

**ALASKA STATE LEGISLATURE**  
**HOUSE HEALTH AND SOCIAL SERVICES STANDING COMMITTEE**

February 17, 2011

3:06 p.m.

**MEMBERS PRESENT**

Representative Wes Keller, Chair  
Representative Alan Dick, Vice Chair  
Representative Paul Seaton  
Representative Bob Miller (via teleconference)  
Representative Charisse Millett (via teleconference)

**MEMBERS ABSENT**

Representative Bob Herron  
Representative Sharon Cissna

**OTHER LEGISLATORS PRESENT**

Senator Cathy Giessel

**COMMITTEE CALENDAR**

PRESENTATION: VITAMIN D

- HEARD

**PREVIOUS COMMITTEE ACTION**

No previous action to record

**WITNESS REGISTER**

DR. ROBERT HEANEY  
Creighton University Osteoporosis Research Center  
Creighton University School of Medicine  
Creighton University  
Omaha, Nebraska

**POSITION STATEMENT:** Presented a PowerPoint, "Vitamin D: Miracle Nutrient or Snake Oil The Challenge for Alaska" and answered questions during the presentation.

CAROLE A BAGGERLY, Director  
GrassrootsHealth  
Encinitas, California

**POSITION STATEMENT:** Presented a PowerPoint, "Vitamin D Prevents What's Next?" and answered questions during the presentation.

**ACTION NARRATIVE**

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**CHAIR WES KELLER** called the House Health and Social Services Standing Committee meeting to order at 3:06 p.m. Representatives Keller, Seaton, Miller (via teleconference) and Millett (via teleconference) were present at the call to order. Representative Dick arrived as the meeting was in progress. Also in attendance was Senator Geissel.

**PRESENTATION: Vitamin D**

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CHAIR KELLER announced that the only order of business would be a presentation on Vitamin D. He expressed his pleasure for a presentation on a preventative resource.

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REPRESENTATIVE SEATON explained that, after watching a University of California television special on Vitamin D, he had urged the scheduling for this hearing. He offered his belief that Vitamin D could reduce health and cost impacts on Alaskans, while improving their lives.

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DR. ROBERT HEANEY, Creighton University Osteoporosis Research Center, Creighton University School of Medicine, Creighton University, said that his investigations had convinced him of the need to convey more information and facts about Vitamin D, and to offer some options for its use. He referred to proposed House Concurrent Resolution 5, "A resolution relating to prevention of disease and to Vitamin D." Directing attention to his PowerPoint, "Vitamin D: Miracle Nutrient or Snake Oil," he addressed slide 2, "Out of Africa," and explained that humans had evolved in equatorial East Africa, were originally dark skinned, and, as they wore no clothes, would have made an abundance of vitamin D, year-round. He moved on to slide 3, "Cutaneous Vitamin D Synthesis," and stated that ultra-violet B rays from the sun acted on a skin compound, 7-

dehydrocholesterol, which was converted to pre-vitamin D, and then spontaneously into vitamin D, which was slowly absorbed into the bloodstream.

DR. HEANEY explained slide 4 and slide 5, "Vit D - Canonical Scheme," stating that the Vitamin D was stored in the liver, as 25(OH)D<sub>3</sub>, which was the functional indicator of the vitamin D status.

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DR. HEANEY explained that slide 6, "Healthy Range - 25(OH)D," reflected the two different units for measuring vitamin D, nanograms per milliliter [ng/mL], and nanomoles per liter [nmol/L]. He announced that the low end for a healthy range of vitamin D was 40 ng/ml or 100 nmol/L.

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DR. HEANEY, referring to slide 7, "Vitamin D & Primate Progress (?)" talked about the timeline chart which reflected the vitamin D levels for Old-World Primates up to the 43 degree Northern Latitude people who were taking 4000 individual units (IU) per day.

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DR. HEANEY, commenting on slide 8, "The Primitive Level," compared the dress of the Bantu and the Maasai tribes in Africa, and concluded that there needed to be skin exposure for vitamin D absorption from the sun.

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DR. HEANEY considered slide 9, "25(OH)D in the Tropics," which detailed a study of 42 older Mayan men in tropical Guatemala, listed their mean vitamin D as 25 ng/mL, and also concluded that there needed to be skin exposure for vitamin D absorption.

