brystkræftforløb.

Materialer & Metoder
De unge blev rekrutteret via deres mødre, som var patienter på brystkirurgiske afdelinger i Region Syddanmark i perioden april 2020-april 2022. Individuelle semistrukturerede interviews blev foretaget på tre tidspunkter i moderens brystkræftforløb: 1) ved diagnosticering, 2) midt i behandlingsforløbet, og 3) ½ år efter endt behandlingsforløb (eller et år efter andet interview, hvis moderen var uhelbredeligt kræftsyg). En eksistentiel fænomenologisk analyse er anvendt til at afdække fælles temaer i interviewene.

Resultater
Elleve 13-18-årige unge deltog. I de præliminære fund er to eksistentielle temaer identificeret: 1) frygt for at miste, som var tæt forbundet med chok over beskeden om moderens brystkræftdiagnose, og 2) følelsesmæssig isolation, som var tæt forbundet med a) et ønske om ikke at belaste forældre og venner samt b) et ændret syn på, hvad der er vigtigt i livet, som udfordrede de unges venskabsrelationer.
Alle ønskede mere information om deres mors brystkræftforløb fra sundhedsfagligt personale. Ingen opsøgte støttetilbud, men oplevede, at interviewene fungerede som en relationel støtte til at være og blive sig selv og til oplevelsen af forbundethed.

Konklusioner
Unge kan havne i følelsesmæssig isolation, når deres mor rammes af brystkræft.
Forældre bør støttes i at informere og støtte unge under moderens brystkræftforløb. Udvikling af relevante interventioner til at informere og støtte unge under deres mors brystkræftforløb anbefales. Der er brug for mere viden om, hvilke interventioner unge finder relevant og vil benytte sig af, når deres mor rammes af brystkræft.

#62 Eksistentielle og åndelige behov hos kræftoverlevere afhængigt af kræfttype og tid siden diagnosen: en populations-baseret spørgeskemaundersøgelse koblet til danske nationale registrer.

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Abstract text
Introduktion
Selvom omfattende både kvalitativ og kvantitativ forskning dokumenterer eksistentielle og åndelige behov (herefter åndelige behov) hos kræftpatienter, er der aldrig foretaget nogen større systematisk kvantitativ undersøgelse på tværs af kræfttyper. Denne undersøgelse er den største, der nogensinde har undersøgt åndelige behov hos kræftoverlevere, og den første til at undersøge sammenhængen mellem åndelige behov hos kræftoverlevere som funktion af kræfttype og tid siden diagnosen.

Materialer og metoder
Vi brugte data fra kohortestudiet EXICODE, som er en national digital spørgeskemaundersøgelse fra Danmark koblet med registerdata. 104.137 tilfældigt udvalgte voksne danskere samt 16.356 kræftpatienter (25% af alle incidente kræftpatienter i år 2020) var inviteret til at deltage i undersøgelsen, som blev sendt ud i november 2021. Multivariable lineære regressionsanalyser blev udført for at undersøge sammenhængen mellem åndelige behov, kræfttype og tid siden diagnosen. Studiet blev juridisk og etisk godkendt på Syddansk Universitet.

Resultater
I alt deltog 23.581 (24,6%) tilfældigt udvalgte danskere og 6.408 (39,2%) kræftoverlevere. Intensiteten af rapporterede åndelige behov var associeret med kræfttype og tid siden diagnosen (især forhøjede åndelige behov rapporteret i de første 6 mdr. efter diagnosetidspunkt).

Konklusioner
Både kræfttype og tid siden diagnosen er associeret med åndelige behov – den højeste intensitet af behov ses ved nylig diagnose. Disse resultater kalder på nationale indsatser rettet mod at fremme åndelig omsorg for denne patientgruppe. Studiet vil tjene som grundlæggende evidens for klinikere og sundhedspolitiske beslutningstagere nationalt som internationalt indenfor holistisk og patient-centreret sundhed og bør medtænkes i sundhedsinitiativer. Randomiserede kontrollerede forsøg efterspørges til at etablere de mest effektive måder at administrere åndelig omsorg på.

#63 The development and testing of the national Patient-Reported Outcome Measure for palliative care (PC), 'PRO Palliation'

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Abstract text
Introduction
Patient-Reported Outcome Measures (PROMs) are increasingly used. Many advanced cancer patients suffer from physical symptoms, functional limitations, and psychological, social and existential problems. Palliative care (PC) may improve quality of life for patients having such 'PC needs'. In 2019, the Danish Sundhedsdatastyrelsen's PRO Secretariat was given the task to produce a PROM for PC in Danish hospitals providing 'basic PC' and for use in municipalities and general practice among patients with cancer or heart, lung and kidney diseases. This presentation is based on seven reports (https://pro-danmark.dk/da/pro-emner/palliation).

Methods
The PRO Secretariat's standard process was followed: a 'National Clinical Coordination Group' with about 40 members representing stakeholders was established and held 7 one-day workshops in 2020-21. The first author chaired the Group. Literature reviews were discussed. The aims of the PROM were defined, PROMs were evaluated, and the composition of the questionnaire was decided. In 2021-22 the final questionnaire was tested for content, comprehension, and usability and then pilot tested in 345 patients and 269 health care professionals at 11 sites.

Results
The aims of this PROM are to screen for PC needs, support dialogue and improve treatment. The PROM consists of EORTC QLQ-C15-PAL (15 items)(used in specialist PC) and 8 items about dry mouth, oedema, intimacy, loneliness, roles in relation to others, the need to share thoughts/concerns, practical/financial problems, sharing feelings. Patients and professionals found the PROM useful in relation to its 3 aims. The PROM was approved by the PRO Steering Committee and will be implemented in the regional/municipal systems for online completion by patients.

Conclusion
Danish authorities and 'Vælg Klogt' (2023) recommend assessing PC needs early in the disease course. The PRO Palliation is now available for this. Knæk Cancer funds a large study in primary care.

#64 Symptomer og livskvalitet blandt indlagte, hæmatologiske patienter: et tværsnitsstudie

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Abstract text
Introduktion
Kræftpatienter kan opleve symptomer og påvirket livskvalitet som følge af deres grundsygdom eller behandling heraf. Afdækning af disse symptomer er første skridt i lindring af disse, og for nogle patienter kan specialiseret palliativ indsats være hensigtsmæssig. Integreret palliativ indsats dækker over afdækning og lindring af symptomer sideløbende med sygdomsmodulerende behandling af grundsygdommen. Med dette studie ønskede vi, at afdække symptomer og den oplevede livskvalitet blandt indlagte hæmatologiske patienter.

Materialer og metode
Studiet er et tværsnitsstudie, hvor i alt 177 voksne, indlagte patienter med hæmatologisk cancer blev inkluderet på to hospitaler i Region Hovedstaden. Livskvalitet og symptombyrde var selvrapporteret (EORTC-QLQ-C30), smerteintensitet og -behandling dels selvrapporteret (BPI) og dels semistruktureret interview mens oplysninger om sygdom, stadie og behandling blev indhentet af læge.

Resultater
I gennemsnit oplevede patienterne påvirkning af 6 domæner af symptomer eller funktionsnedsættelse, 3 domæner i svær grad. Dette mest udtalt for role functioning (80 % i nogen grad; 59 % i svær grad), fatigue (82 %; 53 %), appetitmangel (48 %; 29 %) og smerter (44 %; 24 %) hvorimod finansielle problemer (9 %; 3 %), obstipation (17 %; 9 %) og kvalme (28 %; 9 %) var mindre udtalt. Der var ingen forskel på de mest påvirkede domæner mellem patienter der fik kurativt intenderet behandling og patienter der fik pallierende behandling. Den generelle oplevede livskvalitet var faldende i forhold til stigende antal af påvirkede domæner af symptomer eller funktionsnedsættelse.

Konklusion
Indlagte, hæmatologiske patienter oplever symptomer og funktionsnedsættelser, der forringer livskvaliteten og som ikke er afhængig af behandlingshensigten

Morbidity, late effects, rehabilitation & Palliation

#65-74

#65 Gain from respiratory gating in left-sided partial breast irradiation in the DBCG PBI trial

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Abstract text
Purpose
Partial breast irradiation (PBI) has been Danish Breast Cancer Group (DBCG) standard treatment for selected breast cancer (BC) patients since 2016 based on early results from the randomised DBCG PBI trial. It is also DBCG standard to use respiratory gated radiation therapy (RGRT) in left-sided BC patients. RGRT was introduced in Danish centres during the accrual of patients in the trial. The purpose of our study is to investigate the effect of RGRT on mean heart dose (MHD) in left-sided PBI.

Patients and methods
In total, 865 patients (434 WBI, 431 PBI) were randomised in in five centres in the DBCG PBI trial from 2009-2016, and 230 patients (27%) had left-sided PBI. These patients were separated into those with upper (tumor bed plus 3 mm from papilla and cranial) versus lower located tumors (the rest). MHD and use of RGRT was registered for all patients.

Results
The median MHD for all left-sided PBI patients was 0.37 Gy, 0.33 Gy for upper located tumors and 0.46 Gy for lower located tumors ($p<0.0001$). The median MHD for RGRT and FBRT was 0.27 Gy and 0.45 Gy respectively for upper located tumors ($p<0.0001$) and 0.40 Gy and 0.54 Gy for lower located tumors ($p=0.0034$).
In absolute numbers, the use of RGRT resulted in a reduction in median MHD of 0.16 Gy for all patients treated with left-sided PBI, 0.17 Gy for upper located tumors and 0.14 Gy for lower located tumors.

Conclusions
For patients treated with left-sided PBI there is a significant reduction of MHD by using RGRT independent of tumor location. However, the absolute reduction in MHD is likely of no clinical relevance for the main part of the patients. Patients treated with FBRT were overrepresented in the group of patients with a MHD > 1.5 Gy. Thus, the gain of respiratory gating in PBI may still be clinically relevant in a few selected patients.

#66 Real-life experiences from a late effects clinic: An investigation of health-related quality of life in a subset of Danish cancer survivors

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Abstract text
Background
At least 50% of cancer survivors experience one or more late effects from cancer and its treatment; many report unmet needs. Consequently, the Region of Southern Denmark has established late effects clinics (LEC) for patients with complex late effects after cancer and cancer treatment". The goal is to help cancer survivors regain their physical and mental functioning and improve their Health-Related Quality of Life (HRQoL). This study elucidates the whole range of late effects occurring in a subset of Danish cancer survivors referred to a LEC by the use of patient-reported outcomes. Furthermore, it describes demographic data and the type of intervention following the first consultation

Methods and materials
Primo 2022, a LEC opened at Odense University Hospital. Before their first consultation, patients complete the EORTC QLQ-SURV100 questionnaire to capture the full range of physical, mental, and social HRQoL issues relevant to cancer survivors. Moreover, a database has been established which contains demographic data and the type of intervention following the first consultation.

