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An Evaluation of Nutrition Services Delivered to WIC High-Risk Prenatal Women by Three Nutrition Provider Types in a Regional Rural Health Department

Bonnie Lynn House
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To the Graduate Council:

I am submitting herewith a thesis written by Bonnie Lynn House entitled "An Evaluation of Nutrition Services Delivered to WIC High-Risk Prenatal Women by Three Nutrition Provider Types in a Regional Rural Health Department." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Nutrition.

Betsy Haughton, Major Professor

We have read this thesis and recommend its acceptance:

Paula Zemel, Charles Hamilton

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

To the Graduate Council:

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Betsy Haughton
Dr. Betsy Haughton RD,
Major Professor

We have read this thesis
and recommend its acceptance:

Carla Zemel

Charles Hamilton

Accepted for the Council:

Leominkel
Associate Vice Chancellor and
Dean of The Graduate School

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Signature Bonnie Lynn Hase

Date July 24, 1995

**An Evaluation of Nutrition Services Delivered to
WIC High-Risk Prenatal Women
by Three Nutrition Provider Types
in a Regional Rural Health Department**

A Thesis

Presented for the

Master of Science

Degree

The University of Tennessee, Knoxville

Bonnie Lynn House

August, 1995

DEDICATION

This thesis is dedicated to my parents, Bonnie H. Lassiter and the late Bob House for giving me the opportunity and support to continue with my education. Also I would like to dedicate this thesis to Margie Smith, without her love and support it would not have been possible.

ACKNOWLEDGEMENTS

First I would like to thank my major professor, Dr. Betsy Haughton, for her guidance, support, and confidence in my abilities. I would also like to thank Betsy Spéer, Assistant Regional Director of East Tennessee Regional Health Department for her time, patience and support. Also thanks to all the local health department personnel and computer personnel who made gathering of data possible. Thanks to my other committee members, Dr. Paula Zemel and Dr. Charles Hamilton, for their support and assistance.

Finally, I would like to thank Margie Smith, for believing in me and my abilities. She provided me with encouragement and strength to continue.

ABSTRACT

Objective: To determine if differences existed in pregnancy outcomes and quality of nutrition care delivered to WIC high-risk prenatal women by three nutrition provider types.

Design: A seven month retrospective medical record audit

Subjects/Setting: WIC high-risk prenatal women who met the following criteria, underweight for height, enrolled in WIC ≤ 32 weeks gestation, no other primary certification codes, and could have iron deficiency anemia, were sampled from a 23 county regional rural health department (n=146). The women were divided into three groups based on the provider type classification during their prenatal WIC enrollment.

Main outcome measures: An audit tool was developed by the researchers to gather data from the medical record. This information was utilized to assess the overall quality of nutrition care based on four intervention process variables, accuracy, completeness, quality of nutrition education, and quality of charting note. The information was also used to describe the population. The outcome variables, total weight gain and birth weight, were gathered from WIC's regional computer data system.

Statistical analyses: Multivariate analysis and Tukey's test were used to analysis quality of nutrition care and analysis of variance was used for the outcome variables ($p < 0.05$). Means and Chi-square analysis were used to further describe the population.

Results: The women were relatively homogenous. Significant differences were not noted for the outcome variables by provider type. For the process variables significant differences were noted for quality of nutrition education and quality of charting note.

Applications: Outcome variables continues to support prenatal WIC services. Process variables revealed the need for appropriate staff, adequate staffing ratios and training of staff for WIC nutrition services.

Preface

An explanation of the format used for this thesis is necessary to assist the reader. The thesis consists of two parts. Part I contains an extensive literature review. The actual study is found in Part II and is written in journal style.

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PART I

Introduction, Purpose and Literature Review

INTRODUCTION AND PURPOSE

The Women, Infants, and Children (WIC) Program is a federal supplemental feeding program which began in 1972 (1). The general purpose or mission of WIC is to "...prevent the occurrence of health problems and improve the health status of women and children up to five years of age" (2 p.I-1). In the state of Tennessee, WIC is operated by the Tennessee Department of Health in 94 of the 95 counties to assist low-income people who are pregnant, breastfeeding or postpartum women; infants; or children up to five years of age. Low-income is defined as 185% of poverty. In addition, the person must be identified as having a medical and/or nutritional risk (2).

WIC provides three vital components: nutrition education, supplemental foods and referrals to other agencies, including health care providers and assistance programs. Nutrition education is a federally mandated component of the WIC Program and should be made available to participants twice per certification period. The mission of WIC's nutrition education component is to reduce morbidity and premature mortality and improve the overall health status of the target population (2). According to Tennessee state policy, there are two levels of nutrition education based on the participant's risk assessment: low-risk and

high-risk. Nutrition education can be provided by registered dietitians (RDs), nutrition educators, nurses, health educators or other approved health professionals. However, the type of provider is regulated by the participant's risk classification as either low or high risk (2).

Nutrition service providers, also referred to as certifying health care professionals, prescribe a supplemental food package. There are five standard food packages and a special food package for breastfeeding women which can be tailored to meet the individual needs of the WIC participant. The foods supply the following nutrients which are lacking commonly in the diet: protein, iron, calcium and Vitamins A and C (2).

The final component of the WIC Program is referral to other health care providers and assistance programs. WIC services are to be integrated into the health department's entire system of services. In addition referrals are made to agencies outside the health department to improve the WIC participant's health status (2).

WIC has proven to be successful through research. The success can be seen by improved pregnancy outcomes and improved general overall health of WIC participants (3). In addition WIC has proven to be cost effective because for every federal dollar spent on WIC benefits there is a savings in Medicaid (4,5).

Quality assurance (QA) is an essential part of WIC services. In 1988 the National Association of WIC Directors (NAWD) and the Food and Nutrition Services (FNS) of the United States Department of Agriculture (USDA) developed two documents attesting to the importance of QA in WIC. The documents provide statements which are not mandatory, but are suggestions to improve WIC services by using QA (6-7). Both these agencies released a joint statement in 1993, regarding quality nutrition services in WIC (8).

Studies have been conducted related to the quality of prenatal care delivered by other health care providers such as nurse practitioners, registered nurses and mid-wives as compared to physicians. These studies examined not only the quality of care, but also the cost-effectiveness of various types of service providers (9-12).

WIC funds a large percentage of Public Health Nutrition personnel at both the state and local levels. Direct-care nutritionists provide most of the services at the local level (13). In Tennessee there are six levels of nutrition personnel and of these, three are of primary interest to this study: Nutrition Educator, Nutritionist I and Nutritionist II. While a Nutrition Educator is not an RD, Nutritionist I and Nutritionist II maintain dietetic registration credentials (2).

Therefore, the purpose of this research study was to evaluate the quality of nutrition care delivered to high-risk WIC prenatal women in East Tennessee by three types of nutrition service providers: RDs, non-RDs, and mixed (RDs and non-RDs). Quality was determined by two outcome variables: 1) birth weight; and 2) total weight gain. Also, quality was evaluated by four process variables: 1) accuracy, 2) completeness, 3) quality of nutrition education, and 4) quality of charting note. These process variables are intended to establish differences in nutrition counseling/education as documented by each nutrition care provider type as revealed in a medical record audit.

LITERATURE REVIEW

WIC HISTORY

In November 1968 the Senate Select Committee on Nutrition and Human Needs was established. The Committee's responsibilities included conducting hearings on issues ranging from the importance of nutrition in maintaining health to expansion of old and development of new food programs. One program developed was the Special Supplemental Food Program for Women, Infants and Children, or WIC. The WIC Program was authorized in 1972 on an experimental basis by an amendment to Section 17 of The Child Nutrition Act of 1966, known as Public Law 92-433. The pilot program was funded for two years at \$20,000,000 per year, ending in 1974. It was intended originally as a preventive service providing nutritious supplemental foods to pregnant and lactating women, infants and children less than four years of age, who were determined to be at nutritional risk as the result of inadequate nutrition and income. The program provided supplemental foods containing nutrients most likely to be lacking or limiting in the diets of low income people. These nutrients included high quality protein, iron, calcium, vitamin A and vitamin C (1).

Federal legislation outlined how the program would be funded and provided cash grants to each state health department. Therefore, each state was responsible for the development of local level WIC Programs. It was the local agencies' responsibility to distribute the foods to WIC participants. In the beginning of WIC there were three methods of food delivery. The first method was direct distribution, where the WIC participant received the foods at the clinic or warehouse operated by the clinic. Second was the retail purchase system, where the WIC participant received a voucher from the WIC clinic which was redeemed at a retail food store for the specified foods. Finally, the home delivery system involved the delivery of the WIC foods to the WIC participants' homes by commercial dairies. Currently, the method of food delivery used in Tennessee is the retail purchase system (1).

The actual start of the WIC Pilot Program was delayed by the USDA for almost one year. Therefore, WIC piloting actually began in 1973 and subsequently was extended to 1975. In 1975 key changes were made in the legislation: 1) women were eligible until six months postpartum; 2) children were eligible until their fifth birthday; 3) an advisory committee was formed to evaluate WIC; and 4) nutrition education was required to be offered to WIC participants. The final funding for 1975 was \$100,000,000 as stated in Public Law 93-328 (1).

The WIC Program grew quickly and it had strong advocates. Funding was extended through 1978 at \$250,000,000 per year under Public Law 94-105 (1). The 1993 Clinton economic plan provided an additional \$71 million for increasing WIC funding for the remainder of 1993 and an additional \$318 million for fiscal year (FY) 1994 (14). The total FY 1993 Tennessee WIC grant was \$61,815,142. This included \$45,989,061 (77%) for food and \$15,826,081 (23%) for nutrition services and administration. These monies allowed the Tennessee WIC Program to serve an estimated 128,498 participants in 1993 (15).

ELIGIBILITY CRITERIA

WIC was established by Congress as a preventive service to improve birth outcomes and the health status of at-risk low income eligible persons. The WIC participant must meet three types of criteria: categorical, income and medical and/or nutritional risk. Categorically eligible persons include pregnant, breastfeeding and postpartum women, infants and children to five years of age. The person's household is considered eligible if the total income is less than 185% of the federal poverty index. This is the federal maximum income eligibility limit. However, each state may set its own maximum poverty income limit which is based on the federal poverty index (16). Currently, Tennessee's WIC

income eligibility guideline is based on 185% of poverty (2). A potential participant also must be found at medical and/or nutritional risk by a qualified health professional (16). Each state establishes its own medical/nutritional risk codes based on the federal guidelines.

WIC was not established as an entitlement program; meaning that it does not serve all eligible participants. The highest risk participants are served first, which is determined by risk criteria codes within each state (3). In 1992 approximately 55% of those eligible for WIC were participating actively in the program (14). In 1990 just over 4.5 million of the eligible 8.4 million actually were being served. The gap in the number of eligible and number served is the result of Congressional funding (3).

CLASSIFICATION OF PARTICIPANTS: HIGH-RISK OR LOW-RISK

Since WIC enrollment is based on a priority system (high or low risk), participation varies from state to state. Some states can serve all eligible persons while others can not. The highest risk group is pregnant women (2). In 1990 an estimated 75% of all income eligible pregnant women were being served by WIC (4). In the 1993 economic plan Clinton recommended "... the Women, Infants and Children's nutrition program will be expanded so that every expectant mother who needs the help gets it" (14 p.1).

Clinton's original goal was by 1996 to reach all WIC eligible persons by increasing WIC funding (14).

The group of WIC-eligible persons most vulnerable or at greatest risk for the effects of malnutrition are pregnant women. Unborn infants are ultimately the ones who will most likely benefit from the nutritional supplementation and education received by pregnant women from WIC (16). WIC prenatal women are classified as either low-risk or high-risk. Because WIC is targeted to the high-risk population, in Tennessee there are only three certification codes for low-risk prenatal and nine certification codes for high-risk prenatal women as shown in Figure II-1 (2). The type of nutrition services received by WIC prenatal women is based on their certification status as either low or high-risk.

