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Evaluating Dental Therapy

A Plan for Implementation, Outcome, and Cost Evaluation

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Section I. Introduction

Background

In 2016, the Robert Wood Johnson Foundation contracted with Westat to develop a plan for evaluating the implementation, outcomes, and economic viability of adding one or more dental therapists to a dental practice. Throughout this document, we refer to this addition as a dental therapy program (DTP) or initiative (see Glossary of Terms in Appendix A). This document outlines a plan for evaluating dental therapy programs that can be tailored to the individual program, practice, and community context being evaluated. In particular, the template aims to help new dental therapy programs incorporate evaluation early in the process of development. In addition, the plan suggests a set of existing standardized outcome measures to use in each evaluation to build a common base of knowledge that can be easily shared and translated across settings. Unlike earlier evaluations that focused on the extent to which dental therapists were trained to provide quality care, the evaluations that follow this plan will focus on evaluating the implementation of dental therapy programs and the outcomes of the practices that implement them.

Dental therapy, although in existence in a number of countries for over 50 years, is an emerging profession in the United States (van Hecke, 2012). A dental therapist is a mid-level dental provider trained to perform preventive, basic restorative, and some intermediate restorative procedures with varying levels of dentist supervision (GAO, 2010). Adding one or more dental therapists to a practice aims to increase access to routine preventive and restorative dental care for patients, especially those traditionally under- or unserved, by providing services at a lower cost and with shorter wait times. Longer-term goals are increased efficiencies and productivity for dental practices that include dental therapists, and improved oral health outcomes for the broader community served. Promising early findings have emerged from evaluations of the Minnesota and Alaska dental therapist programs (Wetterhall, Bader, Burrus, Lee, and Shugars, 2010; Minnesota Department of Health, 2014). These findings include strong signs that adding dental therapists to a practice increases the number of patients served with fewer delays in accessing dental care, provides quality of care comparable to quality of care provided by dentists, and receives reports of high patient satisfaction.

As dental therapy grows in its use, it is important to continue to build a knowledge base on both dental therapy's implementation in a range of practices and communities and its outcomes for a variety of patient populations. Evaluations that provide implementation, outcome, and cost data can be of great value in convincing state legislatures and state dental associations to support launching dental therapy programs as well as help guide states in designing and implementing them. For individual practices, evaluations that provide ongoing feedback on implementation as well as the achievement of goals and objectives can help the practices fine-tune procedures and adjust as needed.

A review of existing literature, including past evaluations, informed the development of this plan, as did conversations with a range of individuals involved in implementing dental therapy programs, training

dental therapists, and promoting and developing the model. The plan assumes an evaluator will assist in most aspects of the evaluation, particularly data collection and analysis, although there are areas (highlighted in the document) in which program staff could directly collect the data.

The first section of the plan continues with a brief overview of the literature, followed by a description of a feasibility/development study. Section II summarizes the overall evaluation approach, followed by Section III through V on designing evaluations of dental therapy implementation, outcomes, and costs. Within each of these sections, the plan outlines the purpose of each type of evaluation, several core evaluation questions, and designs for addressing them. Each section focuses on using the most rigorous designs and measurement feasible and practical within modest budget constraints. Both qualitative and quantitative methods and measures are proposed across the different designs. The plan offers fallback strategies and options for adapting the designs, methods, and measures for different program situations, especially those at various stages of development and operating in a differing contexts and cultures. The last section, Section VI, discusses the logistics of designing and implementing evaluations in a range of dental therapy practices and communities.

Overview of Relevant Literature

***Disparities in Oral Health Care*.** In the United States, disparities in oral health and access to oral health care exist, especially for children. The Surgeon General's Report in 2000 noted that millions of Americans have not benefitted from advances in oral disease prevention and early intervention (U.S Department of Health and Human Services, 2000). Low-income children and children of color have higher prevalence of dental caries and unmet dental needs than children from higher income and non-Hispanic white families (Crall, 2011; U.S. Department of Health and Human Services, 2000). Children in remote regions as well as those in inner cities are among those most affected (Evans, 2011). For example, among US children ages two to four years, American Indian and Alaska Native (AI/AN) children have the highest rate of dental caries, at five times the U.S. average (Indian Health Service, 2002; Nagel, 2011). Seventy-nine percent of these children have tooth decay and 60% have severe cases. Among all AI/AN children, 68% have untreated dental caries.

Dental problems are the highest unmet health need in children (Newacheck, Hughes, Hung, Wong, & Stoddard, 2000), causing children to miss school (Gift, Reisine, & Larach, 1992) and many other activities, especially among children who are economically underserved (GAO, 2000). Moreover, Treadwell and Northridge (2007) contend that long-term life course consequences of dental caries for these children include poor grades, low self-esteem, missing teeth, problems finding employment, and low quality of life. Therefore, the importance of improving access to care for vulnerable children is high.

Improving Dental Access. A major reason cited for oral health disparities is the lack of access to dental care. Despite Medicaid coverage of dental care, only a little more than a third (36%) of children on Medicaid used dental services in 2008 (GAO, 2010). The shortage of dentists in a number of areas accounts for low dental care utilization by Medicaid-covered children, compounded by dentist

unwillingness to accept Medicaid due to low reimbursement rates, difficult administrative requirements, denial of claims, and no-shows for appointments (Nash, Friedman, & Mathu-Muju, 2012).

The Surgeon General's report in 2000, highlighting the oral health disparities in America and a national call to action, sparked proposals for addressing the problem (Nash et al, 2012). Workforce alternatives and redesigns have been common strategies offered for increasing access to dental care and, in turn, improving oral health outcomes for the underserved (Crall, 2011; GAO, 2010; Kellogg, 2010; Mertz and Glassman, 2011). Proposals for enhancing the dental workforce have included increasing the number of dentists and/or hygienists through expansion or creation of new dental schools; expanding hygienists' scope of services; creating new categories of expanded function/expanded duty dental assistance; and creating new categories of dental workforce providers, such as dental therapists.

Dental Therapy as Strategy for Improving Access. As noted, dental therapists are mid-level practitioners who provide basic dental care (Nash, et al, 2012). Their role typically involves examination, diagnosis, and treatment planning; making radiographs; oral health education; preventive services; preparation and restoration of cavities; stainless steel crowns; pulpotomies; and the extraction of primary teeth (Nash et al, 2012).

Dental therapy is not new, having been in operation nearly 100 years. It was first established in New Zealand in 1921 to provide dental care to children 2 to 12 years of age (Nash et al, 2012). Over time, it has been introduced and adopted in over 50 countries, both developed and underdeveloped, that have widespread dental disease and a paucity of dentists (Friedman, 2011). In these countries, dental therapists are typically part of dental teams headed by dentists. Many of the dental therapists worldwide are employed by the government (Crall, 2011), typically in school based programs (Nash et al, 2012). The scope of service is generally restricted to children, though a number of countries are permitting dental therapists to treat adults as well (Nash et al, 2012).

In the U.S., up until 2005, opposition has thwarted attempts to implement dental therapy. In 1949, the Massachusetts state legislature passed a two-year training program for non-dentists to prepare and restore teeth that the American Dental Association (ADA) fought, ultimately causing the governor to rescind the decision a year later. In 1972, the dean of the School of Dentistry proposed the use of dental school nurses to treat untreated caries for schoolchildren, but opposition from two California dental associations blocked the funding of the training grant by the U.S. Public Health Service (Nagel, 2011; Nash et al, 2012).

In the past decade, the dental workforce in two locations, one in Alaska and one in Minnesota, have successfully integrated dental therapists. The Alaska Native Tribal Health Consortium introduced dental therapists in tribal villages in 2005. In 2009, the state of Minnesota authorized the training and practice of dental therapists to serve underserved children. Two additional locations are ready to launch in 2016 in Oregon and Washington, and several other states are working on legislation that would permit dental therapy.

Perspectives and Findings on Dental Therapy. Opposition to the introduction of dental therapists, especially by dentists and professional dental associations, continues despite initial findings that indicate dental therapy can increase access to dental care with the safety and quality of care comparable to that provided by dentists. Concerns involve scope of practice, especially the ability to perform basic dental restorative and surgical procedures; level of supervision; and the potential for dental therapists to migrate to independent practices without supervision (Crall, 2011; Evans, 2011). In addition, there are concerns that unqualified people will be able to practice dentistry and, in turn, provide lower quality of care and threaten the safety of the public (Nash et al, 2012).

Proponents of dental therapy, on the other hand, believe dental therapy can free up dentists for more complex procedures, extend the geographical reach of dental care, and increase access for those traditionally underserved or unserved (Nash et al, 2012).

Studies of the technical quality of care provided by dental therapists in other countries have consistently found the care to be equal or superior to that of a dentist (Nash et al, 2012). In addition, studies show an impact on improved access to care for large numbers of children in a given area (Nash et al, 2012).

In the U.S., early evaluations of the implementation and outcomes of dental therapy provide promising results (Wetterhall et al, 2010; Minnesota Department of Health, 2014). The Research Triangle Institute (RTI) evaluation of the Alaska program (Wetterhall et al, 2010) focused on the implementation of dental therapy by examining five therapists and found them to be performing well, and operating safely and within their defined scope of practice. Patients surveyed also reported satisfaction with their care. Similarly, encouraging results have emerged from an early assessment of dental therapists' impact on the delivery of, and access to, dental services in Minnesota (Minnesota Department of Health, 2014), based on an assessment of 15 clinics having dental therapists. These results include: increases in the number of individuals served, especially those underserved, medically complex individuals, and special populations; and reduction in wait times for appointments since the dental therapist was employed, especially in rural areas or in situations when pain or another type of dental emergency is the presenting problem. Preliminary data also suggest reductions in emergency room use and related costs savings, increased productivity, and improved patient satisfaction.

Future evaluations can build on this initial base of knowledge, adding studies of dental therapy in a variety of practices and contexts, with as rigorous designs as possible to understand the short-term and long-term effects of dental therapy on the practices, the individuals served, and the broader communities.

Feasibility/Developmental Study

In order to tailor the plan to the specific practice setting, the evaluator needs to plan time to conduct a fact-finding visit to the practice. As the Sample Agenda in Exhibit 1 illustrates, the fact-finding visit provides an opportunity to meet with relevant stakeholders to discuss issues related to designing and implementing an outcome evaluation in that setting. It provides an opportunity to begin to understand

the practice and how an evaluation can be optimally designed. Moreover, during the visit, the evaluators can begin to establish rapport with key individuals in the practice and community who may be unsure of the role of the evaluation or how the findings can affect them. Some of these individuals might be identified during this phase to serve in an advisory capacity during the conduct of the evaluation.

