University of Washington
Graduate School
Self-study for Review of the
Interdisciplinary Graduate Program in Nutritional Sciences
Department of Epidemiology
School of Public Health and Community Medicine

2004 - 2005

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Section A: General Self-Evaluation

Since the last review in 1997, the Nutritional Sciences (NS) Program has undergone a major transformation. It has become the leading unit in nutrition research, training, and practice at the University of Washington (UW), and one with a growing national and international reputation. Over the past few years, the Program has expanded its core faculty; secured major outside resources; developed a thriving MPH degree track; assumed responsibility for a popular undergraduate course in nutrition, and helped shape obesity prevention strategies for Washington State. These activities led to a marked improvement in the quality of graduate education. The Program's successful transformation was due to a combination of factors.

- The quality and reputation of its faculty. Dr. Drewnowski became Program Director in 1998. The core faculty was expanded in 1998 to include renowned researchers from the Fred Hutchinson Cancer Research Center (FHCRC). The interdisciplinary (ID) faculty benefited from the addition of biomedical researchers affiliated with the Clinical Nutrition Research Unit (CNRU). Recent hires of junior core faculty in genetics and exercise physiology brought additional strengths.
- Appropriateness of organizational setting. The Deans' decision to place the Program in the School of Public Health and Community Medicine (SPHCM) in 1993 was very well-advised. The Program was poised to take advantage of new funding opportunities, as nutrition and disease prevention rose to the top of the public health agenda.
- A major infusion of outside resources. There has been a dramatic turnaround in research grant acquisition. In the past year, Drs. Drewnowski, Johnson, and Rosenfeld alone have brought in grants totaling almost $5 million.
- A growing recognition of the Program's value to the UW, local communities, and the State.

The 3-year P20 award from the National Institutes of Health (NIH) is the most recent recognition of the Program's leading role in obesity research at UW. Dr. Drewnowski is to create a University-wide Exploratory Center for Obesity Research (ECOR), with a view to developing a Center of Excellence proposal in 2007. The NS Program will take the lead in developing a blueprint for trans-disciplinary obesity research at UW. The ECOR will provide opportunities for doctoral, masters, and MPH students as we integrate basic and clinical research on obesity with public health, economic, environmental, and policy approaches. Ongoing partnerships with Public Health-Seattle & King County (PH-SKC) and with the State Department of Health (DOH) have also helped secure more federal funds for nutrition projects.

1. What are your unit's strengths?

Consistent with its interdisciplinary mission, the Program offers its students a very broad spectrum of research and practice options. Our particular strength lies in training students to conduct cutting-edge research in nutrition as it relates to obesity and chronic disease and to apply their findings to public policy issues. Although the Program is administered through the Department of Epidemiology, core faculty can hold appointments in the other departments in the SPHCM, the Department of Medicine, and the FHCRC. The resources of those institutions are open to nutrition students, adding to the richness of the mix. Program core faculty work on such issues as nutrition and gene expression, molecular biology, cancer biology and epidemiology, obesity and social disparities, school-based and worksite-based behavioral interventions, and the design and evaluation of nutrition education programs. Students are taught about the etiology of chronic disease, the applicable prevention and intervention strategies, as well as the broader implications of food and nutrition policies on public health.

The Program serves the UW by bridging the gap between the biomedical sciences and their translation into public health policy. We are increasingly working with groups on the upper campus, some of them new to the health sciences. A recently submitted grant proposal on obesity and the built environment engaged faculty and students in architecture, urban planning, geography, and forest resources. These new contacts complement our more usual collaborations with researchers and scholars in medicine, epidemiology, health services, environmental health, public health genetics, and social and behavioral sciences.

Our trans-disciplinary "Lab to Leadership" model, a feature of the P20 proposal, calls for a better alignment of academic research with policy goals of government agencies and the aspirations of community groups. Whereas research results may provide evidence base for public policy, we realize that research questions need to be formulated to address specific policy goals. Our close ties to public health agencies and to policy makers in WA State are another facet of the Program's strength. Program core faculty advise the Department of Health (DOH) on the design and evaluation of the CDC-funded State plan for the prevention of chronic disease and have major roles in other projects such as the STEPS awards. Those links have led to improved student training and field placement opportunities, exposure to real-life policy issues, and major contracts for research and demonstration projects with the State DOH.

2. How do you measure the success of your unit as a whole?

Our key measures of success are based on providing research opportunities and financial resources to our students and on the students' own accomplishments. First, we have vastly expanded the number, depth and scope of funded research projects. Whereas in 1997, only Dr. Beresford was consistently receiving NIH grant support, the total amount of research funds and

other awards held by the core faculty is now estimated at over $14 million. Although that figure includes grants held at the FHCRC, Drs. Drewnowski, Duncan, Johnson, LeBoeuf, and Rosenfeld are Principal Investigators on at least one NIH grant each. Dr. Drewnowski also holds a $700K award from the USDA for research on poverty and obesity as well as some industry funds. Dr. Kirk is supported by the CNRU, and Dr. Bruemmer has had funding from the Macy Foundation and other UW sources. The level of research support has undergone an exponential increase since 1997.

A major infusion of external resources was the one-time award in 2002 of $837K from the Office of the State Attorney General under the vitamin anti-trust settlement. That award allowed us to create the UW Center for Public Health Nutrition (CPHN) and to develop strong relationships with local and state government agencies. In turn, we participated in grant proposals to the CDC that originated with the County and the State. Subsequent federal awards to both agencies brought grants and contracts to the Program and assured support for several students in the MPH degree track.

Our growing contacts with units in the health sciences and on the upper campus have allowed us to expand student research opportunities. Dr. Rosenfeld was, for a number of years, the nutrition representative on the Nutrition Academic Award (Robert Knopp, PI). Those contacts led to a doctoral thesis on the role of nutrition in the medical curriculum (Tanis Mihalynuk) and a survey of family physicians, supported by the VP for Medical Affairs. Dr. Drewnowski teaches a segment of the current nutrition course for physicians (HuBio568). Dr. Johnson is a core investigator with the UW Health Promotion Research Center (HPRC), a part of the CDC-funded network of Prevention Research Centers that are attached to Schools of Public Health. Her role as investigator on the CDC-funded Special Interest Projects (SIPs) has allowed her to

obtain field placements for community-based research projects for nutrition students. Among ongoing CDC-funded projects on physical activity and nutrition are the Obesity Prevention Network, the Physical Activity Policy Research Network, and the Walkable and Bikeable Communities Project. Our partnerships with other schools, government agencies, non-profit organizations, and community groups add to the breadth and scope of student training.

Collaborations with the FHCRC have been very productive. Drs. Duncan and Bruemmer are included on an NIH award on worksite health promotion to Dr. Shirley Beresford, whereas Drs. Bowen consults on Dr. Drewnowski's USDA grant. A doctoral student, Alex Gonzalez, is funded by an NCI training grant to Emily White and has worked in the laboratory of Dr. Lampe. There is also a growing network of collaborators on the West Coast. A joint MCH Leadership grant with the UCLA School of Public Health (Dr. Johnson) funds one MPH student. Dr. Drewnowski's USDA grant has a subcontract to the University of California Davis and the Western Human Nutrition Research Center. Program faculty were recently asked by the Vice Provost for Educational Outreach to develop a sequence of courses on obesity prevention in collaboration with Oxford University in the UK. All these projects will provide further educational and training opportunities for students.

Our ties to the local and State professional associations serve to promote applied training in clinical and public health nutrition. Both Dr. Bruemmer and Dr. Peck were recently Presidents of the Washington State Dietetic Association (WSDA) and Dr. Bruemmer is a representative to the American Dietetic Association. These leadership roles enhance our standing with state and regional nutrition professionals, increase opportunities for student projects, enrich the training environment, and support our recruitment efforts.

The availability of such resources adds to the student's own success. **Table 1** summarizes some of the UW scholarships and prestigious national awards received by nutrition students. Students often present their work at state and national scientific meetings and publish in peer-review journals. As shown in **Appendix E**, graduates went on to faculty or research positions at the University of North Carolina (Jesse Satia); University of Pennsylvania (Cheryl Anderson); Oregon Health Sciences University (Victoria Warren-Mears); USDA Research Labs Beltsville (Karen Spears) or to the private sector. The Program provides excellent opportunities for graduate education and is better able to support its students than at the time of the last review.

Table 1: Selected NS students and their honors or awards.

Student	Honor or award
Jessie Satia	Am. Soc for Preventive Oncology's New Investigator Award, 1999 AACR Minority Scholar in Cancer Research Award, 1999 NIH pre-doctoral fellowship 2000
Jennifer Shultz	Magnuson Scholar 2000
Sabrina Peterson	FHCRC pre-doctoral fellowship, 2000; featured in Spotlight on Research
Cheryl Anderson	Gil Omenn Outstanding Student Service Award-SPHCM, 2001; Grad. School Merit Award, 2001; featured in Voices of Students Program
Eva Almiron-Roig	Outstanding Dietetic Student Award-WSDA, 2002
Brian Bennett	American Heart Association pre-doctoral fellowship, 2003
Kimberly Robien	Young Dietitian of the Year-WSDA, 2000 American Association of Cancer Research (AARC), GSK's Outstanding Clinical Scholarship Award, 2004
Erin Shade Amy Rovner	American Dietetic Association Scholarships, 2001.
Diana Birkett	A. David Winston Fellowship, Washington DC, 2003. 'Best poster' award at ASPH Annual Meeting 2003
Melissa Mortensen	Gerber's Endowment in Pediatric Nutrition Scholarship, 2004.
Moz Benado	ADA Ruth Lenore Harris Scholarship 2003
Erica Lamson	Soc for Nutr Education Public Health Nutrition Research award 2004

3. What are your unit's weaknesses?

A number of weaknesses, inherent in the UW administrative structure, prevent us from fully realizing our vision. Among the main issues are salaries, administrative support, and space.

- The Program has a limited state budget for faculty salaries that is tied to classroom teaching. Student mentoring and research training are typically not covered. The state resources are limited, making it difficult to support junior faculty members; the last two positions were filled using soft money and with no promise from the UW as to the future availability of state FTE funds. Whereas senior faculty can support themselves though grants, junior faculty need seed money, bridge funds, and support in times of need. There is no incentive for teaching large classes, since teaching revenues do not accrue to the program. The enormously popular undergraduate course "Nutrition for Today" has an enrollment of over 400 and fills the largest auditorium on campus (Kane 130); yet the instructional salary for Dr. Bruemmer is provided wholly by the NS program. An endowment drive is one answer, and the SPHCM Dean's Office has been assisting us in this effort.
- The Program does have a small endowment for student support. However, the level of support is still inadequate. Research Assistantships (RAs) and Teaching Assistantships (TAs), when available, are for 1 year only. We lose doctoral students to other institutions that are able to offer multi-year support at the time of admission. On the other hand, two training grants have opened up eligibility to NS students, and the undergraduate course provides positions for 4 TAs: two PhD students; one MS student and one MPH student.
- Campus space is at a premium. Although Raitt Hall does provide high-quality laboratories to Drs. Kirk, LeBoeuf, and Rosenfeld, office space is extremely limited. The influx of research grants and the expansion of teaching mean that the faculty, doctoral students, research staff, and teaching assistants all compete for the same scarce space. Teaching assistants in the NS300 course, who deal with hundreds of students, have no assigned space; instead they hold office hours in the NS Library. Nazleen Patel, Dr. Johnson's assistant on the NIH project,

was offered space by the PHSKC downtown, since no space at Raitt was available (this is a grant on which the UW charges full overhead). There is no space for the ECOR project in Raitt Hall; we are about to move into commercial space off campus. Extending invitations to Visiting Scholars is out of the question. For the past two summers, Drs. Serge Hercberg and Pilar Galan, eminent French epidemiologists, were provided with office space and other facilities at the FHCRC, since they could not be housed at Raitt Hall.

- Departmental administrative structure. Many of our problems stem directly from the fact that we are a Program and not a Department. Program goals and the departmental administrative structure are often at odds with one another. Program faculty located in Raitt Hall are Drs. Bruemmer, Drewnowski, Duncan, Johnson, Kirk, and Rosenfeld. Although they spend close to 100% of their time in the Program, their merit reviews, salaries, and promotions are all decided elsewhere. The home departments are Epidemiology, Health Services, Pathobiology, and Medicine. Junior faculty feel that important decisions are being made by persons unfamiliar with their work. Multiple curriculum approvals for course changes need to be obtained outside the Program and course reviews are handled by different departments, depending on the instructor's home base. Adding to the difficulty is the fact that protocols, procedures, and record-keeping are not consistent across departments.
- The quality of administrative and fiscal support is uneven. Although the core faculty hold very substantial grant awards, none of the overhead is returned to the Program. Instead, overhead returns are directed to the investigator's home department where they are used to cover administrative expenses, including the support of that department's (rather than nutrition) students. Although departments are supposed to provide fiscal management and oversight to Program researchers, there are instances when they have failed to do so, dealing

instead with the more pressing and more immediate problems of their own. Technically, the purchasing of inventory, computers, research supplies, and the management of funds disbursed by the Program are to be handled by the home department. We have found this arrangement to be highly impractical. Fiscal management may not have been an issue in 1997 when the Program had no funds; however, it has assumed a greater importance now that millions of dollars are at stake. We responded by hiring a fiscal specialist of our own.

