the Harmonization of Core Competencies from a survey of research professionals working in the United States and Canada. Respondents reported how competent they believed themselves to be on 51 clinical research core competencies. Factor analyzes identified 20 core competencies that defined a Competency Index for Clinical Research Professionals—General (CICRP-General, ie, GCPs) and 4 subindices that define specialized research functions: Medicines Development; Ethics and Participant Safety; Data Management; and Research Concepts. RESULTS/ANTICIPATED RESULTS: Factor analysis identified 20 core competencies that defined a Competency Index for Clinical Research Professionals—General (CICRP-General, ie, GCPs) and 4 subindices that define specialized research functions: Medicines Development; Ethics and Participant Safety; Data Management; and Research Concepts. DISCUSSION/SIGNIFICANCE OF IMPACT: These indices can be used to gage an individual's readiness to perform general as well as more advanced research functions; to assess the education and training needs of research workers; and to evaluate the impact of education and training programs on the competency of research coordinators, monitors, and other clinical research team members.

2124

Three stages of cultural change in translational science
Joseph A. Kotarba

OBJECTIVES/SPECIFIC AIMS: This report describes the evolution of scientific culture since the NIH/translational science (TS) mandate. The transition of the conduct of science to an increasingly translational model involves 2 dimensions of change. The first dimension consists of change in the structure and process of scientific work, in terms of factors such as funding, administration, application of new knowledge, and so forth. The second dimension consists of change in culture of scientific work. The culture of science is the set of values, assumptions, meanings, and traditions that inform the conduct of science. As part of the comprehensive evaluation of TS at the University of Texas Medical Branch-Galveston, we have monitored the status of the culture of science there through a sociological framework. We focused on the ways the changing culture of science facilitates and/or inhibits creative and effective medical research. We argue that the long-term success of TS is dependent upon the evolution of assumptions, everyday practices, and taken-for-granted ways of conducting research. Culture also provides meanings for who its people are and helps us define who we are to ourselves (ie, self-concept). In terms of the scientific enterprise, self-identity provides the motivation to participate in group activities or to be content with being a "lone ranger" researcher; the orientation to be either a leader or a follower; the security to take creative chances with one's work or to simply conduct "normal science"; and the sense of esteem for being the best or simply doing one's job. TS requires a constant "reengineering" of its total enterprise. Consequently, we raised the following research questions: (1) What is the traditional culture of science at UTMB? (2) How has the culture of science at UTMB changed since the introduction of the Clinical and Translational Science Award project? (3) What has been the relationship between the culture of science and the conduct of science at UTMB since CTSA? (4) How have cultural influences on self-concept changed? METHODS/STUDY POPULATION: Data have been collected by means of ongoing 1-on-1 interviews with CTSA participants at all levels; observations of lab and classroom interaction; participation in organizational and planning committees; and other everyday organizational activities. RESULTS/ANTICIPATED RESULTS: Following the grounded theory method of qualitative analysis and discovery, we found 3 stages of cultural change. Stage 1 is Cultural Invasion of the existing culture at UTMB by the implementation of the CTSA project. Stage 2 is Cultural Accommodation by which internal responses to change follow the normal scientific paradigm. Stage 3 is Cultural Expansion by which the organizational and cultural platform for conducting science has expanded regionally, nationally and cross-disciplinarily. DISCUSSION/SIGNIFICANCE OF IMPACT: Whether a distinct fourth stage emerges depends on such factors as funding and programmatic directives from NIH; the tension between research and clinical demands for resources; and the emergence of junior investigators schooled on the principles of TS.

