ATC Committee
On
Credentialing and QA

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RPC

Accomplishments (task 1)

- Develop “ONE” facility questionnaire
  - Satisfies the data requirements for all QAOs
  - Applicable to all study groups
  - Start with the RTOG 0617, QARC and EORTC questionnaires
  - Web based
  - Hosted by the RPC
- Meeting of QAO IT folks in Houston to address data transfer and accessibility

Accomplishments (task 2)

- Generate a report and consensus on IMRT credentialing methodology
  - Address the use of phantoms and benchmarks
  - Meet the needs of all Study Groups
  - Reciprocity amongst the QAOs
- Report has been written and submitted to ATC PI
  - Recommendation to conduct research to answer question

Accomplishments (task 3)

- Generate a report and consensus on the need for annual TLD audit
  - Applicable to all study groups
  - Use existing data and literature to justify need
  - Touches on international participation
- Report has been written and submitted to ATC PI
  - Majority opinion to maintain annual TLD audit for all
  - Minority opinion to maintain annual in USA/Canada, but for international
    - once at the beginning for all machines or for each new machine and,
    - At a minimum biennially and completed within 3 months of required time period

Accomplishments (task 4)

- Compilation, from RTOG, COG, ACOSOG, SWOG, ECOG and SWOG protocols, of current
  - dose prescriptions,
  - dose uniformity criteria,
  - deviation criteria
- Marcia has generated a preliminary report that will be reviewed by the committee.

Still to Do (task 5)

- Organize a teleconference of the CERR users within the ATC
  - Identify how each QAO uses CERR
  - What are the problems?
  - Share processes that could be used by all of the QAOs to increase uniformity
  - Provide feedback to J. Deasy for improvements
- This task has not been accomplished

New possible tasks

- Justify the need to maintain multiple advance technology clinical trial patient treatment databases
- Determine status and capability to transfer electronic patient data from international participants
- Document the need for rapid reviews and their impact on trial outcomes
- Create a process to eliminate dose reporting errors that is uniform across all QAOs


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Need for Annual TLD

- Validity of Clinical Trials
  - Predominant focus for radiotherapy trials QA is the reduction of patient treatment uncertainty and to reduce the number of deviations
    - Achieved by ensuring accurate dose delivery
      - Imaging
      - Planning
      - Dose delivery
  - Trial result properly reflects the relative efficacy of the treatments being compared without being **obscured by errors** in treatment delivery

Need for Annual TLD

- Focus of the RPC, QARC and RTOG QA programs are to reduce the variability in the doses (amount and location) delivered by participating institutions and when possible correct errors in dose delivery
- One of the most important factors in dose delivery is the beam calibration
  - Can change with time while other factors don't
  - New and/or different calibration protocols result in errors and/or differences in output calibration

