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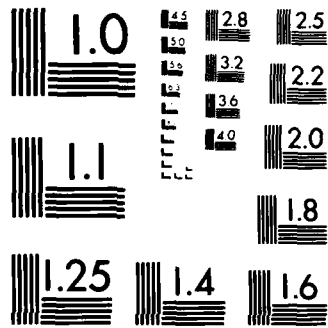
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ANALYSIS FOR ARMY MED. (U) ACADEMY OF HEALTH SCIENCES  
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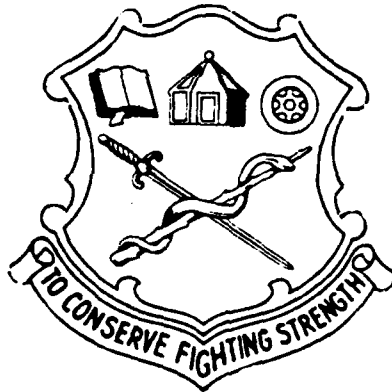
TECHNICAL REPORT AHS-8

APRIL 1985

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NEEDS ASSESSMENT AND TELECOMMUNICATIONS COST BENEFIT  
ANALYSIS FOR ARMY MEDICAL DEPARTMENT CONTINUING  
CLINICAL EDUCATION REQUIREMENTS

B. Davis, K. Finstuen, & E. Kane



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INDIVIDUAL TRAINING DIVISION  
DIRECTORATE OF TRAINING AND DOCTRINE  
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  This study provides a cost benefit comparison of five telecommunication systems for meeting the specified continuing clinical education needs as identified in a policy Delphi study of 27 Army Medical Department offices and installations. Needs were defined as the combination of state and national license, certification, and registration requirements and specific content associated with continuing medical, nursing, dental, pharmacy, and health education. Telecommunication systems were examined in terms of equipment and transmission costs. A panel of AMEDD managers was used to determine system perceived benefits.		

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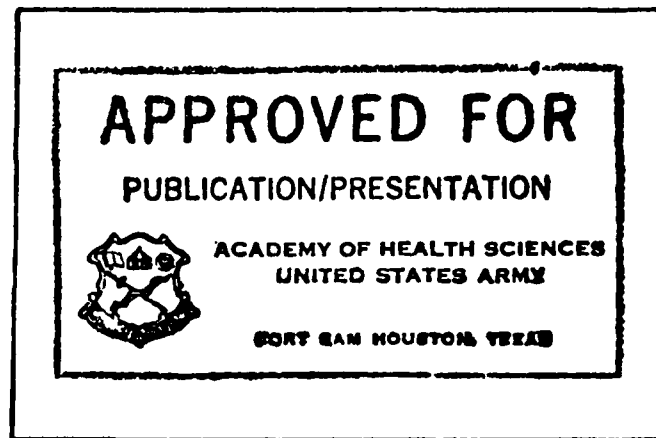
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## Summary

PURPOSE: The major aim of this study was to provide a cost benefit comparison of several telecommunications systems (to include the presently curtailed Health Services Command satellite television network) in relation to a well defined set of clinical continuing education needs for active and reserve health professionals in the Army Medical Department (AMEDD).

### METHODOLOGY:

The study consisted of four phases. In Phase I an extensive literature review was conducted to identify key considerations for the specification of clinical education and training needs for the AMEDD. Requirements were defined as mandatory or highly recommended state and national continuing medical, nursing, dental, pharmacy, and health education programs required to maintain licensure, registration, or certification. In Phase I a model was constructed to provide definitions for needs, to select a vehicle for forecasting and assessing needs, and to delineate an approach to measure and quantify telecommunications relative costs and perceived benefits.

The content portion of AMEDD continuing education (CE) needs was assessed in Phase II via a Policy Delphi approach entitled "Outlook to '89". Directors and coordinators of CE at 27 AMEDD offices and installations participated in a three-wave information generation and revision exercise. The first round of inquiry assessed the method that offices used to plan and program CE activities. The second round of information exchange consisted of the generation of initial CE topics and a description of the current telecommunications use for CE at the respondent's location. The third round of information exchange consisted of review and revision of the final multiple and single CE needs lists. Forty-two multiple and 107 single CE needs topics in priority order were identified.

The third Phase of the study consisted of construction of a relative cost and capability spectrum for seven telecommunications delivery systems. Systems were scaled in relative cost order and ranged from current types of use (status quo - local networks only) through teleconferencing and telephonic graphics (white board) systems, to analog satellite television, full scan digital television, and computerized multi-media teleconferencing.

During the fourth Phase of the study, an Academy of Health Sciences, Health Services Command, and Brooke Army Medical Center executive management committee reviewed the Phase II forecasted AMEDD needs, and the Phase III equipment capabilities and costs. After discussion of potential decision factors to be used, members assigned relative perceived benefit scores to each of the defined AMEDD CE needs to indicate appropriate modes of delivery for specific clinical education topics.

### RESULTS:

Major findings indicated that methods of program development in regard to continuing education in the AMEDD vary widely across installations.

The use of telecommunications in the past at installations also varied widely from the use of video cassettes and closed circuit television, to use of the HSC-TV network, or no use at all.

Of the 149 AMEDD CE topical needs identified by Delphi panelists, about one-third were recommended for some type of low level telecommunications delivery by the executive committee. However, two-thirds of the needs forecast for the next five years (69.13%) were not recommended for telecommunications delivery over that which is currently being used. While these results may not apply equally to enlisted education and training, they do define recommended areas of anticipated emphasis for continuing medical (CME), dental (CDE), nursing (CNE), pharmacy (CPE), and health (CHE) education for AMEDD professionals. Use of these results may be beneficial to continuing education directors and coordinators for future planning purposes.

#### CONCLUSIONS-RECOMMENDATIONS:

The CE needs produced in this study represent a systematically derived and appropriately prioritized list of content issues forecast for AMEDD health care professionals. In conjunction with the identified needs, several telecommunications systems were examined as possible vehicles for delivery of AMEDD CE education requirements. Recommendations from an executive committee indicated that while the use of some telecommunications systems would be beneficial for some projected needs, that little support was evident for targeting high importance needs for sophisticated delivery. As needs change and technology advances in the future, this trend may also change. The strength of this study over past studies is that needs were defined first, and delivery systems were then matched to specific stated needs. Other studies have often attempted to identify education or training needs for a particular system. As shown by the present results, while forms of telecommunications can be useful for some (about a third) CE topics, no single telecommunications system, by any means, meets all needs.

Needs Assessment and Telecommunications Cost Benefit Analysis For  
Army Medical Department Continuing Clinical Education Requirements

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Needs Assessment and Telecommunications Cost Benefit Analysis For  
Army Medical Department Continuing Clinical Education Requirements

INTRODUCTION

Background

The US Army Health Services Command television network (HSC-TV) began in 1979, and provided Army Medical Department (AMEDD) personnel with two educational programs via satellite television which also included the capability for telephonic interactive audience feedback. The Brooke Army Medical Center (BAMC) Hour provided clinical and professional presentations of medical topics and was sponsor-accredited to qualify participants and viewers for continuing medical education (CME) credit under Category 1 of the American Medical Association's requirements for interactive program activity. Added in 1981, Studio "B" provided general AMEDD training segments directed toward skill qualification testing and soldier readiness issues.

Studio "B" was terminated in the Spring of 1984. The decision for cessation of programming cited infrequent interactive responses from the viewing audience, the lack of a systematic needs assessment for future programming, and a small viewership audience as reported to Academy of Health Sciences (AHS) Branch Training Teams (BTT) that visited various hospital and clinical facilities. Later in 1984, presentation of the BAMC Hour was curtailed for the next fiscal funding cycle due to cost constraints. In the interim, prior to possible funding in the future, HSC requested that AHS conduct a training needs assessment for clinical medical education, to include active and reserve components, and to provide a cost benefit study of satellite television education and training.

The Academy previously had conducted two studies of the HSC-TV network. The first, "Video Satellite Communications Needs Analysis and Project Effectiveness Survey" was conducted by the Satellite Evaluation Committee in 1981 and surveyed 220 respondents at Ft. Sill, OK, and Ft. Hood, TX. A second study, entitled "Evaluation of HSC Satellite Television Network", (Twist, 1982) contacted approximately 3,000 AMEDD personnel at five Army installations. The focus of both studies was generally directed toward an on-going evaluation of satellite television delivery in meeting AMEDD training and education needs; and more specifically, toward determining the awareness and participation levels of viewers, examining limitations associated with potential viewership (shift schedule conflicts, supervisory support of satellite TV programs, etc), and recording viewer preferences for program content and program presentation modes. Of those respondents surveyed in both studies, only about half (56% and 53% respectively) reported that they had ever watched programs from either Studio "B" or the BAMC Hour; a trend that appeared to be unimproved during the 1983-1984 Academy BTT visits.

The Studio "B" cancellation and the BAMC Hour fiscal restraints required that this study take a broader approach to the evaluation of satellite television programming by consideration of several types of telecommunications delivery technologies for specific and defined AMEDD education and training needs. The objectives of this study were to: 1) assess AMEDD clinical education and training needs in the near and far term, 2) to examine alternate interactive telecommunications education delivery systems, their capabilities and associated costs, and 3) to determine the most appropriate telecommunications system for identified clinical topics based upon AHS managerial judgments of the perceived benefit which would accrue over the next several years.

### Approach

An extensive literature search was conducted to identify and refine central constructs that would provide a means of measuring various elements and inter-relationships among the stated study objectives. Automated computer searches were accomplished using the Medical Literature and Retrieval System (MEDLARS II) from the National Library of Medicine in Bethesda, MD; the abbreviated Medical Search System (MINIMEDLINE) at the University of Texas Health Sciences Center in San Antonio, TX; the Defense Technical Information Center (DTIC) technical report abstract capability in Alexandria, VA; the interactive education search system (DIALOG) at Texas A & M University, College Station, TX; and the Manpower and Training Research Information System (MATRIS) through the Office of the Assistant Secretary of Defense, Manpower Reserve Affairs and Logistics, and the Office of the Under Secretary of Defense, Research and Engineering in San Diego, CA. Key terms searched included continuing clinical education, needs assessment (methods and models), telecommunications and satellite TV for medical presentations, and cost benefit analyses for medical educational delivery. A manual literature search was also conducted. A bibliography of pertinent articles and sources retrieved is at Appendix A. The bibliography was structured into four major categories: 1) requirements for continuing medical, dental, nursing, and health education, 2) examples of course content, 3) continuing clinical education needs assessment models and methods, and 4) telecommunications delivery systems for continuing clinical education.

Figure 1 represents a condensation of the central study constructs and an initial study design which emerged from the literature search and review. Study constructs were formulated into a set of operational definitions.

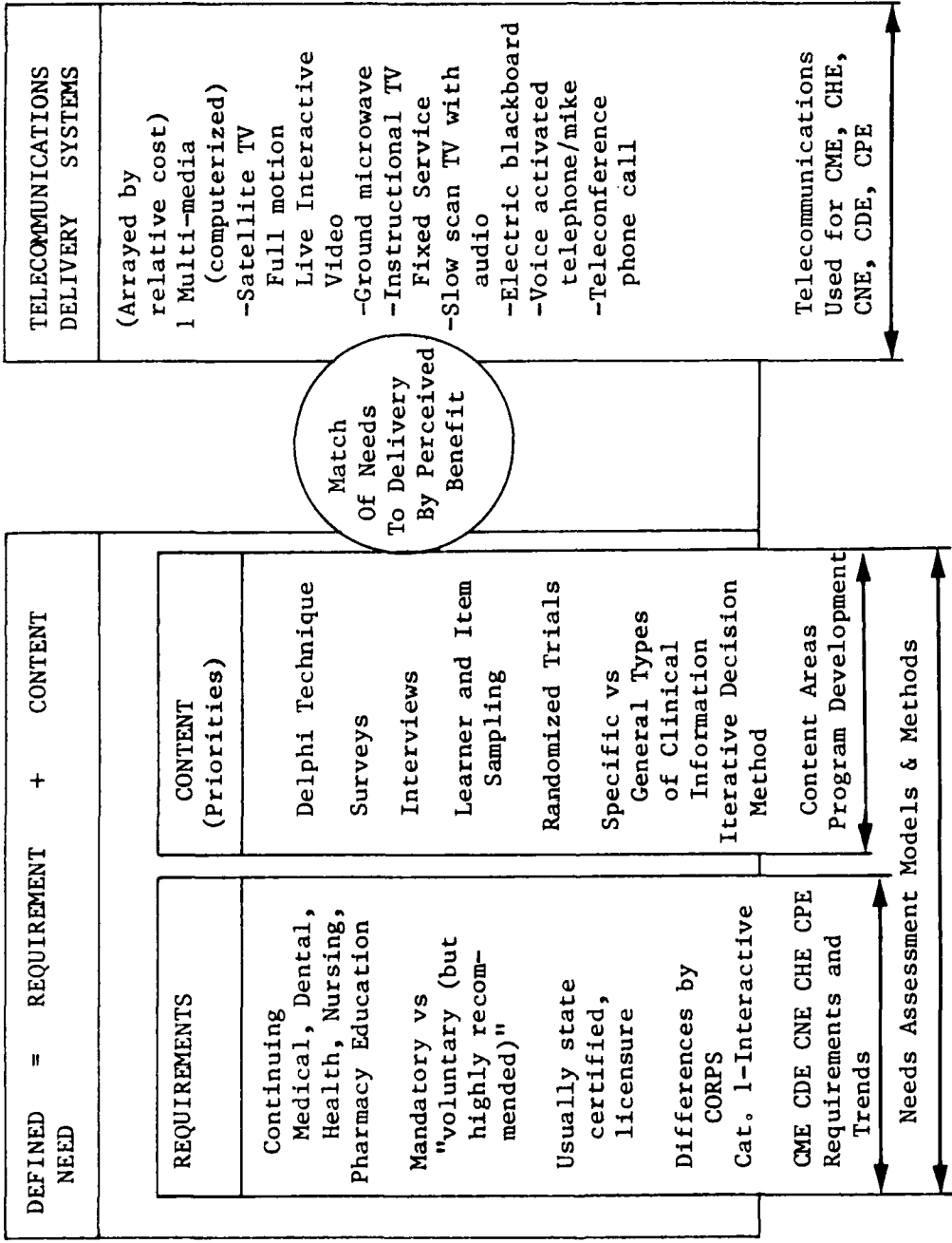


Figure 1. Summary of literature review findings and initial study design for assessing clinical education and training needs, and for conducting a cost benefit analysis of satellite TV and other telecommunication delivery systems. See Appendix A for complete references.