During pregnancy physiological and biochemical changes occur which alter the woman's metabolic needs. These changes create increased nutritional demands on the prenatal woman to maintain a nutritional state that will provide for herself and the growing fetus (17). According to Orstead et al. (18 p.40), "the ultimate quality of the product of gestation can only be as good as the quality of the ingredients." Therefore, it is the responsibility of the WIC nutritionist to provide the nutrition education component of the prenatal care package to complement the food component.

Low-risk codes (code number):

1. Inadequate diet (09)
2. Overweight (15)
3. History of mental retardation/developmental handicap (16)

High-risk codes (code number):

1. General obstetrical risk (teenager, pregnancy in rapid succession within 12 months or multiple fetuses) (01)
2. Low hematocrit or hemoglobin (02)
3. Stillborn, spontaneous abortion or neonatal death at last pregnancy (03)
4. Nutrition related medical condition (inborn errors of metabolism, chronic conditions which affect consumption, absorption and/or utilization of nutrients, chronic or recurring infections which require extended periods of treatment and which affect the consumption, absorption and/or utilization of nutrients) (04)
5. Substance abuse (05)
6. Underweight for height (13)
7. Inappropriate pattern of weight gain (14)
8. Pregnancy induced condition (high blood pressure, preeclampsia, eclampsia and gestational diabetes) (17)
9. Delivery of LBW or premature infant at last pregnancy (18)

Figure I-1: Tennessee WIC Certification Criteria for Low-Risk and High-Risk Prenatal Women Adapted from the Tennessee WIC Manual (2).

NUTRITION SERVICES AND COUNSELING IN PREGNANCY: GOALS, SERVICES, AND PROVIDERS

"The primary goal of nutrition services is to improve the nutritional status of a patient or client in ways that ultimately enhance the health and well being of that individual" (19 p.xv). Therefore, nutrition services for a prenatal woman are intended to enhance her health and that of the fetus. In order to achieve the goal stated above, there are three parts of nutrition services that must be completed: 1) screening; 2) assessment; and 3) planning and implementation of the nutrition care plan. Screening and assessment are used to identify the prenatal women's nutrition problems and/or needs. Planning is based on the results of the screening and assessment. Implementation is the actual personalized nutrition counseling and education of the prenatal woman (20).

Nutrition counseling is defined by the American Dietetic Association (ADA) as "personalized instruction in food selection and therapeutic diets with the intent of changing behavior to make choices that improve health and/or prevent disease" (21 p.980). Nutrition counseling should be provided only by persons qualified to give expert professional nutritional information. Protocols should be established and used as guidelines in the nutrition counseling of prenatal women to ensure that consistent

nutrition information is being given by all health care personnel (20).

The Tennessee WIC Program has minimum standards of nutrition care established for each certification code (2). WIC nutrition personnel are capable of screening and assessing individuals based on each participant's nutritional risk criteria codes for program eligibility. WIC is not designed to provide in-depth assessment or individual nutrition counseling beyond the realm of WIC's risk criteria codes. The WIC Program only provides nutrition counseling/education to eligible WIC participants (20).

ADA defines nutrition education as "the process by which nutrition information and beliefs, attitudes, and environmental influences about food lead to practices that are scientifically sound, practical and consistent with individual needs and available food resources." (21 p.980). Nutrition education should be a structured system and implemented as follows: assess needs, state objectives, determine content, select techniques and evaluate progress. Changing a person's behavior is a difficult and slow process that requires the delivery of many messages over a long period of time (20).

Nutrition education is defined in the Tennessee WIC Manual (2) as the:

individual or group educational session and the provision of information and educational materials designed to improve health status, achieve positive change in dietary habits and emphasize relationships between nutrition and health, all in keeping with the individual's personal, cultural and socioeconomic preferences (p. III-1).

The mission of WIC's nutrition education component is to reduce morbidity and premature mortality and improve the overall health status of the target population. There are two main goals as stated in the Tennessee WIC Manual (2) which address WIC's mission regarding nutrition education:

- 1) to demonstrate the relationship between proper nutrition and good health, with emphasis on the target population;
- 2) to effect a positive change in eating habits through maximum use of the supplemental foods within the context to ethnic, cultural and geographic preferences (p. I-1).

WIC federal regulations require that each WIC participant receive the opportunity for two nutrition education contacts during each six month certification period or quarterly if certified for more than six months. Individual counseling/education or group classes may be used to provide the nutrition education contact and can be

provided by a nutritionist, nutrition educator, nurse, health educator or other approved professional (2).

In Tennessee state policy stipulates there are two levels of nutrition education: low and high-risk. High-risk clients receive intensive education, assessment and follow-up. All high-risk clients require an individual nutrition care plan as documented in the problem-oriented medical record using a SOAP format, which includes subjective (S), objective (O), assessment (A), and care plan (P) components. Low-risk clients receive "normal" nutrition education. Documentation of low-risk nutrition contacts are made in the *Woman's Nutrition Record* or, if not utilized by the facility, are written in the nurses' or progress notes (2).

In Tennessee the content of nutrition education for high and low-risk prenatal women is based on four major nutrition education modules: 1) basic program services; 2) normal nutritional needs; 3) food management; and 4) special risk conditions. Therefore, for each certification code there is a list of four modules to cover during the certification period. These modules represent minimum nutrition education requirements. For example, a pregnant teen would be taught all four modules during her certification period if time permitted. It is the discretion of the nutrition education provider to establish and select which module to use at each prenatal WIC visit. However, module 1 (nutritional risk, food package, WIC

program and the importance of breastfeeding) must be included in the initial prenatal WIC certification contact. For both high and low-risk prenatal women, the date of each nutrition education contact should be documented on the WIC Encounter Form in fields 31 and 33 of the Nutrition Education section. In addition, missed and refused nutrition education contacts must be noted allowing tabulation of all scheduled nutrition education contacts during any women's prenatal certification period (2).

Nutrition education can be delivered by a variety of formats: individual counseling, group classes, audio-visual presentations and literature prescribed by the nutrition health care provider. However, high-risk clients must be counseled by an approved nutrition health care provider, such as a nutritionist or nutrition educator, at the first certification contact. However, if at initial certification a nutritionist or nutrition educator is unavailable to provide nutrition education/counseling, then an appointment for a follow up must be made within 15 days of certification. Ideally, a nutritionist or nutrition educator should see all high-risk prenatal women at subsequent contacts. However, other approved nutrition education providers, such as nurses, health educators or others, may provide nutrition education. Nutrition education requirements for high risk prenatal women can not be achieved by simply providing literature which was

prescribed by the nutrition care provider. It is important to remember that nutrition education must be appropriate for the individual's needs and based on minimum standards of nutrition care (2).

WIC PROVEN TO BE SUCCESSFUL THROUGH RESEARCH

Congress continues to support WIC because research has shown that it works. WIC is a success because it helps low income mothers and children by improving pregnancy outcomes and improving the general overall health of WIC participants. The improved pregnancy outcomes relate to: duration of gestation, increased birth weight and increased head circumference (3).

One research study conducted from 1979 to 1984 was the National WIC Evaluation (22). The objective of this five year study was to estimate the nutritional and health-related effects of the WIC Program on pregnancy and early childhood. Results revealed that women who were enrolled in WIC had an estimated gestational increase of 1.4 days. The study also found that infants born to WIC participants had an increase in mean birth weight of 23 grams. A 1984 General Accounting Office report (23) supported the impact of WIC on birth weight. It concluded there was: 1) 16%-20% decrease in the proportion of LBW infants born to WIC participants; 2) 1%-2% increase in mean birth weight; and 3) positive correlation for length of time a mother was

enrolled in WIC and benefits such as those described above (16,23).

The National WIC Evaluation study (22) also found that WIC participation reduced the number of fetal deaths by 20%-33%. On the other hand, if fetal deaths are decreased, the total number of LBW infants born may actually be increased. This is due to premature births that previously would have been fetal deaths. Consequently, WIC possibly increases the premature infants' chances of living due to their higher birth weight for their gestational age (3). There is an increased need to improve WIC services to high-risk prenatal women in order to further improve birth outcomes, such as birth weight (22).

ECONOMIC BENEFITS OF WIC

There are two methods for determining the economic benefits of nutrition services: cost-benefit and cost-effectiveness analysis. Cost-benefit analysis (CBA) provides information which can be used to compare the costs and benefits from one type of service or program. CBA can be used to compare different outcome variables, since both the costs and benefits are expressed in dollar amounts. In cost-effectiveness analysis (CEA) the desired outcome must be specific and the outcomes must be the same. The results are measured in cost/unit of achieved outcome (24).

To calculate the benefits of nutrition services, the money which is saved as the result of better health through nutrition counseling/education is measured. Effectiveness of nutrition services is calculated based on the anticipated health improvements achieved through a specific intervention (e.g. nutrition counseling/education). There are five preliminary steps needed to calculate effectiveness: 1) identify specific service objectives based on explicit measurable criteria directly related to health improvement; 2) develop standard practices; 3) develop protocols allowing nutrition services to be consistent from one provider to the next; 4) document the process and improved health outcome in the problem oriented medical record; and 5) compile the data of interest systematically and compare results. These five steps allow measurement and calculation of outcomes so that nutrition services can be justified (24).

Calculating the costs of nutrition services involves measuring the resources used in providing nutrition care. This makes it necessary to identify the resources needed to deliver care. Primary resources needed include: personnel, equipment, educational materials, office space and supplies, and travel (24). The WIC Program requires another resource component, food, which is allocated at 77% of the total state grant for Tennessee. Nutrition services and

administration are allocated at 23%, which includes personnel (15).

WIC has shown that it does result in improved health outcomes in relation to pregnancy as previously stated. In addition, providing WIC benefits to pregnant women more than pays for itself within the first year. It is estimated that every federal dollar spent on WIC benefits returns a \$3.50 savings in Medicaid costs over 18 years and \$2.89 in the first year of life (5). Also, there is a savings of between \$1.77 and \$3.13 in prorated Medicaid costs or \$1.92 and \$4.21 for full costs in the first 60 days after delivery (25). Information gained about the costs and benefit savings of WIC nutrition services should be used to make the available WIC resources address the needs of WIC participants and further WIC's service benefits (24).

The 1995 'Contract with America' is challenging many public health nutrition programs including WIC even though it has proven to be cost-effective and cost beneficial. The Federal government is also questioning if it should be operating many of the nutrition programs, like WIC, or should block grants be provided to states to use at their discretion. This means that documented cost-effectiveness will not necessarily guarantee the Federal government will continue to support nutrition programs in their current forms. Public health nutritionists must go beyond cost-effectiveness and advocate for nutrition programs (26).

PUBLIC HEALTH NUTRITION PERSONNEL

In the area of Public Health Nutrition personnel, in 1989 approximately half of the positions for public health nutritionists in state health agencies and 3/4 in local health agencies are funded by WIC. Direct care nutritionists filled 68% of the state positions and 90% of the local positions funded by WIC. Nationally, for Fiscal Year (FY) 1988, WIC reported employment of 3,344 full-time equivalent (FTE) positions of nutrition education personnel (13). By 1994 81.75% of FTE Public Health Nutrition personnel were employed by WIC (27).

Currently, there are no national WIC guidelines to establish staffing ratios of nutrition education personnel to WIC participants. An informal WIC Staffing Survey conducted by the Food and Consumer Service, USDA revealed the average staffing ratio to be 1:1057 (28). Some states use a staff:participant ratio of 1:500. If this ratio were utilized based on FY 1989 WIC participation of 4,000,000, then the required number of nutrition education personnel would be 8,000. Therefore, WIC is understaffed by 4656 nutrition education personnel (13). According to a 1991 Association of State and Territorial Public Health Nutrition Directors (ASTPHND), the census of Public Health Nutrition personnel has shown an overall decline of 200 professionals at the state and local levels (29).

