2019 COSA ASM

ORAL ABSTRACTS

Clinical Oncology Society of Australia

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ABSTRACTS

1 | Latest developments in prostate cancer surgery and active surveillance

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Active surveillance is now the recommended management option for low-risk prostate cancer. In this lecture we will discuss trends in use of active surveillance worldwide, optimal patient selection and monitoring. For men with intermediate- to high-risk localized prostate cancer, radical prostatectomy remains a gold standard treatment option. We will discuss recent trends in the surgical management of localized prostate cancer.

2 | Precise and personalised: Radiation therapy for prostate cancer in 2019

Sandra L Turner

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Radiation therapy has undergone phenomenal advances over the past decades. There is now strong evidence that modern radiation therapy provides equivalent (or superior) outcomes to other treatments in terms of tumour control, side effects and/or quality of life for men requiring active treatment for prostate cancer. Advances apply in both the curative and palliative settings. Radiation therapy (including external beam and/or brachytherapy) either alone or in combination with surgical and/or systemic treatments has a central role in prostate cancer management.

This presentation will give an overview of some of the numerous ways in which radiation therapy is now better able to target the cancer, minimise side effects, enhance patient convenience and generally lead to improved prostate cancer survival and care. This session will touch upon clinical, technological, biological, imaging and genomic research as well as logistical issues that are contributing to radiation therapy in 2019 being more precise and personalised than ever before. The importance of men, their families and their healthcare teams fully understanding the radiation therapy options for managing their prostate cancer will become apparent.

3 | Metastatic hormone-sensitive prostate cancer: A new era

Arun Azad

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The management of metastatic prostate cancer not previously treated with androgen deprivation therapy (ADT) has undergone a paradigm shift in the past 5 years. In addition to commencing ADT, there are multiple phase 3 clinical trials showing that the addition of docetaxel chemotherapy or novel hormonal agents (abiraterone acetate, enzalutamide, apalutamide) significantly improves overall survival. Intensification of systemic therapy is now the standard of care for newly diagnosed metastatic prostate cancer but many challenges remain including optimal selection of patients, management of additional toxicity, and the development of adaptive resistance.

4 | Supportive care for men with prostate cancer

Patsy Yates

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Men with prostate cancer have a range of supportive care needs. Current evidence indicates that responding effectively to these needs requires a comprehensive understanding of the man's responses to his diagnosis and its treatment, the ability to tailor interventions to the man's clinical and personal circumstances and a commitment to promoting health and well-being and enabling self-management. Optimal supportive care also requires specialized knowledge and skills to deal with unique concerns experienced by men with prostate cancer relating to sexual function and urinary incontinence. In Australia, the Movember Foundation is trialling the TrueNTH program, an innovative multicomponent supportive care model for men with prostate cancer. Specialist Prostate Cancer Nurses are now also well established in a number of treatment centres. This presentation reviews the elements of existing supportive care models for men with prostate cancer in Australia and overseas, and examines the system, service and provider level requirements for effective implementation of such models.

5 | Patient selection and dose prescription for radiation therapy

Marcus Dreosti

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The prevalence of muscle invasive bladder cancer increases with age as does this elderly populations propensity to treatment toxicity, competing medical comorbidity and geriatric syndromes. This combination often results in under-treatment, with known worse disease specific outcomes compared to younger cohorts and increased disease-related morbidity but equally at times overtreatment and the imposition of toxicity in the absence of significant benefit arising as a result of poor patient selection.

Individualisation of treatment decisions for these patients is assisted by close multidisciplinary discussion and the use of various geriatric and functional assessment principles and tools in the clinical environment. Defining treatment intent and understanding the breadth of dose/fractionation schedules available for bladder cancer, with or without systemic therapy, can assist the Radiation Oncologist in providing optimally tailored radiation therapy to these patients both in the radical and palliative settings.

6 | Patient selection for palliative chemotherapy

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Like many other malignancies, the incidence of bladder cancer increases with age. The older cancer population is heterogeneous with respect to overall health status. Therefore, the management approach in older adults with advanced bladder cancer should be individualized. Here, we review some of the assessment tools that can help evaluate older cancer patients and will discuss the systemic management approach and the decision-making process in this clinical setting.

7 | Renal function estimates vs measurements; implications for chemotherapy dosing

Jenny Casanova

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For many years the Cockcroft-Gault equation has been the gold standard for estimating creatinine clearance, which is used as a surrogate marker for glomerular filtration rate (GFR) and hence to estimate renal function. Although Cockcroft-Gault is routinely used to 'calculate' GFR in order to identify required modifications of drug doses, there is some debate over whether it's more appropriate to use ideal or actual body weight, particularly in cancer patients where capping of body surface area (BSA) for dose calculations is no longer recommended.

When dosing carboplatin, which is 100% renally cleared, the recommendation from COSA and other bodies is to undertake actual measurement of GFR by nuclear medicine scan, as dosing according to Cockcroft-Gault GFR may underestimate dosing in some patient populations and overdose in others. However, NM GFR incurs a cost, and may not always be accessible in a timely fashion.

Newer formulae are available, including Modified Diet in Renal Disease (MDRD) and Chronic Kidney Disease-Epidemiology (CKD-EPI). These were originally designed to alert physicians to gradual changes in kidney functionality, therefore have not been validated in acute renal impairment or for use in drug dosing, and do not necessarily take into account the patient's BSA. This presentation will discuss what it means when an eGFR, or estimated glomerular filtration rate, is reported by a pathology system, and what its utility is when calculating doses of renally cleared cancer therapies, plus those which have the potential to be nephrotoxic, e.g. cisplatin.

8 | Renal-oncology; impacts of these treatments on renal health

Rob Carroll

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As the use of biological agents increases in cancer, so too do the renal side effects. A/Prof Carroll will discuss the management of interstitial nephritis post checkpoint inhibition and also the management of use of checkpoint inhibitors in renal transplant patients with urological cancers.

9 | Biopsychosocial screening: The bridge to engagement, patient experience and partnerships

Matthew Loscalzo

City of Hope, Duarte, California

Based on ~450 000 completed automated comprehensive biopsychosocial screens and a subset of urological cancer patients, clinical and programmatic relevant information will be presented that has the potential to more deeply engage patients and their families. Additional benefits include higher levels of real-time objective communication among health care providers, enhanced quality of care and reduced costs. Given increasing Randomized Control Trial evidence for the importance of ongoing communications and support for quality and extended length of life, screening is emerging as the sixth Vital Sign internationally. Australian psycho-oncologists have played a significant role in the development of new knowledge in biopsychosocial screening. Based on 26 years of first-hand experience in creating, sustaining and growing such programs, the speaker will briefly share biopsychosocial screening data illuminating specific benefits to patients, families and health care providers across settings. Data will then be shared that are focused on urological cancers and the impact of age, sex, income and the full range of biopsychosocial problems and opportunities. Finally, information will be shared relating to how automated comprehensive screening supports team work,

clarifies provider functions, saves physician time and creates unique actionable data sets for enhancements to clinical care, programmatic development and research.

10 | Ten-year quality of life outcomes in men with prostate cancer

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Objective: To report physical and mental health-related quality of life (HRQoL), life satisfaction and symptom burden of men over the ten years after prostate cancer diagnosis.

Methods: 106 (82.4% response) diagnosed with prostate cancer who were pre-treatment and close to diagnosis were recruited. Most men had localised disease (92.1%) at recruitment. Men were assessed over a ten-year period with self-reported HRQoL, life satisfaction and symptom burden using validated questionnaires. Bowel, sexual and urinary function were also assessed. 598 men completed the questionnaires at 10-years.

Results: Three trajectory patterns were identified for physical and mental HRQoL and life satisfaction. Compared with men who reported constantly high physical HRQoL, men with poorer physical health were more likely to receive ADT, have a low income, and multiple comorbidities. Poorer mental HRQOL was differentiated by lower income and multiple comorbidities versus men with high mental HRQoL. Against men with ongoing high satisfaction with life, lower life satisfaction was predicted by younger age, being single, receiving a low income, and multiple comorbidities. Better urinary, bowel, and sexual function were related to better HRQoL and life satisfaction over time.

Conclusions: Androgen deprivation therapy, comorbidities and socioeconomic disadvantage are risk indicators for poorer long-term quality of life after a diagnosis of prostate cancer. Risk indicators need to be incorporated into survivorship care planning. Survivorship interventions need to account for these indicators to ensure men most at risk of poorer physical and mental health can access appropriate care.

11 | Emotional care needs of prostate cancer survivors and their partners: What do we know?

Peter "Kevin" O'Shaughnessy

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The initial impact of treatments for men with prostate cancer is well reported in the literature. Less is known about the emotional needs of these men as their journey after diagnosis and treatment continues into the months and years. Previous research by the author investigating provides an insight into the needs of men living with prostate cancer, and views of partners of prostate cancer survivors. Fear, distress, loss, regret, anxiety, low self-esteem, depression, changes in sexuality, masculinity and relationships were described by both men and partners as adverse effects of the diagnosis and treatment for prostate cancer.

A scoping methodology was used to review literature from January 2000 to March 2019 to further explore the emotional supportive care needs of prostate cancer survivors. Although there is some literature regarding negative emotional experiences such as fear, grief and regret in prostate cancer survivors, vulnerability, isolation and loneliness are not well understood. There is scant literature that investigates the role of positive emotions such as love, hope and joy and the role they play in helping men become resilient and cope with prostate cancer. Positive emotions may help men become more resilient. Preliminary findings suggest that wives and partners of men with prostate cancer can provide nurses and healthcare authorities with a powerful and unique resource in providing supportive care for men who are challenged by prostate cancer.

12 | Survivorship care plans for prostate cancer survivors – Describing the Australian landscape

Nadia Corsini

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Over the past two decades, cancer survivorship has received greater attention among consumers, professional and accrediting bodies, health care services and policy makers. The structured delivery of information that includes a summary of the treatment received (treatment summary) and a plan for follow-up care (care plan) has been recommended to support care coordination and facilitate transition from regular contact with the treatment team to follow-up care that can be delivered by other health professionals within and external to the treatment setting.

Treatment summaries and care plans are related but 'separate' documents, although they are often implemented together as a combined approach to survivorship care. Various templates have been developed by different organisations worldwide with several common features. The treatment summary typically includes clinical and treatment-related information such as diagnoses, treatment history, key dates and complications. The care plan is often developed with the patient and contains specific information on topics such as management of

persistent treatment effects, supportive care and lifestyle interventions. The purpose of a treatment summary is to ensure that survivors have an accurate record of their treatment and the purpose of a care plan is to support specific actions to promote wellness; both may be shared with other health professionals.

At present, in Australia there are guidelines but no specific mandates requiring health services to provide treatment summaries and care plans, and hence their use in practice is patchy. This presentation will summarise: the history underpinning the focus on survivorship treatment summaries and care plans; intended benefits to patient care and recovery (and also to the treating team); evidence on effectiveness, use and implementation of treatment summaries/care plans; current Australian recommendations and guidelines; and resources and tools available to assist clinicians who would like to offer care plans and treatment summaries.

13 | Computed tomography-defined sarcopenia negatively impacts overall survival in patients with head and neck cancer: Implications for practice

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Computed tomography (CT)-defined sarcopenia, or low muscle mass, is a demonstrated poor prognostic factor for survival in patients with cancer; however, its impact in patients with head and neck cancer (HNC) has only recently been established. Sarcopenia may be considered a nutrition-related condition that can occur in either a primary, age-related context or secondary to inactivity, malnutrition or a range of complex pathogeneses including malignancy. This presentation will provide an overview of CT-defined sarcopenia and the latest research on the prognostic impact of CT-defined sarcopenia on outcomes for patients with HNC with a specific focus on survival in those undergoing radiotherapy ± other treatment modality of curative intent. This presentation will demonstrate that (a) CT-defined sarcopenia impacts negatively on overall survival in patients with HNC and holds a clinically meaningful prognostic value; (b) consensus regarding sarcopenia assessment and skeletal muscle index threshold values is warranted; and (c) future research should focus on implementation of clinically relevant prognostic muscle mass evaluation into routine care.

14 | Nutrition and eHealth

Marina Reeves

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Healthy diet and adequate nutrition play an important role in reducing risk of cancer, during cancer treatment and to improve survivorship. Nutrition services and interventions have traditionally been delivered face-to-face either one-on-one or group settings. Technological advancements however have allowed us to disrupt this traditional model of service delivery. Telehealth and eHealth provide a number of advantages: increasing reach and access to services, thus providing an opportunity to address the inequity often experienced by those living outside urban areas; they have the potential to increase dose and duration of 'intervention'; and, they can be cost-effective. This presentation will summarise the evidence on the delivery of nutrition interventions via eHealth, including examples of such interventions in cancer survivors.

15 | Can early and intensive nutrition care delivered via digital platform or telephone improve quality of life in patients with upper gastrointestinal cancer?

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Background: Malnutrition in patients with upper gastrointestinal cancer confers greater risks of morbidity and mortality. Novel cost-effective approaches that can deliver early, pre-hospital nutrition intervention before usual hospital dietetic service is commenced are needed. Linking clinicians and patients via mobile health and wireless technologies is a contemporary solution not yet tested for delivery of nutrition therapy to people with cancer. The aim of this study is to commence nutrition intervention earlier than usual care and evaluate the effects of using the telephone or mHealth for intervention delivery. It is hypothesised that participants allocated to receive the early and intensive pre-hospital dietetic service will have more quality of life compared with control participants. This study will also demonstrate the feasibility and effectiveness of eHealth for the nutrition management of patients at home undergoing cancer treatment.

Methods: This study is a prospective three-group randomised controlled trial, with a concurrent economic evaluation. The 18-week intervention is provided in addition to usual care and is delivered by two different modes, via telephone (group 1) or via mHealth (group 2).

The control group receives usual care alone (group 3). The intervention is an individually tailored, symptom-directed nutritional behavioural management program led by a dietitian. Participants will have at least fortnightly reviews. The primary outcome is quality-adjusted life years lived and secondary outcomes include markers of nutritional status. Outcomes will be measured at 3, 6 and 12 months follow-up.

Discussion: The findings will provide evidence of a strategy to implement early and intensive nutrition intervention outside the hospital setting that can favourably impact on quality of life and nutritional status. This patient-centred approach is relevant to current health service provision and challenges the current reactive delivery model of care.

16 | Nutrition and exercise interventions for prostate cancer

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Obesity, poor diet quality and physical inactivity have been associated with an increased risk of prostate cancer-specific mortality, all cause-mortality and treatment-related side effects for prostate cancer survivors. It is estimated that approximately 45% of all prostate cancer survivors are being treated with androgen deprivation therapy (ADT). However, ADT comes with significant side effects, including, but not limited to, unfavourable changes in body composition (reductions in muscle and bone mass, and increases in fat mass), and increased risks of cardiovascular disease, insulin resistance and metabolic syndrome. The dietary and exercise guidelines for cancer survivors suggest (a) to maintain a healthy body weight, (b) follow a dietary pattern high in fruit, vegetables and whole grains, (c) and engage in at least 150 min/week of moderate-vigorous aerobic exercise, with two to three resistance training sessions/week of major muscle groups. Despite these guidelines, only a few diet interventions with/without exercise have been published in prostate cancer survivors, or men treated with ADT. Importantly, the utility of dietary interventions to improve disease- and treatment-related health outcomes in ADT is yet to be definitively explored. This presentation will discuss the current dietary patterns of Australian prostate cancer survivors, and describe a series of diet interventions with/without exercise in prostate cancer aiming to counteract the side effects of ADT.

17 | Protein SWATH library construction including recombinant proteins allows identification and quantification of lower abundance human plasma cancer biomarkers

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Human plasma is the most informative, accessible biofluid for assessing the status of human health. However, detection and quantification of low abundance cancer-related proteins (eg CEA, cytokines and shed proteins) remains one of the principal challenges in proteomic biomarker discovery – due to high abundance plasma proteins obscuring biomarkers. Antibody technologies suffer from batch variation and non-specific detection, therefore, quantitative mass spectrometry (MS) techniques such as SWATH-MS and similar DIA methods are an attractive alternative to assess plasma cancer biomarkers. These approaches rely on prior library construction using IDA/DDA data and the challenge of detecting low abundance biomarkers can be hampered by the same dynamic range issues which limit the proteome discovery space for plasma proteomics.

Here, we report on the use of a SWATH mini-library comprised of 32 previously reported cancer biomarkers for the quantitative assessment of non-depleted pooled human plasma cohorts from clinically staged (20 healthy or 20 stages I-IV) colorectal cancer (CRC) patients by SWATH-MS. To ensure validity, we employed two independent SWATH analysis software (Skyline and PeakView) to identify quantifiable peptides. Of the 32 cancer biomarkers used to construct the SWATH mini-library, we reliably identified and quantified 25 proteins in human plasma of CRC patients. In all cases, a significantly higher peptide count for each protein allowed better quantification (eg 12 for CEA and eight for IL-6) compared to prior results. In CRC, CEA expression was significantly upregulated, recapitulating many prior studies. Similarly, we recapitulated our observation that plasma ADAMDEC1 is upregulated in early-stage CRC. We propose the use of expanded recombinant protein SWATH libraries for the discovery of diagnostic, prognostic and theranostic protein biosignatures for cancers and other diseases.

18 | Analysis of alternative spicing in the transcriptome of osteosarcoma

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Aim: We have assessed the extent of alternative splicing in osteosarcoma samples and further examined the relationship between alternative transcripts and gene expression.

Methods: We performed whole transcriptome analysis of osteosarcoma bone samples and sequenced total RNA from 36 fresh-frozen samples (18 tumour bone samples and 18 non-tumour paired samples) in matched pairs for each osteosarcoma patient. Data were analysed

with Python package HTSeq and R package DEXSeq developed to analyse differential exon usage in transcriptome data. FDR correction was used to adjust nominal *P*-values to obtain genome-wide statistical significance.

Results: We identified statistically significant (FDR below .05) differences in alternative splicing of 4175 transcripts. Several different alternative transcripts from the same genes were expressed, in the leptin receptor overlapping transcript, LEPROT; we detected 26 transcripts to be differentially expressed between tumour and normal tissue. Some transcripts were over-expressed in the tumour and some transcripts were over-expressed in normal tissue. The function of LEPROT gene is not fully understood, but it is involved in the regulation of leptin by interacting with the leptin receptor. Also, LEPROT regulates growth hormone-dependent signalling and activity of the growth hormone receptor. Most of the differentially expressed genes were expressed as different alternative forms indicating prevalent and massive alternative splicing in osteosarcoma.

Conclusions: Alternative splicing is prevalent in osteosarcoma and its regulation may play a significant role in sarcoma development. This is a good example of how differential splicing could be involved in the tumorigenesis and further studies need to consider this as an important molecular mechanism.

19 | Efficacy of neratinib neoadjuvant therapy in a pre-clinical model of HER2^{+ve} breast cancer brain metastasis

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HER2-targeted therapies such as trastuzumab effectively control systemic disease but resistance to treatment is common and up to 50% of patients progress to incurable brain metastases. Tyrosine kinase inhibitors (TKIs) are increasingly used as second line therapy but the best clinical setting for these inhibitors and whether they have a place in the clinic for the treatment of breast cancer brain metastasis remains unclear. Progress on that front has been hindered by the lack of clinically relevant models of HER2 breast cancer brain metastasis.

Aim: To develop and characterise a robust mouse model of spontaneous HER2 breast cancer brain metastasis for evaluation of TKI efficacy.

Methods: We selected and characterised clonal variants from a mammary tumour that developed spontaneously in an immune-competent Balb/c mouse. The efficacy of a panel of TKIs was tested in vitro and neratinib was selected for further evaluation in vivo. Resistant variants were developed by long-term exposure to neratinib.

Results: We identified a clonal variant (TBCP-1) that naturally expresses high levels of HER2 and aggressively metastasises from the mammary gland to the brain in immune-competent mice. Evaluation of TKIs against human and mouse tumour lines in vitro identified neratinib as the most potent TKI. Neratinib's superior efficacy was associated with its unique ability to induce cell death by ferroptosis, a mechanism distinct from apoptosis. Neratinib as a first line neoadjuvant therapy potently inhibited tumour growth and spontaneous metastasis to brain and other organs. Neratinib-resistant TBCP-1 variants acquired a mesenchymal phenotype and showed altered expression of integrin receptors and cross-resistance to other TKIs but could be resensitised by treatment with integrin inhibitors.

Conclusions: TBCP-1 is the only model that aggressively recapitulates the spontaneous spread of HER2 breast cancer to the brain in immune-competent mice. Further evaluation of neoadjuvant neratinib alone or in combination with integrin inhibitors is warranted.

20 | Change in frailty index following a 12-month weight loss intervention in Australian breast cancer survivors

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Aim: To investigate change in the frailty index (FI) following a 12-month intervention targeting diet and physical activity in Australian breast cancer survivors diagnosed with stage I-III breast cancer.

Methods: The Living Well after Breast Cancer study was a two-arm pragmatically designed randomised controlled trial of a 12-month telephone-delivered weight loss intervention versus usual care in women (aged 18-75 years; body mass index [BMI]: 25-45 kg/m^2) following treatment for early-stage (I-III) breast cancer. Intervention targets included: modest weight loss (5-10%), 500 kcal/day reduction in energy intake and increasing diet quality, and increasing physical activity to 210 min/week and resistance exercise to 2-3 times/week. Regression analyses, adjusted for baseline FI, age, smoking status, marital status and time since diagnosis were used to assess the intervention effects on change in FI.

Results: Data for participants with complete data (n = 127) were analysed (age [mean ± SD]: 56.4 ± 9.0 years; BMI: 31.5 ± 5.1 kg/m^2). Mean weight loss was significantly higher ($P < .001$) in the intervention group (−4.2 ± 5.4 kg) compared to the usual care group (−0.01 ± 4.2 kg). Mean FI at baseline was 0.19 ± 0.09. Mean FI improved significantly in both groups (intervention: −0.018 [95% CI, −0.027 to −0.009]; usual care: −0.010 [95% CI, −0.019 to −0.000]), although the between-group difference was not statistically significant (intervention minus usual care: −0.008 [95% CI, −0.021 to 0.005]).

Conclusion: Intervention participants experienced a larger mean reduction in their FI compared to the usual care group, although this was not statistically significant. This is one of the first studies to investigate the impact of a weight loss intervention on the FI. In addition to

the intervention targets in this study, future interventions should aim to target more health factors that contribute to the FI, such as social, cognitive and mental health, and medication use. Factors associated with the improvement of the FI in the usual care group also warrant further exploration.

