Evidence-based Decision Making
Interventions: Implementation

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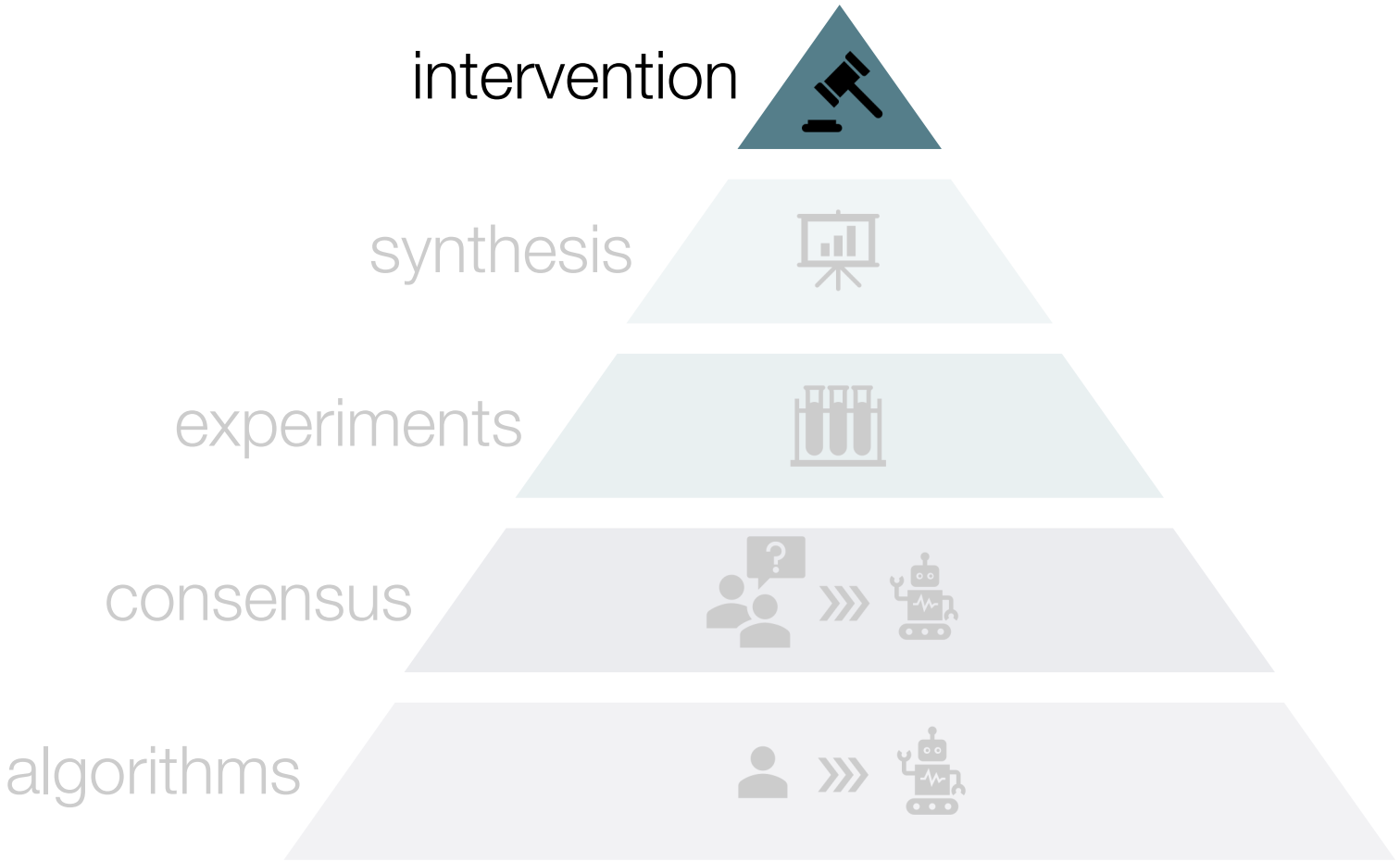