Results
Patients referred to the clinic within its first year are included (n =149). Age; median 58 [26-82] years. Women 75%. The most common diagnosis is breast cancer. 70% are referred by General Practitioner. Over 90% report multiple late effects. Most commonly reported are fatigue, sleep disturbance, pain, cognitive impairment, and fear of recurrence. QLQ-SURV100 mean scores on Global Health 51.4, Role functioning 51.4, Emotional functioning 60.0, Cognitive functioning 49.4, and Physical functioning 52.3.

Conclusion
Patients referred to the LEC suffer from multiple and complex late effects after cancer treatment and report a significantly lower HRQol compared to patients at the time of diagnosis and the general Danish population.

#67 The impact of CHOP versus bendamustine on bone mineral density in patients with follicular lymphoma enrolled in the GALLIUM study

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Abstract text
Introduction: Observational studies have shown increased risk of fractures in patients treated with glucocorticoid containing chemotherapy for malignant lymphoma. The objective of this study was to investigate the impact of Obinutuzumab(G)/Rituximab(R)-bendamustine versus G/R-CHOP on bone marrow density (BMD) in patients with follicular lymphoma (FL) enrolled in the GALLIUM study.

Methods: Patients enrolled in the GALLIUM study, an international randomized phase 3 trial of first-line treatment for FL were included if they were ≥60 years at inclusion and in complete remission following treatment with G/R-bendamustine or G/R-CHOP. Exclusion criteria were treatment with anabolic or antiresorptive therapies, co-existing medical conditions associated with low BMD and new anti-lymphoma treatment during the initial 5 years follow-up.CT scans at baseline, induction treatment completion (ITC), and annually in five years were analyzed. Hounsfield units (HU) measured in L1 were used as surrogate for BMD. Low HU values represent lower bone density while high values represent more dense bone.

Results: A total of 155 patients fulfilled the inclusion criteria, 55 received G/R-CHOP and 100 received G/R-bendamustine. Baseline characteristics were balanced as well as mean baseline HU. The mean HU decrease from baseline to ITC was 27.8 after CHOP versus 17.1 after bendamustine. BMD remained below baseline for both groups during the first 3 years. During treatment and 5 years follow up compression fractures were recorded in five patients, one in the bendamustine group and four in the CHOP group.
Conclusion: CHOP induction treatment for FL was associated with a significantly greater loss in BMD as compared to bendamustine. Fractures were numerically more frequent in the CHOP treated group. The results suggest that considerations regarding use of primary prophylaxis against BMD loss in lymphoma patients receiving glucocorticoid containing regiments are warranted

#68 Vertigo and Impaired Walking Balance in Aging Patients during Chemotherapy

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Abstract text
Introduction
Older adults are at risk of adverse effects during chemotherapy including nausea and fatigue, but many also suffer from vertigo, dizziness, and peripheral neuropathy. This leads to walking impairments and increase risk of falls and affect health-related quality of life. Moreover, these symptoms are often underreported with inadequate awareness among health professionals leading to deficient focus on the need for targeted rehabilitation. We aim to examine the prevalence of vertigo, impaired walking balance, and neuropathy in older patients after initiation of chemotherapy. Further we aim to examine the quantity of patients reporting these symptoms to the oncologist.

Materials and Methods
This is a cross-sectional study among patients ≥65 years with gastrointestinal cancers who have completed three or more series of chemotherapy. The prevalence of vertigo, impaired walking balance, neuropathy, and reporting of symptoms was examined through structured questionnaires.

Results
Of two-hundred patients (43% women, mean age 74.4 years) 108 patients (54%) reported vertigo and 95 (48%) of patients suffered from impaired walking balance. Symptoms of neuropathy was present in 64 (32%) and this was associated with vertigo: odds ratio (OR) 1.86 (95% confidence interval (CI): 1.01;3.44) and impaired balance: OR 3.37 (95% CI: 3.37;6.31). Less than half of patients (62/128, 48%) had told the oncologist about their problems.

Conclusions
Vertigo and impaired walking balance during chemotherapy are frequent symptoms among older patients with cancer. Neuropathy is weakly associated with vertigo and other reasons for vertigo must be further explored

#69 A Nationwide Cohort Study of Outcomes and Mortality after Colorectal Surgery in Elderly Patients

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Abstract text
Introduction
The treatment of colorectal cancer in the elderly can be challenging, yet the guidelines for surgical treatment trajectory does not differ across age groups. We aimed to investigate the longterm outcomes in elderly colorectal cancer patients in a nationwide Danish population-based setting by evaluating the impact of age and postoperative morbidity on long-term survival.

Materials and Methods
Patients undergoing elective, curative-intended surgery for colorectal cancer UICC stage I-III between January 2014 and December 2019 were selected from four Danish nationwide healthcare databases. Postoperative morbidity was defined as presence of the ClavienDindo (CD) classification score ≥ IIIb within 30 days of surgery. The primary outcome was 5-year overall survival (OS) and the impact of postoperative morbidity on OS. All analysis were performed after propensity score matching (PSM).

Results
A total of 12 796 patients were included and stratified within age groups: group I: patients aged 65-69 (n=2991); group II 70-74 (n=3810); group III: 75-79 (n=2876); group IV ≥ 80 (n=3119), respectively. Group I was used as reference for PSM. After PSM with a 1:1 ratio, group II contained 2158; group III: 947; and group IV 309 patients, respectively. There was no significant difference in 5-year overall survival: group II (HR:0.95, 95% Cl 0.78-1.15, p=0.5), group III (HR:0.85, 95% Cl 0.65-1.12, p=0.4) and group IV (HR:1.41, 95% Cl 0.95-2.12, p<0.01). Patients with the presence of CD ≥ IIIb had a significantly decreased OS (p<0.01); however, after excluding patients that died within the first 90 days, OS was comparable with those patients without complications (p=0.5).

Conclusion
Postoperative morbidity, and not patient age, was associated with a decline in OS, especially in those aged 80 years or older. Enhanced postoperative surveillance and perioperative risk stratification in elderly colorectal patients should be investigated further.

#70 Employment Status among Cancer Survivors in a Late Effects Clinic in Denmark

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Abstract text
Introduction
Due to early detection and improved treatment, the number of cancer survivors (CS) has been increasing. But many CSs experience late effects such as fatigue, cognitive impairment, sleep problems, and pain. These can affect the patient's ability to return to their job to the same extent as before their diagnosis. For CSs, returning to work is important from an economic, societal, and personal perspective. This study aims to investigate changes in employment status among CSs with late effects from diagnosis to their first meeting in the Late Effects Clinic (LEC) and investigate associated and patient-reported factors of reduced employment status.

Materials and Methods
Retrospective analysis of a cohort of CSs followed in a LEC at a single institution from January 2022 to March 2023. Working-age patients with no current evidence of active cancer or cancer recurrence were included in this study. Patients completed a baseline questionnaire (EORTC QLQSURV100) before their initial consultation. Reduced employment status was defined as being in paid work at diagnosis and working fewer hours or not at all at the first visit. Descriptive statistics and bivariate analysis were used.

Results
This analysis included 119 out of 165 eligible CSs with diverse cancer types. Forty-one were excluded because of retirement, four because of cancer relapse, and one because of death. Mean age at the first meeting was 51 years (range 26 to 70), and 80% were female. Of 93 CSs in paid work at diagnosis, 66 (71%) have reduced employment status. CSs with reduced employment status reported a lower role function score than CSs with maintained employment status (52.5 vs. 66.7, $p=0.006$) and a higher loss of income score (55.9 vs. 4, $p<0.001$).

Conclusion
This study shows that the majority of CSs seen in the LEC have reduced employment status. This is associated with a lower role functioning score and impacts the CSs' loss of income score.

#71 Educational differences in impaired functioning and severe symptoms among 27,857 cancer survivors in Denmark

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Abstract text.
Introduction: With a growing population of cancer survivors in Denmark, the evaluation of healthrelated quality of life (HRQOL) has become increasingly important. We describe variations in HRQOL between educational groups in a national population of cancer survivors.
Materials and methods: We conducted a cross-sectional questionnaire study among breast, prostate, lung, and colon cancer survivors diagnosed 2010-2019 in Denmark. HRQOL was assessed through the EORTC QLQ-C30 questionnaire and information on educational level and clinical data were extracted from national registers and clinical databases. Multivariate logistic regression was used to examine associations of education and HRQOL. All statistical tests were 2-sided.

Results: In total, 27,857 (42 %) participated in the study. Up to 72 % and 75 % of cancer survivors with short education (≤9 years) reported impaired functioning and severe symptoms, respectively. Cancer survivors with short compared to long education (>12 years) were more likely to report impaired functioning and severe symptoms, with for example significantly higher odds ratios (ORs) for impaired physical function (breast Odds Ratio (OR) = 2.41, 95% CI = 2.01 to 2.89; prostate OR = 1.81, 95% CI = 1.48 to 2.21; lung OR = 2.97, 95% CI = 1.95 to 4.57; and colon cancer OR = 1.69, 95% CI = 1.28 to 2.24).

*Conclusions:*Cancer survivors with short education are at greater risk of impaired HRQOL than survivors with long education 2-12 years after diagnosis. This underscores the need for systematic screening and management of symptoms in cancer aftercare to improve HRQOL for cancer survivors with impaired functioning and severe symptoms.

#72 Principles to promote social equality in the cancer trajectory: A Group Concept Mapping Study

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Abstract text
Introduction
Social inequality is a growing problem documented throughout the cancer trajectory.
Hence, since 2019, the Danish Research Center for Equality in Cancer (COMPAS) has, through seven work packages developed and tested different methodologies, approaches, and interventions to best possible needs-based interventions and hence social equality in the cancer trajectory from diagnosis to palliative care. This study aims to synthesise the knowledge generated across the COMPAS work packages about promoting social equality throughout the cancer trajectory.

Materials and methods
Participants were or had been engaged as researchers, Ph.D. students,
clinicians, or other functions in the work packages in COMPAS. The study was conducted by use of Group Concept Mapping, a stakeholder-driven and mixed-method research approach structured in a preparation phase followed by six phases: 1) Brainstorming; 2) Sorting and labelling; 3) Rating the importance of ideas; 4) Generating a Cluster Rating Map; 5) Validation; and 6) Developing a final conceptual model.

Results
During brainstorming 22 participants generated 162 unique ideas. Preliminary results point towards a concept map with the following topics: 1) Patient-centered approach, 2) Involvement of relatives, 3) Time and resources, 4) Navigator/support person, 5) Transportation, 6) Screening and need assessment, 7) Organizational and transition, 9) Education of health professionals, and 10) Communication and information material. The rating scores and the final principles to guide promotion of social equality will be ready for the conference.

