

Variation in dental treatment – Why?

Oral Health Care Delivery
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Variation in clinical decisions

Widely acknowledged that there are differences in:

- how dentistry is practiced among regions in the country
- Differences among practitioners in the same area

- Has been infrequently studied

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Variation in clinical decisions

These differences commonly accepted as reflections of ...

- 1) The “art of dentistry”
 - The natural variation in the best clinical judgment of dentists concerning individual patients
- 2) Uncertainty or disagreement concerning the most effective approach to treatment

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Variation in clinical decisions

Advocates of the latter (#2) argue that:

- If two dentists consistently provide a different set of preventive and treatment procedures for patients with similar conditions
- Then one dentist must be providing less effective care than the other
- Unless the care leads to equivalent results for patients when compared across a wide range of possible outcomes

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Variation in clinical decisions

- Variation in medical practice has been studied for two decades
- Led to investigations of
 - under- and over-utilization of medical care procedures
 - And of the evidence for the effectiveness of some treatments
- This course of inquiry has begun to mature with the develop of methods to designed to improve clinical decision making, such as practice guidelines

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Variation in clinical decisions

- Few studies have reported *quantitative* measures of the extent of agreement among dentists in their caries diagnoses *in vitro*

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Treatment recommendations for individual teeth made by 15 dentists for the same patient

- An attempt to quantify the extent of agreement among dentists
 - for decisions to recommend treatment
 - and to recommend treatment for reasons related to caries

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Treatment recommendations for individual teeth made by 15 dentists for the same patient

- Table 1 – shows the recs for treatment for *one patient* by 15 different dentists
- Each of the 13 teeth receiving one or more recs for tx appears as a row in the table
- For each tooth, the number of dentists recommending tx overall is shown
- As well as the number recommending treatment for each of four mutually exclusive reasons:
 - Primary caries Secondary caries
 - Faulty restoration Other

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Treatment recommendations for individual teeth made by 15 dentists for the same patient

- For only one of the 13 teeth receiving at least one rec for treatment was there “perfect agreement” among the 15 examining dentists
- Of course, perfect agreement *not* to recommend treatment was achieved for 15 additional teeth not shown in the table
- For all but one of the teeth with multiple recs for tx, there is disagreement about whether caries is the principal reason for treatment

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2. Intraclass correlation coefficient (rho) for agreement among dentists’ recs for restorative tx due to caries, for teeth grouped by restoration and caries status

- Second measure of agreement was a modified intraclass correlation
- Where total variance attributable to differences among examiners for individual teeth is divided by the total variance across examiners and teeth
- Using these two measures, agreement on treatment recommendations due to caries was calculated for 1,187 teeth, and for four subsets of teeth grouped by caries and restoration status, as determined by a visual-tactile epidemiological examination

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2. Intraclass correlation coefficient (rho) for agreement among dentists’ recs for restorative tx due to caries, for teeth grouped by restoration and caries status

The rho value of 0.53 is in the “fair” half of the “fair to good” range

- When outcomes examined for teeth **grouped by the presence or absence of a restoration** and of **clinically evident caries**, clear that the presence of a restoration is associated with a deterioration in the extent of agreement
- both when clinically evident caries is present
- and when it is absent.
- Agreement only enters the good range for teeth with clinically evident caries and no restoration

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2. Intraclass correlation coefficient (rho) for agreement among dentists’ recs for restorative tx due to caries, for teeth grouped by restoration and caries status

- Just as was suggested for the 13 teeth in Table 1
- some of the lack of agreement may be due to **differences in attribution of reasons** to recommend treatment
- Rather than **difference in decisions to recommend tx**
- When parallel analyses were performed to determine **extent of agreement for treatment recommended for any reason**
- the rho values were approximately 0.10 higher for each tooth status category except unrestored carious teeth
- Differences in extents of agreement as well as the deterioration caused by the presence of a restoration suggest that variation among practitioners is elevated in assessments of the caries status of restoration margins

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Variation in decision-making – Phases of decision-making

The clinical decision-making process in dentistry can be divided into three separate phases

Differences in dentists' decision making that results in variation can arise within any of these three phases

- 1. diagnosis, or more usually the detection phase, where a disease is identified
- 2. the decision about intervention, given that a disease or condition is identified
 - Usually a yes/no decision, although dentists routinely indicate uncertainty by noting in the patient record that a condition is “watched”
- 3. selection of the treatment from among alternatives, if a decision to intervene is made

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Variation in decision-making – Diagnostic phase

