The “Key Features” Approach to assess Clinical Decision Making

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November, 2007

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Acknowledgements

- Robert Lee
  Medical Council of Canada

- Gordon Page
  University of British Columbia

- Stephen Aaron
  University of Alberta
Workshop Objectives

1. Define "Key Features" (KFs)
2. Use a systematic strategy to:
   - Select problems
   - Define KFs
   - Develop KF cases, q. & scoring keys
3. Understand psychological & measurement basis of KFs approach
Agenda

1- What are KFs? Why change?
2- Select problems & define KFs
3- Develop KF test cases & quest.
4- Select response format & scoring
5- Why KF cases
Closure
In doubt... ask questions
What are Key Features?

**Unique challenges**, case-specific decisions, in the resolution of a clinical problem, 

*for the level of candidates being tested*
Key Features

**Problem:** Infant in severe, early respiratory distress

**Examinee:** Graduating medical students should:

**KF-1** Consider 3 impending conditions: respiratory failure, dehydration, & congestive heart failure.

**KF-2** Immediately evaluate & manage pt, including: ABG, nebulized salbutamol, O2, IV line, and portable chest x-ray; and avoid unnecessary investigation in acute phase.
Clinical scenario
The triage nurse in the Emergency Department asks you to see a 9-month-old boy. The boy’s mother tells you that her son has had a cold for the past 4 days and...

Followed by 2 or 3 questions assessing only KFs:
1. What impending condition(s), if any, will you consider in this infant?
2. What orders or actions will you take, if any, in your immediate evaluation and management of this infant?

Paper & pencil (or OSCE, MCQs, Orals)
Why change?

60s 80s

Problem solving  Decision making

PMPs  KFs

Patient Management Key Features
Problems
PMPs: Patient Management Problems

Christine McGuire  
CED-UIC 1960s

- Paper & pencil test
- Clinical scenario \((CC)\) +
- Sections \((H&P, Lab. invest., Dx, Managt., F-up)\)

[L] Options  ||  [R] Latent images – answers
Section D

1. Alanine Aminotransferase (ALT)
2. Alcohol level
3. Aldolase, serum
4. Alkaline phosphatase, serum
5. Amylase, serum
6. Arterial blood gases (ABG)
7. Aspartate Aminotransferase (AST)
8. Brain CT-scan
9. Brain MRI
10. Brain PET-scan
11. Calcium, serum
12. Carotid US-doppler
13. Cerebral angiography
14. Cerebro-spinal fluid examination
15. Complete Blood Count (CBC)
16. C-Reactive Protein
17. Creatine Phosphokinase, serum
18. Creatinine, serum
19. Drug screening, serum
20. Drug screening, urine

Etc…

Latent images

- No abnormalities noted
- Salicylate: 32mg/dL (20-25 mg/dL)
- 1.9 (0.7-1.5 mg/dL)
**PMPs:** Patient Management Problems

- 3-hour or ½-day: ≈10 cases
- Scoring: -2 -1 0 +1 +2
- The more “good” things you did, the more THOROUGH you were, the higher your score
1984: Cambridge Conference

PMPs

Dx: 5 ailments
5 ailments re: PMPs

sad ⏧ Low content validity: ≈10 probl.

sad ⏧ Low reliability (consistency) : ≈ .3

sad ⏧ Problem solving = General skill

sad ⏧ Unique format (latent image) : cueing

sad ⏧ Over-rewarding thoroughness
Thoroughness is a predictor of "poor" performance

Elstein, Shulman & Sprafka, 1978
When in doubt, collecting more data *(EKG features)*

- did not improve Dx accuracy
- indicator of uncertainty, Dx error

*Hatala et al, 1998*

*PMPs... rewarding wrong behavior*
Problem solving in medicine

Not a general skill

Specific to each case
- Inter-case correlation = .1 - .3

**Case Specificity**

- Each case presents *unique challenges*
  
  Arthritis ≠ Anemia ≠ Crohns ≠ Diabetes

**Key Features (KFs)**
Consequences for assessment

• Assess only the unique challenges, the case-specific decisions in the resolution of a clinical problem...*best discriminators*

• Many short, focused problems
• Better sampling... better reliability & content validity
Purpose (object) of assessment

Knowledge recall (*describe DT*)
Clinical reasoning (*how*)

