4th Australian Lung Cancer Conference (ALCC), Adelaide, Australia, August 23-25, 2012

068-P12

LUNG ADENOCARCINOMA BIOMARKER SCREENING IN AN AUSTR`ALIAN POPULATION

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Aims: The emergence of new targeted therapies and clinical trials in lung adenocarcinoma suggest that routine molecular biomarker testing is warranted to detected subtypes of adenocarcinoma which will benefit from new therapies. Australian data is still emerging. We aim to detect the incidence of treatment specific molecular subtypes of lung adenocarcinoma in the Australian population.

Methods: This is a single centre prospective pilot study of patients with a histopathological diagnosis of adenocarcinoma who have been presented at a Lung Cancer multidisciplinary meeting. Formalin fixed paraffin embedded tissue of 22 tumour samples were submitted for targeted PCR-based EGFR and KRAS mutation analysis; and EGFR amplification, MET amplification and EML4-ALK rearrangement testing by in-situ hybridization. One sample had insufficient tissue for analysis.

Results: So far 22 patients received a definite tissue diagnosis of lung adenocarcinoma, 8/22 with Stage III and 10/22 with Stage IV disease. 4/22 (19%) are positive for an EGFR mutation, with activating EGFR mutations in 3/22 (14%) and an EGFR mutation of uncertain clinical significance in one patient (5%). EGFR amplification was detected in 2/22 patients (9%), KRAS mutations were detected in 5/22 patients (23%) patients, of which none carried EGFR mutations. EML4-ALK translocation was seen in 2/22 patients (9%) and MET amplification in 1/22 (5%) patients.

Conclusions: Preliminary results indicate that treatment specific molecular subtypes of lung adenocarcinoma occur more commonly in the Australia population than other Western populations. Though further investigation is required, routine molecular biomarker testing is warranted.

Disclosure: This study was funded by an unrestricted grant from Roche.

094-P12

MACROPHAGE POLARISATION IN PRIMARY LUNG CANCER

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Macrophages are part of the tumour microenvironment and have been shown to play a major part in promoting and/or suppressing tumour growth and metastasis. Here, we aim to identify how macrophage phenotypes are affected by the local and systemic microenvironment of patients with primary lung cancer. Alveolar macrophages (AMs) were isolated from patients with primary lung cancer (n=8) and non-cancer control patients (n=9) and analysed for phenotypic differences by flow cytometry. Preliminary results showed that surface expression of M2 markers (CD163, CD36, CD150 CD195) were more highly expressed ($p < 0.05$) compared to M1 marker (CD253, HLA-DR, IP-10) expression was significantly decreased ($p < 0.05$) in patients with primary lung cancer compared to non-cancer controls. In addition, surface expression of myeloid markers CD11b and CD71 was shown to be increased in patients with primary lung cancer suggesting that lung tumours have the ability to alter AM functions and may also play a role in changing the polarising conditions of AM phenotypes. Although these results are preliminary findings, this study aims to clarify how macrophages in primary lung cancer are affected by the tumour microenvironment and how the local and systemic microenvironment influence macrophage phenotypes and functions and further investigations will also investigate how blood monocyte phenotypes are affected in patients with primary lung cancer This study will potentially contribute to the identification of new biomarkers for primary lung cancer and help in the development of more effective anti-tumour treatments in the future.

020-O12

CELLS OF ORIGIN OF THE DIFFERENT SUBTYPES OF LUNG CANCER

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Lung cancers are divided into distinct histopathological subclasses. Squamous cell carcinomas are suspected to originate from the proximal airways, small cell lung cancer are predominantly located in the bronchioles while adenocarcinomas, the most common type of lung cancer, are more frequently detected in the distal part of the lung. It is speculated that these different subclasses arise from distinct cells of origin localised within a defined regional compartment. Prospective isolation of progenitor cells in the lung will enable further evaluation of their roles in tumour initiation.

To isolate lung epithelial subpopulations, fresh human lung samples obtained from surgery (Victorian Cancer Biobank) are dissociated into a single cell suspension. Cells are stained and sorted by flow cytometry based on their differential expression of specific cell surface markers including EpCAM (Epithelial Cell Adhesion Molecule) and CD49f (Integrin a6). These markers have previously been used to isolate mouse lung stem/progenitor cells. Characterisation of the sorted subpopulations demonstrated that distinct populations of progenitor cells were isolated from the proximal and distal lung. To address potential cells of origin for the different lung tumour subtypes, gene signatures of the normal epithelial subpopulations will be compared to the gene expression profiles of lung carcinomas. Known lung cancer oncogenes (K-Ras, EML4-Alk, KIF5-Ret…) will be introduced into the different progenitor cells to evaluate their capacity to preferentially transform a specific cell type.

Establishing a link between the first cell in which a specific mutation occurs and the molecular subtypes of lung cancer will enable better stratification of patients for improved therapeutic strategies.

Funding source: Victoria Cancer Agency

034-O12
THE COMPLEX RELATIONSHIP BETWEEN LUNG TUMOR VOLUME AND SURVIVAL IN PATIENTS WITH NON-SMALL CELL LUNG CANCER TREATED BY DEFINITIVE RADIOTHERAPY: A PROSPECTIVE, OBSERVATIONAL PROGNOSTIC FACTOR STUDY OF THE TRANS-TASMAN RADIATION ONCOLOGY GROUP (TROG 99.05).

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Purpose: To investigate the hypothesis that primary tumour volume is prognostic independent of T and N stages in patients with non-small cell lung cancer (NSCLC) treated by definitive radiotherapy.

Methods: Multicenter prospective observational study. Patient eligibility: pathologically proven stage I-III NSCLC planned for definitive radiotherapy (minimum 50 Gy in 20 fractions) using CT-based contouring. Volumes of the primary tumour and enlarged nodes were measured according to a standardized protocol. Survival was adjusted for the effect of T and N stage.

Results: There were 509 eligible patients. Five-year survival rates for tumour volume grouped by quartiles were, for increasing tumour volume, 22%, 14%, 15% and 21%. Larger primary tumour volume was associated with shorter survival (HR = 1.060 (per doubling); 95% CI 1.01 to 1.12; P = 0.029). This association, after adjusting for the effects of T and N stage, was not evident (HR = 1.029, 95% CI, 0.96 to 1.10, P = 0.39). There was evidence, however, that larger primary tumour volume was associated with an increased risk of dying, independently of T and N stage, in the first 18 months but not beyond.

Conclusions: In patients treated by non-surgical means we were unable to show that lung tumour volume, overall, provides additional prognostic information beyond the T and N stage (TNM , 6th edition). There is evidence, however, that larger primary tumour volume adversely affects outcome only within the first 18 months. Larger tumour size alone should not by itself exclude patients from curative (chemo) radiotherapy.

Disclosure: None identified.

112-S12
SURVIVAL ANALYSIS IN THE MODERN ERA

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Overall survival (OS) or Progression free survival (PFS) can be used as the primary endpoint in pivotal phase III randomized clinical trials (RCTs) for advanced stage solid cancers, according to the US FDA guidelines. At present there is much debate in the medical community about which is the most appropriate endpoint and whether therapies which only demonstrated a statistically significant improvement in PFS but not in OS ultimately benefit patients. This presentation reviews the pros and cons of OS and PFS in light of these discussions and the challenges researchers face when designing a phase III RCT.

023-P12
AN UNUSUAL CASE OF METASTATIC MALIGNANT MELANOMA PRESENTING AS PSEUDOMESOTHELIOMA

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A 75 year old man, previously fit and a non-smoker, presented with one month history of rapidly progressive dyspnea on exertion, left pleuritic chest pain, and weight loss. His medical background included previous asbestos exposure and 2mm Clark IV cutaneous malignant melanoma in the right upper back, treated with wide excision (surgical margins clear of tumour and no axillary sentinel lymph node involvement) 15 months prior to the presentation.

CTPA demonstrated bilateral pulmonary emboli, massive left pleural effusion with collapse of the left lung, bilateral calcified pleural plaques, left hilar and subcarinal lymphadenopathy, and left adrenal lesion. The bloodstained pleural fluid aspirate showed no lymphocytes, bacteria or malignant cells. The patient was anti coagulated.

Further evaluation with FDG PET-CT revealed extensive intense FDG uptake (SUVmax 14.1) throughout the pleura of the left hemi-thorax, bilateral hilar and mediastinal lymph nodes, bilateral adrenals and left gluteal musculature, highly suspicious of metastatic malignancy.

Mesothelioma was considered and the patient underwent thoracoscopic pleural biopsy. The biopsy was consistent with metastatic melanoma. The patient was referred for consideration of palliative therapy but died 10 days later.

Conclusion: The extensive intensely FDG avid pleural disease, with history of asbestos exposure and bilateral calcified pleural plaques, is highly suggestive of mesothelioma. This case illustrates that other malignancies including metastatic melanoma can have a similar appearance. The literature on metastatic malignant melanoma presenting as pseudomesothelioma will be reviewed.

102-P12
DOCETAXEL VERSUS GEFTINIB IN PATIENTS WITH LOCALLY ADVANCED OR METASTATIC NSCLC PRE-TREATED WITH PLATINUM-BASED CHEMOTHERAPY

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Objective: To assess the safety and efficacy of Docetaxel versus Geftinib therapy used as a second line treatment in patients who had progressed or had recurrence after previous platinum-based chemotherapy.

Materials and Methods: 30 patients with locally advanced or metastatic NSCLC previously treated with Cisplatin-based chemotherapy, who had progressive or recurrent disease and ECOG performance score 0-2, were randomized to receive either Geftinib 250 mg /day or Docetaxel 75 mg/m2 every 3 weeks. Tumor response was assessed with RECIST Criteria and adverse events were noted. Patients were followed for 2 years.

Results: Tumor response rates and disease-related symptom improvements were similar for Geftinib and Docetaxel . Significantly more Gefitinib treated patients experienced a clinically relevant improvement in quality of life compared to Docetaxel.

Conclusions: The study demonstrated non-inferiority of Gefitinib relative to Docetaxel in terms of tumor response. Also Gefitinib had a more favourable tolerability profile than Docetaxel.

Disclosure of interest: None

Source of funding: None

029-P12
ABORIGINAL CANCER CARE AT PETER MAC: CONNECTING AND RESPONDING (ACCAP)

Bird, L,[1] *Longo R[1], Hocking A[1], Watson F[1], Joubert L[1] [1]Peter MacCallum Cancer Centre*

Aim: Peter Mac aims to provide a culturally sensitive and appropriate cancer care pathway within Peter Mac to coordinate and effectively coordinate and integrate effective and community linked cancer services to Aboriginal and Torres Strait Islander patients with cancer in Victoria. We will describe the development of an evidence informed pathway for Aboriginal and Torres Strait Islander lung cancer patients.

Methodology:

1. Undertake extensive internal and external stakeholder consultation.
2. Analyse a retrospective consecutive sample of Aboriginal patients receiving services at Peter Mac using a clinical data mining methodology (Epstein 2004).
3. Design, implement and analyse a staff survey addressing Aboriginal health.
4. Develop an evidence informed appropriate and culturally sensitive Aboriginal lung cancer care pathway.

Results: Among other outcomes, findings from the three data sources indicated that lung cancer was one of the most prevalent diagnoses with patients most usually receiving treatment via surgery and chemotherapy. In addition, 36.5% of Aboriginal patients were smokers, with 17.1% seen by the Peter Mac Smoking Cessation Nurse.
A staff survey of 265 respondents indicated that 84% had a moderate to high interest in learning more about Aboriginal health and providing culturally sensitive care.
Conclusion: The results support the importance of a process of stakeholder consultation and staff feedback, analysis of referral patterns, assessment of clinical need as well as exploring the reasons for resisting hospital admission, to inform the process of creating a pathway to better support Aboriginal patients with lung cancer.

075-P12
LUNG CANCER AS AN ALLIED HEALTH SPECIALTY: A CASE STUDY.

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Aims: Allied health professionals are important members of the multidisciplinary team caring for patients with lung cancer. Lung cancer patients experience a high burden of symptoms which can result in rapid deterioration of health and functional status. The aim of allied health intervention is to provide client-centred, family-focused care across the disease trajectory to address patient and family needs, negotiate changing goals, and address quality of life issues.
This case study illustrates how allied health intervention from Social Work, Occupational Therapy, Physiotherapy and Nutrition supported a patient and his family through multiple hospital admissions culminating in enabling the eventual goal of end of life care in his own home.
Methods: A retrospective analysis of the care of a 56 year old male with NSCLC was undertaken. Data related to occasions of service and time usage was collected for each discipline.
An analysis of allied health input over time was also conducted to determine the type and intensity of interventions provided.
Results: A high level of input (Occasions of service: Nutrition= 13, Physiotherapy= 18, Occupational Therapy= 19, Social Work= 37) was required in the care of this patient over five hospital admissions. During this time there were multiple changes to needs and goals. Allied health provided ongoing assessment and flexible care to meet these fluctuating needs and enable end of life care at home.
Conclusions: A high level of specialist allied health input is required to meet the rapidly changing functional needs and goals of lung cancer patients and their families.
Disclosure: None of the above authors have concerns re: dualities or conflict of interest.

100-P12
RETROSPECTIVE ANALYSIS OF NON-SMALL CELL LUNG CANCER (NSCLC) SURGICAL MANAGEMENT IN A SINGLE INSTITUTION STUDY.

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Introduction: The surgical management of NSCLC, while relatively uncontroversial in earlier stage disease, can present management dilemmas in later stage disease. In this study we present the results of a single institution, retrospective analysis of surgically managed NSCLC with a focus on the evolution of stage with progression through staging modalities, surgical procedure and length of stay post-operatively for comparison with similar data from international series.
Methods: Data was drawn from the SVH Lung Cancer database, an integrated database capturing information from thoracic surgical cases and cases presented to the campus multidisciplinary lung cancer team. Data analysis was restricted to cases appropriate for curative surgery with pre-operative stage I-IIIA. Measurable outcome endpoints included length of stay post-surgery (LOS).
Results: Data was analysed from the time period 2006-2011. The database contained 252 cases of NSCLC. 31% (n=79) underwent surgery with a documented curative aim (pre-operative Stage Ia (n=33), Ib (n=10), IIa (n=15), IIb (n=8), IIIa (n=12) and IIIb (n=1)). 9% (n=7) of all patients who underwent surgery were upstaged to Stage IIIa/b based on post-operative histology. Surgical management of pre-operative Stage IIIa included 10 lobectomies and 2 pneumonectomies with curative intent. The average LOS for Stage III was 13 days regardless of procedure. There were no in hospital mortalities or 30 day mortalities.
Discussion: This retrospective, single-institution series, while small, demonstrates that the St Vincent's Hospital lung cancer surgery programme manages cases across the spectrum of early stage disease. In our institution's experience surgical management of stage IIIA disease is consistent with international best practice and that initial outcome measures are favourable.
Disclosure: Please note this abstract contains no issues of duality or conflicts of interest.

040-O12
DO PATIENTS DISCUSSED AT MULTIDISCIPLINARY MEETINGS RECEIVE GUIDELINE-RECOMMENDED TREATMENT?

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Aim: Australian practice guidelines recommend that all lung cancer patients should be discussed at a multidisciplinary meeting (MDM) to determine a management plan. Previous studies have shown that lung cancer MDM recommendations are largely concordant with guidelines. This study aimed to determine whether patients discussed at a lung cancer MDM actually received NHMRC guideline recommended treatment (GRT).
Method: The Liverpool/Macarthur lung cancer MDM collects data prospectively on new lung cancer patients including patient and tumour characteristics, staging investigations, referrals and treatment recommendations. All new lung cancer patients discussed at the MDM between 1/12/05 – 31/12/2010 were identified. Details of patient demographics, tumour characteristics and treatment were obtained from the MDM database and the Area Clinical Cancer Registry. GRT was assigned to each patient according to pathology, stage and ECOG performance status as per the 2004 NHMRC Lung Cancer Guidelines. This was compared to actual treatment received to determine adherence to GRT.
Results: 808 patients were discussed at the MDM. 64% were male and the median age was 68years. 81% of patients had pathologically confirmed NSCLC while 15% had SCLC. Of those with NSCLC, 42% had stage IV disease. Most patients had both stage (99.8%) and ECOG performance status (98.2%) documented. GRT could therefore be assigned in 98% of patients. Overall 51% of patients received GRT, and 47% of patients did not receive GRT.

Conclusion: Although previous studies have shown that MDM recommendations are largely concordant with practice guidelines, this study shows that only 51% of patients actually received GRT. Further analysis will be done to determine factors influencing adherence to GRT.
Disclosure: There are no conflicts of interest.

033-O12

LUX-LUNG 3: A RANDOMIZED, OPEN-LABEL, PHASE III STUDY OF AFATINIB VERSUS PEMETREXED AND CISPLATIN AS FIRST-LINE TREATMENT FOR PATIENTS WITH ADVANCED ADENOCARCINOMA OF THE LUNG HARBOURING EGFR-ACTIVATING MUTATIONS

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Aim: To investigate the efficacy/safety of afatinib, a selective, orally bioavailable, irreversible ErbB Family Blocker of EGFR (ErbB1), HER2 (ErbB2) and ErbB4, compared with pemetrexed/cisplatin in patients with EGFR mutation positive advanced lung adenocarcinoma.
Methods: 345 EGFR mutation positive patients (Stage IIIB/IV, performance status 0–1, chemo-naive) were randomized 2:1 to daily afatinib 40 mg (n=230) or intravenous pemetrexed/cisplatin (500 mg/m^2 + 75 mg/m^2 every 21 days up to 6 cycles; n=115). Primary endpoint was progression-free survival (PFS) by central independent review.
Results: Baseline characteristics were balanced in both arms. Treatment with afatinib significantly prolonged PFS versus pemetrexed/cisplatin (median 11.1 vs. 6.9 months; HR 0.58 [0.43–0.78]; p=0.0004). In 308 patients with common mutations (Del19/L858R), median PFS was 13.6 versus 6.9 months (HR=0.47 [0.34–0.65]; p<0.0001). Objective response rate was significantly higher with afatinib (56% vs. 23%; p<0.0001). Significant delay in time to deterioration of cancer-related symptoms of cough (HR=0.60, p=0.0072) and dyspnoea (HR=0.68, p=0.0145) was seen with afatinib versus pemetrexed/cisplatin. Common drug-related adverse events (AEs) were diarrhoea (95%), rash (62%) and paronychia (57%) with afatinib, and nausea (66%), decreased appetite (53%) and vomiting (42%) with pemetrexed/cisplatin. Drug-related AEs leading to discontinuation were 8% (afatinib) versus 12% (pemetrexed/cisplatin).
Conclusions: LUX-Lung 3 is the largest prospective trial in EGFR mutation positive lung cancer and the first study using pemetrexed/cisplatin as a comparator. Treatment with afatinib significantly prolonged PFS compared with pemetrexed/cisplatin, with significant improvements in secondary endpoints, making afatinib a clinically relevant first-line treatment option. AEs with afatinib were manageable.
Research funding source: Boehringer Ingelheim Pharma GmbH & Co. KG, Germany
Disclosures:
M. Boyer: Advisory role, Boehringer Ingelheim, Pfizer; Honoraria, Boehringer Ingelheim, Eli Lilly, Pfizer; Research funding, Boehringer Ingelheim; Other, Roche
M. Schuler: Advisory role, Boehringer Ingelheim; Research funding, Boehringer Ingelheim; Other, Eli Lilly
N. Yamamoto: None
K. O'Byrne: Advisory role, Boehringer Ingelheim; Honoraria, Boehringer Ingelheim, Eli Lilly; Research funding, Boehringer Ingelheim; Other, Eli Lilly, Boehringer Ingelheim
V. Hirsh: Advisory role, Boehringer Ingelheim
T. Mok:: Advisory role, Astra Zeneca, Eli Lilly, Merck Serono, Aveo, Boehringer Ingelheim, Pfizer, Eisai, Taiho, Roche, BeiGene; Honoraria, Astra Zeneca, Eli Lilly, Merck Serono, Aveo, Boehringer Ingelheim, Pfizer, Eisai, Taiho, Roche, BeiGene; Research funding, Astra Zeneca;
D. Massey: Employment, Boehringer Ingelheim; V. Zazulina: Employment, Boehringer Ingelheim; M. Shahidi: Employment, Boehringer Ingelheim
L. Sequist: Advisory role, Boehringer Ingelheim, Daichii Sankyo, Merrrimack, Clovis, Celgene; Research funding, Boehringer Ingelheim
J.C.-H. Yang: Advisory role, Boehringer Ingelheim; Honoraria, Boehringer Ingelheim

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090-P12

LINC: A PILOT LUNG CANCER INTERDISCIPLINARY CLINIC

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Background: Cancer patients, and in particular lung cancer patients, have a high level of unmet psychological, physical and daily living needs causing personal distress. This distress would be best addressed by access to a combination of health professionals.
It is proposed that an interdisciplinary team located in an outpatient setting can better meet the needs of patients through a collaborative approach to treatment, planning, supportive care and preserving current function.
Aim: To establish the level of distress by using Screening tool; increase access to outpatient interdisciplinary services ; To develop a referral pathway; To provide psychosocial support, practical assistance and education to lung cancer patients to prevent crisis
Design and method: A prospective cross sectional study of lung cancer patients will be undertaken. All new patients that are identified by the Lung CNC via the Lung Multidisciplinary clinic will be invited to attend the Lung Interdisciplinary Clinic (LINC). The clinic is an interdisciplinary team made up of lung cancer nurse, physiotherapists, occupational therapists, social workers and dieticians. Patients will be invited to complete the distress thermometer screening tool. . Based on results of the screen referral will be made to the appropriate profession for follow up interventions. The aim will be to complete the intervention during this appointment or within 1 week from the initial referral. A repeat conduction of the distress thermometer screening tool will be completed within 4 weeks from the conclusion of interventions
Funding from CaPCREU will enable this study to take place. Planned to commence in September 2012.

113-S12

ROLE FOR PET BEYOND INITIAL STAGINS - FOR

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The contribution of ^{18}FDG PET (usually now PET CT) in combination with conventional imaging in improving staging is well established. Most commonly the cancer is upstaged, with improvement in prognostication related to stage migration and more targeted therapy, often changing management from potentially curative to palliative.
Once the original management is planned, PET may have a further role in.

- Detecting recurrence early in patients after potentially curative therapy.
- Determining at an early stage response to therapy (chemotherapy, radiotherapy and radiofrequency ablation) allowing modifications.
- Differentiating recurrence of tumour from post-surgical or post radiotherapy changes
- Molecular characterisation (eg EGF receptor targeting with ^{11}C-erlotinib in planning therapy)

• Characterising rare tumours (eg bronchial carcinoids with ^{68}Ga-DOTA) with potential for targeted therapy.

The Schedule of Medicare Benefits in Australia (item 61529) allows for "Whole body FDG PET study, performed for the staging of proven non-small cell lung cancer, where curative surgery or radiotherapy is planned (R)", but no other lung cancer indication hence the above are not currently rebatable.
It will be important to generate evidence that outcomes (survival or quality of life) are improved with the above uses before they become widespread. Currently, the evidence is not robust.

058-O12
ZIC1 ACTS AS A TUMOUR SUPPRESSOR GENE AND IS SILENCED IN MALIGNANT PLEURAL MESOTHELIOMA

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Epigenetic inactivation of tumour suppressor genes through DNA hypermethylation plays a crucial role in the progression of malignant pleural mesothelioma (MPM). ZIC1, a tumour suppressor gene silenced through promoter hypermethylation in gastric and colorectal cancer, was expressed at high levels in normal mesothelial cells. In contrast, ZIC1 was not expressed or was downregulated in MPM cell lines. Following treatment with decitabine, expression of ZIC1 was significantly up-regulated in all mesothelioma lines but was unchanged in MeT-5A and primary human mesothelial cells. MSP and COBRA analysis revealed methylation of the ZIC1 promoter that correlated with ZIC1 mRNA expression, suggesting ZIC1 is silenced in MPM through DNA hypermethylation. Enforced ZIC1 expression inhibited cell migration and colony formation in H28, Ren and MM05 cell lines, and ZIC1 knockdown enhanced growth of MeT-5A in soft agar. In MPM tumour samples ZIC1 mRNA expression was present at low or undetectable levels, with promoter methylation observed in 16 of 24 cases. Microarray analysis of MPM cell lines revealed that a number of miRNAs were overexpressed in the absence of ZIC1 expression. Upon enforced ZIC1 expression, levels of miR-23a and miR-27a were reduced, and cells transfected with an inhibitor of miR-23a exhibited reduced colony formation. These miRNAs were expressed at higher levels in tumours from patients with shorter survival. Our results show that ZIC1 behaves in MPM cell culture as a tumour suppressor gene that functions in part through downregulation of miR-23a.