Clinical education requirements were defined as mandatory, or highly recommended, activities which were needed to maintain a license, certificate, registration, or professional society or board membership. Course content was defined as the specific topical information to be presented or discussed and the type of program development which was used to identify topics in some prioritized order of importance. A clinical education/training need was operationally defined as the ordered topics of importance as expressed by those individuals that are responsible for continuing education programs. The strength of the Delphi technique over other priority setting methods for identification of medical content topics is that it may be used to forecast future needs as well as current ones (see Appendix A, Section 3: Schoeman & Schwartz, 1974; Bowman, Katzoff, Garrison, & Will, 1983; Bloom & Luft, 1982; Lindeman, 1981). Cost was operationalized as the relative dollar amounts for presenting instruction in several alternate delivery modes. Means of delivery varied from simple telephone conference calls (Waixel, 1976; Graham, 1982) to sophisticated computerized technologies at the cutting edge of research and development (Hoffman & McKinney, 1983). Benefits were defined as the perceived value of meeting forecasted continuing education needs via one of the alternate educational delivery systems. Since benefits represented a perceived measure which constituted an opinion, it was decided early in the study to rely on managerial group decision making to establish the need-system match.

#### METHOD AND RESULTS

The study consisted of four separate phases. Phase I entailed conducting the literature review and formulation of the study model shown in Figure 1. An executive management committee was appointed for the project that consisted

of 7 representatives from the Academy of Health Sciences, Health Services Command, and Brooke Army Medical Center. Members were senior AMEDD managers involved in training, evaluation, telecommunications, funding, and patient care. The committee met periodically during the project to assess progress and to provide guidance.

Phase II consisted of mapping the identified requirements for specific disciplines into the AMEDD corps structure, conducting a Delphi study of Medical Department Activities (MEDDAC), Medical Centers (MEDCEN), Dental Activities (DENTAC), and Area Dental Laboratories (ADL), and producing a prioritized list of clinical education needs. Phase III activities entailed gathering cost and capability data on alternate telecommunications delivery systems. Relative costs were compared in a geographically dispersed network of Army medical installations. In Phase IV of the study, executive committee members examined Phase III relative cost results and assigned a specific delivery system to each of the Phase II Delphi topics in terms of the expected benefit that would result for each match. Specific details and results are listed below by each phase.

#### PHASE I - Literature Review and Identification of Requirements

Table 1 presents the required types of continuing education programs and content hours for eight major medical specialties or disciplines. Generally, continuing education hours and forms of content vary widely from state to state and across disciplines. Usually a nationally accepted program, ie, Physician's Recognition Award, will meet or exceed state requirements. Requirement data was collected in several ways which include computerized and manual literature searches of professional medical journals, telephonic contacts with national offices of various medical and health associations



Table 1  
 Identification of Mandatory and Recommended Continuing Clinical Education

Discipline/ Specialty	Continuing Education (C.E.) Requirement	C.E. Hours*(Source)
Physician (Surgery, Radiology, Urology, OB/GYN Osteopathy, etc.)	Continuing Medical Education (CME) is mandatory for membership in most state medical societies, for reregistration of a license to practice medicine in most states, for membership in most medical specialty academies and societies, and for recertification of specialty board membership. While most state requirements vary, nearly all requirements can be met with the Physician's Recognition Award (PRA) from the American Medical Association (AMA's) Accreditation Council for CME (ACCME).	150 hours in 3 years; 60 hours inter-active under Category 1 (Accredited Sponsor) Categories 2 through 6 include non-accredited experiences. teaching, writing articles, and self-instruction and evaluation. (PRA Information Booklet, AMA, 1983)
Optometry	Continuing education is mandatory for O.D.s in all but four states.	New Jersey and Washington require 50 hours over 2 years. Most states require 8 to 12 hours per year. (American Optometrical Association News, March 1984)
Pharmacy	Of the 50 states, the District of Columbia, and Puerto Rico, thirty-one (31) state boards of pharmacy require pharmacists to participate in C.E. activities as a prerequisite to relicensure, three boards have the authority to promulgate regulations requiring Continuing Pharmaceutical Education (CPE) as a prerequisite for relicensure, and 18 have no current mandatory requirements.	Most state requirements range from 4.5 Continuing Education Units (CEU - equivalent to 45 contact hours) to .8 CEUs per year. (The American Council on Pharmaceutical Education, 1984)
Dentistry	Most states have mandatory Continuing Dental Education (CDE) for reregistration/recertification and licensure. Dental societies and colleges/academies have various requirements. While most state requirements vary, nearly all requirements can be met with Fellowship and Mastership programs from the Academy of General Dentistry (AGD).	Fellowship: AGD member for 5 years, 500 hours of AGD approved C.E. activities 350 hours in C.E. courses. Mastership: AGD fellow, and 600 hours of which 400 must be in participation courses. (Academy of General Dentistry, 1981).

Table 1 (continued)

Discipline/ Specialty	Continuing Education Requirement	C.E. Hours* (Source)
Nursing	Some states have mandatory Continuing Nursing Education (CNE) for licensure. Most nursing organizations (American Association of Critical Care Nurses, American Academy of Nursing) strongly favor voluntary CNE, i.e., as approved by ANA Mechanism for the Accreditation of Continuing Education in Nursing.	Requirements and recommendations vary. CE credit for home study is tested and reported by the Educational Testing Service, Princeton, N.J. (American Journal of Nursing, 1982)
Dietetics	Many states require mandatory continuing education for licensure. C.E. is mandatory for the Registered Dietitian (R.D.) through the American Dietetic Association, and exceeds most state C.E. requirements.	75 to 80 hours within a five-year period. CEUs are converted to contact hours. Five categories are available. (The American Dietetic Association, 1974) A reasonable average is 12 to 15 hours per year. (AHS interview, 1984)
Physical Therapy	Some states (6 or 7) do not require mandatory C.E., but do highly recommend. Offerings vary in the amount of credit approved for C.E. experts on P.T. continuing education are located at the Harmonyville Rehabilitation Center, Harmonyville, PA.	
Hospital Adminis- tration	Some states have requirements for mandatory C.E. Most administrators are members or fellows of the American College of Hospital Administrators.	Attendance at one major conference every 3 years comes to about 12 hours per year. Alternate plans for more hours should be approved. (AHS interview, 1984)

\* See bibliography for specific sources

and agencies, and interviews at local hospital facilities and medical, dental, and nursing schools. The primary concern for requirements, in regard to telecommunications, centered on Category 1 or interactive participation as stated for physician and dental disciplines (column 3, Table 1).

#### PHASE II - Identification and Prioritization of Continuing Education Needs

This phase consisted of selecting a representative group of respondents to comprise a policy Delphi panel, and through several iterations of information exchange and review, to determine appropriate continuing education needs for the AMEDD over the next five years.

Correspondence of discipline requirements to AMEDD personnel. Though the literature review revealed numerous possible CE topic lists (see Appendix A, section 2) needs determined for this study were not limited to civilian topics alone. While certain military medical personnel must participate in CE to maintain civilian state or national licensure, certification, or registration, as Army officers they must also meet Army career development requirements (see Army Pam. 600-4 or AR 40-60). Major Army affiliations which match the eight medical specialties or disciplines identified in Table 1 were identified to assure that CE needs would be representative of Army Corps membership and also give weight to mandatory versus strongly recommended programs. The Medical Corps (MC) covers the first three disciplines: physician, optometry, and pharmacy. Though optometry and pharmacy officers are members of the Medical Service Corps (MSC), in most medical treatment facilities these functions fall under operational control of the Deputy Commander/Chief Professional Services who also directs the physician staff. Dentistry and nursing correspond directly to the Dental Corps (DC) and Army Nursing Corps (ANC) respectively. Dietetics and physical therapy provide examples from the Army Medical Specialist Corps

(AMSC). A lesser number of hospital administration personnel represent the MSC. Population strength figures were acquired for major corps membership as of 30 June 1984 reflecting 5,301 for MC, 1,811 for DC, 4,054 for ANC and 468 for AMSC (data from strength report RCS:DAPC-123, AMEDD PERSA, Attn: SGPE-DS, Education and Training division, Washington, D.C.). Selection of study respondents from the AMEDD population of directors and coordinators of CE was roughly stratified across corps areas to approximate population percentages of 45.56% for MC, 15.57% for DC, 34.85% for ANC, and 4.02% for AMSC. In addition, representation was also required for Army Reserve and National Guard Bureau personnel and the Uniformed Services University of the Health Sciences (USUHS), Bethesda, MD.

Delphi Network of AMEDD Installations. A study participant network was constructed to both reflect major AMEDD installations, and to maintain representative percentages of corps personnel assigned to various locations. Figure 2 represents the finalized network consisting of 11 MEDDAC/MEDCEN, seven DENTAC/ADL installations, and six Army staff agencies including participants from the Office of The Surgeon General, reserve components, and USUHS. Specific respondents (and codes) are listed by corps affiliation and are arrayed in columns one and two of Table 2. Final participant percentages for the content generation and prioritization portion of the study (excluding reserves and USUHS) were 51.52% for MC, 30.30% for DC, 15.15% for ANC, and 3.03% for AMSC.

Columns three and four of Table 2 array results obtained from rounds 1 and 2 of the Policy Delphi study entitled "Outlook to '89." The Delphi technique is a program development method which employs geographically dispersed experts to formulate and forecast organizational policy projections through

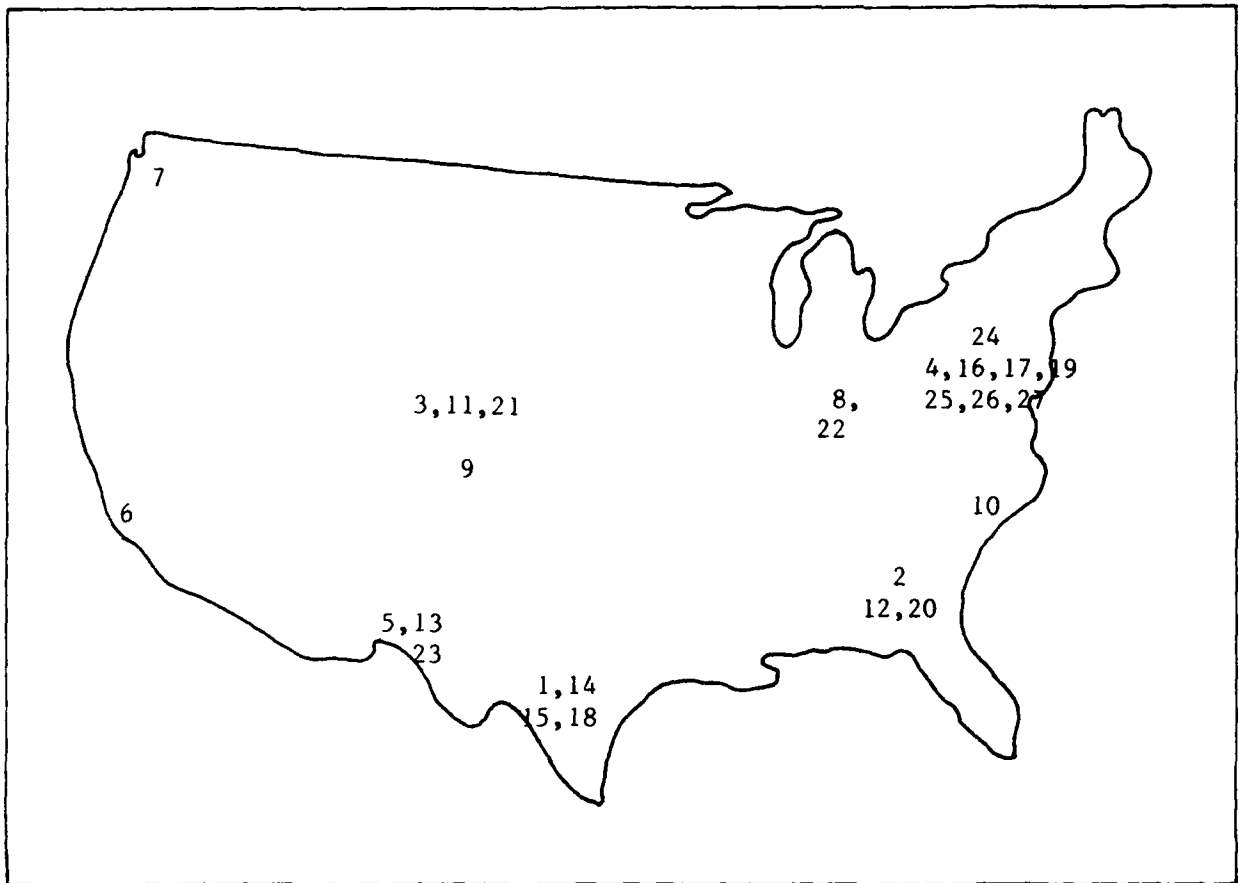


Figure 2. Policy Delphi network of 27 Army Medical Department continuing clinical education offices. See Table 2 for office codes.

a series of data gathering and feedback. Figure 3 lists the events used in the present study. Appendix B contains a complete set of instructions given to experts. Thirty-six continuing education directors or coordinators in 27 AMEDD offices participated in the study. All offices took part in the first telephonic Round 1. Topic specification and generation consisted of two iterations; Round 2 - topic generation, and Round 3 - topic need review and revision. Twenty-six personnel participated in both Rounds 2 and 3 while 10 of the 36 respondents only took part in the last topic Round.

