

**The Convergent Lines of Improved Antimicrobial
Stewardship and Implementation
Science/behavioural Changes**

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**The Convergent Lines of Improved Antimicrobial
Stewardship and Implementation
Science/behavioural Changes**

**...or what a physician performing
antibiotic stewardship knows and
understands...**

Implementation Science

Implementation science is the study of methods to promote the integration of research findings and evidence into healthcare policy and practice.

<http://www.fic.nih.gov/researchtopics/pages/implementationsscience.aspx>

Antibiotic Stewardship

Antimicrobial stewardship encompasses a wide range of processes and interventions that are designed to ensure that antibiotics are used in the most effective manner.

The goals of antibiotic stewardship can be summarized in optimising therapy for individual patients; preventing overuse and misuse; and minimising the development of resistance at patient and community level.

Implementation Science and Antibiotic Stewardship

Antibiotic stewardship is about implementation of guidelines and other evidence-based principles.

Implementation of antibiotic stewardship principles should reach all physicians prescribing antibiotics.

„Evidence Based Medicine“

Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients.

The roots of evidence-based medicine

Drs Lind, Louis, and Semmelweis laid the groundwork for evidence-based medicine in the 18th and 19th centuries.

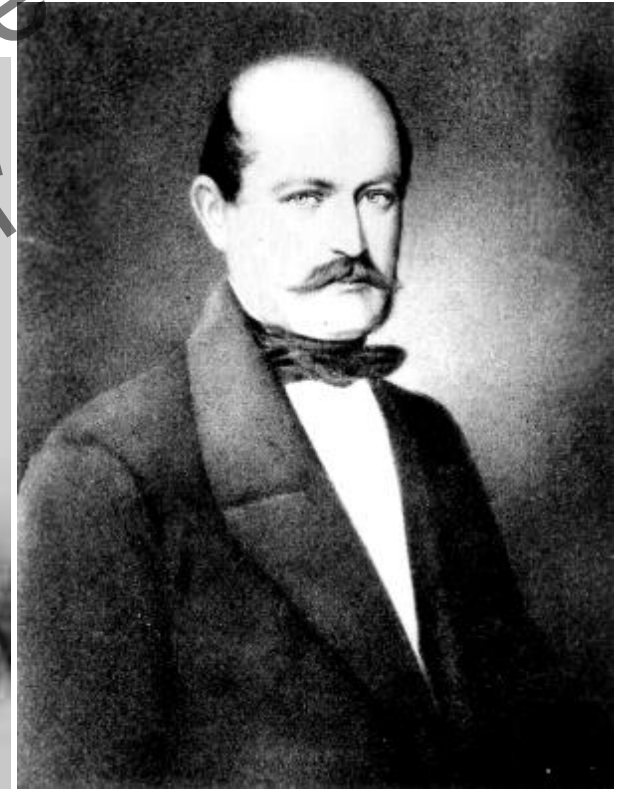
Gerry Greenstone, MD



Dr. James Lind, a British naval surgeon who discovered cure for scurvy (1716-1794)



Dr. Pierre Louis, a French physician who used statistics to assess the effect of bloodletting in acute pneumonia (1778-1872)



Dr. Ignaz Semmelweis, a Hungarian physician who discovered that puerperal fever can be reduced by handwashing (1818-1865)

~ 50 years ago....