21 | The "Ick" factor: An unrecognised affective predictor of symptoms during chemotherapy

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Aim: The emotion of disgust is associated with gastrointestinal symptoms and aversion to certain foods. Given the frequency with which symptoms of this kind are seen in chemotherapy patients, it would appear to have particular relevance. However, disgust's role during cancer treatment has been overlooked. The aims of this research were to investigate whether disgust (a) predicted physical symptoms during chemotherapy (particularly, taste- and smell-related changes) and (b) compare its predictive utility against the most commonly used affective predictor, that is, psychological distress.

Methods: The target sample of this prospective, observational study was 58 participants. Over recruitment ensured that analytical power would not be compromised. Better than expected retention meant that 63 cancer patients completed questionnaires at both baseline (immediately prior to commencing chemotherapy) and follow-up (6 weeks later). Predictors (distress, disgust sensitivity and propensity) were assessed at baseline and outcomes (physical symptoms and food sensory processing) at both baseline and follow-up.

Results: Contrary to expectations, psychological distress did not predict any of the outcomes. However, disgust sensitivity (β = .53; 95% CI, 0.27-1.29; P = .003) and propensity (β = −.56; 95% CI, −1.20 to −0.29; P = .002) both predicted food sensory processing changes, whereas disgust sensitivity predicted marginally greater symptoms during chemotherapy (β = .34; 95% CI, −0.04 to 1.90; P = .060). Broadly, findings were consistent with expectation insofar as disgust was a better predictor of symptoms than distress.

Conclusions: The study represents the first prospective investigation of disgust's ability to predict symptoms experienced during chemotherapy. It demonstrates (a) a robust association between disgust and the food sensory processing changes common in chemotherapy and (b) disgust as potentially being a more useful predictor of food- and digestion-related symptoms than psychological distress. In doing so, it identified hitherto unstudied vulnerabilities and opens new doors for better care during cancer treatment.

22 | Inhibition of vitamin D catabolism and its effects on chemotherapy-induced gastrointestinal mucositis

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Aim: 5-Fluorouracil (5FU) is a chemotherapy agent known to cause gastrointestinal mucositis (GM), a side effect of cancer treatment, for which there is currently no effective treatment. Vitamin D has been widely shown to have immunomodulatory and anti-inflammatory effects in the intestine, and therefore may reduce severity of GM. Because the use of vitamin D and vitamin D analogues have an associated risk of hypercalcaemia, we considered whether competitive vitamin D catabolism inhibitor (VDCI) could be used for reducing 5FU-induced GM, without causing hypercalcaemia.

Methods: C57Bl6 mice (n = 36) received a single intra-peritoneal injection of 450 mg/kg 5-fluorouracil (5FU) or saline (vehicle control), and subcutaneous 500 ng/kg VDCI or saline (vehicle control) daily for 5 days prior and 2 days following 5FU administration, before being euthanized at 48 h following 5FU administration. Routine H&E, RT-PCR and immunohistochemistry was carried out on duodenum sections. NDP.view 2 was used to quantify villi and crypt parameters. Serum calcium levels were measured via KONE analysis. One-way ANOVA, with Tukey's test, was used for statistical analysis.

Results: Calcium levels were unaltered in the presence of VDCI. 5FU significantly reduced villous height (VH; P = .0002) and villous area (VA; P = .0006) in the duodenum, compared to saline. 5FU + VDCI significantly increased VH compared to 5FU (P = .043), and was not significantly different to saline. 5FU treatment decreases transient receptor potential cation channel subfamily v member 6 (TRPV6) RNA expression, whereas VDCI/5-FU does not upregulate TRPV6 in duodenum, suggesting a mechanism for normocalcemia.

Conclusions: Inhibition of vitamin D catabolism alleviates intestinal damage in 5FU-treated mice without causing hypercalcaemia and may provide a promising new avenue for anti-mucotoxic therapy.

23 | Patterns of surgery and outcomes: A guide to best practice for bladder cancer patients following radical cystectomy in Queensland

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Aim: Radical cystectomy (RC) is a relatively uncommon surgical procedure and the management of patients undergoing this surgery is complex. We conducted a review of bladder cancer patients who underwent a RC to understand patterns of surgery and outcomes in Queensland.

Methods: This review includes patients diagnosed with bladder cancer who underwent RC from 2002 to 2016. Data were obtained

from the Queensland Oncology Repository (QOR). A review of pathology reports was conducted. Hospitals were categorised as high (>7 RCs/year) and low (≤7 RCs/year). Multivariate analysis and 2-year overall survival was conducted. Follow-up time was to 31 December 2018.

Results: In the 15-year period, 7403 patients were diagnosed with bladder cancer, of these 1230 underwent RC. Overall 77% were male and the median age was 67 years. One-third (33.5%) were T-stage 3 & 4 at diagnosis. Of the cohort, 71% of (n = 871) had a lymph node dissection and the median number of nodes removed was 7 (range 1-73). Positivity rate was 22.8% and this was similar across hospital volumes. Patients residing in middle and disadvantaged areas were less likely to have had lymph node dissection (OR = 0.46, 95% CI, 0.28-0.75 and OR = 0.44, 95% CI, 0.23-0.84). Lymph node dissection was more likely for public compared to private patients (OR = 2.69, 95% CI, 2.10-3.44). Surgical margins were involved in 9.7% of patients. Surgical margin involvement was higher in low-volume hospitals (10.9% vs 7.1%, respectively, $P = .03$). Stage ($P < .001$), positive lymph nodes ($P \leq .001$), no lymph node dissection ($P = .003$) and involvement of surgical margins ($P < .001$) were all significantly associated with poorer overall survival.

Conclusions: This review has identified some subgroups of patients experience poorer post-operative outcomes. Later stage, positive lymph nodes, no lymph node dissection and surgical margin involvement were all predictors of poorer survival.

24 | Cost-effective analysis of supervised exercise training in men with prostate cancer previously treated with androgen deprivation therapy and radiation

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Aim: Exercise for prostate cancer (PC) survivors has been shown to be effective in addressing metabolic function and associated comorbidities (eg, diabetes, cardiovascular disease, etc), as well as sarcopenia and significant functional impairment resulting from long-term androgen deprivation. The aim of this study is to determine the cost-effectiveness of a supervised exercise intervention for long-term PC survivors who received radiation therapy and androgen deprivation therapy.

Method: We conducted a cost-effectiveness analysis of a multicentre randomised controlled trial (RCT) of supervised exercise training (resistance and aerobic) in long-term PC survivors (>5 years post-diagnosis) alongside the Trans-Tasman Radiation Oncology Group (TROG) 03.04 Randomised Androgen Deprivation and Radiotherapy (RADAR) trial.

Results: In comparison to usual care, the total cost of the intervention was $546 from a health care payer perspective. The incremental cost per QALY gain was $65 050 (2018 AUD).

Conclusions: This is the first cost-effectiveness analysis of a supervised exercise intervention for long-term PC survivors after curative radiotherapy and adjuvant ADT. The results indicate the intervention is effective, but not cost-effective at a generally accepted WTP of $50 000. Evidence to support cost savings from post-intervention outcomes would potentially reveal greater benefits such as reduced health service utilisation, chronic disease, falls and fractures and contribute to a more comprehensive analysis and more favourable cost-effectiveness outcome. Future research should address these deficits via a larger trial with longer follow up.

25 | Prognostic performance of qSOFA in cancer patients admitted to the emergency department with suspected infection

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Aim: We aimed to test the performance of the quick Sequential Organ Failure Assessment (qSOFA) score for predicting adverse outcomes in cancer patients admitted to the emergency department (ED) with suspected infection.

Methods: Retrospective cohort analysis of all ED patients with suspected infection admitted between 01 December 2014 and 01 June 2017 at a tertiary hospital. Cancer patients were identified by cross-linking the electronic health records of the ED and oncology department. The primary outcome was in-hospital mortality and/or ICU stay ≥3 days.

Results: Among 165 912 patients admitted to the ED, 11 205 (6.8%) had suspected infection, of whom 1655 (14.8%) had cancer. Solid tumours accounted for 1267 (76.5%) patients and 388 (23.5%) had haematological malignancies. Chemotherapy or radiotherapy were administered within 6 months before ED admission in 560 (33.8%) patients and 167 (10.1%) had neutropenia at ED admission. A total of 371 (22.4%) patients were qSOFA positive (+). qSOFA+ patients were older, more prone to respiratory infections, and more likely to be admitted to ICU or require mechanical ventilation. In-hospital mortality or ICU stay ≥3 days were 17.3% and 21%, respectively, for qSOFA+ patients versus 4.7% and 6.9% for qSOFA negative patients ($P < .0001$). For prediction of in-hospital mortality, a positive qSOFA had a positive predictive value (PPV) of 17% and a negative predictive value (NPV) of 95%. For prediction of in-hospital mortality or ICU stay ≥3 days, the PPV and NPV of a positive qSOFA were 21% and 93%, respectively.

Conclusions: Among cancer patients admitted to the ED with suspected infection, a positive qSOFA was associated with a much greater risk of ICU admission and hospital mortality. Its absence helped identify patients with low risk of such adverse outcomes.

26 | Alignment with indices of a care pathway is associated with improved survival: An observational population-based study in colon cancer patients

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Introduction: Causes of variations in outcomes from cancer care in developed countries are often unclear. Australia has developed health system pathways describing consensus standards of optimal cancer care across the phases of prevention through to follow-up or end-of-life. These optimal care pathways (OCP) were introduced from 2013 to 2014. We investigated whether care consistent with the OCP improved outcomes for colon cancer patients.

Methods: Colon patients diagnosed from 2008 to 2014 were identified from the Australian State of Victoria Cancer Registry (VCR) and cases linked with State and Federal health data sets. Surrogate variables describe OCP alignment in our cohort, across three phases of the pathway: prevention, diagnosis and initial treatment and end-of-life. We assessed the impact of alignment on (1) stage of disease at diagnosis and (2) overall survival.

Results: Alignment with the prevention phase of the OCP occurred for 88% of 13 539 individuals and was associated with lower disease stage at diagnosis (OR = 0.33, 95% CI, 0.24-0.42), improved crude 3-year survival (69.2% vs 62.2%; $P < .001$) and reduced likelihood of emergency surgery (17.7% vs 25.6%, $P < .001$). For patients treated first with surgery (n = 10 807), care aligned with the diagnostic and treatment phase indicators (44% of patients) was associated with a survival benefit (risk-adjusted $HR_{\text{non-aligned vs aligned}} = 1.23$, 95% CI, 1.13-1.35), better perioperative outcomes and higher alignment with follow-up and end-of-life care. The survival benefit persists adjusting for potential confounding factors, including age, sex, disease stage and comorbidity.

Conclusion: This population-based study shows that care aligned to a pathway based on best principles of cancer care is associated with improved outcomes for patients with colon cancer.

27 | Value for money of putting precision into practice: Germline genetic testing to guide olaparib treatment in HER2-negative metastatic breast cancer

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Aim: Genetic testing for germline *BRCA* mutation in women with HER2-negative metastatic breast cancer (MBC) can guide targeted treatment with poly-ADP-ribose polymerase (PARP) inhibitors (eg olaparib) and inform cancer prevention strategies (eg risk-reducing surgery) for family members of women who test positive. This study aimed to evaluate the cost-effectiveness of *BRCA* testing in women with MBC to inform olaparib treatment and cascade testing of family members.

Methods: A cost-effectiveness analysis was conducted using a decision analytic model from an Australian health-payer perspective. Two scenarios were evaluated compared with no testing and standard chemotherapy: (a) *BRCA* testing of women with MBC followed by olaparib if the test is positive; and (b) *BRCA* testing of women with MBC followed by olaparib and cascade testing of first- and second-degree family members if the test is positive. For each scenario, the incremental cost was compared with the quality-adjusted life-years (QALYs) gained to estimate the incremental cost-effectiveness ratio (ICER). Decision uncertainty was characterised using probabilistic sensitivity analysis.

Results: Scenario 1 resulted in an incremental cost of AU$11 607 and 0.04 QALYs gained (ICER = AU$277 000/QALY), whereas Scenario 2 resulted in an incremental cost of AU$12 575 and 0.12 QALYs gained (ICER = AU$105 000/QALY). At a willingness-to-pay threshold of AU$100 000/QALY and at the listed price of olaparib, none of the scenarios were cost-effective. Probability of being cost-effective was 0% and 40% for Scenario 1 and Scenario 2, respectively. Nevertheless, if olaparib price is significantly reduced by 60%, the two scenarios would become cost-effective, with Scenario 2 offering an additional AU$1100 in mean monetary benefit over Scenario 1.

Conclusions: Genetic testing for *BRCA* germline mutation to guide olaparib treatment in women with MBC is not cost-effective unless the price of olaparib is significantly reduced. Extending *BRCA* testing to cover family members of mutation carriers would provide additional benefits compared with testing affected women only.

28 | Factors associated with treatment type for prostate cancer patients in the 45 and Up Study, NSW

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Aim: We aimed to describe the patterns of care for prostate cancer patients in the 45 and Up Study and ascertain factors associated with type of treatment received.

Methods: There were 267 153 individuals aged ≥45 years in the Sax Institute's 45 and Up Study, a population-based cohort study in New South Wales (NSW). Participants completed a baseline questionnaire during 2006-2009, which included items on sociodemographic factors and was linked to administrative health datasets by the Centre for Health Record Linkage. Incident prostate cancer cases were identified from the NSW Cancer Registry to December 2010. Receipt of radical prostatectomy (RP), external beam radiotherapy (EBRT) and/or androgen deprivation therapy (ADT) were identified in the NSW Admitted Patient Data Collection (to June 2014) and/or the Medicare Benefits Schedule and/or the Pharmaceutical Benefits Scheme (both provided by the Department of Human Services to December 2014). Multivariable logistic regression was used to examine variation in treatment types by sociodemographic characteristics.

Results: A total of 2432 men had a new diagnosis of prostate cancer (median age: 69, range: 45-98; median follow-up 5.5 years, range: 4.0-8.9). The first treatment received was 40% RP (n = 979), 22% EBRT (n = 537) and 10% (n = 232) ADT alone. Of RP patients, 124 (13%) had a radiation oncology consultation recorded prior to surgery. From multivariable analysis, RP was associated with younger age ($P < .001$), regional stage ($P < .001$), being partnered ($P = .023$), having better performance status ($P = .003$) and having private health insurance ($P < .001$). EBRT receipt was associated with older age ($P = < .001$), higher stage ($P < .001$), living <100 km from a radiotherapy centre ($P = .007$), fewer co-morbidities ($P = .047$) and not having private health insurance ($P < .001$).

Conclusions: Prostate cancer patients were twice more likely to receive RP than EBRT. Very few RP patients saw a radiation oncologist prior to surgery. Type of treatment received varied by both health factors and sociodemographic characteristics.

29 | Cancer care 2040 – Meeting the global demand

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The pace of investment in cancer treatment has not followed the needs. Coverage is still poor and in some cases worsening, in parts of the world. By 2040, there will be 26 million new cases of cancer every year. About half of these cases will need radiotherapy, similarly half will need chemotherapy and about 55% will require surgery. Nearly 70% of cases will occur in low and middle income countries (LMIC) where increasing wealth will lengthen life expectancy and the ability to provide cancer treatments. Investment in cancer treatment will save lives and increase productivity. We estimate that it will cost $184 billion to scale up radiotherapy access in LMIC so that all patients can get access by 2035. This will save nearly 1 million lives per year and create a net benefit of $365 billion. For chemotherapy, the demand for cancer clinicians will increase from 65 000 worldwide to 100 000 by 2040. There are many barriers to the sustainable development of cancer services. Cancer control does not happen in isolation and requires functional government, health services, pathology and diagnostics. Small island states are poorly suited to the traditional models of service delivery because their small and dispersed populations.

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30 | Cancer and equality – The global view

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There are increasing evidence of unmotivated differences between groups of cancer patients, related to diagnosis, treatment, care and outcomes. The impact of socioeconomic inequalities in both cancer survival and other outcomes has been frequently reported during the last decades, even in countries whose cancer care system provide care without cost at the point of delivery. Availability to cancer screening and vaccinations, but also awareness among the general public are factors that will heavily impact the level of equality. Well-organised cancer prevention work and supportive care strategies could reduce these differences.

During this session, an overview of existing evidence will be presented and discussed. Experiences from primary and secondary cancer prevention programs and population-based research from the Stockholm-Gotland area of Sweden will be presented. The session will focus on interventions and what cancer care professionals can do to reduce inequalities in cancer prevention and care.

31 | Impact of environmental changes on cancer

Hubertus Jersmann

University of Adelaide, Adelaide, SA, Australia

Professor Jersmann will summarise the current state of Climate Change, it's main drivers and the general impacts on our planet including Human Health. Specific effects on certain cancers, such as skin, breast and lung and possible mechanisms for this effect of Climate Change will be highlighted. The wider implications of destabilisations of societies/economies and the effect of this on the future of cancer therapy in general will be discussed. To enable oncologists to do something about Climate Change several options for mitigation will be outlined.

32 | Maximising cure while minimising treatment in testicular cancer

Andrew Weickhardt

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Metastatic testicular cancer is a curable malignancy with cisplatin-based chemotherapy. However, some men develop platinum resistance, and despite high-dose chemotherapy die from their disease. Over the last 5 years, increased knowledge of the biology behind this phenomenon has led to opportunities for enhancing treatment intensity for this subgroup. On the other hand, population-based research has shed light on the ability to place many patients on simple surveillance after orchidectomy and sparing them chemotherapy-related side effects. The evidence behind these developments will be reviewed.

33 | What are the psychosocial challenges facing testicular cancer survivors and how can technology help to address them?

Ben Smith

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Testicular cancer (TC) is the most common form of cancer in young men (18-39). More than 95% of men survive TC, but psychosocial sequelae are common. Clinically significant anxiety (approximately one in five) and to a lesser extent distress (approximately one in seven), but not depression, are more prevalent in TC survivors than the general population. Approximately one in three TC survivors experience elevated fear of cancer recurrence (FCR). Up to two-thirds of TC survivors report unmet needs for help adjusting after TC, particularly regarding existential, relationship/sexual and financial/insurance issues. Poorer outcomes are more common in men who are single, younger, unemployed/low socioeconomic status, suffering from co-morbidities, experiencing worse symptoms/side effects and using passive coping strategies.

Men may be reluctant or unable to seek face-to-face help due to barriers including stigma, distance and cost. Innovative approaches to providing support are needed. TC survivors report positive attitudes towards eHealth and TC survivors with more unmet needs are more likely to engage in online TC communities. TrueNTH TC (Movember; truenth-tc.org) and e-TC 2.0 (PoCoG/ANZUP; e-TC.org) are two online resources designed to support men from testicular cancer diagnosis through to survivorship. TrueNTH TC aims to reduce anxiety and isolation by providing information and connections with TC survivors and clinicians. Testing of TrueNTH TC is ongoing. e-TC 2.0 is an interactive web-based self-management intervention that aims to reduce anxiety, depression and FCR in TC survivors reporting elevated psychological distress. A single arm phase I trial of e-TC 2.0 in 44 TC survivors found high (>8/10) self-reported acceptability of e-TC 2.0 and pre- to post-intervention reductions in borderline/clinical anxiety (79% vs 30%), distress (59% vs 44%) and FCR (39% vs 8%). However, the feasibility of e-TC 2.0 as a scalable tool to reduce psychological distress in TC survivors may be constrained by limited website usage.

34 | Endocrine consequences of treatment: Hypogonadism

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Testicular cancer is the most common solid tumour in men of reproductive age and as the 10 year survival rate exceeds 97%, long-term complications need to be considered. Primary hypogonadism, defined as low total testosterone levels with elevated luteinising hormone (LH) occurs in up to 20% of testicular cancer survivors and has been associated with increased risk of metabolic syndrome. In addition to

hypogonadism, impaired fertility may occur, often related to treatment intensity (particularly with chemotherapy). Independent of treatment, underlying risk factors for testicular germ cell tumours such as cryptorchidism may also be risk factors for hypogonadism or infertility.

Delineating symptoms attributable to hypogonadism are challenging, as many symptoms such as fatigue, decreased libido and mood disturbance are non-specific. Untreated hypogonadism may contribute to long-term osteoporosis and metabolic syndrome which predisposes to cardiovascular disease.

A decision to initiate testosterone replacement, which is often given lifelong, should be individualised. Benefits and potential risks should be carefully weighed and there is insufficient evidence to show that testosterone replacement is of benefit on metabolic syndrome. Studies in older men without cancer with mild hypogonadism have suggested that testosterone replacement may be associated with increased coronary atherosclerosis. Furthermore, as testosterone is a contraceptive, it should not be initiated in men seeking fertility without discussion with a fertility specialist. Nonetheless, men who have biochemical hypogonadism and clear symptoms should be considered for a trial of testosterone therapy and treatment should be ceased if no demonstrable benefit is achieved.

35 | Surgical advances: Robotic retro peritoneal lymph node dissection

Nari Ahmadi

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Introduction & Objectives: Robotic RPLND (R-RPLND) has been shown to be a viable alternative to open RPLND with lower perioperative morbidities, while maintaining the same oncological outcomes. Herein, we report our initial experience with R-RPLND at a single tertiary referral centre.

Methods: Retrospective review of our prospectively collected database was performed of all patient undergoing R-RPLND at our institution from May 2018 till September 2019. Demographic data, operative parameters, oncological and perioperative outcomes were examined. Intraoperative as well as 30 & 90 day post-operative complications were recorded using Clavien-Dindo classifications.

Results: Overall, 11 patients underwent R-RPLND during the study period. Primary pathology was NSGCT in 9 (82%), Seminoma and paratesticular embryonal rhabdomyosarcoma in 1 (9%) each. 9 (82%) of patients underwent prior chemotherapy with BEP and other 2 patients underwent primary RPLND. Preoperative staging was as following: IIA 2 (18%), IIB 5 (45%), IIC 4(36%). Nine (82%) patients underwent modified unilateral template resection and two (18%) underwent bilateral template resection.

Median age was 31 (14-39) and Median nodal count was 38 (28-65). Median operative time was 300 min (240-360) and Mean estimated blood loss was 100mls (30-1500) with no cases of blood transfusion. One patient required conversion to open surgery due to difficulty in resection and bleeding from IMA. Pathology results indicated teratoma in 5 (45%); necrosis in 4 (36%), Choriocarcinoma in 1 and embryonal rhabdomyosarcoma in 1.

