Anticipating, Eliciting & Interpreting Physical Findings

A Hypothesis-Driven Physical Exam

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“Screening” Head-to-toe PE

- **140 maneuvers** for healthy pts
  (Stillman consortium, '80s)
- Checklist driven exercise

"What are you thinking?"

"Oh, I haven't started thinking yet. First I gather all the data and then I think about it."

"Screening" Head-to-toe PE

- Mechanical thoroughness
- Rote exercise
- Out of context

  …not linked to pt complaints

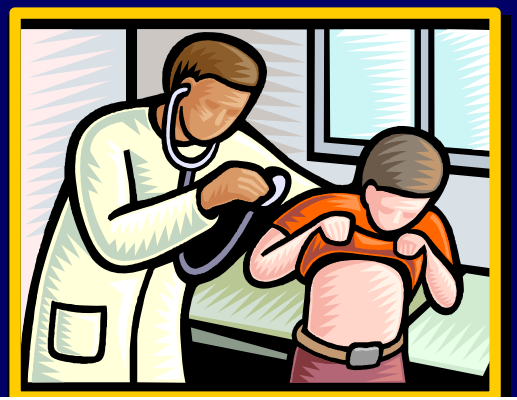
  (Contrary to Van der V. & Shurwirth (2005) integrated into clinical studies)
- Students not thinking

Csqs during clerkships...

- Difficulty to:
  - **Select** relevant maneuvers/signs
  - Recognize **abnormal findings**
  - **Interpret** what they find

- *Checklist thoroughness is not enough*

Context & thinking



Hypothesis-driven PE

In context of Hx + Diff. Dx

- Anticipate : **Discriminating findings**
- Elicit signs : **Correct maneuvers**
- Interpret : **Analytical thinking**
- Be corrected : **Immediate feedback**
- Document : **Reporting accuracy**

