



Impact of data availability on resolution of post-publication image concern cases

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The Prevalence of Inappropriate Image Duplication in Biomedical Research Publications

Elisabeth M. Bik,^a Arturo Casadevall,^{b,c} Ferric C.

"3.8% of published papers contained problematic figures, with at least half exhibiting features suggestive of deliberate manipulation."

<https://mbio.asm.org/content/7/3/e00809-16>

It May Look Authentic; Here's How to Tell It Isn't

By NICHOLAS WADE JAN. 24, 2006


(J. Cell Biology findings) "Since 2002... 25 percent of all accepted manuscripts have had one or more illustrations that were manipulated in ways that violate the journal's guidelines"

<https://www.nytimes.com/2006/01/24/science/it-may-look-authentic-heres-how-to-tell-it-isnt.html>

Incidence of Data Duplications in a Randomly Selected Pool of Life Science Publications

Authors

Authors and affiliations

Morten P. Oksvold 

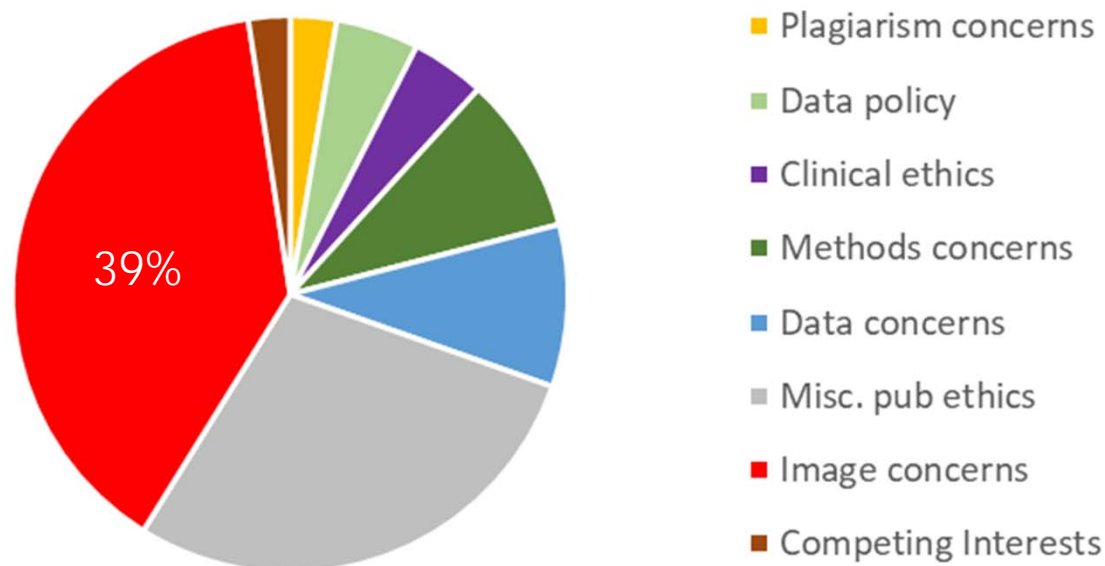
"For the IF < 5 and IF > 20 journals, 25 % of the articles were found to contain data duplications. The IF 5–10 journal showed a comparable proportion (22.5 %)"

<https://link.springer.com/article/10.1007%2Fs11948-015-9668-7>

Image concern cases present a substantial publication ethics case burden at *PLOS ONE*

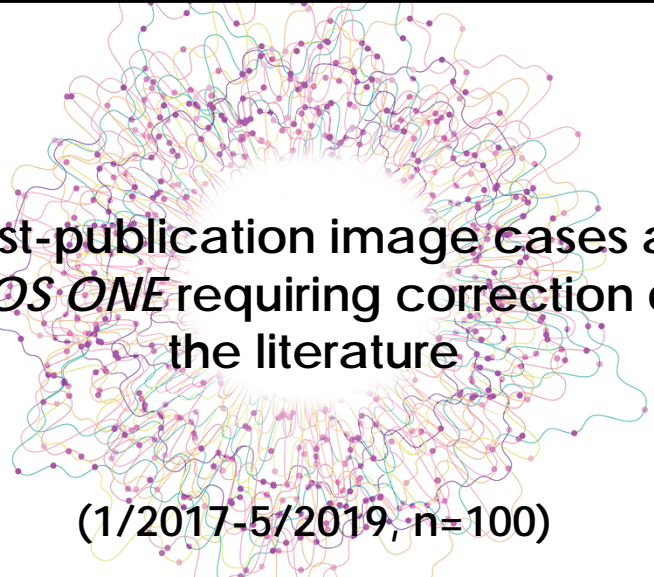
68% of retractions & 75% of EOCS posted by *PLOS ONE* in 2017-2019 addressed image concerns.

