evbres

Evidence-Based Research

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Introduction to Evidence-Based Research

Name of presenter

Date of presentation

Outline

1. Definition of Evidence-Based Research (EBR)
2. The Scientific Ideal
3. The Assumption
4. The Evidence
5. The Suggested Solution
6. The Impact

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Evidence-Based Research

Evidence-Based Research can be defined as:

"The use of prior research in a ***systematic and transparent*** *way to inform a new study so that it is answering questions that matter in a valid,* ***efficient and accessible*** *manner"*

The scientific ideal (1)

"If I have seen farther it is by standing on the shoulders of giants"

- Sir Isaac Newton wrote these famous words in a letter to Robert Hooke on 15th February 1676, referring to influential scientists before him such as Copernicus, Galilei and Kepler.

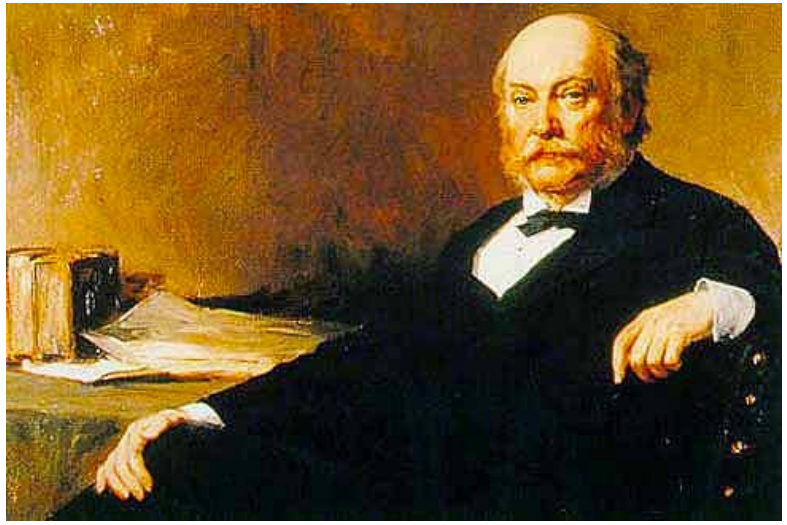
Science is cumulative, with each new discovery dependent on previous knowledge

'Newton', Sculpture by Sir Eduardo Paolozzi

The scientific ideal (2)

"If, as is sometimes supposed, science consisted in nothing but the laborious accumulation of facts, it would soon come to a standstill, crushed, as it were, under its own weight……

The work which deserves, but I am afraid does not always receive, the most credit is that in which discovery and explanation go hand in hand, in which not only are new facts presented, but their relation to old ones is pointed out."

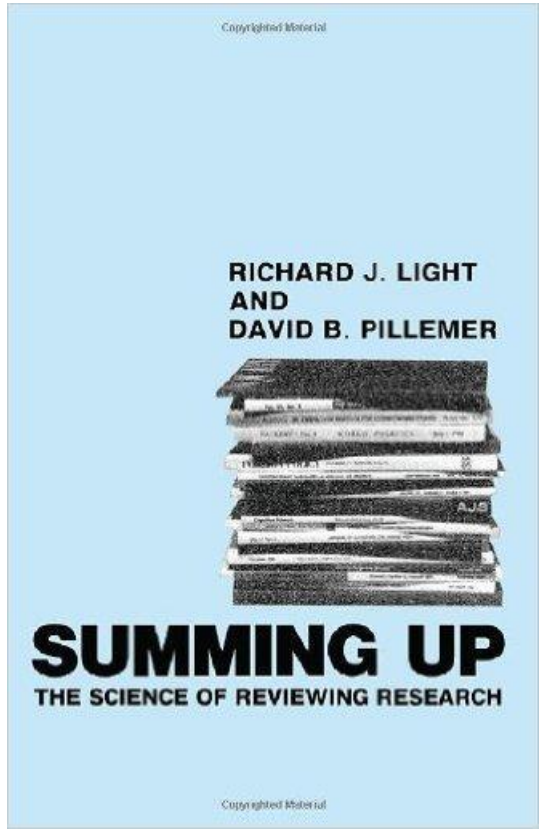


Lord Rayleigh at the 54th meeting of the British Association for the Advancement of Science held in Montreal in 1884.
(Thanks to I. Chalmers, LV Hedges, H Cooper, 2002)

Each new result should be interpreted in the context of earlier research

The scientific ideal (3)

