Video analysis in trauma resuscitations: a national survey of Level 1 trauma centers

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VIDEO ANALYSIS IN TRAUMA RESUSCITATIONS:
A NATIONAL SURVEY OF LEVEL 1 TRAUMA CENTERS

Shannelle Campbell

YALE UNIVERSITY
2004
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Signature of Author

May 3, 2004

Date
Video Analysis in Trauma Resuscitations: A National Survey of Level 1 Trauma Centers

A Thesis Submitted to the
Yale University School of Medicine
in Partial Fulfillment of the Requirements for the
Degree of Doctor of Medicine

By
Shannelle Campbell
2004
Abstract

The purpose of this study is to describe the use of video analysis of trauma resuscitations among Level 1 trauma centers in the era of HIPAA and increased concern over patient safety. A novel survey instrument was distributed nationwide by email to trauma coordinators and/or directors of 167 Level 1 trauma centers identified by the Trauma Information Exchange Program. Centers were queried on demographics, their use of video, and reasons for changes, if any, in their video practice patterns. Descriptive statistics and chi-squared analysis were employed. The survey response rate is 75% (125). There were no demographic differences between centers that currently, formerly, or never used video analysis. Fifty-seven percent of enters that currently use video analysis have used it for seven or more years, whereas the majority of formerly using centers only used it for one to three years. Most of these centers use video analysis for educational and quality assurance purposes. Over half (55%) of currently using centers have captured a poor clinical outcome on video. The majority of currently using centers rate the value of video analysis as “extremely valuable”. Formerly using centers cite HIPAA/medicolegal issues and scarce resources as reasons for abandoning video analysis. Video analysis appears to be a useful tool in trauma care education and quality assurance, but concerns over patient privacy and the lack of resources have caused a decline in the use of this technology.
ACKNOWLEDGEMENTS

I want to thank Dr. Julie Ann Sosa for her unwavering support, helpful advice, and visionary guidance during the past two years. Her passion for surgery and for health services research continues to inspire me and to heighten my own interests and goals in these areas. Thank you, Dr. Sosa, for being a true mentor.

I would also like to thank Dr. Heidi Frankel for her enthusiasm for my research and for helping to bring this project to fruition.

Many thanks to Dr. Mark Schlesinger for his insightful review of this manuscript.

And, always, I thank Roderick Logan, whose constant presence and support during my medical school career has been absolutely invaluable.
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INTRODUCTION

Technology is deeply enmeshed within the practice of medicine. Whether through new or improved diagnostic imaging modalities, surgical equipment, or more user-friendly reagents in the medical laboratory, technology has revolutionized and clarified the practice of medicine. The use of television and video recording equipment in various fields of medicine illustrates how technology has changed our way of approaching a range of clinical and educational problems.

The first use of television in medicine was in 1947 when it provided viewers at Johns Hopkins Hospital a way to observe the demonstration of operative techniques without being in the operating room by way of closed-circuit television. Since the initial application of television in medicine, the use of television and video recording equipment has exploded into various areas in medicine, especially in medical education. Family practice residencies have taped trainees performing medical interviews for the subsequent evaluation of the trainees' skills and for teaching residents internal medicine and psychiatry. Anesthesia trainees have been taught motor skills by reviewing their videotaped performances of caring for surgical and obstetric patients and the incidence of procedural errors associated with tracheal intubation has been determined by videotape review. Dental trainees and medical students on neurology clerkships have been shown to benefit from videotape instruction and review of
their clinical performances recorded on videotape. Pediatrics residents who carried out health supervision examinations of infants improved their performance after reviewing their performance on video.10

Surgeons and surgical residents also have utilized television and videotape. Goldman, in 1969, first described how video analysis could be used to teach general surgical technique.11 The surgical technique of plastic surgeons has also been evaluated using video analysis.12 The applications of television and video in the operating room have been illustrated in several papers. These applications include using a two-way audio-visual system between the operating suite and the pathology department to facilitate consultation between surgeon and pathologist.13 It also identified inefficiency during surgery and elucidated the stress that accompanies performing an operation.14,15,16 Most of the published accounts of the use of television and video analysis in surgery date from the late 1960s and early 1970s. Television was still a fairly novel technology during this time and use of it in medicine was groundbreaking.

Video analysis has been employed in trauma surgery with the most enthusiasm. Video captures events in an objective, inexpensive, mobile, and easy-to-use manner. Because of these inherent characteristics, video analysis has been particularly useful to trauma surgeons. Trauma care systems and their health care providers must work in a most time- and resource-efficient way to deliver
optimal care (especially during the initial trauma resuscitation) to trauma patients. There often is no time during the critical resuscitation period to carefully scrutinize staff behavior, or to teach surgical trainees (such as residents and students) how to best care for trauma patients. Video analysis of trauma resuscitations provides a way an objective and real-time record of events that can be evaluated outside of the resuscitation room after patient care has safely concluded.

Based on published literature, the video recording and analysis of trauma resuscitation appears to be a widespread practice in the United States and abroad. Trauma centers and surgeons have used video analysis for quality assurance, graduate medical education, and to evaluate compliance with certain protocols. Review of the literature suggests, however, that there is no standardized protocol for the use of video analysis; that is, each trauma center uses separate guidelines. Variation in practice patterns implies variation in the quality of the product of video analysis; all trauma centers may not be using video analysis in the most effective and efficient manner possible.

Most commonly, video analysis is used in trauma resuscitation for education (of hospital staff and residents) and quality assurance. The first published description of video-recording trauma resuscitations is from Peltier in 1969. In that report, traditional methods of instruction such as division or departmental conferences were evaluated and deemed to be ineffective. Video recording of
trauma resuscitations was begun and review of these tapes at conference was instituted on a regular basis. This was found to stimulate interest and participation among students and staff (based on impressionistic evidence by the author). Trauma staff also showed an improvement in the delivery of care after viewing themselves on video. Hoyt, in 1988, described how video analysis of trauma resuscitations led to more effective staff education, more efficient resuscitations, and better adherence to assigned responsibilities during the resuscitation. Tapes of resuscitations were integrated into a weekly trauma conference, and this new adjunct improved the quality of the conference. Residents who participated in video conferences were the study group while residents who did not were the control group. The study group decreased the amount of wasted time (occurs when the forward progression of the resuscitation is stopped) during resuscitations from 37% to 15% over a three-month period; the control group only decreased wasted time from 43% to 30%. The study group’s appropriate attention to resuscitation priorities increased from 56% to 88% in this time period, while the control group only increased from 58% to 68%. Staff and students were enthusiastic about this new teaching modality. Townsend discovered that videotape review sessions based on Advanced Trauma Life Support (ATLS) guidelines improved the trauma resuscitation system at their institution and streamlined the resuscitation response. Reviewing the videotapes helped staff improve their compliance with ATLS algorithms and this translated into improved care. More important, greater compliance with ATLS resulted in improved patient outcomes (mortality and TRISS) as well.
(TRISS is the Trauma Score + Injury Severity Score. The Injury Severity Score is an anatomical scoring system that provides an overall score for patients with multiple injuries. The Trauma Score is a physiological scoring system and consists of the Glasgow Coma Scale, the systolic blood pressure, and the respiratory rate. The TRISS calculates from the known injuries and initial trauma score the probabilities of survival.) Errors in clinical judgment, technical procedures, and trauma systems were identified through videotape review, leading to remediation of these errors.