- Program identity. One way that the Program presents itself to students is through course listings, including the on-line schedule. As of now, there is no cross-link between the SPHCM schedule and nutrition courses, this despite repeated requests made to the UW registrar over several years. We were actually told that our request to list nutrition courses under the SPHCM would involve some computer reprogramming and was, in a word, impossible. This correspondence goes back to early 2002.
- Faculty appointments. We rely on affiliate faculty and preceptors to provide mentoring and field experiences to our students. Our preceptors draw no salary and appropriate recognition is their only reward. However, as a Program, we are unable to appoint affiliate faculty and all appointments need to go through the Department of Epidemiology. Whereas some departments treat field work supervisors as affiliate faculty, Epidemiology typically does not.

4. What changes have occurred in your field that influenced your conception of the unit's role?

The major changes in the field of nutrition have all involved a greater focus on public health. No longer regarded as a clinical specialty, nutrition has become a vital tool for health promotion and the prevention of chronic disease. There is increasing pressure to develop evidence-based approaches to dietary guidelines and to evaluate the efficacy of population-wide efforts at dietary

change. Our unit's placement in the SPHCM coincided perfectly with the granting agencies' goal to add nutrition, epidemiology, environmental sciences, and health services research to the study of obesity and chronic disease.

All nutrition departments and programs have had to become multidisciplinary. Whereas large nutrition departments at land-grant institutions have added nutrigenomics or biotechnology to their product line, nutrition programs in school of public health were able to combine human nutrition with population-based sciences. That has required developing new methodologies and some reshuffling of partnerships. Fortunately for us, the Public Health Sciences Division of the FHCRC was an early leader in community-based research. The timely addition of FHCRC faculty to the NS Program in 1998 provided us with the necessary expertise. The current emphasis on community-based participatory research (CBPR) requires contacts with local and state health agencies and with community groups. We view our role as translating cutting-edge research to an agenda for action that can be applied to health concerns in Washington State.

5. Do you see differences between your view of your role and outside expectations of your unit?

In our estimation, the UW expects us to provide nutrition instruction to undergraduate and graduate students, contribute to the teaching of nutrition in medicine, generate the bulk of research resources, and secure student support. When it comes to teaching expectations, we have taken formal steps to assess outside needs for the inclusion of nutrition in the health sciences curriculum. We began by assessing our own students' satisfaction with the existing curriculum and the perceived quality of nutrition courses. We then conducted a more extensive survey of faculty and students in the health sciences, asking about the need for more nutrition content in their degree programs and the extent to which those needs were being met by the existing course

offerings. Dr. Bruemmer (NS Curriculum Committee co-chair) met repeatedly with advisors in the Office of Undergraduate Education, with the Center for Health Sciences Interdisciplinary Education, and the Center for Instructional Development and Research (CIDR) to discuss the NS curriculum. Her work led to the curriculum restructuring project, now in the process of being reviewed by the NS faculty. The new curriculum provides for more service courses, a graduate certificate in nutrition, and a general studies undergraduate major in nutrition.

Section B: Teaching

1. Summary of teaching allocations of NS core faculty

Table 2 shows the number of courses taught per year, number of credits taught, and total student credit hours. The NS Program uses state-budgeted funds to pay for instruction in nutrition classes. Faculty listed in capital letters are supported by state-budgeted positions up to the maximum percentage indicated. Salary support is commensurate with teaching commitments. Following a formula used by the Department of Epidemiology, each credit unit is compensated at the rate of 4% annual salary. In other words, a 3-credit course would provide 12% of annual salary from state funds. Seminars, laboratory training, and student mentoring are not compensated.

FORMULA FOR TEACHING:	FORMULA FOR COMPENSATION:
% appointment paid from state funds:	4% of full-time annual salary/credit
13-37% = 1 quarter/year	1 cr = 4% FTE
38-62% = 2 quarters/year	3 cr = 12% FTE
63-90% = 3 quarters/year	6 cr = 24% FTE
> 90% = 4 quarters/year	8 cr = 32% FTE

Table 2: Teaching responsibilities of NS core faculty

FACULTY	PAID W/STATE FUNDS	COURSE/(#CR.)	OFFERED	% EFFORT
Beresford, SAA* **		NUTR 538 (3)	A	50% (co-listed w/NUTR 538-Drewnowski=40%, TA=10%, controlled by EPI)
Bowen, D*** **		NUTR 581 (4)	Sp	100% (co-listed w/ HSERV 581, controlled by HSERV)
BRUEMMER, B	50%-12 mo	NUTR 300(3)	A	70% (w/TA's=30%)
	(Didactic Dietetics Director)	NUTR 445 (3)	S, *even years*	66% (w/Peck=34%)
		NUTR 445 L (2)	S, *even years*	100%
		NUTR 562 (4)	W	100%
		NUTR 563 (4)	Sp	50% (w/Peck=50%)
		NUTR 564 (4)	S, *odd years*	100%
DREWNOWSKI, A	59%-12 mo (tenured)	NUTR 500 (1)	A, W	100%
	(Program Director)	NUTR 528 (3)	Sp, *odd years*	100%
		NUTR 529 (3)	W, *odd years*	100%
		NUTR 538 (3)	A	40% (co-listed w/EPI 538-Beresford=50%, TA =10%, controlled by EPI
DUNCAN, G*		NUTR 500 (1)	Sp, *Symposium*	100%
		NUTR 525 (3)	A	100%
		NUTR 539 (1)	A, W, Sp	100%
JOHNSON, D	43%-12 mo	NUTR 526 (3)	A	100%
	(MPH Director)	NUTR 531 (3)	W	100%
Kirk, E*		NUTR 520 (4)	A	50% (w/Rosenfeld=50%)
		NUTR 521 (4)	W	10% (w/Rosenfeld=90%)
		NUTR 522 (4)	Sp	90% (w/Rosenfeld=10%)
Lucas, B*		NUTR 530 (3)	Sp, *odd years*	100%
PECK, L	50%-12 mo	NUTR 441(3)	S, *odd years*	100%
	(Dietetic Internship Dir.)	NUTR 445 (3)	S, *even years*	34% (w/Bruemmer=66%)
	(MPH Site Coordinator)	NUTR 561 (6-10)	A, W, Sp	80% (w/TA=20%)
		NUTR 462L (2)	W	100%
		NUTR 463L (2)	Sp	100%
		NUTR 532 (1-12)	A, W, Sp, S	100%
		NUTR 563 (4)	Sp	50% (w/Bruemmer=50%)
		NUTR 595 (1-12)	A, W, Sp, S	100%
Rees, J*		NUTR 527 (3)	Sp, *even years*	50% (w/Trahms=50%)
ROSENFELD, M	50%-12 mo (tenured)	NUTR 520 (4)	A	50% (w/Kirk=50%)
	(Grad. Program Coordinator)	NUTR 521 (4)	W	90% (w/Kirk=10%)
		NUTR 522 (4)	Sp	10% (w/Kirk=90%)
		NUTR 551 (3)	W	100% (co-listed w/PHG 551, controlled by NUTR)
Shell-Duncan, B**		NUTR 465 (3)	A, *odd years*	100% (co-listed w/ANTH 465, controlled by ANTH)
Trahms, C*		NUTR 527 (3)	Sp, *even years*	50% (w/Rees=50%)

*Paid by NSP for teaching, when funds available
**Paid by Anthropology
***Paid by Epidemiology
****Nursing pays for 1-TA and 1-reader, NSP pays for another TA, CLUE pays for another TA
*****Paid by Health Services

2. Assignment of teaching responsibilities

Since the elimination of the undergraduate program in 1983, the NS Program has been a graduate program only. The core faculty teach courses, attend faculty meetings, and serve on committees. Since the NS Program pays instructional salaries, the issue of negotiating teaching loads with the home department does not arise. FHCRC-based faculty who teach a graduate course through Epidemiology or Health Services may elect to cross-list it with nutrition. The interdisciplinary (ID) faculty offer guest lectures, and provide student placements in their laboratories, and student support. For example, Holly Callahan, a master's student, conducted work on ghrelin and satiety with Dr. Cummings, whereas Julie McMinn, a doctoral student, completed her project with Dr. Schwartz before taking up a postdoctoral fellowship at Columbia University. The ID faculty do not generally take responsibility for a full lecture course.

We have traditionally devoted some resources to classroom teaching of undergraduates. Two courses (NUTR 300 and 301) serve the School of Nursing and meet undergraduate science distribution requirements. At one time, those courses were taught by Dr. Faye Dong of the School of Fisheries and Ocean Science, with the TAs provided by the Program. Following Dr. Dong's departure to assume the chair of nutrition at the University of Illinois Urbana-Champaign, her FTE remained in the School of Fisheries, but the responsibility for the NUTR 300 course fell to the Program. Following the advice of the undergraduate college, we expanded course enrollments from 120 to 440 and watched the class sell out in a matter of days. Failing a dedicated FTE, the course is supported by a patchwork of funding that is subject to yearly negotiations and renewals. The Program supports Dr. Bruemmer's instructional salary and Program faculty volunteer as guest lecturers. The School of Nursing supports one TA and the reader, whereas the Office of Undergraduate Education supports another TA through its

innovative CLUE program, an evening teaching lab at Mary Gates Hall. NUTR 300 is one of only three courses in the health sciences that are available to undergraduates. It is a high visibility showcase for the Program; it enhances our presence on campus, and serves to attract qualified undergraduates to graduate programs in nutrition and in public health. However, the fact is no tuition revenue accrues to the Program and the participating faculty are not fully compensated for their efforts.

3. How are faculty involved in undergraduate student learning and development?

Undergraduate students come to us seeking internships, laboratory positions, or paid summer employment. An undergraduate student who worked with Dr. Drewnowski in 2001-3 is now pursuing an MPH degree at another institution. Dr. Glen Duncan also had 2 undergraduate students working for course credit on his grant-funded study. Dr. Rosenfeld has a number of undergraduate assistants in his laboratory. We have also worked with minority undergraduates at Heritage College, Toppenish, WA, sponsored by a training grant held by Dr. Peter Milgrom of the UW School of Dentistry. One student (Sonia Flores) who worked with us in 2002 is a co-author on a published research paper.

4. How do faculty involve undergraduate students in research and scholarship?

Colin Rehm, a geography senior, came to work with Dr. Drewnowski in July 2004. Because of his background in geography, he was familiar with Geographic Information Systems and their applications to the health sciences. He began working on mapping obesity rates by geographic area, first using data from the California Center for Public Health Advocacy, then New York City, and later local BRFSS data for WA State and King County. Mr. Rehm

established excellent relations with the Epidemiology Planning and Evaluation Unit at PH-SKC; submitted two manuscripts for publication, and wrote a $15K grant proposal on geographic analyses of obesity and dental health in rural Lewis county in collaboration with Donna Johnson, Assistant Professor in the Health Sciences. The project was submitted to the Center of Health Disparities in the School of Dentistry and is about to be funded. Mr. Rehm then became the major resource behind the development of a $3 million grant proposal on obesity and the built environment. He was the key person who served as the liaison between the Program, the School of Architecture, and PH-SKC. He arranged meetings, helped shape ideas and methods, produced preliminary data on incomes, house values, and land use; produced many of the figures used in the application; reviewed the literature, selected, entered, and placed references, prepared the front sheets, and oversaw the preparation of the proposal. Mr. Rehm is now applying to the PhD program in the Department of Epidemiology.

5. How does the department evaluate the instructional effectiveness of the faculty?

All Program courses are regularly evaluated by students and are subject to review by the Program and to peer-review by the department. The CIDR provides us with course evaluation instruments at the end of each quarter, which are completed by students. Student evaluations for each instructor and for each course are communicated to the Program Director who reviews them with individual faculty whenever issues arise. Student reviews of Program courses are shown in **Table 3**. We have requested a peer review of a number of NS courses; however, it was not always clear where the lines of responsibility fell and which department (Epidemiology, Pathobiology, or Health Services) should devote resources to reviewing nutrition courses. Whereas some courses have been reviewed on a regular basis, other courses have not. We have

addressed this issue by making the NS Curriculum Committee responsible for course oversight, ensuring that the quality of instruction was high and there was no overlap in course material.