**Clinical decisions, actions**
(*recognize & manage DT*)

H&P, Dx, Rx, Investigation, F-up
How to write a KF Case
3 separate steps

I. Select problems

II. Define KFs for each problem

III. Write test material
      (cases, questions & scoring key)

IV. Pilot test cases
I - Select problems

Goal: Adequate & representative number of clinical problems from the domain for... [graduating students]
Domain of clinical problems

Medical Council of Canada

Objectives for the Qualifying Exam


120 primary clinical presentations (dyspnea)
140 related clinical presentations

260 clinical presentations
By alphabetical order

D
- Dysphagia/Difficulty swallowing 26-E
- Dyspnea 27-E
  - Acute dyspnea (minutes to hours) 27-1-E
  - Chronic dyspnea (weeks to months) 27-2-E
  - Pediatric dyspnea (resp. distress) 27-3-E

S
- Scrotal Mass
- Scrotal Pain
- Seizures (Epilepsy)
By disciplines

• Primary Care
• Medicine
• Obstetrics & gynecology
• Population, ethics, legal, org.
• Pediatrics
• Psychiatry
• Surgery
Each clinical presentation

- Rationale
- Causal conditions
- Key objectives
- Objectives
- Ethics
- Applied sc. concepts
How many problems, pts?

- Inter-case correlation = 0.1 - 0.3
- Desired reliability = 0.8
- Spearman-Brown Formula

40 problems
**Select problems from a blueprint**

### AGE GROUPS

<table>
<thead>
<tr>
<th>Group</th>
<th>Percentage</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preg., neonat., infant</td>
<td>5%*</td>
<td>3</td>
</tr>
<tr>
<td>Children (Peds)</td>
<td>16%</td>
<td>6</td>
</tr>
<tr>
<td>Adolescents</td>
<td>16%</td>
<td>6</td>
</tr>
<tr>
<td>Adults</td>
<td>47%</td>
<td>19</td>
</tr>
<tr>
<td>Elderly (geriatrics)</td>
<td>16%</td>
<td>6</td>
</tr>
</tbody>
</table>

* Health Services Data

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**Summary:**

- Total: 40

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* Health Services Data

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Test Development Process

I - Chair randomly selects problems

II - Assigns a problem to a member to define KFs

Discussion with committee

III - Member writes test case & quest.

Discussion with committee
Avoid broad problems…

Ischemic disorders
Alcohol abuse
Epilepsy

Use more specific problems

Stable and unstable angina
Alcohol withdrawal
SEIZURES - Epilepsy

- D.Dx with: Syncopy
  Drug withdrawal
  Metab/endo derangement
  Febrile seizures

- Emergency treatment

- Prevention of seizures…

Where do clerks go wrong?
Clinical situations

- Undifferentiated complaint
- Single, typical (atypical)
- Multiple, multi-system
- Urgent, life-threatening
- Prevention, health promotion
Seizures (epilepsy)

- Rationale
- Causal Conditions
- Key Objectives
- Objectives
- Ethics
- Applied Sc. Concepts

ER Treatment of Status Epilepticus
What Needs Examining?

- **Unique challenges, critical steps, decisions in the resolution of the problem**
- Steps, actions most likely to **lead to error**
- Most **difficult aspects** of problem identification and management in practice

*Focus only on Key Features*
Emergency Rx of Status Epilepticus: Adult – Life-threatening

Think about many cases at first, many possible actions…

Then focus on KFs…
Anatomy of a KF...

- **Initial clinical information**
  
  *Given an adult presenting with...*

- **A clinical task**
  
  *Order investigation...*

- **If necessary, a qualifier**
  
  *Order immediate investigation*
Given a man brought to the E.R. with multiple seizures and without having regained consciousness, the graduating medical student should:
1. Generate **provisional Dx** of status epilepticus

2. Begin **initial management**: Monitor cardio-respiratory fcts (ABC), NS, IV vitB, bolus hypertonic glucose, IV diazepam +/- phenytoin

3. Elicit Hx of **possible causes**: use of alcohol, medication, heroin or cocaine, diabetes

4. Order **immediate exams**: lytes, glucose, ca, ABG, drug screening, brain CT/MRI
Location, setting

- At home
- Office, ambulatory clinic
- Emergency room
- Hospital
- ICU

With support
Limited support
No support
Clerkship directors from across Canada confirmed:

- Existing KFs 92%
- Generating KFs 94%
Practice... I & II
I. Select problems

Given a clinical presentation:

- Select a specific clinical situation for the level of candidates being tested
- Where do [clerks] go wrong?
MCC Objectives

Dyspnea...
11 - Define KFs for the problem

- Unique challenges, critical steps, decisions in the resolution of the problem
- Steps, actions most likely to lead to error
- Most difficult aspects of problem identification and management in practice

“Where do clerks go wrong?”
Is the challenge for clerk, mostly in:

- Data gathering?
- Data interpretation, Dx?
- Under/over ordering investigation?
- Selecting the Rx, management?