Median return of bowel function was 1 day(1-2) and mean length of stay was 2 days(2-4). There were no early or late (30 & 90 day) post-operative complications. With median follow up of 9 months (1-18), there were no recurrences.

Conclusions: R-RPLND is technically a challenging procedure requiring advanced skills, however it is safe and feasible in selected patients and in a dedicated tertiary centres. The robotic approach offers promising early result with lower perioperative morbidity and length of stay. Larger cohorts and longer follow up is required to demonstrate safety and oncological equivalence to open RPLND.

36 | 50/50 – Comedian Michael Shafar's reflections on being diagnosed with testicular cancer

Michael N. Shafar

Michael Shafar, Melbourne, VIC, Australia

After five rounds of surgery and 24 weeks of chemotherapy, he was finally declared to be in remission. He has since toured his show 50/50 around Australia, which chronicles the entire experience.

37 | The patient perspective

Shona Edwards

Content not available at time of publishing

38 | Exercise and nutrition to treat adverse musculoskeletal effects of hormone therapy in prostate cancer

Steve Fraser

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Androgen deprivation therapy (ADT) is a commonly prescribed 'hormone' treatment for advanced or metastatic prostate cancer that has been shown to improve overall survival. However, treatment-induced hypogonadism is associated with a range of adverse effects, including an accelerated decline in muscle mass and strength, bone density and an increased fracture risk. Although exercise training is recommended to ameliorate some of these effects, the benefits on skeletal health are inconsistent and no known studies have examined the combined effects of exercise training with a nutritional supplement on skeletal health outcomes. Therefore, we conducted a 12-month randomised controlled trial investigating whether resistance training and weight-bearing exercise combined with a nutritional supplement could optimize musculoskeletal health in ADT-treated men.

We randomised 70 ADT-treated men (mean age: 71.3 ± 6.2 years) to exercise + supplementation (ExSuppl, n = 34) or usual care (CON, n = 36). The daily nutritional supplement included 25 g whey protein,

1200 mg calcium carbonate and 1000 IU vitamin D. Key outcomes included: DXA areal hip and spine bone mineral density (aBMD) and total body lean mass and fat mass; pQCT cortical and/or trabecular volumetric BMD, bone structure and strength at the distal (4%) and proximal (66%) tibia and radius; and muscle strength (leg press, chest press and seated row).

ExSuppl resulted in an 11% greater increase in leg press muscle strength compared to CON ($P < .05$), but had no effect on lean or fat mass, DXA aBMD or any pQCT bone outcomes. At 12-months, both groups experienced similar and significant losses of total hip and femoral neck aBMD (1.1-2.0%), distal radius trabecular vBMD (2.7-2.9%) and proximal tibia and radius cortical bone area (1.4-2.3%) and strength (2.1-3.5%). In conclusion, ADT-treated men who completed a 12-month multicomponent exercise program with daily consumption of a protein, calcium and vitamin D-enriched drink improved muscle strength, but not bone and muscle loss.

39 | The cardio-oncology burden is ever-present, so how can we affordably and feasibly assess cardiorespiratory fitness in every patient

David Mizrahi

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The cardio-oncology field has become an increasing focus among the management of cancer survivors. Despite the survival rate of most cancers increasing, cancer survivors experience an increased rate of cardiovascular diseases (CVD) such as ischaemic heart disease, heart failure and stroke compared with the general population. This is generally attributed to treatments such as chest radiotherapy, anthracyclines and methotrexate causing short- and long-term effects. With known potential cardiovascular risks from treatment, an important clinical focus is to prevent the development of CVD after treatment. Supportive care such as increasing physical activity is becoming increasingly supported in oncology clinics, with the Clinical Oncology Society of Australia recently releasing their first statement supporting exercise. Despite this increasing support, receiving individualised physical activity advice and assessing cardiorespiratory fitness are not standard-of-care in Australian cancer hospitals.

Having higher physical activity and cardiorespiratory fitness levels has been shown to reduce the risk of CVD in the general population, as well as improving many physical and psychological factors impaired by cancer treatment. There are multiple methods of assessing cardiovascular fitness, a modifiable CVD risk factor. The gold standard, Cardiopulmonary Exercise Test, requires maximal patient exertion, trained staff, a calibrated gas analysis system and a cycle ergometer or treadmill. Cardiorespiratory fitness can also be estimated, which reduces sensitivity but becomes more practical when large patients volumes are seen and resources are limited. Patients can be objectively monitored over time using submaximal exercise assessments including the 6-min walk test, 3-min step test and a submaximal cycle test. Further, patients can generally accurately self-perceive if they have high or low fitness. This information should be used to identify patients with low fitness to motivate them (and refer if necessary) to become more physically active and thus decrease their CVD risk.

40 | It's not all face to face: Digital delivery of exercise oncology

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For individuals with cancer, the disease and treatment can result in impairments that limit physical, psychosocial and cognitive functioning, interfering with patients' quality of life and ability to perform work-related functions.

Clinical trials published since 1983 have demonstrated that supervised exercise training prescribed during and/or after the completion of cancer treatments is safe and can counteract treatment-related side effects, and elicit many other physiological, functional and psychological benefits.

There are currently limited supportive care programs and services available for cancer patients and survivors in Australia, with recent research indicating that less than 1% of patients with cancer are currently accessing comprehensive, multidisciplinary rehabilitation program within hospitals. Further, the few existing programs rely largely on face-to-face delivery of services, reducing options for those who may be unable to attend due to location or time constraints. A large component of these programs is exercise therapy.

Clearly defined, integrated and patient-centred models of care will be required to deliver exercise services to a growing number of cancer patients; otherwise, such services may continue to remain peripheral to standard care and underutilised. Delivery and availability of exercise oncology services enabled by digital technology may offer considerable potential for improved reach, cost savings and improved health outcomes. Such services can be broadly characterised under Shaw et al's conceptual model, consisting of three core domains:

(1) Health in our hands: using digital technologies to monitor, track, and inform health, for example smartphones, tablets, clinical devices, mobile sensors and wearables, Apps, social media, and online information.

(2) Interacting for health: using digital technologies to enable health communication among practitioners and between health professionals and clients or patients, for example traditionally dominated by teleconferencing and videoconferencing, this domain increasingly includes a range of synchronous and asynchronous tools, such as SMS and push notifications from mobile applications, dedicated portals, social media platforms and virtual or simulated therapy tools.

(3) Data enabling health: collecting, managing and using digital health data, for example technologies that provided expanded knowledge and insights about the health and wellness of an individual, community or population.

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41 | International volunteering through ASCO – a Vietnam experience

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The International Cancer Corps [ICC] is one of the American Society of Clinical Oncology International Programs. ASCO supports Health Volunteers Overseas (HVO), to operationalise this program of partnering with low and middle income countries to strengthen cancer care in medical centres.

ASCO also has a range of Workshops with Volunteer International Faculty which pair with either individual hospitals or national Cancer Organisations. Topics include Multidisciplinary Cancer Management, International Clinical Trials, International Palliative Care, Cancer Control in Primary Care.

HVO/ASCO has current programs in Nepal, Bhutan, Honduras, Uganda and Vietnam. I have previously led the Hue program as well as joined multidisciplinary cancer workshops in Vietnam and the Philippines.

The Hue program had over 88 volunteers visit over five years. The average of four groups per year would over a 2-week period cover a particular organ cancer and its management. To achieve the goal of enhancing multidisciplinary care the stated goal of our hosts, we had a core of at least one medical, radiation and surgical oncologist and senior nurse practitioner/team. Often supplemented with palliative care, pharmacy, anatomical pathology and on one occasion each, psych-oncology and radiation therapy. The format included didactic lectures, participation in tumour boards, individual clinician visits to their clinics or theatre or radiation planning, daily ward rounds and demonstration multidisciplinary tumour boards involving local and visiting faculty with local cases prepared and presented.

Planning and implementation issues and the ongoing process of measuring outcomes are key issues. Of paramount importance is a joint approach to identifying realistic goals, in partnership with the host organisation and ensuring broad internal support and Champions within the local leadership in each targeted speciality. Cultural awareness is a key issue to be sensitive to in planning. The relative benefits of single craft group and multidisciplinary teams and development of a core faculty will be discussed. As will opportunities to link these programs with mentorship and career and research development of junior faculty, and new program directors from visiting volunteers.

The joys of interacting with an international multidisciplinary faculty are immense as is the delight of learning from our colleagues in other countries and understanding the challenges they face and overcome is both humbling and rewarding. Joining is easy, new volunteers are always welcome.

42 | Developing Oncology Services in Johannes Hospital, Kupang, West Timor

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West Timor is a western province of Indonesia. The Flinders Overseas Health Group (FOHG) is a not-for-profit organisation that has supported medical services in West Timor for over a decade. Recently, FOHG initiated efforts to develop cancer services at the Johannes Hospital in Kupang, the capital city of West Timor. The program involved training and supporting medical and nursing staff of the Johannes Hospital through sponsored training programs conducted at the Flinders Medical Centre. In 2015 and 2017, medical oncology, nursing and pharmacy representatives of FOHG traveled in West Timor. Local services were evaluated and areas of need were identified. Prioritisation of resources were considered, and sustainable system changes were recommend and supported. The promote change, FOHG advocated on issues of policy and process through hospital administration and local government. FOHG representatives also met with the Governor of West Timor in an effort to support the commencement of radiotherapy services in the region.

The initiatives of FOHG have promoted the following cancer service changes and improvements at the Johannes Hospital in West Timor;

- reorganisation of ward structure, creating palliative care area
- developing ordering system for chemotherapy drugs (communication between day unit and pharmacy)
- organised patient chemotherapy times in the day infusion centre, matching established 'cyclical' protocols.
- developing pharmacy impress and ordering system
- commencing multidisciplinary team meetings for case discussion
- supplying pathology diagnostic equipment
- training in transfusion medicine
- biomedical hazardous waste removal

A guide to optimising medical oncology services in under-resourced regions is being developed by FOHG.

43 | The APROSIG-National Cancer Centre Collaboration: Expanding access to radiation therapy in Cambodia

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The incidence of cancer is rising rapidly, with a global projection of 26 million cases annually by 2040; 70% of these will arise in low- and middle-income countries (LMICs).[1] Radiotherapy is a core component of cancer care and has been shown to be cost-effective.[2] However, there remains a huge deficit in radiotherapy services in LMICs, with the provision of resources inversely proportional to Gross National Income.[3] By geographic region, the Asia-Pacific has been demonstrated to have the highest absolute deficit in radiotherapy services[4] and the largest investments required to meet those needs. The Global Task Force in Radiotherapy for Cancer Control Lancet Commission demonstrated that in addition to the need for radiotherapy equipment, there is an urgent need for human resources.[2] At present, there is a shortage of in-country training pathways for radiotherapy professionals in many LMICs in the Asia-Pacific.

One such country facing a shortage of radiotherapy resources is Cambodia, which has one linear accelerator for a population of 16 million people. An exciting development has been a recently-built comprehensive cancer centre in Phnom Penh, the National Cancer Centre (NCC), which includes modern radiotherapy services. A major challenge for NCC has been workforce, given the specialized skills required and lack of formal training programs within Cambodia.

The Asia-Pacific Radiation Oncology Special Interest Group (APROSIG) of the Royal Australian and New Zealand College of Radiologists (RANZCR) has partnered with NCC, primarily in aiding with education and training of radiation oncology staff. APROSIG is a volunteer group which aims to support the safe and effective delivery of radiotherapy in neighbouring LMICs. Initiatives have included the organization of in-country Australian radiation therapist trainers in Cambodia for 6-15 months' duration and an observership program for Cambodian cancer professionals in Sydney; both programs supported by the Australian government.

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44 | DFAT pacific islands program: Building capacity and capability of an oncology unit in the Solomon Islands

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The Solomon Islands is a low income nation in the South Pacific with significant challenges in health care resourcing. The National Referral Hospital (NRH) in Honiara is the country's only tertiary referral hospital. There is limited availability of pathology and medical imaging services. There is only a small range of cytotoxics on the formulary. A scoping visit was carried out in 2016 funded by the John James Foundation with recommendations made to assist in the development of coordinated cancer services and to establish a medical oncology unit. This was followed by an observership visit to Canberra by an NRH doctor in 2017 supported by the Foundation. Following a request from the Solomon Islands Ministry of Health, the Australian Government Department of Foreign Affairs and Trade (DFAT) arranged a mission under the Royal Australasian College of Surgeons (RACS) Pacific Islands Programme (PIP) to the NRH with a team consisting of a medical oncologist, haematologist, oncology clinical nurse consultant and oncology pharmacist to help in the commissioning of the NRH Medical Oncology Unit in September 2018. The aims were to (a) create protocols and guidelines for procurement, storing, mixing, administration and disposal of chemotherapy agents suitable to NRH context; (b) to conduct training for health staff assigned to the new department on their respective responsibilities. The team with the assistance of an Australian Volunteers International (AVI) Pharmacist has helped the NRH staff to develop localised Solomon Islands Oncology Guidelines. Donated equipment and supplies have helped with the establishment of the service. Another DFAT Oncology mission visit was made in 2019 followed by two NRH oncology nurses coming to Canberra on observership. These collaborative initiatives have contributed to building the capacity and capability of the NRH Medical Oncology Unit to treat cancer patients.

45 | Developing a model for safe cytotoxic administration in the Solomon Islands

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The National Referral Hospital in Honiara is seeking to establish an oncology unit as part of a project to deliver cancer services in the Solomon Islands.

The cancer treatment room, like the rest of the hospital, suffers from a lack of maintenance. It has louvred windows, no air conditioning, badly rusted fans and the holes in the floor mean that the room is subject to flooding in the monsoon season. The working environment is cluttered with boxes stacked on trolleys and the floor due to there being no storage cupboards.

There are no basic temperature or blood pressure machines to check observations prior to giving treatment and weight scales are borrowed from the Medical Ward on an ad hoc basis. Imaging and pathology services are limited. Treatment can only be given via a peripheral cannula. Cannulas differ depending on which country provided them and there are no bifurcated lines. Intravenous saline and 5% glucose are not available in the volumes normally used for cancer treatment and there are no pumps or giving sets. Not all drugs are available, thereby limiting the protocols that can be used.

The treatment room is staffed by only one registrar and two nurses, none of whom have been given any specialised training in the delivery of cancer treatment. There is no cover if the doctor or one of the nurses is absent for any reason. Providing training and advice and support to the staff remotely is hampered by the patchy availability of internet services.

This presentation describes the approach to developing a model for the safe administration of cytotoxic drugs. The model will use protocols that have been adapted to make best use of the equipment, supplies and drugs available, while minimising wastage. The model will also address staff training and succession planning.

46 | The what, when and how of stereotactic ablative body radiotherapy for oligometastatic prostate cancer

Marcus Dreosti

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Oligometastatic prostate is a hot topic and an area of growing interest in daily urological oncology practice, mandating a multidisciplinary team approach. It is however variably defined and high-quality evidence guiding optimal management is limited. The initial question is how best to define this state, as prognosis will be dependent on the imaging modality used (conventional vs functional), the tissues involved (nodal vs bone vs visceral), the tempo of disease and the number of lesions detected (1 vs 3 vs 5 vs more). Timing is also critical, given that the oligometastatic state can be detected either at diagnosis (synchronous) or following local treatment (metachronous). There are options regarding the integration of local treatments with systemic therapy and consideration must be given to defining relevant endpoints. There are also technical challenges associated with delivering ablative or potentially immuno-stimulatory radiotherapy to such lesions. Here, we will explore the biology, technology and ongoing clinical trial activity around the use of stereotactic ablative body radiation (SABR) techniques in the oligometastatic state of prostate cancer.

47 | Prostate SBRT: Is it ready for prime time?

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Stereotactic body radiation therapy (SBRT) involves extreme hypofractionation whereby a high dose per fraction, and an overall lower number of fractions than conventional radiotherapy, is used for treatment. Advanced treatment delivery platforms, incorporation of MRI into target localization, motion management and real-time image guidance, is required for optimal prostate SBRT delivery. Large published series report long-term data of SBRT regimens giving four to five radiotherapy fractions for low and intermediate risk prostate cancer patients. These data support prostate SBRT having similar efficacy and toxicity to conventionally fractionated radiotherapy. One recent randomised study comparing conventional fractionation with prostate SBRT reported equivalent tumour control, as well as acute and late toxicity, whereas several other randomised studies are currently underway exploring similar stereotactic regimens. In response to this growing body of evidence, international guidelines have incorporated prostate SBRT monotherapy as a treatment option for centres experienced in this technique for low and intermediate risk prostate cancer patients. However, the role of SBRT in the management of high risk prostate cancer remains to be determined, including questions of efficacy in this patient cohort, the role of dose escalation, optimal fractionation regimens and the tolerability and efficacy of whole pelvis radiotherapy incorporated in SBRT courses. The next decade will see a major shift toward extreme hypofractionation in the management of prostate cancer.

48 | Evolving molecular imaging and radionuclide therapies in prostate cancer

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The last decade has seen the development and implementation of molecular imaging techniques that are changing the management paradigms of prostate cancer. Despite widespread clinical acceptance in countries such as Australia and Germany, these imaging agents have yet to obtain formal regulatory approval in most countries and also their role in various clinical scenarios has yet to be fully determined. These new targeted imaging agents have also directly lead to the development of targeted therapeutic agents using beta emitters such as Lutetium-177 and now alpha emitters such as Actinium-225. This dual imaging-therapy paradigm is known colloquially as Theranostics, though the principles of this branch of medicine date back to Iodine-131 therapy used for imaging and treating thyroid cancer since 1943. In this symposium, we will explore the development and emerging role of molecular imaging in the management of prostate cancer and also the growing body of data on the use and potential role of targeted radionuclide therapies, such as Lu-177 PSMA and Ac-225 PSMA, in the management of advanced (and not so advanced) prostate cancer.

Learning Objectives: To better understand the role of the new molecular imaging agents (Ga-PSMA, F-PSMA and similar analogues) in the management of prostate cancer patients.

To consider the role of targeted radionuclide imaging and therapy in current and future management of prostate cancer.

To update on the new advances in this area (eg Ac-225 PSMA and combination therapy) and ongoing clinical trials in this space.

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49 | International experience with lutetium- and actinium-based radionuclide therapies in prostate cancer: Current state of clinical practice and future directions

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Prostate-specific membrane antigen (PSMA) is expressed in poorly differentiated prostate cancers and can be identified by PSMA-ligand PET imaging with subsequent PSMA-based radioligand therapy (PRLT) following the principle of Theranostics.

Retrospective observational data report favourably on the efficacy and safety of PRLT with beta-emitting Lutetium-177 (^{177}Lu). Results from a prospective phase-II clinical trial (LuPSMA) have confirmed high response rates, low toxicity, symptomatic pain relief and improvement in the quality of life of patients with metastatic castration-resistant prostate cancer and treatment-refractory progressive disease. Compassionate use based observational studies and meta-analyses have reported the efficacy of ^{177}Lu-PRLT with a biochemical response (PSA decline >50%) in more than half of the patients, and imaging-derived partial response in about one-third of patients. Presence of visceral metastases and serum alkaline phosphatase ≥220 U/L is associated with poor outcome.

Reports of safety analysis following ^{177}Lu-PRLT demonstrated grade 3-4 hematotoxicity in less than 10% of patients. Other clinical symptoms observed include fatigue, xerostomia, nausea and exacerbation of pain syndrome due to 'flare phenomenon'.

Actinium-225 (^{225}Ac)-based PSMA alpha radioligand therapy (PSMA-ART) utilizes the shorter tissue penetration range of the higher energy alpha particles. It is performed in patients with extensive lymph node, visceral or bone and bone marrow metastases, and sometimes as an escalation therapy in case of disease progression under ^{177}Lu-PRLT.

TANDEM (^{177}Lu/^{225}Ac) PRLT is the approach of administering fractionated activities of both beta- and alpha-emitting radiation during the same cycle in order to maintain the therapeutic effect while attempting to avoid severe and treatment-limiting xerostomia, which could result as an adverse effect of ART with ^{225}Ac.

Future developments are aimed at reducing side effects caused by radioligand therapy, combination therapies, dosimetry studies, application of novel radioligands and radioisotopes as well as novel imaging hardware and software, and most importantly, randomised controlled studies.

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50 | Feasibility of collecting patient-reported outcomes (PROs) from CALD populations: Experience of Arabic immigrants with cancer

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Background: Systematic monitoring of patient-reported outcomes (PROs) is increasingly important in patient-centred care. However, widespread collection and integration into clinical practice remains a challenge, particularly among culturally and linguistically diverse (CALD) patients with limited English proficiency. This is the first study to compare the feasibility and acceptability of ePRO screening as part of routine clinical care among Arabic versus English-speaking patients diagnosed with cancer.

Methods: Patients receiving care at Liverpool and Wollongong Hospitals were recruited in clinic and invited to complete PRO assessments

(Distress Thermometer and Problem List [DT], Edmonton Symptom Assessment Scale [ESAS-r]) in their preferred language on two occasions, 4 weeks apart, followed by an evaluation survey. Assessment #1 was completed on a tablet in-clinic, with option for completing Assessment #2 on a tablet or paper. A mixed method approach was used to evaluate feasibility and acceptability.

Results: Overall, 55 patients (36% Arabic, 64% English speaking, mean age 62 years, 67% female) completed 105 PRO assessments and 46 evaluation surveys. Satisfaction with the PRO assessment items varied between groups (50% Arabic, 75% English). Arabic speaking patients had difficulty understanding survey instructions (50%) and using the tablet (60%), with 95% requiring assistance to complete Assessment #1. Arabic patients expressed greater concern about privacy (22% vs 0%; $P = .02$) and who would access and view responses (33% vs 4%; $P = .01$). The majority (73%) of Arabic-speaking patients elected to complete Assessment #2 on paper, with 95% (19/20) indicating lack of regular access to or use of email to complete assessments outside of the clinic.

Conclusions: Sustainable implementation of PROs in clinical care is challenging. Although acceptability and feasibility of implementing PRO screening was high among English-speaking patients, screening among Arabic-speaking patients presented several challenges. Development and evaluation of targeted strategies to better support CALD populations overcome these linguistic and cultural barriers is needed.

51 | Barriers and facilitators of implementing a web-based infertility risk prediction tool (FoRECAsT) for young breast cancer patients into clinical practice

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Aim: Current tools to predict fertility outcomes after breast cancer treatments are imprecise and do not offer individualised predictions. To address the gap, we are developing a novel web-based infertility risk prediction tool (FoRECAsT) for young breast cancer patients. The aim of this study is to identify the barriers and facilitators for patients and health care providers in implementing the FoRECAsT tool into clinical practice

Methods: A purposive sample of 12 breast cancer patients, six breast surgeons, nine medical oncologists, nine fertility specialists, 12 breast care nurses and two fertility preservation nurses participated in semi-structured in-depth telephone interviews. A constant comparison thematic approach was used to analyse the interviews.

