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ABSTRACT

This report describes the development and pilot testing of a fire safety certification system for board and care operators and staff who serve clients with developmental disabilities. During Phase 1, training materials were developed, including a trainer's manual, a participant's coursebook a videotape, an audiotape, and a pre-/post test which was evaluated for reliability and validity. Pilot testing of the program was conducted with 12 staff members of residential facilities for adults with developmental disabilities. Evaluation indicated a significant mean gain from pre-test to post-test for participants and positive attitudes toward the program. The report documents the need for the study, its objectives, development of the system from the initial focus group process through the design of training materials and selection of training techniques, study design, data analysis, and presentation of the pilot test results. (Contains 24 references.) (DB)

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**A Fire Safety Certification System  
for Board and Care Operators and Staff  
SBIR Phase I: Final Report**

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## Table of Contents

List of Tables .....	iv
List of Figures .....	iv
Abstract.....	v
Chapter I. Introduction .....	1
Need for the Study.....	1
Design of the Study .....	1
Long Range Goal.....	2
Cverall Goals for Phase I.....	2
Measurable Learning Objectives for Phase I .....	2
Other Phase I Objectives .....	3
Background.....	3
Chapter II. Development of the System.....	4
Focus Group Process.....	4
Design of the System .....	5
Design and Development of the Training Materials .....	5
Other Training Materials.....	6
Length of Training and Time Frame .....	11
Selection of Training Aids and Techniques.....	11
Chapter III. Design of the Study.....	12
Setting for the Study .....	12
Sample.....	12
Instrumentation.....	13
Procedures and Data Analysis .....	14
Pre-Post Test Evaluation .....	15
Bowie State University Students .....	15
Form A and Form B.....	16
Statistical Analysis.....	17
Chapter IV: Presentation of the Pilot Test Results .....	18
Pre- /Post Test Results.....	18
Pre-/Post Test Results By Item.....	20
Individual and Group Improvement by Item.....	21
Affective Evaluation Results.....	22
Continuing Education Survey .....	26
Summary of Results by Module.....	28
Summary of the Findings.....	30

Chapter V. Summary and Recommendations..... 31

    Summary..... 31

    Recommendations for Changes to the Coursebook [by Module] ..... 31

    Recommendations for Additional Training Aids..... 32

    Recommendations for Changes to the Trainer's Manual..... 32

    Modifications to the Pre-/Post Test..... 33

    Implications for Phase II Training..... 34

Reference Notes..... 35

Bibliography..... 35

Organizations Contacted for Information..... 36

Attachments

- Trainer's Manual (including preregistration form)
- Participant's Coursebook
- Need for Fire Safety (video)
- Human Behavior in Fires (audiocassette)

Appendices

- Pre-Post Test (original)
- Post Test (Form A)
- Post Test (Form B)
- Fire Safety Training Course Evaluation
- Continuing Education Survey

## List of Tables

<b>Table</b>	
3-1	Distribution of Workshop Participants by Sex (N=12)..... 12
3-2	Distribution of Workshop Participants by Position (N=12)..... 12
3-3	Distribution of Workshop Participants by Experience With Disabilities (N=12)..... 12
3-4	Distribution of Workshop Participants by Years Experience With People With Developmental Disabilities (N=12) ..... 12
3-5	Distribution of Workshop Participants by Areas of Special Training (N=12)..... 13
3-6	Distribution of Workshop Participants by Educational Level Attained (N=12)..... 13
3-7	Distribution of Workshop Participants by Years at the Facility (N=12) ..... 13
3-8	Prior Fire Safety Training of Workshop Participants (N=12)..... 13
3-9	Length of Previous Fire Safety Training (N=3)..... 13
3-10	A Comparison of the BSU Students (N=15) and Workshop Participants (N=12) By Sex . 16
3-11	A Comparison of the BSU Students (N=15) and Workshop Participants (N=12) By Occupation..... 16
3-12	A Comparison of the BSU Students (N=14) and Workshop Participants (N=12) By Knowledge of Developmental Disabilities..... 16
3-13	A Comparison of the BSU Students (N=15) and Workshop Participants (N=12) By Experience with People With Developmental Disabilities..... 16
3-14	A Comparison of the BSU Students (N=15) and Workshop Participants (N=12) By Fire Safety Training..... 16
3-15	A Comparison of Mean Pretest Scores from BSU (N=15) and the Workshop Group (N=12) 17
4-1	Comparison of Mean Gain Scores Between Pre- and Post Test ..... 18
4-2	Analysis of Variance from Pre- to Post Test (N=12)..... 19
4-3	Simple Regression $X_1$ =Pretest $Y_1$ =Post Test..... 20
4-4	Comparison of Participants' Percentile from Pre- to Post Test (N=12)..... 20
4-5	Comparison of Pre- Post Test Results By Item (N=12) ..... 21
4-6	Comparison of Performance by Individuals (N=12) from Pre- to Post Test..... 22
4-7	Comparison of Performance by Individuals from Pre- to Post Test /Group A/B Results and Group B/A Results..... 22
4-8	Participants' Attitudes Towards the Training and Their Learning Experience (N=12) 23
4-9	Time Expenditure for Training By Module in Minutes ..... 24
4-10	Trainers' Comments Not Included in Course Materials ..... 25
4-11	Participants Questions During Training ..... 26
4-12	Participants' Willingness to Pay for Continuing Education (N=12)..... 26
4-13	Participants' Preferences Regarding Training Media (N=12)..... 27
4-14	Participants' Preferences Regarding Training Topics (N=12) ..... 27
4-15	Participants' Interest Regarding Four Job Aids (N=12)..... 28

## List of Figures

<b>Figure</b>	
2-1	Course Objectives and Topical Outline..... 7
4-1	Match of Modules and Items on the Evaluation Form ..... 23
4-2	Summary of the Findings By Objective..... 29

## ABSTRACT

The purpose of this project was to develop a fire safety certification system for board and care operators and staff who serve clients with developmental disabilities. The project took place between June and December 1988. The complete system will consist of fire safety training for board and care operators and staff, training for trainers, a continuing education system, and a system for matching trainers with training sites. The entire process was guided by a Focus Group of experts in fire safety, training, developmental disabilities, board and care management, and life safety requirements for board and care operations. These experts reviewed objectives, content, and materials for the project at three Focus Group meetings and through dozens of individual contacts throughout the project.

During Phase I, the content described in the original proposal was refined, the objectives stated, and a complete set of training materials developed. Materials included a trainer's manual, participant's coursebook, one videotape, an audiocassette, eleven job aids, a pre- and post test, and other evaluation instruments. A second videotape was acquired from the National Bureau of Standards and was incorporated into the training.

An open-ended pre-/post test was developed consisting of thirty-seven items, approximately three items per objective. The instrument was pretested with a group of fifteen graduate students enrolled in a special education program at Bowie State University in Bowie, Maryland. The group's responses were scored and items were evaluated for reliability and content validity and revised as the data indicated. Items were then used to create two equal forms of the test which could be used to measure participant learning in the fire safety workshop which would pilot test the Phase I materials. Half of the participants took Form A as a pretest and Form B as a post test. The other half took Form B as a pretest and Form A as a post test. Analysis of the results showed that the average score on the pretest was not related to the order in which the alternative forms were taken. After the training, the responses of the workshop participants were compared with the responses of the BSU students. The average score of the BSU was similar to the average pretest scores of the workshop participants. The tests were deliberately open-ended so that no ceiling would be placed on the expected learning of the participants. The performance of the field test groups can subsequently be compared to the performance of the pilot test groups. Improvements to the materials and to the training of trainers is expected to result in improved mean scores.

On November 14, 1988, the program was pilot tested at Melwood Training Center, an organization that operates residential care facilities for adults with developmental disabilities in Maryland. Results of the evaluation indicated a statistically significant mean gain from pre- to post test for the participants (N=12). Participants improved from pre- to post test as a group on a large majority of the test items (N=21). Results of the course evaluation which measured the participants' feelings about the training indicated that they had a very positive view of their own learning. Participants were surveyed to determine their interest in continuing education materials. A large majority indicated an interest in learning more about fire safety. Additional data were collected by an independent observer who recorded training events at five minute intervals, an audiocassette recording of the training, and by a second observer who made unstructured comments about problems and successes throughout the training and noted suggested changes to the Trainer's Manual and Coursebook.

Information that would be useful in revising the materials was sought from the pre- and post test results, the course evaluation results, from observations during the training, and from a review of the pilot test materials by members of the Focus Group. The findings suggested that combining the Trainer's Manual and the Coursebook into one document for the trainers would promote ease in handling. Other suggestions included improving some of the photographs in the coursebook, producing additional videos, and converting the open-ended test format to a multiple

choice test for the field test planned for Phase II. Test items which did not reliably measure the participants' learning will be revised.

During Phase II, the training for trainers will be developed. Trainees will spend one full day completing modules in developmental disabilities, fire safety codes for board and care homes, operations of board and care homes, and one additional day practice teaching the materials. The third day of training will be field experience at eight sites in Maryland. In addition to training trainers, project staff plans to develop materials for a continuing education program and develop a computerized database and system for matching trainers and training sites.

