

THE EFFECTIVENESS OF A FORMAL SANITATION TRAINING
PROGRAM FOR RESIDENCE HALL FOOD SERVICE
EMPLOYEES AT OKLAHOMA STATE
UNIVERSITY

BY

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CHAPTER I

PURPOSE

During the past twenty to twenty-five years there has been increasing emphasis on training programs for employees. Many different types of programs have been developed for employees in the food service industry, as well as other industries. Training in sanitation has received considerable attention as this is an important area of the food industry, and many sanitation training programs have been developed for food service workers.

One question of interest is how much do food service employees know about sanitation before they attend training meetings. Then, after the employees have attended a series of meetings, how much did they learn and did they put the knowledge into practice in their work? Other questions of interest are how long does the average food service worker retain the knowledge gained during a course in sanitation and after what period of time is an employee apt to begin to slip back into a previous pattern of work habits.

Managers should know at what intervals of time it is expedient to repeat and re-emphasize the principles of sanitation. Also, a manager should know in which specific areas employees are apt to need extensive retraining.

The author hopes to show that a formal sanitation program is of value to food service employees and that these individuals are able to gain knowledge from such a program. Upon completion of the proposed formal sanitation training program the author will endeavor to show how

beneficial such a program is in relation to knowledge gained and work habits of the employees.

The planning and presentation of a formal sanitation program should provide a learning experience for the author. Also, this research should provide the opportunity for developing effective techniques which are required for organizing future training programs.

CHAPTER II

REVIEW OF LITERATURE

Management's Attitude Toward Training

The training of employees in the food service industry is of vital importance. From a survey that was conducted in 1957 it was determined that the most serious problem of the food service industry was the lack of trained personnel (1).

A major reason for inadequate training stems partly from the fact that management has regarded training as a problem, rather than as a part of its regular job. When training is considered only as a problem, it may be felt that it can be solved once, preferably as quickly as possible, and then forgotten. When management accepts training as part of its job, it then becomes a tool to use daily:

1. to insure a more efficient work force,
2. to help reduce turnover,
3. to build and maintain good morale and teamwork, and
4. to provide an opportunity for the worker to improve his overall efficiency and thereby gain greater job satisfaction (1).

Training must start with top management if it is to be successful. Thus, it is important that top management initiate and participate in the program.

The Bishop-Stoddard Cafeteria Company has developed an employee training program which it has made available to the restaurant industry. This company believes that "a positive attitude carefully adopted by the management is a powerful factor in determining the direction any project or program takes, and the extent and effectiveness of its growth (2). "

In the section of "Management Attitudes and Effective Training" the Bishop-Stoddard Cafeteria Company lists the following areas with which management should be concerned:

1. Management's personal participation is required.
2. Start with people now employed.
3. Encourage employee participation.
4. Concern for customers shown by management (2).

Management needs to be interested in the purpose and content of training rather than just methods. Too often the sole purpose of the training program is to develop skills. Thus, the training consists only of those procedures necessary for successful job performance. Management needs to remember that the employee has goals which include the desire and need to improve himself and his status. In the final analysis the employee must see how he will benefit by utilizing the techniques being taught.

Types of Training Programs

Strauss and Sayles (3) state that there are four types of training programs generally recognized. These include orientation or induction training, vestibule training, remedial training and advancement training.

An orientation or induction training program is designed to introduce a new employee to the job and help with organization identification. In addition to familiarizing the employee with the tasks required in the job, an induction program provides information about company rules and personnel policies, introduces the new person to fellow workers and gives an idea of where this job fits into the total operation of the organization. Induction training is important since the understanding, habits and attitudes developed during the first days are apt to persist.

Vestibule (off-the-job) training takes place away from the normal

work location. This type of training is beneficial when mistakes or slowness will impair production schedules or methods and when special coaching is necessary. However, vestibule training has several disadvantages. Some jobs cannot be learned in slow motion and the trainee does not become accustomed to noise and distractions of the normal work place. Furthermore, vestibule training is expensive to administer and finally, the trainee is not taught by the person who will later judge the performance.

Remedial training, according to Strauss & Sayles (3), is necessary when an employee fails to measure up to established standards. There are several reasons why an employee's work habits may become slipshod. Methods or procedures learned during the induction process may be forgotten or correct techniques may be neglected in favor of short cuts which require less thought and energy. Also, when management introduces new equipment that will alter an employee's job there is the need for additional training.

An employee who has had experience on the job may be more difficult to train than a new employee. The experienced employee may resent being told that more training is necessary to do the job satisfactorily. Also, telling an individual that remedial training is required may cause embarrassment before colleagues, because it is an implied threat to job status.

Strauss & Sayles (3) state that through effective training it is also possible for an employee to move to more responsible and better jobs. In many instances this will be informal on-the-job training which allows an individual to learn by observation the skills of a higher position while doing the job. The other method of advancement training is additional education away from the work situation.

These four types of training illustrate the fact that training should be a continuous process, which requires constant attention by management. This training will benefit both the employee and the employer. The employee benefits by improving skills, acquiring information and thus preparing for promotions. The employer profits by acquiring well-adjusted employees whose rate of production and efficiency are increased (3).

The Trainer

The person who directs training can be any of several different people. This person can be from the personnel department specializing in training, the employee's immediate supervisor or another employee. Regardless of which person conducts the training, the trainer must understand the principles involved and keep the following facts in mind.

1. Training is a planned technique of teaching habits and skills to people.
2. Learning is a continuous process for people of all ages.
3. Teaching inspires people to do even small tasks in a better way.
4. Training must be more than pep talks and scoldings.
5. Training must include both theory and practice.
6. The belief that the best way to learn is by trial and error is costly both in money and effort.
7. Successful training enables an employee to do a job more quickly with less waste of energy and more satisfactorily.
8. Training in food service is basic in the development of skills and of an atmosphere of cooperation within a food service group (4).

The job trainer should know not only the job, but should have the ability to impart this knowledge to others. Thus, the trainer's job is to find an effective means of giving other people the knowledge and understanding that is already possessed.

Another factor the instructor needs to recognize is the need for goals and motivation. Lodde (5) states that the trainee, to be motivated, must know how the job is to be accomplished, when it is to be done, and

where it is to be done. She states this is of importance because whenever a training process is used it is for the purpose of making a change in a person's habits.

Black (6) lists six attributes common to men that have been most effective when teaching a job to a trainee.

1. Each one had a thorough knowledge of his job.
2. Each one set high standards of performance for himself and for the men who worked for him, and demanded that those standards be met in daily job performance.
3. Each one knew how to explain the job assignment in clear and concise language and could make a new job sound interesting and challenging. Each made sure you knew exactly what he wanted you to do before he gave you the 'go ahead'.
4. Each one adapted his coaching methods to the individual.
5. Each one was patient, thorough, and willing to repeat instruction as often as necessary.
6. Each had won the respect of his employees, who had confidence in his decision, trust in his fairness and a firm belief in his planning.

The training will be more effective if the trainer takes the time to prepare. As noted before, the trainer must know the job that is to be taught and should determine or be informed of the kind and amount of training that is necessary. This should be considered since each employee differs in skill, ability, experience, productivity and work habits. A formula for determining training needs is "The total requirements of the job, minus what the man already knows about the job, equals what the man needs to be taught (7)." The use of this formula, according to Sandell (7), should reduce the training time, since the trainer can eliminate unnecessary instructions and emphasize the areas where training needs to be accomplished.

Teaching Plans

In training, as in any type of teaching, a lesson should be prepared. Weaver and Cenci (8) define a lesson as being "a single complete unit of

learning" and cites six important characteristics of a lesson.

1. The lesson must be a unit of learning.
2. Each lesson should contain something new.
3. The lesson should be reasonable in scope.
4. The lesson should be adapted to the need of the students.
5. The lesson should have a clearcut beginning, a presentation, and an end.
6. The lesson should require a measurable standard of achievement.

The lesson is composed of nine basic parts which the teacher should know before the class begins. These would include summarizing: (8 & 9)

1. The topic--the general area the lesson will cover.
2. The aim--the immediate goals or kind of learning desired.
3. The preparation--the teacher should be prepared and have an organized lesson plan before the teaching begins.
4. Motivation--the teacher needs to arouse the student's interest and direct their attention to the lesson goals and objectives.
5. The presentation--the actual presentation of the lesson to the students.
6. The application--the students practicing of a skill or application of knowledge.
7. The summary--the purpose is a brief review of the content of the lesson. An effective summary should help the students arrive at some valid conclusion and to evaluate the extent the goals of the lesson have been achieved.
8. The assignment--the preparation to be accomplished prior to the next lesson.
9. References--the materials and books which pertain to the lesson and will be used.

The teaching plan is an outline of the lesson. The plan should be

easy to follow and should contain notes and key phrases which the instructor can use as a guide. When the teaching plan is prepared, it should be designed with a degree of flexibility. The plan should not be used as a text and should allow the teacher to depart from it when necessary (8).

The pamphlet Supervised Food Service Workers—A Suggested Training Program (9) stresses the philosophy that the best lesson plan is one that has been prepared by the teacher. Thus, it is based on personal experience and manner of teaching. The purpose of the lesson plan is to achieve effective and meaningful classroom instruction.

Proctor and Thornton (10) suggest the use of an outline which presents information to be included in a training program. The outline is planned in detail to attain the specific objectives of the program.

Figure 1 delineates such a structure.

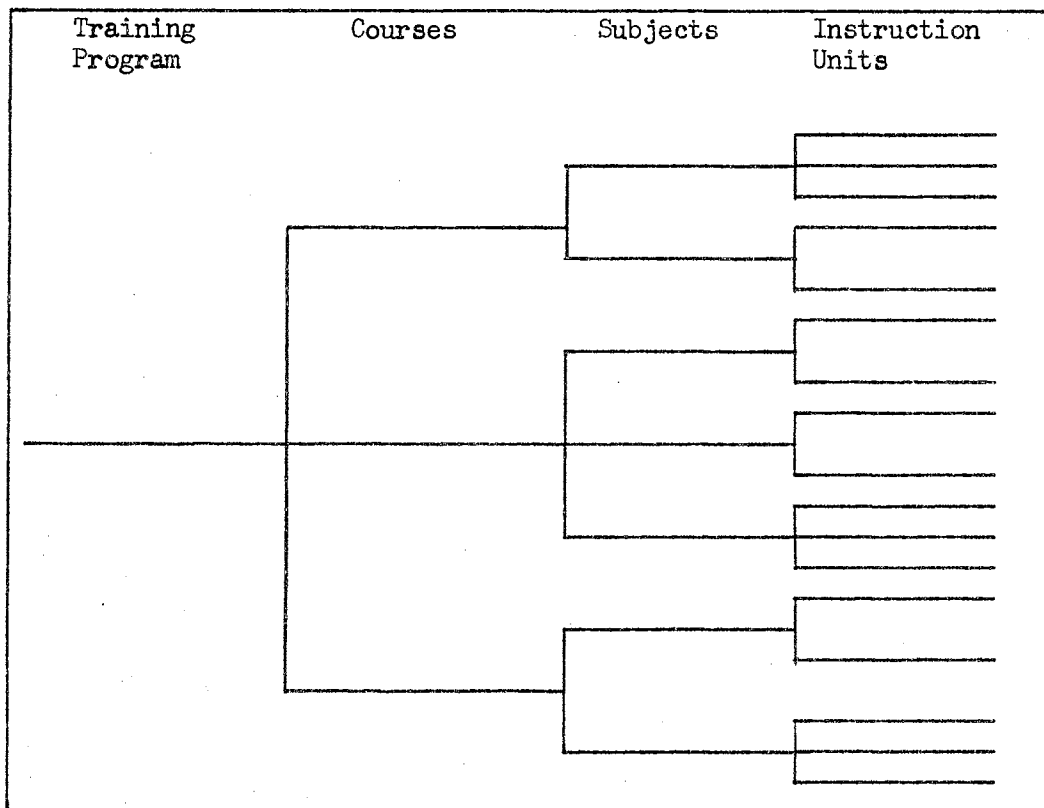


Fig. 1 Elements of a Training Program

Use of Visual Aids

A visual aid, according to Stovall and Brown (11) is "an 'aid' or a 'helping hand' to learning." Thus, all visual aids which convey a message may be called "visual voices" to learning. The "helping hands" or "visual voices" assist in conveying a message and presenting new ideas.

