Objectives for Call

- Voting Explanation
- Recap of Profile Updates
- Transition to Feasibility Testing
- Next Steps

Voting

Quantitative Imaging Biomarkers Alliance

SS **Susan Stanfa <sstanfa@rsna.org>**
Susan Stanfa
Monday, May 7, 2018 at 4:13 PM
Show Details

Dear QIBA PET Amyloid BC Voting Members:

The PET Amyloid BC would like to vote to establish that the Profile has attained CONSENSUS status (Stage 2 of Profile development).

Please visit the eBallot at: **https://tinyurl.com/y8ynokmy** and vote by **EOB** on **Monday, May 21**. For reference, the PET Amyloid Profile is available on the QIBA wiki.

Working documents are posted on the Biomarker Committee's page: http://qibawiki.rsna.org/index.php/PET_Amyloid_Biomarker_Ctte

If you have questions, please contact the PET Amyloid BC Co-Chairs, Ms. Matthews, Dr. Anne Smith, Dr. Satoshi Minoshima, and NM Scientific Liaison, Dr. Paul Kinahan.

Best Regards,

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Voting

Stage 2 **Consensus**	The wider community has read the profile and believe it to be practical and expect it to achieve the claimed performance

Voting: Consensus Stage

Stage 2: Consensus

Meaning:

•The Profile is widely believed to be practical.

•The Profile is expected to achieve the claimed performance.

•The Profile is ready for Feasibility testing.

•The Profile claim and requirements may change based on Feasibility testing results.

Criteria:

•All public comments have been addressed

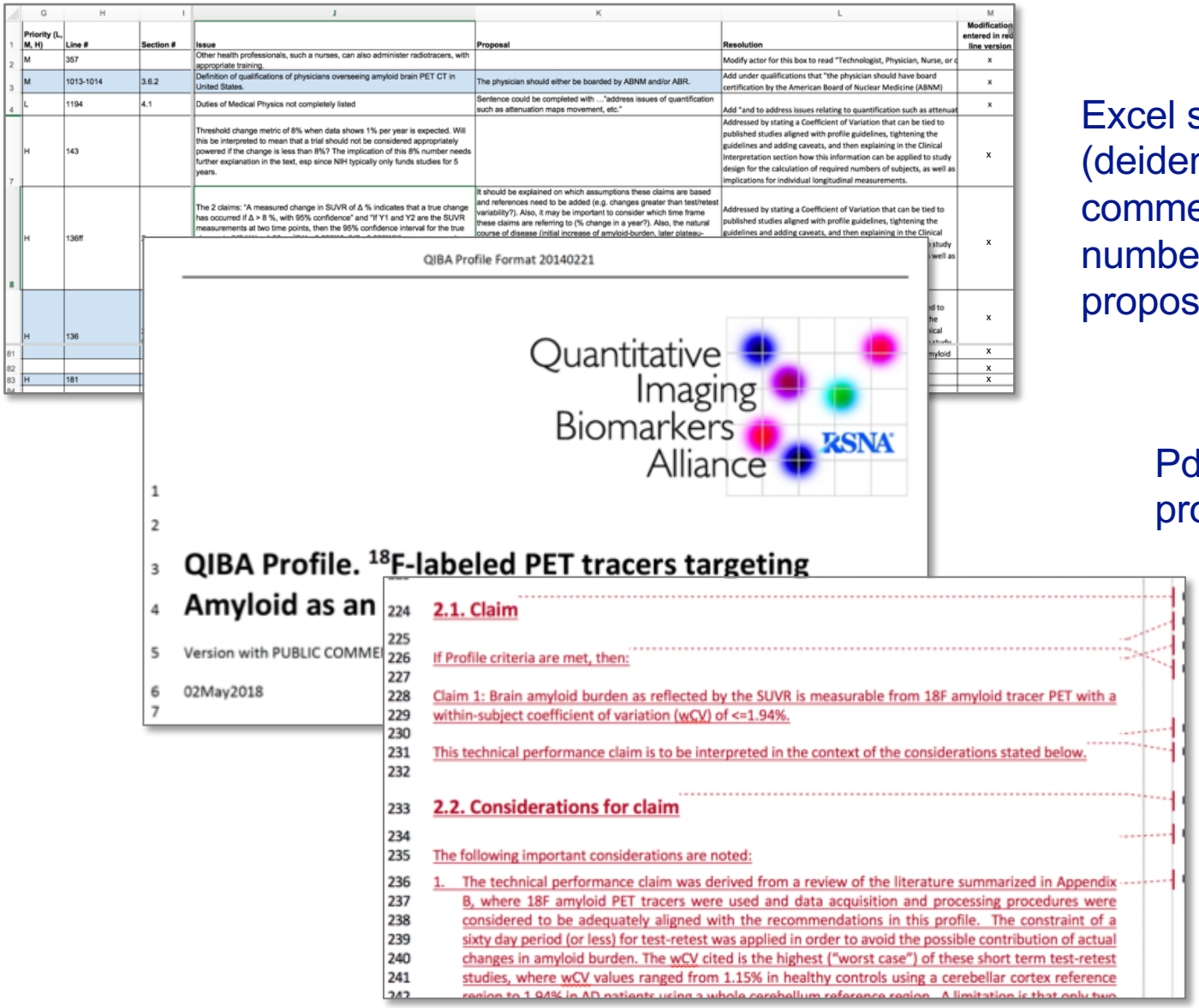
•All open issues necessary for conformant deployment have been resolved

