HHSN268201000050C, RECOVERY
Quantitative Imaging Biomarkers Alliance (QIBA)

PROPOSED WORKPLAN

Consistent with the report submitted to the NIBIB Project Officer on October 11, 2010, QIBA has completed an initial project planning exercise covering the scope of work in the NIBIB award. This planning exercise consisted of the following activities:

- Derivation of a table to identify who is responsible for specific tasks.
- Application of the imaging biomarker roadmap to the specifics of the three biomarkers we have prioritized.
- Sorting of tasks to pursue at the Steering Committee (i.e., program) level as opposed to the individual Technical Committee (i.e., individual biomarker) level. For the organizational relationships among Steering, Modality and Technical Committees, see Appendix 1.

We present our table of task assignments by committee in section A below. Section B provides our organization chart corresponding to the teams mentioned in the table. NIBIB statement of work tasks 1-10 generally comprise the elements of our roadmap for each biomarker. Section C presents the application of the roadmap specifically to the volumetric CT biomarker, using a simplified Gantt chart format indicating dates and dependencies that relate the items. Sections D for quantitative FDG-PET, and E for DCE-MRI, are similar. The differences from one biomarker to another derive from the different development status and maturity of the marker.

NIBIB Tasks 11-19 are associated with the overall program. Some of these comprise ongoing activities that do not lend themselves to scheduling in Gantt chart format, but will be associated with specific events during the contract term. Our initial plan with respect to each numbered task is as follows:

NIBIB Task 11. Stimulate an interest in disseminating and implementing QIBA solutions to assess their feasibility and efficacy more broadly.

a. *We will schedule two QIBA meetings per year, one in May and the other at the RSNA Annual Meeting in November, with agenda set for this purpose.*

b. *We will schedule educational content in the RSNA Annual Meeting to disseminate information to a wide audience.*

c. *We also publish a quarterly QIBA Newsletter electronically.*

NIBIB Task 12. Encourage adoption, integration and clinical education of validated QIBA solutions by the research and industry community.

a. *We have begun to schedule company-specific meetings with managers of medical device companies to explain QIBA, and solicit their feedback.*

b. *We will work with the Pharma Imaging Group to get QIBA solutions integrated into pharmaceutical industry drug trials.*

c. *We will work with ACRIN, the SNM Clinical Trials Network, and other academic organizations to get QIBA solutions integrated into clinical trials.*

NIBIB Task 13. Develop an initial consensus on quantitative imaging biomarkers qualification by coordinating broadly with various stakeholders, including professional imaging societies, academic centers, and imaging device manufacturers, and drug industry.

a. *We will use breakout groups at the annual "Imaging Biomarkers Roundtable" to achieve this objective, as well as collective input from the Pharmaceutical Imaging Group, meetings with individual medical device manufacturers, and recommendations from relevant academic workshops.*

b. *For consensus related to formal FDA qualification of imaging biomarkers, we will work with the FNIH Biomarkers Consortium and the Critical Path Institute as well. This collaboration will occur*

by monthly conference calls, as well as collective work on the Briefing Documents and Data Packages to be submitted to the FDA.

NIBIB Task 14. Organize and manage relationships in a collaborative, multi-disciplinary environment that fosters communication among imaging groups and other medical disciplines involved in the research, approval and use of quantitative imaging biomarkers.

a. *The QIBA Steering Committee meets once per month by phone and in person twice a year.*

b. *The Modality Committees meet monthly.*

c. *The Technical Committees meet biweekly, with groundwork subgroups meeting as needed, often weekly. All of these QIBA groups are composed of individuals from the named stakeholder groups.*

NIBIB Task 15. Create and implement a process by which standardized and harmonized systems emerge that are sufficient for the development, validation, qualification and use of accurate, repeatable quantitative imaging biomarkers across instruments and settings.

The QIBA Steering Committee, with input from the Technical Committees, has begun to develop such processes. These will be documented in a process manual by the end of year 1 (Sept 30, 2011). We will provide a feedback (public comment) mechanism with a formal update mid-way through year 2 (March 30, 2012).

