



Fostering Integrity in Research: Overview of a New Report from the U.S. National Academies

Brian C. Martinson, PhD
orcid.org/0000-0002-4255-5595
[@bcmartinson](https://twitter.com/bcmartinson)

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COMPETING INTERESTS

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Neuroskeptic @Neuro_Skeptic · Jan 16

Imagine if papers came with truly honest disclosure statements.

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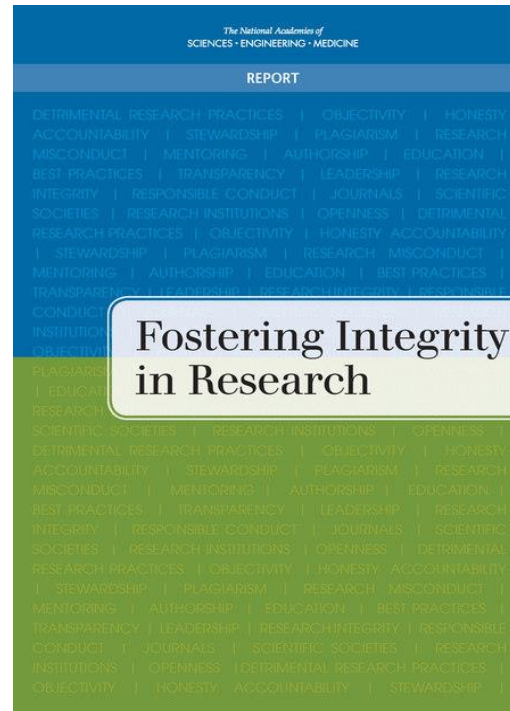
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Learning Objectives

- ▶ Upon completion of this session, learners should be better able to:
 - Recognize the existing U.S. federal definition of research misconduct and how it differs from “detrimental research practices.”
 - Distinguish between an “individually-based” approach to research integrity and a “systems-based” approach.
 - Identify the four key “findings” of the report, and some of the key recommendations that follow from those findings.

Fostering Integrity in Research



Committee on Responsible Science
Committee on Science, Engineering, Medicine, and Public Policy

Background

- In 1992 the National Academies released the report *Responsible Science*
- Much has happened subsequently, the environment for the responsible conduct of research has changed.
- This resulted in COSEMPUP*/National Academies appointing a new committee on responsible science.

*COSEMPUP is the Committee on Science, Engineering, Medicine, and Public Policy

Committee on Responsible Science

Robert M. Nerem (Chair), Georgia Institute of Technology

Ann M. Arvin, Stanford University

Rebecca M. Bergman, Gustavus Adolphus College

Moses H. Chan, Pennsylvania State University

C.K. Gunsalus, University of Illinois at Urbana–Champaign

Deborah G. Johnson, University of Virginia

Michael Keller, Stanford University

W. Carl Lineberger, University of Colorado

Brian C. Martinson, HealthPartners Institute

Victoria Stodden, University of Illinois at Urbana–Champaign

Sara E. Wilson, University of Kansas


Paul Root Wolpe, Emory University

Levi Wood, Georgia Institute of Technology

Study Director: Tom Arrison, National Academies of Sciences,
Engineering, and Medicine

Statement of Task – I

An ad hoc committee under the oversight of the Committee on Science, Engineering, and Public Policy will undertake a revision of the Responsible Science study first issued in 1992. The committee will be charged with addressing the following questions:

- ▶ What is the state of current knowledge about modern research practices for a range of disciplines, including trends and practices that could affect the integrity of research? What is the impact of modern technology such as image enhancement, the Internet, and data storage systems?
 - ▶ What are the impacts on integrity of changing trends in the dynamics of the research enterprise, such as globalization, the treatment of intellectual property, handling of materials and specimens, university oversight and institutional review boards, and demands of government regulation?
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Statement of Task – II

