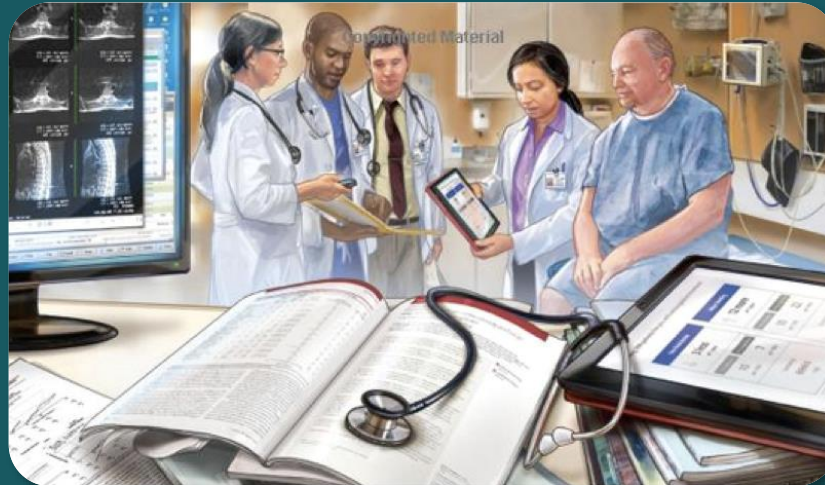


Digital and Trustworthy Evidence Ecosystem Fact or Fiction?



Per Olav Vandvik, MD, Ph.D

Disclosures: Head of MAGIC (non-profit), BMJ Rapid Recs and the Ecosystem project



UiO : **University of Oslo**



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The evidence ecosystem, a hot topic these days



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About the Summit

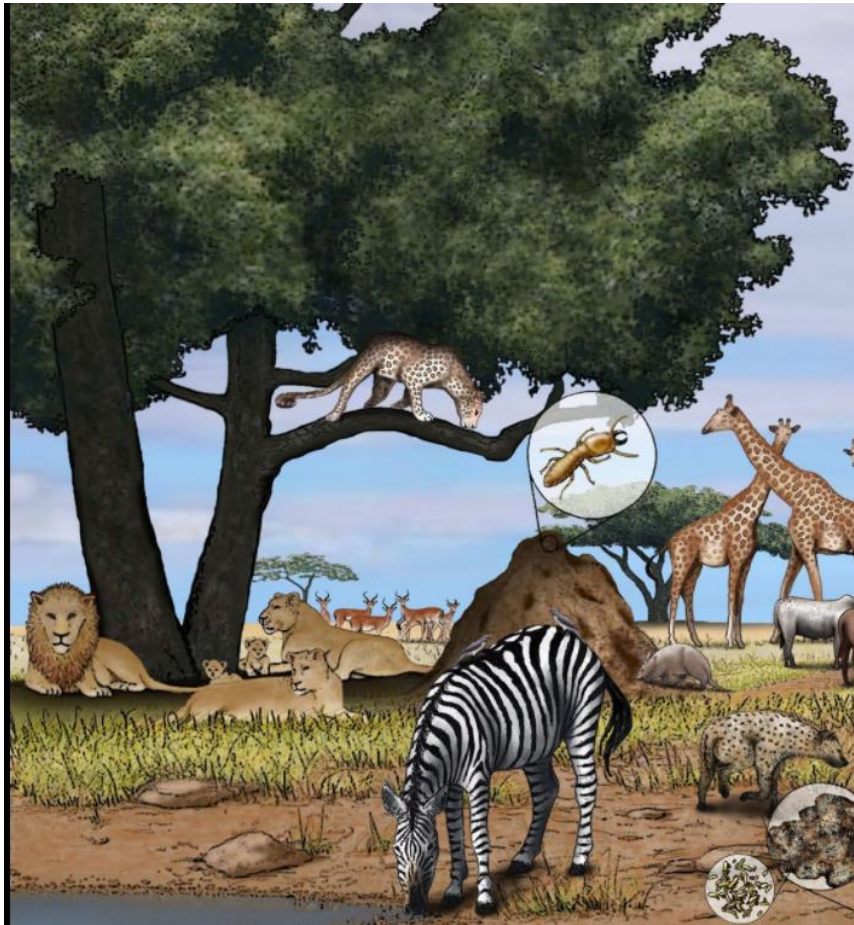
Plenary 2:

BREAKING DOWN THE SILOS: Digital and trustworthy evidence ecosystem

Thursday 14 September, 9-10.30am

This plenary will set out to understand how explicit links between actors are needed - and now possible - to close the loop between new evidence and improved care, through a culture for sharing evidence combined with advances in methods and technology/platforms for digitally structured data.

Ecosystem: African Savanna



Healthy, well-balanced ecosystems are made up of multiple, interacting food chains, called food webs. Carnivores (lions, hyenas, leopards) feed on herbivores (impalas, warthogs, cattle) that consume producers (grasses, plant matter). Scavengers (hyenas, vultures) and decomposers/detritivores (bacteria, fungi, termites) break down organic matter, making it available to producers and completing the food cycle (web). Humans are part of the savanna community and often compete with other organisms for food and space.

The following list defines and provides examples of the feeding (trophic) levels that comprise food webs:

- **Producer:** organism on the food chain that can produce its own energy and nutrients. Examples: grasses, Jackalberry tree, Acacia tree
- **Primary consumer/herbivore:** organism that eats mainly plants. Examples: cows, impalas, warthogs, zebras
- **Secondary consumer/carnivore:** organism that eats meat. Examples: leopard, lion
- **Omnivore:** organism that eats a variety of organisms, including plants, animals, and fungi. Examples: humans, aardvarks
- **Decomposer/detritivores:** organisms that break down dead plant and animal material and waste and release it as energy and nutrients in the ecosystem. Examples: bacteria, fungi, termites
- **Scavenger:** animal that eats dead or rotting animal flesh. Examples: vultures, hyenas
- **Insectivore:** organism that mostly eats insects. Example: Red-billed oxpecker

2016: Time for a post-guidelines era in health care?

