

Incorporating Research Quality Assurance into MD/PhD and PhD Research Training

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5th World Conference
on Research Integrity

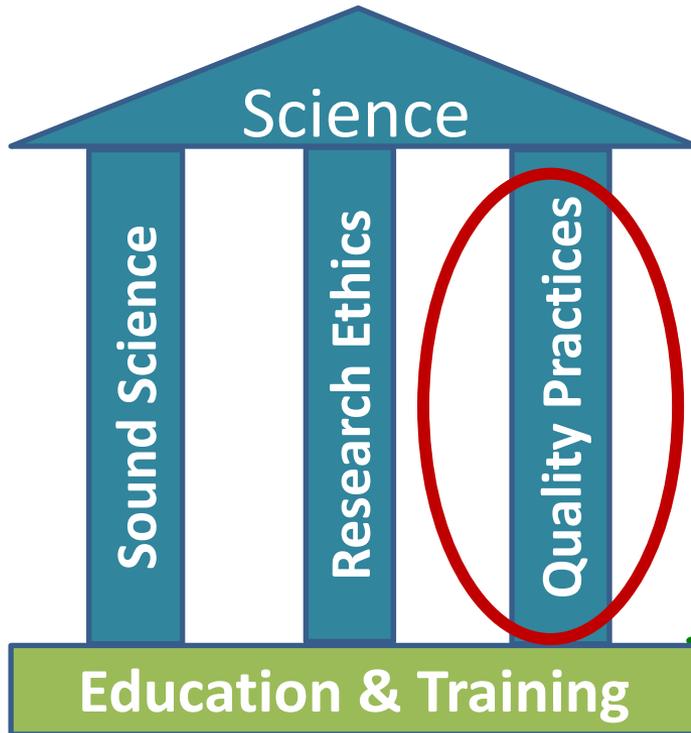
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Today's Remarks



RCR
Approaches 1
Session

training new generations of scientists is a key issue

Research Training: two aspects of quality in research



Sound Scientific Principles
Good Quality Practices

How sound scientific principles and good quality practices contribute to the credibility of results

(World Health Organization: Quality Practices in Biomedical Research Handbook, 2006)

