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The Seven Pillars of Quality Care in a Statewide Pediatric Sexual Assault Nurse Examiner Program

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ASSESSMENT OF CHILDHOOD SEXUAL ABUSE AND TRAUMA

The Seven Pillars of Quality Care in a Statewide Pediatric Sexual Assault Nurse Examiner Program

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This article describes a systematic approach used by a statewide pediatric sexual assault nurse examiner program to ensure the quality of forensic medical examinations it provides in child sexual abuse investigations. Seven strategies for enhancing quality are described: (a) hiring experienced professionals, (b) effective training, (c) comprehensive protocols, (d) ample support for pediatric sexual assault nurses, (e) management oversight, (f) a clinical coordinator to provide ongoing training and technical assistance, and (g) a quality assurance process in which expert child abuse

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This article is dedicated to the nurses of the Massachusetts SANE Program and to the courageous sexual assault patients across the life span, whom we are honored to care for on a daily basis. In addition, we are indebted to the pioneering efforts of Kathleen Ecker, PNP, who paved the way for the Pediatric SANE Program in Massachusetts.

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pediatricians review each statewide pediatric sexual assault nurse examination. To show the evolution of quality care over time, the program's experience from 2004 to 2010 is reviewed, and quality assurance data are analyzed.

KEYWORDS *child sexual abuse, forensic medical examination, sexual assault nurse examiner, quality assurance*

Children who are sexually abused deserve access to quality forensic medical examinations. This is especially important when a child discloses an acute assault that has occurred within 72 hours. Current practice yields positive biological evidence in 25% to 38% of pediatric examinations conducted within that time period and evidence of physical injury in 25% (Christian et al., 2000; Massachusetts Sexual Assault Nurse Examiners Program, 2008; Young, Jones, Worthington, Simpson, & Casey, 2006). The presence of such evidence can be invaluable for corroborating a child's disclosure and building a case for child protection or criminal justice action.

When abuse has taken place more than 72 hours ago or has occurred over a period of time, a quality forensic medical examination still has much value. Examinations in these situations help to identify genital injury, initiate treatment of any related health conditions such as sexually transmitted infections, and reassure children about their bodily integrity and overall health (e.g., Finkel, 2011). Even in nonacute cases, the child's genital examination can provide valuable forensic evidence to assist investigation and prosecution (e.g., Patterson & Campbell, 2009; Walsh, Jones, Cross, & Lippert, 2010).

In the face of limited physician resources, pediatric sexual assault nurse examiner (Pedi SANE) programs have evolved over the past decade with the goal of increasing access to forensic medical examinations for children in emergency departments and child advocacy centers (CACs). Ensuring the quality of examinations is an important part of this development. However, there is little to no literature that has discussed quality assurance (QA) systems employed by Pedi SANE programs. Based on the authors' collective experience and empirical data analysis, this article discusses a statewide Pedi SANE QA system, reporting components of the system and progress in the development of quality over time. This information may assist both emerging and established programs to develop effective quality assurance models.

THE IMPORTANCE OF QUALITY IN A SANE PROGRAM

Families as well as child protection agencies and prosecutors rely on medical clinicians for sound interpretation of examinations and explanations

for both normal and abnormal results. The consequences are significant if examination findings are misinterpreted. However, most physicians and nurses, including those in pediatrics, lack the skills to conduct sound child forensic medical examinations when sexual abuse allegations have been made. Specialized training and a high degree of quality control are essential for ensuring that children receive the best clinical care and valid forensic examinations.

The National Children's Alliance (2011) medical standards require QA and peer review processes for child sexual abuse examinations conducted at CACs. Likewise, the recent establishment of systems such as the TeleHealth Institute for Child Maltreatment's Web-based system, which provides timely and anonymous expert review of sexual abuse examination findings, highlights the importance of peer review and QA (Adams, 2010). QA and peer-review processes provide clinicians with learning opportunities as well as help to ensure accurate exam interpretation.

Assuring quality is particularly relevant for Pedi SANE programs, because some professionals have questioned nurses' competency in conducting forensic examinations in these cases. Ledray (1999) identified stakeholders' concerns that SANEs would not do the exam as well as physicians as a major obstacle in implementing SANE programs. Since that time, SANE programs, which serve mainly adolescent and adult populations, have been shown to provide a higher level of quality care than that provided by emergency department clinicians (Girardin 2005; Plichta, Clements, & Houseman, 2007; Stermac, Dunlap, & Bainbridge, 2005). Crandall and Helitzer (2003) found that SANE programs greatly enhance health care quality for women who have been sexually assaulted, add to the quality of forensic evidence, improve law enforcement's ability to collect information and file charges, and increase the likelihood of successful prosecution.