Salary studies of Public Health Nutrition personnel compared to RDs employed in hospital settings reveal inequity in relation to job responsibilities. Public Health Nutrition personnel are responsible for assessing community nutrition needs, policymaking, planning and evaluating, coordinating, consulting, educating and managing. Public Health Nutrition personnel positions have lower salaries contributing to difficulty in recruitment and retention of qualified nutrition personnel (13). According to Kaufman and Dodds (30), public health nutrition personnel are divided into three position classes: Management series, Professional series and Technical/Support series as shown in Figure II-2. Major functions of the management series involve policy making, planning, management, supervision and fiscal control. The amount of time devoted to each of the above areas varies with each position (30).

The second level within the classification system is the professional series as shown in Figure II-2. Major functions of this series involve planning/evaluation, consultation, education, care coordination/case management and counseling. Therefore, this series shifts from mainly a population/systems focus (Public Health Nutrition Consultant) to a client focus (Nutritionist) as shown in Figure II-3. A population/system focus is involved primarily in administration and community-based planning functions. The client focus is involved primarily in direct

MANAGEMENT SERIES OF POSITION CLASSES

PUBLIC HEALTH DIRECTOR CLASS (NUTRITION)

ASSISTANT PUBLIC HEALTH DIRECTOR CLASS (NUTRITION)

PUBLIC HEALTH SUPERVISOR CLASS (NUTRITION)

PROFESSIONAL SERIES OF POSITION CLASSES

PUBLIC HEALTH NUTRITION CONSULTANT CLASS

PUBLIC HEALTH NUTRITIONIST CLASS

CLINICAL NUTRITIONIST CLASS

NUTRITIONIST CLASS

TECHNICAL/SUPPORT SERIES OF POSITION CLASSES

NUTRITION TECHNICIAN CLASS

NUTRITION ASSISTANT CLASS

Figure I-2: Classifications of Public Health Nutrition Team Positions as Adapted from *Personnel in Public Health Nutrition for the 1990s. A Comprehensive Guide* (30).

Major Focus of Public Health Nutrition Team Positions

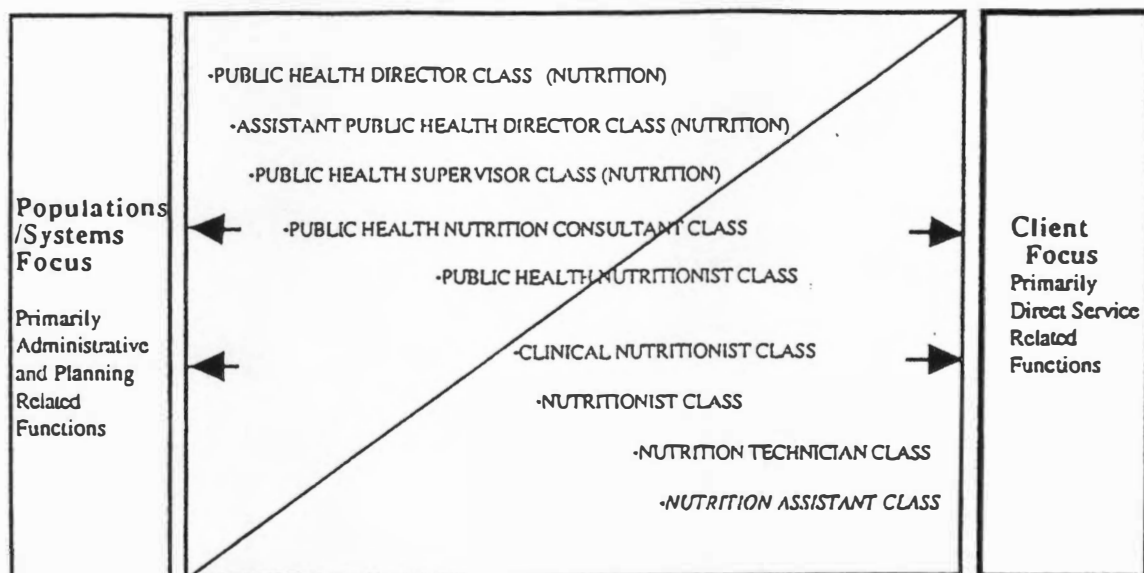


Figure I-3: Public Health Nutrition Team Position's Major Focus as Adapted from *Personnel in Public Health Nutrition for the 1990s A Comprehensive Guide* (30).

service-related functions. The area of focus depends on the amount of time spent in each of the job functions.

For both the managerial and professional series, personnel must be licensed dietitians in many states, such as Tennessee, due to licensure laws. If there is no licensure law, then, according to Kaufman and Dodds (30), persons functioning in the managerial and professional series should be Registered Dietitians. All of the positions described above could be at the federal, state or local level.

The last level of classification in the system is the technical/support series as shown in Figure II-2. Major functions of this series involve education, screening, record keeping and outreach. These persons are employed at the local level and are considered paraprofessionals. Persons employed as Nutrition Technicians require an associates degree from an approved dietetic technician program and must be Registered Dietetic Technicians. Qualifications for Nutrition Assistant positions include graduation from high school or GED and completion of on-the-job training. Neither of these positions requires previous work experience (30).

According to the descriptions above, there are nine public health nutrition team positions, each involving a broad scope of duties, knowledge and skills specific for each job description. If "public health" is used in the job

description title, the person functions with a population-based focus and requires academic training in the field of public health including: biostatistics; epidemiology; environmental sciences; health program planning; management and evaluation; and advanced nutrition. Educational requirements for other public health nutrition personnel whose primary functions are client-focused varies from a masters degree in dietetics or food and nutrition with advanced normal and clinical nutrition classes and/or fulfillment of supervised training in dietetics plus three years of work experience in a progressive clinical dietetic position. These nine nutrition team positions are guidelines to be used by states to establish quality nutrition staff personnel to deliver quality nutrition services to target populations (30).

DIRECT-CARE SERVICE PROVIDERS

The scope of this project dealt with WIC nutrition personnel in Tennessee delivering direct care services. Currently, there are six levels of nutrition personnel in Tennessee: Nutrition Educator, Nutritionist I, Nutritionist II, Nutritionist III, Nutritionist IV and Nutrition Director (31). The positions of primary interest, in this project included Nutrition Educator, Nutritionist I and Nutritionist II, all of which have job responsibilities for nutrition education and counseling of WIC participants.

The Nutrition Educator class specification states that the distinguishing feature of the job includes providing general nutrition counseling and education services at the county level. Also, this class may not provide nutrition service to high-risk clients. Minimum qualification is a bachelors degree in home economics or closely related nutritional field. There is no work experience requirement because this is an entry level position. Therefore, the major functional role of Nutrition Educators involves nutrition counseling and education of low-risk WIC clients (31).

The second level in the Tennessee public health nutrition personnel system is the Nutritionist I, whose specification's distinguishing features are responsibility for providing direct therapeutic nutrition counseling services to high-risk clients and may supervise Nutrition Educators. Based on the 1984 Tennessee personnel guidelines (31), minimum qualifications include the following education and experience as shown in Figure II-4. In 1987 proposed revisions to these guidelines were made and now in practice only Registered Dietitians (RDs) are functioning as Nutritionist I (32). Therefore, Nutritionist I under general supervision are responsible for providing nutrition counseling and education of routine difficulty to individuals or groups (31).

- * Bachelors degree in foods and nutrition from an accredited four-year college and completion of an ADA approved dietetic internship

OR

- * three years of an ADA approved pre-planned dietetic experience

OR

- * graduation from an ADA Coordinated Undergraduate Program in nutrition and/or dietetics

OR

- * graduation from an ADA approved community nutrition program.

Figure I-4: Minimum Qualifications for a Nutritionist I
Based on Tennessee Personnel Job
Specifications (31).

The Nutritionist II class specification's distinguishing features are being responsible for providing nutrition counseling services within a region and functioning as a supervisor of the previous two classes. Minimum qualifications are the same as Nutritionist I, except the person must be an RD or RD-eligible. There is a required work experience of 18 months of full-time professional nutrition work or a masters degree in a nutrition-related field. The person should have a good knowledge of nutrition and dietetics practice and be capable of performing nutrition work of routine difficulty (31).

The remaining three positions, Nutritionist III, Nutritionist IV and Nutrition Director, all involve administrative functions, including supervision of lower level nutrition personnel. Nutritionist IIIs are responsible for directing regional nutrition programs or as central office coordinators of a major area of one of the statewide nutrition programs. The statewide Nutrition Education Coordinator is the Nutritionist IV. Finally, the Nutrition Director position involves planning, coordinating and directing statewide nutrition program (31).

All three of these administrative positions require a masters degree in some area of nutrition, RD status and increasing work experience with supervisory experience (31). The Tennessee WIC Manual provides a complete description of each class's functional roles in relation to administrative,

program planning and evaluation, plan implementation and training responsibilities (2).

TENNESSEE'S NUTRITION PERSONNEL SYSTEM COMPARED TO *PERSONNEL IN PUBLIC HEALTH NUTRITION FOR THE 1990s*

The Tennessee WIC personnel job descriptions do not fit exactly Kaufman and Dodds' (30) pattern as described in *Personnel in Public Health Nutrition for the 1990s. A Comprehensive Guide*. Specifically, the class of Nutrition Educator does not agree with Kaufman and Dodds' description for a Nutritionist or Nutrition Technician. The Nutritionist class requires a minimum of a bachelor degree in nutrition and licensure as a nutritionist or dietitian or status as an RD. The Nutrition Technician class requires an associates degree from an approved dietetic program and a registered dietetic technician status (30). Therefore, the Nutrition Educator class used in Tennessee is either under qualified for the Nutritionist class or over qualified for the Nutrition Technician class. Also, the Nutritionist I class for Tennessee does require dietetic registration status (31). According to Kaufman and Dodds (30), RD status or RD-eligible status is required for the Nutritionist class.

According to the WIC state and federal guidelines, all high-risk WIC clients can be counseled by an RD while low-risk WIC clients are to be counseled by any approved

nutrition education provider (2). Therefore, in Tennessee only Nutritionist I and II's should be counseling high-risk WIC clients. In order to determine what actually occurs in the Tennessee WIC Program at the local level a quality assurance system is necessary and should be integrated into the WIC Program.

QUALITY ASSURANCE

Quality assurance (QA) has been defined as an approach to measuring and monitoring health care in a problem-solving manner to assure that it is effective and efficient (33). QA must be organized and administered by health care providers in conjunction with clients' needs in order to be effective (34). Integration of QA into the nutrition program includes the elements illustrated in Figure II-5 (33).

The primary goal of QA is to improve the clients' health outcomes. Its purpose is to identify the clients' needs, identify problems and gaps in the health care system and make appropriate health care changes. QA is limited because clients have no input into the QA system. However, governmental programs can use QA programs to help meet requirements and regulations. Because QA is a continuous and ongoing process, it can be used in any health care facility or program, including WIC (34).

1. Nutrition Program Plan: time line, work plan, budget and staff required for nutrition services
2. Professional Standards of Practice: based on the most appropriate current research and practice requires continuous updating.
3. Policies and Procedures: defines the target population and nutrition services to be provided, includes development of protocols.
4. Process and Outcome Criteria: the basis for the program plan and objectives which must be realistic, understandable, measurable, behavioral and achievable (RUMBA), used for auditing nutrition services.
5. Documentation: written in the medical record in SOAP format, essential part of the QA system used in the nutrition service audit.
6. Written Audit System: evaluation of the medical record which is used to detect gaps in the system and make improvements in the nutrition services plan.
7. Statistical Reporting System: summary of data collected in the audit.
8. Educational Plan: purpose to correct errors found in the audit and improve patient care.

Figure I-5: Elements of QA Which Should be Integrated Into a Nutrition Program (33).

According to the Tennessee state WIC Manual (2), quality improvement (QI) serves the purpose of evaluating health services and subsequently determining a program's compliance based on established standards and performance criteria. Corrective action is taken if the program (WIC) is found to be non-compliant. Finally, a re-evaluation of WIC is required to determine if the corrective action achieved the desired results or compliance (2).