Presentation…

1. Rationale for HDPE
2. Case development
3. Student PE assessment
4. Initial validity findings

R&D project in progress…

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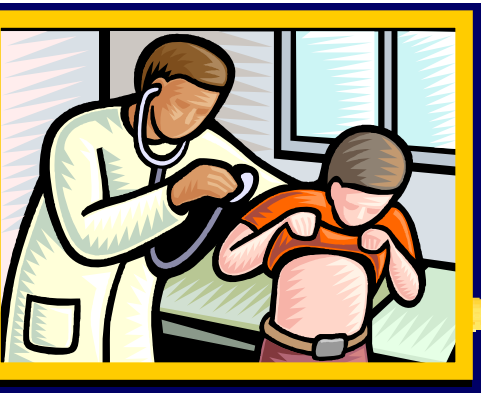
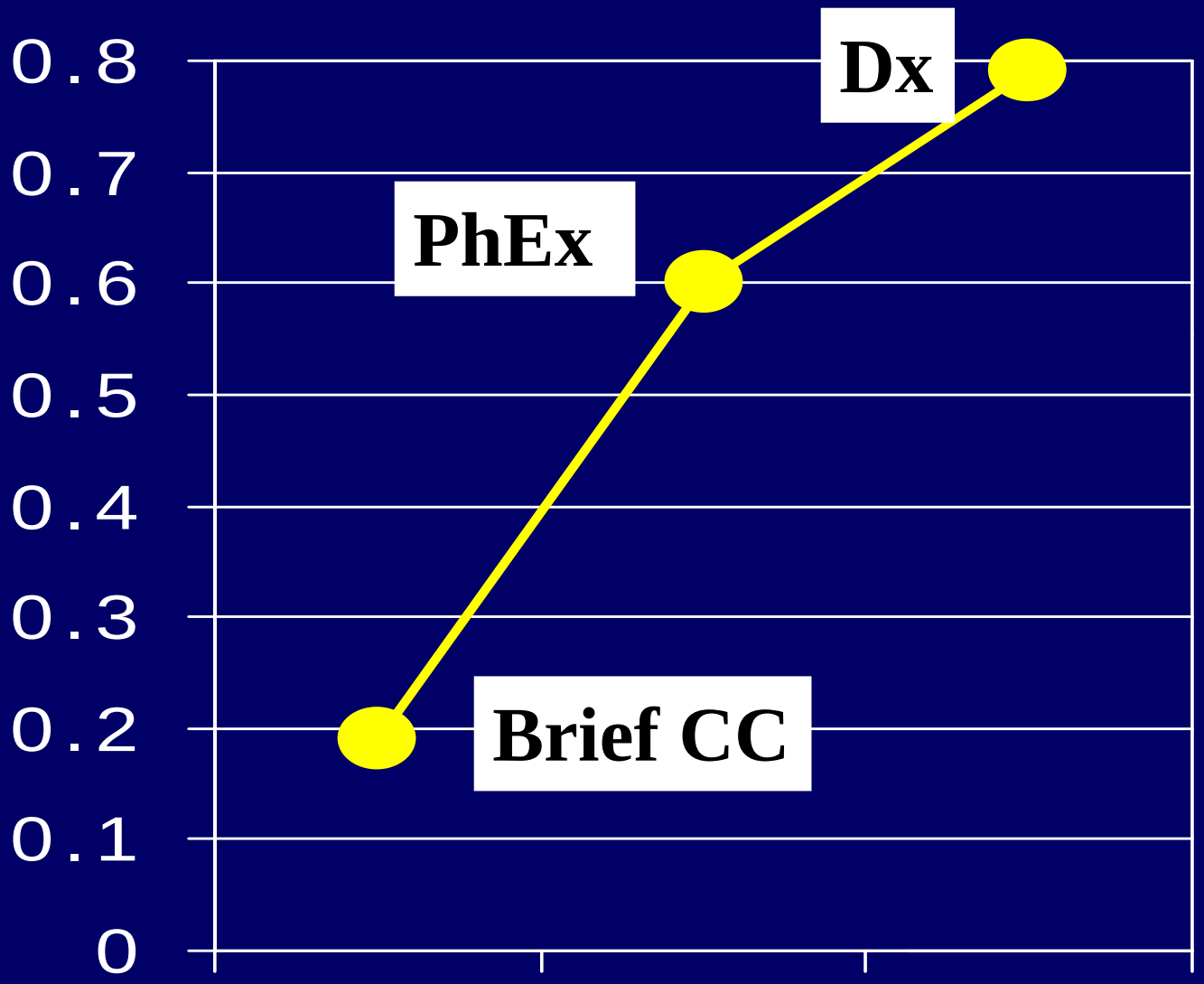


Rationales
(4 main findings)

Bordage, 1999

- Have a Dx in mind → See more findings
- Sort out a differential dx *(analytical reasoning)* → Looking for discriminating features
- Create solid foundation → Less is more *(prototypes)*
- Transfer into practice → Mixed practice with feedback

Data gathering



Features are more evident when Dx is also available

You see what you're looking for...

Norman, 1996, 2000
Hatala, 1999

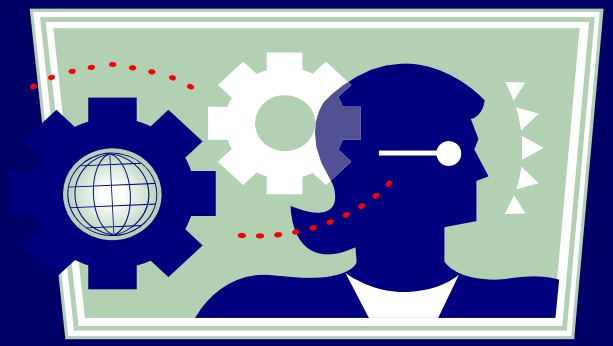
Feature identification
- an interactive process -

	Physical signs	
If looking right Dx	**Most**	**+ + + +**
If looking something (DDx)	**Many**	**+ + +**
Just looking, thorough:	**Fewer**	**+ / -**
If looking wrong Dx	**Least**	**--**

