Evidence-based Dentistry

Collecting the right evidence

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Consultant in Dental Public Health, South East Scotland
Programme

- Introduction
- Question formulation
- Levels of Evidence
- Sources of Evidence
- Pros & Cons of key evidence resources
- How good is the evidence
- Closing discussions and questions
Evidence-based Dentistry

ADA Definition:

- EBD is an approach to oral health care that requires the judicious integration of:
  - systematic assessments of clinically relevant scientific evidence, relating to the patient’s oral and medical condition and history,
- with
  - the dentist’s clinical expertise and
  - the patient’s treatment needs and preferences
Evidence-based Practice

Best Evidence

Clinical Experience

Patient Values

EBP
Why?

- Not a new idea
- Information overload
- Focus on quality and consistency
- Avoid unnecessary treatment
- Questioning attitude to traditional beliefs
- Lifelong learning
- Patient empowerment
- Resources finite
Information overload

Search using term ‘dental’

- Google - > 356 million hits
- Pubmed (Medline) - 458,163
- Cochrane library - 15567
  - Reviews - 179
  - DARE - 559
  - Central - 16412
  - HTA - 96
  - NHSEED - 102

Searches conducted 06-09-19
Increase in dental trials and reviews
1965-2014

Searches conducted 20-02-15
Innovation Bypass

New Knowledge

Knowledge Bypass

Assessment

Managed Innovation

New Technology

Evaluation Bypass

Health System (practice)

“Leaks” between research & practice

The Evidence Pipeline

Evidence-based Practice

An integrated system for aggregating, distilling, and delivering the best clinical evidence:

1. Asking answerable questions
2. Searching for the best evidence
3. Critically appraising the evidence
4. Applying the evidence
5. Evaluating the outcome

The 5 As

Dawes et al. Sicily statement on Evidence-based practice. BMC Medical Education 2005, 5:1
Question Formulation

- Exercise
- Work in pairs/ small group
- Identify a clinical problem/challenge you have encountered recently.
Formulating Questions

Two basic types of question

- Background question

- Foreground question
  - Specific patient specific problem, specific setting
Types of questions..

- **Background**
- **Foreground**

- **Student**
- **Intern**
- **5 yr post grad**
Asking answerable clinical questions

- The question should be directly relevant to the problem at hand.
- The question should be phrased to facilitate searching for a precise answer.
- To achieve the above two aims the question must be focussed and well articulated for all 4 parts of its “anatomy.”
Asking answerable clinical questions

- **P:** Patient (or Problem)
- **I:** Intervention (or Cause, Prognosis)
- **C:** Comparison (or Control)
- **O:** Outcome(s)

Richardson WS et al. The well-built clinical question: A key to evidence-based decisions. ACP Journal Club 123;1995 A12.
Patient presenting with a clinical problem
(7 types of questions)

1. How common is the problem
   Prevalence
2. Is early detection worthwhile
   Screening
3. Is the diagnostic test accurate
   Diagnosis
4. What will happen if we do nothing
   Prognosis
5. Does this intervention help
   Treatment
6. What are the common harms of an intervention
   Harms
7. What are the rare harms of an intervention
   Harms
PICO questions

- Working in pairs/ small groups
- Develop a PICO question based on the clinical problems you were talking about earlier.
Study designs & levels of evidence
Study Designs

Interventional
- Randomized controlled trials

Observational
- Cohort Studies
- Case-Control Studies
- Case Series
- Cross-sectional
Study Designs

Descriptive
- Case report
- Case series
- Survey

Analytic

Observational
- Cross sectional
- Case-control
- Cohort studies

Experimental
- Randomized controlled trials
- Controlled trial
- Uncontrolled

Strength of evidence for causality between a risk factor and outcome
Case Series

- Disease-free
- Diseased

Exposed

Starting Point

Time

Outcomes:
- Outcome
- Outcome
- Outcome
- Outcome
- Outcome
- Outcome
Disease-Free (controls)

Diseased (cases)

Outcome A
Outcome B
Outcome C
Outcome D

Diseased
Disease-free

Time
Starting Point

Case Controlled Study
Case-control studies

- Used for
  - Looking at potential causes of diseases (suitable for rare diseases)