The visit provides an opportunity to review actual records and observe the practice to determine how best to design data collection methods that can be the least disruptive and create the least burden as possible on the practice while also collecting data beneficial to the evaluation. During the visit, the evaluators can gain input into the design and identify all key procedures (such as local IRBs and other consent processes) that need to be incorporated into the evaluation.

Exhibit 1. Evaluation fact-finding visit: Sample agenda

SAMPLE AGENDA

GOAL: To assess the feasibility of conducting an outcome evaluation of the dental therapy program and to collect information to tailor the evaluation template to the specific program and context

ACTIVITIES:

Meet with key stakeholders to discuss evaluation possibilities and constraints. Key stakeholders can include:

- Sponsors of the program and/or the evaluation such as state officials and tribal representatives;
- Staff involved in the practice(s) adding dental therapists such as the dentists, the hygienists, and administrators; and
- Key members of the community, such as members of local dental associations and school representatives.

Observe practice to determine how best to collect data in the least instrusive and burdensome manner

Review existing data records in practice

The Checklist in Exhibit 2 outlines the key information that needs to come from the fact-finding visit and any follow-up contacts with members of the practice.

Exhibit 2. Evaluation fact-finding visit: Checklist

What Do We Need to Know to Design a Feasible, Relevant, Rigorous, and Useful Evaluation?
Evaluation Purpose and Role ✓ Purposes and planned uses for the evaluation findings?
Practice Information ✓ Geographic scope and mobility of the practice? ✓ Nature of the patient population served (e.g., ages; languages)? ✓ Nature and size of staff? ✓ Ramp-up period for the dental therapy program? What timing would be best for the evaluation? ✓ Expected patient flow once dental therapy program is begun? Is it sufficient for desired evaluation design? ✓ Expectations/capacity for participating in the evaluation?
Data Availability, Collection, and Logistics Issues ✓ Types of administrative data and dental records available? Are they complete? What is their quality? What do they contain? How are they maintained (i.e., electronic or paper or both)? How accessible are they? What is needed to access them (including their costs)? ✓ Methods most practical given practice information? ✓ How evaluation logistics could best be handled? ✓ Need and availability of local individuals to support the work? ✓ Constraints on staff time and resources that could help ease burden for evaluation participation? ✓ What IRB and consent procedures need to be followed?
Relevant Context Issues ✓ Relevant state laws or health regulations? ✓ Stakeholder concerns and questions?

Section II. Overview and Summary of the Approach to Evaluating Dental Therapy Programs

As noted, this plan provides a comprehensive approach to evaluating dental therapy programs, including their implementation, outcomes, and costs or economic viability. In this section, we provide a brief overview of the questions that can be addressed in the evaluation, the types of data that can be collected, and a timeline for conducting the study.

Although this plan provides a comprehensive approach to evaluation DTP programs, it is also possible to use sections of the plan for more focused evaluation efforts, such as evaluations of only implementation. Sections III through V provide detail on how to evaluate the program's implementation, outcomes, and costs, respectively. They are written to relate to one another, but also can be used independently. For many efforts, however, questions spanning all three areas are likely to be relevant. Exhibit 3 outlines the list of evaluation questions that can be addressed in a DTP evaluation.

Exhibit 3. Comprehensive list of evaluation questions

Questions Relevant to Evaluations of Dental Therapy Programs
Implementation Evaluation Questions • What is the specific type of dental therapy model implemented? • What is the nature of the practice and what is the role of the dental therapist(s) relative to others? • To what degree is the dental therapy model implemented according to design? • What aspects of the practice, the patient population, and the overall context shape or influence implementation?

Outcome Evaluation Questions
• What is the effect of dental therapy on the *dental practice*?
  ○ including changes in the number of patients served; the reach of the practice, especially the extent to which Medicaid patients are served; the type and quality of care provided; the ability of the dentist to work on more complicated cases; team dynamics; and economic performance and productivity of the dental team
• What is the effect on the *patients served*?
  ○ including changes in patients' service utilization (frequency, type of services, use of ER) , oral health outcomes, avoided more complex care, satisfaction with and confidence in the services provided, and wait time for services
• What is the effect on the *community*?
  ○ including changes in equity of access to care for segments of the community, ER usage for dental needs, and rates of treated and untreated caries

Cost Evaluation Questions • Does the inclusion of a dental therapy program in a practice increase costs to the practice, decrease costs, or is it cost-neutral?

To address these questions, both qualitative and quantitative data are needed from a variety of sources and data collection methods, as outlined in Table 1.

Table 1. Comprehensive list of sources, data collection methods, and domains for dental therapy program (DTP) evaluation

Type of evaluation	Source	Method	Key measurement domains
Implementation	Documents	Review and analysis	Background History
	Key leadership initiating DTP	Interviews	Local context Background Expectations for DTP Specific DTP model
	Dental therapist(s)	Interviews	Personal background Role in practice Nature of supervision Satisfaction and challenges
	Dentist and other employees	Interviews/survey	Practice description Patient population Fit of DT in practice Changes since DTP Support, supervision, and challenges
	Community stakeholders	Interviews	Local Context Need for DTP Perceptions and support of DTP
	The practice	Observations	Operation of the practice
	Patients	Survey/Focus Groups	Impact of DTP Confidence and support
	Dental practice records	Review and analysis	Patient volume, characteristics
	Patient records	Review and analysis	Patient characteristics and procedures
Outcome	Dental practice records	Review and analysis	Impact on operation of practice (e.g., wait times, services, etc.)
	Patient records	Review and analysis	Impact on patient population (numbers, composition)
	Patients	Survey	Oral health practices, frequency of visits, problems
	The practice	Observation	Practice operation
	Existing data	Analysis	Oral health problems Access to dental care
Cost	Practice financial records	Analysis	Total income Expenditures by category (e.g., staff)

In Section I, we propose a timeframe for initiating planning activities, and in Sections III through V, we outline a timeframe for data collection and reporting activities for each evaluation component. Table 2

below provides a summary of the timeline for a complete evaluation. Appendix D provides additional information on the phases of an evaluation for stakeholders interested in commissing an evaluation.

Table 2. Evaluation timeline for data collection and reporting

	Timeline			
	Pre-planning (prior to evaluation implementation)	**Baseline (prior to DTP implementation)**	**Ongoing (DTP initiation through evaluation timeline – ideally 3+ years)**	**Final (at end of evaluation)**
Activity	Conduct fact-finding visit Obtain access to key existing data Complete IRB, including informed consent procedures Finalize study design, data collection instruments, study logistics	Conduct kick-off visit	Conduct annual site visit	
Data Collection		Baseline data on operation (kick-off visit) Existing data (patient records, practice records, financial information, other existing data sources prior to DTP) Patient survey/focus groups (outcome) Possible community survey	Annual implementation data (site visit; followup calls) Existing data (patient records, practice records, financial information, other existing data sources throughout DTP) Annual patient survey Possible community survey (3+ years following baseline) Documents (ongoing)	
Analysis and Reporting	Fact-finding brief summary	Baseline report and briefing	Rapid-feedback reports and briefings Annual syntheses and briefings	Final synthesis report and briefing(s)

Section III. Assessing the Implementation of the Dental Therapy Program

Purpose of Assessing Implementation

Implementation evaluation can have two purposes. The first purpose is to guide mid-course corrections in a program. The evaluation data collected can provide the state or tribal regulatory agencies, the communities served, and the dental practice with useful information that can inform the consistency in implementation and identify factors that may influence the effectiveness of their practice. The second purpose of implementation data is to inform the outcome design. Understanding differences in implementation across programs as well as sites within a program can help to interpret possible differences in specific outcomes.

Implementation Evaluation Questions

- What is the specific type of dental therapy model implemented?
- What is the nature of the practice and what is the role of the dental therapist(s) relative to others?
- To what degree is the dental therapy model implemented according to design?
- What aspects of the practice, the patient population, and the overall context shape or influence implementation?

Time Frame

It is ideal for an implementation assessment to begin right before or soon after the initiation of the dental therapy program and to continue throughout the evaluation to provide an understanding of the program, contextualize the outcome findings, and help keep the program on course. Collection of some of the data, such as those collected through administrative sources, can occur on a routine basis whereas collection of other data can occur on an annual or semi-annual basis, typically involving a site visit to the practice sites. The first site visit provides a more complete understanding of the initial program design and expectations for the program, and subsequent visits provide information on program implementation over time. If possible, the first data collection “kick off” visit would occur even prior the the initiation of the dental therapy program to provide an understanding of the practice before the program is added.

Data Collection Methods, Measures, and Sources

Assessing the implementation of the dental practice involves collecting data from multiple sources using a variety of methods. Methods include document reviews, semi-structured interviews with key informants, formal observations of the practice, surveys and/or focus groups with patients, and review and analysis of existing data. We describe each data collection method in detail below.

Document review: Documents, such as relevant legislation, funding applications, public notices or documents establishing the practice, newspapers, and others, provide a great deal of background information, including:

- the rationale for incorporating dental therapists into the practice, the legislative background for the program and the intended scope of practice;
- the description of the practice and the sites, and the design for incorporating dental therapists into the practice; and
- the overall context, including the nature of the local or regional economy, the extent to which the broader population receives Medicaid, the status of health care in the region, and the level of support provided from communities such as tribes.

Additional documents, such as health department studies describing the status of dental services in the region or state as well as documents describing changes in the practice over time, would also be helpful to review. In addition, data from the Behavioral Risk Factor Surveillance System (BRFSS), the largest, continuously conducted telephone health survey, may be available at the county level and can provide a picture of dental access.

Interviews with key leadership who helped initiate the dental practice: Interviews with the leadership instrumental in getting the dental therapist model in place will focus on understanding the local context in which the project is launched, the expectations for the practice, and the specific model that is being put into place. The person leading implementation may vary from state to state and will often be from an organization supporting the development of a dental therapist program. The leadership interviews ideally will be among the first interviews conducted to provide a framework for the evaluation.

The interviews can be conducted over the telephone or in person, guided by a semi-structured interview guide. The guide will contain the following areas:

- the proposed model (e.g., Alaska, Minnesota, other);
- background on the development of the model, including length of time from launching the concept to development of the program to establishing legislative support to implementing the program;
- how the program now in its implementation (or to be implemented) has changed from its initial inception;
- planned number of practices and how the sites are selected;
- funding and other resources to support the launch;
- training requirements for the dental therapist;
- eligibility requirements (e.g., must be drawn from the dental assistants or dental hygienists);
- population served, including county wide, urban, rural, tribal;
- any eligibility requirements for people to be served, such as by tribal practices (e.g., enrolled members only, only AI/AN who live in the area, or anyone); and

- level of dental community support and strategies used to foster it.

