Mixed Methods in Implementation Science

Lawrence A. Palinkas, PhD
Albert G. and Frances Lomas Feldman Professor of Social Policy and Health
Chair, Department of Children, Youth and Families
Presentation Objectives

• Describe research on three interrelated facets of EBP implementation
  – Provider social networks
  – Use of research evidence
  – Cultural exchange between researchers and practitioners

• Focus on EBP implementation in public youth-serving systems
  – Child welfare
  – Specialty child mental health
  – Juvenile justice

• Illustrate use of mixed method designs in implementation research
What are Mixed Methods?

• A methodology that focuses on collecting, analyzing, and mixing both quantitative and qualitative data in a single study or series of studies.

• Its central premise is that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone.

(Cresswell & Plano Clark, 2011)
Mixed Method Designs

• **Combine** the qualitative and quantitative approaches into the research methodology of a single study or multi-phased study.
  – Not merely parallel play
  – A model of and for interdisciplinary research

• Simultaneously answer confirmatory and exploratory questions, and therefore verify and generate theory in the same study (Teddlie & Tashakkori, 2003).
How to collect data in a mixed method study

• Timing of data collection
  – Simultaneously (qual + QUAN, QUAL + quan)
  – Sequentially (qual → QUAN, QUAL → quan)

• Weight or priority assigned to each method
  – Priority to qualitative method (quan → QUAL)
  – Priority to quantitative method (QUAN → qual)
  – Equal priority to both methods (QUAL + QUAN)
## Mixed Methods Design Typology

<table>
<thead>
<tr>
<th>Design type</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| Convergence       | • Corroboration of findings (data + interpretation) generated through quantitative methods with findings generated through qualitative designs (Triangulation).  
                    • Conversion of one type of data into another (Quantitizing/qualitizing)                                                        |
| Complementarity   | • Findings generated through qualitative methods answer exploratory questions while findings generated through quantitative methods answer confirmatory questions.  
                    • Qualitative methods provide depth of understanding to complement breadth of understanding afforded by quantitative methods.  
                    • Qualitative methods used to study process and context and quantitative methods to study outcomes.                                |
| Expansion         | • Findings from a qualitative study used to expand the depth of understanding of issues addressed in a quantitative study.    
                    • Findings from a quantitative study used to expand the breadth of understanding of issues addressed in a qualitative study.  |
| Exploratory/Devel opment | • Findings from a qualitative study used to develop questions or items for a quantitative survey or instrument, develop or modify a conceptual framework used to generate hypotheses for quantitative analyses, or develop an intervention or program that can be evaluated quantitatively. |
| Sampling          | • Use of one set of methods to identify participants who will provide data using the other set of methods (e.g., purposeful sampling of research participants for semi-structured interviews based on information collected from a quantitative survey; random sampling of a subpopulation of participants identified from interviews or participant observation as being of particular interest. |
How to decide the function of mixed methods

- When seeking answers to the same question (convergence)
- When seeking answers to related questions (complementarity)
- When findings based on one method raises questions that can be answered by use of the other method (expansion)
- When findings based on one method are a prerequisite to use of the other method (development)
- When one method can help to define or identify the participant sample for collection and analysis of data representing the other type of method (sampling)
Three ways of mixing quantitative and qualitative data

Merge the data

```
Qualitative data → Results ← Quantitative data
```

Connect the data

```
Qualitative data → Quantitative data ← Results
```

Embed the data

```
Quantitative data

Qualitative data

→ Results
```

Source: Cresswell & Plano Clark, 2007
How to decide which way to mix

• Merge the data when seeking answers to the same question.
• Connect the data when seeking answers to related questions sequentially.
• Embed the data when seeking answers to related questions simultaneously.
Reasons for using mixed method designs in implementation research

- Quantitative methods to measure intervention and/or implementation outcomes and qualitative methods to measure process.
- Qualitative methods to explore implementation steps and generate a conceptual model along with testable hypotheses and quantitative methods to confirm the validity of the model by testing the hypotheses.
- Quantitative methods to examine implementation content and qualitative methods to examine context.
- Quantitative methods to incorporate research perspectives and qualitative methods to incorporate consumer perspectives into research.
- Use one set of methods to address limitations of the other.
### Examples of Mixed Methods

