

* Two things which are so different as to have no opportunity to unite. The phrase was used by Rudyard Kipling, in his *Barrack-Room Ballads*, 1892: "Oh, East is East, and West is West, and never the twain shall meet."

*Never the twain shall meet?

Implementation science and improvement science

Per Nilsen
KBH, 23 April 2018



- ✓ Defining the fields
- ✓ Brief histories of the fields
- ✓ Comparison of the fields
- ✓ So, what can we learn from each other?

Defining the fields

Implementation science

"...is the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice to improve the quality and effectiveness of health services and care." (Eccles & Mittman, *Implementation Science*, 2006).




The screenshot shows the journal's homepage with the title 'IMPLEMENTATION SCIENCE' and a search bar. Below the title, there are navigation tabs for 'Home', 'About', 'Aims & Scope', 'Editorial Board', 'Editorial Process', 'For Authors', 'For Reviewers', 'For Librarians', and 'For Institutions'. A 'Latest news' section is also visible.

The definition emphasizes...

"methods to **promote** the systematic **uptake**..."

→ **But** many studies are also conducted to understand, describe, analyze current practice, i.e. without specific "methods to promote..."



The image shows a small photograph of a grain of salt on a surface, with the text 'A Grain of Salt' overlaid.


The definition also emphasizes...

"...uptake of **research** findings and other **evidence**-based practices..."


→ **But** many studies concern practices which lack evidence or research support, e.g. something being developed for the study or being based on "**justified belief**" that it will improve outcomes for practitioners, health care and (ultimately) patients or populations.

Improvement science

"... focuses on systematically and rigorously exploring **'what works' to improve quality in healthcare** and the best ways to measure and disseminate this to ensure positive change." (Health Foundation, 2011)



"The primary goal ... is to determine which **improvement strategies work** as we strive to assure effective and safe patient care." (ISRN, 2017)



Quality

"doing the right thing, at the right time, in the right way, for the right person – and having the best possible results" (US Agency for Healthcare Research and Quality, 2007)

QI

"...systematic, data-guided **activities** designed to **bring about immediate, positive changes** in the delivery of health care." (Baily *et al.*, 2006: S5)

"... systemic **changes aimed at improving the processes and outcomes** of health care..." (Alexander & Heard, 2011)

QI vs. improvement science


- The importance of distinguishing between QI and IMPRO science has been emphasized by many scholars
- QI concerns application of knowledge and IMPRO science the discovery of knowledge.
- QI generates knowledge for local improvement; results are not intended to be generalizable beyond the specific setting or population.
- The ambition of IMPRO science is to produce generalizable knowledge.

IMPRO science definitions emphasize...

...the study/evaluation of the **effectiveness** (i.e. "what works") of various **QI strategies** to achieve improved quality

→ Hmm... so what are these **improvement/QI strategies**? 

QI strategies (Hughes, 2008)



QI Strategy	Examples
Provide reminder systems	<ul style="list-style-type: none"> Reminders to share the guidelines Computer based reminders for providers Computer based decision support
Facilitated review of clinical data to providers	<ul style="list-style-type: none"> Discussion of clinical data from computer generated medical record (e.g., phone call or fax)
Point-of-care feedback	<ul style="list-style-type: none"> Feedback of performance to individual providers Quality indicators and reports Standardized quality improvement tools Point-of-care performance data Benchmarking - comparison of outcomes data from top performers
Provide education	<ul style="list-style-type: none"> Workshops and conferences Educational outreach tools (e.g., webinars, desktop) Disseminated educational materials
Peer-to-peer education	<ul style="list-style-type: none"> Champions Peer and family education Peer support Success stories (describes promising self strategies)
Peer-to-peer education	<ul style="list-style-type: none"> Peer-to-peer education Peer support Success stories (describes promising self strategies)
Facilitated review of clinical data to providers	<ul style="list-style-type: none"> Discussion of self management
Operational change	<ul style="list-style-type: none"> Standardized and generic promoting self management Protocols or rules to patients
Facilitated review of clinical data to providers	<ul style="list-style-type: none"> Clear management, decision management TQM, ISO strategies Workshop/peer review Change from paper to computer based records Standard of care Staff wear changes
Facilitated review of clinical data to providers	<ul style="list-style-type: none"> Facilitated education based on achievement of performance goals Education in implementation science (e.g., for the various, targeted personnel) Education requirements
Facilitated review of clinical data to providers	<ul style="list-style-type: none"> Empowerment for various task types Health care team processes, team work Health system structure Changes in accreditation bodies (e.g., accrediting) (work flow issues) Changes in measurement schemes (e.g., registration, prospective payment, related performance)

QI strategies/interventions/activities (the terms are used interchangeably) = implementation strategies/interventions (both terms are used)

Various taxonomies exist, but the QI strategies are the same as/similar to the strategies described in impl. science!