intervention
synthesis
experiments
consensus
algorithms

Goals for today

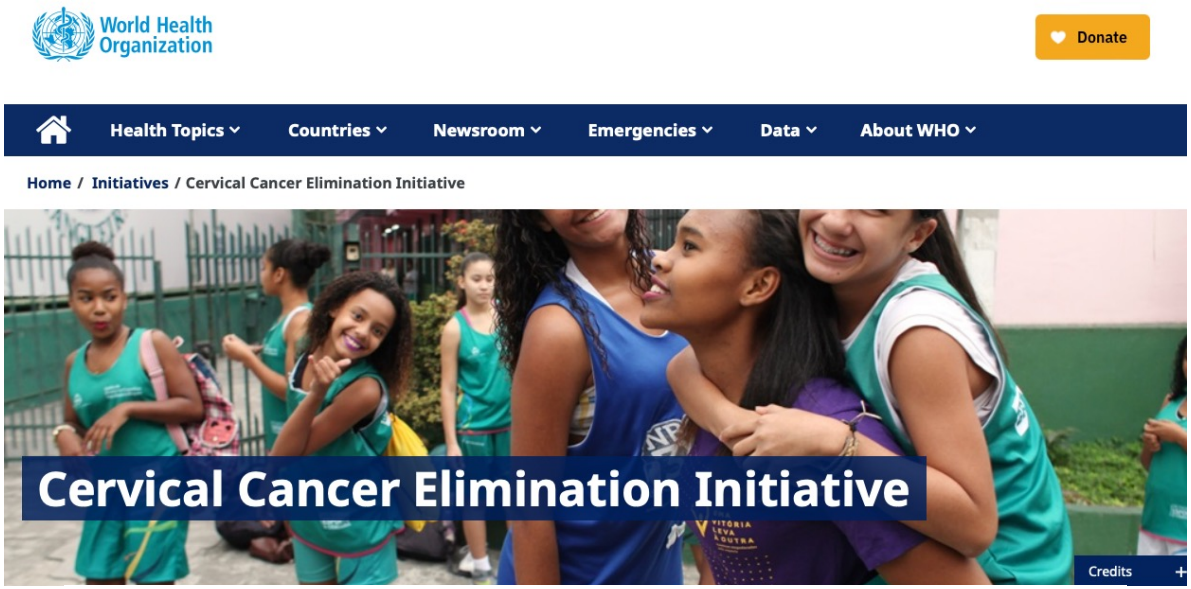
- Gain an overview of implementation science
- Discuss limits of the evidence-based approach
- Course evaluation

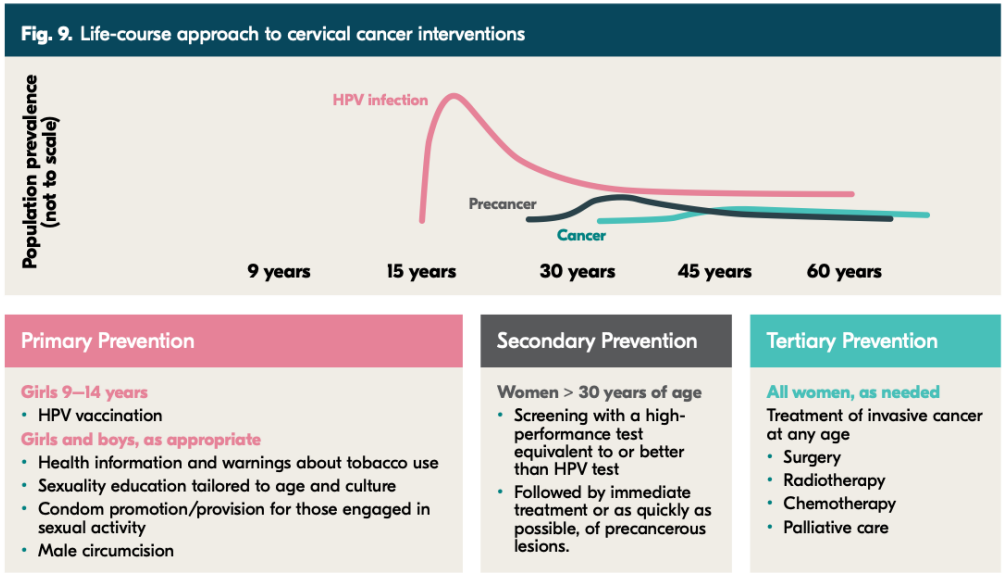
Implementation science

Human papillomavirus (HPV) is the most common sexually transmitted infection worldwide and a major cause of cervical cancer.