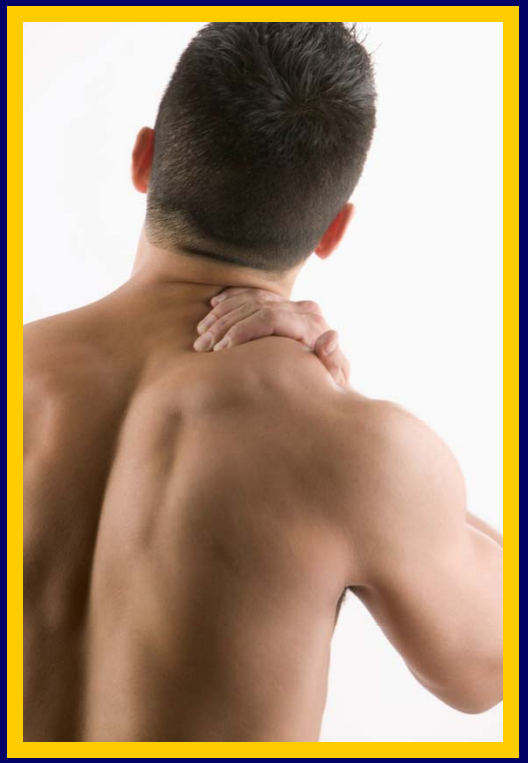
…avoid collecting data simply for its own sake, for being thorough

Have a Dx in mind.

You will see more…



How many Dx initially ?



Shoulder pain

All **34** causes in Jacob's Textbook

vs.

4 prototypical causes
e.g., tendonitis, capsulitis, rotator cuff, referred pain

How many Dx initially?

Bordage, 1987

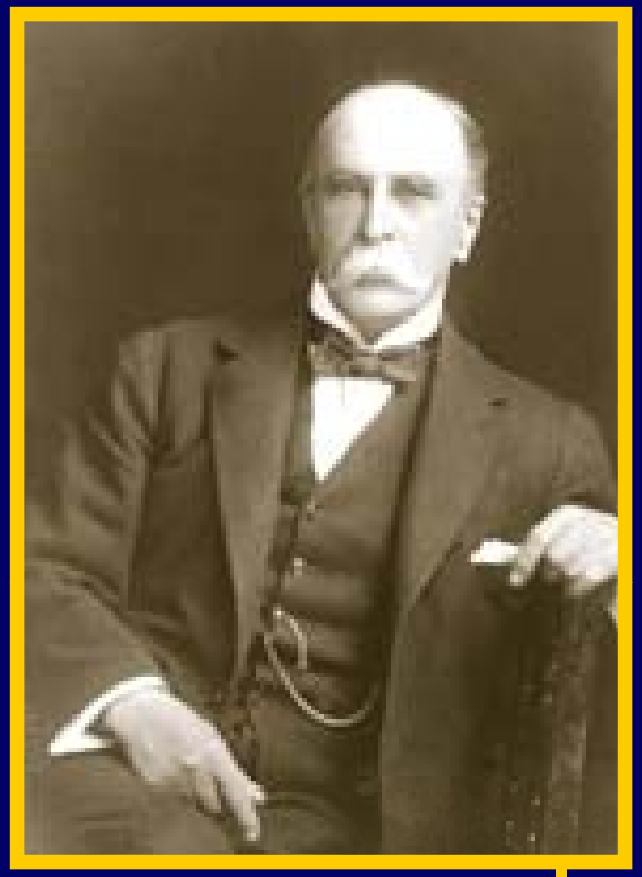
r = -.58

- Number disorders/ syst. course
- Prototype formation in memory

(anchor points)

...less is more

Pneumonia & typhoid



"... the student tries to learn too much, and we the teachers try to teach too much – neither, perhaps, with great success"

- 1899 -

Wm. Osler

"if thoroughly understood by the students, [they] give them a satisfactory **foundation** on which to build their later experience."