Some scholars distinguish between **QI strategies** and **QI tools**, which are used to "define and assess problems" (Hughes, 2008) – see next slide!

Exhibit 3. IHI Model for Improvement

The diagram illustrates the IHI Model for Improvement. It features a fishbone diagram with 'Cause' on the left and 'Effect' on the right. The 'Cause' side is divided into three levels: Primary cause (Equipment, Process, People), Secondary cause (Materials, Environment, Management), and Tertiary cause. The 'Effect' side is a circle labeled 'Problem'. To the right is a circular PDCA cycle (Plan, Do, Study, Act) with three guiding questions: 'What are we trying to accomplish?', 'How will we know that a change is an improvement?', and 'What changes can we make that will result in improvement?'. Below the fishbone are two graphs: 'Organizational Learning' showing 'Performance Improvement' over 'Time' with 'Breakthrough Performance' and 'Continuous Improvement' paths, and 'Deming's Iceberg Model' showing 'Define, Measure, Analyze, Improve, Control' cycles.

Brief histories of the fields

Development of Quality Management Science

The diagram shows the development of Quality Management Science. It features a large blue arrow pointing right, labeled 'Development of Quality Management Science'. Above the arrow are portraits of W. Edwards Deming and Walter A. Shewhart. Below the arrow, a timeline marks '1920s-30s', '1950s and onwards', and '1986'. On the left, a portrait of Shewhart is accompanied by the text 'Shewhart studied quality as an industrial process' and 'Influenced by Shewhart's work, Deming recognized quality as a primary driver for industrial success'. On the right, a portrait of Deming is accompanied by the text 'Deming's 14 Points on Total Quality Management' and 'The Deming's System of Profound Knowledge'. A book cover for 'Out of the Crisis' by W. Edwards Deming is also shown.

1 Deming's 14 Points on Total Quality Management

1. Create and communicate an employee commitment of the spirit and attitude of the job, initiative and responsibility to quality.
2. Break quality into a practical, thoughtful production.
3. End the practice of awarding bonuses on the basis of price per piece, based on a long term relationship based on employee loyalty and trust.
4. Work to constantly improve quality and productivity.
5. Institute on-the-job training.
6. Instill pride in the quality of work.
7. Eliminate slogans, posters, and red-inked exhortations for the work force, instead based on the spirit and attitude of the job.
8. Eliminate work methods based on inspection.
9. Eliminate the dependence on inspection to ensure quality. The Deming 14-Point Total Quality Management philosophy, based on the capabilities of processes, is that to improve work.
10. Institute leaders that take people of pride in their work.
11. Institute an self-improvement program.
12. Institute statistics in the company to accomplish the transformation.

2. The Deming's System of Profound Knowledge

Deming's system of profound knowledge is based on the following four parts:

- 1. Philosophy of quality:** understanding the moral principle leading to quality, problems, and solutions, and recognizing the quality and responsibility of people and organizations.
- 2. Knowledge of variation:** the range and sources of variation in processes, and the statistical methods of measuring and controlling variation.
- 3. Theory of knowledge:** the scientific method, and the use of the scientific method in the study of human behavior.
- 4. Psychology of knowledge:** concepts of human learning and motivation.

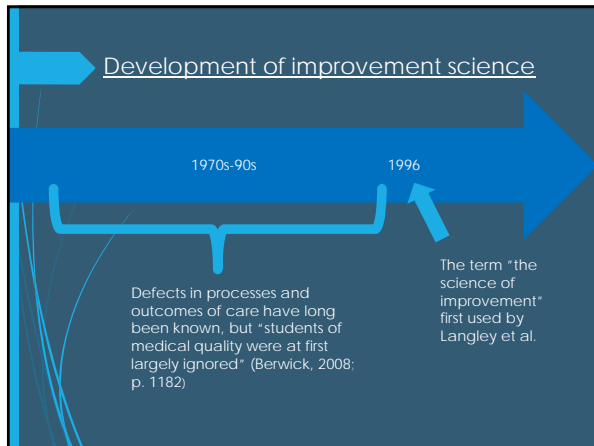
Development of improvement science

1970s-90s

1996

Defects in processes and outcomes of care have long been known, but "students of medical quality were at first largely ignored" (Berwick, 2008; p. 1182)