A life-course approach to cervical cancer prevention includes HPV vaccination in early adolescence, screening and treatment of precancerous lesions in adulthood, and access to cancer care as needed.

Implementation science is essential to ensure these interventions are effectively delivered, equitably scaled, and sustained in real-world settings.





https://www.who.int/initiatives/cervical-cancer-elimination-initiative

Implementation science

The development and use of checklists (e.g., WHO Surgical Safety Checklist), exemplify how implementation science transforms evidence into routine clinical practice through structured, repeatable tools. The content of checklists is the product of a laborious, evidence-based process involving clinical trials, expert consensus, and iterative testing but are put into a relatively simple, easy-to-use format to ensure they address real-world barriers.

Surgical Safety Checklist

World Health Organization | Patient Safety
A World Alliance for Safer Health Care

Before induction of anaesthesia
(with at least nurse and anaesthetist)

Has the patient confirmed his/her identity, site, procedure, and consent?
- ☐ Yes

Is the site marked?
- ☐ Yes
- ☐ Not applicable

Is the anaesthesia machine and medication check complete?
- ☐ Yes

Is the pulse oximeter on the patient and functioning?
- ☐ Yes

Does the patient have a:

Known allergy?
- ☐ No
- ☐ Yes

Difficult airway or aspiration risk?
- ☐ No
- ☐ Yes, and equipment/assistance available

Risk of >500ml blood loss (7ml/kg in children)?
- ☐ No
- ☐ Yes, and two IVs/central access and fluids planned

Before skin incision
(with nurse, anaesthetist and surgeon)

- ☐ **Confirm all team members have introduced themselves by name and role.**
- ☐ **Confirm the patient's name, procedure, and where the incision will be made.**

Has antibiotic prophylaxis been given within the last 60 minutes?
- ☐ Yes
- ☐ Not applicable

Anticipated Critical Events

To Surgeon:
- ☐ What are the critical or non-routine steps?
- ☐ How long will the case take?
- ☐ What is the anticipated blood loss?

To Anaesthetist:
- ☐ Are there any patient-specific concerns?

To Nursing Team:
- ☐ Has sterility (including indicator results) been confirmed?
- ☐ Are there equipment issues or any concerns?

Is essential imaging displayed?
- ☐ Yes
- ☐ Not applicable

Before patient leaves operating room
(with nurse, anaesthetist and surgeon)

Nurse Verbally Confirms:
- ☐ The name of the procedure
- ☐ Completion of instrument, sponge and needle counts
- ☐ Specimen labelling (read specimen labels aloud, including patient name)
- ☐ Whether there are any equipment problems to be addressed

To Surgeon, Anaesthetist and Nurse:
- ☐ What are the key concerns for recovery and management of this patient?

This checklist is not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.

Revised 1 / 2009

https://www.who.int/teams/integrated-health-services/patient-safety/research/safe-surgery/tool-and-resources

Implementation science

Implementation science can be defined as “the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice, and, hence, to improve the quality and effectiveness of health services”

By focusing on strategies to enhance the adoption and sustainable use of evidence-based practices, implementation science aims to close the **research-practice gap**, ensuring that investments in healthcare research translate into real-world benefits.

Bauer, M. S., Damschroder, L., Hagedorn, H., Smith, J., & Kilbourne, A. M. (2015). An introduction to implementation science for the non-specialist. BMC Psychology, 3(1), 65–12. http://doi.org/10.1186/S40359-015-0089-9

Implementation science

Table 1 Characteristics of Efficacy vs. Effectiveness Trial Designs (after [8])

