

AN ABSTRACT OF THE THESIS OF

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Title: A Comparison of Two Instructional Methods for Hospital Food-

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The purpose of this research was to compare two instructional programs of inservice training on Personal Hygiene for hospital foodservice employees for knowledge retention and cost effectiveness. The two instructional methods used were lecture discussion with a script and transparencies and the individual instruction with cassette tape and slides.

The population sample was ninety-five foodservice employees from five Oregon hospitals. Forty-eight foodservice employees comprised the lecture discussion group and forty-seven foodservice employees comprised the individual instruction group. A demographic profile identified eighty-one percent of the foodservice employees as having four years or less work experience at their hospital in foodservice. Sixty-nine percent of the hospital employees had a job title of foodservice worker. Sixty-five percent of the participant population also had previous training in Personal Hygiene. The evaluation tools were a pre and post test consisting of 25 multiple choice items and a time log to record instructor's time involved in preparation and

administration of the instruction. Each method was evaluated for knowledge retained using the analysis of covariance at the  $P = .05$  level of significance. Then each method was also evaluated for cost effectiveness which included both instructor and participant time and the materials cost.

There was no significant difference of knowledge retained between the two instructional methods. The cost analysis revealed that the lecture discussion method was only 7.6 percent cost effective where the individual instruction was 92 percent cost effective using the Gallup formula. This cost analysis included both instructor and participant time along with the actual cost of the instructional materials.

In comparison of the lecture discussion and individual instructional methods there was no significant difference in learning retention. However, the individual instruction was most cost effective. Therefore, the individual instructional method is recommended as a teaching method for hospital foodservice employee inservice training.

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versus Individual Instruction

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A Comparison of Two Instructional Methods for Hospital  
Foodservice Employees: Lecture Discussion  
versus Individual Instruction

INTRODUCTION

The major goal of foodservice departments is to produce quality food products using the most economical methods possible. Quality foodservice products are possible through temperature maintenance, portion control, production and service as they relate to preparation methods, nutrient control and cost. All these elements should be present to meet minimum standards for quality foodservice (1). To assure quality food production, training foodservice employees within the foodservice department is a primary concern so that the goals of the department can be met. Therefore, training is a basic element of foodservice departments used to assist individuals to function in these departments effectively (2).

Inservice training may be defined as teaching an employee what to do, why and how to do it within the facility (3). Inservice training should be a complete effort with the support of all segments of the organization with programs for all. The inservice program should be focused on keeping a frequently used skill up to standard as well as to help individuals learn new skills. Therefore, inservice training needs to be designed to help employees develop job skills and should be implemented on a continuing basis. When objectives of an inservice training program have been decided, the method of implementation is the next step (1).

Inservice training according to Schweitzer (4) should be considered an integral part of the operation of a facility, and long-range planning will improve the chances of success. If economic resources are planned, justified and committed, inservice training will have a greater priority and become a part of the operation. Providing employees with meaningful education is one of the best methods of foodservice manager has to motivate, train and possibly

contribute to the control of dollars caused by unnecessary employee position turnover, lower productivity, absenteeism and the effect of negative attitudes. All of these components affect food quality in the foodservice department. Inservice training topics comprising an education program in foodservice departments include areas of: (1) proper cooking and serving; (2) basic nutrition; (3) food safety and sanitation; (4) personal health habits; (5) fire and safety regulations, and (6) public relations.

### Regulating Agencies of Training

Regulating agencies such as the Food and Drug Administration of the Department of Health, Education and Welfare (5) and the Joint Commission on Accreditation of Hospitals (6) have regulations for national, state and local governments to use in monitoring the standards and procedures when providing training to foodservice employees. The Department of Health, Education and Welfare and the Food and Drug Administration developed a manual on sanitation for foodservice personnel to use as a guide in training. It is composed of sanitary techniques in foodservice regulations and requirements that need to be followed while working in a foodservice establishment. The Joint Commission on Accreditation of Hospitals (JCAH) (6) has continually expanded and more clearly specified areas such as temperature control, food quality and sanitation and safety, in which foodservice employees must be trained. Although JCAH has specified the subject matter that is to be covered for training employees, the amount of training, methods used and program administration are left to the discretion of each hospital. In order for a training program to be effective, management personnel must believe in it and be dedicated (7). Also, the foodservice manager must be willing to budget resources necessary to comprise a sound, effective and interesting program.

### Employee Motivation and Turnover Rate

Foodservice employees need to be motivated to continually meet the goals of the department (8). Items that contribute to motivation are job satisfaction, respect from supervisors and recognition of the employees as individuals. Lack of motivation may cause employee dissatisfaction and could result in high costs for the department. These costs occur in areas of management time involved in employee retraining on the job, a waste of resources as a result of re-doing employee work, unnecessary utilization of benefits such as too frequent use of sick leave and often maintenance of uniforms (9). Therefore, training is one area that can contribute to employee motivation. Job satisfaction plays a large part in keeping the employee motivated to come to work and perform the job in a satisfactory manner. As was identified earlier, foodservice employees want to be respected as individuals and are usually more interested in learning if their efforts are recognized. According to Richard A. Hagan (8), Director of Training for ARA Services, Inc., training is probably more critical in this field than in any other because foodservice employees work closely with consumers. Training can help them do their job well and this in turn, may assist in motivating them to stay on the job (10).

The employee position turnover rate in most foodservice departments, as in other service areas, such as departments of housekeeping, maintenance and nursing, is usually between 50-80 percent (11). The turnover rate has long been recognized as a factor which results in high costs in management time to consistently retrain and orient new employees (12). Foodservice managers have the problem of attracting and keeping non-supervisory employees due to the minimum pay scale and the often less desirable environmental working conditions such as standing on hard floors, poor ventilation, crowded work area, heat and noise. Mier (10) reports that the

training of foodservice employees in the past few years has been a factor in a cost-saving as well as increased employee motivation.

### Informal Survey

An informal verbal survey (13) was conducted in Portland and Wilsonville, Oregon, in November of 1980 to determine what inservice training programs existed in selected hospitals and restaurants. Seven Portland hospitals and three local restaurants were asked to participate. A survey opinionaire, Appendix A, p. 56, was used to assess the current status of inservice training methods in these foodservices.

The outcome of this informal survey of restaurants and hospitals was that all establishments had some form of on-the-job training or inservice training for all their foodservice employees at least once a month. The respondents from all of the restaurants indicated their inservice was more on the job training rather than more formal classes. (Six) of the seven hospitals surveyed held inservice training programs at least once a month and one hospital held training programs weekly. The foodservice training methods used were the lecture discussion for eight of the ten facilities surveyed and the other two utilized the slide-tape individual instruction method. Therefore, this informal survey reflects that inservice training is being accomplished in some of the hospitals and restaurants in the Portland, Oregon area, but knowledge retention by the learner and the cost of the instructional programs were not documented.

### Research Study

The purpose of this study was to compare two types of inservice education, lecture discussion and individual instruction, for hospital foodservice employees. The retention of knowledge and cost

effectiveness of each method was measured and compared. For this study, personal hygiene as it related to foodservice sanitation was used as the content area of instruction of the newly hired employee.

The objectives of the study were to measure: (1) knowledge retention of the lecture discussion and individual instruction; (2) cost of each instructional method which included instructor and materials costs; and (3) time needed for each method including supervisor time needed for preparation and administration.

The null hypotheses of this study were: (1) there will be no significant difference ( $P=.05$ ) in the retention of knowledge using post test mean scores of hospital foodservice employees trained utilizing a lecture discussion versus an individual instruction method; (2) there will be no significant difference in instructor and participant time needed to complete the individual instruction and the lecture discussion method; and (3) there will be no major difference in the materials cost of the two instructional methods.

## LITERATURE REVIEW

The search identified areas of study pertaining to teaching methods for small groups. To provide background information on inservice training for hospital foodservice employees, two major aspects of the literature were reviewed in depth. These two areas were: teaching methods for small groups and teaching methods in foodservice. Based on the literature review, the researcher revealed that learning retention and cost effectiveness of inservice training for hospital foodservice employees was limited.

### Methods of Training for Small Groups

#### Lecture Discussion

One of the earliest and most common methods of presentation for inservice training was the lecture discussion approach (14). The lecture discussion method consisted of presentation of a specific subject matter to a group of learners with possible utilization of visual aids, such as charts, slides, overhead projector or chalkboard. The advantages of this method were that it required nontechnical hardware, such as a slide projector, tapes or television monitor. Errors or slight deviations in performance were pointed out and explained by the instructor. If the training group was small, questions could be directed to the instructor. Often times, the instructor was the manager or immediate supervisor and the "cost" of the presentation was absorbed in the organization. Disadvantages of this method of training were that the teaching method or program may not be standardized. If the group was large, some participants would not be able to hear or see the details and repeated demonstrations could be expensive (14). Also, the variability between instructors in presentation of the lecture material could affect learning retention. Thus, the results of such training was variable, depending upon many uncontrolled or uncontrollable conditions.

### Individual Instruction

Individualized instruction allows the learner to proceed at his/her own rate with the presentation of each phase of learning segmented in small steps to facilitate the retention of knowledge (15,16,17). When using individual instruction, the learner is given a reasonable amount of time to complete a program of instruction with the utilization of a cassette tape-slide presentation. The individual then proceeds to go through the specific subject matter at his/her own desired pace, viewing the slides with the cassette tape. Sometimes a workbook is provided so that the learner may answer questions throughout the program or the learner takes a pre test, views the subject matter, then completes a post test. An individualized learning system is a highly flexible system of multiple materials and procedures. The learner is given substantial responsibility for planning and carrying out his/her own organized program of studies with the assistance of instructors, and in which the progress is determined solely in terms of those plans (18).

Other methods of training for small groups include teaching machines which, is an auto-instructional technique, computer assisted instruction, printed modular instruction and physical objects. The following paragraphs will give a brief description of each method and its characteristics.

### Teaching Machines

Teaching by machine (19) is one application of the auto-instructional technique. The many types of teaching machines and programs have the three characteristics in common: (1) continuous active response is required by the learner; (2) provision is made for informing the learner immediately as to the correctness of the response; and (3) the rate at which the learner proceeds is determined



by their own capabilities. Teaching machines have been utilized in school systems and large hospitals in the Midwestern states for inservice training (19).

### Computer Assisted Instruction

Educators have recognized the value of computers as effective teaching tools since the early 1970's (20). The ability to individualize the learning process, develop decision-making skills, monitor student progress, and direct learners into remedial sequences are a few of the many features the computer program offers.

The first important consideration in designing computer-based materials, according to Caldwell (21), is to make instruction as interactive as possible. An interactive program presents learners with a stimulus to which they must react. This stimulus can be in the form of problems, texts, situations or questions. Learners must be involved in a response behavior to be given information that will aid their progress through the lesson. Computer assisted instruction has become more common for instructional programs in hospitals and schools, but is still in the future planning stages with many organizations (20).

### Printed Modular Instruction

The learning module is a self contained teaching unit. The module employs a systems approach to learning which is defined as an organization of learning experiences into steps from the very simple through the complex (22). Each of these steps or modules is an independent unit. The units combine to form a progression in which the learner mastering the content of one level of skill, moves ahead to the next level, building on his/her previous learning. This process continues until one is capable of performing the full range of

activities required. Each learner is allowed to move ahead at his/her own rate, using whatever available resources that will best enable the learner to meet the states objectives.

The performance of each learner in the classroom, on the job or in a vocational setting, using the printed modular instruction is evaluated against pre-defined criteria of their individual behavior rather than against the performance of other learners. As a result, all learners completing a given module can be safely assumed to have demonstrated specific competencies despite variables with time spent in study and with different instructors observing their performance. Benefits to the institution, learner and the instructor which can result from this type of instruction include: (1) new learners can begin their training program immediately, (2) the time a new learner with previous experience spends in a training program may be reduced which would enable him or her to make a greater contribution earlier in his or her learning task; (3) the learner may repeat study materials as many times as necessary for mastery without fear of criticism; (4) the learner initiates arrangements for testing rather than having tests imposed by the instructor, (5) the instructor is freed from the necessity of repeating the same lecture material to successive groups of learners at frequent intervals; (6) latitude is given the instructor to schedule learners into the learning center for optimal use of their own time as well as the learner's; and (7) the instructor is assured that all learners completing a unit of study demonstrates the ability to perform at an acceptable level as determined by post test evaluations (22,23).

#### Demonstration

The physical object types of instruction involves a demonstration technique where actual objects, mockups or models of the "real things," are used (24,25). An example of this type of instruction would

be an actual cooking demonstration with food and equipment to show various cooking methods. The instructor uses actual materials to teach a concept or principle to the learner.

### Teaching Methods in Foodservice

#### Lecture Discussion

The most common method of training, the lecture discussion approach, is still used throughout numerous hospitals and other institutions for inservice training, but is fast becoming a secondary method to individual instruction (15,17). This is due to the cost factor in the supervisor's time involved with preparation and presentation of the training program. This method of inservice training for hospital foodservice employees involves the supervisor or foodservice manager scheduling several sessions for one subject matter area due to the various shifts and also each session taking a minimum of 20 to 30 minutes for presentation of the material. Often, due to the preparation involved in administering the subject matter, inservice training of this type is not given on a regular basis (26).

#### Individual Instruction

The movement from group-oriented, teacher-directed instruction to an individualized-personalized learning situation prompted the use of new instructional strategies. Individualized learning is a more structured program than independent study, while at the same time remaining very flexible. The advantage of this type of instruction in foodservice is that the learner has more individualization in the learning process, creating more interest and motivation. Also, standardization of the content material can be maintained due to the same slide-tape cassette being utilized for the instruction. The foodservice manager is then given more time to devote to creating more instructional programs and less time is actual presentation

of the material. The disadvantages of this type of training would be the actual initial cost of the audio-visual material such as a slide projector and cassette tape recorder needed to set up a learning center. Also, training of personnel to operate and receive technical knowledge could be costly and poor use of the food manager's time spent. There is also the possibility of equipment failure and malfunction due to improper operation or failure of the equipment itself (18).

### Teaching Machines

One application of the auto-instructional technique in food-service was a preliminary field study to determine the feasibility of using programmed instruction for teaching hospital patients with diabetes (20). The results of this study indicated that the teaching machine can be an effective tool in teaching patients how to take care of diabetes. Although these teaching machines have been and are being used in several large teaching hospitals (19,20), the common widespread use has not existed due to high costs of implementation and the hardware of the teaching machines themselves being very costly (19,27).

### Computer Assisted Instruction

Until the early 1970's, computer assisted instruction had faced two significant problems; expense of equipment and the lack of good interactive software. With the advent of the computer age, computer assisted instruction is becoming more common as a technique of inservice education for hospital foodservice employees (22).

Research that has utilized computer assisted instruction includes a study completed and documented by Waddle (28) in 1982 comparing the effectiveness of computer assisted instruction with the

lecture method of instruction. Findings indicated that participants in the computer assisted instruction group required significantly ( $P < 0.001$ ) more training time compared to the lecture method of instruction group. Computer assisted instruction group members who were less than 25 years of age attained significantly ( $P < 0.01$ ) higher gain scores than the lecture method of instruction group members of the same age category. Gain scores for the other age categories tended to be higher for individuals taught by the computer assisted instruction. These gain scores were, however, not significantly different from those attained by the lecture method of instruction group. Individuals participating in the computer assisted instruction group demonstrated an improved attitude toward computer assisted instruction. It was concluded from this study that the computer assisted instruction technique was equally or more effective than the traditional lecture method (28).

Computer assisted instruction has still been reserved for the larger teaching and government hospitals for utilization (19,28). The small hospital generally does not have the financial resources available to institute this computer assisted instruction in the foodservice department. Also, many foodservice management personnel lack training in computer assisted instruction, thus, implementation of computer assisted instruction is limited (29).

#### Cost Effectiveness of Inservice Training

Information on cost effectiveness of inservice education programs in foodservice is limited. Magrath (24) and Budig (30) have pointed out that the effective use of increasing scarce resources will be among the major challenges of inservice education in the future. Thus, the dilemma for inservice educators is to maintain or improve the quality of instruction while teaching more learners, yet utilizing fewer instructors and limited budgets.

