Abstracts From the NCCN 22nd Annual Conference: Improving the Quality, Effectiveness, and Efficiency of Cancer Care™

The following abstracts were accepted for presentation at the NCCN 22nd Annual Conference: Improving the Quality, Effectiveness, and Efficiency of Cancer Care™ General Poster Session at the Rosen Shingle Creek resort in Orlando, Florida, on March 23 and 24, 2017. Additional abstracts were published in the print edition of JNCCN (2017;15(5.5):657–670) and are available at JNCCN.org.

Best Practices in Implementation and Use of Clinical Practice Guidelines

AB2017-30. Assessment of Deep Vein Thrombosis in Ambulatory Patients With Cancer in Qatar: A Retrospective Case Control Study
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Background: Although primary venous thromboembolism (VTE) prophylaxis is recommended mainly in all surgical and hospitalized patients with cancer without contraindications to anticoagulants, current international guidelines (including NCCN Guidelines for VTE and guidelines from ASCO, European Society for Medical Oncology [ESMO], and the American College of Chest Physicians) provide recommendations for thromboprophylaxis in selected ambulatory patients with cancer. Some of these guidelines suggest using the Khorana Risk Score (KRS) for deep vein thrombosis (DVT) risk assessment. Thus, thromboprophylaxis in ambulatory patients with cancer is considered controversial because of varying influences and treatment-related factors. The primary objective was to assess the incidence of DVT and the related cancer types, and the secondary objective was to assess the correlation of DVT in ambulatory patients on chemotherapy using the KRS. Methods: This observational retrospective case control study was conducted by reviewing Doppler ultrasound reports from January 1, 2014, through December 31, 2014, at the National Center for Cancer Care & Research (NCCCR) in Qatar. Patients with either oncology or hematology malignancies who started chemotherapy were identified, and then those with a positive impression of DVT were selected and screened for the relevant biomarkers in the KRS and any other additional risk factors. Furthermore, ambulatory patients who developed DVT and those who did not were compared to determine the KRS associated with the highest incidence. Patients without malignancies, adults aged <18 years, and pregnant women were excluded. Results: The incidence of DVT in ambulatory patients with cancer compared with those in the inpatient setting was 22.82% versus 7.69%. Breast cancer was the most common malignancy associated with DVT (28.57%) followed by colon cancer (14.29%) in both settings. Ambulatory patients on chemotherapy showed a higher incidence of DVT (29.33%), and those with a KRS of ≥2 were more likely to develop DVT (37.5%; odds ratio [OR], 1.62; 95% CI, 0.58–4.55). Conclusions: Results of this study highlight the importance of a thorough DVT risk assessment for ambulatory patients with cancer who are or will be started on chemotherapy. It also highlights the need to consider the KRS and additional risk factors, such as type of treatment, previous history of DVT, and previous admissions.

AB2017-31. Compliance With Testing for EGFR and ALK Mutations in Metastatic Non–Small Cell Lung Cancer: An Institutional Retrospective Analysis
Bushra Ajaz, MD; Rizwan Tariq, MD; Jennifer Tseng, MD; and Tirrell Johnson, MD
From UF Health Cancer Center–Orlando Health

Background: The prevalence of EGFR mutations in adenocarcinoma is 10% in Western patients and up to 50% in Asian patients. Based on results of the EURTAC trial, the FDA approved erlotinib for the first-line treatment of metastatic non–small cell lung cancer (NSCLC) harboring EGFR exon 19 and 21 mutations. The frequency of ALK gene rearrangement in NSCLC is reported in 3%–7% of patients. In a randomized phase III trial, Solomon et al compared the efficacy of the ALK inhibitor crizotinib with standard chemotherapy; results demonstrated superior progression-free survival (PFS). The NCCN Guidelines for NSCLC recommend testing for EGFR and ALK gene rearrangements in patients with nonsquamous disease. In this study, we assessed guideline compliance across a single institution in testing for EGFR mutations and ALK gene rearrangements and whether testing affects treatment decisions and timely initiation of targeted therapy. Methods: Retrospective data was reviewed for patients diagnosed with metastatic NSCLC to ascertain if molecular testing
was ordered by clinicians in a timely manner. If testing was not ordered, we reviewed reasons for this and whether it delayed therapy initiation. **Results:** Of 220 charts reviewed, 133 met inclusion criteria. The study population included 74 men and 59 women, with a median age of 68 years. Patient histology included 124 patients with adenocarcinomas, 2 with adenosquamous, and 7 with NSCLC not otherwise specified. 94 patients (70.6%) underwent testing, with 81 patients (61.0%) completing testing within 30 days of their first outpatient encounter (prior to, at, or after first visit). Testing was not performed in 39 patients (29.3%) due to lack of tissue (n=4), hospice recommendation (n=7), declining of chemotherapy (n=2), and an undocumented reason (n=26). Of patients tested, 21 (22%) had mutations: 15 patients had EGFR-positive disease and 6 tested positive for ALK gene rearrangement. Of the EGFR-positive patients, 15 started treatment with a targeted agent and 6 initiated treatment with chemotherapy. Of the latter, 4 patients were switched to targeted agents and 2 were never initiated on targeted therapy. **Conclusions:** A considerable delay to therapy initiation exists and not performing a mutational analysis delays initiation of targeted therapy further. We recommend reflex testing of mutations when a targeted agent is available in metastatic NSCLC, because timely initiation of therapy will improve morbidity and mortality.

**AB2017-32. Toward Personalized Medicine: Is the Quantity of High-Grade Dysplasia on Cervical Biopsy Predictive of Subsequent Loop Electrosurgical Excision Procedure of the Transformation Zone?**  
Amy Connolly, BSc (Hons); Paul Hartel, MD; and Clive Kilgallen, MB, BCh  
*From Sligo University Hospital, Ireland*

**Background:** Cervical loop electrosurgical excision procedures (LEEPs) are performed for disease that is biopsy-positive high-grade dysplasia, cervical intraepithelial neoplasia (CIN) 2, or CIN3, but the procedure has a risk for significant potential morbidity. Cervical LEEP was evaluated in this study together with the previously corresponding dysplastic biopsies to determine whether the percentage volume of high-grade dysplasia measured from the biopsy is predictive of the presence or absence of high-grade dysplasia on the subsequently performed LEEP, thereby obviating the need for a LEEP in a subset of women. **Methods:** A list of 50 LEEP results was separated into a positive group displaying high-grade CIN2/CIN3 (N=25) and a negative group of LEEP reported as CIN1/human papillomavirus effects (N=25). Percentage volume of high-grade dysplasia present on each corresponding biopsy was calculated from a measured length of total excised epithelium (mm) and the length occupied by high-grade dysplasia (mm). **Results:** The calculated percentage volume of high-grade dysplasia on cervical biopsy was found not to be predictive of the presence or absence of high-grade dysplasia on the LEEP (95% CI; P=.7285; Table 1). **Conclusions:** Findings indicate that the volume of dysplasia present on a cervical biopsy is not predictive of the outcome of a subsequently performed LEEP. The current practice of using a LEEP procedure as follow-up treatment for high-grade dysplasia appearing on a cervical biopsy remains best clinical practice. Future study with larger patient samples is needed to confirm these findings.

| Sample size | 25 |
| Mean | 37.17 |
| Standard deviation | 19.62 |
| Coefficient of variation (CV%) | 51.72 |

**Paired t test**

| Mean difference | 2.05 |
| Standard deviation of mean difference | 29.21 |
| Standard error of the mean difference | 5.84 |

**95% CI:** -10.0065 to 14.1105

**Abbreviation:** LLETZ, loop electrosurgical excision procedure of the transformation zone.

**AB2017-33. European Edition (Spain) of the NCCN Clinical Practice Guidelines in Oncology: Relevance of the Translation and Adaptation Into Spanish**  
Pere Gascón Vilaplana, MD, PhD; Carlos Camps Herrero, MD, PhD; Eduardo Díaz-Rubio García, MD, PhD; Alfredo Carrato Mena, MD, PhD; Rafael López López, MD, PhD; Margarita Feyjoo Saus, MD; and Vicente Guillem Porta, MD, PhD  
*From CELEX, ECO Foundation, Hospital General Universitario de Valencia, Universidad de Valencia, Clínico San Carlos, Hospital Universitario Ramón y Cajal, Hospital Clínico Universitario de Santiago de Compostela, Hospital Sanitas La Moraleja, and Fundación Instituto Valenciano de Oncología, Spain*

**Background:** Clinical practice guidelines (CPGs) in oncology are an extremely useful tool in in determining the most appropriate interventions to resolve a clinical problem. Adapting international CPGs to
clinical practice in different health systems could be challenging due to the differences in therapeutic options available in each country. This study highlights the importance of adapting CPGs to the clinical needs of an individual health system (in this case, Spain) with the aim of achieving excellence in patient care.

**Methods:** The Excellence and Quality in Oncology (ECO) Foundation represents the major Spanish hospitals involved in the treatment of patients with cancer. It is the first European organization to reach an agreement to translate and adapt the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines) for the Spanish sector. A multidisciplinary panel of experts will identify possible adaptations of the NCCN Guidelines to the Spanish regulatory environment and daily clinical practice. The ensuing adaptations will be proposed to NCCN representatives for verification and, if approved, will be accepted. Guidelines will also be translated into Spanish to provide easy access for local physicians.

**Results:** A total of 5 CPGs will be adapted (lung, colon, melanoma, prostate, and breast cancers). During the first quarter of 2016, 45 Spanish experts participated in several taskforces before the final consensus meeting with NCCN representatives; 5 different meetings were conducted in June 2016 with a high degree of consensus in the adaptations proposed. This initiative will allow Spanish healthcare professionals to use CPGs adapted to their specific needs (different health profile of the population, different drugs and technologies, and different regulatory status), thus enabling clinicians to deliver optimal cancer care to all patients.

**Conclusions:** This is an ambitious project that will have a great impact on the Spanish oncology community, ensuring excellence in the prevention, diagnosis, and treatment of cancer. These CPGs will also contribute to reducing clinical practice variability and improving equity in cancer treatment.

AB2017-34. Improving the Quality, Effectiveness, and Efficiency of Breast Cancer Care Using the NCCN Guidelines: A Report From a Community Hospital

Karen Herold, DNP, FNP-BC, WHCNP-BC; Allyson Brooks, MD; and Ahlam Jadalla, PhD, RN

**Background:** In today's healthcare system, delivery processes involve numerous interfaces among multiple healthcare practitioners, potentially resulting in communication errors. Lack of communication creates opportunities for medical errors or the potential for actionable medical data to not be conveyed to patients or providers. In particular, women at increased risk of developing breast cancer may not know of this increased risk or what they can do to decrease their risk. Furthermore, patients with an increased risk of breast cancer may be harboring mammographically occult breast cancers, and could benefit from annual breast MRI recommended for women with a lifetime risk >20%.

**Methods:** A retrospective descriptive analysis of data collected from October 1, 2015, to September 30, 2016, was conducted to assess the processes and impact of using the NCCN Guidelines for Breast Cancer Risk Reduction version 1.2017 to guide the second year of a high-risk breast cancer screening program. A nurse practitioner conducted individualized consultations with women identified as having an elevated risk for developing breast cancer using the NCCN Guidelines.

**Results:** Of 35,465 screened, 1.6% (n=702) met the a priori HERA protocol criteria of increased risk and were invited for consultation: 40.5% (n=284) completed a consultation. Of those, 76.1% (n=216) had elevated Gail and IBIS (International Breast Intervention Study) scores, 6.41% (n=18) had average Gail and elevated IBIS scores, 13.4% (n=38) had elevated Gail and average IBIS scores, and 4.2% (n=12) had average GAIL and IBIS scores. Lifestyle interventions were recommended for 100% of patients (n=284), yearly breast MRI was recommended for 82.4% of patients (n=234), and 59.4% of patients (n=139) were referred for MRI from the program; for 40.6% (n=95), it is unknown whether they were referred for MRI by their primary care physician (PCP), although PCPs were notified of the recommendation for annual breast MRI. A total of 89.4% (n=254) were eligible for chemotherapy prevention, 39.5% (n=120) were eligible for genetic counseling, and 1.6% (n=5) had breast malignancies that were diagnosed after enrollment into the program. Barriers identified that hinder the full potential of the program were lack of collaboration between some PCPs and difficulty engaging all women identified as being at increased risk.

**Conclusions:** Further research is needed to understand how to increase annual breast MRIs in women with a >20% lifetime risk for developing breast cancer, in order to identify mammographically occult and early-stage breast cancer. Findings will be used to improve processes during the third year of the program.
ate oncologist compliance with ASCO guidelines, and to determine whether noncompliance impacts hospital length of stay (LOS) in patients who develop FN. **Methods:** Inclusion and exclusion criteria were used to identify a study population of 93 patients who developed FN as a direct complication of chemotherapy over a 2-year period. Based on current ASCO guidelines with G-CSF use, 4 subgroups were created: patients who (1) received G-CSFs and met ASCO criteria (n=54); (2) did not receive G-CSFs and met ASCO criteria (n=16); (3) did not receive G-CSFs and did not meet ASCO criteria (n=19); and (4) received G-CSF and did not meet criteria (n=4). LOS was the primary outcome evaluated. **Results:** A total of 17.2% (n=16) of patients treated for FN during the 2-year period should have received G-CSFs based on ASCO guidelines and did not; 8 met criteria because they received chemotherapy regimens with >20% risk for FN, and the other 8 received intermediate risk (10%–20%) regimens but had at least 1 of the 7 identified risk factors (bone marrow involvement, n=2; persistent neutropenia, n=4; recent surgery/open wound, n=2; bilirubin level >2, n=0; creatinine clearance <50%, n=4; age >65 years, n=8). LOS for group 2 (did not receive G-CSFs and met ASCO criteria) was notably longer compared with other subgroups (mean/median LOS, 13.125/7 days; SD, 16), which was 4.25 days longer than group 1 (received G-CSFs and met ASCO criteria) (mean/median LOS, 8.85/5 days; SD, 8.04). Interestingly, LOS was longer in group 4 (received G-CSF and did not meet ASCO criteria) compared with group 1 (P= not statistically significant). **Conclusions:** Noncompliance with ASCO guidelines for prophylactic G-CSF use is seen equally in patients receiving chemotherapy regimens with high FN risk and among those with personal risk factors. Patients who should have received G-CSF prophylaxis and did not had extended hospital LOS, which may represent more severe infections and greater morbidity. These results emphasize the need for an effective risk-stratification tool to improve compliance.

**AB2017-36. The Efficacy of Immunotherapy as First-Line Treatment in Advanced Non–Small Cell Lung Cancer: A Network Meta-Analysis**

Ching-I Hsu, MSa, b, c, *; Ying-Tzu Chang, MSc, d, e, f, g; Jia-Lian Yang, MSa, b, c, *; and Chin-Chuan Hung, PhDa, b, c, *

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*These authors contributed equally.

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**Background:** Lung cancer is one of the leading causes of cancer death worldwide. Non–small cell lung cancer (NSCLC) accounts for most lung cancer diagnoses, with more than half being advanced disease. Platinum doublets are recommended as first-line chemotherapy for patients with advanced-stage NSCLC without EGFR or ALK mutations. However, the efficacy and safety of platinum doublet therapy has been criticized since novel treatment options have been approved for NSCLC, such as immunotherapy (nivolumab, pembrolizumab) and antiangiogenesis therapy (bevacizumab, ramucirumab, nintedanib). We conducted a systematic review to investigate the efficacy of first-line treatment in NSCLC using network meta-analysis (NMA).

**Methods:** PubMed, Cochrane Central Register of Controlled Trials, and ClinicalTrials.gov were searched until October 2016 for randomized controlled trials comparing first-line regimens containing platinum doublets (cisplatin or carboplatin), immunotherapy (ipilimumab or pembrolizumab), or antiangiogenesis therapy (bevacizumab, ramucirumab, sorafenib, vandetanib, axitinib, vandetanib, or motesanib). Study data were extracted by 2 authors independently. Direct and indirect data for overall survival (OS) and progression-free survival (PFS) were combined using random-effects NMA. R Software and the GeMTC package were used for calculating combined hazard ratios (HRs) and 95% credible intervals (CrIs). **Results:** A total of 23 trials, comprising 10,693 patients, were included. Combining direct and indirect effects showed increased efficacy for immunotherapy over antiangiogenesis therapy plus platinum-based therapy (combined HR, 0.64; 95% CrI, 0.42–0.95), platinum doublets (combined HR, 0.60; 95% CrI, 0.40–0.88), and pemetrexed (combined HR, 0.40; 95% CrI, 0.25–0.63) in OS. In terms of PFS, increased efficacy was seen in immunotherapy compared with platinum doublets (combined HR, 0.50; 95% CrI, 0.28–0.88) and pemetrexed (combined HR, 0.26; 95% CrI, 0.13–0.50). **Conclusions:** Our results suggest that immunotherapy may be preferred as first-line treatment for advanced-stage NSCLC compared with platinum doublets, antiangiogenesis plus platinum-based therapy, and pemetrexed.