073-P12
EGFR MUTANT SPECIFIC IMMUNOHISTOCHEMISTRY HAS HIGH SPECIFICITY BUT ONLY MODERATE SENSITIVITY FOR DETECTING COMMON ACTIVATING EGFR MUTATIONS IN LUNG ADENOCARCINOMA

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Aim: We assessed the accuracy of EGFR mutant specific antibodies for detecting two common activating EGFR mutations.
Methods: Expression of mutant specific antibodies to EGFR exon 19 deletion E746_A750 and exon 21 L858R point mutation were assessed in a cohort of 204 resected early stage node negative lung adenocarcinomas. Expression of mutant specific EGFR proteins was compared with standard mutation analysis (mass spectrometry).
Results: Of 7 cases with L858R point mutation, 6 were positive by immunohistochemistry (IHC). There were 2 false positive cases using L858R IHC (sensitivity 86%, specificity 99%, negative predictive value 99%). Of 7 E746_A750 exon 19 deletions identified by mutation analysis, 5 were positive by IHC. Three additional cases were positive for exon 19 IHC but negative by mutation analysis. The sensitivity of exon 19 IHC for E746_A750 was 71%, specificity 98% and negative predictive value 99%.
Conclusion: Mutant specific EGFR immunohistochemistry has good specificity but only moderate sensitivity for identifying targeted activating EGFR mutations. The high negative predictive value of IHC means it could be a useful tool to screen out cases unlikely to harbour mutations.
Disclosure: no dualities of interest identified.
Funding: Cancer Institute of NSW and Lifehouse at Royal Prince Alfred Hospital.

089-O12
BRONCHOSCOPY AND TRANSTHORACIC-NEEDLE ASPIRATION YIELD FOR HISTOMORPHO-MOLECULAR DIAGNOSIS

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Introduction: Somatically acquired mutations, including in the EGFR gene, drive many lung cancers. Since targeted therapies were introduced, diagnosis often requires sufficient tissue for histomorphology and molecular analysis. We studied patterns of molecular analysis after conventional diagnosis.
Methods: Review of consecutive subjects undergoing fibreoptic bronchoscopy (FOB) and transthoracic-needle aspiration (TTNA) for suspected lung cancer over 3 months.
Results: 79 patients underwent 89 procedures; 68 FOB, 21 TTNA. 5/68 patients who underwent FOB proceeded to TTNA, and 5 required repeat FOB. 24/68 (35%) were diagnosed at FOB with primary lung cancer, 2 SCLC and 22 NSCLC; others were metastases or benign. 8/22 (36%) NSCLC were squamous cell carcinomas (SCC) and 14 demonstrated non-squamous histologies including 11 adenocarcinoma (50%) (AC). Of 14 non-squamous carcinomas, 9 had malignant cells in transbronchial biopsy (TBBx), 2 in transbronchial-needle aspiration (TBNA), 2 in lymph node TBNA, 9 in wash (BrW), 4 in mini-bronchioloalveolar lavage and 7 in brushings. Cell-blocks were available for 13 /24 cytology samples. Of the non-squamous NSCLC, 8 were incurable. 21 underwent TTNA, 15 (71%) with primary lung cancer; 2 (13%) 2 SCC, 13 (87%) non-squamous including 7 AC. 1 diagnosed by core biopsy and 14 by cytology from which 10 had cell-blocks. Of the non-squamous NSCLC, 8 had incurable disease.
From 16 incurable non-squamous tumours 5 specimens (3 TBBx, 2 BrW) were tested for EGFR exon 19 / 21 mutations; all were mutation negative.
Conclusions: There is need for a standardised approach to EGFR mutation analysis to guide lung cancer treatment.

Disclosure: No authors have any conflicts of interest to disclose.
This work was supported by: NHMRC project grants; NHMRC Practitioner Fellowship (KF), NHMRC Career Development Fellowship (IY); Cancer Council Queensland PhD scholarship (Marissa Daniels), Cancer Council Queensland Senior Research Fellowship (KF), Cancer Council Queensland project grants; NHMRC NCARD project grant; Cancer Australia project grants; Queensland Clinical Research Fellowship (KF, IY); Australian Lung Foundation / Boehringer Ingelheim COPD Research Fellowship (IY).

063-P12
A PERSONALIZED VACUUM IMMOBILIZATION CRADLE REDUCES TUMOUR MOTION DURING STEREOTACTIC RADIOSURGERY OF PULMONARY TARGETS.

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Aim: To assess the impact of the Elekta BodyFix® system (Medical Intelligence, Schwabmünchen Germany) on tumour motion amplitude and direction of motion in the context of stereotactic radiosurgery.
Method: As part of a prospective pilot study of stereotactic radiosurgery for pulmonary oligometastases, 12 patients underwent both a 4D planning CT and a 4D PET/CT. For the planning CT patients were immobilised using the Bodyfix device. Patients also underwent a 4D PET/CT in the same position without the immobilisation device. The centre point of the tumour was recorded for each phase of the breathing cycle for both scans. A volumetric bounding box encompassing the maximal tumour centroid excursion was generated for both datasets and tumour displacement was analysed in the medio-lateral (X), cranio-caudal (Y) and ventero-dorsal (Z) planes.
Results: The median (range) amplitude of displacement in the X, Y and Z planes when immobilized in the BodyFix® were 0.9mm(0.3-2.9mm), 2.6mm(0.2-10.6mm) and 1.6mm (0.5-5.5mm) respectively. The median (range) amplitude of displacement in the X, Y and Z planes when not immobilized was 1.1mm (0.3mm-6.1mm), 4.9mm (1.7mm-13.8mm) and 2.3mm (0-12.0mm) respectively. Maximum amplitude of tumour motion was statistically greater without immobilization in the Y-plane (p=0.011) and Z-plane (p=0.038) on Wilcoxon testing. The bounding box of tumour displacement was 6 times smaller when patients were in the BodyFix®.
Conclusion: The BodyFix® device significantly reduces tumour motion in the cranio-caudal and ventero-dorsal planes. Immobilization had less impact on medio-lateral tumour excursion. Minimal tumour motion in the BodyFix® reinforces the view that narrow radiotherapy margins are appropriate for our technique.
Disclosure: S Siva has received scholarship support research funding from Elekta. Elekta had no input to study design analysis or abstract preparation. There are no other disclosures to declare.

064-P12
A PERSONALIZED IMMOBILIZATION CRADLE FACILITATES ROBUST IMMOBILIZATION AND REPRODUCIBILITY DURING STEREOTACTIC RADIOSURGERY OF PULMONARY METASTASES

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Aim: To assess the impact of the Elekta BodyFix® system (Medical Intelligence, Schwabmünchen Germany) in reproducing patient setup and minimizing intra-fraction motion.
Method: Single fraction stereotactic radiosurgery was delivered to 19 pulmonary metastases using the BodyFix® cradle. A "mock-up" cone-beam CT (CBCT) scan was performed on the linear accelerator to assess the reproducibility of the set-up. Subsequently, on the day of treatment, a pre-treatment CBCT and a mid-treatment CBCT was performed to verify tumour position with 0mm tolerance. All couch shifts were actioned and recorded in the medio-lateral (X), cranio-caudal (Y), and ventero-dorsal (Z) planes.
Results: The median time to the mid-treatment CBCT was 24 minutes (range 15-39 minutes). The median (0-90% range) shift required at mock-up / pre-treatment in the X-plane was 2mm (0-3mm) / 1mm (0-3mm), in the Y-plane 2mm (0mm-9mm) / 2mm (0-6mm) and in the Z-plane 2mm (0-6mm) / 4mm (0-8mm) respectively. The mean (± standard deviation) mid-treatment shifts were 0.3mm (±0.7mm), 1.1mm (±2mm) and 0.8mm (±1.5mm) in the X, Y and Z planes respectively. Mean shifts were significantly <2mm (p=<0.0001, student's t-test). Linear regression analysis showed no correlation with length of treatment and necessary mid-treatment shifts in the X (r2=0.096, p=0.198) and the Y (r2=0.012, p=0.653) planes but significant correlation in the Z plane (r2=0.377, p=0.005).
Conclusion: Robust intra-fractional immobilization was achieved using the BodyFix® system with mean shifts significantly <2mm. Patient set-ups were reproducible at a median of < 2mm in all directions. Reduction of overall treatment times may further improve intra-fractional immobilization particularly in the ventero-dorsal direction.
Disclosure: S Siva has received scholarship support research funding from Elekta. Elekta had no input to study design analysis or abstract preparation. There are no other disclosures to declare.

103-O12
CARING FOR THORACIC CANCER CAREGIVERS: EXPLORING PSYCHOLOGICAL AND SUPPORTIVE CARE NEEDS

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Aim: The global aim was to explore the psychological and unmet needs of thoracic cancer caregivers and families. Specific aims were to establish the psychological impact of caring for people with thoracic cancer by: i) identifying the psychological concerns, unmet supportive care needs, and priorities of caregivers and families of thoracic cancer patients; and ii) identifying strategies to address these unmet needs.
Methods: A qualitative, grounded theory approach was taken. Caregivers of people with thoracic cancer were invited to participate in a single, in-depth interview. A semi-structured interview schedule was used to explore topics including: a) Roles and identities; b) Diagnosis; c) Decision making; d) Relationships / family dynamics; e) Support and resources; f) Health care system and treatment; and g) end of life. Interviews were transcribed verbatim, transcripts were analysed in NVivo software and coded according to themes identified during and after the interview process.
Results: 43 individuals were interviewed: 34 carers of current patients, and 9 bereaved carers. Thirty-two carers were female;. Relationship to patient: 23 spouses, 13 children, 3 siblings, 4 other. Employment status: 17 full-time, 17 retired, 5 part-time, 4 other. Broad themes identified include: difficult road to diagnosis, healthcare systems issues (communication between healthcare professionals, access to services), smoking, death (timeframe and feeling

unprepared), communication (carer vs patient information needs, translating for family members).

Conclusion: Carers of people with thoracic cancer have ongoing unmet needs. Future research aimed at addressing carer needs and supporting them in caring effectively is required.

069-P12

DRAMATIC REDUCTION OF SEQUENCE ARTEFACTS FROM DNA EXTRACTED FROM FORMALIN-FIXED CANCER BIOPSIES BY TREATMENT WITH URACIL-DNA GLYCOSYLASE

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Formalin-fixed paraffin-embedded (FFPE) tissue is the most frequent source of DNA for mutation testing to stratify cancer patients for molecularly targeted therapies. Artefactual sequence changes detected in FFPE DNA often hamper an accurate diagnosis of mutation status in clinical samples. The underlying causes of sequence artefacts arising from FFPE DNA are still poorly understood. To delineate the possible causes of sequence artefacts, we examined the types of sequence artefacts using two independent sets of lung FFPE DNA samples by Sanger sequencing; for *EGFR* exon 19 and *BRAF* V600 region respectively. Low copy number templates (100 pg) were used for PCR amplification to enable artefact-bearing templates to be stochastically enriched and thus to be detected by Sanger sequencing. Multiple PCR products (9-10) were sequenced for each sample. In the sequencing for *EGFR* exon 19, 25 C:G>T:A sequence artefacts were detected in a total of 29 replicates of three FFPE DNAs. Similarly, 15 C:G>T:A sequence artefacts were detected in the *BRAF* V600 region from five FFPE DNAs, indicating that C:G>T:A changes are the major type of sequence artefacts. We then examined whether uracil lesions due to cytosine deamination caused C:G>T:A artefacts by treating those artefact-detected FFPE DNAs with uracil-DNA glycosylase (UDG) which removes uracil bases in DNA. Treatment of FFPE DNA with UDG prior to PCR amplification dramatically reduced sequence artefacts in all samples. When sequenced for *EGFR* exon 19 after UDG treatment, only one C>T artefacts was detected in a total of 28 replicates of the three FFPE DNAs and no artefacts in 48 replicates of the five FFPE DNAs for *BRAF* V600 region. UDG treatment specifically suppressed the formation of artefacts in FFPE DNA as it did not affect the detection of true *KRAS* codon 12 and true *EGFR* exon 19 and 20 mutations. Our other studies also show that that uracil in FFPE DNA leads to a significant proportion of sequence artefacts that can be minimised by a simple UDG pre-treatment. This finding has immediate and important implications to cancer diagnostics where FFPE DNA is used as the primary genetic material for mutational studies guiding personalised medicine strategies.

071-P12

THE RISE AND FALL OF COMPANION DIAGNOSTICS.

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The emerging paradigm of companion diagnostics is that every drug should have a companion diagnostic based on a biomarker that predicts an individual patient's response to that drug. However, the increasing amount of available drugs (each of which requires testing for an individual biomarker), the limited amount of tissue usually available, and the substantial cost of proprietary tests will inevitably lead to the demise of this concept. The future lies with methodologies that enable multiple parallel analysis of the same sample aliquot. These include but are not restricted to 'next generation' sequencing protocols. The interpretation of the large amounts of data that will be generated will require the emergence of a new interpretative discipline of genomic pathology that will straddle bioinformatics and clinical medicine.

026-P12

LUNG CANCER WAITING TIMES AT THE ROYAL ADELAIDE HOSPITAL

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Introduction: Waiting times for cancer diagnosis and treatment are monitored in the United Kingdom. This audit examines the performance of the Royal Adelaide Hospital (RAH) in diagnosis, staging and treatment of lung cancer.

Methods: We retrospectively identified 100 patients referred to the RAH between February and September 2010, with subsequently histologically confirmed lung cancer. We identified key dates in diagnosis and treatment. We calculated time intervals between these points.

Results: Complete data was available for 91 patients. The median time from GP referral to 1st appointment was 7 days, then 8 days to histological diagnosis. The median time for bronchoscopy was 4 days, CT-FNA 13 days, EBUS-TBNA 10.5 days, PET scan 10 days, and lung function 7 days. The wait for a surgical OPD was 25.5 days from diagnosis, then 12 days to surgery. Medical oncology clinic from diagnosis 24 days, chemotherapy 13 days thereafter. Radiation oncology clinic 15 days, radiotherapy 12.5 days thereafter.

Discussion: The National Health Service in the UK sets 3 cancer waiting times targets : (1) suspected cancers be seen by a specialist within 14 days of GP referral ; (2)treatment begins within 31 days of diagnosis ; and (3) within 62 days of GP referral. The RAH achieved the first target in 7 days, but treatment from diagnosis took 35 days, and from GP referral took 53.3 days.

Conclusion: Although diagnostic performance is acceptable, there are delays in initiating lung cancer treatments.

Disclosure: No Conflicts of interest

051-012

HOW DO PATIENTS WITH LUNG CANCER EXPERIENCE RADIATION INDUCED OESOPHAGITIS?

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Background: Radiation induced oesophagitis (RIO) is a significant toxicity of lung cancer treatment that has profound clinical, social and economic implications. The literature suggests there is minimal evidence to support current analgesic regimes with the exception of systemic analgesia. More information is required to better understand the patient experience of RIO and how it can be managed. **Aim:**To identify the properties and characteristics of RIO experienced by patients having radiotherapy to the chest for lung cancer.

Methods: A qualitative exploratory study conducted with patients with lung cancer receiving radiotherapy to the chest. Patients participated in semi-structured interviews exploring their experience of RIO. Interviews were recorded, transcribed and content analysed.

Results: Twenty six patients participated: six with grade 1; 14 with grade 2 and eight with grade 3 RIO. Four key domains were identified: 1.Pain descriptors such as "feels raw", "burning", "like reflux but worse" were reported 2. Swallowing difficulties varied over time and were described as "felt like there was a blockage, "afraid I would choke," "unable to get anything through". 3. Self care efforts employed by the patients to manage these difficulties ranged from diet modification, allowing food and drinks to go cold before eating and eating slowly. 4. An aversion to taking regular analgesia was also evident. The overall impact on participants' lives was often understated, even in the context

of hospital admissions, insertion of nasogastric tubes and poorly controlled pain.

Conclusions: This study demonstrates the complexity of RIO and suggests clinicians may underestimate the effect and severity of RIO. Given patients appear to continue to experience problems, despite treatment, better prophylaxis and management regimes are required.

084-O12
INTEROBSERVER AGREEMENT OF LUNG ADENOCARCINOMA DIAGNOSIS WHEN APPLYING THE 2011 IASLC/ATS/ERS MULTIDISCIPLINARY CLASSIFICATION OF LUNG ADENOCARCINOMA

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A new histological classification of primary lung adenocarcinomas was proposed in 2011, based on a multidisciplinary approach. We tested the reproducibility of scoring amongst experienced pathologists.

Methods: Patients who underwent lung resection surgery for lung adenocarcinoma were recruited. Histology slides of the resected carcinomas were scored independently by 5 anatomical pathologists, who had 3 to 25 years experience at reporting lung carcinoma. The percentage component of each of the proposed patterns (lepidic, acinar, papillary, solid and micropapillary) was recorded, with the lowest recorded component being 5%. The median score of the predominant pattern from the 5 readers was calculated for each patient, and taken as the consensus score.

Results: 176 patients with lung adenocarcinoma were studied (M/F 58%/42%, mean (SD) age 70(10) y, smoking 43(27) pack-years, tumour size 34(19) mm). 14 patients were never smokers. All except two patients had Stage I lung cancer. Intraclass correlation coefficients for the 5 patterns ranged from 0.87 to 0.98 (averaged measures). Tumours were categorised as well-differentiated (7%), moderately differentiated (64%) and poorly differentiated (28%). This classification was associated with survival (P=0.032, log-rank test), with the main difference being worse survival for poorly vs moderately differentiated (P=0.021).

Conclusions: Pathologists of varying levels of experience can reproducibly apply the proposed IASLC/ATS/ERS classification. This allows better subdivision of the adenocarcinomas into prognostic tiers.

Support: NHMRC project grant, NHMRC Practitioner Fellowship (KF), The Prince Charles Hospital Foundation

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085-P12
THE APPLICATION OF FUHRMAN NUCLEAR GRADE TO LUNG ADENOCARCINOMA AND CORRELATION WITH THE IASLC/ATS/ERS MULTIDISCIPLINARY CLASSIFICATION OF ADENOCARCINOMA AND SURVIVAL IN STAGE 1 DISEASE

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A new classification of primary lung adenocarcinomas was proposed in 2011. Several authors have demonstrated survival benefit by assessing nuclear grade. The Fuhrman grade system is used to grade nuclear atypia in renal cell carcinoma. We sought to determine whether this system could be reproducibly applied to lung cancer and whether this correlated with survival in the context of the new classification.

Methods: Patients who underwent resection for lung adenocarcinoma were recruited. Histology slides of the carcinomas were scored independently by 5 anatomical pathologists. They recorded the highest nuclear grade in each of the tumours using Fuhrman criteria that were circulated at the commencement of the project. The percentage component of each of the histological patterns was also recorded. Median scores of the predominant pattern were calculated, and taken as the consensus score. Grade and pattern were correlated with the survival.

Results: 176 patients with lung adenocarcinoma were studied (M/F 58%/42%), mean (SD) age 70(10) y, smoking 43(27) pack-years, tumour size 34(19) mm). Classification of Fuhrman grades was grade 2: 13 (7%), grade 3: 83 (47%), grade 4: 80 (45%). Intraclass correlation coefficients for the Fuhrman grade was 0.82 (averaged measures). Decreasing differentiation of adenocarcinomas (well to moderate to poor) had worse Fuhrman nuclear grade ($P<0.001$, χ^2). Fuhrman grade (2 or 3, vs 4) correlated with survival of patients after lung resection (P=0.036).

Conclusions: A modified Fuhrman nuclear grading system can be reproducibly applied by pathologists and is prognostically significant. Further investigation is required to determine whether this is independent of architectural pattern.

Support: NHMRC project grant, NHMRC Practitioner Fellowship (KF), The Prince Charles Hospital Foundation

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086-O12
THE APPLICATION OF MITOTIC ACTIVITY AND NECROSIS TO LUNG ADENOCARCINOMA AND CORRELATION WITH THE IASLC/ATS/ERS MULTIDISCIPLINARY CLASSIFICATION OF ADENOCARCINOMA IN STAGE 1 DISEASE

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A new classification of primary lung adenocarcinomas was proposed in 2011, based on a multidisciplinary approach. We sought to determine whether parameters other than histological pattern, such as mitotic activity and necrosis, could be applied to lung cancer and whether this correlated with survival in the context of the classification.

Methods: Patients who underwent resection for lung adenocarcinoma were recruited. Histology slides of the carcinomas had been scored independently by 5 anatomical pathologists for the percentage component of each of the histological patterns. One of the pathologists then performed mitotic counts of each of the carcinomas. Using a Leica DM LB2 microscope with the 40x objective, mitoses were counted in 10 high power fields (HPF) with a minimum of 30 HPF counted in total. The highest number of mitoses in the 10HPF was recorded. The pathologist also estimated the percentage of necrosis.

Results: 176 patients with lung adenocarcinoma were studied (M/F 58%/42%, mean(SD) age 70(10) y, smoking 43(27) pack-years, tumour size 34(19) mm). Mitotic grades were: 0-10 per 10HPF: 99 (56%), >10-20 per 10HPF: 40 (23%), >20 per 10HPF: 37 (21%). Median % necrosis was 1% (IQR 0-10%). Decreasing differentiation of adenocarcinomas (well to moderate to poor) had worse mitotic grade ($P<0.01$, χ^2), and higher % tumour necrosis ($P<0.01$, ANOVA).

Conclusions: High mitotic grade and tumour necrosis are associated with high grade adenocarcinoma architectural patterns. While they may contribute to future grading of resected adenocarcinomas of lung, further assessment to determine whether these independently predict survival needs to be undertaken.

Support: NHMRC project grant, NHMRC Practitioner Fellowship (KF), The Prince Charles Hospital Foundation

098-O12
RADIATION "PNEUMONECTOMY" FOR LOCALLY ADVANCED MALIGNANT PLEURAL MESOTHELIOMA: ACCEPTABLE LOCOREGIONAL CONTROL AND TOXICITY OUTCOMES

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Aims: Malignant pleural mesothelioma is an incurable disease where chemotherapy and conventional radiotherapy produce modest responses and fewer surgeons are undertaking extrapleural pneumonectomies (EPPs). We aimed to optimise palliative radiotherapy by using advanced technologies to maximise the planning target volume (PTV) and radiation doses without producing major toxicity.

Methods: Patients with mesothelioma localized to one hemithorax received radiotherapy utilizing ^{18}F-FDG PET/CT scans to outline tumour volumes. There were no restrictions on prior surgery or chemotherapy. All CTCAE version 4 toxicities were recorded.

Results: From July 2003 to March 2012 we planned 50 patients for radiotherapy with doses of 45-60 Gy over 6 weeks. None had a prior EPP. 30 underwent pleurectomy/decortication, 18 a pleurodesis and 2 only a biopsy. Patients were aged 45-75, mostly males (84%) with right (58%) epithelioid (80%) mesotheliomas, and clinical stage III/IV disease (76%). 33 had prior chemotherapy, including 5 trimodality cases. 17 received 3D-conformal radiotherapy and 33 IMRT, in 31 cases to the complete hemithorax. Median followup post-radiotherapy was 9.4 months (range 2-90), and 58 PET/CT scans were assessed 3-87 months after radiotherapy. 8 patients recurred within the PTV, all with concurrent metastases documented in unirradiated sites. 30 recurred only outside the PTV. There were no significant acute or late toxicities and no radiation pneumonitis > grade 3 in the absence of disease spread to the contralateral lung.