- 1925 -

140 PhEx maneuvers

19 chief complaints *(23 CC ≈ 80%)*

- 3-4 prototypical, competing diagnoses/ CC
- Findings for each Dx *(Evidence-b.: sensit., spec.)*

Devel. Drs. Otaki, Nishogori & Bordage in Japan

~60 Dx as a solid foundation

Shoulder pain

4 diagnoses:

- Bicipital tendonitis
- Adhesive capsulitis
- Rot. cuff tendonitis
- Referred pain

16 maneuvers:

Point to area

Flexion

Int. & external rotation

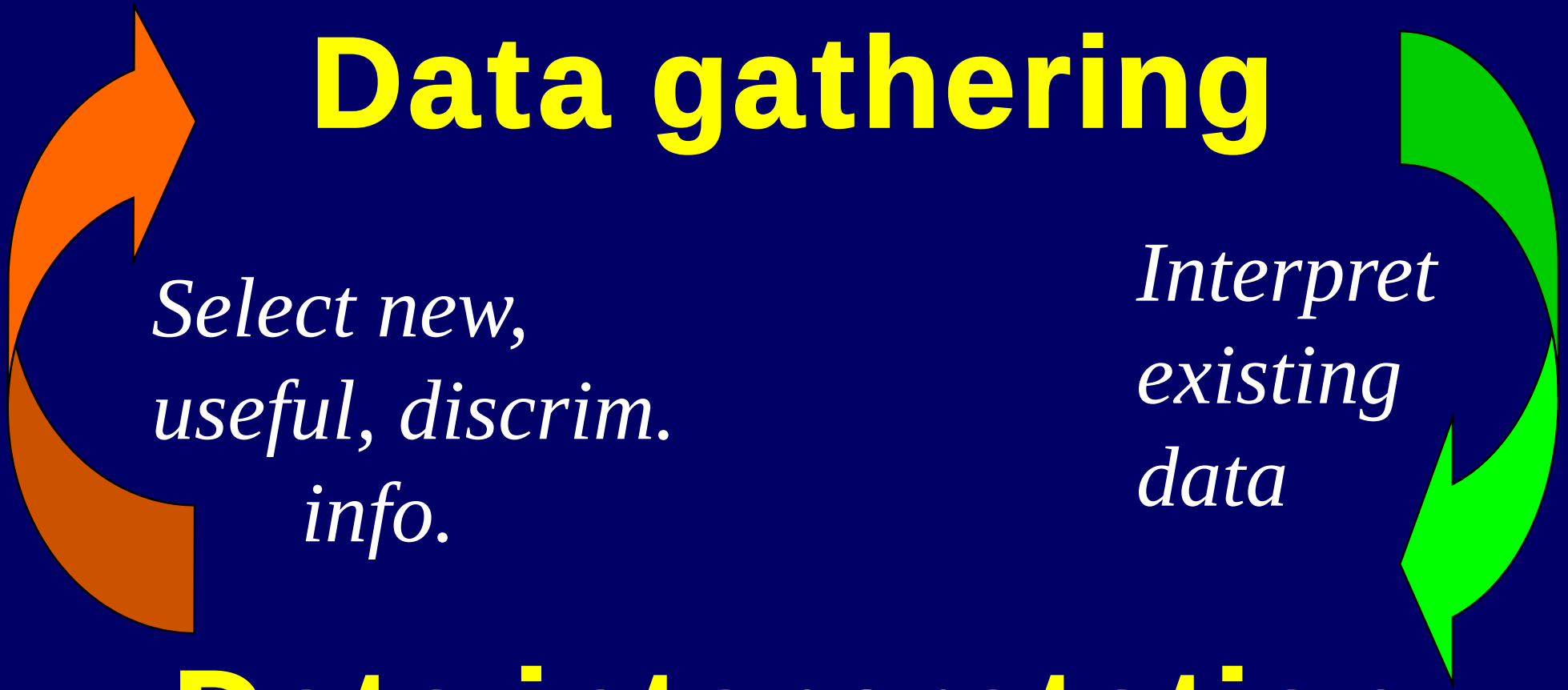
Neck flexion & extension

L & R rotation of neck

Lateral bending neck

Palpation: top, lat., ant.

