

*Offered by the
UC Davis Department
of Nutrition in
collaboration with
UC Davis Extension*



Master of Advanced Study in Maternal and Child Nutrition

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UC DAVIS
EXTENSION

**AGRICULTURE AND
FOOD SCIENCE**



CONTINUING AND PROFESSIONAL EDUCATION

Introduction

During the last decade, the need for nutrition specialists in public health and maternal and child health programs has increased, along with the recognition that low birth weight, diabetes, and childhood overweight and obesity are important national health concerns. There is also an increasing demand for lactation consultants, as greater numbers of women choose to breastfeed their infants. In response, private and public health agencies have focused on improving the nutrition of mothers and children. The UC Davis Master of Advanced Study in Maternal and Child Nutrition is designed to provide a strong scientific background in these topics, and to train professionals to design, implement and evaluate nutrition intervention programs for mothers and children from a wide variety of cultural, ethnic and social backgrounds.

Courses:

- Nutrition During Pregnancy
- Lactation and Infant Nutrition
- Child and Adolescent Nutrition
- Applied Research Methods in Maternal and Child Nutrition
- Topics in Epidemiology of Maternal and Child Nutrition
- Public Policy in Maternal and Child Nutrition
- Principles of Adult Education

A Program Designed for Working Professionals

In recognition of the needs of adult professional learners, classes will be scheduled, and the degree paced, as a part-time program to accommodate students who are working full-time. The core courses will be offered as two evening sessions per week in two-and-a-half hour blocks, with additional online discussions, office hours and Web-based tutorials. Seminars, elective courses and independent projects will complement the core courses.

Career Opportunities

Graduates of the program will qualify for positions as pediatric nutrition specialists, maternal nutrition specialists, lactation educators and lactation consultants within health care organizations, and for administrative positions in public health agencies at the state and national level. In the last 10 years, the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) has grown to serve more than eight million women and children per month (about 45 percent of infants nationally). This program is a major employer of nutrition professionals both at state and national levels and requires an advanced degree for administrative positions. In addition, hospitals, physicians' groups and health maintenance organizations are increasingly seeking qualified lactation consultants with advanced training.

“The connections I made while I was in the program served me extremely well at the time, and continue to provide me with excellent resources and up-to-date information. I am now working as the breastfeeding coordinator for Hawaii State WIC and I use what I learned on a daily basis. The degree program gave me the breadth that I needed to understand the bigger picture relating to public health issues and indispensable breastfeeding and infant nutrition knowledge so that I can respond to all the technical questions I get from nutritionists all over the state.”

~ Carolyn Donohoe Mather, M.A.S. 2007

About the Program

The program will consist of three required six-unit core courses (*Nutrition During Pregnancy, Lactation and Infant Nutrition*, and *Child and Adolescent Nutrition*), six to eight units of special topics seminars, two to four units of electives, and a six-unit student project (produced in consultation with a three-member guidance committee) for a total of 36 units. Each of the core courses will comprise 10 weeks of in-class instruction twice per week for two-and-a-half hours per meeting. Classes will also include online discussion of related material and readings.

Each student will be assigned a three-member guidance committee consisting of two members of the teaching faculty and an additional qualified faculty member to advise the student in choosing electives and identifying a student project.

Description of Student Project

Students will carry out a research or evaluation project during their second year in the program. Working closely with his or her guidance committee, the student will choose the project before completion of the first year in the program. While the focus of the project will vary from student to student, the project is intended to allow students to use the knowledge and skills gained during the program in a manner that may best serve them in their professional positions. For example, students who work in government agencies may choose to develop and evaluate pilot interventions, or students with the appropriate background in economics may conduct cost-effective or cost-benefit analyses of workplace program activities.

