How to inform clinical decisions with evidence

The role of researchers making clinicians’ life easier

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ADA American Dental Association®
Objectives

- To define the main goal of practicing informed by evidence
- To understand the research-to-practice pipeline and why it is leaking
- To define the role of clinical practice guidelines, strength and limitations
- To learn about additional ways to disseminate evidence to patients and clinicians
What is the point on practicing informed by evidence?

Better patient outcomes

- Use effective interventions
- Optimize resource utilization
- Avoid ineffective/harmful interventions
- Understand & include patient perspective
- Analyze practice and improve performance
Key elements in clinical decision making

- Clinical experience or health system context
- Evidence
- Patients' values and preferences
- EBCP
- Resource utilization
Research-to-practice pipeline issue

Myth, opinion, poor research

Systems (bottomline +/- ref)
Synopses (user summary of research)
Systematic Reviews & CATs (search; appraise; synthesis)
Studies (primary research studies: sound & unsound)

2. Bedside EBM
3. Clinical Quality Improvement
4. Decision Aids, Patient Education, Compliance aids

Aware, Accepted, Applicable, Able, Acted on, Agreed, Adhered to

Better patient outcomes

Do clinicians understand the size of treatment effects?
A randomized survey across 8 countries

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Abstract

Background: Meta-analyses of continuous outcomes typically provide enough information for decision-makers to evaluate the extent to which chance can explain apparent differences between interventions. The interpretation of the magnitude of these differences — from trivial to large — can, however, be challenging. We investigated clinicians’ understanding and perceptions of usefulness of 6 statistical formats for presenting continuous outcomes from meta-analyses (standardized mean difference, minimal important difference units, mean difference in natural units, ratio of means, relative risk and risk difference).

Methods: We invited 610 staff and trainees in internal medicine and family medicine programs in 8 countries to participate. Paper-based, self-administered questionnaires presented summary estimates of hypothetical interventions versus placebo for chronic pain. The estimates showed either a small or a large effect for each of the 6 statistical formats for presenting continuous outcomes. Questions addressed participants’ understanding of the magnitude of treatment effects and their perception of the usefulness of the presentation format. We randomly assigned participants 1 of 4 versions of the questionnaire, each with a different effect size (large or small) and presentation order for the 6 formats (1 to 5, or 6 to 1).

Results: Overall, 531 (87.0%) of the clinicians responded. Respondents best understood risk difference, followed by relative risk and ratio of means. Similarly, they perceived the dichotomous presentation of continuous outcomes (relative risk and risk difference) to be most useful. Presenting results as a standardized mean difference, the longest standing and most widely used approach, was poorly understood and perceived as least useful.

Interpretation: None of the presentation formats were well understood or perceived as extremely useful. Clinicians best understood the dichotomous presentations of continuous outcomes and perceived them to be the most useful. Further initiatives to help clinicians better grasp the magnitude of the treatment effect are needed.

Competing interests: Bradley Johnston, Bruno da Costa and Gordon Guyatt conducted methodological work in the development of minimal important difference units as applied to meta-analyses, and the conversion of continuous meta-analytic data to binary. Jan Friedrich and Neill Adhikari conducted methodological work in the development of the ratio of means approach as applied to meta-analyses. These authors have no financial interests in the work related to this manuscript. No competing interests were declared by the remaining authors.

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Figure 1: Respondents’ understanding of the magnitude of the treatment effect for each of 6 statistical formats used to present continuous outcomes from meta-analyses. Higher percentages represent greater understanding; error bars = 95% confidence intervals. Mean difference = mean difference in natural units, MID = minimal important difference, SMD = standardized mean difference.
### Figure 3: Factors associated with respondents’ understanding of the statistical formats.