Visual aids may be used to acquire "breadth" and "depth" in teaching. Also, visual aids may show the "what," the "why" and the "how" of the instruction and the use of the knowledge in unforeseen as well as foreseen aspects of an occupation (11).

When developing visual aids which truly teach, the teacher may identify a few guides for using "visual hands". Some of the types of visual aids that can be used include chalk boards, flannel boards, posters and charts, slides, movies and overhead or opaque projectiles (11).

Posters may be used as independent visuals which state messages alone without the need for supplementary verbal explanation. The poster should be designed to use bold color and to attract attention. Also, the poster should suggest action and convey a message simply but dramatically.

The use of overhead or opaque projectiles facilitates the presentation of information to an entire class at the same time. Color can be applied to transparencies used on overhead or opaque projectiles by using colored pencils, transparent tape, magic markers or food coloring (11).

The use of movies, according to Eppright, Pattison and Barbour (12), can be a valuable aid in teaching. The lifelike situations which are portrayed in a film are difficult to duplicate by any other method. Films

are usually enjoyed by students since movies are most often seen for entertainment. While in this receptive frame of mind, the students can be interested and challenged. Movies used should be informative, but not ponderously dull, in order to avoid spoiling anticipation for future viewings.

Even though students are interested the focal points of a film may not be understood. Thus, evaluation of a film should be carefully directed so the emphasized points in the showing will be remembered. The teacher can focus attention on the aspects of the movie by questions and guided discussion.

Evaluation Tools

Evaluations are used by teachers in appraising the work of students as related to some objective or objectives. Evaluations are used to appraise the effectiveness of a particular teaching method and also the effectiveness of the teaching as a whole.

The term evaluation, according to Williamson and Lyle (13), has a broader meaning than measurement. Evaluation implies that consideration has been given to value standards. Eppright, Pattison and Barbour (12) define a value as "an ultimate goal that determines what more immediate goals shall be." Thus, the results of measurement (tests obtaining quantitative evidence) are interpreted in the light of the goals which the group or individual is striving to obtain.

Williamson and Lyle (13) state that

since education is a process concerned with student growth as evidenced by change in their behavior the results of teaching can only be evaluated fairly by determining the amount and kind of change that has occurred.

Thus, evidence of the degree to which all objectives have been attained

should be sought in the evaluation process. Both objective and subjective methods of evaluation should be used to collect evidence of change in behavior.

Tests are one form of evaluation. Williamson and Lyle (13) indicate that tests may be used for two purposes; for exploration and for measurement. If the same test, or a similar form of the test, is repeated at the conclusion of the study unit, the differences in results between the first and second tests may be used as a measure of progress.

The true-false test according to Army (14) uses one form of the "recognition-type" question. Although commonly used, the typical true-false test is one of the least satisfactory. Army states that there are three objections to using the tests. First, the statements must be unequivocally right or wrong and there are few statements that can meet this requirement. Second, true-false questions are of limited value since there is apt to be less discrimination in the test. Third, true-false statements are apt to foster guessing by students who do not know the material covered. To adjust for the possibility of guessing, a "correction formula" is usually advocated. Several "correction formulas" which can be used are (14):

1. $S = R - W$
2. $S = R - \frac{1}{3} W$
3. $S = R + \frac{1}{2} O$

Key— S = Score
 R = Right answer
 W = Wrong answer
 O = Omissions

The proponents of true-false tests indicate that (14):

1. Tests can be scored with an inflexible key.
2. Students can answer more items within a given time than any other type, so that a wide sampling is possible.
3. Tests are easy to construct.

The first two statements are correct, but the third is not, Army says,

because good true-false statements are difficult to construct.

There is another factor, according to Arny (14), which makes true-false tests valuable. This type of question has real value in motivation and stimulating discussion, especially if the content is controversial.

As indicated before, Williamson and Lyle (13) feel that in evaluation both objective and subjective methods should be used in collecting evidence of change in behavior. The subjective appraisal of student development may be of more value than objective measurement.

Rating sheets are one form of subjective evaluation. The rating devices Arny (14) says, are likely to be more useful:

1. when descriptions of the desirable standards and the typical shortcomings of the product or persons to be rated are included.
2. when sufficiently objective so that different judges rating the same products or persons rank them in approximately the same order.
3. when rating can be done fairly rapidly.

The use of a good evaluation program, according to Eppright, Pattison and Barbour (12), will employ tools to test the student's acquisition of knowledge and the ability to think effectively. Also, the evaluation device will give information concerning the development of attitudes and identification of values.

Sanitation Training Programs

Many sanitation training programs have been prepared and presented to food service workers in various areas of the United States. One bulletin, a "Food Service Sanitation Manual" (15), published in 1962 by the United States Public Health Service, describes food service sanitation ordinances and codes. All these training programs and bulletins emphasize the importance of sanitation programs for food service personnel.

Di Liello (16) states that a survey of the effectiveness of a twelve week short course in School Lunch -- Fundamental Principles of Bacteriology and Sanitation was very favorable. The results of the survey indicated that the school cafeteria employees "received the course with enthusiasm and felt that the knowledge gained by attending the program was very useful in the performance of their services (16)."

The areas of sanitation included in the curriculum for the training of school lunch personnel according to Di Liello (16) were: 1. principles of bacteriology and sanitation, 2. preservation of food--methods, 3. diseases associated with foods and 4. principles of sanitation--detergents, sanitizers and disinfection procedures. These topics comprised one-third of the curriculum, or four lectures of two hours each for a total of eight hours.

Di Liello (16) states that a potential hazard to the public health exists when unsanitary practices are permitted to occur in food service operations. By promoting and developing effective sanitation practices in food production and handling, the threat to public health can be minimized and entirely prevented.

Intestinal diseases, which cause discomfort, suffering and, sometimes, death, are transmitted by infected or accidentally poisoned food supplies. Thus, it is necessary to recognize the need for education and training of food handlers in the area of practical bacteriology and sanitation practices. These intestinal diseases, according to Di Liello (16), are generally transmitted from person to person through contaminated food and water, which can be contaminated either indirectly or directly. Insects, such as the common housefly and roaches, are able to spread enteric microbes indirectly. The direct transfer of pathogenic bacteria may occur from the excreta of infected personnel to the mouths of

susceptible persons by hands or by non-living objects.

Healthy people are able to harbor enteric microbes, thus the role of "human carriers" should not be underestimated. The "healthy" carrier is capable of harboring pathogenic bacteria for long periods and is able to transmit intestinal diseases.

Bacterial food poisoning, according to Eschbach (17), is a term describing the effect caused by various poisonous agents in food. The poisonous agents usually result from the growth of harmful bacteria in food which is spoiled, improperly prepared, or incorrectly handled. Eschbach classifies bacterial food poisoning into two subgroups: food infections and food intoxications. He defines a food infection as an "illness resulting from eating or drinking food which contains harmful bacteria." Food intoxication is defined as an "illness resulting from eating or drinking food in which bacteria have grown previously and developed a toxin."

Stauffer (18) states that the great majority of incidents of food infections and food intoxications have been caused by unhealthy workers, who have, at some time or other, had an opportunity to contaminate the food.

Human diseases contracted from food occur only because some other human being suffering from that disease has through poor personal hygiene practices, contaminated the food before it reached the person who consumed it. It is an unpleasant but inescapable fact that any time we contract a gastrointestinal disease, we have ingested some fecal material from either man or animal. (18)

Training programs, according to Stauffer (18), dealing with sanitation, should include information on personal habits and idiosyncrasies which may contribute to the contamination of food. These practices are usually referred to as "hand habits". Frequently the food service worker is totally unaware of how many of these habits are possessed. As a

result of "hand habits", food service managers have instituted many misunderstood, disliked and ignored regulations. Consequently, it is important not only to give rules for good "hand habits", but also to explain the reason for the rules.

Food service workers, according to Di Liello (16), must be made to realize that "food poisoning" (food intoxication as defined by Eschbach) outbreaks can be controlled more easily than "food infections" by observing the following rules, 1. prevent accidental contamination of food with poison producing bacteria; 2. store and handle foods in a manner discouraging growth of poison producing bacteria and 3. never serve foods which are in the least suspicious of harboring poisonous substances.

Another sanitation training course developed by Dr. W. H. Haskell has been made available to the food service industry by Treva M. Richardson (19). This course is based on one fundamental factor -- "if it were not for the existence of germs, there would be no need for sanitation" and the entire sanitation course is built upon a firm foundation of practical bacteriology knowledge.

Dr. Haskell's course (19) is divided into five sessions of two hours each, for a total of ten hours. The outline of the course is:

Lesson I

Part 1 - Layman's bacteriology

Part 2 - Communicable diseases

Lesson II

Part 1 - Food poisoning

Part 2 - Food protection

Lesson III

Part 1 - Importance of cleaning

Part 2 - Importance of sanitizing

Lesson IV

Part 1 - Pest control

Part 2 - The person is the thing

Lesson V

Part 1 - Review and discussion

Part 2 - Quiz -- Certification

Dr. Haskell was able to gain the interest of the food service workers by stressing that sanitation practices would not only protect the customer, but would be a personal health safeguard. This approach was found to have a great appeal to the students and insured interest in the program.

CHAPTER III

PROCEDURE

Planning

Plans were formulated during the summer of 1965 with Mr. Blair, the Residence Hall Food Service Director, for a series of orientation programs for all food service employees working in the residence halls at Oklahoma State University. The orientation programs were scheduled for September 4, 5 and 6, 1965. This would be the week preceding the opening of the residence halls and all employees would be able to attend since work would begin September 1, 1965. This was the first year that the employees were expected to attend a series of programs prior to opening the halls.

The Residence Hall Food Service at Oklahoma State University includes six residence halls (Bennett, Cordell, Murray, New, Stout and Willard). The kitchens and dining rooms are located on the ground level of all the residence halls with the exception of Bennett and New. At these two residence halls, the kitchen and dining rooms are on the first floor. Four of the Residence Hall Food Services (Cordell, Murray, New and Stout) operate on a contract basis and two (Bennett and Willard) are operated on an a la carte basis. The number of students served in the food services depends upon the capacity of the residence hall. Bennett Hall serves approximately 1100 men plus the public; Cordell Hall, 500 men; Murray Hall, 500 women; New, 1000 men and women from Wentz, Parker and Scott Halls; Stout, 400 women and Willard 400 women plus the

public.

Since Mr. Blair felt that all of the employees could benefit from a short course in sanitation, a part of the orientation program was set aside for the purpose. Plans for the sanitation course included three lecture and discussion sessions of one hour duration to be scheduled in the afternoon on three successive days.

The outline (Appendix A) of the three sessions will be completed after studying "A Training Course in Sanitation for Food Service Workers" (19), "Food Service and Public Health" (20), "Sanitation for Food Service Establishments--A Guide for On-the-Job Training" (21), "The Sanitation Manual--A Guide for Management" (22), and Food Service in Institutions (23). Other publications that are to be consulted for information concerning bacteria, food infections and food intoxications are The Management of People in Hotels, Restaurants, and Clubs (24), and "Bacterial Food Poisoning" (17).

Upon completion of the course outline, the author and the Director of the Residence Hall Food Service will discuss in detail the make-up of the lecture and discussion periods. Decisions will be made to motivate the employees and to obtain maximum employee involvement in the sessions. Also, plans will be made to use several types of visual aids and evaluation tools.

