OPEN SCIENCE: MORE THAN OPEN ACCESS

ABEC

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Wearing two hats…

PLOS is a nonprofit, Open Access publisher empowering researchers to accelerate progress in science and medicine by leading a transformation in research communication.

Our mission is to increase openness, integrity, and reproducibility of research.

Open access

The **free**, immediate, online availability of research articles coupled with the rights to use these articles fully in the digital environment.

The practice of science in such a way that others can collaborate and contribute, where research data, lab notes and other research processes are freely available, under terms that enable reuse, redistribution and reproduction of the research and its underlying data and methods.

(Source: EU FOSTER project)

Open science has two key elements:

- Research **outputs**
- The **process** of doing and communicating science

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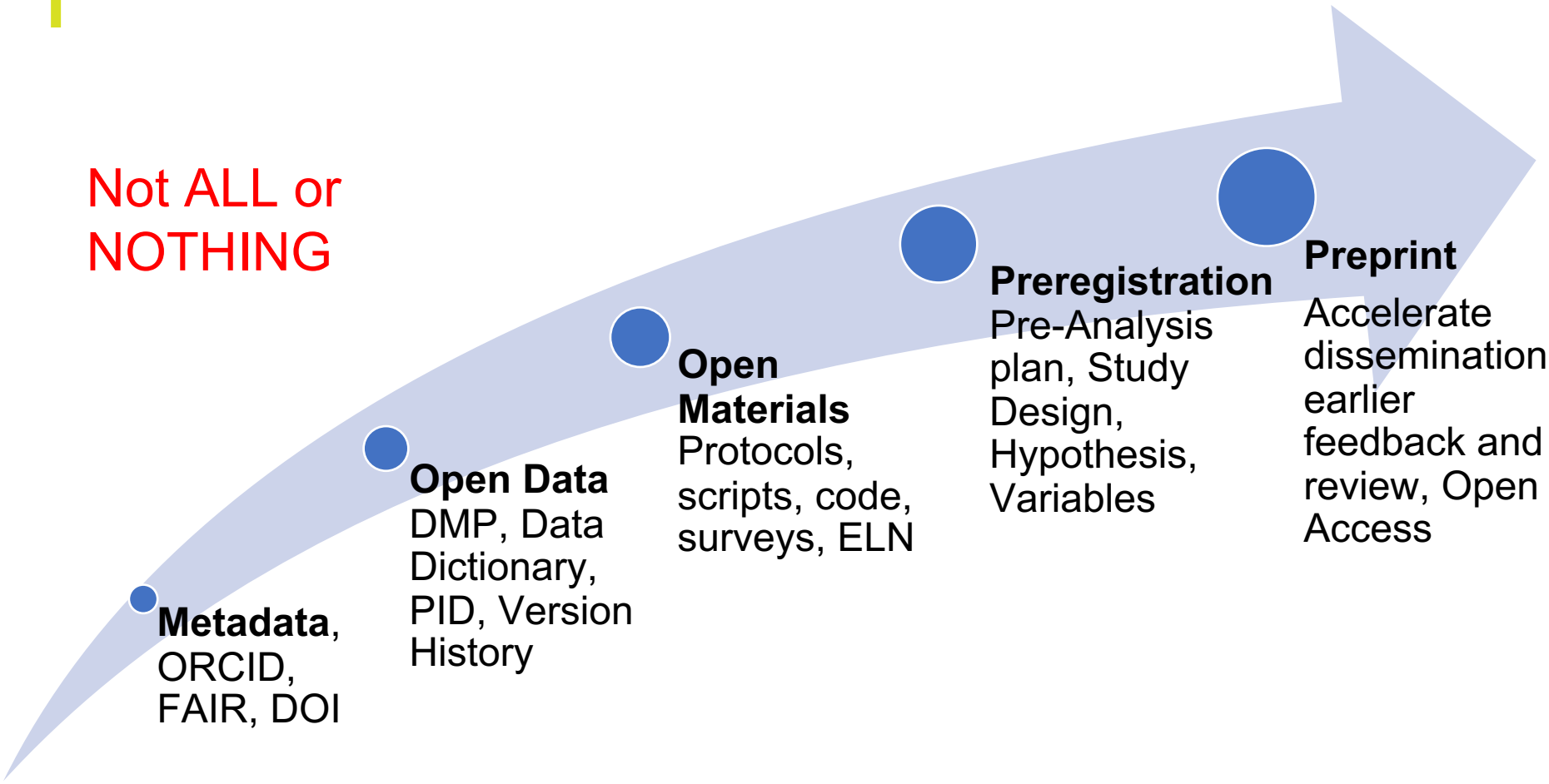
Core open science best practices

