

Cutting Edge Technology for Public Health Workforce Training in Comparative Effectiveness Research



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What is Comparative Effectiveness Research?



“The conduct and synthesis of systematic research comparing different interventions and strategies to prevent, diagnose, treat and monitor health conditions.”

(Federal CER Council, 2009)



Why is CER so important?

Rising healthcare costs and the need for improved decision making



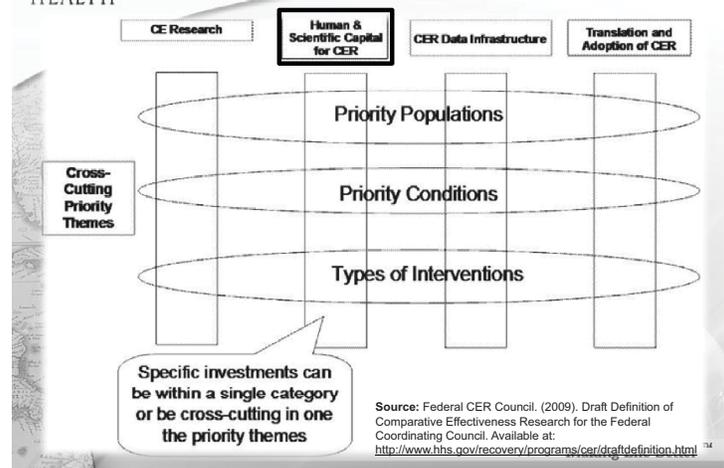
What is driving the healthcare cost?

- Technology and Prescription drugs
- Chronic disease
- Aging of the population
- Administrative costs

Source: Kaiser Family Foundation. (2010) U.S. Health Care Costs. From: <http://www.kaiseredu.org/Issue-Modules/US-Health-Care-Costs/Background-Brief.aspx>



CER Strategic Framework



Challenges for human and scientific capital in CER

- ❖ Workforce needs and gaps
- ❖ Establish CER competencies
- ❖ Mechanisms to support training in CER
- ❖ Identify most effective training modalities
- ❖ Programs that span several weeks or months and use exclusively traditional face-to-face classroom delivery mechanisms are impractical for full-time employees or those geographically removed from the training site.



Integration of health informatics into curriculum development and evaluation processes

- ❖ Sustainable infrastructure for capacity building in CER
- ❖ Empower researchers with tools to synthesize health information and enable informed decision-making
- ❖ Effective means of reaching working professionals to achieve CER objectives

Case Study: e-CER



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Comparative Effectiveness Research (CER)



- ✓ Goal is to quantify effectiveness of medical treatments in real world settings
- ✓ Recently emphasized by the United States government as a priority to improve health care delivery and control excessive health care spending

Problem: Public health workforce largely has no training in methods to implement CER

Task: Effective, accessible training

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E-learning series in CER

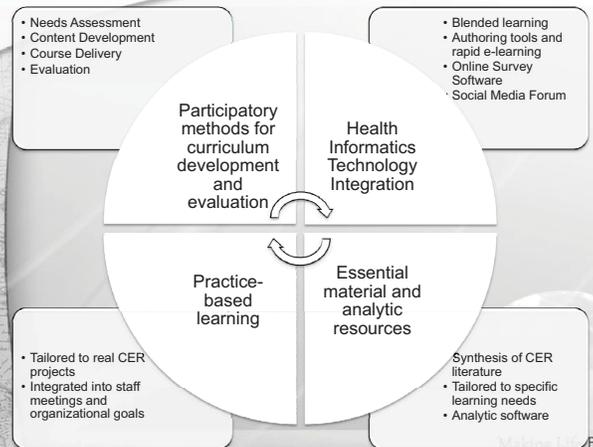
“Learning facilitated and supported through the use of information and communications technology” (e-learning definition)

- ✓ Online and face-to-face components
- ✓ Synchronous and asynchronous availability
- ✓ Can reach working professionals for continuing education



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Our Approach



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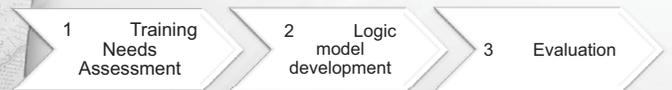
Convened formative CER research collaborative at USF

- ✓ Eight team members conducting research in some capacity for a large, federal CER grant
 - Background in various public health-related fields and at different career stages
 - From a full, tenured professor to masters / doctoral level research assistants
 - All very busy professionals!
- ✓ Needed to establish a baseline proficiency in CER and cost-effectiveness analysis (CEA)
 - But required buy-in from participants and necessitated flexibility around busy work schedules



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Multi-phase mixed methods data collection:



- Characterize pre-training expertise & perceived competence
- Determine training needs, establish learning objectives & tailor curriculum / instructional delivery

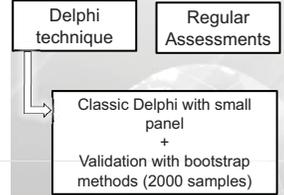
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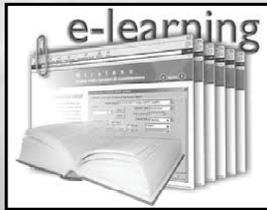
- Developed by trainees
 - ✓ Outcomes of a CER training program to increase research capacity
 - ✓ Required activities to achieve outcomes
 - ✓ Resources needed to implement program operations effectively and efficiently
 - ✓ Used to develop evaluation questions