An odds ratio below 1.0 indicates a worse understanding than the reference category. CI = confidence interval, mean difference = mean difference in natural units, MID = minimal important difference, SMD = standardized mean difference.
Clinical practice guidelines

• “Practice guidelines are statements that include recommendations intended to optimize patient care. They are, ideally, informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options”

IOM
## Goals of guidelines

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>• Improve the quality of patient care and healthcare outcomes</td>
<td>• “Cookbook” approach to dentistry where the clinician has no discretion</td>
</tr>
<tr>
<td>• Reduce inappropriate variation in practice</td>
<td>• Guidance in all circumstances for all patients</td>
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<tr>
<td>• Promote efficient use of resources</td>
<td>• In-depth background clinical knowledge</td>
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<tr>
<td>• Inform public policy</td>
<td>• Legal resource in malpractice cases</td>
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<td>• Support quality control</td>
<td></td>
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</table>
Evidence-Based guideline structure

- Evidence-based CPGs directly link and inform their recommendations to scientific evidence
- 2 main parts
  - Systematic review
  - Formulating recommendations
    - (Moving from evidence to decisions)
What is a recommendation?

- Clear and actionable statement formulated by a guideline panel to assist clinicians deciding the best course of action for patients

1. Written statement

   For patients with prosthetic joint implants, prophylactic antibiotics are not recommended prior to dental procedures to prevent prosthetic joint infection

2. Strength of recommendation

   (Conditional recommendation / Moderate quality evidence)

3. QoE or confidence in the effect estimates
Clinical Recommendation:
In general, for patients with prosthetic joint implants, prophylactic antibiotics are not recommended prior to dental procedures to prevent prosthetic joint infection.

For patients with a history of complications associated with their joint replacement surgery who are undergoing dental procedures that include gingival manipulation or mucosal incision, prophylactic antibiotics should only be considered after consultation with the patient and orthopedic surgeon.* To assess a patient’s medical status, a complete health history is always recommended when making final decisions regarding the need for antibiotic prophylaxis.

Clinical Reasoning for the Recommendation:
- There is evidence that dental procedures are not associated with prosthetic joint implant infections.
- There is evidence that antibiotics provided before oral care do not prevent prosthetic joint implant infections.
- There are potential harms of antibiotics including risk for anaphylaxis, antibiotic resistance, and opportunistic infections like *Clostridium difficile*.
- The benefits of antibiotic prophylaxis may not exceed the harms for most patients.
- The individual patient’s circumstances and preferences should be considered when deciding whether to prescribe prophylactic antibiotics prior to dental procedures.
Issues with recommendations... too vague

“For both outpatients and inpatients with diabetic foot infection, clinicians should attempt to provide a well-coordinated approach by those with expertise in a variety of specialties, preferably by a multidisciplinary diabetic foot care team”
The issue with guidelines… too technical
The evidence alone does not dictate clinical practice

Outcomes routine mammographic screening in women aged 40–49y

- Very small and questionable reduction of breast cancer mortality
- Relatively high probability of a false positive (unnecessary follow-up testing and biopsy)

“Although the benefit is small, I put a higher value on the beneficial outcomes”

“We must avoid the unnecessary procedures and the costs for the health system. The benefits do not outweigh the harms”
“care that is respectful of and responsive to individual patient preferences, needs, and values” and that ensures “that patient values guide all clinical decisions.”

IOM

- **Shared decision-making**
  “…the clinician offers options and describes their risks and benefits, and the patient expresses his or her preferences and values”

Barry, 2012
Sealants for preventing and arresting pit-and-fissure occlusal caries in primary and permanent molars

A systematic review of randomized controlled trials—a report of the American Dental Association and the American Academy of Pediatric Dentistry

John T. Wright, DDS, MS; Malavika P. Tampli, MPH; Laurei Graham, MLS; Cameron Estrich, MPH; James J. Crab, DDS, MS, ScD; Margherita Fontana, DDS, PhD; E. Jane Gillette, DDS; Brian B. Noyé, DDS; Vineet Dhar, BDS, MDS, PhD; Kevin Donly, DDS, MS; Edmund R. Hewlett, DDS; Rocio B. Quinonez, DMD, MS, MPH; Jeffrey Chaffin, DDS, MPH, MBA; Matt Crespin, MPH, RDH; Timothy Iafalo, DMD, MPH; Mark D. Siegal, DDS, MPH; Alonso Carascos-Labra, DDS, MSc, PhD(c)