Not ALL or NOTHING



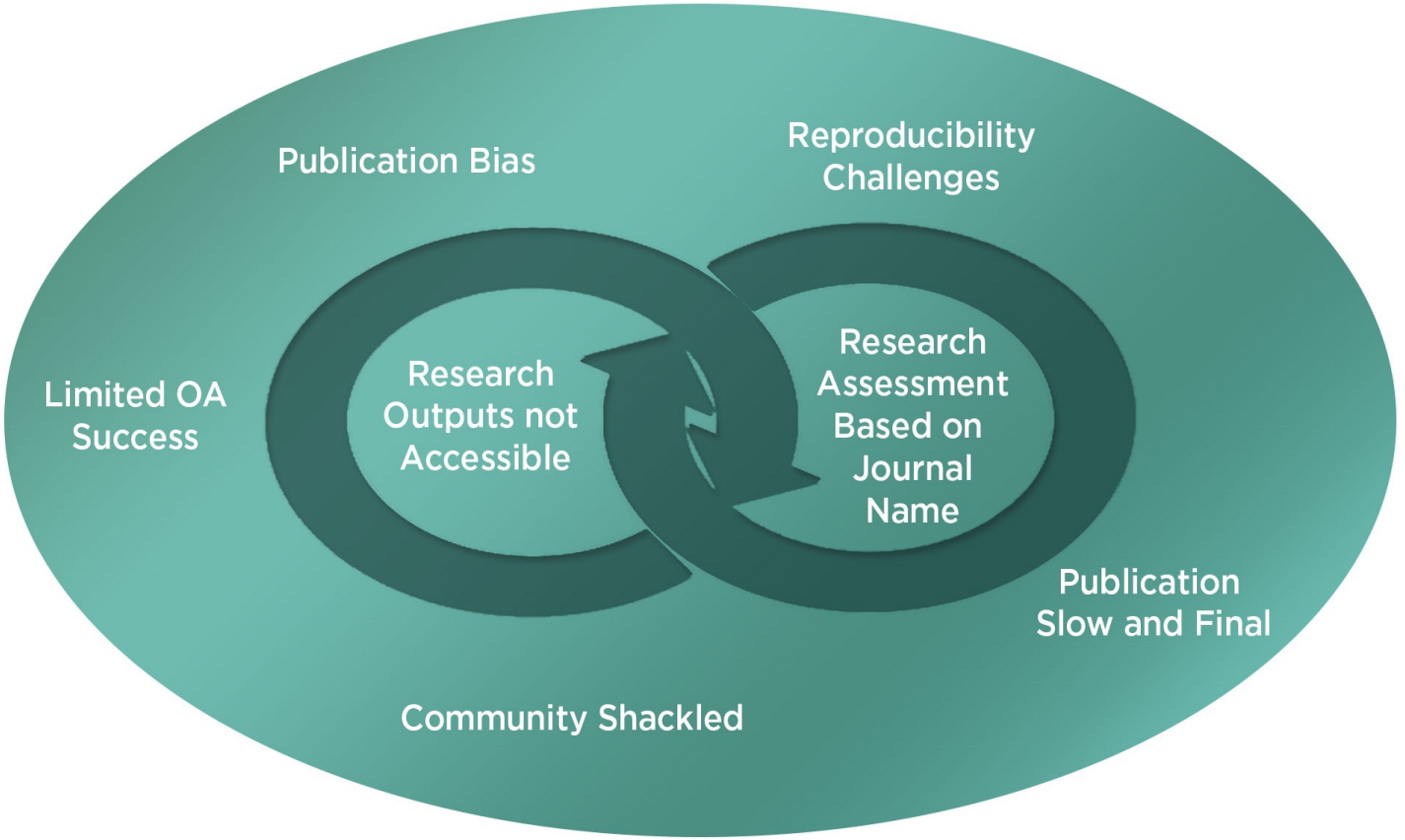
Increase rigor and reproducibility of research

Why is open science important?

