

# Use of Telehealth Technology to Extend Child Protection Team Services

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**ABSTRACT.** *Objective.* In response to increased referrals to Florida's Child Protection Teams and concern regarding statewide availability of medical expertise in the area of child abuse and neglect, Children's Medical Services of the Florida Department of Health established a telemedicine project to facilitate immediate expert medical evaluations of alleged child abuse or neglect. This article describes a baseline examination of the project, including the technique of concept mapping, to examine how larger systematic factors influence the adaptation of telemedicine technology in child abuse examination settings.

*Methods.* This study included interviews of key staff plus the incorporation of concept mapping, which takes qualitative data (individual statements and opinions) and quantifies them (sorts and ranks them by order of group importance).

*Results.* Findings from interviews revealed that the frequency of use of telehealth services varies across the state as a result of several factors, including space limitations and staff training. Patients, however, seem to be comfortable with the use of the new technology. The concept mapping exercise displayed a progression of issues that are perceived to have an impact on the use of this technology.

*Conclusions.* Technology use is affected by unforeseen variables, such as physical space limitations and examination room availability. Family concerns about patient privacy issues were rare and were resolved quickly by the health care practitioner. Although using this equipment is not difficult, the search for user-friendliness should be continued. Staff engagement early in the process likely will result in a greater likelihood of use of the technology. *Pediatrics* 2001;108:584-590; *telehealth, telemedicine, child protection, child abuse and neglect, concept mapping.*

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ABBREVIATIONS. CPT, Child Protection Team; ARNP, advanced registered nurse practitioner; CMS, Children's Medical Services; ISDN, integrated services digital network; MDS, multidimensional scaling; ED, emergency department.

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Received for publication Sep 14, 2000; accepted Jan 16, 2001.

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Child abuse is a pervasive problem throughout the United States. It can occur at any time of the day or night, in any city or town across the nation. On the basis of responses from the states to the 1998 National Child Abuse and Neglect Reporting System, it is estimated that child protective service agencies investigated reports of alleged maltreatment on >2.8 million children in 1998. Of those children investigated, states found that 903 000 children were victims of abuse and neglect, or a rate of 12.9 per 1000 children.<sup>1</sup> In some instances, the immediate and accurate assessment of alleged abuse or neglect is critical to enable child protection staff to make valid and timely child placement decisions. It is essential to determine whether abuse or neglect has occurred and whether there is an immediate threat to the child. When the child protection system fails, the result can be the serious injury or death of a vulnerable child.

In Florida, Child Protection Teams (CPT) are medically directed multidisciplinary teams of professionals who are available to assist in the assessment of suspected abuse or neglect of children. Teams act as consultants, providing a wide array of services to local practitioners and agencies that investigate allegations of abuse or neglect. The CPT Program provides multidisciplinary assessment services in 25 locations. (Note: Florida is composed of 67 counties, so many of these teams serve multiple counties.)

Reports of abuse and neglect to the Florida Abuse Hotline Information System increased from 122 115 in state fiscal year 1997 to 1998 to 164 916 in state fiscal year 1999 to 2000, an increase of 35%. The tremendous demand of working in the discipline of child abuse and neglect in a large geographically diverse state such as Florida, combined with an increase in the number of child abuse and neglect reports that require medical evaluation, make recruitment and retention of medical experts in child abuse and neglect a challenge. As of March 1, 2000, Florida had 81 board-certified pediatricians or family practitioners and 24 advanced registered nurse practitioners (ARNPs) working for CPTs. Efforts to attract qualified physicians and ARNPs who are trained to work in this critical field are ongoing. Each year, the recruitment and attrition rates for physicians and ARNPs remain approximately the same. The majority of these physicians and ARNPs are located in the more populous regions of the state, leaving large geographic areas with limited child abuse and neglect expertise.

In 1998, the Florida Department of Health's Children's Medical Services (CMS) developed a pilot real-time telemedicine network for the evaluation of children who are alleged to be abused or neglected. To our knowledge, this was the first time in the United States that real-time telemedicine has been used in this field. Five sites—3 "remote" sites and 2 "hub" sites—participated in this pilot, which was a joint effort among CMS, the State of Florida's Department of Management Services, and the University of Florida. The pilot was established in a small number of sites to fine-tune the technology for this application as well as to learn what equipment and communications modality work best with this application and in this state. Since the pilot's inception, 3 sites have been added to the network and additional sites are planned. Currently, hub sites in Alachua and Duval counties connect to remote sites in Marion, Putnam, Lake and Clay counties and Polk and St John's counties, respectively (Fig 1).