- Likely that differences shown in tables
- Reflect 4 types of variation in application of diagnostic criteria:
 - Disagreement on:
 - the presence/absence of a condition
 - terminology for a given clinical condition
 - whether an identified condition is carious
 - whether an identified carious lesion or other condition requires treatment

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Variation in decision-making – Diagnostic phase

- Clearly dentists do exhibit substantial differences in the diagnostic or detection phase of clinical decision making
- Likely that two factors account for such difference:
 - Skill and diligence in the examination
 - Definition and criteria employed for the identification of a disease

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Variation in decision-making – intervention phase

- The decision about intervention
- Given that a disease or condition is identified:
 - Usually a yes/no decision
 - although dentists routinely indicate uncertainty
 - by noting in the patient record that a condition is being “watched”

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Variation in decision-making – treatment choice phase

- Selection of treatment from among alternatives
 - has had least attention devoted to it
- Lack of attention may be a result of:
 - limited number of alternatives available for some conditions
 - lack of a perceived need to evaluate alternatives
 - in face of strong *beliefs* about their relative effectiveness

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Variation in decision-making – treatment choice phase

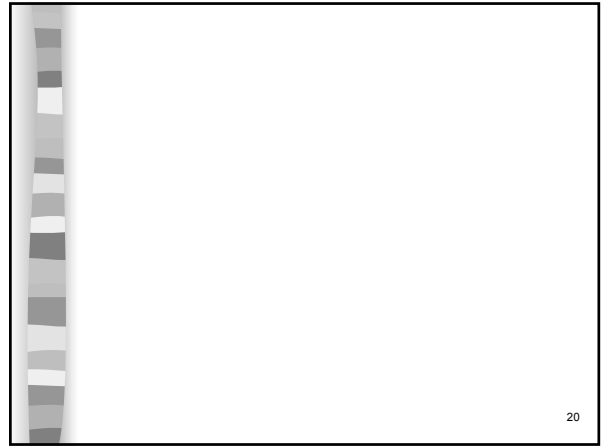
- Strongly held beliefs
 - an extremely important determinant of treatment selection, often in the absence of any supporting evidence
 - Belief that crowns are superior to amalgams
 - But no definitive survival analyses
 - Or examinations of cost effectiveness are available to support this belief
 - And dentists' estimates of the longevity of amalgams and crowns vary widely
 - Placing amalgams rather than sealants in fissures
 - Also associated with strongly held beliefs about relative effectiveness
 - This time in the face of evidence for the effectiveness of the less invasive procedures

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Investigating reasons for variation

- Investigation of factors associated with variation among dentists is infrequent
- Variation introduced by differences in patients

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Investigating reasons for variation

- Controlling patient factors:
 - through selection of practices with similar patients,
 - presenting the same patients to multiple practitioners
 - presenting “teeth” to multiple practitioners
- necessary if nonpatient factors are to be identified with any certainty

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Investigating reasons for variation

Type and/or extent of variation among dentists may be different

- depending on characteristics of patients examined, such as:
 - Previous treatment history
 - Age
 - Insurance status

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Investigating reasons for variation

- When these patient factors are controlled -
- Variation in clinical decisions
 - must be ascribed to differences in clinical decision making among dentists

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Delivery System within which tx provided – Source of Variation

- Incentives emphasized by the system
 - Currently reflect differences among patients more than differences among dentists
 - Delivery system may become a principal dentist characteristic in the future
- financial incentives & constraints imposed by financing mechanisms
 - May contribute to differentiate among groups of dentists operating under assorted reimbursement arrangements

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The Clinician as Service Deliverer - Clinician characteristics – variation source

- The “delivery system” as the provider located within his/her practice setting
 - Age
 - Gender
 - Experience
 - Type of training
- Personal factors, help to explain why variation among clinicians exists even when clinical situation is similar

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The Clinician as Service Deliverer – Style of practice – variation source

- Evidence for styles of practice
Characteristics of the patients whom practitioners want to have in practices
On basis of age, race, sex, or social status
- Preference to care for certain types of clinical problems
 - Unusual, challenging vs. easy to manage
 - Convenience
 - Availability of laboratories, etc.
 - Encourage or discourage follow-up visits, referrals

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The Clinician as Service Deliverer The practice setting – variation source

- Influence of fellow professionals
 - can be particularly strong
- can produce group practice style
 - peer pressure
 - professional leadership

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The Clinician as Service Deliverer Role of Professional Leadership – variation source