PLOS ONE Publication ethics case distribution



Based on ongoing pre- and post-publication cases, as of 5/21/2019

How can we improve the reliability of published results and reduce the frequency of post-publication image concerns?



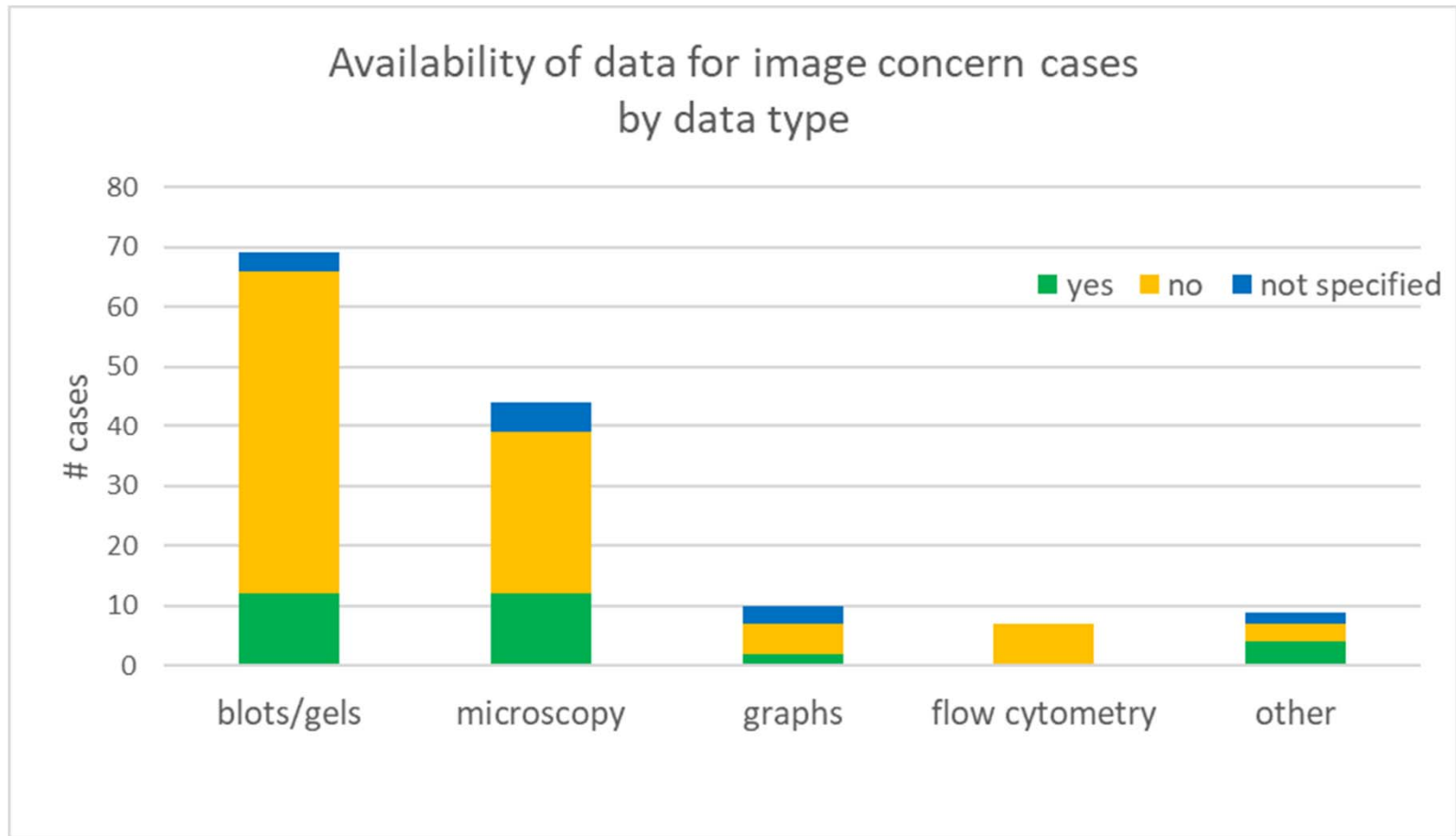
Post-publication image cases at
PLOS ONE requiring correction of
the literature

(1/2017-5/2019, n=100)

- What types of image data are most problematic?
- What is the relative prevalence of different issue types & how have they resolved?
- How does data availability factor into these cases?