One method of determining cost effectiveness of instructional

methods is the Gallup formula (31). The cost effectiveness was calculated as the achievement of students in one alternative teaching method multiplied by the number of students enrolled, divided by the product of time students devoted to instruction multiplied by the costs of instruction:

$$\frac{\text{Achievement x Students}}{\text{Time x Cost}} = \text{Cost Effectiveness}$$

A study conducted by Boren (32) et al., used Gallup's formula for cost effective evaluation of their multi-mode instructional strategy for a basic course in nutrition. The formula provided a means of comparing costs and benefits encountered when two instructional alternatives were used to teach the same course content. Additionally, in this study (32), the formula was used to show the relative effectiveness of each strategy. Two models were used. One model assessed course effectiveness on the basis of achievement on the pre and post test, while the other model used the scores on the attitudes toward the course questionnaire as the variable to measure differences within each model. Both models considered:

$\frac{\text{Achievement x Students}}{\text{Time x Cost}}$  for cost effectiveness. This research study only measured the achievement of both instructional methods.

Boren et. al., (32) made two minor modifications in the Gallup formula: to provide a more accurate measure of time spent, post test scores with covariant pre test scores were used in lieu of gain scores and the total hours spent in class were used as the time factor to eliminate possible bias in self-supporting study time. Gallup (31) cautioned that this model should be used only between alternative teaching methods when both methods involved the same course content and has as their-over-all goal the same basic objectives.

Cost is a primary determining factor in the development and administration of instructional programs. Whether or not a certain

instructional program will be used is most often dependent on the total cost involved.

Hospitals and Schools Where Training  
has been Documented

A study conducted by Mier (3) in 1976 of approximately 100 general bed hospitals indicated that all of the hospitals had some type of inservice education program, but usually a class was conducted only one a month as a formal training session. The Oregon State Department of Education (33) in 1978, developed an individual audiovisual inservice training program. This involved utilization of a portable audiovisual cassette recorder and study guides for the learner to follow. The various programs included subjects such as techniques for baking, vegetable cookery, salad preparation and meat cookery. Preliminary field testing found these individual study programs to be very effective, especially in the smaller school districts where inservice training was difficult to maintain.

Benefits of Training for Hospital  
Foodservice Employees

The benefits from training far outweigh the problems (27,30,34). The benefits can be measured for the learners, the department and the hospital. The learner benefits include: (1) a newfound sense of security from improved job knowledge; (2) development of pride in a job well done; (3) less fatigue because the job is being performed correctly; (4) improved morale through self-confidence and job know-how; and (5) an opportunity for promotion and meeting the need for recognition. Benefits of training to the department are: (1) a group of well-trained employees can efficiently perform assigned tasks within the unit; (2) a smoother, more efficient work flow because

workers know their jobs; (3) skilled employees require less supervision on the job; (4) better communications and human relations as each employee performs the work correctly; (5) reduced employee position turnover; (6) lower cost due to a decrease waste of food and supplies through employee error; and (7) better care and utilization of equipment. The benefits of training to the hospital are: (1) patient care at a reasonable cost; and (2) standardized work procedures carried out by competent employees (27).

Commitment to develop the entire foodservice staff, inservice training programs may be a short-term financial constraint, but a long-term investment for the future. Successful training programs have been noted to assist employees in areas of maintenance, service and waste, to improve current skill levels and provide an opportunity to advance to higher job classifications within the organization (35,36).

Grubb (37) proposes four points to consider when planning a hospital training program. First, decision must be made on how to train on the basis of data concerning the needs of the employee. Second, cost effectiveness concerns should guide the foodservice manager in presenting the training process. Third, evaluation data should be generated and analyzed to determine if the training has met the objectives. Fourth, evaluation of the objectives needs to be analyzed to determine if the objectives are appropriate to the real needs of the foodservice department. Grubb (37) suggests that the evaluation of inservice education programs in foodservice according to cost is limited and further research is needed for program evaluation for knowledge retention and instructional cost.



## RESEARCH DESIGN AND METHODOLOGY

The research study was designed to determine if there was a significant difference in the retention of knowledge of nonsupervisory hospital foodservice employees with the use of lecture discussion instruction versus an individual instruction method. This study was also designed to determine the cost effectiveness of each instructional method which included instructor, participant time/cost and materials cost.

The research study consisted of the following components for experimental design: (1) selection of the population sample; (2) data records; (3) pre and post test; (4) description of the two instructional methods; (5) statistical evaluation; and (6) pilot study. The population sample of non-supervisory hospital foodservice employees were divided into two experimental groups. The two groups consisted of those participants utilizing the two instruction methods, lecture discussion and individual instruction. Personal hygiene as it relates to foodservice, was selected as the topic of instruction for the participants of the study.

The objective of the research study was to teach non-supervisory foodservice employees a learning unit of material using one of two instructional methods, lecture discussion or individual instruction, to determine which method would provide the greatest degree of knowledge retention and cost effectiveness which also includes instructor and participant time. The hypotheses and criteria of the study were designed for practical application in foodservice facilities. The null hypotheses of the study indicated retention or rejection of the following points: (1) there will be no significant difference in the retention of knowledge of non-supervisory hospital foodservice employees trained by a lecture discussion method versus an individual instruction method, (2) there will be no significant difference in instructor and participant time to complete the two instructional

methods; and (3) there will no major difference in the materials cost of the two instructional methods.

A specification of terms was used to clarify the experimental design. Previous research utilized the terms of training, inservice training and inservice education interchangeably with no preference for each (1,7). This research study utilized the term inservice training which was defined as a method of instruction within a department that includes on-the-job training topics (4). Also, there has been little consistency in the job titles of employees in the foodservice area. For the purpose of this research, foodservice personnel were referred to as foodservice employees (1,7). The foodservice employees participating in this study were generally employed at the facility less than four years. Long-term foodservice employees were employees four years or longer at the foodservice facility.

#### Population Sample

The population sample consisted of two groups of non-supervisory foodservice employees currently employed at five hospitals in the Portland/Salem, Oregon area. Two of the hospitals were state institutions, which had capacities of 760 and 400 beds. The other three were community hospitals in Portland, Oregon and, had bed capacities of 400, 320 and 250. The lecture discussion group consisted of 48 employees, and the individual instruction groups consisted of 47 employees. All participants were employed at the hospitals either full or part time and selection was to include employees with generally four years or less experience at that hospital. It was the intention of this research study to obtain participants for both groups who were at a similar level of work experience in their current position.

Random sampling was the method of selecting the participants for the instructional groups within each hospital for the study.

The participants were then assigned to their respective groups and scheduling for instruction was completed by the hospital foodservice supervisor.

A time frame of thirty minutes was set aside for the administration of the group lecture discussion learning package. The individual instruction participants were also given a thirty minute time frame in which each participant was to complete this learning package. The hospital foodservice supervisor scheduled various times throughout a two week period for each participant to complete the individual instruction. This time also allowed ease of scheduling both part-time and full-time employees.

#### Instructional Package Documents

The documents that were developed and used in the research study included the following: (1) cover letter to participating hospital; (2) participant consent form, Appendix B, p. 58,59 and (3) lecture discussion instructional package; with (a) administrative procedure module; (b) time log; (c) pre test; (d) lecture script; (e) post test; (f) participant schedule form, Appendix C, p. 61-104

Each profile data, which precluded the content questions, was the first part of the instructional package, Appendix C, p. 67, consisted of each participant recording their: (1) job title; (2) number years of foodservice employee training in the present job; and (3) on-the-job training relating to personal hygiene either current or previous jobs. This information confirmed the criteria used in obtaining the population tested.

The objective-type subject matter test was used as both a pre and post test measure covering the instructional content during the experimental period. These tests consisted of 25 multiple choice questions which the participant completed before and after the instruction period. The test scores from the two experimental groups

of both the pre and post test were data for evaluating retention of knowledge of the two instruction methods, lecture discussion and individual instruction.

A time log, Appendix C and D, p. 66 and 109, and or both the lecture discussion and individual instruction was utilized, where the instructor of each group was responsible for recording the amount of time spent on the following: orientation of the participants, preparation for each of the instructional packages including scheduling of the participants, room set-up and sign-in sheets, and then the actual time of instruction for each method. The participant individual time log was used to record the amount of time each participant spent with the individual instruction learning package including in the pre test. The time logs were used as a data base for calculation of cost for each instructional method. The amount of time was converted into a dollar value for analysis.

#### The Pre and Post Test

An objective-type subject matter pre test, Appendix C p. 67, was given to the participant in each experimental group. The scores from the test were used to measure their existing knowledge of sanitation with an emphasis on personal hygiene. The amount of time to take the pre test was recorded on a time log data sheet provided for the participant. The pre test was given just before each type of instruction and collected immediately after completion.

The post test, which was the same as the pre test, was given within a two-weeks' time frame after the instructional material was completed by the participants of both groups. The total number of correct scores from both the pre and post tests were input for statistical evaluation. The pre test-post test experimental group design typically yields four scores: pre test mean of the two experimental groups and the post test mean of the two experimental groups.

The Analysis of Covariance statistic at the  $P=.05$  level of significance, was used to aid in the evaluation of the pre and post test scores. Comparison of the difference between the scores from both tests were made to analyze the retention of knowledge of the participants.

### The Instructional Methods

The two experimental groups, lecture discussion and individual instruction, participated in the instructional methods being tested. Each group took the same pre and post test but participated with assigned instruction method.

The lecture discussion learning package, Appendix C p. 61-104 consisted of an administration procedure module, time log, pre test for the participants, a lecture script of the subject matter on personal hygiene, post test, supportive selected references, and a participant schedule form. Transparencies were used as visual aides, not included in this document. The instructor scheduled a time for this instruction to the participants and allowed a maximum of 45 minutes for administration of the pre test and the instructor.

The individual instruction learning package, Appendix D, p. 106-115, administered to the participants, consisted of the instructor's packet, sign in sheet, instructor's time log, participant time log, and instructions to the participant on how to use the learning cassette tape and slides, are not included in the text. The individual instruction learning package contained a separate packet labeled for the instructor and contained the following: instructions for administration of the package, instructor's time log, pre and post test answer sheets and a participant schedule form. Each participant received an individual time log to record their start and finish times and gave this to the instructor at the completion of the slide tape program.

These two instructional methods were administered within the same time frame with the scheduling of all participants completed by the hospital foodservice supervisor. The participating hospital provided an instructor for the lecture discussion package and a room which could be used as a classroom for the instruction. The hospital also provided an instructor to supervise the individual instruction method along with an area for viewing the slide tape program.

After both experimental groups completed the instructional material, a post test was given within a two weeks' time as recommended by Borg and Gall (38). The instructor then notified the researcher that the two instructional methods were completed and the researcher collected the materials from the hospital. A copy of the results from the research study were sent to each participating hospital.

#### Statistical Evaluation

The statistical tool that was utilized for this study to measure the difference between the pre and post test score means from the two instructional methods was the Analysis of Covariance and the F statistic (39,40). The Analysis of Covariance and the F statistic includes the following criteria for evaluation: (1) the data have been derived from normally distributed populations; (2) the variance are common or equal or ratioed proportionately; and (3) the samples have been randomly drawn from normal populations having equal variances. If these criteria are met, then the F statistic is appropriate for testing the difference among the mean test scores. The application of the F statistic with the Analysis of Covariance is appropriate also when several means are being considered. This study met all of this criteria by using a homogeneous group of participants who were foodservice employees with an equivalent amount of experience at the hospital, and these participants were chosen at random.

Therefore, the assumptions can be summarized as indicating that independent random samples were drawn from a population having equal variances.

The Analysis of Covariance is a technique of statistical analysis which permits one to overcome the ambiguity involved in assessing significant differences when more than one comparison is made. It allows the question to be answered: Is there an overall indication that the experimental treatments are producing difference among the means of various groups? Although the Analysis of Covariance may be used in two sample cases, it is commonly employed when three or more groups are involved. The F statistic in Analysis of Covariance is the between group variance estimate divided by the within group variance. The between group variance estimate reflects the magnitude of the differences between and/or among the group means. The larger the differences between the means, the larger the between group variance. The null hypothesis was that two independent variance estimates may be regarded as estimates of the same population value. The null hypothesis was that the samples were drawn from the same population. By consulting the table of F distributions (39), it can be determined whether or not the null hypothesis of equal population variance can be reasonably entertained. In the event of a significant F statistic, it can be concluded that the group means are not all estimates of a common population mean.

For the hypothesis testing, risk is involved in deciding whether to "retain," "reject" or "not reject" the statement. This risk is stated in terms of probability or the level of significance. The level of significance selected for this study was five percent ( $P=.05$ ) due to allowing a greater margin of validity of the test results. When the test results are significant at the five percent level, the statistical method will indicate the difference between the two experimental groups. If the difference between the pre and post test scores is significant at the five percent level, then the

null hypothesis would be rejected and conclusions drawn that one instructional method was better than the other in the retention of knowledge.

### Cost Analysis

Cost data for this research study were collected and analyzed. The amount of time each participant took for the individual instruction and the amount of time involved with the lecture discussion was calculated. This was accomplished by taking the hourly wage rate of the instructor's time times the number of hours spent with the preparation and administration of the instructional materials (31). The cost of materials was included in the total cost analysis, including such items as printing costs of the learning packages, visual aid production such as the slides, tape cassettes and transparencies and the cost of the graphic artist's time involved with the preparation of the visual aids.

### The Pilot Study

A pilot study was conducted at the Veterans Administration Hospital in Portland, Oregon. The objective of the pilot study was to test the research methodology for simplicity, clarity and understandability of the two teaching methods, lecture discussion and individual instruction. Also, the two instructional packages were tested for feasibility and effectiveness of administration.

Instructional results from the pilot study were used to test the computer process of data input and output for statistical analysis. The data input included the pre and post test scores and the output was the post test mean scores of these tests. Also, the output included the cost of instruction, such as instructor labor hours. Within the costs was the hardware, such as slides,



transparencies and printed materials. A time frame that resulted from the pilot study served as a guide for the research study.

Items that resulted from the pilot study that assisted with development of the final research implementation were: (1) the expected scheduling format of the participants for the two groups was difficult and time consuming, and was revised accordingly, (2) a minimum of 15 minutes was needed for the pre test; and (3) due to the small number of participants in the pilot study (lecture discussion N=6 and individual instruction, N=4), the analysis of covariance was not completed. However, the test scores were processed to verify the procedure for analysis.

#### Procedures for the Research Study

The procedures for the research study for implementation of the instructional packages were as follows:

1. The researcher randomly distributed the instructional packages to the five participating facilities which included the cover letter with consent forms and the learning packages.
2. The cover letter, Appendix B, p. 58, was addressed to the Director of Dietetic Service of each participating facility and contained the following:
  - a. Recognition of participation in the research study
  - b. Overview of the research study formatA follow-up phone call to the hospital instructor from the researcher was made to ensure all contents were understandable and to answer questions.
3. A schedule, Appendix C, p. 104, for employees participating in the study was made by the hospital foodservice supervisor.
4. Procedures for using the instructor's time logs were documented for the hospital instructor.

5. Procedures for using the participant time log was documented for the hospital instructor.
6. The pre test, consisting of 25 objective questions, was given to the two experimental groups just prior to the instruction.
7. Instructor personnel from each participating hospital were given two types of instructional packages. One was the lecture discussion and the other was the individual instruction.
  - a. Lecture Discussion: The lecture discussion package consisted of the administrative material with pre tests, lecture script, including transparencies and the post tests. A time allotment of 30 to 45 minutes was given for the lecture discussion.
  - b. Individual Instruction: The individual instruction package consisted of an instructor's packet containing administrative materials such as the pre and post tests with answer sheets, the instructor and individual time logs; the participant section of the individual instruction package consisted of instructions to the participant, cassette tape, slides and pencils. The tape recorder and slide projector were provided by each hospital. The individual instruction was monitored by the hospital foodservice supervisor in charge of the study implementation. An area was provided for the individual instruction group that was separate from the lecture discussion group. This area was enclosed and had room for the participants to read, write and view the slides. The instructor determined if the participants in the individual instruction group were able to operate the cassette tape recorder and slide projector. The supervisor

provided additional instruction for those participants needing it. A time allotment of 30 to 45 minutes was given for the individual instruction.