Major limitations EBM and guidelines

Developers

- Not trustworthy, ignore other knowledge
- Resource-demanding, extreme duplication

Policy-makers, clinicians and patients

- Available, useful, understandable ?
- Allow shared, personalized decisions?
- Up to date?
- Integrated in the electronic health record?

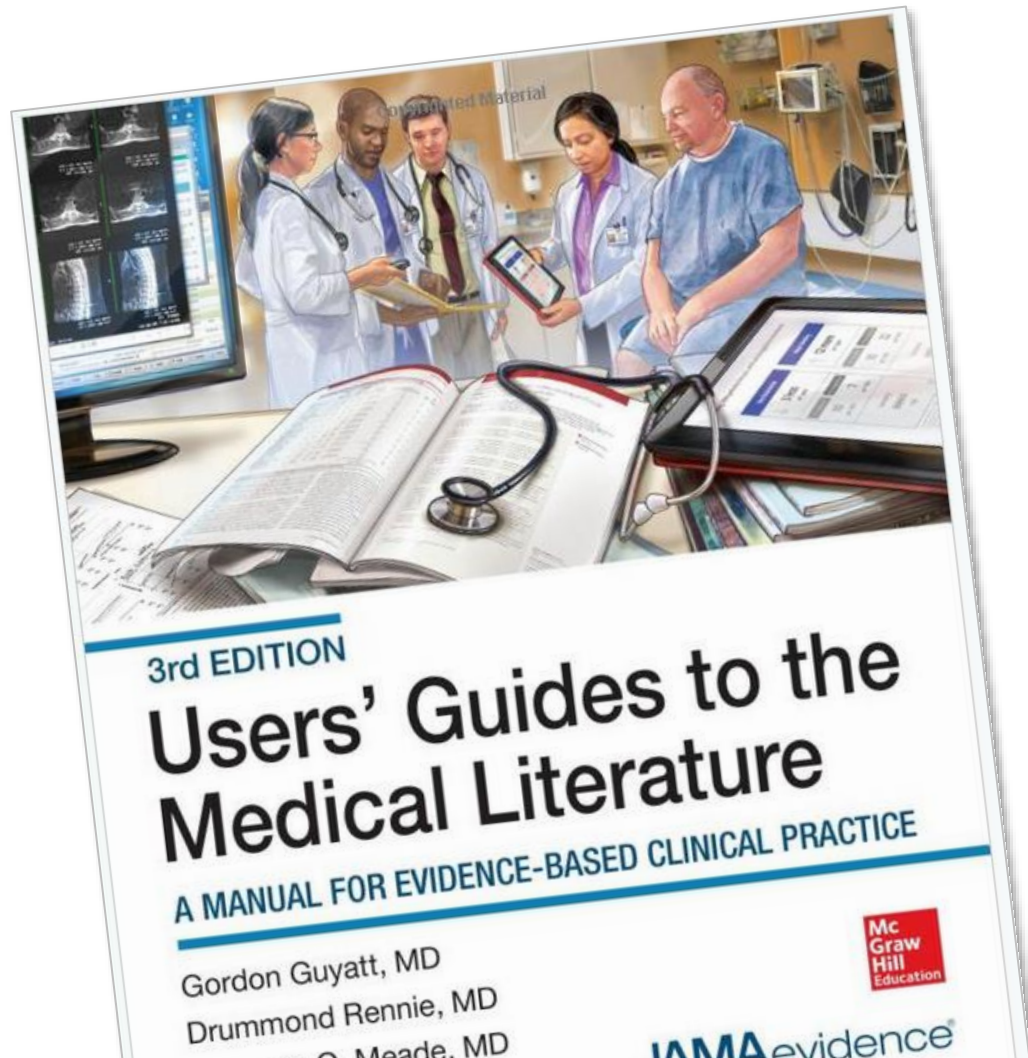
Time to respond to calls from the opponents?

The image shows the front page of a BMJ article. At the top left is the BMJ logo. To the right is the Royal Society Publishing logo. Below the logo is the article ID 'BMJ 2014;348:g3725 doi: 10.1136/bmj.g3725' and the date 'Published 13 June 2014'. On the right side, it says 'Page 1 of 7'. A red horizontal bar spans the width of the page. Below the bar, the word 'ANALYSIS' is written in red. Underneath, the word 'ESSAY' is written in red. The main title of the article is 'Evidence based medicine: a movement in crisis?' in bold black text. Below the title, the authors are listed: 'Trisha Greenhalgh¹ and colleagues argue that, although evidence based medicine has had many benefits, it has also had some negative unintended consequences. They offer a preliminary agenda for the movement's renaissance, refocusing on providing useable evidence that can be combined with context and professional expertise so that individual patients get optimal treatment'. Below the authors, their affiliations are listed: 'Trisha Greenhalgh¹ dean for research impact¹, Jeremy Howick senior research fellow², Neal Maskrey professor of evidence informed decision making³, for the Evidence Based Medicine Renaissance Group'. Below the affiliations, there are three footnotes: '¹Barts and the London School of Medicine and Dentistry, London E1 2AB, UK; ²Centre for Evidence-Based Medicine, University of Oxford, Oxford OX2 6NW, UK; ³Yale University, Staffs ST5 5BG, UK'. The main body of the article is divided into two columns of text. The left column starts with 'It is more than 20 years since the evidence based medicine working group announced a "new paradigm" for teaching and practicing clinical medicine.' and the right column starts with 'Two decades of enthusiasm and funding have produced numerous successes for evidence based medicine. An early example was the British Thoracic Society's 1990 asthma guidelines, developed through consensus but based on a combination of randomised trials and observational studies.'