Although growing in number, Pedi SANE programs have had less of a presence nationally, and research supporting their practice is more limited. In Massachusetts, some communities were hesitant to use Pedi SANEs. Some child abuse physicians shared this skepticism. These skeptics worried that Pedi SANEs would "overcall" normal examinations as abnormal and that exams by Pedi SANEs would face greater scrutiny by defense attorneys than exams by physicians. Other critics have raised concerns about forensic medical examinations retraumatizing child victims, even though considerable research has suggested that most children do not find these examinations difficult (Allard-Dansereau, Hebert, Tremblay, & Bernard-Bonnin, 2001; Britton, 1998; Davies & Seymour, 2001; Lazebnik et al., 1994; Marks, Lamb, & Tzioumi, 2009; Scribano, Hornor, Rhoda, Curran, & Stevens, 2010; Steward, Schmitz, Steward, Joye, & Reinhart, 1995). QA processes that provide case reviews of Pedi SANE decision making using the input of expert child abuse physicians address all of these concerns.

MASSACHUSETTS PEDIATRIC SANE PROGRAM

Established in 2006, the Massachusetts Pediatric Sexual Assault Nurse Examiner (MA Pedi SANE) Program provides quality forensic child sexual abuse examinations to children and youths aged 0 to 17 in seven of the state's 11 judicial districts with a population of over 766,000 children and youth (U.S. Census Bureau, 2011). As of this writing, the Massachusetts program is the only U.S. SANE program that provides centrally managed statewide service delivery. It serves both adult and pediatric victims. Pedi SANEs conduct examinations on-site at six CACs (see Cross et al., 2008) and at a hospital affiliated with a seventh CAC. Three of the state's remaining four CACs have specialized child abuse physicians on-site (two of these are hospital-based CACs), and one CAC refers medical exams to other counties' Pedi SANEs or to a local child protection team.

SANE NURSE JOB REQUIREMENTS

The effectiveness of a Pedi SANE program hinges on Pedi SANEs' ability to carry out a disparate array of functions with a high degree of consistency and professionalism. Pedi SANEs must have the interpersonal skills to deal sensitively with frightened and confused child victims and their parents, whose anxiety can approach panic levels. They must also have the organizational skills and psychomotor dexterity to singlehandedly and often simultaneously: (a) position and handle often squirmy children; (b) gently but effectively maneuver genitalia to conduct the examination; (c) adhere to extensive and precise protocols for collection, maintenance, and documentation of forensic evidence; (d) operate a MedScope (video documentation instrument) competently enough to produce crisp and clear images; (e) operate a computer to record and transmit data; and (f) provide clinical follow-up to children and families about the examination and next steps for medical care.

Pedi SANEs must also work collaboratively with a wide range of disciplines both prior to and after examinations. Pedi SANES in emergency departments must manage the often chaotic emergency environment and interact respectfully but decisively with emergency physicians and nurses, responding police officers, interpreters, and other professionals. They are an important liaison with child protective services, both in filing maltreatment reports and working with caseworkers. Pedi SANEs in CACs need to participate in multidisciplinary team meetings and provide expertise on medical issues for the entire team, both on individual cases and on medical practice as a whole. All Pedi SANEs need comfort and skill presenting expert information in group settings. Finally, they need to assist prosecutors in preparing a case and be able to testify in court.

Technology Used

Video and photo documentation is an important contributor to quality, because it can provide additional objective evidence and is valued by physicians and others in reviewing examinations. The MA SANE Program utilizes a MedScope to capture still and video images of genital structures. The MedScope is a video documentation camera that provides illumination and magnification eight times that provided by the naked eye. In addition to capturing still images directly, the MedScope can take video clips from which still images can later be cut, which is especially helpful when examining a squirmy toddler or preschooler. The MedScope is attached to a laptop computer via a video capture card.

The laptop is configured with Second Opinion Professional (SOP) software by Second Opinion Telemedicine Solutions Inc. This software converts MedScope images into an encrypted format and allows images to be stored in folders that contain patient demographics and other relevant exam documentation. The MA Pedi SANE Program has worked with SOP to convert the program's paper record into an electronic medical record to be located on the laptop so that all documentation can be done electronically. Genital images from the Pedi SANE's examination are encrypted and sent with a referral form to one of two physician reviewers who have the Expert Edition of the SOP software. This software allows the physician to review images and compressed videos without changing the original documentation (see section on the quality assurance process in this article).

