**Going beyond design, going beyond intervention: The American Academy of Neurology (AAN) Clinical Practice Guideline process and other approaches**

**Webinar Series - Part 2**

**Presented by Marcel Dijkers**

**June 18, 2014**

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Title Slide:

Systematic reviews: From evidence to recommendation.  
Session 2 - June 18, 2014.  
Going beyond design, going beyond intervention: The American Academy of Neurology (AAN) Clinical Practice Guideline process and other approaches.

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Slide 1: Objectives:

Discuss, within the context of systematic reviews

* what is considered evidence and why
* how evidence is qualified and synthesized
* how evidence is turned into recommendations for clinicians and other practitioners

Slide 2: Topics:

1. Overview of the process and tools of systematic reviewing, with a focus on assessment and synthesis of evidence, and the idea of a research design-based pyramid of evidence underlying conclusions and recommendations
2. **How the American Academy of Neurology and others have brought in research design details and quality of research implementation in grading evidence, and have gone beyond intervention research**
3. The GRADE approach, with its emphasis on the values and preferences of patients/clients, and flexibility in grading evidence: fit with disability and rehabilitation research
4. A discussion of future developments in methods of qualifying and synthesizing evidence that might benefit disability/rehabilitation practice

Slide 3: June 4 topics:

* The role of (clinical) research evidence in practitioner decision making: primary studies, EBP resources
* The process of creating a systematic review
* The meaning of ‘evidence’ and the need to evaluate the quality of evidence resulting from clinical research:
  + Big D design
  + Little d design
  + Research implementation

Slide 4: June 6 topics:

* Hierarchies for evidence relevant to interventions, developed by:
  + Sackett
  + Cicerone et al.
* Checklists and rating scales for evidence quality:
  + Jadad scale
  + PEDro scale
* Possible uses of checklists and rating scales

Slide 5: Questions?

Slide 6: There is more to EBP than RCTs

* RCTs are irrelevant to prognosis, diagnosis, screening, etc.
* Multiple hierarchies are / may be needed, each one for a specific research question
* And have been developed since Sackett published his hierarchy for intervention studies

Slide 7: Oxford CEBM 2011 hierarchy of evidence

Multicolored table with 7 columns and 5 rows:

The titles of the columns in order from left to right with the colors are:  
How common is the problem? (Teal)   
Is this Dx or monitoring test accurate? (diagnosis) (Yellow)

What will happen if we do not add a therapy? (prognosis) (Green)

Does this intervention help? (treatment benefits) (Tan)

What are the COMMON harms? (treatment harms) (Purple)

What are the RARE harms? (treatment harms) (Bright Yellow)

Is this (early detection) test worthwhile? (screening) (Grey)

Rows 1-5 are labeled: question

Level 1 evidence

Level 2 evidence

Level 3 evidence

Level 4 evidence

Level 5 evidence

The cells in the middle of the table are empty.

http://www.cebm.net/mod\_product/design/files/CEBM-Levels-of-Evidence-2.1.pdf

Slide 8: A note

* The Oxford CEBM (Centre for Evidence-Based Medicine) hierarchies are for clinicians conducting ‘bedside’ EBP, not for researchers conducting systematic reviews:
  + Systematic reviews generally hold the highest rank in the hierarchies
  + A N-of-1 trial with the patient the clinician needs to treat also take a high position

Slide 9: Oxford CEBM evidence levels for Incidence/ prevalence: How common is the problem?

**Level 1** Local and current random sample surveys (or censuses)

**Level 2** Systematic review of surveys that allow matching to local circumstances

**Level 3** Local non-random sample

**Level 4** Case-series

**Level 5** n/a

Slide 10: Oxford CEBM evidence levels for Diagnosis: Is this diagnostic or monitoring test accurate?

**Level 1** Systematic review of cross sectional studies with **consistently** applied reference standard and blinding

**Level 2** Individual cross sectional studies with consistently applied reference standard and blinding

**Level 3** Non-consecutive studies, or studies without consistently applied reference standards

**Level 4** Case-control studies, or **poor** or non-independent reference standard

**Level 5** Mechanism-based reasoning

Slide 11: Oxford CEBM evidence levels for Prognosis: What will happen if we do not add a therapy?

**Level 1** Systematic review of inception cohort studies

**Level 2** Inception cohort studies

**Level 3** Cohort study or control arm of randomized trial

**Level 4** Case-series or case-control studies, or **poor quality** prognostic cohort study

**Level 5** n/a

Slide 12: Oxford CEBM evidence levels for Treatment Benefits: Does this intervention help?