8. The post tests were given to both the lecture discussion and individual instruction participants within a two week time frame.
9. A statistical analysis of the pre and post test scores was conducted to compare knowledge retention.
10. The cost data were collected by figuring the amount of time needed for preparation and actual instruction time from the time log data, along with the cost of materials.
11. The participants received the results of their test scores within a two week period after all the research data were collected. These scores were sent to the hospital instructor who distributed the results to the participants.

## RESULTS AND DISCUSSION

A comparison was made of two inservice training instructional programs, lecture discussion and individual instruction, on the topic of Personal Hygiene for hospital foodservice employees. The employees were tested for knowledge retention and the program was evaluated for cost effectiveness. The population sample consisted of 95 foodservice employees from five Oregon hospitals. The population sample came from selected large hospitals in the area surrounding Portland, Oregon which were able to provide large numbers of foodservice employees. The participants for the study were chosen at random by each hospital foodservice instructor according to years of employment in foodservice and need of learning or reviewing the subject matter.

Data were collected in three areas: (1) employee demographic information; (2) pre and post test scores; and (3) cost of each instructional method. Demographic data were requested to identify a descriptive profile of the hospital foodservice employees who participated in the study. Pre and post test scores were the results of 25 multiple choice test questions. Each instructional method was analyzed from the pre and post test scores for knowledge retained using the analysis of covariance at the  $P=.05$  level of significance. Each instructional method was analyzed for cost effectiveness which included both instructor and participant time and the cost of the instructional materials.

### Demographic Data

The demographic data were gathered from hospital inservice employees who responded to three profile questions on the pre test, Appendix C, p. 67. Results were compiled in Figure 1. Profile information in three parts was: (1) years in foodservice to identify

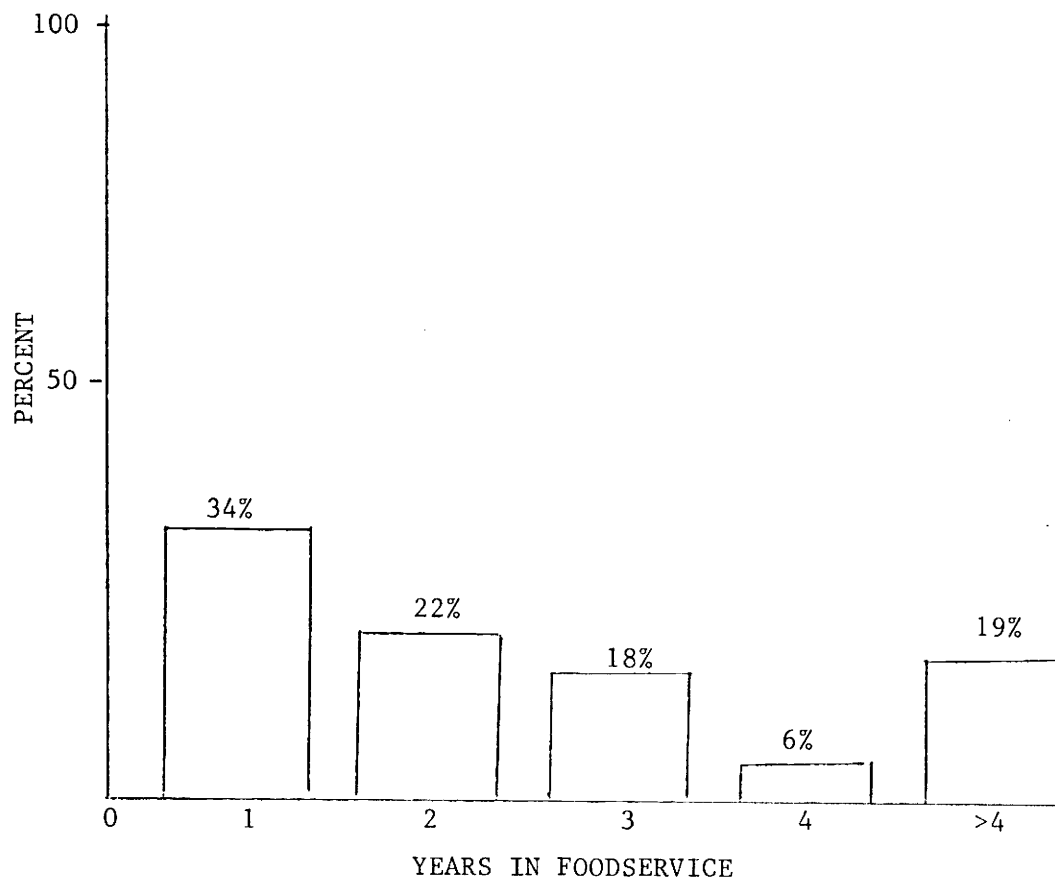


Figure 1. Percent Distribution of Participants by Number of Years in Foodservice

experience level of the hospital foodservice employees tested; (2) job title of each foodservice employee; and (3) previous on-the-job training in Personal Hygiene.

The results of the participants in the two instructional groups for years of experience in foodservice were as follows: (Figure 1) thirty-four percent had less than one year's experience in foodservice; twenty-two percent had one to two years in foodservice; eighteen percent had two to three years; six percent had three to four years and nineteen percent had over four years experience in foodservice. The aim of the study was to obtain a population sample with four years or less experience with preference given to the newly hired employee. However, variances within the hospital foodservice population included participants who had over four years of work experience and needed the instruction in Personal Hygiene, as determined by the hospital foodservice instructor. Therefore, the range of experience for the sample was generally one to four years and the average was two years.

The job titles of the participants included five categories: foodservice worker; cook, assistant cook; dishwasher, pot washer; pantry worker and diet aide. The foodservice worker category was defined as the entrance level job in a foodservice department. Seventy-nine percent of the total participant population were identified as foodservice workers (Figure 2). Six percent of the participant population were cooks or assistant cooks; two percent dishwashers or potwashers; four percent pantry workers and eight percent diet aides.

The last question of demographic data was to identify participants having previous on-the-job training in the area of Personal Hygiene as it related to foodservice (Figure 3). These data were used only as descriptive information of the population sample. Sixty-five percent of the participants had previous on-the-job training in Personal Hygiene as opposed to thirty-three percent who had not.

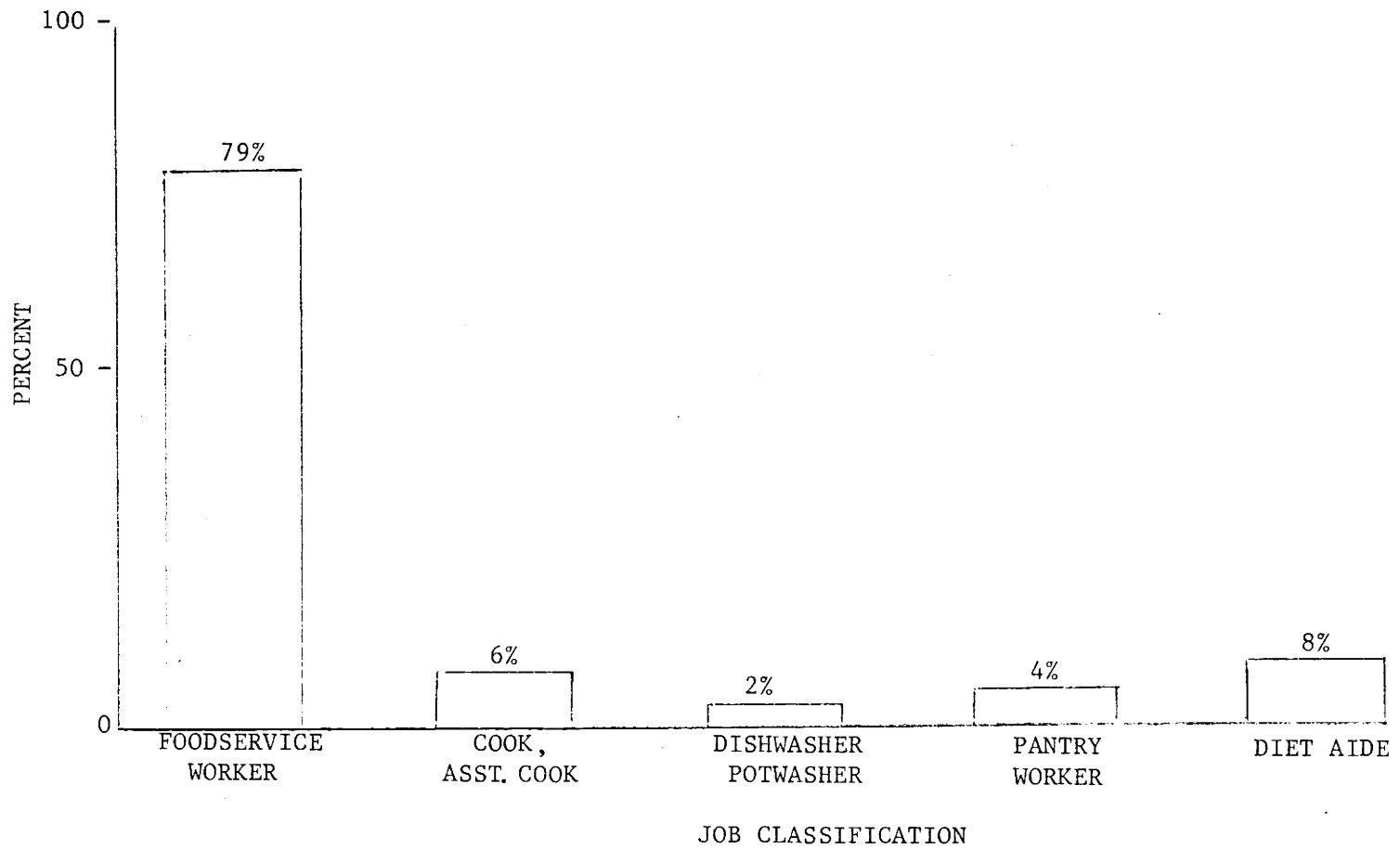


Figure 2. Percent Distribution of Participants by Job Title

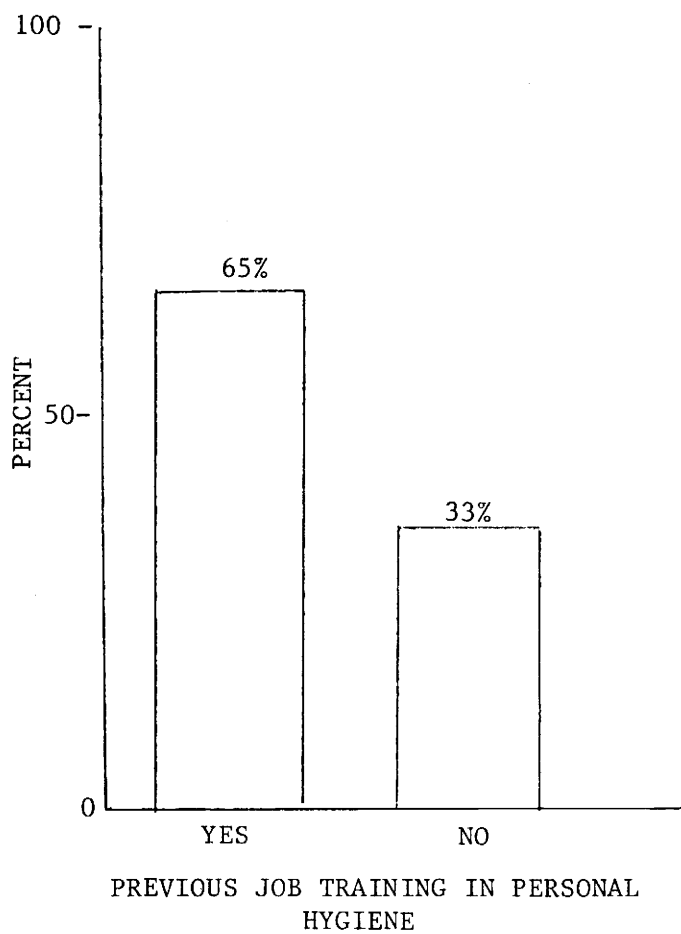


Figure 3. Distribution of Participants with On-the-Job Training in Personal Hygiene



### Statistical Analysis

The null hypotheses at the  $P=.05$  level of significance for the study were stated in three parts as follows:

1. There will be no significant difference in the retention of knowledge of non-supervisory hospital foodservice employees utilizing a lecture discussion method versus an individual instruction method.
2. There will be no significant difference in the cost of instructor and participant time involved to complete the administration of the two instructional methods.
3. There will be no significant difference in the cost of materials of the two instructional methods.

For this research study, the Student's t test and the analysis of covariance were the statistical methods used to assist in the evaluation of the data. The student's t test was used to determine if there was a significant difference between the population sample in previous knowledge of the multiple choice subject matter test. The analysis of covariance was used to test the first null hypothesis ( $Ho_1$ ) if any significant difference resulted in knowledge retention between the two instructional groups. The cost effectiveness of the two instructional methods with time and cost, null hypotheses two and three ( $Ho_2$  and  $Ho_3$ ) was measured by comparing instructor and participant time with materials cost utilizing the Gallup (31) formula.

### Pre Test Scores

The difference in mean scores of the pre test between the two instructional groups was not significant as determined by the Student's t test. This indicated the two instructional groups were comparable with each other in their knowledge of Personal Hygiene at the beginning of this study. The mean pre test score for the lecture

discussion group was 75.24 percent and the individual instruction group was 76.62 percent (Table 1). The standard deviation figure represents the variability among the two instructional groups and indicated there was no significant difference at the  $P=.05$  level.

TABLE 1. Mean, Student's  $t$  and Standard Deviation from Pre Test Scores of Employees in the Lecture Discussion and Individual Instruction Groups ( $P=.05$ )

Instructional Model	$t$	Mean	Standard Deviation
Lecture Discussion (n = 48)	1.78	75.24	35.28
Individual Instruction (n = 47)	1.33	76.62	35.85

#### Post Test Scores

Analysis of covariance at the  $P=.05$  level of significance for the post test was used to determine the retention of knowledge of the subject matter of the two instructional groups. The post test means of 78.02 percent for the lecture discussion method versus 83.30 percent for the individual instruction were compared using the pre test means of 75.24 percent versus 76.62 percent respectively, as the covariate (Table 2). The analysis of covariance permits adjustment of the mean scores on the post test measure for group differences found on pre test measures.

The covariate using the pre test scores had an  $F$  ratio of .085. The  $F$  ratio represents a calculation of the variances of the means. It compares the variance of means to the overall variance to sample observations.  $F$  ratios are interpreted by use of the  $F$  table (43). This table is entered with the number of degrees of freedom for the greater mean-square across the top and with the number of degrees of freedom from the lesser mean-square on the left hand side. For

TABLE 2. Post Test Mean Scores, Adjusted Mean Scores and Standard Deviation of the Multiple Choice Test for Two Instructional Groups: Lecture Discussion and Individual Instruction

Instructional Module	Post Test Mean	Adjusted Post Test Mean	Standard Deviation
Lecture Discussion (n = 48)	78.02	81.72	28.86
Individual Instruction (n = 47)	83.30	81.68	31.06

this study, the degrees of freedom were 2 and 92 and an F value of 3.11 was needed for significance. Since the obtained value of F of .085 was less than 3.11, the null hypothesis ( $H_{01}$ ) is accepted that there was no significant difference in the post test mean scores between the two instructional groups (Table 3).