MA Pediatric Sexual Assault Evidence Collection Kit

Pedi SANEs in Massachusetts utilize the Massachusetts Pediatric Sexual Assault Evidence Collection Kit (MA PEDI Kit) for sexual assault victims 11 years of age and younger who are examined within 72 hours of the assault. The first kit of its kind, the MA PEDI Kit was designed both to meet the need for quality forensic evidence collection and to be appropriate for children's level of physical and emotional development. Before the creation of the kit, clinicians were required to adapt the MA Adult/Adolescent Sexual Assault Evidence Collection Kit (MSAECK) when evidence collection was indicated for a child. The MA SANE Program worked with multiple disciplines including crime labs, district attorneys, law enforcement, and clinicians to develop the MA PEDI Kit. The guiding principle was the medical ethic of *primum no nocere*, or "first, do no harm." The kit consists of a colorful, child-friendly box that contains envelopes, swabs/slides, and clothing bags for 13 steps of evidence collection along with instructions to guide clinicians through the process. Painful or invasive steps in the adult evidence kit have been replaced with painless and noninvasive methods (e.g., a buccal swab

versus a blood draw to obtain the child's DNA). Child-appropriate anatomical drawings and body maps are also provided to document potential injuries.

The MA PEDI Kit has benefits beyond the Pedi SANE program since it is in use in all emergency departments in Massachusetts. Kit instructions and documentation forms guide emergency department (ED) clinicians to limit their interview of the child to basic facts such as who, what, where, and when. ED clinicians responding to child sexual assault have often not understood the importance of a later-structured, developmentally friendly, and legally defensible forensic interview by a specialist. They would often take it upon themselves to obtain a detailed history of the assault from the child. These interviews were typically neither comprehensive nor legally sound, reducing the prospect of effective criminal justice and child protection responses and also putting children in a situation in which they needed to be asked more than once to describe their abuse if they later had a forensic interview. To support the use of the MA PEDI Kit, the MA Pedi SANE Program has also produced and released the MA PEDI Kit Training DVD to all emergency departments statewide.

Documentation

The ED-based Pedi SANEs utilize documentation forms included in the MA PEDI Kit while the MA Pedi SANE Program developed a seven-page medical record form for use in the CACs. The MA PEDI Kit forms require documentation of: (a) consent for elements of care, (b) patient information and guardian report of incident, (c) spontaneous remarks made by the child, (d) physical assessment and identified wounds, (e) genital exam findings, and (f) inventory of evidence collected, medical treatment, and discharge instructions. The CAC record also includes patient demographics and family information, the child's developmental history, review of body systems (respiratory, gastrointestinal, etc.), historian's report of the incident, medical information disclosed by the child to the forensic interviewer, physical examination findings, exam assessment/interpretation, patient plan of care, and a summary report. Exactness and completeness are critical in medical records, especially those used for forensic purposes, and Pedi SANEs work to maintain those high standards.

METHODS USED TO MAXIMIZE QUALITY

The MA SANE Program was developed with the goal of improving the quality of forensic medical examinations in adult sexual assault investigations, and the MA Pedi SANE Program extended that goal to pediatric cases. The aims were both to improve the quality of the acute medical response and the quality of the forensic evidence sent to crime laboratories

in the Commonwealth. The MA Pedi SANE Program adopted seven different strategies to enhance quality: (a) hiring experienced professionals, (b) providing effective training, (c) developing comprehensive protocols, (d) providing support for Pedi SANE nurses, (e) providing management oversight to enhance quality, (f) adding a clinical coordinator to the Pedi SANE team to provide ongoing training and technical assistance to the Pedi SANEs working in the field, and (g) implementing a QA process in which experienced child abuse pediatricians review each Pedi SANE examination. All seven components are grounded in a nursing empowerment model in which all SANEs share power and provide mutual support to maintain quality and quality is further enhanced by a nurse–pediatrician partnership (for a related analysis of empowerment, see Slattery & Goodman, 2009). These components are referred to within the MA Pedi SANE Program as The Seven Pillars of SANE Quality, after the memoir *The Seven Pillars of Wisdom* by T. E. Lawrence (i.e., “Lawrence of Arabia”). Each pillar is discussed in the following sections.

Hiring Experienced Professionals

The MA Pedi SANE Program chose to require that CAC-based Pedi SANEs have an advanced practice nursing (APN) degree with a specialization in pediatric, family, or adolescent health and at least 3 years of nursing experience. An APN is a general term for graduate degree level nurses who have additional specialized training and meet national standards for advanced practice (Hamric, Spross, & Hanson, 2008). Advanced practice nurses often perform functions otherwise reserved for physicians, such as conducting a physical examination, ordering laboratory testing, making diagnoses, and writing prescriptions. Since CAC-based Pedi SANEs work independently and must demonstrate a high level of skill across a range of functions, the expanded responsibilities and greater experience of APNs were ideal for Pedi SANEs in these settings. An advanced practice degree is not required for Pedi SANEs working in emergency departments since they do not work independently, nor do they diagnose or order laboratory tests or medications.

