different opioids in different application forms. Luckily we have choice of different opioids with their advantages and disadvantages. But some problems of opioids are class effects or problems of the opioid system (opioid receptor). In this meaning, new opioids will only have a limited chance for further progresses in analgesia. So-called co-analgesics act mostly through the effect of, what has a more or less effect of sedation with it. New drugs has to take into account, that pain is multidimensional and has something to do with awareness, categorizing, and other learning effects of the brain, which are very different in our patients. This means, that a multidimensional approach of the pain is necessary. For this approach we have to understand, what the pathophysiology of the pain is, what the pain means for the patient and if the nervous system and the brain are already hyper alert or hypo alert. Only if we have understood this step, we can do a better and more individualised pain therapy.
For research that means, that we can't see the pain only as a illness of the nervous system on the basis of receptors, transmitters and nerve fibres. We have also to look after the functioning, the learning style, the coping mechanism, fear and other psychological and social reaction to know how to intervene best.

Scientific Symposium (Sun, 25 Sep, 14:45−16:45)
The Role of Medical Technology in Building a Sustainable Cancer Care

194 INVITED

How Medical Technologies and Pharmaceutical Industry Can Work Together

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Over the last five years, scientists and engineers at GE Global Research Center have been developing a new fluorescence microscopy-based method for multiplexed analysis of >30 proteins *in situ* in a single section of formalin fixed paraffin embedded tissue (FFPE). This provides high content fluorescent imaging at the single cell level and uniquely enables the simultaneous evaluation of multiple markers in multiple sub-cellular compartments, without destruction of the sample. By inclusion of epithelial, stromal cellular proteins in the multiplexed staining sequence, we have demonstrated subcellular protein expression, phosphorylation and co-localization in individual cells. Since multiple proteins are analyzed on the same tissue section, precious clinical sample is saved. Collaborating with pharma and clinical institutes has been an essential part of this work, and has ensured the validity of the technology, the needs of researchers are met and the end applications are clinically relevant. Over the last 4 years, we have been working with scientists at Eli Lilly to utilize the multiplexing technology to evaluate potential predictive and prognostic biomarkers as part of their drug discovery process. New insights have been gained into biomarker response in drug-treated xenografts and heterogeneity of biomarker expression prostate cancer. This collaboration could ultimately lead to new diagnostics for patient stratification and prediction of drug response.

195 INVITED

Recent and Future Advances in Cancer Imaging

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Cancer care today involves millions of multi-modality imaging exams, including CT, MRI, PET/CT, SPECT, X-ray and Ultrasound. Advances in cancer imaging are driving new clinical standards in early detection, targeted therapy and assessment of treatment response. Early detection is being improved by advances in imaging resolution, soft tissue visualization and anatomical+functional detail. These advances also enable therapy targeting with millimeter precision, and targeting in the presence of anatomic motion and physiologic change. Quantitative measurements enable rapid assessment of treatment response and recurrence, driven by technological advances, validated software tools, and standardized clinical protocols. Future advances in cancer imaging will continue improve care across the cancer lifecycle.

196 INVITED

IT Enabled Clinical Decision Support and Integration of Cancer Care-Role of EMR and Cancer Registries

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Background: Electronic Medical Record (EMR) systems dedicated specifically to the care of cancer patients are widely available and currently in common use world-wide. For Radiation Oncology, they are an absolute necessity for treatment delivery. As these systems have evolved, they have become both more sophisticated and have been increasingly integrated into the workflow throughout the cancer care continuum. For example, they have not only been equipped with provisions to support control of complex external devices such as linear accelerators, but also with interfaces to exchange data with allied information systems, features to enhance treatment safety, and direct connections to cancer registries. Ultimately, these types of capabilities are expected to facilitate continuous improvements in cancer care and treatment outcomes.
Using the Elekta EMR (called MOSAIQ) as an example, we will demonstrate the ability of such systems to support a new Electronic Health Record paradigm that promotes this advanced clinical decision support and facilitates the integration of cancer care programs.
Material and Methods: Architecturally, MOSAIQ is deployed in a way that allows users in a Medical Oncology facility to readily share data and information with Radiation Oncology users managing a common cohort of patients, leading to highly integrated and coordinated care. Data elements collected represent a rich superset of Cancer Registry data.
A pilot study of the use of this system as the foundation for establishment of a real-time radiation oncology data registry was mounted in the USA in 2009. The aggregate is composed of de-identified demographic, treatment and follow-up data routinely collected in the course of patient care, and automatically collected and uploaded from each participant's EMR to a central data warehouse on a monthly basis. This system is intended as a model that will be used for the establishment of a US Comparative Effectiveness Research registry on behalf of ASTRO's National Radiation Oncology Registry (NROR) program, and thus designed to be readily scaled in terms of numbers of facilities, number of data elements collected, and geographic locations.
In conjunction with these efforts, features are being incorporated inside MOSAIQ to support "intelligent" care delivery capabilities and permit, for example, the implementation of structured treatment protocols that can be modified to accommodate workflows specific to a locale. These protocols can be followed within and across centers, and can help coordinate and support care delivery in a consistent and structured manner.
Results: The MOSAIQ software is in use in approximately 60% of radiation oncology RO clinics in the US, with significantly increased utilization outside of the US, (37% and 54% growth in 2010 and 2009 respectively).
For the registry pilot program, approximately 50 demographic, treatment and follow-up data elements are collected. These data are core to patient care and routinely collected during treatment, and thus have required minimal additional burden on the part of participating facilities.
To date, a total of over 171,800 patient records have been aggregated over a course of approximately 1,576 automated de-identified data uploads from approximately 35 participating facilities. Data collection adherence for any particular element varies across the facilities, with some nearing 100% compliance and others ranging as low as 20%.
Efforts to enhance MOSAIQ for the purposes of improving data consistency and quality are being pursued. Hard coded safety-related interlock integrated into the software and incorporated into the work flow double as data quality enforcement tools, and a process being released will support development of customized alerts and interlocks and that will further enhance data quality.
Standard treatment protocols that support the management of patients in accordance with certified guidelines are incorporated into the system along with direct links to guideline agencies such as NCCN. Along with provisions to determine eligibility for clinical trials, these features provide a toolset that can be used to manage patients both on and off of clinical studies.
Conclusions: Electronic Medical Records systems used for Oncology care are amongst the most advanced available and in use today. Provisions to support treatment pathways, to enhance and enforce safety, to collect and aggregate data in near-real time, and to feed such data back into these systems to support decision making are among the current and near term features being incorporated into these systems. These programs will not only lead to safer, more efficient and effective care, but will also form the foundation for support of world-wide comparative effectiveness research (CER), guideline-directed care, and enhanced utility of device technology which should ultimately cascade to outcome improvements universally.

197 INVITED

Molecular Diagnostics Role in Personalised Cancer Care

Abstract not received

198 INVITED

The Future of Radiation Therapy in Comprehensive Cancer Care

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Cancer is a very challenging condition and one of the fastest growing health challenges in the developed world. As cancer is not one but hundreds