

**MOVING PAST
DISRUPTION
TO IMPROVE
ORAL HEALTHCARE**

Evidence-Based Dentistry as a Pillar of the Oral Healthcare System

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Disclosures

- Vineet Dhar has no relationships to disclose.



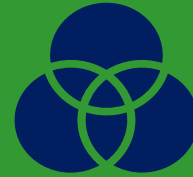
**“IN GOD WE TRUST. ALL OTHERS
MUST BRING DATA.”**

W. Edwards Deming



Prior to 1990s

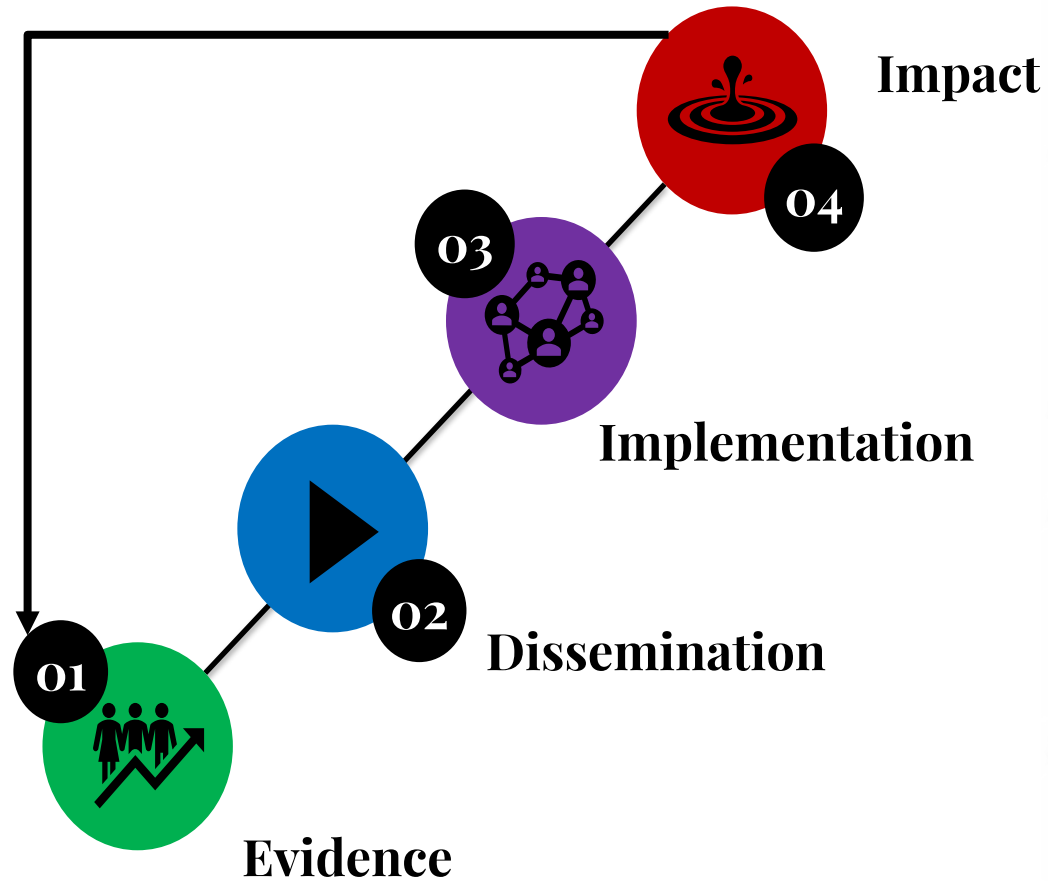
Intuition based Practice



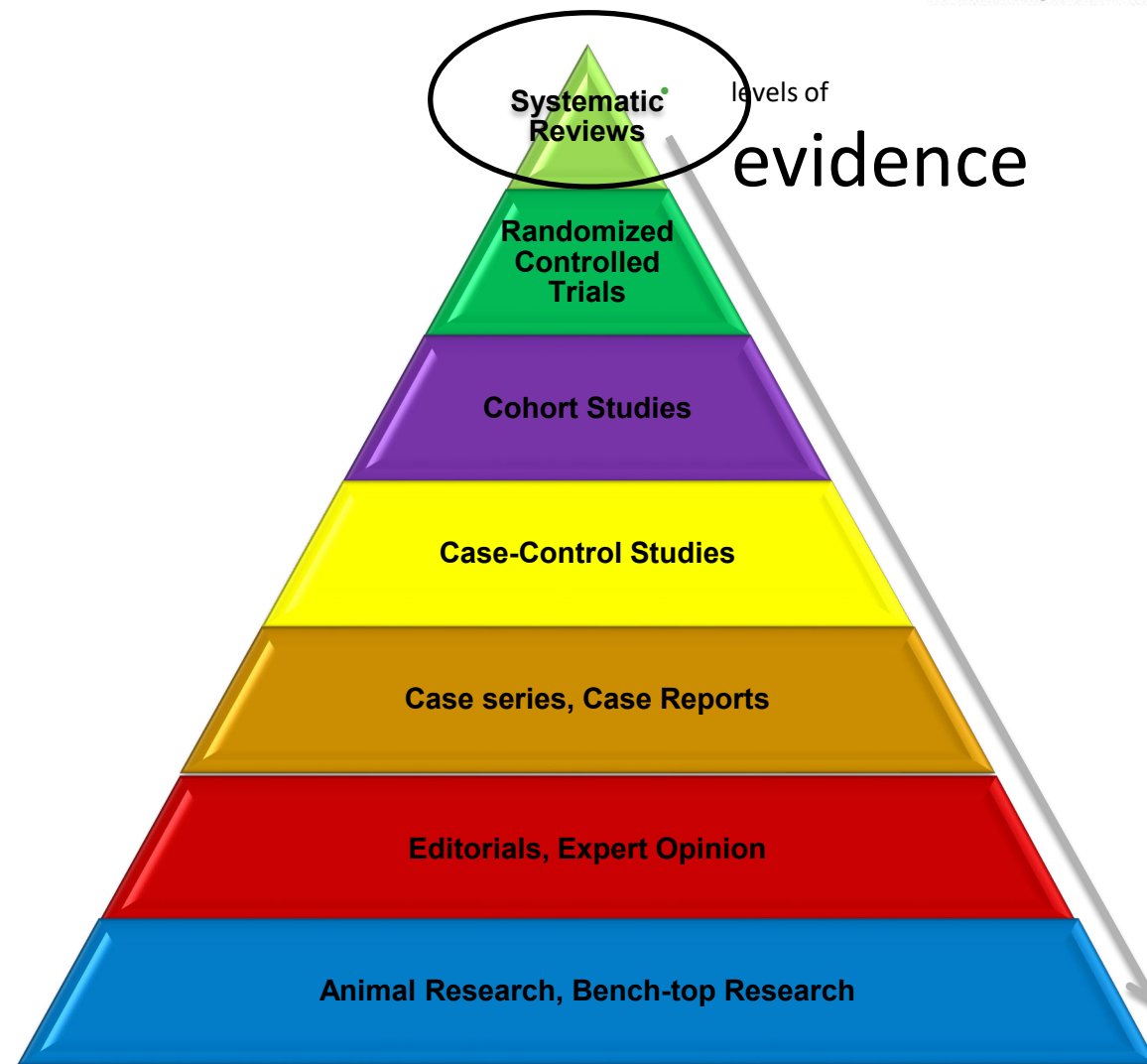
1990s

Evidence-based Practice

Evidence-based Care



Evidence-based Person-centered Practice



ADA American Dental Association®





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GPT-4 Pulp Therapy for Baby Teeth.

vi I took my 4-year-old to a dentist, and he recommended pulp therapies on all the baby molars. He was saying some teeth need vital and some need non-vital pulp treatments and there are different kinds of medicaments he could use. What do you recommend?

As an AI language model, I am not a licensed dentist, and it would not be ethical or responsible for me to provide specific medical recommendations without examining your child and reviewing their medical history. However, I can provide some general information that may be helpful.

Pulp therapy is a type of dental treatment that is often performed on baby teeth that have been affected by decay or trauma. There are two main types of pulp therapy: vital and non-vital.

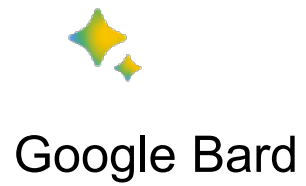
Vital pulp therapy involves removing only the diseased or damaged part of the pulp and leaving the healthy part intact. This type of treatment is typically used for teeth with shallow decay or minor injuries. Non-vital pulp therapy involves removing all of the pulp from the tooth and replacing it with a medicated filling material. This type of treatment is usually reserved for more severe cases, such as deep cavities or significant trauma.

The type of medicament used during pulp therapy will depend on the specific case and the dentist's preference. Some commonly used medicaments include calcium hydroxide, mineral trioxide aggregate (MTA), and formocresol. Each of these has its own unique properties and advantages, and the dentist will choose the most appropriate one based on the individual case.

Regenerate response

It is important to follow the recommendations of your child's dentist regarding their oral health. If you have any questions or concerns about the recommended treatment, it is best to discuss them with the dentist directly.

or facts



☰ Bard Experiment




🔄 Reset chat

🕒 Bard Activity

❓ FAQ

🗨️ Help & support



I took my 4-year-old to a dentist, and he recommended pulp therapies on all the baby molars. He was saying some teeth need vital and some need non-vital pulp treatments and there are different kinds of medicaments he could use. What do you recommend? 



I'm just a language model, so I can't help you with that.





Microsoft Bing

I understand that you are concerned about your child's dental health. Pulp therapy is a dental procedure that helps maintain a tooth so that it won't be lost¹. It is a common dental treatment that can help restore your child's baby tooth to proper function until it is ready for natural exfoliation².

There are two different forms of pulp therapy, which include pulpotomy and pulpectomy¹. Pulpotomy is a procedure that treats infected baby teeth in children³. During a pulpotomy, the pulp of the tooth in the crown (the part of the tooth that is visible) is removed and the pulp in the root canal is left intact³. On the other hand, pulpectomy is a procedure to remove all the pulp from the crown and roots of a tooth⁴.

It's important to note that there are four types of vital pulp therapy for baby teeth which include protective base, indirect pulp cap, direct pulp cap, and pulpotomy⁵. The type of therapy recommended by your dentist will depend on how much damage has been done to your child's teeth⁵.

I hope this helps! Let me know if you have any other questions.

Learn more:

1 of 20 ●

1. acpediatricdentistry.com

2. wemakekidssmile.net

3. verywellhealth.com

4. healthline.com

5. colgate.com

— see less



Microsoft Bing

What are medicaments used in pulp therapy?

- ✓ Searching for: **medicaments used in pulp therapy**
- ✓ Generating answers for you...

There are several medicaments that can be used in pulp therapy for baby teeth. These include calcium hydroxide, ferric sulfate, glutaraldehyde, sodium hypochlorite, mineral trioxide aggregate (MTA), and formocresol ¹. A guideline panel convened by the American Academy of Pediatric Dentistry formulated evidence-based recommendations on the use of vital pulp therapies in primary teeth and strongly recommended both the use of MTA and formocresol as pulpal medicaments in pulpotomies ¹.

I hope this helps! Let me know if you have any other questions.

Learn more:

2 of 20 ●

1. [decisionsindentistry.com](https://www.decisionsindentistry.com)

2. [researchgate.net](https://www.researchgate.net)

3. [aapd.org](https://www.aapd.org)

4. my.clevelandclinic.org

— see less



Freepik.com

Indirect pulp treatment in primary teeth: 4-year results

LUCIANO CASAGRANDE, DDS, MS, PhD, LETICIA WESTHALLEN BENTO, DDS, MS, DÉBORA MARTINI DALPIAN, DDS, MS, FRANKLIN GARCIA-GODOY, DDS, MS & FERNANDO BORRA DE ARAUJO, DDS, MS, PhD

ABSTRACT Purpose: To evaluate clinical and radiographic outcomes of indirect pulp treatment (IPT) in primary molars after long-term function (up to 60 months). **Methods:** Teeth with deep carious lesions without signs and symptoms of irreversible pulpitis were divided by random allocation into two groups, according to the capping material utilized over demineralized dentin: experimental group (1): self-etching adhesive system (Clearfil SE Bond); and control group (2): calcium hydroxide liner (Dycal). Both groups were filled with resin composite (2Z50) and submitted to a clinical and radiographic monitoring period until exfoliation. **Results:** After the follow-up period (up to 60 months), no statistical difference was found between groups ($P = 0.514$). The overall success rate reached 78%. The failures occurred after the first year period recall. (*Am J Dent* 2010;23:34-38).

CLINICAL SIGNIFICANCE: The IPT provides an alternative treatment of primary teeth with deep carious lesions representing a simple and effective technique to maintain the pulp vitality.