After the preliminary decisions, the development of three evaluation devices will be undertaken. The first tools to be developed will be a pretest (Appendix B) and a post-test (Appendix C). These will be used to determine the employee's knowledge concerning sanitation prior to the formal sanitation program and the knowledge possessed at the conclusion of such a program. Both the author and the Residence Hall Food Service Director feel there will be better employee response to the sanitation

program if the employees do not have to sign the tests but the employees will be asked to indicate on the test forms the total years of employment in the Residence Hall Food Services at Oklahoma State University.

The third evaluation tool to be formulated will be an observation sheet (Appendix D). This tool will provide statements concerning personal habits, attitudes and activities of employees in relation to sanitation. Either a Dietetic Intern or a Production Supervisor will use this device to obtain eighteen samplings from each of the Residence Hall Food Service units during the semester following the training program.

As an aid in evaluating data the employee records in each of the Residence Hall Food Services will be analyzed to obtain information concerning the educational level and age of each employee.

Decision to use visual aids necessitated the evaluation of the types of visuals available. The author and the Residence Hall Food Service Director discussed the possibilities of using slides, movies, agar plates, blackboards, posters, opaque projectiles and overhead projectiles. Each type of visual was evaluated according to the degree of effectiveness it could accomplish. The visuals selected for use after a complete analysis were sound movies, posters, bacterial agar plates and overhead projectiles.

The Residence Hall Food Service Director suggested that the author contact Mr. Jack Laughlin, City-County Health Department Sanitarian in regard to visuals that might be available from the Oklahoma State Department of Health. Dr. Donald L. Cooper, M.D., Director of Student Health at Oklahoma State University, was suggested, also, as a person who could be consulted for information about agar plates. Mr. Guy M. Pritchard, Director of Audio-Visual Center at Oklahoma State University, was suggested as a source of information about overhead projectors, movie

projectors and films.

Possible sources of movies were suggested by Mr. Laughlin and Mr. Pritchard. Film catalogs to be consulted will be the Oklahoma State University "Catalog of Educational Motion Pictures" (25), the Cornell University "Film Catalog" (26) and the Oklahoma State Department of Health "Film Catalog" (27). Dr. Cooper suggested that arrangements be made with Dr. Norman N. Durham of the Biochemistry Department to obtain the nutrient agar plates needed. During the discussion Dr. Cooper suggested that the author could use the Clinic's incubator to grow the bacteria which will be planted on the plates. Dr. Durham was contacted and arrangements were made for the author to obtain eight nutrient agar plates.

The outline of the sanitation training program was studied to determine specific areas that should be stressed. Six sound movies were selected for previewing. The films were analyzed and two were selected; one stresses the topic of food-borne diseases and the other emphasizes personal habits of kitchen personnel (26, 27).

An analysis of the course outline showed some topics which could be emphasized by means of posters and some topics which could be stressed by use of overhead projectiles. The posters were developed on 18" X 24" poster board. They were planned to portray

1. Bacteria temperatures
2. Bacteria and people - Similarities
3. Bacteria and people - Differences
4. Shapes of bacteria
5. Foods bacteria like
6. Bacteria - rate of growth
7. Conditions needed for bacterial growth
8. Mouth as a gateway to infection
9. Items mouthed by many people daily
10. Ways of contaminating hands
11. Types of food poisoning
12. Causes of food poisoning

Subjects to be emphasized by use of overhead projectiles are

1. Places where bacteria are present
2. Foods bacteria like
3. Ways to control bacteria
4. Places where flies live and bred
5. Places where cockroaches live and bred
6. Ways hands can be contaminated
7. Areas of skin where staphylococcus bacteria are present
8. Means of introducing harmful bacteria into foods that cause outbreaks of food poisoning
9. Basic rules of physical fitness
10. Additional rules of personal hygiene
11. Correct hand habits

The training course in sanitation is to be based on the principal that sanitation programs are necessary because of the existence of bacteria. If the bacteria are allowed to grow in food, illness and even death may be caused. Therefore it is imperative that food service workers know and understand conditions which favor bacterial growth. Each employee needs to accept responsibility for the health of the customer eating in the dining rooms, in addition to personal health.

The formulation of lesson plans was undertaken after completing the outline of the lessons and deciding on visual aids. The detailed lesson plans include concepts and generalizations for the entire sanitation training program in addition to a graphic presentation (Table 7, Appendix A) of the course. Each lesson as planned includes specific purposes, the lesson outline, group activities and teaching aids delineating references, films and posters.

Discussion

On September 4, 5 and 6, 1965, a short course in sanitation was presented as a portion of the orientation program for the Residence Hall Food Service employees at Oklahoma State University. Approximately one hundred thirty-five employees attended the three one-hour lecture and discussion sessions.

The first session of the short course in sanitation dealt with two topics: "Basic Bacteriology" and "Communicable Diseases". The second session the topic presented was "Food Borne Diseases," and in the third session, "Personal Hygiene" was given attention.

Four types of visual aids were used during the short course. The first visuals were posters and the use of overhead projectiles. These two aids also were incorporated in the presentation on each of the other days. Both of these visuals were used to emphasize the spoken word through writing, diagram or pictures. Agar plates, on which bacteria were cultured, were the third aid utilized. The bacteria were obtained from the fingers and coughs of some of the employee-students and from the air, during the first lecture-discussion sessions. The agar plates were incubated forty-eight hours and then shown to the group during the third lecture-discussion session. Sound movies (color) were the fourth visual aid utilized by the author. Two films were shown which stressed specific areas of the lectures. The movies shown were "Safe Handling of Foods in Quantity" (26) and "Kitchen Habits" (27).

The pretest (Appendix B) and post-test (Appendix C) were administered at the time the sanitation program was presented to the Residence Hall Food Service employees. Each test had been written to include twenty questions which were short, easy to read and easy to understand. The questions on the pretest were to be answered by circling one of three answers: yes, no or do not know. On the post-test the questions were to be answered by circling a statement as either true or false. The employees were told that names were not to be put on the tests, but that the number of years the person had worked in the Residence Hall Food Service at Oklahoma State University should be indicated in the allotted space. Before the employees started either test, the author read the directions

and answered any questions which were asked.

The third evaluation tool (Appendix D), the Sanitation Observation Sheet, was used during a period of time from October 15, 1965 to January 14, 1966. This tool was divided into two sections with six statements included in each division. Section One deals with attitudes and/or behaviors of employees related to personal sanitary habits. Section Two was set up to check whether the employee uses correct or incorrect sanitary procedures in the preparation and service of food and in cleaning.

The author discussed the Sanitation Observation Sheets with the Dietetic Interns and Production Supervisors. The ranking for each section was explained and each statement was discussed. The purpose of the Sanitation Observation Sheets was explained by the author and the observers were encouraged to ask questions regarding the use of the sheets.

The Sanitation Observation Sheets were completed by the Dietetic Interns and Production Supervisors who were working in the various Residence Hall Food Service Units. Each time an observation was made one employee from each of the five departments in a kitchen was observed and ranked according to the scale presented on the form. It was originally planned to obtain eighteen Sanitation Observation Sheets from each of the Residence Hall Food Service Units. However, because of the crowded and busy schedules of the Dietetic Interns and Production Supervisors, an average of six Sanitation Observation Sheets were obtained from each of the six units.

The employee records in each of the Residence Hall Food Service Units were analyzed to obtain information concerning the age and educational level of the employees. Minimum, maximum and average age and education levels were determined.

CHAPTER IV

RESULTS

Upon completion of the Sanitation Training Program, the data which had been collected was analyzed. The information concerning employee age and educational level was tabulated to determine the average age and average number of grades completed in school. The pretest and post-test were scored and compared to determine what the employees seemed to have learned. The scores on the Sanitation Observation Sheets were averaged to evaluate the employee's personal sanitation habits.

The analysis of full-time employee records presented in Table 1 shows that the mean ages were: Bennett Hall, 38.84 years; Cordell Hall, 45.00 years; Murray Hall 43.81 years; New Hall, 33.64 years; Stout Hall, 49.15 years; and Willard Hall, 45.36 years. Note that the median age is higher for the employees in four of the units and lower at the other two--Bennett Hall and New Hall. Although four of the six Residence Hall Food Services employed individuals under twenty years of age at the opening of school, the majority of employees were in the fifties or early sixties. Two of the food service units, Stout Hall and Willard Hall, employed persons over sixty-five years of age. (The policy is to hire such individuals on a yearly basis if they are physically capable of doing the required work.) Two of the Residence Hall Food Service Units, Bennett Hall and New Hall, employed a younger group who were basically in the twenties and early thirties. Generally, both halls had many new employees and if this procedure continues, apparently a younger group of

TABLE 1

ANALYSIS OF THE AGE OF EMPLOYEES BY FOOD SERVICE UNITS

	Bennett	Cordell	Murray	New	Stout	Willard
No. of employees*	43	16	16	36	13	22
Mean Age	38.84 year	45.00 year	43.81 year	33.64 year	49.15 year	45.36 year
Median Age	35 years	51 years	51 years	32 years	56 years	49 years
Age Range	17 to 65	22 to 65	17 to 60	17 to 58	19 to 68	21 to 66

*Number of employees whose employment cards contained information regarding age.

TABLE 2

ANALYSIS OF EDUCATION OF EMPLOYEES BY FOOD SERVICE UNITS

	Bennett	Cordell	Murray	New	Stout	Willard
No. of employees*	38	16	16	35	13	20
Mean Education	10.63 grade	10.19 grade	10.31 grade	10.46 grade	9.08 grade	10.05 grade
Median Education	11 grades	11 grades	10 grades	11 grades	9 grades	11 grades
Education Range	8 grades to 2 yr college	6 grades to 12 grades	6 grades to 4 yr college	5 grades to 1 yr college	5 grades to 12 grades	6 grades to 3 yr college

*Number of employees whose employment cards contained information regarding education

persons may be working in the Residence Hall Food Service Units.