- ▶ What are the advantages and disadvantages of enhanced educational efforts and explicit guidelines for researchers and research institutions? Can the research enterprise itself define and strengthen basic standards for scientists and their institutions? How is this affected by increased collaboration among researchers, in the United States and internationally?
 - ▶ What roles are appropriate for government agencies, research institutions and universities, and journals in promoting responsible research practices? What can be learned from institutional and journal experiences with current procedures for handling allegations of misconduct in science?
 - ▶ What should the definition of research misconduct include? Should it only include the criteria of “falsification, fabrication, and plagiarism” (drawn from the 1992 edition of Responsible Science) or should it be broadened to include elements of questionable research practices and research impropriety?
 - ▶ Should existing unwritten practices be expressed as principles to guide the responsible conduct of research? The committee is encouraged to prepare model guidelines and other materials if it deems that would be useful.
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Themes Informing the Report

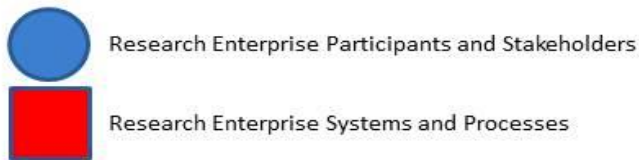
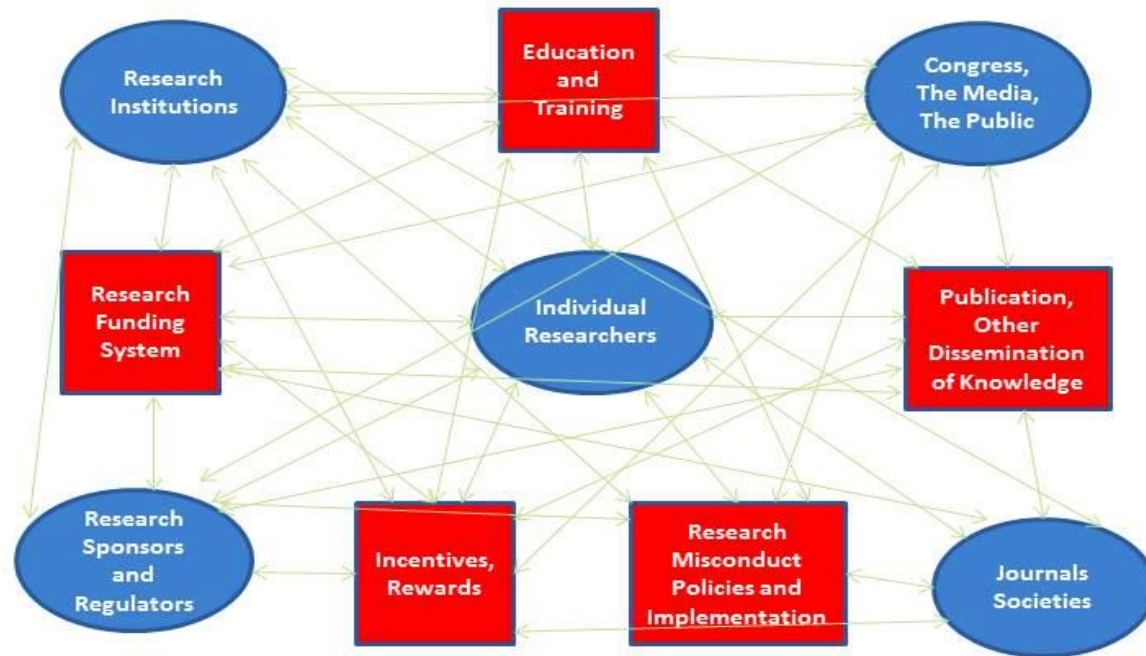
- ▶ Distinguish between an “individually–based” approach to research integrity and a “systems–based” approach.
- ▶ Recognition of “detrimental research practices” as a category of undesirable research behavior distinct from the existing federal definition of research misconduct
- ▶ Focus on assuring the *quality* of science as a means of maintaining integrity, in contrast to a focus solely on fraud/misconduct