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DR. HEANEY continued on to slide 10, "Out of Africa," which depicted the migration out of Africa and the reduced availability of Vitamin D, as clothing covered even more skin surface, and latitude and cloud cover reduced the solar irradiance. From slide 11, "Rickets & Group Survival," he detailed that darker skin pigmentation acted as a sunscreen,

which reduced the vitamin D availability to the skin, and led to rickets which distorted the pelvis and prevented childbirth. Consequently, only paler skinned migrants were able to reproduce, or the race would have died out.

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DR. HEANEY described that slide 12, "Number of months in which solar UV-B can induce cutaneous vitamin D synthesis," reflected Vitamin D synthesis in the temperate latitudes and the tropics. He declared that in Southeast Alaska there was not vitamin D synthesis for more than six months of the year, and in northern Alaska, as the sun was so low on the horizon, there was not any cutaneous vitamin D synthesis. He supported the logic behind proposed HCR 5, as most Alaskans need a year round supplement for Vitamin D. He pointed out that skin color became steadily paler the further from the equator, as this was necessary for survival.

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DR. HEANEY summarized slide 13, slide 14, slide 15, slide 16, and slide 17, "Vitamin D - Sources," sharing that the sun, natural foods, and supplements were the sources of vitamin D. He opined that the year round average of sun vitamin D was about 500 IU/day in Alaska, about 150 IU/day from food, and possibly a few hundred from supplements. He stated that the body needed 4000 IU/day, so it was necessary for supplementation. Referring to slide 18 and slide 19, "Latitude vs. Sun," he explained a study with participants in Hawaii and in Anchorage that measured the skin pigmentation, the blood vitamin D, individual sun exposure and diet. He shared that both groups measured about 70nmol/L, which was below the low end of the healthy range, 100 nmol/L. The following year, another study was conducted which included beach people in Hawaii, whose vitamin D was above 120 nmol/L. He stated the necessity of not only living in a sunny area, but getting out into the sun.

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DR. HEANEY pondered slide 20, "What is the evidence that this low vitamin D status matters?" He directed attention to slide 21, "What are the Consequences?" and listed a variety of bone diseases, high blood pressure, increased risk of cardiac disease, diabetes, complications in pregnancy, and periodontal disease as a partial list.

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DR. HEANEY indicated slide 22 and slide 23, "Small Changes - Big Effects," which reflected a distribution curve of systolic blood pressure in a normal population. He pointed out that a reduction of 4 mm of blood pressure lowered the hypertensive group by almost 50 percent.

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DR. HEANEY introduced slide 24, "Classical Vit D Deficiency," noting that rickets in children was a manifestation of poor absorption of calcium, and indicated a vitamin D level below 10 ng/ml. He said that childhood rickets could be prevented by a daily dose of 200-400 IU of vitamin D, although this dose would not restore full calcium absorptive function.

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DR. HEANEY addressed slide 25, "Rickets Rises Again," and analyzed the cause to be decreased sun exposure for babies, maternal vitamin D deficiency, and failure to supplement infant feedings with 400 IU/daily of vitamin D. He expressed his concern that Canadian babies received a vitamin supplement, but that US babies did not.

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DR. HEANEY, citing slide 26, "Craniotables in "Normal" Infants," stated that a Japanese study indicated that 22 percent had craniotables, with a median vitamin D of less than 10 ng/mL.

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DR. HEANEY shared slide 27 and slide 28, which depicted a young girl pre and post treatment for rickets, and he questioned if there would be any subtle long term consequences to early life vitamin D deficiency.

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DR. HEANEY evaluated slide 29, slide 30, and slide 31, "Juvenile Diabetes in Finland," a graph of boys and girls ages 1-14 years for more than 30 years, from the mid 1960's to the mid 1990's. The horizontal axis was chronological time and the vertical axis was incidences of diabetes per year. He shared that Finland kept excellent medical records and was able to track

populations. He pointed to the line for ages 1-4, which showed an increase from 10 per 100,000 incidences each year of the mid 1960's, to almost 35 incidences each year of the mid 1990's. He noted that the lines for ages 5-9 and for ages 10-14 each reflected this same trend. He opined that this would "lead to long term downstream consequences." He stated that HHSS had a responsibility to make recommendations, even if it did not make decisions about diagnosis or treatment. Directing attention to slide 30, he noted that, in 1960, the intake of vitamin D for infants was 4500 IU per day. He reported that the common practice in Eastern Europe and Scandinavia was for infants to receive 600,000 IU three times each year. Slide 30 depicted decreases of the recommended dosage of vitamin D in 1964, in 1975, and again in 1993, to 400 IU per day which was now the same recommended dosage as the US. He stated that an after the fact comparative analysis of diabetes and recommended dosage of vitamin D reflected an increase of juvenile diabetes.