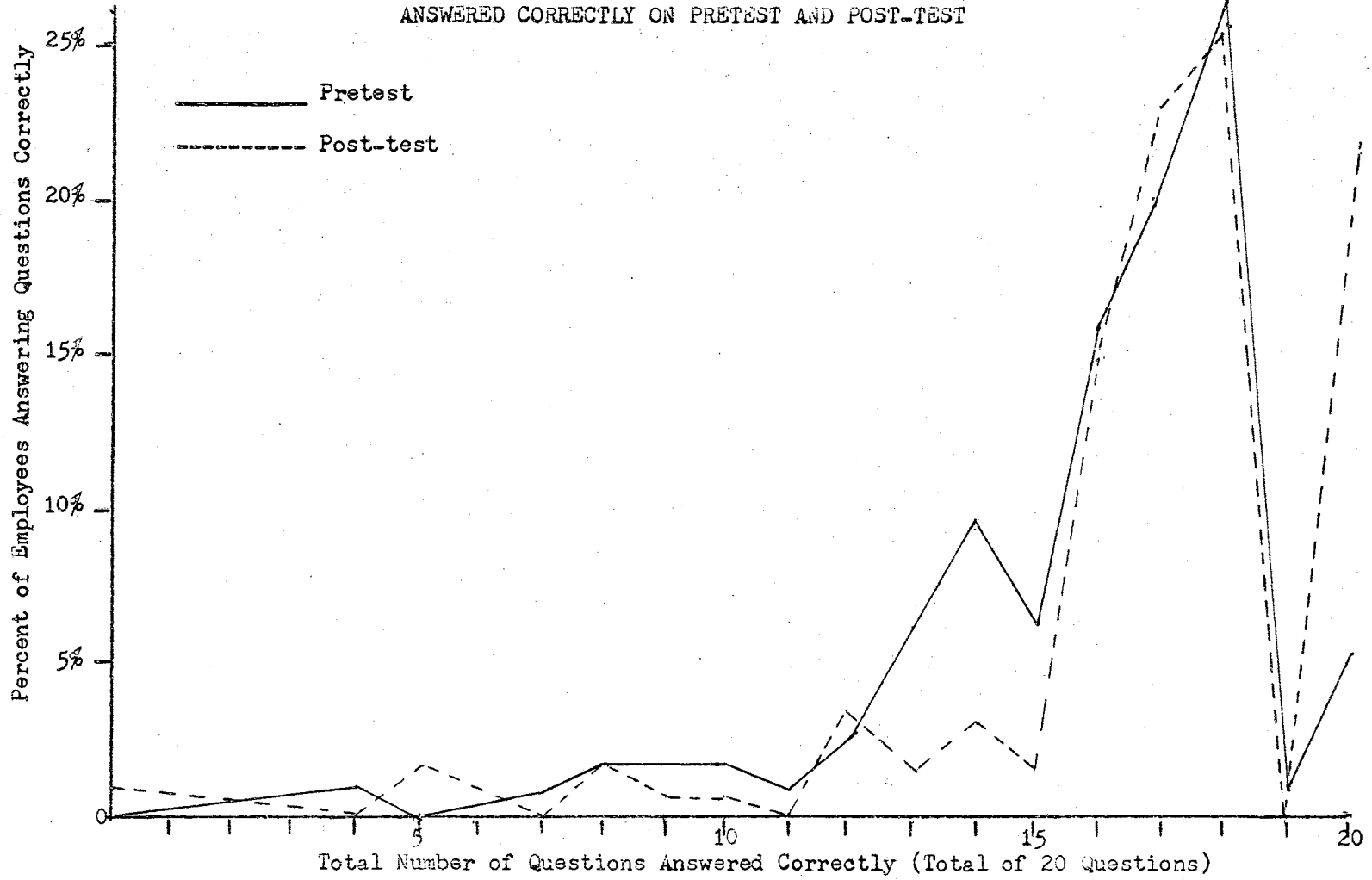
The employees' educational level illustrated in Table 2, shows the mean educational level expressed in grades as: Bennett Hall, 10.63; Cordell Hall, 10.19; Murray Hall, 10.31; New Hall, 10.46; Stout Hall, 9.08; and Willard Hall, 10.05. There are employees at each of the Residence Hall Food Service Units who have graduated from high school: Bennett Hall, 19; Cordell Hall, seven; Murray Hall, six; New Hall, 13; Stout Hall, four; and Willard Hall, seven. Cordell Hall and Stout Hall have no employees who have attended college; however, the other four food service units have from one to four individuals who have completed at least one year of college. When median age is compared with the number of high school graduates employed in a food service unit, analysis shows that Bennett Hall and New Hall, with the lowest median age level, employ twice as many high school graduates.

The scores on both the pretest and the post-test were adjusted to eliminate the factor of guessing by employing a correction factor: $S = R - 1/3 W$ (14). Since more people (135) attended the third lecture-discussion session than the other two (115), there were more individuals who took the post-test. To facilitate comparison of the scores obtained on the two tests, each total score was expressed as percentage. Illustrated in Graph I is data showing that on both tests approximately 25% of the individuals were able to answer 18 questions correctly out of a possible total of 20 questions. On the post-test, however, 21.5% of the employee-students answered all 20 questions correctly as compared to 6% of the students taking the pretest.

The percentages of individuals categorized in four score ranges, on both the pretest and post-test, are presented in Table 3. (The score ranges were 0 to 5, 6 to 10, 11 to 15 and 16 to 20, with a score of 20

GRAPH I

PERCENT OF EMPLOYEES IN RELATION TO THE NUMBER OF QUESTIONS ANSWERED CORRECTLY ON PRETEST AND POST-TEST



as optimum.) On the post-test more people (14.96) scored in the 16-20 score range. This increase was reflected in decreases (15.30 and 2.39) in the second (11-15) and third (6-10) score ranges and by an increase (1.35) in the lowest score range (0-5). The higher incidence of low scores on the post-test may have occurred because some of the employee-students were not present at the first and second lecture-discussion sessions. No comparison could be made regarding an individual's score on the two tests since names were omitted from the test papers.

TABLE 3
COMPARISON IN EACH OF FOUR SCORE RANGES

Range of Scores	Pretest	Post-test	Increase or Decrease on Post-test
16-20	68.71%	83.69%	+14.96
11-15	24.94%	9.64%	-15.30
6-10	6.09%	3.70%	- 2.39
0-5	0.87%	2.22%	+ 1.35
(Rounding of figures has caused small inequities)			

When the questions on the pretest and post-test were compared only 16 actually could be correlated. The correlation showed more correct answers were given on ten of the post-test questions than on the pretest. Three questions showed a slight loss, and three questions showed a definite loss in the number of individuals able to answer the questions correctly. Correlation values between the two tests are listed in percentages in Table 4.

A comparison of the average scores received on the pretest and the post-test with the number of years the individual had worked in the Residence Hall Food Services is shown in Graph II. With the exception of

TABLE 4
COMPARISON OF CORRELATED QUESTIONS
ON THE PRETEST AND POST-TEST

	Increase or Decrease from Pretest
1. Putting food into the refrigerator while hot will not cause food to spoil.	+44.44%
2. A person who appears healthy may be a carrier of disease bacteria.	+15.04%
3. Good sanitation is needed to protect employees as well as students.	+ 6.77%
4. Foods should not be held at room temperature any longer than necessary.	+ 6.75%
5. Food poisoning can be caused by careless handling of food.	+ 4.41%
6. There are some bacteria that are not harmful.	+ 4.27%
7. Foods should be covered when stored in the refrigerator.	+ 2.76%
8. Bacteria are not killed by refrigeration.	+ 2.12%
9. Hands should be washed with hot water and soap after going to the toilet.	+ 1.16%
10. A clean tasting spoon should be used when checking food during preparation.	+ 1.01%
11. Bacteria can get into food from cuts, burns or sores on the hands.	- 0.16%
12. To sanitize dishes, a water temperature of 170° F must be used.	- 0.16%
13. Foods will not smell or taste spoiled even though there are enough bacteria present to cause food poisoning.	- 0.96%
14. Bacteria can be spread by hands.	- 4.15%
15. Flies, cockroaches and rats are carriers of disease bacteria.	- 4.18%
16. Bacteria will grow on food if warm, moist conditions are present.	- 6.87%

four groups (people having worked one year, four years, nine years and ten years) there was an increase in the average score obtained by individuals on the post-test. No reliable comparison could be made with age or educational level of the employees since names were omitted from the test papers.

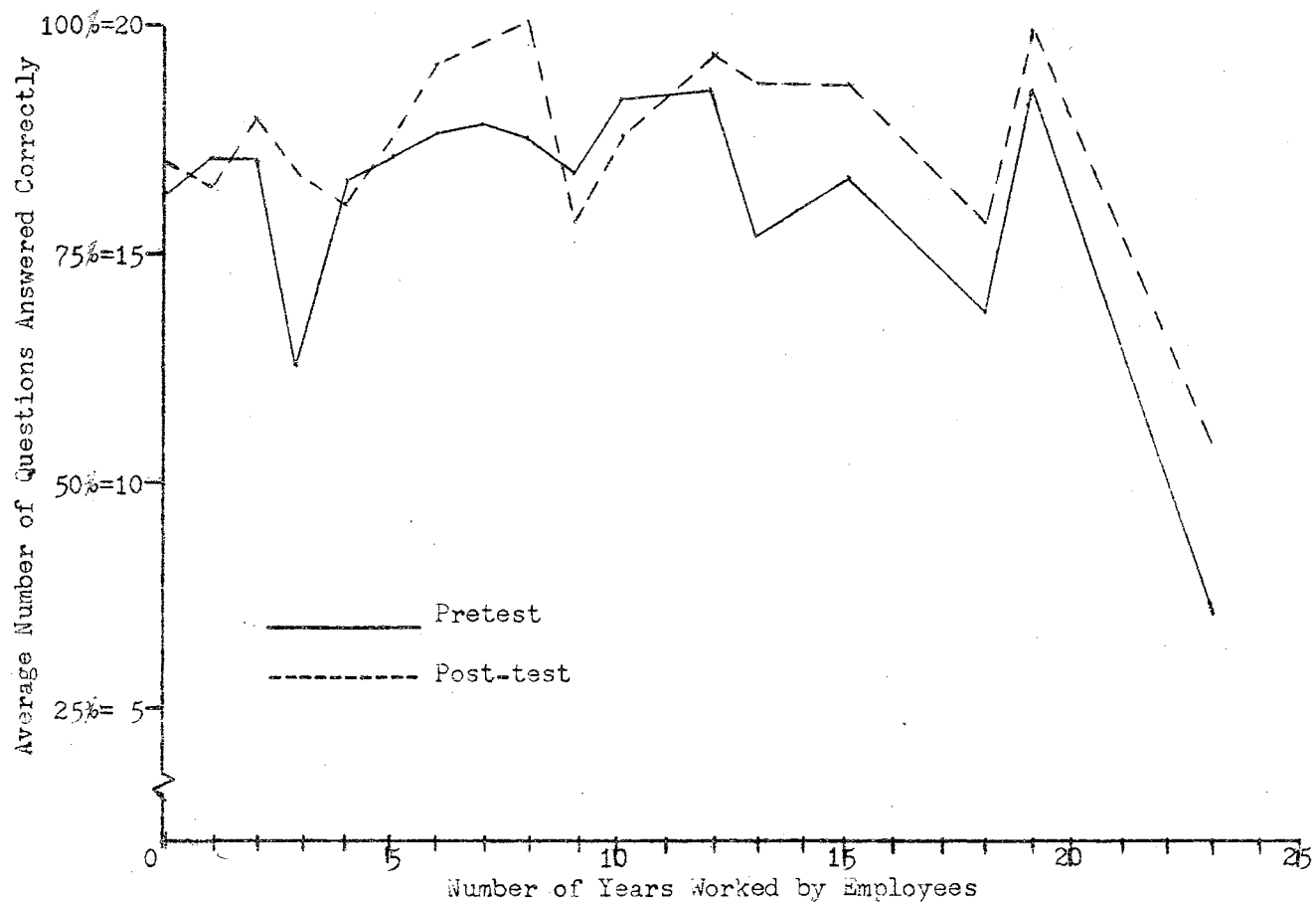
Section One of the Sanitation Observation Sheet was analyzed by assigning a value of six to a rating of A (good attitude or behavior), a value of four to a rating of B (fair attitude or behavior) and a value of two to a rating of C (poor attitude or behavior). An average value was obtained on each Sanitation Observation Sheet for each employee and for each statement.

Section Two of the Sanitation Observation Sheet was analyzed in a manner similar to Section One. In Section Two the ranking of 1 (correct sanitary procedure) was assigned a value of six and a ranking of 2 (incorrect or inadequate sanitary procedure) was assigned a value of three. An average value was determined for each employee and each statement of the Observation Sheet.

A total of 42 Sanitation Observation Sheets were obtained from six Residence Hall Food Service Units. The five Dietetic Interns completed 28 of the Sanitation Observation Sheets and 14 Sanitation Observation Sheets were completed by three Production Supervisors. During the analysis of the Sanitation Observation Sheet it was observed that when a Production Supervisor had completed the observation, a rating of A (good attitude or behavior) or a rating of 1 (correct sanitary procedure) had been assigned in the majority of observations. The ratings completed by the supervisors showed bias on the part of some of these raters and were considered unreliable. As a result of this bias the Sanitation Observation Sheets completed by Production Supervisors were eliminated from the evaluation.