Trends and Challenges

- ▶ Research is being transformed by technology, globalization, collaboration across disciplines and sectors (e.g. industry), growing competition, and growing policy relevance
 - ▶ These trends are changing the research environment and creating new challenges for fostering integrity
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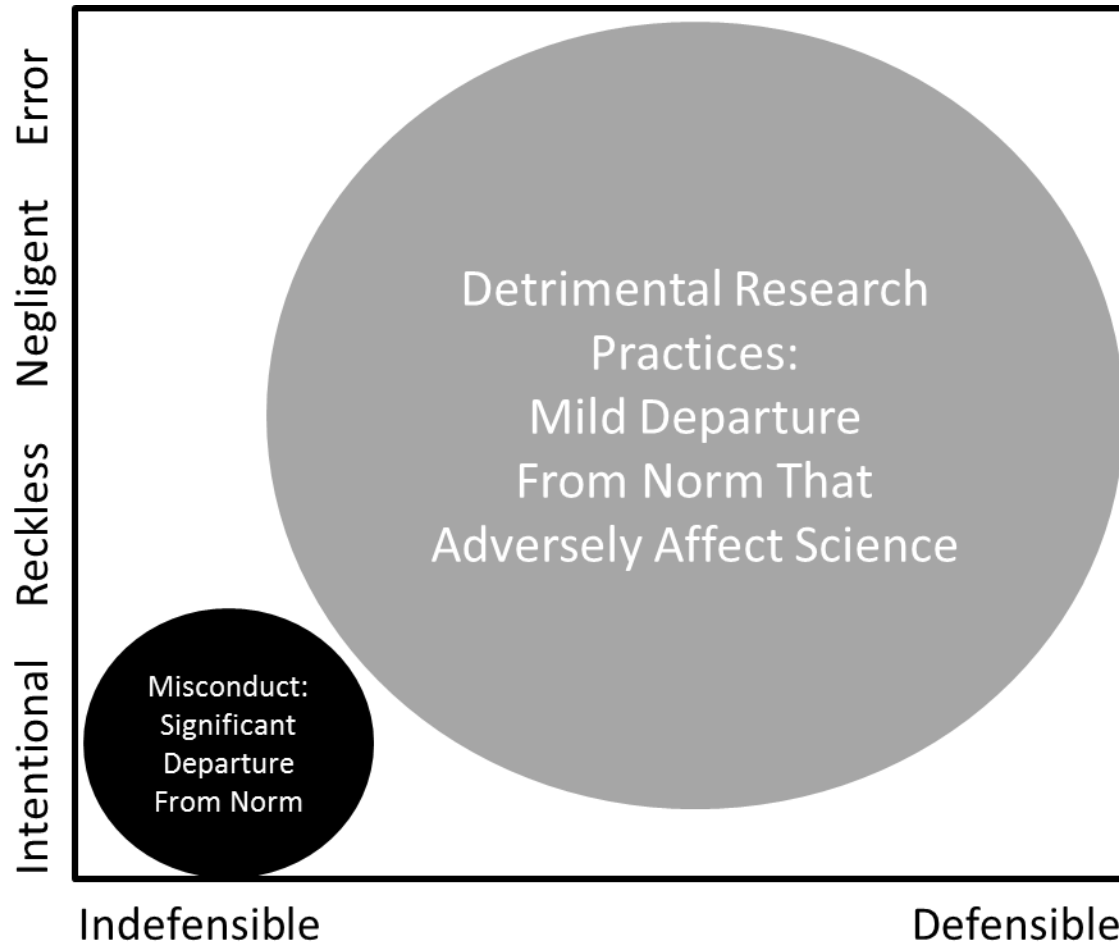
Therefore, focus must expand beyond individual researchers to the entire system to foster integrity