As shown in Table 2, continuing education program development methods varied greatly across the AMEDD network, ranging from department chief decisions

Policy Delphi Respondent Results for Round 1 - Program Development Methods and  
Round 2 - Telecommunications Use in C.E.

Respondent Code	Continuing Education Office	Method of Program Development	Type of Telecommunications Used
Medical Corps C.E. Respondents			
1 a,b,c,	Brooke Army Medical Center(BAMC) Ft Sam Houston, TX	Decentralized/Each Dept Chief Directs	BAMC Hour HSC-TV
2	Dwight D. Eisenhower AMC Ft Gordon, GA	Decentralized/Each Dept Chief Directs	None
3	Fitzsimons AMC Aurora, CO	Decentralized/Each Dept Chief Directs	Video Cassettes
4	Walter Reed AMC Washington, D.C.	Decentralized/Each Dept Chief Directs	Closed circuit TV
5	William Beaumont AMC Ft Bliss, TX	Decentralized/Each Dept Chief Directs	Local Audio Visual
6	Letterman AMC Presidio, San Francisco, CA	Decentralized/Each Dept Chief Directs	None
7 a,b,c, d,e,f,	Madigan AMC Ft Lewis, WA	Decentralized/Each Dept Chief Directs	1 of 6 responses VCR/Videodigest
8	COL Florence A. Blanchfield Army Community Hospital Ft Campbell, KY	Continuing Education Committee	Videotapes
9	USA Community Hospital Ft Carson, CO	Service Specific Committees	None
10	Womack Army Community Hosp. Ft Bragg, NC	Committees and C.E. Catalog	None
Dental Corps C.E. Respondents			
1d	Brooke Army Medical Center Ft Sam Houston, TX	Decentralized/Each Dept Chief Directs	(BAMC Hour HSC-TV
11	US Army Dental Activity (DENTAC) Fitzsimons AMC, Aurora CO	Dentists share duty as coordinator	BAMC Hour HSC-TV
12	USA Area Dental Lab (ADL) Ft Gordon, GA	Staff specialists determine	None
13	USA DENTAC Ft Bliss, TX	TDY each year Consultants/lectures	Video Tapes
14	USA DENTAC Ft Sam Houston, TX	Dentists attend Conferences	BAMC Hour HSC-TV
15	US Army ADL Ft Sam Houston, TX	Committee and Study Groups	None
16	US Army ADL Walter Reed AMC, Wash. D.C.	Clinical Lab Relations Course	None

Table 2 (continued)

Respondent Code	Continuing Education Office	Method of Program Development	Type of Telecommunications Used*
Dental Corps Respondents (continued)			
17	HQ US Army DENTAC Walter Reed AMC, Wash. D.C.	TDY Trips and Guest Speakers	None
18	HQ USA Health Services Command Ft Sam Houston, TX	HSC Dental Corps Advisor	Video Tapes
19	AMEDD Support Agency OTSG Washington, D.C.	Dental Specialty Directs	--
Army Nursing Corps C.E. Respondents			
1e	Brooke AMC Ft Sam Houston, TX	Decentralized/Each Dept Chief Directs	(BAMC Hour HSC-TV)
20	Dwight D. Eisenhower AMC Ft Gordon, GA	Committee-Annual Nursing Needs Survey	In house TV Patient Education
21	Fitzsimons AMC Aurora, CO	Committee-Annual Need Assessment	None
22	US Army Medical Dept Activity Ft Campbell, KY	Committee	Closed circuit television
23	Wm Beaumont AMC Ft Bliss, TX	Committee	None
Other Continuing Education Respondents			
24	Uniformed Services University of the Health Sciences (USUHS) Bethesda, MD	New Program	None
25	National Guard Bureau Surgeon Washington, D.C.	TDY Trips/Assn of Military Surgeons of the US (AMSUS)	--
26	US Army Reserve, Office of the Chief Washington, D.C.	TDY Trips/AMSUS	--
27	Army Medical Specialist Corps Office of The Surgion General Washington, D.C.	--	--

\*-- indicates non-response or not applicable

to formalized C.E. catalogs and surveys. A compiled list of methods was sent to respondents as feedback during Round 2 (see Appendix B for list).

Of the 28 C.E. directors or coordinators that responded to the Round 2 question "Does your facility presently use any form of telecommunications for C.E. activities?", 16 or 57.14% indicated that they did not. In regard to the 12 positive responses, 5 specifically mentioned video cassettes and tapes, three indicated closed circuit television, 3 mentioned the HSC BAMC Hour, and one cited local audiovisual use. For this sample of AMEDD activities, HSC-TV satellite programming had been used by only 3 of the 28(10.71%) continuing education functions.

During Round 2 participants also generated an initial list of CE topics specifically needed at their installation. Respondents were also asked to distribute a possible 100 points to the topics they listed. Topics were compiled and condensed upon receipt from the field and were mailed out to participants for revision and review during Round 3.

Two final lists were prepared upon receipt of the revisions from the Policy Delphi panel. The first contains 42 multiple topics, or topics that were initially generated by more than one of the 36 respondents. The other list contains 107 continuing education needs initially identified by only one participant. Both lists were reviewed and revised by all expert panel members during Round 3. The final continuing clinical education need lists are contained in Appendix C of this report and are prioritized by the revised number of importance points assigned by Policy Delphi participants. By far the most important multiple needs identified were quality assurance and advanced cardiac life support areas. Altogether 149 CE needs were generated, prioritized, and reviewed by the panel. Of the 42 multiple CE needs, 15 were



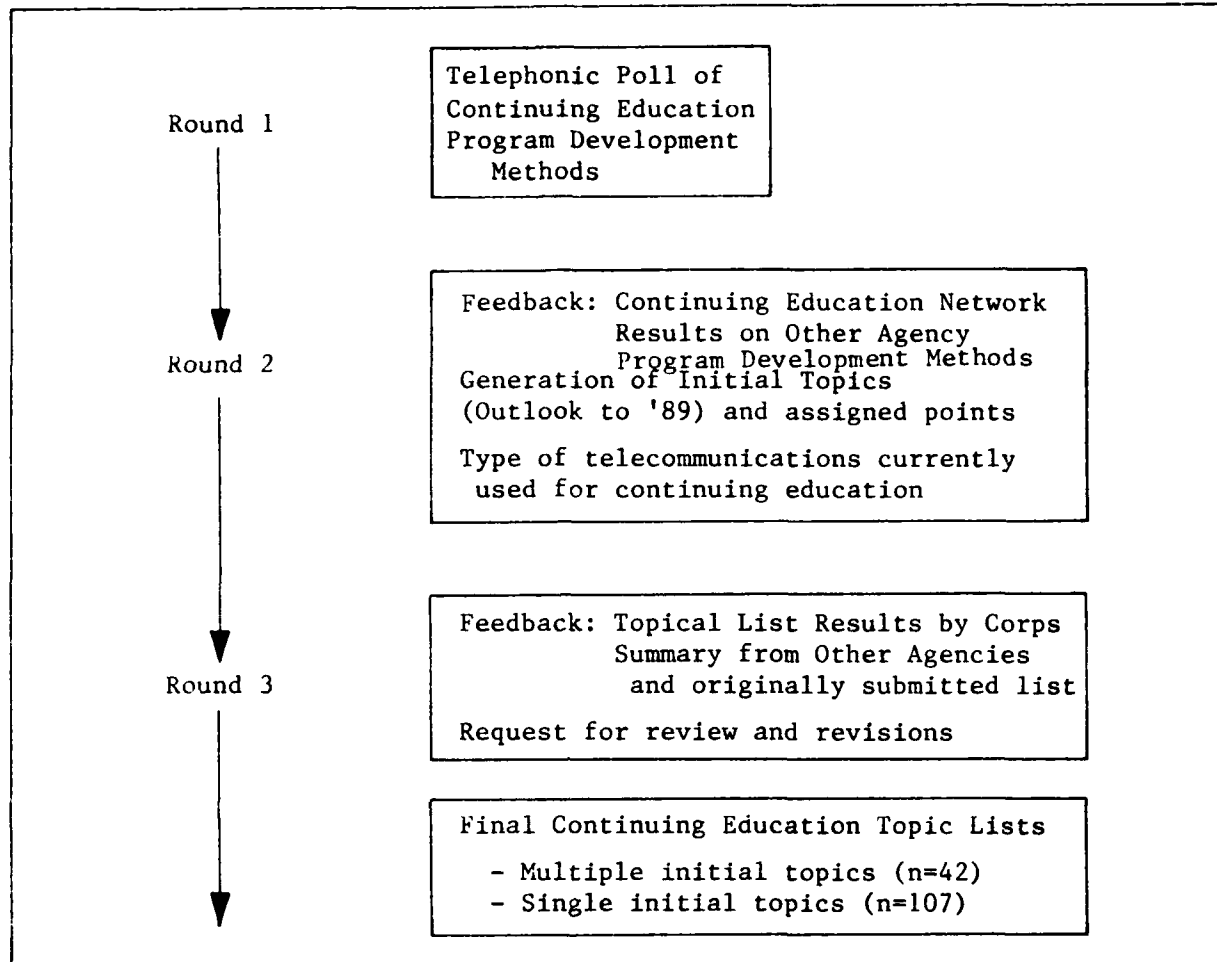


Figure 3. Sequence of events for Policy Delphi Panel composed of 36 directors and coordinators in 27 AMEDD continuing education offices.

explicitly military, field oriented, or emphasized combat/disaster conditions. No additional topics were specifically requested by either the Army Reserve or the National Guard Bureau offices.

Phase III - Determination of Relative Delivery Costs for Alternate Telecommunications Systems

To compare costs of several telecommunications systems a baseline was required from which cost estimates could be developed. The Policy Delphi network (Figure 2) consisted of approximately 12 separate stations and was

chosen as the example network. For system comparisons, the example CE network was hypothesized to present 22 hours of programming per month (264 hours per year). Four stations were designated as transmitting sites for presentation (Ft Sam Houston, TX, Walter Reed AMC, Letterman AMC, and USUHS); the remainder were assigned as receiving stations only. Feedback was possible for all delivery systems through some form of audio capability which would qualify all examined systems for Category 1 credit (interactivity) from the AMA accrediting agency. All cost estimates for each system were made on a per annum basis.

Seven types of telecommunications systems were identified for cost analysis (see Appendix A - Section 4 of Bibliography for range of systems). Table 3 presents a brief summary of each system's capability, and the source of information contacted for development of a cost estimate. Systems are represented in terms of state-of-the-art sophistication and range from simple telephone conference calls to computerized instant graphics and data communications multi-media. Tables 4 through 7 provide specific equipment and transmitting cost information for various systems.

Table 4 presents estimated costs for the "Quorum" teleconferencing system. The teleconference bridge is a device which allows many callers to participate in one large teleconference by "balancing" audio volume levels across many microphone and speaker hook-ups. The per annum cost (\$89,519) is shown at the bottom of the table. Rates were computed from American Telephone and Telegraph (AT&T) zonal communications charts for intra-state connections and Southwestern Bell Telephone rates for inter-Texas connections. Costs are basically made up from equipment costs and operating or transmission costs. The example provided is based upon leasing rather than purchasing the equipment.

Table 3  
Summary of  
Telecommunications Delivery Systems

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Teleconferencing (audio only)

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This is the American Telephone and Telegraph (AT&T) Quorum system with a single control bridge located at Ft Sam Houston. Each of the other 11 stations can take control by dialing into the Ft Sam Houston bridge. The system also includes loudspeakers, microphones and speakerphones.

Source for transmission costs are Mr. Jesse Martinez (512) 366-6640 and the Southwestern Bell.

Source for equipment costs is Mr. Chuck Hullinger, (512) 366-5895.

Teleconferencing with White Board

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This is the AT&T Gemini 100 system which is in operation at Kelly Air Force Base, Texas with the exception that the background for the new board is white. There are also improvements on erasing part of the transmitted image. It is used in conjunction with the AT&T Quorum teleconferencing system. Video monitors must be provided by the purchaser/lessee.

Source for the equipment costs is Mr. Chuck Hullinger (512) 366-5895.

Source for transmission costs are Mr. Jesse Martinez and the Southwestern Bell operator, Mr. Martinez can be reached at (512) 366-6640.

Analog Satellite Television (BAMC/Studio "B" Quality)

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This is full motion, live analog television with the quality of the BAMC Hour and Studio "B". The cost, based on the example AMEDD network telecommunications model, requires less air time and less internal cost at the receiving stations than the HSC-TV network.

Source is Mr. Bill Hoffman, AUTOVON 471-6816

Full Scan Video Teleconferencing.

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This is a downgraded version of the AT&T super system described below. It reduces the presenting stations from 12 to four, 24 hour access to 22 hours/month and two presenters at-a-time to one presenter.