Conclusions
The study identifies generic principles for promoting social equality in cancer
interventions based on knowledge and experience derived from a broad range of research studies. The principles can guide future interventions and clinical practice to alleviate social inequality throughout the cancer trajectory from early diagnosis, rehabilitation, and palliative care

#73 Psychological and biobehavioral late adverse effects after surgery for peritoneal metastases from colorectal cancer.

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Abstract text
Introduction
Colorectal cancer (CRC) with peritoneal metastases (PM) can be curatively treated with extensive surgery, but treatment may result in late adverse effects (LAE) post-surgery. The aim was to explore frequency and change over time of psychological (anxiety, depression, fear of cancer recurrence (FCR)) and biobehavioral LAE (insomnia, fatigue, cognitive impairment, pain) and evaluate their impact on quality of life (QoL).

Materials and Methods
From Jan. 2021 through Dec. 2022, patients who had undergone curatively intended surgery for CRC with PM were screened for LAE. Patients completed the following questionnaires 3, 6, and 12 months post-surgery: General Anxiety Disorder-7 (GAD-7), Patient Health Questionnaire-9 (PHQ9), Fear of Cancer Recurrence Inventory-Short Form (FCRI-SF), the Insomnia Severity Index (ISI), Functional Assessment of Chronic Illness Therapy-Fatigue (FACIT-F), cognitive impairment (six EORTC items), and the rectal cancer pain score.

Results
In total, 88 patients were included. Mean age was 61 years (range 35-79) and 57% were women. The three most reported LAEs were fatigue, FCR, and pain at 3 months post-surgery, and FCR, fatigue, and insomnia at 12 months post-surgery. Most patients developed more than one LAE, with 76% developing at least two LAEs at 3 months post-surgery and 56% of patients at 12 months post-surgery. Patients with moderate-to-severe LAE reported poorer QoL compared both with patients with no or mild LAE. Furthermore, patients with no or mild LAE had similar levels of QoL as found in the general Danish population.

Conclusions
Psychological and biobehavioral LAEs are prevalent in CRC patients after surgery for PM, with up to 76% developing more than one LAE. The number of patients suffering from LAEs is reduced from 3 to 12 months post-surgery. Patients developing LAE have a negatively impacted QoL why screening for and treating these LAEs should be a focus in the follow-up of cancer survivors.

#74 Prospective evaluation of bowel function and quality of life after colon cancer surgery – Is it time for routine screening for late sequelae?

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Abstract text

Introduction: Bowel dysfunction after colon cancer (CC) surgery is widely neglected in current follow up programmes. This study explored changes in bowel function and QoL from three to twelve months (3m/12m) after surgery in CC patients undergoing right- or left-sided colon resection (RightSCR/LeftSCR) and investigated differences between the two groups 12m after surgery.

Materials & Methods: CC patients undergoing surgical resection in 2018-2020 at five surgical departments were included in this population-based prospective cohort study. Included patients completed electronic surveys consisting of a collection of validated scores 3m and 12m after surgery.

Results: A total of 708 CC patients (423 RightSCR, 285 LeftSCR) were included. In RightSCR, no improvement was observed from 3m to 12m in most scores/items, on the contrary, symptom worsening in flatus- and faecal incontinence and urgency was observed ($p < 0.05$). Also, the proportion of patients rating their bowel function as very good/good decreased ($p < 0.05$) in this group.In LeftSCR improvement was found in flatus and faecal incontinence, urgency and night-time defecation ($p < 0.02$), while no improvement was observed in the remaining scores/items.At 12m, higher proportions of RightSCR than LeftSCR reported loose stools, incontinence and urgency (all $p < 0.001$), whereas LeftSCR more often reported hard stools and flatus ncontinence ($p < 0.05$). Among all CC patients 18.3% reported bowel-related impairment of QoL at 12m with no differences between the groups.

Conclusions: From 3m to 12m no significant change was observed in the majority of bowel function and QoL scores/items, however, some symptoms worsened in RightSCR, while a few improved in LeftSCR. Bowel dysfunction and impaired QoL were still common in both groups at 12m, although the symptom pattern differed between the groups. These findings call for a systematic screening for bowel dysfunction to ensure early identification and treatment of symptoms

Screening & early diagnosis

#75-85

#75 Selvvurderet behov for og tilfredshed med rehabiliteringssamtaler efter (neo)adjuverende kemoterapi hos patienter med brystkræft

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Abstract text
Introduktion
(Neo)adjuverende behandling af kvinder med brystkræft kan resultere i bivirkninger, som kan medføre et behov for rehabilitering. Formålet med studiet var at undersøge patientoplevet belastning, behov for og tilfredshed med rehabiliteringssamtaler 8 uger efter afsluttet kemoterapi.

Materiale og metoder
Et tværsnitsstudie med spørgeskema. Spørgeskemaet inkluderede måling af oplevet belastning, selvvurderet behov for og tilfredshed med rehabiliteringssamtalen på skalaer fra 0 til 10. Bivirkninger og antal henvisninger til kommunal rehabilitering blev registreret. Potentielle associationer mellem patientkarakteristik, sociodemografi og medicinske variable blev undersøgt med Wilcoxon rank sum test og Kruskal-Wallis test.

Resultater
I alt gennemførte 217 patienter en rehabiliteringssamtale og 200 (92%) accepterede deltagelse i studiet. Efter rehabiliteringssamtalen blev 45 patienter (23%) henvist til kommunal rehabilitering – flest blev henvist til fysisk træning (49%) og diætist (18%). De hyppigste registrerede bivirkninger var fatique(78%), neuropati gener(58%), og kognitive problemer (58%). Den gennemsnitlige belastning var moderat(3,8±SD 2,3) og det selvvurderede behov for rehabilitering var højt(6,5±SD 2,7). Højere belastning og højere behov for rehabiliteringssamtale samt oplevelsen af flere bivirkninger ($p<0,05$) var signifikant associeret med ikke at have genoptaget arbejdet eller være pensioneret($p<0,05$). Derudover var kortere uddannelse associeret med større behov for rehabiliteringssamtale($p<0,05$). Den gennemsnitlige tilfredshed med rehabiliteringssamtalen var høj(8,9±SD 1,8). Der blev ikke fundet nogle signifikante associationer mellem tilfredshed og medicinske eller sociodemografiske variable.

Konklusioner
Der blev fundet moderat belastning, samt stort behov for og tilfredshed med rehabiliteringssamtaler hos kvinder med brystkræft efter (neo)adjuverende kemoterapi. Blot 23% af patienterne havde behov for henvisning til kommunal rehabilitering.

#76 Systematic screening for sexual dysfunction in males surgically treated for rectal cancer

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Abstract text

Introduction
Prevalence of late sequelae after rectal cancer is high. Systematic screening for common late sequelae using validated PROMs as part of the follow up programme is currently being tested in six Danish surgical units. This study investigates the prevalence of sexual dysfunction among male rectal cancer patients and explores associations with selected clinical factors.

Materials & Methods
PROMs completed by male patients 12 months after rectal cancer surgery were analysed. The IIEF score was used to measure sexual function in sexually active patients. Ad hoc items were used to explore sexual activity level, causes of disrupted sexual life, and self-rated sexual function. Clinical data were obtained from the Danish Colorectal Cancer Group database.

Results
From June 2020 until April 2023, 241 male rectal cancer patients completed the survey 12 months after surgery. Mean age was 67.7 years, range 30.7-91.5. Only 13(5%) declined to answer any questions about sexual function, leaving 228 patients available for analyses. A total of 96(42%) patients were not sexually active prior to diagnosis, while 60(26%) reported to have resigned from sexual activity since diagnosis. Among the remaining 71(31%) who reported to be currently sexually active, the IIEF score could be calculated in 64 patients of where 13(20%) had severe/moderate erectile dysfunction. At 12 months, a permanent stoma and radiotherapy were associated with self-reported bad sexual functioning with OR 3.9(2.2-7.1) and 2.6(1.4-5.0), respectively. During the first year after surgery, 32(13%) patients requesting referral to professional sexual counselling were identified via systematic screening.

Conclusion
Sexual dysfunction is common following rectal cancer treatment. Many become sexual inactive after diagnosis. Sexual dysfunction is associated with stoma and radiotherapy. Systematic screening programme enables identification of patients with sexual dysfunction in need for professional help.

#77 Erectile dysfunction following rectal cancer surgery

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Abstract text
Introduction
Every year in Denmark, 930 men are diagnosed with rectal cancer. Due to better surgical, oncological, and perioperative treatment survival rate is increasing. Intraoperative damage to the pelvic nerve plexus as well as radiotherapy have been suggested as causes of sexual dysfunction. We aimed to determine the prevalence of erectile dysfunction following rectal cancer surgery.

Materials and methods
This study was a prospective observational single-center cohort study. The study included men operated for rectal cancer and who were followed in the Late-complication Clinic, Department of Surgery at Herlev Hospital. Informed consent was provided. Data were collected through REDCap from October 2019 to April 2023 both from electronic medical records and the International Index of Erectile Dysfunction (IIEF-15). The erectile function domain gives a score from 1–30, and erectile dysfunction is defined as a score below 25.

Results
Of 101 eligible male patients, 67 (67%) responded to the questionnaire a median of 6 months (IQR 3–16) after surgery. These men had a mean age of 66 years. Erectile dysfunction was reported by 84% of patients. The degree of erectile dysfunction varied from mild (2%), mild/moderate (3%), moderate (5%), and severe (74%). Furthermore, 47% of the patients reported that they had very low confidence that they could get and keep an erection. The remaining patients has 19% had low confidence, 14% had moderate confidence, 11% had high confidence, and 8% had very high confidence, respectively.

Conclusions
More than four out of five males report erectile dysfunction following rectal cancer surgery. Patients should be informed that erectile dysfunction is common, prior to or after surgery, so that they comfortable discussing therapeutic solutions if troubling. Preventive measures should be explored.

#78 Screening- and psychological treatment procedures for patients with psychological and biobehavioral late adverse effects following surgery for peritoneal metastases from colorectal cancer – preliminary results from a feasibility study

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Abstract text
Introduction: Up to 76% of patients experience psychological and biobehavioral late adverse effects (LAE) following surgery for peritoneal metastases (PM) from colorectal cancer (CRC). We tested the feasibility and outcome of a psychosocial and behavioral treatment strategy to address LAE.

Methods
In 2021-2022, patients who had undergone curatively intended surgery for CRC with PM at Aarhus University Hospital were screened for psychological (anxiety, depression, fear of cancer recurrence (FCR)) and biobehavioral LAE (insomnia, cognitive impairment (CI), pain, fatigue). Patients who scored according to clinical cut-off levels were referred to a Multi-Disciplinary Team conference (MDT). The referred patient, surgeons, nurses, and psychologists participated in MDT together, with the aim of identifying key concerns and proposing a personalized intervention. The six-session interventions were based on a toolbox of evidence-based cognitive and behavioral intervention strategies. Pre and post intervention, patients completed "Measure Yourself Concerns and Wellbeing" (MYCaW) questionnaire, rating the two most distressing LAEs defined by the patient.