Santora et al, using video analysis, also evaluated adherence to the ATLS protocol. Surgical residents demonstrated improved compliance with ATLS after reviewing videos of their resuscitations during trauma conference. However, how much of this improved compliance is due to video review versus repeated exposure to resuscitations is unclear. Resident physician performance and compliance with quality indicators at a pediatric trauma center were examined using video analysis. As was true for adult trauma resuscitations, pediatric trauma resuscitations also improved with regard to increased compliance with standards of care. Weekly (or regular) trauma conferences where videotapes of resuscitations are reviewed are believed to be an effective way to teach trauma care through the discussion of trauma cases supplemented with the video record. The video record eliminates recall bias during the discussion and the weekly format optimizes the recall of events.
Surgical residents are not the only resident physicians involved in trauma care who have been evaluated through video analysis. Emergency medicine residents were videotaped while performing rapid-sequence intubations; these videos were assessed for procedural and technical errors. Video analysis also has been shown to be an effective teaching tool when simulated resuscitations are recorded. The timing of trauma resuscitations can be used to assess performance standards; van Olden et al utilized video review of resuscitations to document resuscitation time and use this information to help standardize trauma care in their institution. Computer-based analysis of trauma resuscitation times has also been described. Finally, Scherer et al have shown that videotape review of trauma resuscitations was more effective than verbal feedback in achieving behavioral changes and algorithm compliance among resident physicians, lending support for the use of video analysis as an educational tool. Videotape review is more sensitive than self-report in the identification of errors; video analysis revealed performance deficiencies among anesthesia care providers that were not picked up by self-reporting tools.

Human factors analysis using video review has also exposed task complexities and their effects on trauma team performance and coordination. Clearly, the practice of video analysis has transformed the way trauma care is taught and the manner in which trauma care is provided.
Specific protocols in trauma resuscitation also have been evaluated using video analysis. Three published papers to date have analyzed the extent of compliance with universal precautions among trauma care providers during resuscitations.\textsuperscript{32,33,34} Compliance with universal precautions among staff (including attending physicians, resident physicians, nurses, and students) was generally poor but improved after videotape review. The importance of a trauma resuscitation team leader or command physician has been evaluated using video analysis.\textsuperscript{35} Deficiencies in team-leader performance (i.e. poor communication, non-assertive direction, inadequate execution of primary and secondary surveys) have been recognized through this video review and its implications for effective resuscitation described.\textsuperscript{36}

Physicians have not been the only beneficiaries of video analysis. Proctor used video analysis to examine how nurses talk to patients undergoing trauma resuscitation.\textsuperscript{37} Videotaped trauma cases also have been reviewed to examine the effects of different “comforting” styles used by nurses when performing uncomfortable patient care activities (such as nasogastric tube insertion) during resuscitation.\textsuperscript{38} The interactions of nurses, patients, and patients' families in the trauma resuscitation bay have been analyzed using qualitative ethology during video review; this analysis has helped nurses select appropriate comforting strategies in the care of patients and their families.\textsuperscript{39}
Based on this review of the literature, it appears that the use of video analysis has assisted trauma health-care providers and refined the delivery of trauma care and the effectiveness of trauma education. Trauma systems problems (such as unavailability of equipment and suboptimal ergonomics of trauma bays), compliance with algorithms and protocols, human factors concerns, and interpersonal relationships among the trauma team can all be analyzed through video review.

Although video analysis appears to be a valuable tool for trauma centers, there are undoubtedly certain issues that may surface regarding its use. All trauma staff may not welcome what they perceive to be an intrusion into their process of delivering care (the act of being videorecorded). Some staff may worry that the video record may capture deficiencies in their performance and thus bring punitive measures upon them. Health care providers may actually alter their performance during resuscitations if they are aware of being videorecorded; this could potentially bias later analysis of the video as those being recorded are not behaving in their "usual" manner. However, the biggest concern to trauma staff (and to the patients being recorded) may be the invasion of patients' privacy and confidentiality.

Several studies have attempted to discover how patients feel about being videotaped for medical reasons. Rates of consent by patients to be videotaped ranged from 72-95% in three studies and several British studies have indicated
that videorecording is acceptable to a majority of patients.\textsuperscript{41} Another British study found that more than 90% of patients who consented to have their general practice consultations recorded felt that videorecording could be a valuable research tool in general practice studies.\textsuperscript{42}

Rodriguez looked at how patients respond to being videotaped for commercial purposes (like for the reality television show, “Trauma—Life in the E.R.”) while they receive care in emergency departments. They found that patients rated invasion of privacy by videorecording significantly lower than physicians and nurses, but filmed patients rated significantly higher invasion of privacy than patients not filmed.\textsuperscript{43} However, patients' ethnicity, socioeconomic status, and educational level may affect how patients respond to being videotaped for commercial reasons—poor, disenfranchised, and minority patients who rely heavily on emergency departments for their medical care may be especially vulnerable to being videorecorded or coerced into giving consent to being recorded.\textsuperscript{44} This may also be true for trauma patients in certain demographic areas (such as high crime areas where the prevalence of penetrating trauma may be high). With regard to obtaining informed consent for being videotaped for commercial reasons, two recent editorials highlight the potential problems that may be attendant to this process. Geiderman states that retrospective consent (filming first, getting consent later) in the commercial filming of emergency care is not ethical and that even prospective consent (getting consent before filming takes place) is suspect because of the unusual conditions under which it is obtained (patients and their surrogates are under duress and in no frame of mind
to give informed consent). A study by Smithline et al supports this opinion; they found evidence that patients in emergency situations may have difficulty processing the information needed to give informed consent. This study did not look at trauma patients, however. It looked at patients with acute myocardial infarction who also were undergoing the informed consent process for an independent acute thrombolytic trial. Mental capacity for consent was measured by the Wechsler Adult Intelligence Scale-Revised. However, the findings of this study may be generalizable to trauma patients since in both studies, patients are under significant duress at the time of the informed consent process. Many trauma patients may not even be conscious at the time of their entry into the health care system. An editorial by Iserson also states that trauma patients may still be under too much stress to even give informed consent retrospectively.