KEY WORDS: Indirect pulp treatment, resin composite, self-etching adhesive system, calcium hydroxide liner, radiographic monitoring.

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Clinical study of Mineral Trioxide Aggregate in primary molars. Comparison between Grey and White MTA—A long term follow-up (84 months)

Cristina Cardoso-Silva ^{a,b,*}, Elena Barbería ^a, Myriam Maroto ^a, Franklin García-Godoy ^a

^a Faculty of Dental Medicine, University of Porto, Portugal. ^b Department of Paediatric, Pediatric Dentistry and Orthodontics, Faculty of Odontology, Complutense University of Madrid, Spain. ^c Biocience Research Center, College of Dentistry, University of Tennessee Health Science Center, Memphis, TN, USA

ABSTRACT Purpose: To evaluate the clinical and radiographic outcomes of mineral trioxide aggregate (MTA) in primary molars after long-term function (up to 84 months). **Methods:** Teeth with deep carious lesions without signs and symptoms of irreversible pulpitis were divided by random allocation into two groups, according to the capping material utilized over demineralized dentin: experimental group (1): self-etching adhesive system (Clearfil SE Bond); and control group (2): calcium hydroxide liner (Dycal). Both groups were filled with resin composite (2Z50) and submitted to a clinical and radiographic monitoring period until exfoliation. **Results:** After the follow-up period (up to 84 months), no statistical difference was found between groups ($P = 0.514$). The overall success rate reached 78%. The failures occurred after the first year period recall. (*Am J Dent* 2010;23:34-38).

Evaluation and Comparison of Mineral Trioxide Aggregate and Biodentine in Primary Tooth Pulpotomy: Clinical and Radiographic Study

O. Carri, F. Ozurhan

Faculty of Dentistry, Department of Pediatric Dentistry, Cumhuriyet University, Sivas, Turkey

ABSTRACT Purpose: To compare the clinical and radiographic outcomes of mineral trioxide aggregate (MTA) and Biodentine in primary molars after long-term function (up to 24 months). **Methods:** Teeth with deep carious lesions without signs and symptoms of irreversible pulpitis were divided by random allocation into two groups, according to the capping material utilized over demineralized dentin: experimental group (1): self-etching adhesive system (Clearfil SE Bond); and control group (2): calcium hydroxide liner (Dycal). Both groups were filled with resin composite (2Z50) and submitted to a clinical and radiographic monitoring period until exfoliation. **Results:** After the follow-up period (up to 24 months), no statistical difference was found between groups ($P = 0.514$). The overall success rate reached 78%. The failures occurred after the first year period recall. (*Am J Dent* 2010;23:34-38).



Clinical Study Success Rates of Ankaferd Blood Stopper and Ferric Sulfate as Pulpotomy Agents in Primary Molars

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Department of Pediatric Dentistry, Faculty of Dentistry, Bingölcü University, 68080 Kayseri, Turkey

ABSTRACT Purpose: To compare the clinical and radiographic outcomes of Ankaferd blood stopper (ABS) and ferric sulfate (FS) as pulpotomy agents in primary molars after long-term function (up to 24 months). **Methods:** Teeth with deep carious lesions without signs and symptoms of irreversible pulpitis were divided by random allocation into two groups, according to the capping material utilized over demineralized dentin: experimental group (1): self-etching adhesive system (Clearfil SE Bond); and control group (2): calcium hydroxide liner (Dycal). Both groups were filled with resin composite (2Z50) and submitted to a clinical and radiographic monitoring period until exfoliation. **Results:** After the follow-up period (up to 24 months), no statistical difference was found between groups ($P = 0.514$). The overall success rate reached 78%. The failures occurred after the first year period recall. (*Am J Dent* 2010;23:34-38).

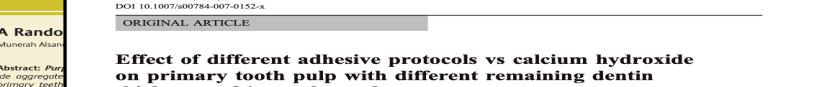
1. Introduction
Pulpotomy is a common therapeutic procedure for the management of asymptomatic teeth with deep carious lesions without signs and symptoms of irreversible pulpitis. The most widely used pulp medication in the world is an FC salt as a 1:1 ratio is the gold standard in the pulpotomy of primary teeth because it is relatively simple to use, it is non-toxic, has a high rate of clinical success [1, 2]. Although FC has a combination of favorable properties, the most common side effect is hemostatic, which may be difficult for clinicians to use alternative methods and agents that are more effective than FC [3]. Several factors affect the success of pulpotomy, and the hemostatic capability of the pulpotomy agent is considered as one of the most important factors in improving the favorable prognosis of vital pulp therapy [4]. Ferric sulfate (FS) has been commonly used as a pulpotomy agent to control pulp bleeding in the preparation of 20-30 years. FS induces hemostasis and the formation of a sealing membrane at the interrupted vessel of pulp tissue by

Clinical, radiographic and histological analysis of the effects of mineral trioxide aggregate used in direct pulp capping and pulpotomies of primary teeth

R. Caicedo,* PV Abbott,† DJ Alongi,‡ MY Alarcon§

ABSTRACT Purpose: To evaluate the clinical and radiographic outcomes of mineral trioxide aggregate (MTA) in primary molars after long-term function (up to 60 months). **Methods:** Teeth with deep carious lesions without signs and symptoms of irreversible pulpitis were divided by random allocation into two groups, according to the capping material utilized over demineralized dentin: experimental group (1): self-etching adhesive system (Clearfil SE Bond); and control group (2): calcium hydroxide liner (Dycal). Both groups were filled with resin composite (2Z50) and submitted to a clinical and radiographic monitoring period until exfoliation. **Results:** After the follow-up period (up to 60 months), no statistical difference was found between groups ($P = 0.514$). The overall success rate reached 78%. The failures occurred after the first year period recall. (*Am J Dent* 2010;23:34-38).

Dr. R. Caicedo, School of Dentistry, Universidad Nacional de Loja, Loja, Ecuador



Effect of different adhesive protocols vs calcium hydroxide on primary tooth pulp with different remaining dentin thicknesses: 24-month results

Bilgin Büyükgöçler - Zafer C. Cehrelli

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ABSTRACT Purpose: To evaluate the clinical and radiographic outcomes of different adhesive protocols in primary molars after long-term function (up to 24 months). **Methods:** Teeth with deep carious lesions without signs and symptoms of irreversible pulpitis were divided by random allocation into two groups, according to the capping material utilized over demineralized dentin: experimental group (1): self-etching adhesive system (Clearfil SE Bond); and control group (2): calcium hydroxide liner (Dycal). Both groups were filled with resin composite (2Z50) and submitted to a clinical and radiographic monitoring period until exfoliation. **Results:** After the follow-up period (up to 24 months), no statistical difference was found between groups ($P = 0.514$). The overall success rate reached 78%. The failures occurred after the first year period recall. (*Am J Dent* 2010;23:34-38).

Incomplete caries removal and indirect pulp capping in primary molars: A randomized controlled trial

ANA ELIZA LEMES BRESSANI, DDS, MSC, ADRIELA AZEVEDO SOUZA MARIATH, DDS, PhD, ALEX NOGUEIRA HAAS, DDS, PhD, FRANKLIN GARCIA-GODOY, DDS, MS, PhD, PHD & FERNANDO BORRA DE ARAUJO, DDS, PhD

ABSTRACT Purpose: To compare the effect of incomplete caries removal (ICR) and indirect pulp capping (IPC) with calcium hydroxide (CH) or an inert material (wax) on color, consistency and contamination of the remaining dentin of primary molars. **Methods:** This double-blind, parallel, randomized controlled trial included 30 children presenting one primary molar with deep caries lesion. Children were randomly assigned to receive IPC with CH or wax. All teeth were then restored with resin composite. Baseline dentin color and consistency were evaluated after ICR, and dentin samples were collected for contamination analysis using scanning electron microscopy. After 3 months, restorations were removed and the three parameters were re-evaluated. In both groups, dentin became significantly darker after 3 months. **Results:** No cases of yellow dentin were observed after 3 months with CH compared to 33.3% of the wax cases ($P < 0.05$). A statistical significant difference was observed only for CH regarding consistency. CH stimulated a dentin hardening process in a statistically higher number of cases than wax (86.7% vs. 33.3%; $P = 0.008$). Contamination changed significantly over time in CH and wax without significant difference between groups. It was concluded the CH and wax arrested the carious process of the remaining carious dentin after indirect pulp capping, but CH showed superior dentin color and consistency after 3 months. (*Am J Dent* 2013;26:196-200).



Formocresol pulpotomy in primary molars: a long-term radiographic evaluation

Luc Christian Bovee, DDS

Department of Pediatric Dentistry, School of Dentistry, Indiana University, Indianapolis, IN, USA

ABSTRACT Purpose: To evaluate the long-term radiographic outcomes of formocresol pulpotomy in primary molars after long-term function (up to 24 months). **Methods:** Teeth with deep carious lesions without signs and symptoms of irreversible pulpitis were divided by random allocation into two groups, according to the capping material utilized over demineralized dentin: experimental group (1): self-etching adhesive system (Clearfil SE Bond); and control group (2): calcium hydroxide liner (Dycal). Both groups were filled with resin composite (2Z50) and submitted to a clinical and radiographic monitoring period until exfoliation. **Results:** After the follow-up period (up to 24 months), no statistical difference was found between groups ($P = 0.514$). The overall success rate reached 78%. The failures occurred after the first year period recall. (*Am J Dent* 2010;23:34-38).

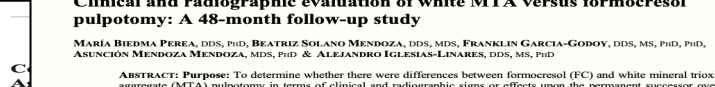
Comparative evaluation of biodentine, 2% chlorhexidine with RMGIC and calcium hydroxide as indirect pulp capping materials in primary molars: An in vivo study

Kondala Rao Boddeda, Ch. Radha Rani, Narsimha Rao V Vanga, Srinivas Kumar Chandrabhatla

Department of Pedodontics and Preventive Dentistry, GITAM Dental College and Hospital, Visakhapatnam, Andhra Pradesh, India

ABSTRACT Purpose: To evaluate the clinical and radiographic outcomes of biodentine, 2% chlorhexidine with RMGIC and calcium hydroxide as indirect pulp capping materials in primary molars after long-term function (up to 60 months).

Dr. Kondala Rao Boddeda, Department of Pedodontics and Preventive Dentistry, GITAM Dental College and Hospital, Visakhapatnam, Andhra Pradesh, India



Clinical and radiographic evaluation of white MTA versus formocresol pulpotomy: A 48-month follow-up study

MARÍA BIEDMA PEREA, DDS, PhD, BEATRIZ SÓLANO MENDEZ, DDS, MS, FRANKLIN GARCÍA-GODOY, DDS, MS, PhD, PhD, ASUNCIÓN MENDOZA MENDEZ, MDS, PHD & ALEJANDRO IEGLESIAS-LINARES, DDS, MS, PhD

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© Springer-Verlag 2007

ABSTRACT Purpose: To determine whether there were differences between formocresol (FC) and white mineral trioxide aggregate (MTA) pulpotomy in terms of clinical and radiographic signs or effects upon the permanent successor over a long term. **Methods:** A total of 212 molars (74 treated with FC and 138 with white MTA) corresponding to 129 subjects (66 females; 61.1%) and 63 males (48.8%) were evaluated. The coronal pulp was carefully amputated up to the entrance of the root canals using a sharp spoon excavator. Post-amputation bleeding was confirmed to be bright red and was seen to subside after applying 2-3 minutes of gentle pressure with a sterile cotton pellet. One group was treated with a 1:5 dilution of formocresol (20% Buckley's formocresol solution), while a second group was treated using white MTA powder (ProRoot). **Results:** There were no significant differences in clinical success rate between the two groups (89% in the white MTA group versus 82.5% if the FC group). However, the radiographic success rate was significantly greater for white MTA versus FC. The radiographic failure rate in the molars treated with MTA was 7.9% versus 18.9% with FC. Regarding alterations in the timing of eruption, early and delayed eruption were respectively recorded in 7.24% and 8.69% of the cases in the MTA group, versus 9.45% and 4.05% of the cases in the FC group. Thus, neither group showed relevant alterations in the timing of eruption. (*Am J Dent* 2017;30:131-136).