Sample Program

Fall Year 1	Winter Year 1	Spring Year 1
Nutrition During Pregnancy (6 units)	Lactation and Infant Nutrition (6 units)	Child and Adolescent Nutrition (6 units)
Fall Year 2	Winter Year 2	Spring Year 2
Seminar – Applied Research Methods (4 units)	Seminar – Topics in Epidemiology of Maternal and Child Nutrition (2 units)	Seminar – Public Policy in Maternal and Child Nutrition (2 units)
Elective (2 units)	Seminar – Principles of Adult Education (2 units)	
	NUT 230 Student Project (2 units)	NUT 230 Student Project (4 units)

About UC Davis

The University of California, Davis, campus is the largest in area of the nine campuses in the UC system and the third largest in student population. The 30,000 students who attend UC Davis pursue a full range of undergraduate and graduate studies, as well as professional programs in law, business management, medicine and engineering. Twenty-four of the undergraduate programs at UC Davis recently ranked among the top 10 in the nation, and the campus stands among the top 20 U.S. universities in research funding. Davis undergraduates persist and graduate at the highest rates among UC campuses. The UC Davis Shields Library is ranked among the top research libraries in North America and contains more than 2.2 million volumes.

Program Eligibility

Admission to the program requires a bachelor's degree with prior course work that includes (or is comparable to): one year of general chemistry, two quarters of organic chemistry, a course in statistics, one course in general physiology, and two quarters of the biochemistry of nutrition.

At least a B average or its equivalent is normally required for admission.

Required Courses

- **Nutrition During Pregnancy: 6 units** – will provide students with an understanding of the anatomical, physiological and biochemical changes that occur during pregnancy and early development. Students will learn about nutritional and lifestyle factors associated with fertility and pregnancy outcomes. Nutrition programs and intervention strategies for women with normal and high-risk pregnancies will be evaluated. Students will learn how to assess and identify risk factors that may complicate pregnancy and to plan and participate in collaborative health care interventions.
- **Lactation and Infant Nutrition: 6 units** – will provide students with an understanding of the physiological and biochemical processes underlying human lactation and growth and development of the infant. Nutritional needs and assessment of both mother and infant under normal and special circumstances will be discussed. Factors associated with infant feeding practices and the consequences of those practices will be discussed. Students will learn to apply their understanding of nutrition counseling, education and support of new mothers and their families.
- **Child and Adolescent Nutrition: 6 units** – will provide students with an understanding of the relationships among nutrition, growth and development during childhood and adolescence. Nutritional assessment for normal and high-risk groups will be discussed as well as the psychological, social and economic factors that contribute to nutritional status. Students will learn about the nutritional needs of groups such as overweight children and adolescents, athletes and those with eating disorders, and will examine and evaluate intervention strategies.

Elective Courses

Two to four units of elective courses will be selected from related courses as approved by the student's advisory committee. These courses may be taught in other departments.

Seminars

A series of special two-unit seminars will be offered to students in their second year of the program. The topics for the special seminars will vary from year to year but will include:

- Topics in Epidemiology of Maternal and Child Nutrition
- Public Policy in Maternal and Child Nutrition
- Principles of Evidence-Based Practice
- Applied Research Methods
- Principles of Adult Education
- Promotion of Breastfeeding in the Public Health Setting
- International Board Certified Lactation Consultant Standards of Practice

Leadership skills are essential for today's health professionals. Through the UC Davis Human Lactation Center, students will have the option of attending a two-day retreat for leadership training including topics such as leadership assessment, successful communication in confrontational environments, effective group management skills, group evaluation and strategic planning.

Location of Courses

UC Davis campus

Program Cost

Because this program is intended for working professionals, it receives no support from the State of California, and fees reflect the full costs of administering the program. Tuition for 36 units of course work currently totals \$15,300. Tuition may be paid in full upon acceptance to the program or on a course-by-course basis. The tuition for a single course is \$425 per unit. It is expected that students will complete the program in no more than three years.

A nonrefundable application fee of \$70 (domestic applicants) or \$90 (international applicants) is due at the time of application. Books, supplies, lab materials, and other program costs are not included in the tuition.