Shoulder abduction & add

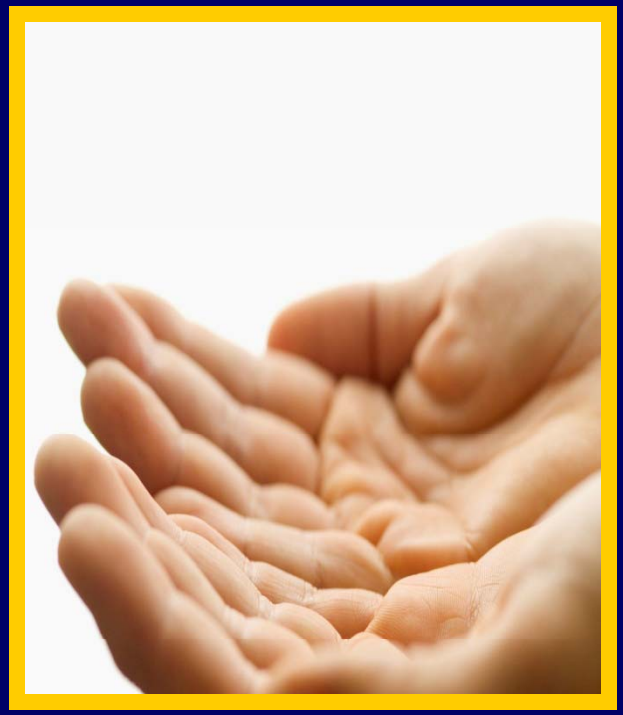


Gruppen et al, 1991

Students select / use irrelevant or non-discriminating info to bolster Dx

(Motrin relieves pain…thus RA)

Premature closure



Friedman, 85% M3

Discriminating features

for example, strep. throat

Age **Nodes** CA/imm-supp.

Imp.m. status IV drug abuse

No cough Asthma exac.

Tachyp-cyan. **Exudate / red th.**

Sex - lung exp. **Fever** ...

Wigton, 1986,'87,'89;
Tape, 1991; Poses, 1992

Fdbk re: discrim. features

- Outcome fdbk *(+/-)* — No

- Cognitive *(optimal vs. S's cue weights)* — + use in practice
- Cognitive + Probability — + + Calibration

Integrating 5 basic elements...

1. Chief complaint *(clinical context)*
2. Corresponding set of proto. Dx
3. PhEx maneuvers *(Sole focus before!)*
4. Interpreting optimal discrim. findings
5. Documenting findings & interpret.

...learning in context - from rote to dynamic

Learning – assessment
The procedure

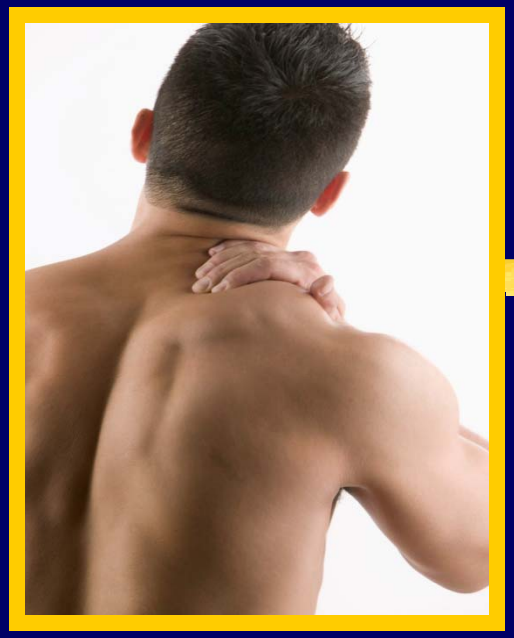
1. Study guide + practice
2. SP exam with immediate fdbk
3. Debriefing: disclosure without blame

Study guide – homework

Given CCs, prototypical Dx & maneuvers :

- Compare & contrast, sort out findings across pairs of Dx
- Learn maneuvers to make a Dx

Build their own representations



Shoulder pain

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Palpation: top, lat., ant.