Conclusions: For mesothelioma patients declining or unsuitable for EPP, a radiation "pneumonectomy" can be an effective alternative to achieve long-term palliation and improved locoregional control. There were no fatal radiation toxicities.

099-O12
PROPHYLACTIC RADIOTHERAPY TO INTERVENTION SITES IN MESOTHELIOMA: CRITICAL ANALYSIS OF THE EVIDENCE

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Aims: Many radiotherapy centres in Australia and other countries deliver low dose electron therapy to scar sites for mesothelioma patients who undergo diagnostic and therapeutic procedures, to prevent subcutaneous recurrences. Evidence for the clinical benefit of this practice is controversial and warrants reevaluation.

Methods: All published systematic reviews, randomised and non-randomised trials, surveys, small institutional series and case reports on this subject were critically evaluated, and the clinical relevance of this approach was determined.

Results: Most of the publications advocating prophylactic radiotherapy have design flaws and there are significant variations in radiation dose, fractionation, field size and placement, electron energies, timing of radiotherapy and followup assessments. The effect of disease stage, histological subtype and the addition of chemotherapy are not addressed. The administration of prophylactic radiotherapy in patients with mesothelioma following pleural intervention has no effect on changing the disease course and is not recommended. With changing biopsy procedures and surgical techniques, older studies are no longer relevant.

Conclusions: Instead of delivering prophylactic radiation, higher doses of radiotherapy should be considered to treat symptomatic tumour deposits, and include regions of major disease relapse inside the chest cavity. No further trials of prophylactic radiotherapy should be undertaken.

012-P12
RETROSPECTIVE AUDIT OF OUTCOMES OF PATIENTS WITH LOCALLY ADVANCED NON-SMALL CELL LUNG CANCER (NSCLC) TREATED WITH CONCURRENT RADIOTHERAPY (RT) AND CHEMOTHERAPY AT PRINCE OF WALES CANCER CENTRE (POWCC)

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Purpose: Lung cancer is the most common cause of cancer-related death worldwide. The majority of patients present with locally advanced or metastatic disease. This retrospective audit analysed survival and toxicity for patients with Stage IIIA (n=18), IIIB (n=34) or III(NOS) (n=3) inoperable NSCLC treated with concurrent chemoradiation at POWCC. Our results were compared with the literature to determine whether outcomes including progression free and overall survival are consistent, and with acceptable toxicity.

Methods: Of 56 patients identified between 1999-2009 from in-house databases, 55 were eligible and treated with concurrent chemoradiation. Over the study period three chemotherapy regimens were used in combination with 60 Gy RT including weekly docetaxel, weekly carboplatin/paclitaxel, and cisplatin with either etoposide or docetaxel. The audit was approved by the SESIAHS Research Ethics Committee. Eligible patients had inoperable stage IIIA and IIIB NSCLC; baseline lung function FEV1 >1; ECOG performance status 0 – 2. RT planning was optimised to ensure that V20 was <30%.

Results: At median follow-up of 13 months, median overall survival was 10, 13.5 and 17 months for docetaxel, carboplatin/paclitaxel and cisplatin-based therapy respectively and 12 months across all schedules. There were 2 toxicity-related deaths from pulmonary toxicity, both treated with weekly docetaxel. Grade 3-4 oesophagitis was the main significant toxicity with 6, 23 and 36% of patients in docetaxel, carboplatin/paclitaxel and cisplatin-based schedules respectively.

Conclusion: Survival and toxicity outcomes in our audit align with the published literature. The current practice of cisplatin-based therapy reflects the results in multicentre trials in concurrent chemoradiation.

Disclosure: The authors have no conflicts of interest to declare

017-O12
IMPLEMENTATION OF NEXT GENERATION SEQUENCING (NGS) AS A HIGH THROUGHPUT DIAGNOSTIC FOR EPIDERMAL GROWTH FACTOR RECEPTOR (EGFR) MUTATION ANALYSIS IN LUNG CARCINOMA

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Mutational analysis of lung cancers are problematic due to the paucity of tumour material in biopsies and dilution of signal by non-neoplastic. Diagnostic laboratories will also be under pressure to provide multiplex testing on the same restricted tissue e.g. *ALK*. Thus, the current paradigm of testing each gene separately often using different assays is not feasible. We therefore used next generation sequencing (NGS) for EGFR testing as a clinical diagnostic. DNA was extracted from two cell lines, eight FFPE NSCLC tumour samples, three of which were tested in duplicate. A two-fold cell line dilution was performed. The EGFR gene was amplified in a Fluidigm access array, pooled amplicons for each sample were tagged with sample specific

index and sequencing tags followed by NGS. Alignment against the target region and variant calling was performed using custom bioinformatics. Of the 33/51 variants that were detected using NGS, there was 100% concordance, including all tumour samples. A further 11/51 variants were detected by detailed analysis by eye but were not called automatically by bioinformatics. Only 7/51 variants were not detected by either eye or bioinformatics but these were cell line dilutions at 3.13% and 1.56%. All variant types were detected including substitutions, deletions, and insertions. This experiment demonstrates the validity of employing ultra-deep next generation sequencing in the clinical setting to profile the mutational events underlying NSCLC tumours from diagnostic samples with >5% allele frequency. Implementation into the clinical laboratory is now being performed with an improved bioinformatic pipeline tool for variant detection.

043-P12

IMPLEMENTING STANDARDISED PET PROCEDURES FOR SCANNING, DATA COLLECTION AND REPORTING IN PATIENTS WITH NSCLC ACROSS AUSTRALIA'S ALTG SITES: A FEASIBILITY STUDY

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Aim: FDG PET for response assessment to chemotherapy in NSCLC shows promise, but clinical trials have been limited by study size and variability in response evaluation. This study aims to gain information on current practice for FDG PET scanning in order to assess the feasibility of establishing a standardised protocol for multicentre clinical trial imaging in Australia.

Methods: 7 PET sites in 5 states (NSW, Victoria, SA, WA and Qld) were identified by ALTG members as potential clinical trial imaging sites and were sent a comprehensive questionnaire to complete.

Results: All 7 sites completed the questionnaire. There were 9 PET-CT cameras at 7 sites, from 3 major manufacturers. The PET sites surveyed included public hospital (n=5), academic/ teaching hospital (n=1) and private practice (n=1). Patient preparation protocols were similar across sites, other than for pre-hydration and instructions for diabetic patients. 5 of 7 sites ensured consistency in imaging procedures for response scans in individual patients. All sites used proprietary software for image reconstruction. 3 sites routinely measure SUV, and all sites reported that they could measure SUVmax for clinical trials. All sites indicated they were willing to join a clinical trial cooperative group. Stated obstacles to multicentre trials included variations in imaging protocols, monitoring for protocol violations, standardisation of SUV measurements, adequate staffing and funding. **Conclusion:** Data collected from this study supports the feasibility of performing multicentre FDG PET trials for response assessment in NSCLC across nominated Australian PET sites. This study was supported by an ALTG Concept Development Grant

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008-O12

ADVANCED CARE PLANNING IN LUNG CANCER PATIENTS

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BACKGROUND: Advance care planning (ACP) is a process of discussion and shared planning for end of life care. It involves patient, family/whanau and health care professionals.

Auckland District Health has led ACP, resourcing training, dispelling the taboo around thinking and talking about end of life, encouraging research and attempting to find clarity in the current legal framework.

In 2010, Temel et al published a paper that demonstrated survival was prolonged by almost two months for patients with metastatic NSCLC with early integration of palliative care alongside standard care. Furthermore patients were less depressed, requested less aggressive treatment and lived longer with early integration of palliative care (including ACP) alongside standard care.

Aim: To identify if the clinicians in the lung tumour stream introduced any form of ACP including hospice referral for patients newly diagnosed with lung cancer.

Method: Retrospective audit of all patients identified from ADHB records who had attended an FSA for medical oncology over six months.

Results: N= 127.

Adjuvant/combined = 10; Metastatic= 117.
Offered referral to hospice= 56%
Refused hospice referral= 15%
Hospice refused referral= 0.8 %
RIP within 12 weeks of referral= 13 %
Mean days referral to RIP= 37
Mean days FSA to RIP = 55
Offered referral and commencing treatment= 63%

Conclusions: Clinicians were referring patients to hospice early in the patient process regardless of intent to treat.

Expansion of the clinicians understanding of ACP needs to extend past hospice referral. Furthermore, conversations around ACP need to be documented and captured more clearly.

014-O12

ERLOTINIB: THE AUCKLAND EXPERIENCE

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Background: Currently there is no requirement for EGFR mutation testing in NZ, despite erlotinib funding.

Aim: To review the Auckland experience of using erlotinib for advanced NSCLC patients. To evaluate total drug acquisition costs when used as per PHARMAC guidelines.

Method: A retrospective audit of patients identified from ADHB records that have commenced erlotinib since October 2010 until Dec 31st 2011. Demographic information was collected. Patients were followed up until Jan 31st 2012. We used application for funding renewal as a surrogate marker of tumour response.

Results: Total of 42 patients.

Non responders=33% (14), Responders = 48% (20), others (treatment failure) = 19% (8).
Mean days start of treatment to first CT= 61(20-91).
Mean TTP=126 days; Mean drug acquisition cost=$17,775
Total days of treatment =5126; Total drug acquisition cost =$701,900.00
Response 365+ days=2 patients
28% of patients reported grade 3/4 AEs. SAE's reported totalled 12% with one reported death related to treatment toxicity.

Conclusions: Since the introduction of Pharmac funding for erlotinib, patients with advanced NSCLC have had greater access to targeted therapy, previously financially unattainable. Side effect profile was acceptable.

EGFR testing is a validated predictive tool for response to EGFR TKIs. We recommend testing should be incorporated into the funding model to deliver more cost-effective, directed health care.

001-P12

A RANDOMIZED PHASE 3 TRIAL COMPARING PEMETREXED/CARBOPLATIN (PC) AND DOCETAXEL/ CARBOPLATIN (DC) AS FIRST-LINE TREATMENT FOR ADVANCED, NON-SQUAMOUSNON-SMALL CELL LUNG CANCER (NSCLC)

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Aims: The primary objective of this multicenter, randomized, phase 3 trial was to compare survival without grade 3 or 4 toxicity (SWT) following first-line treatment with PC versus DC in patients with advanced, non-squamous NSCLC.

Methods: Chemotherapy-naïve patients with stage IIIB/IV non-squamous NSCLC, aged ≥18 years, with an Eastern Cooperative Oncology Group performance status 0 to 2 were randomized to receive carboplatin (AUC 5) with pemetrexed (500 mg/m^2) and standard vitamin supplementation or docetaxel (75 mg/m^2) every 21 days for a maximum of 6 cycles. Patients in both arms received dexamethasone supplementation. SWT was defined as the time from the date of randomization to the first date of any Grade 3 or 4 treatment-emergent adverse event (TEAE) or death due to any cause.

Results: Between October 2007 and April 2009,226 patients were enrolled in 6 countries, of whom 211 (93.4%) were evaluable. The median age was 59.5 years, 41.7% were East Asian, 46.0% were females, and 35.5% were never-smokers. SWT was significantly longer with PC than DC (median 3.2 months vs. 0.7 months, log-rank p<0.001; unadjusted hazard ratio [HR] = 0.45, 95% confidence interval [CI]: 0.35 to 0.58]). There were no significant between-arm differences in progression-free survival, response rate, duration of response, or overall survival. More patients in the DC arm than the PC arm had ≥1 Grade 3 or 4 adverse event(81.9% vs. 63.2%).

Conclusions: The favourable benefit-to-risk profile of PC indicates that PCis an appropriate first-line treatment option for patients with advanced, non-squamous NSCLC.

Conflicts of Interest: The study (H3E-CR-S380) was sponsored by Eli Lilly and Company, Indianapolis, Indiana, USA. H. Barraclough, S. Holt, and M. Orlando are full-time employees of Eli Lilly and Company, the manufacturer of pemetrexed. M.vanKooten was an employee of Eli Lilly Australia Pty Limited during the conduct of the study and is now an employee of Janssen Oncology Asia-Pacific. M. Orlando and H. Barraclough are shareholders of Eli Lilly and Company. V. Ganju, J. Pereira, J.H. Kim, D.H. Lee and J. Wang were clinical investigators in the study. J.H. Kim has been compensated for a consultant/advisory role for AstraZeneca; and has received honoraria from Roche, AstraZeneca, GlaxoSmithKline, and Eli Lilly.

025-P12
OVERALL SURVIVAL (OS) IMPROVEMENT IN PATIENTS WITH LUNG CANCER TREATED WITH DENOSUMAB VERSUS ZOLEDRONIC ACID (ZA)

Presenter: A. Glennane[18] Lipton L[1], *Scagliotti G[2], Hirsh V[3], Siena S[4], Henry D[5], Woll P[6], Manegold C[7], Solal-Celigny P[8], Rodriguez G[9], Krzakowski M[10], Mehta ND[11], García-Sáenz JA[12], Pereira J[13], Prabhash K[14], Tudor-Eliade C[15], Kanarev V[16], Feng A[17], Jacobs I[17] [1]Western Hospital Footscray, Victoria/AUSTRALIA; [2]University of Turino, Orbassano, ITALY; [3]McGill University Health Centre, Montreal/CANADA; [4]Ospedale Niguarda Ca' Granda, Milano/ITALY; [5]Joan Karnell Cancer Center, Philadelphia/UNITED STATES OF AMERICA; [6]Weston Park Hospital, University of Sheffield, Sheffield/UNITED KINGDOM; [7]Klinikum Mannheim, Mannheim /GERMANY; [8]Clinique Victor Hugo, Le Mans/FRANCE; [9]South Texas Oncology and Hematology, San Antonio/UNITED STATES OF AMERICA; [10]The Maria Sklodowska-Curie Institute of Oncology Warsaw POLAND, [11]. Oncology Hematology Associates of Northern Illinois Gurnee UNITED STATES OF AMERICA, [12]. Hospital Clínico, San Carlos, Madrid/SPAIN; [13]Instituto do Cancer Arnaldo Vieira de Carvalho, Sao Paolo/BRAZIL [14]Tata Memorial Hospital, Mumbai/INDIA; [15]Institutul Oncologic I. Chiricuta Cluj-Naooca/ROMANIA; [16]Regional Oncology Dispensary with Inpatient Sector, Plovdiv/BULGARIA; [17]Amgen Inc., Thousand Oaks/UNITED STATES OF AMERICA; [18]Amgen Australia Pty Ltd, Sydney, New South Wales/AUSTRALIA*

*Presented on behalf of trial investigators.

Aims: Denosumab is a fully-human monoclonal antibody that targets a key regulator of bone destruction, RANK ligand. We report a post-hoc analysis of survival data among patients with lung cancer participating in a phase 3 trial of denosumab versus ZA for preventing SREs in patients with bone metastasis from solid tumours (except breast or prostate) or multiple myeloma.

Methods: Patients were randomised 1:1 to receive subcutaneous denosumab 120mg or intravenous ZA 4mg q4w (N=1776) in a double-blind fashion. Daily calcium and vitamin D supplementation were recommended. OS among patients with lung cancer (NSCLC or SCLC) was analysed.

Results: Among 811 patients with lung cancer, OS was prolonged by 1.2 months with denosumab over ZA (median 8.9 months denosumab, 7.7 months ZA; HR 0.80, 95% CI [0.67–0.95]; P=0.01). Improved survival was seen among patients with NSCLC (n=702) receiving denosumab (median 9.5 months denosumab, 8.1 months ZA; HR 0.78 [0.65–0.94]; P=0.01). Further analysis by histological type showed denosumab was associated with prolonged survival over ZA in squamous cell carcinoma (8.6 months denosumab, 6.4 months ZA; HR 0.68 [0.47–0.97]; P=0.035) and adenocarcinoma subtypes (0.80 [0.62–1.02]; P=0.075). Survival in patients with SCLC (n=109) was 7.6 months with denosumab versus 5.1 months with ZA (0.81 [0.52–1.26]; P=0.36). Incidence of adverse events was balanced between groups (96.8% denosumab, 95.4% ZA).

Conclusion: In this post-hoc analysis of patients with lung cancer, denosumab was associated with improved OS compared with ZA.

Funding: provided by Amgen

096-P12
SCREENING LUNG TUMOUR TISSUE FOR WHOLE GENOME SEQUENCING

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Introduction: High quality tumours are required to identify cancer-driven mutations as potential therapeutic targets. We are collaborating with The Cancer Genome Atlas (TCGA) to contribute primary lung adenocarcinoma (AC) and squamous cell carcinoma (SCC) samples towards an international study to characterise cancer genomics through analysis of 500 cases per tumour type.

Aim: We aimed to identify high quality snap-frozen primary lung cancers for whole genome sequencing (WGS) from our tissue bank.

Methods: 470 AC and 310 SCC samples were available for study. After excluding secondary tumours and patients with prior neoadjuvant therapy, sections were taken to assess tumour and necrotic content by pathological scoring. According to TCGA criteria, suitable samples were: 1) ~150mg with flanking and diagnostic slides; 2) ≥20% tumour content and ≤80% necrosis; 3) accompanied by clinico-pathological data; and 4) accompanied by either control blood lymphocyte DNA or uninvolved normal lung tissue.

Results: To date, we have submitted 62/(470-32) (~ 14%) primary AC and 56/(310-4) (18%) primary SCC cases. Of these, our TCGA acceptance rate is 28/39 (72%) AC and 33/56 (59%) SCC. Cases were disqualified due to low RNA integrity (14; 45%), normal-tumour genotyping mismatch (2; 6%), insufficient DNA (3; 10%), insufficient RNA (1; 3%), insufficient tumour

nuclei (5; 16%), excessive necrosis (1; 3%), or insufficient background data (5; 16%).

Conclusions: Only a small proportion (61/95; 64%) of banked tumours qualified according to TCGA criteria. Future work will focus on identifying factors during tissue collection and processing that increases the number of high quality tumours for WGS.

Disclosure: The authors wish to state that there is no conflict of interest for the work presented here. This work was supported by: The Prince Charles Hospital Foundation Novice Researcher grant (FG), Cancer Council Queensland PhD scholarship (M Daniels), Cancer Council Queensland Senior Research Fellowship (KF), NHMRC Practitioner Fellowship (KF) and Queensland Clinical Research Fellowship (KF, IY).

007-P12
CAN WE BUILD THE MODEL TO PREDICT LUNG CANCER GENES?

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There was a substantial progress in identification of cancer related genes. It is also apparent that not all cancer related genes have been identified yet. Can we use the known cancer genes to develop and train a statistical model to predict novel cancer genes? We believe that the answer to this question is: "Yes, we can".

We focused on lung cancer (LC). First we have identified known LC genes using literature mining. A forward stepwise binary logistic regression model was used to discriminate known LC genes from non-LC genes, based on such predictors as the level of evolutionary conservation of the gene, expression level in normal tissue, gene ontology annotation, posttranslational modifications, expression level in adjacent normal and tumor tissue, tissue specificity index and other characteristics (31 variables in total). We were able to correctly predict 96% of the non-LC genes and 48% of LC genes. The proportion of genes predicted to be PCa associated was significantly higher among putative lung cancer genes compared to the genes without any evidence being LC related. To validate the model we randomly chose 100 genes as "mock" LC-related and built the predictive models using the same variables as we have used for "real" LC genes. We found that we could correctly predict only 0.5% of the mock LC genes on average. We found that the model also predicted known breast and prostate cancer genes though the accuracy was not as good as for LC genes.

031-P12
INITIAL MEDICAL ATTENTION AT PATIENTS WITH EARLY-STAGE NON-SMALL CELL LUNG CANCER

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Background: Detection of early stage non-small cell lung cancer (NSCLC) is commonly believed to be incidental. Understanding the reasons that caused initial detection of these patients is important for early diagnosis.

Methods: We retrospectively reviewed medical records of patients diagnosed with stage I or II NSCLC between 2000 and 2009 at UT MD Anderson Cancer Center. Suggestive lung cancer (LC) symptoms or other reasons that caused detection were extracted from patients' medical records. We applied univariate and multivariate analyses to evaluate the association of suggestive LC symptoms with tumor size and patient survival.

Results: Of the 1396 early stage LC patients, 733 (52.5%) presented with suggestive LC symptoms as chief complaint. 347 (24.9%) and 287 (20.6%) were diagnosed because of regular check-ups and evaluations for other diseases, respectively. The proportion of suggestive LC-symptom-caused detection had a linear relationship with the tumor size (correlation 0.96; with $p <$ .0001). After age, gender, race, smoking status, therapy, and stage adjustment, the patients with symptom-caused detection showed no significant difference in overall and LC-specific survival when compared with the patients diagnosed otherwise (not through LC-suggestive symptoms).

Conclusion: Symptoms suggestive of LC are the number one reason for detection of early NSCLC. They were also associated with tumor size at diagnosis, suggesting early stage LC patients are developing symptoms. Presence of symptoms in early stages did not compromise survival. A symptom-based alerting system or guidelines may be worth of further study to benefit individuals at high risk for NSCLC.

032-P12
GENOME-WIDE ASSOCIATION STUDY OF LUNG CANCER IN NEVER SMOKERS

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Background: Although tobacco smoke is the predominant risk factor for lung cancer, about 10–15% of all lung cancer deaths in the US occur among lifetime never smokers. To analyze the genetic component of lung cancer risk in never smokers, we performed a genome-wide association study comparing 1,396 Caucasian cases from North America and the UK to 1,667 controls utilizing the Ilumina OmniExpress genotyping chip.

Methods: Cases (initial n=1,544) and controls (initial n=1700) were obtained from six institutions from the US, UK, and Canada. After applying quality control measures to the genotyping data (tests for HWE, failed missingness and frequency tests), 656,891 SNPs were evaluated. After eliminating duplicates, gender discrepancies, those with call rates <95%, and individuals identified as non-Caucasians by the PC analyses, 1,396 cases and 1,667 controls remained, with the genotyping rate of 98.11%.

Results: The most significantly associated SNPs were those located in the TERT/CLPTM1 region (Chr 5), which confirms previous observations, with the lowest p-value of 1.22×10^{-7} associated with rs380286. Additionally, 4 genes/gene regions previously not considered showed an association at a $p<10^{-5}$. The replication phase currently is underway to further test these associations.

Conclusion: This is the largest GWAS study performed to date on lung cancer in Caucasian never smokers. We confirm the association with the TERT/CLPTM1 region. In addition, multiple other gene regions, not previously considered as susceptibility factors for lung cancer, have been suggested.

The study is supported by NCI R01 CA149462 to OG.

035-O12
PHYSICAL ACTIVITY LEVELS AND FUNCTIONAL CAPACITY OF PEOPLE WITH NON-SMALL CELL LUNG CANCER: PRELIMINARY RESULTS

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Aims: 1) To identify levels of physical activity in people with lung cancer and to compare these with recommended physical activity guidelines for Australians. 2) To identify any change in physical activity or functional capacity over six months following diagnosis.

Design: Prospective longitudinal cohort study.

Participants: Thirty five people (22 male), mean±SD age 67.5±9.2years, FEV_1 76.9±21.2% predicted, BMI 27.6±6.9kg/m^2 with stage I-IIIb non-small cell lung cancer recruited to date from three tertiary hospitals.

Outcome measures: Steps per day measured with accelerometer worn over a five day period; self-reported physical activity measured using Physical Activity Scale for the Elderly and functional capacity measured with the 6-minute walk test (6MWT) were assessed baseline (pre-treatment n=35), 10 weeks (during-treatment n=30), six months post-diagnosis (n=22).