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Structure</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Networks and Implementation of Evidence-Based Practice in Public Youth-Serving Systems</td>
<td>Embedded Merged Connected</td>
<td>QUAL + QUAN</td>
<td>Convergence Complementarity Development</td>
</tr>
<tr>
<td>Innovation and the Use of Research Evidence in Public Youth-Serving Systems</td>
<td>Embedded Connected</td>
<td>Qual → QUAN</td>
<td>Complementarity Development</td>
</tr>
<tr>
<td>Child STEPS Effectiveness Trial Dissemination and Implementation Study</td>
<td>Embedded</td>
<td>QUAN + qual</td>
<td>Complementarity Expansion Development</td>
</tr>
</tbody>
</table>
Social Networks and Implementation of Evidence-Based Practice in Public Youth-Serving Systems

PI: Lawrence A. Palinkas, Ph.D.
University of Southern California

Co-PI: Patricia Chamberlain, Ph.D.
Oregon Social Learning Center

Funded by the William T. Grant Foundation (#9493) and NIMH (R01 MH07658)
Background

- Interpersonal contacts within and between organizations and communities are important influences on the adoption of new behaviors (Rogers, 2003; Palinkas, Allred, & Landsverk, 2005; Brekke, Ell, & Palinkas, 2007).

- Both the influence of trusted others in one’s personal network and having access and exposure to external information are important influences on rates of adoption of innovative practices (Valente, 2010; Valente et al., 2007; Valente et al., 2011).
The CAL-OH Study

• Objective: Determine whether community development teams (CDTs) are more effective than services as usual in “scaling up” implementation of MTFC
  – MTFC: EBP for youth who otherwise would be in congregate care and are placed in well supported foster homes
  – CDTs: Key stakeholders from multiple levels (system leaders, organizations/agencies, practitioners, consumers) who are provided with peer-to-peer exchanges, Locally informed planning (including financing), needs-benefit analysis, monitoring and support, fidelity focus, and technical assistance
• Design: Adaptive or rolling RCT in which 40 California and 11 Ohio counties are randomized into two conditions (CDT vs SU)
  – Matched into 4 equivalent cohorts to deal with feasibility (8 equivalent groups)
  – Then randomized to 2 conditions (CDT or IS)
  – Wait-list feature
Study Specific Aims

• Describe the structure and operation of influence networks of public-youth-serving systems participating in the first cohort of the CAL-OH Study.

• Determine the influence of these networks on decisions related to participation in the CAL-OH Study during the pre-implementation and implementation phases.

• Identify the personal and contextual factors that influenced the operation of these networks within the context of the CAL-OH Study.
Methods

• Semi-structured interviews with 38 agency directors and senior administrators in 12 California counties (MTFC Cohort 1)
  – County response rate (12/13 = 92.3%)
  – Individual response rate (38/45 = 84%)

• Web-based survey of social network structure (n=30) in which each participant was asked to identify up to 10 people for whom they relied for advice on whether and how to use evidence-based practices for meeting the mental health needs of youth served by their agency
  – Examination of Network characteristics of 176 person network using UCINet

• Stage of Implementation Completion scale (SIC: Chamberlain et al., 2010) to measure progress made in implementation from engagement to sustainability
## Stages of Implementation Completion (SIC)

<table>
<thead>
<tr>
<th>Stages</th>
<th>Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Engagement</td>
<td>System Leader</td>
</tr>
<tr>
<td>2. Consideration of Feasibility</td>
<td>System Leader, Agency</td>
</tr>
<tr>
<td>3. Readiness Planning</td>
<td>System, Agency</td>
</tr>
<tr>
<td>4. Staff Hired and Trained</td>
<td>Agency, Practitioner</td>
</tr>
<tr>
<td>5. Adherence Monitoring Established</td>
<td>Practitioner, Client</td>
</tr>
<tr>
<td>6. Services and Consultation begin</td>
<td>Practitioner, Client</td>
</tr>
<tr>
<td>7. Ongoing Services, Consultation, Fidelity</td>
<td>Practitioner, Client</td>
</tr>
<tr>
<td>Monitoring, Feedback</td>
<td></td>
</tr>
<tr>
<td>8. Competency (certification)</td>
<td>System Leader, Agency, Practitioner, Client</td>
</tr>
</tbody>
</table>
Examples of SIC Items