TABLE 3. Analysis of Covariance Results (sum of sq., df, F ratio) of the Mean Post Test Scores on the Multiple Choice Subject Matter Test for: Lecture Discussion and Individual Instruction

Source of Variance	Sum of Squares	df	F Ratio
Between Groups	.92956	2	.085
Within Groups	9.29688	92	
Total	10.22644		

### Pre and Post Scores

A descriptive evaluation of the pre and post test scores was conducted of both instructional groups from each participating hospital. The number of points gained, remained the same or lost on the multiple choice subject matter test were compiled and are documented in Table 4. Comparing the pre test scores and the post test scores reflected improvement in eight-one percent of the lecture discussion group. The average point gain for the lecture discussion group was 2.9 and for the individual instruction group was 2.9 also. The highest score attained within the lecture discussion group on the pre test was 24 points. The lowest score on the pre test was 7 points. The highest score attained within the individual instruction group on the pre test was 24 and the lowest score was 13. The highest score on the post test for the lecture discussion group was 24 and the lowest score was 9 points. The highest score attained on the post test for the individual instruction was 24 and the lowest was 12 points. The average point gain for the lecture discussion method was 2.9 which is a twelve percent gain and the average point gain for the individual instruction group was 2.9 which was also a twelve percent gain. Even though the actual point gain in many cases was just one or two, the scores indicated there was knowledge gained for eighty-one percent of the 95 participants.

### Pre and Post Test Mean Gain Scores

The mean gain scores of participants varied from each hospital with both instructional methods (Figure 4). Hospitals number one, two and three had a higher mean gain post test score with the lecture discussion method. Hospitals four and five had a much higher mean gain score with the individual instruction. A possible explanation for the higher gain score with the individual instruction at

TABLE 4. Pre Test, Post Test Scores and Change in Scores of Food-service Employees in the Lecture Discussion and Individual Instruction Groups (Maximum 25 Points per Test)

Lecture Discussion n = 48			Individual Instruction n = 47		
Pre Test Scores	Post Test Score	Change in Scores	Pre Test Scores	Post Test Scores	Change in Scores
19	21	+ 2	23	22	-1
21	22	+ 1	22	22	0
20	22	+ 2	20	22	+2
8	22	+14	20	22	+2
20	20	0	22	23	+1
20	22	+ 2	22	23	+1
17	22	+ 5	18	20	+2
7	9	+ 2	24	24	0
22	24	+ 2	13	12	-1
14	18	+ 4	18	19	+1
17	21	+ 4	17	20	+3
19	23	+ 4	20	20	0
20	21	+ 1	21	22	+1
23	24	+ 1	15	20	+5
19	23	+ 4	18	15	-3
22	21	- 1	19	23	+4
20	20	0	18	23	+5
16	20	+ 4	17	18	+1
21	20	- 1	17	17	0
17	19	+ 2	20	21	+1
20	22	+ 2	20	21	+1
20	20	0	14	19	+5
16	20	+ 4	15	19	+4
22	23	+ 1	21	21	0
19	22	+ 3	20	23	+3
17	20	+ 3	20	20	0
20	23	+ 3	20	21	+1
17	22	+ 5	21	24	+3
18	15	- 3	22	23	+1
17	19	+ 2	19	23	+4
22	23	+ 1	18	20	+2
21	23	+ 2	21	22	+1
11	18	+ 7	20	23	+3
22	24	+ 2	22	20	-2
24	22	- 2	21	23	+2
22	21	- 1	20	16	-4
18	21	+ 3	13	19	+6
21	22	+ 1	18	22	+4
22	24	+ 2	22	22	0
23	24	+ 1	18	19	+1
19	19	0	18	21	+3
18	22	+ 4	16	22	+6
19	19	0	18	23	+5
21	22	+ 1	21	21	0
23	24	+ 1	18	25	+7
21	23	+ 2	17	23	+6
18	21	+ 3	21	22	+1
21	23	+ 2			

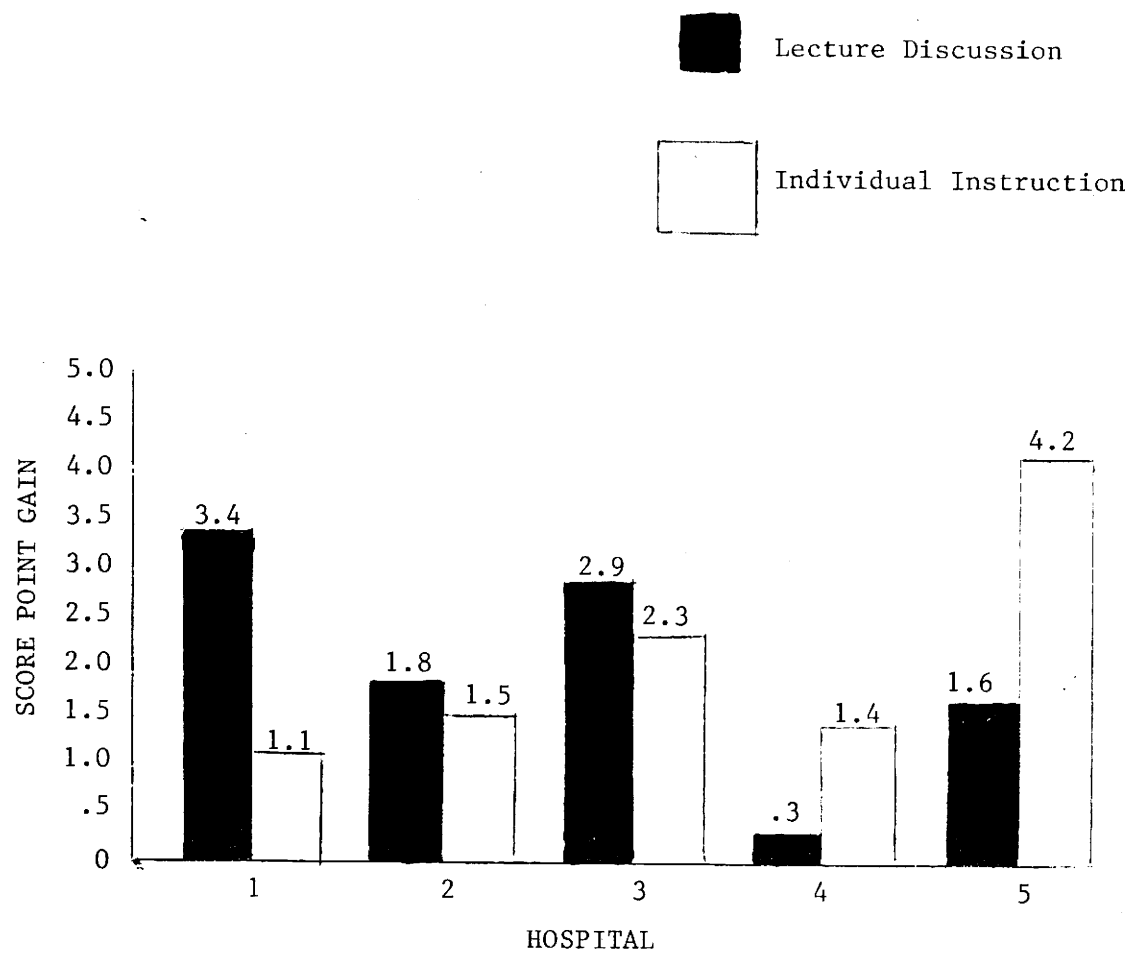


Figure 4. Mean Score Points Gained from Pre Test to Post Test of Each Instructional Method: Lecture Discussion and Individual Instruction

hospitals four and five could be the type of participant in both instructional groups. The demographic data of the individual instruction groups at hospitals four and five revealed the experience of the foodservice employees was less than those employees in the lecture discussion group. Therefore, the subject matter could possibly be more unfamiliar to those participants, thus attributing to the higher gain score. The verbal feedback to the instructor indicated a positive attitude toward the individual instruction which could attribute to the higher gain score. However, the amount of gain was not significant to indicate one instructional method was more effective than the other.

#### Cost Analysis

Instructional methods were measured for cost effectiveness which included instructor and participant time involved with the instruction. Each instructor completed a time log, Appendix C and D, p. 66 and 109. The instructor recorded time spent for administration of the instructional package material for both types of instruction: lecture discussion and individual instruction. The administration of the lecture discussion material included the scheduling of participants, room set up, reviewing instructional material and delivering the lecture along with the pre and post test administration. For the individual instruction, the instructor was given a time log, Appendix D, p. 66, to record the amount of time spent in scheduling, setting up the audio-visual materials and administering the pre and post tests. The amount of time each instructor spent with the administration of each instruction was compiled with their hourly wage to compute the cost for final analysis.

Lecture Discussion. Each hospital instructor had a different hourly wage. The wages ranged from \$8.00 per hour to \$11.74 per hour (Figure 5). The average cost per hour was \$9.77 among the five participating hospitals.

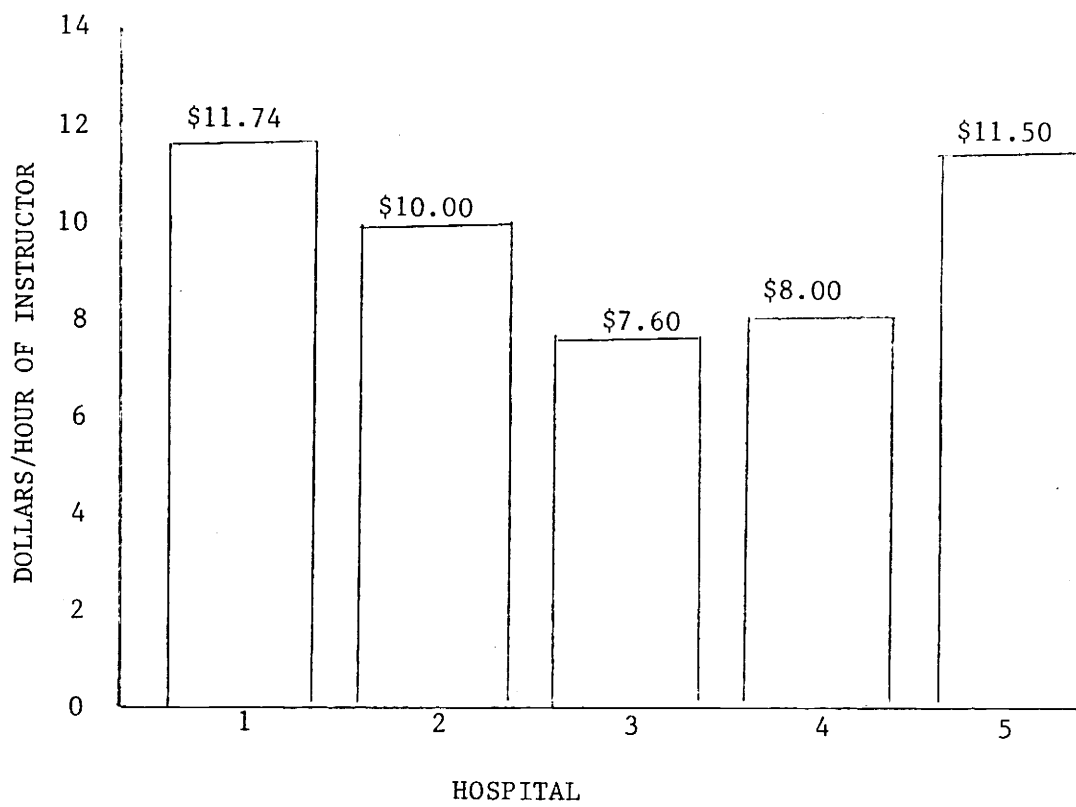


Figure 5. Hospital Instructor Hourly Wage Distribution



The amount of time spent with the lecture discussion method ranged from two to four hours. The average time spent for administration of the lecture discussion method was 2.7 hours, (Figure 6). The four hour session, hospital two, resulted from the instructor spending much more time in pre-preparation for the lecture script than the other four hospital instructors. The cost per actual instructor time was from \$17.50 to \$40.00. The average instructor cost for the lecture discussion method was \$25.46.

Individual Instruction. The individual instruction method was calculated the same as the lecture discussion method with an average cost being determined by the five participating hospitals. Figure 7 illustrates the instructor time involved with the individual instruction, each lasting one-half hour.

The salary range was \$3.80 to \$5.87 per one half hour. Therefore, the average cost per half hour of instructor time involved with the individual instruction method was \$4.88. This value was thirty-three percent less in cost of instructor time than the lecture discussion method which cost an average of \$25.46 of instructor time at an average of 2.7 hours.

#### Materials Cost

Data were collected for cost of the instructional materials. These instructional materials were pre-prepared with no cost to the participating hospital. The materials included two instructional packages with visual aids which were transparencies, cassette tape and slides. A slide projector and cassette tape recorder were provided by each hospital so the value of the hardware was not included in the materials cost. Therefore, additional costs for the individual instruction would be to purchase the projector and tape recorder if they were not already available. The lecture discussion hardware included only an overhead projector which was not included in the materials cost for the lecture discussion (Table 5). In addition, the individual instruction package for excessive art work for slides would be an additional expense.