Figure 1-1: The Research Enterprise as a Complex Adaptive System



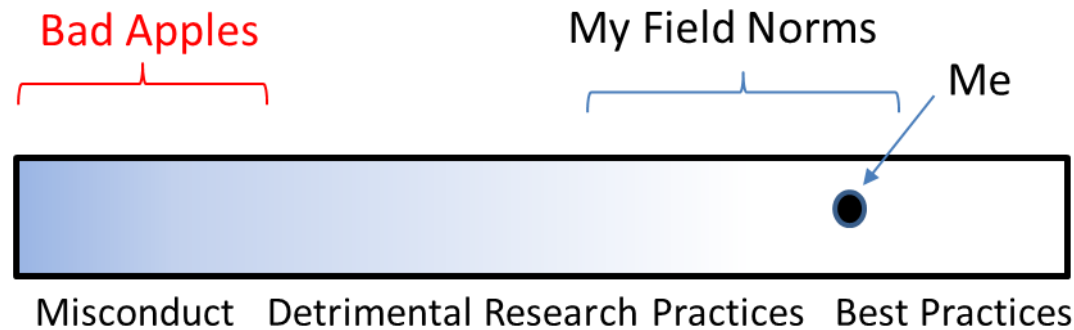
Definitions: Need to **expand focus beyond FFP** to other behavior damaging research process

- ▶ **Endorse current federal definition** of research misconduct as “fabrication, falsification, and plagiarism,” pointing out areas for harmonization and refinement
- ▶ Community should put more focus on “**detrimental research practices**”: failure to share data/code, misleading use of statistical methods, authorship misrepresentation other than plagiarism, abusive/neglectful supervision
- ▶ **Research institutions, journals, etc., can also commit DRPs** (e.g. not having the capability to effectively investigate allegations)
- ▶ **“Other misconduct” also important** (prevent retaliation against whistleblowers)



(Slide credit: Sara E. Wilson, University of Kansas)

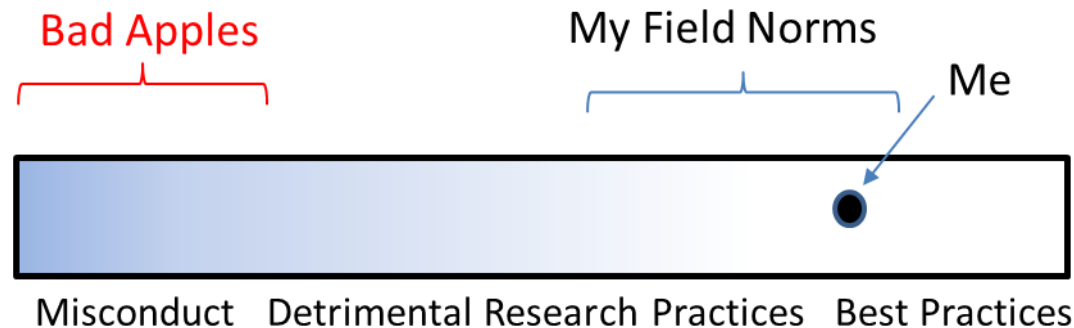
Rather than Binary... a continuum



- ▶ Focus has been on “a few bad apples”
- ▶ We should also be looking at moving researchers and fields towards best practices that improve the quality of research

(Slide credit: Sara E. Wilson, University of Kansas)


Rather than Binary... a continuum



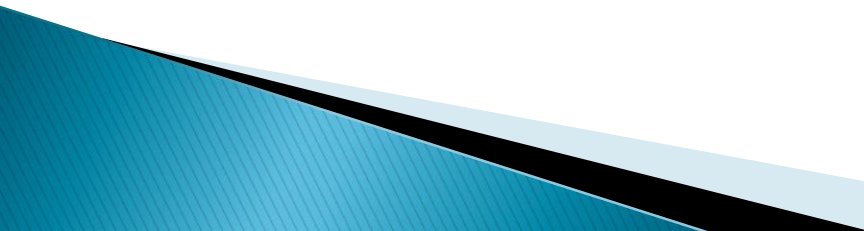
Forces opposing moving towards best practices:

- ▶ Lack of resources (money, time, institutional support)
- ▶ Expectations (publish and procure (\$) or perish) and institutional environment
- ▶ Lack of knowledge, education, skills

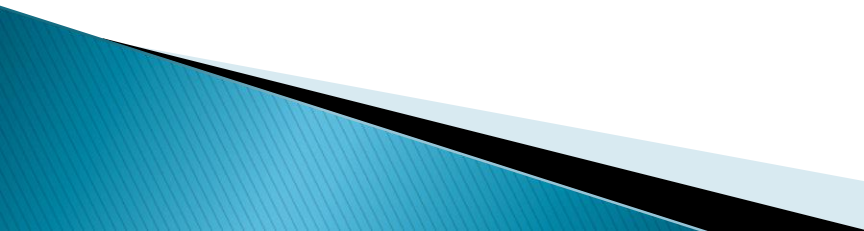
(Slide credit: Sara E. Wilson, University of Kansas)