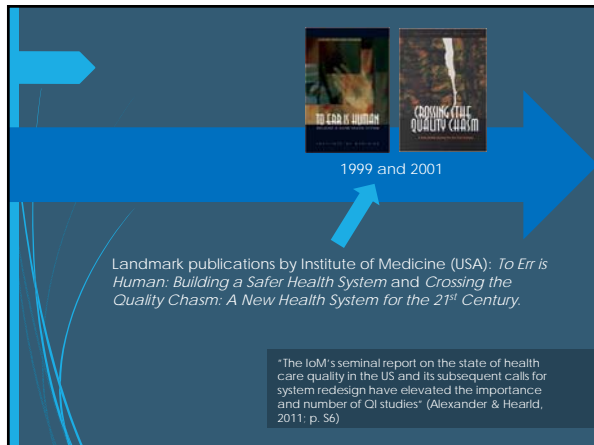
The term "the science of improvement" first used by Langley et al.



1999 and 2001

Landmark publications by Institute of Medicine (USA): *To Err is Human: Building a Safer Health System* and *Crossing the Quality Chasm: A New Health System for the 21st Century*.

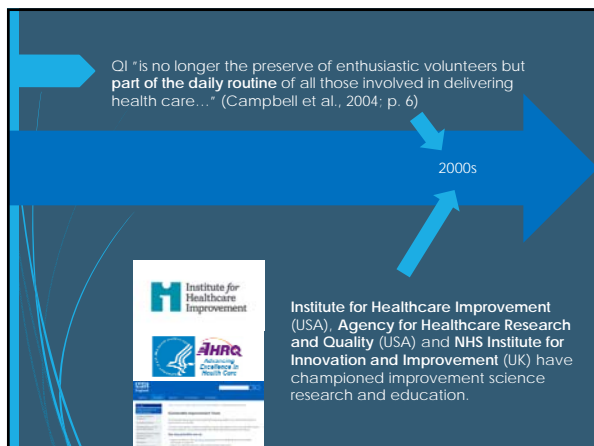
"The IoM's seminal report on the state of health care quality in the US and its subsequent calls for system redesign have elevated the importance and number of QI studies" (Alexander & Heald, 2011; p. 36)

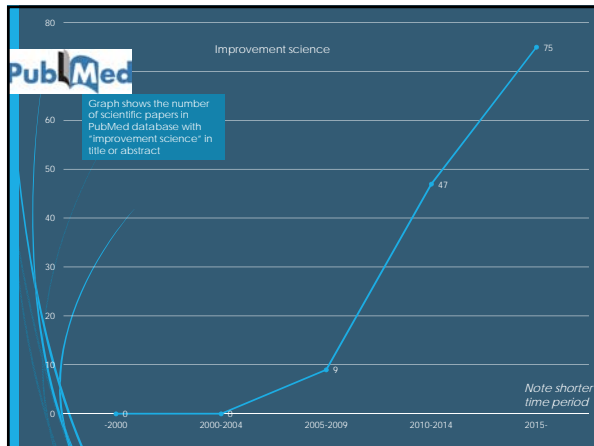


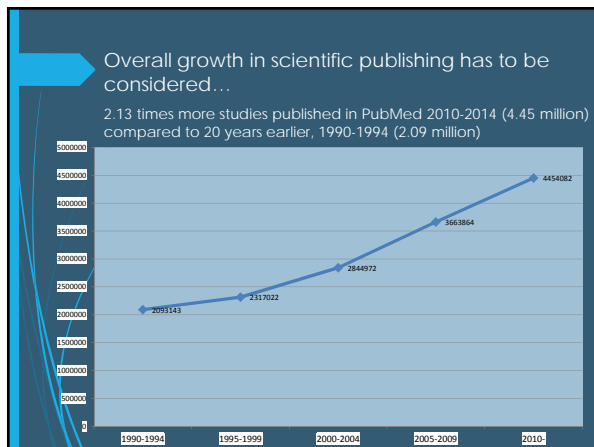
QI "is no longer the preserve of enthusiastic volunteers but **part of the daily routine** of all those involved in delivering health care..." (Campbell et al., 2004; p. 6)

