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feature article

The Many Faces of Health: Dialogue and Research at the University of New Hampshire

—Emily D. Robbins, *Inquiry* assistant editor (Edited by Brigid C. Casellini and Jennifer Lee)

*“Research is to see what everybody else has seen,
and to think what nobody else has thought.”*

—Hungarian Biochemist Albert Szent-Gyorgyi, 1937 Nobel Prize for Medicine

Becoming and staying healthy seems to get more complicated every year. We have learned so much—and still know so little—about what makes us sick or keeps us well. What we do know is that physical well-being is closely connected to mental and social well-being, but exactly how and to what extent is still a mystery. At the University of New Hampshire undergraduate researchers and their faculty mentors are investigating the many aspects of this mystery.

The locations as well as the subjects of their research are wide-ranging—from campus labs to the local community to foreign countries. The students investigate the effects on health of exercise, nutrition, social interaction, nursing practices—and more. In the process they learn different research methods, such as creating surveys, designing experiments, and carrying out complex chemical and statistical analyses.

Each year the University sponsors a university-wide discussion on a theme of local and global significance. This year it is *Taking Care of Self and Community: A University Dialogue on Health*. The Dialogue includes programs on the diverse aspects of health and a collection of essays by University faculty. Along with providing information, the Dialogue also introduces students to the any opportunities for health research on campus. “There’s a synergy that comes from a combination of what is going on nationally and globally as well as what is happening on campus,” Discovery Program Administrative Director Michele Holt-Shannon says. “Having a central theme across campus encourages students to discuss topics from different perspectives. We hope this will help students develop research interests.”



*Students doing Tai Chi on Thompson Hall Lawn as a part of the University Dialogue on Health.
Credit: Taras Ferencevych, RHD Smith Hall.*

As famous scientist Dr. Carl Sagan said, “Somewhere, something incredible is waiting to be known.” Following is a brief survey of some of the health-related research into the “incredible” carried out by undergraduate researchers at UNH.

Let’s Get a Move On: Exercise and Health

Exercise science major Kevin Koski (‘10), believes that there is something to be known about how much “heart” goes into certain types of exercise. He focused his senior research project on the different effects of strength and endurance training on arterial stiffness (the reduced ability of the heart to expand and recoil in response to the heart’s contractions). To

conduct this research, Kevin placed a pencil-sized pressure sensor on the wrists of his subjects, some of whom had just completed either endurance exercise or strength training. In this non-invasive procedure, called applanation tonometry, the sensor detects a pulse wave from the heart and measures arterial stiffness.

Heather Macomber ('09) also researched the effects of physical exertion, but she focused specifically on the neurotransmitter system and resulting mental condition. Unlike Kevin, Heather performed her tests on rodents in a lab. She subjected male rats to forced and intermittent stress swim tests to measure their levels of behavioral depression. Her research methods involved using Plexiglas cylinders, wire meshing and a tank of water.

Psychology major Courtney Stevens ('10) took a different approach to measuring exercise outcomes; she worked outside the lab, walking around campus with groups of students to determine whether the long-term, physiological benefits of walking, such as weight loss and lower heart rate, or the short-term benefits of mood improvements would be more likely to make students stick to a walking program. Courtney recruited sixty students from a Research Experience course and divided them into three groups: "mood benefits walking group", "physical benefits walking group", and a control group. Students who participated in Courtney's experiment walked twice a week for twenty minutes. After taking before and after "mood ratings" from the mood walking group and before and after heart rates from the physical benefits group, Courtney compared the data to a baseline survey she had administered at the beginning of the semester.

Campus walking, according to UNH-Manchester physiologist and biological sciences Lecturer Dr. Patricia Halpin, could be the key to obtaining a healthy and active life style for college students. In her University Dialogue essay, "Too Busy to be Healthy? Join the Club," Dr. Halpin addresses some of the exercise barriers that college students face. "It may seem as if college students are at a disadvantage because their schedule is decided for them," she says. "If someone preferred to exercise in the afternoon and now they have classes or labs every afternoon, they would consider themselves unable to exercise." Because of such obstacles, Dr. Halpin encourages students to "think about the alternatives." For example, she suggests walking from campus parking lots to class instead of riding the bus and taking the stairs instead of the elevator. In conjunction with increased daily activity, Dr. Halpin discusses the importance of nutrition in this health initiative, too. "Instead of a poor choice of snack or caffeine, have a big glass of water and grab . . . an apple, a box of raisins, or vegetables pre-sliced and ready to go. The benefit is huge and the energy boost will last you until dinner."