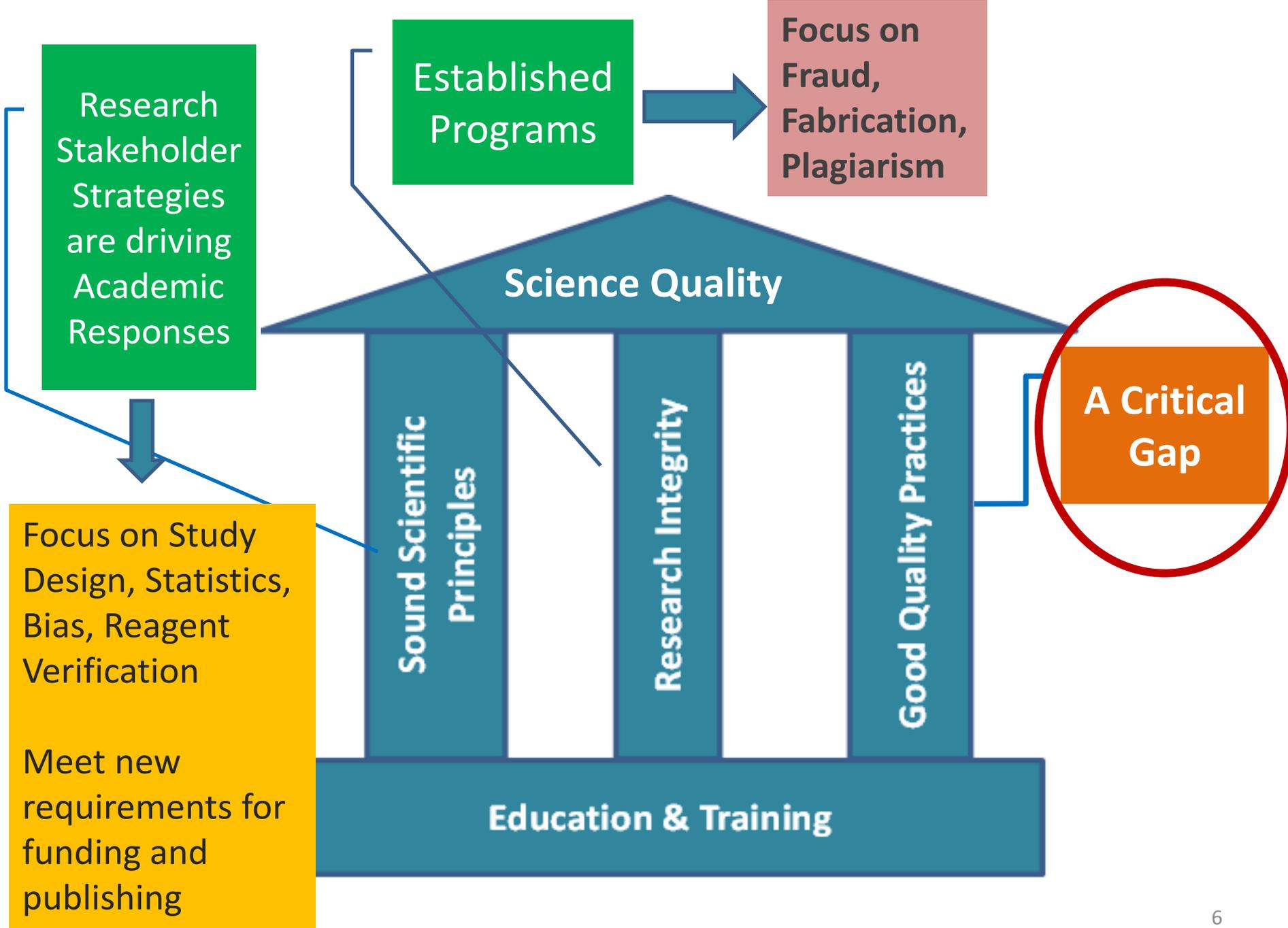
	Sound Scientific Principles	Good Quality Practices	Credibility of Results
Study 1	No	No	No
Study 2	No	Yes	No
Study 3	Yes	No	No
Study 4	Yes	Yes	Yes

Sound Scientific Principles	Good Quality Practices
Premise, Hypothesis, Literature Review	Project Management Data Management
Study Design, Bias	Personnel
Statistics, Inference	Facilities
Variables (Example: Sex)	Equipment
Authentication of Critical Reagents	Materials and
Quality Control	Method Valid
Method Selection	Procedures
Research Review	Research and
	Research Qua