Results
Of 28 eligible patients, 15 (mean age 58 years, 87% women) accepted referral to MDT. To date, 11 patients have participated in a MDT and 4 patients are waiting. All patients were offered a personalized intervention, 7 patients have completed the intervention, 3 are ongoing, and 1 withdrew. Improvement in at least one MYCaW score was observed in 6/7 patients (Hedge's g=1.6 [0.3-2.01] for most- and g=0.83 [0.03-1.63] for second-most distressing LAE), including FCR (N=2), fatigue (N=5), CI (N=3), insomnia (N=2), pain (N=1), and anxiety(N=1).

Conclusion
Screening for LAEs and conducting a MDT can provide a personalized intervention plan, from which patients may be able to complete and derive benefit. Testing the efficacy of the approach in an RCT and exploring unmet needs in patients declining participation will be relevant

#79 Kræftoverleveres tilknytning til arbejdsmarkedet de første tre år efter diagnose – et registerbaseret studie

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Abstract text
Introduktion
Antallet af kræftoverlevere i den arbejdsdygtige alder er stigende grundet den kontinuerlige udvikling i diagnostik og behandling af kræft. En kræftdiagnose medfører øget risiko for sygefravær og tilbagetrækning fra arbejdsmarkedet. Eksisterende viden på området er størst blandt de mest prævalente kræftdiagnoser, og ingen nyere, registerbaserede studier har undersøgt arbejdsstatus blandt alle kræfttyper. Dermed er der risiko for at overse mindre hyppige kræftdiagnoser med øget risiko for at forlade arbejdsmarkedet. Formålet med dette studie er at undersøge arbejdsstatus blandt alle danske kræftoverlevere og sammenligne dem med kræftfrie personer de første tre år efter diagnosen.

Materialer og metoder
Alle danske kræftpatienter, diagnosticeret med deres første kræftdiagnose i perioden 2000-2015, blev identificeret i det danske Cancerregister. En komparativ gruppe bestående af kræftfrie personer matchet i en 1:5 ratio blev identificeret i Danmarks Statistik. Studiepopulationen blev inddelt i 11 diagnosegrupper baseret på NORDCAN. For hver gruppe blev arbejdsstatus hos kræftoverlevere og kræftfrie personer hhv. 1 og 3 år efter diagnosen, samt arbejdsmarkedsdeltagelse i antal uger per år i perioden 0-12 måneder og 24-36 måneder efter diagnosen undersøgt og sammenlignet.

Resultater
I alt blev 618.677 personer inkluderet i studiet, hvoraf 111.773 var ny-diagnosticerede kræftpatienter og 506.904 var kræftfrie personer. Statistiske analyser påbegyndes i april 2023 og de endelige resultater vil blive præsenteret på konferencen.

Konklusion
Viden om tilknytningen til arbejdsmarkedet for personer med forskellige kræftdiagnoser de første år efter diagnosen vil være særligt relevant for sundhedsfaglige personer og andre professionelle, som er i berøring med disse borgere i deres daglige virke. Desuden kan det bidrage til fremtidig udvikling af arbejdsrettet rehabilitering til kræftoverlevere

#80 The health care professional's perception of EORTC QLQ-C15-PAL in specialist palliative care - Results from a national survey

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Abstract text
Background
Patient reported outcomes (PRO) have been systematically assessed in specialist palliative care (SPC) in Denmark since 2010 using the EORTC QLQ-C15-questionnaire. However, little is known on how health care professionals (HCPs) use this information. We investigated the perception of PRO data by HCPs in SPC at the first SPC contact.

Method
A survey was conducted among HCPs in SPC units. The survey included questions on how HCPs experienced using PRO and how HCPs experienced the patient perception of PRO. The questionnaire was initially tested by 4 HCPs and then sent to all SPC unit leaders (N=42) in Denmark, asking them to forward the survey invitation to HCPs in their unit.

Results
The survey was completed by 159 HCPs from 35 (83%) SPC units. Three quarters of HCPs replied that they used the responses from at least 75% of the patients: 61% answered that they used the PRO response in the conversation with more than 75% of the patients, while smaller proportions were presented/discussed the PRO at interdisciplinary conferences and discussed with colleagues. A large proportion of HCPs experienced to some/a high degree that PRO gave them knowledge about the patient's situation (89%), that PRO was meaningful to use (85%) and that they understood how and why PRO was used (93%). The perception of most of the HCPs was that the patients understood why they were asked to complete PRO (83%) whereas 69% of the HCPs experienced that the patients found the PRO completion meaningful.

Conclusion
In Denmark, PRO is integrated in SPC in the first contact with the patients and usually used in the dialogue with the patient. The HCPs found PRO useful and use the information in the contact. Among other data, these results contributed to the development of a 'best practice guideline', with detailed advice to SPC clinicians about how to collect and use PRO data and how to inform patients about the use of PRO; this guideline was circulated to all SPC units after the study.

#81 Barriers and facilitators related to implementation of a national guideline for palliative cancer patients in a Danish cross-sectoral health care setting: a qualitative study based on The Consolidated Framework for Implementation

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Abstract text
Introduction
Patients who do not fulfill criteria for specialized palliative care can according to needs receive general palliative care provided through a complex collaboration between hospital departments, municipalities, and general practitioners. Palliative care to Danish cancer patients is based on national guidelines and cross-sectoral agreements, but implementation has not been sufficiently effective as stated in the report from the National Audit Office (2020). This study aimed to investigate barriers and facilitators for implementation of national recommendations in general palliative care to Danish cancer patients.

Materials and Methods
Qualitative focus groups- and individual interviews were performed with health care professionals from two municipalities, general practice, and an oncology department. The study was a descriptive qualitative study, guided by the Consolidated Framework for Implementation Research (CFIR). CFIR is a determinant framework commonly used to assess context at many levels. CFIR was used in developing the interview guide, coding, analysis and reporting in this study.

Results
We found that most health care professionals across sectors were lacking knowledge about the national guidelines. We found factors influencing the cross-sectoral collaboration, communication and coordination related to all CFIR domains, however, the domains that describe the contexts, inner and outer setting were most frequently represented.

Conclusion
The study showed that there are a wide range of barriers and facilitators that must be considered when working with cross-sectoral implementation of guidelines in palliative cancer care. Through identification of these barriers and facilitators it is possible to take them into consideration when developing and implementing clinical work flow and communication interventions to optimize cross-sectoral palliative care based on the national recommendations.

#82 Fewer referrals to specialized palliative care and reduced screening for palliative care needs during the COVID-19 pandemic, a nationwide register-based study

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Abstract text
Introduction
Few studies have examined whether access to, and quality of, specialized palliative care changed during the COVID-19 pandemic. This study investigated changes in access to and quality of specialized palliative care during the pandemic in Denmark compared to previously.

Materials and methods
An observational study using data from the Danish Palliative Care Database combined with other nationwide registries was conducted, including 69,696 patients referred to palliative care services in Denmark from 2018 to 2022. Study outcomes included number of referrals and admissions to palliative care, and the proportions of patients fulfilling four palliative care quality indicators. The indicators assessed admissions among referred, waiting time from referral to admission, symptom screening using EORTC QLQ-C15-PAL-questionnaire at admission, and discussion at multidisciplinary conference. Logistic regression analysed whether the probability of fulfilling each indicator differed between the pandemic period and pre-pandemic, while adjusting for possible confounders.

Results
Number of referrals and admissions to specialized palliative care were lower during the pandemic. The odds for being admitted within 10 days of referral was higher during the pandemic (OR: 1.40; 95% CI: 1.34-1.46) whereas the odds for answering the EORTC-questionnaire (0.88; 95% CI: 0.85-0.92) and for being discussed at multidisciplinary conference (0.93; 95% CI: 0.89-0.97) were lower compared to pre-pandemic.

Conclusions
Fewer patients were referred to specialized palliative care during the pandemic, and fewer were screened for palliative care needs. In future pandemics or similar scenarios, it is important to pay special attention to referral rates and to maintain the same high level of specialized palliative care.

#83 Social benefit use before and after breast cancer among women in Denmark

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Abstract text
Introduction
In 2020, one million women aged <55 were diagnosed with breast cancer globally. Aside from their cancer, these women are expected to have substantial working years left. Yet, breast cancer and its treatments may reduce the ability to work. We evaluated social benefit use before and after breast cancer by socioeconomic position.

Materials and methods
We included women aged 18-55 registered in the Danish Breast Cancer Group with non-metastatic breast cancer during 2002-2011, who received chemotherapy. From Statistics Denmark, we ascertained weekly information on self-support and social benefit use from one year pre-surgery to 10 years post-surgery, pre-diagnostic cohabitation status and education. We calculated weekly proportions of social benefit use according to cohabitation and education, and absolute differences (percentage points, pp) comparing social benefit use one year pre-surgery with five years post-surgery.

Results
Among 5,345 women, 82% were self-supporting, 5% received disability pensions, 4% were on sick leave and <2% had flexi jobs one year pre-surgery. At breast cancer surgery, 17% were self-supporting, 73% were on sick leave. Post-surgery, the proportion of women on disability pensions and flexi jobs increased and were stable at 10% and 9% five years post-surgery. Women living alone had a higher pre- and post-surgery social benefit use than those cohabiting, but the absolute change was similar. The share of disability pensions and flexi jobs increased from 12% to 21% (9 pp) and 3% to 12% (9 pp) five years post-surgery in women with short education, from 4% to 9% (5 pp) and 2% to 9% (7 pp) in women with intermediate education, and from 1% to 4% (3 pp) and 1% to 5% (4 pp) in women with long education.

Conclusions
Among breast cancer survivors, there was a negative education gradient in disability pension and flexi jobs. These findings suggest that the likelihood of losing the ability to work was inversely proportional to education level

#84 Days Alive and Out of Hospital for older and younger patients with epithelial ovarian cancer

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Abstract text
Introduction
Days Alive and Out of Hospital (DAOH) is a validated outcome measure integrating information on primary hospitalization, readmissions, and mortality. It is negatively associated with advanced age. However, DAOH has not been explored in the surgical treatment of epithelial ovarian cancer (EOC), primarily affecting older patients.

Materials and methods
We conducted a Danish nationwide cohort study of patients diagnosed with EOC who underwent debulking surgery between 2013 and 2018. We stratified patients by age (<70 years and ≥70 years) and surgical modality (primary debulking surgery (PDS) or interval debulking surgery (IDS)) to explore DAOH for the first 30 (DAOH30), 90 (DAOH90), and 180 (DAOH180) postoperative days. We also examined the associations between patient- and surgical outcomes and low or high DAOH30.