Major challenges with EBM, systematic reviews, HTA and guidelines but also advances in standards, methods and tools

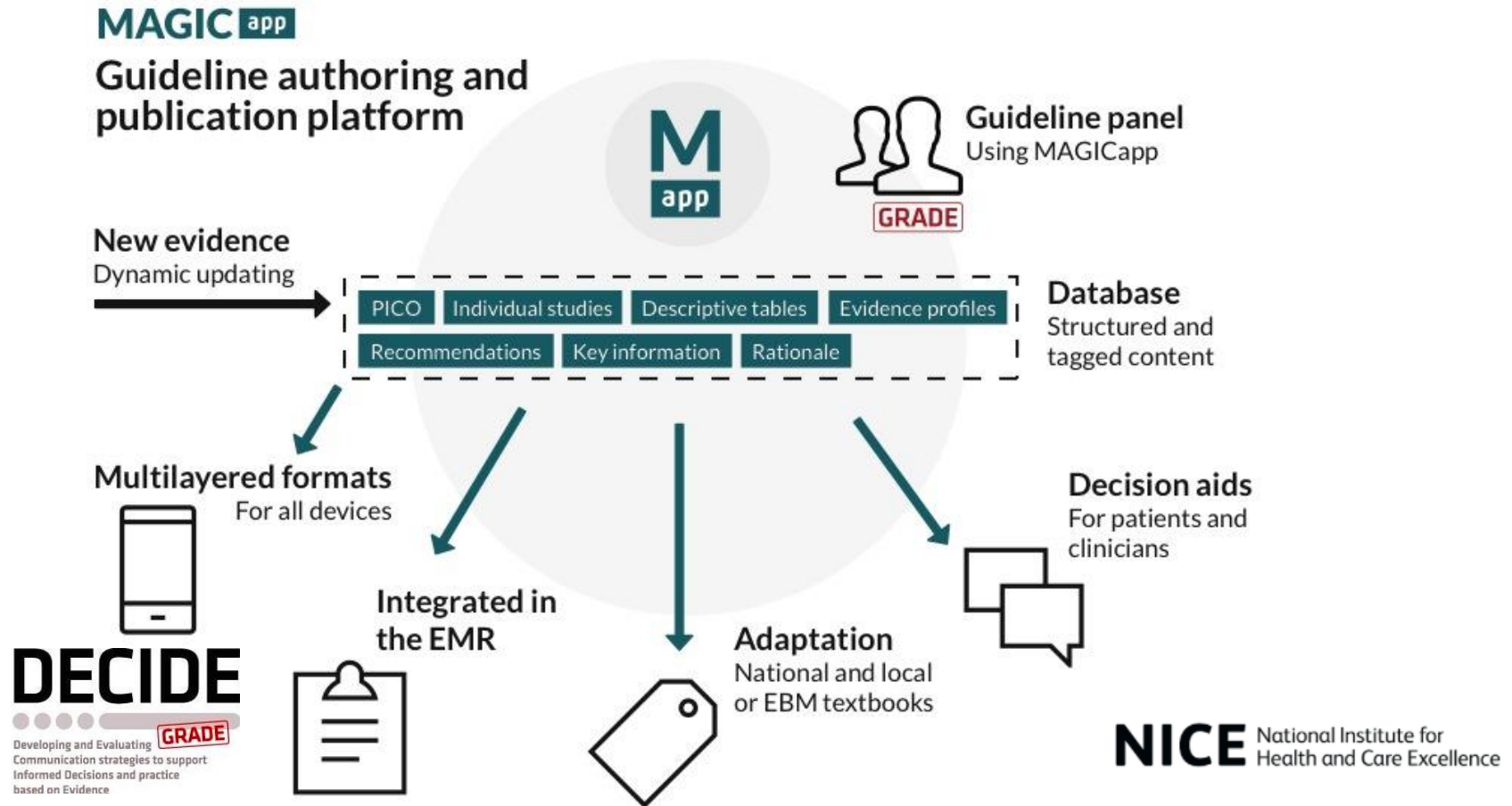


CLINICAL PRACTICE
GUIDELINES
WE CAN TRUST



GRADE

Can technology help? Platforms and tools ready for use (e.g., www.magicapp.org)



A man in a blue suit and tie is pointing his right index finger directly at the viewer. The background is a blurred office setting. The text 'DIGITIZE OR DIE' is overlaid in large, bold, white letters with a blue gradient and a drop shadow effect. The word 'OR' is smaller than 'DIGITIZE' and 'DIE'. There are several 'BIGSTOCK' watermarks and 'BIG' text scattered across the image.

DIGITIZE OR DIE

What can we learn from the Brazilians in Belo Horizonte?

