Vitamin D Status in the South Dakota Rural Bone Health Study (SDRBH)

The EAM Program studied data collected from participants enrolled in the SDRBHS to determine whether people are getting enough vitamin D from sunlight and diet if they are not taking vitamins.

**Background on Vitamin D**

Vitamin D helps the body absorb calcium, an important nutrient for many systems in the body. The bones are a storage site for calcium and if there is not enough calcium in the blood, it is taken from the bones. Vitamin D also is important for muscle strength and balance, especially in older people. Some studies find that depression during winter months also is associated with low blood vitamin D levels. Vitamin D is present naturally in foods such as a fish, liver, and egg yolks, but it is also added to milk, soy drinks, margarine, and various breakfast cereals. One cup of milk provides 100 IU of vitamin D.

**Daily Recommended Value**

The current vitamin D recommendations are 200 to 600 IU per day, with the need increasing as people get older. There are numerous studies, however, showing that this amount is too low, especially in people who live in the north (like South Dakotans) or people with dark skin. It is likely that the recommendations for vitamin D intake will increase in the near future to 800 to 1,200 IU per day.

With sunlight exposure to the skin, the body can make its own vitamin D. In the summer time, about 15 minutes a day in the sun a few times per week will produce an adequate amount of vitamin D. However, there are a few things to take into consideration:

- **Season**—skin can produce more vitamin D in the summer than the winter
- **Time of Day**—more vitamin D is produced from sunlight during the afternoon than during the morning or evening
- **Age**—younger people can produce more vitamin D than older people
- **Skin Color**—more vitamin D is produced in light skin than in darker skin lighter

It is also important to remember that the skin cannot produce vitamin D by sunlight shining through a window or when sunscreen is used. Too much exposure to sunlight puts one at risk for skin cancer.

**Who Was Involved?**

The vitamin D status of 43 SDRBHS adults who do not routinely take vitamin D were studied. The participants were separated into two age groups (20-33 years and 52-66 years) and two seasonal groups (summer and winter).

**What was Examined?**

Data from 24-hour diet recalls were used to determine vitamin D intake and dual x-ray absorptiometry (DXA) was used to measure percent body fat. Blood samples were analyzed to determine the amount of vitamin D in each individual.

**Who’s Deficient in Vitamin D?**

The study found that 86% of the people measured during the winter showed low vitamin D levels in their blood while 27% had low blood levels during the summer. Vitamin D levels were lower in the older group compared to younger group, and also in people with a higher percent body fat. Vitamin D goes into fat rather than staying in the blood circulation where the body can use it. Low vitamin D levels in the blood also led to changes in some of the hormones involved with releasing calcium from bone, suggesting that bone was being dissolved in people with low vitamin D in order to get enough calcium into the blood.

The study showed that 86% of the South Dakota population in the winter and 27% of the population in the summer had low vitamin D levels, and this was more common in older versus younger individuals.
Nutrition Tidbits

Why Do We Want To Continue with the South Dakota Rural Bone Health Study?

The initial grant we received was for 5 years and allowed us to enroll 1,274 people into the study and follow them for 3 years. There were two goals: one was to determine whether peak bone mass in younger people (age 20 to 40 years) who farm or ranch was higher compared to people who do not farm or ranch. The second was to determine in people aged 41 to 66 years if the rate of bone loss was different among those who farm or ranch and those who do not. The rationale was that increased activity levels are associated with high bone mass and stronger bones, and activity levels were expected to be higher in rural compared to non-rural people.

We are currently in the process of writing a new grant to continue to follow people who are part of the SDRBHS. There are several reasons why we would like to continue this study. First, we have data showing that rates of bone loss at the hip tend to be lower in Hutterite and rural men compared to non-rural men, and that bone loss at the spine tends to be lower in Hutterite women compared to non-Hutterite women. We expect these differences will become larger with increased follow-up. Second, we have data indicating that the occurrence of fractures, or broken bones, may be different among the 3 populations we are studying. Hutterite men appear to have fewer fractures compared to other rural men. We do not know, however, whether these differences are due to differences in bone strength or due to differences in how often people fall or have other accidents. Extending this study will let us determine how these very different lifestyles affect bone strength and the risk of breaking a bone or developing osteoporosis, a major public health threat.

In the U.S. today, 10 million people already have osteoporosis and 34 million more have low bone mass, placing them at increased risk for this disease. Osteoporosis is responsible for more than 1.5 million fractures annually, including approximately 300,000 hip fractures, 700,000 spine fractures, 250,000 wrist fractures, and more than 300,000 fractures at other sites. Based on figures from hospitals and nursing homes, the estimated national direct expenditures for osteoporosis and related fractures total $14 billion each year. It is not a disease of just women. One out of every two women and one in four men over 50 will have osteoporosis-related fracture in their lifetime. More than 2 million American men suffer from osteoporosis, and millions more are at risk. Each year, 80,000 men have a hip fracture and one-third of these men die within a year. 

**Osteoporosis facts taken from:** www.niams.nih.gov/bone/bi/overview.htm

We hope you will consider continuing with this important study that will help identify lifestyle factors that can prevent this disease.