The MA Pedi SANE Program recruited candidates by advertising in the state’s nursing organization’s newsletter and local hospitals. The pool of candidates that responded all had at least 7 years of prior pediatric nursing experience. Candidates had experience in (a) primary care nursing, (b) emergency nursing, (c) intensive care nursing, and (d) child abuse protection team. All candidates were interviewed, and 24 were welcomed into the state’s first Pedi SANE training. About half were advanced practice nurses and half were registered nurses. The first training took place in 2004, MA Pedi SANE was funded in 2005, and the program was implemented in 2006. Of the 24 candidates who were trained in 2004, 14 were hired, nine of whom were APNs.

Providing Effective Training

Training for MA Pedi SANEs consists of six days of didactic educational content (delivered once a week over six weeks) and a preceptorship (a medical term for an internship) lasting several weeks to three months with physicians or an APN with substantial expertise in child sexual abuse. In addition to teaching Pedi SANEs their own responsibilities, the didactic training and observational experiences also teach Pedi SANEs about the aims, principles, and methods of the other systems with which Pedi SANEs interact. To that end, the training is multidisciplinary, with other professionals collaborating with Pedi SANE staff to develop and deliver the curriculum. In addition to experienced Pedi SANE nurses, faculty for the training have included physicians with child abuse expertise, police officers, assistant district attorneys, crime laboratory professionals, child protective services professionals, victim advocates, child forensic interviewers, mental health professionals, and staff with expertise in cultural diversity. The curriculum includes lessons on child sexual abuse and its reporting; multidisciplinary teams and Pedi SANEs' role in them; child protective services; law enforcement response to child abuse; domestic violence; child physical, emotional, and cognitive development; relevant child anatomy; physical manifestations of child abuse; sexually transmitted infections; documentation and photodocumentation; the judicial system and rules of testimony; serving as an expert witness; and cultural perspectives. Pedi SANEs are also taught how to do a minimal facts interview and are provided instruction on using the MA PEDI Kit. Every day of the training includes a lesson on self-care to help reduce vicarious trauma and secondary victimization. Pedi SANEs must complete a certification test following the training and obtain a score of at least 85% on the section of the test that covers the Pedi SANE protocol as well as a score of 85% on the test as a whole.

For their preceptorship, most Pedi SANEs either work alongside an expert Pedi SANE nurse or conduct exams with two highly experienced child abuse pediatricians at Children's Hospital–Boston and Massachusetts General Hospital. All examinations conducted by new SANEs during their preceptorship are supervised by the experienced APN or physician. Originally, new Pedi SANEs had to complete 25 supervised examinations during their preceptorship in order to be qualified to work independently in the program. Later, this was reduced to eight supervised examinations given the quality care the Pedi SANEs were providing but with the provision that the clinical coordinator continue to review all additional examinations for quality purposes.

Implementing Comprehensive Protocols

A third tool used to ensure quality is the use of a detailed protocol guiding every aspect of Pedi SANE actions in conducting an examination. Medical

protocols are a well-regarded method for improving care (e.g., Woolf, Grol, Hutchinson, Eccles, & Grimshaw, 1999). Based on the best available science, the protocol developed by the MA Pedi SANE Program addresses how Pedi SANES should collect evidence, when and how they should file a mandated report, what guidelines they should follow to interpret examinations, and what paper and photo documentation they need to provide. The importance of Pedi SANES following the protocol is continually emphasized in hiring, training, and supervision. The protocol has provided a clear, comprehensive framework for developing the training curriculum and for ensuring that training was relevant to practice. In addition, the protocol serves as a vehicle for making sure that SANE practice is evidence-based. Pedi SANES keep abreast of the clinical and research literature and have designed and revised the protocol to align it with best practice. Finally, the protocol standardizes Pedi SANE practice, which facilitates supervision, quality control, and the credibility and clarity of communication to stakeholders.

Providing Support

Conducting forensic child sexual abuse medical examinations is a demanding yet solitary responsibility for Pedi SANES. Pedi SANES must provide compassionate, empathic, quality clinical care to sometimes traumatized children and families; they must respond to the demands of multiple professionals and systems; they face sometimes difficult clinical decisions with enormous consequences; and they are at risk for vicarious traumatization. In addition, ED-based Pedi SANES respond on short notice, with substantial demands for rapidity, sometimes at odd hours and in an often chaotic ED environment. These factors create significant stress for Pedi SANES, which was initially exacerbated by negative attitudes toward Pedi SANES in some corners of the professional community. Given these stressors, Pedi SANES benefit from support to help maintain quality and enhance self-confidence.