The telemedicine network facilitates child abuse and neglect assessments via advanced telecommunications technology between hub sites and remote

sites. Hub sites are comprehensive medical facilities with a wide range of available medical and multidisciplinary professional staff. Remote sites are smaller medical facilities in less urbanized areas with limited diversity in medical and nonmedical expertise. Each hub site is responsible for electronically providing expert levels of medical child abuse assessments to specific remote sites. For ensuring around-the-clock coverage by medical experts, each remote site also can be linked to the other hub site.

This article describes a baseline examination of the CMS telemedicine network in phase I of implementation in child abuse examination settings. In particular, this article documents activities to date and analyzes factors that either promote or hinder use of telemedicine technology in child abuse examinations. This article includes feedback from and information about 6 sites in the network—2 hub sites and 4 remote sites. The evaluation does not seek to reach final conclusions; rather, its purpose is to provide a "point in time" examination of the system that can be used as a starting point for an action research model in which the findings and perspectives of this initial

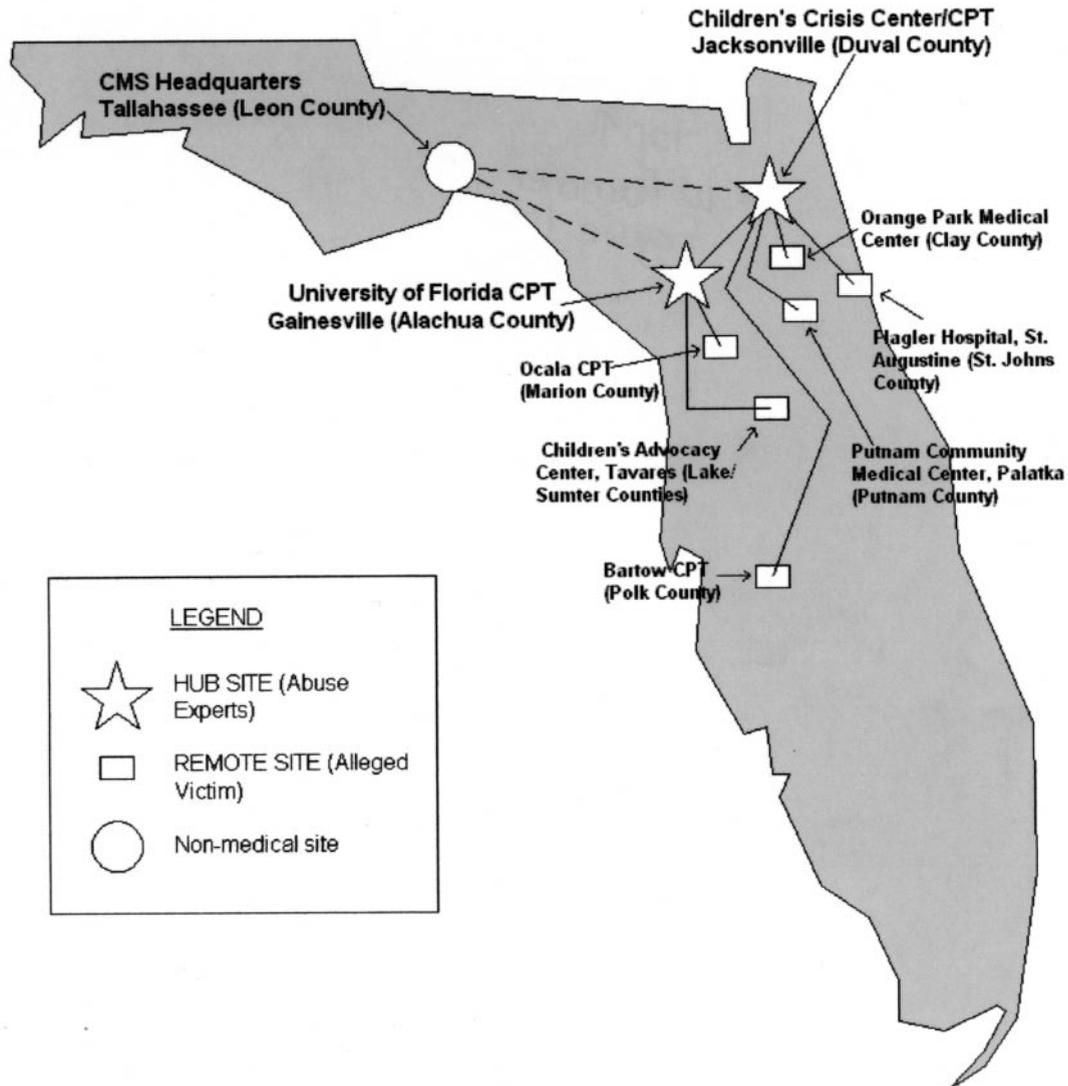


Fig 1. State of Florida, Child Protection Team Telemedicine Network.

report may be used to change future practices. In this role, the report becomes part of the life of the project and can be used as a framework to shape the telehealth program's future direction.

We examined 3 areas of the developing telemedicine network in child abuse and neglect examinations. First is CPT staff reactions to the implementation and integration of telemedicine technology in existing medical facilities and standard operating procedures used in these health care facilities. Second is the assessment of the initial benefits of the technology. Third is a comprehensive assessment of factors that influence the use and nonuse of telemedicine technology in child abuse examinations to assist in future program planning and evaluation.

## METHODS

### Equipment

The conceptual stage for this real-time telemedicine network included exploration by the CPT telemedicine team (composed of engineers, program staff, and involved physicians) of the existing technologies and infrastructures that could support it. This included a comparison of various standards-compliant equipment and a comparison of the transport facilities, including dedicated leased lines, integrated services digital network (ISDN) lines, plain old telephone service lines, and wireless technologies. Three vendors who provided a telemedicine system were asked to demonstrate to the CPT telemedicine team how their equipment was suited to this particular application before a vendor was chosen.

The unit selected included a rolling cart that allowed use in multiple locations. A personal computer was integrated into the cart (the coder/decoder operates independent of a personal computer) and has been outfitted with a video capture card and electronic medical record software for recording data and capturing digital still images. The equipment chosen for this project includes the following:

Tandberg Health Care System III (HCSIII) (<http://www.tandbergapplications.com/tmfamily.htm>)