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DR. HEANEY turned to slide 32, slide 33, and slide 34, "Neonatal Vit D & Diabetes," which charted 10,336 northern Finnish children in relation to the recommended vitamin D dosage of 2000 IU per day for the first year of life. He categorized the children into four groups: those who got the recommended amount regularly; those who got it sometimes; those who got it never; and those who got little or no vitamin D at all and were thought to have rickets. The study tracked these children for the prevalence of Type 1 diabetes at age 31, and calculated the relative risk of developing diabetes under these circumstances. He pointed out that the children who received the 2000 IU of vitamin D daily for the first year of life had an 88 percent lower risk of having diabetes at age 31; those children who received the dosage sometimes had an 80 percent lower risk; and those children who did not receive any vitamin D and were thought to have rickets had three times as many cases of diabetes as those who never got vitamin D, but did not have rickets. He stated that the "burden of chronic diseases, most of which are multi-factorial, is made by inadequate vitamin D status." He stressed that vitamin D impaired the diseases.

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DR. HEANEY, sharing slide 35, "What are the Consequences?" stated that "we won't really know the true size of that chronic disease burden until we eradicate vitamin D deficiency in the

population." He stated that when everyone reached a certain vitamin D level, chronic diseases levels would drop.

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DR. HEANEY directed attention to slide 36, "Vit D & Cardiovascular Disease," explaining the parameters of the study: 1739 Framingham offspring members; average age was 59 years; and the follow up was for 5.4 years. During this study, 120 individuals had a major cardiovascular event, either heart failure, mild cardio infarction, or cardiac death. This graph depicted the hazard ratio (HR) on the vertical axis, which was calculated against the vitamin D usage, above or below 15 ng/mL, on the horizontal axis. He emphasized that 15 ng/mL was still insufficient for a healthy range. He stated that those individuals with a vitamin D value below 15 ng/mL had a 53 percent increase in cardiovascular risk, while those individuals below 10 ng/mL had an 80 percent risk increase.

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DR. HEANEY moved to the next slide, "Calcium, Vit D, & Blood Pressure." This reflected that 148 women in Germany, age 74 years with a vitamin D level below 50 nmol/L, were tested in a double blind, randomized placebo control trial. The bar graph charted systolic blood pressure on the vertical axis with calcium only and calcium plus vitamin D on the horizontal axis. The question posed was whether calcium, with vitamin D, was more effective than simple calcium for lowering blood pressure. After eight weeks of treatment, the findings indicated an additional 7 point drop in blood pressure for the calcium with vitamin D group.

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DR. HEANEY addressed slide 38, "Breast Cancer Risk," which depicted the graph of a study for the odds ratio for cancer inversely associated with vitamin D status. He noted that there were 1394 cases and 1365 controls, and the study reflected the vitamin D range from less than 30 nmol/L to more than 75 nmol/L. He reminded that more than 100 nmol/L was a healthy level, so this study reflected the less healthy aspect. The less than 30 nmol/L group was the baseline for the study. He reported that the risk for having breast cancer decreased as the vitamin D status improved. The group with a vitamin D reading of higher than 75 nmol/L had a 69 percent decrease in risk from the baseline group.

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DR. HEANEY described slide 39, "Diabetes & 25(OH)D," a study of the blood sugar, predicted by body mass index (BMI), of 6228 adults. The study measured vitamin D in each person, used the bottom quartile of patients as the baseline, and then measured the three other quartiles for relative risk to the baseline group. It was noted that the highest vitamin D quartile had a 75 percent lower risk for diabetes.