Need for Annual TLD

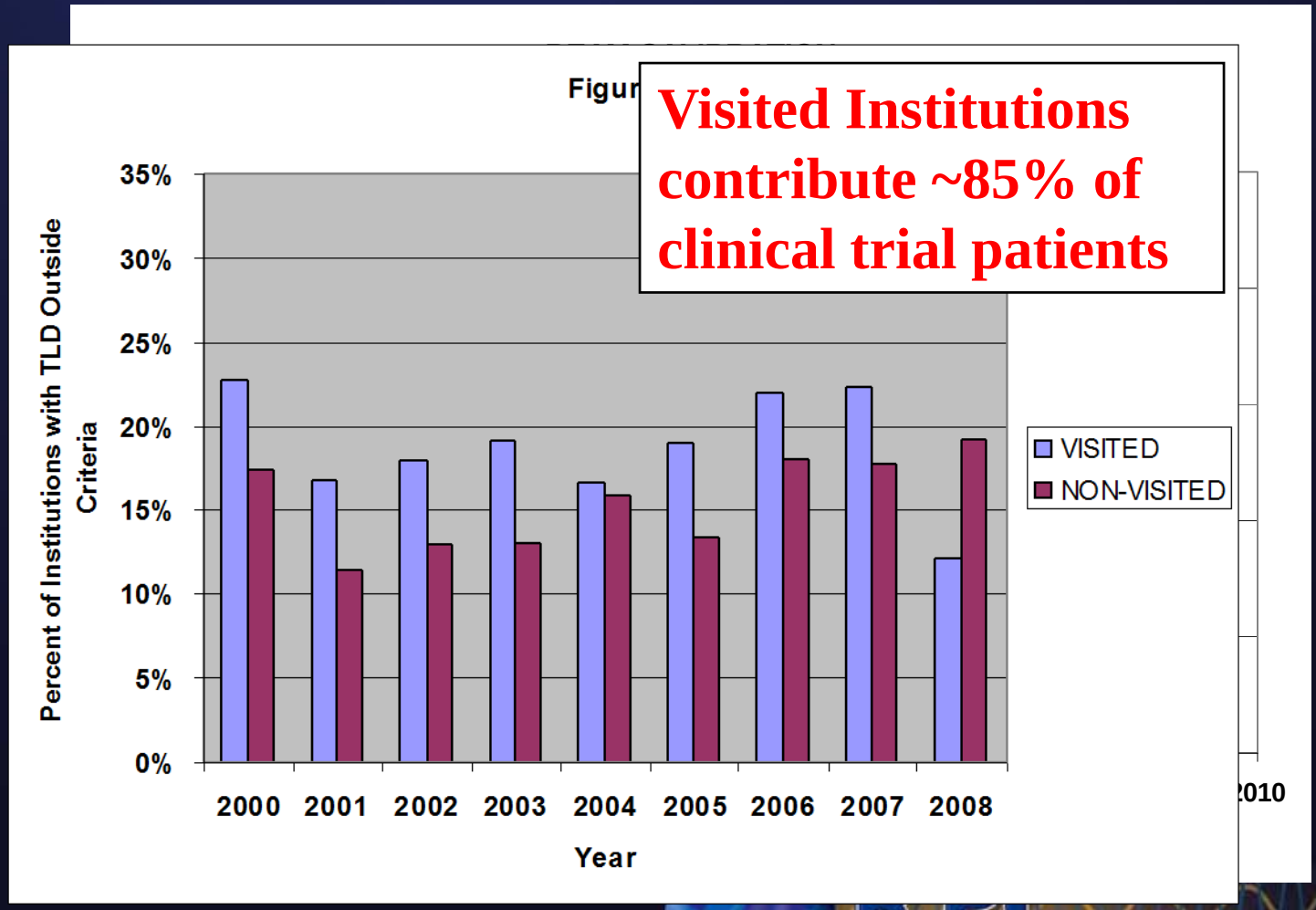
One of the most important contributing factors to errors in beam calibration

Human Error

WHO report on "Radiotherapy Risk Profile" states that 60% of all radiotherapy incidents are attributable to human error

Need for Annual TLD

- Are there errors in beam calibration?



On-Site Dosimetry Review Visit vs. TLD

Reference Beam Calibration

	Percent of Beams out of Criteria (since 2000)	
	Photons	**Electrons**
TLD (±5%)	**3-5%**	**5-8%**
Visits (±3%)	**2-4%**	**3-14%**