Brazil 1-7 Germany – World Cup Semi-Final – 8th July 2014

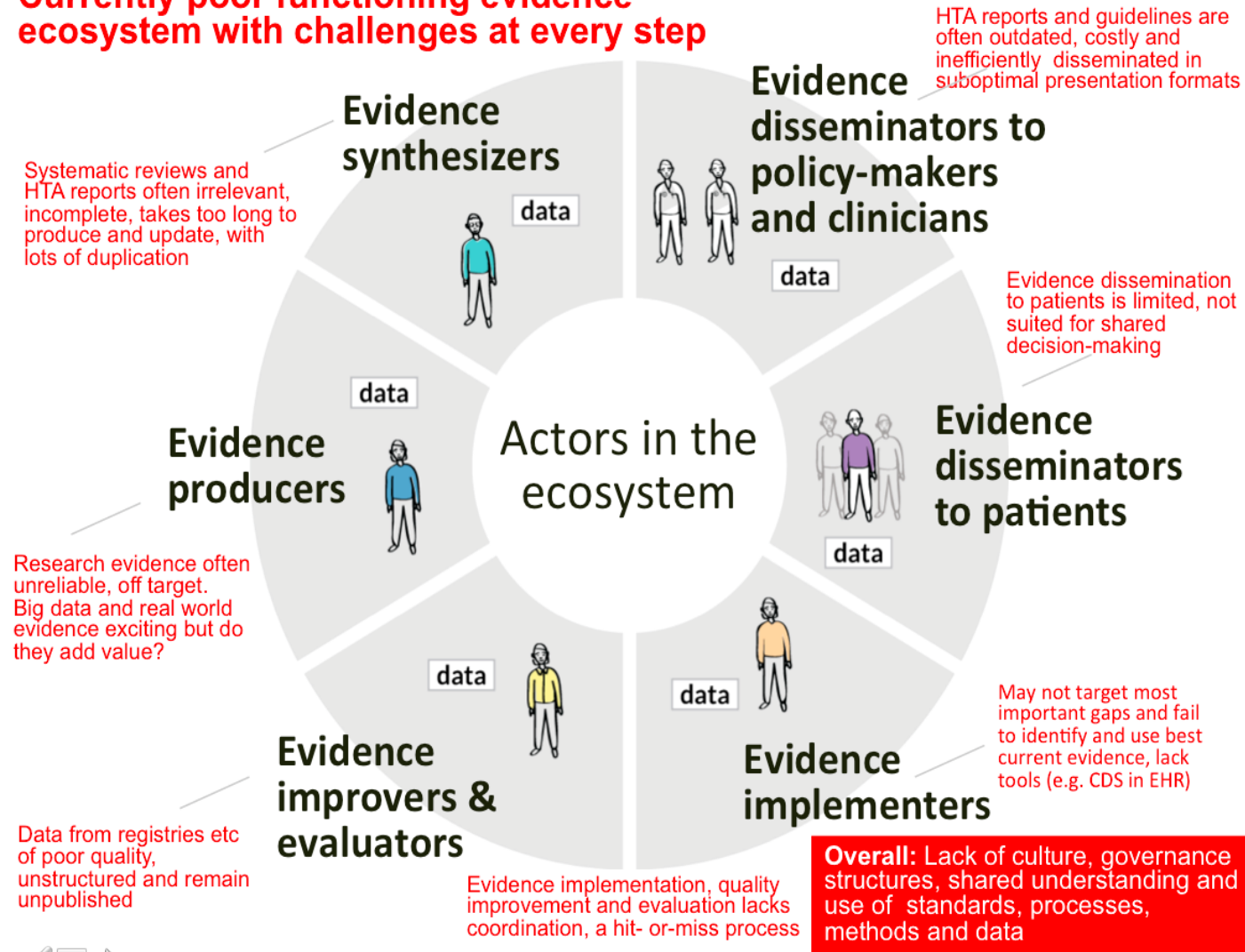


Challenges beyond guidelines, for patients and society to increase value and reduce waste in health care and research