**Level 1** Systematic review of inception cohort studies

**Level 2** Inception cohort studies

**Level 3** Cohort study or control arm of randomized trial

**Level 4** Case-series or case-control studies, or **poor quality** prognostic cohort study

**Level 5** n/a

Slide 13: Oxford CEBM evidence levels for Treatment Harms: What are the COMMON harms?

**Level 1** Systematic review of randomized trials, systematic review of nested case-control studies, n-of-1 trial **with the patient you are raising the question about**, or observational study with dramatic effect.

**Level 2** Individual randomized trial or (exceptionally) observational study with dramatic effect

**Level 3** Non-randomized controlled cohort/follow-up study (post-marketing surveillance) provided there are **sufficient** numbers to rule out a common harm. (For long-term harms the duration of follow-up must be sufficient.)

**Level 4** Case-series, case-control, or historically controlled studies

**Level 5** Mechanism-based reasoning

Slide 14: Oxford CEBM evidence levels for Treatment Harms: What are the RARE harms?

**Level 1** Systematic review of randomized trials or n-of-1 trial

**Level 2** Randomized trial (exceptionally) observational study with dramatic effect

**Level 3** Non-randomized controlled cohort/follow-up study (post-marketing surveillance) provided there are sufficient numbers to rule out a common harm. (for long-term harms the duration of follow-up must be sufficient.)

**Level 4** Case-series, case-control, or historically controlled studies

**Level 5** Mechanism-based reasoning

Slide 15: Oxford CEBM evidence levels for Screening: Is this (early detection) test worthwhile?

**Level 1** Systematic review of randomized trials

**Level 2** Randomized trial

**Level 3** Non-randomized controlled cohort/follow-up study

**Level 4** Case-series, case-control, or historically controlled studies

**Level 5** Mechanism-based reasoning

Slide 16: CEBM language: note the subjective elements

* “consistently applied”
* “poor standard”
* “poor quality cohort study”
* “dramatic effect”
* “sufficient numbers”

Slide 17: Oxford CEBM 2011 hierarchy of evidence: presentation

Table with 5 columns and 7 multi colored rows:

Columns 1-5 are in white:

Level 1 evidence

Level 2 evidence

Level 3 evidence

Level 4 evidence

Level 5 evidence

Rows 1-7 are colored and labeled: question

How common is the problem? (Teal)

Is this Dx or monitoring test accurate? (diagnosis) (Yellow)

What will happen if we do not add a therapy? (prognosis) (Green)

Does this intervention help? (treatment benefits) (Orange)

What are the COMMON harms? (treatment harms) (Purple)

What are the RARE harms? (treatment harms) (Yellow)

Is this (early detection test worthwhile? (screening) (Grey)

Slide 18: Footnotes to the Oxford 2011 scheme

* Level may be **graded down** on the basis of study quality, imprecision, indirectness (study PICO does not match question PICO), because of inconsistency between studies, or because the absolute effect size is very small (GRADE)
* Level may be **graded up** if there is a large or very large effect size (GRADE)
* The Oxford website does not offer a scheme to link the quality and quantity of evidence to strength of recommendation – a consequence of focus on ‘bedside’ EBP?

Slide 19: Oxford CEBM grades of recommendation 2009 grid

A consistent level 1 studies

B consistent level 2 or 3 studies **or** **extrapolations** from level 1 studies

C level 4 studies **or** extrapolations from level 2 or 3 studies

D level 5 evidence **or** **troublingly inconsistent or inconclusive studies** of any level

Action (must, should, may) related to letter grades not to be found!!

Side 20: (AAN Cover shot)

Green journal cover:

2011 Edition

Clinical Practice Guideline Process Manual

Prepared by

Gary S. Gronseth, MD, FAAN

Laura Moses Woodroffe

Thomas S. D. Getchius

<http://tools.aan.com/globals/axon/assets/9023.pdf>

Slide 21: American Academy of Neurology (AAN) 2011 Clinical Practice Guideline Process Manual

* Earlier edition: 2004
* Next edition: 2014?
* Used by AAN groups
* Used by many ACRM groups (but not Cicerone et al.)