GRAPH II

COMPARISON OF NUMBER OF QUESTIONS ANSWERED CORRECTLY
WITH LENGTH OF EMPLOYMENT



A total of 28 Sanitation Observation Sheets were used for the analysis.

The average values obtained in Section One of the Sanitation Observation Sheet ranged from 3.85 to 5.74. Four of the averages lay in a range of 4.02 to 4.50 with an overall average of 4.459. In Section Two the value average ranged from 4.21 to 5.40 with an overall average of 4.67. Each statement on the Sanitation Observation Sheets with its average value is shown in Table 5 (Section One) and Table 6 (Section Two). Averages shown in the tables seem to indicate that the employee's attitude and/or behavior as related to personal sanitary habits were only fair and that correct sanitary procedures were used by approximately half the workers.

The results of the agar plates on which bacteria were cultured showed that these visuals were effective in obtaining employee interest. These plates were prepared during the first lecture-discussion session by having employees volunteer to assist. Plates were prepared by pressing fingers on the agar, putting material from under the fingernails on the agar, coughing on the agar and exposing one plate to the air for twenty minutes. A total of eight agar plates were prepared for incubation and bacterial colonies were cultured on seven of the eight plates. (For some reason the agar plate on which the person coughed failed to produce any bacterial colonies.) The agar plates were incubated for 48 hours and then shown against a dark background during the third lecture-discussion session. The plates were then placed on display after the discussion session for the employee-students to view.

TABLE 5

AVERAGE RATINGS ON SANITATION OBSERVATION SHEET
SECTION I

- 6 = Good attitude or behavior
4 = Fair attitude or behavior
2 = Poor attitude or behavior

Statements	Average Rating
1. Hands are washed after touching or handling an unclean object.	4.50
2. A hair net (women) or cap (men) is worn and it is worn correctly.	5.74
3. Hands are washed after coughing or sneezing.	3.85
4. Hands are washed correctly, using hot water and soap.	4.29
5. Hands are kept away from mouth, nose, ears, eyes and hair while on the job.	4.02
6. Employees attitude toward sanitation	4.35
Overall Average	4.459

TABLE 6

AVERAGE RATINGS ON SANITATION OBSERVATION SHEET
SECTION II

- 6 = Correct sanitary procedure
3 = Incorrect or inadequate sanitary procedure

Statements	Average Rating
1. A clean tasting spoon is used when tasting food.	5.40
2. Spills are cleaned up and not allowed to remain.	4.99
3. Equipment and utensils are washed before being used again.	4.59
4. Utensils are used to mix and serve food.	4.37
5. Foods in refrigerator are kept covered.	4.21
6. Foods are not allowed to remain at room temperature any longer than necessary during preparation and service.	4.46
Overall Average	4.67

CHAPTER V

SUMMARY AND CONCLUSIONS

The review of literature indicated that in order to have effective training programs the programs must be initiated and supported by top management. Also, the literature indicated that training must be considered a daily task and not a problem which can be solved once and then forgotten.

The positive attitude of management is of particular importance when considering sanitation. However, even though the daily attitude regarding sanitation is important, the review of literature also emphasized the need for formal training programs. Such programs are necessary to teach employees basic bacteriology so there is greater realization of the importance of kitchen rules and regulations.

The Sanitation Training Program which was presented to the Oklahoma State University Residence Hall Food Service employees September 4, 5 and 6, 1965, was undertaken to help the employees understand more fully the reasons for good sanitary habits and practices. The Sanitation Training Program was attended by 115 to 135 Residence Hall Food Service employees who were employed at the start of the fall semester. One reason attendance at the three sessions varied may have been that new employees were being hired during that period of time. Four topics were presented during the three lecture-discussion sessions covering the following: "Basic Bacteriology", "Communicable Diseases", "Food Borne Diseases" and "Personal Hygiene". Visual aids which were used to emphasize the

lecture-discussion topics were posters, overhead projectiles, bacterial agar plates and movies.

Three evaluation tools were used to determine the effectiveness of the Sanitation Training Program. A pretest and post-test were administered at the time the program was presented to the Residence Hall Food Service employees. The tests were used to evaluate the employee's knowledge concerning sanitation prior to the sanitation program and the knowledge possessed at the conclusion of the program. The third evaluation tool used was a Sanitation Observation Sheet which dealt with employee's attitudes and/or behavior pertaining to personal habits and checked whether the employees used correct or incorrect sanitary procedures. The Sanitation Observation Sheets were completed by five Dietetic Interns and three Production Supervisors who were working in the various Residence Hall Food Service Units during a period of time from October 15, 1965 to January 14, 1966. During analysis of the Sanitation Observation Sheets it was discovered that the ratings completed by the Production Supervisors showed bias, thus these were eliminated from the evaluation. To aid in the evaluation of data the employee records in each of the Residence Hall Food Service Units were analyzed to obtain information concerning the educational level and age of the employees.

Analysis of data collected from employee records showed that a trend could develop in which a younger group of employees would be hired. Not only would these employees be younger but also all would have completed high school. The two Residence Hall Food Service Units that employ workers with the lowest mean age level had twice as many high school graduates as the other food service units.

Analysis of the pretest and post-test scores showed that employees

generally were able to learn from the presented program. The extent to which the program caused a change in employee habits regarding sanitation could not be determined accurately as no observations were made prior to the training program. Evaluation of the Sanitation Observation Sheets showed that about half the employees apparently use correct sanitary procedures. The employee's attitude and behavior relating to sanitation appeared to be fair after analyzing the ratings on the Sanitation Observation Sheets.

The pretest, post-test and Sanitation Observation Sheets did not show at what interval of time it would be necessary to repeat and emphasize the principles of sanitation. It would, however, be advantageous to regularly conduct small group meetings at which sanitation would be discussed and reemphasized.

The author feels that much was learned from the formulation of the tests, however, more experience is needed in test construction. Although there is no objective proof, the author believes that the pretest as formulated was easier than the post-test. If results of the two tests are to be conclusive, the pretest and the post-test should be of the same degree of difficulty.

The actual presentation of the lecture-discussion sessions could be improved by methods of obtaining greater group participation in the discussions. A higher degree of group participation could be achieved by conducting several sections of the program. The sections composed of smaller groups would enable the employee-students to ask more questions and the instructor to give more attention to individuals.

The use of a microphone would have assisted the instructor to present the information to the large group. It was pointed out that the instructor does not have a strong resonant voice that carries easily in

a large room. Even though the instructor consciously spoke as loud as possible, it was noted that the voice did not always carry well to all parts of the room. There were some employees present who were hard of hearing and had difficulty hearing.

The visual aids selected appeared to be good for gaining employee interest in the Sanitation Training Program. The posters and overhead projectiles visually presented the areas selected for emphasis. These two types of visuals presented the information in writing, pictures and graphs.

The agar plates on which bacteria were grown gained the interest of the employees since they had helped prepare them. The plates could have been shown on the overhead projector for viewing by a large group. To achieve greater employee interest in future programs, the bacteria which are cultured could be examined under a microscope by the employee-students. This would be advisable only if the number of employees in a group was small. Thus, the students would have the opportunity to see the actual organisms and have a greater awareness of the presence of bacteria.

The two films selected for presentation during the training program were effective in emphasizing the topics of food borne diseases and personal hygiene. The importance of previewing the films was noted by the author. Only by previewing can the instructor be sure the movie presents the desired information and know exactly what points to stress. The instructor, by stating specific things to observe in the movie, was able to achieve some discussion at the end of the film.

If time had not been at a minimum, a more effective way of presenting the films would have been to discuss specific things to be observed during the movie. After viewing the movie, the group could have discussed

what was observed. The movie could then be shown again, so the viewers could gain information which might have been overlooked during the first showing. If time permitted, there would have been another discussion session to cover parts of the film which were not fully comprehended prior to the second showing.

The author obtained experience in training during the planning, presentation and follow-up of the formal Sanitation Training Program. A person planning on a career in dietetics and the food service industry needs to possess a knowledge of the different types of training and experience in conducting training programs for large groups of employees.

The following recommendations should be considered, if future training programs dealing with sanitation are conducted by the author. The use of visual aids should be expanded and developed in order to obtain more employee interest in and understanding of the subject. The actual lecture sessions should be shorter and continue over five to eight periods instead of three. Upon completion of the formal training program, small group discussion sessions would be beneficial in developing continued interest in good sanitation. Also, in future programs a section should be added to cover the topic of dishwashing and cleaning.

To facilitate the presentation of future sanitation programs, the use of slides is suggested. The slides could coordinate with the topics that were selected to be used as posters and the overhead projectiles. Also, if slides were taken showing employees working using correct and incorrect sanitary practices, more employee involvement in the training program could be achieved.

The need for training in sanitation, as in all phases of food service work is apparent. As management continues to accept training as a daily tool, it can expect to build a more efficient work force with higher morale and better procedures.

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APPENDIX A

SANITATION TRAINING PROGRAM FOR FOOD SERVICE WORKERS

Concept:

Sanitation

Specific objectives:

To develop understanding of principles involved in good sanitation.

To practice the principle of handling food in a sanitary manner.

To develop appreciation of the importance of cleanliness.

To practice principles of personal hygiene.

Generalizations:

An understanding of how bacteria grow and reproduce.

An understanding of bacteria contributes to the realization of their presence.

Bacterial growth is dependent upon the temperature, the amount of moisture and available food.

An understanding of ways communicable diseases are spread contributes to the good health of the worker and the customer.

An understanding of the various types of food poisonings.

An understanding of the causes contributing to outbreaks of bacterial food poisoning.

An appreciation for rules and regulations concerning clean hand habits is dependent upon the attitudes of employees.

An understanding of the principles of personal health and hygiene promotes improved practices related to them.

TABLE VII
PROGRAM OUTLINE

TRAINING PROGRAM	COURSES	SUBJECTS	INSTRUCTION UNITS
Sanitation	Basic Bacteriology	What Bacteria Are	Size
		How Bacteria Grow	Shapes - Families
			Reproduction
	Communicable Diseases	Ways to Control Bacteria	Moisture
			Warmth
		Sources	Food
	Food Borne Diseases	Classification	Sanitation
			Refrigeration
		Food Infections	Heat
			Infected Persons
			Healthy Carriers
	Personal Hygiene	Physical Preparation for Job	Diseased Animals
			Respiratory
	Hand Habits	Chemical Poisonings	Intestinal
			Salmonellosis
	Hand Habits	Food Intoxications	Streptococcus
			Staphylococcus
Hand Habits	Physical Preparation for Job	Botulism	
		Sodium Floride	
Hand Habits	Physical Preparation for Job	Other Chemical Poisons	
		Basic Rules	
Hand Habits	Physical Preparation for Job	Special Rules	
		Reasons for Rules	
Hand Habits	Physical Preparation for Job	Correct Procedures	

LESSON I BACTERIA AND HOW THEY GROW

Purposes:

To develop an understanding of how bacteria reproduce and grow.

To learn what temperatures favor bacterial growth.

To develop an understanding of the nature of bacteria, their characteristics and habits, their behavior in the environment and their potential danger.

To develop an understanding of the presence of living bacteria and the realization of their presence.