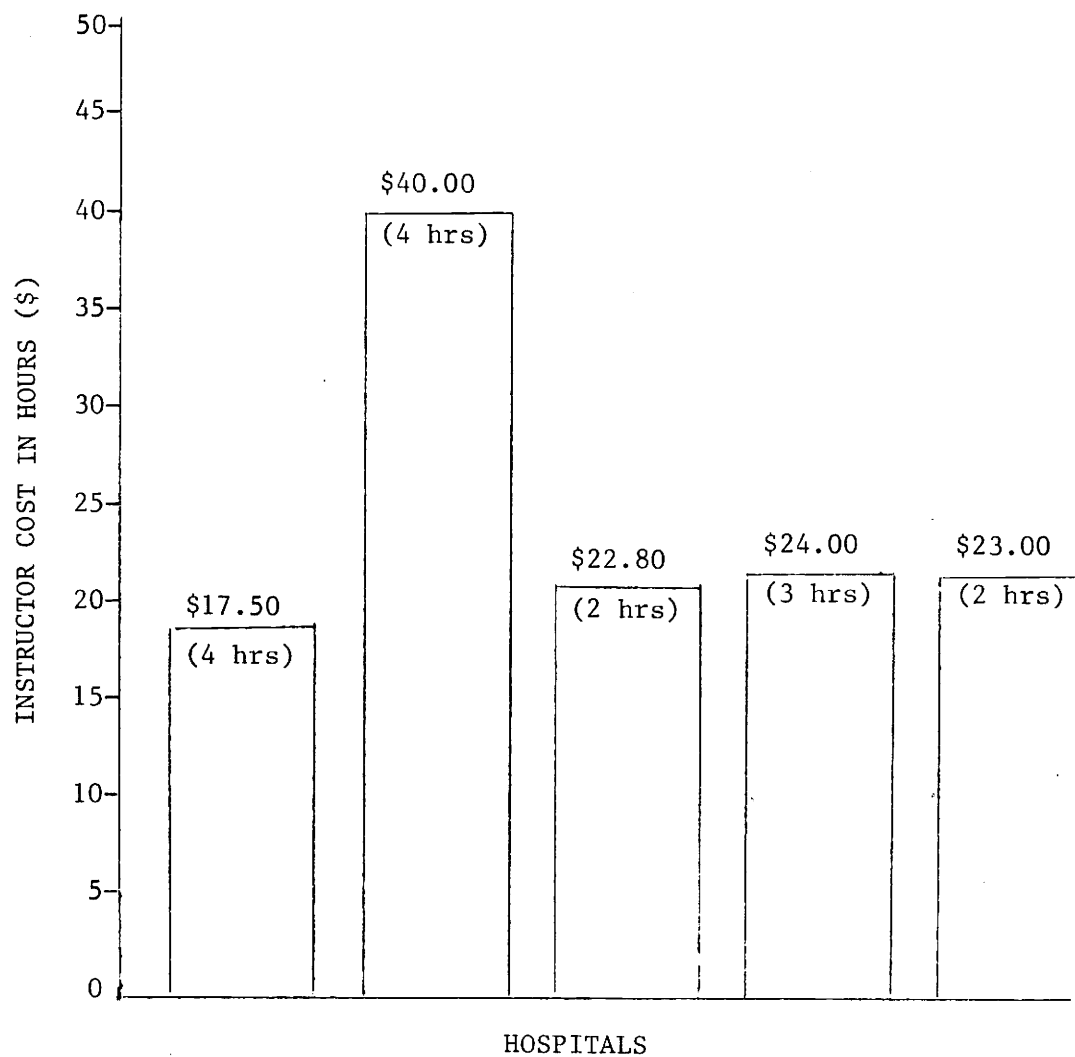


Figure 6. Instructor Cost and Time: Lecture Discussion Method

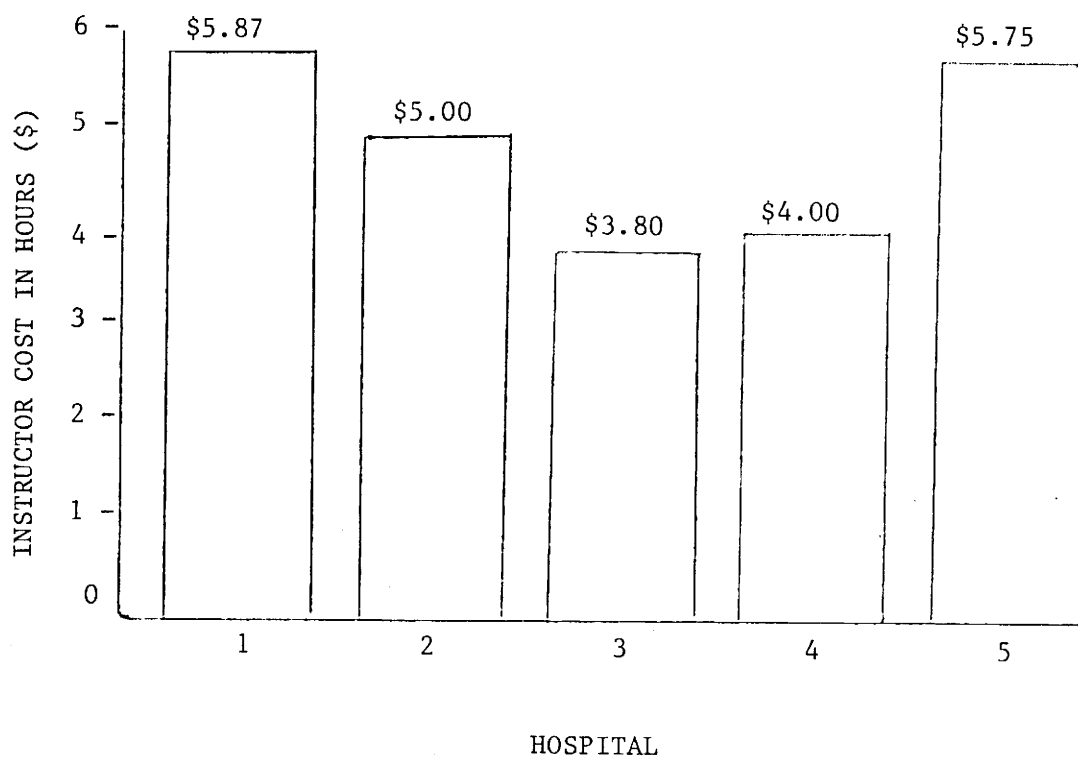


Figure 7. Instructor Cost (for one half hour each): Individual Instruction Method

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TABLE 5. Cost of Instructional Package Materials: Lecture Discussion and Individual Instruction

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Lecture Discussion Package		Individual Instruction Package	
Materials:			
Transparencies, 25 ea.	\$ 25.00	Film, 1 roll, 24 exp.	\$ 5.25
		Slides, 51 ea.	25.00
Professional Labor (graphics for transparencies) (\$12.00/hour)	220.00	Professional Labor (\$12.00/hour)	48.00
Script Production	40.00	Recording Script	24.00
		Cassette Tape	12.00
Notebooks, pencils, Pre/post tests	13.00	Notebooks, pencils Pre/post tests, Plastic Slide Holders	14.50
<b>TOTAL</b>	<b>\$298.00</b>		<b>\$129.75</b>

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Cost Effectiveness Formulation of the Two Instructional  
Methods: Lecture Discussion and  
Individual Instruction

The Gallup formula (31) was used to determine the cost effectiveness relative to achievement of the two instructional methods and is explained in Table 6 and 7. These tables illustrate the Gallup formula format and data. The study population sample was composed of 95 hospital foodservice employees from five Oregon hospitals. The lecture discussion group was composed of 48 foodservice employees and the individual instruction group was composed of 47 foodservice employees. Each instructional group at each hospital had the same

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TABLE 6. Gallup Formula (31) for Determining Cost Effectiveness of the Two Instructional Methods, Lecture Discussion and Individual Instruction, Relative to Achievement

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Effectiveness Model Lecture Discussion ( $e_1$ )	Effectiveness Model Individual Instruction ( $e_2$ )
$e_1 = \frac{(A_1) \times (S_1)}{(T_1) \times (C_1)}$	$e_2 = \frac{(A_2) \times (S_2)}{(T_2) \times (C_2)}$

Where:

$e$  = effectiveness of instructional method

$A$  = achievement: total difference between mean pre test and post test scores adjusted by the pre test as covariant

$T$  = time: total time spent in administration of instruction

$S$  = students: total number of participants completing both the pre test and post test

$C$  = cost: total cost of instruction

Relative cost effectiveness (RCE) of lecture discussion ( $e_1$ )

$$RCE = \frac{e_1}{E} \times 100$$

Relative cost effectiveness (RCE) of individual instruction ( $e_2$ )

$$RCE = \frac{e_2}{E} \times 100$$

$$E = e_1 + e_2$$

Where:

$E$  = percentage of total cost effectiveness

$e_1$  = lecture discussion method

$e_2$  = individual instruction method

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TABLE 7. Cost Effectiveness Relative to Achievement for the Two Instructional Methods Utilizing the Gallup Formula: Lecture Discussion and Individual Instruction

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Formula: 
$$\frac{\text{Achievement} \times \text{Students}}{\text{Time} \times \text{Cost}} = \text{Cost Effectiveness}$$

---

$$e_1 = \frac{(A_1) \times (S_1)}{(T_1) \times (C_1)} \qquad e_2 = \frac{(A_2) \times (S_2)}{(T_2) \times (C_2)}$$

$$= \frac{(81.72 \times 48) \times 48}{(2.7 \times 48) \times 2980} \qquad = \frac{(81.68 \times 47) \times 47}{(.5 \times 47) \times 1298}$$

$$= \frac{3922.56 \times 48}{129.6 \times 2980} \qquad = \frac{3838.98 \times 47}{12.5 \times 1298}$$

$$= \frac{188282.88}{286208} \qquad = \frac{180432.06}{30503}$$

$$= 0.48752 \qquad = 5.91522$$

$$E = 0.48752 + 5.91522 = 6.40274$$

Relative cost effectiveness of  
lecture discussion method

$$= \frac{0.48752}{6.40274} \times 100$$

$$= 7.614\%$$

Relative cost effectiveness of  
individual instruction method

$$= \frac{5.91522}{6.40274} \times 100$$

$$= 92.385\%$$


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instructor for both instructional methods. Both instructional groups were given the same 25 multiple choice subject matter test on Personal Hygiene.

The analysis of covariance at  $P=.05$  level of significance, comparing post test scores yielded adjusted means of 81.72 for the lecture discussion group and 81.68 for the individual instruction group. These results were utilized in the formulation of the cost effectiveness.

The results from the Gallup formula used to measure cost effectiveness indicated the individual instruction method had a 92.39 percent effectiveness versus a 7.61 percent for the lecture discussion method (Table 7). This variance was due to the difference in time and cost of the lecture discussion and individual instruction methods. The materials cost was calculated as the actual cost of the transparencies, slides, cassette tapes, professional labor and the instructional notebooks. The total time cost included both participant and instructor time involved with the administration of the instruction.

The individual instruction was forty percent less in materials cost than the lecture discussion. This excludes the cost of the slide projector or cassette tape recorder. One primary factor in expense of the lecture discussion materials was the professional labor involved to draw and produce the transparencies and lettering for the script. The other factor involved in the lecture discussion high cost was the time utilized in preparation and delivery of the lecture script. If the materials were purchased by each hospital from a commercial source, the costs are anticipated to be enhanced.

In view of these results, the individual instruction method is preferred over the lecture discussion method for total cost effectiveness. The Gallup formula (31) results indicated the individual instruction was 92.39 percent cost effectiveness versus the lecture discussion method at only 7.61 percent cost effective.

### Study Outcomes

There were three major outcomes from this research study. First, the instructional methods for inservice training, lecture discussion and individual instruction, were developed for hospital foodservice employees on Personal Hygiene. Second, a method of evaluation, a pre and post test, were developed to determine knowledge retention of the material tested. This method of evaluation allowed the foodservice manager to determine if the employee retained or gained knowledge of the subject matter tested. Third, a data base was established for cost effectiveness analysis of the instructional methods. The cost data included instructor and participant time with the instruction and cost of instructional materials.

The results of this study allow for the acceptance of the null hypotheses ( $Ho_1$ ) that there was no significant difference in the knowledge retained between the two instructional methods, lecture discussion and individual instruction. A cost effective analysis indicated there was a significant difference between the two instructional methods in regard to instructor time, participant time and materials costs. Therefore, the null hypotheses ( $Ho_2$  and  $Ho_3$ ) which stated there was no significant difference in instructor and participant time and materials cost between the two instructional methods, are rejected. The individual instruction was more cost effective in both time and cost than the same variables of the lecture discussion method.



## SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

A comparison was made of two instructional programs of inservice training, lecture discussion and individual instruction, on Personal Hygiene for hospital foodservice employees for knowledge retention and cost effectiveness. Reviewing the literature revealed limited studies in the area of inservice training for hospital foodservice employees including both knowledge retention and cost effectiveness. This study was developed to compare both knowledge retention and cost effectiveness of two inservice training methods for hospital foodservice employees to determine a preferred instructional method.

The population sample consisted of 95 foodservice employees from five Oregon hospitals. A demographic profile identified eighty-one percent of the foodservice employees as having four years or less work experience at their hospital in foodservice. Seventy-nine percent of the hospital foodservice employees had a job title of foodservice worker with twenty-one percent identified in other areas of cook, assistant cook; dishwasher, potwasher; pantry worker and diet aide. Sixty-five percent of the participants had previous on-the-job training in Personal Hygiene while thirty-three percent did not.

Forty-eight foodservice employees comprised the lecture discussion group and forty-seven foodservice employees were in the individual instruction group. A pre and post test consisting of 25 multiple choice questions was the method of evaluation for knowledge retention. The analysis of covariance at  $P=.05$  level of significance accepted the null hypothesis that there would be no significant difference between the two instructional methods, lecture discussion and individual instruction, in knowledge retention. The total mean gain score was 2.9 points for each instructional group. A time log was used to record the instructor and participant time involved in

the administration of the instructional material. The instructor time included scheduling of participants, classroom set up, time in the classroom for both instructor and participant and the pre and post test administration. The participant time included the classroom session and the completion of the pre and post test.

Time cost was measured for both instructional methods utilizing a time log. The same instructor at each hospital administered each of the two instructional methods. Each instructor had a different hourly wage which ranged from \$8.00 to \$11.74 per hour. Therefore, the average cost per total hours spent for instruction time calculated for the lecture discussion method was \$25.46 with the average of 2.7 total hours. The individual instruction method was calculated the same as the lecture discussion method and resulted in having an average instruction cost of \$4.88 for .5 total hours. This was thirty-three percent less in instruction time than the lecture discussion method. The null hypothesis ( $H_0_2$ ) was rejected as there was a significant difference in time cost between the two instructional methods.

The Gallup formula (31) was used to determine the cost effectiveness of each instructional method which consisted of achievement on mean post test scores multiplied by the number of participants divided by the time involved for both instructor and participant multiplied by the cost of instructional materials. The results from the Gallup formula indicated the individual instruction had a 92.39 percent effectiveness versus a 7.61 percent effectiveness for the lecture discussion method. The individual instruction method was forty percent less in material cost than the lecture discussion method. The null hypothesis ( $H_0_3$ ) was rejected since there was a significant difference in cost between the two instructional methods.

### Conclusions

Two types of inservice training were compared with 95 foodservice

employees from five Oregon hospitals. The comparison of the lecture discussion and individual instruction pre and post test scores revealed there was no significant difference in the knowledge retention of the subject matter on Personal Hygiene. However, a cost analysis reflected that the individual instruction was most cost effective using the Gallup formula (31). The individual instruction cost less in both instruction and participant time involved with the instruction and cost of the instructional materials. Therefore, the individual instruction method is the preferred method of inservice training for hospital foodservice employees based on the results of this study.

#### Recommendations

The individual type of instruction is a method of inservice training recommended for foodservice employees based on learning and cost effectiveness. The individual instruction method allows the foodservice employee to proceed with the material at his/her own pace in addition to scheduling a time to view the program which is convenient to the work schedule. This method would be ideal for a small hospital with a bed size of approximately 125 or less or an institution where the work force and foodservice manager time is limited for training purposes. The individual instruction method would allow the hospital foodservice instructor more time for development of other inservice programs due to the decreased amount of time needed for administration of the individual instruction method and limited budget. Therefore, an individual instruction method is recommended for inservice training in a hospital foodservice environment.

The Gallup formula (31) is also recommended for evaluating other methods of training in foodservice. This method of evaluation could be used to determine if an existing method of instruction

should be retained or if an alternative method of instruction should be reviewed for cost effectiveness.

As a result of this research study, more methods of evaluation of inservice programs in hospital foodservice, need to be developed to measure knowledge gained or retained after a specific subject matter course is given. Also, alternative methods to evaluate cost effectiveness of inservice training programs in foodservice should be researched so that the results would assist the foodservice manager to evaluate their particular training program.

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## APPENDICES



APPENDIX A  
Survey Opinionnaire

Facility \_\_\_\_\_

1. Do you have a training program for your employees?
2. If so, for how long and what type?
  - a.
  - b.
3. Do you have an inservice training program?
4. If you have an inservice training program, how often is it done?
5. Who handles the training in your establishment?

APPENDIX B

Cover Letter to Participating Hospital  
Consent Form

School of  
Home Economics



Corvallis, Oregon 97331 (503) 754-3551

Dear \_\_\_\_\_.

First, I would like to extend my appreciation for your cooperation in this research study. Your assistance with the study will help in meeting the objectives of comparing the two instructional methods with the retention of knowledge and cost effectiveness.

The two instructional packages are divided into three parts: Administrative procedure module, instructional module and the evaluation module. The foodservice supervisors need to be responsible for: (1) keeping of time logs; (2) administration of pre- and post-test; (3) instruction to participants in individual instruction group to know the operation of a cassette tape recorder and slide projector; (4) lecture discussion script delivery; and (5) collection of all data and materials to return to the researcher.

For this study, two groups of a minimum of ten participants in each is requested. These participants should have less than four years' work experience at your facility, since this instructional topic is geared for new employees in foodservice. Participants need to sign the consent form attached to this letter.

The pre- and post-test results will be provided at a later date along with a summary of the study. If you should have any questions about this study, I may be reached at home or at work. Again, thank you for your cooperation, and I look forward to working with you and your staff.

Sincerely,

Jenny S. Nelson, R.D.  
Principle Investigator  
Work phone: 682-3111, Ext. 2339  
Home phone: 682-1263

School of  
Home Economics



Corvallis, Oregon 97331 (503) 754-3551

Research Study  
Department of Institution Management

CONSENT FORM

I, \_\_\_\_\_, give my consent to participate in a research study in the Department of Institution Management at Oregon State University. I understand the study is to examine two teaching methods to foodservice employees and the results will be made available upon completion of this study. I realize that my participation is voluntary and that I may withdraw from the study at any time. I understand that any questions which may arise will be answered by the researchers.

\_\_\_\_\_  
Participant

\_\_\_\_\_  
Date

Please send me a copy of the test results.

APPENDIX C

Lecture Discussion Instructional Package

PERSONAL HYGIENE  
FOR  
FOODSERVICE EMPLOYEES

Lecture Discussion Instructional Package

March 1982

Ann Messersmith, Ph.D., R.D.  
Associate Professor and Head  
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School of Home Economics  
Oregon State University

## PERSONAL HYGIENE FOR FOODSERVICE EMPLOYEES

## Lecture Discussion Instructional Package

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SECTION ONE: ADMINISTRATIVE PROCEDURE MODULE

Introduction: The module goal of this package is to have the participant learn personal hygiene concepts.