- Disadvantages
  - Confounders
  - Selection of controls can be difficult
  - Recall and selection bias
  - Difficult to establish time relationships between exposure to the risk factor and development of the disease
Cross-sectional survey

- Used for
  - Measure prevalence of a disease
  - Look at potential risk factors or cause

- Disadvantages
  - Establishes association at the most, not causality
  - Confounders may be unequally distributed
  - Group sizes may be unequal
  - Recall bias
Cohort Study

Starting Point

- Diseased
- Disease-free

Exposed To risk factor

Not Exposed To risk factor

Outcome
Cohort

- **Used for**
  - Measuring the incidence of disease
  - Looking at the causes of disease
  - Determining prognosis
  - Establishing timing and directionality of events

- **Disadvantages**
  - Controls may be difficult to identify
  - Exposure may be linked to hidden confounder
  - Blinding is difficult
  - For rare diseases, large sample size or long follow-up necessary
Randomised Controlled Trial

Sample Population

Study sample

Randomised allocation

Allocated to Test Group

Outcome

Allocated to Control Group

Outcome

Outcome

Outcome

Starting Point

Time
Randomised Controlled Trials

- **Used for**
  - Causal inferences
  - Minimise bias
  - Specific research question

- **Disadvantages**
  - Expensive (organisation /size)
  - Ethical issues
  - too small
  - Generalisability
  - publication bias
Types of evidence affect the quality
Evidence-based Practice

An integrated system for aggregating, distilling, and delivering the best clinical evidence:

1. Asking answerable questions (Asking)
2. Searching for the best evidence (Acquiring)
3. Critically appraising the evidence (Appraising)
4. Applying the evidence (Applying)
5. Evaluating the outcome (Assessing)

The 5 As

Dawes et al. Sicily statement on Evidence-based practice. BMC Medical Education 2005, 5:1
Searching for Evidence

- Where do you look?
Outlining your search

- Consider the following question

*Is toluidine blue an effective method of detecting oral cancer?*
<table>
<thead>
<tr>
<th>Patient or Problem</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients at risk Oral Cancer</td>
<td>Toluidine Blue</td>
<td>Visual Inspection</td>
<td>increased identification of Oral Cancer</td>
</tr>
</tbody>
</table>

question: *Is toluidine blue an effective method of detecting oral cancer?*
Subject searching

- When performing a search we should use a combination of:
  - text word searching
  - thesaurus headings (MeSH)
  - Boolean operators (AND, OR, NOT)

- Text word searching
  - searching for a keyword in the title or abstract
Developing a search strategy

<table>
<thead>
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</tr>
<tr>
<td>Textwords</td>
<td>No specific population</td>
<td>Toluidine blue Ora-screen Ora-scan</td>
<td>Oral Cancer Mouth Cancer</td>
</tr>
</tbody>
</table>

Think of alternative names and other ways of describing your terms
Thesaurus headings

- Articles entered into a database, have index terms assigned
- Keywords - describe the main topics in article
- Index terms found in database Thesaurus

- Medline - Medical Subject Headings or MeSH
- Embase – Descriptors
## Developing a search strategy

<table>
<thead>
<tr>
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<th>Intervention</th>
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<td>Oral Cancer Mouth Cancer</td>
</tr>
<tr>
<td>MeSH Headings</td>
<td>[Tolonium Chloride]</td>
<td></td>
<td>[Mouth Neoplasms]</td>
</tr>
</tbody>
</table>
Boolean operators

- **OR**
  - this broadens the search
  - e.g. toluidine blue OR tolonium chloride

- **AND**
  - this narrows the search
  - e.g. toluidine blue AND oral cancer

- **NOT**
  - this excludes terms from the search
  - e.g. oral cancer NOT tongue cancer
Boolean operators

Toluidine blue AND Oral Cancer

Toluidine blue OR Oral Cancer

MORE
The 6S System

- Systems
  - E-B computerized decision support systems
- Summaries
  - E-B guidelines, textbooks, Dynamed, UptoDate
- Synopses of syntheses
  - EBD;JEBDP;Dental Elf
- Syntheses
  - Systematic reviews – Cochrane Library
- Synopses of studies
  - EBD;JEBDP; Dental Elf
- Studies
  - PubMed, Specific journals

