


# **Symposium**

## **The Use of the Mini-CEX as a Summative Assessment Tool**

# Introduction

Gordon Page  
University of British Columbia  
Vancouver Canada

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# Purpose of the Symposium

To analyze the utility of the mini-CEX as a summative assessment tool with international medical graduates, postgraduate (specialty) trainees, and general practice doctors.

# What is a 'Mini-CEX'?

- ◆ A 'Mini Clinical Evaluation Exercise'
- ◆ Developed at the ABIM in the mid-1990s (Norcini, 1995)\*
- ◆ An observation (10-15 min) of a trainee performing a focused clinical task with a real patient in a real clinical situation, followed by a feedback session (10-15 min) and completion of a one-page rating form

\* Norcini, J. J., Blank, L. L., Arnold, G. K., & Kimball, H. R. (1995). The mini-CEX (clinical evaluation exercise): A preliminary investigation. *Annals of Internal Medicine*, 123, (10), 795-799.

Mini-CEX Assessment Form

Assessor \_\_\_\_\_ Student. \_\_\_\_\_ Date \_\_\_\_\_

Patient Problem/Dx(s) \_\_\_\_\_ Age \_\_\_\_ Gender \_\_\_\_

Setting \_\_\_\_\_ PROBLEM COMPLEXITY: \_\_\_\_ Low \_\_\_\_ Moderate \_\_\_\_ High

1. MEDICAL INTERVIEWING SKILLS ( \_\_ Not Observed)

1 2 3 | 4 5 6 |7 8 9  
Unsatisfactory Satisfactory Superior

2. PHYSICAL EXAMINATION SKILLS ( \_\_ Not Observed)

1 2 3 | 4 5 6 |7 8 9  
Unsatisfactory Satisfactory Superior

3. PROFESSIONALISM/ HUMANISTIC QUALITIES

1 2 3 | 4 5 6 |7 8 9  
Unsatisfactory Satisfactory Superior

4. COUNSELLING SKILLS

1 2 3 | 4 5 6 |7 8 9  
Unsatisfactory Satisfactory Superior

5. CLINICAL JUDGMENT ( \_\_ Not Observed)

1 2 3 | 4 5 6 |7 8 9  
Unsatisfactory Satisfactory Superior

6. ORGANIZATION/EFFICIENCY

1 2 3 | 4 5 6 |7 8 9  
Unsatisfactory Satisfactory Superior

OVERALL CLINICAL COMPETENCE

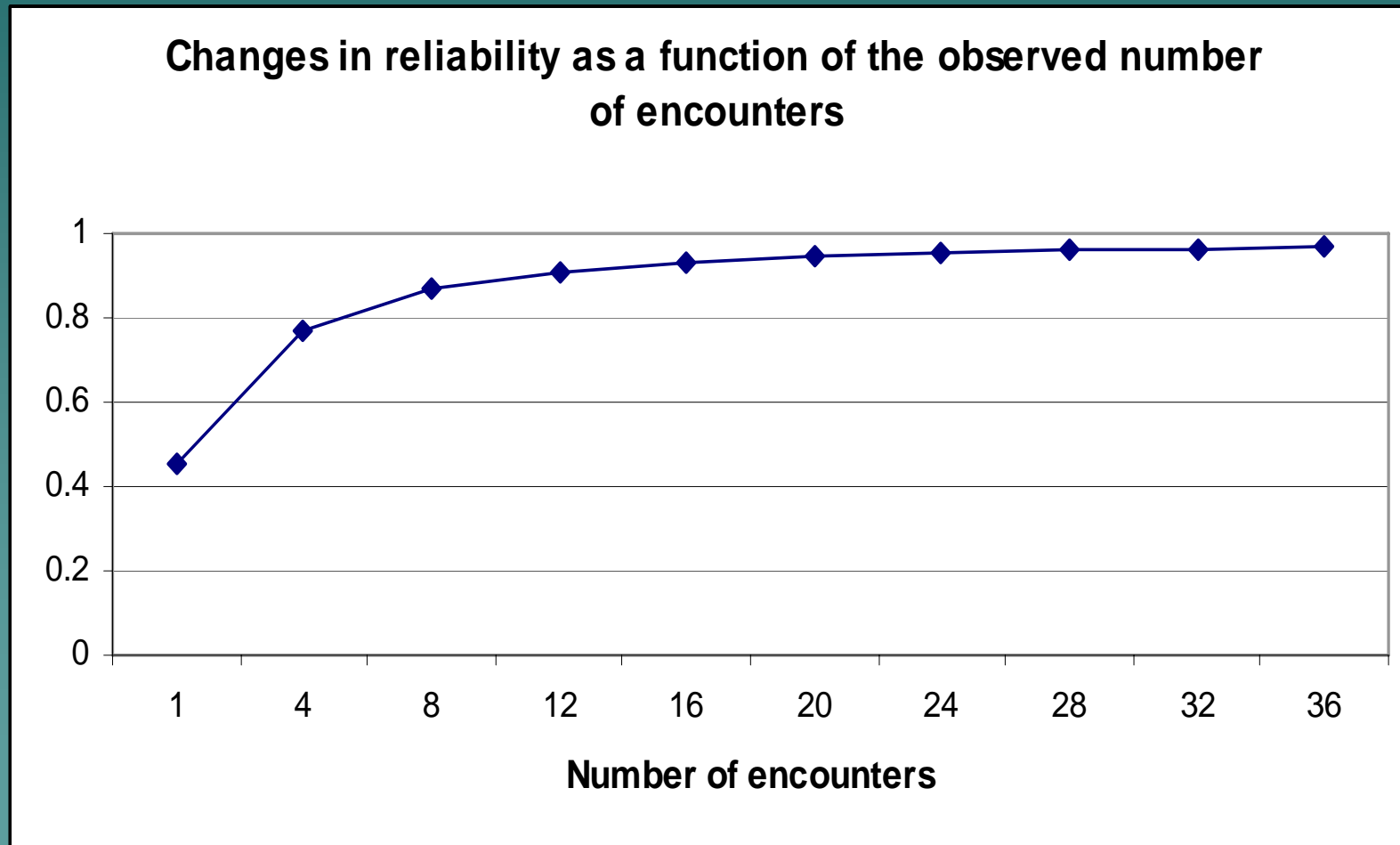
1 2 3 | 4 5 6 |7 8 9  
Unsatisfactory Satisfactory Superior

# ABIM – Why use the mini-CEX?

The Board believes that the mini-CEX offers unique opportunities during training for residents and fellows to be observed and have their clinical skills evaluated on an individual basis and to receive immediate and substantive feedback. While the structure of the training program encourages frequent observations by the faculty of a resident's clinical skills, these encounters are often fragmented, interrupted, brief, and available irregularly. Most opportunities for observation involve the group or team, not the individual.

