Breakout Session I: Informing Cancer Treatments with Computational Predictive Oncology

Co-Moderators: Joel Saltz and Rick Stevens

Current Resources

- TCGA, TCIA, limited other public data sets available – built on model sets with low abundance of data
- Influence of patient advocacy groups and famous people influence
- Relationship of patient and doctor is paramount
- Compliance of prescribed treatment

Key Opportunities

- Use all the data that we can collect
- Want a “learning health care system” – how do you use all the clinical care information in research
- Sequencing patients – trying to link to clinical trials and way to expand recruitment of patients into clinical trials
- Needs to get out of 3rd party
- Let’s make patients’ information portable
- Need to make new data sharing policies that are better for patients
- Need plug-n-play to transfer to the community care to the patients and clinicians beyond MSK, etc.
- **Data sharing solved** – validate models against others and remove “institution-based” models
- Common infrastructure for capturing information

Key Opportunities

- Common infrastructure for capturing information
- Integrate into physician's workflow
- Leveraging registries SEER and otherwise - incorporate more omics into SEER – population based and represented of population (ex. add digitized pathology to SEER).
- Leverage infrastructure for extracting and harmonizing data and extending it.
- DOE-NCI Pilot, CBIIT, and other existing projects with SEER → HARMONIZE
- Send technology to data…. "technology trick"
- **ITCR, DOE-NCI, CBIIT, QIN all have OPEN SOURCE permissive licenses to develop deidentified research datasets – push to cooperate and be interoperable → PUSH ON INTEROPERABILITY**

Challenges and Roadblocks

- Access to patient data; privacy
- Inefficient and ineffective – Ex. MATCH TRIAL precision medicine to tumors – 10-20% are people applicable; a lot of data that could be used, that isn't used – privacy
- Data isn't assimilated / represented in computable forms
- Rare disease is complex, but not enough patients
- Disparity in investment, scale of data, understanding
- Don't have a good way of capturing phenotyping, imaging, etc. → don't have reasonable models
- Trouble with curating data
- – knowing the models is the best the possibly of the confidence
- Clinical trials with disparities…. Reluctance of patience to participate
- How do we integrate quantitative imaging and functional imaging with molecular assays? Most patients get imaged, but not everyone has molecular assays

Next Steps

- Need oncologists in the room to explain what they need
- Think through driving applications to get more involved
- Integrate molecular data with imaging – low hanging fruit (integrated and data curation…)
- How do we relate molecular info to images – they are both highly redundant. How much can we substitute one for the other?
- Radiomics + Pathomics + ML
- Working meeting deep dives with oncologists + FPOC II attendees → formulation of goals to get a report of finding
- Leveraging and extending SEER and cancer registries as a jumping off point for projects that integrate multiple imaging and omics and other data in large cancer populations