Exercise

- SIGN Guidelines Network [www.sign.ac.uk/](http://www.sign.ac.uk/)
- PubMed [www.pubmed.gov](http://www.pubmed.gov)
- Dental Elf [www.thedentalelf.net](http://www.thedentalelf.net)
- TRIP database [https://www.tripdatabase.com/](https://www.tripdatabase.com/)
- ADA-EBD - [http://ebd.ada.org/](http://ebd.ada.org/)
Evidence-based Guidelines

- SIGN – www.sign.ac.uk/
- NICE - www.nice.org.uk
- SDCEP - www.sdcep.org.uk/
- ADA-EBD - http://ebd.ada.org/
- Royal Colleges
- Specialist societies
The Dental Elf

- www.thedentalelf.net
- Blog site with regular summaries of the latest dental evidence
- Part of National Elf Service
- www.nationalelfservice.net/
UTHSCSA CAT library.

- UTHSCSA Dental School Oral Health searchable CAT library.
- https://cats.uthscsa.edu/
Evidence-based Dentistry Journals

- EBD First published as supplement to BDJ - Nov. 1998
- Becomes stand alone in 2000
- Evidence-based Dental Practice launches 2001
The Cochrane Library

- CDSR – Cochrane reviews
- CENTRAL – Trial database
- DARE – Non-Cochrane Systematic reviews
- HTA – Health Technology Assessments
- NHSEED – Economic Evaluations
Pub Med/Medline

www.pubmed.gov
Pub Med/Medline
TRIP Database

Find evidence fast
Trip is a tool for you to find and use high-quality clinical research evidence.

About Trip or Sign up now
1. Oral rinses, mouthwashes and sprays for improving recovery following tonsillectomy
   Cochrane Database of Systematic Reviews 2011

2. Chlorhexidine mouthwash better than chlorhexidine dentifrice or gel at inhibiting plaque but it leads to more tooth discoloration
   The Dental Elf 2014

3. Small trial suggests limited short-term benefit from 0.1% pilocarpine mouthwash for xerostomia
   The Dental Elf 2014

4. CHX Mouthwash is More Effective in Plaque Removal Than an Essential Oil or Listerine Mouthwash
   UTHSCSA Dental School CAT Library 2013

5. New study suggests better outcomes with arginine toothpaste and mouthwash regimen for dentine hypersensitivity treatment.
   The Dental Elf 2013

6. Mouthwashes and plaque control in orthodontic patients
   The Dental Elf 2013
Evidence-based Practice

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Dawes et al. Sicily statement on Evidence-based practice. BMC Medical Education 2005, 5:1
Critical appraisal

The process of assessing and interpreting evidence through the systematic consideration of its validity, relevance and results.
Which would you choose?

**Treatment A**
reduces the risk of having decay by about 62%

**Treatment B**
reduced the odds of having decay by about 83%

**Treatment C**
produces an absolute reduction in risk of decay of 42%

**Treatment D**
requires 3 people to be treated to stop one person having decay
Appraisal tools

- CASP – www.casp-uk.net
- Equator Network – www.equator-network.org/
- CEBD – appraisal page
- www.cebd.org/practising-ebd/appraise/
Equator Network

- **CONSORT** - Consolidated Standards of Reporting Trials

- **PRISMA** - Preferred Reporting Items for Systematic Reviews and Meta-Analyses

- **STARD** - Standards for the Reporting of Diagnostic accuracy studies

- **STROBE** - Strengthening the reporting of observational studies in epidemiology
Appraisal Questions

- Is the study valid?
- What are the results?
- Are the results relevant to my problem?
Is the Study Valid?

- Is there a clear question?
- Most appropriate study design to answer the question?
- Was study conducted reliably?
- Can you follow what the authors did?
What question was being asked?

- Diagnostic
- Prognostic
- Treatment
- Risk / Benefit
- Cost effective
What question was being asked?

- Participants
- Interventions/Exposure
- Comparison
- Outcomes
How well was the study conducted?

How valid is the study?