Table 3: Summary of recent student evaluations for NS Program courses

Nutritional Sciences courses	Credits	Offered	Student evaluation
NUTR 300 Nutrition for today	3	A 04	4.0 (A 03)
NUTR 445/445L Food policy and food safety	3	S 04	3.9
NUTR 462/463 Medical nutrition therapy I and II	2	W/S 04	2.8/3.2
NUTR 500 Graduate seminar	1	A 04	4.3
NUTR 520 Protein and carbohydrate nutrition	4	A 04	3.5
NUTR 521 Lipid nutrition	4	W 04	3.9
NUTR 522 Vitamins and minerals	4	S 04	4.5
NUTR 525 Evaluation of nutritional status	3	A 04	3.3
NUTR 526 Maternal and infant nutrition	3	A 04	4.2
NUTR 527 Childhood through adolescence	3	S 04	3.6
NUTR 529 Nutrition research design	3	W 05	3.5 (A 02)
NUTR 530 Children with special health needs	3	S 03	4.6
NUTR 531 Community nutrition	3	W 04	4.2
EPI/NUTR 538 Nutritional epidemiology	3	A 04	3.2
NUTR 551 Nutrition and gene expression	3	W 04	3.8
NUTR 562 Nutrition and chronic disease	4	W 04	3.3
NUTR 563 Nutrition in acute care	4	S 04	3.2
NUTR 564 Management of nutrition services	4	S 03	4.0 (S 02)

6. Please summarize the data you collect to evaluate the impact of teaching on student learning. Please describe specific changes you have made in response to the data you have collected.

We are in the final stages of a 4-year project to redesign the core curriculum. Our goal was to develop a core list of competencies; set priorities and learning objectives, and eliminate redundancies in course material. Degree credits had to be in line with similar programs at peer universities, with special attention to the needs of MPH students who also complete the School-wide requirements in public health. We needed to assure a minimum number of students in all courses, and establish equitable faculty teaching loads. Finally, the degree requirements needed to be coordinated with professional training and outside accreditation.

The faculty were asked to judge what areas of study were "essential" to the core curriculum. These data were used to construct a brief survey instrument that was distributed to the faculty, students, and alumni. Focus groups of alumni, students, and faculty then captured qualitative information on the curriculum goals and objectives. The curriculum committee, led by Drs. Bruemmer and Johnson, then recommended change in the course sequence that that would progress from basic nutrition science, through clinical care and wellness, to public health applications and policy. Those were adopted by the faculty.

We held a retreat to discuss the proposed changes in course content, sequencing, and credit load. Recognizing that the number of credits for degree programs had been set very high in relation to peer institutions, we paid attention to any overlap in course material. The new curriculum is in line with competing programs, notably those that also offer training in dietetics. It is now going through a series of approval processes and ought to be in place by Autumn 2005.

Master's students will be required to take 8 credits of basic nutrition science; 4 credits of diet and chronic disease; 4 credits of community and public health nutrition, as well as biostatistics. Doctoral level students will take an additional 4 credits of nutrition science through rotating 2-credit modules. Previously offered as an elective, nutrition assessment of individuals and groups will become a key part of the new core. Students will be required to demonstrate competencies through measured academic performance, demonstrated range of skills acquired, applications to evidence-based practice, and the design and completion of a thesis or dissertation. Student evaluations will be based on a web-based portfolio of work.

An additional survey of curriculum directors in the Health Sciences was used to determine whether their programs had any accreditation requirements for competencies in nutrition. That information was used to design new 3-credit survey course NUTR 511, which will be available

to graduate students outside the Program. We have also designed a new Certificate Program in Public Health Nutrition, currently under review, which we plan to offer in the fall of 2005. A web-based certificate program through University Extension is also being considered.

7. What procedures, do you use to help faculty improve undergraduate teaching and learning?

Dr. Bruemmer, lead instructor for NUTR 300, has attended the University sessions on teaching large classes. She has also been meeting with the Office of Undergraduate Education to discuss developing a General Studies Major in Nutrition for undergraduates. Graduate student learning is encouraged through interactive seminars that feature guest speakers and discussion panels, a journal club, and the yearly student science symposium. We also recognize that the preceptors in NUTR 561 course (Dietetic Internship) contribute in major ways to graduate student learning. We are grateful to Don Wulff for his annual preceptor training workshop on how to be a teacher and a mentor, which has been enormously popular.

Section C: Research and Productivity

1. *How does your unit balance the pursuit of scholarly interests with the goals and expectations of the department, school, college, and the University.*

Scholarly interests are often determined by the current priorities of funding agencies. As of now, major resources are being devoted to obesity research. The UW expectations are that not only research funds, but also instructional salaries, student support, as well as funds for building renovation, and computer access are to be obtained from outside sources. The Program has met those expectations in securing millions in outside support (**Table 4**).

Table 4: Sample of research conducted by core faculty members

Faculty	Grant	Title	Amount	Dates
Shirley Beresford	NIH	Women's Health Initiative	$706,304 pa	3/15/93-9/14/05
	NCI	Worksite program to increase F+V intake	$544,463 pa	4/30/99-3/31/05
	NCI	Enhancing Long-Term 5-a-Day Behavior Change in Worksites	$2,294,964 (5 yrs)	10/1/04-9/30/09
	NIH	Reducing Obesity at the Workplace: A Randomized Trial	$1,994,716 (4 yrs)	11/1/04-10/31/08
Alan Chait	NIH	Clinical Nutrition Research Unit (CNRU)	$119,622	12/1/00-11/30/05
	NIH	Lipoprotein-matrix interaction in diabetes	$241,800	04/1/02-03/31/07
A. Drewnowski	USDA	Poverty and obesity	$700,000	05/04-05/07
	NIH	Exploratory Center for Obesity Research	$1,784,011	9/20/04 – 9/19/07
	USDA	A new instrument to assess diet costs	$12,600	9/30/03-8/1/05
	Kellogg	Protein and satiety	$95,000	11/04-12/05
Glen Duncan	NIH	Kinetics of human homocysteine metabolism	$253,206	7/1/03-6/30/05
Donna Johnson	DOH	Obesity prevention in WA State	$684,021	7/1/02-6/30/05
	NIH	Non-commercialism policy in Seattle schools	$682,200	10/1/02-5/31/05
	CDC	Breastfeeding: environment policy evaluation	$118,519	10/1/03-9/30/04
	UCLA	Leadership in maternal and child nutrition	$100,000	7/1/03-6/30/08
	DSHS	Food and Nutrition Eval (BFNEP)	$3,020	1/1/04-9/30/04
Liz Kirk	CNRU	Dietary iron and gene regulation in mice	$86,935	12/1/03-11/30/05
	AHA	The Role of PARP-1 in atherosclerosis	$40,000	7/1/02-6/30/05
Alan Kristal	NIH	Selenium + vitamin E: chemoprevention trial	$167,398	09/1/99-05/31/13
	NIH	Cohort study of benign prostatic hyperplasia	$438,813	7/01/03-6/30/06
	NIH	Selenium, vitamin E and pulmonary function	$54,785	4/01/03-3/31/08
Johanna Lampe	NIH	Glucuronidation in humans: Genotypes and phenotypes	$1,092,400	08/1/01-07/31/05
	NIH	Glutathione transferases in humans	$2,429,045	1/14/02-11/30/06
	NIH	Hormone status postmenopause	$150,000	07/1/02-0630/05
	NIH	Breast and bone density: colonic environment	$1,413,424	05/6/03-4/30/07
	NIH	DNA damage: F+V effects in a feeding trial	$100,000	04/1/04-03/31/06
Renee LeBoeuf	NIH	Atherosclerosis in diabetic mice	$250,000	9/01/02-8/31/06
Mike Rosenfeld	NIH	C. Pneumoniae and plaque destabilization	$740,000	7/01/01-6/30/05
	Merck	Mechanisms by which Simvastatin inhibits calcification of atherosclerotic plaques	$46,424	10/1/03-12/31/04
	POM	Effects of pomegranate juice on athero-sclerotic plaques in Apo E deficient mice	$57,624	9/1/03-13/31/04
	Amgen.	Chlamydia pneumoniae and cytokines	$36,384	1/5/04-12/31/04
	NHLBI	Glutathione, macrophages, and unstable atherosclerosis	$1,000,000	4/1/04-3/31/08
	NHLBI	Diesel exhaust and atherosclerotic plaque stability	$1,000,000	8/19/04-7/31/08
Cornelia Ulrich	NIH/NCI	Polymorphisms in PG/COX pathway and colorectal polyps	$775,012	6/05/01-5/31/05
	NIH/NCI	Modeling folate, one-carbon metabolism & DNA methylation	$674,000	12/1/03-11/30/07

2. How are junior faculty members mentored?

Junior faculty are informally mentored on an ongoing basis by other NS faculty, including the Director, and undergo a yearly review process in their home department. The departmental procedures can be inconsistent. Whereas some departments solicit the review by the Program Director at the time of the annual review, other departments do not. Some departments have assigned faculty mentors to oversee the progress of junior faculty in nutritional sciences. For example, over the past 5 years, the mentors assigned to Dr. Donna Johnson by the Department of Health Services were Drs. Elaine Monsen, Donald Patrick and Michelle Bell. However, Dr. Johnson spends all of her time in Raitt Hall and her first successful NIH grant was written in collaboration with the Program Director, with no input from Health Services. For the most part, Dr. Johnson's extremely successful collaborations and research projects have been outside her home department. The fact that Program and departmental lines cross can create problems, if junior faculty members believe that they are being judged by persons who are not directly familiar with their work. The Program is very conscious of the dual roles of its faculty. We have taken proactive steps to discuss promotion issues with one department, making sure that a policy was laid down to address potential problems if any arose. Fortunately none did. It would help to have a similar policy extended to the other home departments of NS faculty.

3. What has been the impact of your research on your field over the past 5 years?

Core faculty of the Program have received national recognition for their research on obesity, type 2 diabetes, coronary heart disease (CHD) and cancer. Dr. Schwartz and his group at the Harborview Medical Center are the undisputed international leaders in neuroendocrinology and neuropeptide research as they relate to obesity and the regulation of food intake. Dr. David

Cummings has developed an international reputation for his research on ghrelin. The FHCRC studies on cancer biology, biomarkers, epidemiology and prevention are also widely known. Core faculty located in Raitt Hall have established pre-eminence in studies on genetics and cardiovascular disease, obesity and economic disparities, and public health policy and practice. One impact of Program research is a better integration of basic science with public health objectives and policy goals. Selected grants held by ID faculty are listed in **Table 5**.

Table 5: Sample of research conducted by ID faculty members

ID Faculty		Selected Grants/Activities
Melissa Austin	NIH/NHLBI	Genetic Epidemiology of Hypertriglyceridemia. 2R01HL49513
Ilene Bernstein	NINDS NIDA	Neural Mediation of Conditioned Taste Aversions. R01(NS37040) Neural Plasticity and Sensitization of Salt Appetite. R01(DA014609)
John Brunzell	NIH	CRC Director, Training grant 2T32DK007247-26
David Cummings	NIH	Meal initiation and energy homeostasis: Role of ghrelin 5R01DK061516-02
Karen Edwards	NIH	UW Center for Genomics and Public Health S1946-21/2
Robert Knopp	Pfizer, Inc.	ASPEN Study, Effect of 10 mg Astorvastatin.
Mike Schwartz	NIH	Integration of long and short term control of feeding 5R01DK012829-35 Neuroendocrine regulation of energy balance 5R01DK052989-07 Hypothalamic peptides, food intake, and diabetes 2R01NS032273-10
Karen Swisshelm	NIH/NCI	Retinoic Acid Receptor Beta and Breast Cancer. R01CA82455
Scott Weigle	NIH	Studies of regional fat distribution and energy balance 5K24DK002860-03
Emily White	NIH/NCI	Cancer Prevention Training-Nutrition Exercise and Genetics. 5R25CA094880-03

4. In what ways have advances in your discipline, changing paradigms, changing funding patterns, or new technologies influenced research, scholarship or creative activity in your unit?

The NS Program has been very quick to seize the new funding opportunities in obesity research and its applications to policy and public health. Up to a decade ago, obesity was viewed as a metabolic disease, requiring intensive pharmacotherapy or other clinical treatments. While continuing to support biomedical research, funding agencies have begun to explore more public

health oriented approaches to obesity prevention with a focus on communities, children, schools, and on environmental and policy issues. These efforts, often initiated by private foundations, were later supported by the Congressional appropriations to the CDC, before being incorporated in the NIH funding agenda. The 2004 NIH Strategic Plan for Obesity Research included a section on public health approaches as well as multiple references to social and economic disparities. NIH program announcements have addressed such issues as obesity and the built environment, obesity prevention in schools, and obesity and income disparities. We are much better positioned to respond to these new trends than are the more traditional programs in nutrition science. Whereas the previous focus of the Program was on the dietary management of acute and chronic disease, we are now at the very crossroads of policy making in public health.

5. What problems does heterogeneity bring?

Given the breadth of interests and expertise of its faculty, the NS Program is extremely heterogeneous. Adding to the complexity of the interactions, faculty offices and labs are widely dispersed, not only across the UW campus but across Seattle. The programs offices are located on the upper campus in Raitt Hall, named for a home economics teacher, Effie Raitt. However, all classes are taught in the Health Sciences Center, a 10 min walk away. Faculty research labs can be at Raitt, in the Health Sciences Center, at the FHCRC, at Harborview, at the Veterans Administration Medical Center, or other affiliated hospitals. The HPRC is located off campus; the PH-SKC offices are at various locations downtown, whereas the State DOH is in Olympia. Among past and present intervention sites are Moses Lake (3 h drive) and Mt Vernon (1.5 h drive). The geographic dispersion of the faculty does present obstacles to communication.