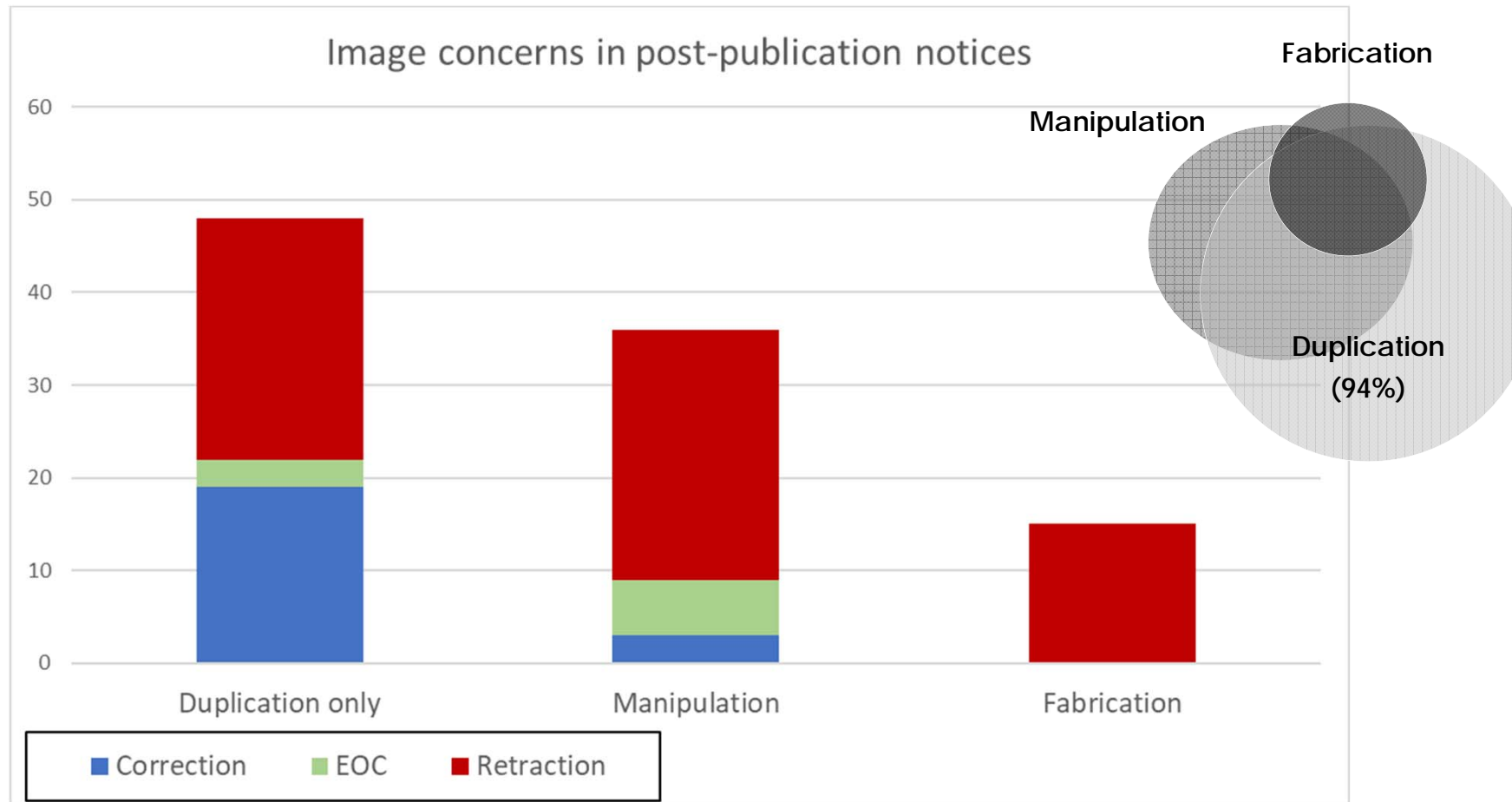
The majority of post-pub image cases at *PLOS ONE* involve blot, gel, and microscopy images