**AB2017-37. Frequency of Guideline “Preferred” Chemotherapy Selection for the Treatment of HER2-Negative Breast Cancer**

Margaret Rausa, PharmDa; Richard Weininger, MDa; Lee Newcomer, MDa; Nick Andrews, PharmDc; Kurt Andrews, PhDc; and Eric Gratias, MDd

From aeviCore healthcare, and cUnitedHealthcare

**Background:** The NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines) are widely accepted as a standard of care for the treatment of patients with cancer, which eviCore healthcare (Bluffton, SC) uses to support its proprietary program
for chemotherapy management. All chemotherapy regimens assigned NCCN Category of Evidence and Consensus 1, 2A, or 2B are considered adherent treatment selections in the eviCore program. For HER2-negative breast cancer, there are many systemic treatment options that are NCCN-recommended and a limited group that are designated as “preferred” based on superior efficacy and/or safety. The purpose of this study was to evaluate the frequency with which practicing oncologists chose NCCN-preferred regimens for the treatment of patients with HER2-negative breast cancer. **Methods:** This study included all chemotherapy regimen authorizations for patients with HER2-negative breast cancer containing ≥1 injectable drug between April 1, 2015, and September 30, 2016, from multiple health plans; >90% of authorizations occurred in United HealthCare members. Authorizations with missing or incomplete clinical data were excluded. A total of 5,248 fully evaluable cases were stratified by stage, HER2 status, estrogen receptor (ER)/progesterone receptor (PR) status, and regimen selected. Regimens were further divided by NCCN-preferred and NCCN-recommended status. The frequency of NCCN-preferred regimen selection was calculated for each subgroup. **Results:** There were 3,698 cases of patients who were HER2-negative but ER+ and/or PR+, and 1,550 cases with patients with triple-negative breast cancer (TNBC). The highest frequency of NCCN-preferred regimen use occurred in patients with stage I/II HER2-/ER+ and/or PR+ receiving adjuvant chemotherapy: 70% of 1,680 patients were given an NCCN-preferred regimen. Patients with stage I/II TNBC had a markedly lower rate of NCCN-preferred regimen use (62% of 549 cases; P < .001), whereas the lowest compliance with NCCN-preferred regimens occurred in patients with metastatic TNBC, with only 32% of 273 cases (P < .001). **Conclusions:** Patients with higher-risk breast cancers received NCCN-preferred chemotherapy regimens at lower rates than those with lower-risk disease. Only one-third of patients with metastatic TNBC received NCCN-preferred chemotherapy regimens. Further study is warranted to determine the reasons for low compliance with NCCN-preferred regimens, as well as opportunities to increase preferred regimen use in patients with high-risk breast cancer.

**AB2017-38. Implementation of the NCCN Guidelines for Adult Cancer Pain Into Oncology Clinics**
Sachin Kale, MD; Janet Snapp, MSN, RN, FPCN; and Erin Heuser, MBOE
From The Ohio State University–James Cancer Hospital

**Background:** Ambulatory patients with cancer experience both acute and chronic pain that affects quality of life. Many factors make pain management challenging, including disease progression and a lack of consistent practice on the part of the healthcare team. Patient satisfaction scores for perceptions of pain management in our oncology clinics were unfavorable when compared with other clinics. Although our overall Press Ganey scores were 93.9, they did not meet our targeted goal of 96.3. In 2014, unmanaged pain in patients with gastrointestinal cancer resulted in the highest number of emergency room visits with resultant hospital admissions. We wanted to standardize pain assessments and effectively implement strategies for interventions. Processes were to be reproducible across all ambulatory settings. **Methods:** As a large team, we used DMAIC (define, measure, analyze, improve, control) methodology to define the problem evidenced by our satisfaction scores. The 2016 NCCN Guidelines for Adult Cancer Pain were chosen as an overarching guide. Topics were combined within the guidelines into 4 categories: assessment and information flow, intervention and primary pain management, patient education, and referrals to specialty care for advanced cancer pain management. Although the guidelines provided a thorough review of best practices, they lack guidance on implementing these practices. Workgroups studied the current state and developed goals or metrics with expected outcomes based on the NCCN Guidelines. All work developed was required to be standardized and reproducible for future clinics. **Results:** A total of 66% of the staff were aware of NCCN Guidelines, but only 45% of those were aware of the guidelines for Adult Cancer Pain, 66% of whom stated confidence in pain management approaches based on NCCN Guidelines. Chief challenges for clinicians were identified as proactively mitigating insurance denials, appropriately selecting between different opioid medications, determining how to convert between different opioid classes, and convincing patients when they no longer needed narcotics. **Conclusions:** Several outcomes resulted from this study: (1) a curriculum for prescribers was developed; (2) barriers to efficient pain management were identified and corrected; (3) triggers for referral to specialty practice were established with appointments within 3 days; and (4) data analytics in the electronic medical record now verifies adherence to the process. Use of the NCCN Guidelines within a quality improvement framework is an effective way to improve pain management.
AB2017-39. Facilitating Delivery of Guideline-Recommended Cancer Care With a Written Care Plan: Pre-Implementation Data From the 4R in Oncology Project
Julia R. Trosman, PhD<sup>a</sup>; Christine B. Weldon, MBA<sup>b</sup>; Claudia B. Perez, DO<sup>c</sup>; Swati A. Kulkarni, MD<sup>d</sup>; Seema A. Khan, MD<sup>e</sup>; Nora M. Hansen, MD<sup>f</sup>; Valerie M. Nelson, MD, MBA<sup>g</sup>; Jennifer Stein, RN<sup>h</sup>; Melissa A. Simon, MD, MPH<sup>i</sup>; Jonathan B. Strauss, MD, MBA<sup>j</sup>; Sasa Espino, MD<sup>k</sup>; Mikele M. Bunce, PhD, MPH<sup>l</sup>; Wayne Pan, MD, PhD<sup>m</sup>; Sarah Friedewald, MD<sup>n</sup>; and William J. Gradishar, MD<sup>o</sup>

From <sup>a</sup>Center for Business Models in Healthcare, <sup>b</sup>University of California, San Francisco, <sup>c</sup>Northwestern University, <sup>d</sup>Loyola University Medical Center, <sup>e</sup>Northwestern Memorial Hospital, <sup>f</sup>Robert H. Lurie Comprehensive Cancer Center of Northwestern University, and <sup>g</sup>Genentech

Background: The Institute of Medicine 2011 and 2013 reports recommend a written care plan (WCP) at cancer diagnosis to facilitate team-based delivery of guideline-recommended care across specialties, as well as patient engagement. Standardized, multimodality, guideline-directed WCPs are a key part of the innovative 4R (Right Information/Care/Patient/Time) model of care planning, coordination, and patient engagement proposed previously (Trosman, JOP 2016; Weldon, J Natl Compr Canc Netw 2016). 4R is being implemented at 3 types of centers: academic, community, and safety net. As part of current state assessment before implementing 4R and standard multimodality WCP, we surveyed clinicians on aspects of care planning/coordination and whether they currently provide any WCPs to patients.

Methods: We conducted a survey of clinicians (n=45) who provide care to patients with breast cancer at the 3 different site types. Simple frequencies and Fisher exact test were used in analysis.

Results: The survey response rate was 93% (42/45). Current gaps and challenges were reported by ≥48% of respondents on 6 of the 7 aspects of care planning/coordination (Table 1). Clinicians providing a WCP perceived themselves as more effective in enabling patients to manage their care compared with those not providing WCPs (59% vs 25%; P=.033); they also reported increased awareness of patients outcomes after treatment compared with clinicians not providing a WCP (55% vs 20%; P=.029). Most clinicians surveyed were dissatisfied with the current state of care planning, whether they are currently providing (73%) or not providing (75%) WCPs. Conclusions: Serious challenges and clinicians’ dissatisfaction with the current state of care planning and coordination exist at our sites. Our findings support the need for 4R implementation, which aims to empower clinicians and patients with consistent, effective tools and processes for multimodality planning and delivery of guideline-based care. Using a WCP, even in a nonstandardized fashion (pre-4R), appears to be an attribute of clinicians following and assisting their patients.

Bioinformatics/Information Technology Sciences

AB2017-40. Connectivity Map of Current Biomarkers for the Advancement of Targeted Therapy in Triple-Negative Breast Cancer
Brett Fleisher, BS, and Sihem Ait-Oudhia, PharmD, PhD
From College of Pharmacy, University of Florida

Background: Triple-negative breast cancer (TNBC) is a complex heterogeneous disease characterized by the absence of 3 hallmark receptors: HER2, estrogen receptor (ER), and progesterone receptor (PR). Compared with other breast cancer subtypes, TNBC is more aggressive and frequently affects younger patients. The biologic complexity of TNBC combined with the logistical challenges of finding new biomarkers has imposed limitations on the number of clinically accepted targets for tailored therapy in TNBC. Methods: BiomarkerBase, a biomarker knowledge base developed by Amplion Inc. (Bend, OR), uses a comprehensive list of synonyms to identify biomarkers registered in clinical trial records (ClinicalTrials.gov). Under each of the registered breast cancer biomarkers (with the exceptions of HER2, ER, and PR), sub-searches were conducted for clinical trials that explicitly used TNBC in the title of the biomarkers studies. Of note, most trials in this review were completed phase II or III studies. The selected candidate biomarkers were classified into 4 FDA biomarker categories (surrogate, prognostic, predictive, or pharmacodynamic) and organized by location (blood/plasma, cell surface, cytoplasm, or nucleus). Current literature about how the biomarkers may interact was examined using PubMed. These markers were further organized into a “cellular protein network” that demonstrates potential connectivity.

Results: Blood biomarkers included VEGF/VEGFR and IL-8; cell surface biomarkers included EGFR, IGFBP, c-Kit, c-Met, and PD-L1; cytoplasm biomarkers included PIK3CA/AKT/mTOR-related metabolites (GFP, PCh, lactate/glucose), pPKM2, F1,6BP,
AB2017-40: Table 1. Potential Triple-Negative Breast Cancer Biomarkers

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AB2017-41. Impact of Chrono-Radiotherapy in Advanced Oral Cancers With Overall Survival, Locoregional Control, and Toxicity Profile Compared With Conventional Radiotherapy

Mirza Qaiser Baig, MD
From BRD Medical College, India

**Background:** This study compared the conventional radiotherapy (RT) timing (8:00 AM–8:00 PM) versus peak tumor temperature (PTT) in locally advanced oral cancers to study the effect of circadian variation. We aimed to determine clinical response, yearly survival rate, and the toxicity profile for both treatment schedules. **Methods:** The study was carried out on biopsy-proven locally advanced oral cancer (N=24). Patients were divided into 2 groups with an intent to treat with RT: group 1 was treated 5 days a week with a 200 cGy fraction following conventional RT timing, and group 2 received RT at PTT times, with the tumor site temperature being recorded at 2-hour intervals during waking periods and at 4-hour intervals during sleep periods. In order to determine PTT time and decide specific time for RT delivery, 200 cGy was given 4 days before RT initiation. **Results:** The PTT group had a higher overall complete response rate compared with the conventional RT group (81.25% vs 37.05%), and a slightly higher overall survival rate (93.8% vs 87.5%). However, oral mucosal reactions and skin reactions were also increased in the PTT group. **Conclusions:** RT given at PTT time (vs conventional RT schedule) showed better locoregional control and overall survival.

AB2017-42. Breast Cancer Among Young Adults: A Retrospective Analysis of Racial Differences

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From *Ohio State University College of Medicine, and *The Ohio State University Comprehensive Cancer Center- James Cancer Hospital & Solove Research Institute

**Background:** Breast cancer (BC) is the most common invasive cancer among North American women. Younger women (age ≤40 years) represent 5% to 7% of all BC diagnoses and 3% of BC deaths (ACS, 2014). These patients may present with more aggressive cancer subtypes, such as HER2 overexpressing and triple-negative breast cancer (TNBC)/luminal breast cancers. Understanding the young adult BC survivor population at The Ohio State University Comprehensive Cancer Center (OSUCCC), including potential racial differences and disparities, may improve treatment, prognosis, and quality of life for these young women. **Methods:** A retrospective chart review was performed of women treated for breast cancer at OSUCCC from 2001 to 2014. The study assessed breast cancer characteristics and outcomes among the young adult population (age ≤40 years). Variables were examined based on age group in 5-year increments and pathologic tumor characteristics. **Results:** Between 2001 and 2014, 398 patients met eligibility criteria. The population consisted of 324 Caucasians (81.5%), 41 African Americans (AAs; 10.3%), and 33 patients of other ethnicity (8.2%); the median age was 34 years (range, 22–39 years). Most patients underwent complete mastectomy (n=279; 70%); 89 (22.3%) received a lumpectomy. Most patients presented with stage II disease (44.1%)
and had a luminal phenotype (46.9%); 26.2% of patients had TNBC and 25.0% had HER2 disease. In the year after diagnosis, chemotherapy was given most frequently in patients with TNBC (55.3%). Although both Caucasians (63.37%) and AAs (58.13%) were more likely to present at stage I or II, AA patients (41.85%) were more likely than Caucasians (30.62%) to present at stage III or IV (P<.05). Conclusions: The young adult population at OSUCCC resembles similar young breast cancer populations demonstrating a higher prevalence of luminal tumors and TNBC. Due to patient preference and more advanced disease at diagnosis, young patients frequently underwent mastectomy. Compared with Caucasians, AAs tended to present at a higher disease stage, suggesting inherent biological tumor differences between races and disparities in timely access to care. A more in-depth analysis of these differences will be presented.

**AB2017-43. Performance Status Dynamics During Treatment With nab-Paclitaxel Plus Gemcitabine Versus Gemcitabine Alone for Metastatic Pancreatic Cancer**

E. Gabriela Chiorean; Daniel D. Von Hoff; Yin Wan; Sandra Margunato-Debay; and David Goldstein, MBBS, FRACP

From University of Washington, Translational Genomics Research Institute & Honor Health (TGen), Pharmerit International, Celgene Corporation, and Department of Medical Oncology, Sydney, Australia

**Background:** The goal of this retrospective analysis was to examine changes in Karnofsky performance status (KPS) as a surrogate for patient well-being during first-line treatment with nab-paclitaxel + gemcitabine versus gemcitabine alone for patients with metastatic pancreatic cancer (MPC) in the phase III MPACT trial. **Methods:** The MPACT trial has been described previously (Von Hoff et al, N Engl J Med 2013; 369(18):1691–703). For each treatment arm, median KPS scores were described at 3 and 6 months post-randomization and 1 month before disease progression. Kaplan-Meier curves were used to assess time to definitive KPS deterioration (decrease ≥10 points), censoring at death, loss to follow-up, or end of trial. KPS for death was not imputed; last KPS visit (alive) was used. In a sensitivity analysis, a larger decrease (decrease ≥20 points) was also investigated. A Cox proportional hazards model was used to analyze the effect of treatment on time to definitive KPS deterioration, adjusting for other covariates associated with prognosis and outcomes in MPC. **Results:** The median KPS at baseline was 90 among evaluable patients in each arm (n=421 for nab-paclitaxel + gemcitabine; n=404 for gemcitabine alone). Median KPS at 3 months after randomization was also similar for both arms (80 and 90, respectively). Both groups had the same median KPS values 6 months post-randomization (90) and 1 month before disease progression (80). No significant difference was observed between nab-paclitaxel + gemcitabine and gemcitabine alone in time to definitive KPS deterioration (≥10 points: median, 74 vs 72 days, P=.74; ≥ 20 points: median, 213 vs 211 days, P=.68). Multivariate modeling revealed that when controlling for baseline variables, treatment arm had no significant effect on time to definitive deterioration in KPS (hazard ratio, 1.03; P=.74). However, the following factors were significantly associated with a longer time to KPS deterioration: lower (70–80) versus higher (90–100) baseline KPS; lower (<5) versus higher (>5) baseline neutrophil-to-lymphocyte ratio; absence versus presence of liver metastases; and region of Western Europe versus North America. **Conclusions:** The median increased overall survival observed with the addition of nab-paclitaxel to gemcitabine for the first-line treatment of patients with MPC was not associated with any clinically meaningful overall decrease in patient performance status.

