NCI’s Evolving Late Phase Clinical Trials System

NCI National Clinical Trials Network (NCTN) Overview

Meg Mooney, MD
Chief, Clinical Investigations Branch, CTEP
on behalf of the

Division of Cancer Treatment & Diagnosis:
Biometric Research Branch, Cancer Diagnosis Program,
Cancer Imaging Program, Cancer Therapy Evaluation Program,
Radiation Research Program

Division of Cancer Prevention:
NCI Community Oncology Research Program (NCORP)

CTAC Meeting – November 12, 2014
NCTN Milestones

- **May 2010**: NCI conducts an extensive review of its late-phase Cooperative Group clinical trials program with widespread stakeholder input on revising the program.

- **November 2011**: NCI Board of Scientific Advisors approves plan to transform former Cooperative Group Program with a Request for Application (RFA) for an integrated National Clinical Trials Network (NCTN) - plan includes a consolidated organizational structure with funding for 1 pediatric group and up to 4 adult groups.

- **July 2012**: NCI releases NCTN Funding Opportunity Announcements.


- **July 2013**: Peer-Review of NCTN applications.

- **March 1, 2014**: NCI launches the National Clinical Trials Network (NCTN).
Vision for Transformation of System for NCI Late-Phase Tx/Imaging Trials - 2014 and Beyond

• Launch trials rapidly & complete accrual per defined guidelines through integrated national network sites

• Promote user-friendly, harmonized processes to extramural community (investigators, patients, advocates, & industry) & facilitate collaborations with partners

• Provide common infrastructure to perform large scale testing of increasingly smaller subsets of molecularly-defined cancers (Examples: LUNG-Map, ALCHEMIST, MATCH)

• Focus on research questions not well supported in a commercial environment
Structure of Late-Phase Clinical Trials Program Prior to NCTN

- 10 decentralized US groups
- Operational redundancies identified in review of program
- Fewer efficiencies

LEGEND:
- Operations
- Statistics & Data Management
- Tumor Banks
- Disease Committees
- Member Sites
NCTN Structure - Optimize Scientific Opportunities

• 5 US Network Groups (4 adult & 1 pediatric) with Operations & Statistics/Data Mgt Ctrs and 1 Canadian Collaborating Network Group

• 30 Lead Academic Participating Sites (LAPS) to provide leadership in development, accrual & conduct of clinical trials in association with the adult US trial Groups

• 7 Integrated Translational Science awards to help incorporate translational science into trials

• 1 RT & Imaging Core for QA/QC in trials

Complete listing of NCTN awards is available in NIH RePORTER

LEGEND:
- Centralized Functions for operational efficiencies:
  • Centralized Institutional Review Board
  • Cancer Trials Support Unit
  • Radiotherapy/Imaging Cores
  • Common Data Management System Central Hosting
- 30 Lead Academic Participating Sites (LAPS)
- Operations
- Statistics & Data Management
- Tumor Banks
- Member Sites
Relationship of NCTN and NCORP

NCTN Focus:
• Late-Phase Treatment Trials
• Advanced Imaging Trials

NCORP Focus:
• Cancer Prevention & Control Trials
• Cancer Care Delivery
• Comparative Effectiveness Research

NCTN/NCORP CENTRALIZED FUNCTIONS
Major Components of NCTN Program

5 US Network Operations Centers (4 adult & 1 pediatric)
• Provide scientific leadership for developing & implementing multi-disciplinary, multi-site trials in a range of diseases and special populations with specific scientific strategies and goals

With 5 Associated US Network Statistics and Data Management Centers
• Provide statistical expertise to ensure effective scientific design & conduct of trials as well as innovation in statistical methodology in addition to data mgt and analysis of all NCTN studies

1 Canadian Collaborating Network Group
• Partners with the US Network Groups in the conduct of selected, late-phase, multi-site clinical trials, helping to reduce regulatory barriers & expanding the geographic extent of patient accrual