QUALITY ASSURANCE IN WIC

The NAWD and FNS of the USDA, developed in 1988 two documents: *WIC Nutrition Services Standards* (NSS) (6) and *Ensuring the Quality of Nutrition Services in the WIC Program* (7). There were two reasons for development of the NSS document: 1) "to provide State WIC directors and nutritionists with a method for evaluating the quality of nutrition services in their program; 2) to encourage states to use their evaluation information to improve nutrition services in their programs" (19 p. 1). Twelve standards were developed which apply to the following six nutrition services components:

1. Nutrition/Health Assessment
2. Nutrition Services Plan
3. Nutrition Education
4. Qualifications and Roles of Nutritionist
5. Nutrition Staff Training
6. Food Packages.

These standards describe quality nutrition services and are intended for use in evaluating current WIC nutrition services being provided. Results of the evaluation are to be utilized in making improvements in WIC (6).

Specifically, standard nine is the Nutrition Staff Training component and refers to qualifications and roles of the nutritionist and states: "The State agency assures that a qualified nutritionist provides WIC services and that the role of the WIC nutritionist is defined" (19 p. 15). Minimum qualifications for local WIC nutritionists providing high-risk counseling include: master's degree with emphasis in a nutrition or nutrition-related area; and Registered Dietitian or RD-eligible. State agencies also establish responsibilities of the local nutritionist. The NSS document provides five categories of assessment standards related to this standard (6).

The document, *Ensuring the Quality of Nutrition Services in the WIC Program* (7), describes the nutrition services provided by the WIC Program and presents four specific goals with accompanying recommendations for providing quality nutrition services in WIC. Specifically, goal #1 refers to nutrition personnel and states: "To ensure the provision of quality nutrition services to WIC participants by qualified staff" (20 p.1). The document includes a list of seven recommendations in order to achieve the goals of standard nine (7).

In January 1993 NAWD and the FNS released a joint statement denoting the importance of delivering quality nutrition services competently and professionally to all WIC participants by WIC clinic personnel. The standards, strategies and recommendations which are made in the statement are not mandatory by WIC. Therefore, the purpose of the statement is to set forth standards and strategies to ensure that nutritionally at-risk WIC clients are provided the optimum opportunity to be healthy individuals based on the following five basic operational concepts:

1. service delivery through WIC;
2. nutrition education and counseling;
3. coordination with medical care and other programs;
4. cultural and linguistic considerations;
5. literacy considerations.

In order to accomplish the above concepts, NAWD and FNS subscribed to standards and strategies for improving participant services and effective quality assurance systems in five program areas:

1. components of WIC certification;
2. quality assurance (standards and protocols);
3. training of staff;
4. supervision of staff;
5. availability, recruitment and retention of staff (8).

The first program area, components of the WIC certification, is necessary to provide quality services and comply with the Federal regulations which specify the minimum requirements for WIC certification. Federal requirements, therefore, may be less than what state and local agencies are doing to provide WIC benefits/services.

The following components were identified by NAWD and FNS regarding what a WIC certification should be from a quality assurance perspective. These components are expansions of the federally mandated requirements:

1. determination of eligibility
2. collection of nutritional/health data
3. assessment of certification data and providing services
4. provision and documentation of the initial nutrition education contact
5. orientation to the WIC Program
6. issuance of WIC food vouchers.

These components are necessary to assess a participant's needs, determine eligibility, provide or arrange for appropriate nutrition services and follow-up, enable participants to understand WIC's purpose and benefits fully and their rights and responsibilities as a WIC participant. Due to the numerous tasks which are performed during a WIC certification, various staff persons are required, some of which may require special training or education. It is the responsibility of the state and local WIC agencies to ensure that all WIC staff are qualified to perform their job functions effectively (8).

The second program area, quality assurance (standards and protocols), is a continuous assessment process of the program plan, policies, procedures and implementation to ensure that quality nutrition services are being provided by all WIC staff to all WIC participants. The process should be provided in an effective and efficient manner. The statement describes seven key components of an effective QA

system (8). Wooldridge and Joyner (34) also suggested that process and outcome criteria should be a part of the total QA criteria. This includes the desirable characteristics of RUMBA (Relevant, Understandable, Measurable, Behavioral, and Achievable), which are the basis for the program plan objectives and the nutrition audit to determine the QA status.

Training of all WIC staff involved in certification and provision of nutrition education is the third program area. If paraprofessionals are utilized for WIC certification procedures, then they must be trained. Two types of training programs have been recommended: 1) competency-based training programs; and 2) WIC training modules. Finally, continuing education should be available to all WIC staff involved in certification as a means of maintaining and improving established training abilities (8). Staff not only need to be trained, but also must be supervised, which is the fourth program area. WIC staff should be evaluated continuously and supervised to ensure that quality nutrition services are being provided to WIC participants. The bases for evaluation should be state WIC minimum standards of care and WIC employee performance standards. In order to ensure qualified WIC staff are being utilized, five components were described in *NAWD/FNS Joint Statement on Quality Nutrition Services in the WIC Program* (8). NAWD and FNS recommend

standards of care protocols developed by states as the basis for measuring quality staff performance (8).

Due to the expanding WIC participation rate, there is a need for qualified nutrition personnel to provide WIC services. Therefore, the fifth program area relates to availability, recruitment and retention of staff. Availability of qualified nutritionists is a major concern of WIC. According to FCS's WIC Staffing Survey, WIC State agencies have experienced difficulties with recruitment of qualified nutrition personnel (28). These nutritionists are vital as direct care providers and managers of WIC clinic operations. Availability, recruitment and retention of WIC nutritionists have posed many problems, which NAWD and FNS have addressed by suggesting possible strategies for improvement (8). The NAWD and FNS statement is not mandatory. However, NAWD and FNS believe that all WIC staff should be obligated to these standards, strategies and recommendations in order to provide services in accordance with WIC's mission (8). Therefore, QA is a major component of ensuring that quality nutrition services are being delivered in the most effective and efficient manner. The study reported in this thesis compared the outcomes of pregnancy and measured the quality of nutrition services delivered to high-risk WIC prenatal women by three of Tennessee WIC nutrition personnel classes: Nutrition

Educator (non-RD); and Nutritionist I and Nutritionist II (RD).

QUALITY OF PRENATAL CARE DELIVERED BY OTHER HEALTH CARE PROVIDERS

There are limited data available comparing the quality of prenatal care delivered by health care providers. The objectives of a study conducted by Taren and Graven (9) were "to determine if intervention strategies were being delivered to high-risk patients and which components were associated with a lower risk of LBW" (p. 427). Results of the study revealed that higher quality prenatal care based on the presence of nutritional and educational components was associated with a lower percentage of LBW infants. The most effective interventions were prenatal education related to early signs and symptoms of preterm labor, hematological assessments and iron supplementation (9). A study conducted by Hulsey et al (10) revealed similar conclusions regarding adequate low-risk prenatal care delivery as measured by preterm and LBW deliveries.

Studies have been conducted directly evaluating the quality of prenatal care delivered by nurse-midwives compared to obstetricians. Heins et al (11) hypothesized that women at increased risk who received prenatal care from nurse-midwives would have a lower incidence of LBW than those women receiving standard care from obstetricians.

Results revealed no detectable difference in pregnancy outcome measures expressed as either LBW or preterm deliveries. Therefore, it was concluded nurse-midwives can provide prenatal care comparable to obstetricians. This suggests utilization of nurse-midwives may make prenatal care more accessible to underserved women (11).

Due to increasing numbers of underserved women and increasing number of LBW deliveries, Graveley and Littlefield (12) established the need for determining the most cost-effective method of delivering prenatal care to these women. The study focused on three low-risk prenatal clinics: 1) physician based; 2) mixed (physician, nurse practitioner, registered nurse and nurse aides); and 3) nurse-based. Demographically all subjects were similar, except for ethnicity, years of education and Medicaid coverage.

Costs of services for each clinic type varied, although the physician-based was significantly more expensive. The mixed clinic had the lowest cost overall. However, the nurse-based clinic had the lowest cost per clinic visit and the highest productivity. Examination of maternal and infant physiological outcome variables revealed no significant difference among clinics and no maternal satisfaction differences regarding accessibility and affordability of prenatal care (12).

Therefore, study conclusions revealed utilizing non-physician maternal health care providers with physicians available for consultation could possibly decrease the cost of providing low-risk prenatal care to underserved women while maintaining quality. Net savings would be essential due to depleting governmental resources (12).

According to a GAO 1992 report (5), cost savings can be achieved by utilizing early intervention programs like WIC. These cost savings can be distributed among federal, state, local and private payers of medical care/services and other governmental funded programs necessary for the care of the infant and later child. The study examined benefits of WIC services to WIC-eligible prenatal women based on the number of low birth weight and very low birth weight infants born to these women in 1990. During the study period an estimated 75% of all income-eligible pregnant women were being served by WIC. It was concluded that WIC prenatal investments lead to the reduction of low birth weight rates by 25% and very low birth weight rates by 44%. Estimated cost of WIC benefits for the study group of WIC prenatal women was \$296 million, but saved \$472 million for the first year of life and an estimated \$1,036 billion over 18 years of the child's life. These figures would represent for every dollar spent on WIC a savings of \$2.89 during the first year of life and \$3.50 over 18 years of life (5). Therefore, if WIC can produce savings, nutrition services is

a component of WIC necessary for attainment of beneficial net cost-savings.

A statement developed in March 1993 by the Health Care Reform Legislative Platform on the economic benefits of nutrition services in maternal and child health states "Nutrition services for pregnant women can lead to the proper growth and development of the fetus and prevention of low birth weight and costly complications" (27 p.10). This statement is based on the GAO report: *Early Interventions Federal Investments Like WIC Can Produce Savings* (5). The statement further concludes major risk factors leading to the delivery of low birth weight infants are poor nutrition and inadequate weight gain (35).

Other variables used in past studies to evaluate pregnancy outcomes and adequacy of care include: infant birth weight, prenatal weight gain, use of cigarettes, alcohol, and/or drugs during pregnancy, low prepregnancy weight, dietary intake, parity, ethnicity, socioeconomic status, age, length of gestation, history of past pregnancies and adequacy of prenatal care. Previous studies revealed prepregnancy weight and weight gain to be modifiable variables affecting infant birth weight. These variables are related directly to nutrition (5,36-37). Therefore, it is the responsibility of nutritionists/dietitians to provide adequate nutritional assessment,

planning, counseling, and education to prenatal women to prevent undesirable birth outcomes.

A cost-analysis study conducted by Splett et al. (38), examined low-risk prenatal services at two different health care facilities: 1) city health department; and 2) county hospital. Study conclusions revealed personnel costs were the largest expense and could be reduced by the utilization of paraprofessionals under the supervision of competent nutritionists (38). It is within this context that this study examined the delivery of quality nutrition care delivered to high-risk WIC prenatal women by RDs, non-RDs and mixed providers in eastern Tennessee.

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PART II

An Evaluation of Nutrition Services Delivered to WIC High-Risk Prenatal Women by Three Nutrition Provider Types in a Regional Rural Health Department

INTRODUCTION

The Women, Infants and Children (WIC) Supplemental Nutrition Program is a federal nutrition program administered by the United States Department of Agriculture, and managed by each state. WIC was established as a preventive service to improve birth outcomes and the health status of at-risk low income (\leq 185% of poverty) eligible persons. Eligibility is based on categorical and medical and/or nutritional risk criteria. Categorically eligible persons include pregnant, breastfeeding and postpartum women, infants and children to five years of age. Medical and nutritional risk factors must be determined by a qualified health professional (1).

WIC provides three vital components: nutrition education, supplemental foods and referrals to other agencies, including health care providers and assistance programs. Nutrition education is federally mandated and made available to participants twice per certification period. The mission of WIC's nutrition education component is to reduce morbidity and premature mortality and improve the target population's overall health status (1).