The Clinical and Radiographic Success of Primary Molar Pulpotomy Using Biodentine™ and Mineral Trioxide Aggregate: A 24-Month Randomized Clinical Trial

Mehmet Barli, PhD * Nagehan Altın, PhD * Çağrı Çinar, PhD * Mesut Eren Odabaş, PhD

Department of Pediatric Dentistry, Faculty of Dentistry, Bingölcü University, 68080 Kayseri, Turkey

ABSTRACT Purpose: The purpose of this study was to compare the clinical and radiographic success of Biodentine™ and mineral trioxide aggregate (MTA) pulpotomy in primary molars. **Methods:** Thirty-two four- to nine-year-olds were included in this study. The primary molars were randomly assigned to the Biodentine™ and MTA groups. After coronal pulp removal and hemostasis, the remaining pulp tissue was covered with Biodentine™ or MTA. All teeth were restored with stainless steel crowns. Clinical and radiographic success and failures were recorded at 12-, 18- and 24-month follow-ups. Data were statistically analyzed using Mann-Whitney U and Wilcoxon tests. **Results:** The 24-month follow-up evaluations revealed that the clinical success rates were 96.8 percent (30 out of 31) for both Biodentine™ and MTA. The radiographic success rates were 24.6 percent (29 out of 31) for Biodentine™ and 87.1 percent (27 out of 31) for MTA. No significant differences were found among the groups at all follow-up appointments ($P > 0.05$). **Conclusion:** Biodentine™ and mineral trioxide aggregate did not differ significantly in combined clinical and radiographic success after 24 months. (*Pediatr Dent* 2017;39(4):284-8) Received March 3, 2016 / Last Revised April 14, 2017 / Accepted April 14, 2017

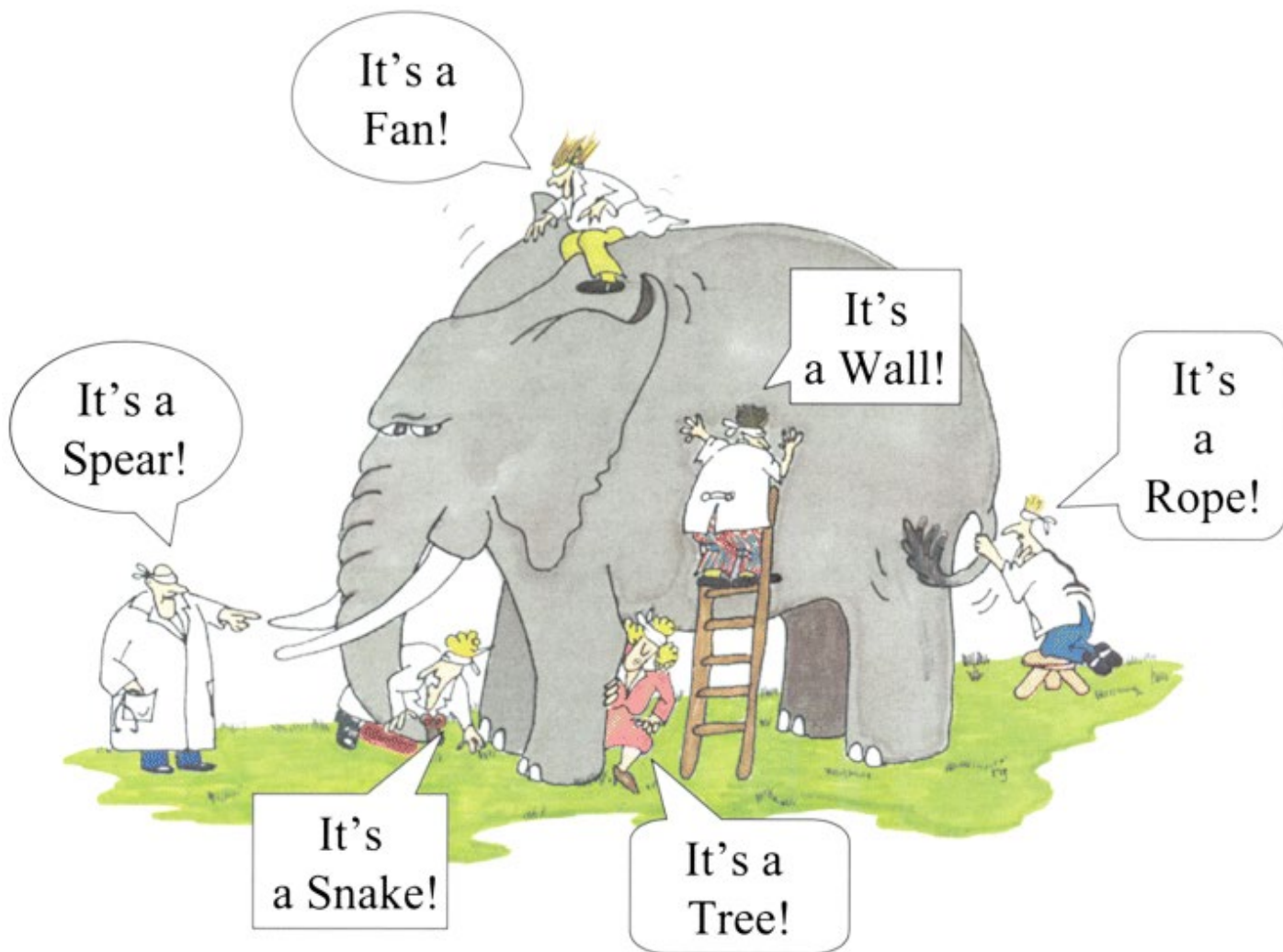


Outcomes of the conventional and biological treatment approaches for the management of caries in the primary dentition

ALAA BANIHANI ¹, MONTY DUGGAL ^{1,2}, JACK TOUMBA ¹ & CHRIS DEERY ²

¹School of Dentistry, University of Leeds, Leeds, UK; ²Faculty of Dentistry, National University of Singapore, Singapore, Singapore; and ³School of Clinical Dentistry, University of Sheffield, Sheffield, UK

ABSTRACT Purpose: To evaluate the long-term radiographic outcomes of conventional and biological treatment approaches for the management of caries in the primary dentition. **Methods:** Teeth with deep carious lesions without signs and symptoms of irreversible pulpitis were divided by random allocation into two groups, according to the capping material utilized over demineralized dentin: experimental group (1): self-etching adhesive system (Clearfil SE Bond); and control group (2): calcium hydroxide liner (Dycal). Both groups were filled with resin composite (2Z50) and submitted to a clinical and radiographic monitoring period until exfoliation. **Results:** After the follow-up period (up to 24 months), no statistical difference was found between groups ($P = 0.514$). The overall success rate reached 78%. The failures occurred after the first year period recall. (*Am J Dent* 2010;23:34-38).

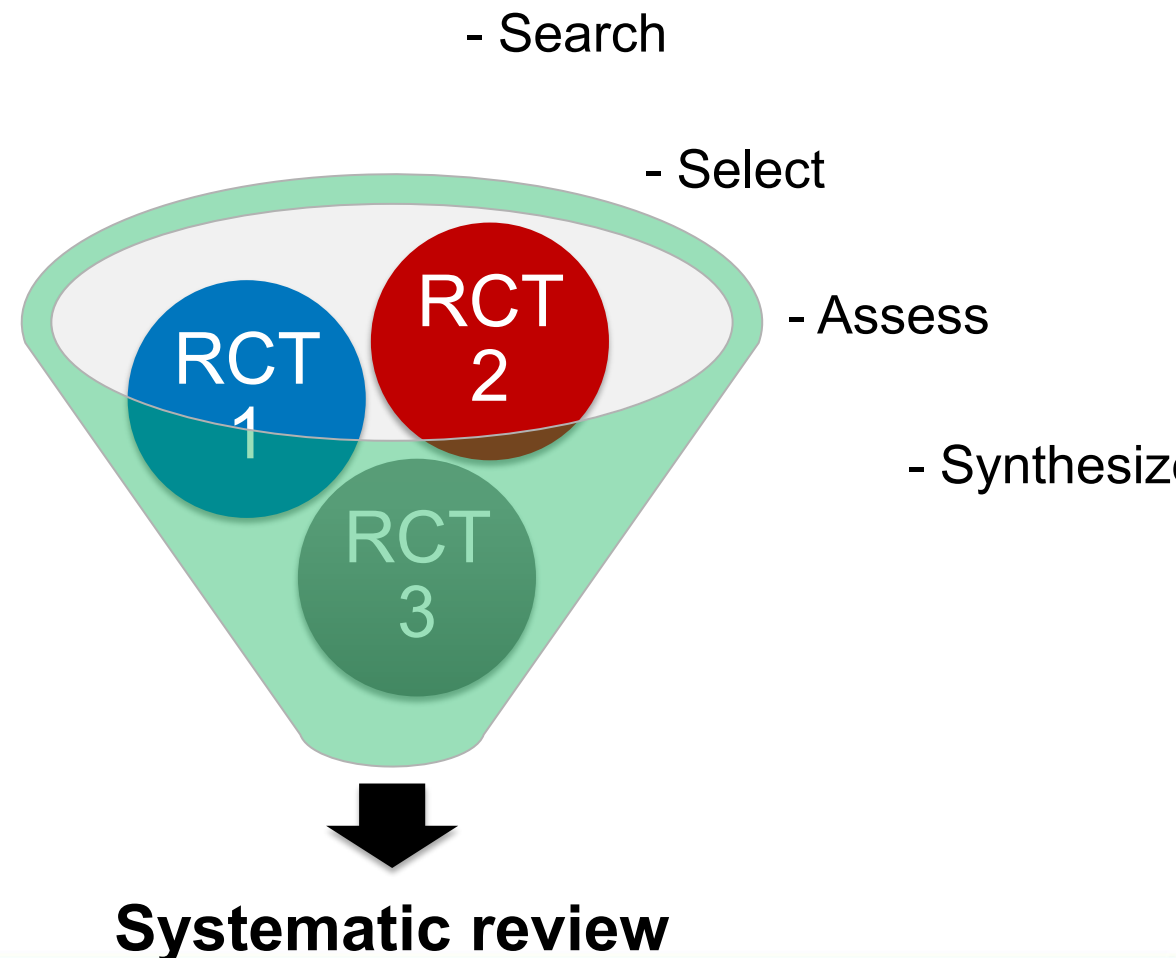


Need to consider the totality of the evidence

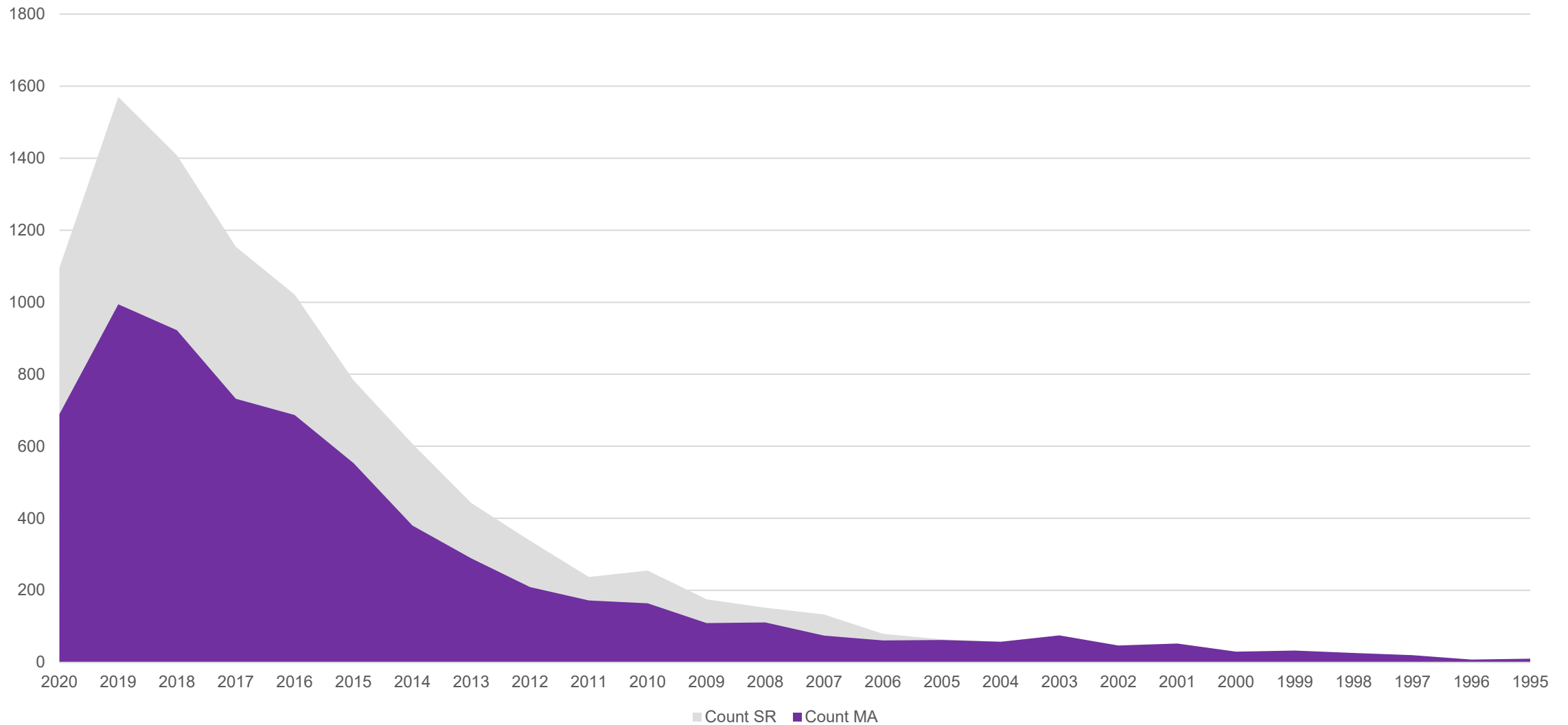
Systematic reviews

What is a Systematic Review?