Leisegang colposcope model number 3DLSUL with LM2PR analog camera (<http://leisegang.com/index2.htm>)

AMD colposcope with articulating arm model number 7800 (<http://www.americanmeddev.com.htm>)

AMD 2500 general examination camera, which uses a single 1/4 inch CCD and 1× and 50× lenses that snap on/off (<http://www.americanmeddev.com.htm>)

The different peripheral cameras were chosen to evaluate the picture quality and ease of use of these instruments for remote, real-time diagnosis. At the inception of this project, colposcopes had not been used for telemedicine examinations, so there was no literature available to assist in this equipment decision. Staff from the various hub sites each had their brand favorites, so the decision was made to include a variety of peripheral cameras so that comparisons could be made before expanding the project.

Regarding the infrastructure, the engineering team decided to build a parallel network to compare the leased line modality (using the SUNCOM backbone, which is the State of Florida's telecommunications network) with ISDN lines (a non-SUNCOM offering) using standards-compliant equipment to determine which better suited the high quality demand of this medical application, in which the goal of the encounter is to achieve diagnosis. The other transport and/or equipment options were ruled out because of high expense, untested technology with perceived interoperability problems, or poor video quality. Following nationally recognized standards, we chose to use a transmission speed of 384 kilobits per second. This speed is consistent, whether using ISDN (3 Basic Rate Interface ISDN lines bonded) or dedicated leased lines (using one quarter of a full T-1; fractional T-1 is not available).

The telemedicine equipment is designed to allow medical staff to transmit live assessments between hub and remote sites. Each hub site is linked to its remote sites as well as to each other and to the CMS Headquarters Office in Tallahassee.

The telemedicine equipment allows medical staff to perform

live assessments of children who are alleged to be abused or neglected from their hub site while the health care practitioner at the remote site manipulates certain medical peripherals while interfacing with the child. Camera images (both still and video) and all audio are transmitted electronically to the hub site, where child abuse experts can listen and observe while directing and consulting with the remote practitioner. The equipment has a minimum of 2 cameras that allow professional staff who are viewing the interaction remotely to see magnified dermatological examinations as well as observe interactions that occur in the examination room. The HSC III has a main camera mounted on the unit and a second mobile camera mounted on wheels, which can be moved anywhere in the room to capture different angles or people with a minimum of disruption during the examination. A third camera (either the general examination camera or a colposcope) is able to provide quality views of loop marks, bruises, abrasions, and external genitalia examinations. Colposcope examinations also are performed by attaching the colposcope's camera to the telemedicine unit. A personal computer integrated into the unit allows storage of images, short audio and video clips, and other assessment data, which can be retrieved at a later time.