Raw image data are often not available for figures/results in question



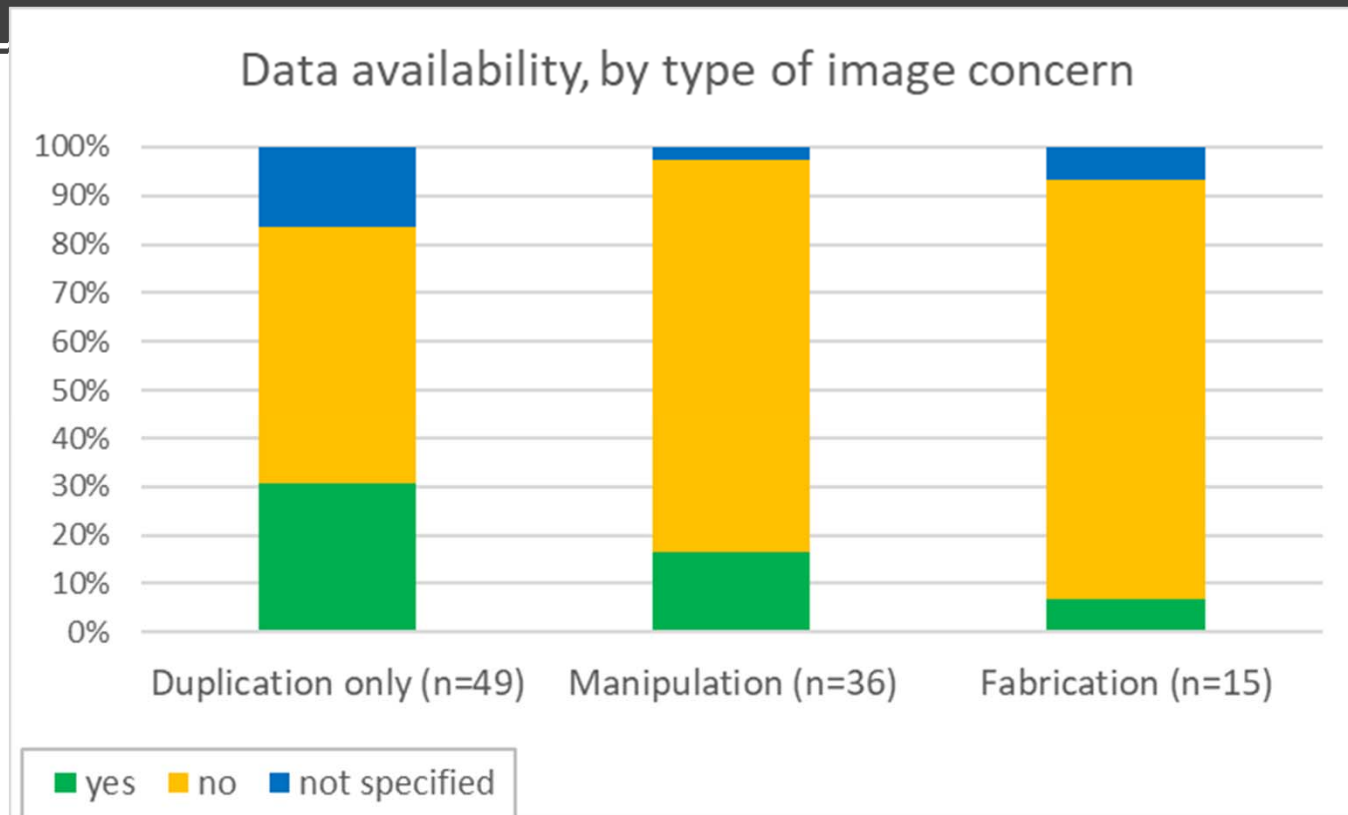
Based on *PLOS ONE* cases resolved 2017-2019