The MA Pedi SANE Program provides support in multiple ways. First, the MA Pedi SANE Program associate director and clinical coordinator are continually available to help with individual cases and to help problem-solve clinical and system issues. The Massachusetts SANE program's statewide experience and status give it access to a network of service and justice professionals in the state as well as leverage to solve thorny system coordination and resource challenges. Second, all Pedi SANE staff, including the program director and Pedi SANES meet monthly to review difficult cases, talk through recurrent system issues, and provide mutual support and guidance. Support for Pedi SANES enhances quality both by enhancing the day-to-day work and by helping retain good, experienced Pedi SANES. Out of the 14 Pedi SANES who were originally hired in 2006, 11 are still working in the program as of this writing (September 2011).

Management Input

Building a Pedi SANE QA system requires significant management time and effort. The MA Pedi SANE Program associate director solicits buy-in and input from physicians participating in the program, coordinates the work of multiple professionals, and serves as a liaison to all stakeholders. At the inaugural Pedi SANE training, the MA Pedi SANE Program associate director ensured that the Pedi SANEs, expert faculty, and preceptors all shared a common understanding of Pedi SANE aims and requirements. The Pedi SANE staff have devoted hundreds of hours to developing the curriculum and setting up technical assistance and case review mechanisms. Hiring quality Pedi SANE nurses requires a significant time investment in the recruitment and interviewing process. Pedi SANE management staff invest considerable time both directly and indirectly to help guarantee that the Pedi SANEs have the support they need and receive both constructive criticism to improve their practice and positive feedback to appropriately bolster their confidence as experts.

Clinical Coordinator

One CAC-based Pedi SANE had three years prior experience working with a child abuse physician and was particularly skilled. Over a two-year period during which the program expanded and clinical demands increased, she was promoted to serve as the clinical coordinator and educator for the program. Every month she visits Pedi SANEs at each of the eight Pedi SANE sites (the seven CACs and the hospital ED). She reviews all documentation and images produced for every case that month. She provides clinical supervision and on-site clinical training for newly hired Pedi SANEs as well as instruction in newly developed practice standards. One part of her mission is to build the expertise of the Pedi SANEs. She is also responsible for accessing relevant medical literature and new developments in the field as well as updating standards on clinical and forensic aspects of practice. For example, she recently developed, together with the associate director and medical consultants, the publication *Management Guidelines for the Treatment of Chlamydia, Gonorrhea, Human Papilloma Virus, and Herpes Simplex Virus in Pre-Pubertal Children*.

Quality Assurance Process

The program has established a quality assurance and peer review process to help ensure the quality of forensic images and interpretation of exam findings. The two board-certified child abuse pediatricians who provide the preceptorships were hired to act as reviewers for images obtained by the Pedi SANEs in both the ED and CAC settings. They have significant scholarly and clinical credentials in the area of child abuse (e.g., Denton, Newton, & Vandeven, 2011; Newton & Vandeven, 2010; Soeiro & Wilson, 2004).

Upon completion of the forensic examination, Pedi SANEs transmit encrypted images via the Internet for review by one of these physicians. Abnormal or indeterminant exam images are submitted for a 24-hour urgent review. In these situations, the Pedi SANE also pages the physician reviewer to discuss his or her findings and questions. Normal exams are submitted for a routine review within 120 hours. The Pedi SANE also completes an SOP Referral Form providing relevant history, exam findings, lab or diagnostic testing, additional information or specific questions, and a provisional diagnosis of the examination as normal, indeterminate, or abnormal. The physician reviewer then completes the SOP Consultation Form and transmits it back to the Pedi SANE via the Internet. On this form, the physician reviewer writes her own assessment of the exam, her agreement or disagreement with the Pedi SANE's interpretation, lab testing recommendations, and a recommended follow-up plan.

The physician reviewers also provide feedback to the program's associate director regarding the Pedi SANE examination by entering data into a Microsoft Access database for each review. Data include whether the Pedi SANE has provided sufficient contextual information for the review and an interpretation of exam findings and whether the photographic image was crisp and clear. The physician reviewers then indicate whether they agree with the Pedi SANE's interpretation of the examination findings and recommendations for treatment and follow-up. The analysis that follows in this article is from data included in this Access database. This review process not only provides assurance of the quality of examinations but also data to improve quality over time. The physician reviewers provide feedback on the work of individual Pedi SANEs for use in supervision and also feedback on system issues that influence quality across Pedi SANEs.