How Food Feeds Us: Nutrition and Health

Dr. Gale Carey, a nutritional science professor at UNH, writes about the importance of nutrition in addition to exercise in her University Dialogue essay, "Dodge This: Do Environmental Chemicals Impact Your Health?" Dr. Carey discusses the chemicals found in food that may have negative effects on our bodies. Flame retardants, for example, may be absorbed by foods we eat every day, entering our bodies during the digestion process. Dr. Carey and her colleagues documented the effects of these chemicals in rats, noting that they "disrupt fat cell response to hormones, promote preference for sweet beverages, and cause weight gain." The implication? Flame retardants could be obesogens—chemicals that promote obesity. Some 20,000 scientific papers have been published worldwide on these endocrine-disrupting compounds. Dr. Carey's research is contributing to an international effort to better understand the danger of environmental chemicals to human health.



Naomi Crystal, pricking the fingers of one of her research volunteers for a study on blood glucose.

On a more local level, Naomi Crystal ('09) studied how Omega Smart nutrition bars impact a person's glucose level. Omega Smart is a small New Hampshire company that produces organic, whole food bars that are rich in antioxidants, omega-3 fatty acids and fiber, and contain no refined sugar, preservatives, or other additives. Through her work in the UNH nutrition lab, Naomi determined that Omega Smart bars have a low glycemic index (GI), meaning that when consumed, they cause a minimal rise in a person's blood glucose level. This allows Omega Smart to label certain bars "Low GI"—a desired tag in the health world, as a low GI diet has been shown to reduce the risk of many diseases including cancer, and is especially important for diabetics. As a result of her success with this experiment, Omega Smart invited Naomi to develop a new nutrition bar for them, which will be distributed with their existing recipes. Now pursuing a master's

degree in kinesiology (also at UNH), Crystal's research demonstrates the interplay between different disciplines: biochemistry, marketing and nutrition. Each discipline, Naomi says, informs the others.

While some of Kayla O'Meara's ('12) research took place in the same UNH nutrition lab, it also brought her off campus to five local farms. With support from UNH's Research Experience and Apprenticeship Program (REAP), Kayla completed a cheese-making apprenticeship as well as independent research on the health benefits of certain compounds in milk fat. She discovered that grass-fed cows produce cheeses that are more yellowish in color and vary widely in flavor because of seasonal influence on pasture.

Benjamin Dudek ('09) wrote his senior honors thesis on a similar theme: the idea that any food should be able to be traced back, step by step, to its natural geographical roots. Benjamin studied how carbon and nitrogen isotopes (atoms with the same atomic number with different numbers of neutrons) can be analyzed to determine where foodstuff—such as meat or dairy—originated. Benjamin used human fingernail samples, complex equations, and equipment such as a mass spectrometer to show that the increased stomach acid found in corn-fed cattle (versus grass-fed cattle) has led to an increased incidence of salmonella poisoning. Findings such as these have implications far beyond a UNH lab; they demonstrate that nutrition is more than what you put in your mouth.

The Social Side of Things: Psychology, Sociology, and Health

It is often more difficult to “say definitively what causes what” in social science research than in the laboratory experiments of biologists and physicists. UNH Sociology Professor, Dr. Michele Dillon, discusses this in her University Dialogue, “Is It Good to Do Good? Altruism and Health.” She writes that “it is not always possible to isolate one set of experiences from another; there are a lot of intricate interconnections that together have an impact on specific outcomes.”