Duplication, manipulation, & fabrication concerns in post-pub image cases



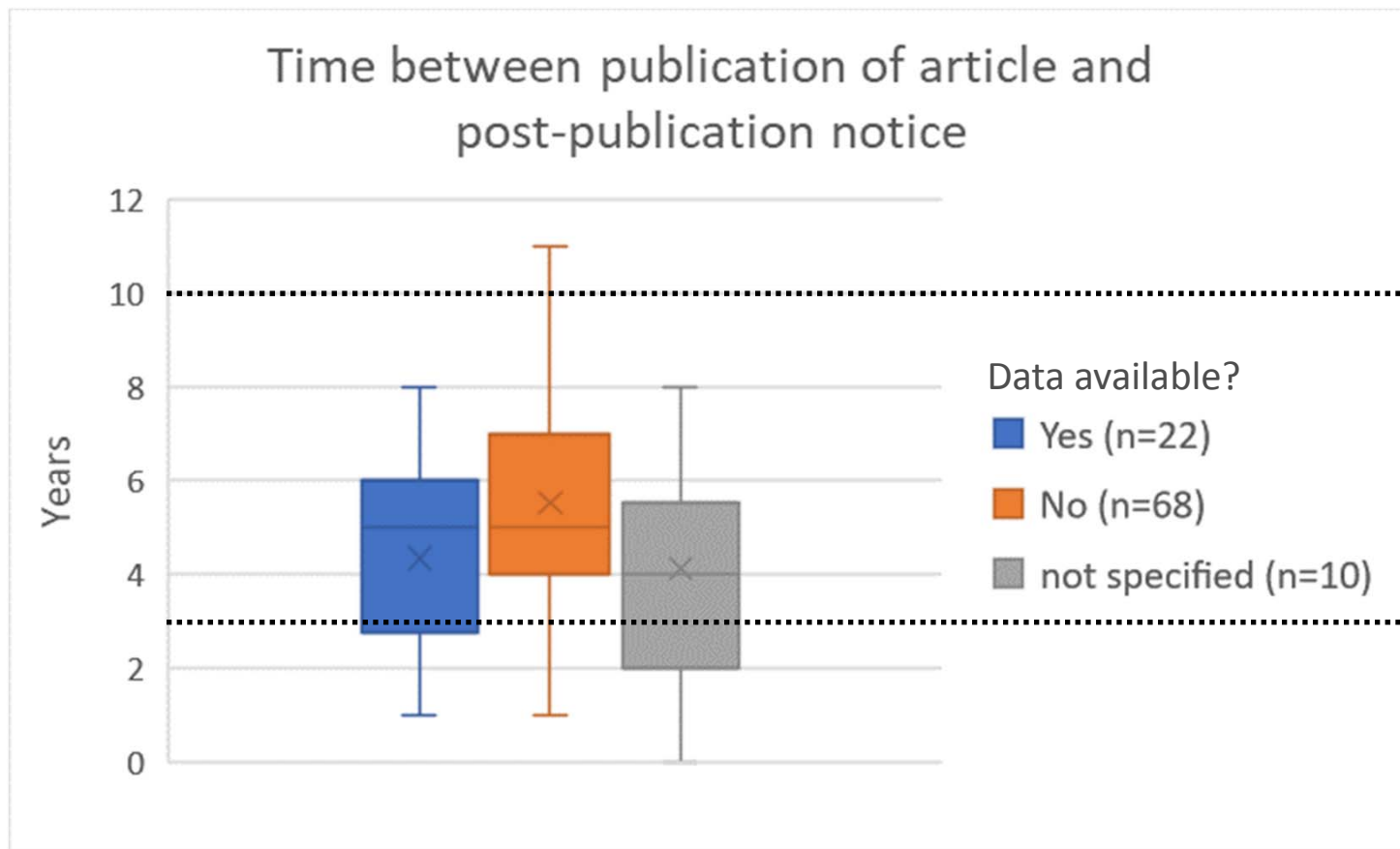
Based on PLOS ONE cases resolved 2017-2019

Raw image data were unavailable for 82% of cases involving image manipulation or fabrication concerns



Timing of post-publication image data requests vs. institutional data retention periods

On average, concerns were raised ~5 years post-publication

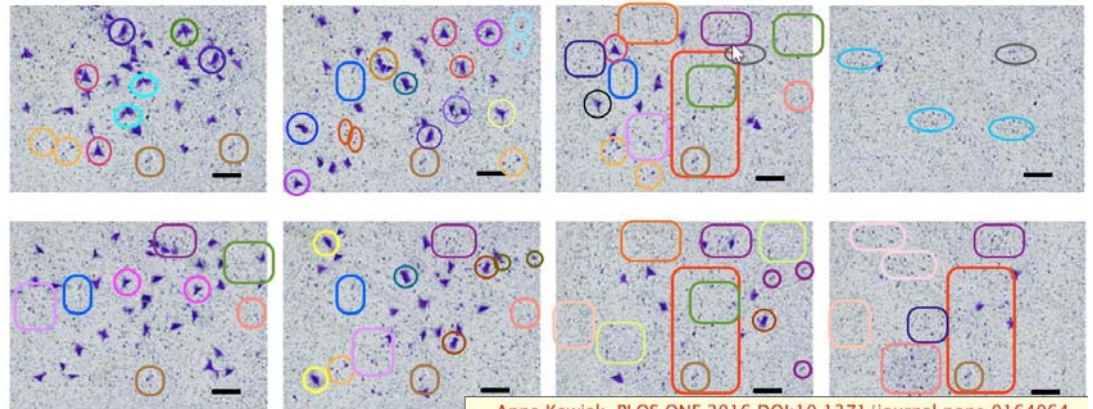
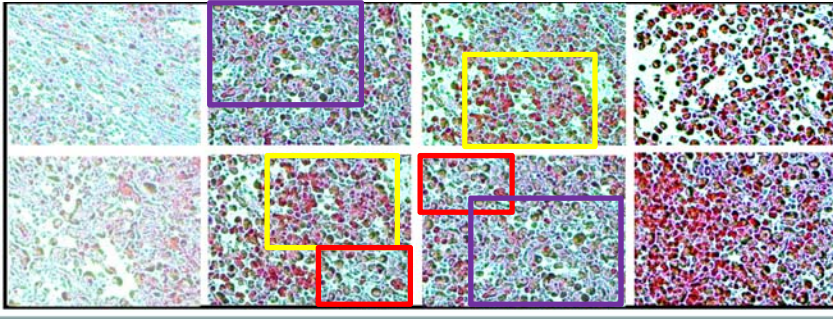


Several US/UK institutions & funders require data retention for minimum of 3-10 years

Based on PLOS ONE cases resolved 2017-2019

Data unavailability:

Data management issue or an indicator of integrity concerns?