Source is Mr. Ron White of AT&T, FTS (202) 457-3661.

For performance critique contact Mr. Hoffman at AUTOVON 471-6816

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Table 3 (continued)

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Full Scan Satellite Video Teleconferencing.

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This top-of-the-line AT&T system was selected for price comparisons. It is the type of system one can see in operation on the Mac Neil Lehrer news hour, and the cost includes transponder, earth stations, controller and modular room equipment. All stations have 24 hour access. All stations can present and two stations can present simultaneously. The Communications manager for HSC, Mr. Bill Hoffman, advises that this system degrades easily when motion gets high.

Price estimate sheet prepared by Mr. Reg Kipke of AT&T. For information on system performance, contact Mr. Ron White, FTS (202) 457-3661. For performance critique contact Mr. Hoffman at AUTOVON 471-6816.

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Multi-Media Teleconferencing.

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This system is in place at the University of Dayton Research Institute, OH, and Brooks Air Force Base, Texas and was developed under the sponsorship of the USAF Human Resources Laboratory. It provides quality audio and visual teleconferencing over a switched telephone network. Computerized projection of color business graphics, freeze frame video, cursor pointing, electronic handwriting, instant copy capability, and data communications are integrated into a single modular system controlled by each station's user console.

The contact for Advanced Technology-Multi-Media Communications (ATMC) is Mr. William McKinney, (512) 536-3842.

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Multi-Media Teleconferencing.

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This is the downgraded version of the ATMC. The control console is limited to four stations and the purchaser provides his own screens and microphones. The stations without control can participate on audio only. However, images can be printed at all stations in color or black and white.

Source is Mr. William McKinney, (512) 536-3842

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Table 4

## Teleconference (audio only) Costs - AT&amp;T "Quorum" System

AMEDD Example C.E. Network*	E q u i p m e n t			Transmission	
	Mo. Lease	Install. Charge	Purchase	1 Hour (0-15 Hr rate)	Approx. Install.
Initiate and receive Instruction (ALL STATIONS - THIS SYSTEM ONLY)					
Ft Sam Houston, TX (bridge)	\$1,278.00	\$1,285.00	\$32,440.00	-	\$100.00
Walter Reed, D.C.	58.00	260.00	1,330.00	20.86	100.00
Letterman AMC, CA	58.00	260.00	1,330.00	20.86	100.00
USUHS, Bethesda, MD	58.00	260.00	1,330.00	20.86	100.00
Ft Gordon, GA	58.00	260.00	1,330.00	20.00	100.00
Fitzsimons, CO	58.00	260.00	1,330.00	19.81	100.00
Wm. Beaumont, TX	58.00	260.00	1,330.00	27.18	100.00
Madigan AMC, WA	58.00	260.00	1,330.00	20.86	100.00
Ft Campbell, KY	58.00	260.00	1,330.00	20.02	100.00
Ft Carson, CO	58.00	260.00	1,330.00	20.02	100.00
Ft Bragg, NC	58.00	260.00	1,330.00	20.40	100.00
OTSG, D.C.	58.00	260.00	1,330.00	20.86	100.00
Subtotal	\$1,916.00	\$4,145.00	\$47,070.00	\$231.75	\$1,200.00
	<u>x 12</u>			<u>x 264</u>	
Per Annum	\$89,519. = \$22,992. + \$4,145. +			\$61,182.00 + \$1,200.	

\*See Figure 2 for Example network. Differentiation between sending and receiving stations does not apply. Savings gained from differentiating sites is trivial.

The break-even point between lease and purchase is approximately two years ( $\$47,070. \div \$1,916. = 24.57$  months). Maintenance, production, and management costs fluctuate across systems and are not included in this or any of the following cost estimates.

Table 5 presents cost estimates for adding a "white board" to the AT&T "Quorum" teleconferencing system described above. The board offers graphics capability from four sending sites. The receiving sites view the "whiteboard" over television monitors. Costs for transmission, including the installation

Table 5

## Teleconferencing Costs Using AT&amp;T "Quorum" with "Gemini" Whiteboard

AMMED Example C.E. Network	On site equipment*			Transmission		
	Mo. Lease	Install. Charge	Purchas Price	1 Hour	Approx. Install.	
Initiate and receive Instruction - Visual graphics capability						
Ft Sam Houston, TX	\$1,702.00	\$1,635.00	\$43,425.40	--	\$200.00	
Walter Reed, D.C.	482.00	610.00	12,315.40	\$41.72	200.00	
Letterman AMC, CA	482.00	610.00	12,315.40	41.72	200.00	
USUHS, Bethesda, MD	482.00	610.00	12,315.40	41.72	200.00	
Receive Instruction only						
Ft Gordon, GA	308.50	505.00	7,857.15	40.04	200.00	
Fitzsimons AMC, CO	308.50	505.00	7,857.15	39.62	200.00	
Wm. Beaumont, TX	308.50	505.00	7,857.15	54.36	200.00	
Madigan AMC, WA	308.50	505.00	7,857.15	41.72	200.00	
Ft Campbell, KY	308.50	505.00	7,857.15	40.04	200.00	
Ft Carson, CO	308.50	505.00	7,857.15	40.04	200.00	
Ft Bragg, NC	308.50	505.00	7,857.15	40.80	200.00	
OTSG, D.C.	308.50	505.00	7,857.15	41.72	200.00	
	\$5,616.00	\$7,505.00	\$143,228.80	\$436.50	\$2,400.00	
	<u>x 12</u>			<u>x 12</u>		
Per Annum	\$199,661.	= \$67,392.	+ \$7,505.	=	\$122,364.	+ \$2,400.

\*Purchaser must provide television monitors

are double the cost for the audio-only teleconference set up. Some or all parts of the "whiteboard" may be erased and redrawn upon during presentation of topical material. Breakeven between lease and purchase is also approximately two years ( $\$143,228.80 \div 5,616. = 25.50$  months)

Table 6 arrays the cost estimates for employing analog satellite television for the presentation of continuing clinical education within the AMEDD

Table 6

## Analog Satellite Television (BAMC Hour/Studio "B" Quality)

AMEDD Example Network	Equipment One-time Cost	Monthly Charge	Transmission		Cost/ Month	Total Cost First Year
			1 Hour Cost	Hours/ Month		
Transmit and receive instruction						
Ft Sam Houston, TX	\$19,000.00	\$1,600.00	\$721.00	11	\$7,931.00	\$133,372.00
Walter Reed, D.C.	19,000.00	1,600.00	466.00	5	2,330.00	66,160.00
Letterman AMC, CA	19,000.00	1,600.00	466.00	3	1,398.00	54,976.00
USUHS, Bethesda, MD	19,000.00	1,600.00	466.00	3	1,398.00	54,976.00
Receive instruction						
Ft Gordon, GA	13,000.00	-	-	-	-	13,000.00
Fitzsimons AMC, CO	13,000.00	-	-	-	-	13,000.00
Wm. Beaumont, TX	13,000.00	-	-	-	-	13,000.00
Madigan AMC, WA	13,000.00	-	-	-	-	13,000.00
Ft Campbell, KY	13,000.00	-	-	-	-	13,000.00
Ft Carson, CO	13,000.00	-	-	-	-	13,000.00
Ft Bragg, NY	13,000.00	-	-	-	-	13,000.00
OTSG, D.C.	13,000.00	-	-	-	-	13,000.00
Subtotal	\$180,000.00	\$6,400.00			\$13,057.00	
		<u>x 12</u>			<u>x 12</u>	
Per Annum =	\$180,000.00.	+ \$76,800.	+		\$156,684.	= \$413,484.

example network. The increased cost for the Ft Sam Houston presentations is due to the requirement for signal transmission from the San Antonio area to Dallas before the signal transmission "up-link" to a satellite can be accomplished. The other three presenting stations are in the vicinity of a commercial "uplink" immediately available.

Table 7 presents cost estimates for an Advanced Technology - Multi-Media Communications (ATMC) system. Two separate versions are estimated.

The final system estimates were developed for Full Scan Satellite Video Teleconferencing and for Full Scan Video with 4 presenters. With the satellite, 24 hour access is available to all stations. Any of the 12 can present, two

Advanced Technology Multi-Media Communications  
Best State-of-the-art and Downgraded Capability System

Equipment	Transmission	Per Annum Total Cost
State-of-the-art  $\$171,000.00/\text{Station}$ $\quad \times 12$ $\underline{\$2,052,000.00} \quad +$	Both systems require the same amount of transmission capability  Leased equipment \$3,000.00/mo. lines Leased audio \$ 300.00/mo. lines $\quad \underline{\$3,300.00/\text{mo.}}$ $\quad \quad \times 12$ (A) Leased Lines $\underline{\$3,900.00/\text{yr}}$	          $= \$2,170,800.00$
Downgraded System  $\$85,000.00/\text{Station}$ $\quad \times 12$ $\underline{\$1,020,000.00} \quad +$	$\$ 300.00/\text{Hr.}$ $\quad \times 264$ (B) Line Usage $\underline{\$79,200.00}$  (A) + (B) = \$118,800.00	          $= \$1,138,800.00$

may present simultaneously. As a package, this system would require \$600,000.00 as a start-up equipment cost, with \$204,000.00 per month for transmission. Total cost of operation was estimated at \$3,048,000.00. A downgraded version of the Full Scan system was estimated at \$990,741.00 by the AT&T representative.

Telecommunications system relative cost computations. To compare the seven systems for purposes of Phase IV, systems were placed along a relative cost scale by dividing the per annum cost of each system by the least expensive delivery system (teleconferencing - audio only). Figure 4 displays the relative cost spectrum with each of the delivery systems identified by a relative scale value on the left of the figure 4. A zero scale point has also been added to represent the current funding which is spent on continuing



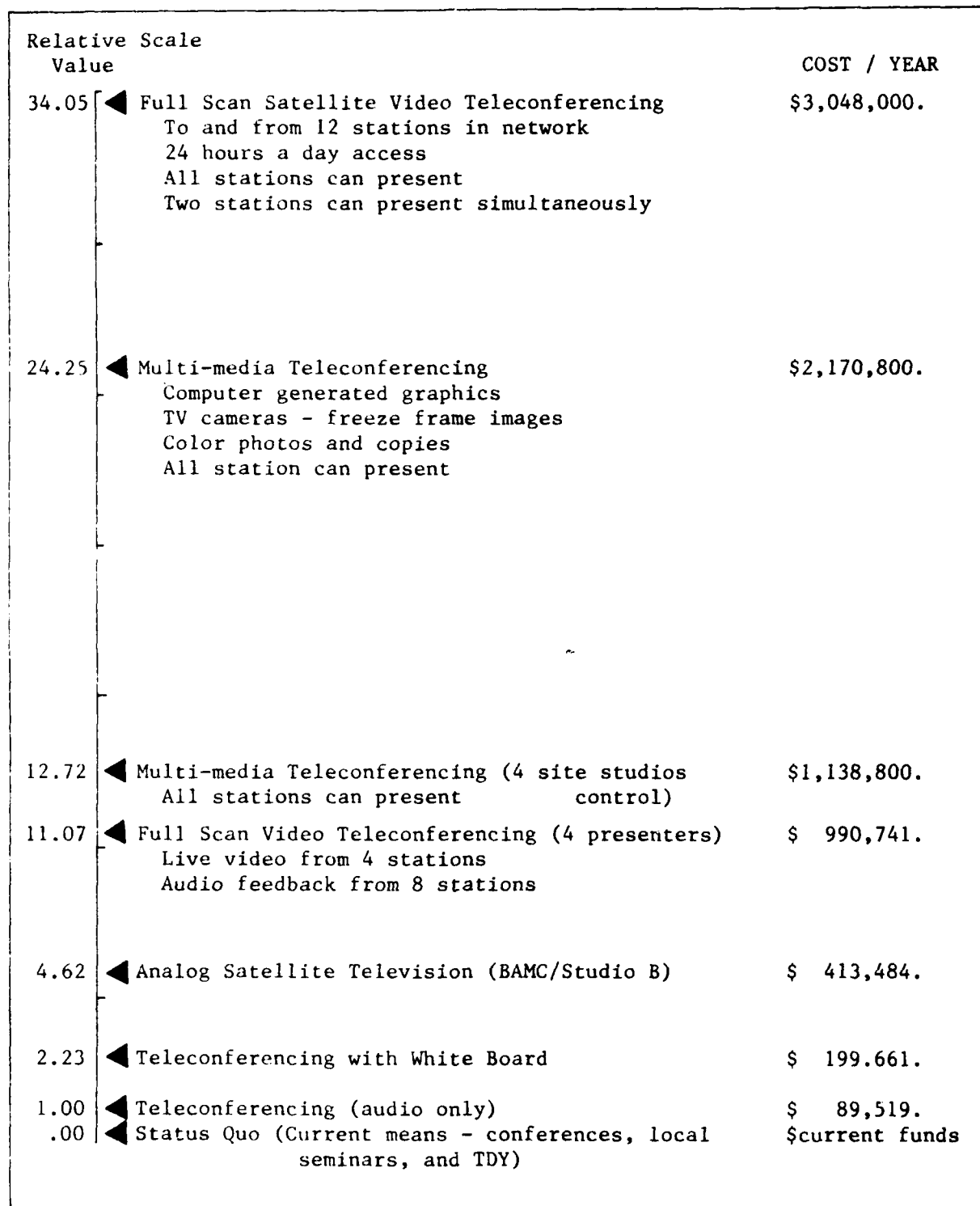


Figure 4. Relative cost scale arraying telecommunications delivery systems. Costs are based upon 12 AMEDD stations in the example continuing education network (see Figure 2.).

education activities. Adoption of one of the telecommunications systems would merely be an increase in relative dollars spent from the current status quo baseline.

