

# The DEXA Van

## Screening for health risks

By Susan McGinley

**O**steoporosis, obesity, diabetes—all three are easier to prevent than to cure. The Department of Nutritional Sciences in the College of Agriculture and Life Sciences is combining research with community outreach to expand current knowledge regarding these diseases and to educate the public at the same time.

“This is new for the College of Agriculture and Life Sciences: our vision is expanding to include health issues and ways of promoting wellness,” says Scott Going, an associate research scientist in the Department of Nutritional Sciences. The department is collaborating with the UA Arizona Health Sciences Center, the Cancer Center, the UA Department of Physiology, UA Cooperative Extension, and various community organizations to bring its applied research out to Arizona counties. Along the way, faculty are cooperating with medical technology companies as well to develop and test better ways of monitoring health conditions.

One of these new advances in technology is the DEXA van, a mobile lab that reads bone mass and density, lean tissue (muscle) mass and fat composition—all at once—in a whole or partial body scan (see sidebar). The unit was designed to measure the factors that pose increased risks for the elderly in particular.

“Body fat is linked to obesity, which leads to heart disease and diabetes,” Going says. “Muscle mass loss in the elderly is linked to a loss of mobility, and loss of bone mass leads to osteoporosis. All of these are increased risks. A woman doesn’t just lose bone, she tends to lose muscle at the same time, and then she’s more at risk for falling. If you lose muscle, that lowers your metabolic rate, and you can gain weight. So losing muscle can contribute to diabetes. All three are related. What’s neat about this machine is that for the first time, we can measure all three at the same time.”

This means the cost is lower than running separate tests, and the DEXA machine fits neatly into a van that can travel directly to different groups across the state. Preliminary studies conducted by Cooperative Extension faculty show that 10 Arizona counties are interested in DEXA van visits.

Going notes that body composition data can support a variety of research projects. The Arizona legislature has mandated \$900,000 for osteoporosis education, screening and awareness, to be distributed through the state health department, the Arizona Public Health Association, and the Arizona Osteoporosis Health Coalition, of which Going is a member. Although the public may not be aware of it, osteoporosis is far more prevalent than breast cancer, according to Going.

The coalition will use the money to produce education programs for health professionals in various disciplines, including primary care medical providers, fitness professionals, and rehabilitation counselors. Faculty in Nutritional Sciences, Cooperative Extension, and the Arizona Health Sciences Center will develop and deliver these programs, and will also train peer educators in counties where there is an interest. Peer educators would teach and also assist with DEXA van screenings.

The van will visit Pima, Santa Cruz, Maricopa and Yuma counties. Faculty, students, Cooperative Extension volunteers and representatives of community health organizations will assist in this effort.

Research is only useful if the data it’s based on is accurate; by extending its research program off campus, the Department of Nutritional Sciences can target and monitor specific audiences right where they are. Faculty will use these precise measurements to develop better ways to assess health

risks and deliver prevention programs. Although the current program focuses on health risks in the elderly, Going says it will expand to include obesity in children and health risks in people of all ages.

Current research projects using body composition data from the DEXA unit include the following:

### **Tea consumption and DNA oxidative damage in smokers (*Nutritional Sciences, Arizona Prevention Center, Cancer Center*)**

Researchers are comparing the body composition measurements of smokers who drink green tea and with those of smokers who don’t to find out whether green tea protects smokers from cancer, and if so, to what extent. It has been suggested that green tea lowers the amount of oxidation that DNA undergoes when someone smokes, thus reducing the damage from free radicals that leads to cancer.

### **Bioelectric impedance analyses for body composition assessment (*Nutritional Sciences, Physiology*)**

In this study faculty members are checking the validity of bioelectric impedance, a new method for testing body composition, by comparing its results to the measurements they collect from the DEXA scanner.