# Reliability of the Mini-CEX

## Average 'Overall Competence' Ratings



# Mini-CEX Trials 2006-2008

## ◆ Australia

- IMGs (Victoria, NSW, Queensland)
- GP postgraduate trainees (Victoria)

## ◆ Canada

- IMGs (BC, Alta, Sask, Manitoba)
- Practicing family doctors (BC)
- Medicine and surgery postgraduate trainees (BC, Alta, Ontario)

# Symposium Panel

- ◆ Gordon Page, University of British Columbia, Canada (Moderator)
- ◆ Ian Frank, Australian Medical Council
- ◆ Heather Alexander, Griffith University, Australia
- ◆ Neil Spike, Monash University, Australia
- ◆ Barry McGrath, Monash University, Australia
- ◆ Kichu Nair, University of Newcastle, Australia

# Trails included ...

- ◆ **Assessor Training Workshops** -- Modeled on the ABIM/NBME 'Direct Observation of Competence Training Program' developed by Eric Holmboe, Richard Hawkins et al at the American Board of Internal Medicine (Holmboe, 2004)
- ◆ Use of the **ABIM Mini-CEX Rating Form**
- ◆ Written **evaluations** from assessors and assessees

# Utility (U) of an Assessment Strategy

$$U = R \times V \times E \times A \times C$$

R = Reliability

V = Validity

E = Educational impact

A = Acceptability

C = Cost

# **Why Use the Mini-CEX for Summative Assessment?**

**Ian Frank**  
**Chief Executive Officer**  
**Australian Medical Council**  
**Australia**

# **The Use of the Mini-CEX to Assess International Medical Graduates (IMGs)**

**Heather Alexander  
Griffith University**

# Study Data

## Cases selected from:

- Medicine
- Surgery
- Emergency Department

## Mini-CEXs to cover:

- History taking
- Physical Examination
- Counselling/ Management

# **Study components**

## **Phase 1: Inter-rater reliability (consultants)**

**A proportion of assessors in all three states watched 3 different levels of performance for one scenario**

## **Phase 2: Pilot of mini-CEX in clinical settings in NSW, QLD and VIC**

# Study Data – Phase 1

## Inter-rater reliability

Rating:	1-3	4-6	7-9
Scenario 1	1	16	5
Scenario 2	22	0	0
Scenario 3	0	1	21

# **Study Data – Phase 1**

## **Inter-rater reliability**

**Inter-rater reliability (by intra-class correlation coefficient) = 0.994**

## Study Data – Phase 2

Number of mini-CEX observations	209
Number IMGs	28
Mean number mini-CEX per IMG	7.2
Number raters	35
Mean number mini-CEX per rater	6.0
Mean number IMGs per rater	3.0

## Study Data - Settings

Setting	No. Encounters
Ward	122
Outpatients	6
ED	70
Office	2
ICU	8
Total	208 (1 missing data)

## Study Data – Fail/Borderline/Pass decisions

Result	Number of encounters
Fail	19 (9.1%) (involving 12 IMGs)
Borderline	40 (19.1%)
Pass	150 (71.8%)

## Study Data – Time for Mini-CEX

	Time (minutes)
<b>Minimum</b>	<b>6</b>
<b>Maximum</b>	<b>45</b>
<b>Average</b>	<b>19.8</b>