Interviews with dental therapist(s): Interviews with the dental therapist(s) can provide information on their role in the practice, as well as the challenges they face and their level of satisfaction with their position. Guided by a semi-structured interview guide, the interview will cover the following domains:

- background, including career prior to starting dental therapy training, years of experience in the dental field, nature and length of training, extent of residency, demographic characteristics, experience as a dental therapist prior to joining practice, licensure requirements;
- nature of their role, including scope of practice (i.e., procedures allowed to perform as well as those most commonly performed and types of decisions made); extent to which they work in remote areas and alone;
- type and level of supervision (e.g., direct, general, indirect, periodic case review, emergency support only) and availability of dentist for more complex cases;
- perception of and satisfaction with role, including level of comfort with skills to perform the work of the dental therapist, with amount and nature of supervision received, with support and with working relationships with other staff; whether they view dental therapist as end of career; and
- challenges experienced and solutions sought; areas to improve as well as areas that are better than expected.

Interviews with other dental practice employees: Interviews with other staff in the dental practice can offer additional information. This information can pertain to how the dental therapist fits within the overall practice, the changes in the practice and staff roles that have occurred due to the introduction of the therapist, challenges and opportunities created by having a dental therapist in the practice, and overall support for the change. Other interviews can be conducted with the supervising dentists and other dental office staff, ideally collecting information from the range of positions in the practice. Depending on the size of the staff, an anonymous survey could be conducted in lieu of individual interviews.

In addition to background information on role and tenure in the practice, the interview with the supervising dentist will include several domains of questions on the practice (those starred can also be asked of others in the practice). These include:

- the size and configuration of the practice (number of dentists, hygienists, other staff);
- *nature and size of the patient population served and any changes in either size or nature after launching dental therapist;
- *complaints about the dental office before and after launching the dental therapy program;

- *perceived impact of dental therapist on the practice (financial, efficiency, burden on dentist and burden on other staff, acceptance by the rest of the office, staff turnover, acceptance by patients, change in numbers, characteristics, funding source for service);
- level of comfort with dental therapist's work;
- services that the dentist feels is appropriate for the dental therapist;
- type and level of supervision provided as well as whether views arrangement as prescriptive or collaborative;
- perceived value of the dental therapist in the practice; and
- any additional challenges as well as benefits from having a dental therapist in the practice.

Interviews with others in the broader community: Interviews with representatives from key organizations in the general community can provide an understanding of the broader context, especially with respect to the need for expanded dental care, and perceptions and support for dental therapy. Interviewees can include representatives from local or state dental associations; school representatives, if applicable; persons responsible for community health and wellness such as officials in the public health departments, hospital administrators, emergency room doctors, pharmacists that offer health services, Medicaid and Medicare administrators, among others. In tribal communities, key interviewees may include the health director and the behavioral health administrator.

These interviews will focus on:

- how the implementation of the dental therapy program has impacted health and health care utilization in the area;
- the extent to which the program is accepted in the health/dental community as well as in the broader community;
- strengths of the dental therapy program; and
- weaknesses of the dental therapy program.

Observations of the operation of the practice: During the site visits, there could be opportunities for the evaluator to observe the practice. Observations can provide an understanding of the configuration of the practice, how the dental therapist is accepted into the practice, and the role the dental therapist plays, as well as an understanding of the overall context and how that might affect what the dental therapist can do and the outcomes.

One of the first evaluations (Wetterhall et al, 2010) placed considerable emphasis on observing the work of the dental therapist and assessing the quality of the work. The costs of this type of observation are both prohibitively expensive and unnecessary for evaluations focused on assessing the implementation and outcomes of the model, not the effectiveness of the dental therapy curriculum itself.

Surveys and/or focus groups of patients: Obtaining the patient perspective is important to understanding how patients perceive the inclusion of the dental therapist(s) in the practice and whether

the inclusion of the dental therapist has had an effect on their behavior (e.g., extent to which they seek dental services). If a patient outcome survey is being conducted as part of the evaluation (as described as an option in Section IV), it may be possible to include questions in the survey that assess implementation from the patient perspective. These surveys, as described later, may be administered in several ways (e.g., through the practice, through the web) depending on how centralized the practice is, patient volume, and other factors.

If a patient outcome survey is not part of the evaluation or if the timing of the survey does not coincide with the need for implementation information, the evaluator should consider conducting patient focus groups. A focus group is a facilitated group discussion with five to seven individuals who can speak on a specific topic. Depending on the practice and the variability of the patients served (either geographic or some other dimension), multiple focus groups might be needed to gain a full understanding of the perspective of the patients being served. An outside facilitator should facilitate the groups to encourage candid discussion. In addition, a small incentive for participation (e.g., a gift card to a local retail vendor) should be provided to each participant to compensate for his or her time.

Questions in either a survey or focus group can include:

- whether the inclusion of a dental therapist has had an impact on frequency in seeking dental services, the ability to receive dental services (i.e., whether now medicaid is now accepted), and the level of care received;
- the level of confidence in the dental therapist and views on receiving services from dental therapist vs. dentist or others in practice;
- factors that make the dental therapist more or less desirable (e.g., level of training; indigenous background);
- whether the time provided by the therapist was sufficient to understand the level and type of care needed; and
- whether the patient would recommend the dental therapist to others.

Review of dental practice records and a sample of patient records: Dental practice records provide detail on the practice as a whole (i.e., volume of individuals served over a period of time) and patient records provide information on specific procedures used, patient characteristics, and so forth. Therefore, records (described in more detail in the outcome section, Section IV) are a key source of information for assessing outcomes at the practice and patient levels. However, small samples of records also can be drawn and reviewed during site visits to provide greater understanding of the procedures being implemented by the dental therapist, as well as to obtain other pertinent information. Record reviews are most feasible in practices where the records are maintained electronically and thus reviewing them would present little additional burden to the practice.

Analysis

The analysis of the data will largely involve qualitative case study synthesis, summarizing the data from each source for each domain area and synthesizing across sources. Appendix B provides a table outlining the implementation assessment domains of questions and the sources that can address them. Having multiple sources for each domain serves several purposes:

- provides triangulation or verification from different, varied sourceson the domain;
- provides more complete perspective on any one domain; and
- highlights areas of particular interest or uncertainty, requiring multiple sources to build complete understanding of the domain.

The purpose of the implementation evaluation guides the analysis. For formative feedback, it would be important for the evaluator to review the data for areas of implementation inconsistency with initial plans, areas of disagreement or dissatisfaction among the informants, and any other issues that emerge. For greater understanding of the implementation story that will help provide context for the outcome analysis, it will be important to describe the process of implementation and highlight various aspects of implementation that might influence outcomes (e.g., the role of the dentist; the geographic spread of the practice).

Implementation Reporting

Two types of implementation reports are recommended: rapid feedback reports and annual implementation reports.

If the implementation evaluation is being conducted to guide mid-course corrections, analyzing the implementation data routinely and reporting back as quickly as possible is important. Rapid feedback reports can be developed after site interviews and other qualitative data are collected as well as following the analysis of key data collection efforts that have implementation data (e.g., patient surveys, administrative data analysis). After each site visit, a brief top-line report highlighting areas that are going well as well as areas of concern can be developed quickly (within three weeks of the visit). Similarly, reports from analysis of survey and administrative data can highlight key findings, ideally through graphs and data displays, that both affirm the direction the practice is taking as well as those that may signal areas in need of improvement. Briefings through calls or onsite contacts with the key leadership are recommended.

The second type of report, completed annually, can document the implementation process and provide a more complete synthesis of information from all sources. A briefing of the highlights of the report for key stakeholders also is recommended.

Section IV. Assessing the Outcomes of the Dental Therapy Program

Purpose of Assessing Outcomes

The purpose of the outcome assessment is to understand the extent to which the inclusion of one or more dental therapists in a practice is having an effect on the practice itself as well as the patients served and the broader community. The key focus is whether the dental therapists have created changes in the practice beyond what would be expected by the status quo as well as whether there are changes specific to certain types of patients and specific site contexts.

Outcome Evaluation Questions

The outcome evaluation plan addresses four overarching questions:

- What is the effect of dental therapy on the *dental practice*?
    - including changes in the number of patients served; the reach of the practice, especially the extent to which Medicaid patients are served; the type and quality of care provided; the ability of the dentist to work on more complicated cases; team dynamics; and economic performance and productivity of the dental team
- What is the effect on the *patients served*?
    - including changes in patients' service utilization (frequency, type of services, use of ER) , oral health outcomes, avoidance of more complex care, satisfaction with and confidence in the services provided, and wait time for services
- What is the effect on the *community*?
    - including changes in equity of access to care for segments of the community, ER usage for dental needs, and rates of treated and untreated caries

Time Frame

The outcome study should ideally begin before dental therapy is introduced into a practice and extend at least three to five years following the initiation of the dental therapy program. Having data on the practice, the patients served, and the community prior to beginning the practice allows for a true baseline measurement of these areas that will strengthen the assessment of outcomes of the dental practice. However, if the outcome data collection cannot be initiated prior to the dental therapy beginning, it may be possible to access existing data for some of the measures as well as obtain "early implementation" data as the starting point of assessing change in outcomes.

Similarly, a longer outcome timeframe provides sufficient time for the dental therapy program to be implemented as well as the changes to occur, especially in the community, and for assessment of whether the changes are sustained. With shorter timeframes, an evaluation can still be conducted but expectations on the extent of the changes should be modified and likely limited to short-term changes.

Study Designs

The type of outcome design possible for each site will be determined, in part, by the size and context of the practice, the resources available to implement the evaluation, the ability to access existing data, the ability to collect data at baseline, and opportunities within the broader community for identification of comparison practices.

The most basic element of an outcome design is the ability to measure change. Ideally, as noted, baseline measures can be collected before the dental therapy program is initiated and compared with measures at several time points following the program's initiation. If baseline measures cannot be collected prior to the dental therapy program beginning, they should be collected as close to the initiation time point as possible. In addition, outcome measures should be collected to allow sufficient time for change to occur for the three levels noted above (the practice, the patients, the community). Changes for the practice and patients depend on the speed of implementation and are likely to occur within a year or two of the model being implemented. Changes for the community are longer term and are likely not to be realized until at least three years after the dental therapists are added to the practice.