Again, the findings stated above are from studies that looked at commercial filming of trauma patients, not at filming done for educational or quality assurance purposes. Filming for commercial purposes is a controversial subject, while filming for educational and/or quality assurance is a widely accepted practice. Informed consent, however, is not addressed in a substantial number of the papers that are reviewed here.
<table>
<thead>
<tr>
<th>STUDY</th>
<th>INFORMED CONSENT (Y/N)</th>
<th>RETROSPECTIVE/PROSPECTIVE</th>
<th>OTHER INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peltier (1969)</td>
<td>Y</td>
<td>Retrospective (if patient unconscious)</td>
<td>If patient refused to give consent, tape was erased</td>
</tr>
<tr>
<td>Hoyt (1988)</td>
<td>No mention</td>
<td></td>
<td>Videorecording was justified as part of hospital's quality assurance program and so was protected under the CA evidence code</td>
</tr>
<tr>
<td>Townsend (1993)</td>
<td>No mention</td>
<td></td>
<td>Vague mention of using tapes as part of quality assurance</td>
</tr>
<tr>
<td>Mann (1994)</td>
<td>No mention</td>
<td></td>
<td>Taping is part of quality assurance</td>
</tr>
<tr>
<td>Mackenzie (1994)</td>
<td>N</td>
<td></td>
<td>Study approved by institutional review board; patient consent waived because anesthesiologists were the study subjects; patient identifiers had to be removed from tape and patients' faces masked</td>
</tr>
<tr>
<td>Santora (1996)</td>
<td>No mention</td>
<td></td>
<td>Tapes used for quality assurance and thus protected from discovery by PA peer review statute; all tapes erased after review</td>
</tr>
<tr>
<td>Noland and Treadwell</td>
<td>No mention</td>
<td></td>
<td>Avoided direct exposure of patient's face on video; limited access to the tapes; tapes erased after review</td>
</tr>
<tr>
<td>Mackenzie (1996)</td>
<td>No mention</td>
<td></td>
<td>Participating anesthesia care providers gave unrestricted consent to be videotaped; those providers who did not want to be identified had their faces obscured on the tape</td>
</tr>
<tr>
<td>Proctor (1996)</td>
<td>Y</td>
<td>Patient—retrospective and prospective</td>
<td>Consent also obtained from staff; authors noted that patient consent was not required since taping was for quality assurance</td>
</tr>
<tr>
<td>DiGiacomo (1997)</td>
<td>No mention</td>
<td></td>
<td>Videotape review part of education and quality improvement program, so protected from discovery; tapes erased after review</td>
</tr>
<tr>
<td>Hoff (1997)</td>
<td>No mention</td>
<td></td>
<td>Videorecording performed as part of performance improvement program</td>
</tr>
<tr>
<td>Evanoff (1999)</td>
<td>No mention</td>
<td></td>
<td>Videorecording performed for training and quality control purposes</td>
</tr>
<tr>
<td>Morse (2000)</td>
<td>Y</td>
<td>Unsure</td>
<td>Study received institutional review board approval; consent obtained from patients, staff, and visiting support persons</td>
</tr>
<tr>
<td>Scherer (2003)</td>
<td>No mention</td>
<td></td>
<td>Videorecording performed according to &quot;state and federal guidelines&quot; for &quot;CQI&quot; and &quot;tapes considered exempt from discovery&quot;</td>
</tr>
</tbody>
</table>
Two abstracts\textsuperscript{23,25} and one paper\textsuperscript{24} did not address informed consent, patient confidentiality, or any medicolegal issues.

In 1999, Ellis et al performed a multi-state survey of trauma centers to determine their videotaping practices. Among non-videotaping trauma centers, medicolegal concerns and concerns over the violation of patients' confidentiality predominated and were considered to be greater than concerns about inadequate resources, such as insufficient funds or personnel for the videotaping program. Sixty percent of these centers said they would not videotape in the future. Among videotaping trauma centers, consent was not specifically obtained from patients or their families (for either the taping or for viewing of the tapes at internal conferences) and most families were not aware of the videotaping. The survey also found that no center had ever been subpoenaed for these tapes and that 56\% of videotaping centers tried to limit patient identification on tape (primarily by manipulating the angle of the camera during taping).\textsuperscript{49}

From the review of the literature regarding patient confidentiality, patient privacy, and informed consent, it appears that most trauma centers treat video and video analysis as part of their "undiscoverable" quality assurance program. Most patients were not consented, and IRB approval was rarely obtained. At first glance, it may seem from these actions that these trauma centers are violating patients' rights to privacy, confidentiality, and informed consent. However, the
videotaping of trauma resuscitations by trauma centers is protected by federal law.

The issues of patient privacy and confidentiality are especially timely now considering the recent passage of the Health Insurance Portability and Accountability Act (HIPAA) in 1996 and the status of its enforcement in 2004. While HIPAA was intended to ensure that workers would be able to carry their health insurance from one job to another, additional riders were placed on the nascent legislation to address patient privacy issues. The United States Department of Health and Human Services issued the Privacy Rule to implement the requirement of HIPAA to protect patient privacy and confidentiality. The Privacy Rule addresses the use and disclosure of individuals' protected health information (all individually identifiable health information in any form or media, whether electronic, paper, or oral) by organizations subject to the Privacy Rule (covered entities, including hospitals that receive federal funds). Protected health information is information, including demographic data, that relates to an individual's past, present or future physical or mental health or condition; the provision of health care to the individual; or the past, present, or future payment for the provision of health care to the individual. Under the Privacy Rule, a covered entity is permitted to use and disclose protected health information without an individual's authorization only for the following purposes or situations: (1) to the individual; (2) treatment, payment, and health care operations; (3) opportunity to agree or object; (4) incident to an otherwise permitted use and
disclosure; (5) public interest and benefit activities; and (6) limited data set for the purposes of research, public health, or health care operations. Health care operations include quality assessment and improvement activities, under which many hospitals and trauma centers include the videotaping of trauma resuscitations. The Privacy Rule also permits a covered entity to use and disclose protected health information for research purposes without an individual's authorization provided the covered entity obtains either:

- Institutional review board approval for the waiver or alteration of individuals' authorization for the use or disclosure of protected health information about them for research purposes
- Representations from the researcher that the use or disclosure of protected health information is solely to prepare a research protocol or for similar purpose preparatory to research
- Representations from the researcher that the use or disclosure sought is solely for research on the protected health information of decedents

HIPAA's definition of health information implies inclusion of patient photography. Therefore, under this assumption, trauma centers can videotape trauma resuscitations without obtaining informed consent from patients provided that the videotaping is used for quality assurance purposes only. However, to be extra cautious, trauma care providers Blank-Reid and Kaplan suggest that the "hospital must have a policy regarding video recordings," presumably to make
sure that hospitals explicitly state their intention to use video records as part of a
quality assurance system.

The Joint Commission on Accreditation of Healthcare Organizations (JCAHO)
has addressed the filming of emergency department care for commercial
purposes. According to JCAHO, it is appropriate to film care activities in the
emergency department provided that patients or their suitable surrogates give
informed consent.\textsuperscript{53} My personal communication with a Vice President at
JCAHO reveals that informed consent from patients is not required if the film is
used for internal educational and/or quality assurance objectives.\textsuperscript{54} The
American Medical Association's Council of Ethical and Judicial Affairs Code of
Ethics specifically addresses commercial filming of emergency department care
activities, but does not address “other uses such as in medical education,
forensic or diagnostic filming, or the use of security cameras”.\textsuperscript{55}

Hospitals and trauma centers should continue to use video analysis to help
improve the delivery of trauma care. Benefits of video analysis have been
documented and the practice appears to be widely accepted among trauma care
providers and trauma trainees. Although informed consent from patients is not
required to conduct this activity, trauma centers should still work to uphold the
patients’ rights to confidentiality and privacy by restricting access to videotapes to
necessary personnel and de-identifying as much patient information as possible.
STATEMENT OF PURPOSE

The purpose of this study is to describe the use of video analysis of trauma resuscitations among Level 1 trauma centers in the current era of HIPAA and to reveal any challenges or problems associated with video analysis. In so doing, this study hopes to encourage dialogue between trauma care providers and educators about how to best achieve their educational and clinical goals using this technology.
METHODS

Overall Design

A national survey was conducted by the Yale University School of Medicine in 2003-2004 by Shannelle Campbell (Yale Medical Student), Heidi Frankel, M.D. (Associate Professor of Surgery), Julie Ann Sosa, M.D., M.A. (Assistant Professor of Surgery and Clinical Epidemiology). This survey was created to elucidate video analysis practice patterns among trauma centers and any challenges or constraints associated with this practice. A literature review was performed to provide background information for this study. The legal, medical, and film literatures were studied to obtain this information.

Survey Instrument

A novel survey was designed based on the inputs of a videographer, trauma surgeon, and a health services researcher. [see appendix] The previous published survey by Ellis provided a foundation upon which the present survey was constructed.56

Institutional Review Board

This study received exempt status from the Yale University School of Medicine Human Investigations Committee (HIC protocol number 26103) under the federal regulation 45 CFR part 46.101(b)(2).
Subjects

Level 1 trauma centers (and their trauma coordinators and directors) in the United States were identified by the Trauma Information Exchange Program (TIEP) that is maintained by the American Trauma Society (ATS). The ATS was founded in 1968 "to save lives through improved trauma care and injury prevention". It is the "primary spokes organization for trauma to federal and state governments, national and local media, and to private industry". The ATS also "sponsors and conducts research designed to improve the clinical, operational, and administrative/managerial aspects of trauma care." The TIEP is a program of the ATS (established in 2000) and is maintained in collaboration with the Johns Hopkins Center for Injury Research and Policy. The Centers for Disease Control and Prevention provide funding for the TIEP. The TIEP "maintains an inventory of trauma centers in the United States, collects data, and develops information related to the causes, treatment, and outcomes of injury and facilitates the exchange of information among trauma care institutions, care providers, researchers, payers, and policy makers."57

According to the American College of Surgeons (ACS) Committee on Trauma, a Level 1 center "provides comprehensive trauma care, serves as a regional resource, and provides leadership in education, research, and system planning. A level 1 center is required to have immediate availability of trauma surgeons, anesthesiologists, physician specialists, nurses, and resuscitation equipment. American College of Surgeons' volume performance criteria further stipulate that
level 1 centers treat 1200 admissions a year or 240 major trauma patients per year or an average of 35 major trauma patients per surgeon." Level 2 centers “must meet the same criteria as Level 1 centers, but volume performance standards are not required and they are not expected to provide leadership in teaching and research”. Level 3 centers “provide prompt assessment, resuscitation, emergency surgery, and stabilization with transfer to a Level 1 or 2 as indicated”. Level 4/5 centers provide advanced trauma life support prior to patient transfer in remote areas in which no higher level of care is available”. While these are the definitions used by the ACS Committee on Trauma to verify trauma centers, states and local agencies also designate trauma centers as particular levels based on their own guidelines. Therefore, a trauma center can be both designated by a state agency and further verified by the ACS.

Level 1 trauma centers were targeted for this study as they represented 73% of all videotaping centers in the previous study by Ellis. Telephone numbers for trauma coordinators and directors were also extracted from the TIEP. Email addresses for trauma coordinators and directors were found using Internet searches and directory searches on medical school websites.

According to the Area Resource File (published by the United States Department of Health and Human Services, February 2002), there are four geographical regions in the United States: Northeast (ME, VT, MA, NH, CT, RI, NY, NJ, PA); Midwest (OH, MI, IN, IL, WI, MN, IO, MO, KS, NE, SD, ND); South (DE, MD, DC,
VA, WV, NC, SC, GA, FL, KY, TN, MS, AL, AR, LA, TX, OK); and West (MT, WY, CO, NM, AZ, UT, ID, NV, WA, OR, CA, AK, HI). Survey respondents were divided into regions using this model.

An introductory letter and survey were emailed to all Level 1 trauma centers as identified by the TIEP. A literature review reveals only seven studies that used email as a survey distribution medium. Email surveys are easy to use, quick, and relatively inexpensive, as no additional costs are incurred for postage, paper, and envelopes. Email is still a novel means for data collection in research, however.