WIC is an early intervention program and a social investment, which has proven to be cost effective. According to a 1992 GAO report (2), WIC is estimated to save \$3.50 for each federal dollar invested in WIC services.

Improvements in infant birth weight have been associated with appropriate prenatal care, optimal nutrition, and avoiding high-risk behaviors such as cigarettes, alcohol and drugs (2). Previous studies examining prenatal WIC participation have concluded that enrollment in WIC does improve birth outcomes (3-11). Low and very low birth weight rates have been reduced in women receiving WIC benefits (2). According to Tennessee state policy, there are two levels of nutrition education based on the participant's risk assessment: low-risk and high-risk. Nutrition education can be provided by registered dietitians (RDs), nutrition educators, nurses, health educators or other approved health professionals. The type of provider is regulated by the participant's classification as either low or high-risk (1).

According to the Association of State and Territorial Public Health Nutrition Directors (ASTPHND) survey (12) WIC continues to be the major funder of public health nutrition personnel. State and local agencies reported problems with recruitment of public health nutrition personnel. In a similar survey conducted by the Food and Consumer Service (13), WIC state agencies experienced difficulties in hiring qualified nutritionists and even reported that other staff were performing nutrition-related services. The average staff:participant ratio was 1:1057 (13). This leads to problems with having appropriately trained staff to meet the

target population's needs and those of the WIC program's policies and procedures. For example in Tennessee not every county has nutrition personnel available for high-risk nutrition education (14).

The purpose of this study was to examine retrospectively the quality of nutrition services delivered to high-risk WIC prenatal women in a 23 county rural regional health department by different nutrition care provider types: 1) RDs, 2) non-RDs, and 3) mixed or combination provider (RDs and non-RDs). This health department served 179,724 WIC participants from September 1993-March 1994, of which 28,810 (16%) were prenatal women (15).

The study addressed two basic questions: 1) Are there significant differences in pregnancy outcomes as measured by infant's birth weight and women's total prenatal weight gain by provider type?; and 2) Are there significant differences in quality of nutrition care provided to prenatal women seen by RDs, non-RDs, or mixed provider types as measured by nutrition services documented in the medical record?

METHODS

Subjects

Subjects included high-risk prenatal women who received WIC services in a 23 county rural Regional Health Department during a 7 month period and who met certain criteria as defined by the state WIC manual. Criteria included: 1) underweight for height (prepregnancy weight at last menstrual period <100 pounds or <90% of standard); 2) enrolled in WIC \leq 32 weeks gestation; and 3) no other risk factors as primary certification codes. The women selected could have iron deficiency anemia (hematocrit \leq 33% or hemoglobin \leq 11.7 gm/dl) also. Prenatal women meeting the criteria were divided into three groups according to the type of nutrition care provider type who delivered services (nutrition education/counseling) during the course of their pregnancy. All women were seen at least once by a nutrition care provider, for a maximum of three visits.

Provider Types

The three nutrition care provider types were: 1) RDs, 2) non-RDs, and 3) mixed (both RDs and non-RDs). RD refers to nutrition care providers who have completed successfully didactic and experiential requirements as specified by the American Dietetic Association and who have passed a national exam administered by the Commission on Dietetic Registration. Non-RDs are persons who are either not

eligible to take the dietetic registration exam but hold a bachelors degree in home economics or related nutrition field, or are eligible to take the dietetic registration exam and hold at least a bachelors degree with a major in foods and nutrition or equivalent coursework. Mixed provider type refers to both RDs and non-RDs who provided nutrition counseling/education to a WIC participant during her prenatal enrollment period. At the time of the study there were 17 RD and 21 non-RD positions, of which 12 and 18, respectively, were filled (14).

Audit Tool

An audit tool (Appendix A) was developed by the researchers to gather required data directly from the *Woman's Nutrition Record* (Appendix B), which is contained in the medical record. The information was used to assess the overall quality of nutrition care based on the following intervention process variables: 1) accuracy; 2) completeness; 3) quality of nutrition education; and 4) quality of charting notes.

Accuracy was defined as the nutrition provider's assessment and documentation of conditions related to anemia and weight status at visit 1. It included four measurements, anemia and underweight status, percent of standard weight, and graphic plotting of weight. A scale

from 1 (not done or incorrect) to 3 (done or done correctly) was used to obtain a maximum potential score of 12.

The nutrition provider's documentation of performance at each WIC visit as described in the state WIC manual was measured as completeness. Thirty-one components such as nutrition history, dietary intake, anthropometric measures, hemoglobin, pre-pregnancy weight, weight recorded and plotted, environmental questions, obstetrical data and charting note, were utilized to achieve a maximum potential score of 91, based on three visits. It used the same scale (1 and 3) and added 2 (partially complete where applicable) except for two questions. One question related to what percent of standard weight was marked and was scored as 0 (incorrect) and 1 (correct). The other question related to actual number of visits and was scored from 0 to 3.

Quality of nutrition education was described by the nutrition topics discussed and education materials provided to the participant at each visit, as documented. The maximum potential score was 123 for three visits, which was derived from 18 components at each visit consisting of 12 topics and 5 education materials. Topics were scored the same as the previous variable using 1 and 3, but education materials was scored from 0-5 based on the number of pamphlets provided at each of three visits. For topics there were six required and six optional topics with a maximum potential score of 54 for both for three visits.

The nutrition provider's charting note was assessed for quality based on WIC protocol and consisted of 16 items. The same scale of 1 and 3 was utilized with a maximum potential score of 144 for three visits. For quality of charting note, there were two required (modified soap note written and follow-up plan) and 14 optional components (appropriate weight gain, risks associated with substance abuse and diet assessment) for a maximum potential score of 18 and 126, respectively.

The audit tool was pilot tested in a county not served by the target health department. Twelve records meeting subject criteria were audited. A second researcher was trained during the pilot testing on how to use the tool. Percent agreement was calculated and considered acceptable if $\geq 80\%$. The audit tool was revised following the pilot test as appropriate. Face validity was determined by the primary investigator and two RDs who worked in a university Department of Nutrition.

Procedure

The study was approved for human subject research by the University's Office of Research Administration and the state health department's Bureau of Health Services. A seven month retrospective medical record audit was completed (September 1993-March 1994). Prior to the audit a list of participants meeting the research criteria (n=181) were

assigned to the appropriate provider type based on which type had delivered nutrition services (RDs 52, non-RDs 68 and mixed 57). Counties having three or fewer women meeting subject criteria were excluded from the study due to traveling time and distance. A letter explaining the study was sent from the Assistant Regional Director to each county Health Department's office manager (n=21), so that records were available for review. The actual audits were conducted at each county health department. The primary audit was conducted by one of the researchers (LH). Reliability was assessed by a second researcher (IS) who completed an audit of 20% of the original records.

Upon physical examination of the records only 146 of the original 181 met the established criteria. Information obtained from the audit was used to describe descriptively the study population and yield data on intervention process variables by provider type. In addition, pregnancy outcome variables, total weight gain and infant birth weight, were gathered following the audit from regional computer data collected from the medical record as self-reported by the women.

Statistical Analyses

Data were doubled-entered and analyzed using university computing facilities and Statistical Analysis System (SAS) programming (16). Differences in quality of nutrition care

described by four process variables (accuracy, completeness, quality of nutrition education, and quality of charting notes) were determined by provider type using multivariant analysis of variance and Tukey's test. Differences in outcomes (total weight gain and birth weight) were assessed using analysis of variance by provider type. Descriptive information was generated and further analyzed using Chi-square. Statistical significance was considered acceptable if $p < 0.05$.

RESULTS

The primary researcher audited a total of 146 of the original 181 medical records from 21 of the 23 counties. The second researcher audited 20% ($n=35$) medical records from five counties. Reliability was 87%.

Demographic and Descriptive Characteristics

WIC participant descriptive information revealed the women were relatively homogenous except for report of adequacy of the food supply and age (Table 1). Tukey's testing did not reveal a significant difference for reported adequacy of the food supply when controlling for rural versus metropolitan location. Further testing to determine the frequency of providers asking the question of adequacy of food supply revealed the following results: RDs (60.00%), non-RDs (54.00%), and mixed (54.09%). Two

Table 1 Analysis of the women's characteristics by provider type, percent, (n)

Characteristic	Provider Type			Statistics
	RD	Non-RD	Mixed	
Prenatal Discomforts				
Nausea/Vomiting				
Yes	50.00 (14)	52.00 (26)	62.30 (38)	$\chi^2=1.715 (2, n=139) ; p=0.424$
No	50.00 (14)	48.00 (24)	37.70 (23)	
Number	(28)	(50)	(61)	
Heartburn				
Yes	31.03 (9)	48.00 (24)	27.87 (17)	$\chi^2=5.199 (2, n=140) ; p=0.074$
No	68.97 (20)	52.00 (26)	72.13 (44)	
Number	(29)	(50)	(61)	
Constipation				
Yes	20.69 (6)	38.00 (19)	31.15 (19)	$\chi^2=5.937 (2, n=139) ; p=0.204$
No	79.31 (23)	60.00 (30)	68.85 (42)	
Number	(29)	(50) ^a	(61)	

Table 1 cont.

Characteristic	Provider Type			Statistics
	RD	Non-RD	Mixed	
Behavioral Factors				
Alcohol/Drug Use				
Yes	3.57 (1)	0.00 (0)	0.00 (0)	$\chi^2=5.937(2, n=139) ; p=0.204$
No	92.86 (26)	100.00 (49)	100.00 (61)	
Number	(27)	(50) ^a	(61)	
Food Cravings/Pica				
Yes	33.33 (9)	32.00 (16)	27.59 (16)	$\chi^2=4.518(2, n=135) ; p=0.348$
No	62.96 (17)	68.00 (34)	72.41 (42)	
	(27) ^a	(50)	(58)	
Good Appetite				
Yes	92.86 (26)	88.00 (44)	81.97 (50)	$\chi^2=2.113(2, n=139) ; p=0.348$
No	7.14 (2)	12.00 (6)	18.03 (11)	
Number	(28)	(50)	(61)	

Table 1 cont.

Characteristic	Provider Type			Statistics
	RD	Non-RD	Mixed	
Vitamin/Mineral Use				
Yes	53.57 (15)	54.00 (27)	63.93 (39)	$\chi^2=1.434 (2, n=139) ; p=0.488$
No	46.43 (13)	46.00 (23)	36.07 (22)	
Number	(28)	(50)	(61)	
Medication Use				
Yes	26.92 (7)	8.51 (4)	11.48 (7)	$\chi^2=5.249 (2, n=134) ; p=0.072$
No	73.08 (19)	91.49 (43)	88.52 (54)	
Number	(26)	(47)	(61)	
Specific Diet				
Yes	15.79 (3)	6.90 (2)	7.14 (2)	$\chi^2=1.312 (2, n=76) ; p=0.519$
No	84.21 (16)	93.10 (27)	92.86 (26)	
Number	(19)	(29)	(28)	

Table 1 cont.

Characteristic	Provider Type			Statistics
	RD	Non-RD	Mixed	
Environmental Factors				
Adequate Food Supply				
Yes	61.90 (13)	96.30 (26)	75.76 (25)	$\chi^2=0.781 (2, n=81) ; p=0.012^b$
No	38.10 (8)	3.70 (1)	24.24 (8)	
Number	(21)	(27)	(33)	
Stove				
Yes	100.00 (22)	96.55 (28)	93.94 (31)	$\chi^2=1.410 (2, n=84) ; p=0.494$
No	0.00 (0)	3.45 (1)	6.06 (2)	
Number	(22)	(29)	(33)	
Refrigerator				
Yes	95.45 (21)	100.00 (29)	96.97 (32)	$\chi^2=1.211 (2, n=84) ; p=0.546$
No	4.55 (1)	0.00 (0)	3.03 (1)	
Number	(22)	(29)	(33)	

Table 1 cont.