A pre-post design can measure change, but it would not be sufficient to allow for strong attributions of the changes to the dental therapy intervention. Lacking a basis of comparison, an evaluation cannot attribute with certainty any measured changes to an intervention. Even without a specific intervention, change can occur for practices, patients, and communities. Evaluation designs need to control for these confounds in order to determine if the dental therapy program has had an impact. At a minimum, if a design cannot be implemented to control for the confounds, there should be components in the evaluation that can help determine if the confounds are in play and describe how they may be affecting the outcomes.

To strengthen the ability of an evaluation to make definitive statements about the dental therapy program's outcomes, an experimental or quasi-experimental design is needed. An experimental design is often touted as the strongest design for controlling confounds. In an experimental design, individuals are typically randomly assigned to the treatment under study (such as a practice with dental therapy) or to treatment as usual (such as traditional dental care without a dental therapist). However, it would likely be infeasible to randomly assign individuals to different care settings, especially if the patients have had history with particular settings.

A number of quasi-experimental designs are possible to use to evaluate dental therapy programs. These designs may help isolate the effects of the inclusion of a dental therapist on the individuals served, as well as shed light on the effects on the practice and the broader community. All of these strategies involve incorporating into the design one or more equivalent bases of comparison for the treatment site. Options for developing a comparison are described below.

Wait list design: For some practices, it is possible that there is a limited number of patients who can be seen at any given time, and those who cannot be served for a while are place on a wait list. The wait list can serve as a temporary comparison group, especially if there are few or no known biases to explain why certain people were able to become patients earlier vs. later. Drawbacks of the waitlist design is that it is contingent both on having many more people interested in receiving service than the practice can accommodate and on those on the wait list not receiving services for a minimal observation period, ideally at least a year. In many rural areas, it is unlikely that there will be large numbers of interested patients who could remain on a waitlist for this period.

Staggering of sites: Dental therapy is being implemented on somewhat of a rolling basis across the country as states become successful in getting legislation passed supporting dental therapy. States trying for legislation can be candidate comparison sites as they wait first for the legislation to be passed and then for practice staff to be trained and hired. Even within a state that has legislation passed, dental therapists are likely to be added to practices over time and candidate sites may serve as possible comparison sites.

Comparison site selection: There may be multiple dental practices in a community or region, only some of which may elect to have dental therapists join their practice. Depending on the characteristics of these other practices (such as size and nature of the patient population), they may be similar enough on many of the features to provide a basis of comparison for the dental therapy program site.

***Propensity score matching*:** Propensity score matching is a statistical strategy for creating comparison groups from existing data sets (Rosenbaum and Rubin, 1983). If there are data sets available that contain measures of service access, ER use, and other measures pertinent to the evaluation of dental therapy, they may present a basis of comparison for the treatment group, at least on those outcome measures represented in the data set.

Outcome Data Collection Methods, Measures, and Sources

As with implementation evaluation, outcome evaluation can and should employ multiple data collection methods and sources to assess changes for the practice, the patients, and the community. As Table 3 displays, these include possible methods and measures for assessing:

- Practice outcomes
    - Patient records, including intake data on patient demographics and characteristics; dental history and problems; receipt of service over time; types of services provided

- Practice records, including wait time for appointments; length of appointments; reasons for visits; services provided by different practitioners; and costs of services

- Patient outcomes
  - Patient records
  - Brief surveys of patients, including a focus on perceived accessibility, satisfaction, etc.
  - Focus groups
  - Observations
- Community outcomes
  - Existing state Medicaid data
  - Other existing data (e.g., Health Department survey data on dental health)

Table 3 provides a synopsis of recommended data methods and sources. In the pages that follow, each recommended method, data source, and survey tool is discussed in greater detail.

Table 3. Dental therapy impact measures: Recommended methods and data sources

Outcome/impact domain	Method	Measures	Respondents
Practice Outcomes	Dental therapist practice and patient records	New patients Frequency of dental visits Dental services and procedures Oral health problems	Dental therapist
	Patient Survey: Medical Expenditure Panel Survey	Frequency of dental visits Dental services	Dental therapist Patient
Patient Outcomes	POSSIBLE PATIENT SURVEY TOOLS		
	World Health Organization Oral Health Survey	Frequency of dental visits Oral health practices Oral health problems	Patient (adult) Patient (child)
	Early Childhood Oral Health Impact Scale	Oral health quality Oral health problems	Parent
	Minnesota Dental Therapist Patient Survey	Dental services Quality of dental services Patient satisfaction	Patient (adult)
	CAHPS Dental Plan Survey	Access to dental care Patient satisfaction	Patient (adult)
	NHANES Household Interview Oral Health	Oral health quality Oral health problems Access to dental care	Adult
	Adult/Youth Risk Behavior Survey	Access to dental care Oral health problems	Adolescent Adult
Community Outcomes	Medicaid Records	Access to dental care ER use	Adult and child Adult and child

Practice and Patient Records: One rich source of data to judge program impacts as well as patient outcomes are practice records and patient records maintained as part of a normal office practice. For example, the study *Early Impacts of Dental Therapists in Minnesota* demonstrated that including a review of office records in the evaluation was important in documenting dental therapist's services (Minnesota Department of Health, 2014). The Minnesota study focused on office administrative data from clinics. Specifically, clinics provide data " … on the number of patients served since hiring a dental therapist. Specifically, each clinic was asked to report the number of patients served by each dental therapist from the time they began employment through the end of the survey, the insurance type of those patients, and the average number of hours worked by the dental therapist" (Minnesota Department of Health, 2014).

Establishing basic baseline measures of office practices is a high priority for an outcome evaluation. The ideal means for establishing such a baseline is through the collection of both patient and practice records. The best means for collecting such records is through the use of the Electronic Health Records (EHRs). It is highly likely that dental practices will employ EHRs. Typically, EHRs maintain data on wait times for appointments, length of appointments, reasons for dental visits, dental services provided by different dental practitioners, costs of services, and key details regarding insurance reimbursements. Also, EHRs also maintain details on patients, including intake data on patient demographics and characteristics, dental history and problems, receipt of dental services over time, and types of dental services provided. Dental therapy practices not employing EHRs likely would still maintain dental office records that maintain practice and patient information similar to that gathered via EHRs. These office records could serve the same purposes as the EHRs. Longitudinally, these records can be used to monitor a wide-variety of outcomes, especially with regard to how the dental therapy practice changes (e.g., does the dental therapy practice increase its caseload, especially of families on Medicaid?) and impacts dental services to patients (e.g., do patients gain expanded access to dental services?).

Office records might include:

- **An initial oral health screening form.** Screening forms are an extremely common source of patient data maintained by dental practices. Generally, these forms capture patient information regarding dental caries experience, untreated dental decay, tooth loss, and periodontal disease (IHS, 2013).

- **Office visit treatment summary data.** Dental offices typically record the primary purpose(s) of patient visits. If these records are not available, those evaluating dental therapy program services also could use simple survey forms already developed and in use. One such survey form is the Dental Care Survey used by the Medical Expenditure Panel Survey (discussed in the next section).

- **Office insurance records.** Typically, dental offices will maintain paper/patient records for insurance reimbursement. These records could play a significant role in documenting dental therapist practices, as well as costs incurred.

- **Other administrative data.** Some administrative data (e.g., dental health utilization) also may be drawn from state or tribal records, including Medicaid records.

Data can be collected through these records on the aggregate patient population to assess changes before and after the introduction of the dental therapy program on the:

- total number of patients served (i.e., whether there is an expansion or reduction of the practice) as well as changes in the nature of "who" is served, especially children less than two years of age;
- frequency of preventative visits;
- the scope of practice (e.g., types of procedures performed) and by whom;
- percentage of patients with different types of payments (e.g. % direct pay, private insurance, Medicaid, Medicare) with particular focus on changes of in the number of Medicaid patients); and
- average (and range) of time between a patient's initial contact with the practice and appointment.

If available, information also can be tracked on the complaints made about the dental office before and after launching the dental therapist program. Complaints are usually filed with a state dental health board.

EHRs also can be instrumental in gathering data that can be used to document changes in patient oral health and patient satisfaction with dental services received. As noted above, EHRs maintain key details on patients and the services they receive. Overtime, these patient records can be used to track changes in how the dental health of patients changes, including, for example, how dental therapy services for low-income patients impact Medicare and Medicaid use (e.g., do dental therapists' patients experience a decline in their use of hospital emergency services?). In the aggregate, patient records also could be used to track improvements in the oral health of dental therapists' patients (e.g., over time, do patients served by dental therapists experience fewer dental problems?).

Patient Surveys: Patient surveys provide an opportunity for collecting data directly from patients on the care they have received, their satisfaction with their care, their access to services, and changes in their oral health. There is a variety of options for implementing patient surveys in practices, depending on the resources available, the configuration of the practice, and team resources. For small practices, the evaluation will likely need to try to include all patients in the survey (i.e., a census of the practice). If the number of patients is very large, it may be necessary to select a sample. If possible, selecting samples by time (e.g., all patients served within a specific period), may be the most useful and feasible strategy. Other sampling strategies (e.g., random samples) are possible but may be difficult to implement due to

both the need to have a complete, active listing of patients and the logistics involved in selecting a sample and following up with patients who do not respond (i.e., in order to have a reasonable response rate and a lack of bias in the sample)

For evaluation purposes, there are sufficient data collection tools that could be used to measure program impacts of dental therapy. Most of the measures presented in Table 3 have been used specifically to measure oral health issues that are relevant to dental therapy programs (e.g., access to dental services or patient satisfaction). The measures, presented in Appendix C, all could be adapted easily for use as in evaluations of dental therapy programs.

Office visits are perhaps the ideal setting for collecting evaluation data. For example, at the time of enrolling patients—the initial office visit - dental therapists or office staff could be required to administer the WHO Oral Health Survey for adolescents and adults, and the Early Children Oral Health Impact Scale for young children. Both surveys would provide dental therapy practices with baseline data on patients' oral health. Re-administering these surveys at one or several points overtime with the same patients would provide valuable data in monitoring changes in oral health.

Dental therapists or office staff also could be required at each dental therapy office visit to gather patient feedback on services rendered. The Minnesota DTP program evaluation study demonstrated that asking patients for feedback (via a survey) at each dental therapy office visit was a practical means to obtaining *regular* patient satisfaction feedback on DTP services. The surveys recommended (see in Table 3) for use with each office visit are extremely brief and straightforward, and ideal for patients to complete at the end of an office visit.