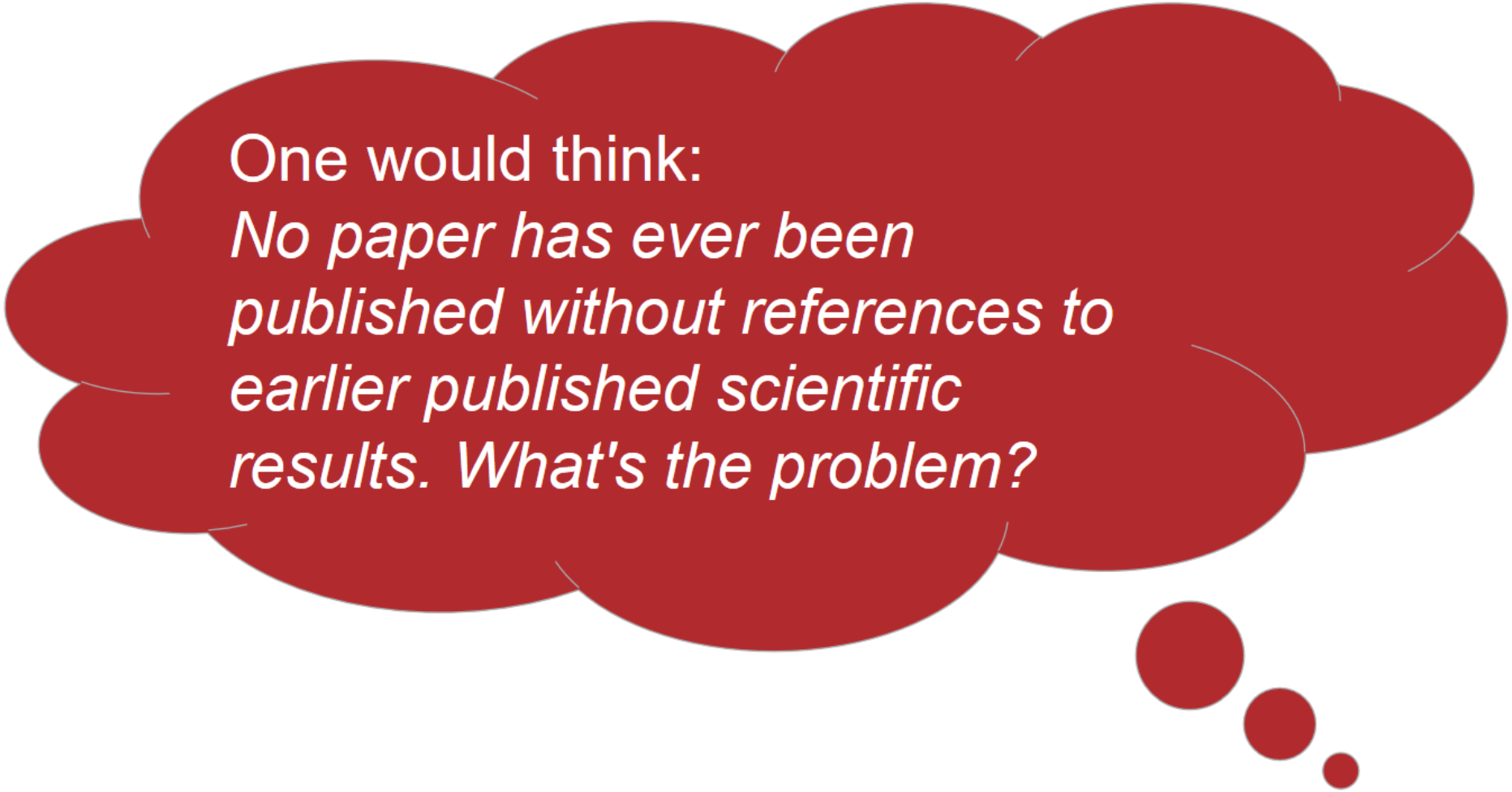
"Why do scientists think that new research is better, or more insightful, or more powerful? The underlying assumption must be that new studies will incorporate and improve upon lessons learned from earlier work. Novelty in and of itself is shallow without links to the past….For science to be cumulative, an **intermediate step between past and future research** is necessary: **SYNTHESIS OF EXISTING EVIDENCE"**