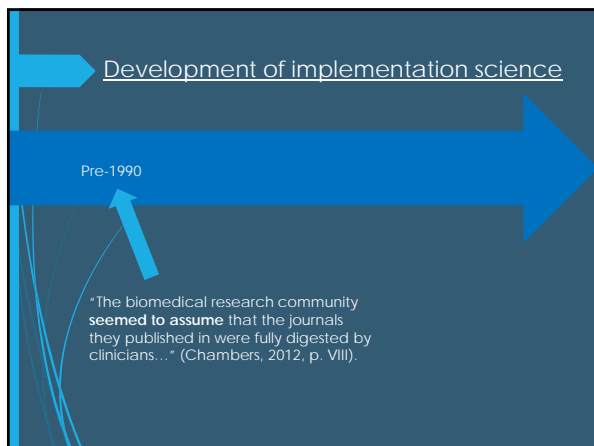
2000s

Institute for Healthcare Improvement (USA), Agency for Healthcare Research and Quality (USA) and NHS Institute for Innovation and Improvement (UK) have championed improvement science research and education.







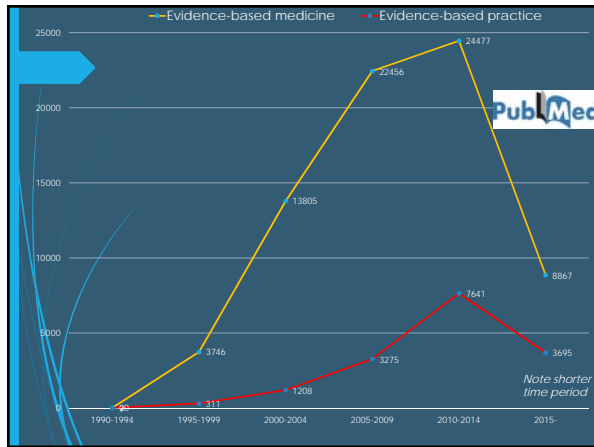


1990s

*The spread of innovations reemerged as an important theme within the health care sector with the rise of the **evidence-based movement*** (Ferlie *et al.*, 2005: p. 117-118)

EBM (1992) and its broader application EBP popularized the notion that **scientific findings should be more comprehensively implemented** within typical practice* (Chambers, 2012: p. VII)

*Many early enthusiasts of EBP naively assumed that the case for implementation would be self-evident and that it would **spread automatically and quickly*** (Dopson *et al.*, 2005: p. 29)



2006

Implementation Science journal is launched.

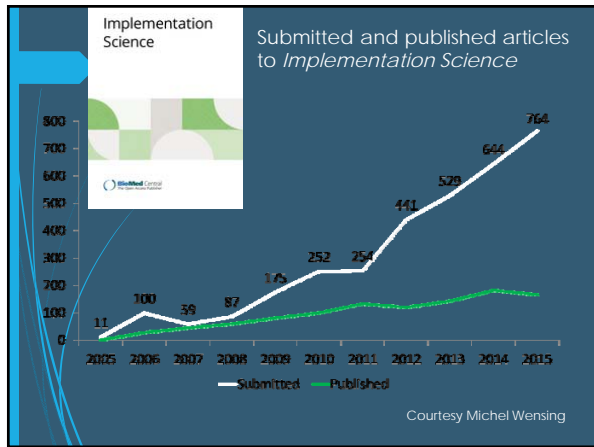
But research of relevance for implementation science existed long before EBM and EBP!

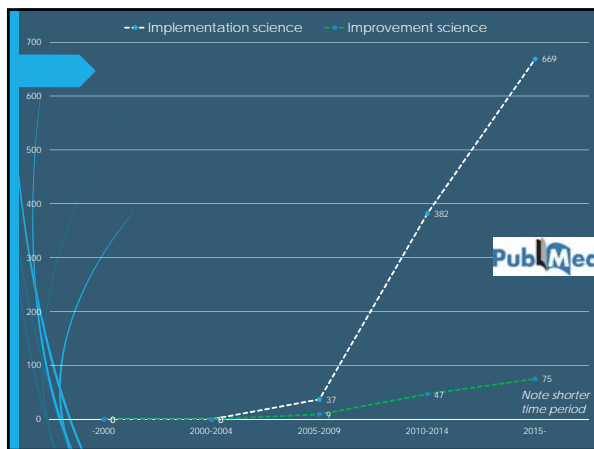
1962: Everett M Rogers' *Diffusion of Innovations* gathers research on diffusion and adoption of innovations.