- Open access, alone, cannot guarantee reproducibility and transparency of research results
  - “Big science” requires more transparency
  - Greater openness facilitates more rigorous review
- Accelerates scientific progress
- Scientific culture can result in “natural selection” of bad science
  - Scientists incentivized to publish novel results frequently in major journals
- Open science is just **good** science!

Incentives for individual success are focused on getting it published, not getting it right

The twin problems of assessment and access



1. Expand sharing

Facilitate publication of more research outputs

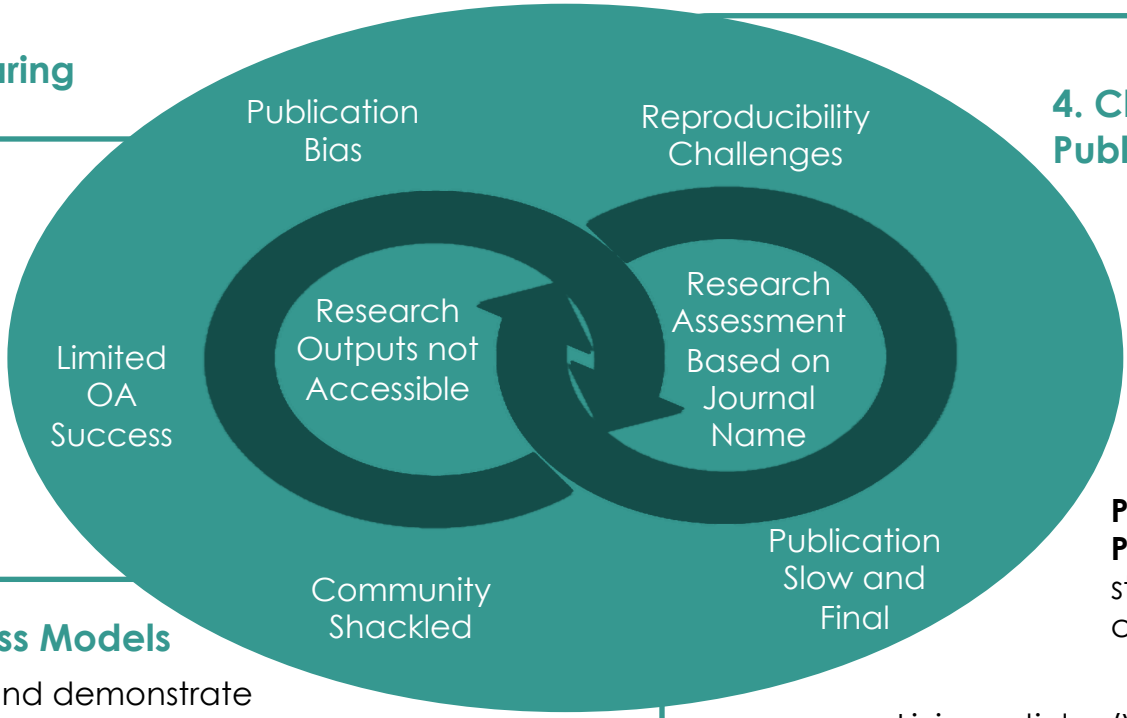
FAIR and robust linking infrastructure (Standards)