“A systematic review is a high-level overview of primary research on a particular research question that tries to identify, select, synthesize and appraise all high-quality research evidence relevant to that question in order to answer it.”

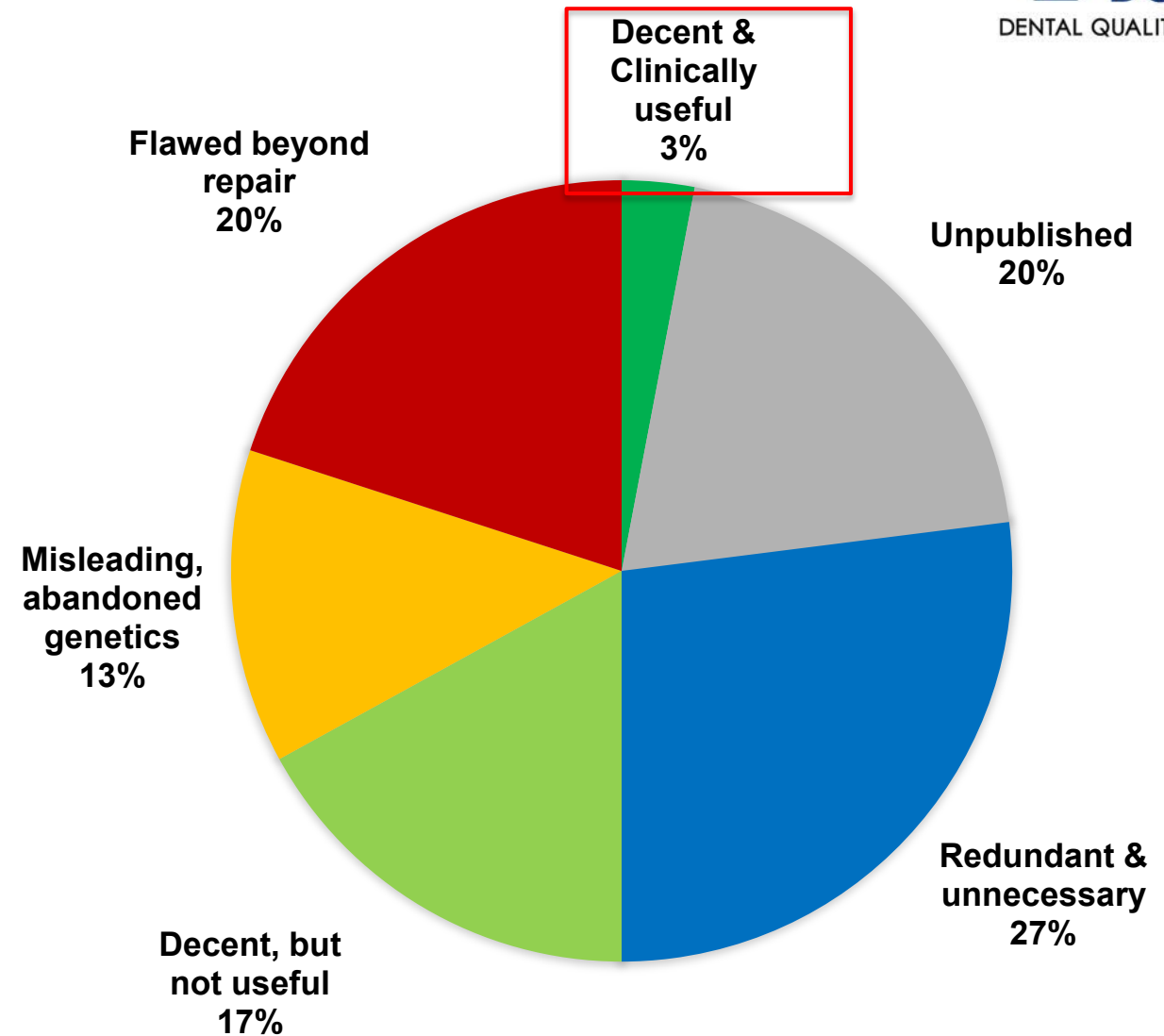


PubMed Search: Systematic review AND dentistry; Meta analysis AND dentistry



• QUALITY OF SYSTEMATIC REVIEWS

SR ≈ 29,000
MA ≈ 9,000



Ioannidis JPA. The Mass Production of Redundant, Misleading, and Conflicted Systematic Reviews and Meta-analyses. The Milbank Quarterly, Vol. 94, No. 3, 2016 (pp. 485-514)

Healthcare in the current era: Evidence ecosystem:

- Using global data to inform local practice guidance





- **Clinical Practice Guidelines**

Statements that include recommendations intended to optimize patient care that are informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options.

Institute of Medicine (IOM)

What pulp therapies should we use to treat our patients?

Practice Guidelines

Cover Story
Evidence-based clinical practice guideline on nonrestorative treatments for carious lesion
A report from the American Dental Association

SR **CPC**

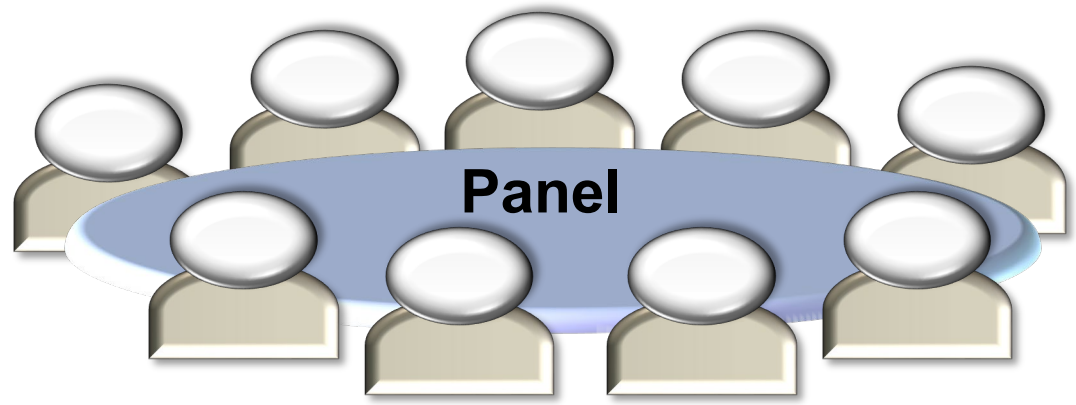
Abstract
Background: An expert panel convened by the American Dental Association Clinical Practice Guidelines Committee and the Center for Evidence-Based Dentistry conducted a systematic review of randomized controlled clinical trials to determine the most effective and safe nonrestorative treatment for carious lesions in children and adults.

Types of Studies Reviewed
The panel reviewed randomized controlled trials, cohort studies, and case-control studies. The panel also reviewed systematic reviews and meta-analyses.

Results
The expert panel found that the most effective and safe nonrestorative treatment for carious lesions in children and adults is the use of 30% silver diamine fluoride varnish. The panel also found that the use of 30% silver diamine fluoride varnish is more effective and safe than the use of 10% silver diamine fluoride varnish.

Conclusions and Practical Implications
The panel concluded that the use of 30% silver diamine fluoride varnish is the most effective and safe nonrestorative treatment for carious lesions in children and adults. The panel also found that the use of 30% silver diamine fluoride varnish is more effective and safe than the use of 10% silver diamine fluoride varnish.

Key Words
Carious lesion, American Dental Association, Clinical Practice Guidelines, evidence-based dentistry, systematic review, clinical recommendations, nonrestorative treatment.



?
PICO framework
Clinical Questions

Treatment effect (Benefits & harms)

Certainty in the evidence

Patient values & preferences

Resource utilization

Systematic review
Evidence



Number-Needed-to-Treat (NNT)

- It is defined as the inverse of the absolute risk reduction
- The number of patients that need to be treated for one to benefit (prevent one failure) compared with a control in a clinical trial.

Pulp exposures- caries excavation

- SCR versus NSCR: **NNT 5**



- SCR versus SWT: **NNT 25**



GRADE

Grading of Recommendations Assessment, Development and Evaluation

Key concepts

- **Estimate of treatment effect or risk of experiencing an outcome given an exposure**
- **Certainty of the evidence:** How certain we are about the estimates when making a decision

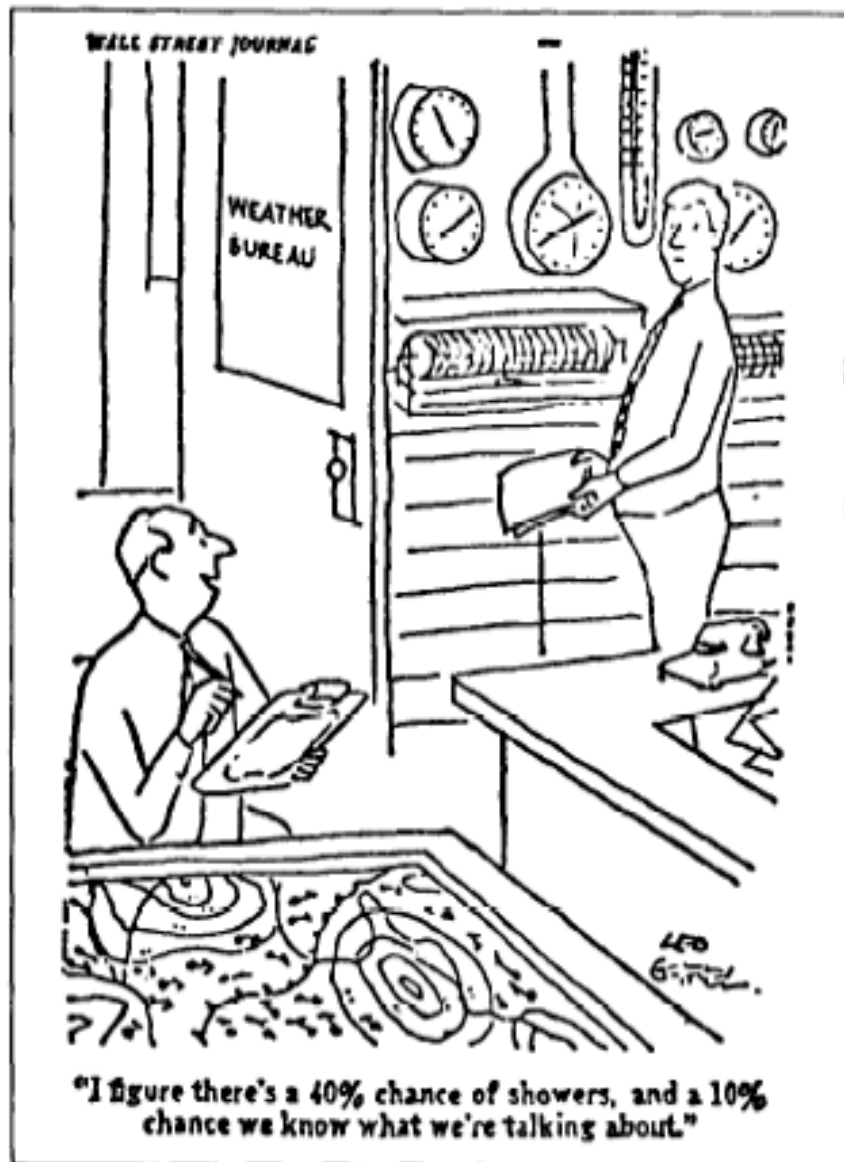


Figure 1. Belief and confidence: a two-dimensional weather report. (Reprinted by permission from the Wall Street Journal).

Interpreting Certainty in the Evidence

Low Our confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the effect.

Very Low We have very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of effect.

