Practice Paper of the Academy of Nutrition and Dietetics: Principles of Productivity in Food and Nutrition Services: Applications in the 21st Century Health Care Reform Era

ABSTRACT
Food and nutrition services, along with the health care organizations they serve, are becoming increasingly complex. These complexities are driven by sometimes conflicting (if not polarizing) human, department, organization, and environment factors and will require that managers shift how they think about and approach productivity in the context of the greater good of the organization and, perhaps, even society. Traditional, single-factor approaches to productivity measurements, while still valuable in the context of departmental trend analysis, are of limited value when assessing departmental performance in the context of an organization's goals and values. As health care continues to change and new models of care are introduced, food and nutrition services managers will need to consider innovative approaches to improve productivity that are consistent with their individual health care organization's vision and mission. Use of process improvement tools such as Lean and Six Sigma as strategies for evaluating and improving food and nutrition services efficiency should be considered.
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MANAGERS OF FOOD AND nutrition services have been held accountable for resource use within their departments for decades. Traditionally, quantitative productivity measures have been used to justify use of existing resources and requests for new ones. In addition, productivity measures have helped to identify opportunities for quality improvement in products and performance improvement related to services and processes. However, current and unprecedented change in the health care industry has called into question the relative value of these simple measures and what they mean in regard to efficient and effective management of food and nutrition services by registered dietitian nutritionists (RDNs) and nutrition and dietetics technicians, registered (NDTRs).

The primary purpose of this Practice Paper is to explore the history of productivity applications, review concepts of productivity, raise awareness of factors influencing traditional use of productivity measures, and suggest future productivity assessment.

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HISTORY OF PRODUCTIVITY IN FOOD AND NUTRITION SERVICES

Frederick Taylor is typically credited with launching the concept of productivity assessment. His work in the late 1800s demonstrated that work could be monitored and potentially done more efficiently to achieve the same output with fewer inputs.[1] More recently, Ozcan[1] described productivity as effective use of a given set of resources.

Application of productivity measurement techniques in food and nutrition services has been reported since the 1930s.[2] According to a review by Brown and Hoover,[3] research on ways to measure and improve productivity in foodservice operations resulted in the definition and evaluation of many productivity measures and ratios, the most prevalent being labor ratios such as labor minutes per meal or labor minutes per meal equivalent. Most of the early research on productivity in food and nutrition services operations[4-8] focused on single-factor relationships between an input and output. Brown and Hoover[3] cautioned that such narrow, focused use of productivity measurement could result in inaccurate productivity measurement.

Systems View of Productivity

Bertlanffy's[9] view of a system introduced the concepts of inputs, processes, and outputs and emphasized the importance of the interrelatedness of the parts of the system. Spears and Vaden[10] used these basic systems components (Figure 1) in the development of their foodservice systems model. Their model identified key labor, materials, facilities, and operational inputs; subsystems, management functions, and linking processes that contribute to the transformation of inputs; and key outputs of meals, financial accountability, and performance indicators. The influence of the environment, controls, and feedback on this open system are detailed as well.

The systems model provided the framework for the practice paper on

Figure 1. Basic components of the systems model.

measuring productivity in health care foodservice by Puckett and colleagues,[11] who suggested that productivity could be improved by reducing inputs, increasing outputs, or some combination of the two. Because labor is typically the more predominant cost in an operation (and more readily quantifiable), Puckett and colleagues[11] recommend developing productivity work standards and implementing productivity monitoring and benchmarking practices focused on labor.

Multiple Factor Productivity

Brown and Hoover[3,12] first suggested that a multiple factor model of productivity assessment, which included a combination of capital, energy, materials, and labor inputs related to multiple operation outputs, might provide a more comprehensive evaluation of a foodservice operation's use of all resources. Their total factor productivity (TFP) ratio was calculated as a monthly sum of outputs (eg, food sales, meal counts, head counts, and nutrition care services) related to a monthly sum of inputs (eg, food costs, labor costs, other operating expenses, inventories, capital, and utilities). The authors[3,12] reported that the relationships between variables and the TFP ratio appeared to be unique to each operation. They encouraged foodservice managers to use the TFP model to monitor productivity on a monthly basis to identify productivity trends and assess the effect of managerial decisions on productivity.

More complex mathematical techniques for evaluating the efficiency of multiple inputs to achieve multiple outputs include data envelopment analysis and stochastic frontier analysis. The data envelopment analysis model is a linear programming model that computes an efficiency score based on multiple inputs and multiple outputs.[1] The stochastic frontier analysis model compares optimal costs vs actual costs given various combinations of inputs and outputs.[13] Taylor, Reynolds, and Brown[14] reported success in using a data envelopment analysis model to evaluate cost-effectiveness of a restaurant menu. The stochastic frontier analysis by Assar and Matawie[15] of 101 health care foodservice operations in the United States and Australia suggested that health care foodservice operations could reduce their input costs by nearly 25% without decreasing their total output by focusing on appropriate skill levels of employees, ensuring that raw materials are readily available, and monitoring the operation of older equipment to ensure it can work when needed. The authors[15] found that managers with more years of experience and advanced education had more efficient operations.

The US Bureau of Labor Statistics uses multifactor productivity indexes that include combined inputs of capital, labor, energy, materials, and purchased business services to track the productivity of various industry segments. Their multifactor analysis of productivity change during the period 2000 to 2006 suggested a negative productivity growth of 0.1% in health care productivity and a positive productivity growth of 3% in foodservice operations.[16]

Given the complexity of these multifactor models, their use has been limited in food and nutrition services. A more practical, organization-specific approach to productivity measurement might be needed.

IMPORTANCE OF PRODUCTIVITY

Measuring and monitoring productivity is an important component of the food and nutrition services manager's role.[11,12,17] Puckett and colleagues[11] suggest that productivity and quality are the two most important issues in organization management. These two issues are of particular interest in health care today relative to the systems concept. First of all, the concept of the environment has expanded well beyond that of the department and organization to include changes that are influencing the entire health care system. Also, in the context of health care, the overarching output is the health of patients.

Health care costs in the United States exceeded $2.3 trillion in 2011.[18] The continued increase in health care costs with little change in health care productivity has created increased interest in finding ways to increase productivity in health care operations.[16,19] Kocher and Sahni[19] encourage elimination of time-wasting, low-value activities; increased use of technology; increased standardization of work to avoid rework; increased use of teams; and increased use of evidence-based personalized care as strategies for improving health care productivity. Glatter[20] cautioned focusing only on indicators such as number of patients seen as the productivity index, and encouraged instead a focus on individual patients and their specific needs to reproduce high-quality, reproducible outcomes with attention to cost containment through evidence-based medicine.

The shifting health care environment challenges food and nutrition services directors to be much more aware of the efficiency and quality of the work being done in their operations. Strategies for increasing productivity become more challenging as the complexity and scope of services in food and nutrition service departments increases.

PRODUCTIVITY AND EXPANDING SCOPE OF SERVICES

Food and nutrition services departments in health care facilities are becoming increasingly complex to meet the changing needs and demands of administrators, patients, and clients. This complexity is evident in patient meal service, clinical nutrition services, and retail offerings as the number of business units within a single food and nutrition department expands in depth and breadth.

Historically, meal service to patients was the primary focus of foodservice departments in health care. Gradually, service expanded to employee and visitor meals and nutrition care services. Today, each of these categories has been further expanded to accommodate food and nutrition needs inside and outside of the health care system. For example, many patient meal