MA PEDI SANE PROGRAM'S EXPERIENCE WITH QUALITY OVER TIME

In 2004, Pedi SANEs were first recruited, and the initial training of 24 nurses was provided. All candidates successfully passed both written examinations and mock forensic examinations. Pedi SANEs completed daily evaluations regarding their classroom experience. Although quantitative data are no longer accessible, evaluations were highly positive. Informally, faculty also commented positively on students' learning to the Pedi SANE associate director.

Funds were insufficient at that time to hire the CAC-based Pedi SANEs and fully implement the program. During a 20-month wait for the program to be funded, trainees remained involved by getting additional periodic instructions from the MA SANE Program on specific skills, by observing forensic interviews and multidisciplinary teams, occasionally spending time with the

program's experts, and coming to two meetings to maintain networking and camaraderie. The five ED-based Pedi SANEs each had more than five years' experience as adult/adolescent SANEs and experience with the MedScope prior to attending the Pedi SANE training. They quickly assimilated their new knowledge and demonstrated the ability to provide pediatric exams proficiently. A senior SANE reviewed all of their exams and exam images and provided reinforcement of learning as needed until the formal QA process was established.

Funds became available to implement the MA Pedi SANE Program in 2006, and the CAC-based Pedi SANEs began their preceptorships. Observations by the program leadership and feedback from the physicians working with the program indicated that the Pedi SANEs began their work with superior abilities to relate to children and families and to handle the psychosocial and crisis intervention elements in the work. What was needed was additional practice to refine the psychomotor skills required to perform examinations as well as experience using the MedScope and documenting results using Adam's (2010) criteria.

Although observations by SANE leadership and feedback from physicians suggested that the quality of the Pedi SANEs' work was excellent from the beginning, some Pedi SANEs were initially providing minimal information on the referral form sent to the reviewing physicians, and often they did not include an exam interpretation. In part, this reflected a need for clinical education and a need to develop the self-confidence to put one's exam observations and interpretation in the medical record. All of the Pedi SANEs were capable clinicians, but some needed to develop the capacity to see themselves as experts and feel comfortable rendering a judgment of *normal*, *indeterminant*, or *abnormal* (see Adams, 2010). A deficit in documentation in some cases also arose out of an assumption by some Pedi SANEs that transmitting the MedScope image provided sufficient information in itself to the physician reviewer. However, medical exam images are only a piece of the puzzle in child sexual abuse cases and need to be evaluated in the context of the information about the child's disclosure (if one is made) as well as medical history and symptoms (Adams, 2010). For example, it is important to know and share with reviewers that a child who was sexually abused also recently sustained a straddle injury from a fall off a bike or the monkey bars, or that an adolescent reporting prior abuse is now in a consensual sexual relationship.

Initially, image quality was sometimes compromised, given that a Pedi SANE singlehandedly and simultaneously needed to maneuver the unfamiliar MedScope while assessing a sometimes wiggly child, conduct a sensitive examination that avoided contamination, and collect comprehensive forensic evidence and lab specimens. Another initial challenge was that some Pedi SANEs were unable to obtain verification of a questionable exam finding by using the knee–chest position. The knee–chest position uses gravity as a tool

to visualize confusing anatomical details occasionally seen when the child is in a supine position. Although the importance of the knee–chest position for exam verification was stressed during training, mastering this technique often takes time and practice, especially when children are reluctant—particularly since the program’s philosophy allows the child to set the pace of the exam and to refuse any portion of it. Pedi SANEs work alone and do not have access to a medical assistant to help position a child in this awkward and vulnerable position while also capturing digital images.

Training needs related to these issues were identified through QA feedback mechanisms to the associate director, direct observation by the clinical coordinator, and staff meetings attended by the reviewing physicians. A number of steps were taken. At staff meetings, physician reviewers discussed the importance of providing information about pertinent medical history and patient symptoms when the Pedi SANES were reviewing images. In addition, Pedi SANEs and physician reviewers shared tips and tricks for positioning, especially related to the knee–chest position. Furthermore, the clinical coordinator, herself an expert on managing these examinations, worked on-site with identified Pedi SANEs to help them gain mastery of this technique.

Pedi SANEs were initially the “new kids on the block” in CACs, which had previously sent children to local hospitals for forensic examinations. The Pedi SANEs had to prove their value, especially since the increase in forensic medical examinations that resulted from their joining the multidisciplinary teams required a greater time investment from the child protection investigators on the teams, who had to bring children to the exam and also postpone the completion of their investigations, for which they had tight deadlines. Feedback from the multidisciplinary teams indicated that the Pedi SANEs demonstrated their value both by assisting the investigation through additional data provided by the examinations and by providing an empathic response and emotional support to children and families. No other member of the multidisciplinary team could provide that immediate emotional support, including the forensic interviewers, who had to maintain a neutral demeanor to avoid any appearance of bias. Sometimes children and families requested additional follow-up for the child or other additional contact with the Pedi SANEs.