- Modified Delphi technique
 - ✓ Well known for ability to build consensus anonymously
 - ✓ Iterative sessions
- Regular assessments
 - ✓ Weekly multiple choice online quizzes
 - ✓ 10 questions each



Course Development and Pilot Implementation



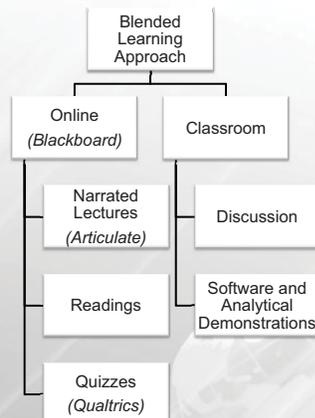
Content Development

- Participants as subject matter experts and narrators for online lectures, on topics of their preference.
 - Rapid e-learning methods:
 - Power point lectures pre-developed, participants' narration and adaptation, flash-based features and online publishing with Articulate Studio.
 - Feedback on quality and content of narrations during face-to-face discussions
 - Enhanced with engaging interactions from the Articulate Studio software



Course Delivery

- Conducted from January-June 2011
- Weekly modules with two components
 - Asynchronous online portion took trainees approximately 4-5 hours
 - Synchronous classroom portion took about 1 hour at weekly staff meetings



Program Evaluation



USF HEALTH Evaluation: Logic Model and Delphi Round 1

- Logic model shown with 3 questions
 - “What elements of the CER curriculum were most valuable to you for enhancing your capacity to conduct CER?”
 - “What was particularly frustrating about the CER program?”
 - “How can the CER curriculum be improved to increase your capacity for conducting CER studies?”

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USF HEALTH Open-ended responses gathered anonymously using *Poll Everywhere* software

Instant Audience Feedback



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USF HEALTH Delphi Round 2

- ✓ Organized responses from round 1 into main themes
- ✓ Item ratings presented to trainees at next staff meeting
- ✓ They rated the utility of each item using a 5-point Likert-type scale
 - ✓ Using online survey software



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USF HEALTH Delphi Round 3

- ❖ Reorganized ratings from round 2 into revised themes
- ❖ Group ratings presented to participants
- ❖ They were asked to re-rate the relative importance of each item considering results from round 2
- ❖ The goal of this step was to achieve group consensus regarding the importance and usefulness of specific training program elements related to increasing CER competence and research capacity

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USF HEALTH Delphi Round 3

Welcome to the eCER Blog!

The eCER blog space is a forum for open dialogue for anyone interested in economic, epidemiologic, analytic, and practical issues that relate to Comparative Effectiveness Research (CER).

- Round 3 results were analyzed
- Areas where no agreement was possible occurred were shown to trainees
- Participants were directed to an *e-CER* blog
 - Designed to elicit discussion on the reasons for persistent disagreements
 - Posts to the blog were anonymous (using pseudonyms)
 - Available for a two-week period

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USF HEALTH Analysis

Qualitative

- ✓ Thematic analysis aided by MaxQDA software
- ✓ Iterative synthesis of Delphi (round 1-4) responses into smaller representative categories or themes
- ✓ 2 independent coders

Quantitative

- ✓ Qualtrics survey software
- ✓ Needs assessment, pre-test and post-test
- ✓ Frequencies, percentages, and measures of central tendency for each Likert-type response from the Delphi process
- ✓ A median reference was used
 - ✓ Values \geq the median (indicative of more agreement) reflected reasonable consensus

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RESULTS



Needs Assessment

- Perceived Strengths
 - Design and conduct of epidemiological research studies
 - Assessing the impact of public health and medical interventions on health outcomes
 - Some trainees also felt proficient at using extant data sources and conducting statistical analyses



Needs Assessment, cont.

- Perceived Weaknesses
 - Conducting economic analysis for CER studies
 - e.g. cost-effectiveness analysis (CEA)
 - Policymaking in health and health care
 - Management of electronic databases
 - Advanced statistical methods
 - Decision tree modeling
 - Probabilistic sensitivity analysis



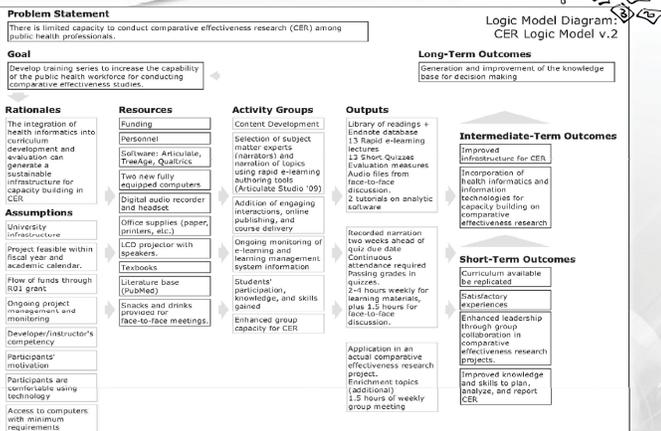
Results – Pre/Post Test

Pre-test mean score = 31.4%
 Post-test mean score = 80.0%

Knowledge Increased!