	Efficacy Trial	Effectiveness Trial
Validity Priority	Internal > External	External ≥ Internal
Population and Sample	• Highly selected for condition of interest, narrowly defined	• Selected for condition of interest, reflecting presentation in source population
	• Few comorbidities	• Comorbidities resemble those in population to which results will be applied; only those who cannot practically or ethically participate are excluded
	• Willing and motivated participants	
Intervention	• Intervention staff are highly qualified	• Staff selection, training, and fidelity monitoring resemble those likely to be feasible in target sites outside of the protocol proper
	• Training may be intensive	
	• Fidelity monitoring may be similarly intensive	
Outcome Measures and Data Collection	• Outcome measurements can be extensive, casting a wide net for potential secondary effects, moderators and mediators, or adverse effects	• Outcome batteries minimize respondent burden (in terms of both frequency and length of assessments) since subjects are heterogeneous in their willingness and capability to participate
	• Since subjects are motivated, respondent burden less of a concern	• Accordingly, outcome measures chosen carefully to target fewer outcomes, and must be simple to complete
Data Analysis	• Standard statistical approaches suffice, and data-intensive analyses may be feasible	• Analyses to account for greater sample heterogeneity
		• Analyses account for more missing data and data not missing at random

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Implementation science

Table 2 Types of Studies to Address Blockages in the Implementation Process

Implementation Process Gap	Types of Studies
Limited external validity of efficacy/effectiveness studies	• Design clinical interventions ready for implementation earlier in the research pipeline, emphasizing tools, products, and strategies that mitigate variations in uptake across consumer, provider, and or organizational contexts
Quality gaps across systems due to variations in organizational capacity (e.g., resources, leadership)	• Assess variations and customize implementation strategies based on organizational context
	• Data infrastructure development to routinely capture or assess implementation fidelity, patient-level processes/outcomes of care, and value/return-on-investment measures
	• Further refinement of implementation strategies involving organizational and/or provider behavior change
	• Development of provider/practice networks to conduct implementation studies or evaluation of national programs
Frontline provider competing demands (e.g., multiple clinical reminders)	• Refinement of implementation strategies using cross-disciplinary methods that address provider behavior/organizational change (e.g., business, economics, policy, operations research. etc.)
	• Positive deviation or adaptation studies especially to improve implementation at lower-resourced, later-adopter sites
Misalignment with national or regional priorities	• National policy/practice roll-outs
	• Randomized evaluations of national programs or policies

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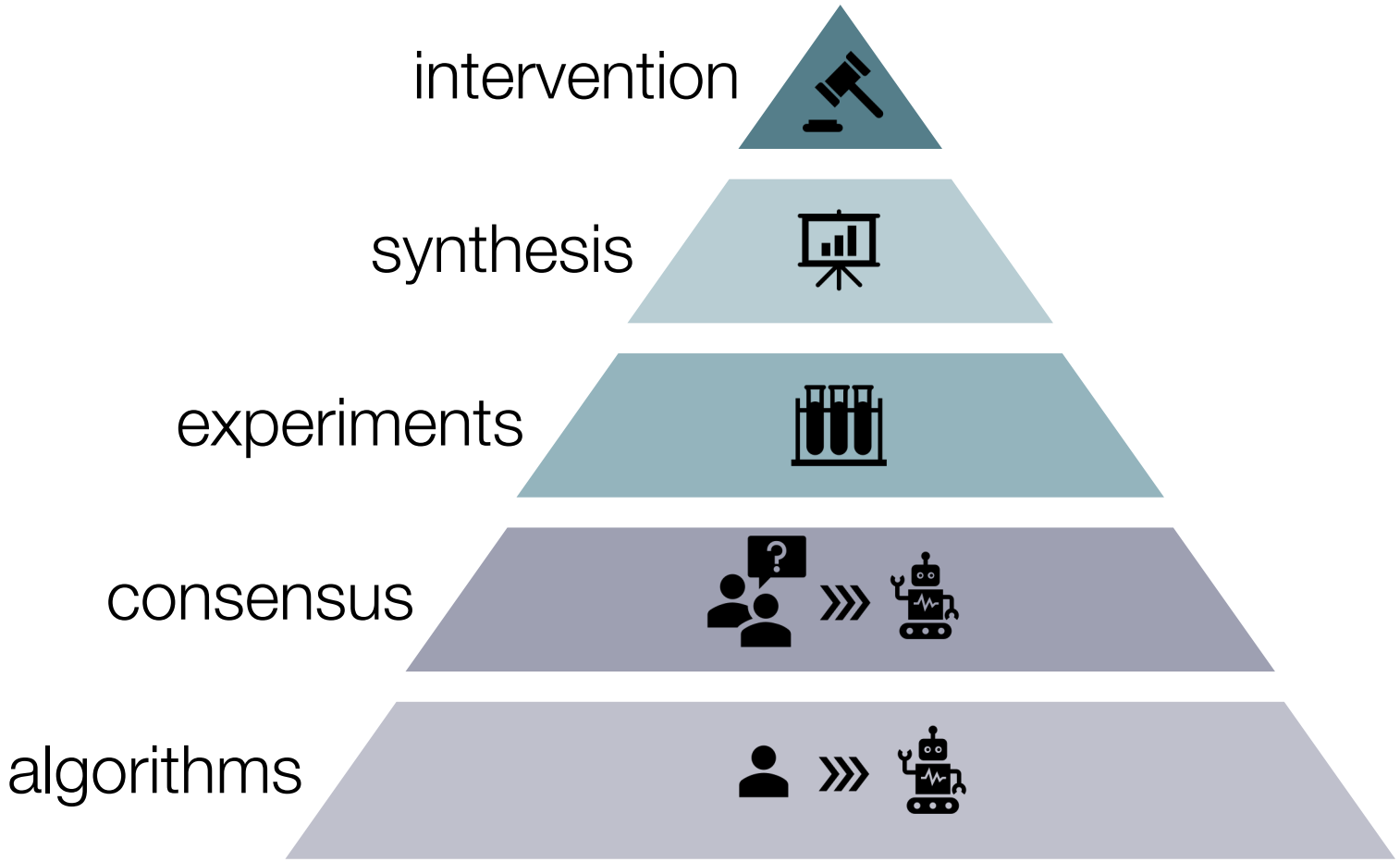
Implementation science