- Influence of professional leadership –
 - set standards
 - peer pressure
 - professional leadership
- Certain individuals seen as influential
 - Lit on health services research shows that influence of professional leadership has been prominent in physicians' acceptance of innovations

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The Clinician as Service Deliverer Income earner – variation source

- Some evidence that clinicians' desire for income has influence on practice patterns
 - Derives from studies of the relationship between the supply of clinicians and the cost and volume of practice
- The literature on clinician-induced demand implies that clinicians can create demand to generate income
 - There is evidence that clinicians do adjust the service they provide in response to economic incentives
- Even if do not induce new demand, may substitute one of their services for another

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Differences in how dentists **Interact with Patients** - Variation source

- Dentists may range at extremes of interaction styles:
- from authoritarian prescriber
 - to patient counselor
- thus varying extent to which patient preferences influence decisions

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The Clinician as Patient's Agent

Patient's economic agent – variation source

- Price patient must pay for services seems to affect physicians' patterns of prescribing services
- Physicians respond to differences in price of medical care by varying their utilization of services
- Number of tests ordered seems to be influenced by cost

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The Clinician as Patient's Agent

The Patient's Clinical Agent – variation source

- Serve as patients' agent in ensuring the quality of care and the provision of services necessary
- Most important variable in choice of drugs is the perception of their effectiveness and risk
- Although price influences clinicians' use of dx test, clinical considerations substantially more important

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The Clinician as Patient's Agent

The Patient's Clinical Agent – variation source
Dealing with uncertainty

- Many have described the importance of clinical uncertainty in clinicians' practice patterns
- Because clinicians' beliefs about the effectiveness and the risk of clinical services is of central importance
 - The certainty with which they hold these beliefs is critical in determining their decision-making

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The Clinician as Patient's Agent

The Patient's Clinical Agent – variation source
Dealing with uncertainty

- Eddy has emphasized the ambiguity inherent in defining the difference between
 - Normal and abnormal
 - Characterizing disease entities
 - Collecting accurate data
 - Evaluating diagnostic tests
 - Measuring outcomes

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The Clinician as Patient's Agent

The Patient's Clinical Agent – variation source
Dealing with uncertainty

- Uncertainty may exist because knowledge simply not available
- Or because do not have access to the available information about the usefulness and risk of a service
- Or because are unable to make use of the available information appropriately

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The Clinician as Patient's Agent

The Patient's Clinical Agent – variation source
Dealing with uncertainty

- Because uncertainty seems inevitable – must be considered as an element in clinical decision-making
- John Wennberg has identified three sources of uncertainty:
 1. Difficulties in classifying a particular patient, so that probabilities of disease, extent of disease, prognosis and treatment outcomes cannot be reasonably ascertained

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The Clinician as Patient's Agent

The Patient's Clinical Agent – variation source
Dealing with uncertainty

Sources of uncertainty (cont.)

2. Information commonly does not exist on the probabilities of treatment outcomes under controlled circumstances
3. Uncertainty exists because the values of the patient may not correspond to the patient's values

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The Clinician as Patient's Agent

The Patient's Clinical Agent – variation source
Uncertainty

Sources of uncertainty (cont.)

4. Clinical care is simply a risky business –fact that outcomes expressed as probabilities means there is uncertainty about how an individual patient will turn out
- Uncertainty in clinical practice includes more than lack of knowledge
- Even if group statistics are known, the outcome will continue to be uncertain for each patient as long as clinical care is a probabilistic process

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The Clinician as Patient's Agent

The Patient's Clinical Agent – variation source
Uncertainty

- Way the clinician deals with uncertainty can influence the amount of variation
 - Establish routines
 - (local clinical rules of thumb often guide practice in areas of high uncertainty)
 - As a result are wide interregional differences in practice patterns
 - Uncertainty enters through the patient
 - Erring on the side of conservatism
 - Defensive medicine?

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Implications of variation in treatment

Unexplained variation in practice style:
suggests that some care may be inappropriate.
when explicit criteria applied:
instances of both overutilization & underutilization found

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Implications of variation in treatment


- Even when differences in patients' preferences
- case mix
- severity of disease considered
- there are potential improvements in the cost and quality of care *that might result from changes in the practice habits of clinicians*

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How to change behavior?

- Task of changing behavior is a daunting one
 - Clues from behavior modification
 - Ideas from management theory
 - Lessons from adult learning theory

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Do Education and Feedback change
clinician's decisions?

- Will education change practice?
- The role of professional leadership in education
- Education and perceived need
- Does the change persist?
- Is the medium more important than the message?