The set of survey tools presented in Table 3 are designed more to provide "a big-picture" assessment of dental access and health rather than feedback to dental therapists' practices. Used overall time with a general population, CDC risk surveys and NHANES could provide dental therapy program staff with valuable data on how dental access and health, in general, change within a geographic service area or region. These surveys would be conducted bi-annually, and the survey work contracted out to state health departments.

Normally, EHRs do not specifically include surveys of patient satisfaction; however, as part of maintaining regular patient records, dental therapy practices should include patient satisfaction surveys, which would include questions about the quality of the dental services used and how patients rate the quality of these services. Also, patient satisfaction surveys might include additional questions about how dental therapists' services have altered the use of hospital emergency services (e.g., do dental therapy patients report actual declines in the use of hospital emergency services as a result of the availability of the dental therapy practice).

The timing of collecting outcome measures falls into three broad time periods: 1) data collected at initial office visits; 2) data collected at each office visit; and 3) data collected periodically, perhaps bi-annually. Table 4 presents recommendations for using tools across these three time periods.

Table 4. Dental therapy impact measures: Recommended data collection times

Source collected at or from …	Data collection time point(s)
Initial visit/screening • WHO Oral Health Survey • Early Childhood Oral Health Impact Scale	Once
Each visit • Medical Expenditure Panel Survey • MN Dental Therapist Patient Survey • CAHPS Dental Plan Survey	Multiple times
Dental therapy clients/non-clients in service area • NHANES Household Interview Oral Health • Adult/Youth Risk Behavior Survey	Bi-annual

When to utilize measures must be balanced against resources available to collect data. Clearly, some of the measures require data collection resources. Typically, measures that gather data through telephone interviews and surveys require additional resources, both staff and time and materials, than those collected during office visits. Surveys conducted via the Behavior Risk Factor Surveillance System (BRFSS) used with adults and the Youth Risk Behavior Surveillance System (YRBSS) used with youth also might require additional resources. For example, a dental therapy program could contract with a state to increase the state samples of teens and adults to cover the dental therapy program service area, but it is highly likely that the state agency conducting the additional survey work would charge the dental therapy program for the additional survey work.

Focus Groups: As described in the earlier section on assessing the implementation of the dental therapy program, focus groups can be an efficient and informative method for obtaining the patient perspective. Patient focus groups may be especially important to include if a patient outcome survey is not possible. The groups can provide insight into the extent to which patients believe the practice has had an impact on their access to services, their oral health outcomes, and their overall satisfaction with their dental care. Even if a patient outcome survey is possible, adding one or more focus groups can provide texture to, and explanation of, the survey outcome findings. At times, it might be beneficial to hold the focus groups following receipt of the outcome data to follow-up and elaborate on specific findings from the survey.

Observations: As discussed in Section III on implementation, opportunities for the evaluator to observe the dental therapy program in action can increase understanding of the practice and the community context within which the program is implemented. Although observations cannot provide 'hard data' on outcomes, they can help explain the outcomes. For example, if conducted following the analysis of patient survey outcome findings, the observations might be structured to provide greater insights into areas of patient dissatisfaction and the factors that are influencing those areas, such as wait times in the waiting room and the time involved in getting treatment.

Existing Data: Some dental therapy practices will find themselves located in communities (e.g., a tribal organization, a city, a county, a state regional health jurisdiction, or a state) that participate in a periodic survey surveillance system that monitors dental health problems and access to dental care. The most commonly used surveillance systems are the Behavior Risk Factor Surveillance System (BRFSS) used with adults and the Youth Risk Behavior Surveillance System (YRBSS) used with adolescents. Both of these systems are managed by the Centers for Disease Control and Prevention (CDC), with communities conducting surveys through these systems every two years. When a dental therapy practice confirms that it is being established in a community that regularly participates in one of these systems or both, the dental therapy practice could use BRFSS and YRBSS results to track changes in community outcomes, including dental health, dental problems, and access to dental care. The key assumption here is that the community participating in the BRFSS and YRBSS geographically encompasses the dental therapy practice's service area. When this occurs, it becomes methodologically and statistically possible to track dental therapist practice impacts on the community at-large (e.g., over time, does the presence of a dental therapy practice improve dental access?). Using existing surveillance systems to track and document community outcomes may require over-sampling survey respondents in certain communities, but for the most part, existing CDC survey surveillance system employ adequate samples to generalize to their participating communities.

Data Analysis

Outcome data analysis can be conducted at key stages in the evaluation, including at baseline and at key follow-up stages, aligning with the timing of the data collection. If the evaluation is conducted over three years, data analysis on baseline data will likely occur in the first year, and there may be yearly follow-up analyses. Depending on the nature of the data and the study design used, different types of analyses will be possible. At a minimum, most evaluations will have the ability to examine pre-post changes over time, from baseline to at least one follow-up period. Some of these analyses could be quite simple, such as the use of t-tests to measure change (e.g., change in the size of the patient population). Other analyses, such as changes in patients' oral health behaviors, might use multivariate models to explain variations related to patients' demographic characteristics and past oral health behaviors. More complicated designs involving one or more comparison groups as well as analyses that examine change using multiple follow-up data collection points also will warrant different analytic procedures, typically some form of multivariate analysis and trend analysis.

Report Writing and Use of Findings

A baseline outcome report can provide the practice and its key stakeholders with an understanding of the "status quo" for the practice, its patients, and the broader community before the dental therapy program is put into place. It can describe the current patient volume and reach, especially with respect to the number of Medicaid patients served, as well as provide an understanding of how the practice operates. The report also can describe the patients served and what their frequency of receiving dental care is, their use of ER, their oral health outcomes, and so forth. If available, the report also can provide

community data that assesses what the level of use of dental services is in the broader community and the rates of treated and untreated caries.

In many evaluations, it may be appropriate to combine the baseline outcome report the initial implementation reports, especially if the practice was observed prior to the dental therapy program being implemented. The report might be written in a more mixed-methods report style, providing for more texture of the baseline findings with findings from the qualitative data. Having the report organized by what is known on the key areas of outcome – the dental practice, the patients, and the community – might provide an easily digestible format as well as encouraging a format that synthesizes the data across the methods and measures within each broad area of outcome. Having appendices for the more detailed tables of findings by measure and method would allow the main text to focus on the key sets of findings.

The same type of report format could be used for subsequent follow-up reports, ideally timed to be developed not long after each wave of follow-up measures. These reports also might be combined with the annual implementation reports or developed separately, depending on the purpose and audiences for each type of finding. Given the nature of the dental therapy area thus far, it is important to consider that each evaluation report is likely to have interest beyond those involved in the particular program being evaluated. Therefore, in writing the reports, it will be important to provide information that can help reader understand the particular context of the findings and their generalizability other patient populations and settings.

Section V. Assessing the Costs of the Dental Therapy Program

Purpose of Assessing Costs

One important question asked in considering implementing a dental therapy program is the financial impact of the program on the practice. Adding new staff and all of the associated personnel costs, the use of an additional dental chair (which the dentist may or may not have), additional records management and the lower Medicaid rates for added clients who are not able to pay out of pocket, are legitimate concerns about the fiscal viability of adding a dental therapist to the practice. Many of the procedures that the dental therapist could perform at a less expensive rate, the dentist could perform at a higher rate. On the other hand, the addition of a dental therapy program to a practice might increase the volume of patients that can be seen as well as allow the dentist to focus on more complicated and costly procedures.[1]

Cost Evaluation Questions

Does the inclusion of a dental therapy program in a practice increase costs to the practice, decrease costs, or is it cost-neutral?

Timeframe

Similar to the outcome study, it would be important to measures costs (and income) prior to the initiation of the program and then at different points following its implementation. Having a cost analysis at different points in the program's implementation may provide additional implementation guidance as well as inform expectations of other practices interested in implementing a dental therapy program (e.g., costs expected to incur during the initial ramp-up stage).

Study Approach

One possible approach to the question of financial viability is an" income to cost ratio" that determines accurate analysis of actual added cost to the practice and added income as a result of the new dental therapist. This is a simple logical and practical approach to determining the financial impact of adding the dental therapist to an existing practice.

Baseline Assessment: The first step would be to establish the current income to cost ratio before incorporating the dental therapist. Income would be measured as the total dollars collected from third party and self-payers (i.e., total revenue for a given year). The second step would be to measures costs. Costs would include all expenditures on personnel and benefits, professional memberships and services, utilities, supplies and equipment, cost of office space, and other costs that are associated with the

[1] This cost analysis is limited to costs to the practice, and does not examine the social costs or benefits is the additional social benefit of serving patients who would otherwise be unable to receive dental services.

practice. Due to likely fluctuation in both income and costs in terms of seasonality and other external factors, it may be best to look each in either quarterly or yearly rates. The third step would be to examine the income to cost ratio. Income to cost ratio is the annual (or quarterly) practice income divided by the annual (or quarterly) practice costs.

Follow-up Assessments: Once the dental therapist is established, the cost analysis should be repeated at key time intervals, now including the costs of the dental therapist and the expenses incurred with the dental therapy program. For example, the added paperwork associated with Medicaid payments may require additional clerical staff to process the reimbursement invoices. The periods of observation (annual, quarterly) should be consistent with the periods used in the baseline. The ratio is calculated in the same way. Comparison of the baseline ratio with the follow-up ratio will provide a basis for determining the income increase or loss to the practice as a result of adding a dental therapist. Having different follow-up time periods will allow the evaluation to determine if the ratio changes over time, after the initial start-up phase as well as over time if the practice increases or decreases in patient volume.

Example

An example can illustrate how the cost approach can be implemented. The following is a simplified example. Several assumptions are made in lieu of actual data. While the values shown here are fictional, they are intended to illustrate calculation of the income to cost ratio.

In the example, there are four equipped treatment rooms, one dental hygienist, one dental assistant, and one dentist. Three offices with chairs are usually active, two by the dentist and assistant (alternating between rooms as procedures require) and one by the hygienist. The fourth treatment room is rarely used.

The following assumptions are made in the following annual income to cost ratio calculations:

- The billable clinical hours for each clinician is seven hours per day
- The average income per hour for each type of staff is as follows:
    - dentist: $120 before and $130 after adding a dental therapist
    - hygienist: $80 both time frames
    - dental therapist: $60
- Each clinician gets two weeks of vacation and works 50 weeks of the year.
- The practice has mostly self-pay and private insurance funded treatments prior to the addition of the dental therapist.
- All staff are salaried rather than fee for service.

Table 5 provides a breakdown of costs and income from the practice and the cost and income as a result of incorporating a dental therapiy program. A positive income to cost ratio over 1.0 indicates a costs savings; an income to cost ratio less than 1.0 indicates a loss.