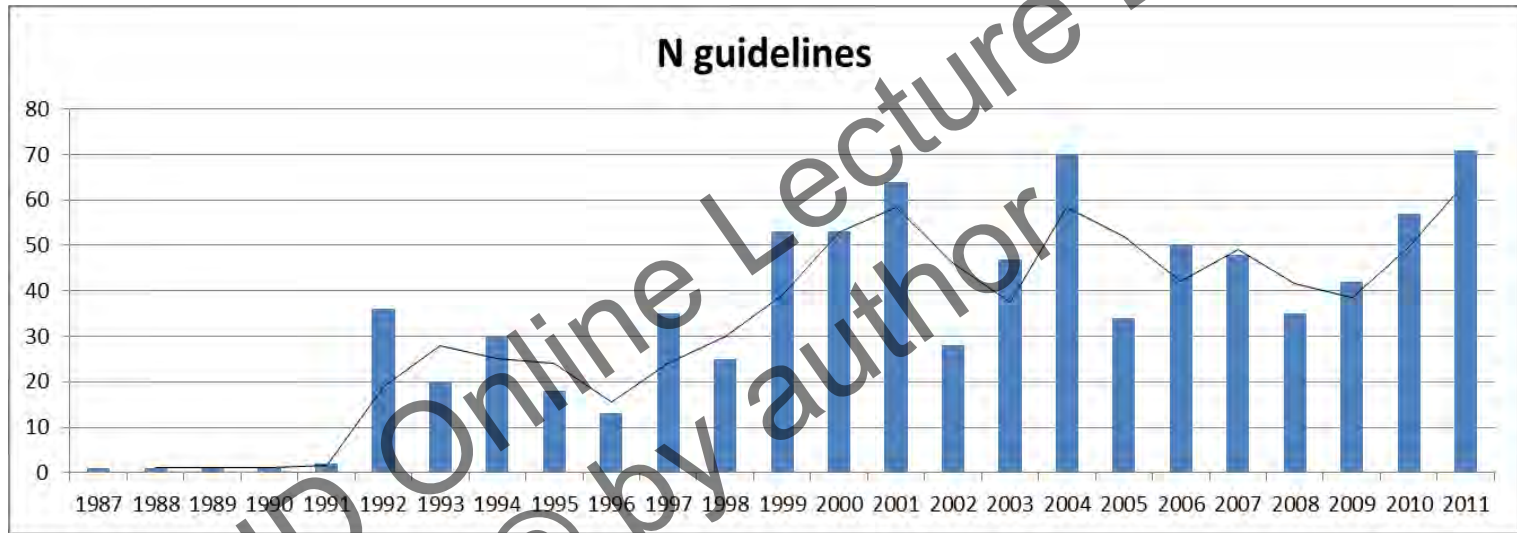
- Through the rigors of medical education, followed by continuing education, journals, their own experiences, and exposure to other colleagues, each physician always thought the right thoughts and did the right things: **the art of medicine.**
- If the majority of physicians were doing something, it was medically necessary.
- Analytical approach and mathematical modelling reserved for the research

The art of medicine
consists in amusing
the patient while
nature cures
the disease.

Voltaire

PICTUREQUOTES.COM

Antibiotic Treatment Guidelines in MEDLINE



All guidelines	893
in English	625
in French	80
in Spanish	38
in German	34

Adherence to Antibiotic Guidelines

...just a few recent examples

- **Primary care, 37 health-care centers: 36% adherence to guidelines before intervention and 57% after intervention (Spain)**
- **Global-PPS: compliance with guidelines 71% to 83% (Europe)**
- **Elderly patients with pneumonia: 38.8% adherence to guidelines (Italy)**
- **Global-PPS: UMC Ljubljana: adherence to guidelines 74 to 83%**
- **Antibiotic surgical prophylaxis UMC Ljubljana, complete adherence to guidelines: 25%**

Why Don't Physicians Follow Clinical Practice Guidelines?

76 articles which included 120 different surveys investigating 293 potential barriers to physician guideline adherence.