# CHAPTER I INTRODUCTION

## Need for the Study

There is a great need for a fire safety training system for operators and staff of board and care homes for adults with developmental disabilities. Although information and materials about fire safety are available, a training "system" which could produce a verifiable effective and uniform control of safety and quality of care. Such a system can go a long way towards filling the gap created by uneven state and local licensing practices. Strong evidence of the need for a national system for fire safety training was demonstrated by the recent report from Project Share in Rockville, Maryland (Rutman, Baron, and Tatem, 1987). Although the authors considered fire and other safety procedures to be standard components of training packages, their data showed that of the 50 training packages currently available from the various states for training residential care proprietors and staff, only seven included any reference to fire safety in the topical outlines (Delaware, Massachusetts, Minnesota, New York, Pennsylvania, South Carolina, and Virginia). Rutman, Baron and Tatem (1987) also found the time allotted to the total training/certification process to be very limited, averaging only a few days. During that time dozens of topics including management, record keeping, resident characteristics, drug administration, CPR, and many other essential areas must be covered.

Another aspect of the problem to be addressed by this proposed project is that existing materials such as those developed by the National Fire Protection Association (Blye and Yess, 1985), Project Share (Groner, 1986), and the National Bureau of Standard (Nelson, et all, 1983), although technically and instructionally sound, have not been shown to meet the specific needs of operators and staff members with respect to content and learning styles. In general, they are too technical and do not provide sufficient motivation for board and care operators and staff to learn.

Materials provided by the states frequently consist of a Trainer's Guide with descriptions of key points to be covered and group exercises. The Guide may be accompanied by handouts and suggested trainee readings. In a few cases a trainee handbook is included. Programs often also consist only of a self-study trainee manual such as the NFPA's *Fire Safety in Board and Care Homes*. None were reported to have incorporated any innovative training technologies such as videotapes, computer-assisted instruction, or audio cassette tapes. Major approaches used are lectures, panel presentation, charts, and readings (Rutman, Baron, and Tatem, 1987).

## Design of the Study

To meet the need for standardized, validated fire safety training in board and care homes, Bonnie Walker & Associates (BW&A), during Phase I of the project, developed and evaluated a training and fire safety certification system. The proposed training system was based on the existing research and content developed by fire safety experts from the National Fire Protection Association (NFPA), and agencies such as the Center for Fire Research at NBS. The specific content offered to operators and staff of board and care homes involved in this project was determined during the first Focus Group meeting. Members of this group were experts in the areas of fire safety, training, people with development disabilities, and board and care home operations.

The design of the training system incorporated existing research regarding the learning styles of adults. Specifically:

- Materials must be viewed as immediately relevant. Adults tend to discount any information that does not seem to relate to their particular situation. Operators and staff who are extremely busy with their day-to-day responsibilities are likely to put aside information on fire safety if the examples appear not to relate to their situation.

- Materials should not be presented in a repetitive format, e.g. all lecture, one self-instructional manual, etc. Repetition quickly leads to disinterest and loss of attention in the subject matter.

- Materials must be aimed at a variety of learning styles: auditory learners, visual learners, auditory/visual learners, and so forth. Most training materials are heavily reliant on two types of approaches: print-oriented (dependent on the adult learner's reading skills and interest in reading); and lecture oriented (dependent on the lecturer's knowledge and ability to communicate effectively).

- Presenting information by use of a video presentation has been found to be highly effective with the adult learner. We propose to develop video training aids which will include footage of actual fires, fire hazard situations, fire safety devices being operated properly, evacuation drills, and a simulated fire safety evaluation of a typical board and care facility. Video taping expert trainers and well-known fire safety experts assures a more uniform presentation of content. Thus training results could be replicated and documented. Other advantages of using a video cassette format include: equipment is easy to use and widely available; the format is familiar to both trainers and participants; the video can be used by individuals or groups; the video can be used in an interactive instructional mode, i.e., viewed from beginning to end, or in segments; video material can be self-contained and used independently by participants.

**The long range goal of this project** is to establish a training certification system whereby operators of board and care homes throughout the United States can receive uniform, validated training in fire safety. This training will include information about specific developmental disabilities and will focus on helping board and care operators and staff adapt fire safety procedures to meet the needs of the individual disabilities of residents and prepare staff for meeting those needs.

**The overall goals for Phase I were to:**

1. Develop a prototype fire safety training system, and
2. Demonstrate its feasibility and effectiveness with operators and staff of board and care homes for the developmentally disabled.

**Measurable Learning Objectives Proposed for Phase I:** The measuring learning objectives listed below were proposed for the Phase I training. These objectives were revised during the course the project after thorough review by the experts on the Focus Group. (Chapter III lists the objectives as they were revised for the pilot test.)

As a result of the training, participants will be able to:

1. Demonstrate their understanding of the need for a basic fire safety evaluation of a board and care facility adapted from the FSES system including:
  - a. Recognize building construction deficiencies;
  - b. Recognize fire and safety hazards.
2. Plan and implement fire standards for a board and care facility including:
  - a. Demonstrate an awareness of local codes and standards applicable to board and care homes in their locality or state.
  - b. Eliminate or minimize fire and safety hazards identified in a fire safety evaluation.
  - c. Understand the need for installation, maintenance, and use of fire safety devices, e.g. smoke alarms, fire alarms, fire extinguishers, automatic detection systems, and sprinkler systems.
  - d. Operate fire safety devices and, where appropriate, learn proper procedures to teach residents how to operate them.
3. Adapt the fire safety system to meet the needs of individual differences of residents and prepare staff for meeting those differences in a specific board and care setting, e.g., hearing impaired, blind, mentally retarded, physically disabled.
4. Implement fire safety programs for residents including:

- a. Demonstrate safe behavior prevention techniques, e.g., safe smoking, cooking, etc.
- b. Demonstrate operation of fire safety devices.
- c. Plan and conduct evacuation procedures and drills.

#### **Other Phase I objectives**

Determine through the Focus Group and Pilot Test evaluation the most appropriate:

1. Length of training (16 hours, 24 hours, other);
2. Content (scope of training and specific objectives);
3. Training aids (video, print, audio cassette, other);
4. Time frame (two consecutive days, four half days, other);
5. Training techniques (demonstration, simulation, role play, using self-study materials, audiocassette, video cassettes, etc.)

### **Background**

Project Share's report on *Training Board and Care Home Providers* (Rutman, Baron and Tatem, 1987) offers the most comprehensive study to date regarding the current numbers of homes, numbers of clients, licensing procedures and training by state. Approximately 65,000 residential facilities (including board and care homes and other types of similar operations) were reported--serving from 1 to 100's of clients drawn from elderly, mentally ill, mentally retarded or developmentally disabled populations. Because of the current emphasis on moving individuals from institutions to community based facilities and the large number of unreported facilities, it is likely that the number of residential facilities already greatly exceeds that number and that the number will continue to grow.

The size of the potential population to benefit by the fire safety training system proposed by this project is substantial. These individuals (operators and staff of various types of residential facilities) are not currently being served to any marked extent by either a fire safety training system or by materials suitable for the targeted population. Further, there are many 1,000's of other families who have elderly, mentally ill, retarded, or otherwise developmentally disabled family members who were not identified by this study and who could benefit from fire safety training specifically designed for these specific populations.

The result of this lack of a training system are evident by the large number of deaths from fires which occurred in board and care facilities between 1978 and 1984. The National Fire Protection Association (NFPA) estimates that the "risk of dying" in a multiple death fire in a board and care facility during that period was five times as high as it was in any other residential property and that two-thirds of these multiple death fires occurred in facilities that house the elderly. A number of factors contributes to the large number of fires and resulting deaths. Most of the deaths could be prevented by an appropriate fire safety training system which would train board and care operators and staff members to recognize and eliminate or minimize common fire hazards such as electrical distribution system overloads and malfunctions, incendiarism, smoking, improper use of matches and lighters and leaving food unattended while cooking. In addition, the training would provide information regarding the installation and maintenance of smoke detectors, the value of automatic sprinkler systems, and the importance of having and drilling a fire evacuation plan (Blye and Yess, 1987).

## CHAPTER II DEVELOPMENT OF THE SYSTEM

### Focus Group Process

The curriculum for the fire safety training program was developed with the assistance of a interdisciplinary group of experts in a Focus Group setting. Areas of expertise were developmental disabilities, regulatory processes and agencies, board and care operations, fire safety, human behavior in fires, training, evaluation, and materials development. The rapid prototyping model of development which lets the system evolve and be tested at multiple points throughout the process rather than only at the end was selected. Thus the Focus Group first received a broad outline of content which was expanded during the first Focus Group Meeting—a full day of discussion.

The discussion which took place during Focus Group I was recorded. The transcript of the meeting was analyzed and the conclusions of the group were used by project staff to revise the content outline and develop the initial draft of the training curriculum and curriculum materials.

Portions of the initial draft of the training materials were reviewed by individual members of the group when special expertise was required.

A "first" draft was then sent to the entire group for review prior to Focus Group II, the second full day of discussions. At this meeting the content (scope and sequence) was further refined. The draft included the evaluation design, scripts for proposed media, the trainer's manual, and participant material. Following the second full review certain components were presented again to individuals for confirmation. Prior to publication for the pilot test, the entire set of materials were again reviewed by representatives of the various disciplines and revised as needed.

During the second meeting of the Focus Group, members also recommended the broad curriculum areas to be included in the training program for trainers. The group also recommended criteria for selecting these trainers and the approach for "training the trainers."

The development of the pre- and post tests for the training underwent review for validity and reliability. A set of three open-ended items were developed for each objective by the project staff and sent for review and responses by members of the Focus Group with expertise in fire safety. The entire set of items were completed by 15 graduate students enrolled in special education program at Bowie State University (BSU). No names were given on these tests; however, demographic data were requested so that project staff could compare the BSU group with the pilot test group. The responses of the BSU were analyzed in order to determine the acceptability of the items. Some items were revised to improve their clarity; a few were determined to be unacceptable and were omitted. All acceptable items were then randomly assigned (by objective) to either Form A or Form B of the test. The goal was to develop two "equal" forms of the test. At the training half of the participants received Form A as a Pre test; the other half received Form B. Participants then received the alternative form as the post test. Participants identified themselves with a "code name" so that pre- post forms could be matched. No participant names were attached to any evaluation instrument except for the preregistration form. No individual will be identified in any manner in project reports.