**AB2017-44. Ultrasound-Guided Renal Mass Biopsy for Small Renal Masses Performed in the Office Setting by Urologists Versus Standard Hospital Setting: A Comparison Study**

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From Oakland University William Beaumont School of Medicine, Beaumont Health System, and Michigan Institute of Urology

**Background:** Contemporary studies have supported the use of renal mass biopsy (RMB) for the evaluation of small renal masses (SRMs) when biopsy results can impact management. We have previously reported that office-based, ultrasound-guided RMB (ORMB) is safe, effective, and feasible when performed by urologists. This study describes the differences in outcomes between ORMB performed by urologists and hospital-based RMB. **Methods:** This is a retrospective study involving 70 patients who underwent ORMB and 155 patients who underwent hospital-based ultrasound (HBUS)– or hospital based CT (HBCT)–guided RMB for the evaluation of a SRM (≤4.0 cm) between January 2010 and February 2016. **Results:** Median age among ORMB patients was 69.5 years and 43/70 (61.4%) were male. There were 103 HBUS patients (median age, 68.0 years; 55/103 [53.4%] male) and 52 HBCT patients (median age, 69 years; 27/52 [51.9%] male). Median tumor size was 2.7 cm, 2.2 cm, and 2.1 cm for the ORMB, HBUS, and HBCT patients, respectively (P=.001). Renal cell carcinoma (RCC) was found in 51/70 (72.9%), 64/103 (62.1%), and 30/52 (57.7%) of the initial biopsies,
AB2017-45. Clinical Value of the Combining Detection of Galactomannan Test and CT Findings for Diagnosis of Invasive Pulmonary Aspergillosis

Li Gao, MD
From Peking University First Hospital, China

Objective: This study analyzed the diagnostic value of specific CT imaging signs, galactomannan (GM) test, and the combination of CT signs and GM test in patients with invasive pulmonary aspergillosis (IPA). Methods: We retrospectively recruited a total of 232 patients diagnosed with possible pulmonary fungal infection at Peking University First Hospital from January 2012 to March 2016; of those, 98 patients were diagnosed with IPA. These 98 patients were then divided into 4 groups according to stratified diagnostic criteria: IPA-proven diagnosis, IPA-probable diagnosis, IPA-possible diagnosis, and unidentified IPA groups. Correlation between CT imaging signs, GM test, and IPA-stratified diagnosis were analyzed in each group. The sensitivity and specificity of CT signs, GM test, and CT signs combined with GM test to IPA diagnosis were calculated. Results: CT signs—defined as nodules or masses, halo signs, semilunar sign, cavities, and significantly thickened bronchial walls—were indicators associated with IPA diagnosis (correlation coefficients, 0.377, 0.372, 0.298, 0.506, and 0.403, respectively; *P* < 0.05), with a 78.6% sensitivity, 91.7% specificity, and 89.7% accuracy. The sensitivity and specificity of GM test were 67.8% and 81.2%, respectively, with an accuracy of 86.6%. The diagnostic accuracy of CT signs combined with GM test was 89.8%. Conclusions: IPA accounts for the highest percentage of invasive fungal disease (IFD) diagnoses; therefore, early diagnosis of IPA is key to improving prognosis. CT signs (nodules or masses, halo signs, semilunar sign, cavities, and significantly thickened bronchial walls) can help clinicians identify IPA in patients with IFD. GM test has a higher sensitivity and specificity for diagnosing IPA among patients with IFD. CT in combination with GM test possesses higher diagnostic value and better clinical significance compared with the single application of CT scans or GM test, attributable to its higher sensitivity and specificity for IPA diagnosis.

AB2017-46. Home Intervention for Chemotherapy-Induced Peripheral Neuropathy: Sensorimotor Program

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LeAnn Gaerke, OTR/L, CHT^a^; and Karli Vicary, SOT^a^

From ^a^The James Cancer Hospital and Solove Research Institute at The Ohio State University and ^b^The Ohio State University

Background: Peripheral neuropathy (PN) is a common side effect in patients receiving neurotoxic chemotherapy, with an incidence ranging from 30% to 40% and as high as 90% in this population. Patients with PN may experience numbness, tingling, or a burning sensation in the hands and feet, which may negatively affect quality of life (QoL) and can lead to dose reductions, therefore resulting in less-than-optimal treatment. The purpose of this study was to assess the effect of a home-based sensorimotor program on pain, function, and QoL in patients with stage I–III breast cancer. Methods: Patients who received taxane-based chemotherapy for stage I–III breast cancer and diagnosed with at least stage 1 PN were eligible. Patients with a history of diabetes or an autoimmune condition were excluded from the study. Study intervention included 1 visit with a licensed occupational or physical therapist, 2 follow-up calls, and a mailed survey at the end of the 6-week program. Patients were instructed on 4 home modules that included manual therapy, desensitization, range of motion, and strengthening. Self-reported data were captured using the McGill Pain Questionnaire, QuickDASH, and QLQ-CIPN20 at study initiation and conclusion. Results: Data were analyzed using SPSS Statistics, version 21 (IBM Corporation, Armonk, NY). Descriptive statistics were used to assess the proportion of patients reporting improvements in pain severity, overall functioning, and QoL after the intervention. Preliminary results demonstrated improvement in pain, function, and QoL. Initially, 87% of participants reported pain at a moderate to severe level. After 4 weeks of home intervention, pain ratings were 100% in the mild to no pain range. Functional improvement was noted by 40% of participants at 2 weeks and 82% of participants.
at 4 weeks; 33% and 73% of participants reported improved QoL at 2 and 4 weeks, respectively. **Conclusions:** Preliminary findings suggest that a conservative intervention for PN could be defined and offered as a treatment approach for patients with PN.

**AB2017-47. Ovarian Germ Cell Tumors: An Institutional Experience of Treatment and Long-Term Outcome**

Manikandan Lakshmanan, MS, Sameer Gupta, MS, MCh; Arun Chaturvedi, MS, MAMS; Sanjeev Misra, MS, MCh; Vijay Kumar, MS, MCh; Naseem Akhtar, MS, MCh; Sudeep Garg, MS, and Kavitha Jain, MS

**From King George's Medical University, India**

**Background:** Ovarian germ cell tumors (GCTs) account for 20%–25% of all ovarian neoplasms, but only 3%–5% of GCTs are malignant. Over the past 3 decades, survival rates for GCTs have dramatically improved due to aggressive surgical staging and combination chemotherapy. We present our experience with ovarian GCTs at our institution over the past 5 years, with a special emphasis on treatment outcome and role of fertility preservation (FP) surgery. **Methods:** A retrospective review was performed of medical records of patients with ovarian GCTs treated at our center from 2012–2016. **Results:** A total of 39 patients with ovarian GCT were treated during this period. Median age at diagnosis was 20.5 years (range, 11–50 years), and the most common symptom at presentation was abdominal lump without ascites. Approximately 35.8% (n=14) had conservative surgery with preservation of the opposite ovary and uterus. Most patients (76.9%; n=30) had received neoadjuvant chemotherapy for advanced disease in the form of ascites or large masses. Of these, 5 were amenable to FP later. 1 of the 14 patients who underwent FP delivered children after completing treatment. Stage distribution for stage I–IV was 17.9% (n=7), 35.89% (n=14), 41.02% (n=16), and 2.56% (n=1), respectively. Dysgerminoma was the most common histology (38.46%; n=15), followed by teratoma (20.51%; n=8) and mixed GCT (15.38%; n=6). BEP (bleomycin/etoposide/cisplatin) was the most commonly used regimen and was also noted to produce a marked tumor response. At a median duration from initial insult to malignant transformation was a chronic nonhealing ulcer over burn scars (n=25; 46.29%), mostly in the lower limb. The median duration from initial insult to malignant transformation was longer for burns (median, 22 years) compared with nonburn causes (median, 11 years). Approximately 81.4% of patients (n=44) presented with T2 disease, with an average tumor size of 11.36 cm (SD, 7.33 cm). Approximately 40.74% of all patients (n=22) had pathologically positive nodes, with an average ulcer size of 14.33 cm; patients with node-negative disease had an average ulcer size of 10.25 cm. The most common histology was SCC followed by sarcomatoid carcinoma (n=3; 5.5%), 6 patients presented with recurrence after being treated at an outside institution, with a median time-to-recurrence of 1.25 years. At a median follow-up of 29.5 months (range, 6–53 months), 9.2% (n=5) of our patients experienced recurrence, with a median time-to-recurrence of 10.5 months (range, 9.5–18.0 months). Of these, 4 patients had distant metastasis that was managed with palliative chemotherapy and 1 had a local site recurrence managed with surgery. **Conclusions:** MU is predominantly a disease of the fifth and sixth decades of life, and the primary treatment modality for these patients is surgery. Although literature mentions that nodes are usually negative in patients with MU, 40.74% of our patients presented with node-positive disease, especially in ulcers that were approximately ≥14 cm, which is significantly more than mentioned in the literature. Hence, node dissection should be performed electively in patients with large ulcers. Overall survival rates in these patients are high.

**AB2017-48. Marjolin’s Ulcer: An Institutional Experience From Northern India**

Manikandan Lakshmanan, MS; Vijay Kumar, MS, MCh; Arun Chaturvedi, MS, MAMS; Sanjeev Misra, MS, MCh; Sameer Gupta, MS, MCh; Naseem Akhtar, MS, MCh; Sudeep Garg, MS, and Kavitha Jain, MS

**From King George’s Medical University, India**

**Background:** Marjolin’s ulcer (MU) is a squamous cell carcinoma (SCC) that occurs secondary to malignant transformation of chronic scar tissue. The unique chronic nature of MU and the surrounding scar tissue poses a management challenge to surgeons. Herein, we present our experience with MU at King George’s Medical University, India. **Methods:** A retrospective review was performed of medical records of patients with MU treated at our center from January 2012–September 2016. **Results:** A total of 54 patients with MU were treated during this period. The median age at diagnosis was 47.5 years (range, 18–68 years), and the most common presentation was a chronic nonhealing ulcer over burn scars (n=25; 46.29%), mostly in the lower limb. The median duration from initial insult to malignant transformation was longer for burns (median, 22 years) compared with nonburn causes (median, 11 years). Approximately 81.4% of patients (n=44) presented with T2 disease, with an average tumor size of 11.36 cm (SD, 7.33 cm). Approximately 40.74% of all patients (n=22) had pathologically positive nodes, with an average ulcer size of 14.33 cm; patients with node-negative disease had an average ulcer size of 10.25 cm. The most common histology was SCC followed by sarcomatoid carcinoma (n=3; 5.5%), 6 patients presented with recurrence after being treated at an outside institution, with a median time-to-recurrence of 1.25 years. At a median follow-up of 29.5 months (range, 6–53 months), 9.2% (n=5) of our patients experienced recurrence, with a median time-to-recurrence of 10.5 months (range, 9.5–18.0 months). Of these, 4 patients had distant metastasis that was managed with palliative chemotherapy and 1 had a local site recurrence managed with surgery. **Conclusions:** MU is predominantly a disease of the fifth and sixth decades of life, and the primary treatment modality for these patients is surgery. Although literature mentions that nodes are usually negative in patients with MU, 40.74% of our patients presented with node-positive disease, especially in ulcers that were approximately ≥14 cm, which is significantly more than mentioned in the literature. Hence, node dissection should be performed electively in patients with large ulcers. Overall survival rates in these patients are high.
AB2017-49. The Clinical Significance of a Restaging TURBT for Nonmuscle Invasive Bladder Cancer in an Indian Scenario

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GGS Medical College and Hospital, Faridkot, Punjab, and Post Graduate Institute of Medical Education and Research, Chandigarh, India

**Background:** Restaging transurethral resection of bladder tumor (TURBT) remains largely underused in India due to long waiting lists, lack of operating rooms, increased risk for complications, and the poor socioeconomic status of patients. We aimed to find the utility of restaging TURBT in our setup, with an objective of detecting tumor on restaging, stage up-migration, and risk of recurrence. **Methods:** This prospective study was performed at a tertiary care teaching hospital in India over a 2-year period. Restaging TURBT was performed 2–6 weeks after the initial TURBT in all high-grade and T1 tumors. Parameters of the initial TURBT, namely number, appearance (solid vs papillary), size of lesions, proximity to ureteric orifice, grade, and presence or absence of deep muscle, were compared for the risk of tumor on restaging. These cohorts were followed for recurrence and progression during the study period. Appropriate statistical tests were applied. **Results:** 45.7% of patients (123/282) underwent restaging TURBT at 2–6 weeks after the initial TURBT; the remaining patients could not undergo restaging due to various reasons, most commonly loss to follow-up. Tumor was detected in 32.5% of patients (40/123) after restaging TURBT and 6.5% (8/123) were up-staged (Ta to T1 in 2 patients; T1 to T2 in 5 patients; Ta to T2 in 1 patient). Tumor size of >3 cm and solid-appearing tumor were associated with a significantly higher chance of tumor on restaging (Table 1). At follow-up, presence of tumor on restaging TURBT (P=.01) and number of tumors at first resection (P=.02) were significantly associated with risk of recurrence. **Conclusions:** Restaging TURBT must be considered in all patients with high-grade and T1 lesions because it detects a significant number of residual tumors and is necessary when the primary tumor is >3 cm and is solid-looking. Presence of tumor on restaging also confers a high risk of recurrence.


Abdul Rafeh Naqash, MD, and Paul R. Walker, MD

From *Leo W. Jenkins Cancer Center, and *East Carolina University

**Background:** Testicular teratoma (TT) with malignant transformation is a rare entity that involves transformation of totipotent mesenchymal elements within a TT into malignant somatic components, with rhabdomyosarcoma (RMS) being the most frequent subtype. However, due to a paucity in data and the dismal prognosis associated with this transformation, little is known about the factors influencing survival in these patients. **Methods:** A MEDLINE/PubMed search was performed for articles published between 1985 and 2015 that pertained to RMS as a component of the primary (testis) or metastatic site in patients with concurrent TTs. 64 cases of patients aged >18 years were identified. Clinical outcomes were assessed specifically with regard to survival. **Results:** Median age at diagnosis was 29 years. As part of primary treatment, all patients underwent radical orchiectomy, demonstrating RMS differentiation within the TT in 73.4% of patients. 39.1% had stage III disease at diagnosis. Retroperitoneal lymph nodes (29.7%) and lungs (28.1%) were the most common metastatic sites. Presence of RMS within the TT was associated with stage I disease (P=.019). 70.3% of patients received chemotherapy and 28.1% received radiation; 46.8% achieved a complete response and 29.7% had progressive disease. 37.5% of patients had embryonal carcinoma (EC) as the most common germ cell histology admixed in TT. After a median follow-up of 85 months, 50% were alive. Age >35 years was associated with poor overall survival (OS; P=.028) and progression-free survival (PFS; P=.012). TT with concurrent presence of EC showed a strong trend for improved PFS (P=.051). Patients treated with concurrent radiation experienced improved PFS (P=.007; hazard ratio [HR], 4.42; 95%
CI, 1.51–12.93) and OS (P=.039; HR, 3.66; 95% CI, 1.06–12.56); most of these were staged II and III (77.7%). **Conclusions:** This meta-analysis demonstrates that patients with stage II/III TT with RMS differentiation, either at the primary or a metastatic site, experience improved PFS and OS with concurrent radiation. Thus, it is imperative to use this modality upfront as part of a combined approach.

**AB2017-51. Clinical Outcome of Octogenarian Patients With Cancer: A Comprehensive Cancer Center Experience**
Ali Raufi, MD; Hassaan Jafri, MD; and Todd Gress, MD, MPH
From Marshall University

**Background:** Management of elderly patients with cancer is an increasingly important and challenging issue for physicians. It is estimated that octogenarian patients will double within the next 20 years. The aim of our study was to retrospectively review patients with cancer aged ≥80 years who were diagnosed and managed at our comprehensive cancer center from 2006 to 2015 were included. We analyzed the impact of treatment on survival using Kaplan-Meier methodology and Cox proportional hazards models. **Results:** A total of 316 patients with cancer were eligible for this retrospective analysis. 236 patients (74.7%) received treatment (treated group; TG) and 80 patients (25.3%) did not receive treatment (untreated group; UTG). Mean age was 83.9 years in the TG and 84.4 years in the UTG (P=.38); sex was similar between the 2 groups (31.4% vs 40.0% male, respectively; P=.16). ECOG score ≥2 was higher in UTG group (53.7% vs 20.3%; P<.001). Tumor type in the TG versus UTG populations included breast cancer (24.2% vs 10.0%), lung (22.9% vs 27.5%), gastrointestinal (17.8% vs 15.0%), hepatobiliary (1.7% vs 18.8%), genitourinary (15.2% vs 21.2%), and gynecologic cancers (18.2% vs 7.5%). 65.7% of patients had early-stage disease, 17.4% had locally advanced disease, and 16.9% had metastatic disease in the TG compared with 48.8%, 16.2%, and 35.0%, respectively, in the UTG. Median overall survival was 33 months (95% CI, 27–44) in the TG versus 8 months (95% CI, 4–16) in the UTG (P<.001). Receiving treatment was associated with improved survival even after adjusting for age, sex, ECOG, stage, and tumor type (hazard ratio, 0.58; 95% CI, 0.41–0.81). **Conclusions:** We found that cancer treatment was associated with improved survival in our octogenarian patient population. Bias regarding the reason to treat may have influenced our findings, which we attempted to account for by adjusting for patient characteristics involved in treatment decision-making. Our findings suggest that physiological age is more important than chronological age.