- **Internal validity:**
  the degree to which the results of a study are likely to approximate to the ‘truth’ for the circumstances being studied.

- **External validity:**
  the degree to which the effects observed in the study are applicable to the outside world
Was the study design appropriate?
Which Study Design?

- **Well participants are chosen on the basis of different exposure, wait to see if they get the disease**
  - RCT

- **Representative sample of people are surveyed to answer a question**
  - Cohort

- **Participants randomly allocated to different interventions, then followed and outcomes assessed**
  - Case-control

- **People with a disease are matched to those without it and earlier exposure to different environmental factors compared**
  - Cross-sectional survey

- **Description of the medical history of one or several patients**
  - Case-series/report
Bias (Threats to Validity)

- “Lay” bias:
  An opinion strongly favoring a particular outcome.

- “Research” bias:
  Any factor causing results to divert from the truth.

  Not associated with malicious intent

- Affects:
  Researchers, statisticians, clinicians, patients
Bias Types

- Selection
- Ascertainment
- Publication
- Measurement
- Academic
- Clinical practice
- Territorial
- Empiricism

- Assignment
- Prestigious journal
- Author
- Institution
- Tradition
- Bankbook
- Technology
- Epidemiologist
Main biases

- Selection Bias
- Performance Bias
- Attrition Bias
- Detection Bias
- Reporting Bias
- Reader/Reviewer Bias
Selection bias

- One of the most important factors that may lead to bias and distort treatment comparisons is that which can result from the way that comparison groups are assembled.

Performance Bias

- Systematic differences in the care provided to the participants in the comparison groups other than the intervention under investigation.

- To protect against unintended differences in care and placebo effects, those providing and receiving care can be 'blinded' so that they do not know the group to which the recipients of care have been allocated.
Attrition bias refers to systematic differences between the comparison groups in the loss of participants from the study.

It has been called exclusion bias.
Detection Bias

- Detection bias refers to systematic differences between the comparison groups in outcome assessment.

- Blinding of patients, health care providers, and other persons (for example, radiologists) involved in evaluating outcomes minimizes the risk for detection bias, also called observer, ascertainment, or assessment bias. This type of bias arises if the knowledge of a patient's assignment influences the process of outcome assessment.
## RCTs in Periodontology

### Table 3. Quality Assessment of RCTs

<table>
<thead>
<tr>
<th>Description</th>
<th>Yes/Adequate n (%)</th>
<th>No/Inadequate n (%)</th>
<th>Unclear n (%)</th>
<th>Not Applicable n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Described as randomized</td>
<td>161 (91)</td>
<td>15 (8.5)</td>
<td>1 (0.5)</td>
<td></td>
</tr>
<tr>
<td>Randomization methods</td>
<td>29 (16.5)</td>
<td>1 (0.5)</td>
<td>147 (83)</td>
<td></td>
</tr>
<tr>
<td>Allocation concealment method</td>
<td>12 (6.5)</td>
<td>1 (0.5)</td>
<td>164 (93)</td>
<td></td>
</tr>
<tr>
<td>Patient blinding</td>
<td>42 (24)</td>
<td>77 (43)</td>
<td>58 (33)</td>
<td></td>
</tr>
<tr>
<td>Caregiver blinding</td>
<td>26 (17a)</td>
<td>84 (57a)</td>
<td>38 (26a)</td>
<td>29 (16)</td>
</tr>
<tr>
<td>Examiner blinding</td>
<td>97 (55)</td>
<td>12 (7)</td>
<td>68 (38)</td>
<td></td>
</tr>
<tr>
<td>All patients accounted for at end of study</td>
<td>100 (56)</td>
<td>25 (14)</td>
<td>52 (30)</td>
<td></td>
</tr>
<tr>
<td>Analysis accounts for patient losses</td>
<td>11 (11a)</td>
<td>33 (33a)</td>
<td>57 (56a)</td>
<td>76 (43)</td>
</tr>
</tbody>
</table>

*Percentages calculated with "not applicable" articles excluded.*
RCT in Prosthetic Journals

- Sixty-two RCTs were identified from 3631 articles screened.
- 47% randomization explicit
- 40% assessment blinding
- 76% accounted for all subjects