30 Lead Academic Participating Sites (LAPS)
• Provide scientific leadership in the development & conduct of trials in association ≥ 1 adult US Network Groups as well as substantial accrual to trials conducted across the entire NCTN

7 Integrated Translational Science Awards
• Provide support for leadership and expertise to facilitate incorporating translational science into Network Group clinical trials

1 Radiotherapy & Imaging Core Services Center
• Provides scientific and technical expertise for incorporating quality assurance and image data management for applicable clinical trials conducted by the NCTN that require specialized QA/QC
<table>
<thead>
<tr>
<th>Network Group</th>
<th>Operations Center Principal Investigator (*contact PI)</th>
<th>Statistics/Data Mgt Ctr Principal Investigator (*contact PI)</th>
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<tbody>
<tr>
<td>Alliance for Clinical Trials in Oncology (Alliance)</td>
<td>Brigham &amp; Women’s Hospital, Inc. Monica Bertagnolli (*)</td>
<td>Mayo Clinic Dan Sargent</td>
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<td>Children’s Oncology Group (COG)</td>
<td>Children’s Hospital of Philadelphia Peter Adamson</td>
<td>University of Florida Meenaski Devidas</td>
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<tr>
<td>ECOG-ACRIN Cancer Research Group (ECOG-ACRIN)</td>
<td>ECOG-ACRIN Medical Research Foundation Robert Comis (*)</td>
<td>Dana-Farber Cancer Institute Robert Gray</td>
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<td>NCIC Clinical Trials Group (NCIC-CTG)</td>
<td>Queen’s University (Kingston, Ontario) Elizabeth Eisenhauer</td>
<td>N/A</td>
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<td>NRG Oncology (NRG)</td>
<td>NRG Oncology Foundation, Inc. Norman Wolmark (*)</td>
<td>University of Pittsburgh Joseph Costantino (*)</td>
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<td>SWOG</td>
<td>Oregon Health &amp; Sci University Charles Blanke (*)</td>
<td>Fred Hutchinson Can Research Ctr Michael LeBlanc</td>
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### 30 Lead Academic Participating Site (LAPS) Awardees