## Study Data – Time for feedback

	Time (minutes)
<b>Average</b>	<b>12.3</b>
<b>Range</b>	<b>3 - 20</b>

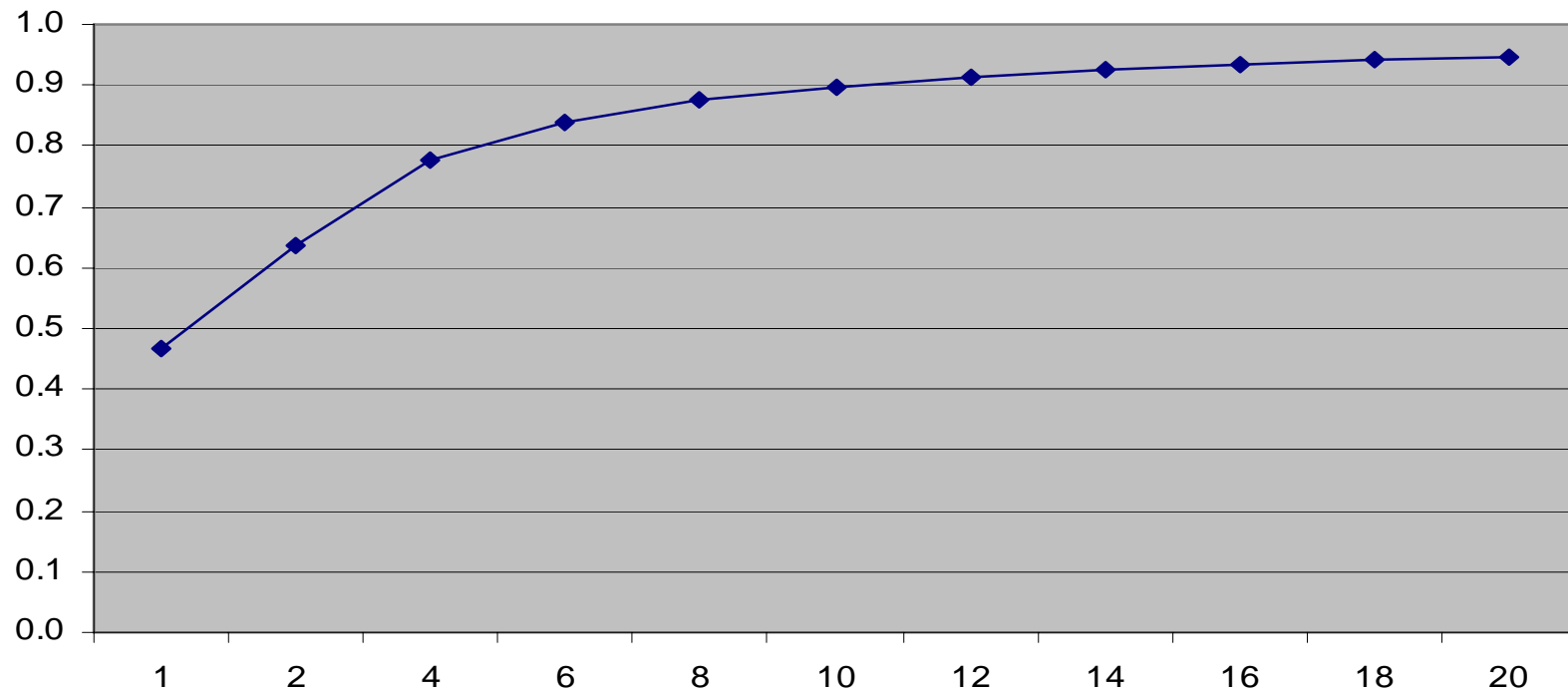
# Study Data – Reliability

Internal consistency:

Coefficient Alpha 0.95  
(desired >0.8)

# Study Results -- Reliability

Changes in G-coefficient as a function of the number of observed clinical encounters



# Study Data – Evaluation

IMGs: n=16

Assessors: n=18

	1 Never	2	3 Usually	4	5 Always	No response
Difficulties arranging? IMGs	3	7	2	0	0	4
Difficulties arranging? Assessors	7	8	2	1	0	0
Interfered with duties? IMGs	5	3	1	2	0	5
Interfered with duties? Assessors	10	5	3	0	0	0

▶ Can be done

## Arranging the mini-CEX- comments

- ◆ **IMG:** Emergency physician not working same shifts as when I was in emergency...
- ◆ **IMG:** For me, whenever I had mini-CEX I had to do discharge summary or other things.
- ◆ **Assessor:** One junior doctor had difficulty arranging times with me due to their schedule and mine...
- ◆ **Assessor:** Excellent admin support provided
- ◆ **Assessor:** Fortunately all was prearranged for me

# Study Data – Evaluation

IMGs: n=16

Assessors: n=18

	1 Too hard	2	3 Approp	4	5 Too easy	No response
Difficulty of cases IMGs	0	4	5	3	0	4
Difficulty of cases Assessors	0	3	12	3	0	0

▶ Cases were appropriate

# Study Data – Evaluation

IMGs: n=16

Assessors: n=18

	<b>1 Never</b>	<b>2</b>	<b>3 Usually</b>	<b>4</b>	<b>5 Always</b>	<b>No response</b>
<b>IMGs: Received feedback?</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>8</b>	<b>4</b>
<b>Assessors: Provided feedback?</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>15</b>	<b>0</b>

▶ Feedback is working

# Study Data – Evaluation

**IMGs: n=16**

**Assessors: n=18**

	<b>1</b> Very Dissat.	<b>2</b>	<b>3</b> Neutral	<b>4</b>	<b>5</b> Very Satisfied	No response
<b>IMGs: Satisfied with feedback?</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>6</b>	<b>4</b>
<b>Assessors: Require more training - feedback?</b>	<b>2</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>0</b>	<b>0</b>

- ▶ **9 IMGs satisfied with feedback**
- ▶ **7 assessors would like more training**

## Feedback- comments

- ◆ **IMG: I had been provided very good feedback after each miniCEX**
- ◆ **IMG: Some assessors provide very good feedback, but some not.**
- ◆ **Assessor: One of the strongest features of the miniCEX**
- ◆ **Assessor: The feedback I felt was a very important part of the exercise...**

## Study Data – Evaluation IMGs: n=16

	1 Never	2	3 Usually	4	5 Always	No response
Developed action plan?	0	2 (1=2.5)	3	2	5	4

▶ Action plan may not have been done in feedback?

OR

▶ IMGs don't see need for action plan?

Supports: need for staff development for giving feedback

# Study Data – Evaluation

IMGs: n=16

Assessors: n=18

	1 Very Dissat.	2	3 Neutral	4	5 Very Satisfied	No response
Tool for learning? IMGs	0	1 (2.5)	4	5	2	4
Tool for learning? Assessors	0	0	4	11	3	0
Tool for asst? Assessors	0	0	8	7	3	0

- ▶ Majority of those responding satisfied with the Mini-CEX as a tool for learning and assessment

# Study Data – Evaluation IMGs: n=16

## Comparison with other methods

	<b>1</b> MiniCEX much worse	<b>2</b>	<b>3</b> Equiv.	<b>4</b>	<b>5</b> MiniCEX much better	No response
ITA	<b>2</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>5</b>
Written exam	<b>1</b>	<b>2</b> (1=2.5)	<b>3</b>	<b>4</b>	<b>0</b>	<b>6</b>
Oral	<b>1</b>	<b>1</b>	<b>5</b>	<b>4</b>	<b>0</b>	<b>5</b>
OSCE	<b>1</b>	<b>1</b> (2.5)	<b>3</b>	<b>2</b>	<b>3</b>	<b>6</b>

# Study Data – Evaluation

**IMGs: n=16      Assessors: n=18**

	<b>1</b> Def. not	<b>2</b>	<b>3</b> Neutral	<b>4</b>	<b>5</b> Definitely	No Resp.
Should continue? IMGs	<b>1</b>	<b>1</b>	<b>2</b>	<b>4</b>	<b>4</b>	<b>4</b>
Should continue? Assessors	<b>0</b>	<b>0</b>	<b>3</b>	<b>6</b>	<b>9</b>	<b>0</b>
Should be summative? IMGs	<b>3</b>	<b>0</b>	<b>3</b>	<b>5</b>	<b>1</b>	<b>4</b>
Should be summative? Assessors	<b>1</b>	<b>3</b>	<b>5</b>	<b>4</b>	<b>5</b>	<b>0</b>

## Should it be used summatively?

- ◆ **Assessor: I found the tool to be somewhat burdensome, but it is no different to other assessment tools**
- ◆ **Assessor: Need more information on its utility as a test instrument.**
- ◆ **Assessor: To assist – not as a stand alone.**