However, this is not unusual. The UW Clinical Nutrition Research Unit (CNRU) has set a precedent for geographic dispersion. In existence for the past 20 y, the CNRU has never had a

physical home, other than a conference room and the office of the Director (Dr. Chait). Instead, the CNRU core labs are distributed across the Health Sciences, Harborview, and Raitt Hall. An earlier Program review recommended that we develop closer collaborations with the CNRU. However, the UW CNRU is a virtual one and a majority of the seventy-odd CNRU-affiliated investigators and the ID nutrition faculty are, in reality, one and the same.

The common challenge is to create cohesive research teams. However, cohesiveness can be expensive. One example is the CPHN, which was specifically created to develop stronger links to government agencies and community groups. To this end, we created two websites and a newsletter; held periodic advisory meetings and retreats; hosted visits by prominent government officials, and disbursed $150K in community based grants for healthy youth. Similarly, the ECOR grant has funds to bring together diverse groups of UW researchers in trans-disciplinary teams. The P20 Center has funds for projects that integrate biomedical research with public health and policy goals. These include surveys, focus groups, commissioned papers, workshops, forums, and conferences. Funds will be provided for pilot/feasibility studies that apply insights from laboratory research to environmental and policy studies – and vice versa. Structured activities for participating UW faculty will build leadership, capacity and skills. Additional activities will prepare UW investigators to submit an application for a future UW Center of Excellence for Obesity Research. These include strategic planning to develop a blueprint for the planned Center; the creation of networks and panels to assist local and State agencies; and the creation of an ongoing forum for researchers, policy makers, and community groups.

6. What impediments to faculty productivity exist?

There are many administrative obstacles. For example, the process for reviewing human subjects applications by the Institutional Review Board (IRB) is dysfunctional. It takes a minimum of 16 weeks to review a modification of a previously approved low-risk protocol. Each student who completes a MS thesis requires several hours of faculty time to complete the application and to respond to questions from the IRB. That time is not compensated. Student calls to the IRB often result only in confusion and frustration. It would help if the IRB were to provide some training and personal guidance to students as they go through the process. Faculty productivity is compromised if applications are not handled within a reasonable time frame.

7. What steps has the unit taken to encourage productivity by staff?

Program support staff are encouraged to take advantage of the many excellent training and development opportunities for professional and classified staff. In 2001, Beverly Winter-Eben, Program Manager, completed the newly created *Strategic Leadership Program (SLP)* sponsored by UW Human Resources Training and Development. She and Carey Purnell, Graduate Student Assistant, have taken several other courses that have allowed them to expand their knowledge of University policies and procedures and build other working skills. They are also encouraged to be involved in personal development courses to help them grow as individuals.

Section D: Relationship to other units

Program faculty are engaged in Program faculty participate in Programs meetings as well as in the meetings of their own home department or institutions. Dr. Drewnowski and Bruemmer participate in Epidemiology faculty meetings, whereas Drs. Kirk and Rosenfeld go to Pathobiology and Dr. Johnson to Health Services faculty meetings. Drs. Lampe and Ulrich

(FHCRC) regularly attend Program faculty meetings, whereas Dr. Drewnowski attends, whenever feasible, affinity group meetings and faculty retreats at the FHCRC, as well as STEPS leadership team meetings at the PH-SKC. The relationship with the FHCRC is very close. Dr. Lampe is currently the chair of the Program admissions committee, whereas Dr. Beresford serves on the curriculum committee and has been involved in curriculum revisions.

Figure 1 shows the relationship between the Program and other UW units. Biomedical sciences and other health professional schools are on the left, whereas the social sciences, local and state government agencies, and community groups are represented on the right. Listed are only those units with which we have an ongoing relationship in the form of jointly held grants or contracts, laboratory placements, regular student mentoring or student support, training grants, student internships, practicums or field work, or opportunities for community-based research. Those relationships are maintained through the attention and efforts of Program faculty and staff.

Figure 1: **Relationship of the Nutritional Sciences Program to other units**

The NS Program may have faced impediments in approaching other units in the past, but no longer. Dr. Johnson is sought after by researchers at Children's Hospital, whereas Dr.

Drewnowski participates in projects originating in Medicine and at the FHCRC. Dr. Rosenfeld is an investigator on a 30-million dollar grant awarded by the Environmental Protection Agency to the SPHCM. On those rare occasions when we were rebuffed, we sought expertise elsewhere. For example, after failing to identify much interest in nutrition-related issues at the UW Business School, we turned to the RAND Corporation in Santa Monica and to the Agricultural Economics Division at the University of California Davis. They will be our collaborators on a future NIH grant application on the economics of food choice.

Section E: Diversity

Most of the graduate students in the SPHCM (69.9%); in the Epidemiology department (71%), and in the Program are women. Two thirds of the core faculty are women. So are most laboratory (66%) and all support staff (100%). Demographic distribution of the entering class reflects that of WA State, since the applicants are typically from Pacific Northwest and from the West Coast. Recruitment of minority students may be hampered by a lack of undergraduate program in nutrition. However, our continued involvement in community-based activities will improve the visibility of the Program among under-represented groups. Our targets are undergraduate students as well as health professionals who may wish to improve their credentials through a graduate degree. However, retaining minority students has been problematic at times due to limited resources. On one occasion a minority student (Jessie Satia) was retained through the award of a minority fellowship from the NIH. On another occasion, we nominated and secured a fellowship through the Graduate School's Minority Affairs Division for another student, Cheryl Fernandez-Kodama.

Section F. Degree Programs

Programs offered and relationship between degrees. The program offers three degrees (MS, MPH, and PhD) along with a professional training program (the Didactic Program in Dietetics and the Dietetic Internship Program). Although there is no longer an undergraduate program in Nutritional Sciences, students with science-related undergraduate degrees, who are interested in pursuing careers in nutrition may apply to our graduate program. Those who wish to become Registered Dietitians (RD) while pursuing their graduate degrees may complete the Didactic Program in Dietetics (academic coursework) and apply for the Dietetic Internship.

1. Doctoral Program (PhD)

A student receiving a Doctor of Philosophy (PhD) degree from the Nutritional Sciences Program will be prepared for research and for professional academic practice, involving the acquisition and dissemination of new knowledge in diverse aspects of nutrition science. The training objectives of the PhD degree are:

1. Objectives and goals

- The PhD degree program is designed to assist students in gaining an advanced understanding of nutrition and metabolism, and of related biochemical, molecular, biological, and behavioral sciences. Students will be able to expand the base of new knowledge in nutrition and will apply this knowledge to research, clinical health care, and to public health.
- The NS Program provides both the educational structure and opportunities to pursue advanced study and research training in clinical, public health, and experimental nutrition.
- The NS Program is responsive to the state, regional, and national needs for academic faculty in nutrition and related health sciences; for leadership positions in health agencies dealing with food and nutrition policy; and for private sector needs in the area of diets and health.

2. Program areas of emphasis.

- Students will be nutrition scholars who are able to critically evaluate sophisticated, multidisciplinary scientific concepts of modern nutrition and translate them to the needs of individuals and diverse population subgroups.
- Students will relate normal physiology, anatomy, molecular and cellular biology, and biochemistry to nutrition status and nutritional requirements and will be able to establish links between nutrient intake and physiological and cellular functions.
- Students will relate the etiology of acute and chronic disease as well as pathophysiologic changes to nutritional requirements and nutrition status. They will assess nutrition status of individuals and groups and formulate nutrition care plans and/or develop nutrition education and intervention programs in public health.
- Students will acquire skills in research methods and will have the opportunity to develop and test timely and original hypotheses in nutritional sciences. They will develop appropriate study designs, conduct research and publish in peer-review literature. They will be familiar with modern techniques of information and data management.
- Students will be knowledgeable about the process, sources, and methods for procuring research funding. Students will be trained to assume leadership roles in research oriented, clinical, and community programs. They will be able to shape and evaluate food and nutrition policy at the community, state, and national levels.

3. The benefits of the PhD program to the academic unit, the university, and the region.

The PhD degree track greatly raises the standard of research conducted by the nutritional sciences faculty by bringing together a diversity of interests and expertise. PhD level training allows faculty and students to plan and execute a sequence of studies and jointly explore research

topics in greater depth. That, in turn, makes the faculty more competitive in obtaining extramural research funding. The range of available research opportunities is particularly broad, given that the laboratories of the ID faculty also contribute to the training of doctoral students. Such student placements have brought about research collaborations; joint grants, and new affiliations by interested researchers with the NS Program.

PhD students regularly interact with members of other research teams as well as with other students in nutrition sciences. Weekly seminars, invited presentations, and the annual Student Research Symposium help broaden the exposure of all of our students to different areas of nutrition research. All PhD students must obtain some experience in classroom teaching and student mentoring prior to graduation. Our doctoral students provide teaching assistance with undergraduate courses, and provide our MS and MPH students with one-on-one tutoring on the more complex aspects of the course material. They also enable Program faculty to offer an enriched research experiences to undergraduates, a priority of the UW administration.

Doctoral students have, at times, taken an active role in shaping the curriculum. One recent graduate developed guidelines for integrating more nutrition training into the UW Medical School, based on surveys of family practice physicians in Washington State and multiple student cohorts. Students also assist with shaping and implementing nutrition education and intervention programs at local and state level.

Only two other Universities in the Pacific Northwest offer a PhD in nutrition (Washington State, Oregon State) and there are only a handful of options on the entire West Coast. Our program has already helped provide trained graduates to fill faculty positions at universities and to fill leadership positions at local, state, and regional agencies.

4. Comparison with PhD programs at peer institutions.

A number of major research universities have highly regarded PhD programs in nutritional sciences. Many of those are at land grant institutions (Wisconsin, Minnesota, Penn State; University of California Davis); fewer are located in Schools of Public Health (University of North Carolina, University of California, Berkeley, UCLA). The web sites of the programs at several of our peer institutions show that the learning objectives and curricula are similar to our own program. Because the basic concepts of nutrition are relevant to virtually all areas of the biomedical sciences, most of these programs are multidisciplinary and draw faculty from a broad spectrum of biomedical and veterinary sciences. However, most of the land grant institutions do not offer an equivalent focus on human nutrition and do not provide training in the three tracks of clinical, public health, and experimental nutrition. Rather, their focus is often on food science and technology, and on animal and agricultural sciences. Fewer graduate programs in nutritional sciences are located in Schools of Public Health. As outlined below, our location in the SPHCM has helped strengthen the NS Program in areas such as epidemiology and community nutrition.

5. Standards of success and the degree to which they have been met.

The success of our PhD program is measured in terms of:

- The number and quality of applicants to the program. The number of applicants to the PhD program has steadily increased and we now receive approximately 30 competitive applications per year. Of these, a significant number are from graduates of institutions with excellent academic reputations such as the University of California, San Diego, the University of California, Berkeley, Stanford University, Columbia University, the University of Michigan, and the University of Wisconsin. The average undergraduate and graduate GPA of applicants accepted into the program over the past 4 years is 3.64/4.0 and the average scores on the Graduate Record Examinations of these same applicants over the past 4 years is

514 on the verbal and 647 on the quantitative components of the exam. Whenever we lost students to competitive programs, they went to such places as UC Berkeley, Columbia or Wisconsin, where they were offered full scholarships. We also receive applications from many countries throughout Europe and Asia. Our web site is one of the first that comes up when searching for graduate programs in Nutritional Sciences. This indicates that it is one of the most frequently visited sites amongst our peer institutions.

- Percent of students staying in the program and graduating in a timely fashion. Since the inception of the PhD program in 1989, we have had 24 graduates with 15 since 1999. The median length of time from entry into the program to graduation has been 5.5 years. However, in several cases, this reflects the time to complete both a Master's as well as a PhD. In addition, since the start of the PhD program only two students have dropped out, both due to financial limitations. Currently, there are 14 PhD students, 5 of whom have completed their qualifying examinations, and all of whom are making excellent progress towards completion of the degree requirements.
- Quality of didactic work as assessed by academic grades in courses both within and outside of the Program. The average GPA of the doctoral students of 3.68/4.0. This includes an average GPA in courses in nutritional sciences of 3.81/4.0 and in courses offered by other departments of 3.59/4.0. The average GPA of the students currently pursuing their PhD is 3.65/4.0. One of our recent graduates was awarded the prestigious Magnuson Scholarship in 2001 based on her outstanding GPA and strength of her research project.
- Number and quality of the publications and invited presentations derived from PhD dissertation research. Last year alone (03-04) current and recently graduated doctoral students were first authors or co-authors on 9 peer review publications and presented 9

papers, posters or abstracts at professional meetings such as: Experimental Biology and American Heart Association. This information is compiled in **Appendix I**.