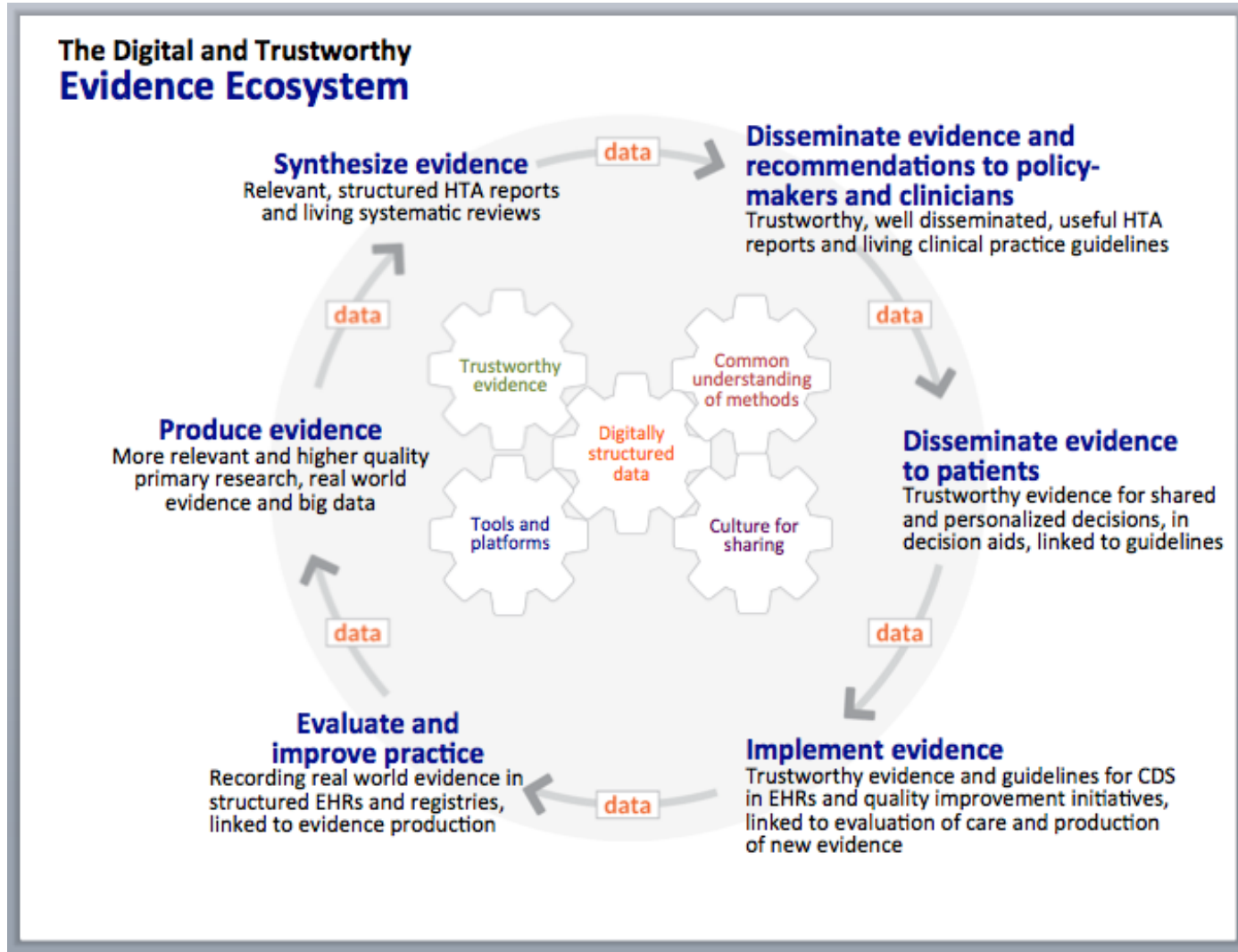


The current evidence ecosystem is broken

Currently poor functioning evidence ecosystem with challenges at every step

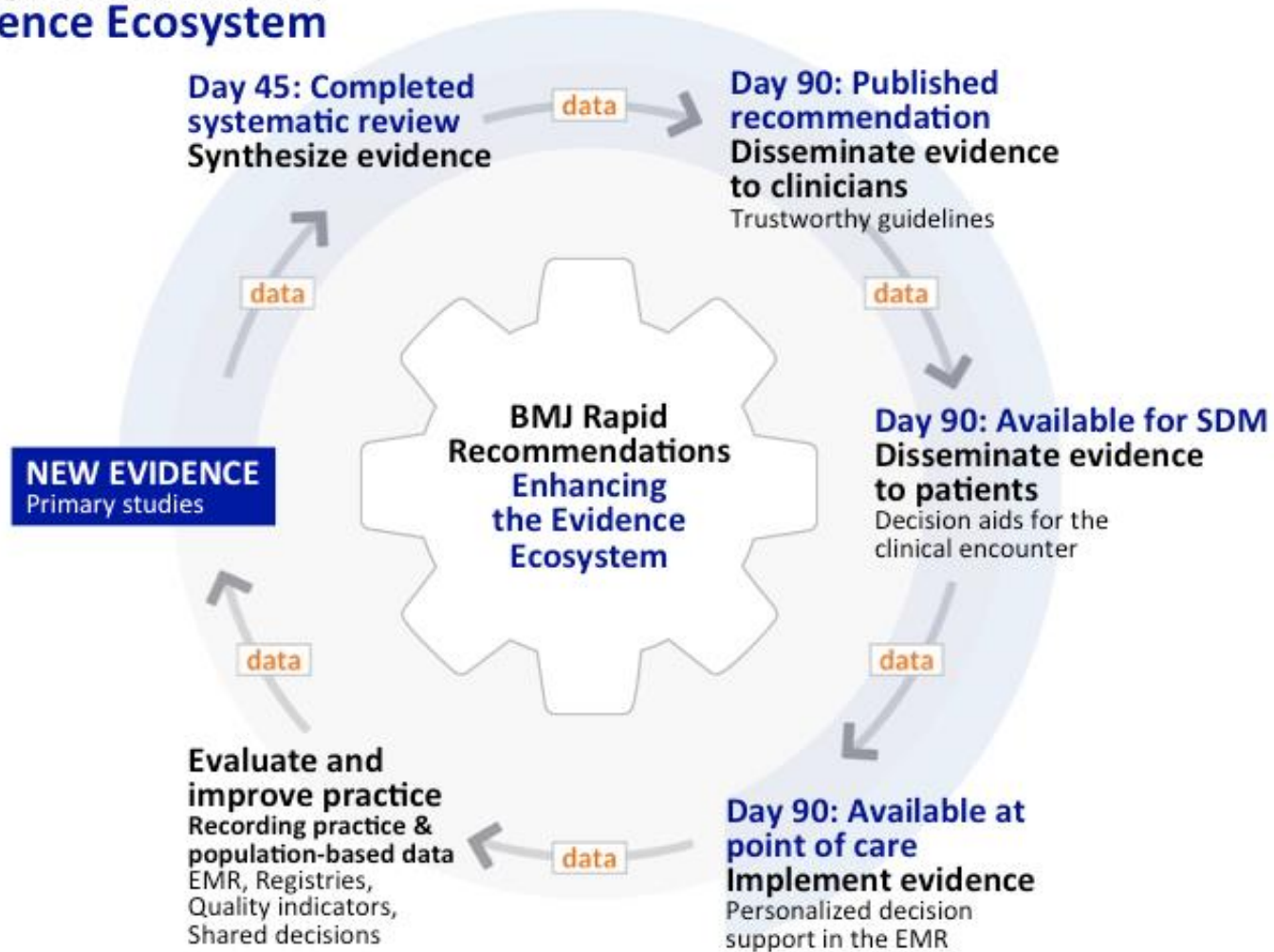


Solutions, in an emerging digital and trustworthy evidence ecosystem to increase value and reduce waste in health care and research



Some hurdles to overcome: Organizations fit for purpose?

The Digital and Trustworthy Evidence Ecosystem




BMJ Rapid Recommendations: Let's check it out...*

thebmj Research ▾ Education ▾ News & Views ▾ Campaigns Archive

Transcatheter or surgical aortic valve replacement for patients with severe, symptomatic, aortic stenosis at low to intermediate surgical risk: a clinical practice guideline


BMJ 2016 ; 354 doi: <http://dx.doi.org/10.1136/bmj.i5085> (Published 28 September 2016)
Cite this as: BMJ 2016;354:i5085

Choice of intervention for those with severe aortic stenosis



Transfemoral TAVI
Inserting a new valve into the aortic valve's place without open heart surgery. Delivery is through the femoral artery.

OR



SAVR
Open-heart surgery, to remove the narrowed aortic valve. Replacement with tissue valve.