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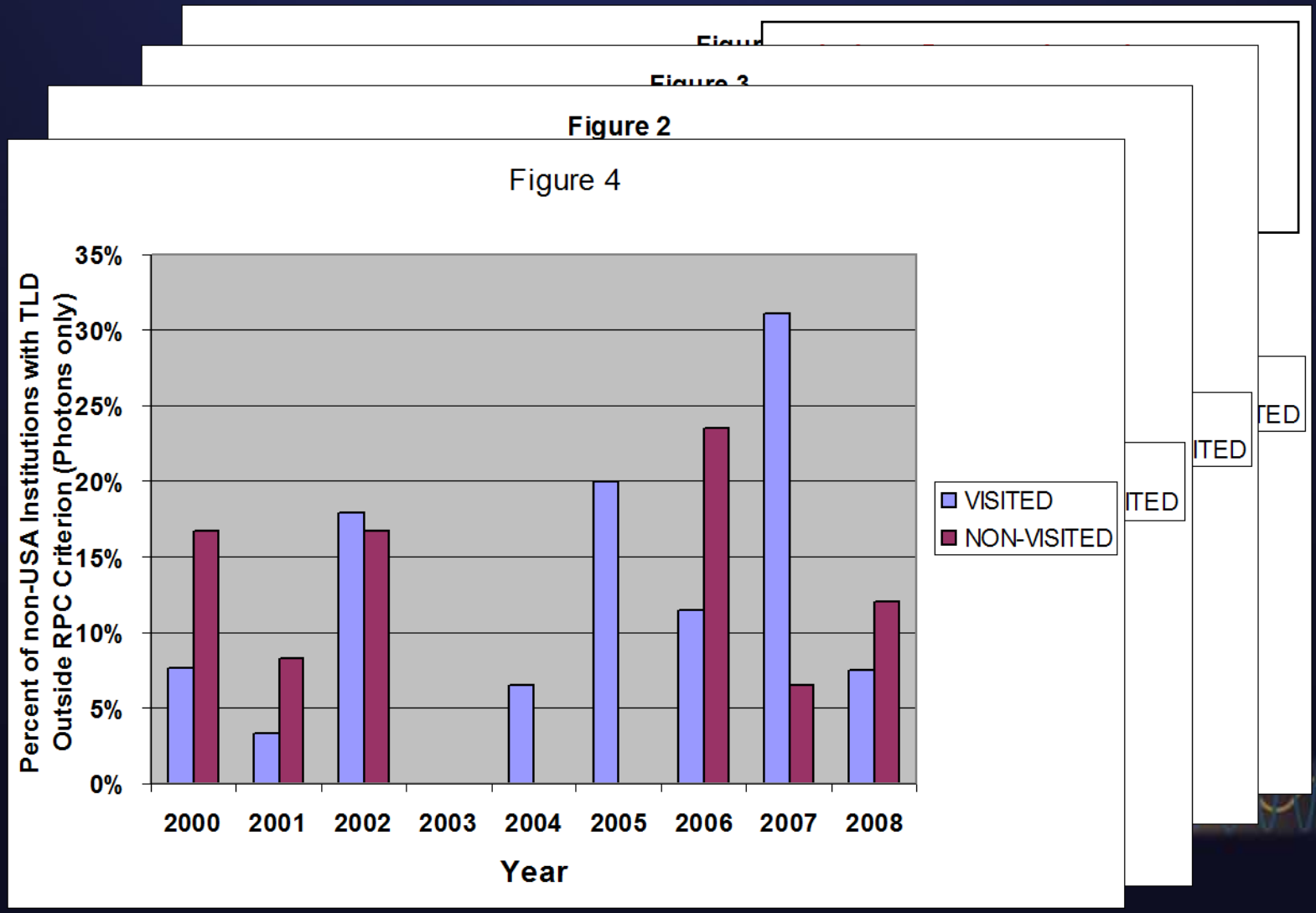
Need for Annual TLD

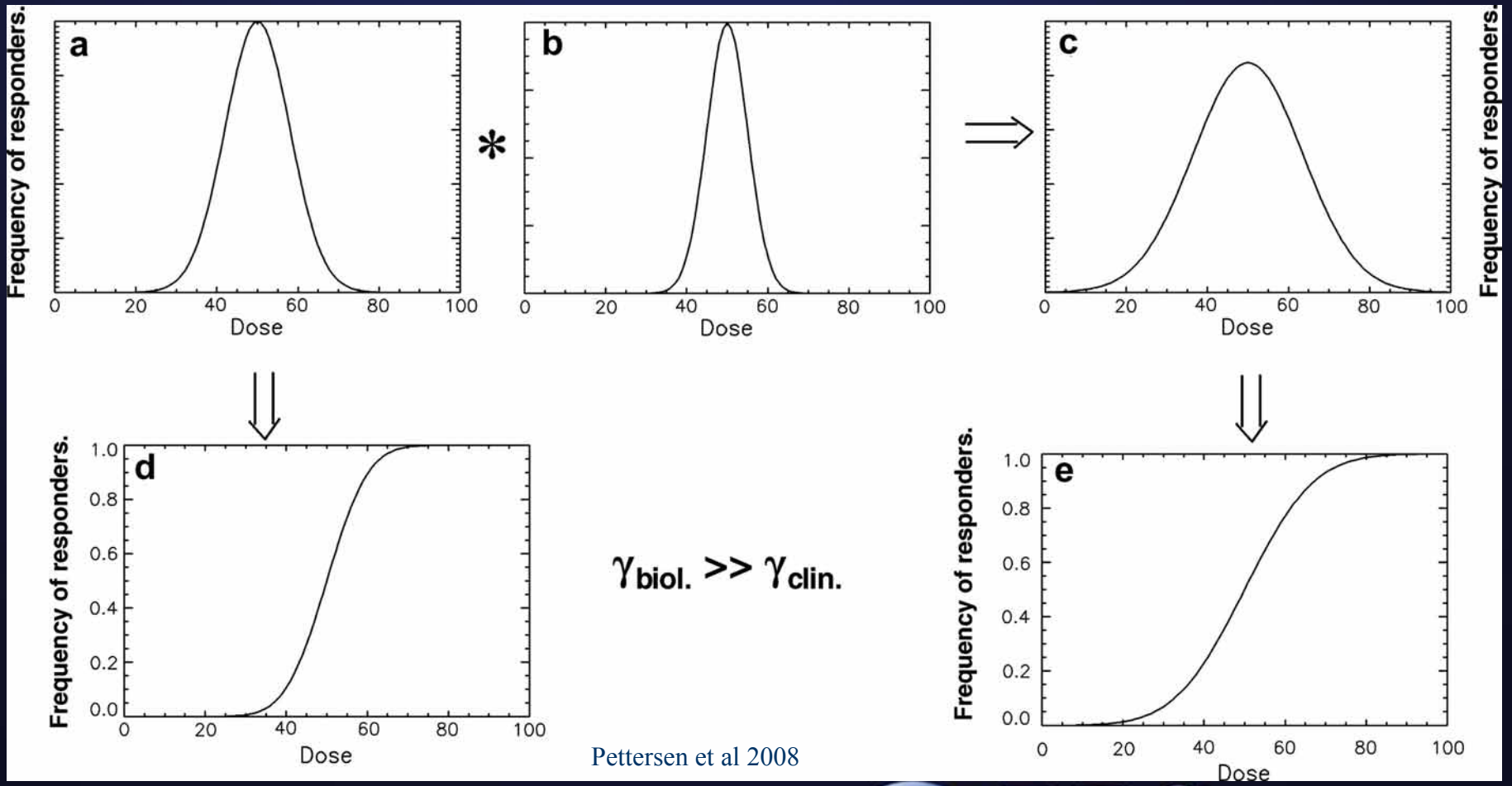
- Are there errors in beam calibration?