- The amount of extramural funding procured by both students and faculty that is related to PhD dissertation research. The quality of dissertation research in the Program is reflected in the success of our students and faculty in obtaining research funding. For example, one of our current PhD students wrote for and received a full graduate fellowship from the American Heart Association. Other PhD students in the NS Program have received funding from the American Heart Association and through competitive applications to existing training programs in several departments within the UW. (Two NCI training grants specifically include nutrition students). Most importantly, several of our current core faculty recently received millions of dollars of new funding from the National Institutes of Health based in part on the quality of research of the PhD students in the program (see **Table 3**).
- Job placement of our graduates. Perhaps the best indication of the success of the PhD program is the success of our graduates in finding jobs. Our PhD graduates have obtained academic positions at the University of North Carolina (Jessie Satia), at Oregon Health Sciences University (Victoria Warren Mears), and at the University of Pennsylvania (Cheryl Anderson). Currently, 2 are doing additional post-doctoral training.

6. Probable causes for the success of the PhD program. Admitting highly qualified students is a key to success, as is utilizing the diverse resources available to help teach and mentor them. In particular, the commitment of the core faculty to teaching and mentoring, the strength of the research programs and the success of both our PhD students and faculty in procuring extramural research funding have been fundamental to our overall success in training our PhD students. Expanded faculty roster – added FHCRC – also since the last program review, have recruited a

new program director and three new junior core faculty. We have also enlarged our inter-disciplinary group faculty and have strengthened our ties with nutrition professionals both within the university and the existing nutrition community in Western Washington.

7. Factors that have impeded the ability to meet objectives and plans for overcoming those impediments. We do not believe that there have been any significant impediments to our fulfilling our objectives as witnessed by the measures of success listed above. A continuing problem is the small number of core faculty within the program. However, this has not impeded the progress of our current students because of the success we have had in enlisting our large interdisciplinary group faculty in supporting and mentoring our PhD students.

8. Additional steps envisioned to improve the overall quality of the PhD in Nutrition Program. The program is currently undergoing curriculum review and development. Sharpen requirements – include community nutrition as part of PhD education – reflect the focus an emphasis on public health. It is envisioned that the new curriculum will include advanced topics courses designed specifically for our PhD students. These will be integrated, problem based courses designed to build on the basic physiology and biochemistry courses required of all of our students. We have also developed a required course for our PhD students (NS 529) that focuses on research design and grant writing and recently strengthened our ties with other departments and programs in the SPHCM by offering highly focused 1 credit mini-courses through Pathobiology and cross listing our advanced course in Nutrition and Gene Expression (NS 551) with Public Health Genetics.

2. Master of Science (MS) degree program in Nutritional Sciences

The MS degree track prepares students to expand the base of knowledge in nutritional sciences and learn how to apply it to health care delivery and community settings. The MS

program offers students the opportunity to conduct advanced study in one of three main areas: nutrition and metabolism, individual wellness/clinical nutrition, and public health nutrition. Graduates acquire appropriate research experience that allows them to function effectively in laboratory research as well as in clinical care and public health settings. The MS degree meets the needs of students who have an undergraduate background in nutrition or a related field (e.g., biochemistry), and who seek an advanced degree with some research experience. The long-term goals of our MS students can be diverse. They can include professional practice in wellness, clinical practice or public health nutrition, credentialing as a Registered Dietitian, pursuing a doctoral degree in nutrition or a related field, or admission to medical school. (see **Appendix C**).

1. Program objectives and goals

The MS degree program is designed to assist students in gaining understanding of nutrition and metabolism and of related biological, biochemical, molecular, epidemiological, and behavioral sciences. The objectives are:

- To provide an opportunity for advanced study in such areas as nutrition and metabolism, individual health and wellness, disease prevention, and medical nutritional therapy.
- To provide research experiences that enable students to acquire training and skills necessary to function as members of a research team.

2. Program areas of emphasis

Following completion of the MS degree in nutritional science, the graduate will be able to:

- Describe human nutrient requirements and their relationship to physiology and metabolism.
- Assess and evaluate the nutritional status of individuals and groups.
- Relate pathophysiological changes to alterations in nutritional status.
- Participate in scientific investigation of topics related to nutritional sciences.

- Evaluate evidence-based medicine pertaining to chronic disease, and nutrition in acute care.
- Provide leadership and management oversight in the provision of nutritional care services for individuals and groups.
- Assist in policy development and evaluation.
- Design effective and appropriate nutritional education programs for individuals and groups.

3. Benefits of the MS degree to the academic unit, the university and the region.

The MS program is a necessary adjunct to the doctoral program in nutritional sciences. Many MS graduates elected to enter the PhD program and went on to make significant contributions in the field of nutrition. For example, Dr. Robien has recently published her work on methylenetetrahydrofolate reductase gene variants and leukemia as a minireview in the American Journal of Epidemiology and has another article in press. Dr Robien is now funded as a postdoctoral fellow at FHCRC through the Cancer Prevention Training Program in Nutrition, Exercise and Genetics (R25 CA94880).

The MS degree track and the PhD program share many of the same courses – for example the 520 sequence is common to both. The MS/RD track has proved attractive to a large number of dietetic professionals whose clinical experiences contribute to classroom interaction. The MS program allows the students to pursue a broad range of interests, including the design of small, interesting projects that dovetail with larger investigations, but do not require the same level of originality and independent work as that of the PhD program.

Graduate students pursuing the MS degree interact with other health sciences students; work with established scientists at the university, and assist professionals in the community in developing clinical and public health projects. The MS thesis projects illustrate how nutrition

can be integrated with research activities in biological sciences, epidemiology, lifestyle interventions, and clinical practice.

4. Comparisons to other institutions

Few institutions offer a masters degree in nutrition that includes an important public health component. Rather, MS degrees, especially those offered at land grant universities, tend to focus on such areas as Nutritional Biochemistry or Food Sciences and nutrition. Comparisons to other programs were a part of the curriculum restructuring project in nutritional sciences. Those examined credit requirements, thesis option, distribution of credits among basic science, individual nutrition and nutrition policy, and links to dietetic education. The tables and documents that were generated for these comparisons are available for review.

5. Standards used to measure success and the degree to which they have been met.

The success of the MS program can be assessed by the following indicators:

- Growing enrollment into the MS program over the decade. Enrollment has grown nearly 10% over the last 5 years compared with the previous 5 year period.
- High grade point average for courses taken within and outside the program. The grade point average for our students over the last five quarters is 3.63.
- High completion rates. During the last 5 years, 95% of enrolled students graduated.
- High rate of employment in the field of nutritional sciences after graduation. All students graduated with MS/RD-eligible obtained employment in their field; all doctoral graduates successfully obtained post-doctoral, faculty, or research appointments.

In the past 5 years, 37 students have graduated from the MS degree track. Of these, 26 students have followed the Didactic Program in Dietetics and graduated with the MS, RD-eligible certification; two others are expected to take their RD exam this year. Graduates with

MS degrees are employed in a wide variety of corporate, wellness, clinical, and public health settings. One graduate went directly to medical school (Ronald Kampanatkosol).

6. Probable causes for success of the MS program.

The MS program offers students an unparalleled breadth of research opportunities. Members of the core and ID faculties have been very open to working with our MS students to find mutually satisfying and technically challenging research projects. In addition, our contacts in the community allow the students to extend their training to clinical and public health practice and allow them to observe and participate in a wide variety of practice settings.

7. Factors that have impeded the ability to meet objectives of the MS program.

The supervision of MS students often falls to the core faculty based in Raitt Hall. For the most part, MS students can be accommodated for their thesis work on a funded project directed by the faculty member. However, in cases when this did not occur, students did not benefit from an ongoing close supervision by faculty members. One way to address this problem is to involve more ID faculty in the supervision of thesis projects. Further, existing resources are often directed toward doctoral students. Limited funding for the MS program means little money to send students to meetings and conferences where they can interact with their peers and faculty from other institutions.

3. Master in Public Health (MPH) degree in Public Health Nutrition

The MPH degree (see **Appendix C**) is a professional degree offered by the School of Public Health and Community Medicine. The first student was accepted into the MPH track in 1997.

Since then, the MPH degree has experienced considerable growth and can be considered a major success. In addition to students who are seeking only the MPH in Public Health Nutrition, the program now admits several students each year for a combined MPH/dietetic internship. Since the previous review, the MPH degree program has been modified. Students may achieve the competencies required for both the MPH degree and RD eligibility in two years and one quarter.

1. Goals and objectives of the MPH degree program.

Graduates of the MPH degree track in public health nutrition can be expected to participate in policy analysis and program development and/or to design, implement and evaluate population-based interventions. Specific learning objectives are:

- To provide a broad overview of the public health system and the environment in which public health recommendations are interpreted and implemented.
- To provide basic analytical and administrative skills to integrate nutrition into public health core functions of assessment, policy development and assurance.
- To provide an opportunity for advanced study of a particular topic in public health nutrition.

2. Program areas of emphasis

The MPH curriculum emphasizes the core functions of public health, assessment, policy development and assurance as they apply to public health nutrition practice. Within this framework, students choose to apply these functions to the population group or program that interests them the most. Most students focus on one of three major areas that coincide with faculty research activities, childhood obesity, cancer prevention or healthy aging. The mission of the CPHN is to address prevention of childhood overweight, so there are many opportunities for students to participate in nutrition policy development for schools and early childhood programs. Students have participated in the development of the new nutrition and physical activity policies

in Seattle schools, modules for training child care providers, and TV reduction programs for early childhood programs. Several Nutritional Sciences faculty hold appointments in the Public Health Sciences Division of FHCRC, and students have the opportunity to build skills for public health assessment by analyzing data from large studies that are conducted through the Cancer Prevention Program. Finally, many students are interested in healthy aging and complete fieldwork and thesis research through the HPRC and the Healthy Aging Network. Recent student work includes building and evaluating a farm to table program for senior congregate meal sites, evaluating the use of nutrition assessment in senior programs and evaluating the impact of a senior farmers' market basket program.

3. Benefits of the MPH degree track to the academic unit, the university and the region.

The MPH degree track in public health nutrition was specifically created to respond to workforce needs expressed by public health agencies in WA State. The initiation of the MPH program coincided with a growing interest in nutrition and wellness both at the UW and among local and state health agencies. For the nutritional sciences program, fostering and promoting the MPH degree track was a logical consequence of the programs new location in the SPHCM. The presence of MPH-nutrition students in public health classes side by side with students in other MPH programs in the SPHCM leads to greater interaction between students with different backgrounds and between faculty trained in different disciplines. This broadens and enriches the NS Program as well as the other programs in the School. The School and the Program have benefited from the strong relationships with public health nutritionists around the state that are fostered and strengthened through both the concurrent field experiences and the MPH practicum which are integral parts of the MPH training.

The MPH program is a very effective way to link the UW with the public health community. MPH students and graduates present their papers at state and national meetings and are honored by national organizations. In 2003, one of our MPH graduates was selected for the highly prestigious David A. Winston health policy fellowship, and in 2004 one of our MPH students earned a student researcher award at the annual meeting of the Society for Nutrition Education.

During their coursework, fieldwork and thesis research, MPH students provide service to the region. MPH thesis research is often undertaken as part of a needs assessment or program evaluation of a real-world public health program. In addition, the six to eight week practicum experience is structured around a need for program planning or evaluation that is identified by potential fieldwork placement sites. Graduates of the MPH-nutrition program receive academic public health preparation in biostatistics, epidemiology and environmental sciences, in health program planning, management and evaluation, and in advanced nutrition. With the advent of considerable federal funding for prevention of obesity and chronic disease, need for these skills continues to increase across the region.

4. Comparison of MPH degree track with programs at peer institutions.

The objectives of our MPH degree track are very similar to those of other institutions. This is due, in no small part, to the fact that the program was developed with reference to the *Curriculum Guide for Graduate Programs in Public Health Nutrition* (Strategies for Success), which was developed on behalf of the Association of Faculties of Graduate Programs in Public Health Nutrition. On the other hand, our links to local, state and federal agencies are stronger than most and we have developed very effective collaborations with peer institutions. For example, and MCH Leadership grant is shared between UW and UCLA.

5. Standards used to measure success and the degree to which they have been met.

- Growing enrollment into the program over the first 5 years of its existence. Enrollment in the program has grown substantially from the two students who had been accepted into the program at the time of the last review. In 2003-2004 seven new students started the MPH in Nutrition program, and seven were in their second and third years.
- High completion rates of students enrolled in the program. The completion rate for the program is high. A total of 12 students have graduated from the program, and of all students who have been enrolled, only two have left the program without completing. One departure was due to health problems.
- High rate of placement of graduates in jobs in public health nutrition. All MPH graduates who have sought employment are currently working in public health nutrition. Our graduates are working in both governmental and non-governmental agencies and filling positions such as the Executive Director of the Washington Association of Local WIC Agencies, Nutrition Coordinator for Healthy Mothers Healthy Babies of Washington State, Communications Specialist for the Center for Public Health Nutrition, Health Policy Analyst for a U.S. Senator, and Research Coordinators for studies such of diabetes in vulnerable populations and environmental hazards of subsistence fishing in immigrant populations.