Results – Logic Model



Results – Delphi Round 1

- What did trainees like?
 - ✓ Didactic sessions on CER and CEA
 - ✓ Tutorials on decision analysis and exercises
 - ✓ Health informatics technology
 - ✓ Blended approach



"I particularly valued the ability to transform conceptual principles into practical applications of comparative effectiveness research."

"I liked the combo of online and in-person platforms."

USF HEALTH Ways to improve?



- ✓ Partnerships with health economic professionals
- ✓ Participation of trainees
- ✓ Better audio and more discreet choice of narrators
- ✓ Enriched exercises

"We should include more video tutorials, not just static presentations."

"USEFUL WHEN THE NARRATOR APPEARED TO BE INTERESTED IN WHAT HE OR SHE WAS TRYING TO BESTOW UPON THE GROUP."

"Homework exercises should also be brief as it is difficult to find time outside class to do exercises."

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USF HEALTH Results: Delphi round 2 and 3 augmented with bootstrap methods

❖ Delphi round 2 ratings:

- ❖ Specific program elements for enhancing CER capacity
- ❖ Ways to Improve CER Training
- ❖ Overall utility of the e-CER training from the participants' perspective

❖ Delphi round 3, consensus and disagreements

- ❖ Estimates from round 3 further validated with bootstrap methods

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USF HEALTH Most useful program characteristics

Themes or categories	Specific program elements*	Median ^b N=7	Mean (95%CI) ^c N=2000
Learning content	Group's discussions	5.00	4.99 (4.31-4.99)
	Class exercises	4.00	4.33 (4.00-4.98)
	Conceptual principles	5.00	4.99 (4.33-5.00)
	Statistical frameworks	5.00	4.63 (3.32-4.99)
	Recorded sessions	4.00	3.65 (2.35-3.997)
	Tutorials	4.00	4.34 (4.00-4.98)
Real world applications	Incorporation of informatics technology	5.00	4.98 (3.72-5.00)
	Direct application to a research project	4.00	4.32 (3.34-4.98)
	Practical applications for CER projects	5.00	4.98 (4.31-5.00)

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USF HEALTH Most useful characteristics, cont.

Resources			
	Food	5.00	4.89 (4.09-5.00)
	Textbooks	5.00	4.99 (4.36-5.00)
	Supplemental articles	5.00	4.65 (4.01-4.99)
	Authoring tools	4.00	4.11 (4.00-4.90)
	Experts as resources	5.00	4.98 (4.31-5.00)
Social interaction	Diversity of expertise	5.00	5 (5.00-5.00)
	Exercises in group	4.00	4.33 (4.00-4.98)
Technology integration	Face-to-face interaction	5.00	4.98 (4.31-5.00)
	Analytic software training	5.00	4.65 (4.02-4.99)
	Web-based programs	5.00	4.88 (4.09-4.99)
	Authoring tool	5.00	4.64 (4.02-4.99)
	Combo of online and in person	5.00	4.99 (4.34-5.00)
	Blackboard learning environment	3.00	3.22 (2.33-4.85)

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USF HEALTH Overall utility of the e-CER training from the participants' perspective

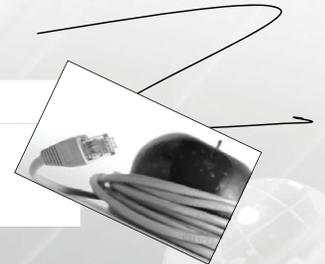
Criteria	Median	Bootstrap mean
Blended e-learning was adequate to my learning style	5.00	4.87 (3.40-5.00)
Activities in the e-CER were implemented according to plan	3.00	3.36 (2.36-4.64)
The e-CER learning series is very relevant to the public health mission	5.00	4.98 (4.31-5.00)
Very useful to increase my confidence to conduct CER	4.00	4.31 (3.31-3.98)
It increased my skills to conduct CER	5.00	4.63 (3.33-4.99)
It made me change the way I do things in my job	4.00	3.65 (3.01-4.66)
As a result of the training, we actually achieved tangible product within the organization	4.00	3.98 (3.07-4.91)

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USF HEALTH Discussion and Conclusions

- Utility in integrating health informatics and information technology with participatory approach for...

- ✓ Development
- ✓ Implementation
- ✓ Evaluation



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USF Discussion and Conclusions

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- Trainees excelled through our blended learning approach
 - Flexible
 - Maintained social aspect of learning
- Integration of informatics and communication technologies with the Delphi technique:
 - Maximized the use of resources and data sources
 - Permitted systematic assessment of the potential utility of participatory, blended learning programs for enhancing CER capacity among the public health workforce

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USF Discussion and Conclusion

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CONCLUSION =



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USF Contact Information

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Presenter Disclosures

Abraham A. Salinas-Miranda

- (1) The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

No relationships to disclose

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