Table 5. Calculating the annual income to cost ratio before and after adding a dental therapist to the practice: A fictitious example

	Before dental therapist	Established dental therapist
Cost	**$**	**$**
Personnel		
Dentist	110,000	110,000
Hygienist	40,000	40,000
Dental Asst.	35,000	35,000
Receptionist	30,000	30,000
½ FTE Receptionist		15,000
Dental Therapist		50,000
Total salaries	215,000	280,000
Benefits (32.5%)	69,875	91,000
Total Personnel	**284,875**	**371,000**
Operating		
Supplies	30,000	40,000
Office rent	20,000	20,000
Utilities	7,000	8,000
Other	1,000	1,500
Total Operating	**58,000**	**69,500**
Total Cost	**342,875**	**440,500**
Income		
Dentist	210,000	227,500
Hygienist	140,000	140,000
Dental Therapist		105,000
Total Annual Income	**350,000**	**472,000**
Income to Cost Ratio	**1.02**	**1.07**

Section VI. Plan for Implementing the Evaluation

Collaborating with the Site

Dental therapy programs will be implemented in a variety of practice settings and communities. The settings can range from a large practice in a large urban area to a small practice in a rural area. The characteristics of the community has an impact on the goals of the program (e.g., increasing access, reducing wait times or providing dental services where otherwise unavailable) as well as the feasibility of possible methodologies. For example, in Alaska, there are isolated villages with fewer than 100 residents in which the dental therapist works with only remote supervision from the dentist. This contrasts with a large metropolitan practice that incorporates dental therapists to expand the practice and accept Medicaid funds. Further, the evaluator must consider the culture of the communities from which the patients are drawn. Such issues as language barriers, reading skills, and customs in the community can limit the design and processes for collecting evaluation data.

These and other considerations have an impact on the final evaluation design. If the contextual factors are addressed appropriately, the resulting evaluation can be successfully implemented. For example, the large urban area offers challenges in identifying the catchment area and to whom a community-wide survey should be administered. The alternative would be to include a brief patient survey when the patient is checking out. Others might hold that the community wide survey could show change. However, the broad brush approach may mask the effects of the specific single practice using dental therapists. A small village may not offer viable options for any kind of random survey but might be best evaluated with key informant interviews or focus groups.

As noted in Section I, it is ideal for the evaluation planning to include an assessment of the context and the capacity of the practice staff and patients to respond to the requirements of the evaluation. It is likely that the optimal approach to evaluation in many contexts is a community participatory evaluation strategy. The engagement of the community, providers, and patients will facilitate the data collection and enhance utilization of the evaluation results. The dental practice staff and community will be more likely to “own” the evaluation process and results. The results of the evaluation in a community participatory evaluation will likely be of greater utility in decision making than other approaches to evaluation.

Several AI/AN communities have expressed an interest or have launched their respective dental therapy projects. Indeed, Alaska has implemented a program in their communities several years before other current or planned projects. Evaluation of the AI/AN communities requires attention to the culture and capacity of the community. In some tribal communities, the presence of a dental therapy program will be the first local and accessible dental care in their isolated communities.

In AI/AN communities, it is strongly recommended that a community participatory evaluation strategy be used. It is important to spend time with the community and get the perspective of the tribal leaders, dental providers, and interested members of the community in designing the evaluation and reporting the results. Discussions with these members of the community will be very helpful in identifying appropriate measures, viable evaluation strategies, and appropriate protocols. Some tribes have their own IRB and require that all data collection be approved by that group. Other tribes may require that the purpose of the evaluation and evaluation design be presented to the tribal council for approval. The concern regarding evaluation for tribal communities is most often both human subjects issues and well as confidentiality of information about the tribe. In many cases, the tribal group may want to review any publications arising from the evaluation as well.

Dealing with Data Collection Challenges

A significant data collection challenge is giving dental therapists and their office staff the responsibilities of collecting, maintaining, and analyzing survey data. These responsibilities are not ones dental office staff are trained to undertake. Collecting brief paper-pencil survey forms from dental therapy patients as part of a normal office visit, however, could become a routine that is fairly easy to follow, especially if dental therapists and office staff are provided with adequate documentation and instructions. However, safeguards need to be put into place to ensure that patients feel comfortable in providing their honest and candid respones on the survey. Providing privacy in completing the survey (e.g., completing it on a tablet in an area separate from staff or on paper that is put in a previously filled out manila envelope).

The act of completing the recommended surveys is not time consuming. With the exception of the bi-annual surveys, all of the surveys discussed in Table 3 are brief, perhaps taking no more than 5 to 10 minutes to complete. The survey results, or the variables themselves, also are fairly simple enough to store in an Excel Worksheet—a tool that should be available on every office computer. Summary survey output could be installed to allow office staff to perform periodic summary statistics.

The Minnesota DTP program evaluation study demonstrated that asking patients for feedback (via a survey) at each dental therapist visit is doable, and this study showed that having patients complete feedback in the office is preferable to handing dental therapy patients a survey to complete at home and to mail back to the office. Response rates for the later data collection method were low.

The recommended bi-annual CDC risk surveys and NHANES data collections potentially could be challenging because of costs associated with undertaking these additional surveys. As noted earlier, these surveys would be contracted out to state health departments or tribal health departmenta, which normally have the responsibility of conducting these surveys or others like them. It is likely that a health department would need additional monies to include additional samples that would cover the dental therapy program geographic service regions. A typical regional or statewide CDC Youth Risk Behavior Survey, for example, can run as high as $20,000 for data collection alone.

Informed Consent

Patient informed consent could be obtained during the initial office visit/patient intake. Patients could be provided both an oral description of the evaluation study and a written description. Consent forms would apply only to evaluation data collected during office visits. CDC risk surveys and NHANES data collection—which take place outside of normal DTP office visits—require their own informed consent and would need to be obtained via the methodology for each of those surveys. Obtaining informed consent requires extra planning, as well as resources (e.g., staff time devoted to follow-up activities associated with obtaining signed consent forms), but because the dental therapy program practice is so well-defined (i.e., patients are known and available), the challenge of obtaining signed consent forms is less than in broad population survey efforts.

Challenges Accessing Existing Data

As part of the feasibility study, it is likely that existing data sources will be identified. One source might be existing community surveillance data files. As noted, the CDC BRFSS may been conducted by a county or state health department and these data may be able to be accessed for the evaluation. A second potential source is existing dental office records (e.g., EHRs). Both of these sources can be extremely valuable for establishing pre-measures of dental care. For example, if the evaluator plans to gather BRFSS data and the community has in the recent past participated in this survey, findings from the existing BRFSS data can provide a baseline measure of general dental health for the community. Similarly, dental office records can also provide baseline measures of dental health for the practice.

Accessing existing data sources, however, present a few challenges. Challenges include:

- **Additional planning time.** Obtaining existing data requires additional planning time. A county health department may agree to share its BRFSS data files with DTP evaluators; however, evaluators may need to submit a formal application for IRB review and approval. The permission request and approval review process might take several months from beginning to end.

- **Using EHRs and obtaining patient permission.** BRFSS survey records are anonymous *and* the survey records do not reveal respondents' personal identifiers. Therefore, patient permissions are not required to access BRFSS records. EHRs, however, are likely to include personal identification details for patients, such as date of birth, social security numbers, and addresses. Evaluators seeking to use EHRs may be required to obtain patient permission to use records for research purposes. The process of obtaining such permission levels would require not only additional planning time, but also extra budgeted resources used to contact patients to gain permission. Evaluators need to factor in these potential roadblocks and challenges. Evaluators could obtain EHRs stripped of personal identifiers; however, even using the stripped records likely would require IRB review and additional planning time. In addition, resources would need to be available to the dental practice to perform the data stripping.

- **Budgeting for an analyst and file costs.** Most evaluators probably will be able to perform their own data analyses; however, some dental therapy program evaluations may need to budget for additional personnel to manage and analyze data files. For the most part, public BRFSS data use files are free; however, evaluations using EHRs may be required to purchase them. For evaluations operating on small budgets such expenses can be significant and cost prohibitive. Factoring in such expenses should be part of the evaluators' feasibility assessment.

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Appendix A
Glossary of Key Terms

Term	Definition
ADA	American Dental Association
AI/AN	American Indian and Alaska Native
BRFSS	Behavioral Risk Factor Surveillance System; for additional information visit: http://www.cdc.gov/brfss/.
CAHPS	Consumer Assessment of Healthcare Provides and System; for additional information visit: http://www.ahrq.gov/cahps/index.htm/.
CDC	Centers for Disease Control and Prevention
DTP	Dental Therapy Program allows trained dental therapists to provide preventive and basic dental repair services, including cleanings, filings and simple extractions under the supervision of a dentist. For additional information visit: https://www.wkkf.org/what-we-do/healthy-kids/oral-health/what-is-a-dental-therapist.
EHRs	Electronic Health Records, also frequently, referred to as Electronic Dental Records (EDRs); for additional information visit: http://www.ada.org/en/member-center/member-benefits/practice-resources/dental-informatics/electronic-health-records.
Experimental design	Experimental design treatment conditions are assigned randomly. An experimental design can be employed as part of an program evaluation when one is interested in assessing program impacts.
Formative feedback	After completing an implementation evaluation, researcher frequently issue formative feedback (reports). Feedback focuses on the strengthens and weaknesses of the program, and recommends areas for improvement.
Implementation evaluation	Implementation evaluation attempts to review those activities of a program that moves it from its creation and into action. Frequently, with such evaluations, researchers are documenting program fidelity and attempting to answer the question, has a program been implemented as planned?
Informed consent	Informed consent a process of obtaining permission for individuals participating in a research study.
IRB	An Institutional Review Board (IRB) is an independent ethics committee used to review, approve, and monitor research studies in the United States.
Medicaid	A joint federal and state program that helps with medical costs for people with limited income. For additional information visit: https://www.medicaid.gov/medicaid-chip-program-information/medicaid-and-chip-program-information.html.