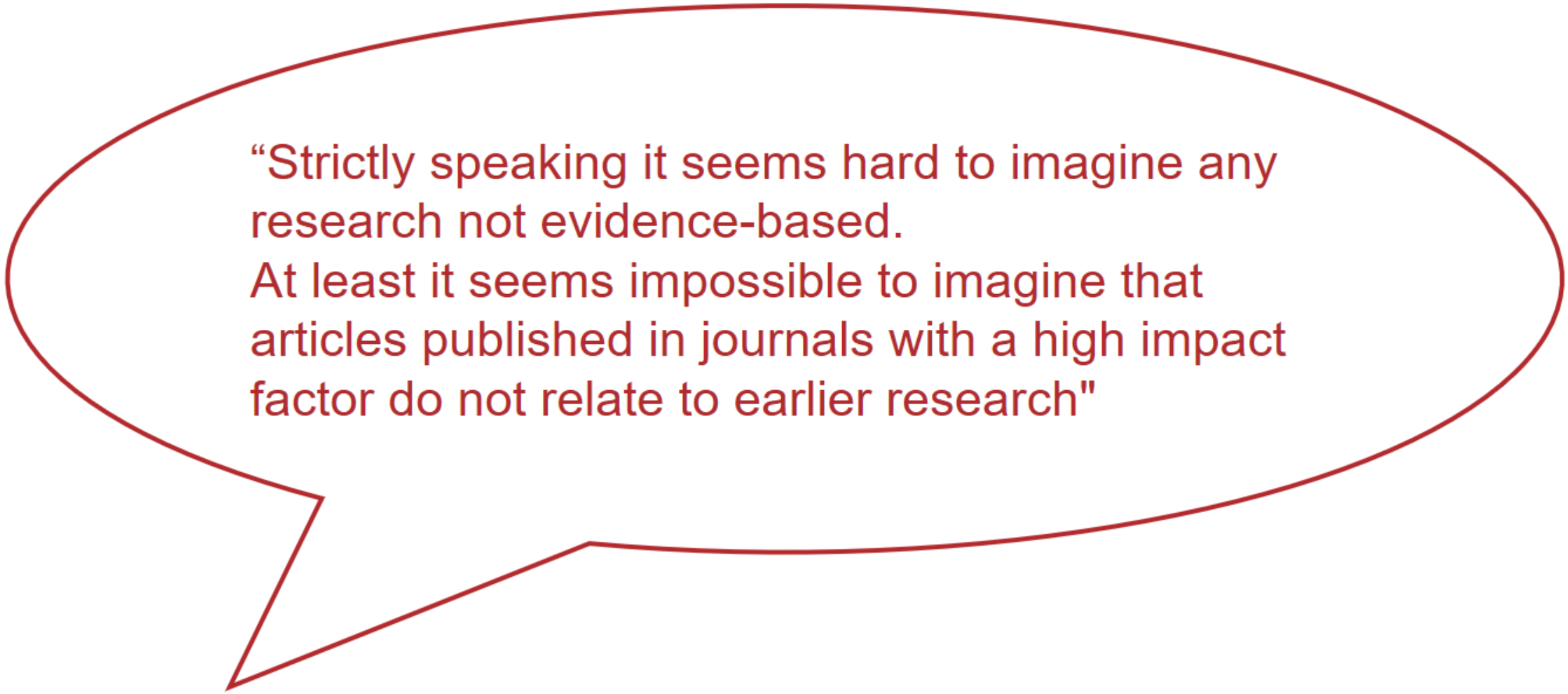
Harvard University Press 1984

All new studies should be based on a systematic review of earlier similar studies