Results: Data were categorized into five main themes: interest in using the FoRECAsT tool; user attributes; access and confidentiality; impact on consultation; and anticipated fertility-related outcomes. A total of 14 sub-themes emerged. Patients identified a need for information regarding post-treatment fertility outcomes. Clinicians and patients both indicated that a comprehensive web-based tool that provided an accurate prognostication about the risk of future infertility would facilitate the use of the tool in clinical practice and result in better management of expectations. The clinical use of the tool would ultimately help patients to make a good quality fertility preservation decisions and be supportive in principle. Barriers included the challenges in inputting clinical data that would be collected at a different time in the treatment process, the responsibilities of clinicians and patients in using the tool, and where and when the tool might be used in the treatment trajectory.

Conclusion: Designing the FoRECAsT tool in consultation with patients and clinicians increases the likelihood that it will be used in clinical practice. Design considerations include taking into account the facilitators and barriers identified in this study.

52 | How can digital health be used to improve outcomes in pancreatic ductal adenocarcinoma (PDAC)? Examining the potential of the PURPLE translational pancreatic cancer platform

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Background: The PURPLE translational registry supports analysis of large amounts of structured clinical and molecular data from routine clinical practice, into a single collaborative data repository. We explored whether, by utilising digital health technology, we could potentially enable big data insights into PDAC.

Methods: The PURPLE translational pancreatic cancer registry is a collaborative effort among 27 institutes, employing an electronic web-based platform for entry of key clinicopathological and outcome data on consecutive patients with PDAC. This federated platform allows de-identified data to be combined and analysed for research purposes, whilst maintaining privacy, confidentiality and data security, with the goal of supporting clinical, genomic and translational research.

Results: Between January 2016 and June 2019, 1279 PDAC patients with >400 matched biospecimens, 369 resections and 486 biopsy specimens have been entered in PURPLE. Median age at diagnosis was 69 (range 20-94 years), and 681 of 1279 (53%) were male. Overall 754 of 1279 (59%) patients presented with localised disease; 350 of 1279 (27%) were deemed resectable, 148 of 1279(12%) borderline resectable and 247 of 1279 (20%) unresectable. A further 445 of 1279 (35%) were metastatic and 80 (6%) were not fully staged. Targeted molecular sequencing performed in 143 PDAC patients identified mutations in *KRAS* in 131 (92%), *BRAF* in 1 (1%), *TP53* in 72 (71%), *CDKN2A* in 41 (41%) and *PIK3CA* in two (2%). *BRCA/BRCA*-like signatures were identified in five of 75 cases undergoing Genome Sequencing (WGS). Since September 2019, 20 WGS cases were reviewed by the Molecular Tumour Board and Precision Oncology Program at the Victorian Comprehensive Cancer Centre. Research in circulating tumour DNA, biomarkers and organoid models is also being supported by the PURPLE translational pancreatic cancer platform.

Conclusion: The comprehensive data collected in the PURPLE registry support a broad range of research focused on precision oncology, including linking molecular data that can help identify candidates for targeted interventions.

53 | The Patient-reported Experience (Cancer) Questionnaire: Development, validation, reliability testing …. and on to system-wide digitisation

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Background: Patient-reported experience measures in cancer care ideally capture hospital performance in six domains advocated by the Institute of Medicine (IOM):

1. Respect for patient needs and preferences
2. Care coordination
3. Information and education provision
4. Physical support
5. Emotional comfort
6. Involvement of significant others.

The Patient-Reported Experience-Cancer (PRE-C) instrument was developed to capture these variables and inform responsive cancer service delivery.

Aim: To determine PRE-C reliability ($\alpha \geq .7$); to establish PRE-C convergent and divergent validity.

Method: The PRE-C was developed with cancer patients and clinicians. Face and content validity were tested with 30 patients and 10 clinicians. Items were revised according to their feedback until a 28-item questionnaire was ready for psychometric testing. A sample size of 280 was needed to determine reliability.

Exploratory factor analysis (EFA) examined the PRE-C's dimensionality. Maximum likelihood was used for extraction, with direct oblimin rotation examining correlation between constructs.

Results: A total of 414 consecutively recruited ambulatory chemotherapy patients from a single tertiary hospital participated. EFA indicated that six of the 28 items were problematic – some fitted better in other domains and some did not measure as intended. Particularly problematic were items that explored respect for cultural preferences and the financial impacts of treatment. Removing these items and re-running the EFA indicated reliability (α in the six domains ranging from .73 to .81).

Discussion: The revised PRE-C instrument reliably and accurately captured all IOM constructs. It is also important that the PRE-C cap-

tures the financial and cultural experiences of cancer patients. To this end, we have revised the problematic items and are currently testing the PRE-C with ambulatory patients in three large health services, anticipating N > 280 for a new EFA and >300 for subsequent confirmatory factor analysis. We are also preparing the instrument for digital embedment to enable routine, responsive data capture.

54 | Impact of age on drug utilization and survival outcomes in advanced colorectal cancer

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Introduction: Forty per cent of newly diagnosed colorectal cancer (CRC) patients are aged over 75 years. However, often elderly patients are underrepresented in clinical trials; resulting in limited evidence-based data to assist clinicians in making clinical decisions. Investigating drug deliverance in real world populations is vital in the extrapolation of clinical trial data to the diverse CRC real world population.

Aim: This study aimed to investigate the effect of patient age on quality use of medicine and outcomes using a linked data set of real world stage IV CRC patients.

Methods: Records from Queensland's CHARM oncology prescribing database were linked to external QLD health data collections from four hospital sites between 2009 and 2018. Statistical analysis was used to investigate relationships between patient age and the prediction of drug utilisation and survival.

Results: Overall 25% of the 589 mCRC patients were aged ≥75 years. Elderly patients recorded a comparable overall survival (OS) when compared with young counterparts (17.9 vs 22.3 months, $P = .292$). Patients aged ≥75 years were less likely to receive beneficial triplet therapy as first line therapy when compared to younger patients (16% vs 38%, $P < .0001$). Elderly patients were also more likely to be dose reduced at the initiation of first line treatment compared to younger counterparts (65% vs 31%, $P < .0001$). Within the elderly cohort, such dose-reduced patients and those dosed appropriately reported comparable OS outcomes (18.1 vs 15.9 months, $P = .796$). Dose-reduced elderly patients were however significantly less likely to experience therapy de-escalation (13% vs 29%, $P = .036$) and less likely to experience a dose reducing toxicity event throughout their first line of therapy (29% vs 57%, $P = .002$).

Discussion: Although age appeared to influence treatment selection and decision making, survival outcomes were found comparable between elderly and younger mCRC patients.

55 | The Australasian tele-trial model – Access to clinical trials closer to home using tele-health

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Background/Objectives: The Australasian tele-trial model (ATM) developed by the Clinical Oncology Society of Australia (COSA) uses existing literature on tele-oncology to articulate a comprehensive framework for the use of tele-health to enable clinicians from larger centres (primary sites) to enrol, consent and treat patients on clinical trials at regional and rural centres (satellite sites).[1] The benefits are not limited to regional areas, with the same model having the potential to connect larger centres (even within the same city) and improve the rate of recruitment to highly specialised trials such as those for rare cancers.

Methods: COSA is leading a project to pilot the model in New South Wales, Victoria and Queensland at regional, rural and metropolitan sites. Five primary sites have received funding through the project to implement the model and the project has supported state-wide implementation of the ATM in Queensland.

Results: Currently three tele-trials are open in New South Wales, one in Victoria and three in Queensland and more than 50 patients have been recruited to tele-trials. Trials are sponsored by industry, cooperative trials groups and investigators. No ethical or safety issues have been raised. Eight new staff have received GCP training and staff have welcomed the inter-site collaboration.

Tele-trial SOPs, supervision plans and subcontracts have been developed and submitted for National Mutual Acceptance. In Queensland, a Health Service Directive will incorporate the ATM into Queensland Health policy.

Conclusion(s): The ATM has been successfully piloted within New South Wales, Victoria and Queensland enabling improved access to clinical trials for regional and rural patients. Increased accessibility to clinical trials and greater participant recruitment also improve collaboration and networking among regional, rural and metropolitan centres, enhance workforce development and improve adherence with guideline recommended care through greater engagement in research activity. This may lead to reduced disparity in cancer outcomes for geographically dispersed populations.

1. COSA. Australasian tele-trial model: access to clinical trials closer to home using tele-health. Sydney, Australia: COSA; 2016.

56 | My health record and beyond: Harnessing the modern information revolution

Angela Ryan

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Digital information is the bedrock of high-quality healthcare. The benefits for patients are significant and compelling: hospital admissions avoided, fewer adverse drug events, reduced duplication of tests,

better coordination of care for people with chronic and complex conditions, and better-informed treatment decisions. Digital health can help save and improve lives. This session will describe recent advances in Australia's national digital infrastructure, including the My Health Record system, in the context of cancer care.

57 | If PROs were a drug, the public would demand immediate implementation! The case for PROs reducing costs and variations in care

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Routine assessment and clinical utilisation of patient-reported outcomes (PRO) is acceptable to patients and care providers, and significant impacts on patient and survival outcomes, and reduced emergency department (ED) presentations in specific patient populations have also been demonstrated. Despite these effects, PRO collection and use has not been systematically adopted as part of routine care in Australia.

The PROMPT-Care eHealth system was initially developed in 2013 to facilitate PRO data capture from cancer patients, data linkage and retrieval to support clinical decisions, patient self-management and shared care. Research has demonstrated the system to be acceptable, feasible and effective in reducing ED presentation in subgroups of patients. However, to date, the patients utilising the PROMPT-Care system have largely been compliant, health-literate, motivated and able to complete the assessment in English. Furthermore, although PROMPT-Care achieved full integration into the electronic medical record, lack of such integrated systems could be a barrier for widespread adoption of systems like PROMPT-Care.

Despite the challenges, the potential benefits of well-implemented PRO systems are significant and cost to the patient and health system, having clear, evidence-based, care pathways and actionable recommendations in response to above-threshold PRO scores, which not only facilitate PRO integration into the clinical workflow, but can also reduce variations in care. Identifying and addressing patient needs in a systematic, timely manner can reduce the overall burden and cost to the patient and to the health care system.

The PROMPT-Care program was funded by Cancer Institute NSW, Bupa Health Foundation, South Western Sydney Local Health District, Wollondilly Health Alliance

The PROMPT-Care team also includes: Geoff P. Delaney, Ivana Durcinoska, Anthony Arnold, Nasreen Kaadan, Andrew Miller, Joseph Descallar, Orlando Rincones, Sandra Avery, Martin Carolan, Stephen Della-Fiorentina, Kenneth Masters, Weng Ng, Tiffany Sandell, Thomas T. Tran, and Martha Gerges.

58 | How can mobilization of health data and application of AI inform decision making in cancer care?

Tim Shaw

The University of Sydney, Sydney, NSW, Australia

There are increasingly large volumes of data being collected within electronic health records and other repositories that include increasingly large volumes of data regarding the delivery and outcomes of cancer care. The potential to mobilise this data to impact on care delivery and patient outcomes is considerable but yet to be fully realised. Key to this realisation is the engagement of clinical teams and organisations in the co-creation of systems of clinical engagement including tools and resources. This presentation will explore key issues that underlie the successful development of data mobilisation programs. This will include a presentation of results and findings from the application of data resources in Western Sydney LHD including dashboards for clinical teams, linking of data to clinical reasoning in medical oncology and the use of electronic health data to trigger just in time learning.

59 | Issues and limitations that arise with digital health

Trish Williams

Flinders University, Adelaide, SA, Australia

Digital health transformation has the potential to revolutionise how we deliver healthcare, facilitating improved value-based, patient-centric care. But, should we be concerned about the impact of digital health on clinical oncology? What will be the impact of digital health on the safety and quality? How much disruption will we be able to tolerate?

60 | Introduction: End of life care is about more than euthanasia

Peter Allcroft

Flinders Medical Centre Southern Adelaide Palliative Services, Bedford Park, SA, Australia

Content not available at time of print.

61 | Organisational readiness for legislated VAD – Reflections on the lessons learnt and experience gained

Mark Boughey

St Vincent's Hospital Melbourne, Fitzroy, VIC, Australia

A dynamic, changing and evolving health care system will always be influenced and affected by government's legislated changes. However, legislation that fundamentally changes clinical practice and challenges the moral framing of health care professionals' personal and professional ways of working and intentions of care brings considerable organisational pressures, challenges and anxieties. At St Vin-

cent's Hospital Melbourne, at the five months mark since the enactment of the Voluntary Assisted Dying legislation in Victoria, organisational readiness, has proven to be the backbone of working in such change, helping to contain and work with the stress points, allow clinical staff to feel supported and help our services navigate these uncharted waters. In this presentation I will explore with you the experiences gained and reflect on lessons learnt that may indeed provide ideas and understandings for those whose states and territories are focussing on similar challenges.

62 | Voluntary assisted dying: How does palliative care respond?

Helen Walker
Salhn, Norwood, SA, Australia

How to respond to Victoria's legislation and other developmental legislative activity in WA, Qld and South Australia has presented challenges for the palliative care sector. In determining its position, the Board of PCA has embarked upon a comprehensive process including an international literature review, international study tour, publishing of reflections and learnings from this tour, guiding principle development and finally the launch of a new position statement on euthanasia and voluntary assisted dying.

Helen will, as part of this panel, outline this journey the palliative care sector has been on to inform its position.

63 | Experience implementing VAD in Victoria

Speaker TBC
Affiliation, to be confirmed

Content not available at time of publishing

64 | Medicines in paediatric oncology – A family matter

Hayley Vasileff
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Background: Erwinia asparaginase is a chemotherapy medication for the treatment of patients with Acute Lymphoblastic Leukaemia who have previously had a hypersensitivity reaction to E. coli-derived asparaginase. There is little published information regarding the emetogenicity of erwinia asparaginase and it is not included in current international antiemetic guidelines.

Aim and Method: This study retrospectively assessed and compared the incidence of nausea and vomiting in paediatric patients receiving intravenous and intramuscular erwinia asparaginase from 2008 to 2017 in a tertiary hospital. Case notes were reviewed for the first course of erwinia asparaginase for each patient and the data collected included the dose, infusion time, concurrent chemotherapy medications, use of anti-emetics, and the incidence and severity of nausea and vomiting.

Results: Fourteen patients received erwinia asparaginase intravenously and 19 patients intramuscularly. Vomiting occurred with 1 or more doses in 57% of patients administered erwinia asparaginase intravenously compared with only 16% of patients who had intramuscular administration. More than 1 antiemetic was administered for 26% and 4% of total doses of intravenous and intramuscular erwinia asparaginase respectively. There was no correlation between nausea with or without vomiting and other chemotherapy agents administered concurrently for all patients.

Conclusions: In our cohort, nausea and vomiting was a common side effect of erwinia asparaginase with multiple antiemetics often required. Erwinia asparaginase administered intravenously had a much higher incidence of emesis than when administered intramuscularly. The incidence of vomiting in these patients suggests that erwinia asparaginase administered intravenously may be classified as at least moderately emetogenic, whereas intramuscular doses may be classified as having low emetogenic potential. These findings should be validated in other centres and/or prospectively to allow guidelines to be updated to include recommendations for antiemetics for erwinia asparaginase.

65 | Engaging adolescent and young adult (AYA) cancer patients: Challenges or opportunities?

Alexandre Chan
[1]*National University of Singapore, Singapore, Singapore*

The adolescent and young adult (AYA) population comprises patients who are at major milestones of their lives with multiple familial and societal responsibilities and roles, and least expect themselves to be ill, much less burdened with cancer. In the literature, studies have highlighted numerous areas that have significant impact on AYA's health-related quality of life, including symptom burden, issues of employment and education, sexual identity and social isolation from peers. The physical and psychosocial toxicities of disease and treatment are made more challenging by the significant changes and life events attendant to AYAs. Hence, there is a clear need for dedicated programs that are designed to address AYA cancer patients' health concerns. At National Cancer Centre Singapore which is the largest ambulatory cancer centre in Singapore, an orientation program that is designed to target AYA cancer patients has been initiated since 2017. In this talk, we will discuss the role that an oncology pharmacist plays in this program, as well as the challenges and opportunities that an oncology pharmacist faces from this program and what we can learn from engaging AYA cancer patients.

66 | Medicine(s) matter(s) in the older patient: Understanding, counselling and health literacy

Jenny Casanova
Flinders Medical Centre, Adelaide, SA, Australia

Patients who are older than ever before are now being given chemotherapy – which was once restricted to under-60s- or

immunotherapy. Many have challenges relating to cognitive impairment (e.g. delirium and early dementia), and the burden of medication-related problems renders these issues more complex. Some patients display little interest in receiving further information about their condition, possibly because they are overwhelmed. Other patients may have well-meaning family and friends who perform an internet search but don't fully comprehend the information they have retrieved. Numerous papers regarding patient health literacy and comprehension of medical/pharmaceutical information have been published over the years, demonstrating that up to 80% of information provided is not retained by patients and assessing their comprehension of that which is retained is not straightforward.

This interactive presentation will discuss challenges facing the pharmacist counselling an older patient who is receiving cancer therapy and associated supportive care medications. Various educative and recall strategies will be discussed. A 'triage' approach can determine the information patients have already received from other sources and their retention of this. Consideration may be given to deprescribing non-essential medications in order to minimise pill burden, but this needs to be done with sensitivity.

67 | Mastering patient education

Lisa McLean

eviQ, Eveleigh, NSW, Australia

Cancer patients and their carer's education needs are high. Education may be less effective in patients who experience high anxiety levels secondary to a cancer diagnosis. Lower health literacy adds to confusion and this cohort of people is vulnerable to inappropriate information.

A total of 59% of the Australian population aged 15-74 are considered to have low health literacy levels.[1]

Low levels of health literacy and health knowledge in patients are associated with increased rates of hospitalisation and use of emergency care, reduced ability to interpret labels and take medications properly, reduced ability to interpret health messages and poorer knowledge about own disease or condition.[2]

Changing the way health professionals deliver patient information to respond to differences in patient health literacy levels can lead to positive change in behaviours, improved health status, reduced anxiety and improved self-management of treatment-related side effects and complications.

Simple, practical education strategies such as practicing universal health literacy precautions, personalising information and the incorporating the teach-back method are effective in supporting the information needs of patients and are easily embedded in clinical practice.

1. Australian Bureau of Statistics. *Health literacy, Australia*. Belconnen, Australia: Australian Bureau of Statistics; 2006.
2. Australian Commission on Safety and Quality in Health Care. *Health literacy: taking action to improve safety and quality*. Sydney, Australia: Australian Commission on Safety and Quality in Health Care; 2014.

68 | The promise and peril of social media for clinicians, researchers and patients

Stacy Loeb

New York University and Manhattan Veterans Affairs Medical Center, New York, New York

The use of social media in medicine has rapidly increased. Social networks are used by clinicians for many purposes, including clinical case discussions, professional networking, advertising their practice, and patient education. Researchers are using social media for recruitment and dissemination of research, and as a source of data. Patients are also using social media as a source of information on health conditions, although there is a significant amount of misinformation. In this lecture, we will discuss the pros and cons of social media use by clinicians, researchers and patients.

69 | Implementing digital health for assessing and responding to clinical anxiety and depression (ADAPT)

Phyllis Butow[1], Heather Shepherd[1], Joanne Shaw[1], Lindy Masya[1], Liebeth Geerligs[1], Nicole Rankin[2], Jessica Cuddy[1], Fiona Davies[1], Haryana Dhillon[1]

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Introduction: Digital health promises to facilitate delivery of clinical pathways (CPs) through use of automatic processes to minimise staff burden. The ADAPT Program uses a digital health solution, an online portal, to implement a CP for anxiety and depression (A/D) in cancer patients in 12 NSW Oncology services, tailored to accommodate local resources, preferences and workflow. This analysis explored the strategies staff reported using to successfully implement the CP.

Methods: Within a cluster randomised trial where sites implement ADAPT for 12 months, we gathered quantitative and qualitative data from all staff prior to ADAPT going live, and at 6 and 12 months, and interviewed psychosocial staff about iCanADAPT. After eight engagement sessions with each site to tailor the CP and clarify staff responsibilities, staff attend training using the portal. Online education in screening and assessing A/D and making psychosocial referrals is available to all staff. An online cognitive behavioural therapy program (iCanADAPT) was available to patients with mild to moderate A/D. Local data on ADAPT screening results and processes are made available to each site.

Results: To date (July 2019), 1305 screening events have been completed (653 first and 652 repeat screens). Five of six sites who have completed the study elected to continue using ADAPT in routine care. Uptake of online training has been low (due to lack of dedicated time)

as patient referrals to iCanADAPT (due to unfamiliarity with and mistrust of online therapy). Staff needed tailored training on the portal. Little technical support has been required. Staff interviews revealed the importance of addressing (a) evidence (staff perceptions), (b) context (culture and staff support) and (c) facilitation (intervention fit, familiarisation, engagement and burden).

Discussion: Tailoring and flexibility of intervention content and process, and of implementation strategies, are essential to ensure successful implementation and long-term sustainability of digital interventions.

70 | Using digital behaviour change tools to help cancer survivors adopt and maintain regular exercise

Camille Short

Faculty of Medicine, Dentistry, and Health Sciences, University of Melbourne, Melbourne, VIC, Australia

Providing exercise support to cancer survivors is now recommended as a key cancer recovery strategy. This is reflected in the 2018 position statement of the Clinical Oncology Society of Australia, which states that best practice cancer care includes referral to experienced exercise physiologist or physiotherapist with oncology expertise.

Unfortunately, Australia is currently unable to implement this recommendation equitably at a population level. For many people, access to exercise physiology and physiotherapy is limited by geographical isolation, limited services and/or inability to pay.

Digital health interventions delivered via apps, websites and wearable sensors have the potential to improve the scale and scope of exercise oncology services in Australia. However, innovative research is needed to embed tailored exercise prescription and supervision options into digital models of care, and to encourage sustained participation in the prescribed exercises. This will require multi-disciplinary input, drawing on evidence and theory from both exercise and behavioural science and the lived experience of cancer survivors.

This presentation will showcase several digitally based intervention models that could be utilised in practice to increase access to multidisciplinary exercise support across the cancer care continuum.