**AB2017-52. Medical University Sofia Prognostic Model for Predicting Risk of Local Recurrence After Breast-Conserving Surgery for Ductal Carcinoma in Situ**
Theophil Sedloev, MD, PhD; Mariela Vasileva, MD, PhD; Todor Kundurzhiev, PhD; and Tatiana Hadjieva, MD, PhD
From Medical University Sofia, Bulgaria

**Background:** Choosing the correct treatment approach for patients with ductal carcinoma in situ (DCIS) is a challenge, solved by correctly predicting the risk of ipsilateral breast tumor relapse (IBTR) in patients after breast-conserving surgery (BCS). In this study we aimed to develop our own model to predict for recurrence. **Methods:** This retrospective study included 210 patients with DCIS treated at Medical University Sofia (MUS) from 1998 to 2013. Each of the 10 factors from the original Memorial Sloan Kettering Cancer Center (MSKCC) nomogram was validated. Kaplan-Meier, log-rank test, Cox regression, and receiver operating characteristic (ROC) analyses were performed on >85 patients treated with BCS, out of 122 with histologically proven, pure DCIS. **Results:** Significant associations were found between initial presentation, nuclear grade, necrosis, margins, family history, number of excisions, radiotherapy (RT), hormonal therapy (HrT), and increased risk of IBTR. We created the MUS prognostic model for evaluation of local recurrence risk in patients with DCIS. ROC curve analysis showed high diagnostic accuracy of the MUS model (area under the curve [AUC], 0.951; P<.001), which is compatible with the MSKCC nomogram (AUC, 0.921; P<.001). **Conclusions:** Based on risk defined by the MUS prognostic model, we recommend patients with a final score up to 300 points be referred for BCS only; those with score of 300–600 points be referred for BCS + RT + HrT; and those with a score of >600 points be referred for mastectomy. The MUS prognostic model provides a practical approach for choosing therapy in patients with DCIS of the breast.

**AB2017-53. HER2 Expression in Patients With Breast Cancer: Single Institutional Study From Saudi Arabia**
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From King Fahad Medical City, Saudi Arabia

**Background:** As in the rest of the world, breast cancer (BC) is the common cancer in Saudi women. HER2 overexpression in BC is considered globally as a poor prognostic factor, associated with high rates of disease
recurrence and death. Knowledge of HER2 receptor status impacts clinical care in several ways, particularly regarding response to specific therapies and overall survival. Given the lack of data, we attempted to identify the exact magnitude of HER2 expression in Saudi patients with BC. Methods: Patients with newly diagnosed BC who presented to King Fahad Medical City within a month of diagnosis from January 2009 to December 2014 were analyzed for overexpression of the HER2 receptor. Receptor analysis was performed using immunohistochemistry and fluorescence in situ hybridization (FISH). Frequency of HER2 expression was computed for all cases with respect to age, region, race, and disease stage via the chi-square test to determine the effect of these characteristics on HER2 overexpression. Data were analyzed using SPSS Statistics, version 19 (IBM Corporation, Armonk, NY). Results: Of 550 patients, the mean age was 50.1 ± 11 years. Overall, 223 patients (40.55%) were HER2-positive and 327 (59.44%) were HER2-negative, with a mean age of 48.14 ± 10.7 years and 51.44 ± 11.01 years, respectively (P = .029). Of the 550 patients, 410 (74.65%) were from Riyadh and Central Region, and 477 (86.63%) were Saudis. Among all patients, 75 (13.6%) were stage I, 200 (36.36%) were stage II, 195 (35%) were stage III, and 85 (15%) were stage IV at diagnosis. In those with stage IV disease, 34 patients (39.39%) were HER2-positive and 51 (60.6%) were HER2-negative (P = .88). Conclusions: The frequency of HER2 overexpression in Saudi patients with BC was 40.55%, which is higher than the international statistics. Younger patients (<50 years) tend to harbor HER2-positive BC. HER2 overexpression was not found to be associated with disease stage, geographic location, or race.

AB2017-54. The Candidate Tumor Suppressor FOXP3 Inhibits Tumor Aggressiveness and Is Associated With Favorable Clinical Outcome in Human Hepatocellular Carcinoma
Jie-Yi Shi*, Jian Zhou**, Jia Fant**, and Qiang Gaoa
From *Liver Cancer Institute, Zhongshan Hospital, and Key Laboratory of Carcinogenesis and Cancer Invasion (Ministry of Education), Fudan University, Shanghai, and **Institute of Biomedical Sciences, Fudan University, Shanghai

Background: FOXP3 has been found to be expressed in tumor cells and to participate in the regulation of tumor behavior. This study investigated the clinical relevance and biological significance of FOXP3 expression in hepatocellular carcinoma (HCC). Methods: Expression profiles of FOXP3 were analyzed using real-time reverse transcriptase-polymerase chain reaction, western blotting, and immunofluorescence on HCC cell lines, and immunostaining of a tissue microarray containing 240 primary HCC samples. The potential regulatory roles of FOXP3 were dissected by an integrated approach, combining biochemical assays, analysis of patient survival, genetic manipulation of HCC cell lines, mouse xenograft tumor models, and chromatin immunoprecipitation (ChIP) sequencing. Results: FOXP3 was constitutively expressed in HCC cells with the existence of splice variants (especially exon 3 and 4 deleted, Δ3,4-FOXP3). High expression of FOXP3 was significantly correlated with low serum α-fetoprotein (AFP) level, absence of vascular invasion, and early TNM stage. Survival analyses revealed that increased FOXP3 expression was significantly associated with improved survival and reduced recurrence, and served as an independent prognosticator for patients with HCC. Furthermore, FOXP3 could potently suppress the proliferation and invasion of HCC cells in vitro and reduce tumor growth in vivo. However, Δ3,4-FOXP3 showed a significant reduction in the tumor-inhibiting effect. Inhibition of the effect of FOXP3 on HCC aggressiveness was probably produced by enhancing the TGF-β/Smad2/3 signaling pathway. Conclusions: Our findings suggest that FOXP3 suppresses tumor progression in HCC via the TGF-β/Smad2/3 signaling pathway, highlighting the role of FOXP3 as a prognostic factor and novel target for an optimal therapy against this fatal malignancy.

AB2017-55. Predictive Markers of Response in a Phase II Trial of Axitinib in Advanced Melanoma
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From *Roswell Park Cancer Institute, *Mayo Clinic Cancer Center, and ‘H. Lee Moffitt Cancer Center & Research Institute

This study was approved and funded in part by the NCCN Oncology Research Program from general research support provided by Pfizer, Inc.

Background: Axitinib is an oral ATP-competitive inhibitor of VEGFR1–3 and PDGFRβ. Angiogenesis plays an important role in proliferation and metastasis of melanoma. This phase II trial examined the efficacy of axitinib in melanoma and explored novel biomarkers of response and toxicity. Methods: Using a Simon’s 2-stage design, eligible patients aged >18 years with advanced melanoma were treated with axitinib, 5 mg orally twice daily (increased to 10 mg...
orally twice daily if tolerated). Correlative studies included use of FLT-PET (15 patients; Graf et al, J Nucl Med 2014;55(suppl 1):1685), measurement of melanoma circulating tumor cells (CTCs), and polymorphisms in VEGFR1–3 and their correlation to efficacy and toxicity. Results: The study met the interim efficacy landmark and enrolled 25 patients, but was terminated before reaching the goal of 40 patients due to changes in the landscape of melanoma treatment. Median age was 72.9 years (range, 40.3–88.4 years) and 56% of patients were male. The response rate was 12% (95% CI, 0.03–0.30), all of which were partial. 10 patients (40%) had stable disease. Median progression-free survival (PFS) was 2.1 months (95% CI, 1.8–4.5), and median overall survival (OS) was 7.4 months (95% CI, 5.5–18.3). Patients with detectable melanoma CTCs pretreatment had worse PFS and OS (P=.04 and .02, respectively). Decrease in CTCs during treatment did not correlate with outcomes. Polymorphisms in KDR (VEGFR2; rs1250208; P=.03) and FLT4 (VEGFR2; rs13172346; P=.04) correlated with improved PFS; FLT1 (VEGFR1) polymorphisms were not significant. No correlation was found between polymorphisms and toxicities. Common grade 3/4 adverse events included hypertension (16%), abdominal pain (8%), and confusion (8%). Conclusions: Axitinib has limited efficacy as monotherapy in a population of unselected advanced melanoma. Baseline CTCs and selected VEGFR polymorphisms may help enrich efficacy; however, this needs confirmation in a larger cohort. The tolerable toxicity profile of axitinib warrants consideration of its inclusion in future combination therapy strategies for melanoma.

Correlative/Genomic


Olga Brovkina, PhD; Marat Gordiev; Leila Shigapova; Rafael Enikeev; Dmitriy Khodyrev, PhD; Oleg Gusev, PhD; Elena Shagimardanova, PhD; Anna Fedrova, PhD; Valentina Kosiy; and Alexey Nikitin, PhD

From ‘Scientific Clinical Center of Federal Medical and Biological Agency, Russia; ‘Republican Clinical Oncology Center of the Ministry of Health, Republic of Tatarstan; and ‘Kazan Federal University

Background: Development of hereditary ovarian and breast cancer (HBOC) is often caused by genetic defects in the DNA repair system, consisting of >100 genes. However, the ovarian and breast cancer diagnostics in most Russian medical centers includes PCR-based identification of only the most frequent mutations (5382insC, 4153delA, 300T>G, 185delAG, 2080delA, 3819delGTAA, 3875delGTCT in BRCA1, and 6174delT in BRCA2). These mutations are common among the Slavic population, but are less frequent in other Russian populations. The aim of this study is to analyze population mutations in the repair system genes.

Materials and Methods: DNA from 70 blood samples from patients of the Tatar population with HBOC were analyzed by targeted next-generation sequencing (NGS; Illumina, San Diego, CA). The comparison group consisted of 49 blood samples from patients of Slavic origin. The presence of mutations was measured using RT-PCR (Applied Biosystems, Foster City, CA).

Results: Sequencing results from 70 patients with HBOC was divided into 2 groups. Group 1 included pathogenic mutations in MUTYH (Gly396Asp, Gly25Asp, Pro18Leu), CHEK2 (Arg517His, Tyr341Cysfs*12, Thr410Metfs*15), CDH1 (Ser270Ala), BRCA1 (Arg1772*, Glu1777Profs*74, Lys654Serfs*47, Cys61Gly, Glu1742*), and BRCA2 (Ile641Tyrfs*19, Ser336*, Val323Lysfs*2, Phe3090Serfs*14, Thr3127*, Ser599*, Lys157*). 19 of these mutations were found in 27 patients. The second group of likely pathogenic mutations includes ATM (Lys1992Thr), PALB2 (Val932Met), APC (Ser2621Cys), CHEK2 (Gly102Val), BARD1 (Lys503Asn), and BRCA2 (Lys1690Asn and Ser1230Phe); these mutations were found in 10 patients. Non-BRCA1/2 mutations were identified in samples from 17 patients. Concurrently, 16 of these patients’ pathogenic mutations were found only in non-BRCA1/2 genes. According to the analysis of reverse transcriptase-polymerase chain reaction among women of Slavic origin, at least 1 of the 8 frequent mutations was identified in 47% of cases. The same mutations were detected in only 7% of cases among Tatar women.

Conclusions: NGS of 70 patients with HBOC from the Tatar population showed 29 mutations in the gene repair system, which allowed the inclusion of mutation carriers in the targeted therapy group.

AB2017-57. ‘Real World’ PD-L1 Immunohistochemistry Testing in Non–Small Cell Lung Cancer in the Reference Laboratory Setting

Allen Michael Gown, MD, and Regan S. Fulton, MD, PhD

From PhenoPath Laboratories

Background: Immunohistochemical (IHC) demonstration of PD-L1 expression on tumor cells, or in tumor-associated immune cells, is required or recommended for several indications, including non–small cell lung cancer (NSCLC). PhenoPath Laboratories is a reference laboratory that offers the complete suite of FDA-approved IHC tests, each tailored for a different PD-1/PD-L1–targeted drug, including those incorporating the 22C3, 28-8, and SP-142 antibody clones. We sought to review our 13-month experience with the 22C3-based anti–PD-L1 test, which represents most of the requests to date.

Methods:
Deidentified data were obtained from all IHC cases tested for PD-L1 since October 2015. Interpretation of all cases was performed by 1 of 2 pathologists. Results: Between October 2015 and October 2016, a total of 1,421 PD-L1 IHC tests were performed, of which 1,083 (76%) were for the 22C3-based assay (pharmDx; Dako North America, Carpinteria, CA) as a criterion for treatment with pembrolizumab. Of these, 995 (92%) were requested on NSCLC specimens. Of these 995 cases, 700 (72%) of the specimens were biopsies. Only 38 specimens (4%) had insufficient tissue for analysis (ie, >100 viable tumor cells). 34 cases (3.4%) required additional IHC tests, using cell type–specific markers (TTF-1 for lung adenocarcinoma cells; CD163 for macrophages), to assist in the correct identification of tumor cells. Overall, the positivity rate (cases with ≥1% positive membranous signal) was 55% (25% were 1%–49% positive; 30% showed ≥50% positivity). Growth in PD-L1 testing has been accelerating, with an approximately 10-fold increase during the 13-month study period. Conclusions: As a result of increased adoption of immune checkpoint therapies, the demand for IHC testing for PD-L1 expression has increased dramatically in the past 13 months. The 22C3 assay has proven to be robust, with only 4% of specimens rejected as showing less than the 100 viable tumor cells required by the assay. Only 3.4% of cases required the use of additional IHC studies to ensure correct identification of the tumor cell population. The real-world positivity rate for the NSCLC samples studied in this reference laboratory setting was slightly higher (55%, with 30% showing ≥50% tumor cell positivity) than in published clinical trials. As the latter incorporated fewer patients, our experience may better reflect the true positivity rate in NSCLC.

Epidemiology/Risks

Laura E. Happe, PharmD, MPH; Howard Rogers, MD; Jonas Puente, MSc; Bryan Loy, MD; and Mara Beveridge, MD
From *Humana Inc., †Advanced Dermatology, and ‡NorthShore University HealthSystem
Background: Incident cases of nonmelanoma skin cancer (NMSC) exceed that of all other cancers combined and have been increasing steadily in recent decades. Because cancer registries do not track NMSC, secondary data sources must be used to estimate its epidemiology. Prior studies have reported the incidence of NMSC in the original Medicare population but not in Medicare Advantage, the Medicare benefit administered by private companies. The objective of this study was to determine the incidence of NMSC in the Medicare Advantage population in 2014. Methods: NMSC diagnostic and procedure codes were extracted from the administrative claims data of a single Medicare Advantage plan. Incident procedures, incident patients (because a patient could have >1 procedure), and procedure type (excision, destruction, Mohs) were reported. Rates were age- and state-adjusted using a direct standardization method. Age intervals were used (<65, 65–69, 70–74, 75–79, 80–84, and ≥85 years). All rates were extrapolated to the US Medicare Advantage population using published state and age distributions. Results: In 2014, there were an estimated 712,314 NMSC procedures in 501,871 individuals in the US Medicare Advantage population (1.42 procedures per patient), which translates to an incidence procedure rate of 48 procedures per 1,000 people and an incidence patient rate of 34 patients per 1,000 people. The procedures were fairly evenly split between excision (33.61%), destruction (31.92%), and Mohs (34.47%). All results are age- and state-adjusted. Conclusions: The Medicare Advantage population has not previously been included in US estimates of NMSC incidence rates. This report can be used to supplement existing epidemiologic data.

AB2017-59. Panel Testing in Men With Prostate Cancer Meeting NCCN Genetic Testing Criteria
Megan Marshall, MS, LGGC; Diana Tully, MS, CGC; Lisa R. Susswein, MS, MHA, CGC; Kristin A. Theobald, MS, CGC; Patricia D. Murphy, PhD, FAMCGB; Rachel T. Klein, MS, LGGC; and Kathleen S. Hruska, PhD, FAMCGB
From *BioReference Laboratories Inc., and †GeneDx
Background: While hereditary cancer genes are traditionally thought to play a role in only a small proportion of prostate cancer (PC) cases, the NCCN BRCA1/2 testing criteria suggest genetic testing for men with a personal history of PC (Gleason score ≥7) and ≥1 close blood relative with breast, ovarian, pancreatic, or PC (Gleason score ≥7). We aim to describe the pathogenic/likely pathogenic variants (PV/LPV) identified in a cohort of men who met these guidelines and underwent multigene hereditary cancer panel testing. Methods: We retrospectively reviewed the results, clinical information, and family histories of all men with PC and a Gleason score ≥7 who underwent panel testing of up to 32 cancer genes at our clinical diagnostic laboratory between August 2013 and September 2016. Results: 142 men reported a personal history of PC with a Gleason score ≥7. Mean age at diagnosis of all probands was 58.5 years. 65% (92/142) met NCCN BRCA1/2 testing criteria, with a family history of ovarian cancer reported 19 times, breast
cancer 135 times, and pancreatic cancer 30 times. A history of PC with a Gleason score ≥7 was noted in only 2 family members, neither of whom tested positive. Among the 142 men with PC, 11 PV/LPV were identified in 10 men who met NCCN testing criteria. Further study is needed to fully discern the role of ATM in men with PC.