Lesson Outline:

I. Introduction

A. Sanitation is needed because there are harmful bacteria and chemical poisons in our environment.

B. Hazards of poor sanitation

1. Spread of disease

2. Food poisoning

II. Definitions

A. Sanitation refers to keeping things clean

1. Clean employees in good health

2. Clean food

3. Clean equipment

4. Clean kitchen and dining area

B. Bacteria sometimes called germs

1. Are tiny living organisms.

2. Are every where

a. Hands

b. Hair

c. Clothes

d. Nose

- e. Mouth
- f. Stomach
- g. Intestinal tract

3. Bacteria are classified by shapes or families.

- a. Round-shape -- called Cocci
- b. Rod-shaped -- called Bacilli
- c. Spiral-shaped -- called Spirilla

C. Ways bacteria are like people

1. Alive

2. Eat food

a. Foods low in acid are more desirable to bacteria

Meat pies	Bland sauces
Poultry	Custard-filled pastries
Poultry dressing	Cream topping and fillings
Ground meat	Chicken and egg salads
Croquettes	Minced ham
Fish dishes	Salad type sandwiches
Cream pies	Hor d' oeuvres

b. Enjoy moist foods

3. Give off waste

a. May cause illness

b. Toxins (waste) of certain bacteria are poisonous to people

4. Reaction similar to temperatures (Chart showing temperature effects on bacteria)

a. High heat kills

b. Cold retards growth, but will not kill

c. Like normal room temperatures

5. Reaction similar to chemicals

a. Certain chemicals kill

b. In food service -- careful use of chemicals

6. Have personalities
 - a. Some do damage
 - b. Some aid humanity

7. Colonize

D. Ways bacteria are different from people

1. Size

- a. Extremely small - can not be seen
- b. 1/25,000 of an inch

2. Reproduction

- a. Grow very rapidly
- b. Multiply by splitting in two every twenty minutes
(Within three hours one bacterium can start a chain reaction resulting in 500 bacteria.)

3. Method of eating

4. No arms; legs -- wings

- a. Are hitchhickers
- b. Move by means of contaminated objects, such as the hands

III. Conclusion

A. Ways to control bacteria

1. Good sanitation
2. Refrigeration
3. Heat

B. Ways to kill bacteria

1. Heat -- temperatures above 170° F
2. Chemicals -- have limited use in food service.

IV Group Activity - Prepare Agar Plates

Discussion Questions: (27)

1. What are bacteria?
2. Name as many ways as you can in which bacteria resemble people.
3. Name as many ways as you can in which bacteria differ from people.
4. Describe the general shapes of bacteria.
5. How do bacteria reproduce? Why is it important for us to know about this?
6. What can you tell about the size of bacteria?
7. What do you consider the one most important thing you learned from the talk on bacteriology? (A good answer here would be that bacteria really do exist and some are capable of causing great harm.)

Teaching Aids

1. Posters
2. Opaque projectiles
3. Agar plates for bacterial cultures
4. References
 - a. A Training Course in Sanitation for Food Service Workers (19)
 - b. Food Service and Public Health (20)
 - c. Sanitation for Food Service Establishments (21)
 - d. The Sanitation Manual -- A Guide for Management (22)
 - e. Food Service in Institutions (23)
 - f. The Management of People in Hotels, Restaurants and Clubs (24)

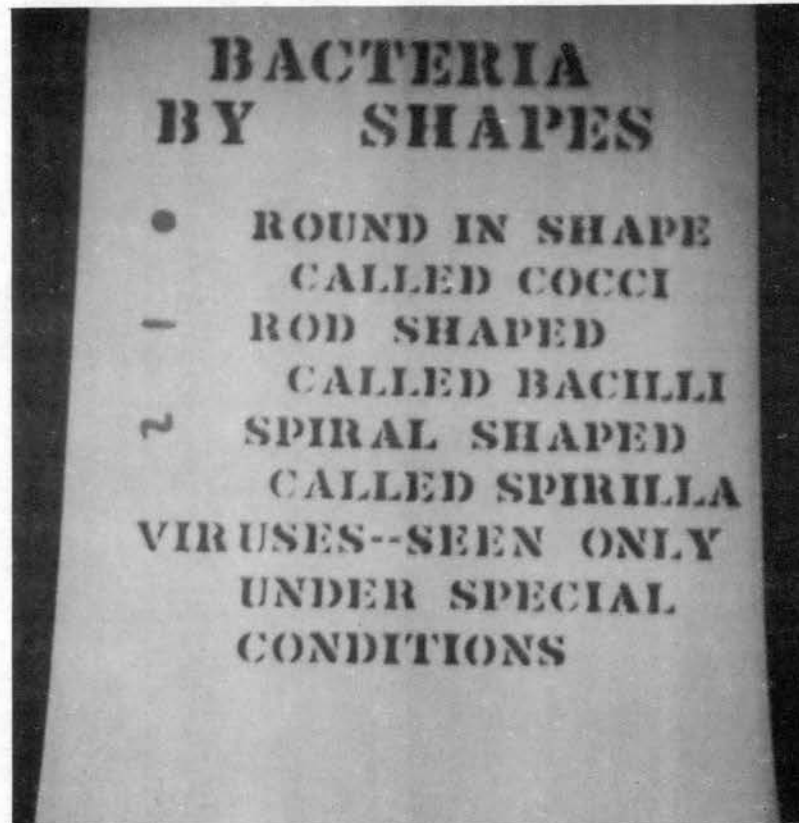


Fig. 2 Shapes of Bacteria

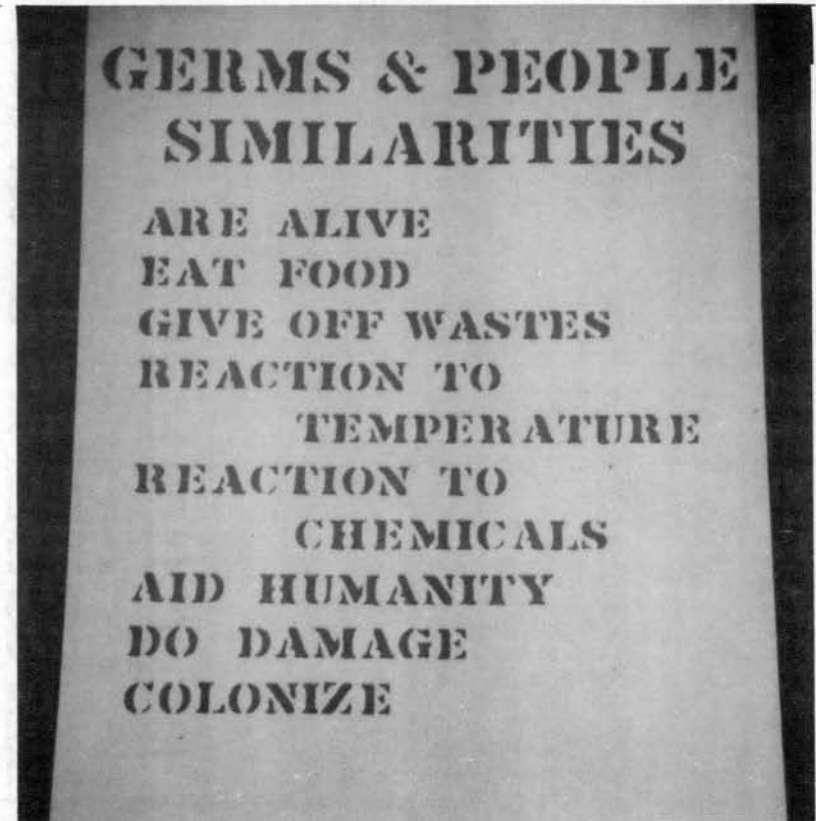


Fig. 3 Bacteria and People - Similarities



Fig. 4. Foods Bacteria Like

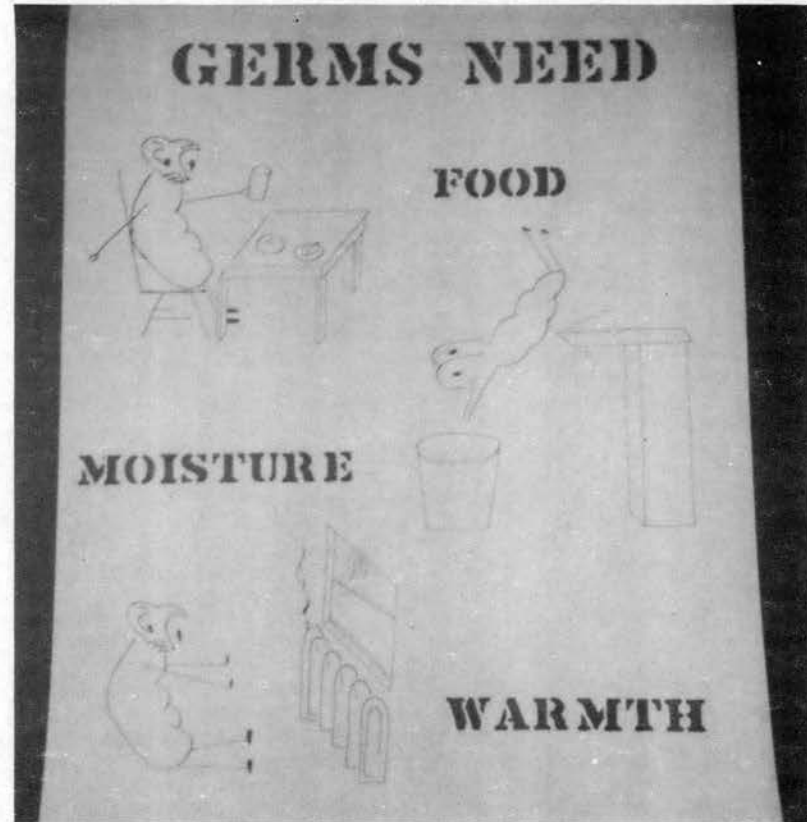


Fig. 5 Conditions Needed for Bacterial Growth



Fig. 6 Bacteria Temperatures



Fig. 7 Items Mouthed by Many People Daily

LESSON II - COMMUNICABLE DISEASES

Purposes:

To learn how communicable diseases are spread by people.

To learn how communicable diseases are spread by animals.

To develop an understanding of how hands are able to spread harmful bacteria.

I. Introduction

A. Communicable diseases can be conveyed from one person to another.

B. Number of communicable diseases

1. Sixty-one known
2. Twenty-eight are spread through
 - a. Food
 - b. Food service personnel
 - c. Utensils
 - d. Other conditions

II. Sources of diseases (90% enter the body through the mouth.)

A. Human cases (sick persons or infected persons)

B. Carriers (person who has the disease bacteria in his body and does not know it)

C. Diseased animals such as rats, hogs and cattle

III. Ways communicable diseases are spread.

A. Respiratory (breathing) diseases

1. Types
 - a. Common cold
 - b. Pneumonia
 - c. Influenza
 - d. Scarlet Fever
 - e. Tuberculosis

- f. Trench mouth
 - 2. Spread from the respiratory tract
 - a. Breathing and speaking apparatus
 - b. Discharge from the nose
 - (1) Usually heavily loaded with the bacteria of the disease in question.
 - (2) Remember, bacteria are alive and capable of doing damage to persons and also to food.
 - (a) Each disease has its own specific bacteria.
 - (b) When a person sneezes or coughs, bacteria are sprayed from the mouth and nose in tremendous numbers and for a considerable distance.
- B. Intestinal (filth borne) diseases
- 1. Types of
 - a. Typhoid
 - b. Para-typhoid fever
 - c. Dysentery
 - d. Diarrhea
 - 2. Spread by the 3 F's
 - a. Flies
 - b. Fingers
 - c. Food
 - 3. Source of disease
 - a. Bacteria are present in the digestive track and leave the body in intestinal discharges.
 - b. Careless personal habits may cause infection of food.
 - c. Reason for the advice to wash hands thoroughly following toilet visits.

C. Insects, Cockroaches and Rodents

1. The house fly

a. Lives and breeds in filth which is provided by many communities

- (1) Human waste
- (2) Animal waste
- (3) Chicken pens
- (4) Saliva on sidewalks
- (5) Open garbage cans
- (6) Dumps
- (7) Public toilets
- (8) Unprotected food

b. Spreads these diseases

- (1) Tuberculosis
- (2) Typhoid Fever
- (3) Dysentery

c. Spreads bacteria three ways

- (1) By its body waste
- (2) By its feet --
 - (a) Leaves tracks
 - (b) Wipes feet on the food
- (3) By the way it eats
 - (a) Has no teeth
 - (b) Has a snoot with a spongy affair at the end of it
 - (c) To eat, the fly vomits up a liquid from its stomach which is deposited on food to soften and moisten it.