Results: Preliminary analyses demonstrate at baseline 40.0%, 37.1% and 22.9% of participants were engaged in 'sufficient', 'insufficient' and 'sedentary' levels of physical activity respectively. Mean steps per day at baseline were 5283±2944steps. At baseline, fewer participants were engaged in 'sufficient' levels of activity (compared with 54.1% aged-matched Australian data) and more participants were classified as 'sedentary' (compared with 17.9% Australian data). At 10 week and six month follow-up only 26.7% and 31.8% of participants were engaged in 'sufficient' levels of activity respectively. At baseline mean±SD 6MWT was 417.7±115.0m. This declined to 391.5±107.5m at 10 week and 388.4±194.5m at six month follow-up.

Conclusion: At diagnosis most participants did not meet physical activity guidelines and took less than the recommended number of steps per day. Updated follow-up data will be presented.

Funding: Victorian Cancer Agency and Eirene Lucas Foundation.

Disclosure: The authors declare no conflicts of interest.

010-P12
COMPARING THE CANCER CARE COORDINATOR'S (CCC) MODEL OF CARE IN TASMANIA AND QUEENSLAND; PARTNERING UP TO PROMOTE OPTIMAL PATIENT OUTCOMES

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Intro / background: Cancer Care Coordinators (CCC) utilise an area wide approach to optimise cancer care for patients, provide patient centred care and promote multidisciplinary care. This role varies according to the area in which they work.

Objectives / aims: To determine if Tasmania and Queensland can learn from, and support each other to improve patient outcomes. This will be done by benchmarking, comparing and contrasting the CCC model of care from two hospitals based in two states.

Methodology: All new patients with lung cancer referred to each CCC in February 2012 will be reviewed. Statistics compared will include; geographic area, staging, proposed treatment, referral source, allied health access, available resources and patient needs.

Results: Statistics will be shown and analysed, we will discuss any aspects of our role we have changed in our model based on the others, aspects of our roles that are working well for both of us, aspects of our roles that need to be different based on work places.

Conclusions: Although geography and resources determine the fine tuning of the CCC role to individual hospitals, essentially both models of care promote improved patient outcomes.

015-O12
THE PREVALENCE OF INCIDENTAL PULMONARY NODULES ON COMPUTED TOMOGRAPHY OF THE CHEST IN TRAUMA PATIENTS

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Background: Lung cancer is the most prevalent type of cancer worldwide and the leading cause of cancer related death. Early detection of potentially cancerous pulmonary lesions enables early management and improves clinical outcomes.

Methods: A computerized search is performed through the Trauma Registry data of the hospital, which registers patient information from all trauma patients admitted. All CT thorax radiology reports of the identified patients were reviewed and the number of incidental pulmonary nodules and their descriptions (largest diameter, location, morphology) were recorded.

Results: 21 of the 248 patients were found to have incidental pulmonary nodules, giving a prevalence of 8.5%. 12 subjects (4.8%) had a single nodule, while 9 subjects (3.6%) had multiple nodules. 17 of the 21 patients (77.7%) with incidental pulmonary nodules required follow-up according to the Fleischner Society recommendations. All 17 patients were high risk for pulmonary malignancy and had one or more significant risk. The 4 subjects that did not require follow-up were all young patients (less than 35 years of age) and had no oncological history.

Conclusions: The finding of incidental pulmonary nodules in patients undergoing CT thorax as part of their initial trauma evaluation is common. Most of these nodules required further follow-up and management based on the Fleischner Society recommendations. A system needs to be in place to ensure that individual care providers are assigned responsibilities in identifying and following-up these patients to potentially improve mortality and/or morbidity.

013-P21
CLINICIANS' EXPERIENCE OF QUALITATIVE LUNG CANCER RESEARCH AND ITS VALUE IN CLINICAL PRACTICE

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Aim: We present our experience of a collaborative research project with a significant qualitative component and its impact on our clinical practice.

Methods: In collaboration with the Research Centre for Māori Health and Development we performed a qualitative study funded by the Health Research Council to ascertain the experiences and opinions of Māori patients and their whānau (family) around a diagnosis of lung cancer. It was part of a larger study exploring the issues regarding epidermal growth factor receptor testing in New Zealand. Qualitative, semi-structured, in-depth interviews were undertaken with Māori lung cancer patients and their whānau by Māori interviewers. Interviews were recorded and transcripts thematically analysed. The research findings were disseminated back to the participants. At a "living with cancer" meeting on the local marae we presented the information to the local Māori community. We present our reflections on the utility and impact of this qualitative research in lung cancer from a clinician's perspective.

Results: This qualitative research has provided important insights into the Māori experience of lung cancer, a community with the poorest outcomes for this disease. This information is not readily accessible without the qualitative research method and highlights the strengths of collaboration between researchers and clinicians. As clinicians, we have strengthened relationships with the Māori community and their care workers and have a deeper understanding of the needs of our Māori patients and their whānau.

Conclusions: Qualitative lung cancer research has had a direct impact on our day to day clinical practice to improve the cancer journey for our Māori

patients. **Disclosure:** Dr Claire Hardie – no conflicts of interest; Dr Helen Winter – no conflicts of interest; Dr Lesley Batten – no conflicts of interest

037-P12

PATTERNS OF CARE IN LUNG CANCER IN NORTHERN SYDNEY, AUSTRALIA

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Aims: To assess patterns of care received by lung cancer patients in the Northern Sydney Central Coast area health network (NSCCH)

Methods: Patients diagnosed with lung cancer in NSCCH between 2008 and 2010 were identified from the local Clinical Cancer Registry, which receives coded data for public sector admissions and treatments.

Results: 1498 patients were identified: 63% non-small cell lung cancer (NSCLC), 12% small cell lung cancer, 7% mesothelioma, 1% carcinoid, 17% not specified. 57% of cases were male and 35% born overseas. The median age at diagnosis was 72yrs.

There were 945 NSCLC cases, by stage: 11% stage I, 6% stage II, 9% stage IIIA, 56% stage IIIB/IV at diagnosis, 18% not stated; subtypes: 40% adenocarcinoma, 24% squamous cell carcinoma, 18% not otherwise specified, 16% large cell, 2% mixed.

31% received any chemotherapy, 23% radiotherapy and 11% surgery. For stages I-IIIA disease, 31% underwent definitive surgery and 2% definitive chemo-radiotherapy. 9 patients underwent EGFR mutation testing. 36 (7%) stage IIIB/IV patients received a targeted agent as ≥ 2nd-line treatment. 20 (2%) patients were enrolled in a clinical trial.

Median survival was 11mo overall; 21mo for stages I-IIIA and 7mo for stages IIIB/IV. 61% of stage III/IV cases were referred to a palliative care service. Median time between diagnosis and referral was 8wks and between referral and death, 6wks.

Conclusions: The survivorship of this cohort appears low, possibly due to the high proportion of advanced cases, however is comparable to published national cohorts. Highlighted areas for improvement include increased molecular testing, clinical trial participation and early palliative care referral.

Disclosure: The authors have no conflicts of interest, dualities or funding sources to declare.

087-P12

DEVELOPMENT OF AN ONLINE LUNG CANCER PATIENT INFORMATION RESOURCE DIRECTORY

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Project Aim: To develop an online Australian Lung Cancer Patient Information Directory that provides high quality online resources and links to paper-based resources on one site. The directory will provide recommended resources to complete our previously produced DVD "Lung Cancer, Understanding, Managing, Living".

Methods: Resources available to lung cancer patients were identified through:

- A survey completed by attendees at the 2010 Australian Lung Cancer Nurses Conference.
- Lung cancer patient information resources available through Peter MacCallum Patient Information and Support Centre, Australian and State Cancer Councils and Australian Lung Foundation.
- Internet search of lung cancer information/support websites.

Lung cancer specific resources were evaluated by an oncologist, cancer nurse and two consumers using the 'Ensuring Quality Information for Patients' (EQIP) tool. EQIP assesses quality of patient information. Resources that met EQIP criteria were included.

General cancer patient resources relevant to lung cancer were included if previously developed by a recognised provider of quality cancer information.

Results: 31 Lung cancer specific and 63 general resources met the inclusion criteria. Resources were linked into an on-line directory at the Kylie Johnston Lung Cancer Network http://www.kjlcn.org.au/patient-resources-and-support/online-resource-directory.

Additionally resources were linked as recommended reading under each chapter of the DVD http://www.kjlcn.org.au/patient-resources-and-support/lung-cancer-dvd/97-01-introduction

The directory is being evaluated through an online survey as well as monitoring 'hits' to the online site.

Key Conclusions: An online Australian Lung Cancer Patient Information Resource Directory has been created to provide access to high-quality information relevant to people affected by lung cancer all on one website.

This project has been funded through a Cancer Australia grant.

030-P12

VOLUMETRIC ARC THERAPY FOR STEREOTACTIC BODY RADIOTHERAPY IN EARLY LUNG CANCER

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Introduction: Stereotactic body radiotherapy(SBRT) for early lung cancer results in excellent local control and potentially improved survival. 3D-conformal radiotherapy(3D-CRT) delivery requires long treatment times, increasing the risk of patient motion. Volumetric arc therapy(VMAT) may result in improved dosimetric outcomes, and potentially reduced treatment time.

Methods: The Pinnacle 3D-CRT and VMAT plans for delivery on Elekta Linacs of 2 patients were compared for the following dosimetric characteristics: target coverage (coverage with the prescribed dose and 98% coverage of the PTV), low dose wash (dose at 2 cm from target) and organs at risk (volume of lung receiving 20 Gy).

Results: Radiotherapy target coverage was improved with VMAT, compared to 3D-CRT (98% vs. 89% of PTV receiving 100% of the prescribed dose), with 98% dose coverage also higher for VMAT (>99% as compared with 92% of PTV). This was achieved without any significant increase in low dose wash, with D2cm being 28.1 Gy versus 35.0 Gy . V20 for VMAT plans was higher (7.94% versus 6.85%), and more monitor units were required (3300 versus 2200). Due to the small number of patients examined the results were not statistically significant. Clinical VMAT treatment with one of these plans required 8 minutes beam-on time, with total treatment taking 35 minutes.

Conclusions: VMAT radiotherapy for SBRT lung is feasible, and results in potential improvements in dosimetry, including improved radiotherapy target coverage, with no increase in low dose wash in the lung. However, it may result in small increases in the V20. Despite increased monitor units, VMAT plans may be delivered rapidly due to reduced gantry and couch movements.

Disclosure: All authors have indicated that they have no conflicts of interest. There was no commercial sponsorship for this research. Dr Hegi-Johnson is supported by a Cancer Institute NSW Translational Centre Research Grant Fellowship.

056-P12

ENTERAL NUTRITION IN LUNG CANCER PATIENTS UNDERGOING RADIOTHERAPY

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Background: Lung cancer patients are a patient group at particular nutritional risk which is often further compounded by toxicities of radiotherapy (RT) and/or chemotherapy.
Aim: To investigate the use of enteral nutrition (EN) in patients undergoing RT +/- chemotherapy for lung cancer and explore associated treatment and nutritional factors.
Methods: A retrospective audit was conducted on 48 lung cancer patients receiving a minimum of three weeks RT (±concurrent chemotherapy) between February 2011–April 2012. Data was collected on: demographics, treatment prescription, presence and severity of oesophagitis, nutritional status (Patient-Generated Subjective Global Assessment, PG-SGA), weight change and EN usage.
Results: Of the sample audited (63% male, mean age= 62 years, 56% receiving combined ChemoRT, median RT dose= 60/30/5), 17% (n=8) of patients required EN as assessed by the dietitian, with 15% (n=7) commencing EN (n=1 patient refused). Eighty-six percent of feeding tubes were nasogastric tubes (NGT) inserted during treatment, with 14% (n=1) requiring a percutaneous endoscopic gastrostomy (inserted pre-RT due to oesophageal stricture). NGTs were inserted at a median time-point 1 week post RT for a median duration of 15 days and required to provide 100% nutrition. At time of NGT insertion, all patients had lost weight (mean -3.4% body weight), all were malnourished according to the PG-SGA and all experienced oesophagitis (median severity= grade 2).
Conclusions: Results suggest a more proactive approach is required for prevention and management of malnutrition in lung cancer patients. Early identification of high risk patients and timely NGT placement would help optimise nutritional status in this vulnerable group.

095-P12
EVALUATION OF AN EVIDENCE-BASED NUTRITION CARE PATHWAY FOR LUNG CANCER PATIENTS UNDERGOING RADIOTHERAPY

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Background: Care pathways help to standardise management, reduce variation in practice, translate evidence-based guidelines into local protocols and improve patient care. As lung cancer patients undergoing radiotherapy are a group at particular nutritional risk, a nutrition care pathway was developed and implemented in 2010.
Aim: This project aimed to evaluate compliance with each component of the lung nutrition care pathway and make recommendations for improvement.
Methods: A retrospective audit was conducted on 29 patients commencing radical radiotherapy from February-October 2011. Compliance with patient screening (high risk patients identified and referred), timing of first contact (week 1 radiotherapy), Patient-Generated Subjective Global Assessment (PG-SGA) completion (week 1 and final week radiotherapy), frequency of review (minimum fortnightly) and post treatment follow up (minimum once) was examined.
Results: Compliance with components of the pathway varied: 79% of patients were correctly screened and booked for dietitian assessment, 69% were seen in week 1 radiotherapy, 90% had PG-SGA completed on initial assessment (dropping to 21% in final week), 76% were seen minimum fortnightly during radiotherapy and 62% had nutrition follow up post treatment.
Conclusions: To improve compliance, feedback was provided to the nutrition department and is to be presented to the multidisciplinary team to improve awareness. To increase completion of PG-SGA in final week, forms are now being attached to outpatient notes (as in week 1). To improve follow up post treatment, dietitian reviews are recommended to be scheduled together with post radiotherapy medical review. Ongoing monitoring and regular evaluation of the pathway is also recommended.

091-P12
CONCAVE: A PHASE II STUDY OF CONCURRENT INTRAVENOUS CISPLATIN & VINORELBINE WITH RADIOTHERAPY PLUS CONSOLIDATION ORAL VINORELBINE FOR STAGE III NSCLC

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Aims: To evaluate the response rate, toxicity and survival outcome for this concurrent chemo-radiation and oral chemotherapy consolidation approach in adequately staged, good performance status patients with stage III NSCLC.
Methods: Twenty-seven patients with PET-staged IIIA/B NSCLC were recruited until June 2010. Participants received cisplatin IV 40mg/m2 and vinorelbine IV 20mg/m2 day1,8,22,29 concurrent with thoracic RT 60Gy/ 30fr. Four weeks later they received oral vinorelbine 20mg/m2 day 1 & 8 q3weeks x 3 cycles.
Results: The median age was 63yrs (42-72), M/F 16/11, ECOG PS 0/1 14/13, stage IIIa/b 15/12, histology SCC/ non-SCC/ NOS 5/13/9. Response rate 23/27 (7 CR+ 16 PR) = 85%. With a median follow-up of 25 months there are 9 patients alive and disease free with an overall median PFS= 11 months and median OS= 14 months. Toxicity data will be presented in detail. Three patients withdrew before completing all treatment because of toxicity. There were 3 early deaths (1 PE, 2 pneumonia).
Conclusion: CONCAVE achieved a high response rate and survival results comparable to other chemo-radiotherapy protocols but the rates of withdrawal for toxicity and early mortality are concerning.
Pierre-Fabre Medicament provided funds for data management.

111-P12
OCCUPATIONAL LUNG DISEASE: ASBESTOS DISEASES

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Occupational lung disease, particularly asbestos induced, continues to touch the lives of many Australians and their families. Tragically, Australia remains a world leader for rates of asbestos disease, particularly mesothelioma and asbestos induced lung cancer.
Australians are in the midst of the "third wave" of asbestos exposure which involves persons exposed as a result of DIY home renovations and as bystanders. Victims of the third wave are predominantly women and, increasingly, children. Unfortunately, what is also tragic about this data is that the general awareness about victims' legal entitlements continues to be poor. This is largely due to the complex nature of those entitlements and a fundamental lack of understanding about them.
Our aim is to provide newly diagnosed patients and their families with a snap shot of their legal entitlements upon diagnosis of asbestos disease. These patients are given the tools to make an informed and educated decision regarding the legal entitlements they may wish to pursue.
This tool will be at the fingertips of the health professionals involved in the patients' care and will be available to GPs, physicians and nurse care co-ordinators to give to the patient and family at the time of diagnosis. As these health care professionals are at the forefront of patient care, they may be the only ones from whom patients seek advice regarding diagnosis. Our hope is to have this template duplicated into many languages so that all people will have access to the same information regarding their legal entitlements.

021-O12
WHO PROVIDES EMOTIONAL SUPPORT WHEN AN ASBESTOS-RELATED DISEASE IS DIAGNOSED? AN EXPLORATORY STUDY INVESTIGATING PATIENTS AND THEIR CAREGIVERS SOURCES OF EMOTIONAL SUPPORT

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A recent meta-analysis confirmed having high levels of perceived social support, larger social network, and being married was associated with decreases in relative risk for mortality of 25%, 20%, and 12%, respectively. An Adelaide practice-based study explored the social experience of people diagnosed with asbestos related diseases (ARD) including mesothelioma and their family caregivers. This presentation reports on the comparison of emotional support between ARD Victims and their Bereaved relatives

The cross-sectional study, using data from 97 respondents between June 2005 and December 2008, included 42 bereaved from the non-government organisation, Asbestos Diseases Society of South Australia (ADSSA). The Victims and the Bereaved completed the Index Source of Emotional Support (Canberra Cancer Quality of Life Study).

Descriptive analysis showed that 90% could share their feelings with someone, with almost no difference between the 2 sub-populations. However, one third of Victims could not share their feelings with their spouse. Although all those with the life-threatening condition mesothelioma (100%) were significantly (p=0.006) more able to share their feelings with their family. The GP was important (39%) for both populations and 20% of both populations could share with the social worker.

The results of this exploratory and descriptive study add to the literature by enunciating who these populations source their emotional support from. In particular, they alert health professionals to the reality that many spouses are unable to share their feelings in times of serious illness. These results will be discussed in terms of their implications for clinical practice within the healthcare team.

003-P12
INCIDENCE OF CODON 72 POLYMORPHISM TUMOR SUPPRESSER GENE P53 IN NON SMALL CELL LUNG CANCER PATIENTS

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Background: The tumor suppressor TP53 pathway plays a crucial role in preventing carcinogenesis through its ability to impose cell cycle arrest and apoptosis following DNA damage and oncogene activation. Single nucleotide polymorphism at codon 72 leads to substitution of arginine for prolin, has been suggested to affect cancer predisposition. However, findings have been inconsistent in various cancers, and ethnicity appears to be a critical factor influencing the effects of the SNP on cancer risk. An increasing trend has been observed in the prevalence of lung cancers, though the underlying genetic basis is unclear.

Methods: A total of 200 samples were studied among which 100 were from NSCLC patients and 100 were collected from healthy controls from three hospitals. The p53 codon 72 genotyping was studied by high sensitive ASO-PCR assay. Associations between genotypes and survival were assessed using Kaplan-Meier method. Cox proportional hazard models were performed to identify significant variables.

Results: The genotype distribution of p53 codon 72 polymorphism was significantly different between bladder cancer patients and controls (p = 0.039). In logistic regression, diagnostic age and genotype Pro/Pro were the risk factors for developing an invasive tumor (OR51.47, 95% CI51.17–1.85, P50.003) compared to the Arg/Arg genotype.A 4.526-fold risk was estimated for the patients with Pro/Pro genotype as opposed to non-Pro/Pro genotype to develop invasive tumors. However, the extent of p53 codon 72 polymorphism did not predict NSCLC adder cancer prognosis. Taken together, p53 codon 72polymorphism may be associated with NSCLC cancer incidence and progression, but not prognosis. Further study is needed to evaluate the usefulness of the constructed model in risk assessment.

Conclusions: These findings suggest that genetic polymorphisms in the P53 pathway may be promising biomarkers for risk of developing NSCLC patients. ASO-PCR proved to be a very economical, sensitive and rapid technique for detection of Arg/Pro codon 72 p53 gene polymorphism.

057-O12
ENHANCING PSYCHOLOGICAL SERVICES FOR PEOPLE WITH LUNG CANCER

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Background: Lung cancer patients have a higher level of disease burden, higher unmet psychosocial needs and lower uptake of psychological services compared with other cancer groups. The Department of Clinical Psychology, in collaboration with the lung cancer service at PeterMac, revised the model of psychological care to optimise access and improve psychosocial well-being.

Method: This revised model of care involved realigning the Psychology Outpatient Clinic to run in parallel with the Lung Outpatient Clinic. The aims were to: 1) provide a timely and early intervention service; 2) increase patient access to psychology services; 3) reduce the burden of accessing psychology services; and 4) assess psychological needs of patients and provide appropriate psychological interventions. Patient demographics, uptake, referral information and session data were collected for a three month period and compared to data from the same period in the previous year.

Results: Our sample included a total of 37 patients with lung cancer. The results indicated that the revised model of service delivery led to: a 21% increase in new lung patient referrals for psychology services; an almost 100% uptake of services; and a 186% increase in the number of scheduled sessions attended by lung patients. The main reasons that patients attended sessions were to address mood fluctuations, loss and grief issues, relationship and existential concerns.

Conclusion: The revised model made a significant impact on meeting the previously unmet needs of this patient group through providing timely assessments and interventions. This highlights the potential effectiveness of integrating psychology services within medical cancer streams.

Disclosure: We received no funding and there was no duality or conflict of interest.

097-P12
CIGARETTE SMOKE CONDENSATE INDUCES THE EXPRESSION OF SPLA2 ISOFORMS IN HUMAN MACROPHAGE LIKE THP-1 CELLS

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Aim: To evaluate the expression of secretory PLA_2 isoforms in cigarette smoke condensate-induced molecular changes in human macrophage like THP-1 cells.

Methods: THP-1 cells were differentiated with 10 nm PMA in RPMI-1640 media. Cigarette smoke condensate –induced molecular changes at different concentrations were assessed in differentiated THP-1 cells after 24 hour treatment by measuring cell viability, reactive oxygen species generation, cell membrane integrity and the extent of apoptosis by MTT assay, DHE staining, FDA-EtBr staining and Annexin-PI staining respectively. Expressions of secretory PLA_2 groups using RT-PCR were also screened.

Results: The cell viability and cell membrane integrity deteriorated with increasing cigarette smoke condensate concentrations from 1µg/ml to 100µg/ml, which may be due to increased ROS production leading to apoptosis. Differentiated

THP-1 cells revealed a significant mRNA expression of $sPLA_2$ groups: IB and IID at 75µg/ml, III at 10µg/ml of cigarette smoke condensate concentrations.
Conclusion: CSC contributes towards oxidative stress in differentiated THP-1 cells thereby inducing $sPLA_2$s expression which may be responsible for the regulation of inflammatory cascade leading to pathological conditions.

049-O12

CIRCULATING MIR-625-3P: A POTENTIAL BIOMARKER FOR MALIGNANT PLEURAL MESOTHELIOMA

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The definitive diagnosis of malignant pleural mesothelioma (MPM) will often depend on the availability of a biopsy of sufficient size. The identification of a biomarker that can be easily measured in blood would represent an important step forward. In this study we investigated the ability of microRNAs (miRNAs) in plasma/serum to serve as a diagnostic marker for MPM.
Microarray-based miRNA profiling of plasma samples from 5 MPM patients and 3 healthy controls identified 17 miRNAs with significantly differential abundance in patients and controls. Validation by quantitative real-time PCR in a series of plasma samples from 15 MPM patients and 13 controls revealed that levels of one of these miRNAs, miR-625-3p, were significantly elevated in plasma of MPM patients (4-fold, p=0.004), and able to discriminate between MPM patients and controls (accuracy 82.4 %). Assessing levels of miR-625-3p in serum of an independent series of MPM (N=30) and asbestosis (N=10) patients revealed that miR-625-3p was significantly (3.8-fold, p=0.023) elevated in serum of the MPM patients and able to discriminate between cases and controls (accuracy 79.3 %). Finally, miR-625-3p was found to be present at significantly higher levels (2-fold, p=0.006) in surgical (MPM) tumour specimens than in normal mesothelium. Preliminary data from a third series of serum samples from 32 MPM patients and matched healthy controls so far confirm our observation that miR-625-3p is elevated at least 3-fold in blood from MPM patients.
Taken together these data provide evidence that miR-625-3p has the potential to serve as a novel blood-based biomarker for MPM.