AB2017-60. Epidemiology of Synchronous and Metachronous Tubular Adenomas: An Institutional Longitudinal Study
Vamsi Parimi, MD, MPH; Theja Kudaravalli, BS; Sharang Tickoo, MS; and Guang-Yu Yang, MD, PhD
From *Robert H. Lurie Comprehensive Cancer Center of Northwestern University, †University of Illinois at Urbana–Champaign, and ‡Northwestern Memorial Hospital

Background: Epidemiological data on synchronous tubular adenomas (sTA) and metachronous tubular adenomas (mTA) is scarce. The propensity of colonic epithelium to harbor high-risk adenomatous transformation may be related to the incidence of both sTAs and mTAs. Methods: We retrospectively studied sTAs and mTAs among patients with long-term colonoscopy (CSPY) follow-up. 13,417 cases of tubular adenoma (TA) diagnosed via CSPY from 2005 to 2014 were followed-up by diagnostic pathology. Results: Among 13,417 patients with TAs diagnosed, 1,580 had mTAs (in 3502 CSPYs), of which 38% of CSPYs (n=1,331) showed sTA (>1 TA per CSPY). Mean age at diagnosis was 63 ±10 years for patients with mTAs. Prevalence of mTAs was high among men (60%), and among Asian, Hispanic/Latino, African American, and Caucasian patients was 2%, 4.7%, 16.4%, and 72%, respectively. Regional incidence of TA was 12% (caecum), 23% (ascending colon), 27% (transverse colon), 14% (descending colon), 20% (sigmoid colon), 4% (rectum), and 0.2% (anus). The average size of TA was largest in the caecum (7.69 mm) followed by the sigmoid colon and rectum. 12% of cases had ≥2 sTAs diagnosed per CSPY visit, 1,102 (71%) of mTA cases had a repeat CSPY within 3 years. 82% and 14% of mTA cases had CSPYs 2 and 3 times in a 10-year surveillance period, respectively. 4% of mTA cases had 5–10 CSPYs in a 10-year period. Among cases with <3 year interval between successive CSPYs, 421 (26%) had 1 TA in each visit, 151 (9.3%) had 2 TAs in the first visit and 1 TA in the next, and 142 (8%) had 1 TA and 2 TAs in the next visits. The prevalence of high-risk TA >10 mm and >20 mm (highest risk) among mTA is 51% and 0.7%, respectively. The prevalence of >3, >4 and >5 sTAs is 8%, 4.5%, and 2.5%, respectively. The prevalence of >3 mTAs is 3.5%. The 10-year cumulative TA index has been calculated based on the total TA prevalence in a single patient. In our mTA cohort, 14%, 2%, and 1% had a 10-year cumulative TA index of 6–10, 11–15, and 16–45, respectively. Conclusions: sTA and mTA are prevalent among Caucasian men who follow screening CSPY guidelines. We were able to identify the high-risk group and a new highest-risk group among our mTA cohort. It appears that the number of TAs occurring in a CSPY visit may have some relation to the number of occurrences in the prior visit. It could be speculated that cumulative colonic TA occurrences in a patient may be relevant. Additional molecular profiling among high-risk TAs may help to better ascertain their invasive risk characteristics. High-risk mTAs and sTAs could also be potential targets for chemoprevention and alternative future clinical management.

Quality Improvement
AB2017-61. Real-World Rates of Chemotherapy Use Near the End of Life in Patients With Cancer
Joshua Krawt; James Gipetti, MS; Cindy Revol; Dylan Peterson; Kristen Fessele, PhD; Vineeta Agarwala, MD, PhD; and Amy Abernethy, MD, PhD
From *Flatiron Health and †Harvard University

Background: Use of anticancer therapies in the
last 14–30 days of life may worsen patient outcomes and increase cost. In response, rate of chemotherapy at the end of life (EOL) has become an important measure of high-quality cancer care. Contemporary benchmarks are needed. **Methods:** Data on chemotherapy use, mortality, and cancer diagnosis were sourced from the electronic health records (EHRs) of 2 large US academic cancer centers. More than 8,000 patients with cancer seen between 2014–2016 and for whom dates of death were available were included. Dates of death entered into the EHR were augmented with public records of death (eg, obituaries) where available. Patients were grouped by diagnosis using ICD-10 codes. **Results:** Rate of chemotherapy use near EOL varies from 3%–7% and 6%–16%, respectively, differing by tumor type (Table 1). Between 2014 and 2016, the overall 30-day rate (across all tumor types) was ≈10%. As expected, rates were highest in diseases where patients may experience rapid clinical decline near EOL; in pancreatic and rectal cancers, 30-day rates were 16% and 13%, respectively.

**Conclusions:** This study provides a baseline from which to understand how often, and in which patients, chemotherapy is used near EOL. Further analysis is needed to confirm whether this quality measure is a meaningful driver of patient and health system outcomes. Subsequent studies should focus on opportunities to improve clinical practice to reduce unnecessary (and potentially harmful) chemotherapy at EOL. Further, this study demonstrated that it is possible to assess this quality measure across multiple organizations; this approach can easily be scaled to all oncology practices integrated within a data-sharing network.

### Table 1. Patients Receiving Chemotherapy

<table>
<thead>
<tr>
<th>Tumor Type</th>
<th>14-Day Rate (%)</th>
<th>30-Day Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anal</td>
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<td>11</td>
</tr>
<tr>
<td>Breast</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Colon</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Esophageal</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Liver and biliary</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Lung</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Pancreatic</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>Rectal</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Renal</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Stomach</td>
<td>3</td>
<td>10</td>
</tr>
</tbody>
</table>

AB2017-62. *Lumpectomy Cavity Clip Placement and Improved Radiation Therapy Outcomes in a Military Population*

Alexandra K. Brennan, BS; Winnifred M. Wong, DO; and Melinda J. Weiblen, BS From *University of Texas Health Science Center at San Antonio, and Brooke Army Medical Center*

**Background:** To demonstrate quality improvement in a military population in the planning and treatment of patients with breast cancer (BC) receiving lumpectomy and surgical clip placement before adjuvant breast-conserving radiation therapy (RT).

**Methods:** A retrospective study at the San Antonio Military Medical Center (SAMMC) was performed on patients who underwent breast-conserving surgery (BCS) from December 2014 to December 2015. This study evaluated the use of seroma cavity surgical clip placement after multidisciplinary discussion of its benefits, and its impact on RT planning and patient outcomes. All pathology was confirmed by needle biopsy, and systemic therapy was allowed. The primary end point was to establish an improved rate of seroma cavity delineation with clip placement, with a secondary end point to establish impact on RT boost treatment. RT planning was performed with 4D-CT simulation and Eclipse software (Ottawa, Ontario, Canada). IRB approval was obtained.

**Results:** 61 patients were included, with 63 total diagnoses of BC: 36 cases of invasive ductal carcinoma (57%), 6 of invasive lobular carcinoma (10%), and 21 of ductal carcinoma in situ (33%). Mean age was 59.6 years (range, 34–75 years). Mean whole-breast RT dose was 47.5 Gy (range, 25.2–50.4 Gy), and the mean boost dose was 7.1 Gy (range, 0–16 Gy). 20 patients received adjuvant chemotherapy, with 17 receiving it before RT; all regimens were anthracycline- and taxane-based. Surgical clips were placed in 45 patients (72%). From December 2014 to May 2015, 25 of 42 BC cases had clips (60%); and from June 2015 to December 2015, 20 of 21 BC cases had clips (95%). Of those with clips placed, 32 had boost RT performed (71%); of those 18 patients without clips, 5 did not receive a boost (28%).

**Conclusions:** The rate of seroma cavity clip placement in a military BC population improved after multidisciplinary discussion of its benefits, which was further reflected in improved rates of RT boost performed for those with clips versus those without. As boost therapy is well-documented to improve local control and survival outcomes, the enhanced clip placement and boost performance improved quality of patient care. Seroma cavity clip placement in patients with BC should be the standard of care in the military population.
AB2017-63. Harnessing the EMR to Improve Coordination of Care for Head and Neck Patients With Cancer: A Team Approach

Katrina V.B. Glaghorn M.S, RD, CSO, LDN; Audrey Caspar-Clark, BSN, RD, LDN, CSO; Margaret Rummel, MHA, OCN, NE-BC; and Tracy Lautenbach, MSW, LCSW, OSW-C* From *Abramson Cancer Center, and **Penn Medicine Radiation Oncology

**Background:** Treatment for head and neck cancer (HNC) is a complex process involving multidisciplinary modalities. Each treatment type requires a team of supportive services to ensure patients complete prescribed therapies. Many symptoms are associated with HNC treatment, and patients often present with challenging psychosocial issues that can impede treatment. Members of the Abramson Cancer Center and Penn Medicine Radiation Oncology recognized the importance of early identification and referrals, and developed processes to assist in coordinating care. **Methods:** The HNC nurse navigator (NN) assists patients in accessing and coordinating care, and serves as the patient contact. To assist the NN, a standardized order set accessible through the electronic medical record (EMR) was developed in collaboration with the multidisciplinary medical team. The order set includes all treatment modalities referred to during the treatment course. Another initiative was to standardize education materials, which are available in the EMR, across treatment sites to ensure consistency. Additional patient information is posted on the University of Pennsylvania Health System’s (UPHS’s) cancer Web site, OncoLink. Social work (SW) and nutrition screens were added to the XRT nursing assessment form, which is completed weekly during radiation treatment and identifies patients who need support services and prompt referrals. During radiation therapy weekly multidisciplinary tumor boards, new patients are presented and supportive care is identified before starting treatment. During radiation therapy weekly HNC team meetings attended by the NN and nursing, SW, and nutrition staff, patients undergoing treatment and those starting treatment are reviewed to identify potential problems. **Results:** Results of a quality improvement project found that patients with HNC whose care was managed by the NN were more likely to receive all of their care at UPHS, and that un-navigated patients who only had surgery at UPHS sought subsequent treatment locally. This resulted in a significant increase in downstream revenue. These referral processes have also improved patient care and communication among clinicians. **Conclusions:** Use of screens and order sets in the EMR, combined with interdisciplinary meetings, identify problems and trigger referrals, ensuring that patients’ medical and psychosocial needs are addressed. Timely referrals to support services along the continuum of care ensures that patients complete treatments as prescribed and receive appropriate follow-up care, thereby promoting cost-effective and quality patient care.

AB2017-64. Impact of Pharmacist Outreach and Intervention on Tyrosine Kinase Inhibitor Adherence and Compliance to Response Testing in Patients With Chronic Myeloid Leukemia

Yuqian Liu, PharmD; Sam Leo, PharmD; Haita Makanji, PharmD; Anne Kangethe, PharmD, MPH, PhD; and Steve Cutts, PharmD From Magellan Rx Management

**Background:** Patients with chronic myeloid leukemia (CML) can be maintained chronically via tyrosine kinase inhibitor (TKI) therapy, and adherence to therapy is important to reduce the risk of disease recurrence and progression. Current guidelines recommend routine polymerase chain reaction (PCR) testing every 3 months in most patients to monitor disease response. Prior studies have demonstrated that patients who receive at least 3–4 PCR tests per year have a lower risk of progression and have fewer inpatient admissions versus those who do not. Despite recommendations, testing and monitoring are significantly underused in the CML space, which may lead to worsened clinical outcomes. **Methods:** A pharmacist-led outreach program was developed to improve TKI adherence and PCR testing compliance in patients with CML within a regional health plan. Patients with a diagnosis code for CML being treated with dasatinib, imatinib, nilotinib, ponatinib, or bosutinib were identified using pharmacy and medical claims. As part of the program, pharmacists outreached to patients monthly and to providers every 3 months to discuss and resolve adherence barriers for both TKI therapy and PCR testing. Providers were sent quarterly reports summarizing their patients’ adherence to TKI therapy as measured by proportion of days covered (PDC) and PCR testing trends. Pharmacy and medical claims data were analyzed 1 year before and after program initiation to assess impact on PDC and PCR use. **Results:** Average TKI PDC increased from 82.95% to 84.75% in the baseline and intervention period, respectively. Increase in PDC was even more dramatic in patients who were maintained on the same TKI in both the baseline and the intervention period, with absolute PDC increases of 7.49%, 1.73%, 8.28%, and 7.74% in patients on dasatinib, imatinib, ponatinib, and nilotinib, respectively. Additionally, the proportion of patients meeting adherence target (PDC ≥85%) increased by 5.74%. The proportion of patients receiving ≥4 PCR tests per year increased by a relative difference of 22%. **Conclusions:** Overall TKI adherence, adherence to individual TKIs, and appropriate
AB2017-65. Evaluating the Impact of an Oncology Hospitalist Model of Inpatient Care on Unplanned 30-Day Readmissions Among Patients With Lung Cancer

Joanna Grace Mayo Manzano, MD; Heather Yan Lin, MD, PhD; Anne Park, MSMIS, MPH; Suyu Liu, PhD; and Josiah Halm, MD
From the University of Texas MD Anderson Cancer Center

Background: Readmission metrics have been used to assess safe transitions from the hospital setting. For patients with cancer, it can be associated with cancer outcomes and quality of life. Longer hospital days can lead to debility and interrupt cancer treatment. At MD Anderson Cancer Center, patients with active lung cancer are admitted by the oncologist. In August 2015, a shared model of inpatient care that assigned patients with lung cancer either to the oncology team or oncology hospitalist service was adopted to help the efficiency of inpatient care. We evaluated the impact of this model on 30-day unplanned readmissions. Methods: A quasi-experimental study design was used to compare baseline readmission rates for the oncology group and the oncology hospitalist group to postimplementation rates. Logistic regression model using generalized estimating equations was used to fit readmission data to take intrapatient correlation into account and compare 30-day unplanned readmission rates. Results: 2,610 hospitalizations (1,645 patients) were analyzed throughout the study period. The baseline readmission rate for patients with lung cancer was 20.7% after being discharged from the hospitalist service and 20.9% after being discharged from the oncology service (P=.650). After adopting the shared inpatient care model, the readmission rate was 27.5% for the hospitalist service and 24.6% for the oncology service (P=.089). No significant difference in readmission rates was seen within the hospitalist and oncology service from baseline period to postimplementation of the model (P≥.089). The readmission rate of hospitalized patients with lung cancer at baseline, regardless of discharging service, was 20.9% and after implementation of the model was 26.0% (P=.12). Conclusions: Our findings show that readmission rates did not differ significantly between discharging services both at baseline and after implementation of the oncology hospitalist shared inpatient care model. The increase in readmission rates over time was comparable for both services. Other factors must be considered when comparing rates, including types of patients that get assigned to each service. This study does support that adopting an oncology hospitalist model of inpatient care can produce comparable results with regard to readmissions. The next step would be to perform further analysis using adjusted rates, evaluate the cost impact of the model, and identify opportunities for practice improvement.

AB2017-66. Evaluation of Early Referral Patterns for Lymphedema Management Following Axillary Dissection in Patients With Breast Cancer

Mary K. Murray, MD, and Brenda Runion, PT, MEd, DPT
From Cleveland Clinic Akron General

Background: Breast cancer (BC) is the most prevalent cancer in women, but with continuing advances in treatment, it has the highest survival rate of all cancers. Current literature supports the need for timely intervention and early referral to physical rehabilitation services to reduce late-stage lymphedema. The purpose of this quality assurance project was to assess our compliance with survivorship interventions in early referral to physical therapy for women diagnosed with BC and who have undergone axillary lymph node dissections (ALNDs). Methods: Registry records of patients who underwent ALND at our institution by general surgeons on the teaching staff during an 11-month period were compared with records of similar patients 1 year later and after a physician education session presented by a physical therapist on early referral of patients with ALND. Only patients referred within the immediate postoperative period, as defined as the “global period” after surgery, were included. The compliance rate of early referral was compared before and after the education session. Results: During the pre-education period, a total of 24 patients were identified who were diagnosed with BC and underwent ALND. Of these, 19 patients (79%) were referred to physical therapy. Specifically, rates of compliance ranged from 0% to 100% for the surgeons who performed ALND. After the physician education session, for the same period, a total of 32 patients who were diagnosed with BC and underwent ALND for management were identified. Of these, 29 patients (91%) were referred to physical therapy. Despite the increased referral rate, rates of compliance still ranged from 0% to 100% for the surgeons who performed the ALND. Conclusions: Based on our findings, a quality improvement surveillance program that includes physician education improves lymphedema referral to rehabilitation services.
AB2017-67. Best of Both Worlds: Integrative and Consultative Survivorship Care in a Comprehensive Breast Center
Kathleen Rogers, BSN, CNP; Dori Klemanski BSN, DNP; Steve Kalister, MHA, MPH; Heidi Basinger, BSN; Julia Garrett, BSN, CNP; Denise Schimming, BSN, CNP; Felisha Lyons, MSW; and Maryam Lustberg, MD, MPH
From The Ohio State University Wexner Medical Center

Background: The National Accreditation Program for Breast Centers requires treatment summaries and survivorship care plans ( SCPs) for patients who have completed primary treatment with curative intent. This study describes how we implemented SCPs at the Stefanie Spielman Comprehensive Breast Center (SSCBC) using a hybrid model of integrative and consultative approaches to best meet survivor needs and increase access to survivorship care. Methods: A multidisciplinary group met to design and implement a survivorship program. Initially, advanced practice providers (APPs) from the primary oncology team provided survivorship visits as part of an integrative model. After 2 years, we added consultative survivorship visits with APPs outside of the primary team. Survivorship visits were supported by a centralized survivorship center with additional referral resources. Distress screening before survivorship visits helped identify appropriate referrals. Patients were also supported by a broad array of classes, support groups, and an annual survivorship conference. Data were collected from the Cancer Registry and the Information Warehouse.