Characteristic	Provider Type			Statistics
	RD	Non-RD	Mixed	
Past Prenatal History				
Last Delivery LBW				
Yes	33.33 (2)	0.00 (0)	7.69 (1)	$\chi^2=4.154 (2, n=27) ; p=0.125$
No	66.67 (4)	100.00 (8)	92.31 (12)	
Number	(6)	(8)	(13)	
Last Delivery Premature				
Yes	66.67 (2)	0.00 (0)	11.11 (1)	$\chi^2=5.278 (2, n=13) ; p=0.071$
No	33.33 (1)	100.00 (3)	88.89 (8)	
Number	(3)	(3)	(9)	
Present Prenatal Condition				
Iron Deficiency Anemia				
Yes	22.22 (6)	40.74 (11)	37.04 (10)	

Table 1 cont.

Characteristic		Provider Type			Statistics
		RD	Non-RD	Mixed	
Demographics					
Months Enrolled	Mean	6.09±1.85	6.21±1.64	6.76±1.01	3.04, 0.050
Age	Mean	25.63±5.60	23.56±4.42	22.32±3.73	5.37, 0.005 ^b
Behavioral Factors					
Cigarette Use/Day	Mean	1.96±3.44	1.60±3.07	1.24±2.55	0.61, 0.542
Caffeine Servings/Day	Mean	1.77±2.02	2.44±2.18	2.06±1.97	0.98, 0.377

Table 1 cont.

Characteristic	Provider Type			Statistics
	RD	Non-RD	Mixed	
Postpartum Status				
Breastfeeding				
Yes	34.48 (10)	52.17 (24)	27.59 (16)	$\chi^2=6.764 (2, n=133) ; p=0.034^b$
No	65.52 (19)	47.83 (22)	72.41 (42)	
Number	(29)	(46)	(58)	

^aContains missing value(s).

^b $p < 0.05$, significant.

^cShaded area represents ANOVA.

additional food-related questions were further analyzed also to determine the frequency of providers asking the questions related to having a stove and refrigerator. The results for both questions were as follows: RDs (62.85%), non-RDs (58.00%), and mixed (54.09%).

Women seen by RDs were significantly older than those seen by mixed providers. Iron deficiency anemia was present in 18.50% (n=27) of the women. Sixty-one percent of the women were nulliparous and the remaining 39% had at least one living child.

Outcome Variables: Total Weight Gain and Infant Birth Weight

There were no differences in the outcome variables, total weight gain and infant birth weight, by provider type (Table 2). Pearson's correlation coefficient revealed a positive relationship ($r=0.276$) between birth weight and weight gain.

To compare weight gain during pregnancy with national recommendations, women were grouped further by whether or not they fell within the range of weight gain recommended by the National Academy of Sciences (NAS) (17) based on their pre-pregnancy body mass index (BMI). These recommendations were met for 53.38% and exceeded or not met by 46.62% of the women. Partitioning revealed that women seen by RDs more frequently met the recommendations compared to women seen by

Table 2 Outcome and process variables overall mean and means by each provider type.

Variable	Mean				F Value, p
	Overall	RD	Provider Type Non-RD	Mixed	
Outcome					
Total weight gain (lb)	37.54±12.63	38.06±12.93	37.10±11.46	37.63±13.51	0.05, 0.948
Birth weight (lb)	7.00±1.22	6.95±1.64	7.00±0.93	7.03±1.19	0.04, 0.959
Process					
Accuracy	9.53±1.59	9.14±1.61	9.60±1.72	9.70±1.45	1.46, 0.236
Completeness	28.65±4.06	28.89±3.83	29.04±3.53	28.20±4.58	0.66, 0.519
Quality of Nutrition Education	29.69±5.04	29.90±6.22 ^{ab}	31.52±4.89 ^b	28.08±3.81 ^a	6.92, 0.001
Required	13.41±2.64	13.85±3.20 ^{bc}	14.04±2.52 ^{bd}	12.65±2.20 ^{cd}	4.68, 0.010
Optional	8.55±1.81	8.39±2.32	9.06±1.89	8.23±1.27	3.17, 0.045
Quality of Charting Note	24.39±2.10	25.08±2.68 ^{ce}	23.77±1.97 ^e	24.50±1.66 ^c	4.38, 0.014
Required	5.05±0.85	5.24±0.81	4.84±0.89	5.12±0.82	2.74, 0.068
Optional	19.61±1.72	19.94±2.37	19.34±1.56	19.63±1.33	1.25, 0.289
^a RD>Mixed	^b Non-RD=RD	^c RD=Mixed	^d Non-RD>Mixed	^e RD>Non-RD	

mixed providers ($\chi^2=6.645$ [1,n=87] $p=0.01<0.05$). Similarly, women seen by non-RDs more frequently met recommendations as compared to women seen by mixed providers ($\chi^2=4.620$ [1,n=104] $p=0.032<0.05$).

Process Variables: Accuracy, Completeness, Quality of Nutrition Education, and Quality of Charting Note

For all process variables variations in the number of participant visits by provider type were controlled by first summing across visits for each components score and then dividing by the total number of visits. Significant differences were noted in two of the four process variables: quality of nutrition education and quality of charting note (Table 2). For quality of nutrition education non-RDs (31.52 ± 4.89) had significantly higher scores than mixed providers (28.08 ± 3.81), but equivalent to RDs (29.90 ± 6.22). Further testing revealed a significant difference by provider type for required and optional nutrition education topics.

Specifically, non-RDs had significantly higher scores ($p=0.010<0.05$) for required nutrition education topics (14.04 ± 2.52) compared to mixed providers (12.65 ± 2.20), but equivalent to RDs (13.85 ± 3.20). Although there was a significant difference by providers using multivariant analysis of variance (MANOVA) for optional topics, subsequent testing with Tukey's did not reveal where the

differences were between provider types. Further testing of the six optional topics to determine the percentage of providers who documented discussing each optional topic are shown in Table 3. Tukey's testing revealed a significant difference for three topics, specifically planning meals/snacks ($p=0.039$), food referrals ($p=0.012$), and food practices/lifestyles ($p=0.043$). For planning meals/snacks and food practices/lifestyles Tukey's testing was unable to detect where the differences were between provider types. For food referrals non-RDs addressed the topic more frequently than mixed providers, but equivalent to RDs.

RD scores for quality of charting note (25.08 ± 2.68) were found to be significantly higher than those for non-RDs (23.77 ± 1.97), but equal to those of mixed providers (24.50 ± 1.66). For quality of charting note, no significant differences were noted between required and optional components as documented.

Other

When controlling for smoking by provider type, no differences were noted in the outcome or process variables, except for total weight gain ($p=0.027$). Tukey's test, however, did not reveal a significant difference between the provider types. Pearson's correlation coefficient revealed a negative relationship between birth weight and reported cigarette use ($r=-0.236$).

Table 3 Percent (n) of provider types who addressed the six optional nutrition education topics

Topic	Provider Type		
	RD ^a	Non-RD ^b	Mixed ^c
Pregnancy Discomforts	31.42% (11)	18.00% (9)	9.83% (6)
Other	5.71% (2)	0.00% (0)	0.00% (0)
Planning Meals and Snacks	22.85% (8)	24.00% (12)	6.55% (4)
Food Resources and Referrals	14.28% (5)	10.00% (5)	0.00% (0)
Food Practices and Lifestyles	5.71% (2)	8.00% (4)	0.00% (0)
Specific Nutrients	11.42% (4)	10.00% (5)	1.63% (2)

^aTotal number in the RD provider type=35

^bTotal number in the Non-RD provider type=50

^cTotal number in the Mixed provider type=61

Total self-reported breastfeeding rate for this population was 37.59%. Rates were significantly different by provider type (Table 1). Further analysis by partitioning revealed a significant difference between breastfeeding outcomes by provider type. Women seen by mixed providers had significantly lower rates (27.59%), compared to those seen by RDs (34.48%) and non-RDs (52.17%). Further testing revealed no differences by provider type in breastfeeding rates when controlling for smoking.

Chi-square analysis revealed a significant difference ($\chi^2=26.875$ [4,n=146] $p=0.000<0.05$) in total number of visits (maximum=3) of women seen by different provider types (n=146). Overall percentage of women who had 1, 2, and 3 visits, respectively, was 15.75%, 31.51% and 52.74%. Women seen by the RD provider type had the following distributions for total visits: 1 (56.52%), 2 (26.09%), and 3 (12.99%). Women seen by the non-RD provider type had total visits of 1 (43.48%), 2 (28.26%), and 3 (35.06%). Women seen by mixed providers had total visits of 2 (45.65%) and 3 (51.95%). Further testing revealed no significant difference by provider type for women who had only two or three visits (n=123).

An analysis of provider types by location (rural versus metropolitan) was completed by grouping counties that fell within the region's two metropolitan areas together. This

revealed a significant difference between provider type distribution ($\chi^2=8.911$ [2,n=146] $p=0.012<0.05$). Women seen in the metropolitan areas included 56.16% of the sample and rural areas included 43.84%. Further testing did not reveal a significant difference by location for RDs and non-RDs ($\chi^2=0.173$ [1,n=85] $p=0.677>0.05$). Overall distribution of the women seen by the provider types revealed the following metropolitan: 52.44% mixed, 26.83% non-RDs, and 20.73% RDs and rural: 28.13% mixed, 43.75% non-RDs, and 28.13% RDs.

Discussion

Retrospective examination of total weight gain and birth weight revealed means comparable to those found in other WIC studies (18-22). This continues to support the significance of WIC prenatal services. Further more no differences were found by provider type for these outcome variables. The correlations of birth weight with weight gain and cigarette use were indicators of predictive validity.

The audit of nutrition services documented was designed to better understand the process by which nutrition care providers delivered services. By grouping available data categorically and then scoring it based on what was documented in the nutrition record, provision of services overall and by provider type could be described and compared. Overall, percent of maximum potential scores for

accuracy, completeness, quality of nutrition education, and quality of charting note were 79%, 32%, 24%, and 17%, respectively. Three of the variables' percentages were notably low, suggesting room for improvement. Similarly, when quality of nutrition education was analyzed further, percentages of maximum for required and optional were 25 and 16, respectively. Maximum scores were calculated based on types of services listed in the nutrition record and from which providers would check if provided to the participant. Speculation of causes for the low scores raises the issues of staffing ratios and the amount of counseling time per participant.

The region's actual staffing ratio for March 1994 was 1:876 (14-15), which was better than 1:1057 average reported by the WIC State agencies (13). During the time of this study there were 8 vacant positions: 5 RDs and 3 non-RDs (14). Numerous factors, such as type of visit, number of scheduled participants, staffing and clinic routine all contribute to the amount of time that is spent with each WIC participant. High-risk prenatal women are considered a higher priority and therefore should be provided additional counseling time. The average amount of time spent per participant is estimated to be about 15 minutes (23). The amount of quality nutrition care that can be delivered in this short amount of time is limited and further compounded by staffing shortages and distribution. The type of

nutrition provider(s) who delivers WIC services during the prenatal period can be of concern in evaluating outcomes.

Three nutrition provider types were utilized for this study because of the way the WIC clinics operate. Staffing varies from clinic to clinic meaning that some clinics are staffed by both RDs and non-RDs and others may only have one provider type. The provider type, mixed, was used to accommodate clinics that have both RDs and non-RDs, thereby providing a complete examination of the study population.