ABSTRACT

Background. National Health and Nutrition Examination Survey 2011-2012 data indicated that, in the United States, nearly one-fourth of children and one-fourth of adolescents experienced dental caries in their permanent teeth. The purpose of this review was to summarize the available clinical evidence regarding the use of sealants for the prevention and management of pit-and-fissure occlusal caries in primary and permanent molars.

Type of Studies Reviewed. The authors identified and included randomized controlled trials that included at least 2 years of follow-up using the MEDLINE (via PubMed) Embase, LILACs, Cochrane, and Register of Controlled Trials, and registers of ongoing trials. Pairs of independent reviewers independently selected the studies, data extraction, and quality assessment.

Results. Of 2,869 records screened, the authors identified the results of 23 studies (representing 25 arms) that were eligible for inclusion. Moderate-quality evidence for caries prevalence in countries that received sealants was associated with a decrease in the odds ratio of caries in permanent molars compared with those without sealants (odds ratio [OR], 0.15; 95% confidence interval [CI], 0.07-0.51). However, this finding was supported by low-quality evidence for caries prevalence in countries that received sealants in permanent molars compared with those without sealants (OR, 0.15; 95% CI, 0.07-0.51).

Conclusions and Practical Implications. Available evidence suggests that sealants are effective and safe to prevent or arrest the progression of caries lesions in children and adolescents.

Evidence-based clinical practice guideline for the use of pit-and-fissure sealants

A report of the American Dental Association and the American Academy of Pediatric Dentistry

John T. Wright, DDS, MS; James J. Crab, DDS, MS, ScD; Margherita Fontana, DDS, PhD; E. Jane Gillette, DDS; Brian B. Noyé, DDS; Vineet Dhar, BDS, MDS, PhD; Kevin Donly, DDS, MS; Edmund R. Hewlett, DDS; Rocio B. Quinonez, DMD, MS, MPH; Jeffrey Chaffin, DDS, MPH, MBA; Matt Crespin, MPH, RDH; Timothy Iafalo, DMD, MPH; Mark D. Siegal, DDS, MPH; Alonso Carascos-Labra, DDS, MSc, PhD(c)

ABSTRACT

Background. This article presents evidence-based clinical recommendations for the use of pit-and-fissure sealants on the occlusal surfaces of primary and permanent molars.

Type of Studies Reviewed. This is an update of the AOA 2006 recommendations for the use of pit-and-fissure sealants on the occlusal surfaces of primary and permanent molars. The authors conducted a systematic search in MEDLINE, Embase, Cochrane Central Register of Controlled Trials, and other sources to identify additional controlled trials. The authors used the Grading of Recommendations Assessment, Development, and Evaluation approach to assess the quality of the evidence and to determine the strength of the recommendations.

Results. The panel formulated 3 main recommendations. They concluded that sealants are effective for preventing and arresting pit-and-fissure occlusal carious lesions in children and adolescents. The authors noted the importance of sealants in the prevention of caries in primary and permanent molars. The panel also recommended the use of sealants on the occlusal surfaces of primary and permanent molars in children and adolescents. The panel concluded that sealants are effective for preventing and arresting pit-and-fissure occlusal carious lesions in children and adolescents. The panel also recommended the use of sealants on the occlusal surfaces of primary and permanent molars in children and adolescents. The panel concluded that sealants are effective for preventing and arresting pit-and-fissure occlusal caries.
SEALANTS ARE SAFE

Breathing air exposes people to about 100 times more BPA than dental sealants.