1973: Pressman & Wildavsky *Implementation* – launches research on policy implementation.

1970s-80s: Research on research and knowledge use/utilization, in nursing.

1976: Stetter Model of Research Utilization (Cont'd).





Comparison of the fields (I)

Influences

IMPRO science draws on knowledge from fields/topics such as quality, measurement, management/leadership, organizational learning (i.e. the business and strategy literature).

IMPLE science is more influenced by **behavioural and social sciences** (e.g. psychology, organizational behaviour, sociology, political science).

Comparison of the fields (II)

Epistemology, ontology and methodology

The epistemology and ontology of both fields can be positioned as **positivist**.

They seek objectivity, use rational approaches to research, with the researcher being a detached, external observer, who has access to the real world.

It is possible to obtain "hard, secure, objective knowledge".

IMPRO science: emphasis on **measurement**

IMPLE science: measurement but also wide use of **qualitative** methods

However, the **methodology** is not entirely positivist:

Both fields acknowledge the importance of pre-understanding

IMPRO science: values the personal experience of those closest to the problem

IMPLE science: non-quantitative methods important

Comparison of the fields (III)

Knowledge production and use

Both fields aim to produce knowledge which is both applicable for **improved practice** and can contribute to **scientific knowledge**.

Both fields aim to produce **generalizable** knowledge.

Both fields involve researchers who do **research on implementation/QI** and/or are actively involved in **enabling** implementation/QI.

IMPRO science principles are **taught** in health care professionals' continuing education and **integrated** into health care practice.

Health care professionals are not expected to be proficient in IMPL science.

IMPRO science has more of a practitioner-friendly and hands-on "how-to-do-it" orientation.

IMPRO science comes with an arsenal of **practical QI tools** to identify and assess problems – PDSA, Six-Sigma, Root Cause Analysis, etc.

IMPLE science also uses these tools, but they were not developed within the field.

IMPLE science: studies of **conditions** (barriers/facilitators) for achieving an EBP **and** studies of the **effectiveness of strategies** to achieve an EBP.

IMPRO science: more emphasis on studies of the **effectiveness of strategies** to achieve desired change/QI.


IMPRO science studies are predominantly carried out in **health care**.

IMPLE science studies go **beyond health care** (incl. community-based services, education, social work).

Comparison of the fields (IV)

What is the problem?

Both fields describe a similar **problem**: many patients do not receive optimal care or treatment – both fields assume that there is a gap/chasm between **current** and **optimal/desired** care and treatment



The diagram illustrates the concept of 'The Gap' between 'Research' and 'Practice'. Two orange arrows labeled 'Research' and 'Practice' point towards each other, with a bracket underneath labeled 'The Gap'. To the right is a small inset image titled 'Closing the Quality Chasm'.

Comparison of the fields (V)

What is the solution?

Although the fields describe a similar problem and ultimate goal, they propose partially different means:

IMPRO science: **QI of practice** (systems, processes and outcomes) can improve patient outcomes.

IMPLE science: **implementation of evidence-based practices** can improve patient outcomes.

The scope of IMPROVE science is **broader** than that of IMPLE science, since a QI is not necessarily evidence-based.

A QI was achieved, but it is not "evidence-based"

A QI that is also "evidence-based"

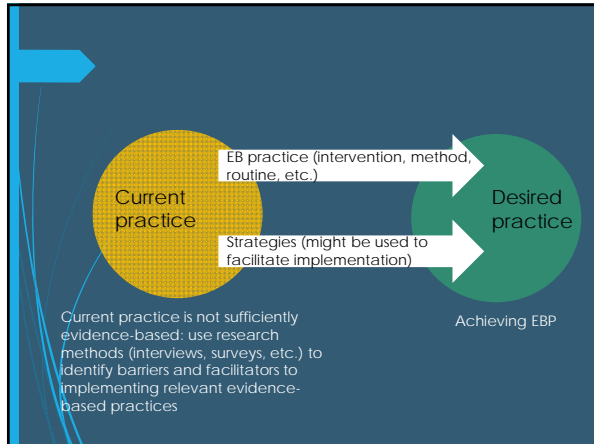
Current practice

Strategies

Desired practice

Quality problems: use QI tools and research methods (interviews, surveys, etc.) to define and assess problems

Achieving QI



So, what can we learn from each other?

That's for our discussion 😊