71 | Web-based psychological interventions for cancer-related distress

Lisa Beatty

Flinders University, Adelaide, SA, Australia

Aim: Clinically significant psychological distress is prevalent among 30-40% of patients after cancer diagnosis, and impacts on medical, quality of life and health service outcomes. However, numerous access barriers to uptake exist, including workforce shortfalls, geography for those residing rurally and personal preferences/stigma. Online delivery of cognitive behaviour therapy (CBT) holds promise for overcoming some of the access barriers to conventional therapist-administered psychosocial interventions in cancer. We conducted a multiphase program of research to develop and evaluate a 6-module/6-week online program ('Finding My Way').

Methods: The program of work comprised a phase I pre-post feasibility trial (n = 12); a phase II single site pilot RCT (n = 60); and a phase III multisite RCT of heterogeneous cancer patients treated with curative intent (n = 191) recruited between October 2013 and November 2015, and randomised to receive either the intervention or attention control. We then subsequently implemented the program into routine clinical and community practice, and collected uptake and adherence data over a matched timeframe to the clinical trial.

Results: Phases I and II outcomes supported the feasibility and potential efficacy of the program. The phase III RCT demonstrated an uptake rate of 41%, moderate-to-high adherence and high satisfaction rates (82%). *Finding My Way* led to reduced health service utilisation at post-treatment, and improved emotional functioning at 3-month follow-up. Ongoing implementation has had similar uptake, but lower adherence than during the clinical trial. FMW is currently being piloted for feasibility among women receiving endocrine therapy in the United States (n = 12), with data to date suggesting high usage and resulting improvements in depression symptoms. Our group has recently developed Finding My Way-Advanced – an adaptation for women with metastatic breast cancer – which is currently undergoing usability testing. Updated results of these latest trials will be presented.

Conclusion: This research program demonstrates the promise of web-based CBT for increasing the reach of psychological therapies after cancer, but also highlights the current challenges this field faces regarding ongoing implementation and dissemination.

72 | Using virtual reality as a clinical tool

Belinda Lange

Flinders University, Bedford Park, SA, Australia

Virtual Reality involves the use of computer hardware and software to create a simulated environment that places the user inside a virtual experience. Virtual reality has potential to be used in a range of clinical areas, offering new opportunities to support and/or enhance current assessment and intervention methods. A brief overview of a range of clinical virtual reality applications will be presented and discussed. These examples will demonstrate different ways in which virtual reality technology can be used and encourage clinicians to think about how technology may be explored in other settings.

73 | Active surveillance (AS) for low and intermediate risk prostate cancer (PCa): Patterns of care from the NSW prostate clinical cancer registry (PCCR)

Chau Bui[1], Andrew Brooks[2], Claire Cooke-Yarborough[1], Warick Delprado[3,4,5], Andrew Kneebone[6], Manish Patel[5,6,7], David Smith[8], Serina Teuss[9]

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Introduction: Active surveillance (AS) is an established management option for low-risk (LR) PCa and is increasing in intermediate-risk (IR) men, although data on outcomes are limited.[1,2] Our data report on patterns of care for LR and IR PCa in NSW.

Methods: Data were obtained for 4833 men participating in the PCCR diagnosed with localised PCa by biopsy, from 2015 to 2018. Participation by specialists and hospitals is voluntary. Primary treatments are recorded for all participants and follow-up data collected where available. The D'Amico classification (cT-stage omitted due to incomplete data) was used to classify LR and IR groups. IR with grade group (GG) 1-2 were sub-classified as favourable-IR and those with GG 3 as unfavourable IR. Advanced pathology (AP) was defined as an upgrade of GG or stage (extraprostatic disease).

Results: Overall, 3343 cases were classified as either LR or IR. Of 942 LR men, 735 (78.0%) were primarily managed by AS and 140 (14.9%) by radical prostatectomy (RP). Of those managed by AS, 86 (11.7%) progressed to active treatment within 2 years. For those whose primary treatment was RP, 104 (74.3%) had AP. Of 1567 favourable-IR men, 890 (56.8%) had a primary RP – 466 (52.4%) of these cases had AP. Of the 279 (17.8%) managed by AS, 47 (16.8%) progressed to active treatment. Of the 834 unfavourable-IR men, 518 (62.1%) were primarily managed by RP – 323 (62.4%) of these cases had AP. Of the 37 (4.4%) managed by AS, three (8.1%) progressed to active treatment.

Conclusion: Overall, most LR men were managed by AS. The proportion of AS cases progressing to intervention is low in both LR and favourable-IR groups and negligible for unfavourable-IR men. Where the primary treatment was RP, AP was seen in the prostate specimen in the majority of LR men and half of the favourable-IR men.

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2. Butler SS, Mahal BA, Lamba N, Mossanen M, Martin NE, Mouw KW, Nguyen PL, Muralidhar V, Use and early mortality outcomes of active surveillance in patients with intermediate-risk prostate cancer. Cancer 2019; https://doi.org/10.1002/cncr.32202.

74 | Implementation of a lifestyle-based clinical pathway in daily clinical practice in men undergoing androgen deprivation therapy for prostate cancer

Renée Bultijnck[1,2], Anniek Bruggeman[3], Barbara Van Ruymbeke[3], Stefanie Mortier[4], Anneleen Raes[4], Elke Rammant[1], Martine De Muynck[3], Benedicte Deforche[5,6], Valérie Fonteyne[1], Karel Decastecker[1], Nicolaas Lumen[1], Piet Ost[1,2]

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Aim: To assess the effect of a lifestyle-based prostate cancer pathway, incorporated in daily practice, to increase the implementation of evidence-based strategies to manage ADT-induced side effects.

Methods: PCa patients receiving ADT for >6 months were referred to the pathway (ie as standard practice), through a central coordinator. The pathway consisted of a medical screening (ie bone and cardiometabolic screening) and a rehabilitation program with a supervised exercise program (3 months) and referrals to a dietician and a psychologist. Anthropometric parameters and physical performance were measured at baseline and after 3 months. Primary endpoint was physical performance evaluated with the 400-m walk test. Planned referral target was set at 200 to accomplish a sample size of 120 patients following the exercise program. A meaningful clinically important difference of the 400-m test was defined as 17 s improvement and $P < .05$ was considered statistically significant.

Results: Between January 2015 and June 2018, 200 patients were referred to the pathway, of which 177 were enrolled (median age 69, IQR 63-74). The majority (84%) had a good functional status (Karnofsky Performance ≥90) at baseline. The indication for ADT was curative in combination with local therapy for locally advanced PCa in 67% and palliative for (non)metastatic PCa in 33% of patients. In total, 124 followed the complete pathway. Medical screening indicated a lower bone mineral density in 51% of the patients and 25% had metabolic syndrome. After initial referral, 43% choose to receive diet advice and 64% psycho-education. A clinically meaningful performance improvement was observed in patients following the exercise program (282 to 253 s; $P < .001$). Compliance rate of the exercise program was high (83%). A total of 10% dropped-out due to medical reasons. After the 3-month exercise program, 81% voluntary continued.

Conclusion: Physical performance improved after following a lifestyle-based clinical pathway for prostate cancer patients in daily practice.

75 | Radiotherapy underutilization in prostate cancer and its impact on overall survival and local control, NSW, Australia

Gabriel Gabriel, Michael Barton, Jesmin Shafiq, Geoff Delaney

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Background: Evidence-based modelling estimates show that 52% of prostate cancer patients would benefit from radiotherapy at diagnosis.[1-3] It was estimated that 5-year overall survival (OS) and local control (LC) shortfall due to not receiving RT were 1.1% and 12.4%,[4,5] respectively.

Aim: to calculate actual RT utilization rate, estimate shortfall in OS and irreplaceable LC and identify factors affecting RTU.

Methods: NSWCCR data for prostate cancer patients diagnosed from 2009 to 2011 were linked to radiotherapy, admitted patients, clinical cancer registry and death datasets. Patients located near State border where their closest RT facility was outside NSW (cross borders) were excluded from the analysis. Irreplaceable benefit of RT counted only where there was no guideline-recommended alternative treatment[5].

Results: There were 19 816 prostate cancer patients during study period. Median age was 67 years, 65% had localized disease, 4% had distant disease and 30% had unknown stage. Of patients with localized disease, 18% received RT, 37% had radical prostatectomy (RP) and 4% had both RP and RT. A total of 28% of patients had RP alone, 3% had RP and RT, 20% had RT alone and 49% had neither RP nor RT. Overall, 23% of all prostate cancer patients received RT within 1 year of diagnosis. OS and irreplaceable LC person-shortfall were 124 and 1398, respectively. Univariate and multivariate analysis showed that younger patients with loco-regional disease, living in least-disadvantaged areas and living >100 km of RT facility were predictors for RT underutilization. Patients living in least-disadvantaged areas were 33% more likely to have RP than patients living in most-disadvantaged areas.

Implications: Prostate cancer constituted to 18% of patients diagnosed with cancer during study period. Underutilization of RT increases disease burden on health system due higher risks of local failure and OS shortfall. Giving RT according to evidence-based guidelines would probably have prevented 41 early deaths and 466 local failures annually.

76 | A comparison of treatment for prostate cancer between patients diagnosed in public and private hospitals in Victoria, Australia

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Aim: To compare prostate cancer treatment for Victorian men diagnosed with prostate cancer in public versus private Victorian health care facilities.

Design: Retrospective study utilising state-wide Victorian Cancer Registry data linked to various administrative datasets.

Setting/Participants: Victorian men diagnosed with prostate cancer between 2011 and 2017 eligible for inclusion (n = 29 813).

Main Outcome Measures: Utilization of prostatectomy (±radiation therapy) and radiation therapy alone within the first year following cancer diagnosis.

Results: Compared with men diagnosed in public health services, those diagnosed in private health services were younger, had fewer comorbidities, lived in areas of higher socioeconomic position and were more likely to live in major cities. They were also more likely to be diagnosed with lower risk prostate cancer. After adjusting age and the presence of comorbidities, men diagnosed in private hospitals were more likely to receive a radical prostatectomy than those diagnosed in public hospitals (44% vs 28%; odds ratio = 2.29; 95% CI, 2.15-2.45) and less likely to receive radiation therapy alone (11% vs. 20%; odds ratio = 0.50; 95% CI, 0.46-0.54). These differences were consistent across each of the Gleason score-defined subsets. Although patterns have changed over time, stark differences remain.

Conclusion: Prostate cancer treatment patterns differ substantially between men diagnosed in public health services compared with private health services in Victoria.

77 | Mixed methods to develop and evaluate a patient-reported symptom index for use with non-muscle invasive bladder cancer patients

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Aim: Non-muscle invasive bladder cancer (NMIBC) is a chronic condition requiring frequent follow-up, endoscopic examinations, tumour resections, and intravesical treatments. In this clinical context, patient-reported outcomes (PROs) have enormous potential to inform treatment assessment and recommendations for NMIBC; however,

current PRO measures are inadequate for NMIBC because they lack key NMIBC-specific symptoms and side-effects associated with contemporary treatments. This study aimed to develop and evaluate a patient-reported NMIBC Symptom Index (NMIBC-SI) that is acceptable to patients; reliable, valid, and responsive to treatment effects; and fit-for-purpose as an endpoint in clinical trials.

Methods: We developed a draft 104-item NMIBC-SI through a systematic review and interviews with 26 patients and 20 clinicians, and pretested using cognitive interviews. We then administered the NMIBC-SI to patients on active treatment from nine Australian sites. NMIBC-SI item responses were analysed and flagged for exclusion if they had low prevalence, were conceptually similar, or highly correlated (≥0.50). Nine urologists reviewed the results and final items for inclusion.

Results: Planned target accrual, n = 220, was reached (178 male, mean age 69.3) representing all risk groups (low 27.7%; intermediate 13.2%; high 50.9%). More than 80% of participants did not experience 21 items, seven items were highly correlated, and four excluded as >50% of urologists rated them not directly related to NMIBC treatment (eg 'have you had a cough?'). The final 56-item NMIBC-SI includes a 23-item symptom burden scale, two treatment-specific modules, and three optional function scales.

Conclusions: The NMIBC-SI allows comprehensive assessment of patients' self-reported symptom burden and functioning impairment. A validation study was commenced in July 2018, recruiting newly diagnosed NMIBC patients from 15 centres across four countries. It will assess key PROs across treatments, disease trajectory (acute to 1-year survivorship), and patient risk categories. The NMIBC-SI will be suitable for use in clinical practice and future clinical trials of treatments for NMIBC.

78 | Treatment decisions among regional Victorians with urological cancer: A consumer perspective

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Aim: People with urological tumours such as prostate, kidney and bladder cancer have many management options, including surgery, radiotherapy, chemotherapy, active surveillance, watchful waiting and hormonal therapy. It is recommended that men with prostate cancer see multiple specialists for information about available management options.[1] This study aimed to assess variation in treatment decisions between people with urological and non-urological cancers.

Methods: The Victorian Department of Health and Human Service's (DHHS') validated Patient Experience of Cancer Care Survey (PECCS) was administered at five hospitals[2] in the Loddon Mallee region (LMR). Patients treated with chemotherapy or surgery in 2016-2017 were identified through the Victorian Admitted Episodes Dataset and assessed against DHHS' inclusion/exclusion criteria.[2] Overall, 1096 surveys were posted to eligible patients, with one reminder sent to non-responders. In the PECCS section 'Deciding on Treatment', the number (%) of all responders was calculated for each question category. Results were stratified by whether patients had urological cancer, with inter-group comparisons performed using the chi-square test for independence. A *P*-value < .05 was considered statistically significant.

Results: Overall 439 people treated across five LMR hospitals responded to the PECCS section 'Deciding on Treatment' (response rate = 40%). There were significant differences among cancer types in the proportions of patients who responded 'yes' to the question 'Were you involved as much as you wanted to be in decisions about your care and treatment?'[1] (urological: 87% of 71 respondents; non-urological: 75% of 364 respondents) and 'yes' to the question 'Did the health professionals encourage you to ask questions about your treatment options?'[1] (urological: 89% of 64 respondents; non-urological: 77% of 345 respondents).

Conclusions: More regional Victorian patients with urological than non-urological cancers were involved in treatment decisions and encouraged to ask questions about treatment options. This may reflect the relatively wide range of management options available to urological cancer patients.

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2. Department of Health and Human Services. Victorian Cancer Patient Experience Survey Tool Project, 2018. Available online: https://www2.health.vic.gov.au/about/health-strategies/cancer-care/cancer-projects/victorian-cancer-patient-experience-survey-tool-project

79 | Does physical activity improve chemotherapy completion in women receiving chemotherapy for ovarian cancer?

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Background: Ovarian cancer has a 5-year survival rate of <45%. Better overall survival has been shown for women who are able to complete a greater proportion of their planned chemotherapy. Physical activity during chemotherapy may reduce treatment-related side-effects enabling patients to better tolerate chemotherapy and avoid dose delays or reductions. We aimed to evaluate if physical activity during chemotherapy or changes in physical activity from pre-to-post diagnosis were associated with improved chemotherapy completion rates.

Methods: Women in the Ovarian cancer Prognosis And Lifestyle (OPAL) Study who received more than three cycles of carboplatin and paclitaxel first-line chemotherapy and completed the Active Australia Survey during chemotherapy were included in this analysis (n = 334). Planned chemotherapy, and dose reductions or delays were abstracted from clinical records. Women were asked about time spent in various types of physical activity in the years before their cancer diagnosis (at baseline) and in the past week (during chemotherapy). We classified physical activity during chemotherapy into tertiles of metabolic equivalent of task (MET) minutes and change from pre-diagnosis into largest decrease (n = 107), smaller decrease (n = 107) and no change (±90 MET-min/week) or increase (n = 84). The associations of physical activity with chemotherapy completion (relative dose intensity [RDI] ≥85%) were assessed using logistic regression, with minimal sufficient adjustment informed by a directed acyclic graph.

Results: Overall 44% of women received ≥85% RDI. We found no association between level of physical activity during chemotherapy and chemotherapy completion (odds ratio [OR] = 1.1; 95% CI, 0.6-1.8 for highest vs lowest tertile). However, compared to women with the largest decrease from pre-diagnosis, women who maintained or increased their physical activity were significantly more likely to complete chemotherapy (RDI ≥85%; OR = 2.2; 95% CI, 1.2-4.0).

Conclusions: Supporting women to maintain their pre-existing level of physical activity during chemotherapy for ovarian cancer may improve chemotherapy completion and in turn overall survival.

80 | Development and validation of a immunotherapy prognostic score (IPS) for patients with advanced lung cancer treated with immune checkpoint inhibitors

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Aim: Immune checkpoint inhibitors (ICI) are a significant advance to the treatment arsenal for advanced non-small cell lung cancer (NSCLC); however, there initiation is still associated with significant heterogeneity in survival outcomes. This study aimed to develop and validate a pre-treatment prognostic tool of survival outcomes in advanced NSCLC patients treated with ICIs.

Methods: Time-to-event modelling techniques including decision-tree, Cox proportional hazard and random forest analysis were evaluated to determine the optimal pre-treatment prognostic model using commonly available clinicopathological data. Model development data consisted of advanced NSCLC patients treated with atezolizumab from the randomised clinical trials OAK and POPLAR (n = 751). Data from the single-arm atezolizumab trials BIRCH and FIR (n = 797) were used for external validation. Overall survival (OS) was the primary outcome and progression-free survival (PFS) was assessed as a secondary outcome.

Results: Based upon pre-treatment C-reactive protein, lactate dehydrogenase, derived neutrophil-to-lymphocyte ratio, albumin, PDL1 expression, performance status, time since metastatic diagnosis and metastatic sites count, an optimal prognostic tool was defined. The tool allows the calculation of a personalised Immunotherapy Prognostic Score (IPS). The OS discriminative performance of the IPS was consistent with a well-performing model in both the development and validation cohorts (c-index >0.73). The IPS discriminated significantly different OS probabilities ($P < .001$), with median OS ranging from 3.4 to greater than 24 months for the upper and lower 15th risk percentiles, from the OAK and POPLAR trials. Similar findings were identified for PFS ($P < .001$), with median PFS ranging from 1.4 to 4.7 months for the upper and lower 15th risk percentiles.

Conclusions: A pre-treatment prognostic tool was developed and validated to identify patient groups with distinctly different survival probabilities following the initiation of atezolizumab treatment for advanced NSCLC.

81 | Prostate cancer risk factors in the New South Wales 45 and Up Study: Family history, lower urinary tracts symptoms (LUTS) and diabetes are associated with risk of prostate cancer diagnosis

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Aim: The aetiology of prostate cancer (PC) is unclear, with the few known risk factors being non-modifiable. We examined the relationships between confirmed and potential risk factors of PC diagnosis in the New South Wales (NSW) 45 and Up Study (n = 267 153).

Methods: Participants were 123 732 men aged ≥45 years recruited between 2006 and 2009. Data from the 45 and Up Study were probabilistically linked with (a) NSW Cancer Registry (1994-2013) by the Centre for Health Record Linkage and (ii) Medicare Benefits Schedule and Pharmaceutical Benefits Scheme by the Sax Institute using a unique identifier provided to the Department of Human Services to identify reimbursements for Prostate Specific Antigen (PSA) tests and prescriptions for diabetes and urological issues. Men with history of PC and radical prostatectomy were excluded. We used multivariable Cox regression analysis, with age as the underlying variable, to estimate adjusted hazard ratios (HRs), and multivariable

Joint Cox regression to examine each association by disease spread at diagnosis.

Results: Of the 91 859 eligible men, 3701 PC cases were diagnosed between recruitment and 2013. Factors associated with PC diagnosis included family history of PC (vs none; HR = 1.26; 95% CI, 1.11-1.42), with an almost twofold increased risk for men with a father and brother with PC diagnosis (vs none; HR = 1.91; 95% CI, 1.35-2.70), LUTS (vs none; HR = 1.75; 95% CI, 1.50-2.03), benign prostatic hyperplasia (vs none; HR = 1.45; 95% CI, 1.34-1.57), vasectomy (vs none; HR = 1.11; 95% CI, 1.03-1.20), and erectile dysfunction (vs none; HR = 1.10; 95% CI, 1.01-1.19). There were associations between PC diagnosis and treatments for diabetes (vs none; HR = 0.73; 95% CI, 0.67-0.80) and urinary complications (vs none; HR = 0.84; 95% CI, 0.75-0.94), with no variation in associations by disease spread at diagnosis.

Conclusion: These results support family history, urinary factors and diabetes as factors associated with PC diagnosis. The conflicting associations observed between self-reported urinary issues and prescriptions commonly used to treat these conditions warrant further investigation.

82 | Supplement use and prostate cancer risk in the New South Wales 45 and Up Study

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Aim: There is uncertainty on the relationship between multivitamin supplementation use and prostate cancer (PC) diagnosis. For example the SELECT study found an increased risk of PC in men who regularly took vitamin E supplements. We explored the relationship between self-reported supplementation use and PC diagnosis in men participating in the New South Wales 45 and Up Study.

Methods: Participants were males enrolled in the Sax Institute's 45 and Up Study between 2006 and 2009 aged ≥45 years at recruitment (n = 123 732/267 153). Data from the 45 and Up Study were probabilistically linked with NSW Cancer Registry data (1994-2013) and the Admitted Patient Data Collection by the Centre for Health Record Linkage, and deterministically linked to Medicare data provided by the Department of Human Services to obtain Prostate Specific Antigen (PSA) tests and GP visits. Men with a history of PC prior to recruitment or a radical prostatectomy were excluded. Multivariable Cox regression analysis with age as the underlying variable was used to estimate adjusted hazard ratios (HRs) for the associations between self-reported supplement use and PC diagnosis. We used multivariable joint Cox regression to examine this association by disease spread, adjusting for sociodemographic factors, BMI, physical activity, comorbidities and frequencies of PSA tests and GP visits.

Results: A total 91 859 men were eligible for this analysis and of these 3701 were subsequently diagnosed with PC up to 7.8 years after recruitment. Overall 45% of the entire cohort of men reported use of supplements or multivitamins. There was no association between vitamin and supplement use and PC diagnosis (vs no use; HR = 1.05; 95% CI, 0.98-1.12). Joint Cox analysis showed no association by disease spread.

Conclusion: The use of multivitamins in the community is widespread. There is no evidence for a relationship between supplement intake and PC diagnosis in this Australian cohort.

83 | Risk factors for cancer registry-notified cancer of unknown primary site (CUP)

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Introduction: Little is known about the risk factors for cancer of unknown primary site (CUP), a high-burden malignancy.