Relevance	To what extent are the programme objectives justified in relation to needs?
Efficiency	Have the objectives been achieved at the lowest cost?
Effectiveness	To what extent has the outcome been achieved?
Sustainability	Are the results and impacts, including institutional changes, durable over time?
Impact	Are the results still evident after the intervention is completed?

World Health Organization (2013). ***WHO evaluation practice handbook***.

Evidence-based decision making – **FTW**!!!



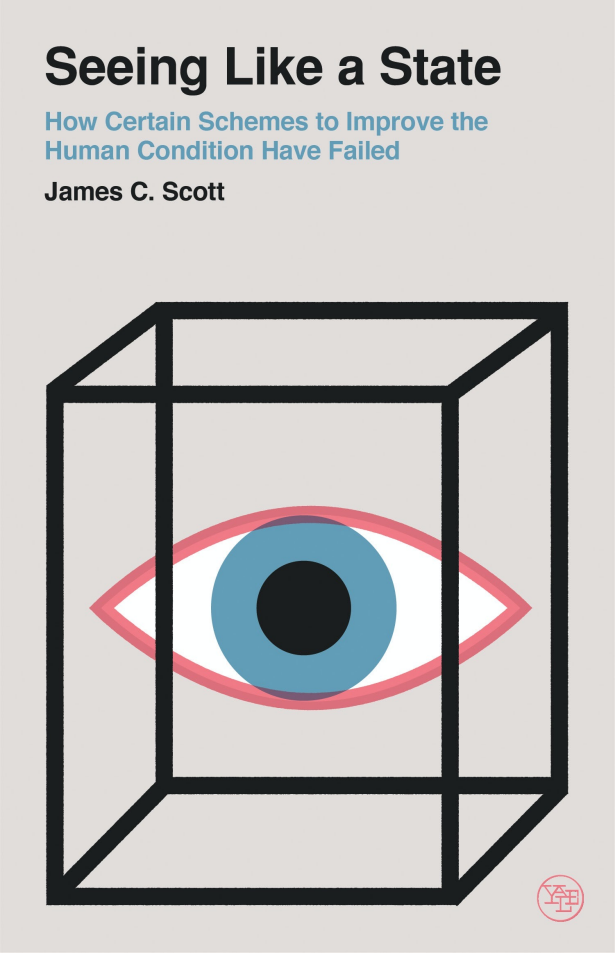
Cautionary tales: Type III errors

Type	Definition
Type I	False positive: detecting an effect that is not present
Type II	False negative: failing to detect an effect that is present

Type III	not a standard term in statistics, used informally to describe errors in the interpretation of statistical tests...

finding the right answer to the wrong question!