6. Factors that have impeded the ability to meet objectives and plans for overcoming them;.

The original plans for the MPH degree track in public health nutrition included a credit load that was very high for a master's level program because it called for all of the core national MPH requirements in addition to the existing MS in Nutrition program here at the University of Washington. In addition, most of our highly qualified applicants were not Registered Dietitians at the time of application, and they often wanted to combine the DPD courses with the MPH courses. We have addressed this problem with a two stage process. First, we combined two

courses that covered health promotion and nutrition education into one, and we combined the MPH practicum into the dietetic internship. In stage two, as described elsewhere, we have undertaken a major redesign of our curriculum to assure that students achieve a core set of sequential competencies in a realistic time frame.

We regularly compete with other MPH programs across the country for the best students. In the first years of the program we would often offer admission to strong students only to have them choose other institutions because we could not offer them financial support. Since that time we have actively pursued sources of assistantships, scholarships, traineeships, and opportunities for hourly employment. In the past year, we supported most of our MPH students through these mechanisms. We can now offer one or more MCH Nutrition Leadership traineeships each year through a training grant from the federal Maternal Child Health Bureau. We use students for many of our contracted projects with the WA State DOH, and we now write graduate assistantships into any of our grant applications.

7. Additional steps envisioned to improve the overall quality of the MPH program.

As the program has grown, the tasks of administration and supervision of student fieldwork have taken more and more time. These responsibilities have fallen to just one faculty member since the program was initiated in 1997. We are currently initiating a series of changes that will lead to better use of faculty time and a higher quality experience for MPH students and fieldwork/practicum preceptors.

4. Professional education in dietetics: Didactic Program and the Dietetic Internship

The Program allows its students to supplement a graduate degree with the Registered Dietitian (RD) credential, generally required of all professional providers of nutrition care.

Students who elect to pursue the MS/RD or the MPH/RD options follow the required curriculum for each graduate degree. Additional training, based the American Dietetic Association (ADA) guidelines, is provided by the Didactic Program in Dietetics (DPD) and the Dietetic Internship (DI). Prior to 1998, RD training at UW took the form of a coordinated program that integrated coursework with clinical experience. The focus was on medical nutrition therapy and on careers in clinical dietetics. However, the needs of the profession have evolved to emphasize health promotion and the prevention of chronic disease. After Dr. Bruemmer became the Director of Dietetic Education, she revised the DPD (coursework) to emphasize both community and public health nutrition. The 10-month DI (fieldwork) was split into a medical nutrition therapy track and a community nutrition track. Students need to complete the DPD prior to applying for the DI. The DPD/DI sequence was accredited in 2000 by the ADA for a 10 year period.

1. Goals, objectives, and areas of emphasis

Professional training in dietetics at graduate level prepares students for careers in nutrition education, nutrition care, and public health planning and practice. These skills are highly valued in today's health care environment, where the evaluation of outcomes, program effectiveness, and cost/benefit ratios are critical to the marketplace. Program objectives are:

- To train students to conduct research in applied nutrition by applying research data and evidence-based medicine into practical nutrition guidance.
- To prepare students to apply the knowledge of nutrition and dietetics to Medical Nutrition Therapy (MNT), public health nutrition, and disease prevention.
- To provide a firm foundation of knowledge and skills for future careers in nutrition, including roles in leadership and policy development.

2. Benefits of professional training to the academic unit, the university and the region.

Most applicants to the NS seek the RD credential in addition to the MS or the MPH degree. Our professional training component directly addresses the State's employment needs. Dietetic interns deliver nutrition education at community level as part of their training. They present two wellness talks each to groups at homeless shelters, transitional housing, K-12 education and student groups. They are also actively involved in direct patient care under the supervision of preceptors at our affiliated institutions. The interns' nutrition education project allows them to review and evaluate nutrition education programs offered to patients at each of the practice sites. Research training at graduate level helps students to develop skills in organization, problem solving, and synthesis of concepts, program planning and evaluation.

3. Comparison of training objectives with programs at peer institutions.

All ADA-accredited programs are monitored and audited by the ADA to ensure that they maintain consistent objectives and outcomes. The UW program has several advantages over the competition, since it is located at a major research university with strong ties to clinical sites and public health agencies. Few other programs on the West Coast offer the training in critical care medical nutrition therapy that is available to our students.

4. Standards used to measure success and the degree to which they have been met

The following are the major indices used to assess success of the DPD and the DI:

- Completion of the graduate degree. Of the 49 students enrolled in the DPD since 1998, 98% have successfully completed their graduate studies.
- Periodic satisfaction surveys of the DPD and DI graduates and of employers
- Pass rate on the national dietetic registration exam. The program has maintained a 100% pass rate for the RD exam since 1998.

5. Probable causes for success of the professional training program.

The DPD/DI has developed a very strong following and support network in the local nutrition community. Many of the local dietitians, agency staff, school nutrition personnel, and policy makers at State level have a connection to our DPD/DI program – either as alumni, or as past or current mentors, preceptors or employers. Among the key factors in our success are:

- Dedicated faculty and preceptors who are committed to professional training in nutrition and who are able to offer both instruction and supervised experiences.
- Creative and varied approaches to teaching: problem-based learning, self- and peer-evaluation, teamwork, emphasis on critical thinking skills and innovative problem solving, effective use of community resources and expertise. Courses initially developed for the DPD now attract many more students. Enrollment in NUTR 562 (Diet and Chronic Disease) jumped from 11 in 1998-99 to a high of 25 in 2003-04. The food and nutrition policy class (NUTR 445) now attracts up to 15 students, many from outside the NS Program.
- Clearly defined performance objectives with ongoing dynamic feedback to ensure success.
- Strong commitment to working, negotiating, and communicating closely with local dietitians to balance their needs and expectations with the learning needs/goals of our dietetic interns.
- Extensive mentoring and career networking opportunities provided to interns via the faculty, teaching assistants (TAs), preceptors, and community experiences.
- Ongoing effort to improve the quality of the program through formal and informal feedback from students, TAs, preceptors, community professionals, and prospective employers.

6. <u>Factors that have impeded the ability to meet the objectives of the DPD/DI.</u>

Health care reform has reduced the opportunities for professional training at practice sites (hospitals, clinics) and the presence of dietetic interns is sometimes viewed as a burden. We

continue to work with affiliated sites on their needs and expectations for student rotations. However, for one reason or another, the DI has had 3 directors in the last 5 years. The new Internship Director (Dr. Peck) has a PhD in nutrition as well as research experience. She has assumed the supervision of the MPH practicum in addition to the DI.

Section G: Graduate Students

1. Recruitment and retention.

Prospective students often contact individual faculty members before filing a formal application for admission. Generally, Dr. Rosenfeld answers specific questions about doctoral research, Dr. Johnson deals with the MPH program, whereas Dr. Bruemmer answers questions about the MS program and all aspects of dietetic training. More general questions are answered by Carey Purnell. Bev Winter-Eben deals with issues of student support. Two training grants in cancer prevention do advertise for trainees; these ads specifically note that nutrition students are eligible for support. We also advertise each year in the Journal of the American Dietetic Association for the paid clinical TA position. That position is open to RDs who enter our graduate program and serve as clinical TAs and mentors for our dietetic interns. However, we do not have the resources to mount a formal recruiting campaign through advertising in professional journals or at conferences.

We are rarely able to offer financial support beyond the initial year, which is a major problem. Over the past 5 years we have lost a number of excellent students at admission because they were offered multi-year fellowships elsewhere. Once students are admitted, we generally find sources for predoctoral support from faculty grants and other awards and attrition rates are

low. Over the past 5 years, we have lost 1 doctoral student (not a financial problem), 1 MS student, and 2 MPH students.

2. Advising, monitoring, and professional development

A student handbook, given to all incoming students, details degree requirements and measures of progress toward a degree. Those issues are also covered in the fall NUTR 500 class – a prolonged orientation for 1st year students that familiarizes them with the organization of the program, research areas of key program faculty (both core and ID), and the opportunities for research, mentoring, lab rotations and financial support. Students are also assigned an initial academic advisor when entering the program. The advisor monitors the student's academic progress, advises on course selections, and guides the student toward submitting a research proposal. Whereas most issues are handled by the student and the advisor, the entire core faculty review student progress on an annual basis, or more frequently, as directed by the Graduate Program Coordinator (Dr. Rosenfeld). If problems are brought to light during the review session or at any other time, the Graduate Program Coordinator serves as the mediator between the student, the advisor, and the Graduate School.

A professional development plan is provided to students pursuing the professional RD credential. We also have formal goals and objectives for professional skills in public health practice that are to be acquired in the course of the MPH practicum. However, neither the MS nor the PhD has a mandated professional practice component, other than teaching skills. Student services offices are available at the Department and the SPHCM level, but not at Program level. We have no resources to offer professional career advice at Program level.

3. Inclusion in governance and decisions

A student representative who attends faculty meetings. We also have student representatives on both the admissions and curriculum committees. When it comes to grievances, students are asked to speak to the Graduate Program Coordinator or the Program Director if they have issues with their advisor, committee chair, or other faculty members. Otherwise, they should first discuss the issue with their advisor. Grade disputes are handled through the instructor, advisor or Program Director and follow formal UW procedures for conflict resolution.

4. Graduate student service appointments

The available Research or Teaching Assistantships are awarded pre-admission, usually to PhD students or to outstanding MS or MPH students. The DI supports one clinical TA from state funds. Teaching assistants attend the Graduate School's training session each autumn and the clinical TA is supervised and evaluated by the DI Director. We also have an annual public health traineeship through the SPHCM. Traditionally, we receive one RA from the Graduate School's Fund for Excellence and Innovation. The Maternal and Child Health Leadership grant at UCLA supports one MPH student. The Program awards additional stipends from endowment funds. The average duration of appointment is one year. The clinical TA can be awarded for a second year, based on good performance.

Students on training grants can be supported for multiple years, depending on academic progress. All other RA positions are funded by faculty grants. RA salaries are governed by the GSSA salary schedule for pre-MS, post-MS and pre-doctoral levels. However, salaries can vary across departments. Since NS faculty belong to different departments, students working side by side in the same lab may find that their stipends are inequitable, since they are set by the home department. As a step toward emancipation we are determined to remove these differences.

Appendix C. List of special pathways, options, certificates, etc. within degree:

MS, MPH-Nutrition *(under Department of Epidemiology umbrella)*, PhD, as well as DI certification (R.D.)—offered alone or in combination with MS, MPH, or PhD.

	2001-2002	2002-2003	2003-2004
*Number of Dietetic Interns (DI) graduated in each of the last 3 years	6	8	8
**Didactic Program in Dietetics (DPD) graduated in each of the last 3 years	4	5	6
*added for Dietetic Internship (DI)			
** added for the Didactic Program in Dietetics (DPD)			

RD-eligible certification (past 3 years):

2002	2003	2004
April Black*	**Eva Almiron-Roig***	**Xenia Averkiou***
Charlotte Furman*	Robin Bayless**	**Adrienne Bartlett***
Lynnette (Kometer) Severy*	**Holly Callahan***	Sarah Bruner**
Jacqueline Messner*	Stephanie Gundel**	**Nicole Campbell***
Chloe Tay*	Cristina Lattuga**	**Katie Cumpston***
Mandee Vimont*	**Melissa Mortensen***	Bethany Fong**
	Leah Paddock**	**Erica Lamson***
	Diane Summers**	Melicent Smith**
*** Received RD here and MS/MPH or PhD**		
** Received RD here, ONLY		

Appendix D. List of faculty by rank; include list of dissertation committees chaired (5y)

Core faculty		Student	Title
Professor			
Shirley Beresford	Sp 2000	Suparna Rajan	*Screening for the treatment of cobalamin deficiency in older adults*
	W 2001	Victoria Warren-Mears	*Folic acid and the prevention of neural tube defects*
	S 2001 Co-chair	Cheryl Anderson	*The response of blood folate levels to folic acid supplementation*
Alan Chait			
Adam Drewnowski	S 2001 Co-chair	Teresa Kemmer	*Iron deficiency anemia in refugee children from Burma*
Alan Kristal			
Renee LeBoeuf	S 2000	Shie, Feng-Shiun	*Cholesterol and Alzheimer 's disease*
	S 2003	Tim McMillen	*Role of Myeloperoxidase in inflammatory diseases*
Elaine Monsen			
Michael Rosenfeld	Sp 2000	Julie McMinn	*Long and short-term regulators of energy balance*
	W 2002	Jennifer Shultz	*Effects of sex steroids and diet on cardiovascular disease risk factors*
	A 2002	Rebecca Eastgard	*Diet-induced hyperhomocysteinemia in a mouse model*
	Sp2003	Tanis Mihalynuk	*What is the essential nutrition information that should be included in medical school, residency and continuing medical education?*
Associate Professor			
Johanna Lampe	W 2000	Neilann Horner	*Comparison of self-reported energy and fat intake with biomarkers in post-menopausal women*
	S 2001 Co-chair	Cheryl Anderson	*The response of blood folate levels to folic acid supplementation*
Ruth Patterson#	A 1999	Jessie Satia	*Diet, acculturation, and health in Chinese American women*
Assistant Professor			
Carrie Cheney#	Sp 1999	Alison Rigby Matthews	*The control of interdialytic weight gain in hemodialysis patients*
	A 2001	Karen Spears	*Relationship of a vitamin A status to bronchopulmonary dysplasia in a large pre-term infant cohort*
Glen Duncan			
Donna Johnson			
Elizabeth Kirk			