This instructional package is intended for foodservice employees and contains three modules: (1) Administrative, (2) instructional and (3) evaluation. The administrative module includes the instructions to the educator, time logs, pretest booklets and answer sheets. The instructional module includes the title, instructional objective, visual aids and script material. The evaluation module contains post-test booklets and answer sheets which are to be given one to two weeks following the instruction.

SECTION ONE: ADMINISTRATIVE MODULE

Instructions to the Foodservice Educator:

BEFORE CLASS SESSION

1. Have all participants sign the consent form provided.
2. Schedule a room for the ten participants which has desks or tables to facilitate writing.
3. Select and schedule participants for the class session.
4. Arrange for overhead projector and check it in advance to make sure it is in working order.
5. Become familiar with the script prior to the class session.
6. Record the amount of time for the preparation of the lecture in the time log, Page 3.
7. A participant schedule form is located in the Appendix A, Page 31, for optional use.

DURING CLASS SESSION

8. Record the starting time (time of day) on the time log, Page 3, when the pretest session begins.

9. Administer the pretest to the class. Allow approximately 15 minutes.
10. Teach the class using the script. This will be the lecture portion of the module. Pause briefly after changing each visual aid (transparency)
11. Record the finish time (time of day) in the time log, Page 3, when the lecture session is completed.
12. Announce that a post-test is necessary and will be scheduled the following two weeks.

#### FOLLOWING CLASS SESSION

13. The post-test should be scheduled as a group, if possible, to prevent any further discussion among participants about the test content.
14. Record the time of day in the time log, Page 3, at the beginning of the post-test.
15. Administer the post-test.
16. Record the time of day in the time log, Page 3, after the last participant has completed the post-test.

CONTINUE TO THE PRETEST MODULE.

TIME LOG FOR LECTURE DISCUSSION INSTRUCTIONAL PACKAGE  
(to be completed by the Foodservice Educator)

DIRECTIONS: Record the amount of time for the following activities  
in the column provided.

ACTIVITY	TIME	REMARKS
A. Orientation to Participants	Begin _____ Finish _____	
B. Preparation for Lecture 1. Scheduling of Participants 2. Distribution of Pretest	Begin _____ Finish _____	
C. Lecture Presentation	Begin _____ Finish _____	
D. Post-test Administration	Begin _____ Finish _____	

## PERSONAL HYGIENE FOR FOODSERVICE EMPLOYEES

## PRETEST

Instructions: The pretest for this instructional package is divided into two parts. Each part contains questions with two to five answers to select from. Choose the best answer and mark the choice on the answer sheet that is separate from this test booklet. An example of a question and selected answer follow:

EXAMPLE:

1. The job title that most closely identifies your job is
  - A. Foodservice worker
  - B. Cook, assistant cook
  - C. Dishwasher, pot washer
  - D. Pantry worker
  - E. Diet aide.

## ANSWER SHEET

PART I PROFILE

1. The job title most closely identified your job is
  - A. Foodservice worker
  - B. Cook, assistant cook
  - C. Dishwasher, pot washer
  - D. Pantry worker
  - E. Diet aide.
  
2. How many years of food service work have you had on your present job?
  - A. 0-1
  - B. 1-2
  - C. 2-3
  - D. 3-4
  - E. Over 4 years

CONTINUE TO THE NEXT PAGE.

3. Have you had any on-the-job training in Personal Hygiene as it relates to foodservice?
  - A. Yes.
  - B. No.

PART II CONTENT

1. Serving safe food in the facility where the foodservice employee is working depends mostly on the
  - A. Supervisor
  - B. Customer
  - C. Employee.
2. Bacteria cannot be seen on hands that look clean because
  - A. There are none there
  - B. They are too small
  - C. They are not alive.
3. Salmonella bacteria are found
  - A. Primarily in improperly stored dairy products
  - B. Only on dirty dishes and soiled work surfaces
  - C. Everywhere.
4. Clostridium perfringens bacteria survive solely on
  - A. Food sources
  - B. Water
  - C. Oxygen.
5. The kind of bacteria that can be found in adequately cooled meat is
  - A. Salmonella.
  - B. Staphylococcus
  - C. Clostridium perfringens.
6. Areas of moisture that aid in the growth of bacteria could be
  - A. A mop bucket
  - B. Sneezing spray
  - C. Refrigerator drain.

CONTINUE TO THE NEXT PAGE

7. The proper temperature for custards and dairy products should be
  - A. 80 to 120 degrees Fahrenheit
  - B. 38 to 45 degrees Fahrenheit
  - C. 110 to 140 degrees Fahrenheit.
  
8. Bacteria can be spread through the air and contaminate the food by
  - A. Sneeze guards
  - B. Fast walking
  - C. Coughing.
  
9. Mold and mildew grow best
  - A. In the absence of sunlight
  - B. With direct sunlight
  - C. With moisture
  
10. Employees with open cuts and scores
  - A. Should only work in the dish room
  - B. Should not work in foodservice
  - C. Should wear clean bandages.
  
11. To ensure body cleanliness, the foodservice worker should
  - A. Take a bath or shower once a week
  - B. Use a deodorant when needed
  - C. Take a bath or shower daily.
  
12. Foodservice workers should
  - A. Wear nail polish that looks nice with the uniform.
  - B. Never wear nail polish in foodservice
  - C. Wear nail polish only when serving food.
  
13. It is necessary to wash hands thoroughly after using the toilet
  - A. Always
  - B. Often
  - C. Usually

CONTINUE TO THE NEXT PAGE

14. The procedure for hand washing includes
  - A. Using scalding hot water
  - B. Lathering the hands with soap
  - B. Using a kitchen cloth towel.
15. Foodservice employees should wear hairnets or caps when
  - A. The hair is dirty
  - B. Serving food
  - C. In the food service area.
16. To assist in maintaining a healthy body, foodservice workers should have a
  - A. Physical checkup once a year
  - B. Weekly bath
  - C. Dental checkup every two years.
17. Foods that are not a part of a well balanced diet are
  - A. Bread and cereal
  - B. French fries and cranberry juice
  - C. Lemon-lime drink and vanilla wafers.
18. Foodservice employees should wear the kind of work shoe that
  - A. Has a high heel
  - B. Has an open toe
  - C. Provides good arch support.
19. Uniforms for foodservice employees should be
  - A. White
  - B. Clean
  - C. New
20. Wearing jewelry in the foodservice department should be avoided because it is
  - A. Attractive
  - B. Unsanitary
  - C. Valuable

CONTINUE TO THE NEXT PAGE



21. Employee lockers are good storage for
  - A. Clean uniforms and accessories
  - B. Sack lunches
  - C. Dirty towels and rags.
22. For sanitary foodservice, one item considered necessary is
  - A. Skilled employees
  - B. Dependable employees
  - C. Healthy employees.
23. Staphylococcal bacteria can get into food by
  - A. Coughing.
  - B. Sanitizing dishes.
  - C. Covering food.
24. Improper food handling practices may cause
  - A. Excessive amount of leftovers
  - B. Poor County Health inspection report
  - C. Customer illness.
25. Personal hygiene can
  - A. Be lessened if extremely busy
  - B. Help the department image
  - C. Be postponed.

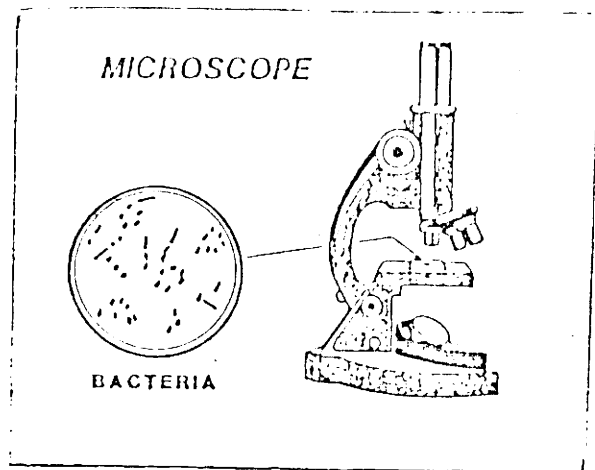
## SECTION TWO: INSTRUCTIONAL MODULE

Personal Hygiene for Foodservice  
Employees

**PERSONAL  
HYGIENE  
FOR  
FOODSERVICE  
EMPLOYEES**

Instructional Objective: TO EMPHASIZE THE IMPORTANCE OF PERSONAL HYGIENE AS IT RELATES TO FOODSERVICE.

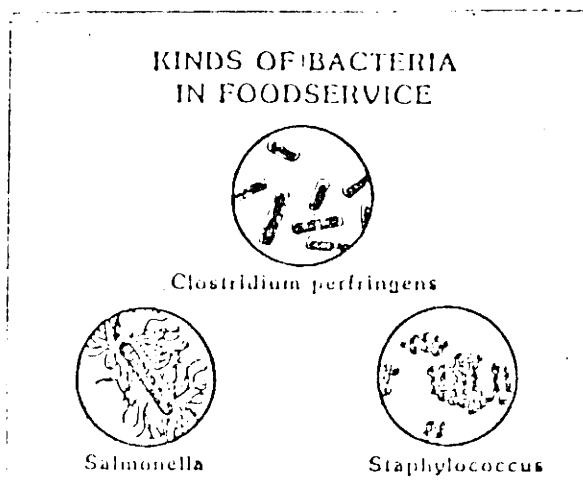
This class session will focus on personal hygiene. A major responsibility for foodservice employees is providing safe and sanitary food attractively served. The key to safe and sanitary foodservice is healthy employees who are properly trained the safe food handling and who practice good personal hygiene. Part of this training also includes being familiar with the kinds of bacteria found in foodservice vice and their characteristics so the foodservice employee will be more conscious of his/her own personal cleanliness. Foodservice employees play a major role in representing the foodservice department and must maintain this image to the people served.

Bacteria Size

Instructional Objective: TO DEFINE THE SIZE OF BACTERIA

Bacteria may be referred to as microorganisms, microbes or simply as germs. Most bacteria cannot be seen without the aid of a microscope. A typical bacteria measures about  $1/25,000$  of an inch, and it would take two thousand of these typical bacteria to reach across the head of a pin at its widest point. Bacteria are living organisms that must have food, which is absorbed through their cell walls to live. They grow, reproduce and give off wastes. Controlling bacteria in foodservice is one of the major goals in foodservice even though they cannot be seen.

Kinds of Bacteria



Instructional Objective: TO IDENTIFY THREE KINDS OF BACTERIA FOUND IN FOODSERVICE AND THEIR CHARACTERISTICS.

The kinds of bacteria are many, but foodservice employees should know of these three: Staphylococcus, Clostridium Perfringens and Salmonella. Staphylococcus is found in food contaminated by people with boils, infected wounds and sores, and unwashed hands. Clostridium Perfringens is found in food that has been precooked, inadequately cooled, then inadequately reheated. An example would be beat that has remained at room temperature for serveral hours, then reheated or cooled and served. Salmonella can be found in food contaminated by unwashed hands. Examples of food sources are egg custards, most dairy products and meat and meat products.

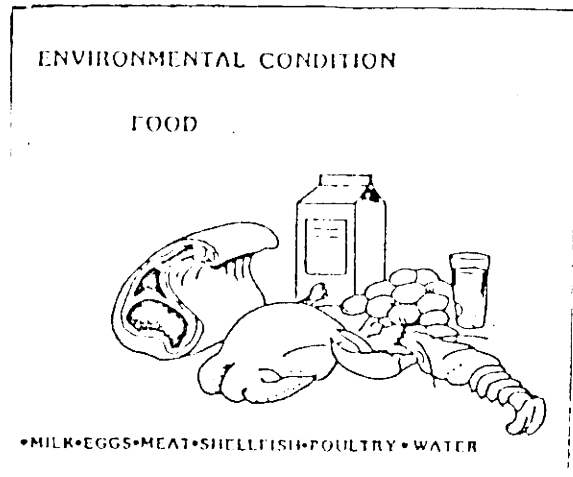
Environmental Conditions for  
Bacterial Growth

ENVIRONMENTAL  
CONDITIONS  
FOR BACTERIAL GROWTH

1. FOOD
2. MOISTURE
3. TEMPERATURE
4. OXYGEN
5. DARKNESS

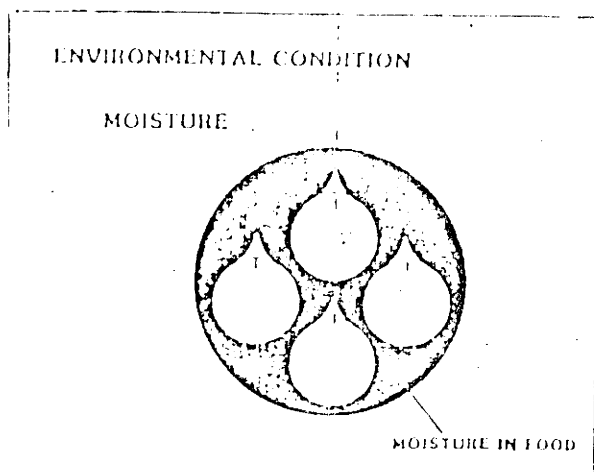
Instructional Objective: TO BECOME FAMILIAR WITH THE FIVE MAJOR ENVIRONMENTAL CONDITIONS FOR BACTERIAL GROWTH

The five major environmental conditions for bacteria to grow are: (1) food; (2) moisture; (3) temperature; (4) oxygen and (5) darkness. The following visuals will explain each condition and its characteristics.

Environmental Condition: Food

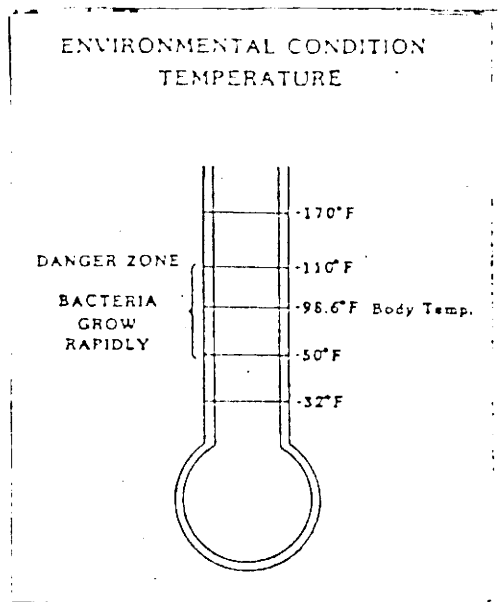
The first environmental condition, food, is a source that bacteria such as *Salmonella* and *Clostridium Perfringens* need in order to live. Bacteria like and use many of our foods such as milk, eggs, meat, shellfish, poultry and water. They can survive only on food sources or substances derived from food. The example of custards being left out at room temperature and meat stored at room temperature invite bacteria to grow and multiply. Therefore, foodservice workers need to follow guidelines established for proper food preparation and storage.

Environmental Condition:  
Moisture



The second environmental condition for bacterial growth is moisture. Nutrients for bacteria such as *Staphylococcus* must have enough moisture to survive as they cannot live without it. Excessive talking, sneezing or coughing cause droplets of saliva which contain thousands of bacteria to fall from the mouth while speaking, thus contaminating the food. Therefore, when coughing or sneezing, cover the mouth, leave the work area, and wash your hands.