**Time Period**

Initial emails were sent in December 2003. The first round of email and telephone reminders occurred in January 2004 and the second round of reminders in February 2004. Surveys were still being collected into March 2004. Completed surveys were received via email, postal mail, and fax.

**Analysis**

Descriptive statistics and $\chi^2$ analyses were used. A p-value less than or equal to 0.05 was considered to be statistically significant. STATA statistical software (version 7.0) was used to analyze the data.
RESULTS

One hundred and seventy-three Level 1 trauma centers were identified through the TIER. Valid email addresses were found for 167 centers; surveys were emailed to these centers. One hundred and twenty-five completed surveys were received for a response rate of 75%. However, not all surveys were received fully completed; there were several partially completed surveys that were returned.

Dec. 2003: surveys emailed to 167 centers

26 surveys received; response rate 16%

Jan. 2004: 1st round of reminder emails/phone calls to remaining centers (141)

28 surveys received; response rate 32%

Feb. 2004: 2nd round of reminder emails/phone calls to remaining centers (113)

63 surveys received; response rate 70%

Mar. 2004: still receiving surveys from remaining centers (50)

8 surveys received; response rate 75%

Figure 1: Timeline of Survey Conduction

The majority of survey respondents are from the Midwest and South regions (see Methods).
Table 1: Geographic Distribution of Trauma Centers

\[
p = 0.53
\]

As this table shows, there is no statistically significant difference between our geographical distribution of survey respondents and the geographic distribution of trauma centers across the United States.

Basic demographic information regarding the type of ownership, bed size, presence of residency programs, and membership in the Council of Teaching Hospitals (COTH) was compiled about the hospitals associated with the trauma centers and compared to the TIEP sample.\textsuperscript{69, 70}
Table 2: Demographic Information of Survey Respondents Compared to TIEP National Data

As Table 2 demonstrates, there are no significant differences between our survey respondents and the general population of Level 1 trauma centers based on these demographic features.

Next, centers were divided into three categories based on their patterns of video analysis use: centers that currently use video analysis, centers that have never used video analysis, and centers that formerly used video analysis. Twenty-
three centers (18%) are currently using video analysis; fifty-two centers (42%) have never used video analysis; and fifty centers (40%) formerly used video analysis.

Centers were queried on basic demographic information: designation/verification status (ACS, state, or both), number of patients treated annually, and the number of trauma faculty. Trauma centers can be designated as such by state agencies (such as a Department of Public Health or a statewide trauma system); furthermore, trauma centers can be verified by the American College of Surgeons as a particular level. Trauma centers can be both state designated and verified by the ACS. For the number of patients treated annually, centers used either their number of annual trauma admissions or the number of trauma patients treated at their center. The number of trauma faculty (full-time or part-time) includes those surgeons who are dedicated trauma faculty members, as well as general surgeons who take trauma call at the institution.

There is no difference in demographics between the three groups of centers (Table 3).
Table 3: Demographics of Survey Respondents

<table>
<thead>
<tr>
<th>Designation/Verification</th>
<th>Current&lt;sup&gt;a&lt;/sup&gt; (# of centers)</th>
<th>Former&lt;sup&gt;b&lt;/sup&gt; (# of centers)</th>
<th>Never&lt;sup&gt;c&lt;/sup&gt; (# of centers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACS</td>
<td>10</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>State</td>
<td>7</td>
<td>25</td>
<td>17</td>
</tr>
<tr>
<td>ACS &amp; State</td>
<td>4</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>p=0.17</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Annual Number of Patients</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>501-1000</td>
<td>3</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>1001-2000</td>
<td>10</td>
<td>29</td>
<td>24</td>
</tr>
<tr>
<td>&gt;2001</td>
<td>9</td>
<td>14</td>
<td>24</td>
</tr>
<tr>
<td>p=0.12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Faculty</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5</td>
<td>12</td>
<td>35</td>
<td>34</td>
</tr>
<tr>
<td>6-10</td>
<td>10</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>11-15</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>&gt;16</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>p=0.39</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Show Table 3 below)

When centers that currently use video analysis are compared on these demographic factors to centers that formerly used video analysis and to centers that have never used video analysis, no statistically significant differences are found (Table 4).
<table>
<thead>
<tr>
<th>Verification/Designation</th>
<th>Current (no of centers)</th>
<th>Former (no of centers)</th>
<th>p-value</th>
<th>Current (no of centers)</th>
<th>Never (no of centers)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACS</td>
<td>10</td>
<td>18</td>
<td>0.25</td>
<td>10</td>
<td>19</td>
<td>0.74</td>
</tr>
<tr>
<td>State</td>
<td>7</td>
<td>17</td>
<td></td>
<td>7</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>ACS &amp; State</td>
<td>4</td>
<td>12</td>
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<td>4</td>
<td>12</td>
<td></td>
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<tr>
<td><strong>Annual Patients</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>501-1000</td>
<td>3</td>
<td>1</td>
<td>0.53</td>
<td>3</td>
<td>6</td>
<td>0.14</td>
</tr>
<tr>
<td>1001-2000</td>
<td>10</td>
<td>24</td>
<td></td>
<td>10</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>&gt;2001</td>
<td>9</td>
<td>24</td>
<td></td>
<td>9</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td><strong>Number of Faculty</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5</td>
<td>12</td>
<td>34</td>
<td>0.3</td>
<td>12</td>
<td>35</td>
<td>0.13</td>
</tr>
<tr>
<td>6-10</td>
<td>10</td>
<td>11</td>
<td></td>
<td>10</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>11-15</td>
<td>0</td>
<td>2</td>
<td></td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>&gt;16</td>
<td>0</td>
<td>0</td>
<td></td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Comparison of Demographics Between Survey Respondents Based on Use of Video Analysis

Centers Currently Using Video Analysis (23)

**General Use**
The majority of centers that currently use video analysis (65%, n=15) only videotape some of their trauma resuscitations. These centers also report having several years experience with video analysis, with 57% (n=12) of centers reporting having used this technology for seven or more years. An additional 24% (n=5) of centers have used video analysis for four to six years. Five percent of centers (n=1) have used video analysis between one and three years, and 14% (n=3) of centers have used it for less than a year.
Access to Video

A person (or people) who regularly reviews the tapes of trauma resuscitations were identified. The trauma coordinator (typically a nurse or other staff member who organizes and keeps track of the activities of the trauma center) was most frequently reported (83%, n=19) as this person. Fifty-two percent (n=12) of centers have a trauma surgeon who also regularly reviews the tapes. Twenty-two percent (n=5) of centers use other trauma/emergency department nurses or staff. Four percent (n=1) reported hospital administration and another four percent (n=1) reported “QA project leaders” as regular reviewers.

