Practices, Perceptions, and Patterns of Research Integrity (PRINT)

Jesper W. Schneider
Centre for Studies in Research and Research Policy,
Aarhus University
jws@ps.au.dk
Colleagues and partners

• **Aarhus University**: Jesper W. Schneider (PI), Niels Mejlgaard (co-PI), Kaare Aagaard, Mads Sørensen, Tine Ravn, Jens Peter Andersen, Allan Rye Lyngs, Asger Dalsgaard Pedersen, Bobby Zachariae & Michael Bang Petersen

• **University of Essex, UK**: Nick Allum

• **University of Split School of Medicine, Croatia**: Ana Marušić

• **Stanford University, US**: Daniele Fanelli

• **Austrian Agency for Research Integrity, Austria & (former) Chair of European Network of Research Integrity Offices (ENRIO)**: Nicole Foeger
Main research objectives of PRINT

1. To examine, define and typologize Questionable Research Practices (QRPs)
2. To estimate their prevalence and examine perceptions of them within and across main fields of research (knowledge production models)
3. To elucidate the most predominant mechanisms potentially influencing QRPs, and examine how they relate to individuals, institutions, norms, and standards
4. To provide a contextualized mapping of the current integrity of Danish research
5. On the basis of the findings, to provide recommendations for improving research integrity in Denmark and beyond
Responsible conduct of research

- good research practice with integrity

Research misconduct
- fraud

The practice of efficient production of relevant, valid, transparent, reliable and reproducible scientific knowledge

A responsible researcher is conceptualized as: objective, meticulous, sceptical, rational, and not subject to external incentives such as prestige or social pressure

Misconduct is formally defined as three types of condemned behaviours: fabrication, falsification, and plagiarism (FFP)
Responsible conduct of research (RCR)
- good research practice with integrity

Questionable Research Practices (QRP)
- the grey zone, a large zone of deviations from RCR that do not fall under the established definition of RM

Research misconduct (RM)
- fraud

QRPs are highly contextual: disciplines, paradigms, traditions, geographic ...

QRPs are often unintentional, rooted in norms and traditions

Demarcation between QRP and RM is difficult to establish – there is no consensus

‘Ideal’ ‘Sloppy’ Unconscious bias Conscious bias

- Fabrication
- Falsification
- Plagiarism
Conceptual issues

Questionable research practices

Detrimental research practices
Conjecture: Breeches of research integrity can be harmful

QRPs Create "bias"

Potential influence (negatively)

Primary
- "truth" (validity of knowledge)
- "trust" between researchers (fairness)
- "trust" in science (credibility)

Secondary
- "waste" of resources and unethical to participants
- "harm" to society, nature, individuals/patients
What are they?

100+ examples of deviations from responsible conduct of research that threaten the relevance, validity and efficiency of research, the trust between scientists, and the trust in science

- **Study design** (items that concern the phase before the start of data collection)
- **Data collection** (items that concern the phase of data collection)
- **Data-analysis** (items that concern the phase of data-analysis)
- **Reporting** (items that concern reporting of results of the study)
- **Collaboration** (items that concern obligations towards colleagues and science as a whole)

Somewhat biased towards the medical fields
A. Study design (22 items)

1. Propose study objectives which are clearly superfluous or irrelevant (Are the problems worth pursuing, or only of slight interest? Will the expected results add any value/usefulness? Has the literature been critically reviewed, or has the review been superficial or selective? Could the questions be resolved by a systematic review of the literature? Has the study been done many times before/have the expected results been obtained before? Are others already doing this?)

2. Insufficient attention to the equipment, skills and expertise essential to do the study

3. Inappropriate study design: Insufficient attention to effect-to-bias ratio

4. Inappropriate study design: Insufficient attention to statistical power problems

5. Inappropriate study design: Insufficient attention to the “vibration of effects” caused by flexibility of definitions and methods for data analysis