Shoulder abduction & add

Discriminating features

Sh. pain	B.tendo.	Adh.cap.	Rot.Cuff T	Ref.p.
S1				
S2				
S3				
S4				
S5				
…				
S16				

Discriminating features: Positive – negative findings

Sh. pain	B.tendo.	Adh.cap.	Rot.Cuff T	Ref.p.
S1	Sign +		Sign +	
S2		Sign +		
S3	Sign +		Sign +	Sign +
S4				Sign +
S5		Sign +		
…		Sign +		
S16			Sign +	

Basic, clinical pathophys. mechanisms

- Progressive, chronic inflammation of the internal part of joint (intra artic.)
- Sub-acute inflammation of a tendon (extra artic.) due to overuse
- Referred pain, dermatomes

Study guide + practice

- System-based workshops
- Video demos *(Novi)*
- Practice with SPs
- Practice on ward & in outpt
- …

Exam procedure

Given brief Hx & DDx:

1. **Anticipate** findings for each Dx
2. **Elicit** physical findings
3. **Interpret** findings… working Dx
4. SP **feedback**: redo if needed
   Revise, **re-interpret** Dx
5. **Document** findings & Dx

Ann, 50 yrs old, sees you because of pain in her right shoulder for the past four weeks, especially when she picks things up that are high as on a top shelf.

You're thinking of possible rotator cuff tendonitis or adhesive capsulitis. In **anticipation** of your physical exam of the shoulder, list the positive sign(s) associated with each diagnostic hypothesis.

SPs & simulator models

Hearing loss	Otitis media	Sudden viral hearing loss
S31: Auditory acuity	**(S) Reduced auditory acuity** McGee 839	Reduced auditory acuity
S32: Inspect external ear	**No lesions present**	Possible vesicles in herpes
S33: Otoscope: internal ear	**(M) Otitis media of right side: Immobile bulging tympanic membrane, dull opaque red color**	Normal tympanic appearance without fluid
S34: Rinne test (air conduction> bone)	**(S) Bone conduction longer than air conduction on right side (NB)** McGee 839	Air conduction longer than bone conduction bilaterally
S35: Weber (apex skull) (toward air conduction; away bone cond.)	**(S) Sound better in the right side. (NB)** McGee 839	Sound better in the left side

www.uptodate.com v15.2 Evaluation of hearing loss in adults

Data interpretation

Given the results of your physical exam, which diagnosis is most likely?

- [■] Rotator cuff tendonitis
- [ ] Adhesive capsulitis (frozen shoulder)
- [ ] Neither because the findings are ambiguous or contradictory
- [ ] Don't know; would be guessing

SP feedback

(see Wigton, Ericsson)

- **Immediate feedback** : - incorrect *(SP demo)*
  or
  - omitted maneuvers

- **Redo**
- Do you wish to **revise** your Dx?

Maximize transfer

"Deliberate mixed practice with feedback"

A. Ericsson, 2003
Hatala et al, 1999

- **Deliberate**: planned 19CC-160M-60Dx
- **Mixed**: Shoulder pain: MS, Cardio, GI
- **Practice**… *lots…*
- **With feedback…** cognitive, indiv & gr. "learning from errors"

Fdbk: Student Profiles (8)

Anticipate	Elicit	Interpret
☑	☑	☑
☑	☑	☒
☑	☒	☑
☑	☒	☒
☒	☒	☑
☒	☑	☑
☒	☑	☒
☒	☒	☒

Group profile & feedback

Name	Antic. signs-Arter. Oblit.	Antic. signs-Stenosis	Elicit PhEx man.	Interpret: Working Dx	Interpret: Revised Dx	Docum. findings
Student-2	86%	100%	71	100	100	40
Student-3	57	100	71	100	100	100
Student-4	43	100	71	100	100	80
Student-5	57	100	86	100	100	50
Student-6	71	50	71	100	100	80
Student-9	57	100	86	0	0	20
Student-10	57	0.0	57	0	0	80
Student-12	29	50	29	0	0	0.0
Class aver	56%	75%	68%	63%	63%	54%

Meeting with attending

- Discuss their errors in a non–threatening setting
  "Disclosure without blame"

- Cognitive feedback… to link
  - discrim. features & Dx
  - errors vs. optimal strategy

...in summary: 5 main goals

- See more findings → DDx in mind, early
- Solid foundation → Prototypical Dxs
- Sort out DDx → Discriminating features

- Contextualized... maximize transfer
- Cognitive feedback, individual & group

disclosure without blame

Validity evidence: 4 studies

- Content validity: Dxs, discr. features, refs.
- Performance estim.: Students profiles
- H1: *Discriminating findings provide more reliable measures than entire set of maneuvers (checklist)*
- H2: *Long-term retention enhanced by receiving immediate SP fdbk*