Results
Our study included 1168 patients with stage IIIC-IV disease who underwent debulking surgery. The DAOH30 was similar in younger and older patients treated with PDS, with values of 22 days [interquartile range (IQR): 18, 25] and 23 days [IQR: 18, 25], respectively. Among patients undergoing IDS, the DAOH30 was 25 days for both younger and older patients. We found no significant differences in DAOH between older and younger patients for DAOH30, DAOH90, and DAOH180. Adjusted analysis revealed that low DAOH30 was associated with poor performance status, primary debulking surgery, extensive surgery, and long duration of surgery.

Conclusions
Our study demonstrated that DAOH did not differ significantly between age cohorts in patients undergoing debulking surgery for EOC. Surgical factors, rather than patient-related factors, were associated with low DAOH30. Our results suggest that the high selection of fit older patients for surgery may have reduced the patient-related differences between younger and older patients receiving surgical treatment

#85 DaBlaCa-17: Long term survival of patients with muscle-invasive bladder cancer undergoing radical cystectomy before and after implementation of neoadjuvant chemotherapy with gemcitabine-cisplatin: a natural experiment study.

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Abstract text
Introduction
Randomized clinical trials report improved survival outcomes following use of neoadjuvant chemotherapy (NAC) in patients with muscle-invasive bladder cancer (MIBC). NAC with gemcitabine-cisplatin was implemented nationwide in Denmark on 1 January 2013. The impact of this NAC implementation on long-term survival outcomes has not previously been evaluated. Purpose: to compare survival outcomes of patients with MIBC before and after NAC implementation.

Methods
We collected data on all 851 patients undergoing radical cystectomy in 2010-2015 who were potential candidates for NAC based on T-stage, age, and renal function. We compared a cohort before the implementation of NAC (Cohort 2010-12) with a cohort after implementation (Cohort 2013-15). Moreover, patients in Cohort 2013-15 receiving NAC (+NAC) were compared to patients in Cohort 2013-15 not receiving NAC (-NAC). We compared pathological results after radical cystectomy and oncological outcome between the cohorts. Overall survival, disease-free survival, and disease-specific survival were compared with Kaplan-Meier plots, univariate and multivariate Cox regression.

Results
When comparing Cohort 2013-15 with Cohort 2010-12, pT0 was more frequent in the late cohort: 34% vs. 18% ($p < 0.001$); and 46% vs. 16% in +NAC compared with -NAC ($p < 0.001$) within cohort 2013-15. Overall survival, disease-free survival, and disease-specific survival at 5 years after cystectomy were not improved in Cohort 2013-15 compared with 2010-12 with adjusted hazard ratios of 1.14 (95% CI: 0.89–1.45), 0.98 (95% CI: 0.75–1.27) and 1.08 (95% CI: 0.82–1.42), respectively.

Conclusions
Despite an increase in pathologic downstaging to pT0 in the cystectomy specimen after NAC implementation, we observed no improved survival. Reasons for these findings may include limited effect of NAC with gemcitabine-cisplatin in a modern MIBC patient cohort, or differences in the cohorts that we were unable to account for.

Clinical epidemiology and database research

#86-96

#86 Incidence of recurrence and time to recurrence in stage I-III colorectal cancer through 2004 to 2019 - a population-based cohort study

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Abstract text
Introduction
The management of colorectal cancer (CRC) has been updated continuously through the last two decades. Here we describe recurrence rates in a nationwide cohort.

Material and methods
Patients undergoing primary surgery for TNM stages I-III CRC in Denmark during 2004-2019 were included. Through individual-level linkage of data from nationwide health registries, recurrence status was determined using a validated algorithm. Patients were followed from CRC surgery until recurrence, death, or second cancer. Stage-specific 5-year cumulative incidence function (CIF) of recurrence and time to recurrence (TTR) were reported for colon and rectal cancer by calendar periods (2004-2008, 2009-2013, and 2014-2019).

Results
Of 35,814 stage I-III CRC patients, 7,764 developed recurrence within 5 years after primary surgery. The 5-year CIF decreased from 16% to 6.9% (95% CI: 6.0%-7.9%), from 23% to 12% (95% CI: 11%-13%) and from 35% to 26% (95% CI: 25%-28%) in pathological stage I, II and III colon cancer, respectively, and from 20% to 10% (95% CI: 8.8%-12%), from 26% to 20% (95% CI: 18%-22%) and from 40% to 31% (95% CI: 28%-33%) in stage I, II and III rectal cancers, respectively. Patients with stage I disease had longer TTR with a median difference in TTR of 4.5 months (95% CI: 1.9-6.7) compared to stage II and 6.5 months (95% CI: 4.3-8.4) compared to stage III. Cancers detected through screening had substantially lower overall and stage-adjusted risk of recurrence.

Conclusions
The risk of recurrence decreased in stage I-III CRC patients through the last two decades, and has become so low in selected patient groups that the future calls for studies exploring risk-stratified surveillance protocols

#87 The Impact of HbA1c levels on Perioperative Outcomes After Rectal Cancer Surgery: A Cohort Study Based on Reviews of Medical Records

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Abstract text
Background
Type 2 diabetes (T2D) and rectal cancer are common diseases that share similar lifestyle-related risk factors. It is poorly described how comorbid T2D and prediabetes influences surgical procedures and perioperative outcomes. This study aims to investigate whether T2D, aswell as high HbA1c levels, are associated with an increased risk of perioperative complications (table 1) and readmissions in rectal cancer patients.

Methods
In a population-based design, all patients receiving surgical treatment for rectal cancer between April 1, 2020, and December 31, 2021, at the Department of Surgery, Aarhus University Hospital, Denmark, were included. Medical records were reviewed, and preoperative HbA1c measurements, perioperative complications, and readmissions were registered. The prevalence of outcomes was compared while stratifying for HbA1c levels (Normal: <42 mmol/mol, High: 42-47 mmol/mol, and T2D >47 mmol/mol).

Results
In total, 193 patients underwent rectal cancer surgery. Compared to the Normal group (n=130), those with T2D (n=29) had a 33% (95%CI:17;50) higher absolute risk for overall perioperative complications and an age-adjusted relative risk (RR) of 2.04 (95%CI:1.29;3.10). The risk of overall complications was similar in the High HbA1c group (n=34). Surgical site were the most common perioperative complication in the High HbA1c and T2D groups, and the age-adjusted RR was significantly higher than in the normal group (High HbA1c: 1.83 (1.05-3.16); T2D: 2.34 (1.34-3.16)). The study found that the high HbA1c group had a significantly higher risk of readmission after surgical treatment compared to the normal group.

Conclusions
T2D was associated with a higher risk of perioperative complications in patients undergoing surgery for colorectal cancer. Patients with High HbA1c levels had a higher risk of wound infections, otherwise, they had a similar risk of perioperative complications as those with Normal HbA1c.

#88 Associations between pre-operative cholesterol levels with long-term survival after colorectal cancer surgery: A nationwide propensity score-matched cohort study

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Abstract text
Introduction
Altered lipid metabolism counts for a prominent metabolic change in patients with solid cancers. Thus, dyslipidemia as well as other sequelae related to metabolic syndrome have been associated with poorer outcomes in patients with colorectal cancer (CRC). The aim of this project was to investigate pre-operative total cholesterol (TC) levels to see if these associate with overall survival (OS).

Materials and Methods
This retrospective study analyzed data from four Danish patient databases that were converted into a Common Data Model. The association of TC levels measured 365 days pre-operatively on longterm outcomes for patients that have undergone elective curative surgery for their stage I-III CRC were investigated. Patients were divided into groups with a TC of > 4 mmol/L or ≤ 4 mmol/L. Propensity scores were calculated using all available pre-operative demographic, diagnostic and measurement data and used to match patients in a 1:1 ratio.

Results
A total of 4,065 patients were included in the study. The matched study population consisted of 1,768 patients that were included in the analysis of OS. No significant difference in OS was seen between patients with a TC > 4 mmol/L versus ≤ 4 mmol/L (HR, 1.04, 95% CI, 0.83-1.30). However, a subgroup analysis combining TC > 4 mmol/L and LDL levels > 3 mmol/L found the target group to have a significantly higher OS than the control group (TC and LDL ≤ 4 mmol/L and 3 mmol/L, respectively) (HR, 0.7, 95% CI, 0.52-0.93).

Conclusions
There was no association to OS in patients undergoing CRC surgery who had elevated TC levels prior to surgery compared to patients with low TC levels. Contrarily, OS was significantly higher with elevated TC as well as LDL levels. Thus, the role of cholesterol levels in CRC should be explored further.

#89 Active surveillance of cervical intraepithelial neoplasia grade 2 and risk of anogenital HPV-related cancer and precancer

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Abstract text

Introduction
Women with a previous history of excisional treatment for cervical precancer (CIN) are at increased risk of ther HPV-related diseases, including vulvar, vaginal and anal cancer and precancer. For women undergoing active surveillance (observation) for CIN grade 2 (CIN2), neither the lesion, nor the underlying HPV infection is removed. Thus, we hypothesize that active surveillance for CIN2, is associated with an even higher risk of developing these cancers and precancers.

Materials and methods
This population-based registry cohort study included women diagnosed with incident CIN2 during 1998-2020. Women were grouped in categories of active surveillance (i.e., a subsequent record of a biopsy and/or cytology) or surgical treatment with cone biopsy (i.e., a subsequent record of a cone biopsy). We calculated crude hazard ratios (HRs) of vulvar, vaginal and anal cancer and precancer using Cox roportional hazards regression, comparing women undergoing active surveillance with women undergoing cone biopsy.

Results
Of the 27,403 women with CIN2 included, 12,442 (45%) underwent active surveillance. Median age in the active surveillance group was 27 years (IQR 23-30) and 30 years (IQR 26-35) in the cone biopsy group. A total of 155 women (0.6%) were subsequently diagnosed with vulvar, vaginal or anal cancer or precancer, of which 60 women (39%) were in the active surveillance group and 95 women (61%) in the cone biopsy group. Preliminary analyses showed no difference in risk of vulvar, vaginal or anal cancer and precancer between the two groups (HR=1.12 (95% CI 0.81-1.55)).

Conclusion
We observed that vulvar, vaginal and anal cancer and precancer are rare in women with CIN2, and there was no difference in risk between women undergoing active surveillance and women undergoing cone biopsy. Adjusted estimates will be presented at the conference.

