Evidence-Based Medicine Putting Evidence into Practice

Component 2 / Unit 5

Specifying a recommendation (Guyatt, 2008)

Task	Method for Achieving Task
Specify options and outcomes	Explicit decision framing
Use evidence to determine the link between options and outcomes in all relevant patient subgroups	Randomized controlled trials and other evidence → Systematic review
Incorporate values to decide on optimal course of action	Values → Decision analysis or practice guideline
If necessary, consider local circumstances and modify course of action	Local circumstances → Local guidelines Assess local burdens, local barriers, and local resources

Techniques for specifying recommendations

- Clinical practice guidelines
- Decision analysis

What is a clinical practice guideline?

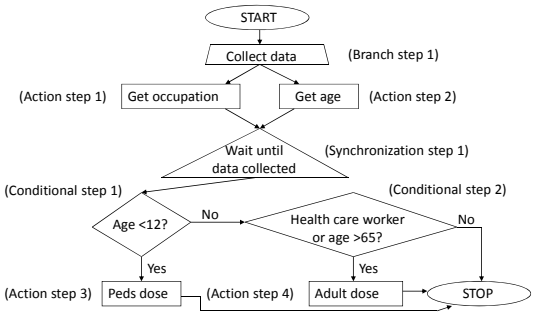
- Series of steps for providing clinical care
- May consist of text/tables or algorithms
- Algorithm steps (Ohno-Machado, 1998)
  - Action – perform a specific action
  - Conditional – carry out action based on criterion
  - Branch – direct flow to one or more other steps
  - Synchronization – converge paths back from branches

Clinical practice guidelines are not new!

- First "guideline" may be Edwin Smith papyrus from ancient Egypt, dated to 1600 BC but probably based on text from 3 centuries older
- Describes diagnoses and treatments for 48 different injuries, from those with known treatment to those without
- (Thanks, Laura Fochtmann, MD)

- http://www.metmuseum.org/special/Art_Medicine_Egypt/view_1.asp?item=0

Example guideline algorithm



Appraising a clinical practice guideline

- Did the developers carry out a comprehensive, reproducible literature search within the last 12 months?
- Is each of its recommendations both tagged by the level of evidence upon which it is based and linked to a specific citation?
- Is the guideline applicable in a particular clinical setting, i.e., is there
  - High enough burden of illness to warrant use?
  - Adequate belief about the value of interventions and their consequences?
  - Costs and barriers too high for the community?

Assigning levels of evidence in a guideline

- ACP PIER
- Evidence rated as A, B, or C

- Consider using a combination of insulin and oral agents if oral agents do not achieve the desired level of glycemic control. B
- Consider using other insulin regimens if oral agents and bedtime insulin combined do not achieve the desired level of glycemic control. B
- Consider improved glucose control to reduce risk of microvascular and neuropathic outcomes in patients with type 2 diabetes. A
- Treat hypertension aggressively to reduce the risk of adverse microvascular outcomes (e.g., retinopathy, nephropathy) in patients with type 2 diabetes. A
- Take steps to prevent and treat diabetic nephropathy to reduce the risk of progression to end-stage renal failure in patients with type 2 diabetes. A
- Consider treating painful neuropathy with tricyclic antidepressants, carbamazepine, gabapentin, or capsaicin. A
- Consider interventions to reduce the risk of macrovascular disease in patients with type 2 diabetes.
- Consider use of prophylactic aspirin in all patients with type 2 diabetes. C

Should they be distributed on paper or electronically?

- Hibble (1998) found 855 guidelines had been disseminated to practices in an area of England
  - Pile was 68 cm high and weighed 28 kg
- Electronic dissemination, especially codified for EHRs, may be a better approach
  - Can be encoded in decision logic

Do guidelines improve care?

- Shiffman (1999) systematic review of 25 studies showed
  - 4 of 4 assessing documentation showed improvement
  - 14 of 18 assessing adherence showed improvement
  - 8 assessing outcomes showed variable results
    - Interventions for managing cholesterol levels and preventing decubitus ulcers showed benefit
    - Interventions for managing back pain, hypertension, and HIV did not
- More recent systematic review (Grimshaw, 2004) identified many newer studies but continued mixed findings

Physicians do not adhere to guidelines

- Cabana (1999) found guidelines not used because physicians unaware of them, disagreed with them, or did not want to change existing practice
- Physicians and nurses in highly regarded practices in UK rarely accessed or used research evidence, instead use "mindlines" (Gabbay, 2004)
- Lin (2008) found lack of adherence to recommendation of major guideline on use of stress testing before percutaneous coronary intervention
  - Diamond (2008) attributes to financial incentives and advocates "evidence-based reimbursement"

Other studies of guidelines

- Guidelines in an electronic health record did not improve adherence by physicians or outcomes of patients in heart disease (Tierney, 2003) and asthma (Tierney, 2005)
- In American College of Cardiology/American Heart Association guidelines, distribution of evidence is (Tricoci, 2009)
  - A – 11%
  - B – 41%
  - C – 48%
- As such, these guidelines overly rely on expert opinion (Shaneyfelt, 2009)

Limitations of guidelines

- May not apply in complex patients – for 15 common diseases, following best-known guidelines in elderly patients with comorbid diseases may have undesirable effects and implications for pay for performance schemes (Boyd, 2005)
- Difficult to implement in EHRs – issues include precise coding of logic and integration into workflow (Maviglia, 2003)
- May be influenced by pharmaceutical industry – 87% of authors have ties to industry; 58% receive financial support for research and 38% serve as employees or consultants (Choudhry, 2002)

The future of guidelines

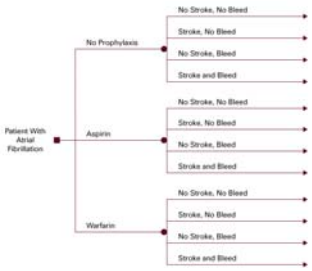
- Many health care systems convinced they help standardize and improve care and/or lower cost
- Use will likely increase with proliferation of electronic health records and/or quality improvement efforts
- Growing number are available from National Guidelines Clearinghouse
  - www.guideline.gov

Decision analysis

- Applies a formal structure for integrating evidence about beneficial and harmful effects of treatment options with associated values and preferences
- They can be applied to guide decision-making of single patient or to inform decisions about clinical policy

Decision analysis for anticoagulation in atrial fibrillation

- Guyatt, 2008
- Squares are decision nodes
- Circles are chance nodes



Using a decision analysis

- Elicit utility values for outcomes from patient, e.g., risk of adverse events from disease or treatment
- Calculate probabilities of events based on best evidence
- "Fold back" decision tree to calculate overall utility

Limitations of decision analysis

- Presents idealized situation that may not apply to a patient but give a framework for making decisions and/or deviating from standard approach
- Decision analyses are time-consuming on individual level and may be dependent upon quantification of values and fuzzy situations