The assumption



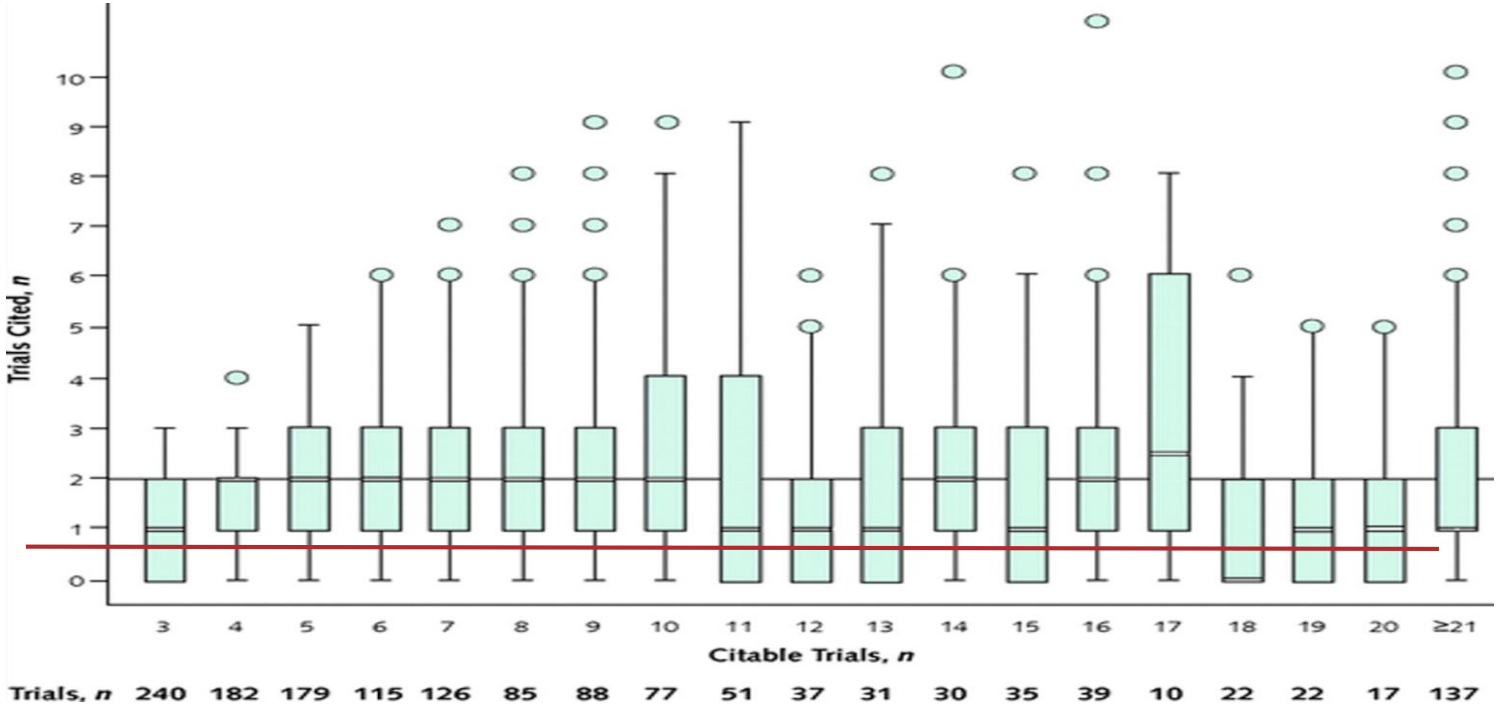
The assumption



The evidence (1)

How often do scientific authors refer to the totality of earlier research?

- 55% cited no trials even though they could potentially refer to 3 or more studies within the same area
- the median number of references for earlier studies was consistently 2



A systematic and transparent approach is rarely used when referencing earlier similar trials

Robinson KA and Goodman SN, Ann Intern Med. 2011

The evidence (2)

Are systematic reviews of existing studies used to see if a new study is required?

- Meta-epidemiological, descriptive cross-sectional study analysing RCTs published in high impact anaesthesiology journals between 2014 and 2016.
- Less than ⅕ explicitly mentioned a systematic review as justification for the new study
- 44% did not cite a single systematic review

Section of the manuscript	SR cited, *N* (%)	Number of SRs cited, range	SR cited as a justification for conducting trial, *N* (%)
Introduction	278 (43)	1-10	76 (12)
Methods	51 (8)	1-4	2 (0.03)
Discussion	245 (39)	1-11	62 (10)
Entire manuscript	360 (56)[a]	1-19	126 (20)[a]

[a]In some of the trials, SR reported in multiple sections of a manuscript.

A systematic and transparent approach is rarely used to justify new studies

Engelking A, Cavar M and Puljak L. Eur J Pain. 2018

The evidence (3)

Do previous systematic reviews guide the research agenda?

- Retrospective study using application for funding to see if a systematic review used in the planning and design of new RCTs
- 37 trials (77.1%) referenced a SR
- 20 of these (i.e. 41.7% of the total) used information in the systematic review in the design or planning of the new study

Area of use	Number of applications (%) (n=37)
Justification of treatment comparisons	6 (16.2)
Choice of frequency/dose	2 (5.4)
Selection or definition of outcome	7 (18.9)
Recruitment and consent	2 (5.4)
Estimating the difference to detect or margin of equivalence	6 (16.2)
Estimating the control group event rate	3 (8.1)
Inform standard deviation	1 (2.7)
Duration of follow up	8 (21.6)
Withdrawal rate	1 (2.7)
Adverse events	9 (24.3)

A systematic and transparent approach is rarely used to design new studies

Bhurke S et al., BMC Med Res Methodol. 2015

The evidence (4)

How often do scientific authors put their results in the context of earlier similar research?