### Staff

Staff training was completed in 2 phases. The first phase included a 4-hour educational presentation regarding the assessment of children who are alleged to be abused or neglected. This presentation was made on-site by medical personnel from the hub CPT, with some participation by the Statewide Child Abuse Medical Director and other guest speakers. An outline of the presentation as well as a preformatted PowerPoint program (Microsoft, Redmond, WA) ensure that the training provided is uniform, regardless of presenter. The second phase of the training involves hands-on instruction and practice with the base equipment and peripheral cameras. Weekly maintenance videoconferencing calls are initiated between the hubs and their remote sites to maintain user confidence with the equipment between actual telemedicine events. To obtain staff reactions, the research team conducted both on-site and telephone interviews with CPT members in the hub sites and with the remote sites in Polk and Clay counties.

### Concept Mapping

The technique of concept mapping<sup>2</sup> was used to examine how larger systemic factors influence the adaptation of telemedicine technology in child abuse examination settings in Florida. The intent was to understand, in a broad way, how technological, administrative, and logistic issues affect the program so that strategies can be explored for future program development and evaluation. Concept mapping was used to structure the thoughts of telemedicine participants to identify and examine factors that influence the use of telemedicine technology.

Concept mapping has become an increasingly popular tool for program planners and evaluators.<sup>3,4</sup> Concept mapping is a structured process that involves quantitative analysis of qualitative data. The technique takes an inductive approach by describing social reality from the points of view of participants within the systems under study, allowing concepts to emerge from the experiences of individuals involved with a program. In particular, the technique organizes complex and diverse ideas into an understandable and coherent framework. The process involves a series of structured steps to arrive at a pictorial representation, in the form of a map, of the interrelationships of ideas.

Data for the concept mapping exercise were collected in different CPT geographic locations via field visits, e-mail, and teleconferencing. One concept map, incorporating input from all participants, was generated for this study. Six staff members participated in the mapping exercise, all of whom were intimately familiar with the telemedicine program philosophy and technology.

Establishing the concept map involved 2 successive steps. Participants were asked to generate statements using a structured brainstorming process. The focus statement for participants was as follows: Generate statements (short phrases or sentences) that describe the use of telemedicine technology in child abuse examinations. The following general rules of brainstorming were applied: participants were encouraged to generate as many statements as possible (with an upper limit of 100); no criticism or discussion of others' statements was allowed (except for purposes

of clarification), and all participants were encouraged to take part. The group brainstormed 53 statements.

Next, the participants sorted the statements into groups. Sorting involved 2 distinct tasks: unstructured sorting and rating of the brainstorming statements. For the unstructured sorting, each participant was instructed to group the statement slips into piles "in a way that makes sense to you." The only restrictions in this sorting task were that there could not be 1) N piles (ie, 50 or 53 piles), 2) 1 pile, or 3) a "miscellaneous" pile (any item thought to be unique was to be put in its own separate pile).

On completing the sorting exercise, participants were asked to rate the statements in terms of importance and feasibility. For the rating task, the brainstormed statements were listed in a questionnaire format, and participants were asked to rate each statement on a 5-point Likert-type response scale in terms of how important the statement was to their idea of the telehealth program and how feasible each statement would be to pursue to improve services.

The total similarities matrix, a table that organizes respondents' feedback to determine the number of times they identify similar issues related to the telehealth program, was analyzed using non-metric multidimensional scaling (MDS) analysis with a 2-dimensional solution.<sup>5</sup> MDS is a technique that produces a pictorial graph of how similar feedback among respondents groups together. This configuration was the input for the hierarchical cluster analysis using Ward's algorithm<sup>6</sup> as the basis for defining a cluster. Ward's algorithm is a statistical technique that produces clusters of similar feedback to be used in the pictorial graph. Using the MDS configuration as input to the cluster analysis in effect forces the cluster analysis to partition the MDS configuration into nonoverlapping clusters in 2-dimensional space. With the use of this approach, a 7-cluster solution was derived.