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<td>DRAGNEV, KONSTANTIN H.</td>
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<td>CRAWFORD, JEFFREY (contact)</td>
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<td>EMORY UNIVERSITY</td>
<td>RAMALINGAM, SURESH S. (contact)</td>
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<td>APPELBAUM, FREDERICK</td>
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<td>BRAHMER, JULIE RENEE (contact)</td>
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<td>INDIANA UNIV-PURDUE UNIV AT INDIANAPOLIS</td>
<td>MILLER, KATHY D</td>
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<td>MAYO CLINIC ROCHESTER</td>
<td>ALBERTS, STEVEN R (contact)</td>
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<td>GOLDBERG, Richard (contact)</td>
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<td>ROSWELL PARK CANCER INSTITUTE CORP</td>
<td>LEVINE, ELLIS G (contact)</td>
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<td>SLOAN-KETTERING INST CAN RES</td>
<td>AGHAJANIAN, CAROL (contact)</td>
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<td>STANFORD UNIVERSITY</td>
<td>WAKELEE, Heather (contact)</td>
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<td>UNIVERSITY OF ALABAMA AT BIRMINGHAM</td>
<td>ALVAREZ, RONALD DAVID (contact)</td>
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<td>UNIVERSITY OF CALIFORNIA DAVIS</td>
<td>GANDARA, DAVID R (contact)</td>
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<td>UNIVERSITY OF CHICAGO</td>
<td>KINDLER, HEDY L (contact)</td>
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<tr>
<td>UNIVERSITY OF COLORADO DENVER</td>
<td>ELIAS, ANTHONY D</td>
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<tr>
<td>UNIVERSITY OF MICHIGAN</td>
<td>ZALUPSKI, MARK M</td>
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<td>UNIV OF NORTH CAROLINA CHAPEL HILL</td>
<td>CAREY, LISA A</td>
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<tr>
<td>UNIVERSITY OF OKLAHOMA HLTH SCIENCES CTR</td>
<td>MANNEL, ROBERT S (contact)</td>
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<td>UNIVERSITY OF PITTSBURGH AT PITTSBURGH</td>
<td>BRUFSKY, ADAM M (contact)</td>
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<td>UNIVERSITY OF SOUTHERN CALIFORNIA</td>
<td>LENZ, HEINZ JOSEF (contract)</td>
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<td>UNIVERSITY OF TX MD ANDERSON CANCER CTR</td>
<td>ENG, CATHY (contact)</td>
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<tr>
<td>UNIVERSITY OF TX SOUTHWESTERN MEDICAL CENTER</td>
<td>SCHILLER, JOAN H.</td>
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<tr>
<td>UNIVERSITY OF UTAH</td>
<td>GAFFNEY, DAVID K</td>
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<td>UNIVERSITY OF WISCONSIN-MADISON</td>
<td>KAHL, BRAD (contact)</td>
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<td>VANDERBILT UNIVERSITY MED CTR</td>
<td>BERLIN, JORDAN D</td>
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<td>WASHINGTON UNIVERSITY</td>
<td>BARTLETT, NANCY L (contact)</td>
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<td>WAYNE STATE UNIVERSITY</td>
<td>FLAHERTY, LAWRENCE E</td>
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<tr>
<td>YALE UNIVERSITY</td>
<td>HOCHSTER, HOWARD S (contact)</td>
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Geographic Locations of the Main Academic Centers for the 30 NCTN Lead Academic Participating Site (LAPS)
### 7 Integrated Translational Science Awards (ITSAs)

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<th>Institution</th>
<th>Title of Award Application</th>
<th>PI</th>
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<tbody>
<tr>
<td>CHILDREN’S HOSPITAL OF PHILADELPHIA</td>
<td>COG SOLID TUMOR MALIGNANCIES</td>
<td>ADAMSON, P (contact)</td>
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<tr>
<td>COLD SPRING HARBOR LABORATORY</td>
<td>SWOG TRANSLATIONAL (XENOGRAFT-DRUG DISCOVERY)</td>
<td>TUVESON, D (contact)</td>
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<tr>
<td>EMORY UNIVERSITY</td>
<td>ECOG-ACRIN THORACIC MALIGNANCIES RESEARCH</td>
<td>RAMALINGHAM, S</td>
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<td>MONTEFIORE MEDICAL CENTER (BRONX, NY)</td>
<td>ECOG-ACRIN LEUKEMIA TRANSLATIONAL RESEARCH</td>
<td>PAIETTA, E (contact)</td>
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<tr>
<td>OHIO STATE UNIVERSITY</td>
<td>ALLIANCE -SWOG LEUKEMIA RESEARCH</td>
<td>MARCUCCI, G (contact)</td>
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<tr>
<td>UNIV OF NORTH CAROLINA CHAPEL HILL</td>
<td>ALLIANCE-NRG ONCOLOGY RNA/DNA SEQUENCING</td>
<td>HAYES, D (contact)</td>
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<tr>
<td>WASHINGTON UNIVERSITY</td>
<td>NRG ONCOLOGY GENOPROTEOEMICS CENTER</td>
<td>Mutch, D (contact)</td>
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### 1 Radiation Therapy/Imaging Core Services Center

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<th>Institution</th>
<th>Title of Award Application</th>
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<tr>
<td>AMERICAN COLLEGE OF RADIOLOGY</td>
<td>IROC (IMAGING AND RADIATION ONCOLOGY CORE)</td>
<td>FOLLOWILL, D (contact)</td>
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Research Agenda for Late-Phase Clinical Trials System