# What the evaluation shows....

- ◆ Acceptable for IMGs and assessors  
*Can be done in Australian workplace settings*
- ◆ Feedback is working  
*Need to focus on training assessors*
- ◆ Majority of respondents satisfied with the Mini-CEX as a tool for learning and assessment  
*Good for formative assessment; more data required on utility as summative assessment tool*
- ◆ Most support the continuation of the mini-CEX  
*Must consider administrative issues*

## What are the lessons?

- ◆ Mini CEX has high reliability with at least 8 encounters
- ◆ Needs organisational support (issues: rosters changing/ mismatch; workload; patients elsewhere; need for admin support)
- ◆ Staff development: Training important.
- ◆ Mini-CEX cannot test everything – not a stand alone assessment

# **Assessment of Postgraduate Trainees in General Practice**

**Neil Spike**

**Monash University**

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# Mini-CEX in GP Training

- ◆ National funding body (GPET)
  - Funded this element of the study
- ◆ 23 regional training providers
  - This pilot in second largest region (VMA)
- ◆ Assessment During Training (ADT)
  - Mini-CEX a possible new method

# Mini-CEX in GP Training

- ◆ Recruitment of trainees
  - Apprenticeship model – working in GP
  - Substitute for existing requirement
  - Additional to existing requirement
  - Independent assessments
  - Feedback and evaluation
  - Compensation for “loss of income”

# Mini-CEX in GP Training

## ◆ Assessors

- 3 medical educators usual training package
- 3 medical educators “untrained”
  - ◆ one page summary of objectives
  - ◆ rating forms with explanatory notes

## ◆ Each trainee assessed by a trained and untrained assessor

# Mini-CEX in GP Training

- ◆ Preliminary pilot results
  - Calibration exercise consistent
  - Assessor and trainee evaluations
  - No significant variance between ratings of trained and untrained assessors
- ◆ Next phase
  - Increase trainee recruitment
  - Expand both groups of assessors
  - Repeat analysis and comparisons with larger trainee numbers

# **IMG Assessment of General Practitioners and Postgraduate Trainees in Medicine**

**Gordon Page  
University of British  
Columbia**

# **The Utility of the Mini-CEX as a tool for Assessing the Performance of Family Practice Doctors**

# Purpose/Research Questions

To evaluate the utility of the mini-CEX as a tool for assessing family and general practice doctors in an office setting

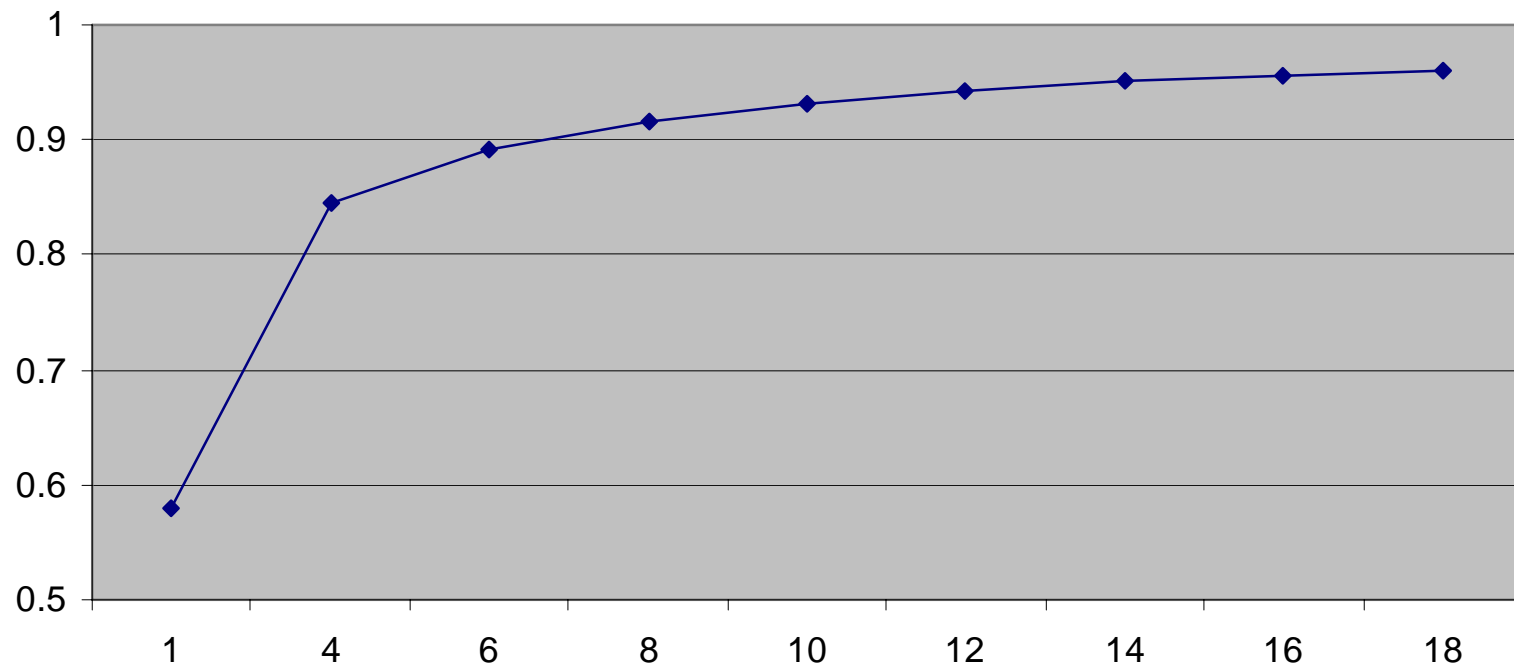
1. How many encounters must be observed to provide a reliable mean rating of overall clinical competence?
2. What level of agreement exists between independent assessors?
3. What is the face validity, educational impact and acceptability of the mini-CEX in this setting, as perceived by those assessed and those assessing?
4. What is the cost of the mini-CEX in this context?