Cornelia Ulrich	A 2003	Kimberly Robien	*Folic status and risk of relapse following allogeneic hematopoietic cell transplant for chronic myelogenous leukemia*
Senior Lecturer			
Barbara Bruemmer			
Lecturer			
Janet Leader#			
Jane Rees			
Cris Trahms			

#no longer at UW

Appendix F. Academic Unit's mission statement

The mission of the Program in Nutritional Sciences is to promote better health and prevent illness through increasing the understanding of nutritional science, and to carry out the University's broad mission of teaching, research, and service. In doing so, we want to provide an environment that promotes excellence in research and excellence in education through instruction and research opportunities. We have defined the following principal goals:

- To expand the base of knowledge in nutritional sciences through careful research in the areas of public health, clinical, and experimental nutrition.
- To train students in nutritional sciences so that they can conduct quality research in experimental, clinical, and public health nutrition, and apply nutritional science knowledge to promote health in community and health care delivery settings.
- To disseminate, integrate, and enhance the application of nutritional science knowledge in community and health care settings.
- To promote better health through meaningful nutrition service activities in the University and the community.

11/8/99 (revised)

Appendix H. HEC Board summary

a. *Name of units*: **Interdisciplinary Graduate Program in Nutritional Sciences**

b. *School or College*: **School of Public Health and Community Medicine and the Graduate School**

c. *Exact Titles(s) of degrees offered*: **MS, MPH-Nutrition, PhD**

d. *Year of last review*: **1997**

e. *Brief description of the field and its history at the University of Washington:* Nutritional Sciences has been an active discipline at the University of Washington since the early part of this century. During the early 1980's, as a result of a serious financial emergency, the School of Nutritional Sciences was one of the programs targeted for elimination by the Dean of the College of Arts and Sciences. After intense review, it was recognized that the discipline of nutritional sciences was a necessary component of the university. Thus the Interdisciplinary Graduate Program in Nutritional Sciences was organized in 1984, administered by the Graduate School. Although the undergraduate degree program was eliminated, undergraduate courses were retained to service the School of Nursing and to meet undergraduate science distribution requirements. Meanwhile, the graduate program was enhanced with the addition of an interdisciplinary doctoral program in nutritional sciences, approved in 1988, along with a graduate level Dietetic Practicum Program, currently the Dietetic Internship Program. In 1993, the Interdisciplinary Graduate Program in Nutritional Sciences joined the School of Public Health and Community Medicine (SPHCM). The Department of Epidemiology now administers the program while the director of the Nutritional Sciences Program provides the day-to-day supervision. Rapid developments in the field, combined with strong public interest and the increasing recognition of its role in disease prevention and treatment, require that attention to nutritional sciences be aggressively maintained. It encompasses a variety of approaches from molecular biology, genetics and bench science on the one extreme to clinical nutrition therapy and public health assessment/intervention on the other. Accordingly, the Nutritional Sciences Program includes faculty with expertise in these diverse areas, whose common goal is to improve the health of the public.

f. *Documentation of continuing need for your program:* As public health research and practice continues to recognize the integral role of nutritional factors in understanding population health, chronic disease risk and mechanisms of disease etiology, the need for the program is self-evident. Positions continue to open up at the public health level as well as at the academic level and in associated research institutions. Well-trained and broadly-trained individuals such as those emerging from this program are sought after.

g. Assessment information relating to student learning outcomes and program effectiveness: We have conducted surveys and focus groups with current students and alumni to evaluate program effectiveness and the value of the nutrition curriculum. There were major areas of agreement as to the topics considered high-priority by both faculty and students, such as basic nutrition science or nutrition assessment. There were also areas of discordance where students and alumni

indicated a higher need for competency on a specific topic than did the faculty, e.g. health promotion, practice and utilization of evidence based medicine and the etiology and treatment of nutrition related disorders. Faculty tended to rate topics in food and nutrition policy higher than did alumni; on the other hand the alumni expressed an interest in ethics of professional care. Focus groups then explored the results of this survey with representatives of each of the three groups, providing provided additional insights into the continuum of needs from didactic education to practice. The quantitative and qualitative information was then reviewed by the curriculum committee for consideration in design of the new curriculum.

h. *Please complete the following grid:*

	2001-2002	2002-2003	2003-2004
Number of undergrad majors graduating from unit in each of the last 5 years	n/a	n/a	n/a
Number of master's (MS and MPH) degrees granted in each of the last 3 years	MS – 1 MPH - 2	MS – 8 MPH – 4	MS – 2 MPH -2
Number of doctoral degrees granted in each of the last 3 years	4	2	3

i. *Plans to improve the quality and effectiveness of the program. What is the process by which your unit sets its overall goals? How often are departmental goals reviewed and reassessed? In what ways do you anticipate the goals of your program will change in the next 10 years? Describe your goals for the next 5-7 years. Describe areas and strategies for developing your potential for academic and pedagogical leadership in your field. How could the college and/or university assist you in achieving your goals, especially through means other than increased budgets?*

The NS Program sets its goals through iterative faculty meetings, task forces and retreats. Over the past several years we have gone through a number of self-studies, self-evaluations and other reports. The 1997 Program self-study was reviewed by the 1998 Ad Hoc Review Committee for the Program in Nutritional Sciences. The Program then developed a response to the committee report in December 1998 and submitted a further 2-year progress report in March 2001. At the same time, the NS Program was undergoing a separate self evaluation to maintain outside professional accreditation in dietetics by the American Dietetic Association. That 2-year self study was completed in 2000, resulting in a 10-year approval by the ADA. Since 2000, the NS Program has engaged in another self-study, preparatory to curriculum review and restructuring. The curriculum revision process is now being completed, with the new curriculum to be launched in the autumn of 2005. In addition, core Program faculty (Drs. Drewnowski, Bruemmer, and Johnson) develop the agenda for the Center for Public Health Nutrition, and are also involved in the ECOR project (Dr. Drewnowski, Bruemmer, Duncan and Johnson). As a result, the faculty meet to discuss program-related issues at least once a week.

The 1998 Ad Hoc Committee made a number of useful suggestions that are detailed below. For the most part, the goals set out for the Program by that review panel have been achieved and even surpassed. Those suggestions and comments are listed below.

1. *There is an acute need for strategic planning to occur. The plan should be submitted to the Deans for review.*
   Strategic planning for the Program did occur. The first plan was submitted to the Deans in December 1998, two months after the arrival of the new Program Director.

2. *It is recommended that the program should be re-evaluated in 5 years.*
   The Program submitted a 2-year Progress Report in 2001 and was initially scheduled for a re-evaluation in 2003.

3. *Identify funding sources to enhance student and faculty resources. This should include the writing of training grants to support graduate students fellowships and research. If a strong department in nutrition is developed, it would enhance the UW ability to attract funding for center and program initiatives focused on nutrition.*
   We have identified and secured numerous funding sources. Without the benefit of a strong departmental structure, we have secured not one but *two* centers focused on nutrition: CPHN and ECOR. Two training grants in nutrition, behavior and cancer prevention were written (Dr. White and Dr. Patrick); they are open to qualified nutrition students. The development of a strong department in nutrition may be the next step.

4. *The administrative link to the Graduate School should be gradually eliminated. The appointment of a strong Director, a clearly articulated mission statement related to program goals, and integration of program faculty into the SPHCM will decrease the need to be linked to the Graduate School.*
   The Program did acquire a Director in 1998; has developed a clearly articulated mission statement, and is now better-integrated into the SPHCM. The issue of eliminating administrative links to the Graduate School has not been discussed so far, but opportunities for doing so may arise from this review.

5. *There needs to be greater communication among the Schools of Medicine and Public Health and the FHCRC related to the NS Program.*
   The Program Director has senior-level appointments in the Schools of Medicine (Adjunct Professor), Public Health and Community Medicine, and at the FHCRC (member). Those important links help to keep the Program at the top of everyone's agenda. Furthermore, several senior members of the FHCRC have become valued core members of the Program; their assistance has been critical to the NS Program's success.

6. *Shift to an MPH-RD program (phase out the MS-RD program) would be a mechanisms to strengthen the ties to the SPHCM. It is likely that the future training of graduate RDs will be more at the level of community rather than acute care based. Thus the shift would better prepare students for future opportunities.*
   The MPH/RD degree track is indeed thriving. The training of graduate RD has indeed become more community than acute care based – we recognized that in 2000 in mounting the community track for the Dietetic Internship. On the other hand, the MS/RD track is still popular, notably with some of our foreign students who may practice nutrition in their own country.

7. *It is important to strengthen the PhD program.*
   The PhD program was greatly strengthened by making the laboratories at the FHCRC available to graduate students in nutrition. Drs. Lampe, Ulrich, Beresford, and White have been supervising and supporting the training of students over the past several years.

8. *Re-establish the reputation for nutrition sciences research at this university. One mechanism for accomplishing this goal may be to initiate strong collaborative ties with both the FHCRC and the School of Medicine. This would hopefully ensure the successful participation of these schools in the PhD program and the training of nutrition scholars.*
   We have established strong collaborative ties with both Medicine and the FHCRC. Both now participate in the training of nutrition PhDs. The ECOR award is specifically intended to promote collaborative ties between biomedical sciences, public health and units on the Upper Campus. When the time comes to submit a Center of Excellence proposal for obesity research coming from Washington State, the Nutritional Sciences program will most likely take the lead.

Appendix I. PhD student publications, papers and abstracts, and meetings

Publications:

Brian Bennett, Bea F, Blessing E, Bennett BJ, Juo CC, Campbell LA, Kreuzer J, Rosenfeld ME. Chronic inhibition of cyclooxygenase-2 does not alter plaque composition in a mouse model of advanced unstable atherosclerosis. Cardiovasc. Res. 2003, Oct. 15;50(1):198-204.

Yu Chen, Almiron-Roig E, Chen Y, Drewnowski A. Liquid calories and the failure of satiety: how good is the evidence? Obesity Rev. 2003, Nov. 4(4):201-12.

Bea F, Puolakkainen MH, **McMillan T**, Hudson FN, Mackman N, Chou Kuo C, Campbell, LA, Rosenfeld ME. Chlamydia pneumoniae induces tissue factor expression in mouse macrophages via activation of Egr-1 and the MEK-ERK1/2 pathway. 2003 Circ. Res. 92:394-401.

Peterson S, Lampe JW, Eaton DL. Genetic susceptibility to dietary carcinogens. In: Pesticides, veterinary and other chemical residues in food. Cambridge, Woodhead Publishing Ltd. (in press)

Robien K, Ulrich CM. 5,10-Methylenetetrahydrofolate reductase gene variants and leukemia: a HuGE minireview. Am. J. Epidemiol 2003; 157(7):571-582.

Ulrich CM, **Robien K**, McLeod H. Cancer pharmacogenetics: polymorphisms, pathways, and beyond. Nat. Rev. Cancer 2003, 3(12):912-920.

Robien K, Schubert MM, Lloid ME, Bruemmer B, Potter JD, Ulrich CM. Predictors of oral mucositis in patients receiving hematopoietic cell transplants for chronic myelogenous leukemia. J. of Clin. Oncology 2004; 22(7);1268-1275.

Robien K, Ulrich CM, Bigler J, Yasui Y, Gooley T, Bruemmer B, Potter JD, Radich JP. Methylenetetrahydrofolate reductase genotype affects risk of relapse following hematopoietic cell transplantation for chronic myelogenous leukemia. Clin. Cancer Res. (in press).

Thompson OM, Ballew C, Resnicow K, Must A, Bandini LG, Cyr H, Dietz WH. Eating food prepared away from home as a predictor of change in BMI z-score among adolescent girls. International Journal of Obesity 28, 282-289, Feb. 1, 2004.

Papers, abstracts and meetings:

Chondrocyte-Like Cells and Calcification of Advanced Atherosclerotic Lesions in the Innominate Arteries of Older ApoE-Null Mice. **Brian J. Bennett**, Marcello Rattazzi, Elizabeth A. Kirk, Florian Bea, Mei Y. Speer, Cecilia M. Giachelli, Michael E. Rosenfeld. Abstracts of the 5th Annual Conference on Arteriosclerosis, Thrombosis, and Vascular Biology. Arterioscler Thromb Vasc Biol 2004, 24:e51-e136.