The MDS configuration of the points was graphed in 2 dimensions. This "point map" showed all of the brainstormed statements; statements that were closer to each other generally were expected to be similar in meaning. A "cluster map" also was generated, showing the original points enclosed in boundaries depicting the clusters. The 1-to-5 rating data were averaged across people for each item and cluster. This rating information was depicted graphically in a "point-rating map."

## RESULTS

Findings from the interviews conducted for part 1 of this evaluation revealed that the frequency of use of the technology varied across sites. In addition, space in several of the existing medical facilities was incompatible with the size and design of the equipment initially selected. However, from the perspective of staff, patients seemed to be comfortable with the technology, and the technology greatly enhanced archive documentation of assessments. The sections to follow elaborate on these findings.

### Variability in Usage

Equipment use varied between sites. Between January 1, 1999, and June 1, 2000, a total of 201 videoconferences were conducted. The majority of these calls were conducted to test the equipment (44%). Other uses included administrative (32%), training (13%), examinations (8%), and consultations between CPTs (3%). Individual site usage varied between a low of 4 videoconferences to a high of 25 videoconferences. For obtaining staff reactions to usage variability, on-site and telephone interviews were conducted with CPT members in both hub sites and with participating staff in the remote sites in Polk and Clay counties. These interviews revealed that perhaps a major reason for nonuse of telemedicine equipment was fear. CPT staff reported a strong fear that people have of "breaking or damaging" the equipment. Furthermore, some medical staff feared that the technology changed their role and placed

them in a compromising situation that was beyond their original training. This phenomenon was particularly evident among emergency department (ED) staff in remote sites.

Before the introduction of the telemedicine project, most rural ED staff were not involved in child abuse and neglect evaluations. Instead, children were referred to the nearest child abuse expert when abuse or neglect was alleged, which often involved escorted transport over long distances. Today, the presence of telehealth equipment in an ED requires direct involvement of ED staff in child abuse and neglect examinations, which compels them to deal with law enforcement or protective investigative staff and upset or hysterical parents. Equally important, ED staff were uncomfortable with having to review magnified pictures of child abuse or neglect. As one ED staff person noted, "This really hits close to home." Consequently, there was a reluctance to use the equipment among ED staff in some remote sites.

Another attribute of staff fear was gaining familiarity with complex equipment in real-time situations. Even the remote control, used to control the videoconferencing unit, could be intimidating to some. At times, the use of the remote combined with other technical instruction (eg, navigating menus to activate the equipment, determining what transmission cable to use) was very confusing. Staff believed that their primary duty was to the patient rather than to the technology.

The field interviews also indicated that the lack of standardization in equipment across sites contributed to staff anxiety, which, in turn, inhibited usage in some remote sites. Each site had slightly different configurations, which either facilitated easy use of the equipment or presented challenges in getting the equipment activated in a user-friendly way. Much of this phenomenon is an unintended consequence of the way the pilot program was designed. For example, during the planning stages of the pilot program, a decision was made by CMS, Department of Management Services, and CPT staff to use different types of equipment and transmission lines to evaluate these products in terms of ease of usage, quality of audio and video transmissions, and interoperability. It seems that this strategy has contributed to the confusion of field staff.

A final issue that affected usage was staff concerns for accidental or improper shutdown of equipment. As one staff member noted, "If someone doesn't attach/detach the [connections] properly, the network detects a 'shutdown' and automatically deactivates that line as a safety feature." The telephone company's central office houses the digital cross-connect device that allows one telemedicine site to connect to another telemedicine site using dedicated, leased lines. When 1 of these end sites turns off its premise equipment or does not terminate the network cable with a loop back connector, the central office detects an open circuit and generates an alarm. That circuit is taken out of service by a central office technician because of the alarm and will remain out of service until the telemedicine site reconnects its

equipment and notifies the engineer to reactivate the circuit. This process is mitigated when “smart” jacks are used or when the equipment is not powered down.

### Limited Space Capacity for Equipment

Another practical barrier to use was space. With bulky pieces of equipment that are not in intensive or regular use, hospitals and offices found it hard to justify its taking up examining space. One site stored this equipment in a shower; others opted to move the equipment to a storage room when not in use. These decisions created the opportunity for improper connection of the transmission and camera wires during setup, which further contributed to staff frustration.

Another issue had to do with multiple uses of spaces. At some sites (hospitals), the room that housed the equipment was in constant use, which made scheduling for training difficult. This situation also deterred anyone from becoming more familiar through practice at his or her own pace.