For purposes of evaluation and analysis for Phase IV, the top two scale points were excluded for several reasons. First, while the systems at points 34.05 and 24.25 represent the highest of the "high-technology" available for telecommunications, the capability is for 24 hours per day rather than the 22 hours per month used as a comparison for the remaining five systems. Further, costs well over \$1,000,000. would be very difficult to justify given the fiscal restraints which curtailed the BAMC Hour. Finally, the downgraded systems for multi-media and full scan video provide virtually all system presentation capabilities as the 24 hour access systems.

PHASE IV - Telecommunications Delivery Recommendations for  
Continuing Clinical Education Needs

The last phase of the study concerned the match between each of the stated CE needs from the Policy Delphi panelists (Phase II) and the recommended telecommunications delivery mode perceived to be of the most benefit to the AMEDD. System recommendations were secured for each of the 149 topical needs from the 7-member AHS management executive committee by employing the Iterative Decision Method (IDM), a systematic and formalized group decision process (see Finstuen, 1982a,b; 1983a,b; and Finstuen & Lacey, 1983 for details on IDM). The committee consisted of four colonels, Health Services Command Deputy Chief of Staff for Operations, AHS Director of Training and Doctrine, AHS Chief of Health Sciences Media Division, and the Assistant Director of Medical Education/ Intern Coordinator from the BAMC Medical Education Office. Two lieutenant colonels, the Assistant Dean of the Medical Field Service School and the

Director of Evaluation and Standardization, also represented the Academy of Health Sciences. The seventh member of the committee was the civilian communication manager from Health Services Command's Director of Telecommunications office.

The executive committee met on two occasions during Phase IV, for an initial review of results and independent decision making, and for formulation of a final group recommendation for CE needs and telecommunications. At the first meeting members were briefed concerning the final list of CE needs developed during Phase II. Details regarding the results from Policy Delphi Rounds 1 through 3 were discussed. Needs were separated for consideration into four lists. The first contained the 42 multiple initial needs. The single list of 107 topics was separated into three lists on the basis of points assigned (single-high = 24 topics with assigned points greater than a value of 10, single-medium = 54 topics assigned a value of 10, and single-low = 29 topics with assigned values of less than 10). Separation into four lists facilitated examination and provided a context of differential importance for individual topical needs. During the second portion of the initial meeting members were briefed regarding the results of Phase III. System capabilities were presented (see Table 3) and cost comparisons and the relative cost scale values were discussed.

Decision factors used in the selection of an appropriate telecommunications system. The next step in the decision making process was the identification of related decision factors during a "brainstorming" session. To aid in determining the perceived benefit of a particular delivery system in presenting a certain CE topical need, the executive committee members suggested and discussed possible factors which they felt the group's decisions should

be based upon to some extent. The following decision factors emerged. First, the minimum delivery system required should be used. Many topics identified by the Policy Delphi participants do not require the capabilities of a fully developed TV delivery system, but rather could be delivered by a less costly system or by current program means which would not require any new funding. In making their choices for each topic committee members were asked to consider the minimum required delivery system.

A second decision factor considered was the level of specialization of a particular topic. A topic with wide audience appeal would be a good candidate for one of the wide range delivery systems as opposed to the status quo option. As described in Phase II, Delphi panelists were asked to develop their lists based upon a five year outlook, i.e., what are their needs for the next five years. Recognizing that significant technology changes can and will occur in the next five years, executive committee members felt that the forecasting aspect of topics and systems should also be taken into account.

A fourth decision factor addressed was the nature of the subject matter identified by the Delphi panelists. Certain topics, such as Advanced Cardiac Life Support (ACLS) are equipment intensive and are not amenable to other than hands-on delivery. Other topics, such as biochemistry, could very well be delivered through a graphics telecommunications system such as transmitting bioequations over an electronic "whiteboard."

Two other factors were identified. The committee felt that time sensitive topics merited instant dissemination over television. New medical or surgical procedures or very recent dangers identified would qualify as time sensitive. The last factor considered was the fact that formal training should not be confused with information exchange for day-to-day management

purposes. The selection of a system should be considered for the expressed purpose of providing support to the CE program and not as a means of "informing" personnel.

Procedure. Executive committee members were then asked to provide a perceived benefit decision for each of the 149 CE needs by assigning a value of 0 (status quo), 1.00 (Teleconference), 2.23 (Whiteboard), 4.62 (Analog satellite television), 11.07 (full scan television), or 12.72 (multi-media) to each of the topics within the four CE need lists. Lists were judged in the following order: single-high, single-medium, single-low, and multiple. The multiple list was judged last to ensure that committee members had developed a well practiced means of providing system recommendations to items. Committee members were asked to work independently of one another and to make any notes on specific issues they wished to discuss at the second group meeting. Decision forms were collected and the independent round of decision making (J1) was concluded.

Decision forms were coded for data analysis and multiple linear regression equations were developed for each of the four lists to provide feedback from the independent round of judgments (J1) at the second group meeting (J2) held the following week.

When the committee reconvened, results were interpreted and discussed. The output from the final meeting was an agreed upon prioritized list of continuing education needs arrayed in order of relative perceived benefit scores indicative of the type of telecommunications required to meet each need.

J1 Results. Overall results indicated that committee members had independently agreed upon the relative placement of 126 of the 149 CE needs (82.55%) along the systems cost scale, therefore only 23 CE needs required discussion

and revision in the J2 group decision mode.

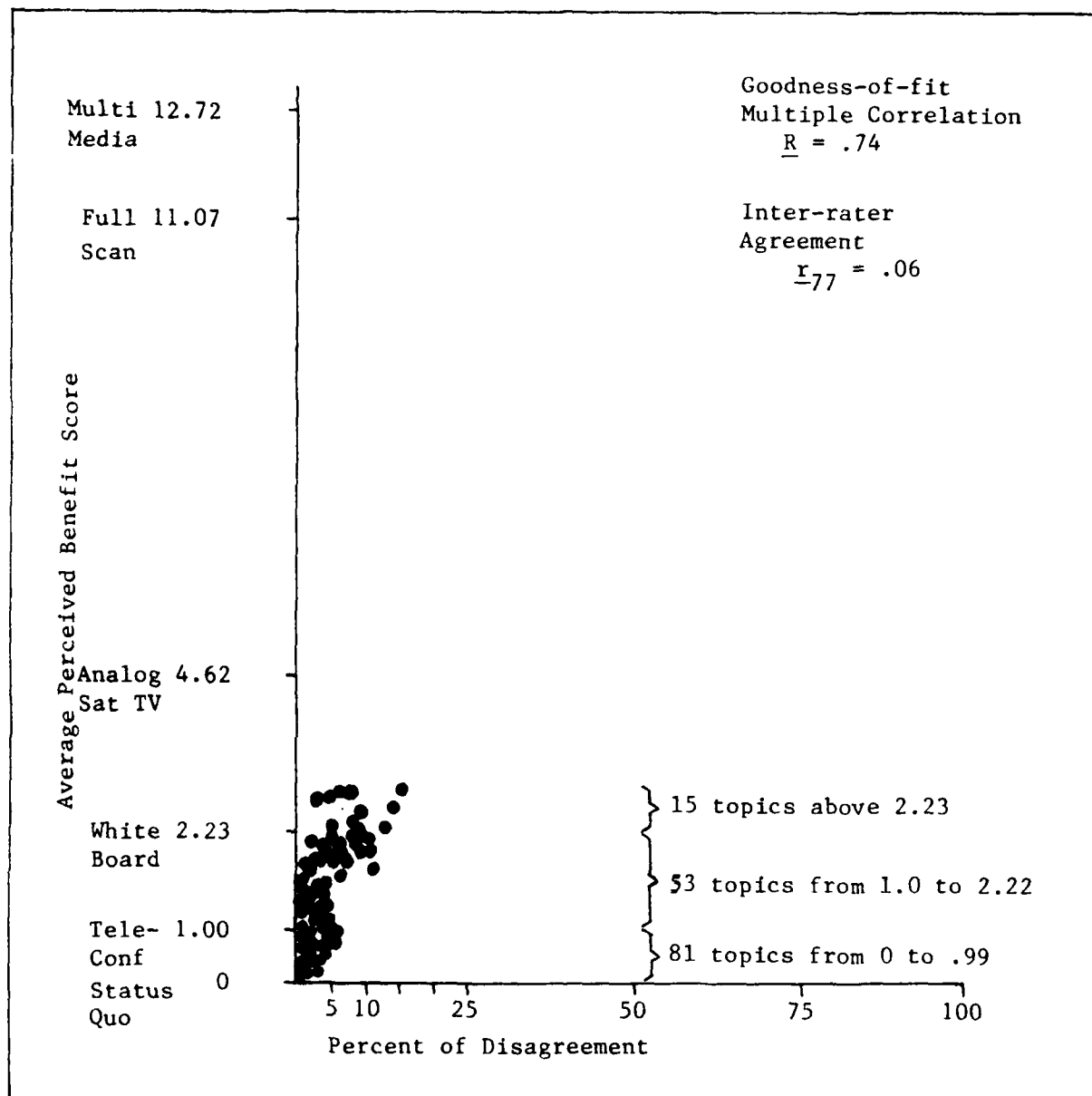


Figure 5. Plot of 149 continuing education topic perceived benefit scores as a function of the percent of disagreement associated with J-1 decisions rendered by the AHS executive committee (independent round of judgments).

Figure 5 presents a plot of all 149 CE needs as placed along the cost telecommunications system spectrum. Individual topics (indicated by dots)

are arrayed vertically according to their averaged perceived benefit score, and are arrayed horizontally along a percentage of disagreement dimension. Perceived benefit means were calculated by averaging the 7 executives' decisions for each CE need. The percent disagreement metric was calculated as the percent of each CE need's contribution to the lack of statistical prediction resulting from the equation for the group's decisions. The group equation took the following form:<sup>1</sup>

$$Y = w_1 N^{(1)} + w_2 N^{(2)} + \dots + w_{149} N^{(149)} + w_{150} E^{(1)} + \dots + w_{156} E^{(7)} + c,$$

where Y is the vector of perceived benefit scores (149 needs  $\times$  7 experts results in 1,043 decisions),  $N^{(i)}$ ,  $i = 1$  to 149, are CE need predictor variables coded 1 if the observed benefit score was associated with a particular need, 0 otherwise;  $E^{(j)}$ ,  $j = 1$  to 7, are executive committee member predictor variables coded 1 if the observed benefit score was rendered by a given expert member, 0 otherwise;  $w_k$ ,  $k = 1$  to 156, are raw least squares regression coefficients associated with each of the predictor variables, and c is the regression constant. The goodness-of-fit index is the multiple correlation coefficient  $\underline{R}$  which results from the group equation shown above. The index is fairly high,  $\underline{R} = .74$ . The corresponding coefficient of determination ( $\underline{R}^2 = .5412$ ), indicates that about 54.12% of the variance ( $100 \times \underline{R}^2$ ) in the perceived benefit criterion scores could be accounted for by the need and expert predictor variables. A test of the  $\underline{R}^2$  against a multiple correlation of zero indicated that  $F(154, 888) = 6.80$ ,  $p < .001$ . This finding may be interpreted as evidence for the appropriate placement of most CE needs; statistically and significantly different from random

<sup>1</sup> Equation notation follows that of Ward & Jennings (1972) Introduction to linear models. Englewood Cliffs, N.J.: Prentice-Hall. See also Kerlinger & Pedhazur (1973) Multiple regression in behavioral science. New York: Holt, Rinehart, & Winston.

placement. As shown in Figure 5, most needs fell at the bottom of the scale.

While the  $R^2$  coefficient indicated that most CE needs were placed appropriately along the perceived benefit spectrum, some needs were not very well agreed upon. The lack of consistency among some of the expert committee members is evident by the low value associated with the intra-class correlation  $r_{77} = .06$ . The attenuated reliability indicated that group discussion was required for those topics which exhibited maximal amounts of disagreement. The low consistency was also indicative of the separate policies that executive members used in assigning perceived benefit scores to CE needs. Average perceived benefit scores for experts ranged from 0.0 for two members, indicating very conservative views, up to 2.45 and 4.86 for media supporters. A third, midway policy emerged for the other three experts with averages of .03, .06 and .61.

To facilitate discussion, perceived benefit scores were analyzed within each of the four CE need lists. A separate group equation was computed for each list, and needs were plotted as shown for all 149 topics. Table 8 presents the results of the computed group equations.

Table 8  
Perceived Benefit Decision Results - J1 Independent  
Decision By The AHS Executive Committee

List (Delphi Points)	Number Of Needs	Number Of Decisions	$\bar{R}$	$\bar{r}_{77}$	Number of Needs Over 5% Disagreed
Multiple Initial (13 to 105)	42	294	.70	$\cong 0.0$	7
Single-High (12.5 to 50)	24	168	.75	.36	3
Single-Medium (All = 10)	54	378	.77	.13	6
Single-Low (2 to 8)	29	203	.77	.10	7
all Lists	149	1,043	.74	.06	23



Table 9  
 Analysis of Average Perceived Benefit Score Placement for 149 Continuing Education Needs

Relative Cost Spectrum	Scale Point Range	J1 - Independent Decisions				J2 - Group Revised Decisions							
		Mult	SH	SM	SL	Total	%	Mult	SH	SM	SL	Total	%
Full Scan to Multi Media	11.07 - 12.72	0	0	0	0	0	.00	0	0	0	0	0	.00
Analog TV to Full Scan	4.62 - 11.06	0	0	0	0	0	.00	0	0	0	0	0	.00
Wht Board to Analog TV	2.23 - 4.61	6	3	3	3	15	10.07	1	0	0	0	1	.67
Tele Conf to Wht Board	1.00 - 2.22	18	7	18	10	53	35.57	16	7	16	6	45	30.20
Above 0 to Tele Conf	.01 - .99	16	10	28	15	69	46.31	16	10	30	15	71	47.65
Status Quo (Unanimous 0)	0	2	4	5	1	12	8.05	9	7	8	8	32	21.48
Totals		42	24	54	29	149	100.00	42	24	54	29	149	100.00

Note: Scores are arrayed vertically by each of the four CE lists, Mult = multiple initially identified topics, SH = single topics: high (above a value of 10 Delphi points), SM = single topics: medium (equal to 10 Delphi points), and SL = single topics: low (below 10 Delphi points).