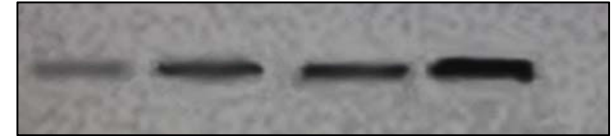


Anna Kawiak, PLOS ONE 2016, DOI:10.1371/journal.pone.0164064

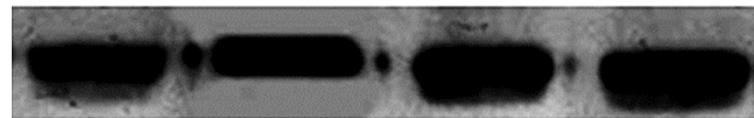
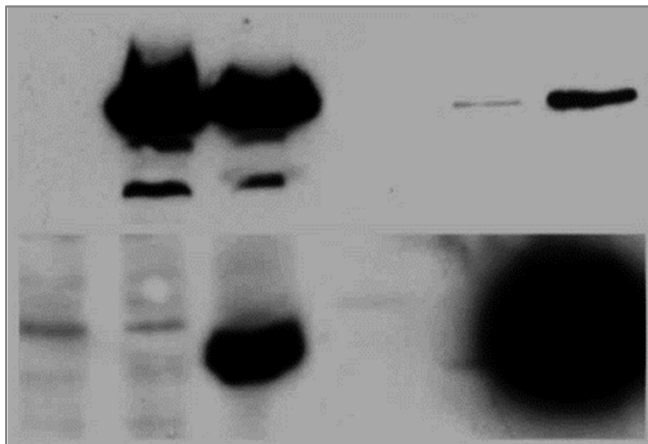
Many cases result from honest error or poor practice

Underlying data play an essential role in clarifying figure preparation issues.

*"the main concern about
"cuts" in the Western blots
figures can be explained
by the **removal of empty
lanes** from the original
blots"*



*"the background templates of
appropriate size were first inserted
and the respective **bands were
then cropped and placed on the
template backgrounds**. Since
background has no informative
value, we find this approach
acceptable"*



Pre-publication raw data requirements to help address image integrity concerns

Require raw
image data



Peer review with
raw image data



Publish articles
with raw data

- *Data can be assessed during the peer review process and archived for future reference*
- *Identify & positively resolve honest errors in figure preparation pre- or post-publication*
- *Present barrier to publishing misrepresented or fabricated data.*



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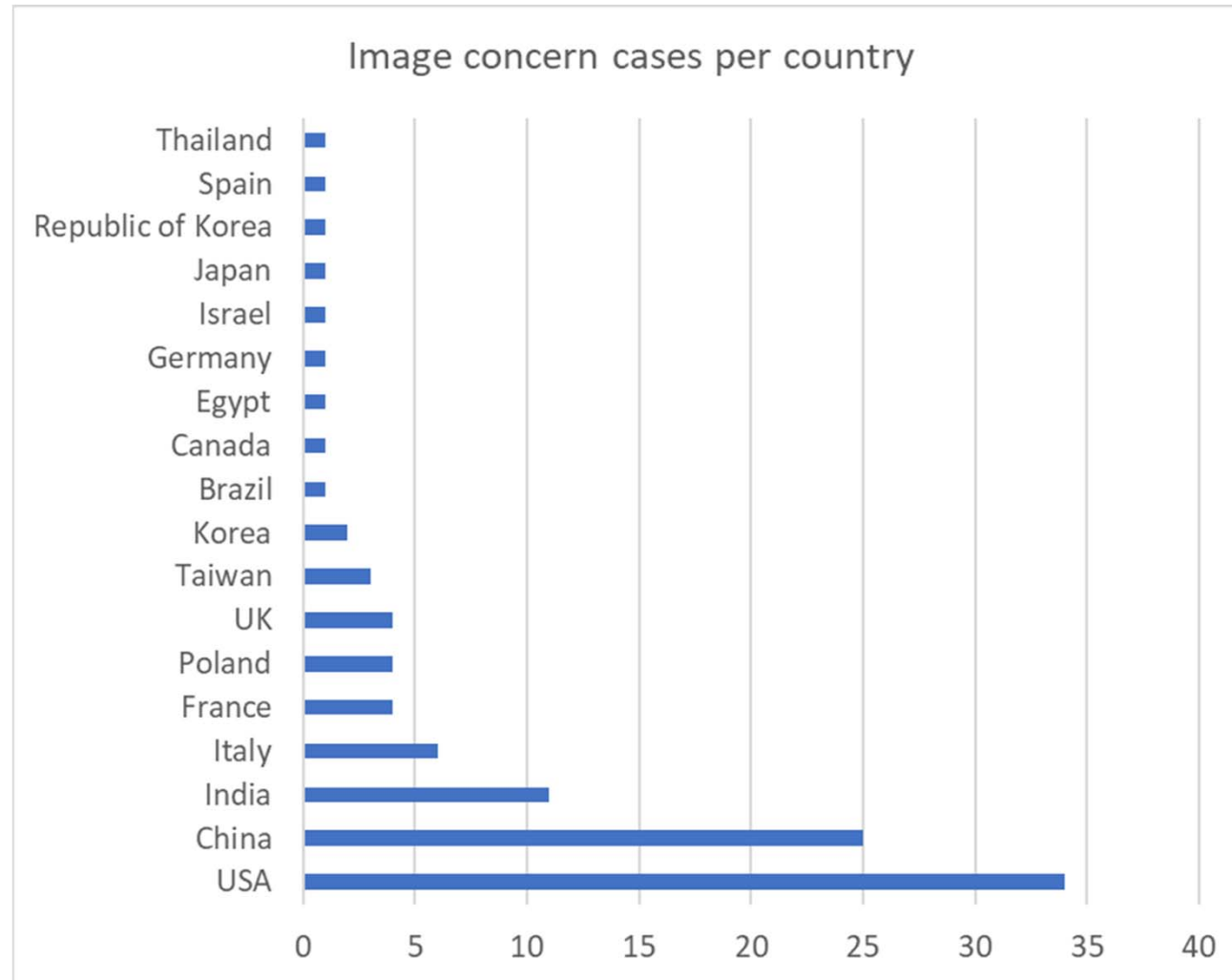
Veronique Kiermer, Executive Editor, PLOS