Content validity

- 8 clinicians experienced in teaching PhEx from US, Canada, Europe & Japan
- Reviewed & commented on
  19 cases, protot. Dx & corresp. signs & add references *(evidence-b.)*

Content validation

- Suggestions led to 226 modifications:
  - Maneuvers & signs (65%)
  - Dx (21%)
  - Added references to EBM base
- Went from **anatomical** organization to **Dx reasoning** organization

Ex.: Chest: lungs only
to lungs + JVD + pedal edema

Indiv. student fdbk- profile

		Case-1	Case-2
1. Anticip. signs:	Dx-1	29 (57)	75 (68)
	Dx-2	50 (75)	75 (78)
2. Elicit PhEx man.		29 (71)	60 (80)
3. Interpret: Work. Dx		0 (53)	0 (73)
4. Interpret: Rev. Dx		0 (60)	100 (87)
5. Documentation		0 (54)	60 (66)

Student-A profile

	Correct	Inc, incomplete
Anticipation	X	
Maneuvers	X	
Interpretation: unprompted	X	
Interpretation: prompted		

Student-B profile

	Correct	Inc, incomplete
Anticipation	X	
Maneuvers		X
Interpretation: unprompted		X
Interpretation: prompted	X	

Student Profiles (8)

Anticipate	Elicit	Interpret	
☑	☑	☑	6%
☑	☑	☒	2
☑	☒	☑	5
☑	☒	☒	1
☒	☒	☑	47
☒	☑	☑	18
☒	☑	☒	5
☒	☒	☒	17

How many cases for reliable assessment ?

Generalisability study: φ coefficient

	Total list	Discrim. signs
M3s		
3 cases :	**.35**	**.50**
D-study		
6 cases :	**.56**	**.71**
12 cases :	**.68**	**.80**
22 cases :	**.80**	

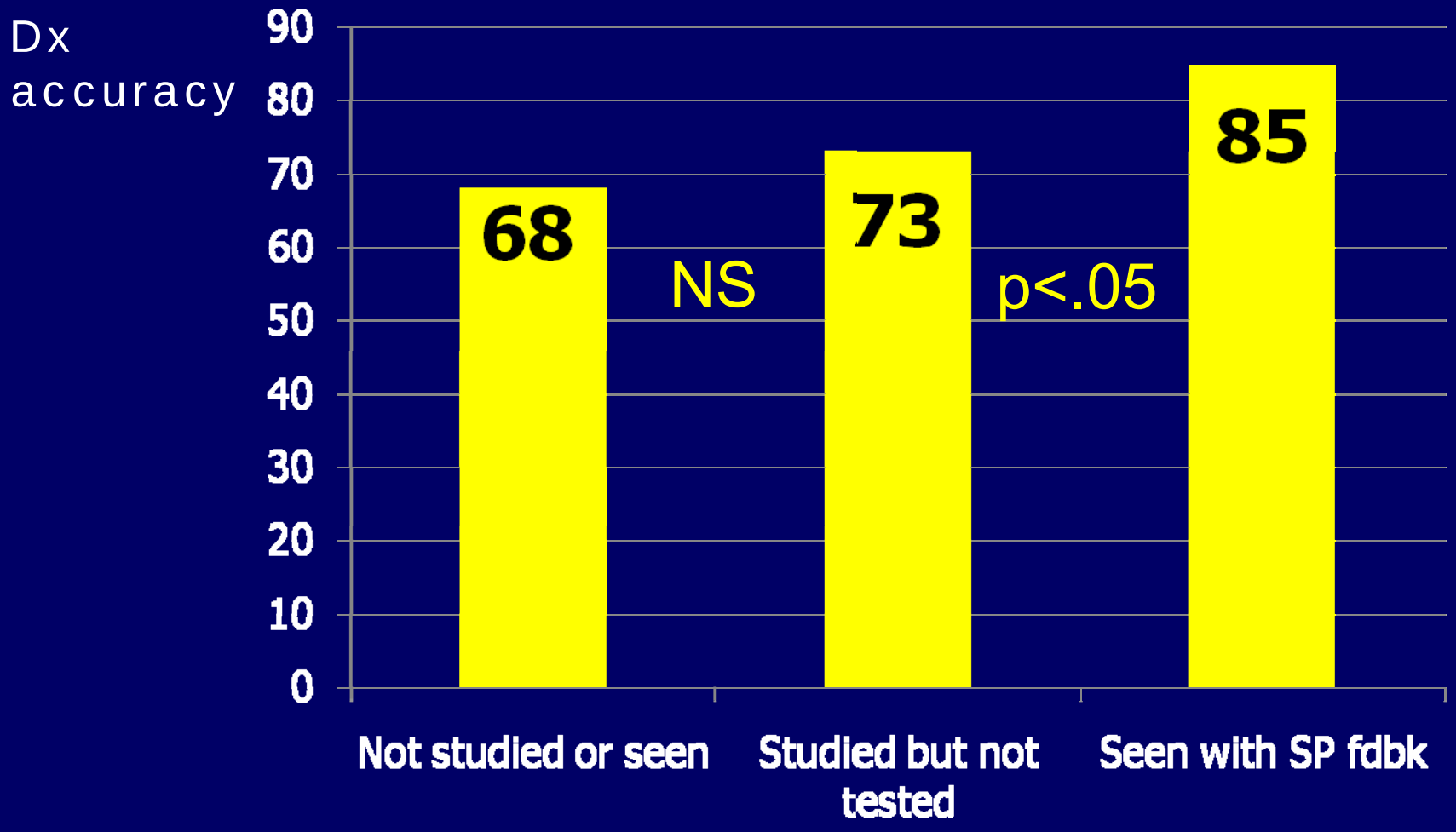
Impact of prior experiences (M3) on retention (M4)