038-O12

MODULATION OF AQUAPORIN 1 AS A NOVEL TREATMENT STRATEGY FOR MALIGNANT MESOTHELIOMA

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Background: Malignant mesothelioma (MM) is an aggressive tumour of serosal membranes with a poor prognosis. We have identified aquaporin 1 (AQP1) as a significant prognostic marker and have shown a positive correlation between AQP1 protein expression measured by immunohistochemistry and patient-derived MM cell proliferation rate.
Aims: To investigate whether alteration of AQP1 function by a pharmacological blocker inhibits cell proliferation, motility and metastasis-forming potential *in vitro*.
Methods: Primary MM cells were harvested from malignant pleural effusions. AQP1 expression and mesothelial phenotype were determined by immunohistochemistry. Cell proliferation was measured with and without altered AQP1 channel function using an MTS assay. Individual cell motility was measured using time-lapse photography. Metastatic growth potential was assessed by an anchorage-independent assay.
Results: AQP1 modulation by a pharmacological blocker decreases mesothelial cell proliferation, motility and anchorage-independent growth without inducing nonspecific cytotoxicity or increasing apoptosis.
Conclusions: AQP1 is a prognostic marker for MM. Targeted pharmacological modulation of AQP1 function can significantly alter MM cell behavior *in vitro*. This observation has treatment potential. AQP1 inhibition by siRNA will further clarify the molecular mechanisms leading to specific AQP1 modulation.
Funding: This work was supported by COMCARE and the FMC Foundation.
Disclosure: There are no conflicts of interest.

041-P12

COMPARATIVE STUDY OF TWO HYPOFRACTIONATED PALLIATIVE RADIOTHERAPY REGIMEN IN LOCALLY ADVANCED NON SMALL CELL LUNG CARCINOMA

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Aims: To discover the most effective and least toxic regimens of palliative radiotherapy for non small cell lung cancer, and here we study of two palliative radiotherapy fractionation schedule.
Methods: Biopsy proven non small cell carcinoma of lung: stage IIIb, IV and IIIa with poor performance status patients coming to the department of radiotherapy and oncology sms hospital Jaipur were included in the study, two radiotherapy schedules were followed : (a) 18.75Gy in 3 #{625cGy/week for 3 weeks} (b)30Gy in 10 #. At base line ,symptoms such as cough, hemoptysis, and dysphagia were categorised for quality of life assessments, the European organisation for research and treatment of cancer(EORTC) quality of life questionnaire(QLQ)-C30 and the lung cancer specific module QLQ-LC13 were used, and imaging at 2,6,14 weeks which is optional.
Results: There is no strong evidence that any regimen gives better palliation .Higher dose regimen give acute palliation of symptoms but more acute toxicity, especially oesophagitis, while the lower dose regimen takes longer time to palliate but the effects lasts longer ,there is evidence for a modest increase in survival in patients with better performance status(PS)
Conclusion: The majority of patients should be treated with short courses of palliative radiotherapy of 2 or 3 fractions. Care should be taken with the dose to the spinal cord .The use of high dose palliative radiotherapy should be considered for and discussed with selected patients with good performance status. More research is needed into reducing the acute toxicity of large fraction regimens.
Disclosure: No Conflicts of interest

054-O12 AWARENESS ABOUT THE SIGNS AND SYMPTOMS OF LUNG CANCER IN AT RISK POPULATIONS IN NSW

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Background: Evidence suggests that knowledge about the warning signs and symptoms of lung cancer may encourage early presentation, diagnosis and better treatment opportunities.

Methods: Sixteen focus groups (6-8 participants) were conducted in metropolitan and regional NSW to investigate public awareness of lung cancer amongst high risk populations (n=125). Quota sampling was used to recruit groups characterised by age (40-64 years, 65+years), smoking status (ex-smoker, current, never) and socioeconomic status.

Results: There was a widespread awareness of coughing up blood as a sign of lung cancer. Other respiratory symptoms were also assumed to be symptoms of lung cancer, among other causes. Most participants accepted that smoking increased the chance of developing lung cancer however current smokers commonly rejected the idea despite stating that health authorities warn of the contrary. Other risk factors mentioned included air pollution, asbestos, workplace and household exposure to chemicals/sprays, an unhealthy lifestyle, poor diet, stress and family history. Smokers tended to attribute symptoms to these alternatives and downplay the risk due to smoking. All participants felt they were at some risk of developing lung cancer. Smokers believed that reducing their cigarette intake lessened their risk and that adopting a healthier lifestyle significantly offset risk. Ex-smokers believed their risk had been reduced to that of a never-smoker.

Conclusion: There is limited understanding about the warning signs and susceptibility of developing lung cancer amongst those at risk More information is needed in the wider community to increase knowledge and awareness about lung cancer.

114-S12
IMAGING GUIDED BIOPSY- WHAT A RADIOLOGIST GIVES?

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With recent advances in target therapy and personalised treatment for lung cancer, there is an increasing role for the radiologist to perform imaging guided biopsy to provide representative tumour tissue not only for histological confirmation of malignancy, but also for molecular and mutation analyses. The role of the radiologist in imaging guided biopsy is three-fold:

I. Biopsy Planning. Biopsy is now a multidisciplinary procedure and can be performed by various specialists using modalities including EBUS, EUS, VATS. It is important for the radiologist to work within the multidisciplinary model to review the imaging findings to help select the appropriate lesion and optimal approach for biopsy, considering the advantages, limitations and complications of each technique. Increasingly, FDG PET/CT is being used to guide biopsy to the most accessible and metabolically active lesion to maximize the return of representative tissue sample.

II. Biopsy Procedure. When imaging guided biopsy is indicated, this is often performed by the radiologist, especially in CT guided biopsy of lung and mediastinal lesions. The advent of real time CT fluoroscopy has made biopsy more efficient and safer. Core biopsy using biopsy gun provides larger specimen and multiple specimens can be safely obtained with a single pleural puncture using a coaxial technique. Good communication between oncologists, pathologists and radiologist is essential to ensure appropriate and adequate tissue sample is obtained. It is also important for the radiologist to be aware of various CT biopsy techniques and the local complication rates, especially in lung biopsy, and benchmark with the accepted standard, so patients can be suitably prepared and allowed informed consent.

III. Post Biopsy Care. This involves the provision of post biopsy observation and management of acute complication, such as aspiration or drainage of pneumothorax using a Heimlich valve. Biopsy outcomes should be audited for quality assurance.

052-O12
DEVELOPMENT OF PRIMARY XENOGRAFTS USING LUNG CANCER SPECIMENS OBTAINED BY ENDOBRONCHIAL ULTRASOUND-GUIDED TRANSBRONCHIAL NEEDLE ASPIRATION

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Background: Over 40% of lung cancers present as inoperable, locally advanced disease. Current diagnosis is based on endobronchial biopsy or cytology, which results in advanced stage lung cancer being markedly under-represented in conventional tissue banks of surgically resected stage 1 tumours. Accurate preclinical models of advanced stage disease are needed for testing of new therapeutic agents, as well as for the development of biomarkers. Here we describe a novel preclinical model using samples obtained by the minimally invasive technique of endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) in patients with locally advanced lung cancer.

Methods: Cell suspensions from samples obtained by EBUS-TBNA were implanted directly into the flanks of NSG (Non-Obese Diabetic, Severe Combined Immune Deficient, IL2Rγ knockout) mice to generate primary xenografts. Once engrafted, serial passage was performed in nude athymic mice. **Results:** Freshly obtained samples from EBUS-TBNA typically contained over 100,000 viable tumour cells, with less then 10% stromal contamination. Engraftment and serial passage were achieved in 5 of 15 (33%) cases. The mean duration from implantation to engraftment was 99 days. In all 5 cases, the histological subtype was identical in patient and xenograft tumours despite serial passage.

Key conclusions: This is the first report of the generation of a mouse xenograft model using fresh human EBUS-TBNA samples. The primary xenograft lines derived from these specimens may provide the much-needed basis for more accurate preclinical modeling of locally advanced lung cancer and a means to investigating targeted therapeutic regimens.

Disclosure: No duality or conflict of interests

093-P12
THORACIC DIGITAL TOMOSYNTHESIS: A SINGLE CENTRE EXPERIENCE

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Introduction: Thoracic digital tomosynthesis (DT) is a radiographic technique that may offer an alternative to computed tomography (CT) for follow up of peripheral pulmonary lesions (PPL) and for clarification of suspicious chest xray (CXR) findings. **Aim:** To describe our early experience of DT. **Method:** Retrospective observational study. Consecutive DT scans performed at the Prince Charles Hospital between March 2011 and May 2012 were selected by searching our Picture Archiving and Communication System. Request forms, accompanying CXR and CT scans (if available) and radiologist reports were reviewed. **Results:** 35 DT scans were performed. 16 (45%) were to clarify suspicious CXR findings. DT characterized these changes sufficiently in 7 /16 patients (43%) to avoid CT scan. Final diagnoses were: atelectasis (1), pleural plaque (1), pulmonary vein (1), healed rib fracture (1), thin-walled cyst (1), no focal lesion (composite shadow, 2). 19 patients (55%) had DT scans for

PPL assessment. 38 PPLs were visible on prior CT . 10/38 (26%) PPLs were visible on CXR (median diameter 18.2mm) whereas 24/38 (63%) PPLs were visible on DT (RUL (8), RML (4), RLL (5), LUL (5), LLL (2)). Median diameter of DT-detected PPLs was 13.0mm (range 3.4-47.0mm); median diameter of 14 PPLs not seen on DT was 4.0mm (range 4.0-7.9mm). These PPLs were located in RUL (5), RML (1), RLL (2), LUL (1), LLL (5).

Conclusion: DT is more likely to detect PPLs than CXR. DT can characterise suspicious CXR findings, in some cases avoiding the need for CT scan.

Disclosure: No authors have any conflicts of interest to disclose

Funding: S.C. Leong is the recipient of an Australian Postgraduate Award PhD scholarship

This work was supported by: NHMRC project grants; NHMRC Practitioner Fellowship (KF), NHMRC Career Development Fellowship (IY); Cancer Council Queensland PhD scholarship (Marissa Daniels), Cancer Council Queensland Senior Research Fellowship (KF), Cancer Council Queensland project grants; NHMRC NCARD project grant; Cancer Australia project grants; Queensland Clinical Research Fellowship (KF, IY); Australian Lung Foundation / Boehringer Ingelheim COPD Research Fellowship (IY).

105-P12
FIRST 24 CASES FROM A HEALTH TECHNOLOGY ASSESSMENT FIELD EVALUATION OF ELECTROMAGNETIC NAVIGATION BRONCHOSCOPY

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Introduction: Electromagnetic navigation bronchoscopy (ENB) (superDimension, Minneapolis, Minnesota) is a diagnostic tool that promises "GPS-like" targeting of peripheral pulmonary lesions (PPLs). Through the use of virtual bronchoscopy software and an eight way steerable catheter passed through the bronchoscopic working channel, the system guides the bronchoscopist through the bronchial tree to the target lesion. Our aim was to assess the utility and safety of this novel technique.

Methods: ENB was introduced at The Prince Charles Hospital as part of a Queensland Policy and Advisory Committee on Technology (QPACT) field evaluation project. We retrospectively reviewed all ENB procedures performed at our institution since its introduction in August 2010.

Results: 24 ENB procedures were performed between August 2010 and January 2012. Mean age was 69, 14 of the 24 lesions were right sided. Mean maximal dimension was 24.07mm (9.9-56mm). 10 lesions were <20mm. Mean distance from pleura was 13.67 mm (0-59mm). Lesion location was as follows: LUL (4), LLL (1), RUL (6), RML (2), RLL (5). Mean procedure time was 63 minutes. ENB obtained true positive results in 4/18 cases - mean lesion size in these cases was 31.625mm. Final diagnoses were: cancer (16), hamartoma (1), organising pneumonia (1), and diagnosis unknown (6). All four ENB true positive cases demonstrated a bronchus sign. No complications were seen.

Conclusion: ENB is a safe bronchoscopic method for diagnosing peripheral pulmonary lesions.

080-O12
BARRIERS TO THE EARLY DIAGNOSIS AND MANAGEMENT OF LUNG CANCER AND DESCRIPTION OF BEST PRACTICE SOLUTIONS

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Background: Patients in Auckland are often diagnosed with lung cancer only at the time of an acute admission and with advanced disease, rather than as a consequence of primary care referral to outpatient services.

Aim: To map the patient pathway from presentation with lung cancer-related symptoms to diagnosis, and evaluate barriers present.

Methods: There were several components to this study including (1) a literature review, (2) audit of patients presenting with lung cancer in the year 2008, (3) interviews with patients presenting to secondary care via an acute admission, (4) survey and focus groups of GPs and (5) survey and stocktake of primary and secondary care services for lung cancer

Results: The audit of lung cancer presentations in 2008 yielded very similar results to a 2004 study, except that more patients were discussed at a multidisciplinary meeting (56% compared to 28% in 2004). Although 76% of patients presented initially to primary care, 44% of these cases subsequently were admitted or self-presented acutely to hospital. Once again, patients presenting to secondary care directly had more advanced disease but achieved diagnosis faster. Patient-related delays were identified in 11% and system delays in 10%. The secondary services stocktake identified commendable but patchy lung cancer initiatives in New Zealand. Patient and GP interviews and focus groups identified a number of perceived problems including fatalistic attitudes, system barriers and poor or delayed access to investigations.

Conclusions: Numerous barriers to the early diagnosis of lung cancer have been identified. Eighteen recommendations for change have been drafted.

Supported by: Health Research Council of New Zealand

Conflict of interest: No

059-P12
THE PROGNOSTIC ROLE OF EXPRESSION OF POLO-LIKE KINASE 1 (PLK1) AND CELL DIVISION CONTROL 2 (CDC2), TWO POTENTIAL THERAPEUTIC TARGETS IN MALIGNANT PLEURAL MESOTHELIOMA

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Background: Increased expression of PLK1 and CDC2 is associated with poor prognosis in cancer, and both genes were upregulated in previous studies of malignant pleural mesothelioma (MPM).We assess the effects of target knockdown on MPM cell growth and determine whether PLK1 and CDC2 expression is associated with overall survival (OS) in MPM patients.

Methods: Tissue microarrays were constructed using samples from patients diagnosed with MPM who underwent surgery. PLK1 and CDC2 immunohistochemistry was performed and their prognostic role reviewed, adjusting for known prognostic factors, utilising a Cox regression model.

Proliferation of MPM cell lines was measured after transfection with PLK1- or CDC2-specific siRNA, or treatment with small molecule drugs BI 2536 or Roscovitine.

Results: In 155 patients, median PLK1 and CDC2 expression was 3% (Range 0-42.5%) and 15.8% (Range 0.5–96%) respectively.

Median OS was 14.3 months (95% CI: 10.6-18.0). On univariate analysis, greater PLK1 expression, non-epithelioid histology, age and male gender were associated with worse outcomes. CDC2 expression was not associated. On multivariate analysis, PLK1 expression (HR 1.87; 95% CI 1.23-2.83; p=0.003), subtype (HR 3.05; 95% CI 2.08-4.46; p<0.001) and age (HR 1.22; 95% CI 1.01-1.48; p=0.036) remained significant.

In cell lines, PLK1 and CDC2 knockdown led to siRNA dose-dependent growth inhibition. Small molecule inhibitors of PLK1 (BI 2536) and CDC2 (Roscovitine) also inhibited proliferation.

Conclusion: We have identified PLK1 expression as an independent prognostic factor in MPM. Furthermore, inhibition of PLK1 and CDC2 is growth inhibitory in MPM cells, suggesting PLK1 and CDC2 as potential therapeutic targets.
Disclosure statement: The authors report no possible dualities or conflicts of interest associated with the conduct of this study.

092-O12
THE QUEENSLAND LUNG CANCER SCREENING STUDY: RISK STRATIFICATION USING PARTICIPANT DATA AND LUNG FUNCTION TESTS CAN SIGNIFICANTLY INCREASE SCREENING EFFECTIVENESS

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Introduction: Screening with low-dose computed tomography (LDCT) reduces lung cancer (LC) mortality in participants aged 55-74 with ≥30 pack year smoking history.
25-50% of screenees have "positive" scans requiring further evaluation, but >95% of these findings are benign; cancer detection rates are only 1-2%. Further risk stratification may help define the highest-risk population, allowing better targeting of screenees and ultimately more efficient and cost-effective screening.
Aim: Explore the potential of risk modelling with lung function and patient variables to improve the positive predictive value of screening in the Queensland Lung Cancer Screening Study cohort.
Methods: Participants received up to 3 annual LDCT scans. Lung function data were collected at entry. Risk stratification was determined retrospectively using a published model based on PLCO Trial data (age, socioeconomic status, positive family history, body-mass index, COPD diagnosis, chest x-ray within last 3 years, smoking history). Lung function thresholds were determined by ROC analysis (%predicted FEV1 and KCO; FEV1*KCO product).
Results: 256 participants were followed for a median of 30 months. Ten LC were detected (1565 LC per 100,000 patient-years; 3.9% yield). Using a model combining thresholds of 5-year LC risk ≥2% and FEV1*KCO product ≤0.85, only 129 participants would have needed to be screened in order to detect all 10 cancers, improving the potential yield to 7.8%.
Conclusions: Lung cancer screening efficiency can be enhanced using easily obtainable patient and physiological data. These findings need validation in larger cohorts.
Disclosure: Supported by a Queensland Smart State Grant, NCARD & NHMRC.

044-P12
THE EFFICACY OF ROUTINE EGFR MUTATION TESTING OF LUNG CANCERS

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Background: The introduction of epidermal growth factor receptor tyrosine kinase inhibitors (EGFR TKIs) into clinical practice has significantly altered treatment of Australian lung cancer patients. Due to the selective responsiveness to EGFR TKIs of lung tumours carrying EGFR but not K-RAS mutations, EGFR mutation testing has been implemented at a number of Australian hospitals. Guidelines for EGFR mutation testing have not been developed.
Aim: To evaluate routine EGFR mutation testing of lung cancers.
Methods: Paraffin-embedded biopsy, surgical and cytology specimens from Royal Perth Hospital taken over two calendar years were evaluated for EGFR (exons 18-21), K-RAS (exons 2, 3) and BRAF (exon 15) mutations using routine PCR and Sanger sequencing.
Results: EGFR mutations were identified in 18/184 (10%) cases, K-RAS mutations in 43 (25%) cases and BRAF mutations in 3 (1.6%) cases. The histological classification of lung tumours carrying EGFR mutations included adenocarcinoma (12), bronchioalveolar carcinoma (2), papillary adenocarcinoma (2), NSCLC (1) and small cell carcinoma (1).
Key conclusions: Similar to other western countries, the EGFR mutation frequency in lung cancers is ~10% in a typical Australian population. EGFR mutation testing frequency could be reduced by ~25% if cases were prescreened for K-RAS/BRAF mutations. The proportion of cases (EGFR, K-RAS or BRAF mutation positive) providing additional information for treating physicians is consistent with that of other routinely performed molecular tests (eg. HER2 CISH for breast cancer) and may optimise treatment or expedite entry of lung cancer patients into clinical trials.
Funding: Boehringer Ingelheim, Anatomical Pathology, RPH

005-P12
A MULTI-CENTER RANDOMIZED, OPEN-LABEL PHASE II TRIAL OF TARCEVA IN SEQUENTIAL COMBINATION WITH GEMCITABINE COMPARED TO GEMCITABINE MONOTHERAPY AS FIRST-LINE THERAPY IN ELDERLY OR ECOG PS OF 2 PATIENTS WITH ADVANCED NSCLC

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Aim: The beneficial interaction between erlotinib and chemotherapy requires pharmacodynamic separation. The aim of this study was to evaluate the relative efficacy and tolerance of sequential erlotinib with gemcitabine versus gemcitabine monotherapy as first-line therapy in elderly or ECOG PS 2 patients with chemonaïve advanced NSCLC.
Methods: GATE is a multi-center, randomized, Phase II study. Primary objective was progression free survival (PFS). Secondary objectives were Overall Response Rate (ORR), Disease Control Rate; duration of response, overall survival, and safety. Patients were randomized to either gemcitabine (1000 mg/m^2 Day 1,8 q28 days) followed by erlotinib (150 mg/day on day 15 through day 28), (EG), or gemcitabine monotherapy (1000 mg/m^2 Days 1,8, 15 q28 days), (G); for up to 6 cycles.
Results: Fifty-four patients were recruited, 28 to G arm and 26 to EG arm. Overall, efficacy results were not significantly different between study arms. Median PFS and ORR for the G vs EG arms were 8.0 vs 10.3 months (HR 1.3;95% CI [0.63;2.68]; p=0.4798) and 7.1% vs 3.8% (95% CI [17.5;10.9]) respectively. The majority of AEs in both arms were Grade 1-2. The commonest AEs recorded for patients in the EG and G arms were rash-like events (65%) and nausea (42%) respectively. Four patients (17%) in EG arm and 5 (16%) in G arm experienced at least one treatment related SAE.
Conclusion: Sequential erlotinib in combination with gemcitabine demonstrated no unexpected safety findings in patients with NSCLC at ECOG PS 2 or aged ≥70 years; efficacy advantage could not be confirmed.

Acknowledgment: The GATE study was sponsored by Roche Products Pty Limited (Australia). Medical writing was provided by Dr Joseline Ojaimi from Roche Products.

046-P12
IMPACT OF AN ONCOLOGY PHARMACIST ATTENDANCE AT A MULTIDISCIPLINARY LUNG CLINIC

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Background: Medication misadventure contributes to unplanned hospital admissions in cancer patients. Numerous medications may be added to existing ones and general practitioners (GPs) may lack experience in managing cancer-related medication. Inpatient clinical pharmacy services impact on patient care and morbidity. This project aimed to evaluate the effects of extending this service to outpatients.

Method: An oncology pharmacist attended lung outpatients for 6 months. Consented patients completed assessments of medication adherence (using Morisky tool) and satisfaction with medicines information at baseline and within 30 days of review. Post pharmacist review, a list of medications and recommendations were provided to patients, and community and hospital healthcare providers. Uptake of recommendations was evaluated after 7 days. Interventions were categorized and graded according to risk avoided. Unplanned admissions and clinic attendance rates were compared to the previous year using the Rate Ratio Test assuming Poisson counts. GPs opinion of the service was evaluated via survey.

Results: 48 patients were recruited. Self-reported medication adherence ($p=0.007$) and patient satisfaction ($p<0.001$) significantly improved. 154 pharmacist interventions were made: 4.5% extreme risk avoided and 43.5% high risk avoided. Ratios of unplanned admissions and clinic attendances decreased; 0.3 to 0.26 ($p=0.265$) and 3.32 to 2.98 ($p=0.004$) respectively. 31 of 48 GPs completed the survey, 74% of whom found the service useful.

Conclusions: Adding a pharmacist to the outpatient lung team led to significant improvements in patient medication adherence. Both patients and GPs were highly satisfied with the service. Medication misadventure, unplanned admissions and clinic attendances were reduced.

Funding: provided by an educational grant from Roche

Disclosure: The authors have no conflicts of interest to report

110-O12
MEASURING THE FUNCTIONAL DECLINE OF PEOPLE WITH ADVANCED STAGE NON-SMALL CELL LUNG CANCER (NSCLC)

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Background: People affected by lung cancer maybe highly symptomatic. This study aimed to quantify changes in physical function and health-related quality of life (HRQoL) in patients with advanced NSCLC.