Over the years, the long-tenured Pedi SANEs have become very experienced, and considerable consensus exists among multidisciplinary team members and the Massachusetts child abuse professional field as a whole about their value. Pedi SANEs contribute substantially to both the investigative and service delivery functions of CACs and are recognized medical experts within their settings and when cases proceed to court. In recent years, Pedi SANEs have even been consulted for their medical expertise by several district attorneys in cases in which the Pedi SANE did not provide clinical care.

QUANTITATIVE ANALYSIS

One source of information on the development of the quality over time is a quantitative analysis of QA data collected from 2007 to 2010. The sample consists of all cases seen by Pedi SANEs from 2007 to 2010 that also were reviewed by the physician reviewers ($N = 832$).

The first statistical analysis examined to what extent over time Pedi SANE nurses provided adequate information and interpretation for the QA physicians to be able to conduct a review. As Figure 1 illustrates, the program improved significantly from 2007 to 2009 in the percentage of cases that were able to be reviewed, from 80.9% to 96.9% during that time period. The improvement occurred because during that time period, the percentage of cases in which Pedi SANEs provided insufficient information to the reviewers decreased from 13.8% to 3.0%, and the percentage of cases in which Pedi SANEs failed to provide an interpretation of their examination findings decreased from 5.3% to 0.4%. Most of the improvement occurred from 2007 and 2008. There was a slight decrease in the percentage that could be reviewed from 2009 to 2010, although it is unclear the extent to which this represents a true decline versus random variation. A logistic regression relating date of review to probability that a case could be reviewed was statistically significant, Wald $\chi^2(1) = 10.49$, $p = .001$.

A second statistical analysis examined the crispness and clarity of MedScope images over time. The proportion of cases that were crisp and clear was about the same from 2007 to 2009 (ranging from 79.3% to 83% depending on the year) but increased to 89.4% in 2010 (see Figure 2). The logistic regression testing the improvement in whether images were crisp and clear by date was statistically significant, Wald $\chi^2(1) = 6.68$, $p = .01$.

Crispness and clarity of images was significantly related to whether a case could be reviewed: 95.2% of cases that were crisp and clear were

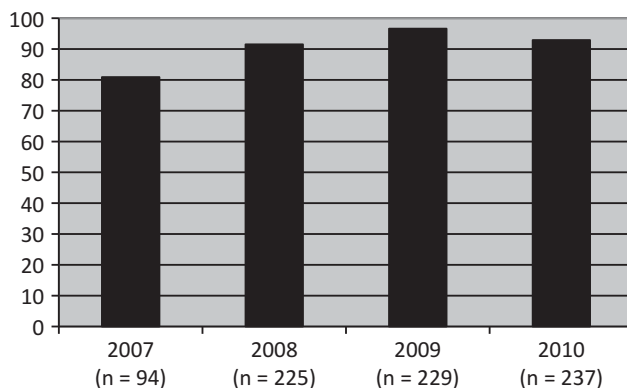


FIGURE 1 Percentage of cases that were able to be reviewed by year.

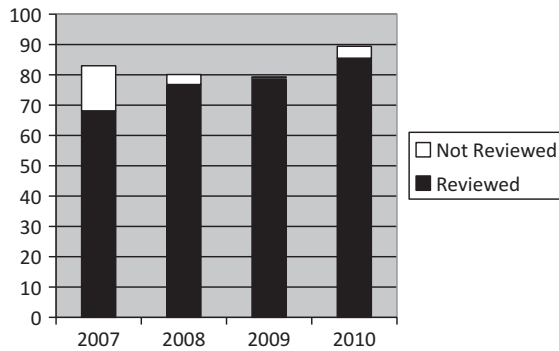


FIGURE 2 Percentage of cases with images that were crisp and clear by year and review status.

reviewed compared to 77.3% of cases that were not crisp and clear, Pearson $\chi^2(1) = 52.21, p < .001$. Because of this relationship, we tested whether the increase in the percentage of cases that could be reviewed was simply a function in the percentage of images that were crisp and clear. Logistic regression analyses showed that: (a) the probability that a case was able to be reviewed increased over time even when we statistically controlled for crispness and clarity of images (Wald $\chi^2(1) = 7.66, p = .006$), and (b) the probability that a case was able to be reviewed increased over time within the group of cases with crisp and clear images (Wald $\chi^2(1) = 11.88, p = .001$; see also the black bars in Figure 2) but not within the group of cases without crisp and clear images (Wald $\chi^2(1) = .002, NS$). Therefore, the improvement in the proportion of cases that were able to be reviewed was independent of crispness and clarity and occurred primarily among cases that did have crisp and clear images.