# Study Design

- ◆ 15 volunteer study subjects (family and general practice doctors)
- ◆ 6 trained assessors (family and general practice doctors) -- 4-hour training workshop
- ◆ 10 office encounters per doctor to be observed over a half day, with feedback provided
- ◆ 12 doctors to be observed by one assessor; 3 doctors by a pair of assessors
- ◆ Assessors and doctors to complete a form eliciting their evaluations of mini-CEX face validity, acceptability, and educational impact
- ◆ Ethics Board approvals – doctors and patients sign consent letters

# How many encounters must be observed to provide a reliable mean rating of overall clinical competence?

Changes in reliability as a function of the number of observed encounters



# What is the cost of the mini-CEX in this context?

- ◆ For assessing 15 practitioners:
  - Assessor time: \$400 per half-day x 24 = \$9,600
  - Staff-- scheduling, data retrieval, preparation and analysis, ...: estimated at \$5,000
  - Leadership – workshop presentation, planning, ...: estimated at \$5,000
- Assuming one assessor per assessment, cost per doctor assessed appears to approximate \$1,300

# Conclusions

In the context of assessing family and general practice doctors in an office setting, the Mini-CEX has demonstrated:

- ✓ An acceptable level of **reliability** of average overall ratings of clinical competence with as few as 6 encounters (inter-rater reliability – average difference in global ratings from rater pairs < 1.0)
- ✓ **Acceptance** by both assessors and those assessed. Both groups support its **face validity** and **educational efficacy**
- ✓ **Costs** that are modest relative to other commonly used tools for assessing clinical competence (OSCEs, orals, ...)

# **Evaluation of the Utility of the Mini-CEX for Internal Medicine Trainees**

**University of British Columbia**

**Ravi S. Sidhu MD MEd FRCSC FACS  
Rose Hatala MD MSc FRCPC**



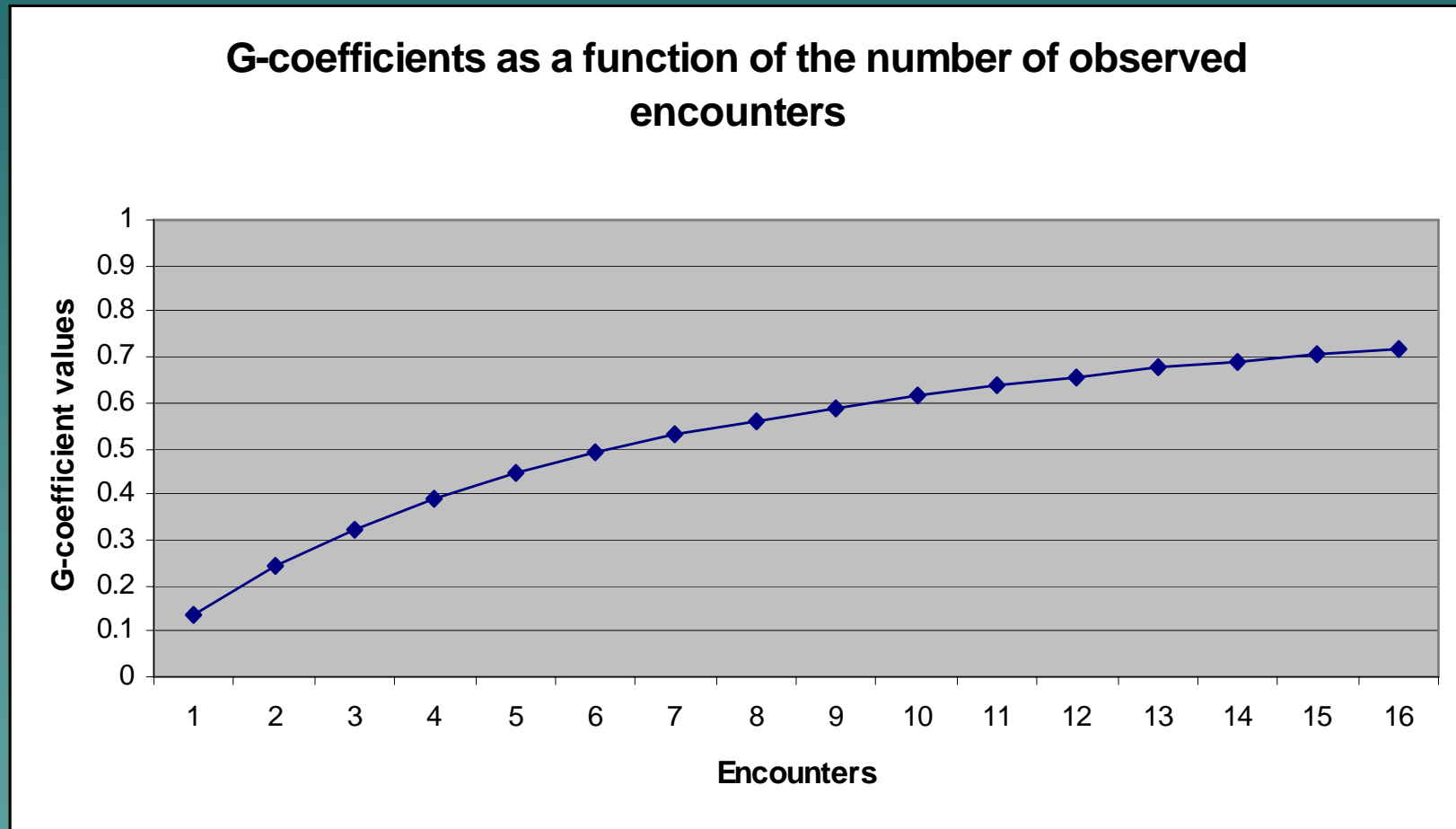
# UBC Internal Medicine Mini-CEX

- ◆ Aim for 1 mini-CEX per clinical rotation, minimum of 6/year
- ◆ Predominantly untrained raters

# Data

- ◆ 75 residents
  - PGY I: 27
  - PGY II: 27
  - PGY III: 9 (12 unknown)
- ◆ 278 mini-CEXs
  - 3.7 encounters per resident
  - Mean time per mini-CEX: 26.2min (sd=12.3)
- ◆ 108 assessors