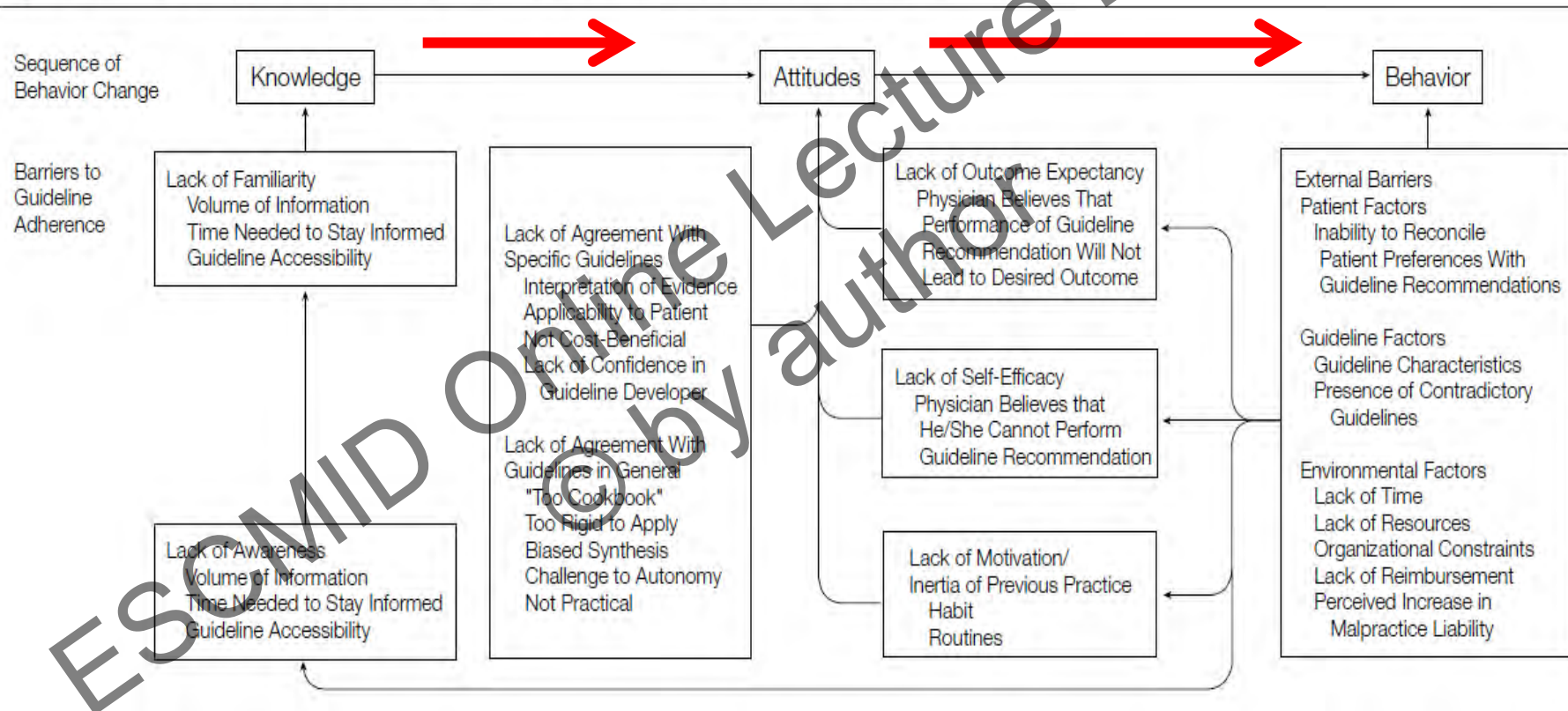
Most often studied barriers (found in at least 10% of respondents in most studies):

- awareness (n = 46)
- familiarity (n = 31)
- agreement (n = 33)
- self-efficacy (n = 19)
- outcome expectancy (n = 8)
- ability to overcome the inertia of previous practice (n = 14)
- absence of external barriers (guidelines-, patient- or environment-related) to perform recommendations (n = 34).

Cabana MD, et al. JAMA 1999; 282: 1458-65.