**Who, What,
Where, When,
How, Why**

**Research Records
throughout the
research and
data life cycle.**

Data Integrity



Strategies are need to fill the gaps

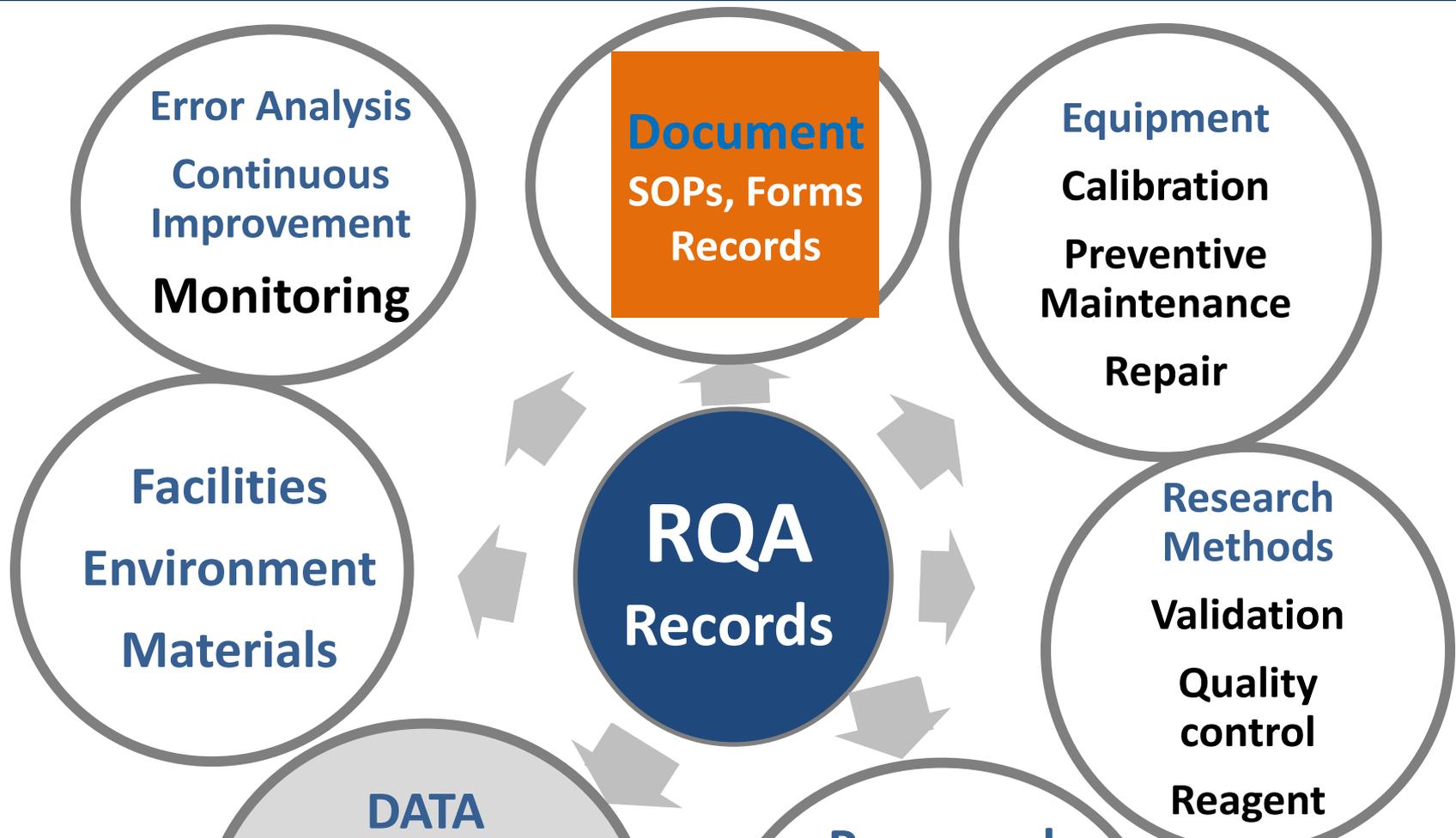
Research Records throughout
the research and data life cycle:
Data Quality and Integrity

Research **Q**uality **A**ssurance best practices could be one
systematic strategy to improve research conduct

Problems Reported with Research Records

Publication	Results
On the reproducibility of science: unique identification of research resources in the biomedical literature . Vasilevsky et al, PeerJ1:e1 48, 2013;	54% of resources are not uniquely identifiable in publications
Who's sample is it anyway? Widespread misannotation of samples in transcriptomics studies; L Toker et al, F1000Research, 2016	Apparent mislabeled samples in 46% of the datasets studied
Gene names are widespread in the scientific literature; Ziemann et al, Genome Biology 2016	Approximately one fifth of papers with supplementary Excel gene lists contain erroneous gene name conversion
Scientists behaving badly, Martinson et al, Nature 435, June 2005	27.5% of scientists self report inadequate record keeping