Aim: We examined the association among demographic, social and lifestyle factors, comorbid disease, health service use and risk of cancer registry-notified CUP in a prospective cohort of 266 724 people aged 45 years and over in New South Wales, Australia.

Methods: A total of 45 and Up Study baseline questionnaire data were linked by the CHeReL to the NSW Cancer Registry, the NSW Registry of Births, Deaths and Marriages, and health service records (NSW Admitted Patients Data Collection, NSW Emergency Department Data Collection and Medicare Benefits Schedule, the latter supplied by the Department of Human Services) 4-27 months prior to diagnosis. Using a nested case-control design, we compared individuals with incident cancer registry-notified CUP (n = 327) to controls randomly selected (3:1) from the general cohort population (n = 981). We used conditional logistic regression to estimate adjusted odds ratios (ORs) and 95% confidence intervals (CIs).

Results: In the fully adjusted model, risk of CUP increased with increasing age (OR = 1.10, 95% CI, 1.08-1.12 per year), current (OR = 3.42, 95% CI, 1.81-6.47) and former (OR = 1.95, 95% CI, 1.33-2.86) smoking, low educational attainment (OR = 1.69, 95% CI, 1.08-2.64), poor

compared to excellent self-rated overall health (OR = 6.22, 95% CI, 1.35-28.6), and a personal history of diabetes (OR = 1.89, 95% CI, 1.15-3.10) or cancer (OR = 1.62, 95% CI, 1.03-2.57). Risk of CUP decreased in those with a personal history of anxiety (OR = 0.28, 95% CI, 0.12-0.63). Neither tertiary nor community-based health service use independently predicted CUP.

Conclusions: Risk of CUP appears increased in people who are older, more unwell and less well-educated. Several novel associations are worthy of further investigation to elucidate modifiable risk factors. Of interest is the implied association with low health literacy and with low self-rated overall health, which warrants exploration to identify opportunities for earlier cancer diagnosis.

84 | Socioeconomic disparities in colon and rectal cancer survival: Contributions of prognostic factors in a large Australian cohort

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Aim: To quantify the contributions of various prognostic factors to socioeconomic disparities in survival for colorectal cancer in a large Australian cohort.

Methods: The study cohort were participants (267 153) in the 45 and Up Study (recruited 2006-2009) who were subsequently diagnosed with colorectal cancer. Socioeconomic status (SES) was defined using the individual's educational attainment and a neighbourhood measure based on place of residence. Study data were linked by the CHeReL with the NSW Cancer Registry, NSW Admitted Patient Data Collection, NSW Emergency Department Data Collection and death data (to 31 December 2015). Treatment information was obtained through record linkage with hospitals, and Medicare Benefits Schedule and Pharmaceutical Benefits Scheme claims supplied by the Department of Human Services. Hazard ratios (HRs) for colorectal cancer-specific mortality were estimated from Cox proportional hazards regression and proportions of socioeconomic differences explained by prognostic factors were quantified.

Results: A total of 1720 participants were diagnosed between recruitment and 31 December 2013: 1174 (68%) colon and 546 rectal cancers. Significant colon cancer survival differences were only observed for neighbourhood SES (P = .033): 95% being explained by disease-related factors.

Differences in rectal cancer survival were greater with the highest risk of death for those with lowest SES compared with the highest (HR = 3.72; 95% CI, 1.86-7.43; P = .0013 for neighbourhood SES; HR = 2.36; 95% CI, 1.44-3.54; P = .0009 for individual SES). Neighbourhood SES differences were explained by patients' characteristics (36%) and disease-related factors (28%). Patients' characteristics, treatment- and disease-related factors explained 33%, 41% and 30%, respectively, of survival differences by individual SES. Inclusion of all significant prognostic factors explained 35% and 65% of the survival differences in neighbourhood- and individual-level SES, respectively, but significant disparities remained.

Conclusions: Disease-related factors explained most of the socioeconomic survival disparities in colon cancer. However, substantial differences remained for rectal cancer after accounting for patients' characteristics, treatment- and disease-related factors.

85 | Overlooked minorities: The intersection of cancer in lesbian, gay, bisexual, transgender and/or intersex (LGBTI) adolescents and young adults

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Cancer significantly contributes to the burden of disease in adolescents and young adults (AYA) and has notable implications in terms of their health care engagement and psychosocial well-being. Added to this, large numbers of AYA oncology patients in Australia are treated within adult hospitals, occupying an at-times uninviting landscape with the potential for unsatisfactory care experiences and poorer health outcomes. The emergence of AYA oncology as a specialised field seeks to redress this historical 'no man's land', championing the cause for developmentally informed and multidisciplinary clinical services within age-appropriate treatment environments.

Notwithstanding the progress of recent decades, for a number of AYA sub-populations cancer care is far from equitable. Over the past 18 months, work undertaken by the Victorian Adolescent & Young Adult Cancer Service suggests that this is pertinent for the AYA with cancer who identifies as sexually and/or gender diverse.

This session will outline how the intersection of cancer (and its associated treatment and interventions) to an already complex period of evolving sexuality and gender diversity can result in unique challenges and risks for the young LGBTI cancer patient. It is relevant to all health care professionals involved in cancer care, from allied health clinician to consultant oncologist, and particularly those whose well-intentioned response may be 'But I don't have any LGBTI cancer patients'. Indeed, conscious or not, this patient cohort are accessing our oncology clinics, hospital wards, radiotherapy beds and surgical suites, and it is imperative that we understand and respond to their unique care needs appropriately.

Topics include:

- Current knowledge of cancer in AYAs who identify as LGBTI: outcomes from literature and systematic reviews (updated to August 2019).
- The case for LGBTI + AYA + Cancer = a medically underserved patient cohort. What we know from the care experiences of similar patient populations.
- Moving toward an equitable and LGBTI-inclusive model of care: from clinical governance and physical space to staff education and training needs.
- Challenges in implementing LGBTI-inclusive principles: reflections informed from the outcomes and barriers experienced by the Victorian Adolescent & Young Adult Cancer Service
- Development of the first resource for LGBTI young people with cancer: an exercise in meaningful consumer engagement and evidence-informed practice.
- Call to action: next steps in building the evidence base.

86 | Cancer and gender-affirming hormone therapy in transgender individuals

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Transgender (trans) or gender diverse (TGD) people are estimated to comprise approximately 0.1%–2% of the population. Like many human traits, gender is diverse and has a biological basis. Many TGD people undergo masculinising or feminising gender-affirming hormone therapy and/or surgery to align their physical characteristics with their gender identity. Many cancers are known to be sex hormone-dependent yet uptake of screening by TGD people can be challenging. This is often related to fear of mistreatment in healthcare settings as well as distress or dysphoria towards secondary sexual characteristics such as the cervix in trans men.

There are no well-designed studies of sufficient duration to suggest that gender-affirming hormone therapy increases the risk of hormone-dependent cancers. Further studies are required. Until then, cancer-screening guidelines should be no different from the general population, based on the presence of organs in TGD people and not based on gender identity or hormonal therapy status. Trans women can develop prostate cancer and trans men can develop gynaecological cancers.

In TGD people who have been diagnosed with cancer, interactions with hospitals and health care professionals can be traumatic. This is understandable given that 28% of TGD Australians have experienced discrimination in healthcare settings and many have been refused care. Respect and sensitivity towards TGD people are required, including the use of inclusive language in interactions, use of preferred names (which may differ from hospital identity labels) and use of pronouns (i.e she/he/they), whilst acknowledging the presence of organs which may not be in keeping with one's gender identity. Many breast cancer or prostate cancer resources, support groups and health services are not only highly gendered, but may not be inclusive of LGBTIQ+ individuals which needs to be considered to ensure all people can benefit from healthcare services and cancer organisations.

87 | Unmet needs of gender and sexually diverse people with cancer

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People who are gender and sexually diverse (GSD) experience disproportionate cancer burden in comparison to mainstream populations. Risk factors, social determinants of health, engagement with healthcare services, real and anticipated discrimination, maltreatment, assumptions and poorer health and well-being outcomes mean that although inclusion of GSD people is growing in some parts of the world, true equity is far from achieved.

There is growing awareness of the importance of sexual issues for people affected by cancer and an increasing appreciation of the need for equality in terms of gender and sexuality, but how cancer impacts GSD people, and how sexuality and gender relates to experiences of cancer and healthcare are less understood.

Every person should receive the best possible care and treatment delivered in a way that meets their personal, individual needs. It is the health professional's responsibility to ensure that each person is informed and able to participate and make decisions that are right for them in relation to that care.

Underpinning effective, safe, appropriate and meaningful healthcare is communication between staff within healthcare contexts and the people who they engage with including patients and their significant others.

GSD people are themselves a diverse group with special, unique needs in relation to healthcare. Understanding how GSD people's needs may not be met in the context of cancer care as well as the ways which healthcare professionals can address these deficiencies is vital to improving the care experiences and outcomes of GSD people.

88 | Improving outcomes for rural cancer survivors: Reflections from a Churchill Fellowship

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To address rural Australians' inferior cancer survival, more needs to be known about what drives this disadvantage, and effective strategies that assist rural people to access optimal cancer treatment and adopt healthier lifestyles during and after cancer treatment (so that they can better manage side effects and reduce their risk of cancer reoccurring) are likely to be required.

As part of a body of multi-disciplinary behavioural research focused on addressing this, and building upon her clinical experience from working as a Clinical Psychologist with people affected by cancer, as well as from lived experience from growing up in a remote community, in April-June 2018 Dr Kate Gunn undertook a Churchill Fellowship to ascertain pertinent research questions that are likely to translate into improved understanding of, and better outcomes for, this disadvantaged group of cancer survivors. Information was gathered from the World Rural Health Conference in New Delhi, as well as visits to Macmillan Cancer Support in London and over 30 universities, cancer control organisations, treatment centres and non-government organisations across the Netherlands, Canada and the United States, including the National Cancer Institute and American Cancer Society, and a follow-up trip to Scotland in July 2019.

Insights and strategies that have successfully improved rural cancer outcomes in other contexts will be outlined (eg lay and nurse-led rural patient navigation, delivery of supportive care interventions via the internet and telehealth networks), with the view to generating research interest and new collaborations in Australia, to help progress this work. Although understanding and addressing rural-urban cancer disparities using culturally appropriate methods is currently receiving much attention in the United States, rural Australians affected by cancer would benefit from more funding and effort being directed towards multi-disciplinary, translational research in this field.

89 | Implementation of teleoncology models of care within health systems

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Teleoncology models have been established as safe, cost-effective and acceptable way of enhancing rural and regional access to cancer care closer to home. They enable clinical consultations, delivery of chemotherapy under direct supervision (Tele-chemotherapy) and recently conduct of clinical trials (Tele-trials).[1,2] By shifting specialist services to rural and regional areas, these models enhance rural and regional service delivery capabilities. All levels of governments have made significant investments to embed telehealth/teleoncology as routine practice. Although uptake has exponentially increased over the last 5 years, we as a country could do better given that the disparity in access and outcome for rural, regional and Indigenous patients remain wide. At local level, frontline clinicians and managers need to use implementation science principles to ensure all aspects of implementation including stakeholder engagement are covered. At management levels, appropriate key performance indictors need to be applied for accountability and adequate resources need to be allocated for sustainability.[3] Clinicians and clinical managers may gain extra confidence to navigate the health systems by familiarizing themselves with negotiation skills and 'clinician levers'.

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2. Australasian Teletrial model: A national guide for implementation, Clinical Oncology Society of Australia, Sydney, 2016.
3. Sabesan S and Kelly J, Perspective: Benefits of telehealth are many: It is time to implement as core business, Med J Aust 2015;202(5),231–232.

90 | Delivering the best and most technologically advanced treatment for cancer patients regardless of their address

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Establishing a facility to provide radiation therapy is expensive. Rural and suburban patients should expect cancer care equal to the best treatment in the world. For radiation therapy this treatment will always be based in a centre with a minimum of $5 million equipment and many cancer care professionals to staff the facility and provide care. There is a trade off of distance to travel for such care versus the need to focus expertise in centres of excellence.

Proton therapy is the extreme end of this equation.

The Australian Bragg Centre (ABC) has commenced construction in Adelaide. The cost of the centre is more than $100 million and the expertise required to deliver the care draws upon expertise developed internationally over many years.

How do we integrate the comprehensive care of a cancer patient, delivering excellence throughout the country yet making low volume high cost treatments accessible.

"Accessible" is more than the PATS for transport costs, it is training all health care providers to recognize options, perhaps to participate actively in planning the care and certainly the follow up.

We have 2 years to develop a coordinated scheme to make the Bragg centre a truly national facility for everyone.

The COSA members are invited to contribute to planning care pathways and all aspects of care delivery, training needs and opportunities, linkages to provide care to our region and research opportunities in medicine and science. There will also be need to define which patients will benefit most from particle therapy and the role of national guidelines, and to advocate for research in areas where the role of particle therapy is yet to be defined.

Guidance in the ABC work in each of these areas will be presented.

91 | Contemporary cancer care coordination: Better rural patient outcomes

Peggy Briggs

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Western Australia Country Health Service (WACHS) comprises seven regions with five of them having a Regional Cancer Centre (RCC). RCCs

provide a comprehensive range of treatments close to home; however, country people still need to travel to Perth to access complex and specialised cancer diagnostic and/or treatment services. The tyranny of vast distances WA people have to travel adds to the complexity of ensuring they get the right treatment, in the right place, at the right time. Country people have an increased risk of falling through the gaps and get lost navigating the large and fragmented tertiary health systems. The Rural Cancer Nurse Coordinator bridges these gaps by being an available point of contact that facilitates timely and appropriate access to care for cancer patients across Western Australia. Case studies describe how Cancer Care Coordination supports rural people in Western Australia access equitable, evidence-based cancer care as close to home as possible.

92 | Why a roadmap is needed for digital health in cancer care – A consumer perspective

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Communication and easy to access information, support and resources are critical components of living with and self-managing a cancer diagnosis. The world of digital applications offers great potential for improving current approaches and supporting cancer survivors as they monitor and self-manage their illness in partnership with health professionals. With a growing demand for digital applications, consumers and health professionals need to be confident that such applications are credible and effective. A roadmap with underlying fundamental principles is needed to ensure that the applications can be assessed, amongst other elements, for their quality, evidence base, fit for purpose and security so that consumers living with cancer can have confidence in using digital technology to monitor progress and self-manage their cancer and be assured this will be of benefit.

This presentation aims to set the scene for development of the Australian Digital Health in Cancer Care Roadmap by introducing issues for the implementation of digital health in cancer care and the need for a digital health roadmap, from the perspective of a consumer living with cancer.

93 | Finding the evidence: Do stakeholder views reflect literature priorities for digital health?

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Aim: Despite strong consumer advocacy in cancer, little is known about consumer preferences regarding implementation of digital health technologies in cancer care. This study aimed to compare issues for implementation of digital health in cancer care identified by consumers and other stakeholders with issues identified through a systematic meta-review of international literature, in order to inform the priority-setting process for developing the Australian Digital Health in Cancer Care Roadmap.

Methods: A systematic meta-review of international literature (January 2013-July 2018) was conducted with data extracted by two independent reviewers on barriers, enablers, needs and opportunities for implementation of digital health in cancer care. Concurrently, consultation on implementation of digital health in cancer care was held via focus groups and interviews with stakeholders to identify barriers, enablers, needs and opportunities specific to the Australian context. Consultation emphasised consumers (people with a history of cancer/cancer caregiving, and health care professionals using digital health). Review and consultation data were thematically analysed (framework analysis).

Results: Analysis of 93 reviews of digital health in cancer care and consultation with 51 stakeholders, including people with a history of cancer/cancer caregiving (14), health care professionals (nine), researchers (six), developers (six), non-government cancer care organisation representatives (six) and government/policy representatives (10), indicated 20 themes. Although literature focused on websites, online interventions and mHealth, stakeholders often discussed electronic health/medical records. Compared with literature, stakeholders were less focused on evidence and theory, and more often raised issues of ease of use/integration, coordination, disparities, access, privacy/security and confidentiality and participatory design.

Conclusions: Although validity, credibility and safety of digital health in cancer care are important to Australian stakeholders, issues for implementation raised in consultation centred on practical issues of 'how to' implement in ways that improve access and efficiency of cancer care.

94 | Developing a roadmap for digital health in cancer in Australia

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Aim: As digital technologies are increasingly adopted in cancer care, there is a need for a systematic approach to development and

application to maximise benefits and ensure equity of access. However, strategic frameworks for implementation of digital health in Australia are not cancer specific. Additionally, there is a need for any cancer-specific framework to reflect consumer-driven priorities. This study aimed to identify stakeholder (including consumer) priorities to inform the Australian Digital Health in Cancer Care Roadmap.

Methods: Priority action items were developed through meta-review and stakeholder consultation, across five categories: (a) design and development; (b) adoption and integration; (c) governance and evaluation; (d) specific digital interventions; and (e) research gaps. Following expert panel review, stakeholders including consumers and other end-users of digital health applications responded to two rounds of Delphi consensus survey, indicating (a) level of priority for each item and (b) appropriate time frames for achieving each item. Data were analysed using frequencies, mean ranks and Kendall's Concordance Coefficient.

Results: A total of 29 stakeholders responded to Round 1 and 23 to Round 2. Most highly ranked priorities included: end-user involvement in design and development; increased quality and usability of digital technologies; monitoring access to, engagement with, and use of digital technologies; facilitating two-way communication between patients and health professionals; developing a research strategy to identify and address research gaps and reflecting consumer-identified priorities in research. Stakeholders identified the appropriate time frame for achieving most priorities to be short term (up to 2 years).

Conclusions: Stakeholder-identified priorities reflected in the Australian Digital Health in Cancer Care Roadmap indicate consumer and other end-user preferences for increased quality/value of digital health technologies and increased involvement and engagement in development and use of digital technologies in cancer care. The Roadmap provides strategic directions for and implementation of digital health in Australian cancer care.

95 | National digital health strategy for every cancer patient – Connecting the dots

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Digital information is the bedrock of high-quality healthcare. The benefits for patients are significant and compelling: hospital admissions avoided, fewer adverse drug events, reduced duplication of tests, better coordination of care for people with chronic and complex conditions and better-informed treatment decisions. Digital health can help save and improve lives.[1]

Safe, Seamless and Secure, Australia's National Digital Health Strategy, was developed following a national consultation with consumers, clinicians, government, researchers and industry. Throughout the consultation, the Australian community was clear about what it expects from healthcare services, today and in the future. Australians want a health system which puts people first – giving more choice, control and transparency. They want better access to mobile digital health services for the whole community – not just those who are experienced users of new technology. They want their health information to be confidential and secure, protected from cyber criminals and from any unauthorised access[2].

The strategy identified seven strategic priority outcomes to be achieved by 2022:

1. Health information that is available whenever and wherever it is needed;
2. Health information that can be exchanged securely;
3. High-quality data with a commonly understood meaning that can be used with confidence;
4. Better availability and access to prescriptions and medicines information;
5. Digitally enabled models of care that drive improved accessibility, quality, safety and efficiency;
6. A workforce confidently using digital health technologies to deliver health and care; and
7. A thriving digital health industry delivering world-class innovation.

The symposium will be an opportunity to discuss these priorities in more detail, Australia's progress against these priorities and specifically how they relate to cancer care – in particular, how they relate to the Australian Digital Health in Cancer Care Roadmap.

1. https://conversation.digitalhealth.gov.au/sites/default/files/adha-strategy-doc-2ndaug_0_1.pdf
2. Ibid

96 | A comprehensive approach to high-quality patient education materials: The beyond five experience

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Background: Information available for patient use is complex, peppered with medical jargon and requires a high reading ability to understand.

Aim: Our aim is to describe a comprehensive, methodological approach to developing patient-centred education materials using the Beyond Five website as an exemplar.

Methods: The following stepped approach was taken in developing a comprehensive information site for head and neck cancer (HNC) patients:

1. Identification of existing information sources
2. Gap analysis to determine unmet information needs of patients and health care providers (HCP)
3. Development of content which involved adaption of existing materials and new materials to address gaps
4. Content expert review of material
5. Health literacy expert review of material
6. Website interface development and testing with experts and patient advocates
7. Iterative revisions to content, user interface and information gaps
8. Usability testing of specific disease information by patients
9. Recommendations for revision

Results: A total of 597 HNC patients and 112 HCP were surveyed demonstrating need for information in coping with psychological distress, sexual health and availability of support groups. Development of content for 10 HNCs was completed with an expert panel including clinicians and health literacy experts. Information about prevention, diagnosis, treatment, side effects and recovery into survivorship was incorporated. Development testing identified the need to layer information and provide it in downloadable, printable factsheet formats. Website usability analysis in 18 patients demonstrated a preference for video content, particularly patient stories. Most patients found the website informative and could navigate to complete specific tasks; however, simplification of the user interface and navigation were required. All patients would revisit the website for accurate information about their HNC.

Conclusion: A structured comprehensive approach to developing patient education materials delivers improved information support for patients, caregivers and HCP. Maintaining information and ensuring it is evidence based remains an ongoing challenge.

97 | Facilitating effective family carer engagement in cancer care: Development of the eTRIO education modules

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Aim: Family carers play an important role in cancer care. However, many carers report feeling disempowered and ill-equipped to support patients. Our group published the evidence-based 'TRIO Guidelines' to improve clinician's engagement with carers and management of challenging situations in the cancer setting. To facilitate implementation of these guidelines into clinical practice, we have developed two novel online education modules: for oncology clinicians (eTRIO) and for cancer patients and carers (eTRIO-pc).

Methods: The eTRIO modules were based on extensive prior research by our group (systematic reviews, qualitative interviews, consultation analyses and Delphi consensus guidelines). Draft module content was iteratively reviewed by an expert advisory group involving academic/clinical experts (n = 13) and consumers (n = 5). User experience testing of the modules was completed by clinicians (n = 5), patients (n = 5) and carers (n = 5).

Results: Both programs utilise interactive web-technology to promote learners' engagement and uptake of key skills. The clinician module includes nine professionally produced short films (with embedded trigger activities) modelling effective clinician behaviours. Reflective practice is encouraged via self-assessments and clinical scenarios. The patient-carer module includes three professionally produced films which model key carer skills (such as advocating for a patient's unmet needs), as well as experiential content provided via video messages from consumers and clinicians. Interactive activities such as a consultation question list builder are also included. A national RCT is currently evaluating the effectiveness of the combined modules in improving: (a) carer involvement in consultations, (b) stakeholders' self-efficacy in clinician-patient-family communication, (c) patient/carer psychosocial outcomes and (d) healthcare costs.