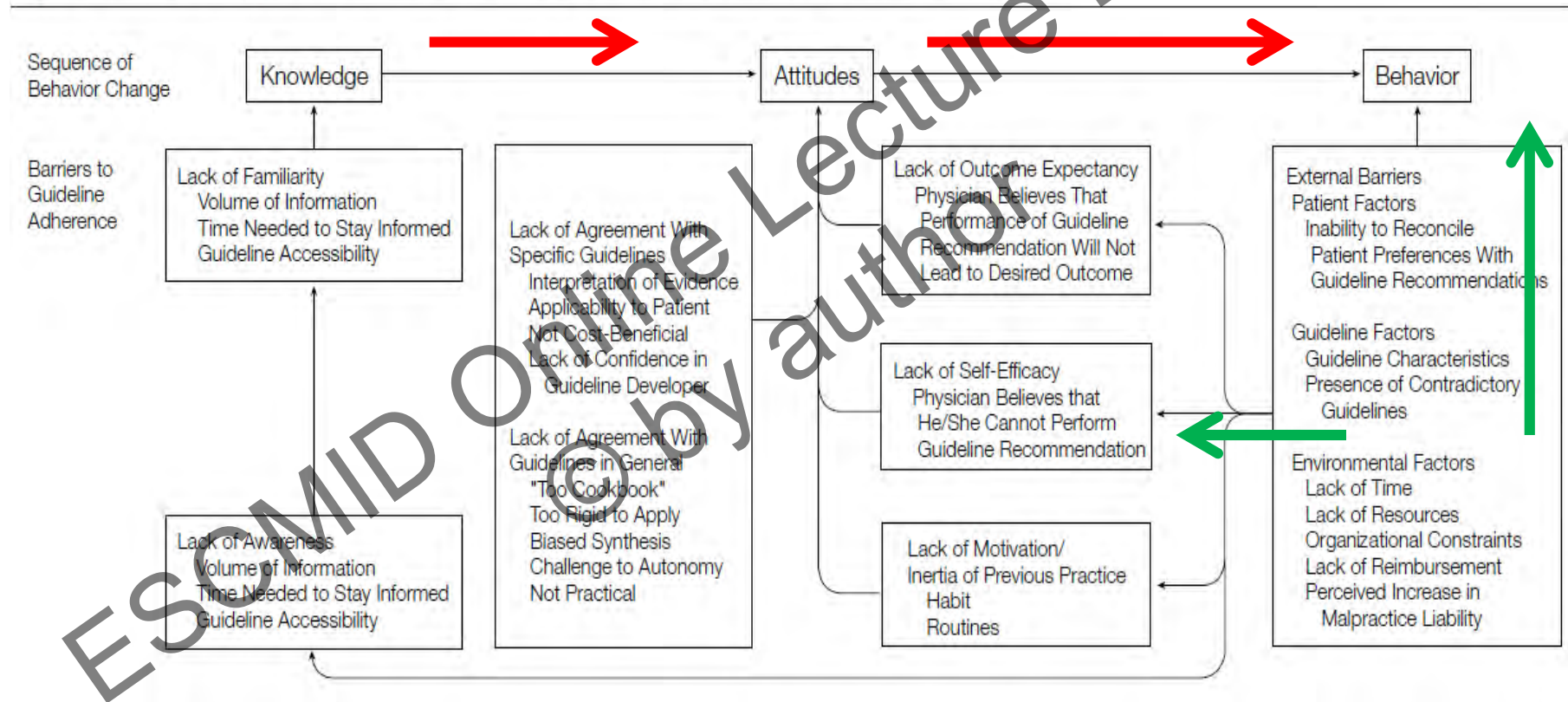
Why Don't Physicians Follow Clinical Practice Guidelines?

Figure. Barriers to Physician Adherence to Practice Guidelines in Relation to Behavior Change