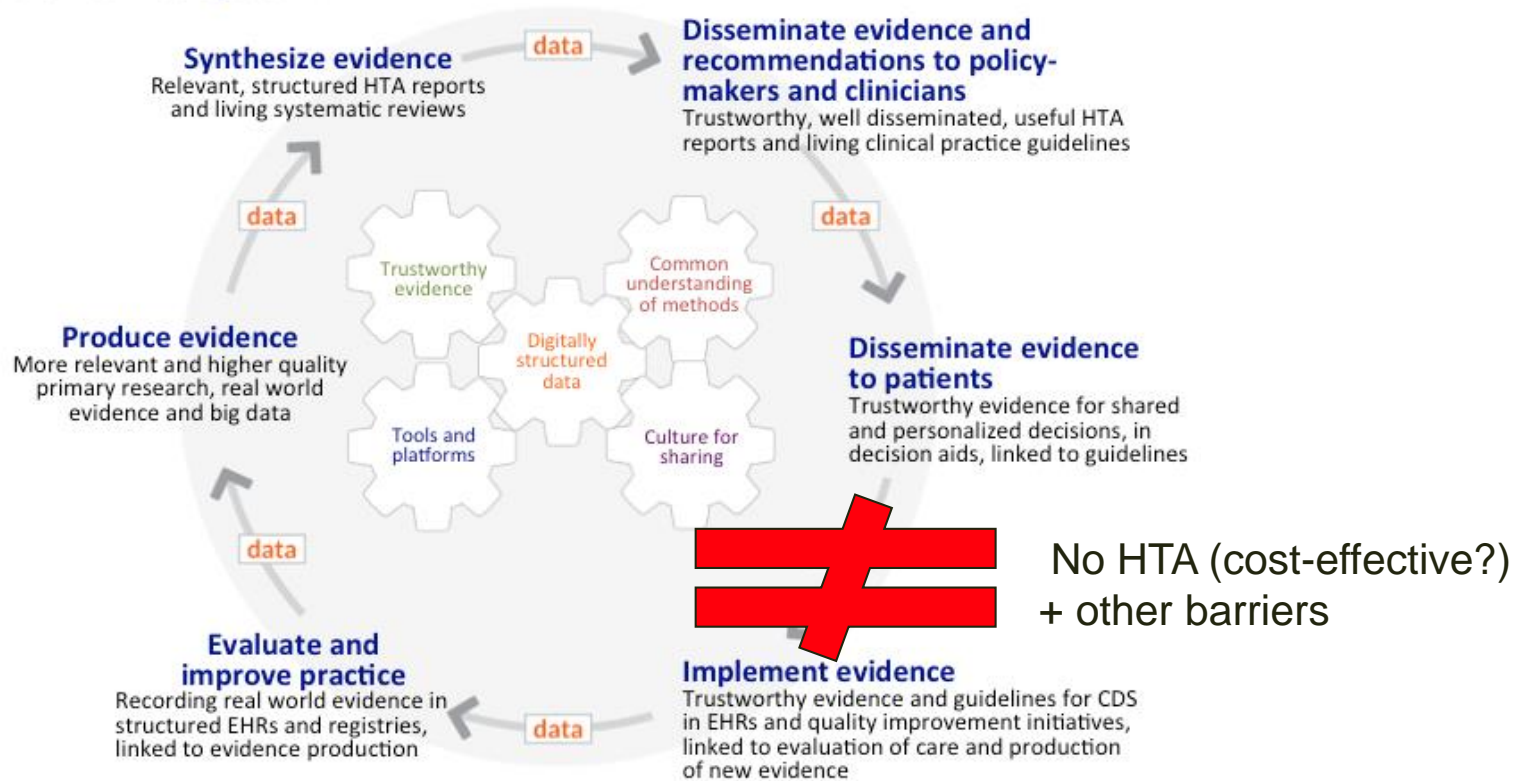
Recommendations

Population	Favours TAVI	Favours SAVR
Age 85+	Strong	
Age 75–84	Weak	
Age 65–74		Weak
Age under 65		Strong

* All papers open access and for you to scrutinize, adapt and use for your purposes

The Evidence Ecosystem: Fact of fiction for TAVI?