Methods: Patients with stage III and IV NSCLC were prospectively recruited when starting treatment. HRQoL and functional status were measured using the EORTC QLQ-C30, 6-minute walk test (6MWT) and timed up and go test (TUG) at baseline, 2, 4 and 6 months or until they became too unwell. Comparisons between baseline and follow-up assessments were carried out by fitting linear mixed models to each outcome separately.

Results: 39 patients (21 male) recruited; median age of 63 (range 40-80). 28% had stage 4 disease with 26% deceased by 4 months. The mean 6MWT at baseline was significantly lower than predicted for the age, sex and height of the cohort (417.9 versus 550.4 metres, $p<0.0005$). Significant decline in mean 6MWT distance was seen at 2 (-42.4m; $p<0.0005$) and 4 months (-63.6m; $p<0.0005$) compared to baseline. Significant increases in time taken to complete the TUG was seen at 2 (+0.76 sec; $p<0.0005$) and 4 months (+1.01 sec; $p<0.0005$). In contrast, self-reported global health status and physical functioning showed small but significant decreases at 2 months, but no significant differences between baseline and 4 months.

Conclusions: Patients with advanced NSCLC show clinically and statistically significant decrements in physical function at treatment commencement. This continues to decline rapidly and significantly over time, despite small changes in self-reported HRQoL. Interventions to address this problem are urgently needed.

Funding: for this study was provided by a NHMRC Palliative Care Grant.

Disclosure: The authors have no conflict of interest to report.

101-O12
INTRA-OPERATIVE SCANNING CONFOCAL ENDOMICROSCOPY OF PLEURAL DISEASE: *IN VIVO* DIAGNOSIS OF MALIGNANCY

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The intra-operative diagnosis of pleural malignancy may facilitate surgical decision making including the need for pleurodesis. A scanning laser confocal endomicroscopy device has been developed which allows histological detail optical imaging of subsurface tissues *in vivo*. Confocal laser microscopy illuminates a fixed point of a specimen which, when coupled with the capacity to scan across a tissue plane and control the depth of imaging, provides a 3D structural view in a living body. Applied to screening of polyps in patients with hereditary polyposis, endomicroscopy obviates the need for tissue biopsy and operators can rapidly learn to identify malignant tissues. We performed the first intra-operative examination of pleural tissues using a thoracoscope-mounted endomicroscope device with patients administered iv fluorescein prior to imaging. Intra-operative endomicroscopic images were correlated with biopsies of pleural tissues. Thirteen patients were imaged: including mesothelioma 5 (2 biphasic) and pleural carcinoma metastases from lung 2, ovary 2, breast 1 and parotid 1. We were able to image and identify normal mesothelium, sub-mesothelium, connective tissues and blood vessels (including RBC). Malignant cells and clusters of cells had a characteristic appearance including poor uptake of fluorescein. Appearances of mesothelioma correlated closely with histology. Glandular and papillary structures were identified in metastatic pleural tumour. In ovarian cancer calcification was readily identified as were psammoma bodies, while the typical cystic spaces mirrored closely the histological appearances of adenoidcystic carcinoma. We plan now to extend our experience of malignancy and also the ability to discriminate between benign disease and malignancy of the pleura.

Supported by a Tumour Stream Grant from the Victorian Cancer Agency.

009-O12
FROM CLINIC TO CLASSROOM: HEALTH PROMOTION FOR HIGH SCHOOL STUDENTS

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Introduction: Lung cancer is in the top four most common cancers and is the most common cause of cancer related death worldwide. At least eighty percent of lung cancer patients are current or former smokers[1]. The younger a person starts smoking along with the number of years they smoke for, significantly increases their chances of developing cancer[2]. An integral part of the Cancer Nurse Coordinator's role is health promotion. A new initiative was developed to inform a younger audience about the devastating effects of smoking particularly in relation to lung cancer.

Objectives/Aims: To increase awareness to high school students on the harmful effects of smoking.
Methodology: Engagement with key stakeholders within the education department and the Chronic Diseases Network, before the implementation of the program ensured that it complemented the education curriculum. Presentations have been delivered to fourteen high schools in the Perth metropolitan area. The presentations were interactive and featured a power-point presentation with graphic pictures and real patient stories. Evaluation forms were completed by both students and teachers.
Results: The quality improvement initiative demonstrated a positive response to the presentation with the majority of the audience expressing a strong anti-smoking sentiment.
Conclusions: As health professionals we need to advocate that "prevention is better than cure". As cancer nurses we are ideally placed to combine an evidence and experience-based approach to education our future generation.

References:
1) http://www.who.int/tobacco/research/cancer/en/
2) Department of Education and Training New South Wales (2001). Stage 4 Smoke screen: a smoking prevention resource. Department of Education and Training

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028-O12
LIVING WITH LUNG CANCER - A PERSONAL PERSPECTIVE ON THE MYTHS, MISPERCEPTIONS AND STIGMA

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Aim: To outline a consumer advocate's perspective of lung cancer including myths, misperceptions and stigma.
Method: personal perspective supplemented by connections made worldwide via social media, and open-access literature sources.
Results/ Conclusion: Ashleigh Moore will present his personal perspective of the experience of lung cancer (twice), after surviving Head and Neck cancer. This personal account is supplemented by his connections with other survivors around the world via social media (FaceBook & Twitter). As a non-smoker, cyclist, father and husband, walk briefly in his shoes as he discovered the stigma and myths around lung cancer. There are surprising community misperceptions and misunderstandings of lung cancer despite it being the leading cause of cancer deaths. These misperceptions contribute to a shortfall in funding for lung cancer research, which flows on to poor survival outcomes which (unlike most other cancers) have not substantially improved in the past 20 years. Average 5 year survival remains low at 9-12%. Support for patients and families is limited. There is much that lung cancer survivors can do to dispel myths and inspire change. Clearly something must be done to erase the stigma, educate the public, and to inform service delivery, policy and research funders.
Funding: Cancer Voices South Australia is a 100% volunteer organization.
Disclosure statement: The authors have no dualities or conflicts of interest to declare.

016-P12
PLEURX CATHETERS PROVIDE SAFE AND EFFECTIVE CONTROL OF MALIGNANT PLEURAL EFFUSION

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Aim: To audit our experience with tunnelled indwelling catheters inserted for the management of malignant effusions.
Methods: A retrospective review of clinical outcomes for patients managed between 2008-2011
Results: 63 patients had 74 PleurX catheters inserted between 2008 and 2011 for malignant effusions (71 pleural, 3 peritoneal). M:F, 19:44. Mean age 66 y (32-96 y). All fluid collections were known to be malignant prior to PleuX insertion. All were inserted under local anaesthetic with awake sedation. The primary malignancy was breast carcinoma in 26, NSCLC (Non-Small Cell Lung Cancer) in 15, gastric carcinoma in 5, adenocarcinoma of unknown primary in 5, mesothelioma in 4, ovarian cancer in 3, small cell lung cancer in 2 and 11 had other malignancies. All achieved control of fluid. 59 subjects have since died (50 died with PleurX in situ) with 3 lost to follow-up and 1 subject with breast cancer is still alive (PleurX removed after pleurodesis). Mean time from insertion to death or removal was 49 days. Of the 18/68 PleurX removed, 6 had achieved pleuradesis, 1 was blocked (and reinserted), 1 was leaking around the insertion site (and was replaced), 4 were removed for infection. All complications occurred prior to 2009.
Conclusions: PleurX catheters are used regularly in our unit in the early management of malignant effusions. In our experience they provide safe, definitive control of pleural fluid for patients with advanced malignancy with much lower rates of discomfort and time in hospital than repeated aspirations or talc pleuradesis.
Disclosure: No

024-O12
LIMITING THE FUNCTIONAL DECLINE OF PATIENTS WITH ADVANCED NON-SMALL CELL LUNG CANCER (NSCLC): A HOME BASED EXERCISE PROGRAM (HEP)

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Background: Phase I of this study showed that 50% of (n=28) advanced stage NSCLC patients demonstrated a clinically meaningful functional decline from commencement of treatment to T2 (2months) follow up. This study (phase II) set out to pilot test a HEP, to lessen functional decline and its impact on this patient group.
Methods: A descriptive cohort study. Patients with stage III and IV NSCLC were recruited within one month of starting treatment and completed assessments bi-monthly to six months or until they became too unwell. The HEP is modelled on pulmonary rehabilitation principles and patients completed the program for 8 weeks. Functional status data was collected using the 6-minute walk distance (6MWD) and timed up and go test (TUG). Preliminary results are presented.
Results: 31 patients met inclusion criteria and were approached to take part in the study with11 patients (7 males) consenting. Patients who completed the intervention (n=10) from baseline to T2, resulted in only 10% having demonstrated a clinically meaningful functional decline on the 6MWD (-50m). 60% of the sample have maintained or improved their functional performance on the TUG and 6MWD from baseline to T2.
Conclusions: Preliminary data suggests that advanced stage NSCLC patients can remain active during the treatment phase to help lessen the functional decline associated with cancer treatments and the disease process. Strategies to increase uptake into the program need to be explored to improve the feasibility of the program in a clinical setting.
Funding for this study was provided by an ALTG concept development grant

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115-S12
THE MOLECULAR PATHOLOGIST IN 2012

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Personalised medicine is the application of genomic and molecular data to target the delivery of optimal health care. A vital part of personalized medicine is the development of suitable companion diagnostics, so specific molecular assays can be utilised to stratify disease status and identify the most appropriate therapy to ensure the best outcome and to potentially minimise side effects. This is of particular relevance to lung cancer where a

significant proportion of lung adenocarcinomas harbour biologically relevant and/or targetable somatic genetic changes such as mutations, amplifications or translocations in a number of genes including *KRAS, EGFR, ALK, MET, PIK3CA, RET, AKT1, ERBB2 & BRAF*. A particular challenge in lung cancer is developing and applying robust diagnostic assays that can identify clinically important changes in a number of genes on the very small amount of material, often with suboptimal quality DNA, that is available for analysis. Accurate and sensitive testing is essential to ensure patients with this poor prognosis disease receive the correct therapy and there is also a pressing need to triage patients for trials of novel targeted therapeutics. Integration of traditional tissue pathology with molecular studies and high quality biopsy material obtained through a multidisciplinary approach between oncologists, pathologists, respiratory physicians and radiologists is critical to ensure optimal diagnosis and therapy of patients with this poor prognosis disease. Our own experience suggests that multigene assays may offer significant advantages to the personalisation of lung cancer, maximising the yield of clinically relevant information on small and precious tissue biopsies.

055-P12

KNOWLEDGE, ATTITUDES AND PRACTICES ABOUT LUNG CANCER AMONG MEDICAL STUDENTS IN KATHMANDU UNIVERSITY SCHOOL OF MEDICAL SCIENCES

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Aims: Often, lung cancer is diagnosed at terminal stages. Poor awareness about the symptoms or risk factors of lung cancer among medics may be one of the factors for delayed diagnosis. We explored the knowledge of medical students and their behavior with the patients of lung cancer.

Methods: Qualitative and quantitative approaches were used for data collection from 153 medical student of Kathmandu University School of Medical Sciences from December 2011 to May 2012. Questionnaires were handed out to the participants, and discussions were carried out in five groups of these students.

Results: The majority of the students had good knowledge of lung cancer. 40% of them knew someone who had ever suffered from cancer. Eighty-nine students had over 80% knowledge of the 14 cancer warning signs, among them 83% knew the nine risk factors for lung cancer. Twenty-three students told lung cancer can be hereditary. 65% of all participants believed that it can be detected at early stage; of them 81% told that it can be treated. About 24% of the total students were current or ex-smokers and about half of them believed that lung cancer does not occur in light smokers. Only 10% have heard of Framework Convention on Tobacco Control in Nepal.

Conclusion: All medical students who know about any cancers may not necessarily have knowledge about lung cancers. Their perception about the cause of lung cancer may be influenced by their smoking behavior. Awareness about national policies needs to be increased.

Disclosure: No conflict of Interest

Source of Funding: – Self Funding

047-P12

UTILITY OF TESTING FOR NON-SMALL CELL LUNG CANCER (NSCLC) EPIDERMAL GROWTH FACTOR RECEPTOR (EGFR) MUTATIONS IN AN AUSTRALIAN TESTING PROGRAM

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Introduction: Treatment of NSCLC with EGFR tyrosine kinase inhibitors should be guided by the presence of activating mutations of *EGFR* in tumour tissue.

Aim: To evaluate rate and utility of testing when cost as an access barrier is removed, to determine what tissues are sampled and test outcomes.

Methods: In 2010, AstraZeneca initiated this program. Partnering Australian laboratories were funded for provision of *EGFR* mutation testing results. For patients, the test charge was supported by the program. Mutation testing was performed using Sanger sequencing. No clinical or personal details were gathered.

Results: Through March 2012, 2012 samples had been submitted. 69% of samples were from solid tissue, 16% from fine needle aspiration(FNA) and 14% from other cell blocks (washings/brushings/fluid). 51% of samples were from lung, 12% from lymph nodes, 10% from pleura/pleural fluid and 7% each from bronchus and brain. 14.8% could not be fully sequenced for exons 18-21. 43% of these had no tissue or no tumour tissue in the block submitted, DNA amplification failed in 25% and not all exons could be sequenced in 31%. A failed/incomplete test was more likely in samples derived from FNA – OR 3.1 (95% CI 1.9-5.2) compared to other samples. We estimate that *EGFR* mutation testing was performed on approximately 20% of incident cases of NSCLC in this period.

Conclusions: *EGFR* mutation testing is feasible on samples from across Australia. The rate of valid test outcomes is high but FNA samples are associated with more frequent test failure. Sending high quality samples is critical.

Conflict of interest: PC and JL are employees of AstraZeneca. BS and MP have participated in advisory boards, and JB has received honoraria from AstraZeneca.

060-P12

SUICIDAL IDEATION IN PATIENTS WITH LUNG CANCER: USE OF A SUPPORTIVE NEEDS SCREENING TOOL

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Background: Patients with lung cancer are at a substantially higher risk of suicide than the general population. This study aims to identify clinical and demographic characteristics of patients expressing suicidal ideation.

Methods: Between August 2009 and September 2010, 78 patients with newly diagnosed lung cancer were screened with the Supportive Needs Screening Tool (SNST) by the lung nurse coordinator. We analysed responses with regards to suicidal ideation and any associated demographic/clinical factors. Medical records were accessed for clinical details, including management and outcomes.

Results: Five (6.4%) patients completing the SNST expressed self-harm and/or suicidal ideation. Suicidal ideation was more common in males (60% versus 51%) and those with a younger median age (54 versus 68 years). On univariate analysis, the only factor associated with suicidal ideation was feeling sad/depressed ($p<0.05$). Avoidant behaviour; difficulty concentrating; not having someone to talk to and difficulty coping with treatment showed a trend to significance ($p<0.065$). Of particular concern, these patients were more likely to have thoughts of giving up treatment (60% vs 5.6%; $p=0.005$). Of interest, three patients had been diagnosed with cerebral metastases and were on dexamethasone. All patients with suicidal ideation were referred to support services; 4 to psychology/psychiatry and 1 to social work. None of the patients committed suicide.

Conclusions: Administration of the SNST allowed identification of patients with suicidal ideation. Albeit from a small sample size, this study highlights characteristics that may alert clinicians to patients at increased risk of suicidal ideation, facilitating referral to psychosocial support services.

Disclosures: The authors indicated no potential conflicts of interest.

082-O12

THE MICRORNA MIR-16 IS A NOVEL TUMOUR SUPPRESSOR GENE IN MALIGNANT PLEURAL MESOTHELIOMA

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MicroRNA expression in malignant pleural mesothelioma (MPM) is significantly altered, with previous studies identifying microRNAs with tumour-suppressor or oncogenic functions. The expression of miR-16 is frequently lost in a variety of cancers, and we demonstrate that miR-16 is also down-regulated in MPM, where it seems to function as a tumour-suppressor gene. The expression of miR-16 was significantly ($p = 0.01$) down-regulated (20-fold) in MPM tumours compared with pericardial tissue. In cell lines, miR-16 expression in MPM lines was 2 to 4-fold down-regulated compared with MeT-5A. The restoration of miR-16 expression with mimic resulted in growth inhibition in all MPM lines, with as little as 1 nM mimic leading to significant effects on proliferation and the ability to form colonies at low density. In contrast, use of miR-16 mimic at 5 nM did not alter the growth of MeT-5A cells. Transfection with miR-16 also led to a 2 to 5-fold sensitization of MPM cells to gemcitabine but did not affect MeT-5A sensitivity. The expression of miR-16 target genes related to gemcitabine resistance were down-regulated in transfected cells. The down-regulation of miR-16 in MPM tumour samples and cell lines, together with the growth inhibitory effects of restoring miR-16 expression suggests a tumour suppressor function in MPM. Together with its ability to sensitize MPM cells to gemcitabine treatment, this suggests miR-16 replacement should be explored as a novel therapeutic approach in MPM.

042-P12

THE NEW MODEL OF LUNG CANCER CARE IS MULTIDISCIPLINARY: THE SOUTH AUSTRALIAN EXPERIENCE OF PATHWAY DEVELOPMENT

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Aim: To develop a comprehensive clinical pathway to standardise lung cancer care and optimise outcomes for all South Australians, regardless of location, ethnicity, age, or financial status.

Methods: From 2010-2012, collaborative efforts by a dedicated working group engaged public and private sector health professionals including lung cancer specialists, allied health professionals, general practitioners, consumers and non-government organisations to produce a guiding document. A state-wide consultative workshop provided opportunity for review, feedback, and revision of this document.

Results: Key pathway recommendations resulted:

1. Establish and maintain state-wide systems for collection and analysis of clinical data.
2. Identify a care coordinator for lung cancer patients along the care continuum to ensure that care aligns with pathway recommendations.
3. Evaluate the supportive care needs and functional status of SA lung cancer patients using validated screening tools.

Conclusion: These key recommendations were considered to be prerequisites for successfully implementing the lung cancer pathway. These recommendations also indicate that changes at a systems level are required to deliver the desired improvements in the patient-focussed management of lung cancer in South Australia. Best practice in cancer management depends on a multidisciplinary approach to treatment planning and care delivery. The South Australian experience of lung cancer pathway development reinforces this view and reflects a commitment to the ongoing efforts needed to implement the pathway.

039-P12

IDENTIFYING ADDITIONAL MOLECULAR TARGETS FOR CRIZOTINIB IN NON-SMALL CELL LUNG CANCER (NSCLC)

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Crizotinib is effective treatment for NSCLC patients exhibiting ALK translocations. Crizotinib may also be beneficial for patients with aberrations in MET or ROS. The aims of this study, funded partly by Pfizer, were to determine the frequency of MET amplifications, ROS and ALK translocations in NSCLC and to correlate mutation with clinicopathological parameters. Tissue microarrays were constructed from 368 formalin-fixed paraffin-embedded tumours obtained from NSCLC patients treated at Peter
MacCallum Cancer Centre and St Vincent's Hospital. Fluorescence in situ hybridisation was used to detect MET amplification, ROS and ALK translocations. MET amplification was identified in 4/331 cases (1.2%) and high polysomy in 15/331 cases (4.5%). All amplified cases were male. 2/4 were adenocarcinoma and 2/4 squamous cell carcinoma. 3/4 were former smokers and 1/4 a current smoker. ROS translocations were identified in 1/322 cases (0.3%) while 3/322 cases (0.9%) exhibited an atypical signal pattern. The patient exhibiting the ROS translocation was a never smoking female with adenocarcinoma. ALK translocations were identified in 3/334 cases (0.9%). A further case contained a small break which did not meet the criteria as positive. All ALK translocated patients were female. 2/3 were adenocarcinoma and 1/3 a pleomorphic carcinoma. The ALK positive patients were a never, former and current smoker. The small number of positive patients makes it difficult to draw conclusions with regards to associations with clinical features of NSCLC. In conclusion, MET amplifications and ROS and ALK translocations are each found in approximately 1% of resected NSCLC.

Disclosure: The authors declare no dualities or conflicts of interest.

050-P12

SINGLE-CENTRE EXPERIENCE OF EPIDERMAL GROWTH FACTOR RECEPTOR (EGFR) TESTING IN NEPEAN BLUE MOUNTAINS LOCAL HEALTH DISTRICT (NBMLHD)

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Mutations in EGFR predict a response to targeted therapies in non-squamous NSCLC. Our aim is to describe the utility of EGFR mutation testing within NBMLHD. This is a retrospective audit of cases with confirmed non-squamous NSCLC where samples were sent for EGFR mutation testing between October 2010 and March 2012.

Results. Twenty-two patients (13F), had tumour samples sent for EGFR mutation testing. These were obtained by tumour or LN resection (n=10), Fine Needle Aspiration (FNA) (n=5), endobronchial ultrasound guided trans

bronchial needle aspiration (EBUS-TBNA) (n=2), core (n=3) and endobronchial (n=2) biopsies. Eighteen were confirmed Adenocarcinomas. Additional, postdiagnostic procedures were required in 8 patients to obtain sufficient tissue for EGFR mutation analysis. Four samples contained insufficient cells for testing, 3 obtained by FNA and 1 by EBUS-TBNA. EGFR mutations were detected in 6 samples; 3 on exon 19, 3 of Asian origin, 5 females and 5 nonsmokers. 2 out of 5 patients with activating EGFR mutations did not fit the classical phenotype of Asian female nonsmokers.

Conclusion. Asian, female, non-smokers are one significant phenotypic subgroup of patients with non-squamous NSCLC in our LHD. Samples obtained by FNA are less likely to yield enough tissue for EGFR mutation analysis than other sampling methods. Additional tissue sampling after diagnosis of non-squamous NSCLC is often required.

Conflict of interest: No.

072-O12
ANAPLASTIC LYMPHOMA KINASE (ALK) REARRANGEMENT IN LUNG ADENOCARCINOMAS – A LARGE MULTICENTRE STUDY OF FISH AND IHC.

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Aims of Study: Non-small cell lung cancer (NSCLC) has the highest cancer-related mortality globally. Rearrangements of Anaplastic lymphoma kinase (ALK) with the Echinoderm microtubule-associated protein-like 4 (EML4) gene in NSCLCs define a subgroup of patients with specific clinical, pathological and molecular characteristics and are associated with sensitivity to an ALK/MET inhibitor, with promising response rates. We aimed to assess the clinical utility of ALK translocation screening and to identify the frequency and clinicopathological features of lung adenocarcinomas harbouring ALK translocations, using immunohistochemistry (IHC) and fluorescence in situ hybridisation (FISH).

Methods: NSCLC tissue was obtained from patients treated at the Royal Prince Alfred Hospital and Concord Repatriation Hospital, Sydney, and St Vincent's Hospital and Peter MacCallum Cancer Centre, Melbourne with a total of 661 cases evaluated. Tissue microarrays were screened using ALK IHC (Clone ALK-1, Dako; Clone 5A4, Novocastra) and ALK break-apart translocation FISH (Abbott Molecular).

Results: ALK rearrangements were found in 5 cases (1%) by FISH. The 5A4 ALK antibody identified all 5 ALK positive cases (100% sensitivity). Two false negatives resulted from the ALK-1 antibody (60% sensitivity).

Conclusions: We have identified ALK translocation in a large Australian cohort occurring at a frequency of 1%, which is low, but within the range of reported percentages of 0.4%-13.5%. We believe ALK IHC represents an effective complement to testing selected NSCLC patients for ALK rearrangement using FISH.

Disclosure statement: No conflicts of interest are declared.

Sources of funding of presenting author: Cancer Institute NSW, LifeHouse RPAH, Sydney Breast Cancer Foundation.

066-O12
TECHNICAL CONSIDERATIONS AND PRELIMINARY EXPERIENCE OF A PILOT STUDY OF GALLIUM-68 VQ 4D-PET/CT IN LUNG RADIOTHERAPY

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Aims: Ventilation/perfusion (VQ) scanning can assess pulmonary pathophysiology in a spectrum of diseases. We sought to evaluate the utility of serial VQ using inhaled ^{68}Ga labelled carbon nanoparticles(Galligas)and injected ^{68}Ga labelled macro-aggregated albumin(MAA), acquired on respiratory-gated PET/CT (4D-VQ), in patients receiving radiotherapy (RT).