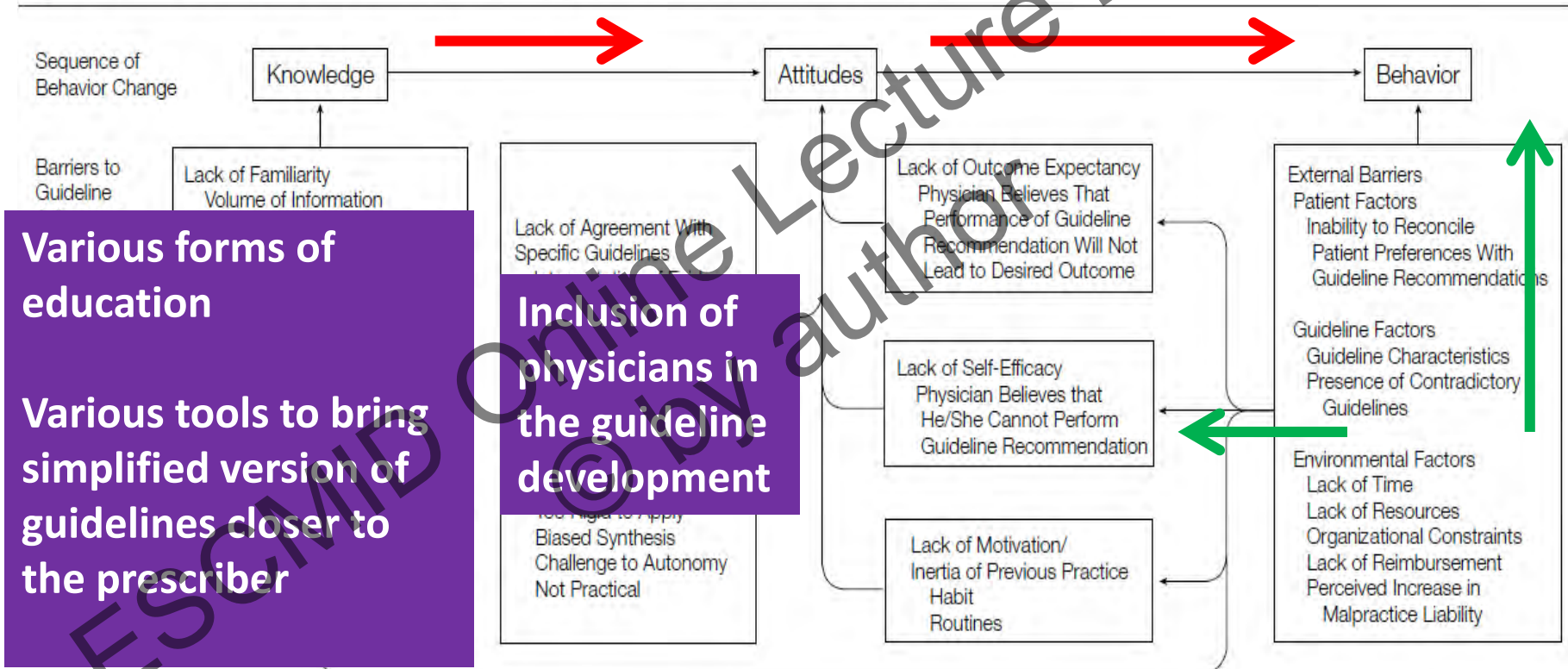
Why Don't Physicians Follow Clinical Practice Guidelines?

Figure. Barriers to Physician Adherence to Practice Guidelines in Relation to Behavior Change



Low Hanging Fruit?

Figure. Barriers to Physician Adherence to Practice Guidelines in Relation to Behavior Change



behaviour

/biˈheɪvjə/ 

noun

the way in which one acts or conducts oneself, especially towards others.

"he will vouch for her good behaviour"

synonyms: [conduct](#), way of behaving, way of acting, [deportment](#), [bearing](#), [etiquette](#);
[More](#)

- the way in which an animal or person behaves in response to a particular situation or stimulus.

plural noun: behaviours; plural noun: behaviors

"the feeding behaviour of predators"

- the way in which a machine or natural phenomenon works or functions.

"the erratic behaviour of the old car"

synonyms: [functioning](#), [action](#), [performance](#), [operation](#), [working](#), [running](#), [reaction](#),