Categorization that impacts mode of assessment

2. Communities

Future proof change: inspire and support pockets of future adopters

Use prestigious journals as levers



3. Business Models

Develop and demonstrate new models for open

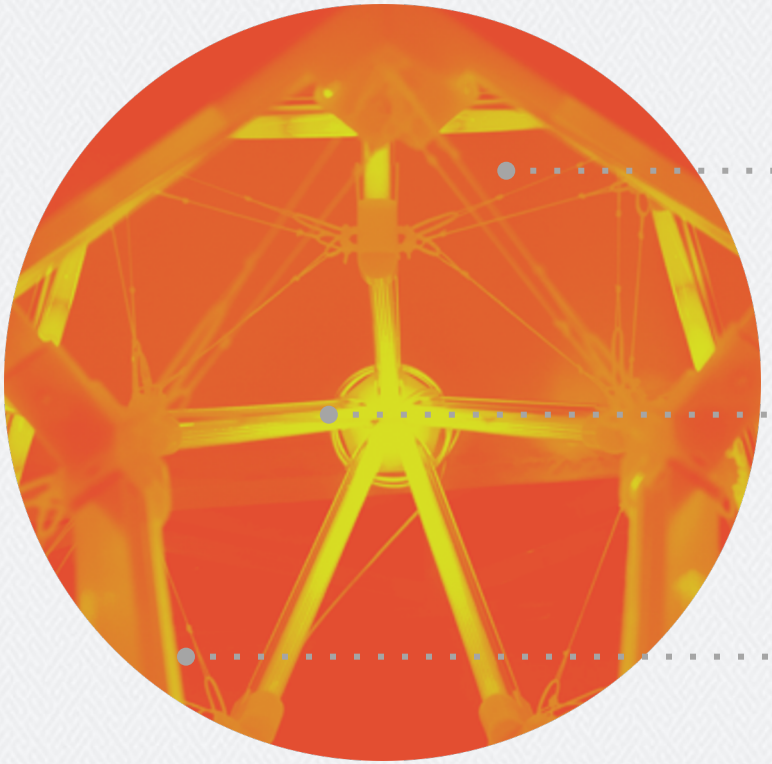
4. Changes to Publishing Process

Apply **new signals of trust** to articles, other outputs, individuals

Publishing as a Process: at different stages of research cycle

Living articles (Versions)

Data at PLOS



1. >125,000+ articles published with a data availability statement
2. <0.1% of submissions rejected due to author unwillingness to share data
3. >33 million views and downloads over past 12 months on Figshare alone

Data sharing is becoming normalized*

- 79% of 2019 respondents were supportive overall of a national mandate for making primary research openly available
- 67% of respondents think that funders *should* withhold funding from, or penalize in other ways, researchers who do not share their data if the funder has mandated that they do so
- 69% of respondents think that funders should make the sharing of research data part of their requirements for awarding grants
- 36% of respondents expressed the concern that their data may be misused if it was shared
- 42% of researchers would be encouraged to share their data if it resulted in a co-authorship