Term	Definition
Medicare	Medicare is the federal health insurance program for people who are 65 or older and certain younger people with disabilities. For additional information visit: https://www.medicare.gov/index.html.
NHANES	National Health and Nutrition Examination Survey; for additional information visit: http://www.cdc.gov/nchs/nhanes/.
Propensity score matching	Propensity score matching is a technique that allows researchers to design and analyze study data so that it mimics a randomized controlled trial. Baseline characteristics of research subjects are used to make assignments into a treatment program or intervention.
Qualitative evaluation research/ measures	Qualitative evaluation research gathers data from sources such as interviews, on-site observations, focus groups, and documents. In general, qualitative measures are viewed as non-statistical. For additional information visit: http://www.cdc.gov/dhdsp/pubs/docs/CB_November_8_2011.pdf.
Quantitative evaluation research/ measures	Quantitative evaluation research gathers data from surveys, existing data-bases, and pre/post measures. In general, quantitative measures are viewed as statistical. For additional information visit: http://www.nsf.gov/pubs/2002/nsf02057/nsf02057_4.pdf.
Quasi-experimental design	Quasi-experimental design treatment conditions are **not** assigned randomly. With a quasi-experimental design, a researcher would employ such design techniques as pre-post comparisons (or before-after comparisons) or interrupted time-series. For additional information visit: https://www.unicef-irc.org/publications/pdf/brief_8_quasi-experimental%20design_eng.pdf.
Rapid feedback reports	In general, rapid feedback reports result from short-term, low-cost evaluation efforts that obtain data from existing records and interviews of key stakeholders. Normally, such reports are completed within 3-6 months.
RTI	Research Triangle Institute; for additional information visit: https://www.rti.org/news/dental-health-aide-therapists-can-be-part-much-needed-solution-dental-care-rural-alaskans.
WHO	World Health Organization
YRBSS	Youth Risk Behavioral Surveillance System; for additional information visit: http://www.cdc.gov/healthyyouth/yrbs/.

Appendix B
Implementation Domains and Sources

	Sources of implementation information								
	Documents and existing data	**Key leader-ship**	**Dental therapist**	**Super-vising dentist**	**Other staff in the practice**	**Patients**	**Other stake-holders**	**Practice/ Patient records**	**Practice observations**
History prior to Implementation	●	●					●		
History of patient dental care						●		●	
Level of dental community support and acceptance in the general community	●	●		●			●		
Nature of the practice and its operation	●			●	●				●
Nature and size of patient population	●							●	
Background of the dental therapist			●	●					
Experience and training requirements for Dental Therapist	●	●	●	●					
Design and implementation of the specific model • Role of supervising dentist • Role and fit of the dental therapist	●	●	●	●	●	●	●		
Procedures practiced by the dental therapist	●							●	
Perception of and confidence in the Dental Therapist and satisfaction with the program	●	●	●	●	●				
Perceived value and challenges from having a dental therapist program				●	●		●		
Impact of the dental therapist program on health and health care	●	●					●	●	

	Sources of implementation information								
	Documents and existing data	**Key leader-ship**	**Dental therapist**	**Super-vising dentist**	**Other staff in the practice**	**Patients**	**Other stake-holders**	**Practice/ Patient records**	**Practice observations**
Overall impact of the dental therapist on the practice	●							●	
Overall impact on the community	●						●		

Appendix C
Survey Tools for Assessing Dental Therapy Outcomes

This appendix presents seven survey tools for assessing various Dental Therapy outcomes. All of the tools are in the public domain; however, evaluators planning to use any of the tools first should seek approval, especially if the evaluator plans to adapt a tool (e.g., slightly alter original survey questions).

The tools appear in a specific order, influenced 1) by their ease of use and/or 2) the ability to compare local survey results to normed state results. For example, an evaluator using questions from the Centers for Disease Control and Prevention (CDC) Behavior Risk Factor Surveillance System [BRFSS] should be able to find state-wide BRFSS results for comparative purposes.

The seven survey tools include:

- Minnesota Dental Therapists Patient Survey
- Centers for Disease Control and Prevention (CDC) Adult/Youth Risk Behavior Survey(s)
- Early Childhood Oral Health Impact Scale
- National Health and Nutrition Examination Survey (NHANES) Household Interview of Oral Health
- Consumer Assessment of Healthcare Providers and System (CAHPS) Dental Plan Survey
- World Health Organization (WHO) Oral Health Surveys
- Medical Expenditure Panel Survey (MEPS) Dental Care Survey

There is no intent to provide the complete tools within this appendix. What follows is a general description of the tool, and a selection of survey questions, items or variables. General contact information also is provided for each survey tool. Most tools, including details about how the survey was developed, are found easily via most web searches.

Minnesota Dental Therapists Patient Survey

In 2009, Minnesota was the first U.S. state to establish a Dental Health Aide Therapist (DHAT) program. When the Minnesota Legislature established its program, it also required the state " … to evaluate dental therapists' impacts on the delivery of and access to dental services (Minnesota Department of Health, 2014)." A great deal of the Minnesota DHAT evaluation focused on practice outcomes and how practices impacted improved dental services. For example, evaluation results demonstrated that DHAT patients experienced reductions in travel times for dental services. Results also linked DHAT practices to reduced emergency room visits for vulnerable populations. The Minnesota DHAT was able to document practice outcomes and their impacts by using a patient survey instrument, the **Minnesota Dental Therapists Patient Survey**. The survey was administered either in the dental office by staff or DHAT patients were handed the survey when departing the dental office and instructed to return the survey

via a postage-paid envelope. Survey results were aggregated to the clinic level. See Exhibit C-1 for the questions used on the **Minnesota Dental Therapists Patient Survey** (response options are omitted).

For more information contact/visit: Minnesota Department of Health; 888-345-0833 (toll-free line)

Exhibit C-1. The Minnesota Dental Therapists Patient Survey

Question
• Who received dental care today?
• When did you last go to a dental clinic?
• What was the reason for your dental visit today?
• How long did it take for your to get this appointment?
• How long did it take for you to get a dental appointment at the last dental clinic you visited prior to this appointment?
• Before making this appointment did you try to get an appointment at another dental clinic to take care of the dental needs your had today?
• Have you been to the dental clinic for your last dental appointment?
• How long did it take you to travel to this appointment?
• How long did it take you to travel to the last dental clinic or dental office you visited prior to this appointment?
• How easy or difficult was it to get transportation to this appointment?
• Did you need to visit a hospital emergency room in the last 2 years for dental pain which was not caused by an injury?
• What is the zip code where you live?

Centers for Disease Control and Prevention (CDC) Adult/Youth Risk Behavior Survey(s)

For more than three decades, CDC has monitored the health risk behaviors of adults and youth. The behaviors that are monitors, via surveys, are ones contributing to the leading cause of death, disability, and social problems among adults and youth in the U.S. CDC surveys adults through its Behavior Risk Factor Surveillance System (BRFSS) and it monitors young adults (teenagers) through its Youth Risk Behavior Surveillance System (YRBSS). Both systems—through the use of standard core questionnaires, focus on topics that include smoking, alcohol use, physical inactivity, diet, and seat belt use. The BRFSS operates in most states and is conducted as a household telephone survey. The YRBSS operates in most states and is conducted as a paper-pencil survey administered in high schools. Both systems use random samples of respondents. In addition to asking respondents a set of standard core questions, over time, both the BRFSS and YRBSS have evolved and have added supplemental questions that address a wide variety of additional health issue, including dental health. See Exhibit C-2 for a list of the questions currently used (response options are omitted).

For more information contact/visit:
http://www.cdc.gov/brfss/
http://www.cdc.gov/healthyyouth/data/yrbs/index.htm

Exhibit C-2. CDC BRFSS and YRBSS Oral Health Questions (Selected Items Only)

Question
• (On the BRFSS): How long has it been since you last visited a dentist or a dental clinic for any reason?
• (On the BRFSS): How many of your permanent teeth have been removed because of tooth decay or gun disease
• (On the YRBSS): When was the last time you saw a dentist for a check-up, exam, teeth cleaning, or other dental work
• (On the YRBSS): During the past 12 months, how many times have your teeth or mouth been painful or sore?
• (On the YRBSS): During the past 12 months, how many times have you missed school because of problems with your teeth or mouth?
• (On the YRBSS): During the past 12 months, how many times did you go to an emergency room or urgent care center for problems with your teeth or mouth?

Early Childhood Oral Health Impact Scale (ECOHIS)

Created in 2007, the **Early Childhood Oral Health Impact Scale** (ECOHIS) was designed to measure the oral health quality of preschool aged children (3 to 5 years old) and their families. ECOHIS is a short 13-item scale completed by either the child's parent or primary caregiver. Field testing for ECOHIS demonstrates high levels of validity and reliability. ECOHIS would be ideal for dental therapy preschool patients or even young children in the lower elementary school grades. Parents or other caregivers would complete the scale either as DHAT office paperwork or as a mail survey (dental therapy parents could be handed the survey and a postage-paid return envelope as they exited the dental office). Aggregated scale data overtime could be utilized to monitor dental therapy patient and practice outcomes. See Exhibit C-3 for survey items.

For more information contact/visit:
University of North Carolina at Chapel Hill
https://uncch.pure.elsevier.com/en/organisations/gillings-school-of-global-public-health

Exhibit C-3. Early Childhood Oral Health Impact Scale (ECOHIS)

Question
• How often has your child had pain in the teeth, mouth or jaws?
• How often has your child … because of dental problems or dental treatments?
○ had difficulty drinking hot or cold beverages
○ had difficulty eating some foods
○ had difficulty pronouncing any words
○ missed preschool, daycare or school
○ had trouble sleeping
○ been irritable or frustrated
○ avoided smiling or laughing
○ avoided talking
• How often have you or another family member … because of dental problems or dental treatments?
○ been upset
○ felt guilty
• How often …
○ Have you or another family member taken time off from work because of dental problems or dental treatments?
○ Has your child had dental problems or dental treatments that had a financial impact on your family?
Response options: 1) never; 2) hardly ever; 3) occasionally; 4) often; 5) very often; 6) don't know

National Health and Nutrition Examination Survey (NHANES) Household Interview of Oral Health

The **National Health and Nutrition Examination Survey** (NHANES) is a program of studies designed to assess the health status of U.S. adults and children. NHANES operates under the U.S. agency the National Center of Health Statistics (NCHS), which is part CDC. NHANES is a survey that combines interviews and physical examinations, including interviews about oral health and actual dental examinations. According to CDC, NHANES findings are used "… to determine the prevalence of major diseases and risk factors for diseases. Information will be used to assess nutritional status and its association with health promotion and disease prevention. The NHANES **Household Interview of Oral Health** could be adapted for DHAT evaluation purposes. The current interview questions are relevant—addressing issues of dental access and health—and could easily be adjusted to form a brief paper-pencil survey to be completed by DHAT adult patients. See Exhibit C-4 for the a sample of interview questions relevant to the dental therapy program (response options are omitted).