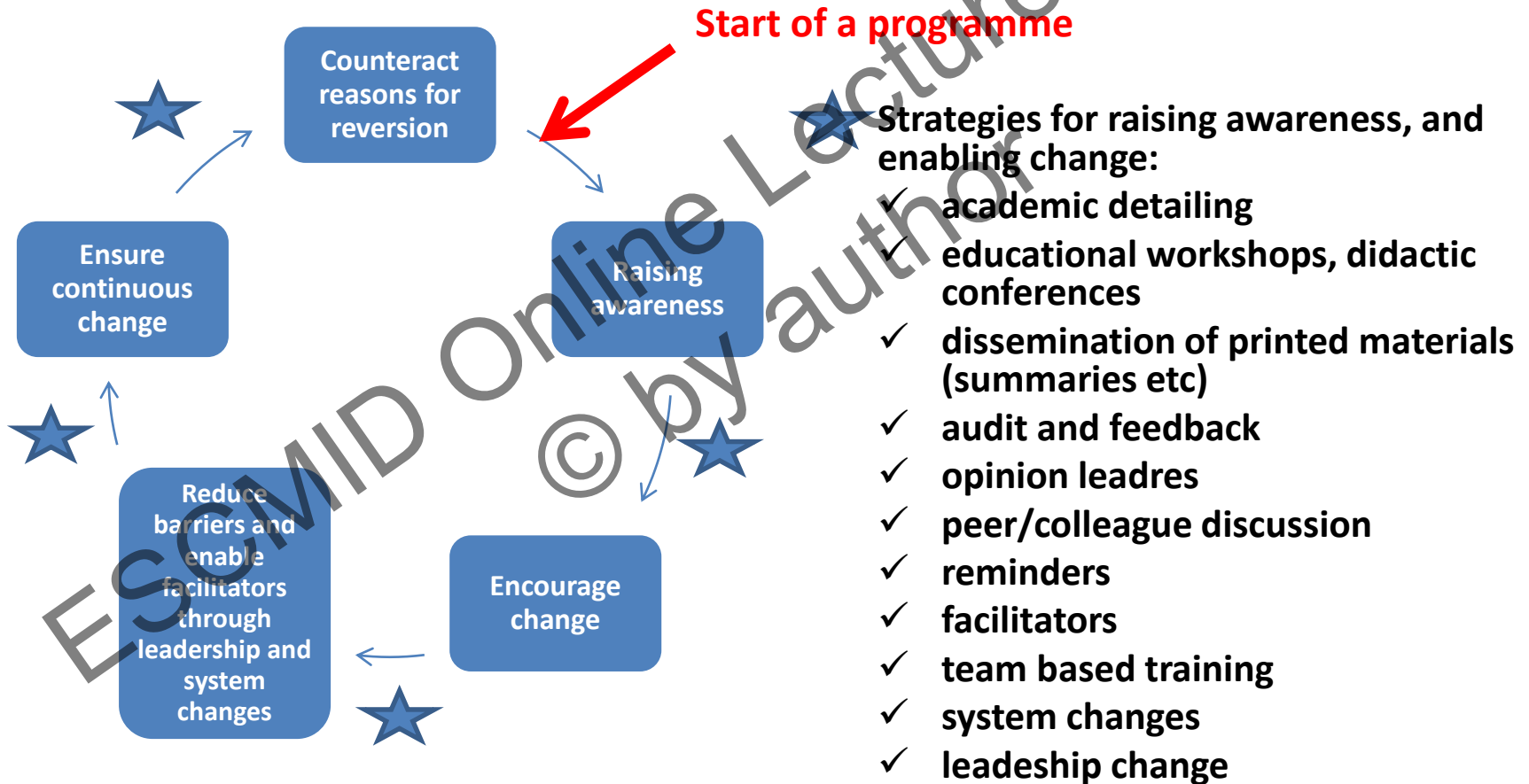
CLINICAL PRACTICE IS A FORM OF HUMAN BEHAVIOUR

Behavioural Theories and Health Professional Practice

„theories of human behaviour that have proved useful“

- **Motivation determines the behaviour**
 - Social cognitive theory (incentives and expectations)
 - Planned behaviour
- **Action theory: other additional factors besides motivation**
 - Conditioning (behavior with good consequences should be repeated...)
 - Implementation intention (~having plans...)
 - Self-regulation (~making sense...)
- **Stage theory: the behaviour changes are a stepwise process**

Stage (Trans-theoretical) Model



The Use of Behavioural Theories in Health-care

- **Commercial marketing**
- **Social marketing**
- **....other medical specialties**
- **Infection control practices**
- **Antibiotic stewardship**

“Would you use the same marketing strategy to sell a Volvo to a nurse as you would if you were selling it to a doctor? Of course not! So why are you surprised that hand hygiene compliance rates are worse among doctors than nurses?”
(Exasperated comment from an advertising executive consulted by Hand Hygiene Australia).

Social Marketing Principles Useful in Health-care Practice

Customer orientation	<i>Understand the customer</i>
Behaviour focus	<i>Define current and desired behaviour</i>
Theoretical basis	<i>Know the theoretical principles of behaviour change</i>
Insight driven	<i>Know what truly motivates people</i>
Acknowledging exchange	<i>Know what the customer has to give up to acquire new type of behaviour</i>
Competition aware	<i>What competes for people's time and attention</i>
Appropriate segmentation	<i>Targeted approach for specific audience („one size does not fit all“)</i>
Mixed methods	<i>Not only one method at the time (multifaceted)</i>

Evidence-based Techniques That are Relevant to Changing Public Health Behaviour

- Goal setting (behaviour)
- Goal setting (outcome)
- Self-monitoring (behaviour)
- Self-monitoring (outcome)
- Feedback (behaviour)
- Feedback (outcome)
- Action planning

NICE National Institute for
Health and Care Excellence

 Behaviour change overview

<http://pathways.nice.org.uk/pathways/behaviour-change>

Pathway last updated: 24 March 2015. To see details of any updates to this pathway since its launch, visit: [About this Pathway](#). For information on the NICE guidance used to create this path, see: [Sources](#).