• Stage 2: Consideration of Feasibility
  * Date of first contact for pre-implementation planning
  * Date first in-person meeting held
  * Date feasibility questionnaire completed

• Stage 3: Readiness Planning
  * Date of cost/funding plan review
  * Date of staff sequence, time-line, hire plan review
  * Date of foster parent recruitment review
  * Date of referral criteria review
  * Date of communication plan review
  * Date of second in-person meeting held
  * Date written implementation plan complete
### Results

Social network members by intervention condition and implementation stage

Regression of implementation stage on centrality, county size and urban/rural classification (n = 137)

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-degree Centrality</td>
<td>0.16</td>
<td>0.07</td>
<td>2.26</td>
<td>0.03</td>
</tr>
<tr>
<td>Out-degree centrality</td>
<td>0.01</td>
<td>0.02</td>
<td>0.61</td>
<td>0.54</td>
</tr>
<tr>
<td>Large county</td>
<td>0.43</td>
<td>0.14</td>
<td>3.14</td>
<td>0.00</td>
</tr>
<tr>
<td>Urban county</td>
<td>0.47</td>
<td>0.15</td>
<td>3.24</td>
<td>0.00</td>
</tr>
</tbody>
</table>

(Source: Palinkas et al., 2011)

Note: Triangles = CDT; Circles non-CDT; Squares = other organizations; Implementation Stage: Grey = 1; Dark green = 2; Bright green = 3.
Treatment and Control Conditions
without Non-County Actors

(Source: Palinkas et al., 2013)
Themes from Qualitative Data

• Systems leaders develop and maintain networks of information and advice based on roles, responsibility, geography, and friendship ties.
• Social networking is central to implementation of EBPs through two mechanisms,
  – Acquisition of information and advice related to EBPs
  – Pooling of resources among agencies
• Both mechanisms involve collaboration between organizations.
Model of inter-organizational EBP implementation collaboration

Collaboration characteristics
- Focus
- Formality
- Frequency

Inner context
- Intra-organizational culture
- Extra-organizational culture
- Characteristics of individual actors

Outer Context
- Availability of funds
- Govt. mandates
- County size
- Same clients

Stage of implementation
Conclusions

• Successful implementation of evidence-based practices requires consideration and **utilization of existing social networks** of high status systems leaders that often cut across service organizations and their geographic jurisdictions for **sharing of information and resources**.
Innovation and the Use of Research Evidence in Public Youth-Serving Systems

PI: Lawrence A. Palinkas, Ph.D.
University of Southern California

Co-PI: Patricia Chamberlain, Ph.D.
Oregon Social Learning Center

Co-PI: C. Hendricks Brown, Ph.D.
Northwestern University

Funded by the William T. Grant Foundation (#10648) and NIDA (P30 DA027828)
Background

- Little is known regarding when, how, and under what conditions research evidence is used in policy and practice that affect youth, and how its use can be improved.
- How do policy-makers gain access to, evaluate, and apply research evidence in their decisions to implement innovative and evidence-based practices?
Study Specific Aims

• **Aim 1.** Understand and measure the use of research evidence by decision makers of public youth-serving agencies.

• **Aim 2.** Prospectively determine whether use of research evidence predicts stage of EBP implementation.
Aim 1. Methods

– Semi-structured interviews and focus groups to assess how systems leaders determine a practice is evidence-based and how they acquire information, evaluate it, and apply it in making decisions about adopting and implementing new programs and practices.

– Development of two new measures
  • Structured Interview for Evidence Use (SIEU)
  • Cultural Exchange Inventory (CEI)

– Web-based survey of 156 leaders of county child welfare, juvenile justice and mental health systems participating in the CAL-OH study, 10 leaders in other counties and states other than California and Ohio, and 37 state-level systems leaders participating in the AAIMS Study (total = 202).
## Structured Interview for Evidence Use (SIEU)