66 M3s IM clkship → **125 M4 exam**

- Student cohorts **prep. 6** of 18 complaints using study guide
- **Assessed** on **3** of 6 complaints

- **Assessed** on **3** of 6 complaints
- Some students:
  - **not seen / studied c.**
  - **studied, not tested**
  - **tested on same complaint /w SP fdbk**

Impact of prior experiences (M3) on retention (M4)



Study guide alone
*did **not** have an effect*

Dx problems tested with
an SP with feedback
enhanced
long-term retention

Anticipate, elicit & interpret findings in context & thinking

- Key role of **discriminating findings (+/-)** for analytical reasoning
- **Detailed profiles** to focus fdbk & instruction
- **Disclosure without blame**
- **Reliable & feasible** *(12 complaints)*

- *Better long-term retention with* ***immediate feedback from SP***

Future plans... development

- Replace HTT with HDPhEx in M2 year, integrated with clinical pathology
- Add Hx component; anal. & non-anal.

Eva, 2006; Ark et al, 2006

- Introduce HDPhEx in M3 yr, reinforcement

- Use discriminating items to build cklists: library of key-feature items linked to Dx

Future plans… research

- HDPhEx - As initial method (M1-2) to learn PhEx
  - Reinforcement in M3-4 yrs
- Validity data from other sites

- Differentiate SP from SP+Fdbk effect

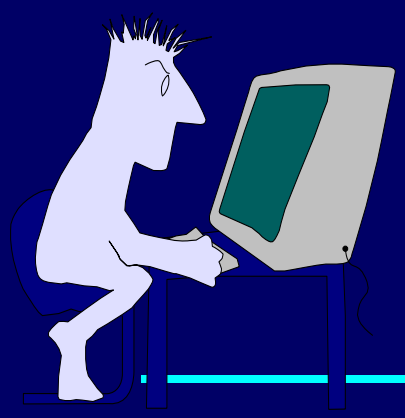

THANK
YOU

Questions

Beyond checklist to context & meaning
Hypothesis-driven Ph Exam

Hx + Diff. Dx : **in context**

- Anticipate : **discriminating findings**
- Elicit signs : **correct maneuvers**
- Interpret : **analytical thinking**
- Be corrected : **immediate feedback**
- Document : **reporting accuracy**



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