Dumbrigue HB, Jones JS, Esquivel JF. Control of bias in randomized controlled trials published in prosthodontic journals. J Prosthet Dent. 2001
Reporting Bias

- Inappropriate/under reporting
- Publication bias
Inappropriate/biased reporting

- Unethical
- Scientific Fraud

Kvaal SI. Ethical and legal considerations in a case of research fraud. J Am Coll Dent. 2008 Summer;75(2):29-35
Publication Bias

- Direction and statistical significance of research findings influence decisions regarding
  - Manuscript submission
  - Manuscript acceptance

- A tendency among:
  - Investigators
  - Peer reviewers
  - Journal editors

http://www.alltrials.net/
Publication Bias

- Poor quality of research design
- Small sample size
- External funding
- Negative findings
- Failure of authors to submit manuscripts
- Rejection of manuscripts by journal editors

Publication Bias

- Trials with positive findings
  - more likely to be published than trials with negative or null findings (OR 3.90; 95% CI 2.68 to 5.68).
  - Tend to be published after 4-5 years

- Trials with Negative findings
  - Tend to be published after 6-8 years

Publication Bias

- 3 Studies found no statistically significant association between sample size and publication.

- 1 study no significant association between either funding mechanism, investigator rank, or sex and publication.

Why does publication bias matter?

- May lead to incorrect conclusions about the safety and efficacy of elements of clinical care
- Raises scientific concerns
- Raises ethical concerns
Reader/Reviewer Bias

- Rivalry bias
- ‘I owe him one’ bias
- Personal habit bias
- Moral bias
- Clinical practice bias
- Territory bias
- Complementary medicine bias
- ‘Do something’ bias
- ‘Do nothing’ bias
- Favoured design bias
- Disfavoured design bias

- Resource allocation bias
- Prestigious journal bias
- Non-prestigious journal bias
- Printed word bias
- Lack-of-peer-review’ bias
- Prominent (non-prominent) author bias
- Famous (unknown) institution bias
- Large (small) trial bias
- Multicentre trial bias
- Flashy title’ bias

- Substituted question bias
- Credential or professional background bias
- Esteemed author bias
- Geography bias
- Language bias of publication
- Omission bias
- Tradition bias
- Bankbook bias
- Belligerence bias
- Technology bias
- Empiricism bias
- ‘I am an epidemiologist bias’
What are the results?

- Are the results presented in a clear and simple manner?
- Is there a clear bottom line?
- Are they clinically important?
Statistical significance

- P-value
- Confidence intervals
How often you would see a similar result by chance, when actually there was no effect by the drug or treatment?

So what does p = 0.5 mean?
How often you would see a similar result by chance, when actually there was no effect by the drug or treatment?

So what does p = 0.1 mean?
How often you would see a similar result by chance, when actually there was no effect by the drug or treatment?

So what does $p = 0.05$ mean?
Statistical significance:
Confidence intervals (CI)

- Is the range within which the true size of effect (never exactly known) lies, with a given degree of assurance (95% or 99%).
Confidence Intervals
(Wobble factor)
Confidence intervals (CI)

the wobble factor, how sure are we about the results?

- the shorter the CI the more certain we are about the results
- if it crosses the line of no treatment effect the intervention might not be doing any good and could be doing harm
Which would you choose?

**Treatment A** - reduces the risk of having decay by about 62%

**Treatment B** – reduced the odds of having decay by about 83%

**Treatment C** - produces an absolute reduction in risk of decay of 42%

**Treatment D** - requires 3 people to be treated to stop one person having decay
<table>
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<tr>
<th></th>
<th>Test</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td>107</td>
<td>94</td>
</tr>
<tr>
<td>Drop-out</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Outcome</td>
<td>58</td>
<td>24</td>
</tr>
<tr>
<td>Results</td>
<td>58/105</td>
<td>24/89</td>
</tr>
<tr>
<td></td>
<td>= 55.24%</td>
<td>= 26.96%</td>
</tr>
<tr>
<td>Absolute Risk Reduction</td>
<td>ARR</td>
<td>Risk</td>
</tr>
<tr>
<td>Relative Risk</td>
<td>RR</td>
<td>RR</td>
</tr>
<tr>
<td>Relative Risk Reduction</td>
<td>RRR</td>
<td>NNT</td>
</tr>
<tr>
<td>Number Needed to Treat</td>
<td>NNT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Test</td>
<td>Control</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------</td>
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<td>94</td>
</tr>
<tr>
<td>Drop-out</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Outcome (improved)</td>
<td>58</td>
<td>24</td>
</tr>
<tr>
<td>Not improved</td>
<td>105-58</td>
<td>89-24</td>
</tr>
<tr>
<td>Results</td>
<td>58/47</td>
<td>24/65</td>
</tr>
</tbody>
</table>