Conclusions: The eTRIO programs have been rigorously developed to meet the needs of clinicians, patients, and carers in improving effective and useful carer involvement. The interventions aim to shift the status of informal carers from an underserved, vulnerable and ill-equipped population to being confident, informed and supported partners in cancer care.

98 | Assessing the gaps in experience and knowledge of Australian Primary Health Care Professionals (GPs), in treating and caring for the increasing number of Australian neuroendocrine tumour (NET) patients

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Aim: Conservatively, the incidence of patients diagnosed with NETs annually is 7/100 000; however, the prevalence of patients living with NETs is higher (30-40/100 000) making it the second most common gastrointestinal malignancy after colorectal cancer. Patients are living longer, however, with impaired quality of life. Management of debilitating symptoms such as diarrhoea, fatigue, anxiety and flushing is complex and heterogeneous. With >60% having metastatic disease at diagnosis, transition to community delivery of SSAs, average travel of 300 km to NET COEs leading to reliance on GPs, we wanted to evaluate their needs in education, in the diagnosis and ongoing treatment and care of NET patients.

Method: From November 2018-August 2019, the Unicorn Foundation encouraged NET patients to nominate their treating GP to participate in a 21-question online or paper survey. Questions ranged from diagnosis and initial symptoms, interactions with NET specialists, educational needs and education delivery preferences.

Results: A total of 77 GPs have been nominated, with a return rate of 46% (35). A total of 72% reported that patients had consulted them prior to diagnosis; however, only 5% suspected a NET. Presenting symptoms included abdominal pain, weight loss, fatigue, diarrhoea, flushing and nausea. CT and ultrasound were the most common investigations, with colorectal-surgeon and gastroenterologist referral most frequent, followed by medical-oncologist. A total of 84% of GPs stated their patients had been presented to a MDT, with 75% of GPs receiving reports after consultations.

Education needs identified clinical-presentation, medical-management, pathophysiology/epidemiology, hormonal syndromes, somatostatin analogue therapy, symptom management, psychosocial, nutrition and supportive care as rating highly. Delivery preferences included online e-modules/webinars, conference workshops and face-to-face sessions.

Conclusions: With only 5% of GPs suspecting a NET diagnosis, the results of this vital survey will provide the foundations for much needed education modules to be made available to GPs. A pilot of this program will begin late 2019.

1. 2018/2019 Unicorn Foundation GP survey Dasari A, et al. JAMA Oncol. 2017; https://doi.org/10.1001/jamaoncol.2017.0589.

99 | Development and pilot testing of a low-literacy decision aid about reproductive choices for younger women with breast cancer

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About 50% of women lack the skills and capacity to access, understand and use health information effectively. Of concern are young women with breast cancer who are facing potential treatment-induced infertility with low health literacy (LHL). These women need access to high-quality and accessible information in order to make informed oncofertility decisions. Current decision support in fertility preservation is not appropriate for LHL groups.

Aim: To develop an online LHL oncofertility decision aid (DA) for younger women with breast cancer and pilot test it among 30 Australian women previously diagnosed with breast cancer.

Method: The DA was developed using LHL principles. Women who were premenopausal (18-40 years) at diagnosis (6 months up to 5 years ago) of early stage breast cancer were recruited from the Royal Melbourne Hospital, the Royal Women's Hospital and through Breast Cancer Network Australia. Participants were asked to complete survey 1, review the DA and complete survey 2.

Results: Twenty-six women enrolled and completed survey 1; 23 completed survey 2. Mean age was 37 years, mean age at diagnosis was 34 years, and 27% had LHL. Most (92%) had planned on having children or were unsure at diagnosis. Most (92%) recalled having an oncofertility discussion. All participants thought the DA was clear, good at giving information, useful, very easy to read, would have been helpful at the time of diagnosis, and 91% would recommend it to others. Knowledge scores significantly increased pre/post DA by a mean of three points (95% CI, 2.2-3.7; $P < .05$). No significant differences were seen in knowledge improvement between high/low literacy groups.

Conclusion: The DA was well received and significantly increased knowledge in women across low and high literacy groups. These data suggest that the DA is an equitable way to provide oncofertility support across health literacy levels; however, a further evaluation is needed.

100 | A good manufacturing practice training experience at the Princess Alexandra Hospital, Brisbane

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Background: The Sterile Production Centre (SPC) at the Princess Alexandra Hospital (PAH) is one of the few hospital-based production facilities in Queensland. Manufacturing parenteral cancer medicines is personalised and requires high precision – doses are manufactured at the individual patient level, dependent upon patient parameters and protocol. The Clinical Oncology Society of Australia (COSA) Guidelines for the Safe Prescribing, Dispensing and Administration of Systemic Cancer Therapy[1] clearly outline the requirement for pharmacy staff knowledge, competence and adherence to relevant standards in order to provide safe and quality aseptic compounding of medicinal products, such as chemotherapy. Furthermore, the Pharmacy Board of Australia requires pharmacy staff to undertake Continuing Professional Development (CPD) activities as part of becoming competent in complex compounding.[2]

Description: A perceived Good Manufacturing Practice (GMP) knowledge and competence gap in the PAH's Cancer Pharmacy team was identified. CPD opportunities for formal GMP training are limited due to the specialised nature of the service.

Action: Training provider SeerPharma delivered a bespoke eight-module GMP course over 2 days to 22 pharmacists and pharmacy technicians with varying levels of experience. Course modules included: operating and managing a clean room, environmental monitoring, and aseptic principles. Modules incorporated tests, exercises and discussions to assess understanding of course objectives.

Evaluation: Attendees completed a survey consisting of 10 statements measured against a 6-point Likert scale. Results indicate increased knowledge across all module outcomes. For the majority of attendees, actual knowledge before the training was less than their perceived knowledge.

Implications: The benefits of the GMP training course included increased GMP knowledge and competence, diversification of skill mix, and the creation of an SPC audit tool to measure compliance with GMP standards. Above all, the training contributed towards governance and expected enhanced quality and safety in the personalised delivery of sterile production services at PAH.

1. Carrington C, Brown-West L, Cameron K, Diakos C, Griffiths T, Kelly A, et al. COSA guidelines for the safe prescribing, dispensing and administration of systemic cancer therapy. Sydney: Cancer Council Australia. Available from: https://wiki.cancer.org.au/australia/COSA:Cancer_chemotherapy_medication_safety_guidelines [cited 2019 May 10]
2. Pharmacy Board of Australia. Guidelines on compounding of medicines. 2017 Aug. Melbourne: Pharmacy Board of Australia. Available from: https://www.pharmacyboard.gov.au/Codes-Guidelines.aspx [cited 2019 Feb 13].

101 | Advanced cancer patient preferences for return of molecular profiling results

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Aim: Research evidence is mixed regarding cancer patient preferences for receiving tumour molecular profiling (MP) results. This study aimed to discern preferences for return of MP results in patients who have recently agreed to undergo genomic testing.

Methods: We conducted a mixed-methods study to explore cancer patients' views on which MP results they would like to receive. The planned accrual target was reached with 1299 advanced cancer patients undergoing MP and completing questionnaires at the time of consent. A subset of patients (n = 20) participated in semi-structured interviews which underwent thematic analysis.

Results: Response rate was 92%. Most (96%) participants wanted to receive MP results that could guide further treatment for their advanced cancer. Sixty-four per cent wanted to access MP results which would not inform treatment, and 60% wanted to learn about germline findings. Participants with children (Exp(B) = 2.28; 95% CI, 1.09-4.76; $P < .05$) or with a first degree relative diagnosed with cancer (Exp(B) = 2.37; 95% CI, 1.17-4.80; $P < .05$) were more likely to want to be informed about gene variants that 'can guide treatment'. In terms of being informed about gene variants that 'cannot guide treatment', rural/remote patients were more likely than urban patients to want these results (Exp(B) = 0.45; 95% CI, 0.28-0.72; $P < .01$).

Two main themes were identified in the interview transcripts: (a) 'Cancer is the focus', which conveyed the priority of identifying therapies and fear of non-findings, and (b) 'Trust in clinicians', where participants relied on their clinicians to manage the process.

Conclusions: The majority of advanced cancer patients undergoing MP prioritised results which would lead to treatment options and trusted their oncologists to help them navigate the results return process. Concerns were related to receipt of non-findings.

102 | Who should access germline genome sequencing? A mixed methods study of patient views

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Aim: Implementation of any new medical test, including germline genome sequencing (GS) to inform cancer risk, should take place only when a test is effective, ethically justifiable and acceptable to a population. Little empirical evidence exists on patient views regarding GS for cancer risk.

Methods: Participants with a likely genetic basis for their cancer and their blood relatives were recruited to undergo GS and invited to complete questionnaires at the time of testing. A subset also participated in qualitative interviews about their views regarding access to GS to detect cancer risk, which were analysed by thematic analysis.

Results: The planned accrual target was reached with 536 participants (response rate of 92%). Forty participants were interviewed before saturation was reached, with no refusals. Probands and relatives had similar views on access to GS. Significantly more participants thought that if available, GS should be offered to their 'relatives' (91%) compared with GS being offered to 'everyone' (66%) (a difference of 25%; 95% CI, 20-31%; $P < .001$). Similarly, more participants thought that 'anyone who requests it' should have the GS (91%) than 'everyone' (66%) (a difference of 25%; 95% CI, 21-31%; $P < .001$). Males were less likely than females to think that relatives should have access to GS (Exp(B) = 0.43; 95% CI, 0.19-0.96; $P = .039$). Rationales for these views elicited during interviews reflected maximising the sound use of resources. Challenges to introducing community screening via GS to limit cancer burden were raised, including the current limits of science and individual ability to cope with uncertain results.

Conclusions: Participants undergoing GS supported cancer risk testing for those with a family history of cancer but were concerned about the challenges of designing and implementing a population-based GS cancer screening program.

103 | Key findings from the ColoREctal Well-Being (CREW) study, a 5-year longitudinal study of people living with and beyond colorectal cancer

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Aim: People living with and beyond colorectal cancer (CRC) form the largest group of cancer survivors that includes men and women but knowledge about recovery from CRC in terms of health and well-being is limited. The ColoREctal Well-Being (CREW) study is the first study to prospectively recruit a representative sample of CRC patients, carry out the first comprehensive assessment pre-treatment and follow up longitudinally over 5 years to explore the impact of treatment on health and well-being.

Methods: CRC patients from 29 UK cancer centres received questionnaires at baseline (pre-surgery), 3, 9, 15, 24, 36, 48 and 60 months. Quality of life (QOL), self-efficacy, mental health, social support, affect, socio-demographics, clinical and treatment characteristics were assessed. Data were analysed using trajectory analysis and multivariable regressions (linear and logistic).

Results: A representative cohort of 872 non metastatic CRC patients participated. Around 30% had poor psychosocial outcomes and this persisted to 5 years. Baseline psychosocial factors (particularly self-efficacy and depression) were more important than disease stage and location of tumour in determining those most likely to have health and well-being problems over the next 5 years. Risk factors for poor outcomes throughout the follow-up were depression, low self-efficacy, a lack of perceived social support, comorbidities that limit an individual's typical daily activities and unmet needs.

Conclusions: CREW provides robust evidence that psychosocial factors, such as self-efficacy, are important predictors for longer term well-being and health outcomes of CRC patients. We call for early assessment and intervention, including assessment of depression and confidence to manage illness-related problems and limiting comorbidities, from diagnosis onwards. Early assessment would identify those most likely to need support and has the potential to reduce need and improve outcomes throughout treatment and beyond.

104 | Reducing cancer malnutrition – What is happening in Victoria?

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Aim: Cancer malnutrition prevalence has been reported in Victoria biennially since 2012. The aim of the 2018 cancer malnutrition point prevalence study (PPS) was to determine the prevalence of malnutrition for adult inpatients and ambulatory patients receiving chemotherapy and/or radiotherapy.

Methods: A PPS of adult patients with cancer was conducted at multiple Victorian health services between July and August 2018. The Malnutrition Screening Tool and ICD-10-AM malnutrition definition were used to determine the risk and presence of malnutrition, respectively.

Results: A total of 19 sites recruited 1462 oncology patients into the study (n = 319 inpatients, 22%). Four hundred sixty (31%) patients were at risk of malnutrition, with an overall malnutrition prevalence of 15% (n = 220). This is a reduction in malnutrition prevalence in 2 years from 23% reported in the 2016 PPS and an overall reduction

of 16% over 8 years. Inpatients had a higher prevalence compared to ambulatory patients (29% vs 11%) and upper gastrointestinal (UGI) and lung cancer tumour streams had the highest prevalence (39% and 21%, respectively). Of those patients that were identified as malnourished, only 65% were receiving dietetic care at the time of the study.

Conclusions: The 2018 cancer malnutrition PPS indicates that the state-wide cancer malnutrition prevalence rate in Victorian health services has reduced in both the inpatient and ambulatory settings over the previous 2 years. Improvements are still needed in the UGI, lung and colorectal tumour streams where malnutrition prevalence is moderate, but patient volume is high. These results will continue to inform both local and state-wide approaches to address the burden of cancer malnutrition.

105 | SQiD: Can a single question help clinicians identify delirium in hospitalised cancer patients?

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Delirium has poor patient outcomes, more so where diagnosis is delayed or missed. Detection tools aid delirium identification but are not always used. We tested the SQiD (Single Question in Delirium) against psychiatrist diagnosis.

Methods: Patients admitted to either of two comprehensive cancer centres, in Sydney, Australia, were prospectively screened. Admissions of 24 h or less, or for chemo or radiotherapy only, were excluded. The SQiD 'Do you feel that [patient's name] has been more confused lately?' posed to the, relative, carer or friend was tested against clinical diagnosis by a consultant psychiatrist (PD) based on Diagnostic and Statistic Manual criteria. The primary endpoint was negative predictive value (NPV) of the SQiD versus PD; secondary analysis comprised NPV of SQiD versus NPV of the short Confusion Assessment Method (CAM).

Results: Between May 2012 and July 2015, the SQiD plus CAM was applied to 122 patients; 73 had SQiD plus psychiatrist interview. Median age was 68 years, 46% were female with median length of hospital stay of 12 days (interquartile range 5-18 days). Major cancer types were lung (19%), breast (12%) and prostate (11%). A total of 70% of participants had stage 4 cancer. A total of 9% had cerebral metastasis. Agreement was similar between the SQiD (NPV = 74%; 95% CI, 67-81; kappa = 0.32) and CAM (NPV = 72%; 95% CI, 67-77; kappa = 0.32), compared with psychiatrist interview. The CAM identified only a small number of delirious cases but all were true positives. Of the 16 patients with hypoactive delirium, six were identified on SQiD, the CAM identified one. The SQiD had higher sensitivity than CAM (44% [95% CI, 41-80] vs 26% [95% CI, 10-48]).

Conclusion: The SQiD, administered by ward clinical staff, was feasible and demonstrated favourable psychometric properties. The SQiD has potential to set a new standard of care as a delirium detection tool for hospitalised cancer patients.

106 | Do cancer survivors change their diet after cancer diagnosis?

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Lifestyle factors such as healthy diet and regular exercise may reduce risk of cancer and/or cancer recurrence. We aimed to investigate dietary changes made by cancer survivors including vegetable and fruit intake since cancer diagnosis.

Method: Data were collected prospectively from cancer survivors who had completed potentially curative cancer treatment and attended Sydney Cancer Survivorship Centre (SCSC) clinic between September 2013 and July 2019. Survivors were asked to complete a food questionnaire including questions about dietary changes since diagnosis and a 3-day food dairy. A dietitian assessed patients' fruit and vegetable intake based on their food dairy.

Results: A total of 572 survivors consented: 68% were female, mean age 57 (range 18-90) years. Main cancer types were breast (41%), colorectal (31%) and lymphoma (17%). More than half (n = 299/518) reported making dietary changes. Based on 298 descriptions, the most common dietary changes were increased vegetable intake (35%), reduced/avoiding red meat (23%), increased fruit intake (19%), reduced/avoiding sugar or foods high in sugar (18%), reduced alcohol intake (13%) and reduced high-fat food products (13%). Less than 10% of survivors chose to avoid dairy, reduce/avoid seafood, decrease coffee intake and/or start 'juicing'. An average of two dietary changes were made, with some making up to seven dietary changes. Adherence to special diets was reported by 8% of survivors, including intermittent fasting, low carbohydrate diet and vegan. Only a small proportion of survivors, 53 of 280 (19%) and 110 of 282 (39%), met the

recommended serves for vegetable and fruit intake, respectively. Some alcohol intake was reported by 233 of 487 (48%) survivors.

Conclusion: The majority of survivors modified their diet after cancer diagnosis; some modifications appear to be beneficial, whereas others were extreme and not evidence based. Future studies are needed to investigate the best approach to providing dietary information to support survivors to make appropriate dietary changes.

1. https://www.wcrf.org/dietandcancer

107 | Cancer epidemiology across age spectrums (incidence, prevalence, burden and issues of disease)

David Roder
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Over the 30 years from 1985 to 2015, numbers of cancer-diagnoses in Australia increased about 2.5-fold and numbers of cancer deaths increased about 1.7-fold. Corresponding increases for older Australians aged 75+ years were higher at about 3.1-fold for cancer diagnoses and 2.6-fold for cancer deaths. As a result, case loads have included progressively higher proportions of older people. This is illustrated by the increased percentage of cases in the 75+ age range which increased from 24% in 1985 to 30% in 2015 for cancer diagnoses and from 33% to 52% for cancer deaths. These trends indicate the scale of increase in case load on cancer services over the past 30 years, which has been much greater among older than younger cases.

Little respite is anticipated. Compared with the percentage increase in population size projected in Australia over the next 30 years, a 51% higher percentage increase in cancer diagnoses and a 71% higher percentage increase in cancer deaths are projected, largely due to change in age distribution. Cancer case complexity will increase with increased concentration of cancers in older Australians due to increased prevalence of age-related frailty and co-morbidity and age-related reductions in treatment effectiveness. Also due to ageing, a higher proportion of cases will experience a loss of living independence.

There will need to be an evidence-based response that includes stronger RCT evidence for treatment planning for older patients and broader health service data for monitoring clinical and health-system performance. Evidence-based planning and monitoring of limited resource availability will be paramount. The implications of increased cancer load on capacity of clinical services are significant and will need to be factored into health-service planning. For holistic care, community services including home support will need to be strengthened if as expected, more people with cancer and more facing death from cancer will be living alone.

108 | Beyond age and gender – What about race?

Lisa Whop
Menzies School of Health Research, Brisbane, QLD, Australia

Around the world, the changing face of oncology is being driven by scientific inquiry helping to deliver personalised medicine and care. Despite cancer mortality decreasing in the last decade for non-Indigenous Australians, cancer mortality has increased for Indigenous Australians. Understanding the multifactorial reasons for these diverging mortality trajectories requires examining the epidemiological understanding of age, gender and cancer type, but also demands close examination and dismantling of our understanding of race and racism and how it is operationalised in the Australian health care system. Understanding culturally safe care is critical in delivering personalised care at the population level for Indigenous Australians and will allow us the paradigm shift so urgently required.

109 | The emergence of youth cancer services as a unique model of care

Michael Osborn
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A key driver in establishing adolescent and young adult (AYA) oncology as a unique discipline was the observation that conventional healthcare models often struggled to adequately address the complex medical, psychological, and social issues experienced by patients aged 15 to 25 years. Over the past decade, considerable progress has been made in Australia and other developed countries to develop novel models of care to deal with the unmet needs of young people with cancer. The principles underpinning these models include patient and family-focused care informed by an understanding of normal AYA development, enhancing existing adult or paediatric cancer services to meet the needs of AYA, and promoting collaboration between paediatric and adult oncologists. Common elements of AYA cancer care include establishing an AYA multidisciplinary team that integrates medical and psychosocial care, efforts to centralize complex care, providing access and equity for all AYA, promoting clinical trials, and helping facilitate transition to healthy survivorship. Internationally, a number of successful organizational approaches have evolved, with a consistent theme being that local program development depends on resources, infrastructure, and assessment of unmet needs within the region. In Australia, there is now a network of five Youth Cancer Services across the country. Funded by the federal and state governments and CanTeen Australia, these Youth Cancer Services have enabled the majority of 15 – 25-year old Australians with cancer to access AYA-specific multidisciplinary care. In addition to providing tailored psychosocial support, these services have aimed to optimise access to oncofertility services, enrolment on clinical trials, and co-ordination of the complex care needs of young people during active treatment and the transition to survivorship. The development of national networks has also provided opportunities for shared learning and approaches to evaluation.

110 | Older cancer patients: The evolution of geriatric oncology and palliative care

Jane Phillips

University of Technology Sydney, Broadway, NSW, Australia

A combination of population ageing, the increasing number of older people diagnosed with cancer and living with other comorbidities and the complexity of cancer treatments is challenging healthcare systems and clinicians to consider new models of care. There is an urgent need for greater collaboration between oncology, geriatrics, primary and palliative care providers to ensure that the needs of this population are adequately addressed. This presentation will provide an overview of the current evidence supporting the integration of geriatric medicine principles and cancer-focused geriatric assessment to enhance the delivery of best evidence cancer care for older adults, with palliative care needs. It will explore the evidence supporting the interface between palliative medicine, geriatrics, oncology and primary care and the tools and resources that contributes to better care outcomes for this population.

111 | Why should I bother? The clinical benefits of germline genetic testing for a cancer patient

Nicola Poplawski
Royal Adelaide Hospital, Adelaide, SA, Australia

Tumour genetic testing identifies the unique combination of somatic mutations within a cancer clone. This tumour profiling provides clinicians with knowledge about the metabolic and molecular pathways to target when making treatment decisions, improving the care of individual patients. Germline genetic testing, on the other hand, can improve the clinical care of not only the individual cancer patient but also their genetic relatives. This talk will focus on the utility of germline genetic testing for patients and their families (why to test), how to effectively target testing to the patients who are most likely to benefit from testing (who to test), gene panel selection (what to test) and the key discussion points when obtaining informed consent (how to test).

112 | I did it – Now what? Benefits and limitations of NGS testing

Karin S. Kassahn, Lesley Rawlings
SA Pathology, Adelaide, SA, Australia

Next-generation sequencing (NGS) has greatly reduced the cost of genetic testing. As a result, more cancer patients now have access to testing and this has improved clinical care. Nevertheless, the technology is still evolving and so are the applications and uptake of NGS testing in various settings. As with any new technology, there is a steep learning curve for both, the laboratory and the clinical services that use the results of testing. This talk will present a number of clinical cases that illustrate the power and limitations of NGS testing for cancer patients. Using clinical case studies, we will discuss mosaicism, ethnicity and variants of uncertain clinical significance, virtual gene panels and their design. We will give examples of why a genetic test result can be different from what was expected and how testing may change practise.