### Patient Concerns and Potential for New Opportunities

Field interviews with Duval County staff revealed a great comfort level with the equipment. For example, 1 staff member noted that the training that she received was minimal (<15 minutes) but that this was adequate for her. However, she did go on to observe that she does not view herself as a typical user in that she is very comfortable with information and computer technologies. She also noted that a few of the staff had anxiety in learning the telemedicine system by themselves, but she sees the level of anxiety decreasing as staff gain experience through practice.

At the Duval County site, the telemedicine equipment was used with a variety of children, from very young to adolescents. Staff believed that assessments via telehealth technology were “not harder or easier on the children” as compared with an assessment without it. One staff member mentioned that “most kids don’t even blink an eye” about having to sit down in front of the camera. In sum, this respondent concluded that “kids don’t have hang ups about [the technology], and expert consultants can have a live interaction with children as opposed to a document review.”

In effect, participants at the hub sites believed that the technology offered privacy to the patient and reduced trauma, stress, and inconvenience to the child and the family. Equally important, staff members in both Duval and Alachua counties stressed that the technology seemed to improve timeliness of evaluations, risk assessment, and decision making. Furthermore, staff believed that the technology offered convenience for law enforcement and child protective investigation staff in that the availability of the technology at different sites could reduce transport time.

One key area that is missing is feedback from the children and families that are served through the telemedicine project. Because referrals for assessments are made through the child protection agency in Florida, families, as might be expected, are not

always happy about participating in the process and, in many instances, view a child protective investigation as intrusive and unwarranted. Therefore, gaining useful information regarding the assessment experience from their perspective often is challenged by their unfavorable view of the whole investigative process, of which the telemedicine project is only a small piece. A decision has been made for the immediate future to focus on the participants in this project, which are the CPT staff, medical providers and agencies, child protection workers, and law enforcement staff involved when there are allegations of abuse or neglect. However, it is recognized that further study is warranted on how this technology affects the children and families that are the end users in this process.

### Interpretation of the Concept Map

Results of the concept mapping exercise are displayed in Fig 2. The 53 statements are grouped into categories of benefits and challenges of using telemedicine technology in child abuse examinations. Each category is labeled with a series of bullet points that summarize the content of the statements that composed the various groupings.

The map shows a progression of issues moving from the left-hand side of the diagram along the middle toward the low right side. In this sequence of issues, the utilization of telemedicine technology in child abuse examinations is perceived as yielding faster evaluations of children’s conditions and offering better use of limited resources and increasing accessibility to different medical expertise.

At the center of the figure is a category entitled “Need to Establish User-Friendly Technology and Foster Acceptance of Technology.” The specific brainstormed statements within this cluster indicate that although telemedicine offers staff opportunities to work with new technologies, there are challenges and difficulties to having the technologies better integrated with day-to-day medical activities. Furthermore, the statements stress the importance of bringing in all community partners when making a decision to use the technology in child abuse examination. In effect, the results stress the importance of improving the interrelationship between the technology and the occupational dynamics/demands of medical professionals. The strong importance rating assigned to this cluster suggests that the participants in the study view integration and stakeholder buy-in as critical in getting medical facilities throughout the state to adopt the technology in conducting examinations.

In the lower right quadrant of the map, 3 clusters that focus on the dynamics between staff and the technology in the field emerge. The first cluster in this quadrant, labeled “Under-utilization of Telemedicine Equipment,” includes brainstormed statements, which suggest that the uniqueness of child abuse settings minimizes or contains usage of telemedicine technology. For example, this cluster includes such statements as, “Staff concerned with chain of custody or forensic evidence,” and, “Hard to recruit nurses to participate in child evaluations.”