Faculty

Faculty members include Lindsay Allen, Kathryn Dewey, Jane Heinig, Lucia Kaiser, Carl Keen, Bo Lönnerdal and Mark Underwood. These faculty members are internationally known for their groundbreaking research in the area of Maternal and Child Nutrition, and have been highly influential in shaping both U.S. and international policy with respect to maternal and child health. Specific professional and research interests of participating faculty include:

- The influence of diet during pregnancy on embryonic and fetal development
- Zinc metabolism during pregnancy and lactation
- Calcium homeostasis during pregnancy and lactation
- Assessment of energy balance during pregnancy
- Teratogenic effects of deficiencies and excesses of trace elements
- Nutritional status, growth and development of infants
- Risk factors for insufficient breast milk production
- Impact of maternal nutrition and exercise on lactation
- Complementary feeding of breastfed infants
- Determinants of infant feeding practices
- Causes, complications, treatment and prevention of childhood malnutrition in developing countries
- Assessment of child growth in developed and developing countries
- Association between infection and nutritional status in infants and children
- Acculturation and food insecurity and their effects on the child-parent feeding relationship
- Food intake and health outcomes among diverse populations
- Predictors of overweight in pre-schoolers
- Nutrition interventions in young children

LINDSAY H. ALLEN, Ph.D., R.D., is the director of the USDA Western Region Human Nutrition Research Center located on the UC Davis campus. She is an expert on the prevalence, causes and consequences of micronutrient deficiencies in developing countries and has conducted numerous interventions to assess the efficacy of micronutrient supplements and food-

based approaches to improve nutritional status, pregnancy outcome and child development. Allen has served on the Food and Nutrition Board of the National Academy of Sciences, and has been active in the development of the new Dietary Reference Intakes. She serves as an adviser to bilateral and international agencies, including World Health Organization, UNICEF, the Asian Development Bank, the World Bank, PAHO and FAO, and has served as the president of the American Society of Nutritional Sciences and the president of the Society for International Nutrition Research. Allen was awarded the Kellogg International Nutrition Prize by the American Society for Nutritional Sciences in 1997.

KATHRYN DEWEY, Ph.D., is a professor in the Department of Nutrition and associate director of the Program in International Nutrition at UC Davis. She has published numerous research papers on maternal and child nutrition in both affluent and low-income countries, with a focus on lactation and infant nutrition and growth. She has served as an expert consultant for the World Health Organization and UNICEF and as president of the Society for International Nutrition Research, and is currently president-elect of the International Society for Research on Human Milk and Lactation. Dewey received the Norman Kretchmer Memorial Award in Nutrition and Development from the American Society for Clinical Nutrition in 1997 and the March of Dimes Agnes Higgins Award in 2000.

JANE HEINIG, Ph.D., IBCLC, is an academic administrator in the Department of Nutrition at UC Davis, executive director of the UC Davis Human Lactation Center, and the editor-in-chief of the *Journal of Human Lactation*. She is an international board-certified lactation consultant. Heinig's research area is maternal and child nutrition, particularly during lactation. Current topics of investigation include: a) nutritional factors related to infant growth and development; b) behavioral theory and its relation to infant feeding intentions and practices among diverse populations; c) benefits of breastfeeding for infants and their mothers; and d) risk factors for poor weight gain among breastfed infants.

LUCIA L. KAISER, Ph.D., R.D., is a Cooperative Extension specialist in the Department of Nutrition at UC Davis. Kaiser's outreach efforts include developing nutrition education materials (fact sheets and curricula) for use through the Expanded Food and Nutrition Education Program (EFNEP), the Food Stamp Nutrition Education Program and other community programs; publishing a bi-monthly newsletter, "Maternal and Infant Nutrition Briefs;" and presenting nutrition topics at workshops and conferences throughout the state. Research interests include the impact of acculturation and food security on the child-parent feeding relationship among Latinos, development of tools to evaluate nutrition education and diabetes prevention.

CARL L. KEEN, Ph.D., is a professor in the Department of Nutrition at UC Davis. Keen's research group has three main areas of activities. The first concerns the influence of diet on embryonic and fetal development. A major theme in his laboratory is that a significant proportion of birth defects are the consequence of embryonic and/or fetal malnutrition. Thus, the correction of nutritional deficiencies during early development should result in a marked reduction in pregnancy complications. A second research theme in his group is the study of gene-nutrient interactions, with an emphasis on how subtle changes in cell mineral concentrations influence the expression of select genes. The third major research theme in his laboratory is the study of how diet influences oxidant defense systems, and as a consequence the occurrence of cellular oxidative damage. Keen was awarded the American Institute of Nutrition Bio-Serv Award in Experimental Animal Nutrition in 1985 and the American Institute of Nutrition Research Award (the Borden Award) in 1995.