A one day training session was held on November 2, 1988 to prepare the two instructors for the pilot test training session. Both instructors were fire safety specialists with previous experience as trainers. Each were also members of the Focus Group. Neither had had specific previous instruction in developmental disabilities or board and care operators, but each had participated in the two day discussions of these topics at Focus Group meetings. The two instructors

spent an entire day reviewing the materials and making final suggestions which were incorporated into the pilot test version of the materials.

On November 9, 1988, the pilot test of the Fire Safety Training System took place. There were 12 participants—members of the supervisory staff and direct care staff at Melwood Training Center. The training took place at the Melwood location in Nanjemoy, Maryland.

The final step in the Phase I process was to review the results of that training session (pre- and post test scores, participant and trainer evaluations, audiocassette recording of the sessions, and the report of the independent observer). During the third convening of the Focus Group on December 14, 1988, recommendations for further revisions were gathered and incorporated into this Report.

## **Design of the System**

The initial design of the Fire Safety Certification System for Board and Care Operators as presented in the Phase One Proposal was also refined by Project Staff with input from a wide variety of conversations with people in the field. Contacts were made by letter and telephone with several state and local officials, fire marshalls, and others with an interest in fire safety in board and care environments. From these discussions, the current model has emerged. This model includes (1) Training for Board and Care Operators, (2) Training for Trainers, (3) Continuing Education, (4) The Network.

## **Design and Development of the Training Materials**

The major focus of energy during Phase One was on the design and development of the Fire Safety Training for Board and Care Operators. BWA developed objectives and related materials (a) to train the professional staff of board and care homes in fire safety and (b) to enable them with skills to train the direct care staff who will in turn train residents in fundamentals of fire safety. Specific objectives for each segment of the audience were developed. (See Figure 2-1: Course Objectives and Topical Outline.)

Training materials were geared towards specific audiences (e.g, professional staff, direct care staff, residents) as well as towards the specific environments (e.g., small home, large home, apartments) and toward specific disabilities (mentally retarded, visually or hearing impaired, physically disabled).

The training manual and participant materials addressed seven topics:

- The Need for Fire Safety
- Fire Behavior and Life Safety Code Requirements
- Human Factors in Fire Safety
- Fire Hazards and Fire Prevention
- Fire Safety Devices
- Fire Emergency Planning
- Staff and Resident Training

Training aids included:

- The Trainer's Manual
- The Participant's Coursebook (125 pages of print materials with photographs)
- The Need for Fire Safety (7 minute videotape)
- Human Behavior in Fires (10 minute audiocassette tape)
- Flashover: Countdown to Disaster (12 minute videotape produced by the National Bureau of Standards, made available for training)
- Job Aids (13 Checklists to be used in Fire Safety Training, Fire Prevention and Reporting)

**Evaluation Instruments included:**

Preregistration Form (For descriptive group data only)

Pre- and Post Tests (Form A and Form B)

Fire Safety Training Evaluation Form (for affective learning)

Continuing Education Questionnaire (assessment to determine areas of continuing interest for follow-up materials)

**Other Training Materials**

In addition to the video that was completed, "The Need for Fire Safety," project staff also obtained footage suitable for editing additional videos on the topic of identifying code violations and fire hazards, and a comparison of fire damage with a smoke alarm system as compared to a residential sprinkler system. Initially, project staff planned to incorporate fire hazards into the video "The Need for Fire Safety." However, because we had identified a home and the direct care staff (counselors) who operated that home, we felt that it was not appropriate to include hazards or code violations. The video planned for that subject will use an on-camera actor and an unidentified setting.

## Figure 2-1: Course Objectives and Topical Outline

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### Module 1: Why Study Fire Safety?

#### Objective:

1. Participants will demonstrate their understanding of the need for fire safety evaluations and emergency procedures.
  - Participants will identify fire safety concerns of board and care owners.
  - Participants will identify legal responsibilities concerning fire safety.
  - Participants will identify procedures that can be used to meet the special needs of each resident.

### Module 2: Fire Safety Standards and Prevention

#### Objectives:

1. Participants will demonstrate their knowledge of fire behavior.
  - Participants will identify the length of time it takes for a fire to spread or to flash over.
  - Participants will understand how intense the heat of a fire becomes.
  - Participants will understand that all materials are flammable.
  - Participants will understand smoke production.
  - Participants will understand the characteristics of flame spread.
2. Participants will understand basic fire concepts.
  - Participants will identify materials which are highly flammable such as upholstered furniture, paneling, ceiling tiles.
3. Participants will demonstrate their knowledge of fire safety standards.
  - Participants will identify the number of required exits.
  - Participants will identify appropriate types of interior finishes.
  - Participants will identify vertical openings and identify required protection.
  - Participants will identify hazardous areas and required protection.
4. Participants will demonstrate their knowledge of fire prevention procedures by identifying code violations and corrective measures.

Code violations may include:

  - Door to sleeping room propped open.
  - Window painted shut.
  - Improper protection of vertical opening.
  - Blocked egress
  - Inoperable smoke detector
  - Unprotected hazardous areas

## Figure 2-1: Course Objectives and Topical Outline (con't)

### Module 3: Human Factors

#### Objectives:

1. Participants will identify relative characteristics of direct care staff.
  - Participants will describe the characteristics of direct care staff, e.g., age, physical limitations, communication skills, life goals, education, previous experience with emergencies, motivation, rapport with residents, habits (i.e., smoking, alcohol consumption), interests.
  - Participants will identify the impact of direct care staff characteristics on fire safety.
2. Participants will identify relative characteristics of developmentally disabled residents.
  - Participants will describe relative characteristics of developmentally disabled residents, e.g., resistance to evacuation, ability to evacuate, etc., behaviors which could impact on fire safety (i.e., smoking), etc.
3. Participants will identify community fire safety resources.
  - Participants will name and describe the degree of services provided by their fire department, fire safety consultants, health department, and other community resources.
  - Participants will create a list of resources available for training and during an emergency with names and telephone numbers.
4. Participants will identify characteristics of human behavior in fires as determined by fire safety research and the appropriate reactions to these types of behavior, e.g.
  - Inappropriate reactions or misinterpretation of fire cues.
  - Need to seek reinforcing cues.
  - Response of individual versus a group in an emergency.
  - Tendency to reenter buildings.
  - Behavior related to the emergency such as response to smoke.
5. Participants will demonstrate their ability to recognize an emergency and appropriate procedures.

### Module 4: Fire Hazards

#### Objectives

1. Participants will identify fire hazards and procedures for correcting those hazards.

Hazards will include:

  - Smoking
  - Cooking
  - Overloaded electrical systems
  - Extension cords
  - Space heaters
  - Appliances
  - Cleaning Fluids
  - Fireplaces
  - Neglected maintenance
  - Obstructed egress
  - Christmas trees
2. Participants will complete a fire hazard checklist.
3. Participants will complete a bedtime fire hazard inspection checklist.

## Figure 2-1: Course Objectives and Topical Outline (con't)

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### Module 5: Fire Safety Devices

#### Objective:

1. Participants will identify the function and maintenance procedures of fire safety devices including:
  - Detector Devices (Heat and Smoke)
  - Types of Detector Alarms
    - Single Station. Multiple Station, Systems
  - Other Alarm Systems (Annunciator Systems; Manual Alarm; Remote Receiver)
  - Special Alarm Features for the Developmentally Disabled
  - Sprinkler systems
  - Emergency Lights and Exit Signs
  - Doors and Barriers
  - Fire Extinguishers
  - Tactile Aids
  - Bedside Safety Aids (whistle, flashlight, dolly, glasses)
  - The Telephone as a Fire Safety Device
  - Community Projects (Project ID)

### Module 6: Fire Emergency Planning

#### Objective:

1. Participants will develop a fire emergency plan suitable for implementation in their board and care facility or facilities with their direct care staff and their residents.
  - Participants will make decisions affecting the design of the fire emergency plan including:
    - a. Identify strengths and weaknesses of the board and care environment.
    - b. Identify primary and backup strategies in a board and care environment.
    - c. Identify a refuge strategy.
    - d. Identify special needs of any resident and how to respond to those needs during a fire emergency.
  - Participants will develop and implement a fire emergency plan including:
    - a. Identify emergency tasks for staff.
    - b. Identify basic emergency tasks for residents.
    - c. Develop a form for reporting fires suitable for use by staff.
  - Participants will develop fire drill policies and procedures for their facility.
  - Participants will identify a plan for evaluating the fire emergency plan and how to improve it including:
    - a. Improving escape strategy
    - b. Improving staff assistance to residents
    - c. Limiting the spread of fire and smoke.

## Figure 2-1: Course Objectives and Topical Outline (con't)

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### Module 7: Direct Care Staff Training

#### Objective:

1. Participants will identify methods and materials for training staff to implement the Fire Emergency Plan including:
  - Staff will become familiar with the human behavior to expect during a fire.
  - Staff will be able to use and maintain fire safety devices in their facility.
  - Staff will be able to run and evaluate a fire drill.
  - Staff will be able to assist residents in evacuating.
  - Staff will be able to perform each of the emergency tasks during a fire or fire drill situation.
  - Staff will be able to complete the fire report form.