Slide 22: EBP Process as Applied by the American Academy of Neurology (AAN)

**A. Developing the Questions**

i. PICO Format

Or PICOTS: time frame, setting

All other questions (Dx, Px, etc.) squeezed into PICOTS framework – e.g. for screening question, ‘I’ is doing screening, ‘C’ is not doing screening

ii. Types of clinical questions

iii. Development of an analytic framework

Slide 23: An hypothetical and simple analytic framework  
Three boxes with arrows in between them leading from left to right:

DX: 90% sensitive

Tx: NNT is 4.8

Px: 5 year future 30% predicted

Slide 24: EBP Process as Applied by the American Academy of Neurology (AAN)

B. Finding and Analyzing Evidence

i. Finding the relevant evidence

ii. Identifying methodological characteristics of the studies

iii. Rating the risk of bias

iv. Understanding measures of association

v. Understanding measures of statistical precision

vi. Interpreting a study

Slide 25: EBP Process as Applied by the American Academy of Neurology (AAN)

C. Synthesizing Evidence—Formulating Evidence-based Conclusions

i. Accounting for conflicting evidence

ii. Knowing when to perform a meta-analysis

iii. Wording conclusions for nontherapeutic questions

iv. Capturing issues of generalizability in the conclusion

Slide 26: EBP Process as Applied by the American Academy of Neurology (AAN)

D. Making Practice Recommendations

i. Rating the overall confidence in the evidence from the perspective of supporting practice recommendations

ii. Putting the evidence into a clinical context

iii. Crafting the recommendations

iv. Basing recommendations on surrogate outcomes

v. Knowing when not to make a recommendation

vi. Making suggestions for future research

Slide 27: Questions?

Slide 28: AAN evidence classification schemes for:

* Therapy
* Causation
* Prognosis
* Diagnosis
* Population screening

Slide 29: Classification of Evidence Scheme: Therapy – class I

* Randomized, controlled clinical trial (RCT) in a representative population
* Masked or objective outcome assessment
* Relevant baseline characteristics are presented and substantially equivalent between treatment groups, or there is appropriate statistical adjustment for differences
* Also required:

a. Concealed allocation

b. Primary outcome(s) clearly defined

c. Exclusion/inclusion criteria clearly defined

d. Adequate accounting for dropouts (with at least 80% of enrolled subjects completing the study) and crossovers with numbers sufficiently low to have minimal potential for bias

e. For noninferiority or equivalence trials …

Slide 30: What is ‘objective’?

* Objective outcome measurement: an outcome measure that is unlikely to be affected by an observer’s (patient, treating physician, investigator) expectation or bias (e.g., blood tests, administrative outcome data)
  + Level I: unmasked investigator and unmasked patient cannot influence measurement of the outcome
  + Level II: either the unmasked investigator or unmasked patient (but not both) can influence measurement of the outcome
  + Level III: unmasked investigator and unmasked patient can influence measurement of the outcome
* For AAN guidelines, only level I is objective > major issue for disability and rehabilitation studies, where blinding often is not possible, and either therapist or patient rates treatment outcomes

Slide 31: Classification of Evidence Scheme: Therapy – class II

* Cohort study meeting criteria a–e (see Class I) or an RCT that lacks one or two criteria b–e (see Class I)
* All relevant baseline characteristics are presented and substantially equivalent among treatment groups or there is appropriate statistical adjustment for differences
* Masked or objective outcome assessment

Slide 32: Classification of Evidence Scheme: Therapy – class III

* Controlled studies (including well-defined natural history controls or patients serving as their own controls)
* A description of major confounding differences between treatment groups that could affect outcome
* Outcome assessment masked, objective or performed by someone who is not a member of the treatment team.

Slide 33: Classification of Evidence Scheme: Therapy – class IV

* Did not include patients with the disease (indirectness – GRADE)
* Did not include patients receiving different interventions (i.e. comparator)
* Undefined or unaccepted interventions or outcome measures
* No measures of effectiveness or statistical precision presented or calculable

Slide 34: AAN approach to evidence synthesis and formulating conclusions

* Link to clinical question
* Consideration of four types of information
  + Class of evidence all studies included
  + Strength of associations between treatment and outcome (effect size) (GRADE)
  + Statistical precision (confidence intervals and statistically pooled confidence interval) (GRADE)
  + Consistency between studies (GRADE)

Slide 35: AAN characterization of individual studies

I low risk of bias

II moderate risk of bias

III moderately high risk of bias

IV very high risk of bias

Slide 36: AAN approach to evidence synthesis and formulating conclusions: therapy questions