2134

Integrating Epidemiology and Biostatistics teaching using the case method
Jessica K. Paulus, Angie Rodday and Farzad Noubary

OBJECTIVES/SPECIFIC AIMS: Biostatistics and Epidemiology courses within clinical research or public health training programs are typically developed and taught separately. As a result, students may have trouble in their research outside the classroom, where biostatistical and epidemiological concepts must be well integrated. Case method teaching is a participant- and discussion-centered pedagogical approach that has been used in business and law schools for more than

50 years to improve student learning, yet has taken longer to be adopted in health professional schools. The case method is distinguished by presenting learners with a real-world problem without a single unique solution. Designed to mimic the constraints and incomplete information found in real life, it is an ideal approach for integrating multiple related disciplines. A team of Clinical and Translational Science (CTS) faculty from the Tufts CTSI collaborated to develop a new course that integrates epidemiology and biostatistics disciplines using the case method. METHODS/STUDY POPULATION: We developed an intermediate-level, case-based course integrating epidemiology and biostatistics topics using modern, real-world clinical examples. Recognizing the importance of technical skill building, this intermediate-level Tufts CTS course adopted a hybrid approach, incorporating lecture and in-class laboratory exercises, alongside cases. We surveyed CTS faculty to identify a set of core methodological competencies. These included randomized trials, case-control and cohort studies, confounding, effect modification, propensity scores, linear and logistic regression, and survival analysis. Faculty provided us with clinical questions and deidentified data sets corresponding to these competencies; we also reviewed publicly available data sets. RESULTS/ANTICIPATED RESULTS: CTS faculty collaborated to develop 10 cases (with accompanying data sets) from modern clinical research examples that illustrate the connections between epidemiology and biostatistical concepts. Each case contains a background section, a statement of the core problem, a data set with data dictionary, articles from the primary literature (often the publication of the data set) with discussion questions and in-class lab exercises (R programming). One case presents students with the challenge of whether acupuncture may be an effective therapy for pain associated with chronic headache. Through case activities, students gain experience weighing observational Versus experimental evidence, apply directed acyclic graph theory, and analyze clinical trial data. Qualitative evaluations in 2015 (pilot year) and 2016 indicate students preferred the integrated approach to separate courses, and found the integration facilitated application of methods to their independent research projects. Significant rewards for faculty include cross-disciplinary collaboration, sharpened teaching skills, and engaging with learners in a dynamic classroom environment. DISCUSSION/SIGNIFICANCE OF IMPACT: Despite administrative and pedagogical challenges, a case-based, integrated curriculum offers rewards for faculty and students. The case method may be a useful pedagogical strategy to integrate other closely related topics or courses in translational science to better prepare scholars for the challenges of independent research.

2142

A competency-based approach to redefining clinical research workforce quality and development
Rebecca Namenek Brouwer and Denise Snyder

OBJECTIVES/SPECIFIC AIMS: Describe the process used to develop job descriptions and how this translates into consistent hiring practices. Describe how competencies are used to provide transparency into professional development opportunities. Discuss planned incorporation of competencies into efforts to train the clinical research workforce. METHODS/STUDY POPULATION: These processes were developed at Duke, an academic medical center with over 2000 active clinical research protocols and 300 new clinical trials per year. Over 1000 employees were evaluated for mapping into clinical research positions, with 685 mapping into new research positions (makeup of workforce to be depicted). RESULTS/ANTICIPATED RESULTS: Prior to this initiative, the clinical research workforce was not well-defined. Through the mapping process, employees were mapped from over 80 different positions into 10 (figure), resulting in a workforce that allows for visible career ladders and greater opportunity for development. As the initiative evolves and grows to include competency-driven performance evaluations, training modules, and assessments, we anticipate the ability to see the relationship between the competencies and high-quality clinical research support. DISCUSSION/SIGNIFICANCE OF IMPACT: The use of competencies in the context of workforce development is not new, yet in clinical research, they provide a much-needed framework for an ever-evolving profession. This comprehensive use of competencies throughout a workforce development initiative is key to ensuring strong support of high-quality clinical research.

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Using social network analysis to design and evaluate CTSA pilot programs
Therese Kennelly Okraku, Valerio Leone Sciabolazza, Raffaele Vacca and Christopher McCarty

OBJECTIVES/SPECIFIC AIMS: We aim to leverage our analysis of the scientific collaboration network at a research university to design an innovative pilot