J2 Results. During the J2 group meeting, committee members examined the feedback--one list at a time--and discussed pertinent rationale associated with any disputed item. A value of 5 percent disagreement was used to identify candidate CE needs which required more attention. Obviously, there was no requirement to center discussion on CE needs that everyone agreed upon. After discussion members revoted on the particular topic of concern and a new perceived benefit average was computed for that item. Table 9 shows the overall results from the J1 independent round of judgments and the J2 group revised decisions for CE need perceived benefit scores. Numbers of CE needs are indicated for each scale point range by each of the four CE needs lists and for the total of items. Percentages identify the proportion of needs which fall into a given cost range. For example, during the independent round of judgments for the multiple identified CE needs, 18 CE topics were recommended for presentation requiring at least the capability of teleconferencing, and some support for graphics capability in addition to the audio-only recommendation. As a result of the group discussion of disputed items, the number of CE needs within the 1.00 to 2.22 range of at least teleconference support dropped from the 18 CE needs to 16. Overall, the final revised decisions of the committee place some 45 or 30.20% of the CE needs in the category of at least teleconference audio only support required for beneficial delivery. No support was found for delivery systems costing more than analog satellite television. As shown in Table 9, support for graphics capability up to and including live video (Analog TV) changed from 10.07% of the CE needs to less than one percent (.67%) as a result of the group discussion of disagreements.

Specific Continuing AMEDD Clinical Education Needs Results. Table 10 was constructed to array the CE needs by their recommended telecommunications

Table 10  
 Final Continuing Education Topic Needs Arrayed  
 By Perceived Benefit Scores

Continuing Clinical Education Need	Points Assigned by Delphi	Perceived Benefit Score
Multiple Initial Needs N = 42		
Legal Issues (Physicians)	45	2.79
Diagnosis/Treatment Planning	50	2.15
Quality Assurance	105	2.1
Medical and Professional Ethics	30	1.9
Credentiailling Medical Staff	15	1.78
NBC Casualty Treatment/Theory	55	1.57
Weight Control/Physical Fitness	22.5	1.57
Drug and Alcohol Abuse (Substances)	60	1.38
Cardio-Pulmonary Resuscitation(CPR)	50	1.38
Combat/Battlefield Nursing	30	1.38
Mobilization	30	1.38
Human Relations	20	1.38
Blood Banking/Products	15	1.38
DRG's and Nursing	15	1.38
Nursing Documentation	35	1.32
Medical Emergencies in the Dental Office	35	1.32
Legal Issues (Nurses)	25	1.21
Profiles-Do's/Don'ts Mgt of Workforce	50	0.99
Computer Technology for Nursing Health Care	32	0.99
Medical Board Processing and Evaluation	30	0.99
Nursing Management in the Field	30	0.99
Disaster Planning/Management	20	0.99
Triage in Disaster	15	0.99
Computer Applications for AMEDD MC Officers	35	0.909
Advanced Trauma Life Support (ATLS)	65	0.66
Field Oriented Preventive Medicine	35	0.66
Shock-Recognition/Treatment	30	0.66
Infection Control, Hospital Safety (JCAH)	20	0.66

Table 10 (continued)

Continuing Clinical Education Need	Points Assigned by Delphi	Perceived Benefit Score
Multiple Initial Needs N = 42 (continued)		
Pharmacology in Dentistry	20	0.66
Dental Clinic Administration and Management	15	0.66
Dental and Medical Unit Management	13	0.66
Use of Statistics in Medicine	35	0.637
Diagnostic Clues/Techniques	15	0.143
Advanced Cardiac Life Support	105	0
Abuse-Child/Spouse	80	0
Wartime Roles for Dental Officer	35	0
Nursing Leadership, Motivation Change Theory	32	0
Expert Field Medical Badge	30	0
Dental Combat Preparedness Material	25	0
Combat Casualty Care	20	0
New Dental Materials	20	0
Patient Records-Microcomputer Uses	15	0
Single Initially Identified Needs (over 10 points) N = 24		
Risk Management	15	1.7
Airway-Clearing and Control	35	1.57
Military Nursing (Mobilization, NBC, Field Equip)	20	1.57
Musculoskeletal Assessment/Physical Therapy	12.5	1.57
Physical Therapy (65 <sup>B</sup> /91 <sup>J</sup> ) in TOE Units	12.5	1.38
ANC Preceptor Program	15	1.28
Clinical Research Issues	20	1.02
Occupational Therapy and Stress Management	12.5	0.819
Injury Prevention	12.5	0.819
Videotapes of Major Pediatric Conferences	50	0.66
Hysteroscopy	25	0.66
Laparoscopy	25	0.66
Nuclear Specialist Personal Risk Program	20	0.66
Non-Surgical Treatment-Periodontal Disease	15	0.66
Diagnosing Knee Ligament Injuries	20	0.473

Table 10 (continued)

Continuing Clinical Education Need	Points Assigned by Delphi	Perceived Benefit Score
Single Initially Identified Needs (over 10 points) N = 24		
Role of the Surgeon in Combat	30	0.33
Patient Education in Physical Therapy	12.5	0.159
Outpatient Biopsy/ D and C	25	0
Laser in Surgery: Safety Principles	20	0
Composite Retained Acid Etched Fixed Partial Dentures	20	0
Revised TB Med 148 and Lab Prescriptions	15	0
Balancing Demands and Resources	13	0
Nutrition and Fitness	12.5	0
Management of Nutrition Needs in Combat	12.5	0
Single Initially Identified Needs (Equal 10 points) N = 54		
Pediatric Emergencies	10	1.9
Conducting Sick Call	10	1.71
Computed Tomography: Head/Neck Anatomy	10	1.57
Pediatric Infectious Disease	10	1.57
Pediatric Development	10	1.57
Micro-Computers for Medical Statistics	10	1.57
New Medical Equipment Demonstrations	10	1.57
Office Automation	10	1.52
Medical Record: Medico-Legal Implications	10	1.46
Conflicts of Interest	10	1.43
Expanded Roles of RN and LPN	10	1.41
Lasers in Surgery: Scientific Principles	10	1.38
Lasers in Surgery: Therapeutic Uses	10	1.38
Preventive Dentistry in the Army	10	1.38
Career Planning for MC Officers	10	1.37
Military Medical Evacuation	10	1.13
Post Traumatic Facial Reconstruction	10	0.99
OB/Gyn Malpractice	10	0.99
Work/Exercise-The Pregnant Soldier	10	0.99

Table 10 (continued)

Continuing Clinical Education Need	Points Assigned by Delphi	Perceived Benefit Score
Single Initially Identified Needs (Equal to 10 points) - (continued)		
Trends in Antibiotic Therapy	10	0.99
Clinician Abuse of Diagnostic Studies	10	0.99
Myofacial Pain	10	0.99
Update on Nurse Techniques/Practice	10	0.99
Intervention in Acute Myocardial Infarction	10	0.99
Leadership Assessment Program	10	0.979
Current Restorative Dental Techniques	10	0.803
Staff Functions of Bde/Div/Corps Surgeon	10	0.72
Anatomic Pathology	10	0.66
Micro Surgical Techniques	10	0.66
Anesthesia for Endoscopy	10	0.66
Impaired Physician-Drug/Alcohol Abuse	10	0.66
Blood Therapy	10	0.66
Sexual Transmitted Diseases	10	0.66
Radiology Quality Assurance	10	0.66
Conscious-Sedation Techniques	10	0.66
Basic Field Medical Surgery	10	0.66
Non-Traditional Nursing Interventions	10	0.66
Nurse Clinician in the Field	10	0.66
Professional Officers Filler System (PROFIS)	10	0.473
Patient Education (Compliance/Discharge)	10	0.424
Orthopedics for General Practitioners	10	0.33
OB/Gyn Risk Management	10	0.33
Medcase/CEEP Mechanisms	10	0.33
Outpatient Management of Ventricular Ectopy	10	0.33
Examination/Patient Evaluation	10	0.214
T-Group Training	10	0
Clinical Chemistry	10	0
Electron Microscopy	10	0

Table 10 (continued)

Continuing Clinical Education Need	Points Assigned by Delphi	Perceived Benefit Score
Single Initially Identified Needs (Equal to 10 points) - (continued)		
Food Chemistry/Microbiology	10	0
Soft Tissue Surgical Techniques	10	0
Patient Management	10	0
All Porcelain Posterior Fixed Appliance	10	0
Mandatory vs. Non-Mandatory Continuing Education	10	0
Single Initially Identified Needs (Less than 10 points) N=29 Problems Oriented Medical Records	2	1.65
Physical Assessment Skills	2	1.57
Research in AMEDD	5	1.52
Labor/Management Relations	5	1.38
Computed Tomography-Head/Neck Trauma	5	1.38
Computed Tomography-Head/Neck Tumors	5	1.38
Medical Operations in Field Environment	5	0.99
Nursing Process, Use and Implementation	5	0.99
Geriatric Medicine	5	0.99
Pharmacology Update	2	0.979
Overuse Syndrome in Runners/Joggers	5	0.819
Restorative Dentistry/Materials	8	0.66
Computer Technology	5	0.66
Decision Paper/Staff Guidance	5	0.66
Increasing Dental Productivity	5	0.66
Osseo-Integrated Prothesis	5	0.66
Logistics/Finance for Dentists	3	0.66
Dental Administration	2	0.66
Discharge Planning, Need, and Process	5	0.301
Selecting Ongoing QA Monitors	5	0.143
Patient/Executive Management	5	0.143
Strategies for Training	8	0
Handling Medically Compromised Patients	8	0
Nursing Management	5	0
Motivational Preventive Dentistry	5	0
Medical Teaching Techniques	5	0
Medical Proficiency Training	5	0
Amalgam Filling Mercury Poisoning Scare	5	0
Future Trends in Health Care Delivery	4	0

benefit. The table is divided into four separate lists based on the multiple and single identification and on point value ranges. Original point values from the Policy Delphi panel are also displayed such that for any given value of perceived benefit, i.e., at the status quo value of 0, the CE needs fall in descending order, i.e., on the multiple list, ACLS is first = 105, abuse child/spouse is second = 80, wartime roles for dentists is third = 35, etc.

Use of the Table 10 lists by AMEDD continuing education offices will allow directors and coordinators to match current delivery system capabilities at their facilities to AMEDD-wide CE needs. For example, all topics on the multiple list below a value of 1.00 are possible candidates for local presentation (recall that Table 9 lists 71 topics below teleconference and above zero, and lists 32 topics with a value of zero). Table 10 will also provide a list from which coordinators and directors may choose potential topics for their programs with some information as to the type of recommended delivery required. Installations with closed circuit television capability may want to work from the top of the lists downward to identify high point topics to present if utilization of television equipment at their site is also a concern.

Correspondence of Perceived Telecommunications Benefits and Policy Delphi Importance. One last set of computations was accomplished for Phase IV to examine the relationship between the importance of CE needs as stated by Policy Delphi panelists and the perceived benefit scores assigned to the CE needs by the AHS executive committee. Table 11 lists the zero-order correlations among Delphi points, J1 independent benefit scores, and J2 final revised benefit scores for the multiple list, the three single lists, the single lists combined, and for all 149 CE needs.



Table 11  
Zero-order Correlations Among Policy Delphi Need Importance  
and The J1 and J2 Perceived Benefit Scores

List	Number of CE Needs	Points and J1 Scores	Points and J2 Scores	J1 and J2 Scores
Multiple Needs	42	.26	.11	.19
Single-high	24	-.19	.05	.29
Single-medium <sup>a</sup>	54	a	a	.46*
Single-low	29	.14	-.42	-.13
All single items	107	-.13	-.02	.23
All CE Needs	149	.17	.14	.24*

\*Indicates that correlation is statistically significant from a correlation of zero,  $p < .01$

<sup>a</sup>Since all 54 single-medium needs have a value of 10, a correlation with points is not meaningful.

Essentially, there is no evidence to support a functional relationship between the importance of a need and a recommendation for costlier telecommunication's delivery. A brief inspection of the values in Table 10 shows that many high Delphi point topics fall in the status quo category as well as toward the teleconference and analog television end of the spectrum.

Correlations between the executive committee's independent and group revised judgments show a slight trend for the 54 single-medium list and for all lists combined. This result indicates that while several of the individual lists were appreciably different after the group discussed the disagreed upon topics and revoted (e.g., multiple, single-high, and single-low), the overall correspondence of the committee's independent and group benefit decisions was similar. This finding may be interpreted roughly as a test-

retest index of consistency and indicates that executive committee members gave careful consideration to both sessions of decision making.