•Few, if any, groundwork projects remain active

•All recommended procedures have been tested in one or more groundwork project(s) or referenced studies. (Reasonable deviations from Profile details may exist.)

•Requirement specifications include requirements and assessment procedures for the statistical assumptions underlying the Profile Claims (e.g. assessment procedure includes sample sizes, details of phantoms and data collection methods, metric computation, requirement specified thresholds).

Posted documents



Excel spreadsheet with (deidentified) public comments, pdf line number references, and proposed responses

Pdf version of the profile as updated

Red-lined Word version of profile as updated

Public Comments and Responses

Category	Number
Acquisition parameters	5
Analysis methods	6
Centiloid	5
Claim	5
Clinical context	4
Full dynamic modeling	1 (3)
Patient prep/positioning	6
Personnel qualifications	3
PET/MR	1
Radiotracer	10
Reconstruction	2
References (ref region)	9
Reporting	1
Scanner QC	4
Terminology, numberings	26
Total	87

Claim

Category	Number
Acquisition parameters	5
Analysis methods	6
Centiloid	5
Claim	5
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- Reference literature updated to align with guidelines
- Citing one Technical Performance Claim
- Updated Claim Considerations; strongly stated caveats
- Developed Clinical Trial Examples using wCV and assumptions for literature
- See Profile group meeting slides from:
  - Oct 12, 2017
  - Feb 9, 2018
  - April 13, 2018

Full Dynamic Modeling

Category	Number
Acquisition parameters	5
Analysis methods	6
Centiloid	5
Claim	5
Clinical context	4
Full dynamic modeling	1 (3)
Patient prep/positioning	6
Personnel qualifications	3
PET/MR	1
Radiotracer	10
Reconstruction	2
References (ref region)	9
Reporting	1
Scanner QC	4
Terminology, numberings	26
Total	87

- Claim considerations revised to make more clear
- Appendix I added on Kinetic Modeling
- See Profile group meeting slides from:

  March 9, 2018

  April 13, 2018

PET-MR

Category	Number
Acquisition parameters	5
Analysis methods	6
Centiloid	5
Claim	5
Clinical context	4
Full dynamic modeling	1 (3)
Patient prep/positioning	6
Personnel qualifications	3
PET/MR	1
Radiotracer	10
Reconstruction	2
References (ref region)	9
Reporting	1
Scanner QC	4
Terminology, numberings	26
Total	87

- PET-MR is now included
- Text updates implemented
- See Profile group meeting slides from:
  March 9, 2018

References

Category	Number
Acquisition parameters	5
Analysis methods	6
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Claim	5
Clinical context	4
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Patient prep/positioning	6
Personnel qualifications	3
PET/MR	1
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- Numerous references added
- Primary categories:
  - Reference region
  - Kinetic modeling
- In reference section, retained by-topic grouping but stated and ordered by first author last name