NIBIB Task 16. Clarify and optimize the regulatory pathway by which quantitative imaging biomarkers enter the market.

a. *We have authored a Special Report that will be published in Radiology during the Spring of Year 1 (2011).*

b. *We have also initiated formal efforts with FDA/CDER to qualify two biomarkers utilizing these ideas as of this year. We expect to meet with the FDA in a collaborative process and then transition to the formal review phase. As these processes are new to both FDA and ourselves, we are not able to indicate a schedule at this time but will update in our periodic reports. Additionally, early in Year 2, we anticipate formal discussions related to the use of data accumulated for qualification to be contributory to CDRH filing and will update as we get closer to that engagement.*

NIBIB Task 17. Establish a process for relating biomarkers to disease areas, setting the clinical context and, based on the clinical context, identifying and prioritizing what biomarkers to pursue.

We will use breakout groups at the annual "Imaging Biomarkers Roundtable" to achieve this objective,

NIBIB Task 18. Create a collaborative, multidisciplinary infrastructure to foster research, approval and use of quantitative imaging biomarkers, including development and maintenance of a national repository of quantitative imaging biomarker data, representation at a variety of workshops and meetings, and provide project management and staff support for same.

a. *The QIBA committee structure and leadership constitutes one component of a collaborative, multidisciplinary infrastructure to foster research, approval and use of quantitative imaging biomarkers. A plan for long-term sustainability will be developed over the next year. (See Task 19).*

b. *In partnership with NCRR/NIH, RSNA provides support for a CTSA Imaging Working Group which constitutes another component of a collaborative, multidisciplinary infrastructure to foster research, approval and use of quantitative imaging biomarkers.*

c. *We have created and Ad Hoc Committee on Open Image Archives which will provide in approximately 6 months a report containing recommendations for creating one or more national repositories of quantitative imaging biomarker data.*

d. *RSNA staff supported by this NIBIB contract will provide project management and staff support for same.*

NIBIB Task 19. Explore self-funding models to maintain forward progress of the infrastructure and effort described in task 18 above.

We will create an Ad Hoc Task Group to conduct strategy discussions on this topic during Year 1 and will develop a draft proposal by year end. Based on the nature of that proposal we will lay out actions and a plan for Year 2.