(d) Nourishment is sucked back into body.

(e) While eating, frequently eliminates at the other end of body.

2. Cockroaches

a. Enemy of man which must be eliminated and controlled

b. Most menacing pest of food establishments

c. Lives and breeds in

(1) Sewers

(2) Old wood

(3) Dark corners

(4) Wet floors

(5) Damp cellars

(6) Rubbish

(7) Bottle cases

(8) Paper cartons

(9) Store rooms

(10) Unwashed bottles

d. During the day hides

(1) In cracks and crevices

(2) Behind baseboards

(3) Behind sinks

(4) In meter housing

(5) In food service equipment

e. Do not have to be seen in order to know they are present

(1) Deposit waste matter from intestines whenever they crawl

(3) Females drop or attach egg capsules from which the young will hatch

D. Infected persons and carriers

1. Direct contact between people
2. Indirect contact between people
 - a. Way diseases are usually transmitted in food establishments
 - b. Disease is transmitted from one person to another by some contaminated object
 - c. It is in the prevention of infection by indirect means that most of the rules of sanitation are necessary.
 - d. Hands are a major source.

E. Contaminated hands

1. Most dangerous type of soil (bacteria) can not be seen.
2. Contaminate objects used in service of food or by customers.
3. Ways of contaminating hands
 - a. Putting fingers in mouth
 - b. Picking the nose
 - c. Scratching head
 - d. Rubbing eyes
 - e. Fingering ears
 - f. Handling dirty dishes
 - g. Going to the toilet
4. If these practices are performed, the hands should be washed before utensils or food are handled.
5. The procedure of sticking fingers into food for tasting purposes should never be practiced.

IV. Conclusion

A. Means of spreading communicable diseases

1. Sick people
2. Healthy carriers
3. Diseased animals

B. Ways of spreading communicable diseases

1. Direct contact
2. Indirect contact

Discussion Questions: (28)

1. What is a communicable disease?
2. What is meant by direct contact? Give an example.
3. What is meant by indirect contact? Give an example.
4. Give several ways in which bacteria may travel into the human body.
5. How can we help to eliminate these entrance channels used by bacteria?
6. What do we mean by proper hand habits?
7. Name several ways in which hands may become contaminated.
8. What is the rule for controlling coughs and sneezes?
9. What danger lies in using a soiled handkerchief?
10. In the communicable disease lecture, what three things do you consider most important? (Frequent & thorough handwashing should be included in the answer.)

Teaching Aids:

1. Posters
2. Overhead projectors
3. References

- a. A Training Course in Sanitation for Food Service Workers
(19)
- b. Food Service and Public Health (20)
- c. Sanitation for Food Service Establishments (21)
- d. The Sanitation Manual---A Guide for Management (22)
- e. Food Service in Institutions (23)

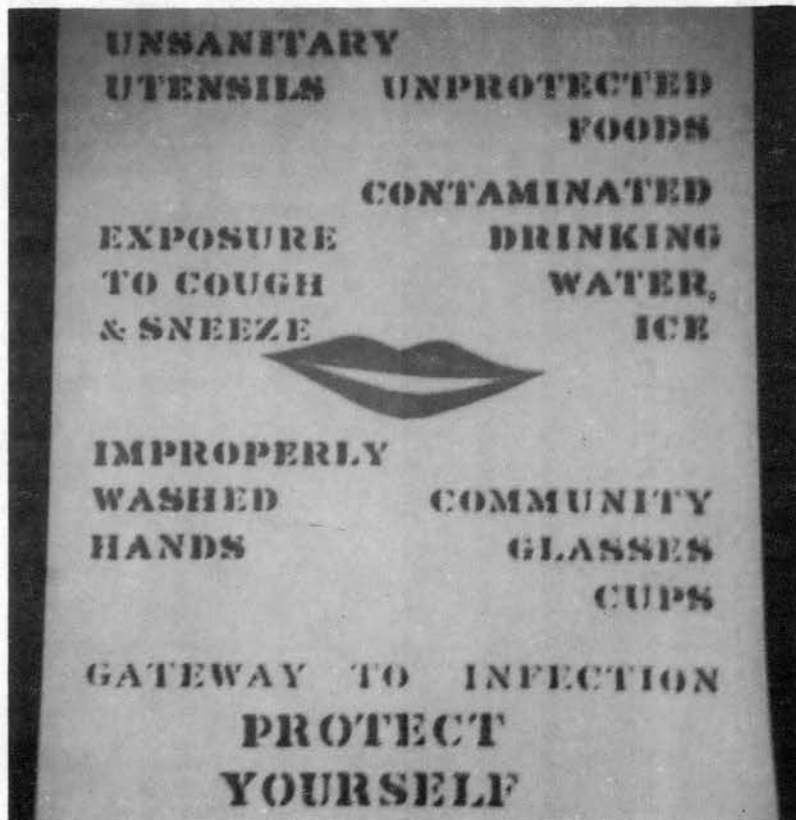


Fig. 8 Mouth as a Gateway to Infection

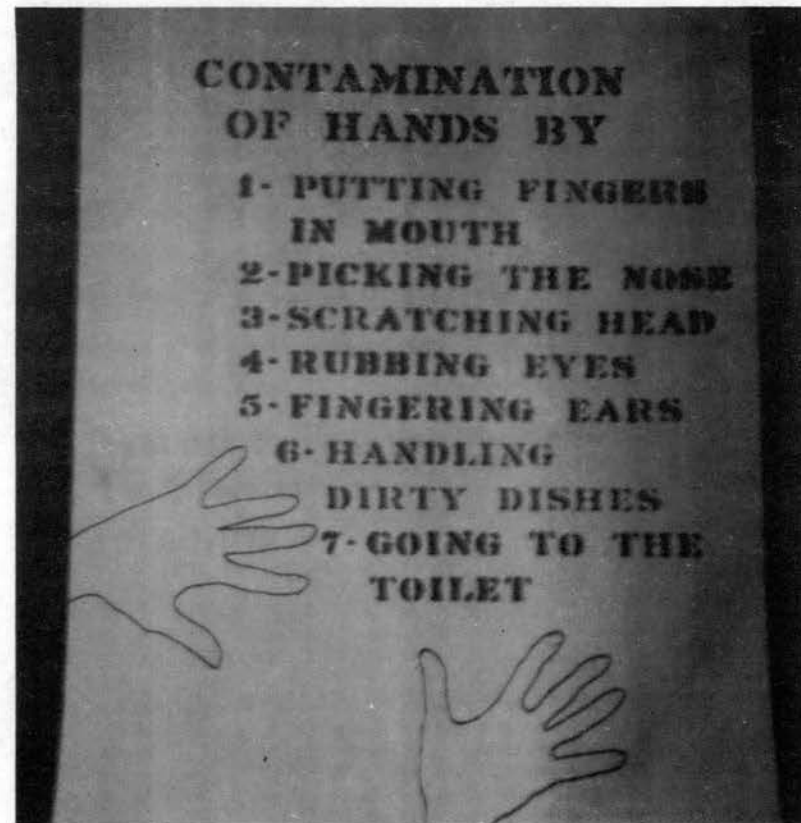


Fig. 9 Ways of Contaminating Hands

LESSON III - FOOD BORNE DISEASES

Purposes:

To learn how food poisoning occurs.

To learn how food poisoning can be prevented.

To understand the difference between "food infections" and "food intoxications".

To learn which foods are most often involved in cases of food poisoning.

I. Introduction

A. Yesterday the discussion covered two subjects

1. Bacteria

a. What bacteria are

b. How bacteria grow

2. Communicable diseases

a. How communicable diseases are spread

(1) Sick people

(2) Healthy carriers

(3) Diseased animals

b. Means of spreading communicable diseases

(1) Direct contact

(2) Indirect contact

B. Today the discussion will consider food poisoning.

1. Food contaminated with bacteria could be called "sick food".

2. Each year thousands of people are made sick by contaminated food and drink.

3. Food service workers could help to prevent most of the illnesses by

- a. Proper food service know-how
- b. Carefulness
- c. Cooperation

II. Types of bacterial food poisoning

A. Definition of food poisoning

1. Term to describe effects caused by various poisonous agents in food.
2. An acute attack of abdominal pain and diarrhea, usually accompanied by vomiting, which develops within two to seventy-two hours after eating food.
3. Results from growth of harmful bacteria in food that is
 - a. Spoiled
 - b. Improperly prepared
 - c. Incorrectly handled

B. Food infection

1. Results from eating or drinking food which contains harmful bacteria
2. Foods most commonly involved

Custards	Shell fish
Milk	Salads, Mayonnaise base
Cream	Mayonnaise
Ice Cream	Salad Dressings
Sea Foods	Poultry Dressings
Meats	Bread Puddings
Eggs	Cream Pies
Meat Products	Eclairs
	Any filled pastry

3. Symptoms

- a. Sudden onset of gastrointestinal disturbances usually six to forty-eight hours after eating
 - (1) Normally about twelve hours
 - (2) Attack lasts twenty-four to forty-eight hours

- b. Headache and chills
 - c. Abdominal pain
 - d. Later, watery-greenish stools
 - e. Prostration, muscular weakness, faintness and thirst are marked
 - f. Vomiting may occur
4. Means of contamination (channels of infection)
- a. From the pre-sick, sick person and/or carrier
 - b. By "droplet" infection and by "manual" contamination of food and sometimes from contaminated utensils
 - c. Allowing infected food to remain at incubation (room) temperature for over an hour.
5. Types
- a. Salmonellosis
 - (1) Major source - poultry products
 - (2) Living organism must be present in the food.
 - (3) Salmonella bacilla leave the body through intestinal tract.
 - (a) Main source of infection is the person who does not wash his hands after leaving the toilet
 - (b) Unwashed hands are source of contamination of food and utensils
 - (4) Mice, rats, cockroaches and flies may contaminate food and utensils by mechanical means of dragging filth over food and utensils.
 - (5) The appearance and taste of food will appear all right even though infected by the bacteria.

b. Streptococcus infection

- (1) Causes gastrointestinal disturbances
- (2) Sources are usually human in origin
- (3) Grow and multiply like Salmonella and produce an infection type food poisoning.

C. Food intoxication

1. Illness resulting from eating or drinking foods which contain bacteria that produce toxins or poisons while these bacteria grow and multiply in food.
2. Toxin is the cause of the illness.
3. Symptoms
 - a. Incubation period of two to four hours
 - b. Attack lasts three to six hours.
4. Types
 - a. Staphylococcus
 - (1) Most common type of food poisoning
 - (2) Main sources of bacteria are the skin and the intestinal and respiratory tract.
 - (a) Throat
 - (b) Skin - the causative agent of
 - 1- Pimples
 - 2- Boils
 - 3- Carbuncles
 - (3) Suitable mediums for growth of bacteria and production of toxin

Tenderized ham	Salads
Chopped foods	Custard-filled
Cured meats	baked goods

- (4) Food may contain sufficient toxin to produce violent illness and yet have no odor of spoilage or abnormal taste.
- (5) The toxin is resistant to both heat and cold.
 - (a) Cold will not kill the toxin.
 - (b) Cooking or boiling is not a reliable method for destroying the toxin.
- (6) Cooling cooked food for three to four hours at room temperature before being placed in the refrigerator is a poor practice, since toxins are produced by bacteria during these few hours.

b. Botulism

- (1) Usually fatal
- (2) Caused by toxin produced by the rod-shaped bacterium called *Clostridium Botulinus*
- (3) Foods most often responsible are either canned or fermented, since these foods do not come in contact with air in their containers.
- (4) Commercially canned foods are considered safe.