#90 Laparoscopy as a predictor of complete cytoreduction in women with advanced ovarian cancer

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Abstract text
Introduction
Ovarian cancer is the most lethal gynecologic malignancy. Due to discrete symptoms most patients are diagnosed in advanced stages. The 5-year survival rate is 40% and dependent on the surgical result: if not all visible tumor is resected (R0) the patient is offered neoadjuvant chemotherapy.The likelihood of complete tumor resection is evaluated by PET/CT. If PET/CT findings are inconclusive, a laparoscopy is performed, where seven predefined areas in the peritoneum are evaluated. A score of either 0 or 2 depending on the extent of disease is given to each parameter. The sum is called Predictive Index Value (PIV). A PIV-score ≥8 identifies patients who are considered to have non-resectable disease. At PIV-score <8, the patient is offered primary debulking surgery. We aim to validate the performance of the laparoscopic PIV as a predictor of R0 in a Danish cohort.

Methods
Data was obtained from the Danish Gynecological Cancer Database of all patients who have undergone laparoscopic evaluation of resectability in ovarian cancer at Rigshospitalet from 2015-2022.

Results
A total of 217 patients had a laparoscopy to evaluate resectability prior to either primary or interval surgery from 2015-2022. The mean age was 65,7 years. Of these, 147 women had PIV <8 (68%), and 70 had PIV ≥8 (32%). Ninety-two patients had subsequent primary surgery (62.5%), 39 had interval surgery (26.5%) and 16 patients had no surgery due to other causes (11%). R0 was obtained in 81 of 92 patients (88%). R0 was not possible in 11 patients (12%). Thus, a negative predictive value of 88% of the PIV was obtained in this Danish cohort.

Conclusions
The PIV is a validated tool to evaluate resectability in patients with advanced ovarian cancer when preoperative imaging is inconclusive. In patients with PIV <8, complete resection was obtained in a high proportion of patients. In the further analyses of the data, we seek to further improve triage of patients to most suitable treatment.

#91 Socioeconomic inequalities in access to systemic anti-cancer therapy

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Abstract text
Introduction
In recent years new medicines used in systemic anti-cancer therapy (SACT) have been successful in educing cancer mortality. However, there are concerns regarding the potential impact of non-biological factors, such as socioeconomic status (SES), on patients access to these new and often expensive treatments. Currently evidence of differences in treatment across SES is limited. The purpose of the study was to assess the extent of inequality in use of SACT and to identify groups of patients experiencing reduced treatment.

Materials and methods
We utilized a database of all SACT administrations from 2008 - 2021 for cancer patients ≥18 years in the North Denmark Region. We defined vulnerable patients through the register-based social vulnerability index (rSVI) based on both social and clinical factors. Outcomes were defined as: 1) Treatment with immunotherapy (Yes/No), 2) Administrations with intravenous (IV) chemotherapy (Count), 3) Different SACT drugs (Count), 4) Total accumulated cost of SACT (EUR).

Results
(Preliminary results) The cohort included 15827 patients, treated within the period, where 2620 (16.6%) were categorized as vulnerable. We found no clear pattern of decreased use of immunotherapy for vulnerable patients. For IV treatments we found a 17% (95% CI, 10% to 23%) lower utilization for vulnerable men and 7% (2% to 12%) lower utilization for vulnerable women. These effects were mostly consistent across cancer sites. Male and female vulnerable patients on average received 7% (5% to 10%) fewer different SACT drugs and accumulated 31% (22% to 38%) less in total SACT costs.

Conclusions
We found a reduced number of IV treatments, number of different SACT drugs, and total cost of SACT used in treatment of vulnerable patients. To what degree these differences in treatment can be explained by patient/tumor characteristics at start of treatment, and how they are associated with differences in survival will be the next step in analyzing the data.

#92 The Impact of Type 2 Diabetes on Complications after Primary Breast Cancer Surgery: a Danish population-based cohort study

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Abstract text
Background
Type 2 diabetes (T2D) is associated with comorbidities, potentially increasing the risk of postoperative complications. We investigated the association of T2D and risk of complications after primary breast cancer (BC) surgery and evaluated the interaction contrast between T2D and comorbidities.

Methods
We conducted a cohort study including all women diagnosed with early-stage operable BC from 1996-2018 registered in the Danish Breast Cancer Group clinical database. All patients underwent primary surgery—mastectomy or breast conserving surgery. From Danish registries, we defined prevalent T2D via diagnostic codes or ≥2 prescriptions for glucose-lowering drugs. We defined complications as hospital admissions for medical/surgical complications within 30 days of primary surgery. We calculated the 30-day cumulative incidence proportion (CIP) and used Cox regression to estimate hazard ratios (HR) and associated 95% confidence intervals (95%CI) of complications. We estimated the interaction contrast between T2D and comorbidities on the incidence rate of complications.

Results
Among 84,491 women with BC, 4,669 (5.5%) had T2D at BC surgery. Overall, 800 (17.1%) and 8,621 (10.8%) BC patients with and without T2D developed complications yielding CIPs of 17% (95% CI, 16-18) and 11% (95% CI, 10-11), respectively, and a HR of 1.46 (95% CI, 1.36-1.57). The most frequent were surgical and infection events. The incidence rate of complications explained by interaction in women with moderate and severe comorbidity was 21% and 41%, respectively.

Conclusion
Women with BC and T2D have higher risk of postoperative complications after primary BC surgery compared with those without T2D. Furthermore, comorbidity and T2D have a synergistic effect on the risk of postoperative complications.

#93 Socioeconomic differences in the pre-diagnostic interval among patients diagnosed with head and neck squamous cell carcinoma - a nationwide, population-based study from DAHANCA

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Abstract text
Introduction
Elucidating the widely observed socioeconomic differences in cancer outcomes is crucial for intervention planning. This nationwide, population-based study investigates socioeconomic differences in the pre-diagnostic interval and stage at diagnosis among patients diagnosed with squamous cell carcinoma (SCC) in the head and neck region.

Materials and methods
Information on patient-reported symptom onset, symptoms and diseasespecific factors for patients diagnosed with head and neck SCC between 2008 and 2019 was obtained from the nationwide population-based Danish Head and Neck Cancer Group (DAHANCA) database. Information on consultations in primary care and socioeconomic position (SEP) was obtained from administrative registers. Differences in the interval from symptom onset to diagnosis were estimated in general linear models with 95% confidence intervals (CIs). Consultation patterns in primary care were examined using methods for change-point detection and associations with advanced-stage disease were estimated in logistic regression models.

Results
Patients with low, medium and high SEP had a similar interval from patient-reported symptom onset to diagnosis of 10 weeks. Despite this interval varied largely according to primary symptom and anatomical subsite, minor socioeconomic differences was observed within and across these subgroups. A distinct increase in consultation rates was observed at 9 weeks (95% CI (9.3;10.7)) before diagnosis for patients with low SEP, and at 7 weeks (95 % CI (4.8;9.2)) for patients with high SEP, with overlapping CIs. Patients with low compared to high SEP had increased odds for advanced-stage glottic, HPV+ oropharyngeal, and oral cavity SCC (OR range: 1.5-1.8 95% CI [1.0-2.3]), but not non-glottic laryngeal, HPV- oropharyngeal, and hypopharyngeal SCC.

Conclusions
Despite socioeconomic differences in stage at diagnosis for some subsites, minor socioeconomic differences in the pre-diagnostic interval were observed.

#94 Socioeconomic position and adherence to adjuvant endocrine therapy in premenopausal breast cancer patients

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Abstract text
Introduction
Socioeconomic position (SEP) may impact prognosis of estrogen positive (ER+) breast cancer in premenopausal women, in part by affecting adherence to adjuvant endocrine therapy (AET). We investigated the association between SEP and AET adherence from initiation to five years after diagnosis.

Materials and Methods
We included Danish premenopausal women diagnosed with stages I-III, ER+ breast cancer during 2002–2011. We ascertained SEP—cohabitation, education, employment, and income—before diagnosis from national administrative registries. AET adherence was based on dispensing data from the Danish Breast Cancer Group and operationalised using two outcomes: adherence trajectories describing the dynamic patterns of adherence over time (defined using group-based trajectory modelling) and early discontinuation (i.e., stopping AET more than six months before the end of follow-up). We estimated the associations of SEP with AET adherence using multinominal and logistic regression, adjusting for covariates specified in directed acyclic graphs.

Results
Among 4,353 patients, we identified three adherence trajectories—high adherence (57%), slow decline (36%), and rapid decline (7%). For women living alone compared with cohabiting women, the odds ratios (ORs) and 95% confidence intervals (95% CIs) for slow decline and rapid decline vs. high adherence were 1.26 (1.08, 1.46) and 1.66 (1.27, 2.18). The corresponding estimates for women not working compared with employed women were 1.22 (1.02, 1.45) and 1.76 (1.30, 2.38). For the outcome early discontinuation (17%), ORs (95% CIs) were 1.48 (1.23, 1.78) for living alone and 1.44 (1.17, 1.78) for not working.

Conclusions
AET adherence was lower in women with low compared with high SEP, especially among women living alone or not working. This may contribute to the higher mortality in breast cancer patients with low SEP. Women with low SEP may benefit from support programs to enhance their AET adherence.

#95 The potential for oligometastatic treatment of distant metastatic disease in head and neck squamous cell carcinoma (HNSCC) – a real-world data analysis

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Abstract text
Introduction
Real-world data on radical treatment of distant metastases (DM) in patients with head and neck cancer are limited. We aim to describe the DM treatment in a complete cohort and address the oligometastatic (OM) treatment potential.

Materials and Methods
From 2008 to 2017, 1703 patients with HNSCC of the larynx or pharynx were diagnosed at Rigshospitalet, Copenhagen. The patients were identified in the Danish Head and Neck cancer database (DAHANCA) and patient files were manually reviewed in case of a DM recurrence. The extent of DM, the therapeutic intent (radical/palliative) and type of treatment (surgery, radiotherapy (RT) and chemo(immuno-)therapy) were recorded. Survival is reported as the time between date of DM diagnosis and date of death or end of follow-up (Dec 1st, 2022). OM disease (metachronous) was defined as 1-5 DMs identified on the recurrence scans.

Results
A total of 124 patients (7 %) developed DM. Among these, 44 (35 %) received no therapy, either due to comorbidity, physician's decision, or personal choice. RT was given to 51 patients (41 %) and 43 (35 %) had chemotherapy at some point. After radiological review, 67 (54 %) patients had polymetastatic (PM) and 57 (46 %) had OM disease. Of the OM patients, 23 were not candidates for radically intended therapy due to inoperable locoregional recurrence, poor performance status, or treatment refusal. Of the remaining 34 OM patients, 18 were treated with radical intent for their DM; 14 of these were lung resections. Of the remaining 16 patients, four patients were neither suited for radical surgery nor radiation, yielding 30/124 (24 %) as potential candidates for radical treatment of OM. The 1-year overall survival was 15 % (PM), 41 % (non-radically treated OM) and 67 % (radically treated OM).