Pending update to PLOS ONE and PLOS Biology reporting requirements:

“For manuscripts submitted on or after [June 2019], authors must provide the original, uncropped and minimally adjusted images supporting all blot and gel results reported in an article’s figures or Supporting Information files.”

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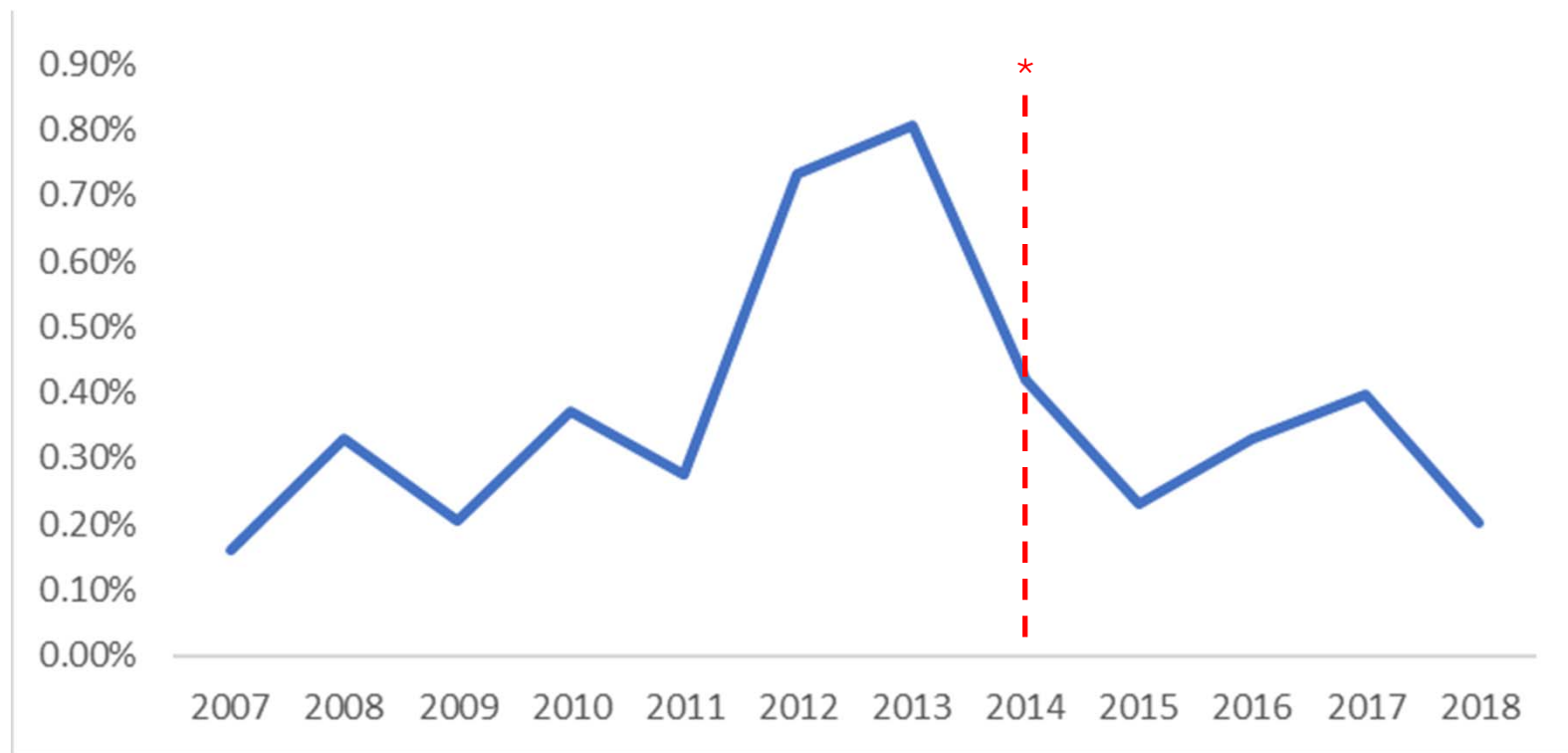
Country of origin for resolved image cases 2017-5/2019