6. Conceal the significance of the need for replication of the study

7. Ignore substantial risks of the expected findings for society or the environment

8. Ignore substantial safety risks of the study for participants, workers or environment

9. Do not pay appropriate attention to laws and regulations pertinent for the study

10. Do not explore, or conceal conflicts of interests and commitments in grant applications

11. Write no, or a clearly inadequate research protocol

12. Hype a grant application

13. Misleading grant application: Present false research data

14. Misleading grant application: Present grossly imbalanced information

15. Misleading grant application: Withhold essential details of methodology

16. Misleading grant application: Conceal already obtained own results (e.g. pilot data)

17. Misleading grant application: Present a superficial literature review

18. Misleading grant application: Present an undisclosed selective literature review

19. Misleading grant application: Present false information on participants’ education, merits and affiliations

20. Don’t show the entire grant application to all named participants of the study

21. Fail to obtain (written) accept from all named participants before submitting a grant application

22. Make an inappropriate change of the study objectives, design or methodology in response to coercion from a funding source (‘funding bias”)
B. Data collection (9 items)

1. Store materials or data in an insufficient way
2. Handle and record materials and data in an inadequate/insufficient way
3. Keep inadequate notes of the research process
4. Fabricate or falsify data
5. Change research design or methodology during the study, e.g. due to coercion from a funding source (and don’t report it)
6. Collect more data than stated in the protocol to obtain statistical significance (and don’t report it) (‘Data Peeking’)
7. Stop data collection earlier than planned because the result already is statistically significant (unless predefined stopping rules are implemented appropriately)
8. Don’t attend to the quality of data provided by coworkers/coauthors, ignore basic principles of quality assurance
9. Don’t adhere to pertinent laws and regulations
C. Data analysis (9)

1. Delete data before performing data analyses (and don’t report the deletion) (falsification)
2. Modify data before performing data analyses (and don’t report the modification) (falsification)
3. Delete data after performing initial data analyses (and don’t report the deletion) (falsification)
4. Modify data after performing initial analyses (and don’t report the modification) (falsification)
5. HARKing: Undisclosed Hypothesizing After Results are Known (‘Data-driven hypotheses without disclosure’; ‘post hoc analyses of data until an exciting result emerges’; ‘metamorphosing ugly initial results into beautiful articles’ (‘the Chrysalis effect’))
6. Significance chasing (‘P-hacking’; ‘data-dredging’; ‘snooping’; ‘fishing’; ‘double-dipping’; explorative subgroup analysis; report an incorrect downwardly rounded P-value; ‘trying multiple things/torture the data until you get the desired result’)
7. Analyze only selected data in the study (selective analysis within the study)
8. Conscious use of inappropriate methods
9. Undisclosed data-analyses not stated in the research protocol
D. Reporting (28 items)

1. Don’t report all protocol-stipulated results (Selective Reporting)
2. Conceal results that contradict research you have published previously
3. Do not attempt to report a valid ‘negative’ study (Selective Reporting; the ‘file drawer problem’)
4. Report an unexpected finding as having been hypothesized from the start (HARKing)
5. Withhold clearly relevant details of study methods
6. Publish falsified or fabricated data, tables, curves or figures
7. Do not report replication problems
8. Cite the literature selectively to enhance own findings or convictions
9. Cite strategically in order to please editors, reviewers, or colleagues
10. Let conscious bias or prejudice influence the conclusions
11. Do not carefully study all the papers cited in the paper
12. Present an insufficient discussion of the study’s flaws and limitations
13. Deliberately fail to mention important aspects of the study in the paper
14. Spread study results over more papers than needed, in order to increase own number of publications (‘Salami slicing’/’Least Publishable Unit’—strategy)
15. Reuse your previously published data without disclosure
16. Reuse your previously used/published material without disclosure
17. Publish the same paper twice without disclosure (and permission from the editor(s))
18. Reuse parts of your own previous publication without citation (self-plagiarism)
19. Use unpublished phrases, ideas or methods of others without their permission (plagiarism)
20. Use published phrases, ideas or methods of others without proper citation (plagiarism)
21. Modify the results or conclusions of a study in response to coercion from a sponsor who has seen the results (funding bias)
22. Do not disclose a sponsor of the study
23. Do not disclose relevant conflicts of interests and commitments
24. Report inaccurately that all authors meet the requirements for authorship. For other authorship issues see below: E.14-28
25. Do not correctly report where the research has been done
26. Communicate results to the public before peer review
27. Willfully communicate research findings inaccurately in public
28. Make no clear and explicit distinction between professional (expert) comments and personal views when engaging in public communication
E. Collaboration (40 items)