References

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- Numerous references added
- Primary categories:
  - Reference region
  - Kinetic modeling
- In reference section, retained by-topic grouping but stated and ordered by first author last name

Other

Category	Number
Acquisition parameters	5
Analysis methods	6
Centiloid	5
Claim	5
Clinical context	4
Full dynamic modeling	1 (3)
Patient prep/positioning	6
Personnel qualifications	3
PET/MR	1
Radiotracer	10
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- Uniformity in axial field of view
- 10% variability allowance is automatic recipe for longitudinal SUVR error
  - Reference region dependent
- Narrowed variability guidance
  - Less issue in new scanners

Notes regarding variability

ADNI PET procedures have a similar focus to profile on motion avoidance

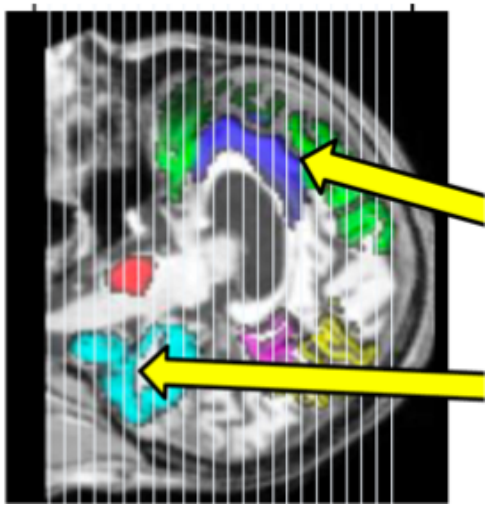
Participant Positioning

Proper patient positioning is a key aspect of the successful completion of the PET exam. It is important to take the time necessary to ensure not only that the patient is properly positioned but can comfortably maintain that position throughout the duration of the scanning session. **Excessive motion and in particular a difference in the subjects' position between the emission scan and the transmission (or CT) scan used for attenuation correction is the single most common cause of failed studies.**

- However, cautions against subject motion do not preclude motion from occurring
  - Subject motion occurs, despite precautions
  - Other sources of variability occur
  - Thus, reference region definition has impact as evidenced in the literature (e.g. Chen, 2015; Brendel 2015; others cited in profile); Groundwork projects showed that different reference and target regions have differing vulnerabilities to factors such as subject motion

Notes regarding variability

- Scanner axial variability is historically “within 10%”, which is a “recipe” for longitudinal variation in SUVR
- The axial uniformity guideline was tightened in the profile update
- However, the profile claim is based on reference literature that did not constrain axial variability to a more rigid standard than within 10% (so a “worst case”, even though the profile recommends a tighter constraint
- This is one reason that reference region selection makes a difference (see explanation at right)



If scanner axial uniformity varies, then depending upon subject position from scan to scan, differences in SUVR will be introduced not because of amyloid changes, but rather due to differences in scanner sensitivity across axial slices. Impact on SUVR only cancels out when the target region and reference region are in the same axial slice.