Environmental Condition:  
Temperature

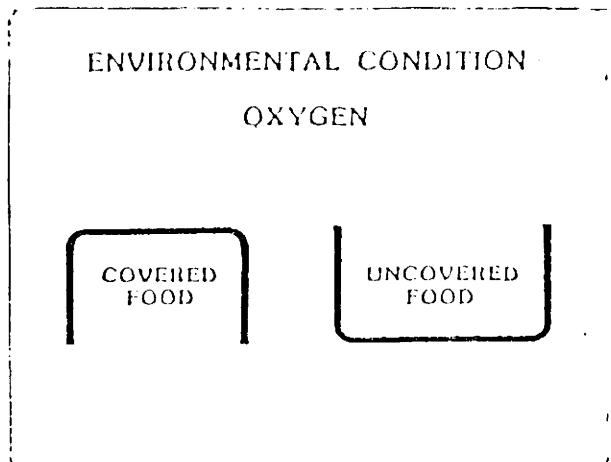


The third environmental condition for bacterial growth is temperature. Bacteria such as Salmonella and Clostridium Perfringens grow best within the temperature range of 50 degrees fahrenheit to 110 degrees fahrenheit. These bacteria are those that spoil vegetables and meat, sour the milk and cause illness. A temperature of 170 degrees fahrenheit or over will kill most harmful bacteria. A freezing temperature of 32 degrees fahrenheit will not kill bacteria but will slow their growth.

The human body is normally 98.6 degrees fahrenheit. Therefore, bacteria easily thrive in or on the body. Foodservice employees need to be aware of personal cleanliness as well as a concern of transmitting disease. This is important as the body is a prime source for bacteria to grow and multiply.

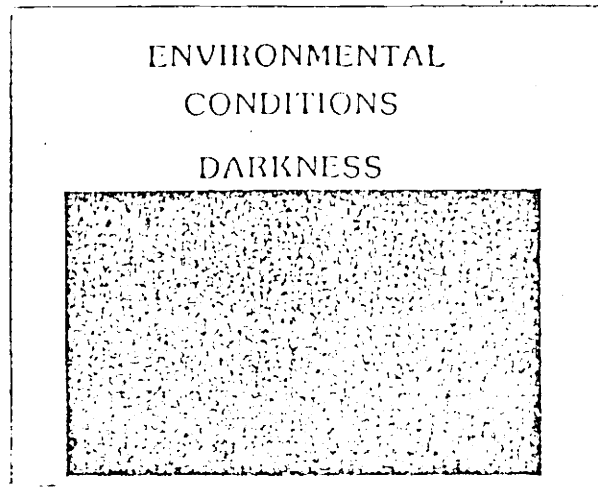


Environmental Condition:  
Oxygen

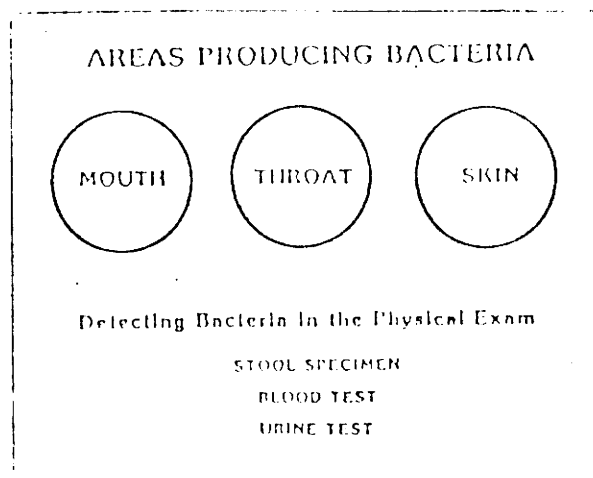


The fourth environmental condition, oxygen, is in the air and is a major source of transmitting bacteria and promoting growth. Oxygen can transmit bacteria such as *Staphylococcus* when people sneeze and cough, thus contaminating food. A sneeze guard is a transparent plastic or glass protection placed over food when it is on a cafeteria counter. The sneeze guard assists in preventing bacteria from getting into the food from people sneezing or coughing. Therefore, foodservice employees need to keep all food that is exposed to air protected and covered.

Environmental Condition:  
Darkness



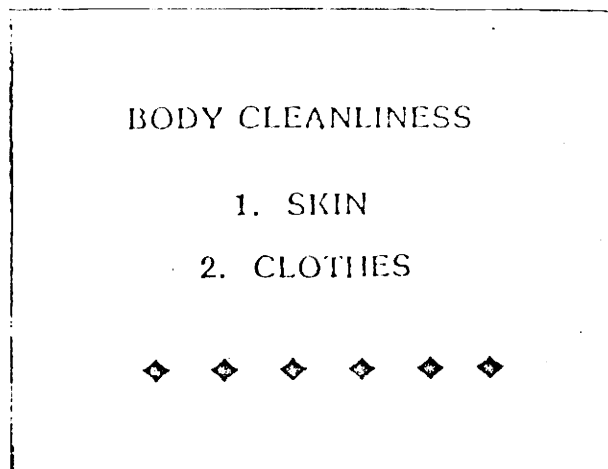
The fifth and last environmental condition for bacterial growth is darkness. Darkness favors the development of these bacteria, and they become very active and multiply rapidly. Bacteria such as molds and mildew grow best in the absence of direct light or sunlight. Therefore, a drawer with dirty rags or a locker with soiled linen are primary sources for bacteria to grow and multiply.

Disease Producing Bacteria

Instructional Objective: TO BECOME FAMILIAR WITH WHERE DISEASE PRODUCING BACTERIA GROW AND THRIVE

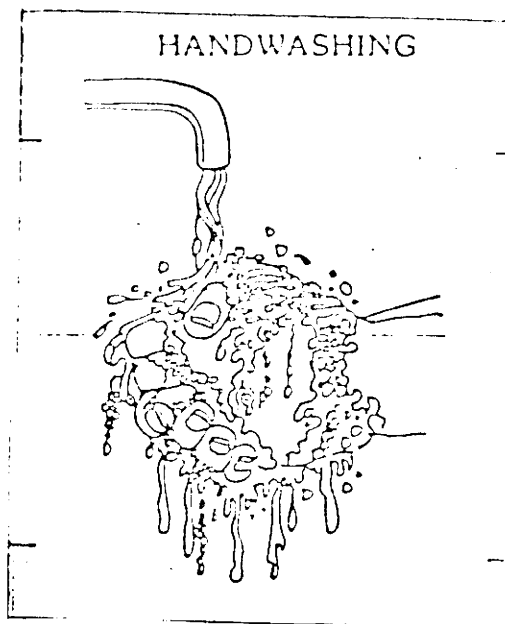
Disease producing bacteria such as Staphylococcus may exist in the mouth, throat or on the skin. The physical exam required of new foodservice employees includes a stool specimen, blood test and urine sample to check for these bacteria that might be present. The physical exam will prevent foodservice employees from working until the identified problem has been eliminated. For example, the rule of not allowing employees to work with open sores and cuts is because cuts carry large numbers of bacteria that can cause infection and can also spread this infection to other employees or consumers.

In foodservice departments, employees must constantly fight against bacteria and the conditions that cause bacteria to grow. Cleanliness in personal habits and in working areas is most important. Therefore, each foodservice employee must monitor his/her own personal hygiene constantly.

Body Cleanliness

Instructional Objective: TO ENSURE BODY CLEANLINESS

To ensure body cleanliness, care should be taken to keep the body and clothes clean at all times. The skin is a prime breeding ground for bacteria. A bath or shower with warm water and soap should be taken to reduce the amount of bacteria present and also help prevent any body odor which is offensive to customers and fellow employess. Body perspiration and food odors penetrate clothes and can be unpleasant. Therefore, underclothing as well as outer wear is to be clean daily.

Hand care

Instructional Objective: TO LEARN THE CORRECT CARE OF HANDS AND PROCEDURE FOR HAND WASHING

Hand care is a major concern in personal hygiene because hands are often the source of bacteria such as Staphylococcus involved in food contamination. To have clean hands, fingernails must be trimmed and cleaned. Nail polish should be avoided due to the possibility of its chipping off into the food. Also, hangnails harbor bacteria and are very difficult to keep clean, therefore, should be trimmed.

(continued)

(Continued)

Hand care: When to Wash Hands

WASH HANDS WHEN:

1. AFTER SMOKING
2. CHANGING JOB TASKS
3. AFTER GOING TO THE RESTROOM
4. AFTER TOUCHING ANY PART OF THE FACE OR HAIR

Washing hands should follow any task or action that offers the possibility your hands have picked up germs. The following are examples of when hands should be washed:

1. After smoking, due to droplets of saliva from the mouth that get onto the hands.
2. Changing jobs in the work area, such as handling the crates of food, then going into the preparation of food.
3. Returning to the work area from the restroom or a coffee break.
4. After touching any part of the face, due to contamination of the hands from blemishes or facial sores.

(Continued)

(Continued)

Hand care: Detailed Hand  
Washing Procedure

DETAILED HANDWASHING  
PROCEDURE

1. ADJUST WATER TEMPERATURE
2. WET HANDS & WRISTS
3. APPLY SOAP
4. INTERLOCK FINGERS
5. LATHER
6. USE BRUSH OR NAILFILE
7. RINSE
8. DRY WITH PAPER TOWELS  
OR HOT AIR DRYER



To assure properly washed, clean hands, follow this simple hand washing procedure prior to reporting to a work area:

1. Adjust the temperature of the water to be as warm as the hands can comfortably stand.
2. Wet the hands and the exposed areas of the wrists and forearms with warm water.
3. Apply soap to palm of one hand; join hands palm to palm, working up a soap lather on hands, wrists and forearms.
4. Use interlocking motion with fingers to cover all areas between fingers with soap.
5. Force the lather under fingernails.
6. With a clean nail file or brush, remove suds and grime from under fingernails.
7. Rinse hands thoroughly under warm, running water
8. Dry hands carefully with paper towels or hot air dryer.

This procedure is a very detailed method of hand washing. An attempt to wash hands often will reduce the opportunity for bacteria to grow and be transferred to food items.

(Continued)

(Continued)

Hand care: Simple Hand  
Washing Procedure

SIMPLE  
HANDWASHING PROCEDURE  
DURING WORK PERIOD

1. WARM TO HOT WATER
2. LATHER HANDS
3. RINSE THOROUGHLY
4. DRY ON PAPER TOWEL  
OR HOT AIR DRYER

*WGA*

This hand washing procedure is to be followed during the work period:

1. use warm to hot water,
2. lather the hands with soap, using palm to palm motions,
3. rinse the hands thoroughly with warm to hot water, and
4. use paper towels or hot air dryer for drying the hands.



Hair

Instructional Objective: TO DESCRIBE THE IMPORTANCE OF HAIR CARE WHEN WORKING IN FOODSERVICE

Hair should be kept clean as it is a prime source for bacteria growth such as Salmonella. Frequent shampoos and regular brushing with a clean hairbrush keep the hair clean, odorless and free from dry skin scales and dandruff. The hair should be a style that is simple and easy to arrange and keep in order. A few simple hair styles that are easy to manage are short or a ponytail which is pulled back and off the collar.

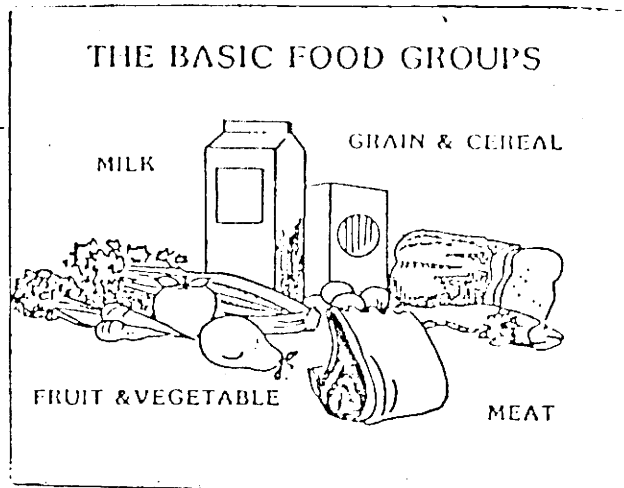
To comply with local, state and federal health codes, employees are required to wear hairnets, bands or caps to keep hair confined so it cannot contaminate food. Hair restraints serve a double purpose. They discourage foodservice employees from running fingers through the hair, scratching the scalp or otherwise contaminating the hands by touching the hair. Hair restraints also prevent the hair from breaking off and falling into the food. Think how unappetizing it would be for patients and customers to find a stray hair in their food because a foodservice employee was careless in hair grooming.

A Healthy BodyTHE  
BODY

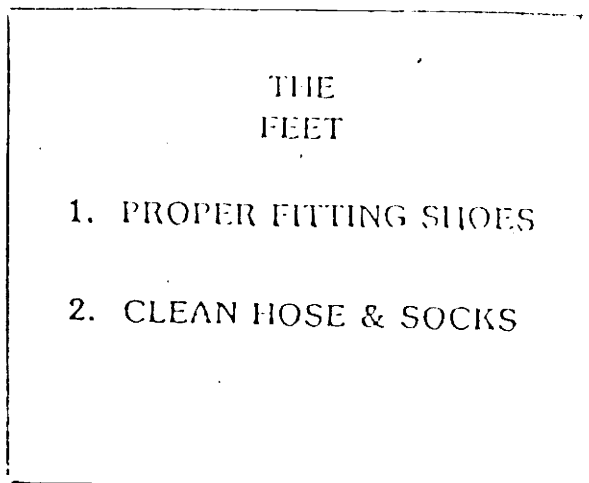
1. PHYSICAL EXAM
2. DENTAL EXAM

Instructional Objective: TO PREVENT THE SPREAD OF INFECTIONS BY  
MAINTAINING A HEALTHY BODY AND PROPER  
NUTRITION

It is necessary that sanitary conditions be maintained at all times. This is because there is so much danger of infection spreading directly from the foodservice department to the patient or customer. Therefore, employees in the foodservice department should have a physical and dental exam at least once a year. The physical exam should include a blood, urine and stool test for bacterial counts and a chest X-ray for TB detection. These tests will ensure the employees that they are fit to work in a food preparation area. The dental exam included both teeth and gum checks. Gum and teeth infections can lead to serious trouble elsewhere in the body if these problems go untreated.

A Healthy Body: The Food Groups

Proper food and the right amounts aid in producing a healthy body. Foodservice employees will feel and work better if they have a well-balanced diet. A wise selection of food is necessary to provide the body with the energy needed to keep going. The best way to obtain what the body needs is by eating the proper amounts of the following foods: two servings from the milk group; three servings from the meat group; four or more servings from the fruit and vegetable group, and four servings from the grain and cereal group.

Feet

Instructional Objective: TO IDENTIFY STANDARDS OF PROPER FOOT CARE  
AND THE NECESSITY OF COMFORTABLE WORKING  
SHOES

Feet that are in good condition are essential to people who must do much standing or walking. Good physical care is necessary to keep the feet in condition. Soaking tired feet in a hot bath at night will bring relief. In warm weather a commercial foot powder can be used to help relieve excessive perspiration.

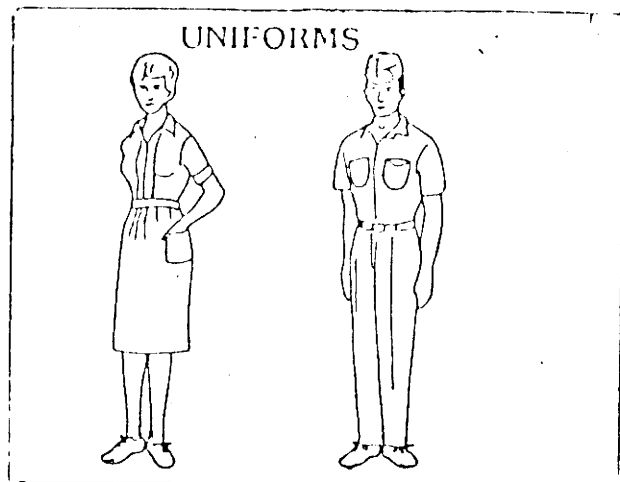
Foodservice workers are on their feet a great portion of the work day. Therefore, shoes should fit well, have plenty of toe room to take care of the foot in motion, have a well-placed heel of comfortable height and provide good support for the arches. All shoes worn should have closed toes, due to the safety factor of having more protection in case a heavy object should fall on the foot. The shoes should be kept clean, polished and in good repair. It is impossible to do an efficient job in unsuitable shoes - that is, too high heels, run-down heels and worn out shoes which make slipping and falling easy.