\[
\begin{align*}
\text{Odds} & = 1.2340 & \text{Odds ratio} & = 3.25 \\
\text{Odds} & = 0.375 \\
\end{align*}
\]
Odds Ratio

Less than 1  1  More than 1

Line of no difference
Odds Ratio

- If you want more of something to happen, such more people with no tooth decay and the experimental intervention is successful
- the results will show in the right-hand side
If you want less of something to happen, such as fewer cavities and the experimental intervention is successful the results will show in the left-hand side.
Risk & Odds

- Risks and odds are just ways of expressing chance
- Risk ratios and odds ratios are ways of comparing chances in more than one setting
- RR and OR differ when the event is common
- Risk difference shows the amount of change from baseline in absolute terms
- NNT communicates how many people would need to be treated for one extra to be helped
- ALL these estimates of treatment effect are uncertain, and should be presented with a confidence interval
Review: Triclosan/copolymer containing toothpastes for oral health
Comparison: 1 Plaque
Outcome: 1 Plaque at 6 to 7 months (Quigley-Hein Plaque Index)

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Triclosan/copolymer</th>
<th>Control</th>
<th>Mean Difference</th>
<th>Weight</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Mean(SD)</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Baseline prophylaxis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garcia-Godoy 1990</td>
<td>54</td>
<td>54</td>
<td>0.71 (0.25)</td>
<td>5.2 %</td>
<td>-1.02 [-1.14, -0.90]</td>
</tr>
<tr>
<td>Cubells 1991</td>
<td>56</td>
<td>52</td>
<td>2.17 (0.464)</td>
<td>4.9 %</td>
<td>-0.72 [-0.91, -0.53]</td>
</tr>
<tr>
<td>Deasy 1991</td>
<td>58</td>
<td>63</td>
<td>1.11 (0.34)</td>
<td>5.2 %</td>
<td>-0.53 [-0.66, -0.40]</td>
</tr>
<tr>
<td>Denevitiya 1992</td>
<td>70</td>
<td>75</td>
<td>1.82 (0.45)</td>
<td>5.1 %</td>
<td>-0.40 [-0.54, -0.26]</td>
</tr>
<tr>
<td>Bolden 1992</td>
<td>154</td>
<td>152</td>
<td>1.63 (0.58)</td>
<td>5.2 %</td>
<td>-0.34 [-0.46, -0.22]</td>
</tr>
<tr>
<td>Mankodi 1992</td>
<td>145</td>
<td>149</td>
<td>1.48 (0.49)</td>
<td>5.3 %</td>
<td>-0.20 [-0.31, -0.09]</td>
</tr>
<tr>
<td>Palomo 1994</td>
<td>42</td>
<td>44</td>
<td>1.72 (0.51)</td>
<td>4.9 %</td>
<td>-0.21 [-0.40, -0.02]</td>
</tr>
<tr>
<td>Triratana 1994</td>
<td>32</td>
<td>33</td>
<td>1.54 (0.38)</td>
<td>4.9 %</td>
<td>-0.52 [-0.71, -0.33]</td>
</tr>
<tr>
<td>Kanchanakamol 1995</td>
<td>62</td>
<td>62</td>
<td>2.84 (0.48)</td>
<td>5.1 %</td>
<td>-0.39 [-0.54, -0.24]</td>
</tr>
<tr>
<td>Renvert 1995</td>
<td>26</td>
<td>28</td>
<td>0.3 (0.255)</td>
<td>4.9 %</td>
<td>-0.20 [-0.38, -0.02]</td>
</tr>
<tr>
<td>McClanahan 1997</td>
<td>155</td>
<td>172</td>
<td>2.23 (0.3735)</td>
<td>5.4 %</td>
<td>0.00 [-0.08, 0.08]</td>
</tr>
<tr>
<td>Hu 1997</td>
<td>69</td>
<td>67</td>
<td>2.6 (0.241)</td>
<td>5.4 %</td>
<td>-0.50 [-0.58, -0.42]</td>
</tr>
<tr>
<td>Allen 2002</td>
<td>74</td>
<td>36</td>
<td>1.61 (0.49)</td>
<td>5.0 %</td>
<td>-0.66 [-0.83, -0.48]</td>
</tr>
<tr>
<td>Schiff 2006</td>
<td>37</td>
<td>40</td>
<td>1.47 (0.19)</td>
<td>5.3 %</td>
<td>-0.26 [-0.36, -0.16]</td>
</tr>
<tr>
<td>Matsu 2008</td>
<td>48</td>
<td>46</td>
<td>2.23 (0.5)</td>
<td>4.8 %</td>
<td>-0.68 [-0.88, -0.48]</td>
</tr>
<tr>
<td>Pradeep 2012</td>
<td>28</td>
<td>28</td>
<td>2.593 (0.69)</td>
<td>3.6 %</td>
<td>-0.42 [-0.81, -0.03]</td>
</tr>
</tbody>
</table>