#### DISCUSSION

The first objective of this study was to assess AMEDD clinical education and training needs in the near and far term. To meet this objective, a Policy Delphi study of 27 AMEDD continuing clinical education offices was conducted titled "Outlook to '89." A listing of 149 continuing education needs was created, revised, and prioritized by the Delphi panel experts. Needs were further identified as multiple, or general audience needs (n = 42), and single specialization needs (n = 107). Appendix C contains listings of both CE needs. Table 10 of this report provides a ordered list of the 149 needs based upon recommended telecommunications cost-benefit delivery recommendations made by an AHS executive management committee. System capabilities and associated costs, developed to meet the second study objective, were systematically arrayed into a relative cost spectrum ranging from teleconferencing to multimedia capabilities. Executive committee recommendations were employed to meet the third objective of the determination of the most appropriate telecommunications systems for the five-year forecasted Delphi topics.

Major findings indicated that methods for continuing clinical education program development vary across major AMEDD installations. Further, the use of telecommunications to meet local continuing education requirements is usually limited to video cassette tapes and closed circuit television. Only three of the 28 CE directors of coordinators specifically mentioned use of the BAMC Hour (HSC-TV), even though the program had been available to some installations for five years.

For about one-third of the identified continuing clinical education needs, some form of lesser expensive telecommunications delivery capability would be of benefit to the Army Medical Department as perceived by an executive management committee of senior Army personnel. However, two-thirds (69.13%) of the AMEDD CE needs for the next five years do not require much more telecommunications capability than is currently being used. From the Phase II - Round 2 Policy Delphi results it is known that past use of telecommunications in continuing education was limited. This finding coupled with the AHS executive committee recommendations provide little support for analog satellite television and no support for the costlier forms of telecommunications such as full scan television or computerized multi-media graphics delivery for meeting CE needs. Further, results also indicated that there was little relationship between the importance of Delphi topics and the cost of telecommunications delivery. This finding indicated that the solution to meeting AMEDD clinical education needs is not entirely an equipment solution--regardless of cost.

This major finding must be qualified. The scope of the study was limited to continuing clinical training of professionals. Typically, enlisted medical specialties do not have the same types of requirements nor CE content as those of health care professionals within the AMEDD corps.

Another point of consideration may be made regarding the multiple and single lists. As shown by the varying topical content, the continuing education requirements for professionals in the AMEDD are vast. Often times professionals are stationed in locations far from centers of clinical education. Because the educational needs are vast and the obstacles to meeting these needs are formidable, continuing education gives promise of providing the

kind of mass audience that makes sophisticated telecommunications delivery systems feasible. However, when continuing education needs are broken down by some 106 AMEDD officer specialties, and further shredded out within specialties by individual state requirements, the promised mass audience becomes many small groups with very specialized needs. This finding is best appreciated by referral to Appendix C where well over half of the needs fall on the bottom two lists (83 needs with points of 10 or less).

Further evidence for specialization emerged during the study as the type of clinical continuing education was redefined to finally include continuing medical education (CME), continuing nursing education (CNE), continuing dental education (CDE), continuing health education (CHE), and continuing pharmacy education (CPE); each with content requirements for certain types of hours (or CEU's) varying across all 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands.

In addition to the central findings of the study, a number of related management and social ambience issues arose which were not directly addressed by the study. Previous evaluation studies of satellite television in the AMEDD indicated that the HSC-TV audience suffered from a nonavailability of many viewers because of patient care responsibilities. Productivity and manpower accountability in Army medical treatment facilities is measured by the Medical Care Composite Unit (MCCU) which credits facilities with manhours based on medical care and directly related activities but gives no credit for education or training activities. The MCCU system provides annual indices used to distribute personnel resources to medical facilities. Therefore, there is little, if any, incentive for hospital or clinic commanders to require on-duty attendance at a particular training activity presented by any delivery system.

Another related issue concerns the time to schedule education or training activities, whether they should be part of the 8-hour duty day or whether they should be accomplished before or after normal duty hours. There is a natural tendency to want to accomplish all duty activities during a normal 8-hour day, and extra activities which might be scheduled before or after the 8-hour day are not favorably received by most soldiers and often compete with sports activities. Additionally, some functions, i.e., ward work, food preparation, routinely take more than the typical 8 hour shift which makes scheduling even more difficult.

There is also the issue of audience preference versus identified mission requirements. Individual preferences and interests may not coincide with regulatory requirements resulting in potential conflicts and a less than enthusiastic view of some training or education opportunities. Until management strategies are developed to deal with such issues, there cannot be any assurance that even the finest quality education and training productions will receive wide acceptance and experience high participation rates.

#### CONCLUSIONS AND RECOMMENDATIONS

For the most part, the AMEDD does not have a standard or centralized method for program development of continuing clinical education. With the cooperation of 36 directors and coordinators of continuing clinical education at 27 AMEDD sites, which included the Army Reserves, National Guard Bureau, and the USUHS, a common CE need reference has been developed which may be used as a five-year guide to planning CE activities at AMEDD installations. Over the future years, as technology costs decrease and capabilities increase, it may be appropriate for AMEDD managers to update the current study results and reassess the costs and benefits of telecommunications delivery systems

to meet projected CE needs of the future.

As technology and associated costs change over the next few years it will be appropriate to relook the issue of telecommunications in the delivery of AMEDD education and training. At that time it may be appropriate to consider a short term rental or a lease trial of equipment coupled with an on-going usage evaluation of any system prior to the investment of capital funds. In the event that participation rates meet AMEDD needs and remain steady or increase, the possibility of equipment purchase would be defensible. On the other hand, if the delivery system failed to maintain or increase audience participation, programming could be terminated without incurring the burden of equipment disposal.

APPENDIX A  
BIBLIOGRAPHY AND REFERENCES

- Section 1. Requirements for Continuing Clinical Education
- Section 2. Examples of satellite TV, teleconference, and traditional Continuing Education topics and course content
- Section 3. Continuing Clinical Education Needs Assessment Models and Methods
- Section 4. Telecommunication Delivery Systems for Continuing Clinical Education

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APPENDIX B

Delphi instructions, instruments, and feedback

1. Outlook to '89 Letter - Round 2
2. Project description
3. Delphi Instructions
4. Feedback from Round 1 - CE Program Development Methods
5. Outlook to '89 Delphi Questionnaire - Round 2
6. Feedback from Round 2 used for Round 3 review and revision listing topics by corps and combined



REPLY TO  
ATTENTION OF

HSHA-TOD

DEPARTMENT OF THE ARMY  
ACADEMY OF HEALTH SCIENCES, UNITED STATES ARMY  
FORT SAM HOUSTON, TEXAS 78234

SUBJECT: Training/Needs Assessment for Continuing Clinical Education

1. One of the most important problems facing Army Medical Department/health-care professionals is the matter of maintaining their skills through continuing education (medical, dental, or health education) programs. Because of your knowledge and position as continuing education coordinator or director at your facility you have been asked to join with continuing education coordinators and directors from other major AMEDD installations in a project designed to elicit information about officer CE program plans and priorities for the next five years.
2. The Academy administrative staff has decided to use the Delphi Method in this project. We are in the process of forming a "Delphi Panel: that will work to construct a consolidated list with regard to the continuing education "CE-OUTLOOK TO 1989". The following concerns will be addressed: the continuing education topical needs of the AMEDD over the next five years; a general ordering of these needs by priority; and possible alternative means for meeting these needs through several types of telecommunications media with perhaps some indication of the urgency of program needs. The data you provide will be used by an Academy executive committee concerned with training telecommunications.
3. A project description and information on the Delphi Method at Incl 1. In addition, a brief compilation of initial telephonic CE inquiries is attached which lists the Delphi panelists and facilities. Be assured that this project is being conducted so AHS may assist you in your CE planning and is not for the purpose of standardizing professional CE.
4. We have attached the first of a series of questionnaires designed to seek your assistance in identifying and prioritizing continuing education needs. Please complete the questionnaire, "CONTINUING EDUCATION - OUTLOOK TO 1989", and return it to us in time for analysis on 10 August 1984. Again, thank you for your help.

HSMA-TOD

SUBJECT: Training/Needs Assessment for Continuing Clinical Education

5. The Academy POC for this action is MAJ Brian Davis, AUTOVON 471-7004, or Dr K. Finstuen, AUTOVON 471-5575. If there are any questions please feel free to contact them.

FOR THE COMMANDANT:

Incl 1

as



TRAINING NEEDS ASSESSMENT AND TELECOMMUNICATIONS COST BENEFIT STUDY OF  
ACTIVE/RESERVE CONTINUING MEDICAL (DENTAL/HEALTH) EDUCATION

PURPOSE/REQUIREMENT: In Jan 84, HSC approved an AHS request to discontinue live broadcasts of Studio B via satellite television with the stipulation that AHS would conduct an assessment of training needs, costs, and benefits for the remainder of the interactive HSC-TV network, primarily directed to continuing medical education.

OBJECTIVES: To 1) determine the conducting medical, dental, and allied health needs and education requirements for AMEDD personnel, 2) to identify and formulate a taxonomy of continuing education areas to meet mandatory and desirable continuing education needs, 3) to determine which needs are best served by satellite, telecommunications, and interactive delivery systems, and 4) to estimate costs of various approaches and to compare benefits on the basis of costs and meeting continuing education needs.

APPROACH: Continuing education hours/activities will be determined for each of the AMEDD Corps through literature review and interviews. Content needs and priorities for topics will be determined through a POLICY DELPHI study. Alternate delivery systems (and associated costs) will be matched with AMEDD CME priorities to evaluate costs/benefit tradeoffs for telecommunication programming.

This study is being conducted by the Individual Training Division, Directorate of Training and Doctrine, Academy of Health Sciences. For further information contact MAJ Davis (471-7004) or Dr Finstuen (471-5949).

## TO PROSPECTIVE DELPHI PANELISTS

We are asking you to assist in meeting the first two study objectives and to indicate any strong preferences you may have for the third objectives.

### What is the Delphi Methods?

A method of eliciting and refining group judgements. Panelists are not required to travel; nor is advanced reading required. It has three hallmark features: (1) all responses are anonymous and opinions of members of the panel are obtained by telephone or questionnaire; (2) interaction among panelists is accomplished at each round by synthesizing all responses, informing each panelist of the group's current position and redistributing the questionnaire results for further consideration; (3) the group generally achieves a consensus after a few rounds. These three features of the Delphi Method are designed to minimize the biasing effect of dominant individuals, of irrelevant communications and of group pressure toward conformity. It is an important part of the Delphi Method that all opinions be considered, even those at the extreme, since they may well include imaginative insights.

### Who will be on the Panel?

The panel was generated by soliciting nominations from a variety of sources. Panelists have all been initially contacted by telephone and are being invited to participate as a result of their interests, understanding, and position as continuing education coordinator or director.

### Why use the method here?

One of the prime prerequisites for effective health, dental, and medical continuing education would seem to be an understanding of the particular Corps and installation you represent. We feel that the Delphi Method will provide a useful means of arraying informed opinions about CE needs across the AMEDD and possible ways of meeting those needs.

### What will I get out of it?

By participation in CE Outlook to 1984, each panelist will have played a part in the determination of information vitally important to the planning of continuing education needs in the AMEDD. We believe that you will find it interesting to respond to your own and other's ideas in this project. We will send you a summary report of the Delphi results at the completion of the project.

### How much time will it take me?

We estimate that it will take 8-10 hours total over a two month period to respond to three or four questionnaires. The first will request one or two sentence answers to specific questions as well as suggestions for additional questions. In the subsequent questionnaires, the format will shift to numerical responses, such as rating or ranking items, and hence each will require less time than the first. At each round we expect to receive your responses within one week if we are to remain on schedule.

It should be stressed that it is important for you to complete all rounds of the project. Although some persons may have to drop out or be replaced for reasons entirely beyond their control, we would like to reduce such panel depletion to a minimum.

You have already participated in a preliminary telephone round of the study when you indicated the method your facility uses to determine continuing education topics and program needs. The attached list indicates the various methods of formulating topics at various AMEDD locations. In future rounds, individual sites will not be identified by responses to assure anonymity of responses.

The executive advisory committee on training telecommunications at the Academy of Health Sciences needs your help in facilitating the accomplishment of two of its objectives.

Training needs for continuing officer education are defined as the composite of mandatory hourly requirements and the major topical content

for medical, dental, and allied-health professions within the AMEDD.

Before the committee establishes recommendations for telecommunications it would like input from a number of people representing a variety of perspectives.

Today the committee requests that you respond to several questions.

QUESTIONS

1. In column 1 list the ten major topical areas needed for CE for the next five years. Given 100 points, indicate in column 2 the number of points each topic should receive of the 100.

Major CE Topical Needs	Assigned Points
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
<b>TOTAL POINTS</b>	<b>100</b>

Does your facility presently use any form of telecommunications for CE activities?