Where do clerks most often go wrong???
Test Development Process

I - Chair randomly selects **problems**

II - Assigns a problem to a member to define **KFs**

   Discussion with committee

III - Member writes **test case & quest.**

   Discussion with committee
III - Write test material

1) Prepare **clinical scenario**
   re: problem, situation, & KFs

2) Write **test questions**
   re: KFs only

3) Choose a **response format**

4) Set **scoring key**
Given man w/ suspected alcohol dependence brought to ER w/ multiple seizures w/o regaining consciousness…

- Case scenario includes:

  *CC, some Hx, initial physical*
Writing the Scenario

- Sounds real
- Data presented as in real life, uninterpreted: “vomited blood” vs. “hematemesis”
- Leave out data if you want to ask about history, physical exam or investigation
- Put in info if you want to ask about management
- Put non-contributing data in the case, even if they don’t relate to the KFs, as in real life
Mr. “X,” a 36-year-old man, is brought to the emergency room in your hospital by ambulance because he fell to a sidewalk unconscious while waiting for the bus. A witness immediately called an ambulance and reported to the ambulance crew that before falling to the ground, he seemed confused, agitated, and was arguing with some invisible person. After falling, he began to twitch for a short while, his face became blue, and then he began to have jerky movements all over his body for about a minute. He did not recover consciousness after the episode. During the 10-minute ambulance trip, he presented two other similar episodes, without recovering consciousness, and a third episode that you witnessed on arrival. His temperature is 37.8 C. He looks neglected & is unconscious. No relatives, friends accompanied Mr. “X.”
III- Write test material

1) Prepare **clinical scenario**
   re: problem, situation, & KFs

2) Write **test questions**
   re: KFs only

3) Choose a **response format**

4) Set **scoring key**
Asking the Question(s)

Generally

1 question / KF
1. Generate **provisional Dx** of status epilepticus
2. Begin **initial management**: Monitor cardio-respiratory facts (ABC), NS, IV vitB, bolus hypertonic glucose, IV diazepam +/- phenytoin
3. Elicit Hx of **possible causes**: use of alcohol, medication, heroin or cocaine, diabetes
4. Order **immediate exams**: lytes, glucose, ca, ABG, drug screening, brain CT/MRI
KF-1 Generate provisional Dx of status epilepticus

What’s the exam question?
Question 1  

What is (are) your leading working diagnosis (es) at this point in time? You may list up to two.

1. ________________________________

2. ________________________________
1. Generate **provisional Dx** of status epilepticus
2. Begin **initial management**: Monitor cardio-respiratory facts (ABC), NS, IV vitB, bolus hypertonic glucose, IV diazepam +/- phenytoin
3. Elicit Hx of **possible causes**: use of alcohol, medication, heroin or cocaine, diabetes
4. Order **immediate exams**: lytes, glucose, ca, ABG, drug screening, brain CT/MRI
Question 2  *(KF-2)*

What is your immediate management at this point in time? List as many things as you feel are appropriate.

