Hospital Foodservice — 1978 and Beyond

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(Received for publication November 23, 1977)

ABSTRACT

This paper (a) discusses how changes within the health care and food processing industries have influenced development of alternate foodservice systems and (b) projects some future trends related to resource usage. Schematic diagrams for four alternate foodservice systems are presented and discussed. The need for strengthening cooperation among food processing and foodservice industries is emphasized. Research activities related to the quality and safety of foods within each of these systems have been limited. In addition, these foodservice systems evolved without adequate consideration of effective use of energy resources. In the future, food processors and foodservice managers will have to coordinate their functions to serve good quality, energy-efficient menu items.

Hospital foodservices are uniquely operating within the health care environment as well as within the regional and local community. Therefore, political, social and economic changes within the health care field directly affect foodservice management and established policies and procedures. In addition, hospital foodservice managers are pressured to adopt technological changes in equipment and market forms of foods with the goal of increasing productivity.

What are the current issues within health care facilities? Recent issues of the Journal of the American Hospital Association, J.A.H.A., feature headlines about cost with phrases such as cost containment, controlling costs, financial crunch, accountability, scarce resources, shared systems, and changes in operational systems.

Since about 1960 the flow of food materials within the foodservice facility has been increasingly altered. This in turn has altered food purchasing. Such changes were initially made in response to increasing labor costs. In 1960, convenience type hospital foodservice systems began to develop. Another innovation, which appeared about 10 years ago, was temporary storage of cooked food between production and service. Thus the food production and foodservice stages became separated, both in time and in physical location. Many of these changes are radical departures from the conventional foodservice system. They have all happened within the last 15 to 17 years. Such rapid change makes it difficult for foodservice administrators to control systems so that quality and effectiveness are maintained.

FOOD PROCESSING/FOODSERVICE INTERFACE

The following are schematic diagrams which delineate four alternative foodservice systems within hospitals. These conceptual frameworks were published in a research foodservice bulletin (1) developed by a North Central Regional Research Committee on food quality and safety of foods within mass feeding operations.

With the evolution of current foodservice systems the interdependence of the food processing and the foodservice industries has become more apparent. Many highly processed foods are available for use in foodservices. The types of foods procured from food distributors for foodservices tend to describe the interface between the two industries. Figure 1 gives a schematic diagram of this interface.

The food processing continuum represents the amount of processing which food items receive. Food items at the far left in this continuum have received little or no processing; at the far right processing has been completed.

To illustrate this concept a ready-to-cook, whole chicken carcass which is chilled in ice slush receives little processing before distribution. If the bird is cut up, packaged and frozen, it has received moderate processing. However, if the chicken has been diced, frozen, incorporated into chicken cacciatore, portioned into 10-12 lb. aluminum containers, frozen, and distributed to a foodservice system, it has been completely processed for the menu item. Figure 1 represents a foodservice operation which tends to procure food items with either no processing or a limited amount of processing.
PRODUCT FLOW IN FOODSERVICE SYSTEMS

Four major categories of systems provide a basic conceptual framework of the current foodservice industry. In some establishments, a combination of two or more of these categories may be used to prepare different menu items.

In considering alternative systems the following should be kept in mind:

1. Selection of any type of foodservice system will depend on the objectives and constraints of the individual situation. No one system is best for everybody.
2. There is no concrete evidence in the literature that cost effectiveness has been adequately substantiated for any of the four categories of foodservice systems that will be described.
3. Only limited research data are available on the quality of food produced and served from these systems, although there are plenty of claims that certain systems improve or maintain quality.

A conventional foodservice system (Fig. 2) is one that uses some prepared food items, such as bread, ice cream and frozen or canned vegetables, but relies primarily on preparation “from scratch”, particularly for entree items. Since conventional systems require so much preparation “from scratch”, they are heavily labor intensive. Because of increasing labor costs, administrators with conventional systems have gradually made changes to reduce the labor component for meals served. Foodservice administrators are procuring foods from all points along the processing continuum. One exception is in correctional facilities where labor is abundant and the conventional system is normally used. These foodservices systems tend to have their own meat processing, baking, and vegetable preparation areas.

Hot-holding

When food is subjected to hot-holding conditions, quality can be affected. The effect upon the product during the holding stage must be considered when managerial decisions are made concerning food production scheduling. Temperature and humidity are critical factors affecting food quality. Prolonged holding at 160-170°F usually has adverse effects on nutritional and sensory quality. Batch cooking of food in quantities to supply the service line for approximately a 15-min interval is an effective production technique for vegetables.

Hot delivery systems for trays to patients have the problem of not being able to maintain sensory quality and proper temperature for an extended period. “Late trays”, or “hold trays” are also special problems.

Ready-prepared foodservice systems

These (Fig. 3) were developed in response to a critical shortage of skilled food production personnel and increased labor costs. Food items for ready-prepared systems may be procured from all points along the food processing continuum. However, if adequate skilled labor is available, there generally is a tendency to procure less completely prepared menu items. Following receipt, procured food products are placed in appropriate storage conditions until needed for ingredient unit assembly and production.
Generally, foodservice administrators who adopted these systems found that available completely prepared foods did not meet their organizational requirements. Thus they went into on-premise production and storage systems which we know as...cook-freeze and cook-chill systems.

**Cook-freeze system**

This system is one in which batches of food are prepared on a Monday through Friday production schedule, individually portioned and plated immediately after production, blast frozen, stored, thawed, and reheated at point-of-service to consumers. The main problems in frozen cooked foods are damage to texture and structure and development of off-flavors. According to Palmer (2) much of this damage can be reduced or eliminated by substituting more stable ingredients, adding stabilizers and exercising control of storage time, temperature, and packaging.

