# Supplemental Digital Content

## Study Methodology Following the Standards for Reporting Qualitative Research1

### **Qualitative Approach & Research Paradigm**

We used collective case study analysis2,3 to describe the dental therapy movement across the 13 states (i.e., cases) that have adopted dental therapy as a profession, informed from a constructivist/interpretivist research paradigm. We chose this approach to enable our understanding of the varied and complex processes of authorization and because it allows us to analyze multiple data sources, including individual perspectives via interviews, published literature, grey literature, news articles, etc. We used several well-defined conceptual models to guide our analysis: (1) community engagement4 and policy advocacy,5 (2) dissemination and implementation,6 and (3) access to care.7 Trends and findings were assessed within these frameworks using thematic analysis to identify common themes or patterns across the cases. We then collectively mapped these findings to their potential or real impact on equity, with critical concepts of equity derived from various oral health equity theoretical models:8-11 changing “upstream” structures and systems (policy, political, economic, social, etc.) are critical for sustainable “downstream” change in health access and outcomes; strategies to approach equity along this continuum focus on effects at the individual, environment, or system level; and recognition that change efforts are often focused on near-term changes in material conditions of life (community well-being, physical, social, economic and service environment), while long-term effects on health equity will be summative of these efforts. Our results summarize and assess equity (as defined above) within each of the three pre-defined domains of interest including community engagement, implementation, and access to care, for the dental therapy movement as a whole.

### **Researcher Characteristics & Reflexivity**

The study researchers have varied backgrounds and training (sociology, public health, medicine) and tenure (from decades of experience to new investigators). All have focused their research on the oral health workforce and are professionally connected to academic, public health, and policy experts working on dental workforce issues, of whom some were interviewed for this research.

### **Context**

We utilized PubMed, Google Scholar, newsletters, and general Internet searches to collect literature and media, and conducted stakeholder interviews with key contacts in each state. Some interviews were held in person, while others were conducted telephonically. This was mostly due to ease of scheduling remotely; however, important context and communication was perhaps lost in telephonic interviews.

### **Sampling Strategy**

A comprehensive document library on the dental therapy movement was compiled by searching several literature databases (PubMed, Google Scholar) and search engines with a simple search for “dental therap” to find articles relevant to dental therapy and/or dental therapists. We also elected to receive newsletters via email from national, regional, and state dental therapy advocates. We utilized a snowball sampling technique to invite key advocates and stakeholders in each state and tribal nation that has authorized dental therapy to be interviewed and interviewed as many people as were willing to speak with us in each state where authorization was achieved.

### **Ethical Issues Pertaining to Human Subjects**

This work was submitted to the University of California, San Francisco Institutional Review Board (IRB) for review (study #17-24000); however, the IRB deemed this research to not be human subjects research that requires IRB oversight. That said, we did acquire verbal assent for audio recordings and assured interview participants that their interviews would be confidential. Interview recordings were stored securely and many, though not all, were transcribed verbatim by HIPAA-compliant professional transcriptionists.

### **Data Collection Methods & Units of Study**

The comprehensive document library, including published literature (n=57), internal grant documents (n=47), and grey literature and press (n=36), was compiled between 2017-2020. Semi-structured interviews were conducted with key stakeholders in all states and tribal areas that have authorized dental therapy, as well as with stakeholders engaged in active campaigns (n=81) between 2018-2020.

### **Data Collection Instruments & Technology**

We prepared a comprehensive interview guide to structure our interviews and ensure we ask pertinent questions, though the interviews themselves were only semi-structured and we allowed the interviewees to go off-topic and tangentially provide context on their perspectives (see interview guide below). The interview guide mostly stayed the same throughout the interview process, but only a few key questions were often used to collect the information we were looking for and many probes were not needed. Also, several questions did not apply for interviews in states that were only just past the authorization stage, not into implementation, education, etc. Typically, at least two researchers were present during all interviews, with one designated as the primary interviewer and the other tasked with taking detailed, as-verbatim-as-possible, notes. We used cell phone apps (e.g., Rev, simple recorders) during in-person interviews or videoconferencing apps (WebEx, Zoom) during remote interviews to record audio. Audio files from interviews where our notes were insufficient, were transcribed verbatim.

### **Data Processing**

Dedoose software was used for qualitatively analyzing the document library and interview transcripts/notes. All media were uploaded to Dedoose, tagged with descriptors that were used for categorizing the data by stakeholder source (e.g., public, government, educator), case site (state), data type (e.g., literature, interview), and focal area (e.g., implementation, advocacy, education). We then used a deductive coding approach structured around the three conceptual domains described above: (1) community engagement and policy advocacy, (2) dissemination and implementation, and (3) access to care (see codebook below).

### **Data Analysis**

We iteratively, that is, read and reread notes, interviews, and coded excerpts, identified common themes or patterns across the cases. Multiple researchers codes the same documents from different conceptual approaches, allowing for overlapping analyses. Results were drafted and checked/edited by all team members.