The mixed provider group consisted of 61 participants, which was the largest provider type. Twenty-two (34%) participants had only two visits, counseled once by both an RD and non-RD. The remaining mixed participants (66%) had three visits. The provider comparison for three visits was as follows: 14 (23%) women were seen by one non-RD and two RDs; and 26 (43%) were seen by two non-RDs and one RD. According to WIC policy and procedure, high-risk participants are to be seen only by RDs. Due to staffing patterns, however, this is not always possible. Data indicate this is an issue for many women, because 50 were seen by the non-RD provider type and 61 were seen by the mixed provider type for a total of 111 women. These women did not receive nutrition education/counseling from only an RD as required by WIC. The data indicate differences in the education/counseling sessions, since significantly lower scores for overall quality of nutrition education and for

required nutrition education topics were calculated for the mixed provider type. In addition, lower breastfeeding rates were reported for the mixed provider type. Mixed messages, inconsistencies and assumptions of information delivered by previous provider type(s) could be contributing to the lower scores for this provider type.

The second group, women seen only by non-RDs, consisted of 50 participants. Scores for these women were equivalent to those of women seen by RDs for quality of nutrition education. Quality of nutrition education was reported as nutrition education topics discussed and educational materials used during each participant's visit. Adequate training of non-RDs to follow WIC policies and procedures possibly contributed to the results although, as noted earlier, overall scores were quite low as percent of maximum potential score. All nutrition staff when hired are trained regarding WIC policies and procedures. In addition, quarterly WIC program updates and nutrition in-services are provided by the Regional Office. The state's Central WIC Office also provides various nutrition related seminars biannually (24).

Finally, women seen only by RDs consisted of 35 participants. Scores for quality of charting note were significantly greater than non-RDs and equivalent to mixed providers. The didactic coursework and supervised experiences required to become an RD provides the advanced

knowledge and training in nutrition including, assessment and documentation.

Overall, the study does support WIC prenatal services based on the outcome variables, total weight gain and infant birth weight and therefore, supporting the effectiveness of WIC services. It does not provide evidence of different outcomes based on provider type for these two outcomes. However, there is evidence that services rendered as documented in the nutrition record differ. For two of the process variables, quality of nutrition education and quality of charting note, there were significant differences by provider type, despite low scores overall. The following question arises: If nutrition provider types had or took the opportunity to provide more services, would differences exist for process variables? Perhaps other outcome and process variables examined on a per visit basis would yield differences by provider type, such as pattern of weight gain, iron status, dietary intake and assessment, and interviewing and counseling skills.

Currently, WIC does not utilize the NAS prenatal weight gain guidelines (17) and no studies have examined the relationship of these guidelines to WIC prenatal women. Women seen by the RD provider type were found to meet the NAS recommendations more frequently, possibly due to the RD's advanced knowledge and training. In addition RDs more frequently asked questions related to food adequacy and

availability of a refrigerator and stove. RDs more frequently discussed four out of the six optional topics, which related to food issues. Further counseling/education by RDs could have possibly contributed to the increased frequency of these women meeting NAS recommendations.

The limitations of this study are that it was too broad to detect more specific differences in outcomes by provider types, sample sizes were relatively small, and the final study population was not equally distributed between provider types. Further studies should be considered, which use a larger sample size.

APPLICATIONS

The pregnancy outcomes of adequate weight gain and birth weight provide further evidence to health care professionals and policy makers that prenatal WIC services are beneficial and should continue to be fully funded. If the *Healthy People 2000 Objectives* (25) to reduce infant mortality and low birth weight and increase the incidence of breast feeding are to be met, then prenatal WIC services are an essential component of the overall health care system for eligible women.

The findings related to the four process variables, accuracy, completeness, quality of nutrition education and quality of charting note, show that adequate staffing of RDs and non-RDs are essential elements for WIC nutrition

services. RDs are essential for the delivery of nutrition services to high-risk prenatal women. Also, RDs are necessary for the training of non-RDs. In addition, adequate staffing ratios are necessary to ensure ample counseling time for high-risk participants.

Due to the format used at each nutrition visit, which is documented in the *Woman's Nutrition Record*, difficulty existed in gathering data for analyzing the quality of nutrition care. The modified SOAP note used in the state does not allow for complete documentation at each visit. Using this type of SOAP note does save time and allows for quick and easy monitoring of services in relation to following protocols. However, a return to the standard, more detailed SOAP format contained in a problem-oriented medical record would be advisable. This would provide more information regarding the nutrition care delivered at each visit and would assist in follow-up at subsequent nutrition care visits. Overall, standard SOAP notes would allow for better assessment of the quality of nutrition care delivered during each visit.

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Appendices

APPENDIX A: Audit Tool

AUDIT TOOL

I. Provider codes

II. Type/classification of provider(s):

___ (R)D
___ (N)on RD
___ (M)ixed (RD and Non RD)

III. ___ ___ ___ Medical record location/county

IV. ___ ___ ___ Subject ID number

V. ___ ___, ___ ___ Certification codes (documented)

VI. ___ ___/ ___ ___/ ___ ___ Date of certification

VII. ___ ___/ ___ ___/ ___ ___ Date audit completed

VIII. ___ ___ Auditor (initials)

___ ___ Reliability auditor (initials)

IX. Record Audit of *Woman's Nutrition Record*

Dates of Prenatal Visits

___ ___/___ ___/___ ___ Date of Visit 1
___ ___/___ ___/___ ___ Date of Visit 2
___ ___/___ ___/___ ___ Date of Visit 3

___ Total Number of Visits

A. NUTRITION HISTORY (Recommended)

1. Y/N questions including date completed at visit 1?

___ (3) Yes
___ (2) Partial (\geq 1 question is not answered)
___ (1) No

2. Y/N questions including date completed at visit 2?

___ (3) Yes
___ (2) Partial (\geq 1 question is not answered)
___ (1) No

3. Y/N questions including date completed at visit 3?

- ☐ (3) Yes
- ☐ (2) Partial (\geq 1 question is not answered)
- ☐ (1) No

4. Complete table below for each visit by entering (3) Yes or (1) No; or enter number where appropriate as indicated by the # sign.

	VISIT 1	VISIT 2	VISIT 3
N/V			
HEARTBURN			
CONSTIPATION			
# CIG/DAY			
ALCOHOL/DRUGS			
# SER CAFF/DAY			
FC/PICA			
GOOD APPETITE			
VIT/MIN			
MEDS			

B. DIETARY INTAKE (Required)

1. Is 24 Hr recall written including foods & portion sizes at visit 1?

- ☐ (Y) Yes
- ☐ (F) Foods but no portion sizes
- ☐ (S) Some portion sizes with foods recorded
- ☐ (N) No

2. Is 24 Hr recall evaluated & recorded at visit 1?

- ☐ (Y) Yes
- ☐ (E) Partial (servings Eaten recorded but no servings lacking recorded)
- ☐ (L) Partial (servings eaten not recorded, servings Lacking recorded)
- ☐ (N) No

3. Is Date/Initial completed at visit 1?

- ☐ (3) Yes
- ☐ (1) No

4. Is 24 Hr recall written including foods & portion sizes at visit 2?

- ☐ (Y) Yes
- ☐ (F) Foods but no portion sizes
- ☐ (S) Some portion sizes with foods recorded
- ☐ (N) No

5. Is 24 Hr recall evaluated & recorded at visit 2?

- ☐ (Y) Yes
- ☐ (E) Partial (servings Eaten recorded but no servings lacking recorded)
- ☐ (L) Partial (servings eaten not recorded but servings Lacking recorded)
- ☐ (N) No

6. Is Date/Initial completed at visit 2?

- ☐ (3) Yes
- ☐ (1) No

7. Is 24 Hr recall written including foods & portion sizes at visit 3?

- ☐ (Y) Yes
- ☐ (F) Foods but no portion sizes
- ☐ (S) Some portion sizes with foods recorded
- ☐ (N) No

8. Is 24 Hr recall evaluated & recorded at visit 3?

- ☐ (Y) Yes
- ☐ (E) Partial (servings Eaten recorded but no servings lacking recorded)
- ☐ (L) Partial (servings eaten not recorded but servings Lacking recorded)
- ☐ (N) No

9. Is date/initial completed at visit 3?

- ☐ (3) Yes
- ☐ (1) No

C. WIC Participants (Required)

1. Ht recorded in inches at certification visit.

— — . — —

2. Wt recorded in pounds at certification visit.

— — — . — —

3. HCT/HGB recorded at certification visit.
(Only enter value recorded on record)

HCT — —
HGB — — . —

3a. Based on the WIC definition of anemia,
is this prenatal woman "truely" anemic?

— (3) Yes
— (1) No

D. Prenatal Only (Required)

- 1 Standard Wt for Ht recorded.

— — —

2. Wt before this pregnancy recorded?

— (3) Yes
— (1) No

3. Actual pre-pregnancy weight recorded

— — — . — —

3a. Based on WIC's definition of underweight, is this woman "truely" underweight based on her reported pre-pregnancy weight or current weight?

___ (3) Yes
___ (1) No

4. What % STD was marked?

___ (1) 90%
___ (0) 100%
___ (0) 120%

5. Based on WIC table of Standard Wt for Ht for non-pregnant females age 17 to 44 years, what is the correct value for each % STD?

___ ___ ___ 90%
___ ___ ___ 100%
___ ___ ___ 120%

6. Was % STD marked equal to the "true" STD?

___ (3) Yes
___ (1) No

7. Date of recorded EDC.

___ / ___ / ___

E. Prenatal Wt Gain Grid (Required at first visit)

1. ____ Number of visits with recorded Wt
2. Wt recorded with date at each visit?
____ (3) Yes
____ (2) Partial (< number of total visits)
____ (1) No
3. Wt plotted at each visit?
____ (3) Yes
____ (1) No
4. Wt plotted correctly at each visit based on Wt recorded?
____ (3) Yes
____ (2) Partial
____ (1) No

F. WIC Cert (Required)

1. Certification codes other than 02 and 13 recorded here but not recorded on the WIC Encounter Form.

____ ____ ____ ____
____ ____ ____ ____
____ ____ ____ ____

G. At Initial Visit (Recommended)

1. Information completed for prenatal?
____ (3) Yes
____ (2) Partial (\geq 1 not completed excluding comments)
____ (1) No
2. Comments made?
____ (3) Yes
____ (1) No

3. Complete the table for each question based on the response (3) Yes or (1) No to the following questions at the initial visit. If question is blank (unanswered) indicate so with (U).

	Yes	No	Blank
ADEQUATE FOOD SUPPLY			
STOVE			
REFRIG			
SPEC. DIET			

H. WIC ONLY Obstetrical Data (Required if not else where)

0. Record the woman's pregnancy status.

G _ P _ A _

1. Date of last delivery.

_ _ / _ _ / _ _

2. Y/N question regarding delivery of LBW infant at last pregnancy completed?

_ (3) Yes
 _ (2) Incomplete
 _ (1) No

3. Did last pregnancy involve the delivery of a LBW infant?

_ (3) Yes
 _ (1) No

4. Y/N question regarding delivery of premature infant at last delivery completed?

_ (3) Yes
 _ (2) Incomplete

— (1) No

5. Did last pregnancy involve the delivery of a premature infant?

— (3) Yes

— (1) No

I. Nutrition Education (Required)

1. Complete the table by using either (3) Yes or (1) No to indicate at which visit each topic was discussed.

	VISIT 1	VISIT 2	VISIT 3
*DIET			
*APP WT GAIN			
DISCOMFORTS			
(1)*BFEEEDING			
OTHER			
(1)*WIC SERVICES			
(1)*RISK PROGRAM			
*ALC/DRUG/CIG			
PLAN M/S			
FOOD REFERRALS			
FOOD PRAC/LIFE			
SPEC NUTR			

(1) indicates required at visit 1 and contained in module 1.

* indicates required during certification period.

2. Complete the table regarding total number of topics discussed at each visit?

	VISIT 1	VISIT 2	VISIT 3
(1) REQUIRED			
* REQUIRED OTHER			
OPTIONAL			

3. Complete the table by using either (3) Yes or (1) No regarding the utilization of educational materials which are specified at each visit.