- ▶ Quality control problems in science vs. fraud
 - ▶ For several decades at least, we have strongly emphasized legal and regulatory mechanisms to ensure the integrity of research
 - ▶ This is well suited for addressing fraud-like behaviors (FFP) but less well suited for addressing the broader range of detrimental behaviors that damage the integrity of science
 - ▶ Legal and regulatory mechanisms are but one end of a spectrum of social control
 - ▶ Quality control in science requires use of a broader range of social-control mechanisms
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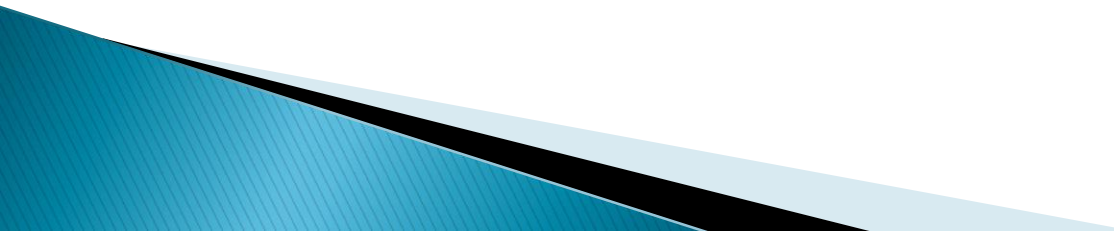
Incidence and Consequences – I

- ▶ The report reviews the available evidence: statistics from agencies, analysis of retractions, survey data
 - ▶ Estimating the true incidence of misconduct and detrimental research practices is fraught with problems
 - ▶ Thus unknown whether incidence is increasing or not; misconduct appears to be unusual but not rare, more is being uncovered
 - ▶ Concerns are certainly increasing, reproducibility is a current focus (more later)
- 


Incidence and Consequences – II

- **FFP and DRPs impose direct financial costs and significant indirect costs – but these are difficult to measure and estimate, but include:**
 - Public health costs, damage to the credibility of research
 - \$ spent on fraudulent research and irreproducible research due to detrimental practices; following up fraudulent research; on misconduct investigations,
 - Opportunity costs of wasted research time
 - Costs of careers sidetracked or ruined, individual and institutional reputations damaged, civil penalties
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The Reproducibility Challenge

- **A concerning percentage** of published findings in some fields are not reproducible,
 - Failure to reproduce has several causes—a **certain level of irreproducibility is normal**,
 - **Research misconduct and DRPs can be causes**
 - **Tolerance of DRPs** can cause irreproducibility and prevent/delay uncovering misconduct
 - **Several initiatives are underway** to address the challenge
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Need to understand how **funding/structural issues** affect research environments and propensity to engage in research misconduct and detrimental practices

- ▶ **Knowledge in the social and behavioral sciences** is providing more insight on the environmental factors that encourage cheating and other deviant behavior,
 - ▶ These include high stakes, low probability of success, acceptance of corner-cutting in the environment
 - ▶ Hypercompetition in some fields of research is contributing to creating research environments with these characteristics
 - ▶ Also greater recognition of common, unavoidable cognitive biases
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Findings / Recommendations – I

Recognize the complex interactions among the many components of the research system and implement improved approaches