Conclusions
Approximately 7 % of HNSCC patients develop DM and 46 % of these were found to have OM disease. Half of these appeared to be potential candidates for radical treatment.

#96 Immune-related adverse events in a nationwide cohort of melanoma patients treated with adjuvant anti-PD1

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Abstract text
Introduction
The introduction of immune checkpoint inhibitors (ICIs) has transformed the treatment of advanced melanoma. However, treatment with ICIs comes with the risk of immune-related adverse events (irAEs), leaving doctors and patients with the task of weighing potential risks and benefits of treatment, especially challenging when treatment is offered in an adjuvant setting.

Methods
A retrospective cross-sectional study on immune-related toxicities in patients treated with an antiPD1 antibody for resected stage III and IV melanoma in the adjuvant setting. Data were retrieved from two national clinical databases, the IMMUNOTOX database and the Danish Metastatic Melanoma Database (DAMMED).

Results
763 patients were included. The majority of patients were male (420 patients/55%) with a median age of 62 years (range 16-88) at time of first treatment. Of the total population, 664 (87%) experienced an immune-related adverse event. The most common immune-related adverse event was fatigue experienced by 329 (43%) patients. Low-grade irAEs (grades 1-2) were very common whereas severe irAEs (grades 3-5) were observed in 1-4% in the different subtypes. In total 96 (12.6%) of patients had severe irAEs out of which 5 (0.7%) patients died from irAEs. Data are currently being updated and irAEs in relation to outcome of melanoma as well as seasonal changes in debut of irAEs will be presented at the meeting.

Conclusion
Our data on irAEs from real-world adjuvant melanoma patients are comparable to those reported in clinical phase III trials and in previously published real-world studies. Low-grade irAEs (grades 1-2) were slightly more frequently observed than previously reported, but severe toxicities (grades 3-4) and fatal toxicities are comparable with previous data.

Emerging treatments, biomarkers & diagnostics

#97-107

#97 Benefit of dose reduced preoperative chemotherapy in the older population with resectable gastroesophageal cancer in a Real-World Dataset

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Abstract text
Background
Older patients (pt) with gastroesophageal (GE) cancer are at increased risk of low tolerability and poor outcome. The GO2 trial reported improved tolerability of dose reduced chemotherapy (CT) without compromising efficacy in advanced GE cancer (Hall, JAMA Oncol, 2021). Yet the impact of reduced preoperative chemotherapy (pCT) in the curative setting of older pts is unknown. The primary aim was to investigate if dose reduction during pCT impacts survival in older pts aged 70 years with resectable GE cancer.

Method
This retrospective study, included consecutive pts with resectable GE cancer referred to perioperative CT from November 2016 until October 2021. Kaplan-Meier analysis was made to estimate survival. Chi2-test and Fisher's exact test were used for statistical analysis.

Results
A total of 624 pts (age 70, 215; age<70, 409) were included. Fewer older compared to younger pts had ECOG PS 0 at baseline (49% vs 61%; p=.009). pCT was more often initiated at reduced dose in the older pts compared to younger (30% vs 12%; p<.001). Older pts, who experienced a dose reduction of pCT after 1. cycle, were more likely to complete pCT (88% vs 73%; p=.03). This was not seen in thethe younger pts (83% vs 82%; p=.87). Dose reduction after 1. cycle pCT was associated with significantly better OS for the older pt population (HR=2.0, 95% CI: 1.2-3.3; p=.005) but not for the younger (HR=0.99, 95% CI: 0.69-1.4; p=.9). A landmark analysis, using surgery as time zero, was performed to control for immortal time bias. The survival benefit was maintained for dose reduced older pts (HR=1.82, 95% CI:1.06-3.13; p=.03) and not for the younger (HR=1.04, 95% CI: 0.70-1.53; p=0.9).

Conclusion
Dose reduction after 1. cycle of pCT seems safe and feasible in older pts without compromising survival and could result in prolonged overall survival. This finding should be validated in an independent cohort which is ongoing.

#98 Subdivisions of R1 resections in patients with Stage III colorectal cancer – bad luck, bad surgery, or bad biology?

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Abstract text
Background
Microscopically positive (R1) resection margins are associated with poorer oncological outcomes. However, whether this association differs according to tumour site (rectum vs colon) or type of R1 margin (primary tumour (R1tumour) vs metastatic lymph nodes (R1LNM)) is unknown. We present a series of studies that aimed to answer these questions.

Materials and methods
Retrospective cohort studies were performed using data from the Danish Colorectal Cancer Group (DCCG) database. Patients undergoing potentially curative resections of Stage III colorectal cancers from 2016-2020 were included. Clinicopathological variables were retrieved directly from the DCCG database and electronic patient journals. R1 resections were defined as the presence of viable cancer cells ≤1 mm of resection margins.

Results
4,186 patients were included, 3,012 with colon cancers and 1,174 with rectal cancers. R1 resection rates were 16.5% and 18.2% in patients with colon and rectum cancer, respectively, with R1LNM accounting for the majority at both sites. Prognostic factors for R1 subdivisions differed, with R1tumour associated with factors associated with technical difficulty (T stage, involvement of other organs, acute operations). In contrast R1LNM were associated with potentially biological factors (right-sided colon cancers, N stage). Whilst both R1 subdivisions were associated with poorer oncological outcomes, their respective impacts differed in colon and rectum cancers. Patterns of relapse also differed between R1 subdivisions. Neither differences in surgical quality nor the use of adjuvant chemotherapy appeared to account for differences in oncological outcomes.

Conclusion
Subdivisions of R1 resections appear to occur under different circumstances and have distinct impacts on oncological outcomes. The association with poorer outcomes does not appear to be related to deficiencies in treatment, implying that R1 resections are a surrogate for aggressive cancer biology.

#99 MRI T1 relaxation time for evaluating neoadjuvant treatment of rectal cancer

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Abstract text
Introduction
Patients with rectal cancer receive an MRI scan to assess the stage of the disease. It is crucial to know the stage of the disease when it comes to choice of treatment. A recent study found significantly lower MR T1 relaxation time in patients with complete pathologic response to radiochemotherapy and development of fibrosis. This first result is promising, but the study did not include patients in the watchful waiting (WW) follow-up. Our aim is to test these results in a controlled setting including relevant patients in the WW treatment.

Method
This is a single center, prospective and blinded study. Inclusion criteria: rectal cancer patients with planned pre-treatment. Exclusion criteria: contradictions to MRI. MRI scans are performed on a high-field MRI-unit. The exams are referred to a software-program, where relaxation time is measured. Experienced radiologists will draw the regions of interest and measure T1 relaxation time. The first T1 relaxation time is measured during the first MRI. The treatment plan is determined on the multidisciplinary team (MDT) conference. The second MRI scan is six weeks after the neoadjuvant treatment. T1 relaxation time is blind to MDT during the experiment. The endpoint is complete response as judged by either MRI and endoscopy or – if surgery is performed – histopathological examination of the resected specimen. The histopathological report of the specimen is endpoint in case of surgery. We use ypTN tumor-node-stage and 5 point Mandard TRG system. Our sample size calculations are based on Lian´s results. To obtain a statistical power of 95 % with an α=0,01 we must include 108 patients.

Scientific considerations
If the T1 relaxation time measurement is a reliable marker for complete response, a more accurate allocation of patients to organ-preserving treatment may potentially be possible in the future. Patients with verified complete response after radiochemotherapy may avoid surgery and a permanent stoma.

#100 Rethinking MDT´s – a qualitative study of Multidisciplinary Team conferences and the strategic potentialities for developing the concept

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Abstract text
Introduction
Multidisciplinary Team-conferences (MDT´s) has become an integrated cornerstone for the patient-centered clinical decision-making in Danish cancer management. Facing a future with fewer resources and a rising numbers of patients there is a need to rethink the MDT concept to uphold and improve the quality and value. The purpose of this study is to explore the status and strategic potentialities for developing the MDT´s.

Materials and Methods
13 months of ethnographic, qualitative participant observation on everyday activities concerning MDT´s were conducted from November 2021 to December 2022 primarily at five university hospitals in Denmark. The observations were pursued in 39 interviews with clinicians, politicians, and patient organization representatives. Most of the data material has a case focus on renal cancer, e.g. 37 out of 45 observed MDT´s were renal cancer MDT´s.

Results
The data shows how the health care professionals actively establish MDT´s as valued spaces for knowledge and expertise, e.g., through preparation activities. The data also shows various local understandings and use of the MDT concept across and within cancer areas, e.g., related to the time frame, participants, inclusion of patients and documentation of decisions.

Conclusions
Based on the results we point at four strategic potentialities which could level the quality, efficiency, and value of the MDT´s: 1) Engagement with the rising resource intensity of preparation and coordination activities on a strategic level rather than on a local level. 2) The rising number of patients discussed at MDT´s calls for national discussions of inclusion criteria and the function of MDT. 3) Creating a shared IT-supported infrastructure for MDT´s could level the equality of data, increase the work efficiency and support MDT as an organizational modality. 4) Systematical integration of doctors in fellowship could utilize the existing learning potentiality.

#101 Using structured templates or free text style in reporting CT staging on colon cancer - A national survey

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Abstract text
Introduction
Computed tomography (CT) is a widely used method for staging colon cancer.
Accurate reports could lead to a better preoperative evaluation and planning of the treatment of colon cancer. The purpose was to evaluate the use of CT free text reports and structured report templates, when it comes to staging CT-imaging of colon cancer.

Material and Method
A multiple choice questionnaire survey was conducted in the span of 4 weeks. Online questionnaire software was used, and a link was shared to medical doctors with help from the Danish Colorectal Cancer Group (DCCG) and from a social media radiologist group.

Results
Clinicians preferred the template style (95%), whereas the support for template reports was less among the radiologist (76%). All female responders preferred the template style, this was only true for 84% of the male responders. Furthermore, the survey showed a slightly deficient level of national CT-reporting quality, only seven out of thirteen questions and sub questions, concerning CT report quality, achieved an approval rate of > 85%. The colorectal cancer multi-disciplinary team consultants who always or usually work with template style reporting of CT scans of colon cancer, tends to be more satisfied with the quality and content of the reports, compared to those who rarely use or read template reports.

Conclusion
The following indicators were insufficient reported: tumor invasion growth, number of hepatic metastasis, segment location of hepatic metastasis and retroperitoneal lymph node involvement. In the template reports group, nearly all participants found relevant information easily accessible.

#102 Feasibility and safety of laparoscopic D2 gastrectomy in combination with pressurized intraperitoneal aerosol chemotherapy (PIPAC) in patients with gastric cancer at high risk of recurrence – The PIPAC-OPC4 study

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Abstract text
Introduction
Patients with gastric adenocarcinoma (GAC) are at high risk of peritoneal recurrence despite perioperative chemotherapy and radical resection. This study evaluated feasibility and safety of laparoscopic D2 gastrectomy in combination with Pressurized IntraPeritoneal Aerosol Chemotherapy (PIPAC).