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Behavioural Science in Antibiotic Stewardship?

Interventions to improve antibiotic prescribing practices in ambulatory care (Review)

Arnold SR, Straus SE



38 studies:

- Audit/feedback
- Educational materials
- Educational meetings
- Outreach visits
- Physician reminders
- Financial and system changes
- Patient-based interventions

Authors' conclusions

This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration, 2005, Issue 4

<http://www.cochrane.org>

The effectiveness of an intervention on antibiotic prescribing depends to a large degree on the particular prescribing behaviour and the barriers to change in the particular community. No single intervention can be recommended for all behaviours in any setting. Multi-faceted interventions where educational interventions occur on many levels may be successfully applied to communities after addressing local barriers to change. These were the only interventions with effect sizes of sufficient magnitude to potentially reduce the incidence of antibiotic-resistant bacteria. Future research should focus on which elements of these interventions are the most effective. In addition, patient-based interventions and physician reminders show promise and innovative methods such as these deserve further study.

Antimicrobial Stewardship Interventions and Behaviour Theory

Review of 191 studies *(published January 1999 to April 2011):*

Interventions based on behaviour theories:

- 5 quantitative studies

Studies exploring health care professional behaviors, and perspectives on prudent use of antimicrobials

- 5 qualitative studies

Quantitative Studies Including Behaviour Science into the Antibiotic Stewardship Interventions

Surgical prophylaxis guidelines implementation (McCahill 2007)	<ul style="list-style-type: none"> • sessions to communicate the guidelines • multidisciplinary team for guideline development • quarterly communication with surgical team • monthly sessions with detailed analysis of compliance • task force team implementation
Antibiotic prescribing guidelines implementation (Mol 2005)	<ul style="list-style-type: none"> • development of guidelines includes consultations with practitioners • dissemination of guidelines in paperback form • other launch activities • „academic detailing“
Improving antibiotic surgical prophylaxis (Kritchewsky 2008)	<ul style="list-style-type: none"> • in-person meetings led by experts • monthly teleconferences • receipt of supplemental materials over 9 months
Restriction of antibiotics and decreasing <i>C. difficile</i> infections (Fowler 2007)	<ul style="list-style-type: none"> • restriction of cephalosporins • 2/3 monthly feedback on antibiotic use, CDI, and MRSA • narrow-spectrum antibiotic policy written and disseminated in laminated cards
Implementation of antibiotic guidelines (Buising 2008)	<ul style="list-style-type: none"> • dissemination of guidelines • „academic detailing“ • computerized decision making

Qualitative Studies Investigating Antibiotic Prescribers' Behaviour

Opinions on local guidelines	<ul style="list-style-type: none"> • high general acceptance of guidelines • not a homogenous group: subgroups should be addressed separately • influential role of supervisors towards residents
Factors influencing prescribers	<ul style="list-style-type: none"> • more-senior colleagues most influential • greater autonomy later in the career • minor role of guidelines
Perception of antibiotic resistance, barriers and facilitators for the fight against resistance	<ul style="list-style-type: none"> • antimicrobial resistance is more a national problem than related to the institution/practice • barriers: tendency to emulate incorrect behaviors of fellow clinicians, lack of knowledge, and the nursing shortage • facilitators: education, information technology, and consults
Obstacles to the guidelines on timely administration of surgical prophylaxis	<ul style="list-style-type: none"> • low priority • inconvenience • workflow • organizational communication • role perception
Barriers to appropriate antibiotic use in community-acquired pneumonia	<ul style="list-style-type: none"> • Lack of agreement with empirical antibiotic choice • Lack of confidence because of perceived lack of evidence for the empirical antibiotic choice • Organizational problems hinder timely administration of antibiotics • Lack of agreement with the de-escalation policy