113 | Closing the loop – Managing the patient and the family

Debra Trott
CALHN (Central Adelaide Local Health Network) RAH site, Adelaide, SA, Australia

Genetic testing and the identification of disease causing (pathogenic) mutations is enabling individualised cancer risk advice to be given to individuals and their genetic relatives. This talk will include a number of clinical cases to illustrate a number of real world issues including:

- Disclosure of results
- Residual cancer risk calculation
- Family risk notification and cascade/predictive genetic testing
- The importance of family communication for maximising the clinical utility of genetic testing for inherited cancer predisposition

114 | Recent advances in psychosexual interventions for prostate cancer

Amanda Hutchinson
Flinders Centre for Innovation in Cancer, Flinders University, Adelaide, SA, Australia

The psychological burden associated with prostate cancer and its treatment is increasingly recognised by clinicians, patients and their families. Men with prostate cancer are reported to have a higher risk of anxiety, depression and suicide than their peers. Thus, routine screening for distress, anxiety and depression is an important part of clinical care. The extent to which screening can improve outcomes for men with prostate cancer is dependent on the provision of quality evidence-based interventions that are responsive to their needs. In this presentation, recent evidence for psychosocial interventions will be considered from published reviews to pilot studies. Attention will be given to the intervention types, modes of delivery (online vs face-to-face) and settings of effective interventions.

115 | Management of supportive care issues associated with systemic treatment of prostate cancer

Alexandre Chan
National University of Singapore, Singapore, Singapore

Worldwide, prostate cancer is the second most commonly diagnosed of all cancers in men. Systemic treatments such as hormonal

therapy, chemotherapy and immunotherapy are frequently prescribed to patients diagnosed with prostate cancer. Despite excellent treatment outcomes associated with these treatment modalities, these treatments are often associated with a myriad of long-term side effects that could impact the health status of prostate cancer survivors. In this talk, we will discuss the management of common late toxicities that are associated with systemic prostate cancer treatment, which include bone, cardiac, metabolic and cognitive side effects, as well as the implications on care coordination for a prostate cancer survivor.

116 | Continence challenges faced by prostate cancer survivors

Kerry Santoro

Southern Adelaide Local Health Network, Bedford Park, SA, Australia

Prostate cancer is the most commonly diagnosed cancer in Australian men and it is estimated that in 2019 there will be 19 508 new cases of prostate cancer diagnosed in Australia. The risk of being diagnosed with prostate cancer increases with age, peaking at age groups 65-69 and 70-74. From 1986 to 2015, the 5-year survival from prostate cancer improved from 59% to 95% indicating men are living longer following a prostate cancer diagnosis (Australian Institute of Health and Welfare, 2019).

This presentation will look at prostate cancer as a disease, treatment options and side effects, with a focus on the impact of urinary incontinence post prostate cancer treatment. Living with incontinence is a major source of emotional stress, which can affect a man's social interactions and his sense of self-worth. It can be very debilitating, soul destroying and financially draining. It is vital that men are well counselled before prostate cancer treatment regarding side effects and their possible impact on quality of life.

Managing incontinence following prostate cancer treatment with medication or behavioural techniques in conjunction with pelvic floor exercises can provide some benefit, but some men may have to look to surgical intervention in an attempt to improve their urinary control. Again, careful counselling and sound clinical judgment must be applied when determining an appropriate approach to managing urinary incontinence following treatment for prostate cancer.

118 | Risk-stratified melanoma prevention and screening

Anne E. Cust

Sydney School of Public Health & Melanoma Institute Australia, The University of Sydney, Sydney, NSW, Australia

Despite Australia's high melanoma incidence rate, there is currently no population melanoma screening program and no systematic approach to melanoma prevention and early detection. International clinical practice guidelines vary considerably in screening and surveillance recommendations for high-risk individuals. The US Preventive Services Task Force has recommended that future research on skin cancer screening should focus on evaluating the effectiveness of targeted screening in those considered to be at higher risk, and risk stratification is likely to be an important component of future melanoma prevention and screening services in Australia. This talk will present the latest evidence on melanoma risk assessment, tailored approaches to prevention, screening and surveillance, and the benefits and potential challenges of this precision approach.

119 | Prostate cancer screening: Confusion, controversy and enlightenment

Michael O'Callaghan[1,2,3]

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[3]*Urology, Flinders Medical Centre, Bedford Park, SA, Australia*

Prostate Cancer: Prostate cancer is the most common cancer among Australian men. It is estimated that in 2019 there will be 19 000 new cases in Australia and 3500 deaths from the disease. Newly diagnosed patients have a 95% relative survival at 5 years with early stage diagnosis being beneficial.

Screening: PSA testing for prostate cancer was introduced to Australia in the late 1980s, resulting in increased incidence (86/100 000 males in 1988 to 184/100 000 in 1994). These new cases were typically low-grade disease and a decline in mortality was observed (44/100 000 in 1993, 35/100 000 in 1999). Approximately 80% of men treated for prostate cancer will experience negative effects such as urinary incontinence or erectile dysfunction.

Practice Recommendations: In Australia, RACGP guidelines do not recommend routine PSA screening. NHMRC guidelines (2016) recommend that the risks and benefits of PSA screening are discussed with men who can then make an informed decision; but do not recommend a population screening program. The UK national screening committee (2016) recommended against a systematic screening program and the US preventive services taskforce (2018) recommended that information about the benefits and harms of PSA testing is provided to patients. The European Association of Urology (2019) advocates for structured PSA screening using individualised screening intervals.

Evidence Limitations: The evidence basis for PSA screening comes from five randomised controlled trials. All trials have been conducted outside of Australia and some show low compliance rates and high contamination. A further obstacle to interpreting these trials is time. Prostate cancer has a long natural history, with mortality outcomes typically occurring after 15+ years. As follow-up time increases, the benefits of screening grow, while treatment options and triaging tools improve.

Conclusions: Current evidence supports a benefit for PSA testing, particularly in the context of individualised screening intervals.

120 | Cancer screening – A policy perspective

Sanchia Aranda

Cancer Council Australia, Sydney, NSW, Australia

Australia currently has three national cancer screening programs in breast, cervical and bowel cancer. There are also new opportunities and challenges as interest in risk stratified screening intensifies in breast cancer, following on from some level of risk stratification already embedded in the cervical screening renewal. Policy issues also arise from the bowel screening program related to both low investment in public education about participation and in the context of de facto and expensive use of colonoscopy. Calls for targeted screening in lung and liver cancer for high-risk individuals intensify and further challenge population approaches. The emergence of blood tests for circulating tumour cells and the potential of these tests to be directly marketed to consumers will also set new challenges for policy and practice. These challenges occur in the context of lower than desired participation in existing screening programs. This paper will explore the policy implications of these emerging issues in screening and will consider the role researchers and non-government organisations play in building the evidence base and creating the arguments for changes to existing programs and the funding of new programs. This policy debate sits against a backdrop of low investment in cancer prevention and early intervention compared to investment in treatments for late-stage disease in a health system struggling for economic sustainability.

121 | Challenges in demonstrating the value of cancer screening

Jonathan Karnon

Flinders University, Bedford Park, SA, Australia

Evaluations of cancer screening programs tend to focus on the early detection of cancer, but assessing the value of cancer screening requires the estimation of the consequences of early detection. Such consequences include improved health outcomes and reduced downstream costs, but also potentially increased costs due to the over treatment of precancerous lesions that would not have affected patients within their remaining lifetime. It is generally not feasible to conduct clinical trials that are able to detect such long-term consequences and so decision analytic modelling methods are commonly used to predict expected costs and patient outcomes. Such models also allow the comparison of the costs and effects of alternative potential screening programs to a no screening scenario.

This talk will introduce the types of data and modelling methods used to assess the value of cancer screening, using applied cancer screening models to illustrate the methods and model outputs and their use to inform funding decisions.

122 | Dose modifications for taxane chemotherapy induced peripheral neuropathy: A survey of Australian medical oncologists

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Aim: Chemotherapy-induced peripheral neuropathy (CIPN) is a recognised adverse effect of taxane chemotherapy that affects long-term quality of life. Evidence for dose modification of antineoplastic therapy for CIPN is limited. eviQ is an online resource providing cancer treatment protocols with dose modification guidelines formulated by expert opinion and evidence-based review. These guidelines recommend omitting taxanes for G3 CIPN, 25% dose reduction for the first incidence of G2 CIPN and 50% dose reduction if G2 CIPN persists. We sought to evaluate how rigidly Australian medical oncologists adhered to eviQ recommended dose modifications for taxane-related CIPN.

Methods: An online survey was distributed to over 400 MOGA and eviQ medical oncology reference committee members. Toxicity grading was based on CTCAE version 5.0.

Results: A total of 66% of 153 respondents (response rate 35%) followed the eviQ CIPN recommendations. A total of 14% of respondents would stop or dose reduce taxane chemotherapy when patients experienced G1 CIPN, 89% with G2 and 100% with G3. Reasons for not following the eviQ recommendations included: dose modification according to the individual clinical situation (23%), too aggressive (22%) and too conservative (8%).

Overall 92% of respondents would continue the current taxane dose on first occurrence of G1 CIPN. Fewer clinicians continued the current dose on the second (63%), third (42%) or fourth recurrence (42%). At first occurrence of G2 CIPN, 27% would continue the current taxane dose, 65% would dose reduce and 8% would cease. On second recurrence, only 11% would continue the current dose, and 5% on the third and fourth recurrences.

Conclusions: This survey demonstrated that clinicians readily dose modified taxane chemotherapy for CIPN and the majority of respondents followed the eviQ recommendations. The eviQ recommendations were not changed. Notable deviations from the eviQ guidelines included dose reduction for G1 CIPN and no dose reduction at the first occurrence of G2 CIPN.

123 | BEACON CRC: A randomized, 3-Arm, phase 3 study of Encorafenib (ENCO) and Cetuximab (CETUX) with or without Binimetinib (BINI) versus choice of either Irinotecan or FOLFIRI plus Cetuximab in BRAF V600E-mutant metastatic colorectal cancer

Jayesh Desai[1], Scott Kopetz[2], Axel Grothey[3], Eric Van Cutsem[4], Rona Yaeger[5], Harpreet Wasan[6], Takayuki Yoshino[7], Fortunato Ciardello[8], Ashwin Gollerkeri[9], Kati Maharry[9], Fotios Loupakis[10], Yong Sang Hong[11], Neeltje Steeghs[12], Tormod Kyrre Guren[13], Hendrik-Tobias Arkenau[14], Pilar García Alfonso[15], Timothy Price[16], Andrew Strickland[17], Niall Tebbutt[18], Christos Karapetis[19], Lorraine Chantrill[20], Felicity Murphy[21], Victor Sandor[22], Janna Christy-Bittel[9], Lisa Anderson[9], Josep Tabernero[23]

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BRAF V600E mutations are identified in ≤15% of metastatic colorectal cancer (mCRC) patients and confer a poor prognosis. In patient's refractory to initial therapy, ORR to standard chemotherapy and biologic combinations are generally <10%, with median PFS and OS of ~2 and 4-6 months, respectively.

The BEACON CRC Study (NCT02928224) was a multicentre, randomized, open-label, 3-arm, phase 3 study evaluating ENCO + CETUX +/− BINI (triplet or doublet combination) versus investigator's choice of Irinotecan or FOLFIRI + CETUX (control) in patients with BRAF V600E-mutant mCRC who had failed one or two prior regimens in the metastatic setting. Primary endpoints were OS and ORR (blinded central review) for the triplet versus control arm; secondary endpoints included OS for the doublet versus control arm, as well as PFS, duration of response and safety.

A total of 665 patients were randomly assigned to receive: triplet combination (n = 224), doublet combination (n = 220) or control regimen (n = 221). Median OS was 9.0 months (95% CI, 8.0-11.4) for the triplet versus 5.4 months (95% CI, 4.8-6.6) for control regimens (HR: 0.52; 95% CI, 0.39-0.70; $P < .0001$). Confirmed ORR (blinded central review) was 26% (95% CI, 18-35%) for the triplet versus 2% (95% CI, <1% to 7%) for control ($P < .0001$). Median OS for the doublet was 8.4 months (95% CI, 7.5-11.0) (HR vs control, 0.60; 95% CI, 0.45-0.79; $P = .0003$). Adverse events (AEs) were consistent with prior trials with each combination. AEs ≥grade 3 occurred in 58%, 50% and 61% of patients in the triplet, doublet and control arms, respectively.

ENCO + BINI + CETUX improved OS and ORR in patients with BRAF V600E-mutant mCRC compared with current standard of care chemotherapy and had a safety profile consistent with the known safety profile of each agent. This targeted therapy regimen should be a new standard of care for this patient population.

124 | Neurocognitive outcomes in a phase-3 randomised trial comparing adjuvant whole brain radiotherapy with observation after local treatment of brain metastases in patients with melanoma

Haryana Dhillon[1], Gerald B. Fogarty[2,3], Kari Dolven-Jacobsen[4], Rachael L. Morton[2,5], George Hruby[6,7], Anna K. Nowak[8], Janette L. Vardy[9], Kate J. Drummond[10,11], Catherine Mandel[12], Richard A. Scolyer[2,13], Brindha Shivalingam[14], Mark R. Middleton[15], Bryan Burmeister[16], Daniel E. Roos[17,18], Serigne N. Lo[19,20], Claudius H. Reisse[4], Elizabeth J. Paton[1,21], Narelle C. Williams[1,22], John F. Thompson[2,23], Angela Hong[2,3]

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Aim: Concerns regarding neurocognitive function (NCF) after whole brain radiotherapy (WBRT) exist. This trial compared WBRT versus observation (OBS) following local treatment in patients with one to three melanoma brain metastases. Here, we present the NCF results.

Methods: Objective NCF was evaluated in English speakers at baseline, then two-monthly. Primary outcome was change in delayed recall at 4 months on the Hopkins Verbal Learning Test-Revised (HVLT-R). Other NCF tests were also performed. A mixed linear model calculated the effect of intervention on relative raw scores, adjusted for baseline score and time. Cognitive failure was determined by Reliable Change Index; global cognitive impairment was defined as Global Deficit Score >0.5. Analysis was by intention-to-treat, with nominal two-sided significance level 5%.

Results: A total of 207 patients were randomised (100 WBRT and 107 OBS) from 31 sites in three countries. NCF testing was completed by 73 WBRT and 70 OBS patients at baseline. Patients had similar characteristics.

OBS group had greater relative improvement in HVLT-R from baseline at every time point. At 4 months, delayed recall declined 2.7% from baseline in WBRT but improved by 20.9% in OBS; overall adjusted average intervention effect 23.6% (95% CI, 9.0-38.2%; $P = .0018$). Significant effects were seen between groups at 4 months in HVLT-total recall and delayed recognition; the overall adjusted average intervention effects were 8.3% (95% CI, 0.4-16.1%; $P = .0397$) and 25.0% (95% CI, 14.3-35.7%; $P < .0001$), respectively. There were no significant differences in time to cognitive failure (log-rank $P = .44$) or proportions with global cognitive impairment at 4 months (OBS 32% vs WBRT 53%; $P = .11$). Cognitive decline in T-scores, baseline to 4 months, of 1 SD in at least one NCF test occurred in 24 of 38 (63%) WBRT versus 11 of 25 (44%) OBS ($P = .13$).

Conclusion: Cognitive impairment was common in both groups but greater memory decline occurred in patients receiving WBRT.

125 | Phase-3 international trial of adjuvant whole brain radiotherapy (WBRT) or observation (Obs) following local treatment of 1-3 melanoma brain metastases (MBMs)

Gerald B. Fogarty[1,2], Kari Dolven-Jacobsen[3], Rachael L. Morton[2,4], George Hruby[5,6], Anna K. Nowak[7], Janette L. Vardy[8], Kate J. Drummond[9,10], Haryana M. Dhillon[8], Catherine Mandel[11], Richard A. Scolyer[2,12], Brindha Shivalingam[12], Mark R. Middleton[13], Bryan Burmeister[14], Daniel E. Roos[15,16], Serigne N. Lo[8,17], Claudius H. Reisse[3], Elizabeth J. Paton[8,18], Narelle C. Williams[8,18], John F. Thompson[2,19], Angela Hong[2,20]

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Aim: The role of adjuvant WBRT in MBMs is controversial. This randomised trial compares WBRT with Obs after local treatment of 1-3 MBMs.

Methods: The primary endpoint is distant intracranial failure (DIF) within 12 months of randomisation. The a priori neurocognitive function (NCF) endpoint is Hopkins Verbal Learning Test-Revised (HVLT-R) delayed recall at 4 months and is reported separately. Secondary endpoints include local failure (LF), overall survival (OS) and global quality of life (QoL). Analyses were conducted on intention-to-treat basis with nominal two-sided significance level 5%. Drug therapy was allowed. Effective drugs became available during trial and their impact was analysed.

Results: Of 586 eligible patients (pts), 215 consented from 31 sites in three countries (Australia, the United Kingdom and Norway) between 2009 and 2017. Eight (0.04%) who withdrew or had no data collected were excluded. A total of 107 randomised to Obs and 100 to WBRT. Mean age was 62 years, 67% were males, 61% were with single MBM of mean size 2 cm and 67% had extracranial disease at randomisation. The two arms were well matched.

Within 12 months, 54 (50.5%) Obs pts had DIF compared with 42 (42.0%) WBRT pts (OR = 0.71; 95% CI, 0.41-1.23; P = .222). There was no difference in LF (P = .100) or OS (log-rank P = .861). A total of 53% (Obs) and 59% (WBRT) pts were alive at 12 months. There was no significant between-group difference in mean intervention effect on global QoL (P = .083). Pts who received T-cell checkpoint inhibitors and/or mitogen-activated protein kinases (MAPK) pathway inhibitors and WBRT before or within 12 months of randomisation had DIF rate 29% compared with Obs and no systemic therapy had 44%, but was not significant (P = .228).

Conclusion: This level one evidence shows WBRT does not improve outcomes in MBMs. This practice-changing trial justifies the recent move away from WBRT that occurred during the course of the trial.

126 | Central venous catheter thrombosis in cancer: A multi-centre retrospective study investigating risk factors and contemporary trends in management

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Aim: Reliable and safe central venous access is needed to facilitate chemotherapy for many cancer patients. However, central venous catheter-associated thrombosis (CVCT) is a common complication that can cause significant morbidity and mortality. There is a paucity of primary research examining the nature of CVCT in Australian cancer populations or exploring its management. Better understanding of factors predisposing to CVCT may allow prophylactic interventions to be better targeted to high-risk populations and influence decisions regarding choice of venous access device.

Methods: This multi-centre retrospective cohort study investigated factors associated with CVCT in cancer patients undergoing chemotherapy, using unadjusted and multivariate analyses. The management of CVCT was also described.

Results: A total of 402 cases of central line insertion were included, corresponding to 317 patients and 166 972 catheter days. Catheter associated deep venous thrombosis occurred in 20 patients (5.0%) and isolated superficial venous thrombosis occurred in four patients (1.0%). Factors associated with CVCT in univariate analysis included the proceduralist (P = .04), catheter type (P = .009), catheter site (P = .02), BMI (P = .03) and antithrombotic use (P = .04). On multivariate analysis, peripherally inserted central catheters (hazard ratio [HR] 4.39; 95% CI, 1.80-10.70, P < .001) and body mass index ≥25.0 kg/m^2 (HR = 3.32; 95% CI, 1.23-8.94; P = .02) remained significantly associated with thrombosis. CVCT was managed with line removal (19/24 cases) and anticoagulation, including direct oral anticoagulants (DOACs) in five patients.

Conclusions: This is the largest Australian study investigating CVCT in cancer patients to the authors' knowledge. Peripherally inserted central catheters and increased body mass index were associated with an independently increased risk of CVCT and this was often managed with catheter removal. Further research into the use of DOACs for CVCT prophylaxis or management would be of benefit and is particularly topical in light of recent developments in DOAC use in malignancy.

127 | Phase 2 study of lenvatinib (LEN) plus pembrolizumab (PEMBRO) for disease progression after PD-1/PD-L1 immune checkpoint inhibitor (ICI) in metastatic clear cell renal cell carcinoma (mccRCC): Results of an interim analysis

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Aim: LEN is a multi-kinase VEGFR inhibitor approved for use in combination with everolimus to treat advanced RCC following VEGF-targeted therapy. PEMBRO is an anti-PD-1 antibody. We report results of an interim analysis of the RCC cohort of a phase 2 trial of LEN+PEMBRO, in patients who progressed with prior ICI therapy.

Methods: This is a per-protocol interim analysis of an open-label study for patients with mccRCC, ≥1 prior therapy, RECIST disease progression on/following an ICI regimen (confirmed ≥4 weeks later), measurable disease, and ECOG PS ≤1. Patients received LEN 20 mg/day orally QD plus PEMBRO 200 mg intravenously Q3W until toxicity or disease progression. Tumour assessments were performed every 6 weeks (until week 24), then every 9 weeks.

Results: At data cutoff (29 March 2019), the first 33 enrolled patients were followed for ≥12 weeks for response evaluation, and 24 (73%)

patients were still on study treatment. The ORR was 51.5%, the DCR was 93.9%, and most patients had tumour shrinkage. Median follow-up time for PFS was 4.2 months. Patient characteristics are summarized (**Table**). ORR (investigator by irRECIST) was 51.5% (95% CI, 33.5-69.2) and median PFS was NE. The most common treatment-related adverse events were fatigue (49%), dysphonia (36%) and diarrhea (33%). Three (9%) patients discontinued treatment due to adverse events.

Conclusions: For patients with mccRCC who progressed during/following ICI therapy, LEN+PEMBRO demonstrated promising antitumor activity. No new safety signals were detected. The study will continue to full cohort expansion.

Patient Characteristics, n (%)	LEN+PEMBRO (n = 33)
Prior anticancer regimens	
1 prior regimen	14 (42)
>1 prior regimen	19 (58)
Prior VEGF-targeted therapy	26 (78.8)
Prior ICI therapy	33 (100)
PD-1/PD-L1 monotherapy	14 (42.4)
With VEGF agents	9 (27.7)
Nivolumab + Ipilimumab	7 (21.2)
With other agents	2 (6.1)
PD-L1 positive	12 (36.4)*

*30.3% were negative and 33.3% were not available.