1. ___________________________________
2. ___________________________________
3. ___________________________________
4. ___________________________________
5. ___________________________________
6. ___________________________________
7. ___________________________________
8. ___________________________________
9. ___________________________________
10. ___________________________________
Ten minutes after arrival, Mr. “X” is still unconscious. The nurse found a telephone number in his wallet that you decide to call immediately. What questions will you ask the person answering the phone – assuming he/she knows the patient? You may select up to six questions. Select option 35 if you think that it is not appropriate to call at this point in time.
<table>
<thead>
<tr>
<th>Question 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Abdominal pain</td>
</tr>
<tr>
<td>2. Alcohol history</td>
</tr>
<tr>
<td>4. Benzodiazepine</td>
</tr>
<tr>
<td>5. Cancer history</td>
</tr>
<tr>
<td>7. Coronary bypass history</td>
</tr>
<tr>
<td>9. Diarrhea</td>
</tr>
<tr>
<td>10. Dizziness</td>
</tr>
<tr>
<td>11. Drug allergy</td>
</tr>
<tr>
<td>12. Family history</td>
</tr>
<tr>
<td>13. Food allergy</td>
</tr>
<tr>
<td>14. Headache</td>
</tr>
<tr>
<td>15. Hearing disability</td>
</tr>
<tr>
<td>16. Heroin abuse</td>
</tr>
<tr>
<td>17. Joint pain</td>
</tr>
<tr>
<td>18. LSD abuse</td>
</tr>
</tbody>
</table>
It has been 15 minutes since Mr. X's arrival. What ancillary exams will you order at this point? You may select as many as you feel appropriate. Select option 35 if you think that ancillary exams are not needed at this point in time.
1. Alanine Aminotransferase (ALT)
2. Alcohol level
3. Aldolase, serum
4. Alkaline phosphatase, serum
5. Amylase, serum
6. Arterial blood gases (ABG)
7. Aspartate Aminotransferase (AST)
8. Brain CT-scan
9. Brain MRI
10. Brain PET-scan
11. Calcium, serum
12. Carotid US-doppler
13. Cerebral angiography
14. Cerebro-spinal fluid exam
15. Complete Blood Count (CBC)
16. C-Reactive Protein
17. Creatine Phosphokinase, serum
18. Creatinine, serum
19. Drug screening, serum
20. Drug screening, urine
21. Echovirus, serology
22. EEG recording
23. Electrolytes (Na, K, Cl)
24. G-Glutamyl Transferase
25. Glucose, serum
26. Lactate Deshydrogenase, serum
27. Lyme disease, serology
28. Protein electrophoresis, plasma
29. T4, Free
30. Temporal artery biopsy
31. Thyroid-Stimulating Hormone
32. Total protein, plasma
33. Urea, serum
34. VDRL (Venereal Disease Research Laboratory), serum
35. No tests needed at this point in time
Question 4 (computer-based)

- Clinical pathology (labs)
- Anatomical pathology (incl. biopsy)
- EEG
- EKG
- Imaging (x-rays...)
- Microbiology
- No tests needed at this point in time
<table>
<thead>
<tr>
<th>Questions - KFs matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
</tr>
<tr>
<td>Q2</td>
</tr>
<tr>
<td>Q3</td>
</tr>
<tr>
<td>Q4</td>
</tr>
</tbody>
</table>
- Single-q. cases, more cases but... reliability went down
- Generalisability study: maximize reliability with 2 - 3 q. / case

1 question/ case, not enough
>3 redundant, wasting testing time

Norman et al, Med Ed., 2006
III. Write Test material

1. **Clinical scenario**
   based on KFs to be tested

2. **Questions**: 1 q./ KF
III- Write test material

1. Prepare **clinical scenario**  
   re: problem, situation, & KFs

2. Write **test questions**  
   re: KFs only

3. Choose a **response format**

4. Set **scoring key**
Open response vs. Selected response

- Nbr responses: WI < SM (+14%; cueing)
- Difficulty: WI > SM (-18pts; 54 – 72)
- Variance: WI > SM
- Discrimination: WI > SM
- Marginal cand.: WI > SM

→ SMs: H&P, Lab. & Investigation
→ WI s: Dx, Rx & Management
Discrimination as a function of the number of options?

PERCENT CORRECT SCORE

PERCENT OF STUDENTS

5 options
15 options
What is the most likely renal abnormality in children with nephrotic syndrome and normal renal function?

A 2-year-old boy has a 1-week history of edema. Blood pressure is 100/60 mm Hg, and there is generalized edema and ascites. Serum concentrations are: creatinine 0.4 mg/dL, albumin 1.4 g/dL, and cholesterol 569 mg/dL. Urinalysis shows 4+ protein and no blood. What is the most likely diagnosis?