1. “Toxic leadership”: Obstruct critical, open minded and free discussion in your research group
2. “Toxic leadership”: Let students unknowingly compete on solving the same problem
3. “Toxic leadership”: Pay no attention to systematic fostering of RCR (ignore the fact that the most important RCR-training takes place in the daily life of research guided by an experienced supervisor/mentor)
4. “Toxic leadership”: Assign too many PhD students to a project with “too little meat on the bone”
5. “Toxic leadership”: Do not regularly have follow up meetings on how a collaborative research project evolves, e.g. concerning presentation of raw data, preliminary results, change of duties and authorship expectations
6. Don’t take responsibility for the trustworthiness of the research in which you participate
7. Do not as a senior/leading author accept the responsibility that is implicit in the definition of seniority/leadership for the trustworthiness of the research (blame others when something goes wrong in the group you lead)
8. Turn a blind eye to other people’s putative breaches of research integrity
9. Do not respond to suspicions of breaches of research integrity
10. Do not pay respect to whistle blowers who in good faith report suspicions of RM, or breeches of RCR
11. Do not respond to whistle blowers who in bad faith report suspicions RM
12. Be unwilling to share data and materials with bona fide peers
13. Supervise and mentor (junior) coworkers insufficiently
14. Prevent from authorship a person who is qualified for authorship
15. Omit from authorship a person who evidently is a major contributor (ghost authorship)
16. Invite a person for an authorship for which she/he not qualify
17. Add an author who does not qualify for authorship
18. Add a star scientist as co-author, although he/she is not qualified for authorship
19. Demand an authorship for which you don’t qualify
20. Accept an authorship for which you don’t qualify

Cont ->
E. Collaboration (cont.)

21. Accept a coauthor’s proposal for adding an author who is not qualified for authorship
22. Accept or demand (significant) favors (gifts, money or sex) in exchange for authorship, access to data or promotion of particular persons
23. Do not acknowledge contributors who do not qualify for authorship
24. Do not ask permission by contributors for the wording of the acknowledgement
25. Do not openly discuss with the group of authors who does, or does not qualify for authorship
26. Submit a paper for publication without consent from all authors
27. Do not share and discuss reviewers’ and editor’s comment with all authors
28. Submit a revised paper for publication without all authors’ consent
29. Game the review process by suggesting friendly reviewers
30. Game the review process by reviewing your own papers (‘Self peer review’)
31. Change the manuscript in accordance with reviewers’ comments if the suggestions evidently are wrong or biased
32. Unfair reviewing: Delay your review
33. Unfair reviewing: Delay publication by excessively critical comments, or demand unreasonable extra work by the authors
34. Unfair reviewing of grant applications
35. Unfair reviewing of persons, e.g. for positions/promotion
36. Unfair reviewing: Don’t disclose your conflicts of interests and commitments when reviewing papers, grant applications or persons for promotion
37. Use confidential reviewer information (from reviewing papers, grants, persons) for own work/grant applications/papers
38. Participate in manipulation of a journal’s impact factor by excessive citing of papers from the journal, e.g. by coercion from the editor
39. Game citation metrics by inappropriate citation of own or others papers
40. Establish or manage a predatory journal

......and still counting.....
Perceptions and relevance of QRP are varying extent conditional on "knowledge production models", norms and reward structures
The three work packages and their aims

**WP1**
Systematically review and elicit contextualized knowledge and perceptions on QRPs and research integrity for individual analyses and basis for WP2 and WP3

**WP2**
Examine prevalence and patterns of QRPs, as well as mechanisms leading to QRPs, in a large-scale survey

**WP3**
Various “meta-research” analyses of publication data to unobtrusively examine research and publication practices across fields (and over time?) to complement, extend and contrast findings from in WP2
WP 1

• Narrative and systematic reviews of the current literature and empirical claims
  • Manuscript is well-underway

• 22 focus group interviews (across all fields)
  • Input to survey (QRP formulations, “causes”)
  • “Thick descriptions”, qualitative analyses of various themes (e.g., QRPs in the humanities/natural sciences, perceived “causes ...”)