Definition of Strong and Conditional Recommendations and Implications for Stakeholders[†]

Implications

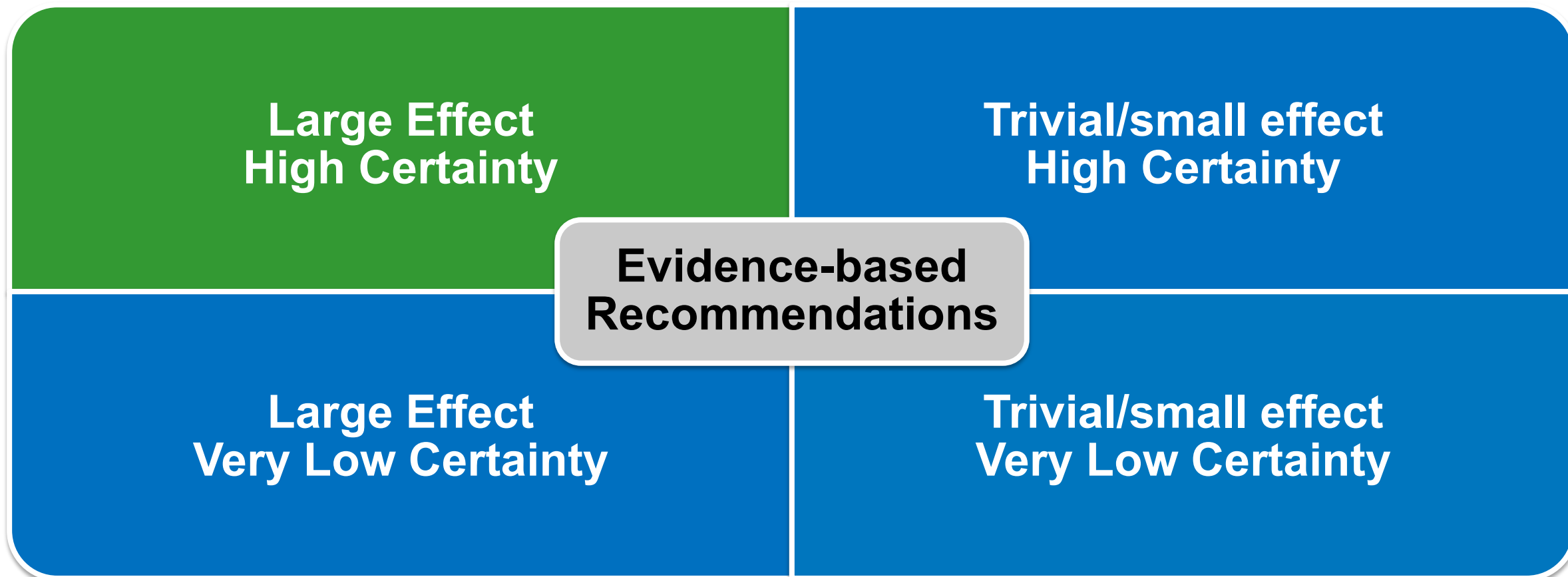
Strong Recommendations

Conditional Recommendations

For Patients

Most people in this situation would want the recommended course of action, and only a small proportion would not. Formal decision aids are not likely to be needed to help people make decisions consistent with their values and preferences.

Most people in this situation would want the suggested course of action, but many would not.



Determinants of the strength of recommendation



Treatment effect
(Benefits and harms)



Certainty of the evidence



Patient values and preferences

Patients' values and preferences

The evidence of the effects (benefits and harms) of an intervention must be interpreted in the context of patients' values and preferences



How can PVPs influence the direction of recommendations?

Population: Primary teeth with deep caries being treated by IPT

Intervention: Complete caries removal

Comparator: Selective caries removal

Outcomes: Overall long-term success, preventing pulp exposures, postoperative comfort, costs....

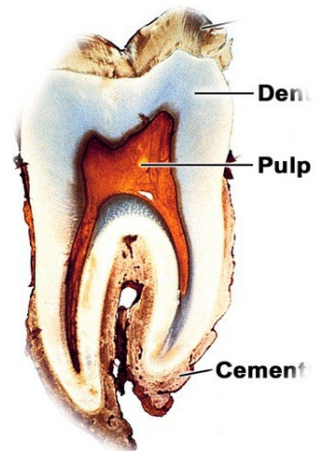
Scenario 1:

If panel focuses on overall success. It can recommend **in favor** of either selective or complete caries removal for IPT

Scenario 2:

If panel places a higher value on overall success AND preventing pulp exposures: It is likely to recommend **against** complete caries removal.

The workgroups assumptions regarding patient and societal values and preferences lead to opposing recommendations.



Determinants of the strength of recommendation



Treatment effect
(Benefits and harms)



Certainty of the evidence



Patient values and preferences



Resource utilization

What is a recommendation?

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

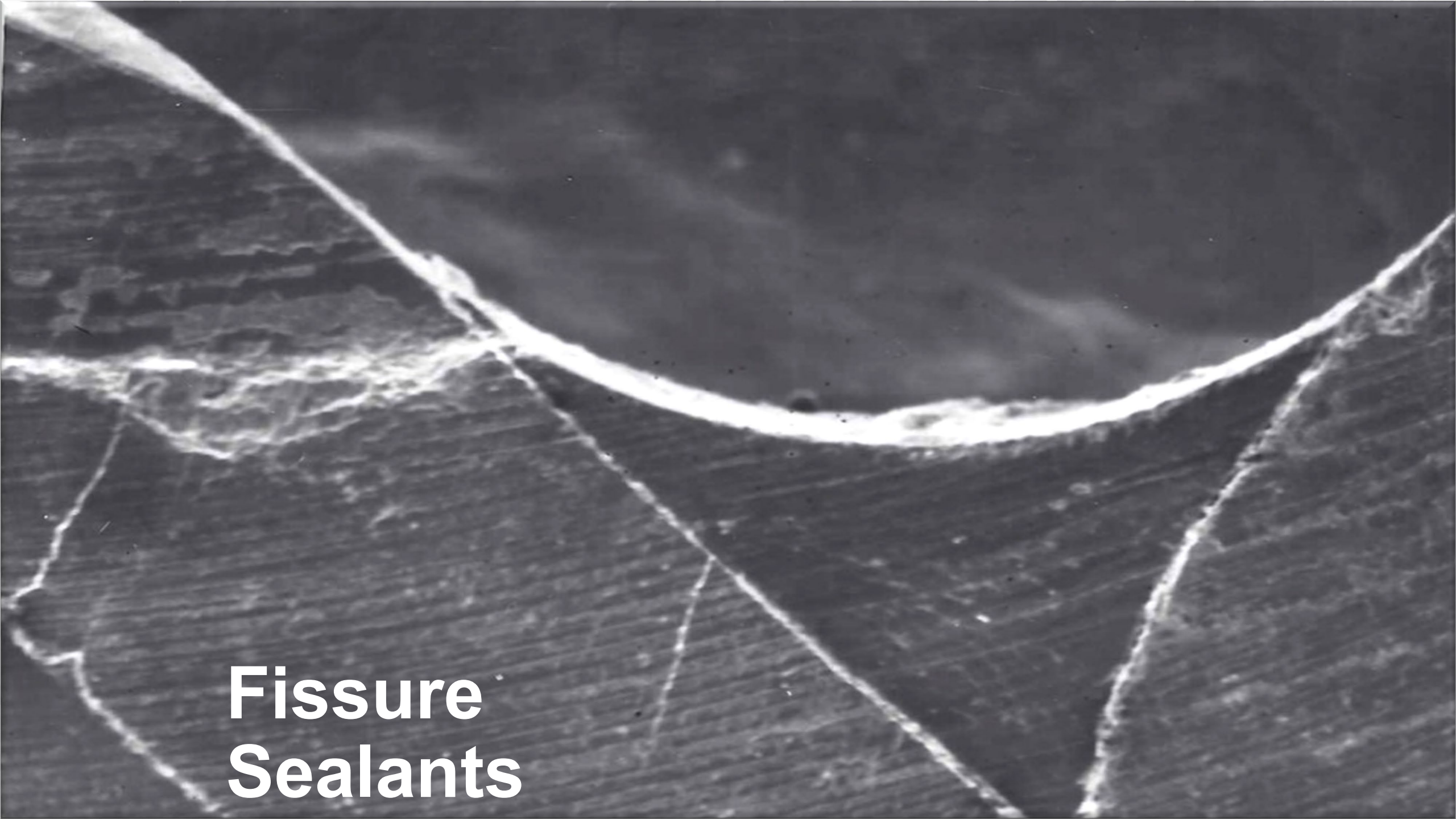
1 Written statement

The sealant guideline panel recommends the use of sealants compared with nonuse in permanent molars with both sound occlusal surfaces and noncavitated occlusal carious lesions in children and adolescents*

2 Strength of recommendation:
Strong

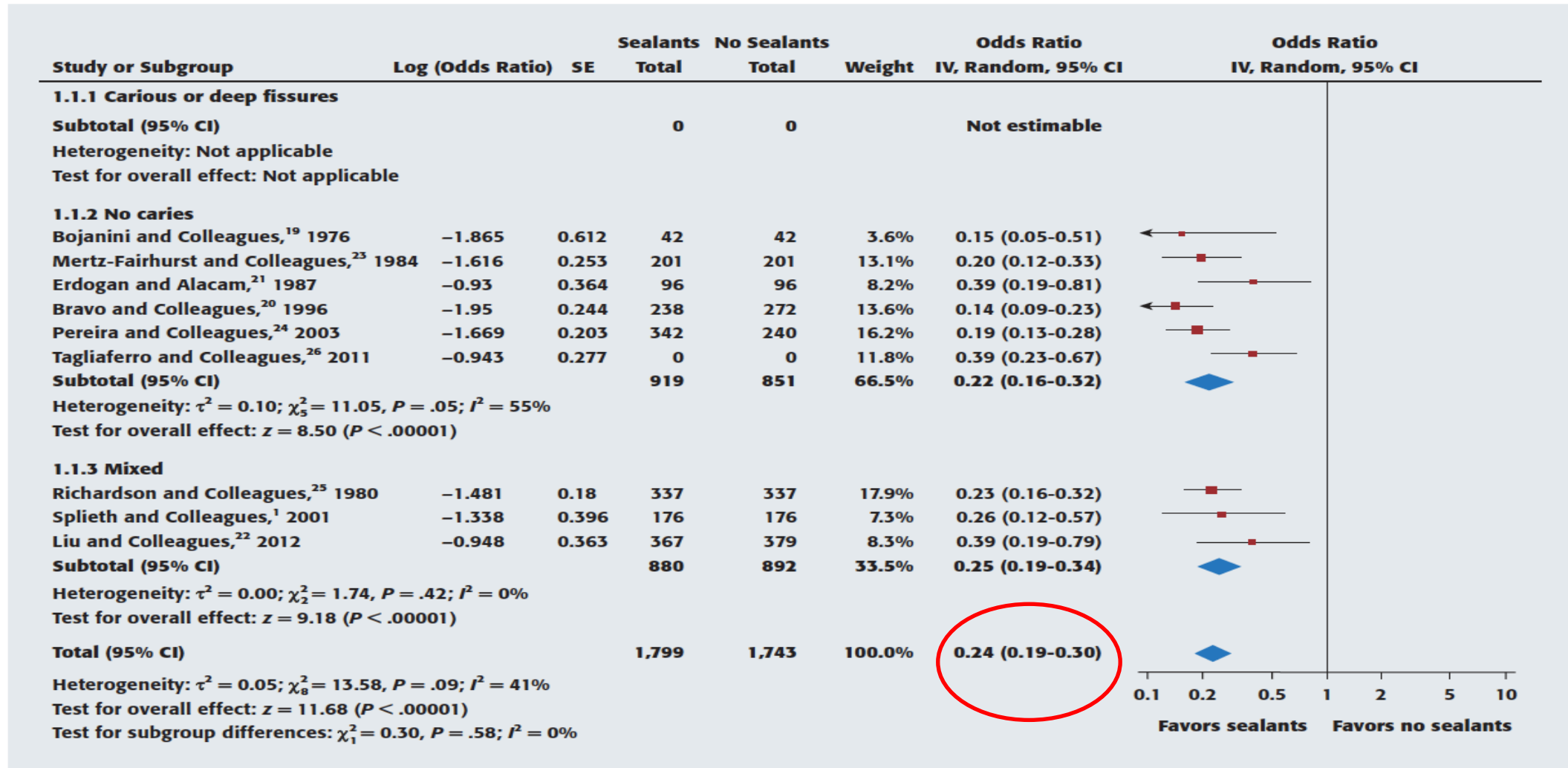
3 QoE or confidence in the effect estimates:
Moderate

ADA CPG on Sealants. JADA 2016



**Fissure
Sealants**

Sealant versus No-Sealant and Caries Incidence-



$(1 - \text{Risk}) \times 100 = (1 - 0.24) \times 100 = 76\%$

How do guideline panels use risk stratification to formulate recommendations?

Josh **80%**

Milee **2%**

High Risk

Low Risk

Relative effectiveness of fissure sealants

↓ 76% (RR 0.24)

↓ 76% (RR 0.24)

Treatment with sealants

80% X 0.24 =
19.2%

2% X 0.24 = 0.48%

Absolute risk reduction

80% - 19.2% =
60.8%

2% - 0.48% =
1.52%

NNT

2   

100

Risk of caries development in formerly sealed (FS) teeth and never-sealed (NS) teeth for each interval since sealant placement.