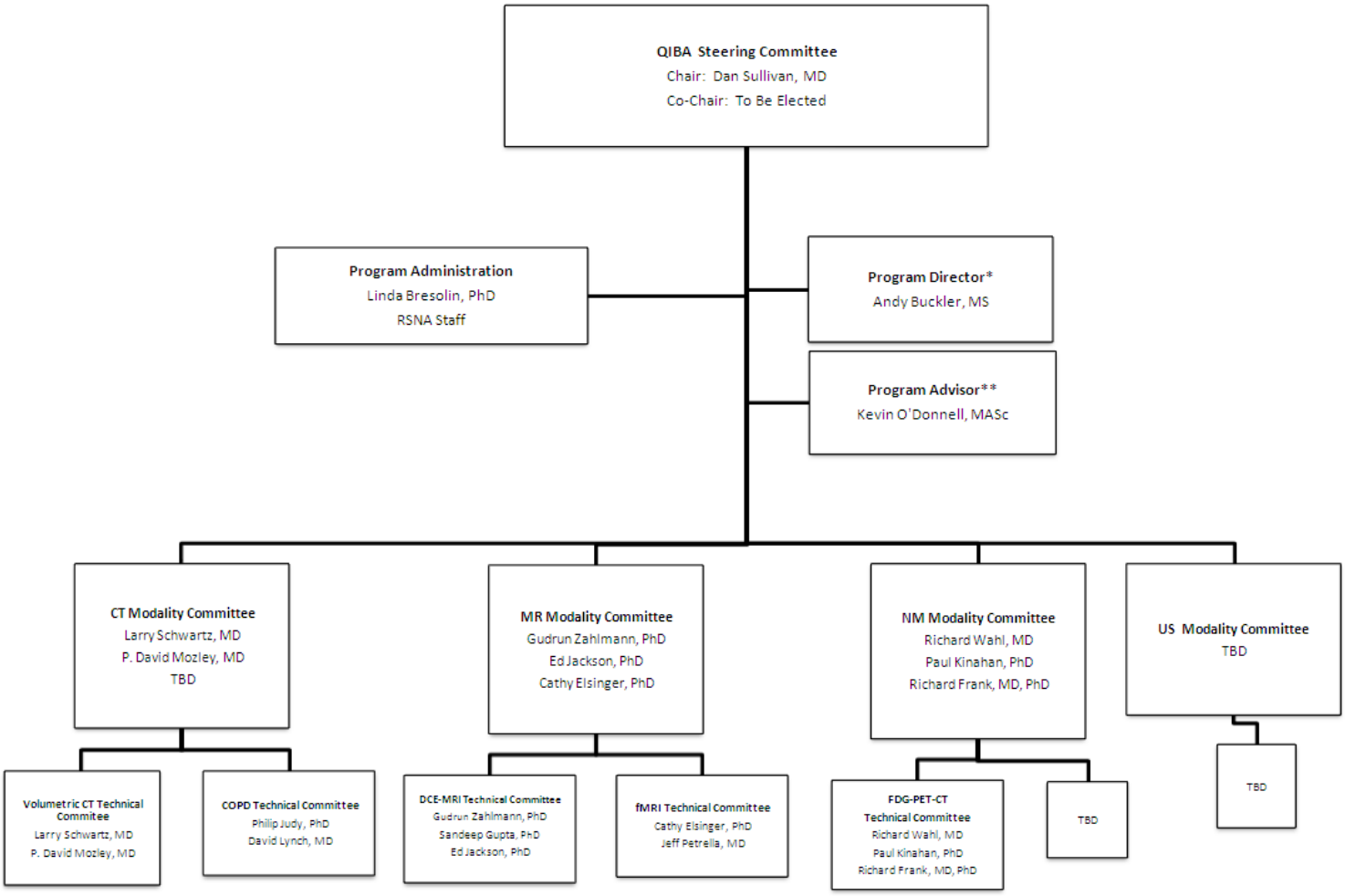
A. ASSIGNMENT TABLE FOR SPECIFIC NIBIB TASKS

TASKS ORGANIZED BY TOPIC	ASSIGNMENT
A. Technical Validation	
A.I. Define the variability problem, using reference objects:	
NIBIB Task 1.Identify and characterize sources of error that affect the validation of quantitative imaging biomarkers, e.g. CT, DCE-MRI and FDG-PET.	Technical Committees.
NIBIB Task 2. Develop consensus on the appropriate imaging system quality control phantoms and acquire phantom images, if needed, for assessing quantification.	Technical Committees.
NIBIB Task 3. Analyze the covariates that affect the quantification of quantitative imaging results, such as scanner performance, scanning environment in which the images is acquired, the biologic features being measured, and others factors including repeat imaging acquisition, reconstruction, and registration, and analysis that associated with the measurement of change.	Modality or Technical Committees.
A.2. Define the variability problem, using clinical images:	
NIBIB Task 4. Collect clinical image data where appropriate, i.e. short interval imaging exams for noise estimate.	Modality or Technical Committees.
NIBIB Task 5. Estimate variance of measurements on clinical images from retrospective longitudinal studies	Technical Committees.