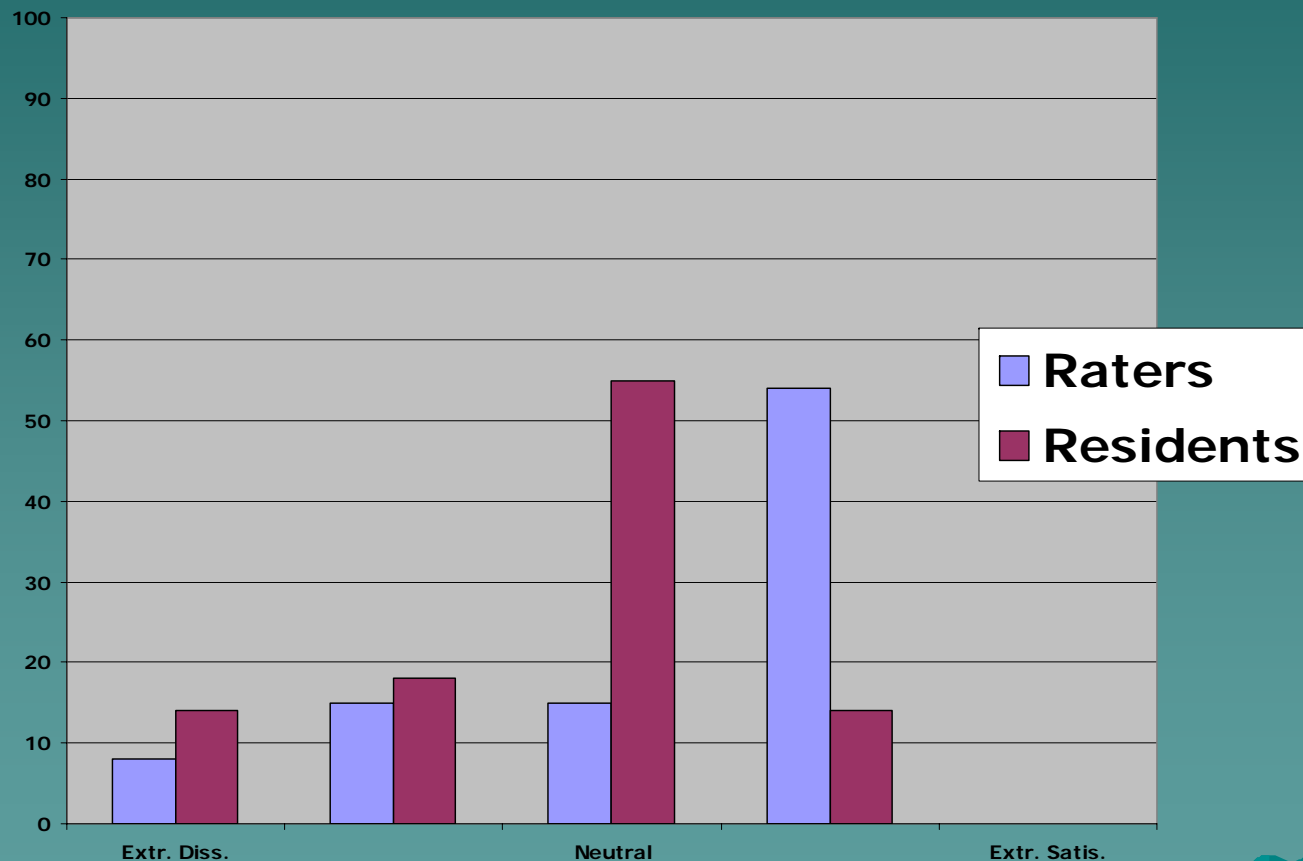
# Results -- Reliability



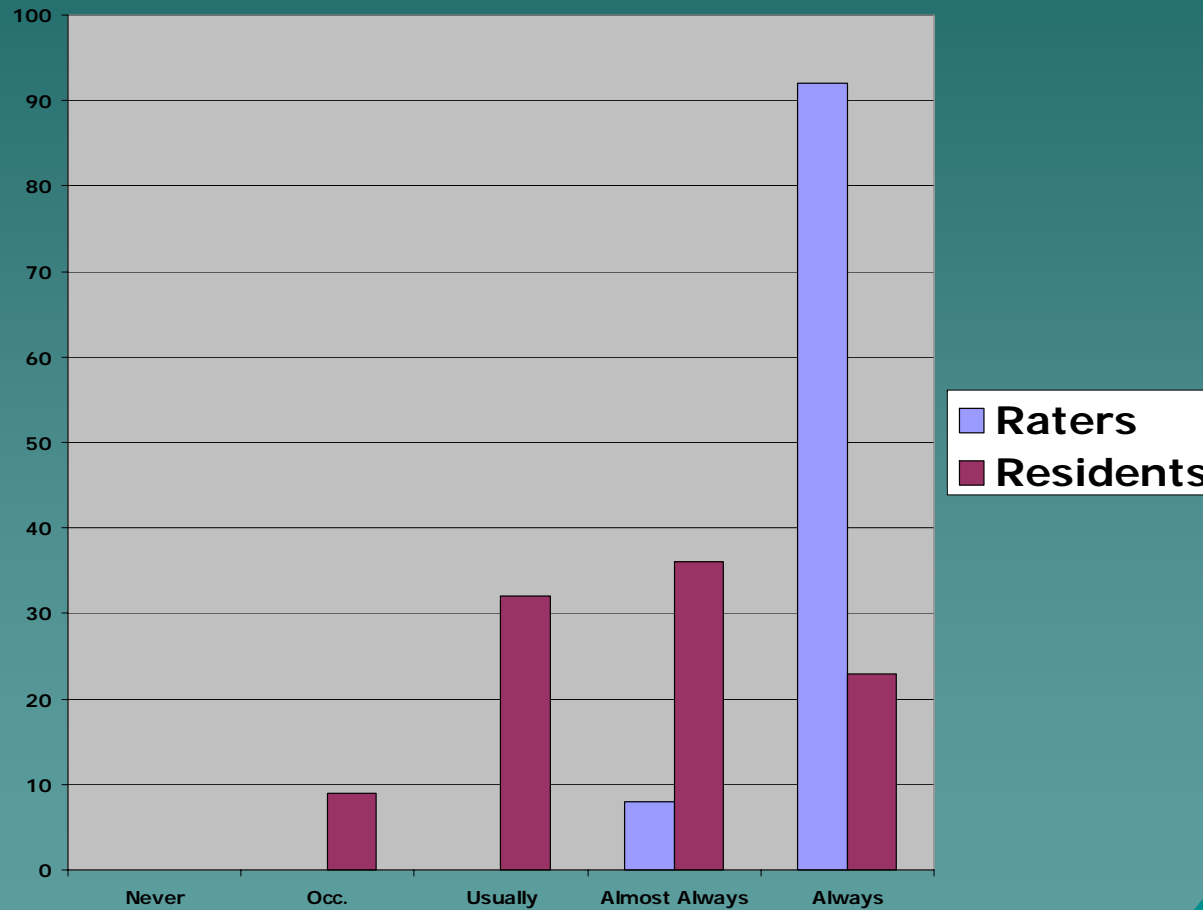
# Evaluation Form Response Rates

- ◆ Raters: 13/28 who had assessed  $\geq 3$  encounters (46%)
- ◆ Residents: 22/75 (29%)