### Module 8: Resident Training

#### Objective:

1. Participants will identify methods and materials for training residents to implement the Fire Emergency Plan including
  - Residents will assemble bedtime safety devices and identify function of each device during a fire.
  - Residents will be able to perform each of the emergency tasks during a fire or fire drill situation including "evacuate the home in 3 minutes or less."
  - Residents will demonstrate ability to implement refuge plan.
  - Residents will demonstrate emergency actions to take in clothing fires.

## **Length of Training and Time Frame**

A major question to be answered during Phase I was the length of the training. The scope of content as described in the Phase I proposal was estimated to require three days. During the first Focus Group meeting, representatives of Melwood Training Center which operate several board and care facilities in Prince George's and Charles County, Maryland, expressed reservations about the length of time. Later discussions with Melwood staff suggested strongly that even one day was going to be difficult for staff due to heavy client demands on their time. Further discussions with Marjorie Owens, Director of Project Home, of the Maryland Department of Human Resources, about the length of time indicated that a full day of training was nearly impossible, particularly for the individual board and care operator who is both owner and direct care staff. Because the scope of the curriculum needed to be sharply curtailed to meet the time constraints, two general approaches were selected. First the training sessions would focus sharply on the practical skills and information required to accomplish the project goals. The materials would be highly structured. The participant's materials would serve as a future reference after the training. Finally, a continuing education component to the system was proposed.

## **Selection of Training Aids and Techniques**

The Focus Group members, all of whom had training experience, discussed the types of training aids they preferred using. The consensus of opinion was that a variety of training aids would be required designed around a set of print materials. A video tape was determined to be the best media to illustrate the need for fire safety. The materials needed to be specifically aimed at the board and care audience. There should be a minimum of lecturing. Content should be conveyed in a standard format through audio cassettes, videos, print materials. The trainer should be primarily a facilitator and leader, rather than a conveyor of content. A minimum of equipment should be required. Some members enjoy using slide presentations, but others had negative experiences with that type of training aid. Transparencies and overhead projectors were not preferred. A broad consensus felt that use of computer assisted instruction was inappropriate for the audience.

An instrument was developed stating the purpose of each training aid developed for the project. Trainers during Phase II will be asked to evaluate each training aid using the stated purpose as the criteria for determining the usefulness of the aid. See the Appendix for a copy of that form.

## CHAPTER III DESIGN OF THE PILOT TEST

### Setting for the Study

The pilot test of the Fire Safety Training for Board and Care Operators took place at the Melwood Training Center, a nonprofit corporation that operates residential units for adults with developmentally disabilities in Charles County and Prince George's County, Maryland. Approximately 200 clients are served by the horticultural training center. Approximately 60 clients live in 19 residential facilities in Prince George's County and approximately 30 clients live in 10 residential facilities in Charles County.

### Sample

Twelve staff members from Melwood Training Center, participated in the pilot test of the Fire Safety Training for Board and Care Operators. The participants were both supervisory and direct care staff members. Tables 3-1 to 3-9 below present information about the participants collected on the Preregistration Form (See Appendix A). These data can be used to develop a profile for comparison purposes with the field test groups during Phase II.

Table 3-1  
Distribution of Workshop Participants by Sex (N=12)

Males	2
Female	10

Table 3-2  
Distribution of Workshop Participants by Position (N=12)

Supervisor	9
Instructor	1
Counselor	2

Table 3-3  
Distribution of Workshop Participants by Experience With Disabilities (N=12)

Mentally Retarded	10
Visually Impaired	4
Epilepsy	6
Hearing Impaired	7
Cerebral Palsy	7
Autistic	0
Mobility Impaired	5

Table 3-4  
Distribution of Workshop Participants by Years Experience  
With People With Developmental Disabilities (N=12)

0-1 years	1-5 years	6-10 years	11+ years
3	5	4	0

**Table 3-5**  
**Distribution of Workshop Participants by Areas of Special Training**

Management	6
Rehabilitation	1
Developmentally Disabled	7
Recreation	2
Nutrition	1
Medications	3

**Table 3-6**  
**Distribution of Workshop Participants by Educational Level Attained**

High school	2
A.A. Degree	1
Bachelor's Degree	4
Master's plus	1
High school plus college	1
Bachelor's plus	3
Master's	0
Doctorate	0

**Table 3-7**  
**Distribution of Workshop Participants by Years at the Facility (N=12)**

0-1	1-5	6-10	11+
10	1	1	0

**Table 3-8**  
**Prior Fire Safety Training of Workshop Participants (N=12)**

	YES	NO	NO RESPONSE
Previous Fire Safety Training	3	9	0
Fire Safety Training at the Same Facility	0	12	0
Experience Training Direct Care Staff	8	3	1
Experience Training Clients	3	8	1
Experience Training Other Professional Staff	3	8	1
Experience With a Fire Emergency	1	7	4

**Table 3-9**  
**Length of Previous Fire Safety Training (N=3)**

1 Hour	2
More Than 1 Day	1

### Instrumentation

**Preregistration Form**—To collect information regarding the demographic characteristics of the pilot test group, each participant was asked to complete a Preregistration Form. [See Appendix A.] Copies of the form were mailed to supervisory personnel at Melwood a few weeks before the training. Additional copies of the form were distributed at the training.

**Pre-/Post Test**—A pre- post test was developed to assess the cognitive learning of the participants. Initially three test items were developed by the project staff to match each learning objective. These items were reviewed by content experts in fire safety who were asked to respond in writing to each item. The pre- post test containing 40 items was completed by 15 students in a graduate school classes enrolled in a special education curriculum at Bowie State University. The answers of the BSU students were collated and compared with responses by the fire safety experts. Items measuring the same objectives were randomly assigned to two similar forms of the test (Form A and Form B) were developed. Each form contained 21 items.

**Course Evaluation Form**—An Likert-type evaluation instrument was developed to assess the participant's affective learnings. Ten items were developed to assess the participants' perception of their own learning.

**Continuing Education Interest Form**—Following the training participants completed a survey-type questionnaire to determine their interest in a continuing education program as proposed for Phase II and III of this project.

**Training Observation**—During the training, two observers observed and recorded observations. In addition, an audiocassette recording was made. Observer one recorded events throughout the day at five minute intervals. Observer two recorded responses to the training and variations from the planned structure using the trainer's manual. A transcript of the training session was made from the audiocassette.

**Other Sources of Information**—A letter was sent to each state agency listed in Project Share sharing information about the project and requesting information. Agencies responded both by mail and by telephone.

## Procedures and Data Analysis

**Preregistration Forms**—The preregistration forms were distributed to the participants about three weeks prior to the training. Additional forms were distributed to members of the group who had not previous completed a form. Results were presented in description form. (See above.)

**Pre-Post Tests**—Half of the participants received Form A and the other half received Form B as a pretest instrument. Participants were asked to think of a password to identify their papers and to use that name on their pre- and post tests so that project staff could match their tests. On the post test the half who had received Form A took Form B as the post test. The other half took Form A as a post test. Analysis of the results showed that the two forms were essential equal. The mean score of both groups on the pretest, regardless of Form, was exactly equal. The group that took Form B as a post test has a slightly higher mean score on the post test. (Results are presented in Chapter IV.)

The data were analyzed to determine the group total score and mean score on each item. Data were also analyzed to determine whether or not a majority of the participants had improved their scores on a majority of the items.

**Pre- Post Test Limitations**—Several limitations were noted regarding the pre- and post testing of the participants:

- The test was limited to 21 items in order to keep the time under 30 minutes. The Bowie State University students had required approximately forty-five minutes to complete thirty-seven items. Some content was not adequately measured; for example, only two items were designed to measure the participants' understanding of fire hazards.
- The test was open-ended and the items did not request a specific number of responses. For example, Item One asked: "Why is there such a strong need for fire safety training in board and care homes? Mention as many different reasons as you know."

The rationale for this approach was to judge the participants' knowledge at a greater depth than simply recognition level.

- A percentage score based on the highest possible score was not an appropriate measure of the participants' achievement. The evaluation plan did not
- Participants completed the post test after an eight hour intensive training. A fatigue factor seemed to be apparent, especially when participants who had written several reasons why fire safety training in board and care homes was needed on the pretest and a shorter response on the post test.

**Course Evaluation**—The participants' responses to each item were totaled and converted to percentages to determine whether they believed they had learned. These results were tabulated and presented by item and by response.

**Continuing Education**—The participants' responses to each item were totaled and recorded in tables to determine whether the participants were interested in continuing education and if so, which topics and which training media they preferred.

**Observations**—Information from three sources (two observers and the recording of the training session) were analyzed and combined so that all of the unexpected events were noted. Those events included questions the trainers or participants asked that were not in the training materials; questions or information that were not asked or covered that were in the training materials; interruptions in the training. The information per module were compared with items on the post test on which participants scored poorly. Information from three sources (two observers and the audiocassette recording) were compiled and summarized. This information was used to make recommendations for changes in the training materials and to guide the recommendations for training of the trainers proposed for Phase II.

### **Pre-Post Test Evaluation**

The project staff initially developed thirty-seven items for the training pre- and post tests, approximately three per objective. To determine whether the items were valid and reliable, the test was administered to fifteen students at Bowie State University (BSU) who took the test at one sitting with no previous knowledge that they would be taking the test.

All of the students had completed the exam within forty-five minutes. They were instructed to answer every question, no matter how foolish their guesses might seem. Demographic information was requested from the participants, but they were instructed NOT to put their names on their papers.

Their answers were compiled and compared with responses given by a fire safety expert with a background specifically in fire safety in board and care homes. Their responses were also compared with an answer key compiled from the actual course materials. A score was assigned to each paper and compared to the pretest scores of Melwood workshop participants.