**Subtotal (95% CI)**
1110
1101
80.2 % -0.44 [-0.58, -0.30]

Heterogeneity: Tau² = 0.07; Chi² = 265.60, df = 15 (P < 0.000001); I² = 94%
Test for overall effect: Z = 6.12 (P < 0.000001)

2 No baseline prophylaxis

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Triclosan/copolymer</th>
<th>Control</th>
<th>Mean Difference</th>
<th>Weight</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Mean(SD)</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lindhe 1993</td>
<td>56</td>
<td>54</td>
<td>1.164 (0.7543)</td>
<td>4.3 %</td>
<td>-0.48 [-0.76, -0.19]</td>
</tr>
<tr>
<td>Triratana 1993</td>
<td>60</td>
<td>60</td>
<td>1.327 (0.313)</td>
<td>5.2 %</td>
<td>-0.65 [-0.78, -0.52]</td>
</tr>
<tr>
<td>Triratana 2002</td>
<td>60</td>
<td>59</td>
<td>1.57 (0.29)</td>
<td>5.3 %</td>
<td>-0.84 [-0.95, -0.73]</td>
</tr>
<tr>
<td>Mankodi 2011</td>
<td>57</td>
<td>58</td>
<td>1.86 (0.41)</td>
<td>5.1 %</td>
<td>-0.43 [-0.58, -0.28]</td>
</tr>
</tbody>
</table>

**Subtotal (95% CI)**
233
231
19.8 % -0.61 [-0.82, -0.41]

Heterogeneity: Tau² = 0.04; Chi² = 21.70, df = 3 (P = 0.00008); I² = 86%
Test for overall effect: Z = 5.91 (P < 0.000001)

**Total (95% CI)**
1343
1332
100.0 % -0.47 [-0.60, -0.34]

Heterogeneity: Tau² = 0.08; Chi² = 336.77, df = 19 (P < 0.000001); I² = 94%
Test for overall effect: Z = 7.27 (P < 0.000001)
Test for subgroup differences: Chi² = 1.92, df = 1 (P = 0.17), I² = 48%
Are the results relevant to your clinical practice?

- Not all valid research is relevant
- How generalisable are the findings?
- Is it feasible to implement the findings?
Are the results relevant to my problem?

- Are the participants similar to my patients
- Is it realistic for me to apply this to my patients
Summary

- Different types of questions require different types of evidence
- Need to be able to identify most appropriate evidence for your question
  - Ideally a systematic review
- Whatever the level of evidence its quality/validity and relevance to your practice needs to be considered
“If a man will begin with certainties, he shall end in doubts; but if he will be content to begin with doubts, he shall end in certainties.”

The Advancement of Learning 1605, Francis Bacon 1561–1626