Cautionary tales: Seeing like a state



Legibility	Legibility (making something visible) often leads to simplifications that strip away local knowledge and context, leading to flawed decision-making
Metis	Importance of metis (practical local knowledge) in decision-making processes
High-modernism	High-modernist ideology combined with authoritarian state power can lead to disastrous social engineering projects (colonialization; Soviet collectivization of agriculture; design of Brasília)

Evidence-based approaches should integrate both quantitative data and qualitative insights from local contexts

Cautionary tales: The big con

Over-reliance on outside expertise

Public sectors have become overly dependent on consulting, leading to a lack of in-house expertise and reliance on advice that not aligned with the best interests of the public (tax law consultancy, healthcare.gov rollout)

Standardization

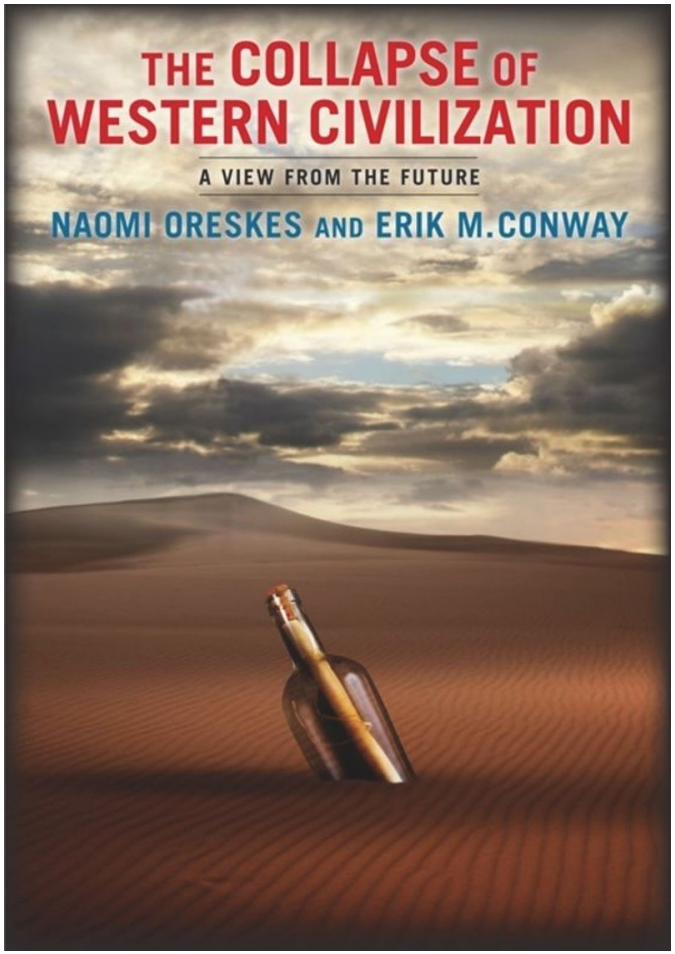
The advice offered by consulting firms often lead to a standardization of strategies and policies across different sectors and regions resulting in homogenized approaches not suitable for local contexts

Lack of long-term focus

Consulting firms promote efficiency and cost-cutting, often at the expense of long-term sustainability, equity, and investment in public goods

Evidence-based approaches need to integrate the values and needs of local contexts

Cautionary tales: The collapse of western civilization



Work of fiction - a speculative history of the 21st century from the perspective of a future historian

Scientific failure	Climate change was both predictable and predicted, reductionism reigned, technological solutions were available but not always implementable at scale.
Political failure	Short political cycles, influence of vested interests, and beliefs in market fundamentalism led to ignoring evidence and lack of coordinated action

Evidence is not enough!

Summary

- **Implementation science:** Efficacy of interventions (nudges or otherwise) is not the only criterion on how to decide about their use/implementation. Considerations of effectiveness, including long-term impact, but also cost—benefit, etc. are key!
- **Limits of evidence-based approach**: evidence-based approaches favor **legible** evidence but available evidence may not be the best or bear on the "right" question; one must remain humble and ensure that evidence is understood by those that need to/should put it into practice…