**Cook-chill system**

In this system batches of food are prepared daily, usually chilled in bulk for 24 h, individually plated, and stored in refrigerated carts. Food is reheated, usually in a microwave oven, as needed in each patient area. In some cook-chill systems, food is prepared on a Monday through Friday food production schedule and food is then refrigerated for 24 to 72 h.

Recipe reformulation is a major consideration in cook-freeze and cook-chill systems. Entrees and hot vegetables in these systems receive two heat treatments. The first heating occurs in quantity production and the second is at point of service to the consumer. Terminal temperatures of food given these two heat treatments should be carefully controlled as they can greatly affect quality. Because food products are subjected to a variety of temperature zones and methods of handling, close supervision in production is essential to maintenance of quality. Advantages to the cook-chill systems are that cold foods are less perishable and retain nutrients longer than hot foods. Their major limitation is the large capital investment required initially for freezers, refrigerators, large volume cooking equipment, and, perhaps, packing equipment. This processing/storage equipment requires significant space in the production area. Also, space is required in patient housing areas for foodservice employees to reheat food, and there is an added investment in reheating equipment, usually microwave or convection ovens.

**Commissary foodservice systems**

Evolution of these systems (Fig. 4) has been made possible by development of sophisticated foodservice equipment, initially in Europe. Dynamic Systems in Philadelphia is currently selling this equipment in the U.S. and adapting it to our market forms of food products (3).

Foodservice administrators who adopt these foodservice systems emphasize economics-of-scale in food production. These systems have centralized food procurement and production functions with distribution of prepared menu items to several remote areas for final preparation and service.

Commissary managers tend to acquire foods which have received little or no processing. The economics of
large scale purchasing and production realized from utilizing one central facility often justify procurement of expensive multi-function foodservice equipment which may be automated and computer-directed for preparation of foods from the unprocessed state.

Following procurement, food supplies are received and stored frozen, chilled or dry. Most food items are completely processed in the central production stage, which is the same as the ready-prepared service or conventional systems.

Assembly-serve foodservice systems

These systems (Fig. 5) evolved in response to (a) the chronic shortage in skilled personnel available for food production, (b) technological changes within the food processing industry which made feasible production of high quality, frozen food products, and (c) the extensive nationwide marketing and distribution system for frozen food products.

Three market forms of completely processed frozen entree products predominate in the assembly-serve systems: (a) bulk, (b) pre-portioned, and (c) pre-plated. Following receipt and frozen storage, the bulk form requires portioning before or after reheating within the foodservice system. In addition to reheating, the pre-portioned form requires an assembly step. The pre-plated product requires only reheating before distribution and service.

IMPLICATIONS FOR EFFECTIVE ENERGY USE

Throughout the discussion of these systems, I purposely ignored one scarce resource, energy. These systems evolved without much consideration of energy — it was abundant. Some of the feasibility studies for alternative foodservice systems have been negligent concerning energy. In 1975, a feasibility study was commissioned by and completed for the Commonwealth of Pennsylvania (4). This study concluded that five to six commissaries could serve all of the 80 government foodservice facilities throughout the state, including hospitals. This conclusion was reached without adequate consideration of energy requirements for initial food production, blast freezing, frozen storage, distribution, satellite storage, and product reheating.

The Department of Food Science and Nutrition at the University of Missouri, in cooperation with the College of Engineering, has completed a preliminary study of energy use throughout the food processing/foodservice industry (5). This involved development of a computerized energy accounting model to identify accumulated energy expenditures from the initial stages of food processing to the point of service. The data for each of the foodservice systems were expressed in BTU's per gram of protein and per calorie. We compared regular vs. modified diets, initial vs. leftover production, and limited vs. extensive food processing. In addition, energy expenditures for various types and distances of food distribution were identified.

Within each type of foodservice system we found serious energy inefficiencies. In hospital foodservices this is not surprising, seeing that 90% of the nation's existing health care facilities were built before 1973-74 and are largely energy inefficient foodservice systems (6). It would be disastrous to compare and make recommendations for use of inefficient systems. Before such comparisons can be made, each hospital foodservice system must make an effective use of energy as technically feasible. Increasing the efficiency level includes three important, distinct, yet interdependent dimensions:

1. Identify and implement energy conserving technologies (such as microprocessors to control ovens). When technologies are identified, their effect on the entire food product flow must be ascertained. Without such accountability, a reduction of energy in one process may increase energy expenditures for subsequent processes.

2. Identifying, implementing and monitoring of policies and procedures to effectively manage scarce energy resources.

3. Accounting for use of energy on a producer-user level. Within the food processing industry scientists should consider the energy expenditures needed for flow of products within the hospital foodservice department. Conversely, foodservice administrators cannot decide to use all convenience foods which lower their energy expenditures without considering and having knowledge of the energy which must be expended to process, store and distribute that highly processed and usually energy-intensive product. There has to be cooperation between
food processors and foodservice administrators to produce menu items with minimal energy expenditures on an industry-wide scale.

With energy supplies becoming increasingly limited, there will be no excuse for serving an item which has accumulated energy expenditures per nutrient content of 500, 800 or 1200% more than is feasible by another system. Our technological developments and managerial policies must preclude these types of error.

To summarize, there is not a gap between the functions of food processors and foodservice managers. We are all working toward the service of energy-efficient menu items, produced with good quality, in a productive foodservice environment.

ACKNOWLEDGMENT


REFERENCES