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DR. HEANEY presented slide 40, "Vitamin D & Influenza," which studied 208 African-American post menopausal women with a baseline vitamin D of 18.5 ng/mL, well below the healthy level of 40 ng/mL, for three years. The study resulted in a two-thirds reduction in influenza by the group receiving the vitamin D supplement over the group given the placebo. He explained that preventive outcomes were assessed by something which did not happen, and this was most easy to recognize in a randomized controlled trial where each individual had to be tracked.

DR. HEANEY indicated slide 41 and slide 42, "Vitamin D & Caesareans," which measured the vitamin D of 253 women shortly after birth. He acknowledged that the risk for Caesarean was four times higher if there was a lower vitamin D.

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DR. HEANEY moved on to slide 43, slide 44, slide 45, and slide 46, "Vit D & Pregnancy Outcomes." He explained that this study was for 690 pregnant women, and they were dosed with vitamin D amounting to 400, 2000, or 4000 IU each day, from week 12 until delivery. The study reflected the time frame for vitamin D to be absorbed into the blood, and the relative risk for pregnancy outcomes. Comparing the 400 IU group to the 4000 IU group, it was shown that the risk of untoward outcomes was half for the 4000 IU group. He noted that, beyond the human cost, the financial cost difference was substantial.

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DR. HEANEY introduced slide 47, "Vit D & Nursing Outcomes," which compared the vitamin D level in a mother's milk with that in the mother's blood. The results showed that adding more vitamin D to a woman's blood, meant more vitamin D in her milk.

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DR. HEANEY assessing slide 48, "Colorectal Cancer," summarized that the higher the vitamin D level, the less likely the cancer would develop, by almost a 50 percent reduction.

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DR. HEANEY described slide 49 and slide 50, "Vitamin D & Cancer," which examined a four year study of 1179 healthy women, between 59 and 74 years of age. There were three treatment groups: the placebo control group, the group which received calcium only, and the group which received calcium and 1100 IU per day of vitamin D. The results were a 77 percent lower risk for cancer with the calcium and vitamin D, than with the placebo control group. He noted slide 51, "Cancers by Treatment (yrs. 2 - 4)," which compared breast, colon, lung, lymphoma and other cancers, and he compared the reductions for each type of cancer by the calcium with vitamin D group.

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DR. HEANEY reviewed slide 52, "Status of the Evidence," and said "there are now more than 40 randomized trials evaluating a causal connection between [vitamin D] levels and various health outcomes." He listed some of these trials to include: falls, hypertension, cancer, respiratory infection, pregnancy outcomes, and diabetes. He ascertained that there were a lot of randomized trials which offered a "huge body of evidence there that, for some reason, the regulatory bodies seem to ignore."

DR. HEANEY asked the question on slide 53: "How can a single nutrient have such diverse effects in so many different tissues?" He directed attention to slide 56, "Cell Models," and explained that the old cell models had stated there was DNA in the nucleus, which were the full plans used for cloning. He reported that new models stated that DNA functioned "constantly in the synthesis of needed cellular apparatus, without the cells multiplying at all."

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DR. HEANEY, sharing slide 57, "Cell Models," stated that it was previously thought that each cell type contained different cytoplasmic apparatus; however, new thought focused on the differentiation to mean that only certain genes can be accessed

in each cell. For example, muscle cells access the genes necessary for muscle function, and white blood cells access the genes that facilitate white blood function.

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DR. HEANEY explained slide 57, slide 58, and slide 59, "How a Cell Responds." He stated that as a signal impacted a cell, the cell response was to search "the plans for what I need in my DNA library." The cell nucleus "opens up the plans and the cell immediately synthesizes the needed cellular equipment." He confirmed that the active form of vitamin D was the key "that unlocks the DNA library; without it the cells can't get in and find the plans that they need in order to respond to normal signals." He clarified that this vitamin D was synthesized in the cell itself, not circulated in the blood.

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DR. HEANEY read slide 61, "things go better with Vitamin D," and emphasized that "everything works better if you get the vitamin D status up to a normal level." He confirmed that, in the absence of Vitamin D, the body could not deal with the problems as well, as the body needed the vitamin D to access the information stored in the cells. He indicated slide 62, "Perspective," and declared: "Vitamin D is an integral component of the mechanism whereby cells respond to signals." He read: "Adequate vitamin D status enables optimal response to a broad variety of signals and expression of deficiency [status] will vary from person to person depending upon tissue-specific sensitivity."