Two column table with headings: Findings and Phrasing

Column 1: In case of effective therapy

Multiple class I studies

Multiple class II studies / single class I study

Multiple class III studies / single class II study

Multiple class IV studies / single class III study

Column 2:

Tx X is highly likely to be effective

Tx X is likely to be effective

Tx X is possibly effective

Insufficient evidence in favor or against Tx X

Slide 37: AAN approach to evidence synthesis and formulating conclusions: therapy questions

Two column table with headings: Findings and Phrasing

Column 1: In case of ineffective therapy

Multiple negative, adequately powered class I studies

Multiple negative, adequately powered class II studies/single adequately powered class I study

Multiple negative, adequately powered class II studies/single adequately powered class II study

Multiple negative class IV studies/single adequately powered class III study/negative, inadequately powered class I, II or III studies.

Column 2:

Tx X is highly likely NOT to be effective

Tx X is likely NOT to be effective

Tx X is possibly NOT effective

Insufficient evidence in favor or against Tx X

Slide 38: Questions?

Slide 39: AAN Classification of Evidence Scheme: Prognosis – class I

* Cohort survey with prospective data collection
* Includes a broad spectrum of persons at risk for developing the outcome
* Outcome measurement is objective or determined without knowledge of risk factor status
* Also required:

a. Inclusion criteria defined

b. At least 80% of enrolled subjects have both the risk factor and outcome measured

Slide 40: AAN Classification of Evidence Scheme: Prognosis – class II

* Cohort study with retrospective data collection or case-control study. Study meets criteria a and b (see Class I)
* Includes a broad spectrum of persons with and without the risk factor and the outcome
* The presence of the risk factor and outcome are determined objectively or without knowledge of one another

Slide 41: AAN Classification of Evidence Scheme: Prognosis – class III

* Cohort or case control study
* Narrow spectrum of persons with or without the disease
* The presence of the risk factor and outcome are determined objectively, without knowledge of the other or by different investigators

Slide 42: AAN Classification of Evidence Scheme: Prognosis – class IV

* Did not include persons at risk for the outcome
* Did not include patients with and without the risk factor
* Undefined or unaccepted measures of risk factor or outcomes
* No measures of association or statistical precision presented or calculable

Slide 43: Questions?

Slide 44: AAN Classification of Evidence Scheme: Diagnosis – class I

* Cohort survey with prospective data collection
* Includes a broad spectrum of persons suspected of having the disease
* Disease status determination is objective or made without knowledge of diagnostic test result
* Also required:

a. Inclusion criteria defined

b. At least 80% of enrolled subjects have both the diagnostic test and disease status measured

Slide 45: AAN Classification of Evidence Scheme: Diagnosis – class II

* Cohort study with retrospective data collection or case-control study. Study meets criteria a and b (see Class I)
* Includes a broad spectrum of persons with and without the disease
* The diagnostic test result and disease status are determined objectively or without knowledge of one another

Slide 46: AAN Classification of Evidence Scheme: Diagnosis – class III

* Cohort or case control study
* Narrow spectrum of persons with or without the disease
* The diagnostic test result and disease status are determined objectively, without knowledge of the other or by different investigators

Slide 47: AAN Classification of Evidence Scheme: Diagnosis – class IV

* Did not include persons suspected of the disease
* Did not include patients with and without the disease
* Undefined or unaccepted independent reference standard
* No measures of diagnostic accuracy or statistical precision presented or calculable

Slide 48: Questions?

Slide 49: AAN approach to evidence synthesis and formulating conclusions

* Link to clinical question
* Consideration of four types of information
  + Class of evidence (I, II, III or IV) for all studies
  + Strength of associations between treatment and outcome (effect sizes of individual studies and pooled studies)
  + Statistical precision (confidence intervals of individual studies and pooled studies)
  + Consistency between studies

Slide 50: Conflicting evidence: what to do?

Approach 1: try to explain inconsistencies from systematic or random error

* Bias: disregard the weaker studies (class III), and base conclusion on stronger ones, if these are consistent
* Random error: disregard the ‘out-of-line’ studies if they have low power, even if of same class as the ‘in-line’ studies
* Meta-analysis: do a formal meta-analysis (if homogeneity of studies is adequate) to see whether the pooled studies support a conclusion

Slide 51: Conflicting evidence: what to do?