A 2-year-old black child developed swelling of his eyes and ankles over the past week. Blood pressure is 100/60 mm Hg, pulse 110/min, and respirations 28/min. In addition to swelling of his eyes and 2+ pitting edema of his ankles, he has abdominal distension with a positive fluid wave. Serum concentrations are: creatinine 0.4 mg/dL, albumin 1.4 g/dL, and cholesterol 569 mg/dL. Urinalysis: 4+ protein and no blood.
III - Write test material

1. Prepare **clinical scenario**
   re: problem, situation, & KFs

2. Write **test questions**
   re: KFs only

3. Choose a **response format**

4. Set **scoring key**
Scoring

- Only score answers that relate to the Key Features

- Give zero for: - wrong answer
  - too many options or
  - harmful actions

  (e.g., zero for choosing more than 5 options; or doing a catherization when uncalled for)
### KF-1

<table>
<thead>
<tr>
<th>Score</th>
<th>Keyed responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Status epilepticus <em>(SE)</em></td>
</tr>
<tr>
<td></td>
<td><em>(Note: both elements are required)</em></td>
</tr>
<tr>
<td>0</td>
<td>Wrong answer or wrote more than 2 diagnoses.</td>
</tr>
</tbody>
</table>
KF-3 Initial Mgmt

1. ABC: 0.20
2. NS: 0.20
3. Vit B: 0.20
4. Glucose: 0.20
5. Diaz+Phen: 0.20

Best reliability
Scoring KFs, cases

- **KFs:** Partial credit *(better reliability)*
  ...different weights do **not** increase reliability

- **CASE** *(unit of measurement)*

  Average KF scores/ problem *(KF equal weight)*

  e.g., \[(1 + 0 + 1 + .66) / 4 = 0.67\]
Scoring test – Pass/ fail

- **Test as a whole**

  Average problem scores *(Prob. equal weight)*

  \[ \frac{(0.67 + .75 + \ldots)}{32} = .78 = 78\% \]

- **Passing score**

  Content (criterion)-based approach

  *(modified Angoff procedure: prob. that minimally competent candidate will get answer correct; 30min./pr.)*
Justification & References

- Brief justification (1 paragraph) for problem & KFs

- References:

* EBM: Evidence based medicine
Test material

- Clinical scenario
- Test questions
- Response format
- Scoring keys
- Brief justification: problem & KFs
- References
Reliability

- PMPs (1/2-day; ~10 cases): ~0.30
- KF exams (1/2-day; 32-36 cases): ~0.65 - 0.71

Spearman - Brown Prof. Formula

0.80 → 45-50 cases = 1 day
Practice... 3 & 4
3. Response format
4. Scoring keys
5. Brief justification: problem & KFs
6. References
1. Title of Clinical Problem & ID number
2. Author(s)
3. Life Span Period
4. Clinical Situation(s)
5. Location, setting
6. Patient’s age & gender if relevant
7. List of KFs: Given… candidate should: …
8. KF – question table
9. Brief justification for problem & KFs
10. References (EBM)
11. Date of revisions
12. Case Scenario
13. Questions & scoring keys
Life Span Periods

- Neonatal, infant, pregnancy
- Child (1-11)
- Adolescent (12-18)
- Adult (19-64)
- Elderly (≥65)
Clinical situations

[ ] Undifferentiated complaint
[ ] Single, typical problem
[ ] Multiple, multi-system problem
[ ] Urgent, life-threatening problem
[ ] Prevention, health promotion
Location, setting

- At home
- Office, ambulatory clinic
- Emergency room
- Hospital
- ICU
- With support
- Limited support
- No support
Common Adm. Pitfalls

- Failure to follow, read instructions:  
  http://www.mcc.ca/english/examinations/qualifying_e1.html

- Be aware of scoring
- One case at a time
- No reversal once case is submitted

→ Read, practice before exam day:
  http://www.mcc.ca/english/examinations/qualifying_e1_practice.html

- Practice cases (6 available)
The Medical Council of Canada / Le Conseil médical du Canada

CLINICAL REASONING SKILLS (CRS) EXAM
(Online demonstration version)

This is the demonstration version of the CRS component MCC's Qualifying Exam Part I in a computer-based format. You must be using Netscape Navigator 4 or Microsoft Internet Explorer 4, 5 or 6 in order to try out this exam. In addition, your browser must have Java and JavaScript enabled. Click your "Back" button to return to the MCC's main web site if you do not want to try the exam or if your browser version is incorrect.

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EXAMEN DE RAISONNEMENT CLINIQUE (ERC)
(Version de démonstration)

L'examen qui suit est une version de démonstration de la composante ERC de la Partie I de l'Examen d'aptitude du CMC dans un format informatisé. Cet examen a été conçu pour être utilisé de concert avec Netscape Navigator version 4 ou Internet Explorer de Microsoft version 4, 5 ou 6. En plus, les langages Java et JavaScript devraient être initialisés. Si vous n'avez pas la bonne version de navigateur ou que vous ne voulez pas essayer l'examen en ce moment, veuillez cliquer sur le bouton "Back" afin de retourner au site du CMC.