Seventy-four percent (n=17) of centers show these tapes to an audience: residents/medical students (100%) or staff (76%). One center (6%) reported showing these tapes to “subspecialty attendings and the performance improvement team”. No center reported showing these tapes to patients.

When asked who had the right to see these tapes, 100% of centers stated that clinicians/staff had the right to see them, while 13% of centers stated that the hospital administration had the right to see them also. Trauma patients who are videotaped during resuscitations, lawyers (for patients or for the hospital), and the public are not allowed to access the videotapes, according to survey respondents.
Use of the Videotapes

Fifty-two percent (n=12) of centers use a specific protocol for reviewing tapes of resuscitations. The frequency of use of different protocols among the 12 centers is shown below (Table 5):

<table>
<thead>
<tr>
<th>Type of Protocol</th>
<th>Percentage (#) of Centers Using the Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compliance with clinical algorithms</td>
<td>75% (9)</td>
</tr>
<tr>
<td>(i.e. Advanced Trauma Life Support)</td>
<td></td>
</tr>
<tr>
<td>Compliance with universal precautions</td>
<td>67% (8)</td>
</tr>
<tr>
<td>Timing of certain events</td>
<td>58% (7)</td>
</tr>
<tr>
<td>Resource utilization</td>
<td>50% (6)</td>
</tr>
</tbody>
</table>

Table 5: Frequency of Use of Protocols for Video Analysis

Other protocols mentioned include looking for “leadership effectiveness and analgesia/sedation” (one center); looking for “professional behavior” (one center); “EMS report protocol” (one center); looking for “certain features unique to the project, such as central venous line insertion” (one center); and a “hospital-specific protocol” (one center).

Ninety-one percent (n=21) of centers use the tapes of resuscitations for educational purposes, while 83% (n=19) of centers use them for quality assurance. Other uses of the tapes include research (12%; n=6) and to answer clinical questions (8%; n=4). However, while 12% of centers report using the tapes for research purposes, only 33% of these centers (n=2) have actually
published research from using the tapes. The vast majority of centers (91%; n=21) have not published research from the use of video analysis.

**Video and Consent**

Thirty-nine percent (n=9) of centers obtain written consent from patients, staff, and residents. Sixty-seven percent (n=6) obtain prospective consent while 22% (n=2) obtain retrospective consent. (One center that obtains consent did not specify if this was done retrospectively or prospectively.) No centers indicated using verbal consent.

Most centers (65%; n=15) do not post signs in the trauma area/emergency department that inform patients and employees that the videotaping of patient care activities is performed there.

**Videotape Security**

Methods for restricting access to the tapes of resuscitations were identified. Ninety-one percent of centers offered their methods of restriction. These methods are tabulated below (Table 6):
Table 6: Methods of Restricting Access to Videotapes

<table>
<thead>
<tr>
<th></th>
<th>%age of respondents (#)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secure video and equipment</td>
<td>48% (10)</td>
</tr>
<tr>
<td>Secure and erase video after review</td>
<td>19% (4)</td>
</tr>
<tr>
<td>Secure and destroy video after review</td>
<td>14% (3)</td>
</tr>
<tr>
<td>Erase videotapes after review</td>
<td>10% (2)</td>
</tr>
<tr>
<td>Destroy videotapes after review</td>
<td>10% (2)</td>
</tr>
</tbody>
</table>

Among centers that erase or destroy the video after review, there is variation in time frames within which erasure or destruction occurs (anywhere between 24 hours to 14 days of taping or review). Four centers that secure the video and equipment further restrict access by allowing only one person to have the key. When secured, videotapes and equipment are kept in locked boxes/cabinets.

Poor Clinical Outcomes

Over half (55%; n=12) of centers reported capturing a poor clinical outcome (i.e. death, complications, breach of standard of care) on video. Among those centers that captured a poor clinical outcome, six erased the tape, two destroyed the tape, and two used the tapes for education and remediation. (Two centers did not answer this question.) Of note, most respondents simply stated that they restricted access to the video. No centers reported that the tape had been subpoenaed or discovered by patients involved or their legal representation. Indeed, one center reported that video at that institution had been “deemed nondiscernable by peer review”.
**Institutional Review Boards (IRB)/HIPAA**

Eighty-seven percent (n=20) of centers do not acquire IRB approval to video trauma resuscitations.

More than one-third (35%; n=8) of centers reported that HIPAA (or other patient privacy legislation) has affected their videotaping practices. Four centers report suspending videotaping practices while they developed policies regarding video security and patient consent. JCAHO suspended videotaping activities at two of the four centers because of concerns about patient consent. Two centers changed their video practices by ensuring that patients are not identifiable on the tape. The remaining two centers obtain patient consent for videotaping; one of these centers has put information about videotaping into the hospital admission form that the patient signs at the point of entry into the health care system.

**Perceived Value of Video Analysis**

On a Likert scale of 1 to 5 (1= not valuable, 5= extremely valuable), the majority of centers (41%; n=9) rated video analysis of trauma resuscitations as extremely valuable. The remainder of the ratings are as follows (one center did not report a rating):
Figure 2: Likert Scale Ratings of the Perceived Value of Video Analysis of Trauma Resuscitations

Centers That Formerly Used Video Analysis (50)

The majority (36%; n=16) of these centers used video analysis for one to three years before terminating its usage. The length of time video analysis was employed is tabulated below:

<table>
<thead>
<tr>
<th>Length of Time</th>
<th>Percentage of Centers</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 year</td>
<td>24% (11)</td>
</tr>
<tr>
<td>1-3 years</td>
<td>36% (16)</td>
</tr>
<tr>
<td>4-6 years</td>
<td>29% (13)</td>
</tr>
<tr>
<td>&gt;7 years</td>
<td>11% (5)</td>
</tr>
</tbody>
</table>

Table 7: Length of Time Video Analysis Was Used

a—5 centers did not respond
Thirty-six percent of centers (n=16) also reported discontinuing video analysis between one and three years ago. The time frames for the discontinuation of video analysis is tabulated below:

<table>
<thead>
<tr>
<th>Length of Time</th>
<th>Percentage of Centers</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 year ago</td>
<td>0</td>
</tr>
<tr>
<td>1-3 years ago</td>
<td>36% (16)</td>
</tr>
<tr>
<td>4-6 years ago</td>
<td>29% (13)</td>
</tr>
<tr>
<td>7-9 years ago</td>
<td>22% (10)</td>
</tr>
<tr>
<td>&gt;= 10 years ago</td>
<td>13% (6)</td>
</tr>
</tbody>
</table>

Table 8: Time Frames for the Discontinuation of Video Analysis

a—5 centers did not respond

HIPAA/medicolegal issues (62%; n=31) and scarce resources (62%; n=31) were the most frequently reported reasons for abandoning video analysis. Only 28% of centers (n=14) stated that video analysis was abandoned for lack of usefulness.
A variety of medicolegal issues were given as reasons for discontinuing video analysis. Four centers reported that their hospital legal teams were in opposition to video analysis. At two centers, patient privacy was decided to be inhibitory; one of these centers reported concern over the protection of physician privacy, stating that there were "legal issues with one physician". Unfortunately, no further details were provided. Two centers had concerns about patient confidentiality and the discoverability of the videotapes. JCAHO recommendations to abandon video analysis unless patient consent was obtained prompted three centers to stop. One center cited a state supreme court ruling that the videotapes are discoverable as their reason for stopping video analysis. Nineteen centers generically reported HIPAA (or other patient privacy legislation) as their reason.
Scarce resources included: nonfunctioning equipment, lack of funding, lack of staff support, and lack of time.

![Figure 4: Reasons for Abandoning Video Analysis: Breakdown of Scarce Resources](image)

Lack of staff support and lack of time were the major contributors to the reporting of scarce resources.

Ninety-four percent (n=47) of centers reported that they do not plan to resume video analysis. Four percent (n=2) plan to resume activity while two percent (n=1) are uncertain about the future of video analysis at their institution.

**Centers That Have Never Used Video Analysis** *(52)*

The majority of these centers (75%; n=38) have discussed implementing video analysis of trauma resuscitations.
DISCUSSION

Conclusions

Video is being increasingly used in a number of venues, including education, quality assurance, clinical care, research, and commercial. In the realm of education and quality assurance in clinical care, trauma surgeons were one of the earliest groups to utilize this technology. While video analysis in trauma resuscitations has a more than 30-year history, there are many perceived challenges (primarily HIPAA/medicolegal issues and lack of resources) and inconsistencies that have hindered or decreased its use in this area. Because of these challenges, only a minority of Level 1 trauma centers presently employs this technology (although it is perceived to be extremely valuable among current users). However, HIPAA does not contraindicate the use of video analysis for educational and quality assurance purposes.

Most centers that currently use video analysis are ACS-verified as Level 1 trauma centers. To be ACS-verified, a trauma center must “provide comprehensive trauma care, serve as a regional resource, and provide leadership in education, research, and system planning.” 72 This suggests that ACS-verified Level 1 trauma centers have a variety of resources at their disposal; these resources may enable them to support the practice of video analysis. Formerly videotaping centers cite “scarce resources” as one of the prime reasons
for abandoning the practice; most of these centers are either state-designated (37%) or ACS-verified (37%).

More than one-third (36%) of currently taping centers report that HIPAA has affected their video practices. Sixty-two percent of formerly taping centers report HIPAA/medicolegal issues as a reason for abandoning video. These results support the hypothesis that HIPAA and related privacy concerns have caused a change in trauma practices as they relate to video. Video analysis is considered to be a useful technology as evidenced by its 3.9 rating on the Likert scale by currently taping centers. Also, only a minority (28%) of formerly taping centers found video analysis to not be useful. However, even though the technology is thought to be valuable, its implementation in trauma practices has been variable. For example, only 50% of currently taping centers use a specific protocol to analyze their tapes while the remaining 50% use no protocol at all. This variation in practice implies that there is variation in the quality and effectiveness of video analysis. Also, one-third of currently taping centers get informed consent from patients for video analysis. However, HIPAA allows “covered entities” (including health care providers, regardless of size, who electronically transmit health information in connection with certain transactions; health care providers include institutional providers) to use “protected health information” (individually identifiable health information... in any form or media) without a patient’s consent for treatment, payment, or health care operations (including quality assurance and education). Therefore, currently taping centers may be wasting resources
in the pursuit of informed consent from patients. It should be noted that HIPAA does require informed consent from patients for any sort of commercial/public videotaping. This sentiment is echoed by JCAHO and the American Medical Association.\textsuperscript{74, 75} Finally, currently taping centers report a variety of ways of approaching access to and security of videotapes. Some centers destroy tapes within 24 hours while others wait as long as two weeks before doing so. Also, more than one person can have access to the videotapes at a few centers, which also introduces an increased security risk.

Implications

In summary, video analysis appears to be a useful technology in trauma practices. There is a rich history of video use in trauma that dates back to the late 1960s. Video provides a relatively objective record of patient care activities and captures multiple events at once. Videotapes of trauma resuscitations can be reviewed at any time, especially in more relaxed settings (compared to the trauma bay) in which more effective learning can occur. Despite these advantages, however, trauma centers are abandoning video analysis because of HIPAA and medicolegal concerns and a lack of resources. This desertion has several implications for trauma education and quality assurance in trauma care. What will replace video analysis as an educational and quality assurance tool? Video analysis has been used for more than 30 years in trauma and no real alternatives have surfaced to rival its efficacy. The health care field has recently been flooded with statistics and warnings about medical errors and patient
safety; poor patient outcomes were captured on tape by more than half of currently taping centers, which suggests that attention must be paid to the discovery and eventual eradication of potential sources of error. Video analysis can be used to identify these potential sources during trauma resuscitations. Video analysis can also be used for the education of residents and staff, but a more efficient method of using this technology must be found. There is much variation in the use of video analysis in trauma, which implies that there is variation in the quality and effectiveness of video analysis among trauma centers. A consensus conference of some sort should be held among leaders in trauma care and education (as well as accrediting bodies such as JCAHO) to set guidelines regarding how video analysis should be ethically and legally used (addressing such issues as patient consent, access and security, and use of video). All trauma centers using video analysis should understand what HIPAA means for their purposes; while individual state laws regarding discoverability and other medicolegal issues will vary, HIPAA, as a federal statute, remains constant. Trauma care leaders may also want to look to the human factors and aviation literature to come up with ideas for educating residents and staff. Pilots have long used flight simulators and other such technology to reproduce the various conditions and circumstances of air travel. Perhaps “trauma patient simulators” should be increasingly used to prevent patient privacy violations.