The Digital and Trustworthy Evidence Ecosystem

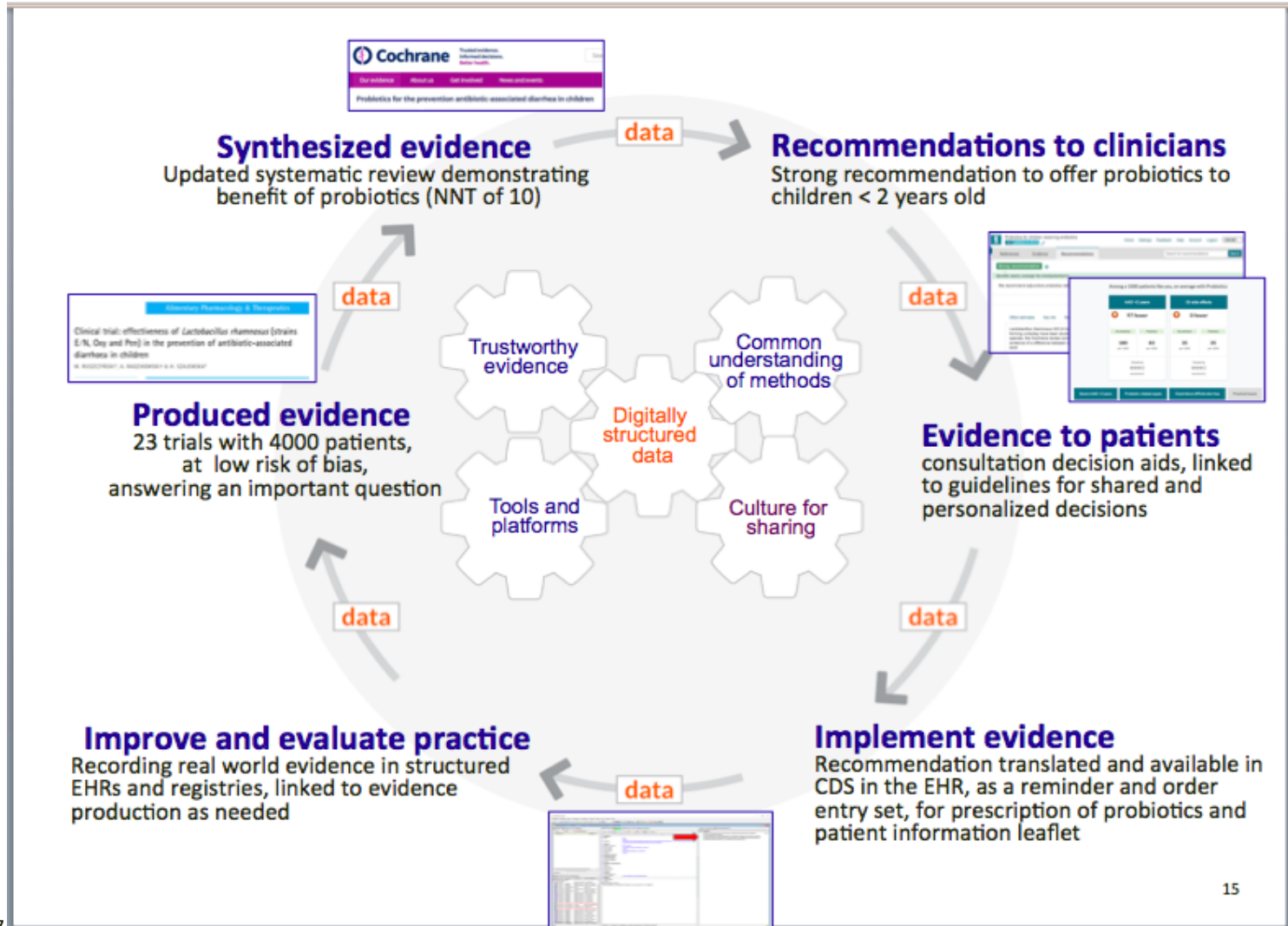


Evidence, experts, trustworthy guidelines and WikiRecs

How far can we come with all the actors and platforms in place?

Evidence Ecosystem: Fact of fiction

for Probiotics in children taking antibiotics?



2 Probiotics for children receiving antibiotics for an infection

Children 1 month to 2 years old receiving antibiotics for an infection.

Strong recommendation

Benefits clearly outweigh the drawbacks/harms.

We recommend adjunctive probiotics rather than no probiotics.

[VIEW LESS DETAILS](#)

Research evidence

[Key info](#)

[Rationale](#)

[Practical info](#)

[Adaptation](#)

[Decision Aids](#)

[Feedback \(0\)](#)

Population

Children 1 month to 2 years old

[View](#)

Intervention

Adjunctive probiotic therapy

Comparator

No probiotic therapy

Evidence profile

[Summary](#)

[References](#)

Outcome Timeframe	Study results and measurements	Absolute effect estimates		Certainty in effect estimates (Quality of evidence)	Summary
		No probiotics	Probiotics		
AAD <2 years	Relative risk 0.46 (CI 95% 0.35 - 0.61) Based on data from 3898 patients in 22 studies Follow up: 1-12 weeks.	180 per 1000	83 per 1000	Moderate Due to serious inconsistency.	Probiotics appear to decrease the incidence of AAD.

WikiRecs - EBM guidelines - translation, adaptation - CDSS in the EHR

SDL Trados Studio - evd ergo 04042016 EN-FR

Advanced View Add-Ins Help

Batch tasks: URM RM Clear Formatting

Concordance Search: Select Previous Match, Select Next Match, Apply Translation

Translation Memory: Show Translations, Add New Term, Quick Add New Term

Terminology: Confirm

Segment Actions: Copy Source to Target, Merge Segments, Copy All Source to Target, Split Segments, Clear Target Segment, Change Segment Status

Navigation: Go To, Find, Rep, Sele

IVS-EN-FR-2016 - Translation Results

Project Settings: None of the 16 trials (n = 2455) that reported on adverse events documented any serious adverse events attributable to probiotics.

Term Recognition: adverse TermMed_EN-FR, nocif TermMed_EN-FR, document TermMed_EN-FR, document

IVS-EN-FR-2016 1-9-2016 17:41:57 vertaler3-HP\vertaler3

IVS-EN-FR-2016 - Translation Results IVS-EN-FR-2016 - Concordance Search Messages (0)

evd07477.html.sdxliff [Translation]

13 receiving antibiotics.		antibiotiques.	
16 Most participants were under 6 years of age.		La plupart des participants avaient un âge inférieur à 6 ans.	
17 The studies compared probiotics to placebo, active alternative prophylaxis, or no treatment and measured the incidence of diarrhea secondary to antibiotic use.		Les études ont comparé les probiotiques aux placebo, la prophylaxie alternative active, ou aucun traitement et a mesuré l'incidence de la diarrhée liée à l'usage d'antibiotiques.	
18 Trials included treatment with either Bacillus spp., Bifidobacterium spp., Clostridium butyricum, Lactobacilli spp., Lactococcus spp., Leuconostoc cremoris, Saccharomyces spp., or Streptococcus spp., alone or in combination.		Les essais comprenaient un traitement aux espèces Bacille, aux espèces bifidobactérium, au Clostridium butyricum, aux espèces Lactobacille, aux espèces Lactocoque, Leuconostoc Cremonis, aux espèces Saccharomyces ou Streptococcus, seules ou combinées.	
19 Eleven studies used a single strain probiotic, four combined two strains, and eight studies combined three or more strains.		Parmi les études, onze d'entre elles ont utilisé une seule souche de probiotique, quatre ont combiné deux souches et huit études ont combiné trois souches ou plus.	
20 The probiotic species with most data were Lactobacillus rhamnosus or Saccharomyces boulardii, at a dose of 5 to 40 billion colony forming units/day.		Les espèces de probiotiques aux données les plus importantes étaient le Lactobacillus rhamnosus ou le Saccharomyces boulardii, à la dose de 5 à 40 milliards unités formant une colonie/jour.	
21 The incidence of AAD in the probiotic group was 8% (163/1992) compared to 19% (364/1906) in the control group (RR 0.46, 95% CI 0.35 to 0.61; I2 = 55%, 3898 participants), NNT 10 (95% CI 8 to 12).		L'incidence de la DAA dans le groupe de probiotiques était de 8% (163/1992) comparé à 19% (364/1906) dans le groupe témoin (RR 0.46, 95% CI 0.35 à 0.61; I2 = 55%, 3898 participants), NNT 10 (95% CI 8 à 12).	P+
22 Single-strain probiotics appeared as effective as multiple-strain preparations.		Les probiotiques à souche unique semblaient aussi efficaces que les préparations à souches multiples.	
23 None of the 16 trials (n = 2455) that reported on adverse events documented any serious adverse events attributable to probiotics.	CM	Aucun des 16 essais (n = 2455) qui ont mentionné des événements indésirables n'ont démontré d'événements indésirables graves attribuables aux probiotiques.	P+
24 There is insufficient evidence on the safety of probiotics in immunocompromized children.		Les preuves sur l'innocuité des probiotiques chez l'enfant immunodéprimé sont insuffisantes.	P+
25 SOF table		Tableau SOF	P+
26 Goldenberg JZ, Lyubov L, Steurich J, Parkin P, Mahant S, Johnston BC.		Goldenberg JZ, Lyubov L, Steurich J, Parkin P, Mahant S, Johnston BC.	S+
27 Probiotics for the prevention of pediatric antibiotic-associated diarrhea.		Probiotics for the prevention of pediatric antibiotic-associated diarrhea.	
28 Cochrane Database Syst Rev 2015;(12):CD004827		Cochrane Database Syst Rev 2015;(12):CD004827	