Infection of Macrophages with Chlamydia Pneumoniae May Contribute to Vascular Calcification and the Conversion of Smooth Muscle Cells to an Osteoblast/Chondrocyte-Like Phenotype. Marcello Rattazzi, **Brian J. Bennett**, Kambiz Yaraei, Florian Bea, Lee Ann Campbell, Cho-chou Kuo, Paolo Pauletto, Cecilia M. Giachelli, Michael E. Rosenfeld. Abstracts of the 5th Annual Conference on Arteriosclerosis, Thrombosis, and Vascular Biology. Arterioscler Thromb Vasc Biol 2004, 24:e51-e136.

Chen Y, Bigler J, Lampe JW. Effects of Isoflavones on Gene CpG Island Methlation in Colonic Cancer Cell Lines. CME jointly sponsored by University of Minnesota and the American Association for Cancer Research.

McMillen T, Heinecke J, LeBoeuf R. Accelerated atherosclerosis in myeloperoxidase transgenic mice. Abstract. 4th Annual Conference on Arteriosclerosis, Thrombosis and Vascular Biology, 2003.

Peterson S, Bigler J, Horner NK, Potter JD, Lampe JW. Dietary determinants of serum bilirubin in relation to UGT1A1*28 polymorphism. Presented as poster at AACR's Frontiers in Cancer Prevention Research, Seattle, WA., October 2004.

Peterson S, Lampe JW, Guo Y, Bammler TK, Eaton DL. Apiaceous vegetable constituent inhibits CYP1A2-mediated aflatoxin mutagenicity: implications for CYP1A2-activated procarcinogens. Presented as poster at Experimental Biology annual meeting, Washington, DC, April 2004.

Peterson S, Lampe JW, Gross-Steinmeyer K, Guo Y, Bammler TK, Eaton DL. Effects of phytochemicals on CYP1A2 activity in humans and a yeast expression system: implications for aflatoxin metabolism. Platform presentation at Pacific Northwest Association of Toxicologists' annual meeting, Bend, OR, September 2003.

Peterson S, Gross-Steinmeyer K, Lampe JW, Bammler TK, Easton DL. Human CYP1A2 inhibition: effects of apiaceous vegetable constituents. Presented as poster at Experimental Biology annual meeting, San Diego, CA, April 2003.

Peterson S, Gross-Steinmeyer K, Lampe JW, Bammler TK, Eaton DL. Inhibition of human CYP1A2 by phytochemicals in apiaceous vegetables. Presented as poster at Pathobiology of Cancer Workshop, American Association.

Appendix J. General Catalog Course Descriptions

NUTR 300 Nutrition for Today (3) NW *Bruemmer*
Science of nutrition as it relates to individual food choices, health behaviors, public health. Health topics include wellness, obesity, eating disorders, sports nutrition, prevention of chronic disease. Nutrients and nutritional needs across the lifespan. Issues facing society including food safety, biotechnology, use of supplements and botanicals. Offered: A.

NUTR 441 Chemistry of Foods (3) *Peck*
Principles of food science integrated with laboratory sessions that observe the effects of various parameters of food composition, and applied sensory evaluation. Explores current trends in the culinary sciences to promote pleasurable eating. Recommended: general and organic chemistry. Offered: odd years, S.

NUTR 445 Food Policy and Food Safety (3-5) *Bruemmer*
Presentation of emerging issues in food safety, food policy, including food and nutrition regulatory and legal issues, labeling; sanitation; biotechnology; and consumer perception of nutritional risk. Lab element examines objectives of management in the delivery of safe food; receiving systems; inventory control, menu planning, and cost control. Recommended: microbiology. Offered: even years; S.

NUTR 462 Medical Nutrition Therapy I (2) *Peck*
Intervention strategies, counseling skills, and diet modifications that pertain to chronic disease prevention and management. Co-requisite: NUTR 562. Offered: W.

NUTR 463 Medical Nutrition Therapy II (2) *Peck*
Didactic training in nutrition support theories and skill development for interpretation of laboratory values. Management of fluids and electrolytes, and nutrition interventions in acute care. Pre-requisite: NUTR 462; Co requisite: 563. Offered: Sp.

NUTR 465 Nutritional Anthropology (3) I&S/NW *Shell-Duncan*
Concerns interrelationships between biomedical, sociocultural, and ecological factors, and their influence on the ability of humans to respond to variability in nutritional resources. Topics covered include diet and human evolution, nutrition-related biobehavioral influences on human growth, development, and disease resistance. Pre-requisite: BIO A 201. Offered: jointly with BIO A 465; odd years; A.

NUTR 499 Undergraduate Research (1-5, max. 10) *Faculty*
Independent study and research supervised by a faculty member with appropriate academic interest. Offered: AWSpS. *Credit/No Credit.*

NUTR 500 Graduate Seminar: Current Issues in Nutrition (1, max. 4)
A review of current topics in nutritional science and public health nutrition. Provides a forum for student and faculty presentation, and review of current research efforts. Pre-requisite: graduate student in nutrition. Offered: AWSp. *Credit/No Credit.*

NUTR 520 Protein and Carbohydrate Nutrition (4) *Kirk, Rosenfeld*
Metabolic/physiologic concepts related to protein and carbohydrate nutrition. Areas addressed include composition of foods, requirements through the life cycle, quality of protein, vegetarianism, protein deficiency, carbohydrates of physiological importance, low carbohydrate diets, glycemic response to foods, carbohydrates and dental caries, inborn errors in carbohydrate and protein metabolism. Pre-requisite: biochemistry. Offered: A.

NUTR 521 Lipid Nutrition (4) *Kirk, Rosenfeld*
Normal lipid components of animal fluids and tissues, with review of their metabolism and physiological functions. Effect of diet and the normal development during the life span of these lipid metabolism. Changes of lipids with various types of disease states and means of nutritional modification of these changes. Pre-requisite: biochemistry. Offered: W.

NUTR 522 Vitamin and Mineral Nutrition (4) *Kirk, Rosenfeld*
Advanced study of biologically essential minerals and vitamins. To include absorption, transport, function, storage, excretion; imbalance, deficiency and toxicity; dietary sources; role of these nutrients in prevention diseases directly on indirectly (such as cancer, dental caries); role of modern food technology on availability of these nutrients in our food supply. Pre-requisite: biochemistry. Offered: Sp.

NUTR 525 Evaluation of Nutritional Status (3) *Duncan*
Dietary, clinical, and biochemical components in the assessment of nutritional status of individuals and groups. Interrelationships of nutrients and effects of varying levels of nutrient intake. Critical appraisal of nutritional status surveys. Experimental design and dietary methodology. Pre-requisite: human nutrition and biochemistry. Offered: A.

NUTR 526 Maternal and Infant Nutrition (3) *Johnson*
Influence of maternal and infant nutrition on the health of populations. Nutrition-related physiological, psychological, and social factors in pregnancy, lactation, and infancy. Application of evidence-based approaches to maternal and infant nutrition recommendations and interventions for populations and high-risk individuals. Pre-requisite: human nutrition and human physiology. Offered: A.

NUTR 527 Nutrition: Childhood Through Adolescence (3) *Rees, Trahms*
Interactions of nourishment with behavior, growth, and development of children, from infancy through adolescence. Critical evaluation of normative data and special problems, as well as strategies for individual and public health interventions. Pre-requisite: graduate student in nutritional sciences or permission of instructor. Offered: even years; Sp.

NUTR 528 Nutrition in Aging (3) *Drewnowski*
Physiological, psychological, social, cultural, and economic factors affecting health and nutritional status in the middle and later years. Pre-requisite: human nutrition and human physiology. Offered: odd years; Sp.

NUTR 529 Nutrition Research Design (3) *Drewnowski*
Critical review of selected nutrition literature. Evaluation of experimental design, research

protocols, data analyses, and data presentation. Pre-requisite: BIOST 511. Offered: odd years; W.

NUTR 530 Nutrition for Children with Special Health Care Needs (3) *Lucas*
Principles of nutrition screening and assessment, clinical nutritional care, family-centered care, and health services as applied to meeting nutritional needs of children with special health care needs. Both population-based and individual care concepts are explored for children with a variety of chronic conditions. Offered: odd years; Sp.

NUTR 531 Community Nutrition (3) *Johnson*
The functions of public health as applied to nutrition: nutrition monitoring and assessment, assuring access to food and a safe food supply, and national nutrition policy. The practice of public health nutrition: the nutrition environment, program planning, implementation, and evaluation. Offered: W.

NUTR 532 Fieldwork in Public Health Nutrition (1-12, max. 12) *Peck*
Experience and service learning in organizations that plan, deliver, and promote population-based nutrition education and nutrition services. Pre-requisite: Nutritional Sciences graduate student and permission of instructor. Offered: AWSpS. *Credit/No Credit*.

NUTR 537 Laboratory Rotation (1-4, max. 6) *Faculty*
Exposure to research being conducted in the laboratories of the graduate nutrition faculty. Provides hands-on experience in laboratory research. Introduces the student to on-going research for preparation of dissertation topics. Pre-requisite: permission of instructor. Offered: AWSpS.

NUTR 538 Nutritional Epidemiology (3) *Beresford, Drewnowski*
Application of epidemiological methods to current studies of diet, nutrition, and chronic disease. A discussion of current issues and controversies enable students to plan studies in nutritional epidemiology and disease prevention. Pre-requisite: EPI 511 or EPI 512 and BIOST 511 or permission of instructors. Offered: jointly with EPI 538; A.
Instructor Course Description: *Shirley A. Beresford*

NUTR 539 Nutrition Journal Club (1-3, max. 9) *Duncan*
Critical evaluation of research on selected topics in the field of nutrition. Pre-requisite: graduate student in nutrition. Offered A,W,Sp. *Credit/No Credit.*

NUTR 551 Nutrition and Gene Expression (3) *Rosenfeld*
Lectures, student presentations, and discussions of current research on nutrient:gene interactions. Focus on how dietary factors act both directly as transcriptional regulators or indirectly as inducers of signal transduction cascades leading to alterations in expression of proteins associated with cellular nutrient metabolism. Pre-requisite: NUTR 520, NUTR 521, NUTR 522, or permission of instructor. Offered: W.

NUTR 561 Dietetics Internship (6-10, max. 30) *Peck*
Focuses on the competencies for entry-level practice in dietetics. Autumn and winter quarters include core experiences in wellness, public health, food service, ambulatory care, home health,

and clinical services. Spring quarter activities are devoted to either nutrition therapy or public health, depending on student's career goals. Pre-requisite: clinical students only. Offered: AWSp. *Credit/No Credit*.

NUTR 562 Nutrition and Chronic Disease (4) *Bruemmer*
Epidemiology/pathophysiology of chronic disease related to nutrition (e.g., obesity, cardiovascular disease, osteoporosis, hypertension, diabetes). Examines nutritional risk/protective factors in relation to public health, individual nutrition, and clinical intervention. Pre-requisite: physiology, biochemistry. Offered: W.

NUTR 563 Nutrition in Acute Care (4) *Bruemmer, Peck*
Assessment of the nutritional demands and hypermetabolic response of trauma, surgery, organ failure, burns, AIDS, and neoplastic disease. Examines specialized nutritional support and substrate requirements in the acute care setting. Pre-requisite: NUTR 562, or permission of instructor. Offered: Sp.
Instructor Course Description: *Barbara Bruemmer*

NUTR 564 Management of Nutrition Services (4) *Bruemmer*
Policy and administrative issues that impact delivery of nutrition services in health care environments. Topics include organization behavior, productivity, financial environments, clinical management, and human resources. Offered: odd years; S.

NUTR 581 Strategies of Health Promotion (4) *Bowen*
Assessment of health promotion planning, implementation, and evaluation strategies for their strengths, weaknesses, and effectiveness. Students critique strategies to modify behavioral factors that influence lifestyles of individuals, including decisions influencing their reciprocal relationship with environmental factors affecting the health of individuals, organizations, and communities. Pre-requisite: HSERV 511. Offered: jointly with HSERV 581; Sp.

NUTR 595 Nutritional Sciences Master's Practicum (1-12, max. 12) *Peck*
Supervised practice experience providing students an opportunity to learn how nutritional sciences are applied to public health settings and in the formulation and application of public health policy. Pre-requisite: HSERV 511; NUTR 531; EPI 511; NUTR 520; 521; 522: Offered: AWSpS. *Credit/No Credit.*

NUTR 600 Independent Study or Research (*)
Pre-requisite: permission of faculty. Offered: AWSpS. *Credit/No Credit*.

NUTR 700 Master's Thesis (*)
Pre-requisite: permission of faculty. Offered: AWSpS. *Credit/No Credit*.

NUTR 800 Doctoral Dissertation (*)
Pre-requisite: permission of faculty. Offered: AWSpS. *Credit/No Credit*.