NIBIB Task 6. Analyze any additional reference image data necessary for repeat measurement studies.	Modality or Technical Committees.
NIBIB Task 7. Demonstrate the minimum change that can be measured for the proposed method.	Technical Committees.
B. Clinical Evaluation (Clinical Validation)	
NIBIB Task 10. Compare correlations between imaging biomarkers and standard biomarkers with outcome measures.	Technical Committees.
C. Dissemination	
NIBIB Task 11. Stimulate an interest in disseminating and implementing QIBA solutions to assess their feasibility and efficacy more broadly.	Steering, Modality or Tech Committees
NIBIB Task 12. Encourage adoption, integration and clinical education of validated QIBA solutions by the research and industry community.	Steering, Modality or Tech Committees
NIBIB Task 8. Work with vendors to better track software upgrades and ensure better clinical quantification.	Steering, Modality or Tech Committees
D. Develop QIBA Process	
NIBIB Task 17. Establish a process for relating biomarkers to disease areas, setting the clinical context and, based on the clinical context, identifying and prioritizing what biomarkers to pursue.	Steering Committee
NIBIB Task 13. Develop an initial consensus on quantitative imaging biomarkers qualification by coordinating broadly with various stakeholders, including professional imaging societies, academic centers, and imaging device manufacturers, and drug industry.	Steering Committee
NIBIB Task 14. Organize and manage relationships in a collaborative, multi-disciplinary environment that fosters communication among imaging groups and other medical disciplines involved in the research, approval and use of quantitative imaging biomarkers.	Modality or Steering Committees
NIBIB Task 15. Create and implement a process by which standardized and harmonized systems emerge that are sufficient for the development, validation, qualification and use of accurate, repeatable quantitative imaging biomarkers across instruments and settings.	Steering Committee
NIBIB Task 9. Establish QIBA Profiles incorporating technical characteristics as determined, acquisition protocol, data analysis and transfer, and other reference standards.	Technical Committees.

E. Work on regulatory pathways	
NIBIB Task 16. Clarify and optimize the regulatory pathway by which quantitative imaging biomarkers enter the market.	Steering Committee
F. Sustainability	
NIBIB Task 18. Create a collaborative, multidisciplinary infrastructure to foster research, approval and use of quantitative imaging biomarkers, including development and maintenance of a national repository of quantitative imaging biomarker data, representation at a variety of workshops and meetings, and provide project management and staff support for same.	Steering Committee
NIBIB Task 19. Explore self-funding models to maintain forward progress of the infrastructure and effort described in task 18 above.	Steering Committee