### **Bowie State University Students**

Demographic data for the two groups (the BSU students and the Melwood workshop participants) were compared in order to assess the similarity of the two groups. Since the two groups were found to be similar with respect to their demographic data.

Since all of the BSU students responded to all of the items as a pretest, their papers were scored and compared with the workshop participants' responses and scores from either Form A or Form B, whichever the individual had taken as a pretest. Thus for each item 15 BSU students were compared to 6 workshop participants.

**Table 3-10**  
**A Comparison of the BSU Students (N=15) and Workshop Participants (N=12) By Sex**

Groups	N	Males	Females
Bowie State University	15	3	12
Melwood Staff	12	2	10

**Table 3-11**  
**A Comparison of the BSU Students (N=15) and Workshop Participants (N=12) By Occupation**

Bowie State University		Melwood Staff	
Teacher	8	Residential Supervisor	4
Student	1	CLA	2
Housewife	3	Director, Residential Services	1
Assistant Manager	1	Primary Councilor	2
No Responses	3	Residential Manager	2
		Instructor	1

**Table 3-12**  
**A Comparison of the BSU Students (N=14) and Workshop Participants (N=12)**  
**By Knowledge of Developmental Disabilities**

Group	None	Some	Extensive
Bowie State University	2	10	2
Melwood Staff	0	5	7

**Table 3-13**  
**A Comparison of the BSU Students (N=15) and Workshop Participants (N=12)**  
**By Experience with People With Developmental Disabilities**

Group	None	Some	Extensive
Bowie State University	3	8	2
Melwood Staff	0	8	4

**Table 3-14**  
**A Comparison of the BSU Students (N=15) and Workshop Participants (N=12)**  
**By Fire Safety Training**

Group	None	Some	Extensive
Bowie State University	3	10	1
Melwood Staff	9	2	1

### Form A and Form B

The responses to the initial test draft were analyzed and revised as needed for clarity. One item was dropped. \* The remaining items were randomly assigned to either Form A or Form B of the test—the attempt was to make each form of the test as equal as possible. The new length of the test

\* The item was "Explain the difference between fire resistant and fire retardant." Since there is no important difference, the item was useless.

(21 items) would take approximately 15 to 20 minutes to complete if the workshop participants were similar to the BSU students.

Following the workshop the mean pretest scores of the BSU students were compared to the mean pretest score of the workshop participants. The average score of the BSU students (N=15) was 24.7 as compared with the average score of the workshop participants which was 28 (a difference of 3.3 points. The two groups were judged approximately equal in terms of knowledge of fire safety.

Table 3-15  
A Comparison of Mean Pretest Scores from BSU (N=15) and the Workshop Group (N=12)

Group	Mean Pretest Score	Number of Items
BSU	24.7	41
Melwood Staff	28.0	21
Difference	+3.7	

### Statistical Analysis

In each case statistical analysis (other than simple descriptive data) were performed using Stat View 512+, a professional, graphic, statistics utility software program designed for the Macintosh computer by Daniel S. Feldman, Jr. and Jim Gagnon. The software was published by BrainPower, Inc. in 1986.

An analysis of variance (ANOVA) test was selected to test the significance of differences between pre- and post test scores of the Melwood staff.

## CHAPTER IV PRESENTATION OF THE PILOT TEST RESULTS

The findings of this study represent an analysis of the data obtained from 12 participants in a fire safety workshop held at Melwood Training Center in Nanjemoy, Maryland on November 9, 1988. The participants were either supervisory or direct care staff employed by Melwood, a residential care facility for adults with developmental disabilities. Data were obtained from pre- and post tests, the course evaluation, the continuing education survey, and from observations by two observers. Additionally, data were obtained from notes taken from the audiocassette tape of the training session.

### Pre-/Post Test Results

*Question 1: Did the participants, as a group, improve their scores from pre- to post test?*

The scores of each participant on the pre- and post test were totaled. A mean, median, mode, and range were calculated for each test.\* The results indicate that participants' mean score improved from 28 points on the pretest to 44 on the post test for a mean gain score of 16 points.

The analysis of variance (ANOVA) test comparing the individual's results from pre- to post test showed a statistically significant gain at the probability level of .0001.

A regression test was performed on the data, shown in Table 4-3, which indicated that the higher one had scored on the pre-test, the higher that individual scored on the post test. In other words individuals gained in proportion to their original knowledge.

Table 4-1  
Comparison of Mean Gain Scores Between Pre- and Post Test

	Total Points	Mean	Mode	Median	Range
Pretest	335	27.9	28	28	15 to 40
Post Test	528	44.0	none	45	30 to 57
Difference	183	16.1			

---

\* The mean is the average score. The median is the exact middle score. The mode is the most frequent score. The range is the highest and lowest score.

Table 4-2

Analysis of Variance from Pre- to Post Test (N=12)

One Factor ANOVA-Repeated Measures for X<sub>1</sub> ... X<sub>2</sub>

Source:	df:	Sum of Squares:	Mean Square:	F-test:	P value:
Between subjects	11	1125.458	102.314	.642	.7647
Within subjects	12	1913.5	159.458		
treatments	1	1552.042	1552.042	47.232	.0001
residual	11	361.458	32.86		
Total	23	3038.958			

Reliability Estimates for- All treatments: -.559      Single Treatment: -.218

1

One Factor ANOVA-Repeated Measures for X<sub>1</sub> ... X<sub>2</sub>

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Pretest	12	27.917	7.141	2.061
Posttest	12	44	9.175	2.649

2

One Factor ANOVA-Repeated Measures for X<sub>1</sub> ... X<sub>2</sub>

Comparison:	Mean Diff.:	Fisher PLSD:	Scheffe F-test:	Dunnnett t:
Pretest vs. Posttest	-16.083	5.151*	47.232*	6.873

\* Significant at 95%

3

Table 4-3  
Simple Regression  $X_1$ : Pretest  $Y_1$ : Post Test

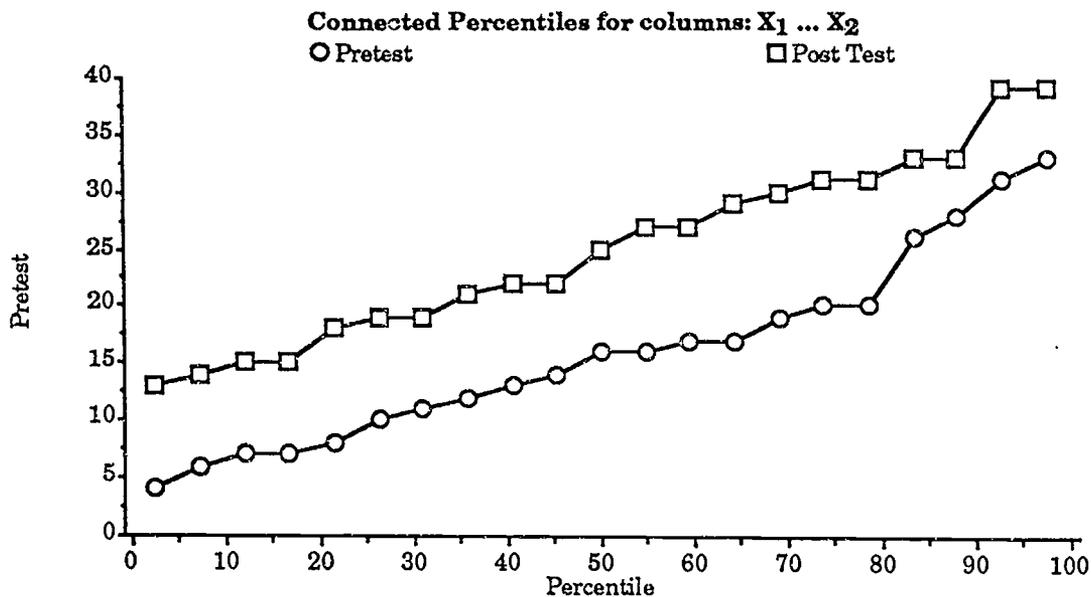
DF:	R:	R-squared:	Adj. R-squared:	Std. Error:
20	.792	.628	.608	4.969

Analysis of Variance Table

Source	DF:	Sum Squares:	Mean Square:	F-test:
REGRESSION	1	791.466	791.466	32.056
RESIDUAL	19	469.105	24.69	$p = .0001$
TOTAL	20	1260.571		

No Residual Statistics Computed

Table 4-4  
Comparison of Participants' Percentiles from Pre- to Post Test (N=12)



### Pre- /Post Test Results by Item

Question 2: *Did the participants improve their scores from pre- to post test on each item?*

The scores of each participant on each item of the pre- and post test were compared to determine how many of the participants showed an improvement between pre- and post test on each item of the test. Results showed that they had improved at least slightly on all but two items #2 and #4). As a group the average improvement was 9.1 per item. The individual mean improvement per item was .76—in other words, each participant improved slightly less than one point per item. Item #2 asked participants to name activities in a routine fire safety inspection or evaluation. One point was awarded for each response. Participants who had scored high on this item tended to give fewer responses on the post test which resulted in what appears to be no improvement. Item #4 tested their understanding of interior finishes. Participants either identified reasons why interior finishes were a potential fire hazard or explained what to look for when shopping for interior finishes. The responses to the first version were correct on the pretest and so could not

improve. The desired response to the second version of the question was to look for the Class Rating. Only two participants mentioned Class Ratings in their responses. Examination of the observers' notes and the audiocassette tape of the training indicates that while the subject was taught, Class Ratings were not emphasized.