The 2 remaining clusters in this quadrant focus

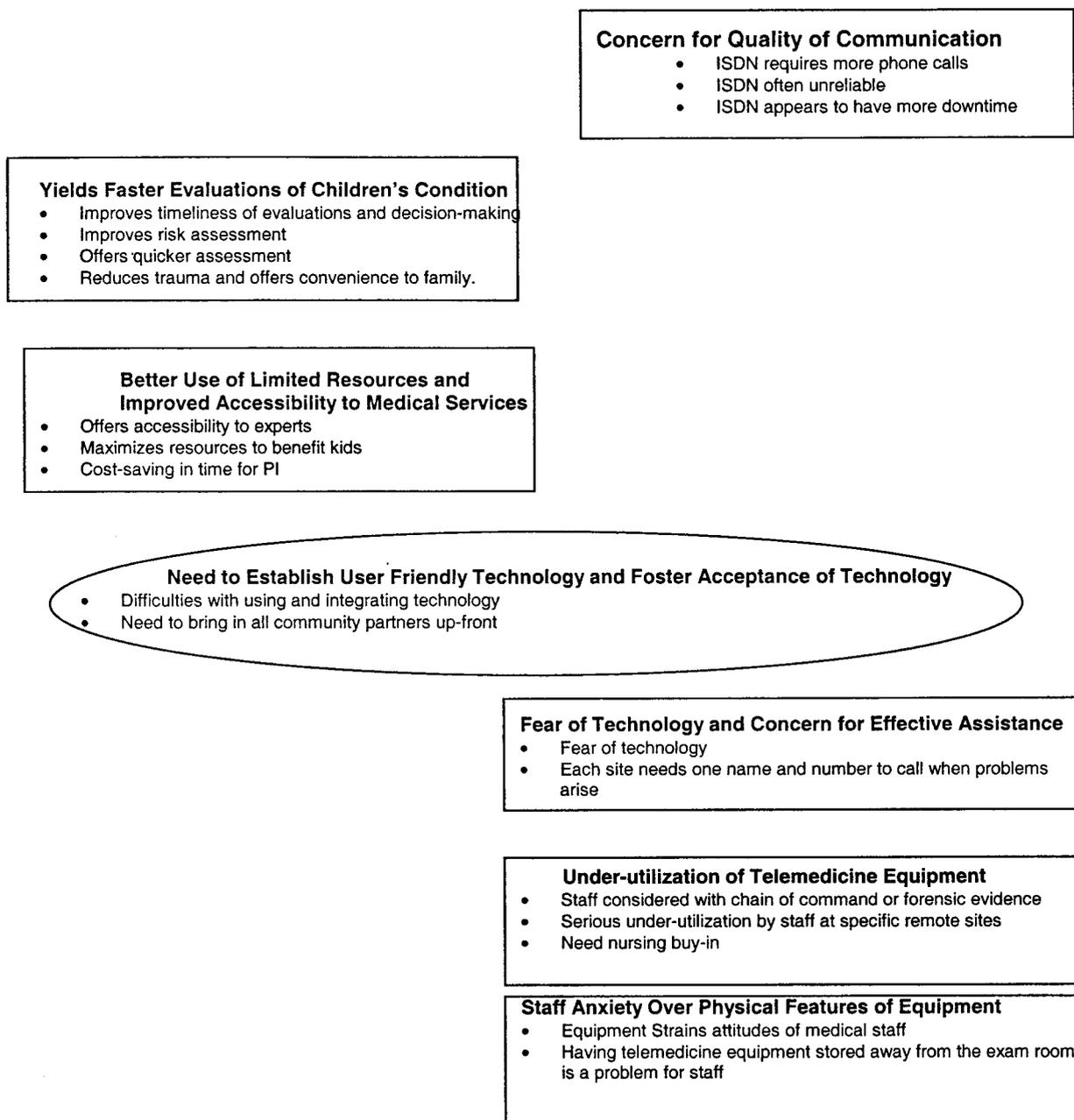


Fig 2. Benefits and challenges of using telemedicine to extend CPT services.

predominantly on the concern of staff related to the technology. In particular, the cluster labeled "Fear of Technology and Concern for Effective Assistance" focuses primarily on staff members' fear of the technology and concerns that a person and telephone number be available to call when problems arise in the field. Closely related to this cluster is the cluster group labeled "Staff Anxiety Over Physical Features of Equipment." The specific brainstormed statements within this grouping describe staff members' concerns of storing and using the equipment in confined spaces.

It is evident from the figure that the 2 primary benefits of the telemedicine technology are that it offers faster medical assessments and allows for better use of limited resources. Equally important, the technology improves accessibility to various medical experts. The use of the technology, however, offers a

few challenges, namely staff concerns regarding quality of communication, anxiety over the physical challenges of using the equipment in confined space, and assurance that reliable technical assistance will be available when the equipment is in use.

It is apparent from Fig 2 that making the technology more user friendly and fostering acceptance of the technology are critical for the success of the telemedicine project. Hence, the challenges mapped out in Fig 2 can be addressed by minimizing the difficulties of using the technology and by bringing in key partners in the child protection network as program planning for this project moves forward.