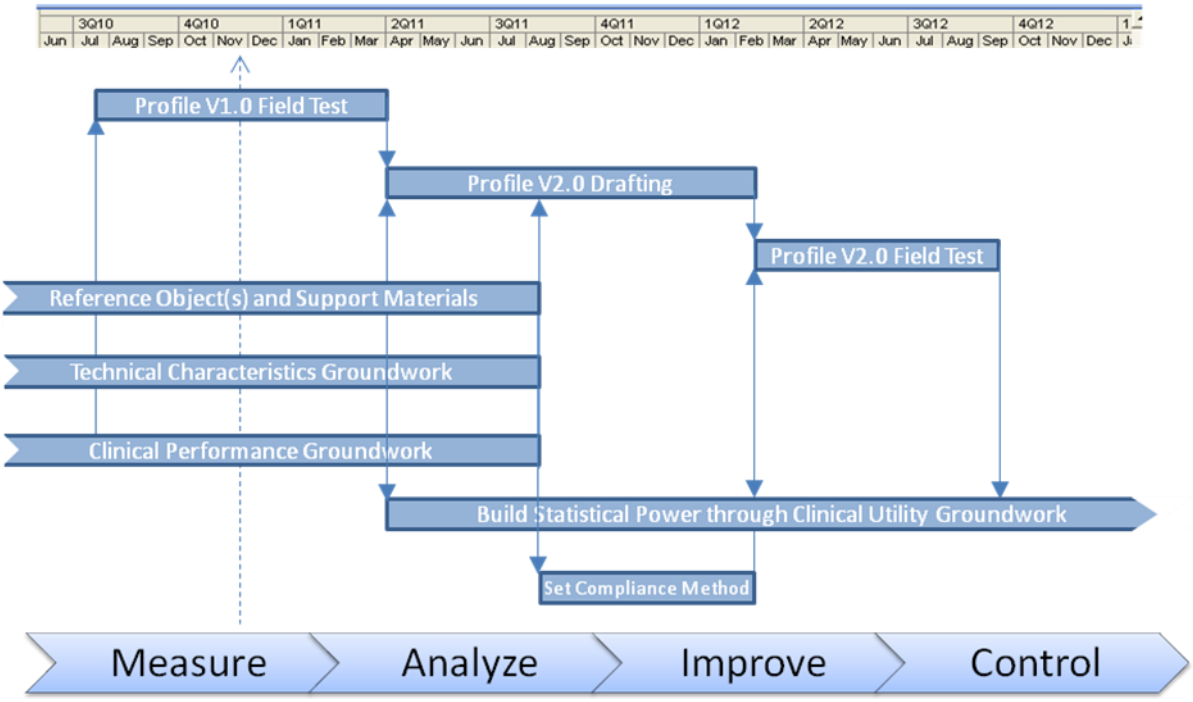
B. QIBA ORGANIZATION



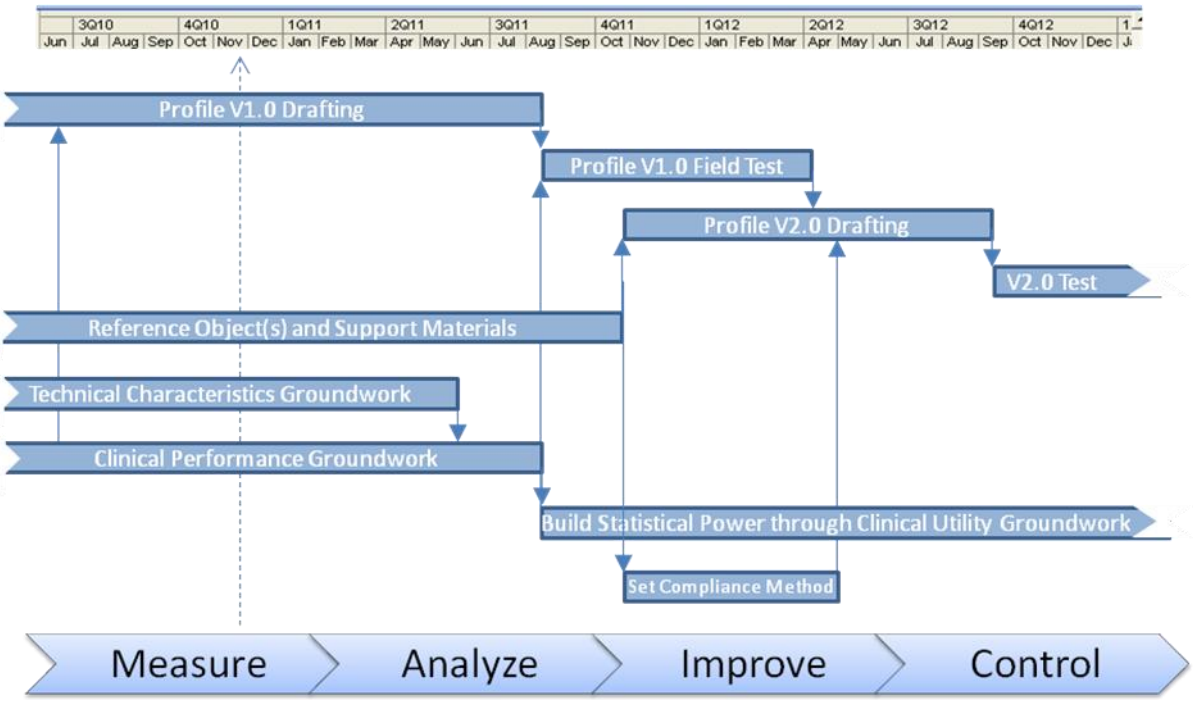
*The Program Director assists the QIBA Steering Committee with overall program coordination, project monitoring, program promotion and cross-modality standardization.

**The Program Advisor consults with QIBA on issues related to governance, policies and procedures, as informed by the Integrating the Healthcare Enterprise program.

C. WORKPLAN FOR VOLUMETRIC CT



D. WORKPLAN FOR QUANTITATIVE FDG-PET



E. WORKPLAN FOR DCE-MRI