Quality Assurance Approaches Safeguard Records



Credible Evidence leading to Data Traceability, Trust in Data
and Confidence in Research Outcomes

Rare in Basic Research Settings

Quality Central

Sharpening the focus on sound science and quality practices

UNIVERSITY OF MINNESOTA

College of Veterinary Medicine

QuARRC

Quality Assurance Research Reproducibility Collaborative

Who

- **Trainees:** 12 MD/PhD and PhD predoctoral trainees [Lab Med & Path, Biochemistry, Neuroscience, Genetics, Microbiology, Immunology, and Cancer Biology]
- **Instructors:** Scientists with expertise in Quality Assurance (Quality Central Program), Educational Paradigms (Center for Education Innovation) and Data Management (Library)

What

- **Pilot program** to facilitate the adoption of Research Quality Assurance (RQA) best practices within basic research settings to enhance research rigor and reproducibility.

How

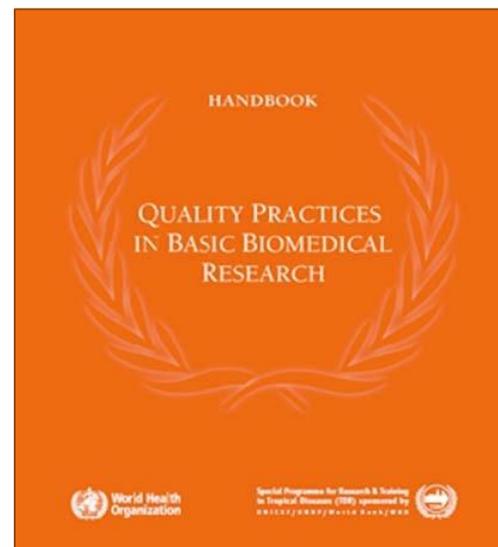
- **Trainee project based – ‘Research in context’**

Learning Objectives

- Establish a Research Quality Assurance (RQA) process to maintain research rigor, data quality and data integrity throughout the research life cycle.
- Implement RQA procedures to allow the full reconstruction and traceability of research activity.
- Provide evidence that data are fit for their intended purpose.

Training Resources

- Quality in Research: Guidelines for working in non-regulated research. Research Quality Association
- Quality Systems Workbook. Research Quality Association
- World Health Organization Quality Practices in Basic Biomedical Research (QPBR)
- Research Quality Assurance Toolkit
Michelson Prize and Grant Program.