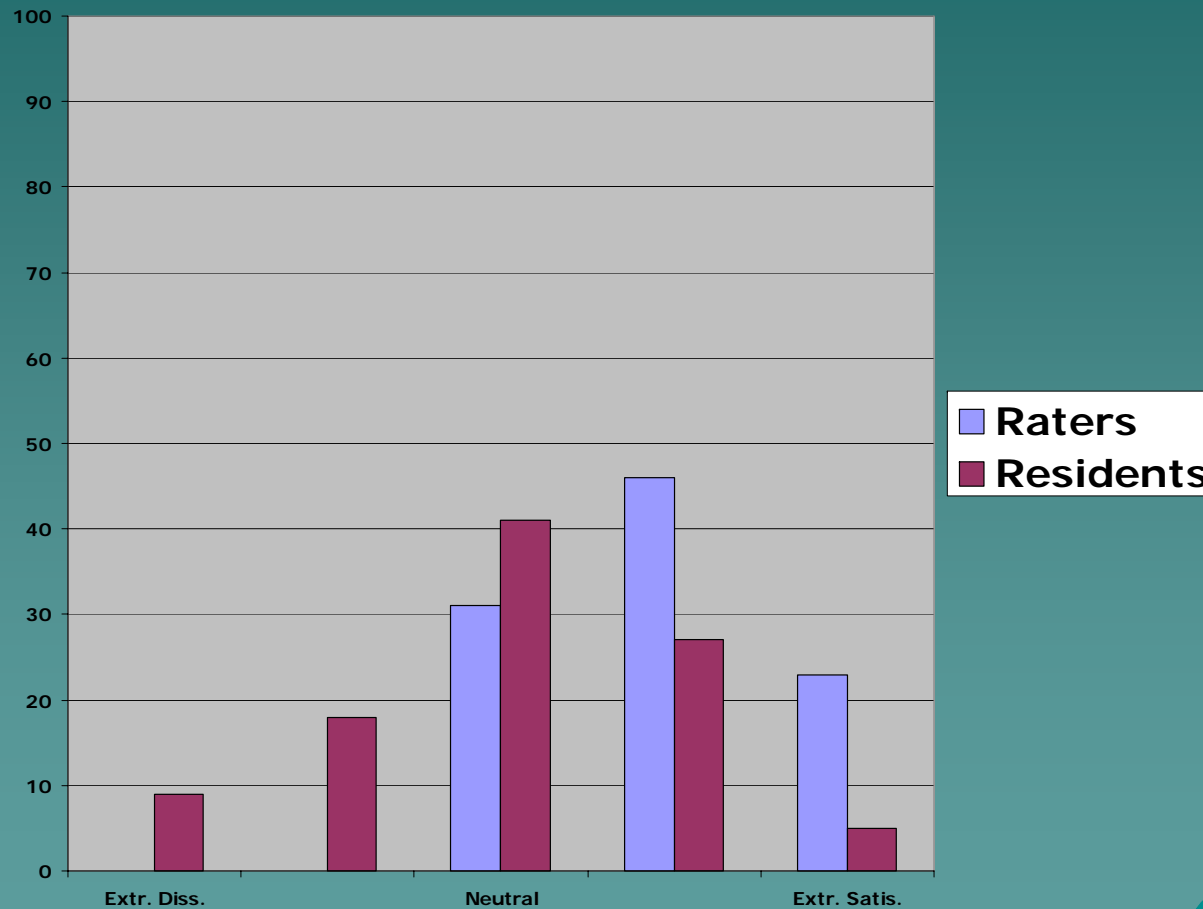
# Are you satisfied the variety of encounters was sufficiently varied to provide an adequate assessment?



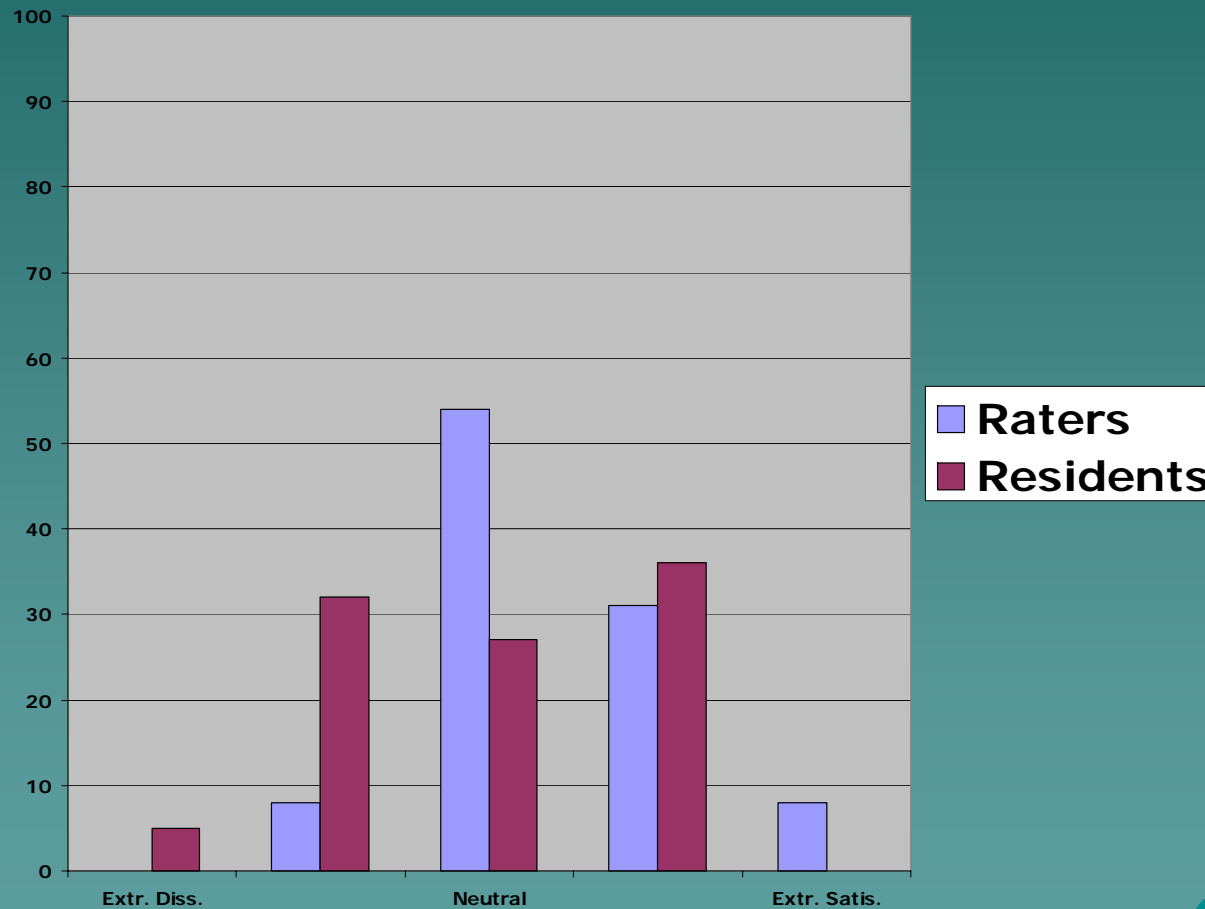
# How often did you provide/receive feedback?