D. Chemical poisoning

1. Sodium fluoride

- a. Often in roach poison
- b. White powder easily mistaken for baking powder, baking soda, flour and milk powders
- c. Three grams sufficient to cause death
- d. Used as an insecticide spray
 - (1) Danger of residue being left on fruits and vegetables

(2) Fresh fruits and vegetables need to be thoroughly washed

2. Other chemical poisons

- a. Arsenic
- b. Copper
- c. Cadmium
- d. Lead
- e. Zinc

III. Means of introducing harmful bacteria causing food infection and food intoxication

- A. Improperly washed vegetables
- B. Contamination of foods by employees who are carriers of disease
- C. Contamination of foods by any employee due to unclean hands after visiting the toilet
- D. Contamination of food by rats, flies, and cockroaches
- E. Contamination of food by food service workers with infected arms, fingers and so on
- F. Contamination of foods by customers
- G. Contamination of food by waiter or waitress
- H. Improper use of hand towel
- I. Inadequate cooking of foods
- J. Improper handling of pies and other pastries with cream fillings
- K. Improper handling of ice

IV. Conclusion

- A. Most food borne disease outbreaks have been traced to three causes
 - 1. Food prepared far in advance
 - 2. Poor refrigeration

3. Careless handling

V. Movie--- "Safe Handling of Foods in Quantity" (26)

A. Things to look for in movie

1. The cause of food borne illnesses.
2. Where the bacteria causing the illness comes from and how food is contaminated.
3. Conditions that favor growth and multiplication of the bacteria.
4. How the bacteria can be controlled.

B. Discussion after movie.

1. When should hands be washed?
2. What sanitation measures were stressed?

Discussion Questions: (28)

1. What does "sick" food mean?
2. Give some ways in which bacteria enter food?
3. Why should food be refrigerated?
4. Why are we particular about proper steam table temperatures?
5. What is meant by the incubation zone? What are the safe "holding temperatures"?
6. Name several classes of food borne diseases.
7. What are the two major groups of bacterial food poisoning?
8. What is the most common type of all food poisonings?
9. Give some examples of where staphylococci may be found and tell how these bacteria may be transmitted to food.
10. If a food contains sufficient toxin to cause illness, can we detect it by odor of spoilage or "off" taste?
11. Name the three most important things you learned from the

discussion on food poisoning? (Answer should include: 1- thorough handwashing, 2- proper bandaging of cuts, 3- prevention of any discharge from boils, pimples, gaining entrance to food, and 4- proper hand habits.)

12. Can you tell me the three general causes of most food borne disease outbreaks?

Teaching Aids:

1. Posters
2. Overhead projectiles
3. Movie: "Safe Handling of Foods in Quantity" (26).
4. References
 - a. A Training Course in Sanitation for Food Service Workers (19)
 - b. Food Service and Public Health (20)
 - c. The Sanitation Manual--A Guide for Management (22)
 - d. Bacterial Food Poisoning (17)

FOOD POISONING
BACTERIAL
 FOOD INFECTIONS
 SALMONELLOSIS
 STREPTOCOCCUS
FOOD INTOXICATION
 STAPHYLOCOCCUS
 BOTULISM
CHEMICAL

Fig. 10 Types of Food Poisoning

FOOD PREPARED
FAR IN ADVANCE
 +
 POOR
REFRIGERATION
 +
 CARELESS
HANDLING
 =
SICKNESS

Fig. 11 Causes of Food Poisoning

LESSON IV PERSONAL HYGIENE - "THE PERSON IS THE THING"

Purposes:

To develop an understanding that the competent food service worker makes a definite contribution to the place of work.

To appreciate the basic rules of physical fitness.

To understand additional rules of personal hygiene required of food service workers.

To learn and appreciate the reason good "hand habits," are the special requirement of all food service workers.

Lesson Outline:

I. Introduction

A. Two facts stand out from the previous discussion

1. Presence of living bacteria and realization of their presence.
2. Fact that each one of us is involved in coping with these organisms.
 - a. The "person is the thing" that counts in any sanitation program.
 - b. Success or failure depends on the attitude and cooperation of the food service personnel involved.

B. Employees are the most important factor in assuring proper food service.

II. Competent food service worker makes a definite contribution to the place of work

A. Must know the job

1. Be aware of duties
2. Be able to perform duties

B. Efficient performance of duties must include carrying out the

rules of sanitation as related to

1. The job
2. Themselves

III. Rules applying to physical fitness and daily physical preparation for work

A. Basic rules

1. A thorough physical check-up once a year
2. Dental check-ups several times a year
3. Eat proper amounts of good nutritious foods
4. Get plenty of rest at night
5. Stay home when sick

B. Additional rules of personal hygiene

1. A daily bath is a must
2. Shampoo hair frequently
3. Clean teeth frequently
4. Use a deoderant and mouth wash
5. Clean undercloths each day
6. Clean uniform each day
7. Sensible comfortable shoes
8. Women wear hair-nets, men wear caps
9. No jewelry
10. Hands and nails kept clean

IV. Hand habits

A. The special requirement of all food service workers

1. Anyone in the establishment whose work involves contact with food, utensils, or equipment
2. To carry out these requirement each person must
 - a. Be constantly aware

b. Be continuously alert

B. Correct hand habits are a must

1. Learn to automatically wash hands after
 - a. Toilet visits
 - b. Smoking
 - c. Touching any unclean object
2. Learn to keep hands away from mouth, nose, ears, eyes and hair while on the job
3. Learn to immediately clean, disinfect and bandage any cuts or sores on fingers, hands or arms
4. Learn to cover coughs and sneezes - and then wash hands
5. Learn to handle tableware properly
6. Learn to wash hands after removing soiled dishes
7. Learn not to dip hands into ice bins
8. Learn not to dip fingers into food already prepared in order to taste it
9. Learn to wash hands correctly - plenty of soap and hot water

V. Conclusion

A. Two main qualities of a competent food worker

1. Know your job
2. Conscientiously carry out sanitation in performing routine job duties

VI. Movie: "Kitchen Habits" (27)

A. Things to look for in movie

1. The good hand habits that are used
2. Good sanitation practices

B. Discussion after movie

1. When should hands be washed?
2. What sanitation measures were stressed?

Discussion Questions: (29)

1. Why is this lecture called "The Person Is The Thing?"
(good answer--because success or failure of any food sanitation program depends upon the attitude and cooperation of all food service personnel involved)
2. What are the two main qualities of a competent food worker?
3. Name some desirable hand habits.
4. Name some undesirable hand habits.
5. Why is it important to wash hands after smoking?
6. Why is it important to wash hands after handling soiled dishes?
7. Describe what is involved in thorough hand washing?

Teaching Aids:

1. Posters
2. Overhead projectiles
3. Agar plates on which bacteria have grown
4. Movie: "Kitchen Habits" (27)
5. References
 - a. A Training Course in Sanitation for Food Service Workers (19)
 - b. Food Service and Public Health (20)
 - c. Food Service in Institutions (23)
 - d. The Management of People in Hotels, Restaurants and Clubs (24)

APPENDIX B

PRETEST

Number of years you have worked in
O. S. U. Food Service _____

Read each question and then circle either Yes or No
or D.N. (Do not know answer).

- Yes No D.N. 1. Are there some germs which are harmless?
- Yes No D.N. 2. Will food spoil if it is put into the refrigerator while hot?
- Yes No D.N. 3. Can healthy people cause other people to get sick?
- Yes No D.N. 4. Can germs be spread from person to person by way of silverware?
- Yes No D.N. 5. Do germs multiply very rapidly at room temperature?
- Yes No D.N. 6. Are germs present in the air?
- Yes No D.N. 7. Do all germs get into the body through the nose?
- Yes No D.N. 8. Can the temperature at which foods are stored have an affect on the growth of germs?
- Yes No D.N. 9. Should foods be stored in the refrigerator without being covered?
- Yes No D.N. 10. Is the protection of the students the only reason for sanitation?
- Yes No D.N. 11. Can you smell or taste germs that are present in food?
- Yes No D.N. 12. Are dishes and utensils free of germs if they have been washed?
- Yes No D.N. 13. Can washing hands with soap and hot water help prevent the spread of germs?
- Yes No D.N. 14. Do cuts and sores on hands need to be disinfected and bandaged?
- Yes No D.N. 15. Should a clean tasting spoon be used whenever food is checked for seasoning, etc.?

- Yes No D.N. 16. Can food poisoning be caused by incorrect handling of food?
- Yes No D.N. 17. Can refrigeration kill germs which are present in food?
- Yes No D.N. 18. Are rats, flies and cockroaches sources of disease?
- Yes No D.N. 19. Can the amount of food in a pan affect the length of time required to cool the food?
- Yes No D.N. 20. Are there ways to fight disease germs?

APPENDIX C

POST-TEST

Number of years you have worked in
O. S. U. Food Service _____

Read each statement and then circle whether it is true or false.

- T F 1. Communicable diseases can be spread only by direct contact with a sick person.
- T F 2. Sanitation is the responsibility of every person who works in a food service unit.
- T F 3. Bacteria are killed at temperatures below 40° F.
- T F 4. Bacteria need dry and cool locations in order to grow.
- T F 5. Bacteria can be left on dishes if the water used during dishwashing is below 170° F.
- T F 6. Foods stored in the refrigerator should be uncovered.
- T F 7. Food should not be held at room temperature any longer than necessary.
- T F 8. Foods which are ground or diced are good places for bacteria to grow.
- T F 9. Cuts, burns or sores on hands are one way bacteria can get into food.
- T F 10. Good sanitation is needed to protect ourselves, as well as the students we serve.
- T F 11. Flies, cockroaches and rats are not carriers of diseases.
- T F 12. While handling dirty dishes we may be exposing ourselves to disease.
- T F 13. Bacteria can be moved from dirty dishes or utensils to clean dishes on our hands.
- T F 14. All bacteria are harmful and cause disease.

- T F 15. If a person is in good health, there will be no dangerous bacteria in his body.
- T F 16. Putting food into the refrigerator while hot, will cause the food to spoil.
- T F 17. Foods will not smell or taste spoiled even though there are enough bacteria present to cause food poisoning.
- T F 18. Hands should be washed with hot water and soap after going to the toilet.
- T F 19. Food poisoning can be caused by careless handling of food.
- T F 20. A clean tasting spoon should be used when checking foods during preparation.

APPENDIX D

Observer's Name _____

Dormitory _____

Date _____

SANITATION OBSERVATION SHEET

Section One

Rank each statement as A, B or C

- A=Employee has good attitude or behavior
- B=Employee has fair attitude or behavior
- C=Employee has poor attitude or behavior

1. Hands are washed after touching or handling an unclean object.
2. A hair net (women) or cap (men) is worn and it is worn correctly.
3. Hands are washed after coughing or sneezing.
4. Hands are washed correctly, using hot water and soap.
5. Hands are kept away from mouth, nose, ears, eyes and hair while on the job.
6. Employee attitude toward sanitation.

Range	Employee's Name			
	Salad	Vegetable Prep	Counter	Dish Machine

Section Two

Rank each statement as 1 or 2. (Some statements will not apply to all employees).

- 1=Correct procedure of sanitation
- 2=Incorrect or inadequate sanitation procedure

1. A clean tasting spoon is used when tasting food.

--	--	--	--	--

2. Spills are cleaned up and not allowed to remain.
3. Equipment and utensils are washed before being used again.
4. Utensils are used to mix and serve food.
5. Foods in refrigerator are kept covered.
6. Foods are not allowed to remain at room temperature any longer than necessary during preparation and service.

Dish Machine	Counter	Vegetable Prep	Salad	Range

VITA

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MASTER OF SCIENCE

Thesis: THE EFFECTIVENESS OF A FORMAL SANITATION TRAINING PROGRAM FOR
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