STUDY, ACCORDING TO INTERVAL SINCE SEALANT PLACEMENT	NO. OF TOOTH PAIRS	CARIOUS FS TEETH	CARIOUS NS TEETH	RR*	95% CI†
One Year					
Mertz-Fairhurst and colleagues ¹⁴	50	12	14	0.857	0.441-1.666
Charbeneau and colleagues ^{15‡}	88	42	41	1.024	0.749-1.401
Going and colleagues ^{29§}	87	38	34	1.118	0.784-1.401
Thylstrup and Poulsen ^{22¶}	120	24	29	0.828	0.513-1.335
WEIGHTED MEAN	345	Not applicable (NA)	NA	0.998	0.817-1.220
Two Years					
McCune and colleagues ^{13#}	28	7	15	0.467	0.225-0.967
Mertz-Fairhurst and colleagues ¹⁴	146	74	63	1.186	0.928-1.516
Going and colleagues ²⁹	124	62	75	0.827	0.659-1.037
Thylstrup and Poulsen ²²	183	61	73	0.836	0.637-1.096
WEIGHTED MEAN	481	NA	NA	0.912	0.793-1.048
Three Years					
McCune and colleagues ¹³	34	21	22	0.955	0.664-1.372
Mertz-Fairhurst and colleagues ¹⁴	122	66	73	1.111	0.893-1.382
Going and colleagues ²⁹	176	86	113	0.761	0.631-0.918
WEIGHTED MEAN	332	NA	NA	0.901	0.789-1.029
Four Years					
Mertz-Fairhurst and colleagues ^{14**}	162	117	126	1.083	0.955-1.229
Charbeneau and colleagues ¹⁵	190	135	139	0.971	0.857-1.101
Going and colleagues ²⁹	195	106	130	0.815	0.893-0.959
Horowitz and colleagues ^{32††}	205	97	140	0.693	0.583-0.823
Leake and Martinello ^{49‡‡}	671	514	543	0.947	0.895-1.001
WEIGHTED MEAN	1,423	NA	NA	0.936	0.896-0.978

* RR: Relative risk.
† CI: Confidence interval.
‡ Actual period was 1.5 years.
§ RR for partially lost sealants was 1.06, 0.78, 0.75 and 0.72 for one, two, three and four years after placement, respectively.
¶ RR for partially lost sealants was 0.2 and 0.5 for one and two years after placement, respectively.
RR for partially lost sealants was 0 and 0.71 for two and three years after placement, respectively.
** Actual period was 4.5 years.
†† RR for partially lost sealants was 0.1.
‡‡ RR for partially lost sealants was 1.0.

Griffin et al. Caries risk in formerly sealed teeth. JADA 2009; 140(4):

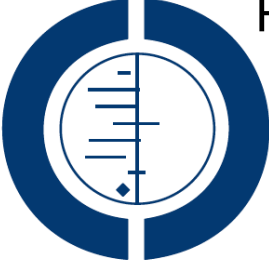
How do we determine that Fluoride varnish is effective for a specific population?



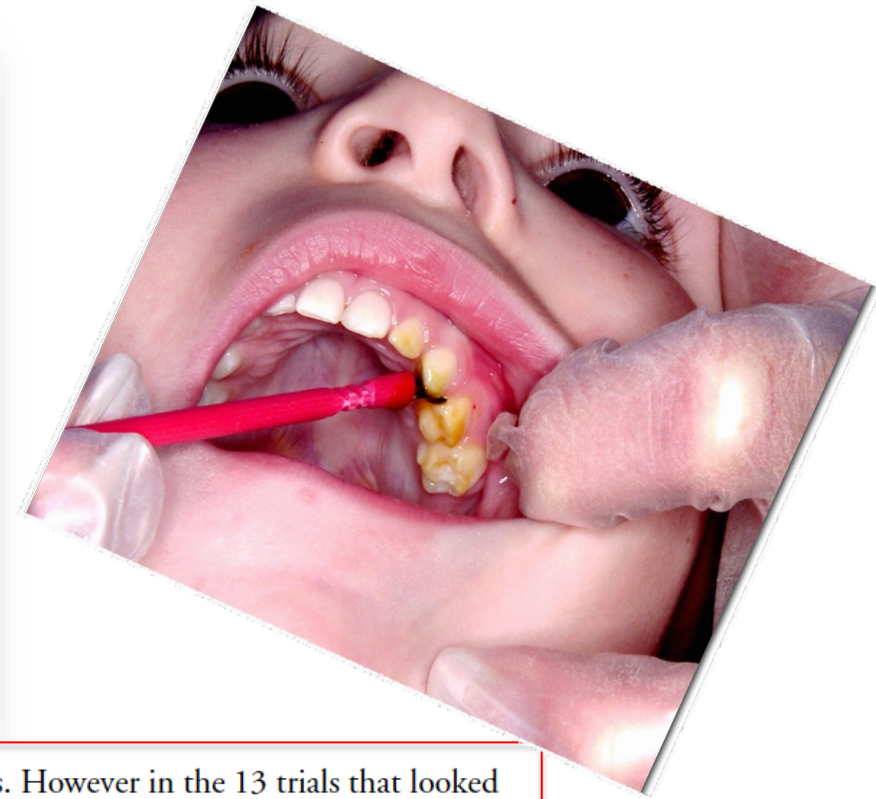
Fluoride varnishes for preventing dental caries in children and adolescents (Review)

Marinho VCC, Worthington HV, Walsh T, Clarkson JE

RR= 0.57



THE COCHRANE COLLABORATION®



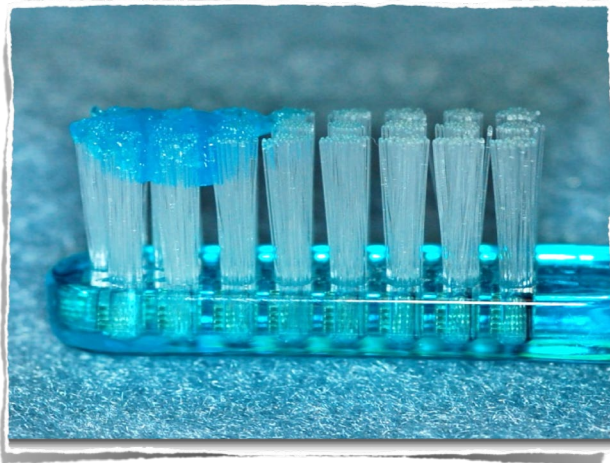
The evidence produced has been found to be of moderate quality due to issues with trial designs. However in the 13 trials that looked at children and adolescents with permanent teeth the review found that the young people treated with fluoride varnish experienced on average a 43% reduction in decayed, missing and filled tooth surfaces. In the 10 trials looking at the effect of fluoride varnish on first or baby teeth the evidence suggests a 37% reduction in decayed, missing and filled tooth surfaces. There was little information concerning possible adverse effects or acceptability of treatment.

RRR= $1 - 0.57 = 43\%$ permanent teeth

NNT (High risk) 3 

NNT (Low risk) 125

How do we determine that Fluoride toothpaste is effective for a specific population?



Community Dent Oral Epidemiol 2013; 41: 1–12
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COMMUNITY
DENTISTRY AND
ORAL EPIDEMIOLOGY

A systematic review and meta-analysis of the effects of fluoride toothpastes on the prevention of dental caries in the primary dentition of preschool children

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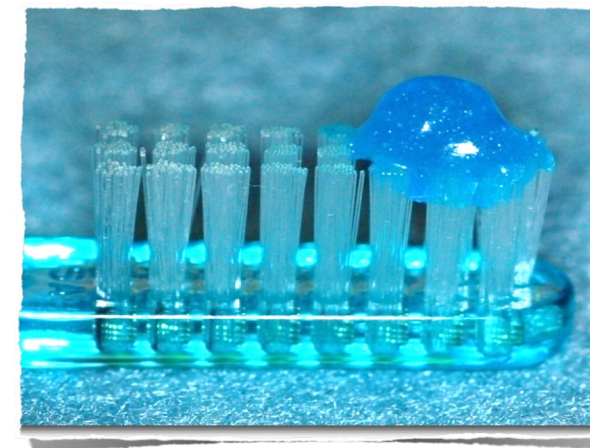
Santos APP, Nadanovsky P, Oliveira BH. A systematic review and meta-analysis of the effects of fluoride toothpastes on the prevention of dental caries in the primary dentition of preschool children. Community Dent Oral Epidemiol 2013; 41: 1–12. © 2012 John Wiley & Sons A/S

Abstract – Objectives: To assess the effects of fluoride (F) toothpastes on the prevention of dental caries in the primary dentition of preschool children. **Study design:** Systematic review and meta-analysis. **Methods:** A search for randomized or quasi-randomized clinical trials was carried out, without idiom restraints, in six electronic databases, registers of ongoing trials, meeting abstracts, dentistry journals and reference lists of potentially eligible studies. The search yielded 1932 records and 159 full-text articles were independently read by two examiners. Data regarding characteristics of participants, interventions, outcomes, length of follow-up and potential of bias were independently extracted by two examiners on the basis of predetermined criteria. Any disagreement was solved by consensus after consulting a third examiner. Pooled prevented fractions (PF) and relative risks (RR) were estimated separately for studies testing low F toothpastes (<600 ppm) and those testing standard F toothpastes (1000–1500 ppm). **Results:** Eight clinical trials fulfilled the inclusion criteria and most of them compared F toothpastes associated with oral health education against no intervention. When standard F toothpastes were compared to placebo or no intervention, significant caries reduction at surface (PF = 31%; 95% CI 18–43; 2644 participants in five studies), tooth (PF = 16%; 95% CI 8–25; 2555 participants in one study) and individual (RR = 0.86; 95% CI 0.81–0.93; 2806 participants in two studies) level were observed. Low F toothpastes were effective only at surface level (PF = 40%; 95% CI 5–75; 561 participants in two studies). **Conclusion:** Standard F toothpastes are effective in reducing dental caries in the primary teeth of preschool children and thus their use should be recommended to this age group.

Key words: child, preschool; dental caries; dentition, primary; fluoride; meta-analysis; toothpastes

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accepted 3 June 2012



- NNT (children, high risk scenario, 70%): 11 (95% CI 7–20)
- NNT (children, medium risk scenario, 50%): 15 (95% CI 10–28)
- NNT (children, low risk scenario, 20%): 37 (95% CI 26–59)

dos Santos AP, Nadanovsky P, de Oliveira BH. A systematic review and meta-analysis of the effects of fluoride toothpastes on the prevention of dental caries in the primary dentition of preschool children. Community Dent Oral Epidemiol. 2013 Feb;41(1):1-12

Dissemination

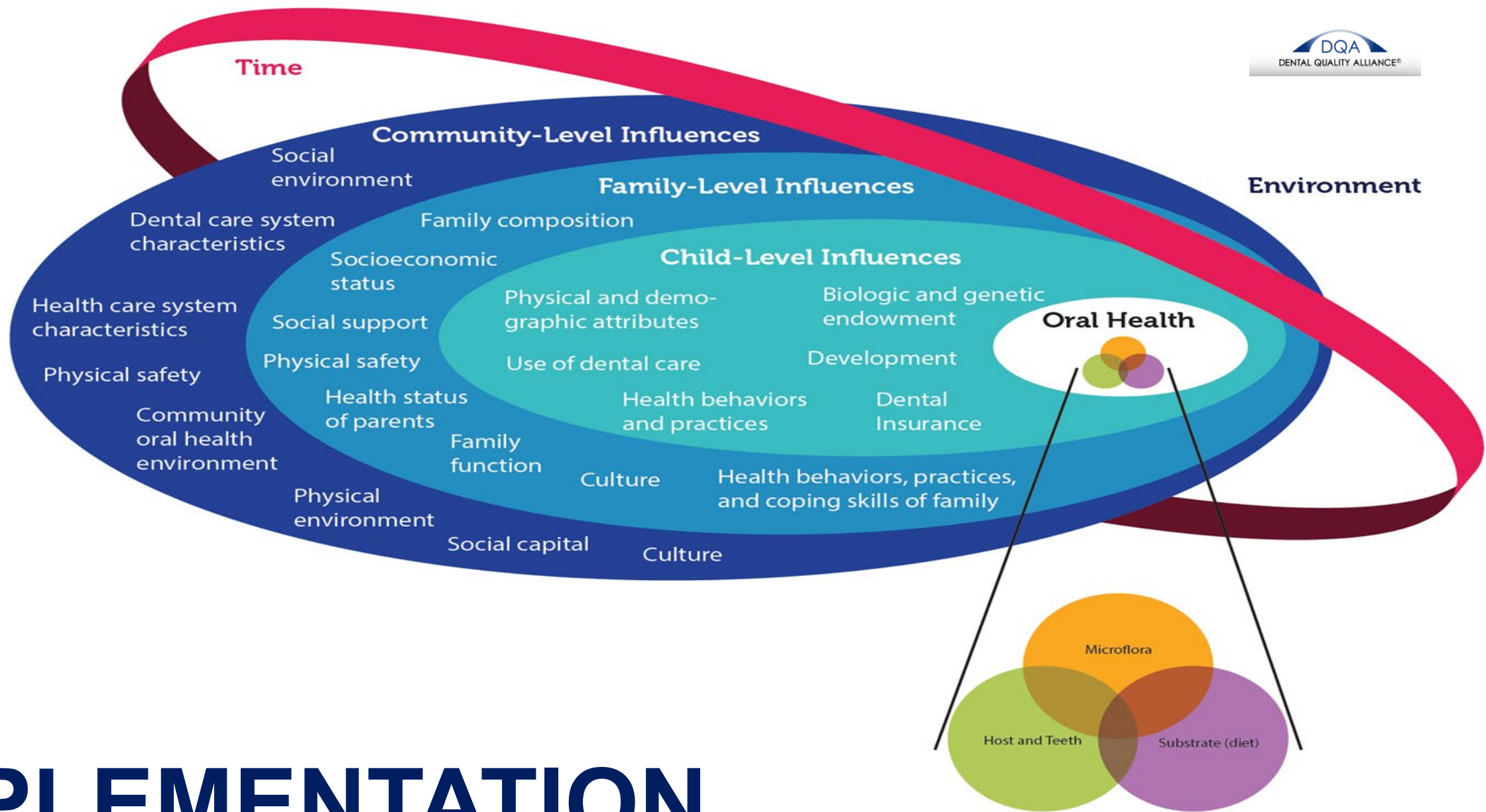
- Decision makers
- Provider level
- Community level
- Family level
- Child level