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DR. HEANEY supplied slide 63, "Vitamin D - Sources," and emphasized the need for at least 4000 IU per day. He pointed out that, in Alaska, as the sun was not a viable source, the focus needed to be on food and supplements. Pointing to slide 64, "Vitamin D Intake & Toxicity," he offered reassurance that there was no vitamin D toxicity when the dosage was less than 30,000 IU per day.

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DR. HEANEY presented slide 62, "Fortification vs. Supplementation," and emphasized that both will work, in theory. He explained that supplementation required voluntary compliance

and commitment, a result of education and promotion. He directed attention to proposed HJR 5 and stated that fortification offered the best long term effectiveness. He suggested the addition of at least 1000 IU per day to the diets of most Alaskans, and offered as an example the addition of vitamin D to all wheat flour products. He summarized slide 63, "The Prevention Paradox," "A preventive measure that brings much benefit to the population... usually offers very little to each participating individual, that is the people don't feel that they've gotten one." He offered his belief that a portion of the population and some physicians would become convinced of the value, but that the majority of the population would not notice any advantage.

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DR. HEANEY closed his PowerPoint presentation with slide 64 and slide 65, "The Naaman Syndrome," and recounted the biblical story of Naaman, the Syrian general, in 2 Kings 5:12-14. He concluded that the problem was that "if something is easy, inexpensive, and safe, it can't be any good" or "if this is so great, why isn't everybody doing it already?"

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CAROLE A BAGGERLY, Director, GrassrootsHealth, presented a PowerPoint, "Vitamin D Prevents What's Next?" and explained that GrassrootsHealth, a non-profit consortium of Vitamin D researchers, was formed in 2007.

MS. BAGGERLY directed attention to slide 2, slide 3 and slide 4, "Alaska Statistics." She noted that, in Alaska, there were 372 breast cancer diagnoses each year, with a total cost of \$27,911,341. She stated that a reduction of 20 percent with use of vitamin D, although one researcher had projected an 80 percent reduction with vitamin D use, would result in 74 fewer diagnoses with a savings of \$5,582, 268.

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MS. BAGGERLY reported that at least 10 percent of the over 65 population would be injured by a fall, at a cost of \$10,555 each fall, for a projected cost to Alaskans of \$58,052,500 each year. She cited that the use of vitamin D would increase healing and result in a 20 percent cost reduction, a savings of \$11,610,500.

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MS. BAGGERLY detailed that 11 percent of births would be pre-term births, earlier than 34 weeks, with a cost of \$64,075,200; whereas a 50 percent potential prevention would save \$32,037,600. She directed attention to slide 5, "Potential Benefit of 3 Conditions," and declared the savings, just from these three conditions, could total \$49,230,368. She referred to slide 6, "Cost of supplementation for 626,932 people/year," and declared that the cost of supplementing each Alaskan at \$36 each per year, would be \$22,883,000. She subtracted this from the earlier potential savings of \$49,230,368 and declared the net savings benefit for Alaska to be \$26,347,368. She agreed that some of this savings would need to be spent on testing and education programs, and she suggested spending some of this on a special program of supplementation for pregnant women, people over 65, and all cancer patients. She declared that this would result in an immediate impact.

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MS. BAGGERLY presented slide 7, "How to prevent these conditions?" and announced that attaining a vitamin D serum [blood] level of 40-60 ng/mL would be a solution.

MS. BAGGERLY moved on to slide 8, "Disease Incidences Prevention by Serum 25(OH)D Level," and discussed the various incidences that could be prevented by attaining this serum level.

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MS. BAGGERLY supplied slide 9, "What's in place to solve this problem?" and reviewed the Vitamin D\*action Community Project. She explained that 3708 people had volunteered to get tested every six months for vitamin D levels and to fill out a health questionnaire. She referred to slide 11, which depicted that 47 percent of the people were vitamin D deficient when first tested. She pointed to the results of the second test six months later on slide 12, reporting that only 24 percent of the group was now deficient, as people were paying attention to the vitamin D intake. She directed attention to the test results after one year, slide 13, which showed that only 10 percent of the group was now deficient. She noted that the costs for the supplement, the monitoring, and the tests were trivial.