Video analysis has decreased in prevalence among trauma centers; in 1999, 34% of all Level 1 centers used the technology, while our survey demonstrates
that only 18% of respondents currently use it. Thirty-three percent of formerly taping centers in 1999 declared that they would not tape again, while 94% of formerly taping centers in our survey said that they would not. These changes indicate a transformation in the thinking about video analysis in trauma.

**Limitations**

This study is primarily descriptive. While the benefits of video analysis in trauma resuscitations are quite evident, further inquiries of formerly using centers should be made to clarify their experiences. Since the survey used for this study is mostly multiple-choice with few questions requiring a narrative response, semi-structured telephone interviews with formerly using centers may be helpful in revealing more details.
The goal of this study is to describe national trends in the use of video analysis in trauma centers and to clarify the effect of medicolegal issues (such as those arising from the recent implementation of the Health Insurance Portability and Accountability Act—HIPAA) on this use.

Please bold or highlight your answers for the multiple-choice questions. Please provide legible written or typed responses where asked.

Please have one member of your institution complete this survey and return to us. You may return this survey via email to shannelle.campbell@yale.edu.

Thank you!

DEMOGRAPHIC INFORMATION

Date: / / 

Your Title: ________________________________

1. What is the level of your trauma center?
   a. Level I  
   b. Level II  
   c. Level III  
   d. Level IV  
   e. Other: specify ____________________________

2. What institution or organization verifies your trauma center as a particular level?
   a. American College of Surgeons  
   b. State designated  
   c. Other: specify ____________________________

3. At your center, how many trauma patients do you treat annually?
   a. 1-500  
   b. 501-1000  
   c. 1000-2000  
   d. >2001

4. At your center, how many dedicated trauma faculty are there?
   a. 1-5  
   b. 6-10  
   c. 10-15  
   d. >16
5. Do you have a trauma coordinator (nurse, staff member, full-time faculty member etc.) who organizes the activities of your trauma center?

   a. Yes
   b. No

6. Do you routinely videotape trauma responses (for any reason)?

   a. Yes (if yes, go to question # 7)
   b. No (if no, go to question # 23)

### TRAUMA CENTERS CURRENTLY USING VIDEO ANALYSIS

#### General

7. Do you video ALL or SOME trauma responses?

   a. All
   b. Some

8. How long have you videotaped trauma responses?

   a. > 1 year
   b. 1-3 years
   c. 4-6 years
   d. >7 years

#### Use

9. Who reviews the videotapes on a routine basis? Circle all that apply.

   a. Trauma coordinator
   b. Trauma surgeons
   c. Hospital administration
   d. Other: specify ________________________________

10. Is there a specified form/checklist/protocol that is used for the analysis of each videotape?

    a. Yes—check all that apply:

       - Compliance with clinical algorithms (i.e. ATLS)
       - Timing of certain events
       - Resource utilization
       - Compliance with universal precautions
       - Other ________________________________

    b. No
11. How are the tapes used? Check all that apply.

- Education (ex. morbidity and mortality conference, staff/resident education)
- Research
- Quality assurance
- To answer clinical questions

12. Have you ever published research from the use of these videotapes?
   a. Yes: type of research ________________________________________________
   b. No

13. Do you show the videos to an audience?
   a. Yes—check all that apply:
      - Residents and medical students
      - Patients
      - Staff (nurses, respiratory therapists, X-ray technicians, etc.)
      - Other: specify ________________________________________________
   b. No

**Medicolegal**

14. Do you have institutional review board (IRB) approval to videorecord trauma responses?
   a. Yes
   b. No

15. Who has the right to see the videos? Check all that apply.
   - Clinicians/staff (faculty, nurses, housestaff)
   - Patients who are videotaped
   - Lawyers (for patients or for the hospital)
   - Hospital administration
   - Public

16. Has a poor clinical outcome (i.e. death, complications, breach of standard of care) ever been captured on video?
   a. Yes (if “yes”, go to question #17)
   b. No (if “no”, go to question #18)

17. If “yes” to #16, what happened to the video? (i.e. subpoena)

   ________________________________________________

18. How do you restrict access to the videotapes? ____________________________

19. Do you obtain written consent from staff, residents, and patients for videotaping?
   a. Yes (if “yes”, go to question #20)
   b. No (if no, go to question #21)

20. If “yes” to #19, how is the consent obtained?
a. Retrospectively  
b. Prospectively  

21. Do you have signs posted in your emergency department informing patients and employees that the videorecording of patient care activities is performed there?  
   a. Yes  
   b. No  

22. Has HIPAA (or other patient privacy legislation) affected your videotaping practices?  
   a. Yes: please give a brief written explanation ________________________________  
      ________________________________  
      ________________________________  
      ________________________________  
   b. No  

Other  
On a scale of 0 to 5, in your opinion, how valuable a tool is video analysis of trauma responses to your institution?  
0 ______ 1 ______ 2 ______ 3 ______ 4 ______ 5  
Not valuable at all  
Extremely valuable  

TRAUMA CENTERS NOT CURRENTLY USING VIDEO ANALYSIS  
23. Have you EVER videotaped trauma resuscitations?  
   a. Yes (if “yes”, go to question # 25)  
   b. No (if “no”, go to question # 24)  

24. If “no” to #1, was there ever any discussion at your institution about videotaping trauma responses?  
   a. Yes  
   b. No  

Answer the following questions if “yes” to #23  
25. When did you STOP videotaping trauma responses? ____________________________  
26. How long did you videotape trauma responses before you stopped?  
   a. < 1 year  
   b. 1-3 years  
   c. 4-6 years  
   d. > 7 years
27. Why did you stop videotaping? Circle all that apply.
   a. HIPAA/patient privacy legislation
   b. Videotaping equipment not functioning
   c. Lack of funding for video-related activities
   d. Video analysis not found to be useful
   e. Lack of staff support for videotaping
   f. Other ____________________________

28. Do you think your institution will resume videotaping trauma responses?
   a. Yes
   b. No
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AMA Code of Ethics: www.ama-assn.org
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This thesis by has been used by the following person, whose signatures attest their acceptance of the above restrictions.

____________________________________
NAME AND ADDRESS DATE