For more information contact/visit:
http://www.cdc.gov/nchs/nhanes/index.htm
http://www.cdc.gov/nchs/data/nhanes/nhanes3/cdrom/NCHS/MANUALS/DENTAL.PDF

Exhibit C-4. NHANES Household Interview of Oral Health (Selected Items Only)

Question
• About how long has it been since you last visited a dentist?
• During the past 12 months, was there a time when you needed dental care but could not get it at that time?
• What were the reasons that you could not get the dental care needed?
• How often during the last year have you had painful aching anywhere in your mouth?
• How often during the last year have you had difficulty doing your usual jobs or attending school because of problems with your teeth, mouth or dentures?
• Overall, how would you rate the health of your teeth and gums?
• Have you ever had treatment for gum disease such as scaling and root planning, sometimes called deep cleaning?
• Have you ever had any teen become loose on their own, without an injury?
• During the past three months, have noticed a tooth that doesn't look right?
• Aside from brushing your teeth with a toothbrush, in the last seven days, how many days did you use dental floss or any other device to clean between your teeth?

Consumer Assessment of Healthcare Providers and System (CAHPS) Dental Plan Survey

In 1995, the federal Agency for Healthcare Research and Quality (AHRQ) established The Consumer Assessment of Healthcare Providers and System (CAHPS) program. CAHPS's main focus is providing consumers with standardized survey tools to assess health plans (Lake, Kvam, and Gold, 2005). Since its inception, CAHPS has grown and added a wide-variety of survey tools, including one that assesses dental care plans—the CAHPS **Dental Plan Survey**. The survey generates four measures: 1) care from dentists and staff; 2) access to dental care; 3) dental plan costs and services; and 4) patients' ratings (of the dental care received). The **Dental Plan Survey** is an ideal assessment for evaluating dental therapy practices, especially with regards to wait times for appointments and patient satisfaction with dental services and staff. The standard CAHPS **Dental Plan Survey** is 39 items and it is administered as a mail survey—a survey is handed to a patient as they exit their dental office. The survey, however, could be shortened, asking only the questions addressing wait times and satisfaction with services. Both issues are of importance to evaluating dental therapy practice outcomes. See Exhibit C-5 for sample survey questions on wait times and satisfaction (response options are omitted).

For more information contact/visit:
http://www.ahrq.gov/cahps/Surveys-Guidance/Dental/index.html

Exhibit C-5. CAHPS Dental Plan Survey (Selected Items Only)

Question
Wait time/access to dental care
• How often were your dental appointments as soon as your wanted?
• How often did you have to spend more than 15 minutes in the waiting room before you saw someone for your appointment?
• If you had to spend more than 15 minutes in the waiting room before you saw someone for your appointment, how often did someone tell you why there was a delay or how long the delay would be?
• If you needed to see a dentist right away because of a dental emergency in the last 12 months, did you get to see a dentist as soon as you wanted?
Satisfaction
• How often did your regular dentist explain things in a way that was easy to understand?
• How often did your regular dentist listen carefully to you?
• How often did your regular dentist treat you with courtesy and respect?
• How often did your regular dentist spend enough time with you?
• How did the dentists or dental staff do everything they could to help you feel as comfortable as possible during your dental work?

World Health Organization (WHO) Oral Health Surveys

The **World Health Organization (WHO) Oral Health Surveys** have existed since 1971. WHO uses the surveys to evaluate the oral health status of populations around the world. In addition, survey results are used by oral health planners to improve service coverage and utilization of oral health services. According to WHO, the **Oral Health Surveys** " … can be used to collect essential data on self-reported oral health, oral health behavior, use of available oral health services, oral health related quality of life, and the socio-environmental risk factors for oral health (World Health Organization, 2013)." Two of the **Oral Health Surveys**, both self-administered—one for adults and one for adolescents, would be ideal to employ as a means to capture dental therapy patient outcomes. Both surveys have been tested throughout the world. The WHO surveys also could be administered via one-on-one interviews—possibly completed by the dental therapists or dental office staff. See Exhibit C-6 for the issues explored on the **Oral Health Surveys** (for brevity only variable/issue included).

For more information contact/visit:
http://www.who.int/oral_health/publications/9789241548649/en/

Exhibit C-6. WHO Oral Health Surveys

Variable/issue explored	Adult	Child
• general ID (e.g., gender of patient)	x	x
• age	x	x
• self-reported number of teeth present	x	
• experience of pain/discomfort from teeth and mouth	x	x
• wearing of removable dentures	x	
• self-assessment of status of teeth and guns	x	x
• frequency of tooth cleaning	x	x
• use of aids for oral hygiene	x	x
• use of toothpaste containing fluoride	x	x
• dental visits	x	x
• reason for dental visit	x	x
• experience of reduced quality of life due to oral problems	x	x
• consumption of sugary foods and drinks	x	x
• use of tobacco; type and frequency	x	x
• consumption of alcohol	x	
• level of education (of parents)	x	x

Medical Expenditure Panel Survey (MEPS) Dental Care Survey

The Medical Expenditure Panel Survey (MEPS), which began in 1996, is a set of large-scale surveys of families and individuals, their medical providers, and employers across the United States (Cohen, et al, 1997). MEPS collects data on the specific health services that Americans use, how frequently they use them, the cost of these services, and how they are paid for, as well as data on the cost, scope, and breadth of health insurance held by and available to U.S. workers. Since its inception, MEPS has included a **Dental Care Survey**, which includes details on the nature of the dental care visits, type of dental care providers, treatments and services performed, and prescribed medicines. The MEPS **Dental Care Survey** could be used as a survey that individual DHAT patient respond to after a dental therapy visit or as a survey that individual dental therapists or their office staff complete, record, and file with each individual dental therapy patient office or practice records. Given the need for recording accurate details for dental therapy services and outcomes, it perhaps best that dental therapists complete the MEPS Dental Care Survey. See Exhibit C-7 for the questions asked on the **Dental Care Survey**.

For more information contact/visit:
http://meps.ahrq.gov/mepsweb/
mepsprojectdirector@ahrq.hhs.gov
301-427-1406

Exhibit C-7. MEPS Dental Care Survey

Question	Responses
What did (you/patient) have done during this visit?	**DIAGNOSTIC OR PREVENTIVE** • General Exam, Checkup or Consultation • Cleaning, Prophylaxis, or Polishing • X-Rays, Radiographs, or Bitewings • Fluoride Treatment • Sealant **RESTORATIVE OR ENDODONTIC** • Fillings • Inlays • Crowns or Caps • Root Canal **PERIODONTIC (GUM TREATMENT)** • Periodontal Scaling, Root Planning, Gum Surgery • Periodontal Recall Visit **ORAL SURGERY** • Extraction, Tooth Pulled • Implants • Abscess or Infection Treatment • Other Oral Surgery **PROSTHETICS** • Fixed Bridges • Dentures or Removable Partial Dentures • Relining or Repair or Bridges or Dentures **ORTHODONTICS** • Orthodontia, Braces, or Retainers **ADDITIONAL PROCEDURES** • Bond, Whiten, or Bleach • Treatment for TMD or TMJ • Other
During this visit, were any medicines prescribed for (you/patient)?	Yes No
Please tell me the names of the prescriptions from this visit that were filled.	Prescribed medicine #1: Prescribed medicine #2: Prescribed medicine #3:

Appendix D
Phases of a Dental Therapy Program

The timeline below provides a perspective on the steps needed to conduct a useful evaluation. The optimal evaluation in the case of Dental Therapy programs provides stakeholders (dentist, dental therapist, other dental staff, state regulators, supporters and advocates for dental therapy) information on the implementation of the program, acceptance among patients, economic feasibility for the practice, and impact on the dental health of patients. The latter information source is important in documenting the impact of Dental Therapy on patients covered by Medicaid and Medicare who were previously unserved by the practice because of cost. The recommended evaluation is focused on the implementation process, not the curriculum by which Dental Therapists are trained.

Please note that, with the exception of Phase I, the remaining phases can occur simultaneously. In phase 1 the goals are established along with the model identified and the planned implementation process. This should occur first. Also identifying an evaluator is an important activity in Phase I.

Table D-1. Phases in a Dental Therapist Evaluation

Phase	Action	Comments
Phase 1 Pre-planning	Identify process of acquiring regulatory approval and issues in implementing	Document how long it took, who advocated and how the advocacy was conducted
	Identify and establish an evaluator	The selected evaluator must have evaluation skills and capacity to work with the dental community
	Clarify the reasons for establishing a Dental Therapy	The point is to help identify intended outcomes
	Identify goals and objectives for implementing a Dental Therapy Program	The goals could as simple as increasing the number of people in the service area having the opportunity to receive dental care. Objectives are the actions and achievements that help reach that goal. The evaluator should be able to assist in developing the evaluation
Phase 2 Baseline Data	Identify and acquire data that relates to your goals and objectives	For example, if your goal is increase access to dental care by individuals who have not been able to afford it, get estimate of the proportion of the population in your area who have and have not seen a dentist.
	Document the process of implementing the Dental Therapy program	This process will be a great help in identifying the "what" in the evaluation. The evaluator should be able to organize that information
Phase 3 Collection and Analysis of Data	Collect process data such as the number of patients seen by the Dental Therapist and the number of patients seen by the practice before and after the Dental Therapy Program began	The information will include quantitative and qualitative data. The administrative data (e.g. number of patients served, practice income and cost) must be collected systematically and on an ongoing basis (e.g. monthly). The evaluator can help design a data collection process. The evaluator may also conduct interviews on site.
	Collect outcome data such as patient satisfaction, repeated appointments, improved dental health, patient perceived improvement in health and mental health.	The specific outcome measures Depend on the specific practice goals and objectives. Keep in mind that each practice will serve a fixed number of patients who self-select. The Dental Therapy program may not "move the needle" reflecting overall increase in persons served in a community unless that community is relatively small. Practices are encouraged to use the BRFSS and YRBS items provided in Appendix C. These are basic outcome items that will reflect most outcome goals.
	Analysis can be done by the evaluator in collaboration with interested members of the practice	The data will likely include qualitative and quantitative measures. It is suggested that the data be viewed over time using trend data. The baseline data collected in Phase 2 will serve as a basis for comparison with the same measures after implementation.

Table D-1. Phases in a Dental Therapist Evaluation (continued)

Phase	Action	Comments
Phase 4 Reporting Results	Identify the primary audiences. They might include the practice staff, the state dental regulatory office, fellow dentists in the state, medical professionals in the state, supportive state legislators, and agencies that support the Dental Therapy Program	The reports should be tailored to each audience.