- Emphasis on phase 3, practice-changing, treatment and advanced imaging trials, especially in research areas that are not well supported in a commercial environment
- Combinations of novel & molecularly targeted agents developed by different sponsors
- Integration of new agents & imaging approaches into standard of care
- Evaluation of multi-modality regimens (e.g., Surgery, Radiotherapy, IP therapy)
- Therapies for pediatric cancers, rare cancers, and uncommon presentations of more common cancers
- Different treatment and imaging approaches already approved for clinical care
NCI: Developing National Strategy for Precision Medicine - NCTN Opportunities

• Help advance molecular profiling from research use into the clinic

• Genotype to Phenotype:
  • Develop portfolio of trials across spectrum from early stage to advanced disease
  • Screen for molecular features that may predict response to a drug with a given mechanism of action
  • Analyze tumor specimens at relapse to define mechanisms of resistance
  • Develop public database that links clinical outcomes with molecular tumor characteristics for continued research

• Phenotype to Genotype:
  • Molecular mutations or changes in gene expression may explain why patients responded to a treatment that did not work for others
ALCHEMIST Background

• ALCHEMIST will evaluate molecularly targeted therapy in early stage NSCLC with non-squamous histologies (i.e., adenocarcinoma, large cell ca, etc.) that has been completely surgically resected.

• Molecularly targeted therapy has improved outcomes within these histologies in advanced NSCLC:
  - erlotinib (target: EGFR activating mutation)
  - crizotinib (target: EML4-ALK)

• This has lead to routine testing of EGFR mutations and ALK rearrangement in advanced disease.

• Not known if these agents are beneficial in the adjuvant clinical setting.
ALCHEMIST Structure

ALCHEMIST is an integrated research effort with 3 component trials:

1. Screening Trial - A151216: Eligible patients will have their tumor tissue tested for genetic changes in ALK or EGFR. If tissue testing is positive, they will be referred to one of the treatment trials. If negative, they will be followed for 5 years. All patients contribute information to the national public resource for research.

2. Erlotinib Treatment Trial - A081105: Erlotinib vs. placebo will be evaluated in patients with activating EGFR mutations following standard of care adjuvant therapy.

3. Crizotinib Treatment Trial - E4512: Crizotinib vs. placebo will be evaluated in patients harboring the Anaplastic Lymphoma Kinase (ALK) fusion protein following standard of care adjuvant therapy.
Trials conducted at sites in the NCI Clinical Trials Networks: NCTN & NCORP

Stage IB (≥ 4cm)-IIIA non-squamous NSCLC (n=6000-8000)

Pre-op cohort

Post-op cohort

Complete resection + standard adj therapy per treating physician

Central EGFR & ALK genotyping

EGFR-mutation: A05 Phase III trial of erlotinib vs placebo x 2 years (n=410) after any adj tx

ALK-rearranged: Phase III trial of crizotinib vs placebo x 2 years (n=360) after any adj tx

Without Molecular Alterations: Followed q6 months x 5 years after any adj tx

FFPE tissue & blood specimen

FFPE tissue from biopsy done at recurrence

Epidemiologic Questionnaire & Advanced genomics analysis at the NCI Center for Cancer Genomics for all screened patients
S1400 Master Protocol
Unique Private-Public Partnerships with the NCTN
Biomarker Study for 2nd-Line Tx of Squamous Cell Lung Ca

- Special Private-Public Partnership
- Multi-arm randomized, controlled phase 2/3 registration protocol
- Each arm opens/closes independent of others, independently powered for Overall Survival (OS). Positive results at “rolling” interim analysis determine if a arm proceeds to phase 3 portion
- Each drug with clinical data demonstrating biologic activity in responsive patient group against measurable target, using predictive biomarker assay analytically validated & suitable for a pivotal trial
- Led by SWOG with participation by all Groups in the NCTN and by all sites in the NCORP and NCTN
LUNG – MAP (Master Protocol – S1400)