Results: From fiscal years (FY) 2013–2016, 3,027 new patients with nonmetastatic breast cancer were treated at SSSCBC (stage 0: n=603; 19.9%, stage I: n=1,219; 40.3%, stage II: n=889; 29.4%, stage III: n=316; 10.4%). Median age was 50–59 years (range, 21–98 years). Due to staffing limitations and high-patient capacity and prioritizing relationships, patients with stage 0 disease are now receiving SCPs from APPs in surgical oncology. Conclusions: A hybrid model of integrative and consultative survivorship care significantly increased the number of patients who received SCPs. Given the varied needs of breast cancer survivors, it may be advantageous to use multiple care models to address their needs while meeting accreditation standards.

AB2017-68. Examination Clinic to Chemotherapy Care Coordination: Working as a Multidisciplinary Team to Create an Exceptional Patient Experience
Amanda Samijlenko, MBA, MPM, SSB, and Penny Moore, MSN, RN, OCN, NEA-BC
From The Ohio State University Wexner Medical Center

Background: The James Comprehensive Cancer Center’s ambulatory chemotherapy volume has continued to expand since the December 2014 move into our new hospital. We currently average 5,900 infusion visits per month (a 25% increase after the move), most of which (30%) occur on our ambulatory floor. This study aimed to determine how to develop and ultimately sustain a high level of commitment to our patients while maintaining our increase in infusion visits per day. Methods: Through the use of DMAIC (Define, Measure, Analyze, Improve, and Control) process improvement methodology, the infusion clinic worked within a multidisciplinary team to develop an enhanced way to provide robust communication between our examination and infusions areas. Results: By creating this focused-team approach, we have seen an approximate 7% increase in patient satisfaction scores. A steering committee was created in March 2016 and included members from pharmacy, patient access, and examination/chemotherapy nursing teams. Objectives of the steering committee were to ensure that chemotherapy staff were ready to receive patients and able to administer chemotherapy upon arrival, increase timely review of potential treatment complications to reduce safety concerns, and increase the number of patients being cleared for chemotherapy prior to their arrival in the infusion area. To facilitate these objectives, sub-teams were created to keep the project team focused and committed.

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<th>EMR Documentation</th>
<th>Accuracy/Signing of Orders</th>
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<td>April 2016</td>
<td>8</td>
<td>3</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>May 2016*</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>June 2016</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Totals</td>
<td>31</td>
<td>8</td>
<td>26</td>
<td>6</td>
</tr>
</tbody>
</table>

*When sub-team work commenced. All of the categories experienced a reduction except the miscellaneous category:
• Communication issues declined by 74%
• EMR documentation issues declined by 26%
• Accuracy/Signing of orders increased by 54%
focused on the deliverables within their areas of work. As opportunities were identified, work was prioritized within each area to keep focus on the critical areas that would have the greatest patient impact. Work began in May 2016; with focus on the established deliverables, data collection exercises were underway to validate the areas to focus attention. The chemotherapy nursing staff kept detailed records regarding delays to timely infusion (Table 1). In addition to data gathering, the process improvement specialist began observing the examination and infusion clinics to identify areas of waste.

Conclusions: We continue to monitor the data monthly with focused attention on key metrics. If these metrics fall outside of established thresholds, the project leadership team will be reconvened to determine appropriate actions and next steps.

AB2017-69. Metastatic Breast Cancer Quality Improvement: Preimplementation Data From the 4R in Oncology Project
Christine B. Weldon, MBA; Valerie M. Nelson, MD; Jennifer Stein, RN; Jonathan B. Strauss, MD, MBA; Eytan Szmulowicz, MD; Al B. Benson III, MD; Sarah Friedewald, MD; William J. Gradishar, MD; Melissa A. Simon, MD, MPH; and Julia R. Trosman, PhD, MBA
From Northwestern University Feinberg School of Medicine

Background: Comprehensive care for patients with metastatic breast cancer (MBC) is highly complex, requires multiple components (eg, cancer treatments, comorbidity care, supportive care, care coordination, family and caregiver support, other), and is delivered by multiple clinical specialties and organizations. Using the framework of the 4R oncology model in breast cancer care (Weldon et al, J Natl Compr Canc Netw 2016[AB2016-5]) and supported by a grant from NCCN/Pfizer, the current state of quality, appropriateness, and timeliness of delivery of comprehensive care for patients with MBC was assessed via clinical data.

Methods: Clinical data were abstracted for 35 patients with stage IV MBC at 2 sites to measure adherence to quality practices. We used simple frequencies in analysis. Results: Preimplementation data identified ≤50% adherence to 8 quality practices (Table 1). More than half of the patients (63%; 22/35) had a goal-of-care discussion documented, but only 29% (10/22) of the discussions were conducted within 60 days of diagnosis. Although “NCCN believes that the best management of any patient with cancer is in a clinical trial,” only 37% of patients had clinical trial options noted. This population averaged 4.14 emergency room visits. Sample size was limited to patients with sufficient history/timeline within the institution. No statistically significant correlations were found between quality practices. Conclusions: Current baseline data indicate opportunities for quality improvement in MBC care. The 4R model includes an extensive supportive oncology component (care goal/wishes definition, palliative care, distress management, symptom management, end-of-life care) based on patient’s wishes and preferences. Preimplementation clinical data (Table 1) allow for comparison to postimplementation data and may inform broader adoption of the 4R model to improve quality practice.

AB2017-70. Multidisciplinary Approach to Grading Infusion-Related Reactions in an Oncology Treatment Unit
Lauren Nicole Gallegos, BSN, RN, OCN; Angela Olier-Pino, DNP, MBA; Leonor Aquino-Perez, MSN, ARNP, AGNP-BC, AOCNP; Rohanmi Perez, BSN; and Gloria Campos, MSIE
From Sylvester Comprehensive Cancer Center

Background: Infusion-related reactions (IRRs) in chemotherapy/biotherapy infusion units are a unique and dangerous complication. Distinguishing IRRs from true allergies are vital to quality care and patient safety. Improper grading and management of the IRR may create a false sense of medication tolerance. Without proper management and clear communication across disciplines, subsequent exposures to the agent can result in serious harm, including loss of life.

Methods: A multidisciplinary team of physicians, nurses, pharmacy, and the information technology support department was convened. The team engaged major stakeholders, drafted a project charter, and conducted a Gemba walk and FMEA-based review of incidents reported. The need to develop a standardized reporting process was identified. A literature search was conducted and NCI recommendations were ex-

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**AB2017-69: Table 1. Rate of Adhering to Quality Practice-Pre-4R Implementation**

<table>
<thead>
<tr>
<th>Quality Practice</th>
<th>N=35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals of care discussion documented in medical records: NCCN PAL-27</td>
<td>63%</td>
</tr>
<tr>
<td>Clinical trial options discussed with patient: NCCN and ASCO recommendation</td>
<td>37%</td>
</tr>
<tr>
<td>Distress level documented for at least one encounter: NCCN DIS-3</td>
<td>43%</td>
</tr>
<tr>
<td>Nutrition consult: NCCN PAL-13</td>
<td>31%</td>
</tr>
<tr>
<td>Pain assessment documented: NCCN PAIN-2</td>
<td>51%</td>
</tr>
<tr>
<td>Dental health assessed: NCI 2009 - Oral Health, Cancer Care, and You</td>
<td>11%</td>
</tr>
<tr>
<td>Documentation of family cancer history: NCCN BR/OV-2</td>
<td>40%</td>
</tr>
<tr>
<td>Palliative referral (referral averaged 166 days after MBC diagnosis): NCCN PAL-6 &amp; -7</td>
<td>31%</td>
</tr>
</tbody>
</table>

Abbreviations: NCCN BR/OV; NCCN Clinical Practice Guidelines in Oncology: Genetic/Familial High-Risk Assessment: Breast and Ovarian; NCCN DIS, NCCN Clinical Practice Guidelines in Oncology: Distress Management; NCCN PAIN, NCCN Clinical Practice Guidelines in Oncology: Adult Cancer Pain; NCCN PAL, NCCN Clinical Practice Guidelines in Oncology: Palliative Care
amines to develop a flowsheet based on presented symptomatology using a user-friendly documentation tool tied to an evidence-based grading system within the electronic medical record (EMR). **Results:** A standardized, user-friendly documentation tool and IRR grading system within the EMR was proposed. The tool will present as a post-IRR flowsheet based on patient symptomatology. Flowsheet responses trigger a suggested IRR grade based on NCI recommendations. At the next physician encounter, the suggested grade will be reviewed and validated. The causative agent and grade will appear as an IRR subset of the allergy flag. Transparency of the event allows for the inter-disciplinary team to work together and determine any additional measures needed for future exposures. **Conclusions:** Development of an IRR documentation tool and grading system integrated into the EMR has the potential to improve communication among the healthcare team and identify patient safety risks in order to improve overall patient outcomes.

**AB2017-71. The Consumer Assessment of Healthcare Providers and Systems Cancer Care Survey: Administration and Sampling Recommendations**

Kathleen J. Yost, PhD; Christian Eversen, MS; Sarah Jenkins, MS; Sue Visscher, PhD; Timothy Beebe, PhD; San Keller, PhD; and Steven Garfinkel, PhD

*From* Mayo Clinic, *American Institutes for Research*, and *University of Minnesota*

**Background:** The Consumer Assessment of Healthcare Providers and Systems (CAHPS) Cancer Care Survey is the latest addition to the CAHPS family of surveys. It was developed and validated using standard CAHPS methodology and assessed in 2 field tests. This study focused on the recommended survey administration protocols and standardized sampling methodology.

**Methods:** The first field test involved 6 collaborating sites, 3 of which were Comprehensive Cancer Centers. Modes of administration assessed included postal mail with telephone reminders (2 postal mail and 3 telephone contact attempts) and telephone only (6 contact attempts). The second field test involved 4 community-based cancer centers, with administration by postal mail only (2 contact attempts) and e-mail/postal mail mixed-mode (3 e-mail and 2 postal mail contact attempts). We calculated the response rate (RR) in the postal mail–only mode for 6- and 10-week fielding periods. We developed a standardized sampling methodology based on ICD diagnosis and procedure codes, and tested it in the second field test. **Results:** In the first field test, the RR for postal mail with telephone reminders was 50.6% and for telephone-only it was 34.3%. The RR for postal mail–only administration in the second field test was 44.9% at 6 weeks, increasing to 50.1% at 10 weeks. The RR was 52.9% for e-mail/postal mail mixed-mode survey administration. A mode effect analysis in the second field test indicated that data collected by e-mail and postal mail can be evaluated and reported together without first adjusting for mode of administration. The standardized sampling approach based on ICD diagnosis and procedure codes was feasible to implement across diverse collaborating sites in the second field test. **Conclusions:** A postal mail–only protocol is supported. The duration in the field depends on the time needed to achieve the target RR for CAHPS surveys of at least 40%, but between 6 and 10 weeks will likely be sufficient for most cancer centers. Although we did not test a mail with telephone follow-up mixed-mode protocol, sufficient evidence from other CAHPS surveys supports it as a viable option for this survey as well. An e-mail/postal mail mixed-mode protocol with multiple contacts per mode is supported as a feasible approach to collecting CAHPS Cancer Care Survey data. Based on data from the first field test, a telephone-only protocol does not appear to be sufficient to yield an RR of at least 40% for this survey. Postal mail with telephone reminder is not a standard CAHPS protocol and is therefore not recommended.

**Outcomes and Health Services Research**

**AB2017-72. Real-World Adherence, Treatment Patterns, and Outcomes in Patients With Multiple Myeloma Initially Treated With Lenalidomide + Bortezomib + Dexamethasone**

Chi-Chang Chen, PhD, MS Pharm,a Kejal Parikh, BPharm,a,b Safiya Abouzaid, PharmD, MPH,a,c Catherine B. McGuiness, MA,a,b; Ali McBride, PharmD,a,b Faiza Zafar, MPH,a,b and Rolin Wade, RPh, MS,c

*From* QuintilesIMS Real-World Evidence Solutions, *Celgene Corporation*, and *The University of Arizona Cancer Center*

**Background:** Adherence to treatment for multiple myeloma (MM) may impact outcomes. Real-world evidence regarding MM treatment adherence is sparse, and there are no published assessments of adherence to lenalidomide (R) + bortezomib (V) + dexamethasone (d) (RVd). This study aimed to assess treatment adherence, patterns, and outcomes in patients with MM initially treated with RVd. **Methods:** US claims data from PharMetrics Plus (Quintiles IMS, Plymouth Meeting, PA) was used to identify patients with ≥2 MM diagnoses (ICD-9 code 203.0x) who initiated RVd (R + V ± d; index date) between January 1, 2009, and September 30, 2014. Patients were followed for ≥12 months postindex and grouped according to observed treatment patterns: RVd throughout the initial line of therapy (LoT; RVd); RVd followed by R monotherapy (RVd-r); or RVd followed by V or steroid monotherapy (RVd-other). LoT progression was defined as the ad-
dition of or switch to a new agent >60 days from the index date or treatment restart after a treatment gap of >180 days. Nonpersistence was defined as >45-day gap in treatment before treatment progression. Patients were considered to be adherent in each consecutive month with claims for ≥21 units of R and ≥4 units of V (the US dosing guideline for a 21-day cycle). Only patients with ≥3 RVd cycles were included for analysis. Time to next treatment (TTNT) was measured from index date to start of the next LoT. Results: Among 194 identified patients, RVd (n=88; 45.4%) and RVd-r (n=79; 40.7%) were the most common treatments, followed by RVd-other (n=27; 13.9%). Mean (SD) age was 60.2 (8.6) years, and 56.7% of the sample was male. The mean (SD) duration of treatment for all patients was 17.6 (13.0) months. Initial treatment was shorter in patients on RVd (9.2 months; SD, 8.4) versus RVd-r (25.2 months; SD, 12.5). The mean (SD) number of adherent months was 6.5 (2.9) (RVd, 6.8 [3.4]; RVd-r, 6.3 [2.5]), and the mean (SD) number of persistent months was 10.7 (10.6) (RVd, 7.6 [5.7]; RVd-r, 12.8 [16.7]). Treatment progression was seen in 66 patients (34.0%) and the rate was higher in patients on RVd (54.5%) versus those on RVd-r (16.5%). Among those with treatment progression, mean (SD) months from nonpersistence with index treatment and the next LoT was longer in those on RVd-r versus RVd (12.7 [12.9] vs 3.1 [5.0]), although TTNT was longer in the RVd-r group versus the RVd group (23.9 vs 9.5 months; P<.0001). Conclusions: The most common treatment patterns seen were RVd throughout the initial LoT or RVd followed by R monotherapy; both treatment patterns had similar duration of initial RVd treatment. Patients treated with RVd alone progressed to the next LoT faster than those on RVd followed by R monotherapy.

AB2017-74. Phototherapy Use Patterns and Costs Among Patients With Mycosis Fungoides Cutaneous T-Cell Lymphoma: A Retrospective Database Study in a Commercially Insured US Population

Tao Gu, PhD; Yuen Tsang, PharmD, MPH; Gaurav Sharma, PharmD; Marjan Sepassi, PharmD; Hiangkiet Tan, BPharm, MS; and William Drake III, PharmD

From *HealthCore Inc.* and *Actelion Pharmaceuticals Ltd.*

**Background:** Cutaneous T-cell lymphoma (CTCL) is a group of lymphoproliferative disorders characterized by neoplastic T lymphocytes in the skin, with mycosis fungoides (MF) as the most frequent subtype. Prior research has indicated that phototherapy is effective in the treatment of MF-CTCL. However, the financial
Highlights of the NCCN 22nd Annual Conference

AB2017-75: Development of an Algorithm to Identify Women With Ductal Carcinoma In Situ From Medicare Data

Sandra Hatch, MD\textsuperscript{a}; Jacqueline M. Hirth, PhD, MPH\textsuperscript{b}; Yu-Lin Lin, MS\textsuperscript{b}; Sharon H. Giordano, MD, MPH\textsuperscript{b}; H. Colleen Silva, MD\textsuperscript{b}; and Yong-Fang Kuo, PhD\textsuperscript{b}

From \textsuperscript{a}The University of Texas MD Anderson Cancer Center, \textsuperscript{b}University of Texas Medical Branch, and \textsuperscript{c}University of Texas MD Anderson Cancer Center

Background: Diagnoses of ductal carcinoma in situ (DCIS) are difficult to identify from billing claims data sets, because providers may cross-code DCIS with breast cancer (BC) codes. The objective of this study was to develop and validate an algorithm that can differentiate primary DCIS cases from BC cases with a high positive predictive value (PPV).