96%  5800 ng
Food and Drink

2%  138 ng
Receipts

1%  58 ng
Dust

1%  22 ng
Cosmetics

0.13%  8 ng
Air

0.001%  0.09 ng
Dental Sealants


The guideline panel suggests that clinicians take into account the likelihood of experiencing lack of retention when choosing the type of sealant material most appropriate for a specific patient and clinical scenario.

GRADE Quality of Evidence

<table>
<thead>
<tr>
<th>High</th>
<th>Moderate</th>
<th>Low</th>
<th>Very Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>We are very confident that the true effect lies close to that of the estimate of the effect.</td>
<td>We are moderately confident in the effect estimate. The true effect is likely to be close to the estimate of the effect.</td>
<td>Our confidence in the effect estimate is limited.</td>
<td>We have very little confidence in the effect estimate.</td>
</tr>
</tbody>
</table>

GRADE Interpretation of Strength of Recommendations

<table>
<thead>
<tr>
<th>Implications</th>
<th>Strong Recommendations</th>
<th>Conditional Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Patients</td>
<td>Most individuals in this situation would want the recommended course of action and only a small proportion would not.</td>
<td>The majority of individuals in this situation would want the suggested course of action, but many would not.</td>
</tr>
<tr>
<td>For Clinicians</td>
<td>Most individuals should receive the intervention.</td>
<td>Recognize that different choices will be appropriate for individual patients and that you must help each patient arrive at a management decision consistent with his or her values and preferences.</td>
</tr>
<tr>
<td>For Policy Makers</td>
<td>The recommendation can be adapted as policy in most situations.</td>
<td>Policymaking will require substantial debate and involvement of various stakeholders.</td>
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ADA. Center for Evidence-Based Dentistry™
Summary of Clinical Recommendations on the Use of Pit-and-fissure Sealants in the Occlusal Surfaces of Primary and Permanent Molars in Children and Adolescents

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Quality of the Evidence</th>
<th>Strength of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The sealant guideline panel recommends the use of sealants compared to non-use in permanent molars with both sound occlusal surfaces and non-cavitated occlusal caries lesions in children and adolescents.</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
<tr>
<td>The sealant guideline panel suggests the use of sealants compared to fluoride varnishes in permanent molars with both occlusal sound surfaces and non-cavitated occlusal caries lesions in children and adolescents.</td>
<td>Low</td>
<td>Conditional</td>
</tr>
<tr>
<td>The panel was unable to determine superiority of one type of sealant over another due to the very low quality of evidence for comparative studies. The panel recommends that any of the materials evaluated (e.g. resin-based sealants, resin-modified glass ionomer sealants, glass ionomer cements, and polyacid-modified resin sealants in no particular order) can be used for application in permanent molars with both occlusal sound surfaces and non-cavitated occlusal caries lesions in children and adolescents.</td>
<td>Very Low</td>
<td>Conditional</td>
</tr>
</tbody>
</table>

If 100 Children Do Not Receive Sealants
- 50 children will have caries
- 50 children will not have caries

76% REDUCTION IN CARIES

If 100 Children Do Receive Sealants
- 12 children will have caries
- 38 children will be caries free due to sealant application
- 50 children will not have caries
American Dental Association

Sealants are good for your teeth—and your wallet!

Defending Your Children's Teeth (and Dentist) from the Value of Sealants

Plastic coatings applied to the surfaces of teeth aren't just cost-effective.

NYTIMES.COM | DE AUSTIN FRAKT

536 veces compartido

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Billie Jo Edge | need this, I didn't even know this existed. I want to know more.
Me gusta | Responder | 21 de septiembre

Will Kelly | As a dentist that sees hundreds of patients daily... I was missing more than my singular ane... Ver más
Me gusta | Responder | 21 de septiembre 19:59

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In summary

• The main goal of using evidence to inform practice is to improve patient outcomes
• The research-to-practice pipeline is leaking
• Clinical practice guidelines aim to assist clinicians in decision making
• Multiple approaches are necessary to assist clinicians in practicing EBD