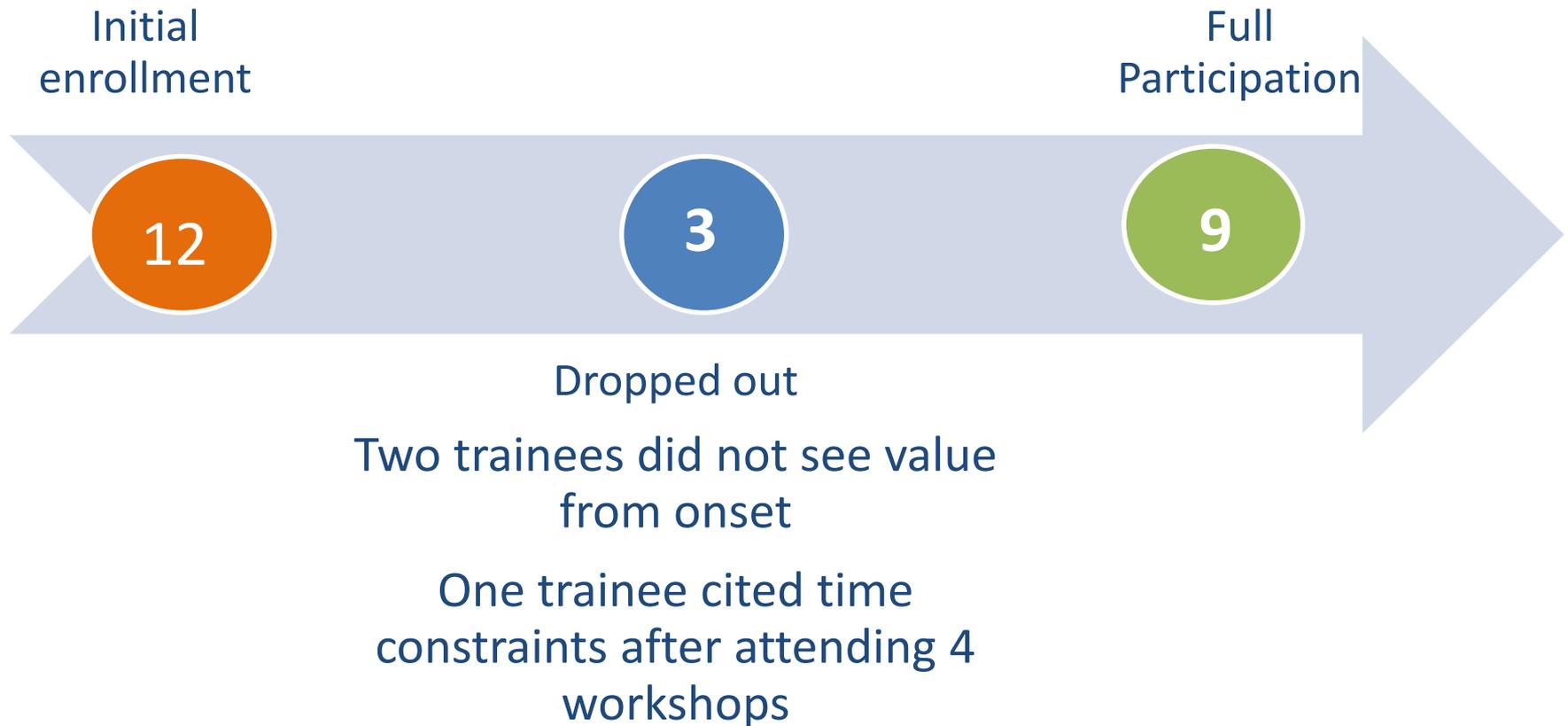


Plan

Kick Off Event	Introduction, Research Scientist Panel Discussion
Workshop 1	Targeting Research Quality Assurance (RQA) to your research project
Workshop 2	Identifying risk to research data
Workshop 3	Mitigating risk to research data
Workshop 4	Managing research data to improve reproducibility
Workshop 5: Individual consultations	Using RQA to demonstrate the quality of your research
Workshop 6	Securing data and records now and in the future
Workshop 7	Monitoring and maintaining the quality and integrity of your research data with RQA audits.
Individual consultations	RQA Coaching and audit/assessment



Voluntary Participation Outcomes



Lessons learning

Mentor commitment is critical

- Time, resources, communication, trust

Lack of Mentor experience with QA

- Distrust, Anxiety

Voluntary or mandatory approach

Sustainable monitoring model

Consider additional targets (lab managers, technician)

Time constraints (blended curriculum)

**Demonstrate
Research
Quality**

**Promote
Best
Practices
and Sound
Science**

**Improve
Research
Rigor**

Why integrate

**Scientist Driven Response to
Research Reproducibility Concerns**

**Establish and
Drive Research
Standards**

**Support
and Train
our
Scientists**



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Conclusions



Integrating RQA into basic research settings addresses a critical gap and may be a reasonable strategy for addressing research reproducibility concerns.

training new generations of scientists is a key issue and new models of research training are needed

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Thank you!



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NATURE | NEWS FEATURE; 27 JAN 16

MONYA BAKER

QUALITY TIME

IT MAY NOT BE SEXY, BUT QUALITY ASSURANCE IS BECOMING A CRUCIAL PART OF LAB LIFE.