Responses to Item #20, "How can you improve fire safety in your home?" did not improve from pre- to post test. Analysis of the observation data suggests that this topic was not discussed in depth since it was the last topic in the last module and time was running out.

Table 4-5  
Comparison of Pre- Post Test Results by Item

Module	Item	Pretest		Post Test		Difference	Result
		Range	Total Points	Range	Total Points		
1	1	[0-4]	20	[1-5]	33	+13	Improvement
2	2	[0-7]	33	[1-4]	33	0	No change
2	3	[0-2]	16	[0-2]	21	+5	Improvement
2	4	[1-2]	14	[0-2]	13	-1	Negative result
2	5	[0-2]	8	[0-3]	19	+11	Improvement
2	6	[0-3]	6	[1-2]	19	+13	Improvement
2	7	[0-3]	19	[1-4]	30	+11	Improvement
3	8	[0-1]	4	[1-3]	18	+14	Improvement
3	9	[0-5]	28	[0-5]	39	+11	Improvement
3	10	[0-3]	17	[1-4]	25	+8	Improvement
3	11	[0-1]	7	[0-3]	22	+12	Improvement
4	12	[0-3]	16	[1-4]	31	+15	Improvement
4	13	[0-5]	20	[1-3]	31	+11	Improvement
5	14	[0-3]	17	[1-4]	29	+12	Improvement
5	15	[1-1]	12	[0-2]	15	+3	Improvement
5	16	[0-1]	7	[0-2]	14	+14	Improvement
6	17	[0-2]	13	[0-3]	22	+9	Improvement
6	18	[1-4]	31	[2-4]	39	+8	Improvement
6	19	[0-2]	10	[0-5]	27	+17	Improvement
6	20	[0-5]	26	[1-5]	27	+1	Improvement
N/A	21	[0-3]	11	[0-3]	15	+4	Improvement
Totals			335		526	191	

Group Mean improvement per item = 9.1

Individual Mean Improvement = .76

### Individual and Group Improvement by Item

*Question 3: Did the participants improve from pre- to post test on individual items?*

The data were also analyzed to compare the number of items on which each individual improved from pre- to post test. Results showed that a majority of the participants (7 out of the 12) showed improvement on a majority of the items (11 or more). Lack of improvement on a particular item could have resulted from several causes: (1) The items on Form A and Form B were not equal in terms of difficulty. (2) Participants were tired because they had spent 8 hours in the workshop and did not write everything they knew about a topic. (3) The content was not covered adequately or emphasized during the training. (4) The participants already scored the maximum number of points on the pretest and could not improve. (5) The participants may have been out of the room while a particular topic was being covered. Since the training was held at Melwood, the participants were called to solve problems from time to time during the day.

Table 4-6  
Comparison of Performance by Individuals (N=12) from Pre- to Post Test

Participant	Improved	Same	Negative	Total
1	12	4	5	21
2	8	7	6	21
3	9	6	6	21
4	7	11	3	21
5	17	2	2	21
6	14	5	2	21
7	12	6	3	21
8	14	5	2	21
9	10	6	5	21
10	14	7	0	21
11	13	4	4	21
12	10	6	5	21
Totals	140	69	43	
Means	11.67	5.75	3.58	
Modes	14	6	2 & 5	
Range	8-17	2-11	0-6	

Half of the group (N=6) took Form A as the pretest and Form B as the post test and the other half (N=6) took Form B as the pretest and Form A as the post test. An analysis was performed to compare the two groups regarding individual performance on each item from pre- to post test. The AB group mean improvement was 11.17 (On the average they had improved as a group on slightly more than eleven of the items.) The BA group mean improvement was 12.17, a difference of one item.

Table 4-7  
Comparison of Performance by Individuals from Pre- to Post Test  
Group A/B Results and Group B/A Results

		Improved	Same	Negative
AB	Totals	67.00	35.00	24.0
	Means	11.17	5.83	4.0
	Modes			
	Range			
BA	Totals	73	34	19
	Means	12.17	5.67	3.17
	Modes	10&14	2&6	5
	Range	10-14	4-7	0-5

### Affective Evaluation Results

The participants (after having completed the post test) also completed the Fire Safety Evaluation Form (See Appendix A.) a Likert-Scale type instrument designed to measure their feelings about the training they had just received.

*Question 5: Did the participants have positive feelings about the workshop and their learning?*

Items were developed to approximately match the cognitive content. (See Figure 1 below.)

Figure 4-1  
Match of Modules and Items on the Evaluation Form

Module	Item Numbers
Module 1--The Need for Fire Safety	#1, #7
Module 2--Safety Codes and Fire Behavior	
Module 3--Human Factors	#5, #6
Module 4--Fire Hazards	#3, #9, #8
Module 5--Fire Safety Devices	
Module 6--Fire Emergency Planning	#2, #4
Class Atmosphere	#10

The results of the analysis presented below in Table 4-8 suggest an overall approval of the participants of the class and a feeling that they believed they had gained in knowledge during the day. Approximately 91 per cent of the participants (over the average) either agreed or strongly agreed with each statement. Since all statements were positive statements about the training, that was the desired response. Items 2 and 3 which dealt with identifying fire safety procedures and making their facilities safer received the most positive ratings. Item 7 related to legal responsibilities received the least number of positive ratings and the lowest overall score.

Table 4-8\*  
Participants' Attitudes Towards the Training and Their Learning Experience (N=12)

Item	Percentage of Respondents				
	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
1. I was motivated to learn more about fire safety by this training session.	33%	58%	8%	0	0
2. I am better able to identify and do something about fire safety problems than I was before this training.	50%	50%	0	0	0
3. I have a clear idea of the things I must know about to make my facilities and clients safer from a fire.	50%	50%	0	0	0
4. Issues were raised which causes me to rethink our current fire emergency procedures.	42%	42%	8	8	0
5. I have a better understanding of the special needs and risks of the clients and staff.	25%	58%	8%	0	0
6. I can better evaluate my own readiness to deal with a fire emergency than I could before.	25%	67%	8%	0	0
7. I have a clearer understanding of my legal responsibilities and licensing requirements than I did before.	17%	50%	25%	8%	0
8. I have a better understanding of the things I must do regularly to prevent a fire.	25%	67%	8%	0	0
9. I am more aware of the consequences of smoking and other high risk behaviors.	33%	67%	0	0	0
10. I was encouraged to express my thoughts and feelings in this class.	33%	67%	0	0	0
<b>Average</b>	<b>33.3%</b>	<b>57.6%</b>	<b>6.5%</b>	<b>1.6%</b>	<b>0</b>

\* Averages do not total 100% due to rounding.

**Question Six:** *How did the workshop training vary from the plan in terms of time spent on each topic, the specific information covered, and the participants responses?*

The time allocated for each module was generally adequate except for Module One. (See Table 4-9.) On that module the trainers spent thirty-five minutes more than had been planned. Examination of the observation data, however, indicates that the trainers deviated markedly from the instructions and spent time discussing fire safety codes and other topics that had been planned for later modules. The purpose of Module One was to point out the major reasons why fire safety is especially important in board and care environments with clients with developmental disabilities. Module Six was covered very briefly and Module Seven was not discussed at all. A structured training program for "trainers" should improve the timing of the workshop.

Table 4-10 summarizes trainers' comments that were not included in the course materials. These comments will be analyzed to determine whether they should be added to the revised trainer's manual. Questions such as "What can burn in this room?" were considered to be appropriate and helpful by the observers. Also included were two devices brought in by trainers that had not been anticipated.

Table 4-11 identifies the questions asked by participants. They will be analyzed by the project staff and incorporated into the coursebook or trainer's manual.

Table 4-9  
Time Expenditure for Training By Module in Minutes

Module	Time Allotted	Time Used	Difference
Pretest	15	30	+15
Course Introduction	15	0	- 15
Module One	45	80	+35
Module Two	60	63	+ 3
Module Three	60	51	- 9
Lunch	30	43	+13
Module Four	30	38	+ 8
Module Five	30	49	+19
Module Six	60	22	- 38
Module Seven	30	2	- 28
Post Test and Evaluation	60	15	- 45

Table 4-10  
Trainers' Comments Not Included in Course Materials

MODULE	COMMENTS
One	<ul style="list-style-type: none"> <li>Fighting fires incorrectly is one of the ways that fires get out of control.</li> </ul>
Two	<ul style="list-style-type: none"> <li>A graph was drawn showing how fire grows exponentially.</li> </ul>
	<ul style="list-style-type: none"> <li>In the first five minutes of a fire, the temperature within a room can reach 1800 F.</li> </ul>
	<ul style="list-style-type: none"> <li>Smoke changes from lighter to darker as the fire intensifies.</li> </ul>
	<ul style="list-style-type: none"> <li>Discussion of fire-setters.</li> </ul>
	<ul style="list-style-type: none"> <li>Participants were asked "What can burn in this room?"</li> </ul>
	<ul style="list-style-type: none"> <li>Participants were asked "What is an example of an interior finish in this room?"</li> </ul>
	<ul style="list-style-type: none"> <li>There are no fire rating requirements for furniture.</li> </ul>
	<ul style="list-style-type: none"> <li>Fire retardant clothes for children were proven to cause cancer.</li> </ul>
Three	<ul style="list-style-type: none"> <li>The participants were told to read the section on client's strengths and weaknesses, and to use it as a future reference.</li> </ul>
	<ul style="list-style-type: none"> <li>The fire department is there to serve you. Invite them over and talk to them.</li> </ul>
Four	<ul style="list-style-type: none"> <li>Use fire retardant blankets for people who smoke.</li> </ul>
	<ul style="list-style-type: none"> <li>Make sure that when your electricity goes off, you turn off your stove.</li> </ul>
	<ul style="list-style-type: none"> <li>Rags ignite through spontaneous combustion.</li> </ul>
Five	<ul style="list-style-type: none"> <li>In 1991, all new single family residential homes will require sprinkler systems in P.G. County, Maryland.</li> </ul>
Six	<ul style="list-style-type: none"> <li>None</li> </ul>
Seven	<ul style="list-style-type: none"> <li>None</li> </ul>

Devices Brought in By Trainers

- A self-extinguishing fire blanket was shown and discussed.
- Two different types of sprinkler heads, ceiling and side wall, were shown and discussed.