- Retrospective study showed that hardly any randomised studies published in the month of May in the top 5 high impact journals contained an updated systematic review integrating the new results, and a large proportion made no systematic attempt to set the results in context.

	1997 N=26	2001 N=33	2005 N=18	2009 N=29	2012 N=35
First trial addressing the question	1	3	3	5	2
Contained an updated systematic review integrating the new results	2	0	0	1	2
Discussed a previous systematic review in the topic area of the new trial but did not attempt to integrate their results	4	3	5	10	11
No apparent systematic attempt to set the results in the context of other trials	19	27	10	13	20

Classification of Discussion sections in reports of randomised studies published in May in Annals of Internal Medicine, BMJ, JAMA, Lancet and NEJM

A systematic and transparent approach is rarely used when placing new results in the context of existing results from earlier similar trials

Clarke M and Hopewell S, J Bahrain Medical Society. 2013

Some thoughts

- To embark on research without systematically reviewing the evidence of what is already known, particularly when the research involves people or animals, is unethical, unscientific, and wasteful.

- We fully acknowledge that most of the time clinical researchers refer to previous studies and try to do it correctly - however, the evidence shows that researchers, research funders, regulators, sponsors and publishers of research fail to use earlier research systematically and transparently when preparing to start, fund, regulate, sponsor or publish the results of new studies.

The suggested solution

- To implement «**systematicity**» and «**transparency**» in all phases of research.
- To make sure that research is valuable, i.e. "**relevant**" and "**necessary**".

- To achieve this, an international group of researchers established the Evidence-Based Research Network (EBRNetwork) in Bergen in December 2014.
- EVBRES (EVidence-Based RESearch) is 4 year (2018-2022) EU-funded COST action aimed at creating an international European-based network to raise awareness of the need to use evidence syntheses when planning new studies and when placing new results in context.
- Sustainability of EVBRES is secured by the EBRNetwork.

The impact

By building on the existing body of evidence and presenting results in context, an Evidenced-Based Research approach will:

- help prevent research waste by making research more relevant, more ethical and more worthwhile
- focus money spent on research improving resource allocation
- reduce false positives (type 1 error) and medical reversals
- make better evidence available for informed choices
- help with how clinical trials are reported in the media
- restore end user trust in research.

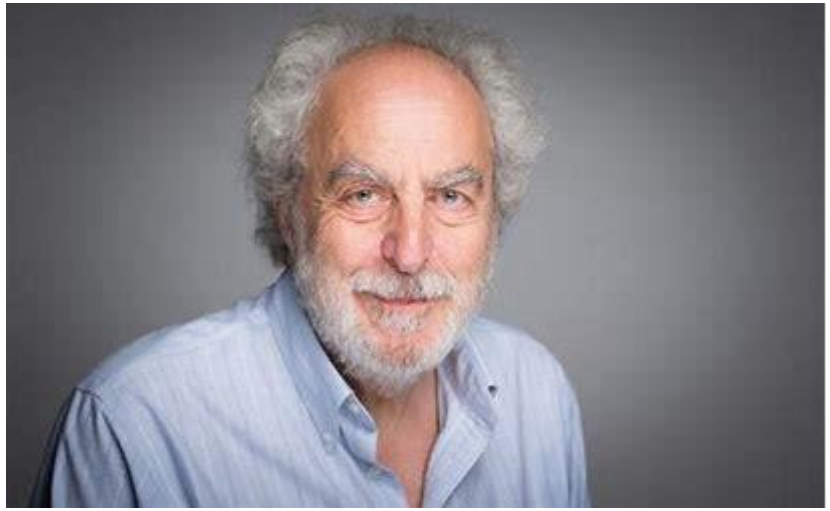
Stakeholders (especially clinical researchers) will need to invest in acquiring the knowledge and skills to be evidence-based, but in return will gain more interesting and relevant research.

The impact

In 1994 Prof. Doug Altman expressed the need for less but better research.

Evidence-Based Research will help make this a reality:

- Less research waste
- Research that is truly necessary and relevant, addressing the needs of society today.



“We need less research, better research, and research done for the right reasons”.

Professor Doug Altman, 1994

Thank you

ADD PERSONAL EMAIL/TWITTER IF REQUIRED

www.evbres.eu

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