No \_\_\_\_\_ Yes \_\_\_\_\_ If yes what type? (specify) \_\_\_\_\_

1. Committees	Brooke Army Med Ctr ATTN: HSHE-ED Ft Sam Houston, TX 78234-6200	Local	221-4222
2. Decentralized Program Each Department Chief Directs Education	Dwight D. Eisenhower AMC Ft Gordon, GA 30905-5650	AUTOVON	780-2975
3. Decentralized Program Each Department Head Directs Education	Fitzsimons AMC ATTN: HSHG-ZBA	AUTOVON	943-8037
4. Decentralized Program Each Department Head Directs Education	Walter Reed AMC ATTN: HSHL-NAA-CSS Washington, DC 20307-5001	AUTOVON	291-1906
5. Decentralized Program Each Department Head Directs Education	William Beaumont AMC ATTN: HSHM-GME El Paso, TX 79920-5001	AUTOVON	979-2521
6. Decentralized Program Each Department Head Directs Education	Letterman AMC ATTN: C, ME Branch Clinical Spt Div Presidio of San Francisco, CA 94129-6700	AUTOVON	586-3122
7. Decentralized Program Each Department Head Directs Education	Madigan AMC ATTN: HSHJ-CLM (Medical Education) Tacoma, WA 98431-5009	AUTOVON	357-6637
8. Committee - Annual Nursing Needs Assessment	Dwight D. Eisenhower AMC ATTN: NETS Coordinator (LTC Bruce C. Allanach) Ft Gordon, GA 30905-5650	AUTOVON	780-7742
9. Committee - Yearly Needs Assessment Survey	Fitzsimons AMC ATTN: Chief Nursing Education Aurora, CO 80045-5000	AUTOVON	943-8944

10. Committee	Madigan AMC ATTN: Nursing Education & Training Service Tacoma, WA 98431-5032	AUTOVON	357-6443
11. Committee	USAMEDDAC ATTN: Nursing Education & Training Coordinator (MAJ S. Kading) Ft Campbell, KY 42223-1498	AUTOVON	635-8311
12. Committee	William Beaumont AMC ATTN: Nursing Education & Training Service El Paso, TX 79920-5001	AUTOVON	927-2007
13. Committee	COL Florence A. Blanchfield Army Community Hospital ATTN: HSXD-DCS Ft Campbell, KY 42223-1498	AUTOVON	635-8016
14. Committee & Service Specific	USA Community Hospital ATTN: HSXE-CSD Ft Carson, CO 80913-5000	AUTOVON	691-5565
15. Community & Service Specific Catalog Pro- duced by Education Coordinator	Womack Army Community Hospital ATTN: HSXC-CS Ft Bragg, NC 28307-5000	AUTOVON	236-6003
16. No Formal Program Roster on Doctors Who Share Duty as Coordinator	USA DENTAC Fitzsimons AMC Aurora, CO 80045-5000	AUTOVON	943-8810
17. Coordinates With DENTAC, Ft Gordon	COMMANDER, USAADL ATTN: HSRG (COL Nelson) Ft Gordon, GA 30905-5060	AUTOVON	780-5757
18. TDY Once A Year AR 40-67 Dental Consultants & Lectures	USA DENTAC ATTN: HSNE-DZA (COL Tromly) Ft Bliss, TX 79920-5001	AUTOVON	978-4706

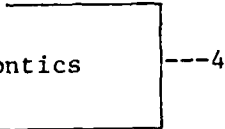
19.	Each Dentis Decides What Conference He Will Attend	USA DENTAC ATTN: HSNK-BD Ft Sam Houston, TX 78234-6200	Local	221-6677
20.	Committee & Study Groups	USA ADL ATTN: HSRT Ft Sam Houston, TX 78234-6200	Local	221-3098
21.	Clinical Laboratory Relations Course	USA ADL Walter Reed AMC ATTN: HSRW Washington, DC 20307-5001	AUTOVON	291-3449
22.	TDY Trips, Guest Speakers	HQ DENTAC WRAMC ATTN: HSNL-DH (COL Taylor) Washington, DC 20307-5001	AUTOVON	291-3704
23.	HSC Dental Corps Advisor	HQ USA Health Svc Cmd ATTN: HSDS Ft Sam Houston, TX 78234-6000	Local	221-4865
24.	Directed toward Dental Specialty	US Army Medical Department Support Agency Office of The Surgeon General ATTN: SGPE-EDA-D Washington, DC 20324-2000	AUTOVON	223-5453
25.	New Program	Uniformed Services University of The Health Sciences F. Edward Hebert School of Medicine 4301 Jones Bridge Road Bethesda, MD 20814-2500	AUTOVON	295-3106
26.	TDY Trip-in conjunction with AMSUS	NGB Surgeon Chief, NGB ATTN: NGB-ARS (MAJ Patterson) Washington, DC 20310-2500	AUTOVON	225-3084
27.	TDY Trips-in conjunction with AMSUS	Office of the Chief-Army Reserve ATTN: DAAR-MA Room 1 E440 Pentagon Washington, DC 20310-2422	AUTOVON	227-3023

Combined

Most Mentioned Topics

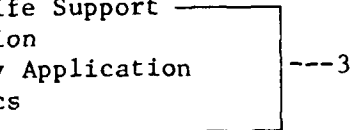
Oral Pathology/Medicine---5

Nursing Management  
Combat Nursing  
Removable Prosthodontics  
Periodontics  
Endodontics



---4

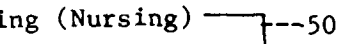
Advanced Cardiac Life Support  
Nursing Documentation  
Computer Technology Application  
Fixed Prosthodontics  
Oral Surgery



---3

Highest Point Totals (when mentioned more than once).

Mobilization Planning (Nursing)  
Combat Nursing




---50

Airway-Clearing and Control---46

Nursing Management---45

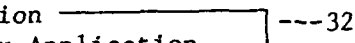
Oral Pathology/Medicine---38

Removable Prosthodontics  
Periodontics  
Endodontics



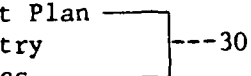
---35

Nursing Documentation  
Computer Technology Application



---32

Diagnosis-Treatment Plan  
Restorative Dentistry  
Fixed Prosthodontics



---30

13 Responses



Ranked by number of responses

ACLS---3

Airway-Clearing & Control	}	---2
Quality Assurance		
Substance Abuse		
Diagnostic Issues		
Child Abuse Prev.		
Spouse Abuse Prev.		
Legal Issues		

Ranked by total points assigned

Airway-Clearing & Control---46

Shock-recognition & Treatment---25

Quality Assurance---25

Substance Abuse	}	---21
Child Abuse		
Spouse Abuse		
ACLS		



Legal Issue---20



Diagnostic Issues---16





4 Responses

ANC



Ranked by Number of responses

Management  ---4  
Combat Nursing  ---4



Documentation  ---3  
Computer Tech  ---3



Mobilization  ---2  
Legal Issues  ---2  
Research  ---2  
Training Management  ---2

Ranked by total points assigned

Mobilization  ---50  
Combat Nursing  ---50

Management ---45

Documentation  ---32  
Computer Tech  ---32

Legal Issues  ---25  
Research  ---25

Quality Assurance ---15

Training Management ---13

4 Responses

DC  
Specific Subjects

Ranked by points assigned

Alternate Waretime Roles for Dental Officers---25

Composite Retained-Acid Etched Fixed Partial Dentures---20

Efficiency of non-surgical treatment modalities of periodontal disease

Medical emergencies in the dental office

Revised TB Med 148 and Laboratory Prescription Blank

Dental Combat Preparedness

EFMB

C-4 Course

Advanced Cardiac Life Support

Short Course Oral-Maxillofacial Surgery

---15

Ranked by number of responses

Management---4

Pharmacology ---2

Preventive Dentistry ---2

3 Responses

APPENDIX C

CONTINUING EDUCATION TOPICS IDENTIFIED BY DELPHI PANELISTS

Multiple Initial Topics N = 42

C..E. Topic from Delphi Forecast - "Outlook to '89"	POINT VALUE
Quality Assurance	105
Advanced Cardiac Life Support	105
Abuse-Child/Spouse	80
Advanced Trauma Life Support (ATLS)	65
Drug and Alcohol Abuse (Substances)	60
NBC Casualty Treatment/Theory	55
Profiles-Po's/Don'ts Mgt of Workforce	50
Cardiac-Pulmonary Resuscitation(CPR)	50
Diagnosis/Treatment Planning	50
Legal Issues (Physicians)	45
Computer Applications for AMEDD MC Officers	35
Use of Statistics in Medicine	35
Field Oriented Preventive Medicine	35
Nursing Documentation	35
Wartime Roles for Dental Officer	35
Medical Emergencies in the Dental Office	35
Nursing, Leadership, Motivation Change Theory	32
Computer Technology for Nursing Health Care	32
Medical and Professional Ethics	30
Medical Board Processing and Evaluation	30
Shock-Recognition/Treatment	30
Combat/Battlefield Nursing	30
Stabilization	30
Expert Field Medical Badge	30
Nursing Management in the Field	30
Dental Combat Preparedness Material	25
Legal Issues (Nurses)	25
Weight Control/Physical Fitness	22.5

## Multiple Initial Topics N = 42 (continued)

C.E. Topic From Delphi Forecast - "Outlook to '89"	POINT VALUE
Combat Casualty Care	20
Infection Control, Hospital Safety (JCAH)	20
Human Relations	20
Disaster Planning/Management	20
New Dental Materials	20
Pharmacology in Dentistry	20
Credentialling Medical Staff	15
Blood Banking/Products	15
Diagnostic Clues/Techniques	15
Patient Records-Microcomputer Uses	15
Triage in Disaster	15
Dental Clinic Administration and Management	15
DRG's and Nursing	15
Dental and Medical Unit Management	13

## Appendix C

Single Initial Topics N = 107

Continuing Education Topic from Delphi Forecast 1989	POINT VALUE
Videotapes of Major Pediatric Conferences	50
Airway-Clearing and Control	35
Role of the Surgeon in Combat	30
Hysteroscopy	25
Laparoscopy	25
Outpatients Biopsy/ D and C	25
Military Nursing (Mobilization, NBC, Field Equip)	20
Diagnosing Knee Ligament Injuries	20
Nuclear Specialist Personal Risk Program	20
Laser in Surgery: Safety Principles	20
Composite Retained Acid Etched Fixed Partial Dentures	20
Clinical Research Issues	20
Risk Management	15
Revised TB Med 148 and Lab Prescriptions	15
Non-Surgical Treatment-Periodontal Disease	15
ANC Preceptor Program	15
Balancing Demands and Resources	13
Physical Therapy (65 <sup>B</sup> /91 <sup>J</sup> ) in TOE Units	12.5
Nutrition and Fitness	12.5
Management of Nutrition Needs in Combat	12.5
Occupational Therapy and Stress Management	12.5
Musculoskeletal Assessment/Physical Therapy	12.5
Injury Prevention	12.5
Patient Education in Physical Therapy	12.5
Orthopedics for General Practitioners	10
T-Group Training	10
Conducting Sick Call	10
Anatomic Pathology	10
Clinical Chemistry	10
Electron Microscopy	10
Food Chemistry/Microbiology	10
Office Automation	10
Conflicts of Interest	10

Single Initial Topics N = 107 (continued)

Continuing Education Topic from Delphi Forecast 1989	POINT VALUE
Medical Record: Medico-Legal Implications	10
Staff Functions of Bde/Div/Corps Surgeon	10
Soft Tissue Surgical Techniques	10
Lasers in Surgery: Scientific Principles	10
Lasers in Surgery: Therapeutic Uses	10
Micro Surgical Techniques	10
Computed Tomography: Head/Neck Anatomy	10
Anesthesia for Endoscopy	10
Post Traumatic Facial Reconstruction	10
Pediatric Infectious Disease	10
Pediatric Development	10
Pediatric Emergencies	10
OB/Gyn Malpractice	10
OB/Gyn Risk Management	10
Military Medical Record Administration	10
Medcase/CEEP Mechanisms	10
Impaired Physician-Drug/Alcohol Abuse	10
Work/Exercise-the Pregnant Soldier	10
Micro-Computers for Medical Statistics	10
Military Medical Evacuation	10
Career Planning for MC Officers	10
Trends in Antibiotic Therapy	10
Outpatient Management of Ventricular Ectopy	10
Professional Officers Filler System (PROFIS)	10
Blood Therapy	10
Sexual Transmitted Diseases	10
Clinician Abuse of Diagnostic Studies	10
Examination/Patient Evaluation	10
Preventive Dentistry in the Army	10
Radiology Quality Assurance	10
Current Restorative Dental Technics	10
Conscious-Sedation Techniques	10

Single Initial Topics N = 107 (continued)

	POINT VALUE
Continuing Education Topic from Delphi Forecast 1989	
Myofacial Pain	10
Patient Management	10
All Porcelain Posterior Fixed Appliance	10
Basic Field Medical Surgery	10
Expanded Roles of RN and LPN	10
Mandatory vs. Non-Mandatory Continuing Education	10
Non-Traditional Nursing Interventions	10
Leadership Assessment Program	10
Nurse Clinician in the Field	10
Patient Education (Compliance/Discharge)	10
Update on Nurse Techniques/Practice	10
New Medical Equipment Demonstrations	10
Intervention in acute Myocardial Infarction	10
Strategies for Training	8
Restorative Dentistry/Materials	8
Handling Medically Compromised Patients	8
Labor/Management Relations	5
Computer Technology	5
Medical Operations in Field Environment	5
Decision Paper/Staff Guidance	5
Selecting ongoing QA Monitors	5
Nursing Management	5
Computed Tomography-Head/Neck Trauma	5
Computed Tomography-Head/Neck Tumors	5
Overuse Syndrome in Runners/Joggers	5
Medical Teaching Techniques	5
Increaseing Dental Productivity	5
Amalgam Filling Mercury Poisoning Scare	5
Motivational Preventive Dentistry	5
Osseo-Integrated Prothesis	5
Patient/Executive Management	5
Discharge Planning, Need, and Process	5
Nursing Process, Use and Implementaion	5



Single Initial Topics N = 107 (continued)

Continuing Education Topic from Delphi Forecast 1989	POINT VALUE
Research in AMEDD	5
Medical Proficiency Training	5
Geriatric Medicine	5
Future Trends in Health Care Delivery	4
Logistics/Finance for Dentists	3
Dental Administration	2
Problems Oriented Medical Records	2
Physical Assessment Skills	2
Pharmacology Update	2

**END**

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