### **Techniques to Enhance Trustworthiness**

Early on, media was coded collectively across researchers to come to consensus, and ongoing member checks were employed throughout the analysis process.

### **Method Supplement References**

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3. Stake RE. *Multiple case study analysis.* New York: The Guilford Press; 2006.

4. Russell N IS, Kuoh H, Pavin M, Wickerstrom J. . *The active community engagement continuum. ACQUIRE Project Working Paper. .* 2008.

5. Gardner A, Brindis C. *Advocacy and Policy Change Evaluation: Theory and Practice.* Stanford, CA: Stanford Business Books an Imprint of Stanford University Press; 2017.

6. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implementation Science.* 2009;4(1):50.

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8. Hilton IV, Lester AM. Oral health disparities and the workforce: a framework to guide innovation. *J Public Health Dent.* 2010;70 Suppl 1:S15-23.

9. Lee JY, Divaris K. The ethical imperative of addressing oral health disparities: a unifying framework. *J Dent Res.* 2014;93(3):224-230.

10. Watt RG, Sheiham A. Integrating the common risk factor approach into a social determinants framework. *Community Dent Oral Epidemiol.* 2012;40(4):289-296.

11. Bay Area Regional Health Inequities Initiative. A Public Health Framework for Reducing Heatlh Inequities. 2020; <https://www.barhii.org/barhii-framework>. Accessed August 16, 2020.

## Interview Guide

Background & Context

* Background
	+ Tell us a little bit about yourself, your role, and your organization.
	+ How did you get involved in the dental therapy initiative? Why?
		- How has your involvement progressed over time?
		- What is the relationship between your work with the dental therapy initiative and other work you do?
	+ What are your thoughts on the dental therapist role as a new addition to the dental workforce?
		- What is the relative advantage of dental therapists over other providers?
		- What is the relative disadvantage of dental therapists over other providers?
		- What is your perception of the quality and validity of evidence supporting the use of dental therapists?
			* [Probe:] What do you feel about the quality, validity, and reliability of this evidence?
			* [Probe for those who are convinced there is evidence of sufficient quality:] What do you think the weaknesses are in supporting the use of dental therapists?
		- Have your views changed over time? What influenced your opinion?
* Big picture goals of dental therapy initiative:
	+ What is important about the dental therapy initiative to you?
	+ What do you want the dental therapy initiative to accomplish?
		- Has this changed over time? Why?
		- How might your goals be different from other organizations involved in the initiative?
			* [Probe if interviewing multiple people within an organization:] Are there differences of opinion within the organization?

Implementation

* Tell us the legislative story – how did this bill end up passing and being signed into law?
	+ Who supported the bill?
		- Who else was part of the initiative/coalition?
		- Who was your legislative champion and how were they brought on board?
		- How was the campaign financed?
	+ Who opposed the bill?
		- What were their arguments? Were they effective?
		- Were any compromises made? If so, what were those compromises and how did the coalition react?
	+ Were similar bills introduced in other legislative sessions (i.e., how many sessions did it take to eventually pass)?
* What are the regulatory processes, licensing, and reimbursement issues surrounding the implementation of dental therapy? What progress has been made, and where do you think it should go from here?
* What educational pathways are in place now, and what do you see as the future of dental therapy education?
	+ [If applicable] Please describe educational facilities, curriculum, administrative processes, and what kind of support is in place for students, faculty, and administrators.
	+ What educational resources are needed for successful CODA accreditation?
* Recruitment [if applicable]:
	+ To what extent have organizations that employ dental therapists been able to recruit and retain providers from the local community?
	+ How do you (your organization) recruit providers that are from and stay in the community?
* Barriers:
	+ What barriers have blocked or slowed the process of implementation?
	+ How have barriers been overcome?
	+ Given what you’ve learned so far, what barriers do you think could be identified early, prevented, and avoided?
	+ How accepted are dental therapists for each of the following populations (1=not at all, 2=somewhat, 3=very):
		- Within your organization? Why?
		- Within the general population? Why?
		- Within the tribal population? Why?
		- Within the dental community? Why?
	+ What are some strategies that you’ve taken to overcome resistance on the dental therapy initiative? (from the organization, general population, tribal population, and dental community)