Start / Commencer
Common Adm. Pitfalls

- Running out of time...
  - Built-in time management tool
- Keeping track...
  - Flags that count # of responses
  - Provide [N] values, calculator

...in general, candidates do well
MCC CRS Exam

Case One

Switch to French

0:13:38

Time remaining in exam

Case 1
Question 1
Question 2

Normal values
Normal values for most common laboratory tests

Calculator
Online calculator

Check your answers before clicking "Submit."

Submit

QUESTION 2 (Case 1)

4 hours after the beginning of your treatment. The patient feels somewhat better. Vital signs are: blood pressure 130 mm Hg; pulse 104/minute; respirations 26/minute; rectal temperature 38.2°C. Total urine output has been 200 mL. The latest laboratory results are as follows:

- Blood sugar: 12 mmol/L
- Serum ketones: ++
- Arterial blood gases:
  - pH: 7.24
  - PaCO₂: 20 mm Hg
  - PaO₂: 100 mm Hg
  - HCO₃⁻: 12 mmol/L
- Serum electrolytes:
  - Na⁺: 135 mmol/L
  - K⁺: 3.9 mmol/L
  - Cl⁻: 98 mmol/L
  - HCO₃⁻: 13 mmol/L

Given all previous orders are cancelled or terminated, what orders would you write for the next few hours of treatment?

Select up to ten.
(N.B. There are 32 options.)

1. Aminophylline I.V.
2. Amoxicillin
3. Bicarbonate I.V.
4. Blood cultures
5. Central venous catheter
6. Check blood sugar in 2 hours
7. Check blood sugar in 4 hours
8. Check electrolytes in 2 hours
9. Check electrolytes in 4 hours
10. Chest x-ray
11. Daily weights
12. Dental x-rays
13. Electrocardiogram
14. Glucagon I.V.
15. Hourly intake/output
16. Hydrocortisone I.V.
17. Insulin (regular) I.V.
18. I.V. fluids D5 in NaCl 0.9%
19. I.V. fluids D50W
20. I.V. fluids D5W
21. I.V. fluids D5W
22. I.V. fluids D5W
1986-91
Medical Council of Canada
Qualifying (MD) exam – graduating clerks

5-yr R & D : **Q4 Project** – Page & Bordage

1992 : Replaced PMPs with KF cases
2003 : 10-yr review
Why Use KF Cases?

- **Reliability**: Focused cases – broader sampling
- **Content Validity**: Assess most important, case-specific decisions
  Representative sample of cases
- **Fidelity & discrimination**: better ID weaker candidates
- **Construct validity**: Predictive of complaints
  Tamblyn et al, JAMA, 2007
- **Defensible** pass-fail **decisions**
Measurement Basics...

- Adequate & representative **sampling**
- Simple, precise **scoring** focusing on key decisions
- **Formats** fit various purposes
- **Defensible** pass-fail **decisions**
MCC Qualifying Exam

3 parts:

I. Knowledge (MCQs)

II. Clinical decision making
   KF cases (CDM)

III. Performance (OSCE)
Breadth of testing on MCC QE

**I- Knowledge MCQ**

**II- Clin. Dec. Making KFs**

**III- Performance OSCE**

- Data Acq.
- Comm.
- Pr Solv
- KF Cases
  - PMCH
  - ObGyn
  - Psycho
  - Peds
  - Med Surgery
Dissemination

- 1992... Medical schools across Canada
- 1991 Collège des Médecins du Québec (SOI)
- Swiss National Examination Board
- 1993 College Physicians & Surgeons of Pakistan
- 1995 American College of Physicians (MKSAP)
- 1996 Amer. C. Colon & Rectal Surgeons (CARSEP)
  - 9 cases – 30 KFs; \( Crb \alpha = .95 \text{ overall } .93 \text{ CRS } 
- 1997 Royal Australian College General Practice
- 2002 Hatala & Norman, clerkships\((k=15; \ Crb \alpha = .49)\)
Thank you !
Merci !
References


References


- **Bordage G. Carretier, H., Bertrand, R., Page, G.** Comparing times and performances of French- and English-speaking candidates taking a national examination of clinical decision-making skills. Acad Med. 1995; 70:359-65
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- http://www.mhpe-online.org