Methods: Preliminary experience of 4D-VQ was evaluated in a prospective study examining serial pulmonary function in patients undergoing curative intent RT (+/-concurrent chemotherapy). Radiation was delivered over 6 weeks in 30 fractions of 2Gy via a 3-field technique. Patients underwent 4D-VQ at baseline, 4 weeks into RT, and 3 months after RT. Additionally, a FDG-PET/CT was performed at 3 months after RT.

Results: Six participants have completed baseline and four week 4D-VQ scans and three have completed all PET studies. The use of 4D-VQ PET and 4D-CT enabled precise co-registration and accurate attenuation correction, minimising artefact otherwise prevalent at the lung bases. Both ventilation and perfusion are markedly decreased at 3 months within irradiated portals but minimal changes have been observed at 4 weeks. Tumour regression at 4 weeks and 3 months is not associated with perfusion or ventilation recovery in the immediate peri-tumoural region. No patient has had clinical grade 3 pneumonitis, although one patient had radiological pneumonitis demonstrated on FDG-PET at 3 months.

Conclusion: 4D- VQ PET/CT is technically feasible and can demonstrate sub-acute changes in VQ both during and after RT seemingly independent of severe clinical pneumonitis. Preliminary findings suggest that neither ventilation nor perfusion recover in the region around regressing tumour up to 3 months after RT.

067-P12
RESPONSE ASSESSMENT OF STEREOTACTIC ABLATIVE BODY RADIOTHERAPY (SABR) FOR PULMONARY METASTASES: UTILITY OF 4D-FDG-PET AND CT PERFUSION

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Aim: To evaluate the utility of 4D-FDG-PET/CT and CT perfusion after single fraction SABR for inoperable pulmonary oligometastases.

Methods: Eligible patients had 1-2 pulmonary metastases with no extrathoracic disease on staging FDG-PET. Imaging studies were performed at baseline, 14 days and 70 days after therapy. Two independent radiologists reported CT perfusion scans.

Results: At a median follow-up of 11 months (range 1-26), 20 patients with 24 metastases received SABR, of which 10 patients were enrolled into the prospective imaging protocol. All patients are alive, with 2/24 local failures and 7/20 patients with distant progression. The most severe toxicities were transient cough and chest wall pain (grade 2). SUVmax differed between 3D and 4D-PET by a mean of 20.6% (range 0.2%-47.2%) at 14 days and 14.8%

(range 0-37.8%) at 70 days. Significant discordance in 3D and 4D response assessment was noted in one case with 12mm tumour motion, where the day 70 scan 3D-SUVmax increased by 38% whilst no change was observed in 4D-SUVmax. This metastasis was clinically controlled. Overall SUVmax increased at 14 days (mean 104.9%, $p<0.001$) and decreased at 70 days (mean=55.5%, $p=0.005$). A linear correlation to metabolic response at 70 days fit 4D-SUVmax ($r^2=0.566$, $p=0.001$) more reliably than 3D-SUVmax ($r^2=0.407$, $p=0.011$). There was strong level of inter-observer agreement of CT perfusion interpretation with a median intraclass correlation coefficient of 89%(range 57%-98%). Perfusion analysis is ongoing.

Conclusions: SABR appears safe and affords promising local control. Increased SUVmax at 2 weeks post-RT is likely due to an inflammatory response to large single dose radiotherapy.

Disclosure statement: - there are no disclosures to declare by any of the authors.

079-O12
THE EXPRESSION OF EPITHELIAL MESENCHYMAL TRANSITION MARKERS IN EARLY STAGE NON-SMALL CELL LUNG CANCER

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Aims: This study aimed to describe expression patterns of sentinel epithelial mesenchymal transition (EMT) markers in early stage lung cancers and correlate these with histopathologic features associated with poorer prognosis.

Methods: 46 resected non-small cell lung carcinomas with clinic-pathological annotation from The Prince Charles Hospital Lung Tumour Bank were included; mean age at resection was 68.21 years, with a male/female ratio of 25/21. 29 adenocarcinomas, 15 squamous cell carcinomas, 1 large cell neuroendocrine and 1 carcinoid were analysed. Haematoxylin and eosin stained sections from embedded paraffin blocks confirm that each section contained cancer cells. Immunohistochemistry for E-cadherin (ECAD), Vimentin, β-catenin and cytokeratin 7 (CK &) were performed using standard immunohistochemical procedures and appropriate controls. ECAD and β-catenin staining were scored on an intensity scale of 0-3 with 0 being entirely negative and 3, representing high intensity. CK 7 and Vimentin antibodies were scored as negative or positive.

Results: Positive staining for Vimentin was demonstrated in tumours with vascular (9/18 cases), perineural (1/2 cases) or pleural invasion (6/11 cases). There was no correlation between EMT biomarker expression patterns for ECAD, CK7, β-catenin and histopathologic invasion phenotypes in these samples.

Conclusions: This study showed a correlation between Vimentin staining and mesenchymal EMT orientation. This correlation was not seen with ECAD, β-catenin and CK7. However, the small sample size in this pilot study is unable to provide a definitive answer into the role of EMT in invasion and metastatic behaviour of lung cancers.

011-P12
INHALED CORTICOSTEROIDS (ICS) ATTENUATES EPITHELIAL MESENCHYMAL TRANSITION (EMT) IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) – IMPLICATIONS FOR LUNG CANCER PROPHYLAXIS

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Introduction: Smokers with COPD are at especial risk of lung cancer. We have recently published that EMT-type-III is active in the airways of COPD patients; in this process epithelial cells change shape and become motile, then digest through the reticular basement membrane (Rbm) which becomes fragmented. The epithelial cells transition to form a mesenchymal fibroblast-like cell, with associated increase in angiogenesis. Type-III EMT is a dangerous pre-malignant condition. We have now assessed the effects of ICS on markers of EMT in bronchial biopsies (BB) from COPD patients.

Methods: Double-blind, randomised, placebo-controlled study assessing the effects of inhaled fluticasone propionate (FP; 500μg twice daily) on EMT in 34 COPD patients. BB were stained for the markers of EMT, S100A4 (a fibroblast epitope) and MMP-9 (matrix-metalloproteinase-9) and the marker of epithelial activation, epidermal growth factor receptor (EGFR).

Results: Rbm "fragmentation" markedly improved with ICS, with a significant change compared to placebo ($p<0.03$). There were also significant reductions in S100A4 ($p<0.004$), MMP-9 ($p<0.02$) and EGFR ($p<0.03$) staining in both basal epithelial cells and in the Rbm comparing ICS with placebo.

Conclusions: This is the first study reporting an anti-EMT effect of FP in COPD airways. EMT may well be a link between smoking, COPD and lung cancer, and these findings may underlie the published anti-cancer effects of ICS in COPD. Our study suggests EMT in smokers to be an important therapeutic target.

Supported by: NHMRC project grant 490023

Conflict of interest: Nil

048-O12
FREQUENCY AND SPECTRUM OF EPIDERMAL GROWTH FACTOR RECEPTOR (EGFR) MUTATIONS IN LUNG CANCER IN AN AUSTRALIAN TESTING PROGRAM.

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Introduction: The presence of activating mutations of *EGFR* in NSCLC tumour tissue is predictive of treatment response to EGFR-tyrosine kinase inhibitor (TKI). Few data have been reported about these mutations in an Australian population.

Aim: To gather information on the frequency and spectrum of mutations seen from Australian lung cancer cases.

Methods: In October 2010, AstraZeneca initiated a program to gather data on EGFR mutation testing outcomes in Australia. Outcomes of mutation testing were provided from 1727 samples whose tumour DNA was sequenced from exons 18 to 21. No clinical or personal details including treatment or responses were gathered.

Results: 359 mutations were seen in 337 samples, a mutation frequency of 19.6%. Of major activating mutations, exon 19 deletions were seen in 8.9% and L858R point mutations in 5.6%. Other activating mutations (L861Q/G719) were found in 1.0%. Two samples showed exon 19 deletions with T790M mutations conferring resistance. There were non-sensitising exon 20 insertions in 1.4% and a variety of single and double mutations of uncertain significance in 2.6%. Activating *EGFR* mutations were more frequently identified in lung tissue (17.2%), than bone (15.6%), pleura/pericardium or fluid(14.1%), brain (9.2%) or lymph nodes (8.3%).

Conclusions: There is a clinically meaningful yield of "classical" activating *EGFR* mutations in samples submitted for testing in Australia but also the not infrequent identification of mutations associated with uncertain or poor response to EGFR-TKI. We found a similar spectrum of mutations in

Australian patients to those reported internationally. EGFR mutation results should be used to guide treatment with EGFR-TKIs.

Conflict of interest: PC and JL are employees of AstraZeneca. BS and MP have participated in advisory boards, and JB has received honoraria from AstraZeneca.

061-P12
TELOMERE LENGTH IN PLEURAL FLUID IS NOT DIFFERENT BETWEEN MALIGNANT AND BENIGN EFFUSIONS

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Background: Alterations in telomere length (increased and shortened) in peripheral blood leucocytes and tumour tissue have been associated with malignancies. The aim of this study was to quantitatively measure absolute telomere length in pleural fluid cell-free DNA in subjects with malignant compared with benign pleural effusions.

Methods: We studied pleural fluid samples from 96 consecutive subjects (68 malignant and 28 benign effusions). Absolute telomere length was measured in pleural fluid cell-free DNA (cfDNA) using a modified quantitative PCR method. Median absolute telomere length was compared in the pleural fluid cfDNA between subjects with malignant and benign effusions.

Results: The median absolute telomere length measured in pleural fluid cfDNA was not significantly different in MPEs compared to benign effusions (9.7kb per diploid genome vs. 8.5kb per diploid genome, p=0.488). There was no difference in pleural fluid cfDNA absolute telomere length when stratified for age <60 years vs. age > 60 years (8.0kb vs. 9.7kb, p=0.187), females vs. males (9.5kb vs. 9.9kb, p=0.548), malignant cytology positive vs. cytology negative (8.99kb vs. 9.38kb, p=0.924) or smokers compared with non-smokers (9.0kb vs. 12.3kb, p=0.076).

Discussion: In this study we found that it was technically possible to measure absolute telomere length in pleural fluid cfDNA but there was no correlation with malignancy. Pleural fluid cfDNA contains variety types of blood, mesothelial and tumour cells. Further study is required to determine the absolute telomere length in malignant cells, possibly by initial cell-sorting the by flow cytometry.

Disclosure: No Conflict of interest

This work was supported by: NHMRC Postgraduate Medical Scholarship (KBS); UQ PhD Scholarship (KBS); The Prince Charles Hospital Foundation Novice Researcher Grant (KBS); NHMRC Practitioner Fellowship (KF), NHMRC Career Development Fellowship (IY), Cancer Council Queensland Senior Research Fellowship (KF);UQ Early Career Researcher Fellowship (VR).

062-P12
PLEURAL FLUID CELL-FREE DNA INTEGRITY INDEX AND MESOTHELIN TO IDENTIFY CYTOLOGICALLY NEGATIVE MALIGNANT PLEURAL EFFUSIONS INCLUDING MESOTHELIOMAS

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Background: The diagnosis of malignant pleural effusions (MPE) is clinically challenging if the cytology is negative for malignant cells. Recently, cell-free DNA integrity index as represented by the ratio of longer to shorter DNA fragments has been reported to be a marker of malignancy. The aim of this study was to evaluate the utility of pleural fluid cfDNA integrity index in the diagnosis of MPE.

Methods: We studied pleural fluid from 100 consecutive subjects. Pleural fluid cfDNA ALU DNA repeats [115bp, 247bp and 247bp/115bp ratio (cfDNA integrity index)] were assessed by real-time quantitative PCR. Pleural fluid mesothelin levels were quantified using ELISA.

Results: Based on clinico-pathological evaluation, 72 subjects had MPE (including 23 mesotheliomas) and 28 had benign effusions. Pleural fluid cfDNA integrity index was higher in MPE compared with benign effusions (1.2 vs. 0.8; p<0.001). In cytology-negative (35 MPE and 28 benign effusions), elevated pleural fluid cfDNA integrity index had 80% positive predictive value in detecting MPEs. In the detection of mesothelioma, pleural fluid cfDNA integrity index had comparable sensitivity to pleural fluid mesothelin (81% and 81% respectively).

Conclusion: Pleural fluid DNA integrity index is a promising diagnostic biomarker for identification of MPEs, including mesothelioma. This biomarker may be particularly useful in cases of MPE where pleural aspirate cytology is negative, and could guide the decision to undertake more invasive definitive testing. A prospective validation study is to be undertaken to validate our findings and test the clinical utility of this biomarker for altering clinical practice.

Conflict of interest: Nil

This work was supported by: NHMRC Postgraduate Medical Scholarship (KBS); UQ PhD Scholarship (KBS); The Prince Charles Hospital Foundation Novice Researcher Grant (KBS); NHMRC Practitioner Fellowship (KF), NHMRC Career Development Fellowship (IY), Cancer Council Queensland Senior Research Fellowship (KF);UQ Early Career Researcher Fellowship (VR).

053-O12
RAPID ON-SITE EVALUATION OF BRONCHIAL BRUSHINGS DURING INVESTIGATION OF PERIPHERAL PULMONARY LESIONS

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Background: Rapid on-site evaluation (ROSE) of transbronchial needle aspirates is cost-effective due to its ability to reduce biopsy number and complication rates without compromising diagnostic yield. Reliable ROSE results may also allow therapeutic interventions to be undertaken at the time of diagnostic bronchoscopy. Use of ROSE during sampling of peripheral pulmonary lesions (PPLs) has not previously been examined

Aims: To determine the ability of ROSE performed on transbronchial brushings of peripheral pulmonary lesions to accurately determine final procedural diagnosis Methods: Prospective cohort of patients undergoing radial probe endobronchial ultrasound-guided bronchoscopy for investigation of PPLs. ROSE diagnosis, bronchoscopic diagnosis and final diagnosis were all recorded, along with procedure time and complication rates

Results: Data were recorded from 50 consecutive cases of bronchoscopic assessment of PPL. Final diagnoses included non-small cell lung cancer (n=45), metastatic malignancy (n=1), benign inflammatory/infective infiltrate (n=5). Sensitivity of bronchoscopy for detection of NSCLC was 80%(36/45). Positive predictive value of ROSE for bronchoscopic diagnosis of NSCLC was 96% (26/27). The single false-positive case is discussed. Procedure times were significantly shorter in those in whom ROSE specimens demonstrated malignancy than in those in whom the procedure was non-diagnostic (16 minutes v 29 minutes, respectively)

Conclusion: ROSE examination of brushings specimen had high positive predictive value for bronchoscopic diagnosis of cancer. Potential diagnostic pitfalls are discussed. ROSE of brushings specimens has the potential to shorten bronchoscopy times, reduce complications and is likely to be cost-effective.

074-P12

BRONCHOSCOPIC DYE MARKING OF PERIPHERAL PULMONARY LESIONS TO AID VATS RESECTION

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Background: Limited (wedge) resection of pulmonary lesions is frequently performed as a diagnostic/therapeutic procedure. Some lesions may be difficult to locate thoracoscopically and conversion to open thoracotomy or incomplete resection are potential limitations to this approach. Multiple methods have been described to aid Video-assisted thoracoscopic surgical (VATS) wedge resection of pulmonary nodules including hookwire localization, percutaneous tattoo or intra-operative ultrasound. We report on our experience using bronchoscopic dye marking of small subpleural lesions to assist wedge resection.

Methods: patients planned for VATS underwent pre-operative bronchoscopy. Electromagnetic navigation was utilized to accurately guide a 25-gauge needle to within/adjacent to the lesion for resection and 1mL of methylene blue or indigo carmine was injected under fluoroscopic vision.

Results: Six patients underwent bronchoscopic marking of peripheral pulmonary lesions. Navigation to lesions was successful in all six patients. Surgery was performed within 24 hours of bronchoscopic marking. Pleural staining by dye was visible thoracoscopically in all six lesions either adjacent to or overlying the lesion. All lesions were fully excised with wedge resection. Pathologic examination confirmed accuracy of dye staining.

Conclusion: bronchoscopic dye marking of peripheral lesions is feasible, and is not compromised by complications associated with percutaneous marking procedures. Further experience is required but early findings suggest this method may have utility in aiding minimally invasive resection of small subpleural lesions.

106-P12

QUALITY IN LUNG CANCER CARE: THE DEVELOPMENT OF A POPULATION BASED LUNG CANCER REGISTRY

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Rationale: Lung cancer is the fourth most common cancer in Victoria and the leading cause of cancer mortality. Little local knowledge exists of the factors which influence outcome in lung cancer. A pressing need exists to describe regional structure, process and outcome in lung cancer care to improve quality of care and to inform translational research and health care planning. We aim to develop and pilot a population-based lung cancer clinical quality registry to describe clinical assessment, diagnosis, staging, management and outcomes in lung cancer in Victoria.

Methods: The establishment of the Victorian Lung Cancer Registry Pilot Project commenced with the appointment of a Steering Committee to provide project governance. Review of current literature and evidence-based national and international clinical practice guidelines was undertaken by an expert working group. Included data items were epidemiologically sound, reproducible and valid. The data set enables the capture of identified quality indicators and to describe nominated structural, process and outcome indicators. Case ascertainment is derived from institutional ICD-10 coding of small and non-small cell lung cancer. Consent to recruitment to the registry occurs via an "opt-off" system. Follow up and outcome measures are to be captured 3 and 12 months after initial diagnosis capturing survival, treatment and quality of life assessments.

Results: Epworth Healthcare ethics approval was received January 2012 and data collection commences 2012. A mechanism for rapid case ascertainment has been established and tested. Further institutional sites have been identified and ethics applications are underway. A web enabled data collection tool is in development and data linkage options are being explored.

Conclusion: Lung cancer registries have proven capacity for improving outcomes in lung cancer. The development of rapid case ascertainment and "opt off" recruitment strategies appear viable and should ensure broad recruitment from eligible patients diagnosed with lung cancer in Victoria.

083-O12

FIVE YEAR SURGICAL EXPERIENCE WITH LUNG CANCER RESECTIONS AT THE GOLD COAST

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Prior to August 2007 there was no Thoracic surgical service at the Gold Coast Hospital, and all patients had to be referred to Brisbane. However with the arrival of a Thoracic surgeon, patients were treated locally – only requiring to go to Brisbane for PET scanning and Radiation Oncology. Multidisciplinary Cancer meetings were begun to manage patients referred. This presentation details lung resection for primary lung cancers performed at the Gold Coast Hospital over the last five years, from July 2007 to June 2012. It is a retrospective review of all cases of lung resection for Primary Lung Cancer detailing clinical presentation and workup, the resection performed, and the post-operative complication rate and thirty day mortality rate. No survival figures are given because of the short time period reviewed.

Disclosure: The authors have no dualities or conflicts of interest to disclose.

116-S12

A PATIENT'S PERSPECTIVE

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Anti-smoking campaigns and health warnings may stigmatise lung cancer patients. What happens to quality of care? Reflections and experience of one patient consider survival and funding.

002-P12

A 10 YEARS SURVEY OF LUNG CANCER IN SHAHID RAJAI RADIOTHERAPY CENTER IN NORTH OF IRAN

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Introduction: Lung cancer is not in the list of most common cancers in Iran. According to a last study it was ranked fifth and eleventh among males and females, respectively. This study is performed to obtain more recent data on lung cancer among patients who referred to Shahid Rajai radiotherapy center during 2000-2009.

Material & methods: Study was a historical cohort research. Data were obtained by the review of patients' documents during 2000-2009. This center

is the only radiotherapy center in this area. Data included demographic variables, histopathological malignancy and metastasis history.
Results: 317patients with lung cancer were referred to this center (3.8% of all). 83% were male. The mean age of the men and women was 63.85 ± 12.56 and 59.94 ± 13.59, respectively. Most frequency (33.8%) was among men 70-79 years of age at the time of diagnosis and women (25.9%) 50-59 age groups. Mean age for men was significantly higher than women (P=0.03) and among women it considerably dropped from 73 in 2000 to 55 years in 2009, but for men it decreased slightly from 63 to 61.A more detailed survey between 2008 and 2009 showed that squamous cell carcinoma (37.5%), small cell carcinoma (28.1%) and adenocarcinoma (18.8%) were the most common subtypes of the lung cancer. About half of patients (43.7%) were metastasized and most common sites of metastasis were brain (27%) and bone (17.6%)
Conclusion: Results showed most age group was 70-79. According to a sharp decrease in mean age among women during these years, we can suggest exposure to carcinogens like cigarette has increased among young women.

036-P12
ASPIRATION CYTOLOGY OF NON-SMALL CELL LUNG CARCINOMA: A CYTOLOGIC-HISTOLOGIC CORRELATION REVIEW AT A REFERRAL CENTER

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Introduction: Aspiration cytology through CT-guided procedure has become the favored modality in the diagnosis of lung carcinoma. Classification into small cell lung carcinoma (SCLC) and non-small cell lung carcinoma (NSCLC) is possible in most cases. This study reviews the extent of diagnostic correlation between the cytologic aspirates of NSCLC and lobectomy/wedge specimens.
Materials and Methods: We reviewed 53 cases (2004-2011) of NSCLC with histologic diagnoses rendered on lobectomy/wedge resection. Their corresponding aspiration cytologic studies are then reviewed and analyzed the cytologic-histologic correlation. On histology, cases include 30 (56.6%) Adenocarcinoma/subtypes, 21(39.6%) Squamous cell carcinoma and 2 (3.7%) Large cell neuroendocrine carcinoma
Results: Of the 53 cytologic aspirates, 20 (38%) were given specific subtypes while 33 (62%) were given the diagnosis of 'non-small lung cell carcinoma not otherwise specified'. Of the cases with specific subtype diagnoses, 16 (30%) yielded the correct diagnoses based on tissue specimens (8 squamous cell carcinoma, 7 adenocarcinoma/subtypes and 1 large cell type). Of the remaining 4 cases (7.5%), 3 turned out as adenocarcinoma while 1 turned as squamous cell carcinoma. Of the 33 cases with 'non-small cell carcinoma not otherwise specified' diagnosis, 20 (37.7%) turned out as adenocarcinoma, 12 as squamous cell carcinoma (22.6%) and 1 (1.8%) as large cell type. The extent of our cytologic-histologic correlation approached statistical significance (P=.004)
Conclusion: The results provided evidence that aspiration cytology diagnoses of non-small cell lung carcinoma correlates with the histology and correct subtyping can be achieved in at least 30% of cases. The cytologic diagnosis of adenocarcinoma and its subtypes however seems to be more of a challenge and imply that further familiarization to its cytomorphologic features will improve diagnostic interpretation.

108-O12
SUICIDE IN LUNG CANCER PATIENTS: WHO IS AT RISK?

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Background: Lung cancer patients have a 5-times higher rate of suicide than the general population. This study aims to further identify patient and disease characteristics associated with higher suicide rates in patients with lung cancer.
Methods: We performed a Surveillance, Epidemiology and End Results (SEER) based analysis of subjects with primary lung cancer diagnosed between 1973 - 2008. Demographic, tumour characteristics and treatment variables were assessed and correlated to suicide rates.
Results: Of 779,229 patients diagnosed with primary lung cancer, 1055 (0.14%) committed suicide. The median time to suicide was 7 months, with 25% of suicides occurring within 2 months of diagnosis (range 0-312). On univariate analysis patient characteristics associated with a higher risk of suicide included: older age, male gender, white race, married and live in areas of low income (all p<0.05). The only tumour factor associated with a higher risk was locoregional compared to metastatic disease (RR 1.6 p <0.001). Refusal of local treatment (surgery and/or radiotherapy) was not associated with suicide. When considering patients who committed suicide within 6 months of diagnosis, small cell lung cancer and neuroendocrine cancers (including carcinoid) had a higher risk compared to non-small cell lung cancer (p<0.05).
Conclusion: The risk of suicide in lung cancer patients is particularly high in unexpected subsets of patients, such as those suitable for curative treatment. Given the majority of suicides occur soon after diagnosis, strategies are needed to facilitate early identification of and support for patients at risk of suicide following a diagnosis of lung cancer.
Disclosure: The authors indicated no potential conflicts of interest.