- Peer reviewed publications
- Textbooks



SOCIAL MEDIA



IMPLEMENTATION

IMPLEMENTATION & IMPACT



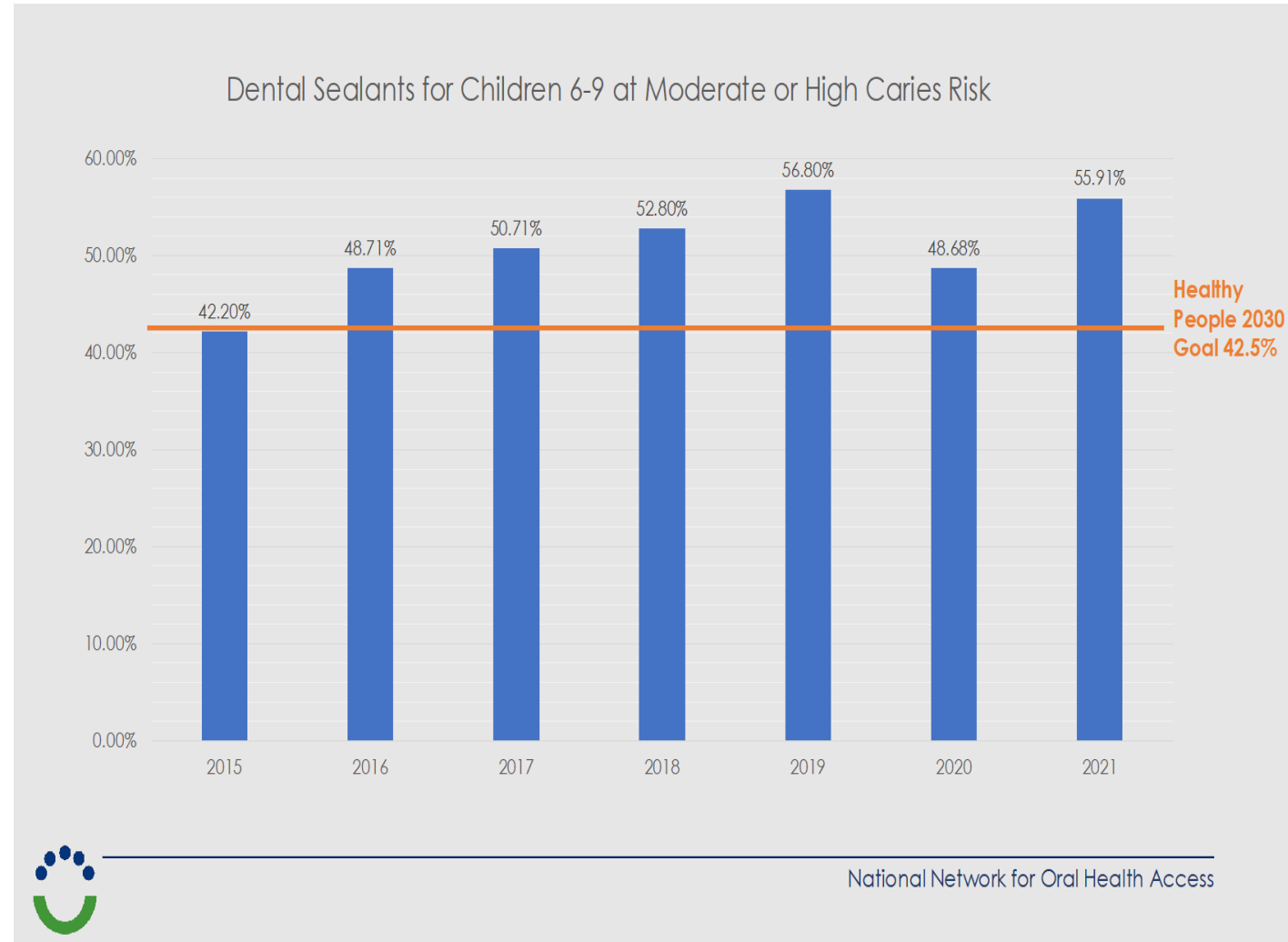
National Quality Measures Clearinghouse (NQMC) Measures

Sealants

Implementation

Strategies (NNOHA):

1. Same Day Sealants
2. Prioritizing sealant placement
3. Develop Sealant workflows
4. Optimize workforce
5. Equipment & Materials
6. Treatment planning Sealants



Impact of ADA Guidelines?

<https://www.nnoha.org/>

Impact

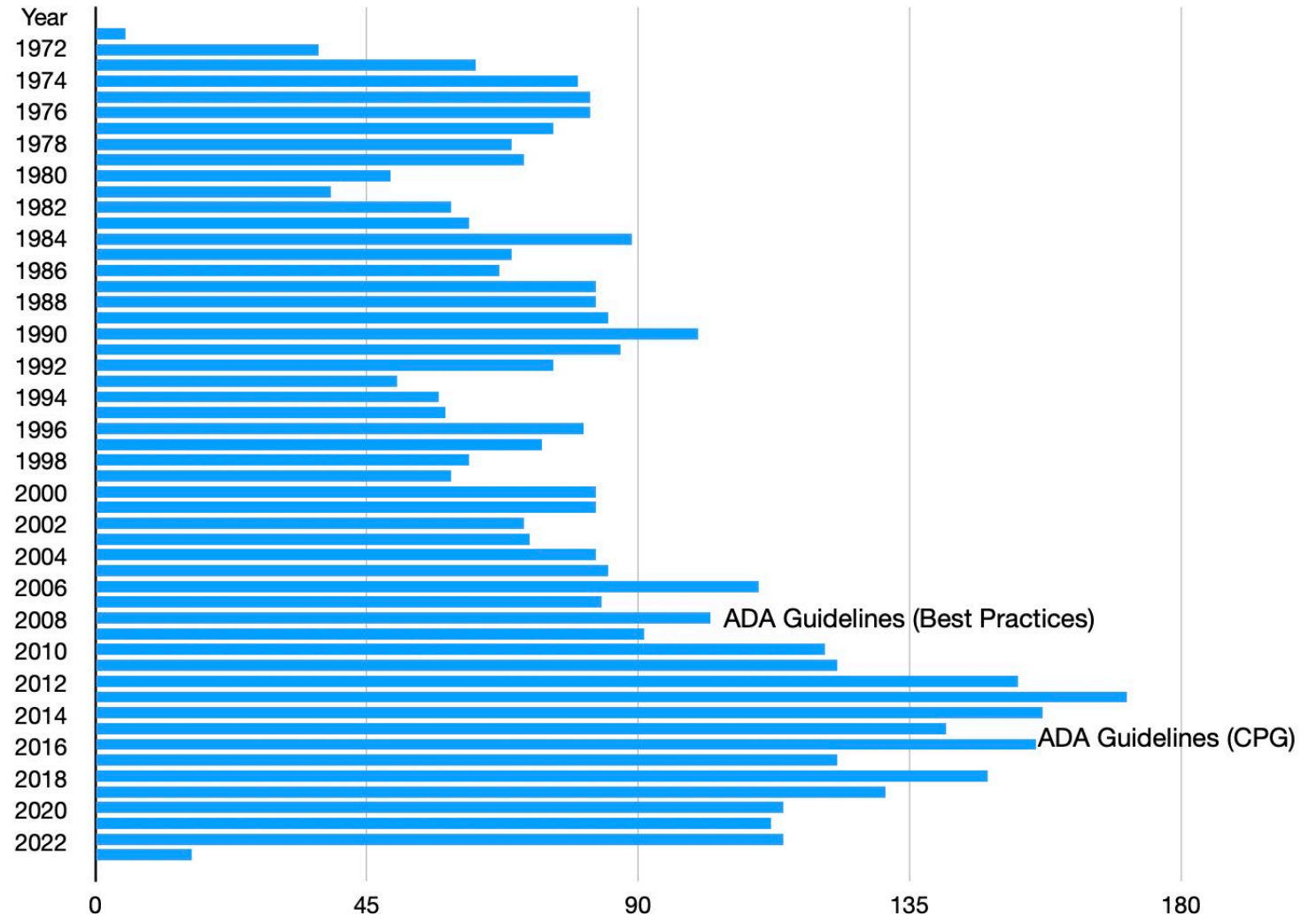
Sealant Research

Publications on Sealants
(PubMed):

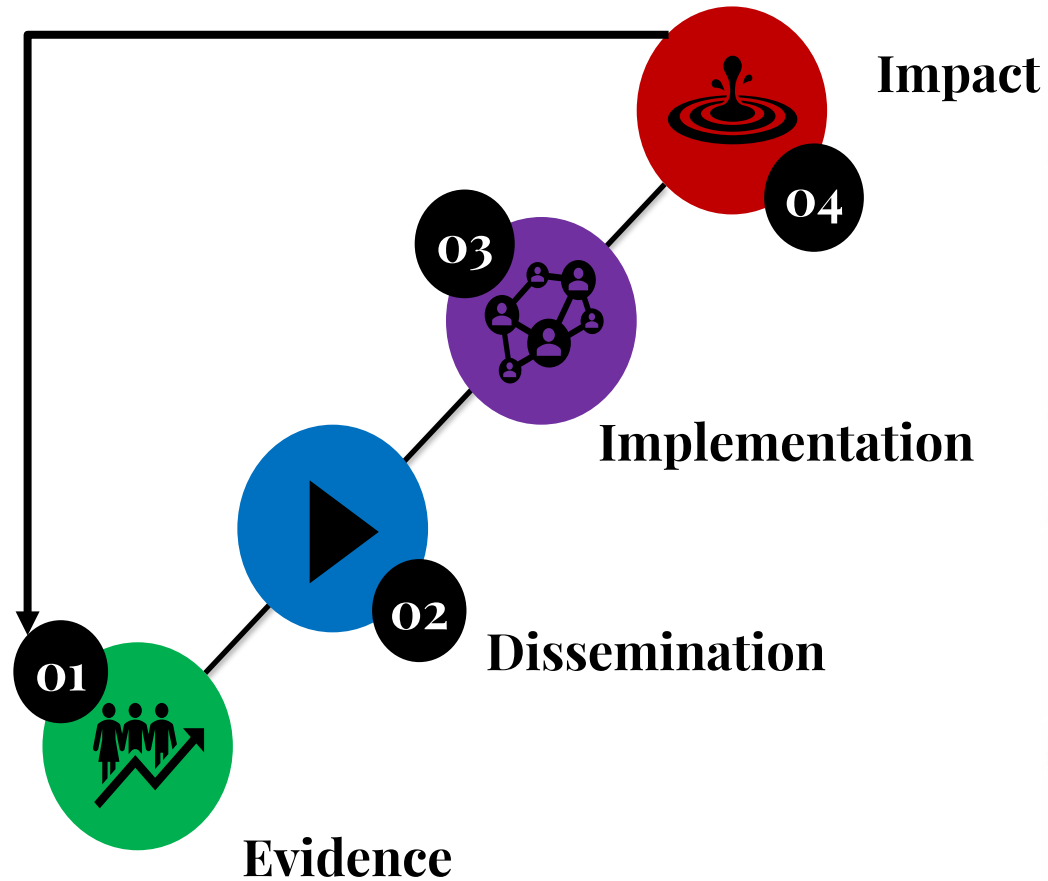
1971- 2008: 2,727, Avg: 72.