Normalized to total #
PLOS ONE articles
published per country

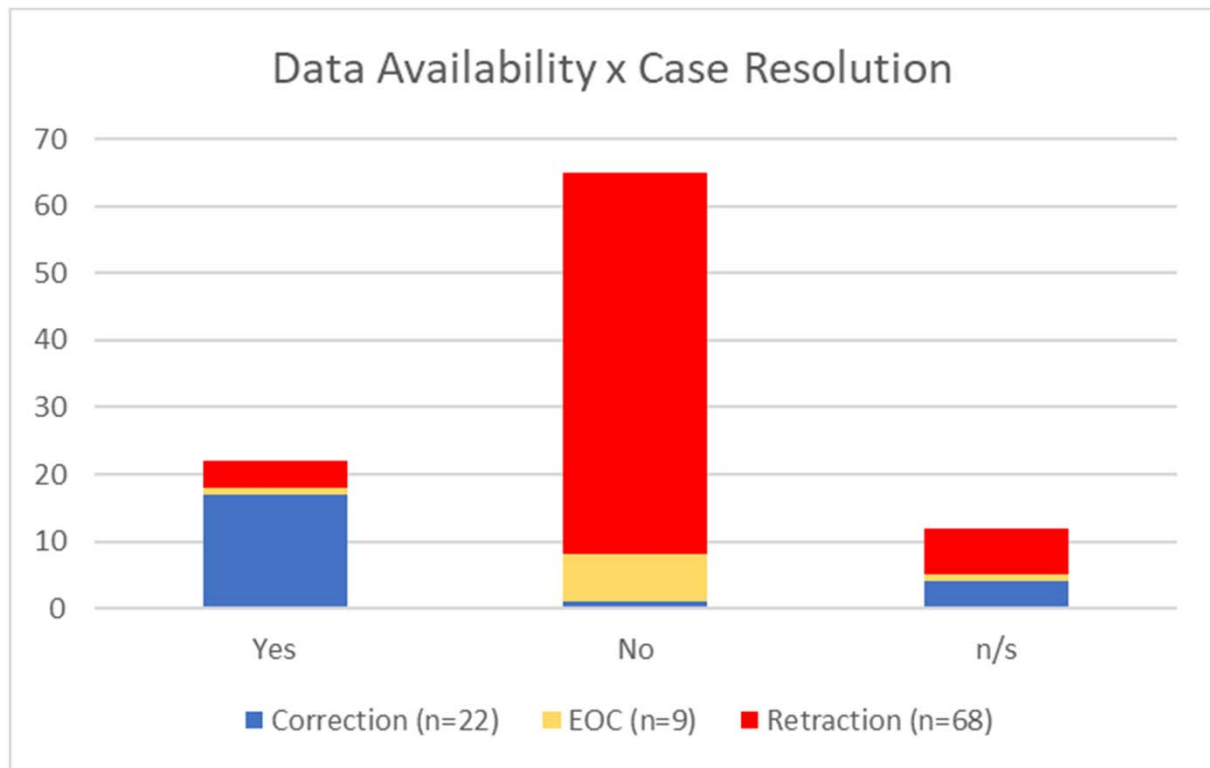
India	0.3%
Italy	0.1%
China	0.09%
USA	0.05%
France	0.05%
UK	0.03%

Prevalence of publication ethics issues, by article publication year



* *Bik et al. systematically examined figures in articles published through 2014 which included western blots*
<https://mbio.asm.org/content/7/3/e00809-16>

The majority of data unavailability cases ended in retraction



Based on PLOS ONE post-pub notices 2017-2019