Community Engagement

* To what extent has the community demonstrated readiness and buy-in towards the dental therapy initiative?
* What is the role of community engagement for the success of the dental therapy initiative?
	+ Has the community been engaged from the beginning, throughout, toward the end, etc.?
	+ Who would you say are key/essential stakeholders from the community?
		- [Probe:] Why are these stakeholders critical to the dental therapy initiative?
	+ How did you engage the community (e.g., grassroots, on advisory board, town halls, etc.) and for what purposes (see below)?
		- Advocate for licensing and reimbursement
			* Who would you say are the advocates/champions/experts for licensing and reimbursement?
				+ [Probe:] How critical are these advocates to the dental therapy initiative? In what ways?
				+ [Probe:] What about opponents/activists? How have they disrupted the initiative?
			* Who is responsible for accountability and follow-up, both at the grassroots-level as well as with the advocates/champions you described?
				+ E.g., processes are happening, resources are in place, timelines are followed, barriers are identified and addressed timely, etc.
		- Promote educational opportunities/recruit students
			* Who would you say are the advocates/champions/experts for educational opportunities/recruiting students?
				+ [Probe:] How critical are these advocates to the dental therapy initiative? In what ways?
				+ [Probe:] What about opponents/activists? How have they disrupted the initiative?
			* Who is responsible for accountability and follow-up, both at the grassroots-level as well as with the advocates/champions you described?
				+ E.g., processes are happening, resources are in place, timelines are followed, barriers are identified and addressed timely, etc.
		- Advocate for accessible services and promote them
			* Who would you say are the advocates/champions/experts for the services and accessibility of dental therapists?
				+ [Probe:] How critical are these advocates to the dental therapy initiative? In what ways?
				+ [Probe:] What about opponents/activists? How have they disrupted the initiative?
			* Who is responsible for accountability and follow-up, both at the grassroots-level as well as with the advocates/champions you described?
				+ E.g., processes are happening, resources are in place, timelines are followed, barriers are identified and addressed timely, etc.
		- Recruit employers and dentists as both employers and supporters
			* Who would you say are the advocates/champions/experts recruiting employers and dentists as both employers and supporters of dental therapists?
				+ [Probe:] How critical are these advocates to the dental therapy initiative? In what ways?
				+ [Probe:] What about opponents/activists? How have they disrupted the initiative?
			* Who is responsible for accountability and follow-up, both at the grassroots-level as well as with the advocates/champions you described?
				+ E.g., processes are happening, resources are in place, timelines are followed, barriers are identified and addressed timely, etc.

Success & Health Equity

* What would you say have been some of the biggest successes of the dental therapy initiative?
* What would long-term success of the dental therapy initiative look like for you?
* What does health equity mean to you and how does it relate to the dental therapy initiative?
	+ How has the dental therapy initiative impacted access for vulnerable and underserved populations (specifically children and tribal communities)?
		- Access to services for patients
		- Cultural access - ties to providers staying in the community and the pipeline
		- Educational and career opportunities, income generating opportunities
	+ What changes have occurred to [INSERT SUB-BULLET BELOW]?
		- Social beliefs (e.g., discriminatory)
		- Institutional power (e.g., laws, regulations, finance, etc.)
		- Social inequality (e.g., workplace opportunities, children’s readiness to learn)
	+ What changes have occurred to [INSERT SUB-BULLET BELOW], both in dental therapy initiative sites and possibly external to it?
		- Changes to risk factors/behaviors
		- Changes to access to care
		- Changes to health outcomes

Wrap Up

* Who else should we talk to about this?
* Is there anything we didn’t ask you that you think is important for us to know?

## Codebook

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Community Engagement | Community access to information | Inclusion of communities in decision making | Local organizing capacity | Accountability of institutions to the public |  |
| Implementation | Innovation characteristics: | Inner setting: | Characteristics of individuals: | Outer setting: | Process: |
| Evidence strength and quality | Networks and communication | Knowledge and beliefs about the innovation | Needs and resources of those served by the organization | Planning |
| Complexity | Implementation climate: | Individual stage of change | External policy and incentives | Executing |
| Cost | *Organizational incentives and rewards* | Individual identification with organization | Cosmopolitanism | Engaging: |
| Design quality and packaging | *Goals and feedback* | Other personal attributes | Peer pressure | *Formally appointed internal implementation leaders* |
| Adaptability | *Learning climate* | Self-efficacy |  | *External change agents* |
| Innovation source | *Compatibility* |  |  | *Champions* |
| Relative advantage | *Relative priority* |  |  | *Innovation participants* |
| Trialability | *Tension for change* |  |  | *Opinion leaders* |
|  | Culture |  |  | Reflecting and evaluating |
|  | Readiness for implementation:  |  |  |  |
|  | *Access to knowledge and information* |  |  |  |
|  | *Available resources* |  |  |  |
|  | *Leadership engagement* |  |  |  |
|  | Structural characteristics |  |  |  |
| Access | Ability to engage | Ability to pay | Ability to perceive | Ability to reach | Ability to seek |
| Acceptability | Affordability | Approachability | Appropriateness | Availability and accommodation |
| Equity | Upstream factors: | Downstream factors: |
| Discriminatory beliefs | Social inequality  | Cultural representation | Health status | Health access and quality |
| Institutional power | Community economics |  | Risk factors and behaviors | Costs |