<table>
<thead>
<tr>
<th>Factor</th>
<th>No. of items</th>
<th>Mean</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>17</td>
<td>2.89</td>
<td>.80</td>
</tr>
<tr>
<td>Acquisition from network members</td>
<td>7</td>
<td>2.61</td>
<td>.75</td>
</tr>
<tr>
<td>Acquisition from experts</td>
<td>5</td>
<td>3.08</td>
<td>.73</td>
</tr>
<tr>
<td>Acquisition from documents and published materials</td>
<td>5</td>
<td>3.10</td>
<td>.71</td>
</tr>
<tr>
<td>Process</td>
<td>16</td>
<td>3.80</td>
<td>.86</td>
</tr>
<tr>
<td>Self assessment of validity and reliability</td>
<td>9</td>
<td>3.82</td>
<td>.88</td>
</tr>
<tr>
<td>Self assessment of relevance</td>
<td>4</td>
<td>4.06</td>
<td>.71</td>
</tr>
<tr>
<td>Assessment by others</td>
<td>3</td>
<td>3.42</td>
<td>.74</td>
</tr>
<tr>
<td>Output</td>
<td>12</td>
<td>3.22</td>
<td>.80</td>
</tr>
<tr>
<td>Use the evidence to make or support decisions</td>
<td>8</td>
<td>3.65</td>
<td>.80</td>
</tr>
<tr>
<td>Ignore the evidence</td>
<td>4</td>
<td>3.18</td>
<td>.84</td>
</tr>
<tr>
<td>Total Use of Research Evidence</td>
<td>45</td>
<td>3.38</td>
<td>.88</td>
</tr>
</tbody>
</table>
Aim 2. Methods

- **Participants**
  - 140 directors and senior administrators of child welfare, mental health and juvenile justice systems in 40 California and 11 Ohio counties participating in an RCT of the use of community development teams to scale up implementation of Multidimensional Treatment Foster Care over a 3 year period (2010-12).
Aim 2. Methods

• **Analysis**
  – SIC Variables
    • Most advanced stage achieved in a specific year
    • Stage Duration - Amount of time between first and last activity completed within a Stage
    • Proportion of activities completed within each stage
  – Multiple regression models controlling for year, state and county.
## SIC measures by average use of research evidence

<table>
<thead>
<tr>
<th>SIEU measures</th>
<th>SIC Stage</th>
<th>Duration</th>
<th>Proportion of activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Phase 1</td>
</tr>
<tr>
<td></td>
<td>r</td>
<td>r</td>
<td>r</td>
</tr>
<tr>
<td>Input</td>
<td>.15¶</td>
<td>.03</td>
<td>-.10</td>
</tr>
<tr>
<td>Process</td>
<td>.19</td>
<td>.28</td>
<td>.07</td>
</tr>
<tr>
<td>Output</td>
<td>.29*</td>
<td>-.11</td>
<td>.15</td>
</tr>
<tr>
<td>Total SIEU score</td>
<td>.29*</td>
<td>.13</td>
<td>.02</td>
</tr>
</tbody>
</table>

* p < 0.05; ** p < 0.01

¶ When SIC stage in divided into three categories (Stages 1-3, 4-7, and 8), p = 0.026
Lessons Learned from Semi-structured Interviews

- Systems leaders use three other types of evidence when considering whether to seek and apply research evidence in making decisions:
  - evidence of resources necessary and available for making use of research evidence (supply),
  - evidence of the need for research evidence, usually obtained from local conditions of client and service needs (demand), and
  - personalized evidence gained from experience (i.e., is the research evidence consistent with practice experience).

(Source: Palinkas et al., 2015)
Conclusion

• Engagement in URE was positively associated with stage of implementation
  – Especially in later phases/stages
• URE must be understood in context
  – Resources available to implement
  – Demand for innovation
  – Experience of policymaker/practitioner
Child STEPS Effectiveness Trial Dissemination and Implementation Study

CSET PI: John Weisz
Harvard University

DIS PI: Lawrence A. Palinkas, Ph.D.
University of Southern California

Co-Is: MacArthur Research Network on Youth Mental Health

Funded by the John D. and Catherine T. MacArthur Foundation
CSET Study Objectives

• Compare effectiveness of 3 approaches to treating depression, anxiety, and conduct disorders in 8-13 yr olds
  – Usual Clinical Care
  – Standard Manualized Treatment (SMT)
  – Modular Manualized Treatment (MMT)
  – Why modular?
    1. Single disorder cases are rare; comorbidity is common
    2. Children don’t stay put; problems shift during episode of care
    3. Clinicians dislike rigidity & single focus; may not be sustainable
    4. Modular mirrors what clinicians do with EBTs in practice, BUT provides structure and logic for decision-making
Coefficient Estimates for Group by Log-day for Overall Scores (Youth + Parent-report Random Effects Analyses; N=174 for Each Analysis) and Diagnostic change from pre- to post-treatment by study condition