#### DISCUSSION

The goal of the telemedicine program in child abuse assessment is 2-fold. The first goal is to offer finite medical and multidisciplinary expertise to

more geographic areas in Florida. The second goal is to expedite the evaluation of children without having to transport them from remote areas across large distances. This project was established as a pilot program to learn what equipment and communications modalities work best in this application and in this state. In addition, this project has afforded multiple learning opportunities in using technology and working with front-line medical staff in the critical field of child abuse and neglect assessment. With the use of concept mapping, several key areas in which the technology has been viewed as helpful have been identified, whereas other areas require more study for a better understanding of the efficacy of this project.

It is important to understand that this study is a qualitative pilot based on a small number of cases. The value of this information lies in the lessons learned, which are highlighted, as well as its role in verifying the conformability, dependability, credibility, and transferability of results<sup>7</sup> before expanding the project or moving to larger studies.

One of the first areas of concern to emerge was related to privacy protections and intrusiveness of the telemedicine equipment in a clinical setting. Findings suggest that, from the perspective of the medical practitioners involved, these seem to be minimal. Medical staff report that young people have a very high comfort level with the equipment itself. Because the transmissions occur over dedicated lines that are not open to an "accidental" interface or interruption, patient and family concerns about potential violation of confidentiality can be addressed with assurance. Once it is explained that this transmission is not occurring over the Internet and that no one will observe the interaction on either side without the patient's and family's knowledge, patients seem reassured. Because of the investigative nature of the child abuse or neglect process, it is challenging to gather feedback from the families and children who are the end users of this project. In some cases, families and children are not willing participants of the evaluative process, making feedback difficult to obtain. Additional research, which can address this critical area, is warranted.

Human interface with technology is a core issue in this project. Some users are comfortable with the technology, whereas for others it is foreboding. Technology use is dependent on user-friendliness. Fortunately, the equipment used in this project operates with the use of a standard remote control template, similar to a television or videocassette recorder remote. In addition, the menus are pull-down and simple to navigate. Similarity with an everyday household object helps to reduce anxiety generated as an operator of this equipment. Telemedicine projects need to be sensitive to the user-friendliness of the equipment and provide adequate training and support to reduce the apprehensions of ED or other clinical staff.

Technology use also is affected by unforeseen variables. In one area, staff expressed fear of "breaking" the equipment, which negatively affected its use. In

another, the space limitations of the ED was not conducive to keeping the equipment readily available. This required staff to set up and break down equipment for each examination. In addition, many ED staff were reluctant to be involved in a child abuse and neglect evaluation. Several commented that despite the trauma that they see everyday, nothing was more heartbreaking than having to deal with an abused child. In an effort to make the technology less intrusive and more accommodating to the ED staff, the CPT telemedicine network is exploring deployment of smaller, more portable units in remote sites, relocating the larger, more complex units to new hub sites as they are added. In addition, findings suggest the need to provide sensitivity training for ED staff in the area of child abuse and neglect to reduce the psychological impact of working with abused or neglected children. Clearly, the key dynamic, identified through the concept mapping process, is to ensure that all parties who participate in this project have ownership rather than perceive it as an "imposed" assignment.

Several areas that will need additional exploration and follow-up include attending to stakeholder needs and concerns before technology introduction, ensuring stakeholder buy-in at the beginning, standardizing training and procedural protocols for child abuse and neglect examinations, providing ongoing support and technical assistance to remote and hub sites, developing quantifiable measures to assess the efficacy for children and families that are evaluated with the use of this technology, using cost-benefit analysis to examine resource maximization and time commitments by professional staff, promoting ease of access, and facilitating ease of use.

#### ACKNOWLEDGMENTS

This research was supported, in part, by the Office for the Advancement of Telehealth of the Health Services and Resources Administration (purchase order number 99-0675) and by the Florida Developmental Disabilities Council (contract number 175HC99).

We thank the personnel involved in this evaluation, including J. M. Whitworth, MD, Statewide Child Protection Team Medical Director, Betsy Guimond, ARNP (Children's Crisis Center); Linda Galloway (Gainesville Child Protection Team), Patricia Buck, MD, and Sharon Childress, ARNP (Bartow Child Protection Team); and Terry Tacco, RN (Orange Park Regional Medical Center).

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