* From *The State of Open Data 2019,* Figshare

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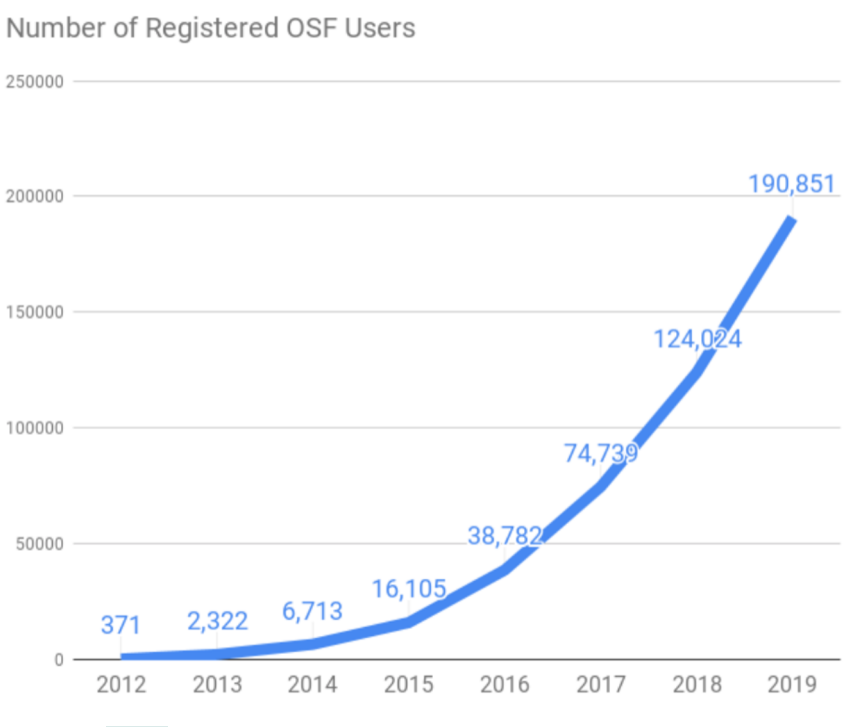
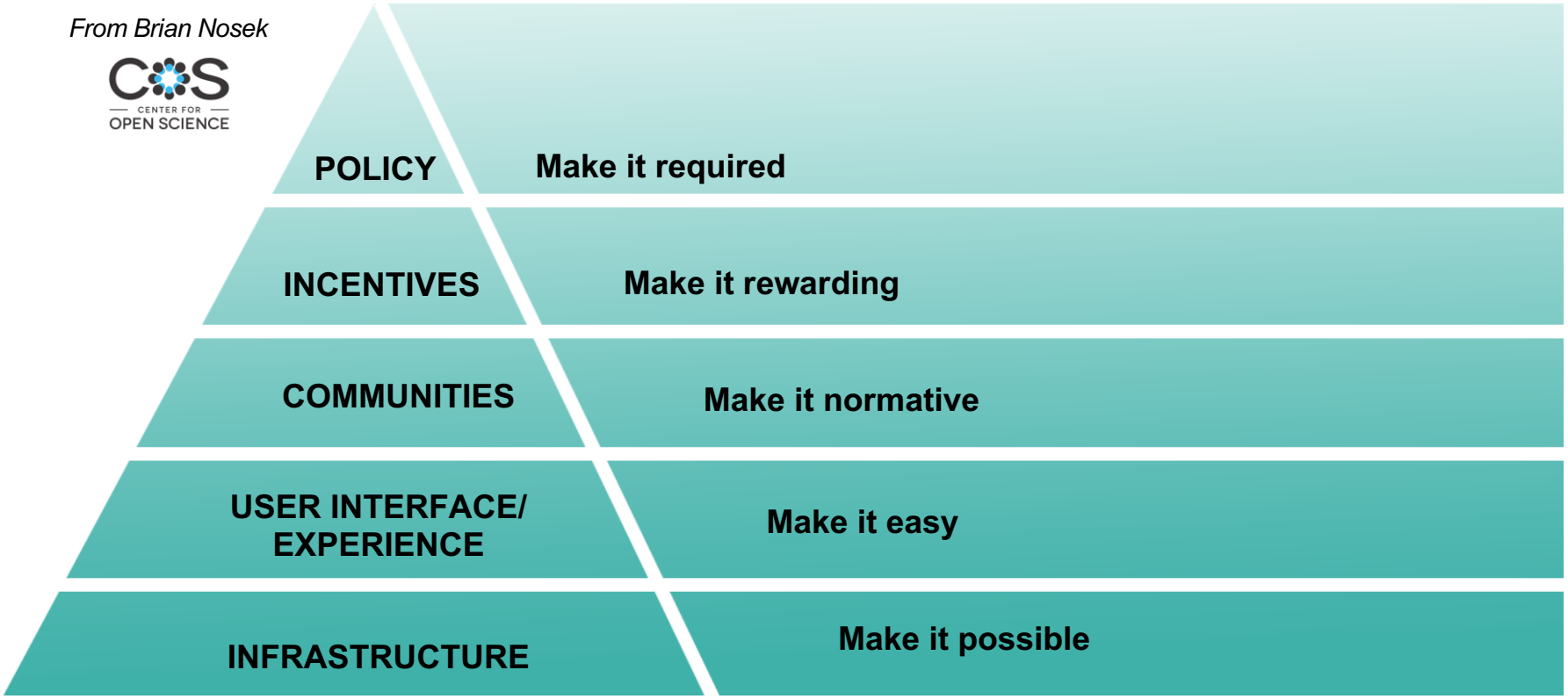
Evidence of Culture Change



Changing a research culture

From Brian Nosek



Transparency and openness (TOP) guidelines

Portuguese: https://osf.io/us5yg/

	Level 1	Level 2	Level 3
Data Citation			
Data Transparency			
Materials Transparency			
Code Transparency			
Design & Analysis			
Study Prereg			
Analysis Prereg			
Replication			

Example: data transparency

Level 1: Disclosure

State whether or not data are available. If so, give URL.