	VISIT 1	VISIT 2	VISIT3
HELP YOUR BABY			
BF INFO			
NEWSLETTER			
OTHER-SPECIFY			
OTHER-SPECIFY			

4. Indicate the total number of nutrition education materials used at each visit.

_____ Visit 1
 _____ Visit 2
 _____ Visit 3

J. Assessment, Plan, Progress Notes (Required)

1. Complete the table by using either (3) Yes or (1) No regarding the completion of the "A" and "P" notes contained in the *Woman's Nutrition Record*.

	VISIT 1	VISIT 2	VISIT 3
*MODIFIED SOAP WRITTEN			
NUTR/PREG OUT			
APPROP WT GAIN			
FOODS IRON/VIT C/FOLACIN			
FACTORS AFFECTING IRON ABSORPTION/INTERFERENCE			
RISKS ASSOC W/ SUBSTANCE ABUSE			
BF/FORMULA AND INTRO TO SOLIDS			
APPROP WAYS TO INCREASE CALORIE AND PROTEIN INTAKE			
NEED FOR VIT/MIN			
DIET ASSESSMENT			
FOOD PACKAGE MODIFIED			
REFERRALS			
NAUSEA/VOMITING			
PICA			
INABILITY TO OBTAIN FOOD			
*FOLLOW-UP PLAN			

* indicates required

2. Indicate if the modified SOAP note is dated and initialed by using either (3) Yes or (1) No at each visit by nutrition care provider?

____ Visit 1
____ Visit 2
____ Visit 3

APPENDIX B: Woman's Nutrition Record

NUTRITION HISTORY

Date							
Nausea/Vomiting (Y, N)							
Heartburn (Y, N)							
Constipation (Y, N)							
Number Cigarettes/day							
Alcohol/Drugs (Y, N)							
Number servings Caffeine beverages/day							
Food Cravings/Pica (Y, N)							
Good Appetite (Y, N)							
Vitamin/Mineral Supplements (Y, N)							
Medications (Y, N)							
Comments/Explanation:							

DIETARY STANDARDS						
GROUP	PREGNANT		LACTATING		NONPREGNANT	
	Adult	Teen	Adult	Teen	Adult	Teen
MILK GROUP 1 c milk or yogurt 1 1/2 oz cheese 1 1/2 c ice cream	4	5	4	5	2	4
MEAT/PROTEIN GROUP 2 eggs 2 1/2 oz lean meat* 1 c tuna 1 c beans, peas 1 1/2 c peanut butter 1 c nuts or seeds 1 1/3 c cottage cheese	1	4	3	3	2	2
FRUIT/VEGETABLE GROUP 3/4 c corned, 1 c raw includes corn, potatoes 1 medium fru: 1/2 c juice	(should include a vit. C source daily)					
	4	4	5	5	1	1
BREADS/CEREALS 2" square corn bread 1 biscuit, roll, muffin 1/2 cup or slice bread 1/2 c hot cereal, grits, cereal or rice 3/4 c cold cereal	4	8	4	8	4	4

*Meats such as bologna, wieners, and sausage are considered high fat. 1 slice of bologna, 1 wienie or 1 oz sausage is only equal to 1/4 serving of meat. Bacon should not be counted as a meat.

DIETARY INTAKE									
24 Hr. Recall or Foods Usually Eaten **STATUS: PA PT LA LT A T									
	SERVINGS EATEN	FOOD GROUP	SERVINGS LACKING						
	_____	MILK	_____						
	_____	PROTEIN	_____						
	_____	FR/VEG.	_____						
	_____	BRO/CER	_____						
		TOTAL # LACKING							
Date/Init. _____									
24 Hr. Recall or Foods Usually Eaten **STATUS: PA PT LA LT A T									
	SERVINGS EATEN	FOOD GROUP	SERVINGS LACKING						
	_____	MILK	_____						
	_____	PROTEIN	_____						
	_____	FR/VEG.	_____						
	_____	BRO/CER	_____						
		TOTAL # LACKING							
Date/Init. _____									
24 Hr. Recall or Foods Usually Eaten **STATUS: PA PT LA LT A T									
	SERVINGS EATEN	FOOD GROUP	SERVINGS LACKING						
	_____	MILK	_____						
	_____	PROTEIN	_____						
	_____	FR/VEG.	_____						
	_____	BRO/CER	_____						
		TOTAL # LACKING							
Date/Init. _____									

PRENATAL WEIGHT GAIN GRID

Complete at
Initial Visit:

Height in inches without
shoes plus 1 inch _____

*Usual weight before this
pregnancy _____ lbs.

Standard weight for
height _____ lbs.
See Table, WIC Manual

*Based on Standard Wt. Table, weight
before pregnancy was:
Indicate by (+, -).

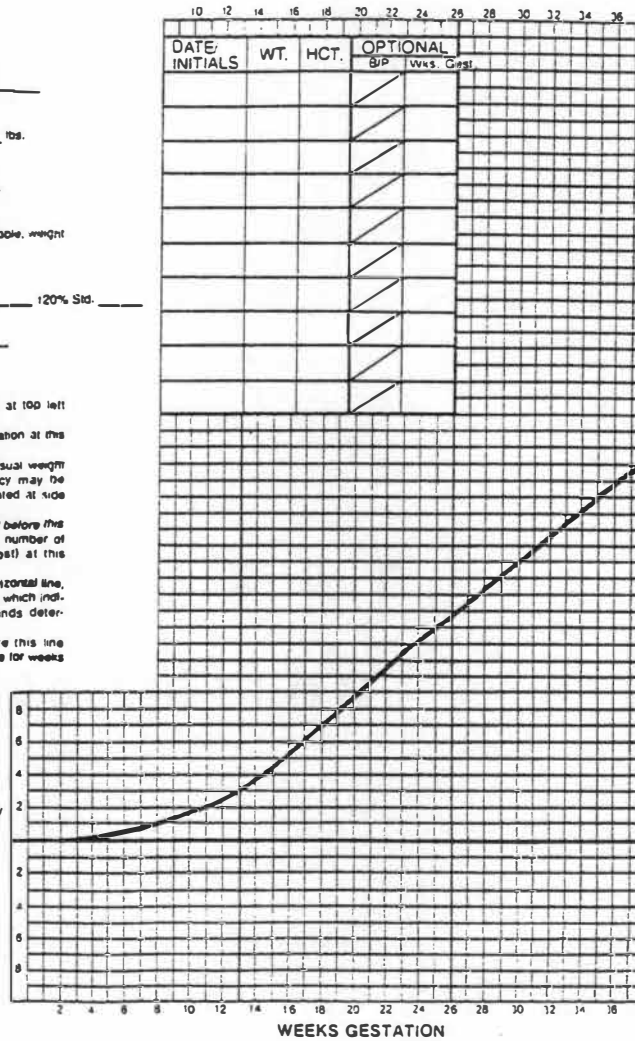
90% Std. _____ Std. _____ 120% Std. _____

EDC _____

INSTRUCTIONS:

1. Complete information at top left corner of page.
2. Determine weeks gestation at this visit.
3. For ease in plotting, usual weight before this pregnancy may be written in space indicated at side of grid (optional).
4. Based on usual weight before this pregnancy, determine number of pounds gained (or lost) at this visit.
5. Beginning at heavy horizontal line, find the horizontal line which indicates number of pounds determined in Step 4.
6. Place a dot (•) where this line crosses the vertical line for weeks gestation at this visit.

Usual
weight
before
this
pregnancy _____



ID Card or
Write name and file #

NUTRITION RECORD — WOMAN

	STATUS	CODE	DATE/INIT	STATUS	CODE	DATE/INIT	STATUS	CODE	DATE/INIT
WIC CERT.									
AT INITIAL VISIT				WIC ONLY — Obstetrical Data					
Adequate				Prenatal	Postpartum	Other	Age at Conception		
Food Supply (Y, N)							LAST PREG. OUTCOME		
Stove (Y, N)							Prenatal Cert. Postpartum Cert.		
Relief (Y, N)							Date of Delivery		
Spec. Diet (Y, N)							LBW		
(Include Allergies)							Premature		
Comments:							Other:		
						(Explain)			

NUTRITION EDUCATION

Date/Initials					ASSESSMENT, PLAN, PROGRESS NOTES (LIMIT INTERVENTION STRATEGIES TO 3 OR LESS PER VISIT)				
PRENATAL	* Prenatal Diet (2)				DATE/ INITIALS				
	* Approp. Wt. Gain (2)								
	Pregnancy Discomforts (2)								
	* Breastfeeding (1)								
	Other:								
	* WIC Program Services (1)								
GENERAL	* Risk Related to Program (1)								
	* Alcohol, Drugs, Cig. (4)								
	Plan Meals/Snacks (3)								
	Food Resources/Referrals (1)								
	Food Practices/Lifestyles (3)								
	Specific Nutrient (Identify) (4)								
P.P.	Other:								
	* Approp. Diet (2)								
	Wt. Mgt. (2)								
ED MATERIALS	Other:								
	Help Your Baby to a Healthy Start								
	Iron — the Blood Builder								
	B.F. Baby's Best Start								
	Newsletter								
	Other — Specify								

* Required, others selected per Nutrition Ed. Curriculum and individual's Need.
Numbers in () refer to Nutr. Ed. Curriculum Modules

Date _____	Signature/Title _____	Date _____	Signature/Title _____
Date _____	Signature/Title _____	Date _____	Signature/Title _____
Date _____	Signature/Title _____	Date _____	Signature/Title _____
Date _____	Signature/Title _____	Date _____	Signature/Title _____

APPENDIX C: Definition of Terms

Definition of Terms

1. Infant birth weight is the weight at birth of the infant as reported by the mother and recorded on the WIC Encounter Form. This self report will be based on measurements taken by hospital staff at delivery.
2. Prenatal weight gain is the total weight gained by the woman during the pregnancy as reported by the woman and recorded on the WIC Encounter Form.
3. Underweight for height as defined in the Tennessee WIC Manual(7) as "prepregnancy weight at LMP less than 100 pounds or weight which is below 90% of standard at LMP."
4. Iron deficiency anemia according to the Tennessee WIC Manual(7) is a hematocrit at or below 33% or a hemoglobin at or below 11.7 gm.
5. High-risk prenatal as utilized in this study is defined as any prenatal woman who meets the defined WIC criteria for underweight with or without the defined WIC criteria for iron deficiency anemia.
6. WIC Encounter Form refers to the data entry form used at each WIC clinic site which contains the following information of value to this study:
 - a. prenatal risk code of interest
 - b. nutrition education provider code
 - c. infant birth weight
 - d. total weight gain during pregnancy
 - e. date of WIC certification
 - f. Expected Date of Conception (EDC)
 - g. smoking status
 - h. date of delivery
 - i. sex of infant
 - j. food package prescribed
7. *Woman's Nutrition Record* refers to the portion of the medical record utilized by WIC nutrition personnel and other health care providers to record vital information pertaining to the prenatal patient. It replaces the standard SOAP note documentation used in medical records.

8. RD refers to a nutrition health care provider who has successfully completed the requirements to become a Registered Dietitian.
9. Non-RD refers to a nutrition health care provider who has not or is not eligible to take the RD exam to become a Registered Dietitian.
10. Mixed providers refers to WIC participants who receive nutrition counseling/education from both RD's and non-RD's during their current WIC enrollment.

VITA

Bonnie Lynn House was born in Ahoskie, North Carolina on April 1, 1963. She graduated from Ridecroft School in May 1981. Pursuing a career in Veterinary Technology, she attended Central Carolina University where she received in June 1983 an Associate of Science degree. She continued at Murray State University where she received a degree of Bachelor of Science in Animal Health Technology. After two and a half years of working in the veterinary field, she returned to college at East Carolina University, where she received her second degree of Bachelor of Science in Nutrition. She spent 18 months working in a public health nutrition setting prior to entering The University of Tennessee, Knoxville and in August of 1995 received a Master of Science degree in Nutrition with an emphasis in Public Health Nutrition. Also she has completed the AP4 program at The University of Tennessee, Knoxville and has passed successfully the examination to become a Registered Dietitian.