Methods: We identified primary BC and DCIS cases among women aged 66–70 years diagnosed between 2004 and 2011 using linked data from the Texas Cancer Registry (TCR) and Medicare billing claims data. TCR records were used as “gold standards,” and the sensitivity, specificity, and PPV of various algorithms were evaluated. Women were included if they had undergone a biopsy, were enrolled in Medicare Parts A and B 12 months before and 3 months after first biopsy, and did not have a documented second diagnosis of DCIS or BC within 12 months in TCR. Results: In the TCR data set, there were 6,999 cases that met inclusion criteria. Of those, 1,252 were DCIS cases. We adopted a 5-step algorithm to differentiate DCIS cases from BC cases. Sensitivity, specificity, and PPV at each step were compared, while also comparing them with claims data at different time frames. The proposed algorithm has a sensitivity of 60%, specificity of 96%, and PPV of 77%.

Conclusions: Coding DCIS as BC in billing claims records was common, and thus our sensitivity was low. This algorithm, which is the first developed for this purpose, will be important in developing future research using billing claims records to differentiate DCIS from BC. It will be particularly useful for studies on quality of care for patients with DCIS using administrative claims data.

AB2017-76: Treatment Disruption of First-Line Endocrine and Chemotherapy Among Postmenopausal Women With Hormone Receptor–Positive/HER2-Negative Metastatic Breast Cancer

Nanxin Li, PhD\textsuperscript{a}; Ella X. Du, MSc\textsuperscript{a}; Miranda Peeples\textsuperscript{a}; Lihao Chu, PhD\textsuperscript{b}; Jipan Xie, MD, PhD\textsuperscript{b}; Victoria Barghout, MSPH\textsuperscript{b}; and Derek H. Tang, PhD\textsuperscript{b}

From \textsuperscript{a}Analysis Group Inc., \textsuperscript{b}VEB HealthCare LLC, and \textsuperscript{c}Novartis Pharmaceuticals Corporation

Background: Real-world treatment disruption may be an indicator of compromised treatment effectiveness and adds uncertainties against accurate prediction of patient outcomes based on clinical trial results. This study aimed to assess treatment disruption of first-line endocrine therapy (ET) or chemotherapy initiated after the approval of the first CDK 4/6 inhibitor, palbociclib, among postmenopausal US women with hormone receptor–positive (HR+)/HER2–negative (HER2–) metastatic breast cancer (MBC).

Methods: Postmenopausal women with HR+/HER2– MBC who initiated first-line endocrine or chemotherapy were included if they had a diagnosis of MBC between January 1, 2006, and September 30, 2015. The study defined disruption as a gap in consecutive ET or chemotherapy treatments of ≤60 days. Results: In the 12-month follow-up period, the mean number of phototherapy treatment courses was 181 days and 40 sessions, respectively. Average cost of the first phototherapy course was $4,841. Of that amount, insurer expenditures were $4,099 (84.7%) and patient out-of-pocket expenditures were $742 (15.3%). Approximately 33% of patients had >1 phototherapy course during the 12-month follow-up period. Conclusions: Although insurers bear most of the phototherapy costs, patients can still be faced with considerable out-of-pocket costs in terms of coinsurance and copay. Furthermore, this study observed frequent office visits related to phototherapy, which may result in indirect costs from loss of work earnings and travel. However, the extent of the indirect cost needs to be further studied and quantified.

AB2017-76: Table 1. Treatment Discontinuation Rate

<table>
<thead>
<tr>
<th>Month Since Index Date</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endocrine therapy</td>
<td>21.3%</td>
<td>31.8%</td>
<td>37.7%</td>
<td>41.4%</td>
<td>42.8%</td>
<td>42.9%</td>
</tr>
<tr>
<td>Chemotherapy</td>
<td>48.6%</td>
<td>78.6%</td>
<td>86.1%</td>
<td>89.3%</td>
<td>91.3%</td>
<td>91.1%</td>
</tr>
</tbody>
</table>
AB2017-77. Patient and Oncologist Preferences for Attributes of Drug Therapy in Advanced Melanoma: A Discrete Choice Experiment
Frank Xiaoqing Liu, PhD; Edward A. Witt, PhD; Scott W. Ebbinghaus, MD; Grace DiBonaventura Beyer, MBA; Enrique Basurto, MSc; and Richard W. Joseph, MD
From *Merck & Co., Inc., *Kantar Health, and ‘Mayo Clinic Cancer Center

Background: Multiple treatment options exist for patients with advanced melanoma. Understanding patient and oncologist preferences for treatment alternatives can improve clinical decision-making. This study aimed to elicit and compare patient and oncologist preferences for drug treatments in advanced melanoma.

Methods: A discrete choice experiment (DCE) was conducted among patients with advanced melanoma and their oncologists. Qualitative pilot testing was used to inform the DCE design. A series of scenarios asked stakeholders to choose between 2 hypothetical medications, each with 7 attributes: mode of administration (MoA), dosing schedule, median duration of therapy (DoT), objective response rate (ORR), progression-free survival (PFS), overall survival (OS), and grade 3/4 adverse events (AEs). Each attribute had 3 levels except dosing schedule (8 levels). D-efficient algorithms were used to ensure that a sufficient number of respondents were allocated evenly across orthogonal combinations of attributes and levels, and hierarchical Bayesian logistic regression models with effects coding parameterization were used to estimate preference weights for each attribute. Analysis of variance models and independent t-tests were used to compare relative importance between patients and oncologists.

Results: 200 patients and 226 oncologists completed the study. Based on the DCE, OS was most important to patients (33%), followed by AEs (29%), ORR (25%), PFS (12%), dosing schedule (1.5%), DoT (0.1%), and MoA (0%). An improvement from 45% to 55% in 1-year OS was valued similar in magnitude to a 22% decrease (from 32% to 10%) in likelihood of AEs. For oncologists, AEs were the most important attribute (49%), followed by OS (34%), ORR (12%), PFS (3%), dosing schedule (2%), and the rest (0%). An improvement from 55% to 75% in 1-year OS was valued similar in magnitude to a 23% decrease (from 55% to 32%) in likelihood of AEs. In comparison, patients and oncologists differed significantly on the importance of ORR, AEs, and PFS, but consistent in OS and the remaining attributes.

Conclusions: Patients with advanced melanoma valued OS, AEs, and ORR, sequentially, as the most important treatment attributes in making a treatment decision, although oncologists valued AEs most, followed by OS and ORR. For both stakeholders, PFS, dosing schedule, DoT, and MoA were relatively less important.

AB2017-78. Radiographic Imaging Among Patients With Metastatic Lung Cancer During First EGFR TKI Treatment
Margaret McCusker, MD, MS; Mindy Cheng, MS, PhD; Yuan-Chi (Daisy) Lee, MSc; I-Ning Cheng, MS; Frank A. Corvino, PhD; Nengjun Zhao; and Sid Scudder, MD
From *Diagnostics Information Solutions, Roche Molecular Systems; Medical Outcomes Reimbursement & Economics, Roche Molecular Systems; Real-World Data Science, Genentech, Inc.; Genesis Research; and Medical and Scientific Affairs, Roche Molecular Systems

Background: Most patients with advanced non–small cell lung cancer (NSCLC) with sensitizing EGFR mutations who are treated with EGFR tyrosine kinase inhibitors (TKIs) will eventually develop resistance and stop responding to treatment. Therefore, response assessment is an important component of treatment. The 2016 NCCN Guidelines for NSCLC recommended evaluation with a CT scan after 1–2 cycles for all patients on first-line systemic therapy, and additional as-
Assessment every 2–4 cycles thereafter. The objective of this analysis was to ascertain radiographic imaging test use in patients with metastatic lung cancer (mLC) during their first EGFR TKI treatment. Methods: Adult patients newly diagnosed with mLC based on ICD-9-CM diagnostic codes and a first EGFR TKI utilization claim between January 1, 2010, and December 31, 2014, were identified in the Truven MarketScan Commercial and Medicare Supplemental healthcare claims databases (Ann Arbor, MI). Imaging test use consistent with tumor monitoring was ascertained from the index date of first EGFR TKI claim through end of first EGFR TKI treatment, loss to follow-up, or study end date (September 30, 2015), whichever occurred first. Kaplan-Meier analysis was performed to calculate median first EGFR TKI treatment duration with 95% CIs. Results: Among 871 patients with mLC and treated with EGFR TKI, the median age at index date was 67 years and 62% were women. Median first EGFR TKI treatment duration was 6.5 months (95% CI, 5.9–7.7 months). During treatment, 73% of patients received >1 imaging test within 60 days of the postindex date, and 47% received a CT scan. Imaging test use occurred at a rate of 1.6 tests per patient per month during treatment. Table 1 shows details by test type. Conclusions: During the first EGFR TKI treatment, approximately all patients with mLC received ≥1 imaging test. CT use was lower than expected based on NCCN Guidelines. These results provide insights into real-world imaging test use patterns for this patient population.

AB2017-78: Table 1. Imaging Test Use among patients With mLC With ≥1 Test During First EGFR TKI Treatment

<table>
<thead>
<tr>
<th>Test Type</th>
<th>N (%)</th>
<th>Mean Tests Per Patient (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT</td>
<td>654 (75.1)</td>
<td>3.3 (2.9)</td>
</tr>
<tr>
<td>MRI</td>
<td>393 (45.1)</td>
<td>2.7 (2.6)</td>
</tr>
<tr>
<td>PET</td>
<td>249 (28.6)</td>
<td>2.0 (1.4)</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>203 (23.3)</td>
<td>1.6 (1.0)</td>
</tr>
<tr>
<td>X-ray</td>
<td>540 (62.0)</td>
<td>3.8 (3.8)</td>
</tr>
<tr>
<td>Total (all tests)</td>
<td>787 (90.4)</td>
<td>7.7 (7.2)</td>
</tr>
</tbody>
</table>

AB2017-79: Table 1. Patient Characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Sample Size (N=125)</th>
</tr>
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<tbody>
<tr>
<td>Age, y</td>
<td></td>
</tr>
<tr>
<td>0–30</td>
<td>4%</td>
</tr>
<tr>
<td>31–40</td>
<td>20.8%</td>
</tr>
<tr>
<td>41–50</td>
<td>34.4%</td>
</tr>
<tr>
<td>51–60</td>
<td>21.6%</td>
</tr>
<tr>
<td>&gt;60</td>
<td>19.2%</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>76.8%</td>
</tr>
<tr>
<td>Male</td>
<td>23.2%</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
</tr>
<tr>
<td>Laborer</td>
<td>9.6%</td>
</tr>
<tr>
<td>Housewife</td>
<td>69.6%</td>
</tr>
<tr>
<td>Farmer</td>
<td>16%</td>
</tr>
<tr>
<td>Other</td>
<td>4.8%</td>
</tr>
<tr>
<td>Cancer type</td>
<td></td>
</tr>
<tr>
<td>Gut</td>
<td>42.4%</td>
</tr>
<tr>
<td>Breast</td>
<td>24.8%</td>
</tr>
<tr>
<td>Head, neck, and thorax</td>
<td>20%</td>
</tr>
<tr>
<td>Blood and connective tissue</td>
<td>8.8%</td>
</tr>
<tr>
<td>Unknown primary</td>
<td>4%</td>
</tr>
</tbody>
</table>
interference in QOL among different groups. **Conclusions:** CT alone or combined with RT and surgery causes significant gastrointestinal and affective symptoms in non-gastrointestinal cancers, but contrary to general belief, it has no significant effect on general symptoms or interference in QOL. Further study with large numbers of patients in each treatment group is required to substantiate these findings.

**AB2017-80. Real-World Healthcare Costs Among Patients With Newly Diagnosed Multiple Myeloma in the US Veteran Population**

Shivani Pandya, MS; Safiya Abouzaid, PharmD, MPH; Lin Xie, MA, MA; Kejal Parikh, BPharm, MS; Onur Baser, MS, PhD*; and Manali I. Patel, MD, MPH, MS

*From *STATinMED Research (Plano, TX), *Celgene Corporation, *STATinMED Research (Ann Arbor, MI) *Columbia University, *STATinMED Research (New York, NY), and *Stanford University School of Medicine

**Background:** This study assessed healthcare costs among patients with newly diagnosed multiple myeloma (MM) without stem cell transplant in the US Veteran Health Administration (VHA) population (fiscal year [FY], 2011–2015). **Methods:** Adult patients with ≥2 claims for MM (ICD-9-CM: 203.0x) 30 days apart and ≥1 treatment from October 1, 2011 to March 31, 2015 were identified from the VHA data set. Regimens were defined as all treatments prescribed within 60 days of the initial course of therapy (COT1) (index date). This study included patients with 12 months pre-index and ≥6 months post-index continuous enrollment unless patients died <6 months into the follow-up period, had ≥1 full cycle of therapy with a valid COT1, and had no evidence of prior MM diagnosis or treatment. Time to next treatment (TTNT) was the duration from COT1 initiation plus any gaps before the earliest addition of a new drug or switch in treatment >60 days post-index date, restart of a previous treatment after a >180-day gap, or dose increase from maintenance to relapse therapy. Healthcare costs per patient per month (PPPM), estimated by fitting a generalized linear model (GLM) during the 12-month follow-up period, were compared among patients initiating lenalidomide (R) or bortezomib (V) with dexamethasone (d) (Rd or Vd) as COT1. **Results:** Of 1,183 patients, 26.5% initiated Rd and 17.2% initiated Vd as COT1. Patients treated with Rd were older and less likely to have comorbidities than those treated with Vd, and had a longer duration in COT1 (10.9 vs 7.0 months; P<.0001) and TTNT (12.8 vs 9.3 months; P=.005). Results from GLM analysis suggested that although MM oral pharmacy (Rx), overall Rx, and total costs were significantly higher among patients treated with Rd, outpatient, MM intravenous (IV) and chemotherapy, other Rx, and medical costs were significantly lower (Table 1). **Conclusions:** Patients treated with Rd had longer treatment duration and TTNT, and although they incurred higher total costs, medical costs were significantly lower, leading to a reduced difference in total costs compared with patients treated with Vd.

**AB2017-81. Prostate-Specific Antigen Progression in Patients Treated With Abiraterone Acetate Plus Prednisone or Placebo Plus Prednisone and Correlation With Overall Survival: An Exploratory Post Hoc Analysis of COU-AA-302 Trial Data**

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**Background:** Although men with metastatic castration-resistant prostate cancer (mCRPC) have a poor prognosis, treatment options for mCRPC have expanded in recent years. Notably, abiraterone acetate plus prednisone (AA) prolongs overall survival (OS) in men with mCRPC. However, identifying men early after treatment who are likely to have good or bad outcomes remains challenging. We hypothesized that PSA changes after enrollment may be associated with long-term outcomes such as OS. We identified prostate-specific antigen (PSA) progression patterns for men in the COU-AA-302 trial, correlated these PSA trends over time with OS, and also identified pretreatment predictors of favorable PSA trends among men treated with AA. **Methods:** Data from both treatment arms of the final analysis of the COU-AA-302 trial were used, restricted to men with ≥6 months of follow-up. Log-transformed PSA values over the first 6 months post-randomization (3 visits) were used in...
Background: The prognosis for men with metastatic castration-resistant prostate cancer (mCRPC) and visceral metastases is generally poorer compared with those without visceral metastases. The 2 oral mCRPC therapies, abiraterone acetate plus prednisone (AA+P) and enzalutamide (ENZ), have been shown to improve overall survival in this more severe population. However, dose reductions and refill gaps may be associated with lower drug effectiveness. This study assessed refill gaps and dose reduction events in patients with mCRPC with visceral metastases treated with AA+P or ENZ. Methods: The MarketScan databases (March 2012–October 2015) were used to conduct a retrospective analysis. Patients initiated on AA+P or ENZ (index date) after September 2012 with ≥6 months of continuous eligibility before the index date (baseline period) who had ≥1 diagnosis for prostate cancer and ≥1 diagnosis for visceral metastases during the baseline period were included. Inverse probability of treatment weighting (IPTW) was used to adjust for observed baseline confounders between groups. Weighted Kaplan-Meier rates and Cox proportional hazard models were used to compare the occurrence of refill gaps (≥14, ≥30, or ≥60 days) or dose reductions (ie, relative dose intensity [RDI] of ≤80% and ≤85%) between groups. RDI was calculated as the ratio of the delivered dose intensity (total delivered dose divided by the period over which the total dose was measured) to the standard dose intensity as recommended in the package insert for AA+P or ENZ.