We then examined the proportion of cases over time in which the reviewing physicians reported that they agreed with the Pedi SANE's evaluation of the examination findings. Only the cases in which Pedi SANEs provided both sufficient information and an interpretation of the examination were included in the first calculation of this proportion, because those were the only cases in which the reviewing physicians rendered a judgment. Across the sample, the reviewing physicians reported that they agreed with the Pedi SANEs in 99.2% of those cases in which they were able to render a judgment. This percentage did not change significantly over time, exceeding 98% in every year. However, because the percentage of cases that could be reviewed by the physicians increased over time, we then calculated the percentage of all cases, reviewable or not reviewable, in which the physicians reported agreement with the Pedi SANE. This percentage increased significantly from 80.9% in 2007 to 91.1% in 2008 and 94.9% in 2009 before falling back somewhat to 91.8% in 2010. A logistic regression testing the increase over time in the percentage of all cases in

which in the reviewing physician agreed with the Pedi SANE was statistically significant, Wald $\chi^2(1) = 6.57, p = .01$.

We also examined the percentage of cases in which the reviewing physicians agreed with the Pedi SANE on treatment and follow-up recommendations. The physicians agreed with the Pedi SANEs on 99.3% of treatment recommendations and 99.1% of follow-up recommendations, with no significant change over time.

DISCUSSION

The experience and data of the MA Pedi SANE Program strongly suggest that it has been able to implement a process of providing high quality forensic medical examinations in child sexual abuse cases over a geographic area serving most of the state's children and youth. The program's experience suggests that (a) the Pedi SANEs have provided a high level of quality from the outset, (b) the seven quality mechanisms have helped the Pedi SANEs increase quality over time, and (c) the Pedi SANEs are now embraced by the Massachusetts child abuse professional community and play a central role in the state's response to child sexual abuse. The quantitative analysis suggests some of the specific changes related to quality that took place: the proportions of cases in which SANEs provided sufficient information for review, provided an interpretation of the MedScope image, and provided crisp and clear images, all increased over time. Our experience of the program strongly suggests that these changes relate to the MA Pedi SANE Program's use of the seven methods described previously.

The very high degree of agreement between the reviewers and the Pedi SANEs provides evidence against the claim that MA Pedi SANE nurses' examinations are inferior to those of physicians. As a research method, it should be acknowledged that the physician review process described here lacks some rigor. The physicians helped train the Pedi SANEs, consult with them on their cases as part of the Pedi SANEs' assessment process, and are not blind to the Pedi SANEs judgments before they render their own. It is likely that the exceptional level of agreement found here would not be possible in a study in which physicians were independent of the Pedi SANEs and made their judgments blindly. Nevertheless, though it does not provide strong independent evidence of Pedi SANE quality, it does suggest that a system in which expert child abuse physicians are substantially involved in training, consultation, and QA but not conducting the examinations can provide essentially the same quality of care as if they did conduct the examinations.

Other states could replicate Massachusetts' experience of developing a statewide program to provide quality forensic medical examinations and maintain that quality using the seven strategies described here. Larger states could do so regionally. Developing the organizational, management, and

multidisciplinary structures described here is the key. The process takes years, but the payoff is enormous.

Despite the limitations, MA Pedi SANE Program's experience of QA and the quantitative results are important steps toward demonstrating the quality that Pedi SANEs can achieve and promoting their credibility as forensic examiners. Moreover, they demonstrate how attention to quality can promote program improvement, as the Massachusetts Pedi SANEs have improved the sufficiency of information and the quality of images over time.

More research is needed on Pedi SANE quality. Future studies, for example, should examine the concordance between judgments made by Pedi SANEs and by qualified child abuse physicians through an independent rating process in which both are blind to the assessments made by the other. Client and allied professional satisfaction data are also needed to assess Pedi SANEs' impact.

The MA Pedi SANE Program's experience demonstrates that there can be large-scale improvement in the quality of the medical response to child sexual abuse through the collaborative efforts of nurses, pediatricians, and the entire child abuse professional community. We look forward to a not-so-distant future in which every child for whom there is a question of sexual assault has the benefit of a compassionate, high quality, medical response that provides good clinical care as well as accurate assessment and expert consultation to support decision making.

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