Material and methods
Prospective, controlled bi-institutional study in patients with GAC at high risk of recurrence treated with PIPAC with cisplatin and doxorubicin (PIPAC C/D) after laparoscopic D2 gastrectomy. High risk defined as poorly cohesive subtype with predominance of signet ring cells, clinical stage ≥T3 and/or ≥N2, or positive peritoneal cytology. Peritoneal lavage fluid collected before and after resection. Cisplatin (10.5 mg/m2) and doxorubicin (2.1 mg/m2) were aerosolized after anastomosis (flow 0.5-0.8 ml/s, maximum pressure 300 PSI). Treatment was feasible and safe if 20% had Dindo-Clavien ≥ 3b surgical complications or CTCAE ≥ 4 medical adverse events within 30 days. Secondary outcomes were length of stay (LOS), peritoneal lavage cytology, and completion of postoperative systemic chemotherapy.

Results
Twenty-one patients were treated with a D2 gastrectomy and PIPAC C/D. Median age 61 years (range 24-76), eleven female patients, 20 patients had preoperative chemotherapy. No mortality. Two patients had Grade 3B complications that were potentially related to PIPAC C/D (one anastomotic leakage, and one late duodenal blow-out). One patient had severe neutropenia, nine patients had moderate pain. The LOS was six days (4-26), one patient had positive peritoneal lavage cytology before resection, none after. Fifteen patients had postoperative chemotherapy.

Conclusions
Laparoscopic D2 gastrectomy in combination with PIPAC C/D is feasible and safe.

#103 Neoadjuvant intratumoral flu vaccine treatment in patients with proficient mismatch repair colorectal cancer leads to increased tumor infiltration of CD8+ T-cells and upregulation of PD-L1: A phase 1/2 clinical trial

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Abstract text
Introduction
In colorectal cancer, the effects of immune checkpoint inhibitors are mostly limited to patients with deficient mismatch repair tumors, characterized by a high grade infiltration of CD8+ T-cells. Interventions aimed at increasing intratumoral CD8+ T-cell infiltration in proficient mismatch repair tumors are lacking.

Materials & Methods
We conducted a proof of concept phase 1/2 clinical trial, where patients with non-metastasizing sigmoid or rectal cancer, scheduled for curative intended surgery, were treated with an endoscopic intratumorally administered neoadjuvant flu vaccine. Blood and tumor samples were collected before the injection and at the time of surgery. The primary outcome was safety of the intervention. Evaluation of pathological tumor regression grade, immunohistochemistry, flow cytometry of blood, tissue bulk transcriptional analyses, and spatial protein profiling of tumor regions were all secondary outcomes.

Results
A total of ten patients were included in the trial. Median patient age was 70 years (range 54-78), with 30% females. All patients had proficient mismatch repair UICC stage I-III tumors. No endoscopic safety events occurred, with all patients undergoing curative surgery as scheduled (median nine days after intervention). Increased CD8+ T-cell tumor infiltration was evident after vaccination (median 73 vs. 315 cells/mm2, $p < 0.05$), along with significant downregulation of transcripts related to neutrophils and upregulation of transcripts encoding cytotoxic functions. Spatial protein analysis showed significant local upregulation of PD-L1 (adjusted p-value < 0.05) and downregulation of FOXP3 (adjusted p-value < 0.05).

Conclusions
Neoadjuvant intratumoral flu vaccine treatment in this cohort was demonstrated to be safe and feasible, and to induce CD8+ T-cell infiltration and upregulation of PD-L1 in proficient mismatch repair sigmoid and rectal tumors. Trial registration: NCT0459137

#104 Long-term outcomes in patients with a R1 resection who received induction chemotherapy before chemoradiotherapy compared to patients who received chemoradiotherapy alone for locally advanced rectal cancer

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Abstract text
Introduction
Neoadjuvant treatment with induction chemotherapy (ICT) followed by chemoradiotherapy (CRT) has improved rates of achieving a R0 resection and suggested better long-term outcomes. R1 resection is associated with a poor prognosis in regard to both local and distant recurrence. This study investigates median overall survival (mOS) and disease-free survival (DFS) in patients with R1 resection after receiving intensified preoperative treatment with ICT and CRT compared to neoadjuvant treatment with CRT alone.

Materials and methods
All R1 resections were retrospectively retrieved from the NORD database with 689 patients with locally advanced rectal cancer who received treatment between 2006-2017. R1 resection was defined as distance less than or equal to 1 mm from the tumor to the circumferential resection margin upon pathological assessment. ICT consisted of 1 to 3 cycles of capecitabine and oxaliplatin (CAPOX) and was followed by radiotherapy concomitant with capecitabine. Recurrences and survival were analyzed by Kaplan-Meier and compared with the log-rank test.

Results
Among 48 patients with R1 resection, 25 (52%) received both ICT and CRT. There was no significant difference in mOS, however, the results indicated a better survival rate in the patients who received both ICT and CRT compared to CRT alone: 36% vs. 26% (p = 0.188) respectively. DFS between the two groups was similar: 44% vs. 43% (p = 0.879). Local recurrence rates showed a trend towards better local control in the ICT group: 8% compared to 22% in the CRT group (p = 0.169), whereas there was no difference in the rate of distant recurrence between the groups: 40% vs. 39% (p = 0.935).

Conclusions
The results suggest that the addition of ICT to CRT improves the local control rate and might improve OS compared to patients who received CRT alone in patients with R1 resection. There was no difference in DFS or the rate of distant recurrence.

#105 Targeting of microRNA-22 suppresses tumor spread in a mouse model of triple-negative breast cancer

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Abstract text
Introduction
MicroRNA-22 (miR-22) is an oncogenic miRNA whose up-regulation promotes epithelialmesenchymal transition (EMT), tumor invasion, and metastasis in hormone-responsive breast cancer. We confirmed its role on EMT also in triple negative breast cancer (TNBC) using a 3D invitro model and a xenograft mouse model. Moreover, we developed and tested an LNA-based therapy for miR-22 inhibition that was able to reduce metastatic spread in this model and extend mice life.

Materials and Methods
MDA-MB-231 overexpressing miR-22 or a control plasmid were used to generate both a 3D in vitro model and a xenograft model based on Nu/J mice. The role of miR-22 on EMT and stemness was confirmed by qRT-PCR and WB before and after treatment of all models previously described with either an LNA-modified antimiR-22 oligonucleotide, a scramble LNA or VHL. Furthermore, immunohistochemistry and H&E staining were performed on the lungs and livers of injected mice to assess metastatic spread.

Results
Overexpression of miR-22 in both the 3D cellular model and the xenografts of human TNBC promotes stemness and the increased expression of EMT-related genes and mesenchymal markers. Similarly, human TNBC xenografts overexpressing miR-22 show an increased aggressiveness correlating with a profound decrease in overall survival of the metastatic mice. Furthermore, we report that pharmacological inhibition of miR-22 is effective in reducing EMT both in vitro and in vivo, also suppressing the metastatic spread in the mouse xenograft model, and markedly improving survival.

Discussion
miR-22 plays a key role in TNBC by modulating EMT and cell proliferation. Suppression of the metastatic spread and growth of metastatic TNBC highlight the potential of miR-22 silencing as a new therapeutic strategy for the treatment of TNBC.

#106 Proton FLASH radiation-induced skin toxicity within the Spread-out Bragg Peak

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Abstract text
Introduction
The newly emerging field of FLASH radiotherapy has proven highly relevant in reducing adverse effects of radiation damage, without compromising tumour control. In a recent study at DCPT, the FLASH effect was determined in a mouse model at the entrance of a proton beam. Clinical practice, however, utilizes the beneficial property of the proton beam to deliver a high dose at the tumour site within the Spread-Out Bragg peak (SOBP). The current study aimed to determine the FLASH effect on skin toxicity within the SOBP.

Material & Methods
FLASH dose rates of 60 Gy/s (250 MeV) were compared to conventional (CONV) dose rates of 0.4 Gy/s (244 MeV). A ridge filter was used to obtain the SOBP from a single beam energy. A single fraction of varying doses, between 20-55 Gy for CONV and 30-65 Gy for FLASH, was delivered to the right hindleg of healthy female CDF1 mice. Acute skin damage of the foot was assessed visually between 8-30 days post-treatment.

Results
Dose-response curves were calculated from the fraction of mice reaching each acute toxicity score. The FLASH effect was calculated as the ratio between the dose where 50% of mice reached the acute score for the FLASH dose rate relative to the CONV dose rate. Preliminary data shows indications of FLASH irradiated mice developing less toxicity compared to CONV dose rates, resulting in a FLASH effect.

Conclusion
Preliminary data suggest that FLASH dose rates used within the SOBP in proton radiotherapy result in a FLASH effect where higher doses are needed with FLASH than with CONV dose rates to induce a certain toxicity level.

#107 Difference between planned and delivered dose to the internal mammary nodes in high-risk breast cancer patients

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Abstract text
Introduction
Internal mammary node irradiation (IMNI) improves overall survival. Chest wall motion during delivery of IMNI can impact the delivered dose. We examined the delivered dose coverage of the internal mammary nodes (IMN) in high-risk breast cancer patients using continuous portal images (cine MV) of tangential breast fields.

Material and methods
In a consecutive cohort of 39 left-sided node-positive breast cancer patients treated with daily image guided radiotherapy (IGRT) and deep-inspiration breath-hold (DIBH) continuous portal images were recorded. On the final frame of each cine MV recording the chest wall was matched with the Digitally Reconstructed Radiograph (DRR) from the treatment plan. The geometrical errors were rounded to integer millimeters and binned. For each 1 mm bin, an isocenter-shifted treatment plan was recalculated assuming that the 2D error observed in the cine MV image was caused by an anterior-posterior chest wall shift in the IMN region. A weighted plan sum yielded the IMN clinical target volume receiving at least 90% dose (V90_CTVn_IMN).

Results
The mean number of cine MV observations per patient was 36 (range 26-55). Most patients (67%) had on average a lowered chest wall position on cine MV images compared to the plan DRR. This translated into a change in the delivered median V90_CTVn_IMN of -0.7% (range, -11.9-2.9%; $p<0.001$). The V90_CTVn_IMN reduction was >9% in three patients. No clinically relevant differences were found for the mean lung dose or mean heart dose

Conclusion
Using cine MV images, we found that the delivered V90_CTVn_IMN was significantly lower than planned. In 8% of the patients, the V90_CTVn_IMN reduction exceeded 9%. Vulnerable treatment planning, caudal placement of DIBH marker block, and non-reproducible patient positioning from daily IGRT were identified as possible causes. Based on these data our institution expects to implement cone beam CT as daily image guided RT.