Approach 2: try to explain inconsistencies from systematic or random error

* Study differences: evaluate whether disagreements between studies (of same class and adequately powered) can be explained by creating subgroups based on population, intervention, comparator, and/or outcome measure (PICO)

Slide 52: Considering generalizability issues

* Assess whether generalizability of the evidence is limited because the combined studies were limited in
  + Subgroups studied (e.g. only or predominantly males)
  + Intervention strengths (dose) or varieties studied
  + Comparators studied
  + Time points after intervention termination studied
  + Outcomes studied
* Phrase recommendation so as to reflected the limit(s) of the evidence
  + e.g. “it is highly recommended that women with problem X receive Tx Y; but the effectiveness of Tx Y for men has not been established”

Slide 53: AAN: interpretation of the levels of evidence

I (low risk of bias)

II (moderate risk of bias)

III (moderately high risk of bias)

IV (very high risk of bias)

Slide 54: Operationalization of AAN criteria for therapy

Article ID#: \_\_\_\_\_\_\_\_\_ Authors and year:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Criterion A: Design type of the study (see AAN manual Appendix 3 for details)

* + If a randomized controlled trial, maximum Class I
  + If not a randomized trial, maximum Class II
  + If well-defined natural history controls or patients serving as their own controls, maximum Class III
  + If no comparison group, single subject design, case study or other (e.g., qualitative), maximum Class IV

Criterion A rating: \_\_\_

Slide 55: Operationalization of AAN criteria for therapy

Criterion B: Blinding and assessor independence

1. Was the person doing the outcome assessment blinded to management strategy? (i.e., treatment arm the subject was assigned to)

Yes / No / Not stated / Ambiguous

2. Was the outcome measure objective? (Objective: The determination of theoutcome is unlikely to be affected by observer expectations). NOTE: If the subjects knows the treatment they received AND the outcome is self-reported, it is not objective or masked.

Yes / No / Not stated / Ambiguous

3. Was the person doing the outcome assessment independent? (Independent: The investigator assessing outcome was different than the treating clinicians. A subject giving self-report measure of fatigue is independent)

Yes / No / Not stated / Ambiguous

Criterion B For the outcome rating consider items 1-3:

If B1 or B2 = YES, maximum is Class I

If only B3 = YES, maximum is Class III

If all (B1, 2, 3) = NO/NOT STATED: Class IV

Criterion B rating: \_\_\_

Slide 56: Operationalization of AAN criteria for therapy

Criterion C: Other Therapeutic Study Characteristics

4. Was treatment allocation concealed (Check “no” if not an RCT): “Concealed Allocation”: Investigators could not manipulate treatment assignment. Examples of concealed allocation include consecutively numbered sealed, opaque envelopes containing a predetermined, random sequence for treatment assignment or an independent center that an investigator contacts to obtain the treatment assignment.

Yes / No / Not stated / Ambiguous

5. Primary outcome measure(s) was specified

Yes / No / Not stated / Ambiguous

6. Explicit inclusion and exclusion criteria were used

Yes / No / Not stated / Ambiguous

7. Patients in different treatment arms were similar at baseline or appropriate statistical adjustments were made for baseline differences

Yes / No / Not stated / Ambiguous (cont.)

Slide 57: Operationalization of AAN criteria for therapy

Criterion C: Other Therapeutic Study Characteristics (cont.)

8. Less than 20% of patients were lost to follow-up

Yes / No / Not stated / Ambiguous

(Percentage lost to follow-up: \_\_\_)

Criterion C For criterion C consider items 4-8: (see AAN manual for details)

If all 5 (C4, 5, 6, 7, 8) = “yes,” maximum is Class I.

If only three or four = “yes,” maximum is Class II.

If < three = “yes,” maximum is Class III.

Criterion C rating: \_\_\_

Slide 58: Operationalization of AAN criteria for therapy

Criterion A rating: \_\_\_\_

Criterion B rating: \_\_\_\_

Criterion C rating: \_\_\_\_

Final Rating: Select worst maximum therapy class from above (criteria A, B and C): overall rating: \_\_\_\_

I (low risk of bias)

II (moderate risk of bias)

III (moderately high risk of bias)

IV (very high risk of bias)

Slide 59: Questions?

Slide 60: Wrapping Up – Thank you!

We invite you to:

* Provide your input on today’s session
* Share your ideas for future sessions
* Participate in the Community of Practice to continue the dialogue
* PLEASE CONTACT US: [joann.starks@air.org](mailto:joann.starks@sedl.org)

Please fill out the brief Evaluation Form:

<http://www.surveygizmo.com/s3/1689087/Evaluation-Webinar-Series-Session-2>

Slide 61: Disclaimer

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