Note regarding variability

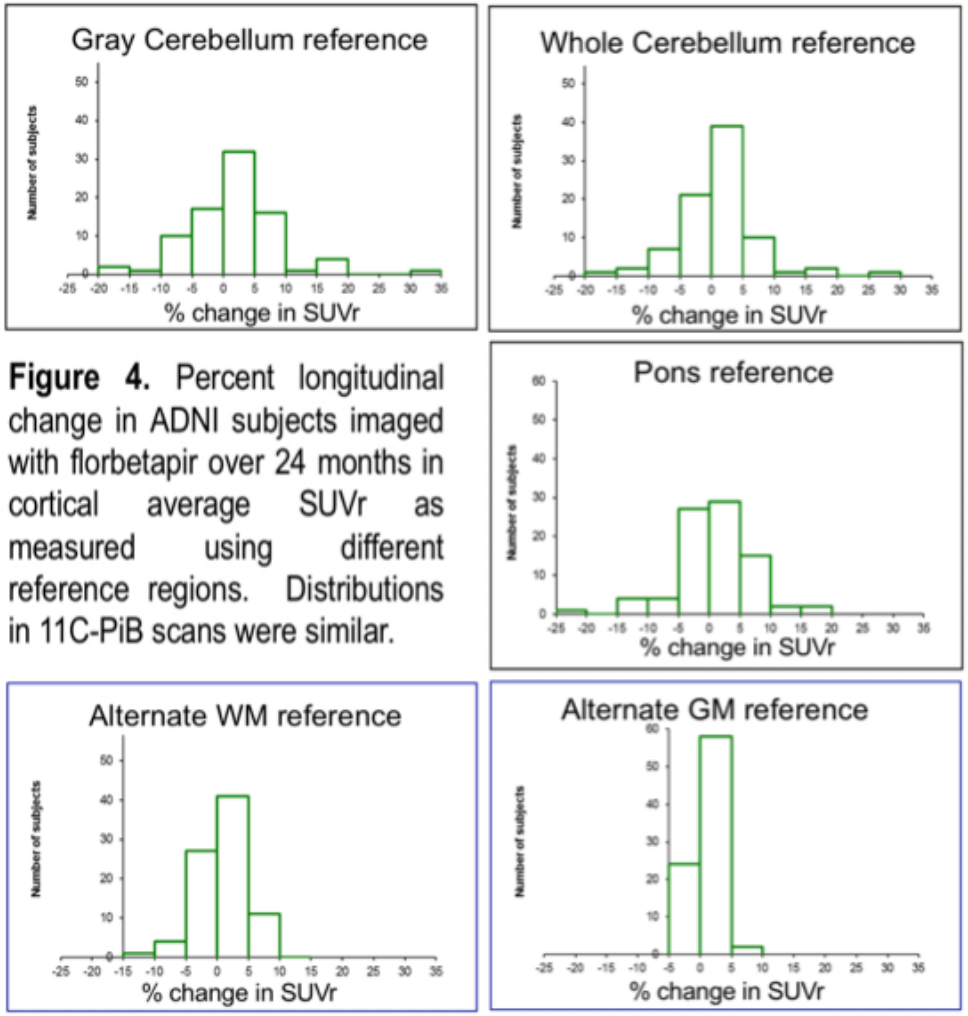
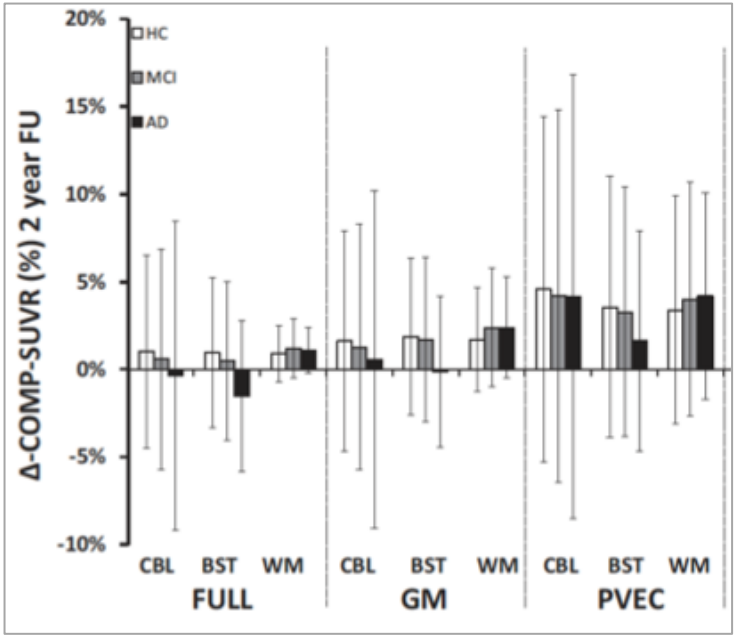


Figure 4. Percent longitudinal change in ADNI subjects imaged with florbetapir over 24 months in cortical average SUVr as measured using different reference regions. Distributions in 11C-PiB scans were similar.

Matthews et al, HAI 2014



Brendel et al 2015

Next Steps

Vote

If not passed:

- Address concerns, remaining items

If passed (and regardless):

- Feasibility testing
- Follow up on Hoffman file, script