Table 4-11  
Participant Questions During Training

MODULE	QUESTIONS
One	• What are the legal responsibilities of residents?
Two	• Why are so many fire fighters injured? • Does furniture have fire ratings?
Three	• Who should we contact if we have questions about fire safety?
Four	• None
Five	• Why are fire ladders not recommended? • What if there is only one exit from our home? • Are remote receivers expensive? • Once activated, do sprinkler heads need to be replaced? • How long do sprinklers take to be activated? • How long does the water keep coming out? • How do you know if a door is a fire door?
Six	• None
Seven	• None

### Continuing Education Survey

Following the post test, participants were asked to complete the Continuing Education Form (See Appendix A.) This program was proposed to provide participants with information that could not be included because of the limited amount of time for the fire safety workshop as well as to provide board and care operators and staff with information on new equipment or research findings in the area of fire safety. Questions were geared primarily to identifying topics and materials of greatest interest.

*Question Seven: How much were the participants willing to pay for a continuing education program?*

The participants were asked how much they would be willing to pay for an annual subscription. They were given three choices. (See Table 4-6.) The majority of the participants were willing to pay \$60 per year. Participants were also asked if they would purchase videotapes for staff or client training individually (not included in the subscription). Eleven of the twelve participants responded "yes." All of the respondents preferred VHS half inch format and were willing to pay \$25 each.

Table 4-12  
Participants' Willingness to Pay for Continuing Education (N=12)

No Response	\$60.00	\$120	\$200
2	7	2	1

*Question Eight: What kinds of materials did the participants say they preferred?*

Participants were presented with a list of materials and asked to rank them from one to eight in terms of their personal preferences. Videotapes were the overwhelming favorite as all twelve respondents selected this as the preferred training media. Table 4-15 below lists the media in the order of preference. Points were assigned by order of preference (from 7 to 0) and totaled.

Table 4-13  
Participants' Preferences Regarding Training Media (N=12)

Rank Order	1	2	3	4	5	6	7	8	Total
Media									
N=	12*	11	9	8	7	6	6	1	
Videotapes	12	-	-	-	-	-	-	-	84
Booklets	-	2	5	-	1	1	-	-	42
Checklists	-	4	-	2	2	1	-	-	40
Transparencies	-	1	1	1	-	-	4	-	36
Audiocassettes	-	2	1	3	-	2	1	-	34
Slide/Tapes	-	1	2	-	3	1	-	-	27
Filmstrips	-	1	-	3	-	1	1	-	21

Question Nine: What subjects or topics would the participants like information about?

Nine possible topics were listed for participants to rank in terms of their preferences. Total scores were calculated by assigning 8 points to topics receiving number one ranking, 7 to the topics receiving a second ranking and so forth. Of the five most popular training topics, four were to be presented on videotape. Only one non-video made the top five, the photographic essay on problems and causes of death and injury in fire emergencies based on actual cases. The top ranking topic for future development was the videotape showing the proper way to conduct a fire drill with practice of primary and alternative routes and refuge strategies. The least preferred topic presented was to develop art posters on fire safety suitable for framing.

Table 4-14  
Participants' Preferences Regarding Training Topics (N=12)

Rank Order	1	2	3	4	5	6	7	8	9	Total
Topic										
N=	12*	11	9	8	7	6	6	1		
Video: Proper Way to Conduct a Fire Drill for Staff and Residents	4	1	3	2	-	-	1	-	1	81
Flashover edited for B&C audiences	2	3	2	1	1	-	-	-	1	68
Photographic Essay on Causes of Fire Emergencies	2	1	1	2	2	-	-	1	-	57
Video on Hazards & Code Violations	3	2	1	-	2	1	-	-	-	52
Video: Sprinkler vs Smoke Detector	1	2	1	1	1	1	1	-	-	52
Cassette: When you Need a Fire Safety Consultant	-	2	-	-	1	1	1	1	2	32
Cassette: Bedtime Safety Check	-	-	-	1	-	4	3	1	-	33
Booklet: Interior Finishes	-	-	-	2	1	1	1	2	1	29

\* Number of respondents ranking the item. All respondents did not rank all 7 items. None of the respondents named another type of training aid.

\* Number of respondents ranking the item. All respondents did not rank all 7 items. None of the respondents named another type of training aid.

*Question Ten: The final question posed to the participants was on their preferences with respect to checklists.*

The four items listed were part of the course package that they had already received. This item could shed some light on which of the job aids included in the training package would be most likely to be used. Participants were simply asked if they would purchase a package (tear tablet) of job aids. The highest ranking given to any of the items was the monthly fire hazard checklist. Only 50% of the participants indicated that they would want to purchase those items.

Table 4-15  
Participants' Interest Regarding Four Job Aids (N=12)

Topic	Interested	Not Interested
Monthly Fire Hazard Checklist	50%	50%
Fire Drill Evaluation Form	33%	67%
Individual Resident Fire Drill Performance Form	9%	91%
Fire Report Form	17%	83%

### Summary of Results by Module

#### *Module One-Need for Fire Safety (Motivation)*

Module One was tested only by Item 1 on the pre- and post test. A majority of the participants (N=7) improved from pre- to post test on this item. Four others scored the same on this item. The twelfth participant received a lower score the second time around. More emphasis needs to be spent on the "reasons" for fire safety rather than on fire safety codes.

The total score for item one improved from pre- to post test from 20 to 33 points. The improvement (13) was above the average improvement overall (9.1). See Table 1 above.

Items measuring affective response suggest that participants felt that they were motivated by the training to learn more about fire safety. Participants did not feel they learned enough about their legal responsibilities. Additional research will be conducted on this topic. A few examples of court cases in which board and care owners were held responsible for property loss or injury will be presented. The specific areas in which legal responsibility can be an issue will be added to the Coursebook for discussion purposes.

#### *Module Two-Fire Behavior and Code Requirements*

Items 2,3,4,5,and 6 on the pre- and post test measured content related to fire behavior and code requirements. Topics included interior finishes (item 4). Question 6 (the one item on which every participant showed improvement) related to vertical openings—a term no one understood before the course (as measured by the pretest response) and which all participants understood better after the training (as measured by the post test).

Item 2 which requested information about required fire safety activities was supposed to elicit responses related to legal requirements, e.g. to hold regular fire drills, to test smoke alarms, etc. was apparently not clear to the participants. The test item itself seems to have been misunderstood.

Item 4 related to interior finishes. Participants knew what interior finishes were and that they should be fire resistant or retardant, but only two participants mentioned Class ratings which

was the desired response. The Focus Group recommended a list of good and bad finishes—those which are highly flammable and those which are more fire retardant.

### *Module Three—Human Factors*

Items 8, 9, 10, and 11 measured cognitive learning related to human factors (e.g, client and staff characteristics, community resources, human behavior in fire). An audiocassette was used to convey content related to human behavior in fire. Participants, as a group, showed an improvement on each of these items.

It should be noted, however, that a large number of participants indicated on the pre test that "panic" was a common response. A few of the participants also included that behavior on the post test although "panic" as an expected behavior was not mentioned in the course materials.

### *Module Four—Fire Hazards*

Module Four was measured by responses to Items 12 and 13 on the pre-post test and by items 8 and 9 on the Evaluation Form. On both items, participants showed a larger than average gain from pre- to post test. Responses to items 8 and 9 on the Evaluation Form were also mostly positive.

### *Module Five—Fire Safety Devices*

Knowledge about fire safety devices was measured on the pre- post test by items 14 through 16. One set of items dealt with the use of fire extinguishers. Participants improved (+3) on those items. Specific information about fire safety devices and potential problems for people multiple handicaps needs to be explored in more depth.

### *Module Six—Emergency Planning*

Finally, items 17 through 20 dealt with topics related to emergency planning. Participants showed improvement from pre- to post test on all items even though less time than was planned was spent on this module. Item #20, how to improve fire safety, requires a structured activity; however, since it is the last major topic of the day, fatigue may continue to be a problem.

### *Module Seven—Staff and Resident Training*

No test items were designed to measure the participants ability to transfer their learning to other staff members or residents. Project staff recommends developing a follow-up questionnaire to assess how many of the participants used the materials or job aids in staff training.

Figure 4-2  
Summary of the Findings by Objective

Module	Objective	Achieved	Partially Achieved	Not Achieved
1	1	x		
2	1	x		
2	2		x	
2	3	x		
2	4	not adequately measured		
3	1	x		
3	2	x		
3	3	x		
3	4	x		
4	1		x	
5	1		x	
6	1	x		
6	2	x		
6	3	x		

### Summary of the Findings

1. Participants in the workshop significantly improved their mean scores from pre- to post test.
2. Participants in the workshop improved their scores on each item (N=21) except for 3.
3. The majority of the participants achieved the majority of the objectives.
4. Overall the course materials were appropriate and useful in accomplishing the objectives.
5. The majority of the participants were interested in continuing education materials.
6. Videotapes are the preferred training aids of all of the participants.