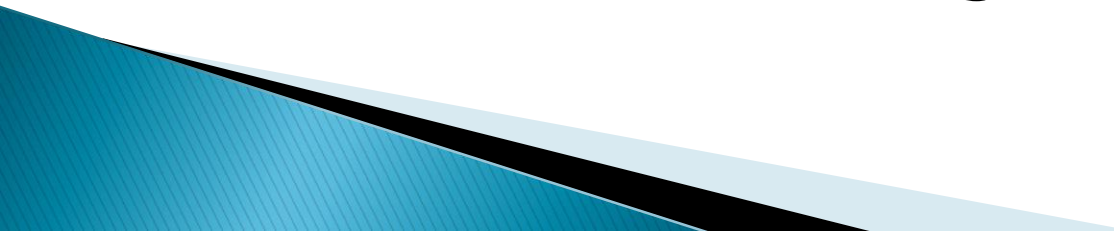
Rec #1: All participants need to improve and update policies / practices

#2: Research institutions are central: need to uphold highest standards of integrity, go beyond compliance

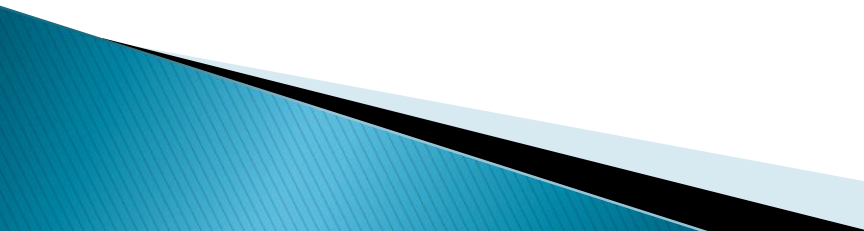
#3: Protect good-faith whistleblowers

#4: Establish Research Integrity Advisory Board

Best Practices for Research Integrity

- Chapter 9 provides an overview of **best practices** for individual researchers, research institutions, research sponsors, journals, and scientific societies
 - Best practices speak to **relationships between components of the system**
 - Concise checklists are provided for each constituent group.
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Research Integrity Advisory Board

- ▶ Research integrity across disciplines/sectors is not the core mission of any current US organization
 - ▶ **Establish RIAB as an independent non-profit**, would be supported by dues-paying members (stakeholders in the research enterprise)
 - ▶ **Would aim to increase capacity of institutions** to foster integrity, serve as a forum to share knowledge and expertise, and be a focal point of efforts to improve standards and develop consensus
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**HONESTY, ACCOUNTABILITY AND TRUST:
FOSTERING RESEARCH INTEGRITY IN CANADA**

The Expert Panel on Research Integrity



Council of Canadian Academies
Conseil des académies canadiennes

Science Advice in the Public Interest

2010 Canadian report –
Honesty,
Accountability and
Trust: Fostering
Research
Integrity in
Canada

Included a recommendation
for the creation of a similar
entity – “Canadian Council
for Research Integrity”
(CCRI)

Full disclosure: I was a
member of the panel that
drafted this report

Findings / Recommendations – II

Increase openness and accountability to foster integrity AND improve quality


#5: Framework for authorship standards

#6: Research sponsors and journals should ensure that **info sufficient to reproduce results** is provided at the time of publication

#7: Sponsors should **support long-term storage and access** to data/code

#8: Researchers should **disclose all statistical tests** and negative results

Framework for Disciplinary Authorship Standards

- **Authorship is based on significant contributions**
 - **Many types of contributions:** design, conduct, data analysis, drafting intellectual content
 - **All authors should approve final manuscript**
 - **Standards should identify** author(s) responsible for entire work, require disclosure of roles
 - **Specify that gift/honorary, coercive, and ghost authorship are unacceptable**
 - **Disciplinary standards** should be developed by leading societies and/or journals
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Findings / Recommendations – III

Invest in new knowledge to develop better evidence-based approaches

#9: Research sponsors should invest in research to quantify and develop responses to conditions associated with misconduct and DRPs; should use this knowledge to monitor and modify policies and regulations

#10: Research sponsors and research institutions should develop, assess, and implement more effective approaches to RCR education

Findings / Recommendations – IV

Working to ensure research integrity at the global level is essential to strengthening science both in the United States and internationally

#11: Researchers, research institutions, and research sponsors that participate in and support **international collaborations should leverage these partnerships** to foster research integrity through mutual learning and sharing of best practices

Thank you!

Brian C. Martinson, Ph.D.

marti148@umn.edu

brian.c.martinson@healthpartners.com