All segments | INS 0.00% | 0.00% | 100.00% | Chars: 155 | 0/2284 | EN-FR

To practice: Meet “Stella Artois” 17 months old, with pneumonia prescribed with antibiotics in Belgian primary care



Doctor prescribes antibiotics in the EHR....

The screenshot displays a Dutch Electronic Health Record (EHR) system interface. The main window shows a patient's medical history and a list of prescriptions. A red arrow points to a specific prescription entry: "Enterol (c) 250mg 20 poeder voor orale suspensie".

The "Voorschriftenbeheerder" (Prescription Manager) window is open, showing the details of the selected prescription:

- Productnaam:** Enterol (c) 250mg 20 poeder voor orale suspensie
- Prijs:** 0.85
- Geneesmiddel in ggekope categorie:** 0.85

The "Voorschrift wijzigen" (Edit Prescription) dialog box is also open, showing the following details:

- Rx:** Enterol (c) 250mg
- Dose:** D7/20 poeder voor orale suspensie
- Price:** (33,92 EUR)
- Frequency:** 1 zakje(s) 3 x / 1 dagen
- Quantity:** Hoeveelheid 2 verpakkingen
- Duration:** Van 20/09/2016 Tot 26/09/2016
- Parameters:** Gegeven geneesmiddel, Toegestane herhalingen, Voorgeschreven door specialist, Voorschrift op gtoonaam, Automatisch bewaren, Schrijf voor, Vitalink

The background window shows a table of medical transactions (Transacties) with columns for date, type, and doctor name. The current date is 20/09/2016.

Drilling back to the Evidence if needed

EBM guidelines – MAGICapp - all the way to the meta-analysis?



Probiotics for children receiving antibiotics

v1.2 published on 9/2/16

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Search for recommendations

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Research evidence Key info Rationale Practical info Adaptation Decision Aids Feedback (0)

Population	Intervention	Comparator
Children 1 month to 2 years old View	Adjunctive probiotic therapy	No probiotic therapy

Evidence profile Summary References

Outcome Timeframe	Study results and measurements	Absolute effect estimates		Certainty in effect estimates (Quality of evidence)	Summary
		No probiotics	Probiotics		
AAD <2 years	Relative risk 0.46 (CI 95% 0.35 - 0.61) Based on data from 3898 patients in 22 studies Follow up: 1-12 weeks.	180 per 1000	83 per 1000 Difference: 97 fewer per 1000 (CI 95% 117 fewer - 70 fewer)	Moderate Due to serious inconsistency.	Probiotics appear to decrease the incidence of AAD.
Severe AAD <2 years	0.46 (0.35 - 0.61) Based on data from 3898 patients in 22 studies Follow up: 1-12 weeks.	18 per 1000	8 per 1000 Difference: 10 fewer per 1000 (CI 95% 12 fewer - 7 fewer)	Low Due to serious inconsistency and indirectness.	Probiotics may decrease the incidence of severe AAD by a small amount.
GI side effects	Relative risk 1 (CI 95% 0.71 - 1.29) Based on data from 2455 patients in 16 studies Follow up: 1-4 weeks.	35 per 1000	35 per 1000 Difference: 0 fewer per 1000 (CI 95% 10 fewer - 10 more)	Moderate Due to serious indirectness.	Probiotics do not appear to increase the risk of gastrointestinal side effects.

And same goes for Finland

The screenshot shows a medical record interface with a prescription form on the left and a sidebar on the right. The prescription form includes fields for drug name (Amoxin), dosage (100 mg/ml), and quantity (1 pack of 60 ml). The sidebar contains a 'Muistutteen' (Reminder) section with a dropdown arrow pointing to a text box. A blue callout box is overlaid on the bottom right, containing text about the automatic reminder.

Automatic reminder triggered in a Finnish medical record:
The patient got a prescription of antibiotics (Amoxin). Probiotics (Lactobacillus or Saccharomyces boulardii) are recommended for the prevention of antibiotic diarrhea. In immunosuppressed patients their

Acting on – and implementing - the evidence, together



In summary:

- Better methods, processes and tools and available in an emerging **Digital and Trustworthy Evidence Ecosystem in health care**
- More of a fact than a fiction, despite the challenges
- **People:** culture for sharing work, evidence and understanding of research methods, including different sources of knowledge
- **Technology:**
 - Rapidly evolving platforms with digitally structured data. G-I-N, Cochrane and others joining forces
 - Real world evidence, big data and genomics: huge potential but..
- BMJ-RapidRecs as a model: Will organizations get the work done or do we need a disruptive innovation, in health care like elsewhere?