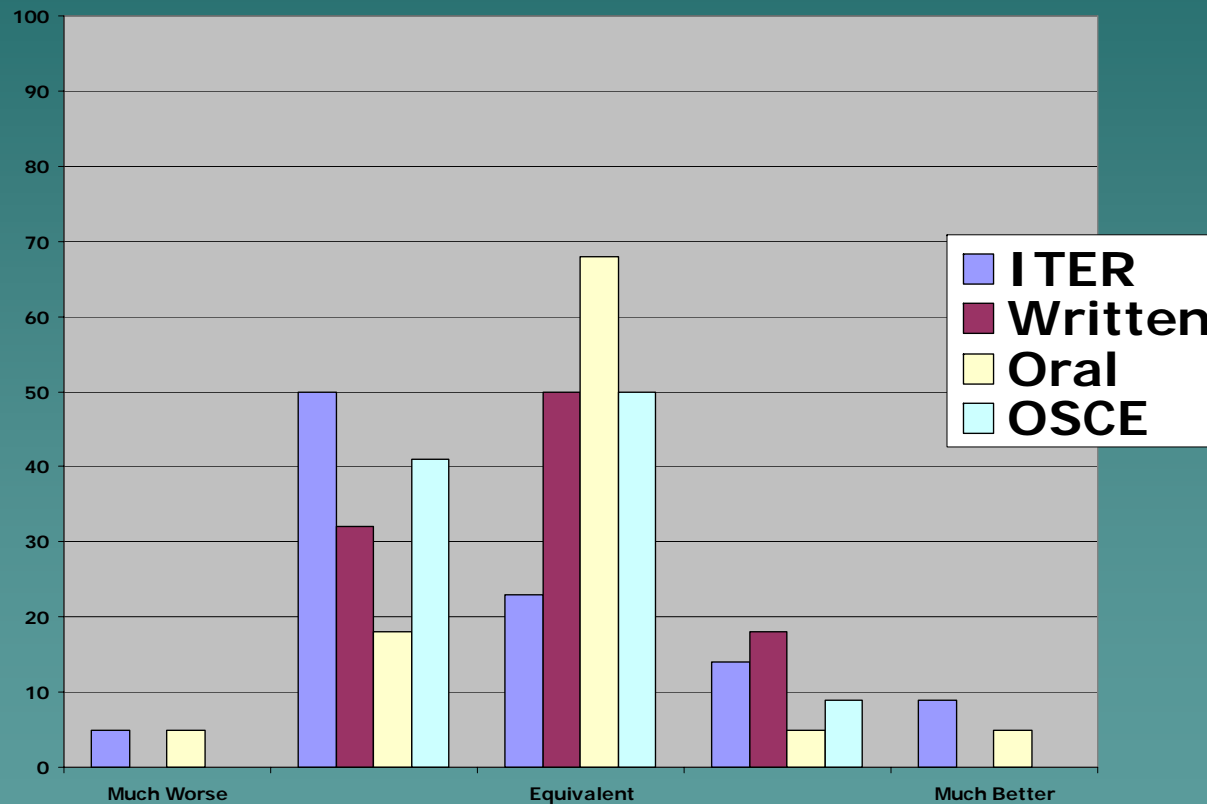
# As a tool to stimulate learning and provide feedback, how satisfied?



# As a tool to assess the ability to provide patient care, how satisfied?



# Comparison to other assessment formats in assessing knowledge and ability?



# Utility (U) Evaluations in Internal Medicine Trial

$$U = R \times V \times E \times A \times C$$

**X** R = Reliability

**?** V = Validity

**?** E = Educational impact

**X** A = Acceptability

**X** C = Cost

# Poor Reliability (Discrimination) and Evaluation Results – Why?

- ◆ Lack of assessor training – specialty directors/division chiefs were trained, then asked to introduce it to their faculty
- ◆ Lack of commitment of faculty assessors – unwilling to commit the time when asked by trainees
- ◆ Lack of standardization of assessments, and plan for selection of cases
- ◆ Poor/variable quality of feedback
- ◆ Lack of infrastructure support – scheduling, forms, ...

# **The Mini-CEX as a Summative Assessment Tool**

**What are the Issues?**

# Symposium Panel

- ◆ Gordon Page, Canadian studies of IMGs, GPs, med and surg trainees
- ◆ Ian Frank, Australian studies of IMGs
- ◆ Heather Alexander, Australia studies of IMGs
- ◆ Neil Spike, Australian study of GP trainees
- ◆ Barry McGrath, Australian studies of IMGs
- ◆ Kichu Nair, Australian studies of IMGs