004-O12
SEX AND SUVMAX: SEX DEPENDENT PROGNOSTICATION IN EARLY NON-SMALL CELL LUNG CANCER

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Background: The identification of sensitive prognostic factors for patients with early-stage non-small cell lung cancer (NSCLC) is clinically important. The International Association for the Study of Lung Cancer has identified the maximum standardized uptake value (SUVmax) of 2-[F-18]-fluoro-2-deoxy-D-glucose in the primary tumor as measured by positron emission tomography (PET) as a potential prognostic variable. We examined the prognostic value of SUVmax in a surgical cohort of patients with NSCLC and disaggregated the findings by sex.
Methods: Patients with NSCLC, who had undergone a pre-operative PET scan and surgical resection with curative intent from 2001-2009, were identified from a prospective database. A SUVmax cutoff was calculated using receiver operator characteristic curves. Overall survival was correlated with SUVmax for the whole cohort and disaggregated by sex.
Results: Inclusion criteria were met by 201 patients, 134(67%) men and 67(33%) women. Five-year survival was 54·2% for the whole cohort, 48·3% for men and 66·4% for women. Using 8 as a cutoff, SUVmax correlated with survival in univariate analysis for the whole cohort (HR=2·21; 95%CI 1·53-3·50, p=0·001) and men (HR=3·31; 95%CI 1.92-5·69; p<0·000) but not women (HR=0·89; 95%CI 0·34-2·15, p=0·99). In multivariate analysis, SUVmax correlated with overall survival for the whole cohort (HR=1·78; 95%CI 1·08-2·93, p=0·023) and men (HR=2·69; 95%CI 1·44-5·01; p=0·002) but not for women (HR=0·74; 95%CI 0·29-1·89, p=0·53).

Conclusion: SUVmax independently predicted overall survival for men, but not women in this surgical cohort. Our results suggest that SUVmax is an independent prognostic variable in men with surgically treated early NSCLC.
Conflicts of Interest: We have no conflicts of interest to declare.
Ethics: We have adhered strictly to the ethics obtained for this research from the Peter MacCallum Cancer Centre Ethics Committee.
Dr Zoe Wainer was the recipient of the Royal Australasian College of Surgeons Raelene Boyle Scholarship. No other funding sources were obtained for this research.

104-P12
REAL WORLD USE OF MAINTENANCE CHEMOTHERAPY FOR ADVANCED NON-SMALL CELL LUNG CANCER IN AN AUSTRALIAN CANCER CENTRE

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The usual treatment for advanced non-small cell lung cancer (NSCLC) is first line chemotherapy, observation and second line when there is disease progression with recent research suggesting maintenance therapy during the observation phase. We aim to explore the rate of use of maintenance therapy in advanced NSCLC in our Cancer Centre.
The study was approved by the ethics board. Data was extracted from our cancer database in correlation with patient's notes, pharmacy records and correspondence for 123 patients from 2005-2011 with advanced NSCLC. Demographics, the proportion of patients going onto second line chemotherapy, the reasons why they didn't receive it and overall survival (OS) data in various subgroups were analysed.
Results show that of the 105 patients for analysis, 44 achieved stable disease or partial response after their first line chemotherapy. Of the 42 eligible for maintenance therapy; only 7 received it. Of the 35 observed patients; 12 didn't receive any treatment at disease progression (the reasons why were explored) and 23 received second line chemotherapy and reflected the subgroup with the best mean OS.
We concluded that a significant proportion of patients that didn't receive second line chemotherapy at disease progression were due to ill health and postulated that the use of maintenance therapy may improve their progression free survival as highlighted in recent studies. With this information, we hope to incorporate maintenance therapy into the guidelines for treatment of advanced NSCLC at our Cancer Centre.
Disclosure: No conflict of interest.

045-P12
HEDGEHOG SIGNALING, INNATE CHEMORESISTANCE AND TUMOR REGENERATION IN SMALL CELL LUNG CANCER

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Evidence suggest that innately chemoresistant cells possess and/or acquire a phenotype resembling somatic stem cells, and are therefore dependent on specific embryonic signaling pathways for survival and regeneration. These pathways are evolutionarily conserved, and are derived from cell fate and patterning genes in Drosophila, including the Hedgehog (Hh), Wingless, Notch or Decapentaplegic families of morphogens. The Hedgehog (Hh) pathway is an attractive therapeutic target in cancer, since inhibitors of Smoothened (Smo), a molecule required for all known components of the pathway, can potently and specifically shut down Hh signalling. To explore this idea, we focused on small cell lung cancer (SCLC) as a model of cancer cell regeneration in a highly chemosensitive, common adult solid tumor. In a primary xenograft model, we showed that depletion of bulk tumour with *cis*-platinum chemotherapy resulted in a small population of residual tumour cells that demonstrated markedly enhanced Hh pathway activation. Moreover, it was this residual population, but not the bulk tumour, that was responsive to manipulation of Hh signalling *in vivo* and *in vitro*. The Smo antagonist LDE225 (Novartis) was able to block or delay regeneration of SCLC cells following chemotherapy, but had no effect on the growth of the chemonaïve tumour. These data suggest that in chemosensitive carcinomas such as SCLC, Hh inhibitors may be useful in blocking or delaying the regeneration of minimal residual disease.
Disclosure: Dr Watkins receives an honorarium from Novartis for participating in their Hedgehog Scientific Advisory Board.

081-P12
EXTRACTING HIGH QUALITY RNA FROM FFPE SAMPLES FOR GENE EXPRESSION STUDIES

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The use of targeted therapies in the treatment of non-small cell lung cancer is still limited to a relatively small fraction of patients. Chemotherapy remains the mainstay of treatment for most patients today. So far, the best predictors for chemotherapeutic success are based on the expression of certain nucleotide metabolism or DNA damage response and repair related genes. However, the samples available for study most commonly comprise FFPE samples, which are characterised by a high degree of RNA fragmentation or degradation.
To address this problem, we have developed a protocol to reliably extract large amounts of high-quality RNA from FFPE samples. The protocol includes pathology review of the FFPE block to identify tumour rich areas, removal of a 2mm core, followed by RNA extraction from this core. Next, the total RNA amount is quantified and a small proportion is tested for fragment length by a multiplex RT-PCR.
We extracted total RNA from 9 core punches and 3 sections for a total of 12 different samples. All extracted samples contained RNA (100ng to 1ug/ul elution). The total amount of RNA extracted from sections was generally lower compared to the amount extracted from 2mm cores. Ten samples contained fragments of sufficient length for RNA-Seq as assessed by our established multiplex RT-PCR.
In conclusion, our extraction protocol enables us to reliably extract total RNA from FFPE samples. These RNAs can be used to study the expression of chemotherapy-response related genes like *BRCA1*, *ERCC1* and *RRM1* as well as whole transcriptome analysis by RNA-seq.

006-O12
FEASIBILITY OF MEASUREMENT OF FUNCTION IN ADVANCED CANCER: COMPARISON OF THE 6-MINUTE WALK TEST, 2-MINUTE WALK TEST, ISOMETRIC ARM EXERCISES AND READING NUMBERS ALOUD

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Introduction: The pattern in which functional decline in people living with advanced cancer occurs has been described as an initial period of reasonably stable function, followed by more rapid functional deterioration with a defined terminal phase. However little is known about the more subtle changes in function in the more advanced stages of cancer, and the role that breathlessness plays in functional changes. **Objective:** The aim of this pilot study was to compare the feasibility of conducting a range of standardised assessments at different levels of performance status in people with advanced cancer.

Methods: A consecutive cohort was recruited to a cross sectional study from 2 large palliative care units in metropolitan Sydney. Assessments were completed by an occupational therapist including: Australian Modified Karnofsky Performance Scale, Eastern Cooperative Oncology Group Performance Scale, Life-Space Assessment, Charlson Comorbidity Index, Six-minute Walk Test (6MWT), Two-minute Walk Test (2MWT), Isometric Upper limb Exercises, Reading Numbers Aloud, Medical Research Council Dyspnoea Scale (MRC), Intensity and Unpleasantness of Breathlessness Visual Analogue Scales and Numerical Rating Scale for Breathlessness.
Results: 42% (n=5) of pilot participants were able to complete the 6MWT, 67% (n=8) completed the 2MWT, 84% (n=10) completed the isometric arm exercises and 100% (n=12) completed reading numbers aloud. Ten participants had baseline breathlessness at rest using the MRC. Findings from the pilot study suggest that at AKPS<60 this predicts an inability to do the 6MWT.
Conclusion: These measures of function are feasible in the palliative population and have potential to contribute to clinical assessment.
This oral presentation will highlight the pilot study results and the feasibility of using these assessments in clinical practice to improve the assessment of functional capacity and breathlessness in people living with advanced cancer. There is currently limited evidence into how function can be assessed in advanced cancer when breathlessness is present. This pilot study adds to the evidence and knowledge base around the assessment of function in this population.

018-P12
MULTIDISCIPLINARY CARE IN LUNG CANCER: COLLABORATIVE PRACTICE IN ACTION

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Prince of Wales Hospital provides a specialist service to people living with lung cancer in the eastern and south-eastern suburbs of Sydney. The lung cancer team consists of medical oncology, radiation oncology, respiratory, cardiothoracic surgery and palliative care doctors. The patients are linked in with a specialist lung cancer nurse coordinator to ensure their needs are being met and they are receiving the right service at the right time. How is this specialist nurse supported and what makes the service at Prince of Wales Hospital work? Collaborative practice between the specialist oncology occupational therapist and lung cancer nurse coordinator has developed over the past 6 years. Working together to provide the best possible outcome for the patient ensures patients are offered a whole person and true multidisciplinary approach to their care. Many specialist nurses and allied health professionals work in isolation, which can lead to professional deskilling, burnout and decreased referrals to other team members. Through this collaborative approach we have achieved an immediacy of nursing and allied health intervention for patients, which in turn leads to decreased hospital admission, enabling patients to remain at home for longer and facilitating the achievement of patient goals towards the end of their life.
This paper will present case vignettes of joint intervention between nursing and occupational therapy for lung cancer patients at POWH. The economic, physical and psychosocial impact of this collaborative practice will be discussed.

078-P12
LUNG CANCER REFERRALS IN NEW ZEALAND – THE EXPERIENCE OF ONE REGIONAL CANCER SERVICE

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Background: The overall 5 year survival rates for lung cancer in New Zealand are 10%, and only 5% in Maori patients. In other countries, guidelines have been set up to facilitate referrals for suspected lung cancer, and ultimately to improve survival with earlier diagnosis.
Method: We undertook a retrospective audit and review of case notes of 168 patients diagnosed with lung cancer and referred into a regional cancer service. The UK guidelines were used to examine duration of symptoms and diagnostic pathways. Management and outcomes were investigated. Data was collected manually and analysed using Microsoft Excel.
Results: This population consisted of 102 male (61%) and 66 female patients (40%). Of these, 39 (23%) were Maori. 79% had a histological diagnosis of lung cancer (87% NSCLC). 64% of patients were referred from outpatients, 31% from hospital inpatient services and 5% from the community. Histological diagnoses were made using bronchoscopy (48), fine needle aspiration (36) and biopsy of metastases (28). Significant delays from onset of symptoms to diagnosis were identified. In the majority, the intent of treatment was palliative by the time of first oncology consultation.
Conclusions: Varied pathways, routes to diagnosis and delays from onset of symptoms to diagnosis persist. Earlier detection and access to trials and new therapies are urgently required. We have now established a lung cancer MDT and prioritised engagement with Maori cancer coordinators. We have undertaken a feasibility research project on EGFR testing for Maori. A re-audit will examine the impact of such initiatives.

019-012
A NOVEL APPROACH TO RESTORATION OF TUMOUR SUPPRESSION BY P16^{INK4A} IN LUNG CANCER

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The tumour suppressor p16^{INK4a} is downregulated, or lost in the vast majority of lung cancer patients (~70%). This has been linked to poor survival and therapeutic resistance. In half of the cases loss of p16^{INK4a} expression cannot be explained by promoter methylation, deletions or mutations. Restoration of p16^{INK4a} provides one of the most attractive therapeutic targets for tumour suppression through cellular senescence.
E6-Associated Protein (E6AP) has been extensively studied in HPV-induced cervical carcinoma but its role in other cancers remains elusive. We have recently linked E6AP to the regulation of cellular stress response. Here we report that cells lacking E6AP show attenuation of p16^{INK4a} resulting in the bypass of RAS-induced senescence and acquisition of tumourigenic potential. We found that E6AP positively regulates *p16^{INK4a}* at the transcriptional level via CDC6 (Cell Cycle Division 6), a well-defined repressor of *INK4a/ARF* locus. E6AP forms complex with E2F1 and suppresses transactivation of CDC6.
Overexpression of CDC6 was previously associated with aggressive disease and poor clinical outcome in NSCLC patients. Interestingly, we found that low levels of E6AP and p16^{INK4a} inversely correlate with elevated CDC6 in a subset NSCLC cell lines and resected patient samples. Importantly, expression of E6AP in NSCLC cells using lentiviral inducible system resulted in the reduction of CDC6 accompanied by induction of p16^{INK4a}-mediated senescence. Furthermore, restoration of E6AP in a xenograft model significantly delayed tumour development supporting the role of E6AP-CDC6-p16^{INK4a} axis in lung carcinogenesis. Our study provides a rational for a novel therapeutic approach by targeting E6AP/CDC6.
Disclosure: The authors declare no possible dualities or conflicts of interest.

088-P12
THE EXPRESSION OF LONG NONCODING RNAS IN MALIGNANT PLEURAL MESOTHELIOMA

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Background: Long noncoding RNAs (lncRNA) are a class of RNAs >200 nucleotides in length, that do not code for protein but make up >90% of the human genome. Recent studies have investigated the potential role of lncRNAs in cancer. As malignant pleural mesothelioma (MPM) is an aggressive disease and lncRNAs have not been previously investigated, our aims were to characterize the expression of lncRNAs potentially involved in MPM biology.

Methods: Microarray profiling was performed on five cell lines - MeT-5A and four MPM lines (H28, H226, MM05 and MSTO) using Invitrogen's NCode lncRNA microarrays. Data was analysed using Gene Spring V12.0. High priority candidate lncRNAs were selected on the basis of statistical ($P<0.05$) and biological significance (>3-fold difference). Expression levels of candidate mRNA and lncRNAs were validated using Taqman Gene Expression assays on 7 MPM cell lines and 5 cancer cell lines (HCT115, HCT116, A549, PC-3, MDA-MB-231, MCF-7).

Results: Microarray profiling of MeT-5A versus MPM cell lines identified 350 probes (310 mRNA, 40 lncRNA) differentially expressed between mesothelioma and normal cell lines at >3-fold and $P<0.05$. These probes included known cancer genes including *EGFR*, *CDKN2A*, *MYC* and *MET.* The majority of candidates were found to be up-regulated in tumor cell lines. Validation of microarray data by RT-qPCR is underway and will be presented at the conference.

Conclusions: Microarray profiling has identified novel lncRNAs and mRNAs with a putative role in MPM biology. Independent validation of *MALAT1* using RT-qPCR identified over-expression in MPM cell lines compared to a normal mesothelial cell line MeT-5A. Further biological and functional validation is required to confirm the role of novel lncRNAs in the biology of MPM.

Disclosures: No conflicts of interest

076-P12
REVIEW OF SUBCLASSIFICATION OF NON SMALL CELL LUNG CANCER (NSCLC) REPORTING AND EPIDERMAL GROWTH FACTOR RECEPTOR (EGFR) TESTING AT THE ROYAL HOBART HOSPITAL

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Background: Clinical decisions regarding the management of NSCLC require the accurate distinction between adenocarcinoma and squamous cell carcinoma as studies have demonstrated differences in therapeutic efficacy and toxicity based on this information. Similarly, identifying subsets of NSCLCs harbouring EGFR mutations is of clinical importance.

Aim: To analyse our institution's rates of histological subtyping in NSCLC cases and rates of molecular testing.

Methods: Retrospective analysis of data on 178 patients with NSCLC recorded at the Royal Hobart Hospital Lung Cancer Multidisciplinary Meetings between February 2010 -February 2012

Results: The median age of patients was 71 years and 70% were advanced stage at diagnosis. 96% of patients had a diagnosis of NSCLC that included a specific histological subtype; 99 (55%) adenocarcinoma, 50 (28%) squamous, 13 (7%) NSCLC not otherwise specified (NOS), 5 (3%) large cell neuroendocrine and 4 (2%) adenosquamous. 2 patients had synchronous tumours of differing pathological subtypes. 8(5%) patients were given a diagnosis of NSCLC but had either inadequate tissue available or incomplete immunohistochemical profile performed to allow further subclassification. 16 (9%) patients had EGFR testing (13 with adenocarcinoma, 3 NSCLC NOS). 2 patients with adenocarcinoma had activating mutations.

Conclusion: The reporting of specific histology subcategories of NSCLC appears high at our institution but EGFR mutation testing rates are low suggesting we miss patients who may benefit from EGFR Tyrosine kinase inhibitors. EGFR mutation testing can be expected to increase with recent addition of testing on the Medicare Benefits Schedule.

Disclosures: There are no dualities or conflicts of interests to be declared by the authors of this abstract.

077-O12
UTILISATION OF INVESTIGATORY PROCEDURES TO OBTAIN A HISTOLOGICAL DIAGNOSIS OF NON SMALL CELL LUNG CANCER (NSCLC)

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Background: The increased variety of diagnostic tools and advent of targeted therapies necessitating greater sample quantity potentially require patients to undergo multiple diagnostic procedures prior to starting definitive treatment. This is not only unpleasant for patients but will increase time taken to commence treatment and health care costs.

Aim: To review the utilisation of different modalities in obtaining a histological diagnosis of NSCLC at the Royal Hobart Hospital (RHH).

Method: We analysed all diagnostic procedures performed on all patients with a histological diagnosis of NSCLC between February 2010 and February 2012 at the RHH.

Results: 178 patients (median age 71) had a histological diagnosis of NSCLC. 231 procedures were performed with 180 histologically positive. 46 (26%) patients had more than 1 procedure. Main procedures performed (% positive histology) were bronchoscopy 102 (62,7%), computed tomography (CT) guided biopsy 72 (95.8%), lymph node biopsy 9 (88.9%), surgery 8 (100%), pleural aspirate 16 (60%), sputum 7 (71.4%). Of those who had a failed bronchoscopy, positive histology was then obtained by CT guided biopsy 22, surgery 5, sputum 4, repeat bronchoscopy 5 and other biopsy 2. Significant complication for CT biopsy was 2% and bronchoscopy 1%.

Conclusion: Our positive bronchoscopy rate is low which may reflect a reliance on bronchoscopy as initial diagnostic strategy when CT guided biopsy may be more appropriate. It is important that an investigatory protocol in line with current evidence is established (especially prior to introduction of additional techniques) to avoid patients undergoing multiple investigations and suffering delays in treatment.

Disclosures: There are no dualities or conflicts of interests to be declared by the authors of this abstract.

070-O12
MUTATIONS IN RESECTED NODE-NEGATIVE LUNG ADENOCARCINOMA

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Aim: To examine the diversity of mutations in resected node-negative lung adenocarcinoma

Methods: We analysed the clinicopathologic characteristics and outcomes data for 204 patients who underwent resection at our institution for stage IB lung adenocarcinoma. No patient received adjuvant treatment. Tumours

were genotyped using the OncoCarta v1.0 kit (ABL1, AKT1, AKT2, BRAF, CDK4, EGFR, ERBB2, FGFR1, FGFR3, FLT3, JAK-2, KIT, MET, HRAS, KRAS, NRAS, PDGFR, PIK3CA and RET) and processed on the Sequenom compact MassARRAY platform.

Results: The median age was 69 (40-87). 84 (41%) were female. Majority of patients (80.4%) underwent lobectomy, 6.4% underwent pneumonectomy and the remainder had lesser resections. Median survival was 6.5 years and 5-year survival rate was 55%. Patients with KRAS and PIK3CA mutations tended to have poorly differentiated tumour (p=0.06), while patients with EGFR mutations had well differentiated tumour (p=0.02). 116 (57%) cases harbored at least one somatic mutation. KRAS, EGFR, PIK3CA, MET, ALK and less common mutations (AKT1, BRAF, FGFR1, HRAS and PDGFR) were detected in tumours from 77 (37.7%), 29 (14.2%), 9 (4.4%), 7 (3.4%), 2 (1%) and 6 (3%) patients respectively. Synchronous mutations (eg PIK3CA + KRAS) were detected in 9.3% of patients. Two cases of T790M, mutation related to resistance were identified.

Conclusion: Mutations are common in resected node-negative lung adenocarcinoma. Pattern of mutations may play an important role in identifying high risk patients who may benefit from adjuvant treatment.

Source of funding: Postgraduate Grant-in-aid of Australian Lung Foundation and The Chris O'Brien Lifehouse at RPA Grant.

Disclosure statement: Authors have no dualities or conflicts of interest to declare.

027-O12
AUSTRALIAN MESOTHELIOMA REGISTRY

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Aims: The Australian Mesothelioma Registry (AMR) was established to collect information on all new cases of mesothelioma in Australia, including detailed information on asbestos exposure.

Methods: The AMR is funded by Safe Work Australia and managed by the Cancer Institute NSW, which coordinates notifications from state/territory cancer registries. Participants complete a job and residential history postal questionnaire and are assessed for their past asbestos exposure by telephone interview using OccIDEAS, an online exposure assessment tool. Clinicians are required to advise if their patient is suitable for recruitment to the asbestos exposure component. Detailed information on occupational and environmental asbestos exposure can only be obtained if clinicians promptly review and respond to AMR requests.

Results: The AMR became operational in 2011. More than 600 cases of mesothelioma were notified to the Registry in the first year. This number will further increase when supplementary notification processes, including from clinicians, are implemented.

The long latency between first exposure to asbestos and onset of mesothelioma is a major reason why incidence is expected to peak over the coming decade. Exposure assessments collected within the AMR framework will provide information not previously available. Data will be presented for 2011, the first calendar year of data collection.

Conclusions: AMR information will aid federal and state governments to more accurately define the relationship between work and environmental asbestos exposure sources and the development of mesothelioma. It provides a national resource for researchers to identify preventable risk factors and will assist in preventing mesothelioma in the future.

Disclosure: No conflict of interests

107-P12
THE ONCOLOGY ANALYSIS SYSTEM (OASYS): APPLICATIONS IN LUNG CANCER SERVICE IMPROVEMENT AND BENCHMARKING

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The Oncology Analysis System (OASys) is the single most comprehensive source of Queensland cancer data online and is now available both locally and internationally to lung cancer clinicians and researchers worldwide. Built using online analytical processing technologies and accessible over the internet using any regular browser, OASys makes available a range of lung cancer measures such as age-standardised incidence and mortality and Kaplan-Meier survival curves and rates, all of which can be aggregated and stratified by clinical and demographic factors such as primary site, morphological subtype, residence geography and remoteness, and indigenous and socioeconomic status. Clinicians and lung cancer service providers can use OASys to:

- Evaluate the potential scope and impact of proposed interventions or changes to a lung cancer practice or service
- Estimate the potential pool of patients available for cross-institutional clinical trials
- Identify disparities in lung cancer outcomes that may warrant further study
- Examine data on lung cancer patients with rare histological subtypes
- Monitor trends for specific patient cohorts at population level
- Analyse hospital catchment distribution and outcomes
- Formulate benchmark and baseline measures of lung cancer incidence and survival

A hands-on demonstration and tutorial on OASys with examples of these applications will be provided.