• Typologizing QRPs
  • Analyses to be done at the end of the project
Interview themes

Introduction (10 min.)
1. The good research practice (10 min.)
2. Questionable research practices (10 min.)
3. Exercise: 8 pre-written cards with QRPs plus “free” cards must be graduated, first in relation to severity of the QRP, then in terms of prevalence. (15-20 min. for negotiation on severity, 10 min. break, 10 min. for negotiation of prevalence)
4. Reasons behind QRP (15 min.)
5. Generic questions (15 min.)
Rounding off (5 min)
WP 2

• Survey (currently sampling)
  • Sampling: Eight Danish universities, ten foreign universities in four countries
  • Questionnaire, focus on ”truth”:
    • Knowledge production modes
    • Perceptions of knowledge claims
    • Nine statements of QRPs (prevalence and relevance)
    • Questions addressing conditions and context under which we do research
WP 3

• “Meta-research” is the study of research itself: its methods, reporting, reproducibility, evaluation, and incentives ...

• Unobtrusive analyses based on publications and the information provided in them

• Large-scale quantitative analyses, combined with manual coding
Current work

Stratified random sample from WoS ≈ 250,000 pubs from 2015

Full-text of 250,000 pubs

Social sciences and humanities

Biomedical and health sciences

Life and earth sciences

Mathematics and computer science

Physical sciences and engineering

Sub-sample ≈ 5,000 pubs from 2015

352 journals
- Sociology
- Psychology
- Economics
- Management
- Physics
- Astronomy
- Chemistry
- Medicine
- Epidemiology
- Health
- Pharmacology
- Psychiatry
- Molecular biology & genetics
- Ecology
- Agricultural
- Plant/animal
- Multidisciplinary

Full-text analyses

Manual coding and full-text analyses
Original Contribution

Associations of Non-Hodgkin Lymphoma (NHL) Risk With Autoimmune Conditions According to Putative NHL Loci


Correspondence to: Sophia S. Wang, Division of Cancer Epidemiology, Department of Population Sciences, Beckman Research Institute of the City of Hope, 1500 East Duarte Road, Duarte, CA 91010; e-mail: sowang@coh.org.

Initially submitted July 7, 2014; accepted for publication September 18, 2014.

Autonomous conditions and Immune system-related genetic variations are associated with risk of non-Hodgkin lymphoma (NHL). In a pooled analysis of 8,892 NHL cases and 5,250 controls from 14 studies (1995–2007) within the international NHL Epidemiologic Consortium, we evaluated the interaction between immune system genetic variants and autoimmune conditions in NHL risk. We evaluated the immune-related single nucleotide polymorphisms (eSNPs) in the tumor necrosis factor gene (TNF) (rs361773), the tumor necrosis factor receptor II gene (TNFRSF1B) (rs6983267), and the interleukin-1 family genes. Associations with autoimmune conditions were mediated by TNF or T-cell responses. We constructed unconditioned logistic regression models to measure associations between autoimmune conditions and NHL with stratification by genotype. Autonomous conditions were consistently associated with TNF risk, specifically downregulating B-cell expression (OR = 1.31, 95% confidence interval CI: 1.23, 1.39) and marginal zone lymphomas (OR = 1.36, 95% CI: 1.27, 1.46); those mediated by T-cell responses were associated with peripheral T-cell lymphomas (OR = 2.14, 95% CI: 1.35, 3.36). In the presence of the m.000839 AGA AGA genotype, B-cell mediated autoimmune conditions increased NHL risk (OR = 1.37, 95% CI: 1.27, 1.47). Furthermore, we compared the above associations with the GSS genotype (OR = 1.60, 95% CI: 1.31, 1.93). This interaction was consistent across major B-cell NHL subtypes, including marginal zone lymphomas (OR = 1.26, 95% CI: 1.08, 1.47) and follicular lymphomas (OR = 1.22, 95% CI: 1.04, 1.43). Autonomous conditions include: environment, genetics, interaction; human leukocyte antigen; lymphoma, non-Hodgkin; tumor necrosis factor.
The use of “significance tests” over fields

Map 6: Signifying results based on some stat test PLUS an adjective in the abstracts

- Social sciences and humanities
- Biomedical and health sciences
- Life and earth sciences
- Physical sciences and engineering
- Mathematics and computer science
Thank you for your attention!