Need for Annual TLD

- Reducing the frequency to every 2 years nearly doubles the number of beams with potential errors
  - 33% of the institutions would need follow-up
    - Very few in consecutive years
  - Increases the potential variability in dose delivery
- Annual TLD audit falls in line with accepted standards of practice specified by the AAPM and ACR

Need for Annual TLD



Pettersen et al 2008

Increased dose uncertainty requires greater accrual to compensate

Need for Annual TLD

- Reducing the frequency of the TLD increases the uncertainty in the dose delivery
- Trial outcomes should be derived from the highest quality data available before transfer to the community
- If any questions arise as to the trial outcome, QA of the data is normally questioned first and more patients may be required to answer the question
  - NSABP B-06 and GOG 85 were reevaluated (QA) using the RPC's data (including TLD results) eliminating data/outcome concerns

A wise man once wrote:

"The validity of a cancer clinical trial is dependent in large part on the quality of the treatments delivered by participating institutions. When a large number of submissions fail to meet the requirements of the protocol, the effectiveness of the trial to successfully evaluate its hypothesis is compromised."

This was written regarding the low deviation rate for RTOG 95-17

The Facts

1. Variation in patient dose delivery reduces the effectiveness of a trial.
2. RPC dosimetry audits (incl. TLD) indicate a substantial number of institutions have potential dosimetry errors.
3. Reduction in the frequency of the audits will lead to an increase in the number of undetected dosimetry errors for a longer period of time.
4. More patient dose errors may either:
   - blur any differences between trial arms or
   - require more patients such that the trial is not underpowered which is problematic due to existing accrual issues
5. Trials that fail to answer the question are a waste of resources.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Accomplishments (Task 4)

- List the requirements or recommendations from the various societies' publications as to the need for quality audits.
  - Marcia has reviewed several key documents listed below
    - **AAPM TG45**: "advisable to obtain an independent check on the calibration" (..by using mailed TLD service…)
    - **AAPM TG40**: "Quality Audit should be performed" A mailed TLD service can be used to verify the treatment unit calibration
    - **AAPM TG103**: peer reviewer would verify that TLDs have been performed within the year and that the results acceptable
    - **ACR accreditation**: requires
      - Documentation of compliance with AAPM TG-40, TG-21 or TG-51
      - Documentation of treatment planning system QA program TG- 53
      - Independent Verification of Output of each beam
  - Dave has sent out requests to 4 European physicists and one Aussie as to what is required in their countries for machine QA.