As a result, the more subjective psychological and sociological studies are often difficult to conduct. Kristina Breton ('09) knows this first-hand. For her senior honors thesis, “Dating Patterns at UNH: Hooking up vs. Dating,” she used her psychology degree to examine just exactly what was happening in UNH bedrooms.

The research process, which Kristina notes was “full of trial and error,” required that she supplement statistical analysis with qualitative research so she could contextualize the numbers she obtained through an anonymous online survey. “It takes a lot of time, patience, and effort to fully reach the questions you wish to answer,” Kristina says. Her effort, though, paid off: Kristina was able to identify a trend she did not expect in her research. Despite the prevalence of “hooking up” on campus, 89.7% of participants stated that a “healthy” committed relationship was more rewarding than hooking up. Kristina's commitment to social research earned her an acceptance at the Simmons School of Social Work, which she is considering attending in fall 2010.



Kristina Breton and her thesis advisor, Rebecca Warner, at the Psychology Department's George M. Haslerud Undergraduate Research Conference in 2009.

Nursing student and UNH soccer player Lia Barros ('07) also demonstrated how qualitative data can help shed important light on “specific outcomes,” as Dr. Dillon calls them. Lia chose to study college athletes' perceptions of their susceptibility to alcohol use. She wanted to understand why a group, “so centered on health and performance, could practice negative health behaviors” such as binge drinking. In order to gather her data, Lia talked with college athletes, transcribed these interviews, and arranged patterns and subjects into themes to identify relationships that came out of the conversations. “From this process of examination and categorization,” Lia says, “I made a schematic representation, or working model, for each group.” The tree-like model represented the central themes. “In this way I could see the significance of my data and make it easier to share with nurses and others dealing with this problem,” explains Lia.

Such a model helped Lia to come to her surprising conclusion that gender played more of a role in college athletes' drinking mentalities than their collective identity as athletes. Without a “system” to interpret these findings, Lia might never have been able to recommend that college athletes' alcohol education “should be gender specific, taking into account the genders' differing views of college stresses and identity in conjunction with drinking.”

Both Lia's and Kristina's research are good examples of how multiple research methods often are needed to provide a comprehensive understanding of a topic. The two UNH graduates not only conducted important studies, but they also anticipated and dealt with the "intricate interconnections" in the social sciences which Dr. Dillon speaks of.

It's the Act of Doing Research that Counts Most

As writer Zora Neale Hurston said, "Research is formalized curiosity. It is poking and prying with a purpose." Soon into writing this article, I realized that, regardless of the research topic, natural curiosity and inquisitiveness inspire UNH students and faculty to study health from many different angles, using diverse approaches. A desire to give meaning to their work motivates them to apply their findings and share their research experiences with the greater UNH community. In the words of Naomi Crystal: "As with any health-related field, I must be able to communicate with the public. Otherwise, what I know does not help anyone."

In order to teach all UNH students to poke and pry, the University will replace the current general education requirements with the Discovery Program in fall 2010. The class of 2014 will be the first required to take a research-based inquiry course in a discipline of their choice. "We hope that this experience pipelines students to really explore and find a place where they might develop research interest," says Discovery Program Administrative Director Michele Holt-Shannon. In other words, it doesn't matter what you study as long as you learn the skills to research your topic. Holt-Shannon hopes that instead of "filling a bucket with knowledge," UNH students and graduates will feel, move, and eat like active, *healthy* researchers.

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Author Bio

*Relinquishing her secret desire to be a party planner, **Emily Robbins**, a native of Cornish, New Hampshire, is pursuing an MFA in nonfiction writing at the University of New Hampshire. She received a BA in community health from Brown University in 2006. While serving as assistant director of the Writing Fellows Program at Brown and later as a newspaper editor in Norwich, Vermont, Emily developed a love of writing and of helping authors work through their creative process. Currently, she is writing a book which incorporates ethnographic research on women's experiences with body weight and the effects of our culture's obsession with this issue. On a more personal level, she reveals that she loves to write memoir. Aside from her academic and professional interests, Emily cultivates her love of the outdoors by hiking, kayaking, biking, skiing, and snowshoeing. After completing the MFA program, she hopes to publish her book and teach writing at the college level.*