**MASTER PROTOCOL**

- **Common Broad Platform (CLIA Lab Profiling)**
  - **Biomarker A**
    - TT A
    - CT* → Endpoint (Interim PFS) OS
  - **Biomarker B**
    - TT B
    - CT* → Endpoint (Interim PFS) OS
  - **Biomarker C**
    - TT C+CT
    - CT* → Endpoint (Interim PFS) OS
  - **Biomarker D**
    - TT D+E
    - E* → Endpoint (Interim PFS) OS
  - **Non-match**
    - CT* → Non-match drug

**TT=Targeted therapy, CT=chemotx (docetaxel or gemcitabine), E=erlotinib**

*Archival FFPE tumor, fresh CNB if needed*

NCI-MATCH

• Umbrella protocol for multiple, “signal-seeking” single-arm phase II trials across various histologies
  – Identify mutations/amplifications/translocations in patient tumor sample & match patients to targeted agent
  – Tumor biopsies & sequencing at progression to illuminate resistance mechanisms
    • De-identified samples submitted to central labs
    • Whole-exome sequencing (research purposes) to detect non-ambiguous germline variants

• IND for protocol template
  – Arms could be added or deleted without affecting other arms

• Initially focused on single-agents (commercial or experimental)
  – Combinations will be considered for targets that have validated combination targeted therapy
  – Need minimum dose/safety established in phase 1 trials

• Study will be reviewed by the CIRB

• Will be led by ECOG-ACRIN & open to entire NCTN and NCORP Networks - anticipate opening in 1st Quarter 2015
Additional Precision Medicine Trials Planned for NCTN

• **PEDIATRIC MATCH**
  – Umbrella protocol for multiple, “signal-seeking” single-arm phase II trials across various histologies in early stages of planning for pediatric patient population similar to the Adult NCI MATCH study

• **ALK Master Protocol**
  – Evaluation of 2nd generation ALK inhibitors compared to crizotinib in advanced lung cancer (1st-line)
Objective:
Explore how to best work across the NCTN to identify opportunities and strategies to collectively address accrual to challenging and genomic-driven trials

Participants:
Representatives from all 30 LAPS, the 5 US NCTN Groups & the NCTN Canadian Collaborating Network, Patient Advocates, and NCI (DCTD, DCP, OD)

When:
December 4-5, 2014 (NCI Shady Grove)

Sponsor:
Foundation for the NIH
NCI provided approximately $24 million to consolidate infrastructures & more than $40 million to transition to a common data management system (Medidata Rave®), develop an integrated IT system for the tumor banks, and implement specific precision medicine clinical trials.
NCTN-Related Annual Funding

Additional Estimated Annual NCI Support
(This is an approximation and is dependent on annual NCI appropriations)

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<tr>
<th>NCI Central IRBs (Adult &amp; Pediatrics)</th>
<th>$4.5 Million</th>
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<tr>
<td>Cancer Trials Support Unit</td>
<td>$14.0 Million</td>
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<td>Tumor Banks</td>
<td>$8.6 Million</td>
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<td>BIQSFP</td>
<td>$10.0 Million</td>
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<tr>
<td>NCORP Treatment Trials (estimated)</td>
<td>$33.1 Million</td>
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<td><strong>TOTAL:</strong></td>
<td><strong>$70.2 Million</strong></td>
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Other NCI support includes but is not limited to:
- Common Data Management System (Medidata Rave®)
- Clinical Trials Monitoring
- Drug Storage and Distribution
- Regulatory Oversight & Monitoring (CTEP IND Studies)

NCTN Accrual Projections

Average Annual Total Accrual (Intervention & Screening)

- FY 2007 – FY 2013 (7 Yr Avg): $23,670
- FY 2010 – FY 2013 (3 Yr Avg): $20,900
- Projection for Year 1 of NCTN: $19,000 to 20,500

With new Network, accrual reporting can now be done in real-time across a variety of accrual categories to help with collaborative planning & development of new trials.