Behaviour Change and Antibiotic Stewardship Interventions

Systematic review assessing the application of behaviour change techniques (self-monitoring and feedback) to improve hospital antibiotic use

123 interventions:

- **Feedback: 17 interventions**
- **Self-monitoring: 1 intervention**
- **Poorly specified goals**

„Prescribing etiquette“ as the Main Determinant of Antibiotic Prescribing Behaviour

Qualitative study: interviews with 39 health-care professionals

- Behavior of clinical leaders or seniors influences practice of junior doctors.
- Senior doctors consider themselves exempt from following policy and practice autonomous decision making that relies more on personal knowledge and experience than formal policy.
-
- Prescribers adjust their antibiotic prescribing according to the prevailing practice within the groups.
-
- A culture of “noninterference” in the antimicrobial prescribing practice of peers prevents intervention into prescribing of colleagues.

**PHE&Department of Health (2015):
Behavioural Change and Antibiotic Prescribing in Health-care Settings
Literature Review and Behavioural Analysis**

Behaviours that drive antibiotic resistance

patients	<ul style="list-style-type: none">• mixed understanding of relationship between antibiotics and resistance• misconception that resistance affects over-consumers• in-appropriate prescribing reinforces the belief that antibiotics ought to be prescribed and are effective when they are not
primary care physicians	<ul style="list-style-type: none">• norms• fear what might happen,• fear of the patient's disappointment
secondary care physicians	<ul style="list-style-type: none">• acuity of patients• prescribing etiquette

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Target behaviours required to reduce antibiotic prescribing

Patients	<ul style="list-style-type: none">• self care for acute respiratory and other self-limiting infections• not requesting antibiotics from the physician• act upon the physician's advice
Primary care physicians	<ul style="list-style-type: none">• not prescribing antibiotics to common cold...• give the patients an information leaflet instead• explain the decision to the patient• prescribe proper dose/duration
Secondary care physicians	<p>Increase physicians' guidelines compliance in respect of :</p> <ul style="list-style-type: none">• indication• choice with the preference of narrower-spectrum• amendment of the therapy when appropriate• discontinue the therapy when appropriate

Organizational Perspective in Infection Control (and Antibiotic Stewardship)

Organizational level behaviours: organizations considered as biological systems

The drivers of organizational change (experiences from infection control):

- **Performance management (for example: monthly monitoring of targets and external benchmarking for MRSA and CDI)**
- **Raising and maintaining the high profile**
- **Leadership**
- **Coalition building and cross-boundary working**
- **System design**

The Broader Context of Behaviour:

Cultural aspects

- Sociocultural Dimensions
- Socioeconomic factors

Contextual aspects

- Organisational policies
- Multidisciplinary approach
- Obstacles

Socio-cultural Dimensions and Antibiotic Prescribing

The differences in expenditure for the medicines in general in European countries can be explained by the sociocultural dimensions.

Country differences in prescribed antibiotic use in the community was found to correlate with power distance index, uncertainty avoidance, hierarchy, masculinity, religion.

The differences in the use of antibiotics for cold/flu/sore throat in Eurobarometer are related to uncertainty avoidance and masculinity.

Surgical antibiotic prophylaxis > 24h is related to uncertainty avoidance.

- Hulscher MEJL, et al. *Lancet ID* 2010; 10: 167-75.
Deschepper R, et al. *BMC Health Serv Res* 2008; 8: 123.
Borg MA. *J Antimicrob Chemother* 2014; 69: 1142-4.
Borg MA. *J Antimicrob Chemother* 2012; 67: 763-7.

Conclusion

- **Implementing antibiotic stewardship is implementing behaviour change.**
- **Behaviour science theories have proven to be useful in health-care, social marketing and elsewhere**
- **The „clinical phase testing“ of behavioural science in implementation of antibiotic stewardship is still in its starting phase.**

François-Marie Arouet

a French Enlightenment writer, historian, and philosopher

Common sense is not so common.

Prejudices are what fools use for reason.

Every man is guilty of all the good he did not do.

It is dangerous to be right in matters on which the established authorities are wrong.

I disapprove of what you say, but I will defend to the death your right to say it.