<table>
<thead>
<tr>
<th>Rater</th>
<th>SMT vs UC</th>
<th></th>
<th>MMT vs UC</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Interaction</td>
<td>p-value</td>
<td>ES</td>
<td>Interaction¹</td>
</tr>
<tr>
<td>Brief Problem Checklist Internalizing Score</td>
<td>0.014</td>
<td>.852</td>
<td>.04</td>
<td>-0.179</td>
</tr>
<tr>
<td>Brief Problem Checklist Externalizing Score</td>
<td>0.059</td>
<td>.424</td>
<td>.17</td>
<td>-0.164</td>
</tr>
<tr>
<td>Brief Problem Checklist Total Score</td>
<td>0.070</td>
<td>.569</td>
<td>.12</td>
<td>-0.346</td>
</tr>
<tr>
<td>Mean Severity Rating on Top Three Problems</td>
<td>-0.043</td>
<td>.578</td>
<td>.12</td>
<td>-0.226</td>
</tr>
</tbody>
</table>

Source: Weisz et al., 2012
DIS Study Objectives

• Conduct a process and implementation evaluation of SMT and MMT in the Clinic Treatment Project.

• Identify characteristics of community-based mental health clinics that facilitate or impede the dissemination and implementation of evidence-based practice.
DIS Data Collection

- Participant observation at training sessions and clinics, key informant interviews.
- Semi-structured interviews with clinicians, clinical directors/managers, and CTP clinical supervisors.
- Member checking focus groups with therapists and clinical supervisors.
Model of EBP Implementation in Randomized Clinical Effectiveness Trials

Pre-Implementation Determinants

Training opportunities
Lag time between training and use
No. of clients

Clinician engagement in clinical trial
Motivation
Enthusiasm
Commitment

Clinician-treatment fit
Prior experience with evidence-based treatments
Theoretical orientation
EBT structure vs flexibility

Clinician first impressions
Positive
Negative

Clinician competence
Researcher assessment
Self-assessment
Client assessment

Clinician and researcher adaptability
Creativity
Compromise

Clinician-researcher interactions
Professional
Social

Child Steps support
Ongoing training
EBP adaptation

Clinic support
Leadership
Organizational Culture
Culture broker

Black = individual
Red = organizational
Green = cultural

(MMT)

(Source: Palinkas et al., 2008)
Results

• Reasons for continued use of the EBTs by 93% of the therapists
  – Therapists came to accept the treatments after using them
  – Therapists valued the interactions and support from researchers
  – Therapists valued the structure of the treatments
  – Therapists valued the evidence base of the treatments

• However, 93% of these therapists used them in a modular fashion (Palinkas et al., 2013).
Why was the Modular Condition so successful?

• MMT allowed for more cultural exchange between therapists and researchers.
  – Association with investigators was viewed by therapists and clinic directors as a benefit to participating in the CTP.
  – Everyone loved the training and supervision and many thought the supervision was the best part.
  – MMT allowed for more accommodation and negotiation than SMT.
    • Both therapists and supervisors felt that MMT approach gave them more “license” to negotiate/exchange.
Cultural Exchange

• A theory and a method for conducting translational research and facilitating research translation.

• A transaction and transformation of knowledge, attitudes and practices (KAP) of individuals or groups representing different cultural systems
  – Global culture of Evidence-Based Practice
  – Local culture of Practice-Based Evidence

• A process and product of debate and compromise. (Palinkas, Allred & Landsverk, 2005)
Future Directions

• Developing a comprehensive understanding of implementation
  – Linking process and outcomes
  – Linking both to context

• Identification of new strategies to support implementation
  – Social networks
  – Use of research evidence
  – Cultural exchanges among implementation stakeholders

• Advancing the methodology of mixed methods
  – Using QUAL methods to identify and implement innovative QUAN designs
  – Developing innovative QUAL methods
THANK YOU

QUESTIONS??