Level 2: Mandate

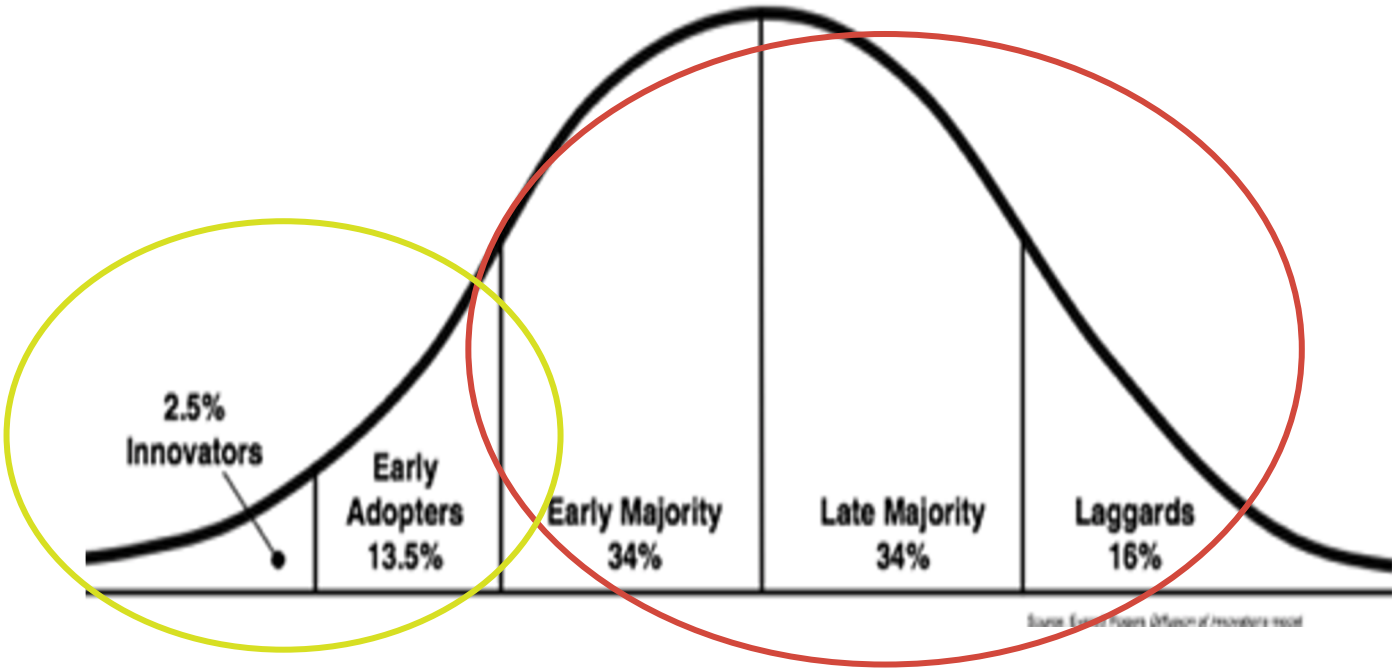
Share your data (exceptions permitted for legal or ethical constraints).

Level 3: Verified Mandate

Can results be replicated using your data prior to publication?

PLOS's approach to expanding open science

Journals



Open science roadmap

The open Science toolbox at PLOS

Access and usability of:		Facilitate	Normative/ rewarded	Required
outputs	Publication			CC-BY mandate
	Data			**Sharing mandated**
	Code		Sharing encouraged	
	Methods	**Link to protocols.io**		
	Reagents		**RRID encouraged**	
process	Pre-registration	**Registered Reports workflow**	**Publication of RR Protocol**	
	Preprint	bioRxiv workflow		
	Open peer review	PPRH workflow		
	Post publication	**Discovery/Update articles**		

OS toolbox evolution: data

FROM:
PLOS Data Policy

TO: **Data strategy at PLOS**

- Integration with data repositories to facilitate sharing and reuse
- Tools and services to increase trust, facilitate reuse and sharer's benefits
- Signals and products to increase incentives and proportion of articles with linked shared data
- Analytics tools and services for partners who provide incentives
- Set of data policies with qualified sharing based on local challenges(?)

Towards a global open science

Open science must be guided by universal values:

- Inclusiveness and respect for diversity
- Equitable practice reciprocity and complementarity
- Universally shared benefits, and
- Opportunities for scientific education and social participation

Q&A

Thank you!

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