Results: A total of 2,540 patients treated with AA+P and 1,265 treated with ENZ were identified, of which 236 (9.3%) and 111 (8.8%) had baseline visceral metastases, respectively. IPTW resulted in balanced baseline demographic, comorbidities, and disease characteristics. At 12 months post-index, patients initiated on AA+P were less likely to have an RDI of ≤80% or ≤85% or to have a refill gap of ≥14, ≥30, or ≥60 days compared with patients initiated on ENZ (Table 1). Conclusions: This study showed that patients with mCRPC with visceral metastases treated with AA+P were less likely to experience a refill gap and to reduce their treatment dose than patients treated with ENZ.

AB2017-82. Refill Gaps and Dose Reductions in Patients With Prostate Cancer and Visceral Metastases Treated With Abiraterone Acetate Plus Prednisone or Enzalutamide
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From "Analysis Group, Inc., and "Janssen Scientific Affairs, LLC

Background: The prognosis for men with metastatic castration-resistant prostate cancer (mCRPC) and visceral metastases is generally poorer compared with those without visceral metastases. The 2 oral mCRPC therapies, abiraterone acetate plus prednisone (AA+P) and enzalutamide (ENZ), have been shown to improve overall survival in this more severe population. However, dose reductions and refill gaps may be associated with lower drug effectiveness. This study assessed refill gaps and dose reduction events in patients with mCRPC with visceral metastases treated with AA+P or ENZ. Methods: The MarketScan databases (March 2012–October 2015) were used to conduct a retrospective analysis. Patients initiated on AA+P or ENZ (index date) after September 2012 with ≥6 months of continuous eligibility before the index date (baseline period) who had ≥1 diagnosis for prostate cancer and ≥1 diagnosis for visceral metastases during the baseline period were included. Inverse probability of treatment weighting (IPTW) was used to adjust for observed baseline confounders between groups. Weighted Kaplan-Meier rates and Cox proportional hazard models were used to compare the occurrence of refill gaps (≥14, ≥30, or ≥60 days) or dose reductions (ie, relative dose intensity [RDI] of ≤80% and ≤85%) between groups. RDI was calculated as the ratio of the delivered dose intensity (total delivered dose divided by the period over which the total dose was measured) to the standard dose intensity as recommended in the package insert for AA+P or ENZ.

Results: A total of 2,540 patients treated with AA+P and 1,265 treated with ENZ were identified, of which 236 (9.3%) and 111 (8.8%) had baseline visceral metastases, respectively. IPTW resulted in balanced baseline demographic, comorbidities, and disease characteristics. At 12 months post-index, patients initiated on AA+P were less likely to have an RDI of ≤80% or ≤85% or to have a refill gap of ≥14, ≥30, or ≥60 days compared with patients initiated on ENZ (Table 1). Conclusions: This study showed that patients with mCRPC with visceral metastases treated with AA+P were less likely to experience a refill gap and to reduce their treatment dose than patients treated with ENZ.
ET combined with targeted therapy (ET+TT), on QoL of women with hormone receptor–positive (HR+)/HER2– aBC through a systematic literature review (SLR). Methods: An SLR was conducted to identify randomized controlled trials (RCTs) meeting the following criteria: (1) included ET mono or ET+TT, (2) reported QoL outcomes, (3) focused on women with HR+/HER2– aBC and (4) published in 2007 or later (the era of standardized HER2 testing). The search databases included Medline, EMBASE, Cochrane Library, and key conference proceedings from 2013 to 2016. QoL outcomes for ET mono, ET+TT, and comparisons between the two were summarized from the identified trials by line of therapy, with the primary QoL outcomes being the ones representing general health (GH). Results: A total of 10 studies (representing 5 RCTs) were identified in the SLR. The study populations included first-line (n=4) and aromatase inhibitor (AI)–failure settings (n=6). The QoL instruments used were EORTC QLQ-C30 or BR23, brief pain inventory, and FACT-B, as well as certain domains in these instruments. Time to deterioration (TTD) in QoL GH was analyzed in 5 studies and 3 RCTs, with variation in definition. Across the settings, the studies consistently found that QoL GH maintained or deteriorated slightly on these treatments during the trial period. Treatments evaluated in the first-line setting included anastrozole (ANA), everolimus + exemestane (EVE+EXE), EXE, fulvestrant (FUL), letrozole (LET), and palbociclib (PAL) + LET. Reported median TTD in QoL GH was similar between ET mono and ET+TT (7.2–13.8 months in ET mono; 11.1 months in ET+TT). Treatments evaluated in the AI-failure setting included EVE+EXE, EXE, FUL, and PAL+FUL. Reported median TTD in QoL GH ranged from 5.6 to 8.4 months in ET mono and 8.3 to 11.7 months in ET+TT. Despite the variation in QoL measures, ET+TT showed significantly longer TTD versus ET mono in GH and several domain-specific QoL measures. Conclusions: ET+TT users experience similar QoL in the first-line setting and better QoL in the AI-failure setting relative to patients on ET mono. New therapies improving overall and/or domain-specific QoL relative to current options in the first-line setting may provide increased value to patients.

AB2017-84. Characteristics of Patients Treated With Fulvestrant as First Hormonal Therapy for Metastatic Breast Cancer in a Real-World Setting
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Supported by AstraZeneca.

Background: Fulvestrant is a selective estrogen receptor degader approved for the treatment of postmenopausal women with estrogen-receptor–positive, locally advanced or metastatic breast cancer (MBC) with progression following antiestrogen therapy. First-line (L1) treatment with fulvestrant showed superiority in progression-free survival compared with anastrozole in the phase III FALCON study, but real-world data are lacking. The objective of this study was to describe the characteristics of patients receiving fulvestrant in the L1 or second-line (L2) setting following MBC diagnosis. Methods: This was a retrospective medical record review from 10 US community oncology practices for women diagnosed with MBC and treated with fulvestrant as the first hormonal therapy (HT) in the metastatic setting, administered as L1 or L2 treatment following L1 chemotherapy. Fulvestrant was initiated between January 1, 2011, and December 31, 2015. Independent samples t test and Fisher exact test were conducted to evaluate differences between fulvestrant monotherapy (mono) and combination therapy (combo; fulvestrant and other agent) groups. Results: The study included 178 patients; the mean age was 65.4 (SD, 11.4) years, 80.9% were Caucasian, 14.7% were African American, 71.9% were postmenopausal, and 86.0% were HER2–. At MBC diagnosis, 11.2% had visceral metastasis, 58.4% had nonvisceral, and 30.3% had both. A total of 138 (77.5%) patients received adjuvant HT (62.3% early relapse during or ≤12 months of adjuvant HT completion; 37.7% late relapse >12 months), 11 (6.2%) had no adjuvant HT, and 29 (16.3%) were de novo. A total of 87.1% patients received fulvestrant in L1 (12.9% in L2 following chemotherapy as L1). Nearly all (91.6%) patients received a 500-mg dose of fulvestrant. Overall, 121 patients (68.0%) received fulvestrant mono and 57 patients (32.0%) received combo. Most combo patients (70.2%) received fulvestrant with an aromatase inhibitor, 10.5% with palbociclib, 15.8% with other chemotherapy, and 3.5% with HT. Age, race, stage of diagnosis, and sites of distant metastasis did not differ between mono and combo patients. Mono patients may be more likely to experience early relapse (P=.054). Combo patients were more likely to have diabetes (P=.024) and impaired performance status (P=.013). Conclusions: The results suggest that characteristics among patients treated with fulvestrant mono and combo therapy were largely similar. Further planned analysis for this real-world sample will evaluate differences between mono and combo therapy in effectiveness outcomes and healthcare resource utilization.
AB2017-85. Total Healthcare Costs and Treatment Patterns Among Patients With Metastatic Pancreatic Cancer Initiating First-Line on Nab-Paclitaxel/Gemcitabine or FOLFIRINOX
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**Background:** The economic burden of metastatic pancreatic cancer (MPC) is substantial, whereas treatment options are limited. This study aimed to compare total healthcare costs (including all pharmacy, inpatient, and outpatient services paid by the insurer) and treatment patterns in patients with MPC who initiated nab-paclitaxel/gemcitabine (nab-P+G) or FOLFIRINOX (FFX) in a large insured US population.

**Methods:** A retrospective study was conducted using the Clinformatics Data Mart Database. Adults who had ≥2 claims for pancreatic cancer, ≥1 claim with a secondary malignancy, completed ≥1 cycle of nab-P+G or FFX as first line (1L) between January 1, 2013 and December 31, 2015, and had continuous enrollment in health plans (Medicare or private/commercial health plan) for ≥6 months before and 3 months after the start of 1L were selected. Total healthcare costs and MPC-related treatment costs were measured per patient per month (PPPM) during 1L. Kaplan-Meier method was used to calculate median time to treatment discontinuation (TTD).

**Results:** A total of 216 patients with MPC met selection criteria (nab-P+G, n=139; FFX, n=77). Patients on nab-P+G were significantly older (mean age, 67.6 vs 61.4 years; P<.001) and more were enrolled in a Medicare plan (64.0% vs 41.6%; P=.0014) than those treated with FFX.

Compared with FFX, patients treated with nab-P+G incurred similar total healthcare costs, a trend which was also noted in both commercial and Medicare patient populations. There was no significant difference in median TTD of 1L (3.52 vs 3.45 months; adjusted P=.9663) between nab-P+G and FFX. No significant difference was seen in either commercial (3.50 vs 3.45 months; P=.654) or Medicare (3.55 vs 3.37 months; P=.4885) populations.

**Conclusions:** Patients treated with nab-P+G illustrated similar total healthcare costs and comparable TTD to patients on 1L FFX.

| AB2017-85: Table 1. Mean Healthcare and MPC-Related Treatment Costs During 1L (PPPM) |
|-----------------|-----------------|-----------------|
|                  | nab-P+G         | FFX             | P Value |
| Total healthcare, n | 139             | 77              |         |
| Total healthcare, $USD | $17,394         | $17,737         | .6028   |
| Commercial health plan, n | 50              | 45              |         |
| Commercial health plan, $USD | $19,339         | $19,372         | .9932   |
| Medicare, n     | 89              | 32              |         |
| Medicare, $USD  | $16,302         | $15,502         | .5533   |

AB2017-86. Supporting Adolescents and Young Adults With Cancer: Oncology Provider Perceptions of Unmet Needs
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**Background:** Oncology care teams may have less experience addressing the unique needs of adolescents and young adults (AYAs) with cancer, particularly related to treatment, finances, and mental health. We investigated differences in oncology provider experiences and awareness of concerns of their AYA patients with cancer between academic medical centers and community cancer centers.

**Methods:** Medical oncologists (ie, pediatric and adult), radiation oncologists, and oncologic surgeons were recruited through statewide societies, professional licensing lists, clinic websites and LISTSERVs in Utah. A total of 91 eligible providers completed a survey (response rate of 57.6%). The survey collected demographics and assessed provider perceptions of unmet needs.

Two 5-point Likert scale questions (1=always to 5=never) asked how often AYA patients with cancer need assistance with concerns related to resources, treatment, and social support, and how often their needs go unmet for those concerns. Responses were grouped as always/often versus sometimes/rarely/never. Chi-square tests were used to compare differences in the outcomes by practice location (pediatric/adult academic cancer center vs community oncology facility).

**Results:** On average, cancer center providers (n=55) reported that 22.8% (interquartile range, 15%–30%) of their patients were in the AYA age range, compared with community oncologists (n=36) with an average of 18.8% (IQR: 10%–27.5%). More cancer center providers reported AYA patients needed employment support compared with community providers (37.7% vs 2.9%; P<.001). Educational support was deemed needed by cancer center providers more often than other community oncology providers (49.1% vs 23.5%; P=.01). Both financial aid (cancer center, 66.0%; other, 58.8%) and insurance (cancer center, 68.5%; other, 71.4%) were endorsed as areas AYAs needed assistance with, regardless of practice location. Sexuality or intimacy, appearance/body image, and mental health counseling were endorsed by more than one-third of providers as key needs of their AYA patients. Approximately one-third of providers indicated that their patients had unmet needs related to sexuality and intimacy counseling.

**Conclusions:** Outreach to providers caring for AYA patients with cancer may need to focus less on awareness of AYAs’ resource needs, such as insurance, and more on addressing issues of employment, sexuality and psychosocial issues, which are key concerns for AYA cancer patients.
AB2017-87. Refining a Validated Distress Screening Tool for Caregivers of Patients With Cancer in a Community-Based Sample
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From Cancer Support Community, Research and Training Institute

Background: Family caregivers of people with cancer face distress that can impact the patient and their own well-being. Although validated distress screening for patients is essential to quality care, there is an absence of validated measures to identify and address unmet psychosocial needs of caregivers. We developed a novel distress screening tool for cancer caregivers based on Cancer SupportSource (CSS), a Web-based distress screening and referral tool for people with cancer. The objective of this study was to identify scale items most predictive of distress through the use of statistical criteria and expert review. Methods: Family caregivers completed 47 items assessing distress across several domains: emotional distress (27 items), caregiving tasks (11 items), and concerns about patient well-being (9 items). We evaluated items for strength: (1) item discrimination; (2) endorsement for request for assistance among concerned individuals; (3) correlation with the Distress Thermometer, Zarit Burden Interview, Caregiver Reaction Assessment, Center for Epidemiological Studies Depression Scale (CES-D), and Short-Form 12 Health Survey (SF-12); (4) statistical reliability; and (5) contribution to unique variance in overall distress. Next, an expert panel of licensed mental health professionals of a community-based cancer advocacy organization reviewed items for caregiver relevance, existing resources available to address distress, and potential utility to healthcare or supportive care providers. Results: Participants were 246 caregivers (median age, 52 years; 68% female; 88% White) from 10 affiliates of a community-based cancer advocacy organization. Statistical criteria and expert review led to the exclusion of 13 items (eg, keeping it all together in front of others, talking with caregiver’s healthcare team, patient’s weight change), revision of 12 items (managing money, gaining information about how to provide care), and combination of 3 pairs of items (eg, feeling irritable and feeling angry or resentful). The final scale comprises 31 items, including a 4-item depression subscale that mirrors the patient version of the measure. Conclusions: These findings provide a useful framework for generating a reliable and sustainable screening tool, CancerSupportSource-Caregiver, for evaluating psychosocial distress among cancer caregivers across a large network of community-based care providers. Next steps include implementation and further validation in diverse settings, including oncology practices, primary care, and community-based organizations.

AB2017-88. Analysis of the Conceptual Models Developed by Stakeholders Participating in the SEED Method for Improving Lung Cancer Outcomes in Martinsville/Henry County, Virginia
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Background: The SEED method is a community-engaged research approach to generate patient-centered questions. By listening to a range of stakeholder experiences in 3 topic groups (TG), 6 focus groups, and 12 key informant interviews, we dug deeper into stakeholders’ understanding of the factors affecting lung cancer outcomes in Martinsville, Virginia. Methods: Stakeholders from the community were recruited to form a core research team and 3 TGs (healthcare providers: TG1; survivors and caregivers: TG2; access influencers: TG3). Focus groups and key informant interviews were conducted to inform the topic groups. Each group created a concept model of the factors affecting lung cancer outcomes. Factors were categorized and the models were compared for complexity, type of categories/factors in the model, and overall perspective. Results: TG1 produced the most complex model based on the number of factors, categories, and linkages within the model. TG1 had 21 categories with 55 factors, TG2 had 19 categories with 38 factors, and TG3 had 15 categories with 37 factors. TG1 had the greatest number of linkages between factors (TG1, 68; TG2, 48; TG3, 31). Ten categories were common among all 3 groups, 2 categories (stress and health values) were unique to TG1, and 1 category (faith in God) was unique to TG2. The position of categories relative to lung cancer outcomes differed between models. For example, religiosity was positioned farthest from lung cancer outcomes by TG2, while directly adjacent to lung cancer outcomes by TG3. All models included the factors faith, prayer, support, income and pain management, while fear was unique to TG3, and denial was only in TG2 and TG3. The variance in factors, categories, and position gave a unique perspective to each model. TG1 emphasized healthcare factors and positioned them closest to lung cancer outcomes, TG2 highlighted factors within a patient’s control and placed them closest to lung cancer outcomes, TG3 emphasized the macro-environment and social policies. In the next phase of the project, each TG will develop research questions from the concept models. Conclusions: The SEED method effectively engaged key community stakeholders with diverse viewpoints in analysis of a community-relevant cancer issue. Community-derived concept models from diverse perspectives provide an effective framework around which collective responses and patient-centered research questions will be developed.