2008 - 2016: 1,113, Avg: 139

2016 to date: 742, Avg: 123



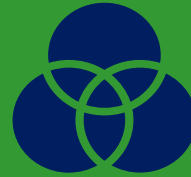
Evidence-based Care





Prior to 1990s

Intuition based Practice



1990s

Evidence-based Practice



Next

Interpersonal medicine

That's all good, but how do you do it?

Interpersonal Care

TEACH

- Teach Evidence-based Care- didactic and experiential learning for skill acquisition

ANALYZE EVIDENCE

- Analyze evidence to develop guidance

MEASURE

- Measure processes and outcomes based on agreed metrics.

IMPACT & REFINE

- Assess impact and refine protocols

INCENTIVES

- Identify incentives (financial and nonfinancial) for interpersonal care

Chang S, Lee T. Beyond Evidence-Based Medicine. NEJM 2018, 379; 21.

Evidence



Real World Data (RWD)

Data generated from routine, standard care of patients (EHRs, Claims & billing data, patient-generated data). It can include all research data including clinical trials.



Real-world 'evidence' (RWE)

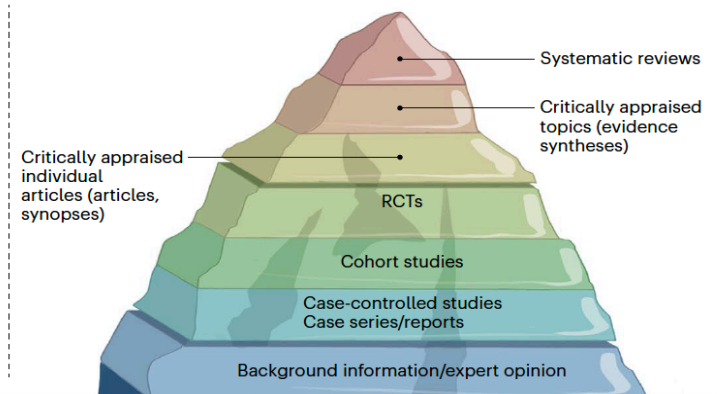
Evidence generated from RWD regarding the potential use of a product/intervention (benefits, harms, preferences)

Subbiah V. The next generation of evidence-based medicine. *Nat Med.* 2023 Jan;29(1):49-58.

Evidence-based deep medicine iceberg

The current evidence-based medicine pyramid represents the tip of the iceberg and barely provides shallow evidence to care for a generic patient.

Group recommendation

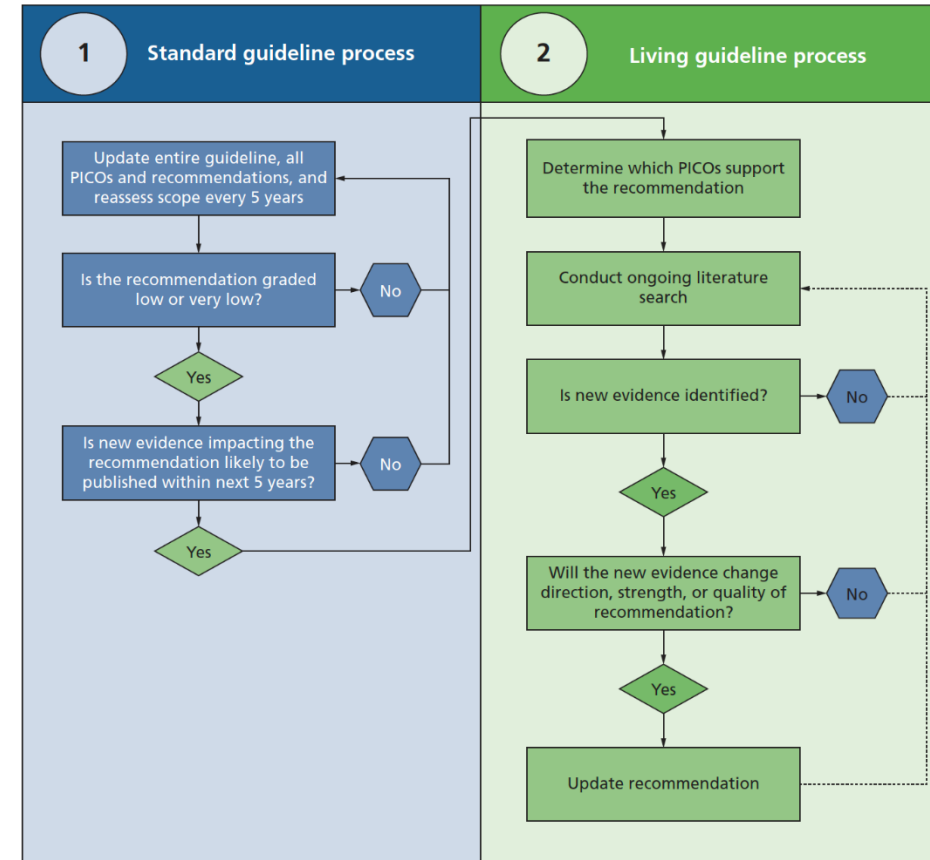
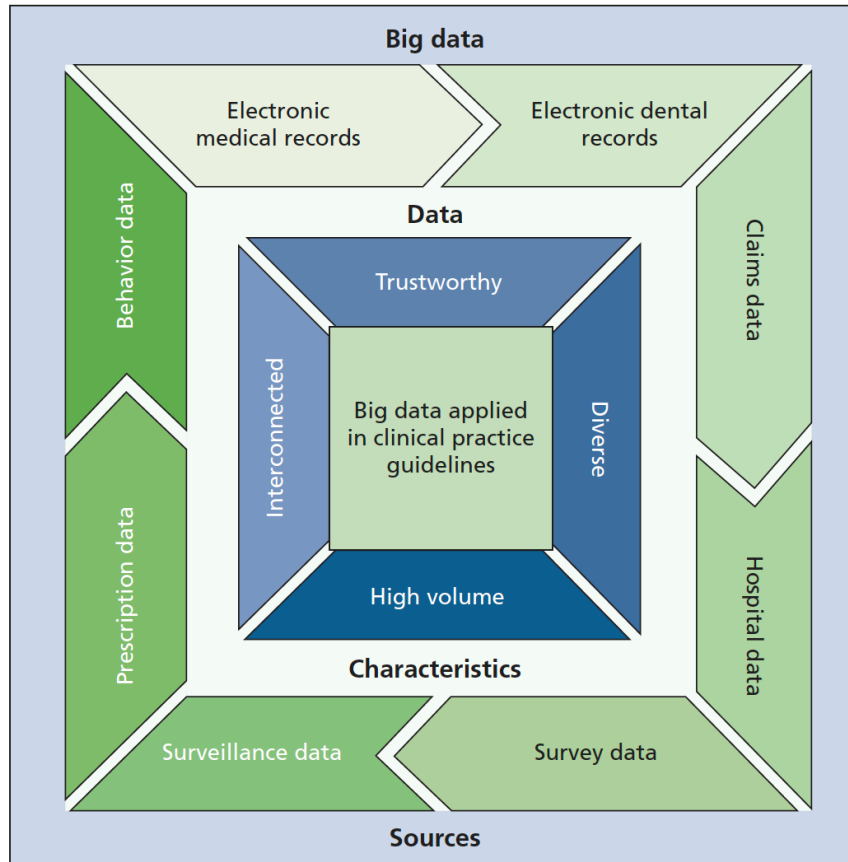


Guidelines

A deep synthesis and amalgamation of all available data is needed to achieve next-generation, 'deep' evidence-based medicine.

Subbiah V. The next generation of evidence-based medicine. Nat Med. 2023 Jan;29(1):49-58.

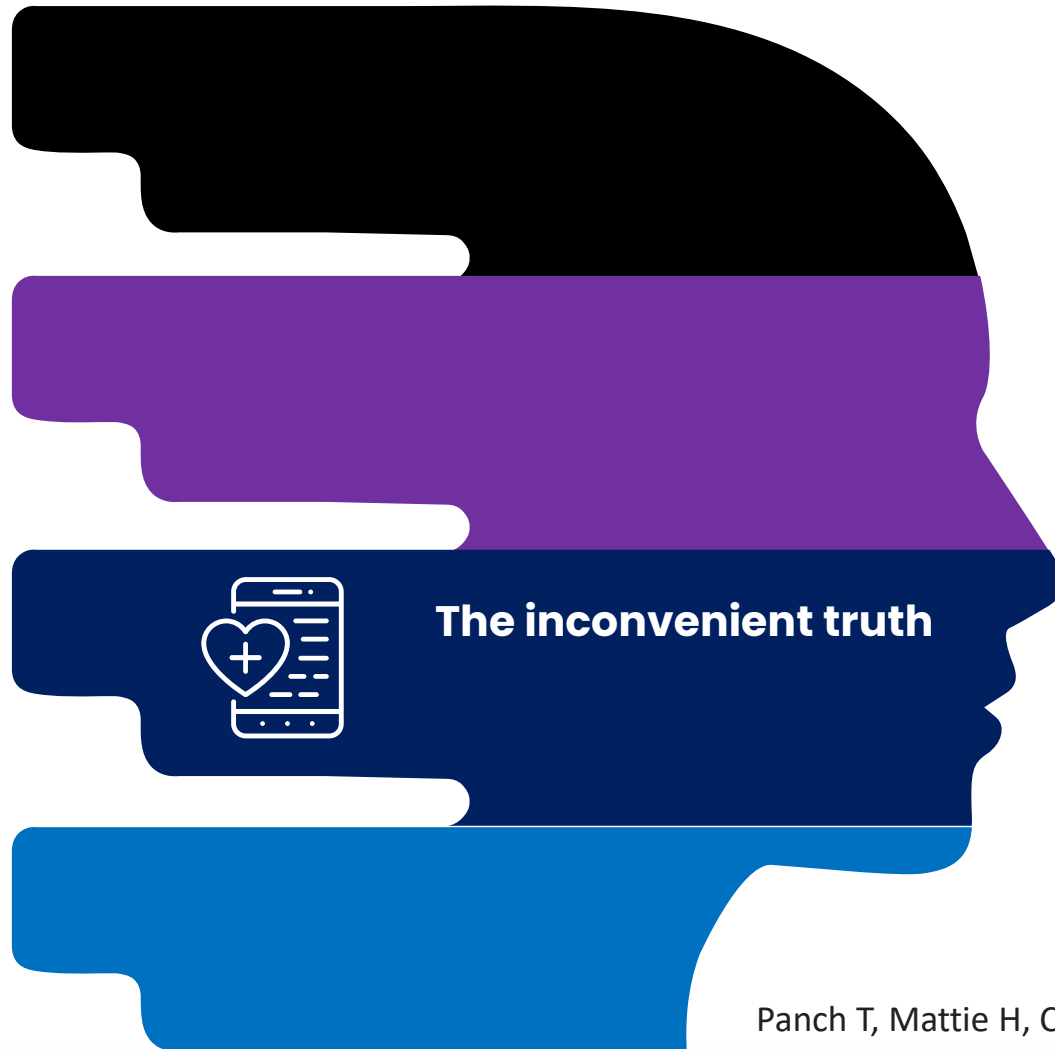
LIVING GUIDELINES



Frantsve-Hawley et al. Strategies for developing evidence-based clinical practice guidelines to foster implementation into dental practice. JADA 2022;153(11):1041-1052

Artificial Intelligence in Healthcare

The Inconvenient Truth!



- Aggregated healthcare data to produce powerful models
 - automate diagnosis
 - enable an increasingly precision approach to medicine by tailoring treatments and targeting resources with maximum effectiveness in a timely and dynamic manner.
- AI innovations by themselves do not re-engineer the incentives that support existing ways of working
 - Costs, resources, regulatory factors, patient values and preferences
- Most healthcare organizations lack the data infrastructure required to collect the data needed to optimally train algorithms to
 - “fit” the local population and/or the local practice patterns, a requirement prior to deployment that is rarely highlighted by current AI publications, and
 - interrogate them for bias to guarantee that the algorithms perform consistently across patient cohorts, especially those who may not have been adequately represented in the training cohort.

Panch T, Mattie H, Celi LA. The "inconvenient truth" about AI in healthcare. NPJ Digit Med. 2019 Aug 16;2:77.



Conclusions

Personalized, pragmatic, evidence-based and patient-participatory care is needed.

Standards of care and clinical trials are currently viewed in different realms; however, the overarching goal of both is to improve health outcomes.

The healthcare system should be integrated into an intuitive RWE-generation system, with clinical research and clinical care must go hand in hand.

Current paradigms must be continuously challenged by emerging technology and by all stakeholders.

“The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn.” — Alvin Toffler

Thank you!