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MS. BAGGERLY shared slide 14, "D\*action Project: Serum Level vs Intake" and announced that the results from this study were about to be published. She pointed to the necessity of testing serum level, as supplements affected each individual's vitamin D serum level differently.

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MS. BAGGERLY stated that slide 15, "Key Results of D\*action Project," reflected that the public was ready for this. She said that with 5000 IU per day, more than 88 percent of the group had a serum level greater than 40 ng/mL. She described slide 16, "Major Goals with D\*action in 5 Years in Any Community," and announced that the goal was to reduce the incidences of breast cancer, colon cancer, and pre-term births, among others, by 25 percent, educate the public and health care personnel, and develop public health policy actions. She pointed to slide 17 and slide 18, and shared that education, vitamin D testing, feedback, and community action plans were the means to attain this goal.

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MS. BAGGERLY read a quote from slide 19, "Action springs not from thought but from a readiness for responsibility."

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SENATOR CATHY GEISSEL, Alaska State Legislature, shared that she was also a nurse practitioner and had been advising the use of Vitamin D as a supplement for nine years.

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REPRESENTATIVE DICK asked: was Vitamin D cumulative in the body, was there a shelf life for vitamin D supplements, and was there any negative effect to freezing vitamin D supplements.

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DR. HEANEY, in response to Representative Dick, said that, although it was cumulative, 4-5000 IU could be taken daily and would not accumulate to toxic levels in the fat. He shared that vitamin D deteriorated about 1 percent each month, but that many manufacturers overloaded the capsules by about 10 percent. He said that there was not any harm to freezing the supplements, but he did not know if this slowed the deterioration.

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DR. HEANEY, in response to Chair Keller, said that studies all showed there was a difference for individual response. He relayed that an important question was whether poor responders were being under treated or exuberant responders were being over treated. The only known factor was that bigger people did not get as big a response.

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CHAIR KELLER asked if it was common knowledge that vitamin D was the key to unlock the DNA.

DR. HEANEY replied that these cell biology studies were about three years old. He pointed out that vitamin D as a key for a cell was older knowledge, but only recently had this key been linked to the entire body.

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DR. HEANEY opined that the first year of life was crucial for the immune system to differentiate self from non-self. He confirmed that both Type 1 diabetes and multiple sclerosis were auto immune diseases.

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MS. BAGGERLY referred to a study in Canada which showed a significant decrease in the recurrence of breast cancer for people with higher levels of vitamin D.

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REPRESENTATIVE SEATON directed attention to [www.grassrootshealth.org](http://www.grassrootshealth.org) and said that the presentations available on the website detailed the cellular biology mechanism. He noted that Alaska Natives eating a traditional diet were the only group to have an adequate dietary vitamin D. He pointed out that even during times of peak sun, Alaskans remained covered up.

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DR. HEANEY, in response to Representative Dick, explained that the vitamin D3 was cholecalciferol, while vitamin D2 was

ergocalciferol. He pointed out that ergocalciferol was a synthetic product, while cholecalciferol was produced by the skin.

REPRESENTATIVE DICK asked what part of the animal might have the most Vitamin D 3.

DR. HEANEY offered his belief that it was not concentrated in the liver or the kidneys, but primarily in the fat. He suggested that there was not much research on meat sources for vitamin D. He noted that the molecules closely resembled cholesterol molecules.

REPRESENTATIVE SEATON pointed out the low cost for Vitamin D3 supplements.

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DR. HEANEY emphasized that the immune system needed Vitamin D, and that it enabled the body's repair and defense mechanism.

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SENATOR GEISSEL reflected on cod liver oil and salmon oil as being high in vitamin D. She reported that [wild] Alaska salmon was low in toxins, but high in Vitamin D.

DR. HEANEY, in response to Chair Keller, said that farm raised salmon had 90 percent less Vitamin D than wild salmon.

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MS. BAGGERLY observed that it would be necessary to eat ten servings daily of salmon to receive adequate vitamin D.

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#### **ADJOURNMENT**

There being no further business before the committee, the House Health and Social Services Standing Committee meeting was adjourned at 4:43 p.m.