## CHAPTER V SUMMARY AND RECOMMENDATIONS

### Summary

The overall goal of the project to develop a prototype fire safety training system, and demonstrate its feasibility and effectiveness with operators and staff of board and care homes for adults with developmental disabilities was successful. The participants showed improvement on a majority of the items measuring their knowledge of fire safety. They indicated that their attitude towards their learning and the workshop was very positive. Their responses to the "Continuing Education" survey suggested their interest in learning more about fire safety and conveying their knowledge to others.

Analysis of the data obtained from the pre- and post test, the course evaluation, the continuing education survey, and the observation notes indicated the aspects of the program that could be improved prior to conducting the field test of the program scheduled for Phase II. One of the findings was that combining the training manual and the participant's coursebook would make it easier for the trainers to handle. Another aspect of the findings is the need for trainers to have a greater depth of understanding of developmental disabilities and board and care operations in addition to knowledge of fire safety.

The training for the trainers, a one day workshop in which the trainers and the developers went over the materials in detail, was adequate for the pilot test, but pointed out the need for the more intensive three day training planned for Phase II. Trainers need to become fully prepared in developmental disabilities, board and care operations, and fire safety codes that pertain specially to board and care homes.

### Recommendations for Changes to the Coursebook

In general, the coursebook including the checklists (job aids) successfully presented the content. A few specific changes have been described below to strength the areas where the participants performance was weak. The coursebook could be improved by using an offset printing process rather than a copier. The photographs would especially be improved by printing. In some cases, as noted below, the photographs were not clear and should be reshot.

#### Module One: The Need for Fire Safety

Although participants improved on this item, the coursebook materials need to emphasize that the need for fire safety is due to the increased risk of death, injury, and property damage in board and care homes when there is a fire.

#### Module Two: Life Safety Codes and Fire Behavior

On the Residence Checklist, add "Check posted escape plan" and "Check fire drill records."

Emphasize that Class A is the safest rating for interior finishes and that Class A interior finishes should be purchased for board and care homes for maximum safety.

More emphasis should be placed on "doors" as a fire safety requirement.

Add photographs of code violations - ideally showing both good and bad examples.

Add illustration or photograph showing legal and illegal egress (access, exit, discharge).

#### Module Three: Human Factors

Emphasize on Human Behavior During a Fire that most people do not panic during a fire. A large majority of participants in the workshop and the students who pre-tested the materials at Bowie State University held the view that people are likely to panic.

Add to the Bedtime Hazards Checklist "9. Have slippers, robe ready near the end of the bed., and "10. Have flashlight, glasses, and whistle near bedside."

Add multiple handicaps to considerations when planning a fire safety program.

Plan an activity to follow-up the audio cassette to promote discussion of how the information can be used to plan a fire safety program.

#### Module Four: Fire Hazards

Add Christmas tree hazard.

Add computer aids.

Add discussion and illustration of pile of rags and spontaneous combustion.

Reshoot dark and unclear photographs.

#### Module Five: Fire Safety Devices

Emphasize "Use a fire extinguisher ONLY to save someone's life." Few participants mentioned that saving someone's life is the only time when you should use a fire extinguisher. Most participants knew that you should only try to fight a "small" fire.

Perhaps "small" or "friendly" fire should be described. Participants seemed to hold the view that fighting a fire was permissible even after the training.

Reshoot dark and unclear photographs.

Emphasize importance of considering multiple handicaps, e.g., hearing impairment and epilepsy, when selecting special fire alarms. Certain flashing lights, for example, are not suitable for people with epilepsy.

#### Module Six: Fire Emergency Planning

A separate page with photographs should be prepared to explain "refuge" procedures such as feeling the door to see if it is hot, putting towels around the door, and so forth. Participants did very poorly on this item.

### Recommendations for Additional Training Aids

1. Posters for each module listing the main points of that module that trainers can use to introduce the module and post as reinforcement during the training. (See Appendix C.)
2. A video showing code violations in a house. Participants can look for the violations and write them down as they occur. This activity should be supported by black and white photographs of the violations in the Coursebook, Module 2, and used as a review after the video.
3. A video showing a demonstration of fire drills (practice, planned, and surprise, using primary and alternative routes) and a demonstration of refuge procedures would be very useful.

### Recommendations for Changes to the Trainer's Manual

The Trainer's Manual and the Coursebook should be combined into one publication. The coursebook should be reduced to 75%. The Trainer's Manual instructions should be printed in the right hand margin—preferably in a second color.

#### Introduction

Trainers did not use introduction in the TM; however, there needs to be instructions for warm-up or get acquainted activities. Trainers need to discuss workshop goals and objectives and briefly go over the agenda before beginning.

#### Module One: The Need for Fire Safety

Trainers need to emphasize that the need for fire safety is related to the increased risk of death, injury and property loss.

Add additional information about legal responsibilities including examples of situations where board and care staff were legally responsible for fire loss.

#### Module Two: Life Safety Codes and Fire Behavior

When introducing Flashover, Trainer: How long do you think you have to get out of a house during a fire? Trainer can record responses on a flipchart and ask the participants to respond again after the video.

Video Follow-up: Add answers to the teacher's guide.

Add the question, How does smoke travel? (Upward to ceiling through vertical openings and through ventilation systems.)

Interior Finishes—When introducing this subject, the trainer can ask: Look around the room. What can burn in this room? What are the interior finishes in this room?

Emphasis that Class A or B interior finishes are required.

Add a page on furniture. Give examples of upholstery that is better or worse. Say that there are no requirements for board and care homes for furniture.

Add discussion of safe means of egress. (Use the coursebook material.) Explain the 3 criteria for a safe egress: access to the exit (you have to be able to get to the exit. It can't be blocked by something), an exit (windows can't be blocked by air conditioners, for example.), and a safe discharge (can't be a hole or broken steps, etc.).

Mention fire safety devices as a life safety requirement. Do not go into detail on how they work or what they do.

Under Common Code Violations, add storage of paper products near the furnace, frayed electrical wires.

#### Module Three: Human Factors

Under client characteristics omit the questions to improve the time allowed for this topic. Tell the participants to read the material later or refer to it as needed.

Under fire safety resources provide a poster (or have the trainers prepare a flipchart page ahead of time) showing resources. Add Health department as a possible resource.

#### Module Four: Fire Hazards

For suggestions on minimizing risk of smoking fire, add smoke in an upright position to avoid falling asleep. Add use metal or glass ashtrays.

For suggestions on minimizing risk of cooking fire, make sure stoves and oven are turned off during a power outage. A burner that was on cooking something could come back on during the middle of the night or later when no one was watching it.

Under extension cord, add walking on an extension cord wears out the insulation.

Under cleaning fluids, ask the participants if they know that rags can catch on fire without any ignition source through spontaneous combustion. Discuss meaning of "spontaneous combustion."

Modules Five through Seven: No changes.

### Modifications to the Pre-/ Post Test

On the whole the post test (Form A and Form B) were adequate to measure the course effectiveness. On a number of measures used, the tests appeared to be both content valid and reliable. A few of the objectives, however, were not adequately measured and items need to be added to the field test version of the workshop. Analysis of a few items suggest that the wording was not clear.

The pre and post test need to be revised from free form answers to multiple choice for ease of use and standardization of grading by instructors in the field. Even if tests were mailed to the main office of BW&A (the developers) the expense of evaluating the exams could be prohibitive. Multiple choice items would permit the use of a longer test with more items.

## Implications for Phase II Training

During Phase II, project staff will develop the curriculum for the training of trainers. There will be one module on the following topics: developmental disabilities, board and care administration, and fire safety as it applied to board and care homes. Trainees will become familiar with the training materials and will practice teaching them to the others in the class. The third day of training will be a field test of the training program at one of eight sites in the state of Maryland. Trainees will be assigned to sites in teams of two. The training will be observed by a member of the project staff.

The following suggestions will be implemented during Phase II.

1. Changes to the trainer's manual and the participant's coursebook should be made prior to the pilot test of the trainer's workshop. Both the manual and the coursebook will be printed on one side only unless prohibited by budget constraints.
2. Trainer's need to spend at least a full day getting familiar with the materials and practicing their use. One approach could be to divide the trainees up into six groups and have each group present one Module to the others. That way the trainees would have practice teaching the materials and also learn their contents.
3. Early in the development of the trainer's manual, project staff should develop the pre-post test for each module and have it tested with a group of individuals similar to those who will participate in the training. The information acquired from the Phase I preassessment with Bowie State University students regarding their preconceived ideas (e.g., people are likely to panic during a fire), the areas where they had no previous knowledge (e.g., vertical openings), and vocabulary which they do not know (e.g., egress) would have been more useful had the project staff had it earlier.

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## Organizations Contacted for Information

Administration of Developmental Disabilities—Board and Care Coordinating Unit  
AMCARE CORPORATION, Newport News, VA  
American Psychiatric Association  
California Specialized Training Institute (CSTI)  
Center for Fire Research  
Center for the Study of Social Policy  
City of Los Angeles, CA, Fire Department  
Deaf and Hearing (organization)  
Delaware State Fire School  
FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)  
Massachusetts Department of Mental Health  
Massachusetts Firefighting Academy  
National Association of Residential Care Facilities  
National Bureau of Standards, U.S. Fire Administration  
National Fire Protection Association  
Project Share  
US Department of Health and Human Services

### Attachments: \*

The Need For Fire Safety (video)  
Human Behavior in Fires (audio cassette)  
Fire Safety in Board and Care Homes (Coursebook with Job Aids)  
Fire Safety in Board and Care Homes (Trainer's Manual)

\*These items are available from the author.