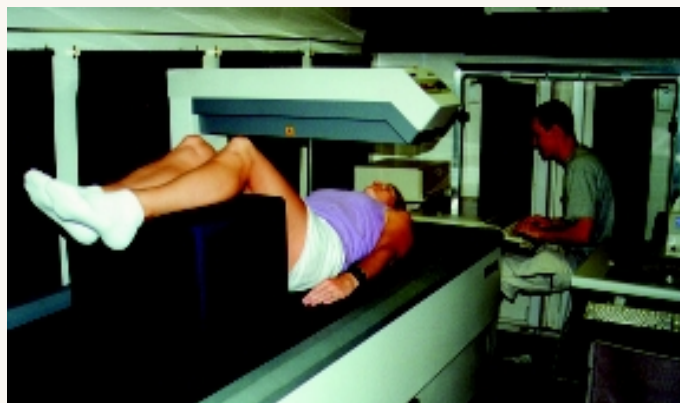


D. Peterson

# THE DEXA SCANNER

(Dual Energy X-Ray Absorptionometry)

The DEXA scanner is a low-dose X-ray machine that can focus a very narrow beam on targeted areas in the body, usually the hip and spine, although it is capable of taking a full-body scan as well. The radiation dose is comparable to what you'd get on a jet plane flying from Tucson to New York, according to Scott Going, an associate research scientist in the Department of Nutritional Sciences. An X-ray source is mounted below an 8' by 40" table where the patient lies, with an automatic detector above. As the scanner moves to different points under the patient's



body, the detector delivers the reading on a computer. A human operator monitors the readings on a screen, after selecting the type of scanning needed—partial (hip and/or spine) or head to toe.

These scans read three components of body composition—bone mass, tissue mass and fat composition—all at once. The DEXA unit is small enough to fit in a van that can

travel to different locations throughout the state.

"We have immediate feedback," Going says. "The computer analyzes the scan and gives all the numbers. This is low cost, and there is no charge to the people in the community who receive the screening."

## Fat Blockers (Nutritional Sciences)

Fat blockers are food products, not drugs, that cause the body to absorb less fat when a meal is eaten. Subjects in this study will take fat blockers and undergo periodic body composition tests to determine the composition of the weight they lose. The machine can sort out both fat loss and lean tissue (muscle) loss. Ideally, a weight loss program or product should promote fat loss only, not lean tissue loss.

## Obesity prevention and weight loss (Nutritional Sciences, Physiology)

Faculty are creating a three-month curriculum targeted to women aged 45-55, which will encompass eating habits, exercise and emotional/psychological issues. This is a critical age for women because they are entering menopause, a stage where they are prone to weight gain and increased risk for heart problems. After three months, half the subjects in the study will participate in an Intranet program where they use a web site for ongoing contact

and support. Since they will be out in the counties, it will be less expensive for these women to participate online in chat rooms, one-to-one private consultations, and other activities than to meet in person at the university. During the two-year program all of the women will be monitored regularly with the DEXA scanner for body composition.

## Healthy Living program in Green Valley (Nutritional Sciences, Arizona Prevention Center)

This recently completed pilot program looked at quality of life—including emotional, social, and physical—in 21 people, aged 16 to 84. The group included 20 women and one man. Cooperative Extension and the Arizona Prevention Center faculty met with the group once weekly for eight weeks. Participants learned about nutrition, exercise, and ways to create and maintain social relationships. Health screening, exercise demonstrations, healthy meal demonstrations and the introduction of new foods such as soy were included.

The DEXA van was part of the screening. This outreach program met with enthusiastic responses from the participants, who liked the immediate feedback they got from the screenings.

Thus the flexibility and portability of the DEXA unit makes it ideal for both research and outreach needs. Down the line, the DEXA mobile unit will include other equipment to address a variety of health concerns—a machine to measure resting metabolic rate and a blood pressure monitor, for example. An ultrasound scanner has already been made available to UA personnel for osteoporosis screening. It is less accurate than the DEXA, but also less costly. Through a measurement on the heel, it can predict a person's risk for osteoporosis. High risk individuals are then referred for a DEXA scan. Faculty are screening a lot of people using both devices to gauge how well the ultrasound scanner predicts risk.

The ultimate goal is to improve public health, according to Going. "Together, we're working to develop a better statewide screening program for the people of Arizona." ❖