(Continued)

(Continued)

Feet

A consideration with the care of feet are hose and socks. For women, hose in a medium weight will wear better and be easier on the feet than sheer weights. The color of hose chosen should be neutral and harmonize with the color tones of the uniform. Light brown hose usually look better with white or pastel uniforms. Medium or dark brown colors usually look better with dark colored uniforms. In order to assure maximum wearing and cleanliness, hose should be washed after each day's wearing. For men, socks that are of a cotton or polyester material are best suited for wear that will aid in comfort and proper air circulation.

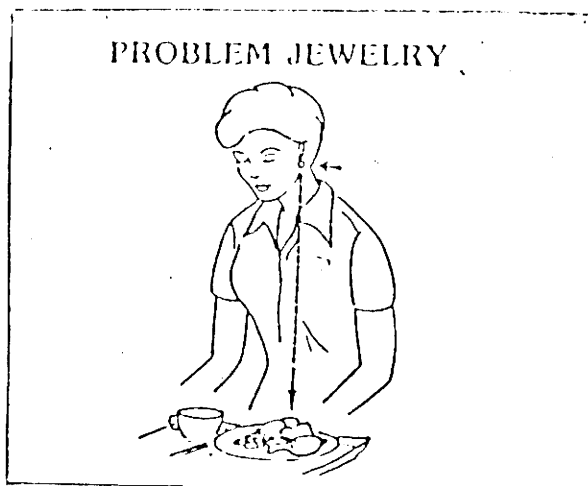
Uniforms

Instructional Objective: TO DEFINE THE IMPORTANCE OF A CLEAN UNIFORM AND APPEARANCE WHILE REPRESENTING THE FOODSERVICE DEPARTMENT.

The clothing of foodservice employees plays an important role in the prevention of food contamination. Soiled underclothes that have gone for days without cleaning are offensive to fellow employees and customers who are concerned if the food being served is as unsanitary as the person serving it. Also, the contact with dirty uniforms is enough to start the bacteria contamination cycle: from the clothing to the hands to the food.

The uniform should fit well and be kept in good condition. The buttons should match, belts should be of correct length, and the uniform should always be clean and well pressed. These things are part of the total uniform and represent the appearance of the foodservice department.

A uniform is an emblem of employment in a particular department or restaurant. An attractive uniform reflects favorably on both the wearer and the facility. Therefore, it is essential that employees observe strict standards of personal appearance and always strive to look their best.

Jewelry

Instructional Objective: TO IDENTIFY PROBLEMS THAT COULD OCCUR WHEN WEARING JEWELRY WHILE WORKING IN THE FOOD-SERVICE DEPARTMENT

Jewelry such as necklaces, bracelets, earrings, pierced or otherwise, may catch food and dirt particles and carry them to the food. Pieces of jewelry can break, fall into the food and find their way to a customer's plate. Rings with settings and watches are soil collectors and are difficult to clean. Often stones set in jewelry become unglued with the kitchen heat, such as steam and ovens, and drop into the food.

A simple, clean appearance is much more attractive and indicates cleanliness rather than an ornate appearance that may produce potential hazards to the food such as fingernail polish chipping off into the food. Also, as a safety precaution, earrings should be avoided due to the possibility of their getting caught in machinery during operation and seriously injuring the employee.

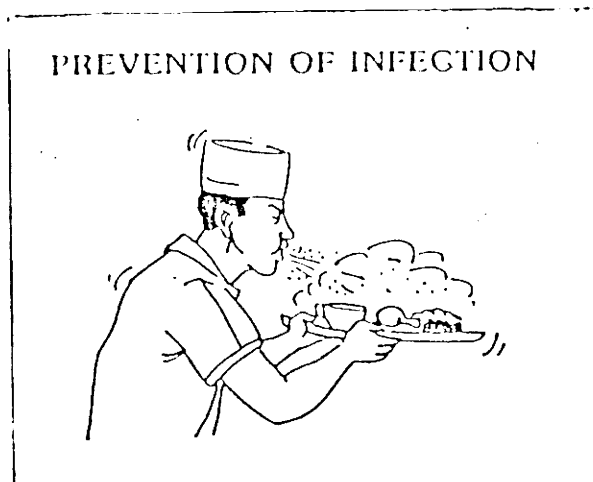
Lockers

- LOCKERS
1. CLEAN
  2. NEAT
  3. USED FOR  
TEMPORARY STORAGE

Instructional Objective: TO RELATE EMPLOYEE LOCKER ROOM NEATNESS AND CLEANLINESS AS A PART OF PERSONAL HYGIENE

Employee lockers should be kept neat and clean so that the clean uniform the foodservice worker wears is not contaminated by old, soiled clothing. The purpose of the employee locker is to temporarily store clean and neat uniforms and also the work shoes. The foodservice worker need to use the locker for storage of clean uniforms. The employee should avoid wearing the uniform to work. If uniforms are furnished, the foodservice employee should change at work. If uniforms are not furnished, but the employee has a locker, then the employee should change clothes at work. If lockers are not available, the foodservice employee should wear a long, clean overcoat when coming to work to assist in keeping the uniform clean as possible.



Prevention of Infections

Instructional Objective: TO IDENTIFY THE IMPORTANCE OF REPORTING ALL INJURIES TO THE SUPERVISOR

Respiratory tract infections such as colds, sore throats and pneumonia are especially difficult to control because they are spread easily to larger groups. An uncontrolled sneeze releases many water droplets, each of which contains thousands of Staphylococcal bacteria. It is the responsibility of the foodservice employee to report colds, sore throats and infections to the supervisor, as the Staphylococcal bacterial count and potential as a food contaminator increase dramatically when the foodservice worker becomes visibly ill.

Bacteria thrive in and around skin boils, pimples, inflamed cuts and infected eyes and ears. A sore throat, cough, sinus pain and other symptoms of a cold are further signs that bacteria are taking over. Along with the reporting of infections, any injuries on the job should be reported to the supervisor immediately so the proper medical attention is obtained. Therefore, it is extremely important the foodservice worker report any illness or injury, and get the proper medical attention immediately to prevent any spread of bacteria to the food.

Concluding Statement

**PERSONAL  
HYGIENE  
FOR  
FOODSERVICE  
EMPLOYEES**

These concepts on personal hygiene are translated into working guidelines or rules for all foodservice employees. These guidelines or rules are generally available in the foodservice department. If the foodservice employee is careful and clean in personal habits, there is minimal need for others to catch an illness from the foodservice worker. Following these guidelines on personal hygiene each foodservice worker will prevent the spread of colds and similar infections to customers of fellow workers. Also, the image of the foodservice department will be enhanced.

We will now have a question and answer period. Do you have any questions over the material we just covered?

Allow 5 minutes

Thank you for your cooperation. You will be instructed in the next few days as to when you will take the post-test.

The End

## EVALUATION MODULE: POST-TEST MATERIAL

## PERSONAL HYGIENE FOR FOODSERVICE EMPLOYEES

## POST-TEST

Instructions: The post-test for this instructional package contains questions with three to five answers to select from. Choose the best answer and mark the choice on the answer sheet that is separate from this test booklet. An example of a question and selected answer follows:

EXAMPLE:

1. The job title that most closely identifies your job is
  - A. Foodservice worker
  - B. Cook, assistant cook
  - C. Dishwasher, pot washer
  - D. Diet aide.

## ANSWER SHEET

CONTENT QUESTIONS:

1. Serving safe food in the facility where the foodservice employee is working depends mostly on the
  - A. Supervisor
  - B. Customer
  - C. Employee.
2. Bacteria cannot be seen on hands that look clean because
  - A. There are none there.
  - B. They are too small.
  - C. They are not alive.

CONTINUE TO NEXT PAGE.

3. Salmonella bacteria are found
  - A. Primarily in improperly stored dairy products
  - B. Only on dirty dishes and soiled work surfaces.
  - C. Everywhere.
4. Clostridium perfringens bacteria survive solely on
  - A. Food sources
  - B. Water
  - C. Oxygen
5. The kind of bacteria that can be found in adequately cooled meat is
  - A. Salmonella
  - B. Staphylococcus
  - C. Clostridium perfringens.
6. Areas of moisture that aid in the growth of bacteria could be
  - A. A mop bucket
  - B. Sneezing spray
  - C. Refrigerator drain.
7. The proper temperature for custards and dairy products should be
  - A. 80 to 120 degrees Fahrenheit
  - B. 38 to 45 degrees Fahrenheit
  - C. 110 to 140 degrees Fahrenheit
8. Bacteria can be spread through the air and contaminate the food by
  - A. Sneeze guards
  - B. Fast walking
  - C. Coughing.
9. Mold and mildew grow best
  - A. In the absence of sunlight
  - B. With direct sunlight
  - C. With moisture

CONTINUE TO NEXT PAGE.

10. Employees with open cuts and sores
  - A. Should only work in the dish room
  - B. Should not work in foodservice
  - C. Should wear clean bandages.
  
11. To ensure body cleanliness, the foodservice worker should
  - A. Take a bath or shower once a week
  - B. Use a deodorant when needed
  - C. Take a bath or shower daily.
  
12. Foodservice workers should
  - A. Wear nail polish that looks nice with the uniform
  - B. Never wear nail polish in foodservice
  - C. Wear nail polish only when serving food.
  
13. It is necessary to wash hands thoroughly after using the toilet
  - A. Always
  - B. Often
  - C. Usually
  
14. The procedure for hand washing includes
  - A. Using scalding hot water
  - B. Lathering the hands with soap
  - C. Using a kitchen cloth towel.
  
15. Foodservice employees should wear hairnets or caps when
  - A. The hair is dirty
  - B. Serving food
  - C. In the foodservice area.
  
16. To assist in maintaining a healthy body, foodservice workers should have a
  - A. Physical checkup once a year
  - B. Weekly bath
  - C. Dental checkup every two years.

CONTINUE TO NEXT PAGE.

17. Foods that are not part of a well balanced diet are
  - A. Bread and cereal
  - B. French fries and cranberry juice
  - C. Lemon-lime drink and vanilla wafers.
18. Foodservice employees should wear the kind of work shoe that
  - A. Has a high heel
  - B. Has an open toe
  - C. Provides good arch support.
19. Uniforms for foodservice employees should be
  - A. White
  - B. Clean
  - C. New
20. Wearing jewelry in the foodservice department should be avoided because it is
  - A. Attractive
  - B. Unsanitary
  - C. Valuable.
21. Employee lockers are good storage for
  - A. Clean uniforms and accessories
  - B. Sack lunches
  - C. Dirty towels and rags.
22. For sanitary foodservice, one item considered necessary is
  - A. Skilled employees
  - B. Dependable employees
  - C. Healthy employees.
23. Staphylococcal bacteria can get into food by
  - A. Coughing
  - B. Sanitizing dishes
  - C. Covering food.

CONTINUE TO NEXT PAGE.

24. Improper food handling practices may cause
- A. Excessive amount of leftovers
  - B. Poor County Health Inspection report
  - C. Customer illness.
25. Personal hygiene can
- A. Be lessened if extremely busy
  - B. Help the department image
  - C. Be postponed.



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- (4) Food Service Sanitation Manual. Washington, D.C.: U. S. Dept. of Health, Education and Welfare, 1978.
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- (7) Richardson, T. M.: Sanitation for Food Service Workers. Chicago: Medalist Pub., 1969.
- (8) Training the Food Service Worker. Instructor's Guide. Washington, D. C.: Hospital Research and Educational Trust, 1967.



APPENDIX D

Instructor's Packet for Individual Instruction Package  
Individual Instruction Package

INSTRUCTOR'S PACKET  
FOR  
INDIVIDUAL INSTRUCTION PACKAGE

The following items are enclosed in this packet to assist with the administration of this individual instructional package:

1. Sign-in sheet for participants
2. Instructor's time log
3. Individual time log record for each participant
4. Pretest answer sheets
5. Pretest envelopes
6. Post-test booklets
7. Post-test answer sheets.

When the participant is ready to begin the individual instruction package, these guidelines may be used:

1. Have the participant sign on the sign-in sheet provided.
2. Give the participant the following:
  - a. Individual time log record
  - b. Pretest answer sheet.
3. Remind the participant to read all the instructions in the instructional package thoroughly.

The participant should turn in the pretest answer sheet completed before starting the slide-tape program. The individual time log record is turned in to you at the completion of the slide-tape program. This indicates the participant is finished. You might want to check the cassette tape recorder and the slide projector before the next participant begins to make sure they are ready to go. All materials should be kept in one packet to be ready for the researcher to collect. Be sure to complete the instructor's time log. Your

time involved will be part of the results to be evaluated for this research study.

Any questions about this procedure may be directed to the Food Manager or Dietitian in charge of your foodservice. Thank you for your cooperation.

SIGN-IN SHEET FOR INDIVIDUAL INSTRUCTION

Name \_\_\_\_\_

Name \_\_\_\_\_

Name \_\_\_\_\_

Name \_\_\_\_\_

Name \_\_\_\_\_

Name \_\_\_\_\_

Name \_\_\_\_\_

Name \_\_\_\_\_

Name \_\_\_\_\_

Name \_\_\_\_\_

Name \_\_\_\_\_

Name \_\_\_\_\_

## INSTRUCTOR'S

## TIME LOG FOR INDIVIDUAL INSTRUCTION INSTRUCTIONAL PACKAGE

Directions: Record the amount of time for the following activities in the column provided.

ACTIVITY	TIME	REMARKS
A. Orientation to Participants	Begin _____ Finish _____	
B. Preparation for Individual Instruction 1. Room set up 2. Sign-in sheet	Begin _____ Finish _____	
C. Administration of Post- test	Begin _____ Finish _____	

PARTICIPANT TIME LOG

Name \_\_\_\_\_

Start Time \_\_\_\_\_

Finish Time \_\_\_\_\_

RETURN THIS SHEET TO THE  
SUPERVISOR WHEN FINISHED

-----  
PARTICIPANT TIME LOG

Name \_\_\_\_\_

Start Time \_\_\_\_\_

Finish Time \_\_\_\_\_

RETURN THIS SHEET TO THE  
SUPERVISOR WHEN FINISHED



# PERSONAL HYGIENE FOR FOODSERVICE EMPLOYEES

April 1982



## INDIVIDUAL INSTRUCTIONAL PACKAGE

Instruction Packet Includes:

1. Instructions
2. Pre Tests
3. Cassette Tape
4. Slides
5. Time Log

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Investigator, Institution Mgmt.  
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School of Home Economics  
Oregon State University

Ann Messersmith, Ph.D., R.D.  
Associate Professor & Head,  
Institution Management  
School of Home Economics  
Oregon State University

## INSTRUCTIONS

### 1. SIGN IN SHEET ON DESK

➔ Sign Your Name

### 2. TIME LOG

➔ Record Your Name

➔ Record Time Of Day example 2:45

### 3. PRE TEST / ANSWER SHEET

a) Record Your Name

b) Record Your Responses On

The Answer Sheet

c) Do Not Write On Pre Test

### 4. WHEN FINISHED WITH PRE TEST,

GIVE TO FOOD SERVICE SUPERVISOR.

**PERSONAL HYGIENE**

## CASSETTE TAPE AND SLIDE PROGRAM

1. START SLIDE PROJECTOR - GO TO SLIDE ONE
2. START CASSETTE
3. ADVANCE SLIDES AT (BEEP) SOUND
4. LISTEN TO PERSONAL HYGIENE FOR  
FOODSERVICE EMPLOYES PROGRAM
5. AFTER PROGRAM, REWIND CASSETTE  
AND RETURN SLIDES TO BEGINNING

(Turn To The Next Page)

**PERSONAL HYGIENE**

## TIME LOG

WHEN THE PROGRAM IS COMPLETED,

1. RECORD TIME OF DAY IN THE TIME LOG
2. GIVE COMPLETED TIME LOG TO

FOODSERVICE SUPERVISOR



In approximately two weeks  
your foodservice supervisor will schedule  
a follow-up evaluation for you.

(Turn To The Next Page)

**PERSONAL HYGIENE**



**CONGRATULATIONS**

**YOU HAVE COMPLETED  
THE INSTRUCTIONAL PART  
OF THIS CLASS**

**THANK YOU**

**PERSONAL HYGIENE**