BO LÖNNERDAL, Ph.D., is a professor in the Department of Nutrition at UC Davis. Lönnerdal's research program is focused on two main areas: infant/pediatric nutrition and trace element metabolism. Current research topics include: a) studies on factors affecting breast milk composition, including maternal nutrition, hormones and stage of lactation; b) mechanisms for nutrient uptake by mammary cells as well as expression of genes encoding human milk proteins; c) bioavailability of nutrients to infants and how this is affected by the mode of feeding, including receptor-mediated uptake mechanisms in the small intestine; d) iron, zinc, copper and selenium nutrition of infants, children and adolescents; e) bioactive factors in milk; f) trace element uptake and transport by biological membranes, including receptor-mediated uptake of trace elements by the placenta, intestine, liver and mammary gland; and g) nutrient-nutrient interactions. Lönnerdal has received numerous awards including the Nanning Throne-Holst's Award for Research in Nutritional Physiology, the Borden Award and the International Award for Modern Nutrition.

MARK UNDERWOOD, M.D., M.A.S., is an assistant professor of clinical pediatrics in the Division of Neonatology, UC Davis Health System. His clinical activities are in the care of premature and sick newborn infants in the neonatal intensive care unit at UC Davis Children's Hospital. Dr. Underwood's research focuses on the gastrointestinal disease necrotizing enterocolitis; development of intestinal innate immunity; and mechanisms of action of probiotics and prebiotics in pre-term infants. His research projects include clinical trials of probiotics and prebiotics in premature infants, analysis of human milk oligosaccharides, assessment of Paneth cell antimicrobial expression in infants with necrotizing enterocolitis and evaluation of Paneth cell expression in an animal model.

How to Apply

Admission to the program is accepted for fall quarter every other year. A complete application package must be submitted by April 15 for the following fall quarter.

A. Application

- Complete a UC Davis Graduate Studies application form (available at <http://gradstudies.ucdavis.edu/b4apply.htm>).
- You will be asked to provide a curriculum vitae/resume, a statement of purpose and a personal history statement as part of the electronic application. The statement of purpose is one of the most important requirements of your application. Be sure to draft your statement of purpose carefully and specifically. Your statement should reflect your experience and interests as related to this program and be well-organized and concise. For the applicant who is already working in the field of maternal and child nutrition, the statement should contain specific reference to your recent experience and accomplishments.
- Three letters of recommendation from former professors or persons familiar with your capability and expertise and able to evaluate your readiness for graduate study in maternal and child nutrition. Letters must be submitted electronically through the online application. You will be asked to include the name and email address for each of your recommenders. The recommender will automatically be notified by Graduate Studies with the instructions on how to submit his/her letter. Do not have your recommenders send letters in hard copy. Letters must be received by the application date.
- Application fee—a non-refundable deposit of \$70 (domestic applicants) or \$90 (international applicants) is required and must be paid when the application is submitted. The fee may be paid by credit card or e-check. The fee must be paid before the application will be considered.
- Transcripts—one official set of academic transcripts showing graded coursework, dates of attendance and the degree earned from all colleges attended (community, state and private universities). Send your transcripts directly to the Maternal and Child Nutrition Graduate Program, 1333 Research Park Dr., Davis, CA 95618. Transcripts must be received by the application deadline date.

General Information

For more information

If you have questions about the Master of Advanced Study in Maternal and Child Nutrition Graduate Program, call UC Davis Extension at (530) 757-8734, email extension@ucdavis.edu, or visit the website.

www.extension.ucdavis.edu/macnutrition

Tax deductibility of education expenses

Expenses of education—including registration fees, travel, meals and lodging—may be deductible if they maintain or improve professional skills or meet the explicit requirement of an individual's employer.

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