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THE LONGITUDINAL STUDY OF ASTRONAUT HEALTH

Newsletter

October 2009

Volume 17 • Issue 1

Vitamin D Deficiency

BY: ADRIANA BABIAK-VAZQUEZ, MA, MPH

Lately, much has been reported and written about vitamin D deficiency and its possible association with numerous diseases. Vitamin D is essential for a number of biological processes in humans, like calcium absorption; bone mineralization; reduction of inflammatory responses; and the regulation of neuromuscular functions, immune functions, and the cell life cycle [1]. Recent studies have linked vitamin D deficiency with increased risk for heart, liver, and lung diseases, diabetes, fibromyalgia, Alzheimer's, and various cancers and their propensity to metastasize [1].

Vitamin D is acquired from sunlight exposure, which triggers synthesis, through consumption of fortified foods (i.e. milk and other dairy products), vitamin supplements and foods rich in vitamin D (i.e. salmon, mackerel, tuna). Since the vitamin is biologically inert, activation must take place in the body through hydroxylation in the liver to 25-hydroxyvitamin D [25(OH)D] or calcidiol and through hydroxylation in the kidney to 1,25-dihydroxyvitamin D [1,25(OH)₂D] or calcitriol [1].

Vitamin D deficiency does not seem to be concentrated solely in the malnourished and those living far from the equator, whose exposure to sunlight may be limited. Scientists and physicians have documented vitamin D deficiency in populations living in India [2], Australia [3,4] and others close to the equator, where sunlight is found much of the year [5].

Furthermore, recent studies have indicated the daily recommended levels of vitamin D consumption are

not sufficient. Even in groups, such as pregnant and lactating women receiving prenatal care, consuming 2-3 glasses of milk and 400 international units (IU) of vitamin D daily, decreased levels of vitamin D have been identified [2].

Equipped with a new instrument, the DiaSorin LIAISON®, the same analyzer used for measurement of vitamin D levels in major reference medical laboratories across the country, Kathleen A. McMonigal, M.D., Director of the Clinical Laboratories, has been measuring vitamin D levels in the NASA community. During a brief interview, Dr. McMonigal discussed what she was encountering: "I was somewhat surprised with the results. We started measuring vitamin D levels in active and retired astronauts and Occupational

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Image 1: Dr. Kathleen A. McMonigal, M.D., Director of the Clinical Laboratories, standing by the new DiaSorin LIAISON®

The New Direction of Your Health Records

By: JOCELYN MURRAY, MPH

The new direction of health records in the United States lies within the Nationwide Health Information Network (NHIN). The program was established in 2004 under the direction of the Office of the National Coordinator for Health Information Technology (ONC) in an effort to provide a foundation for meaningful data communication among healthcare providers, medical support personnel, and consumers, regardless of the distance between participating parties [1]. The NHIN is an “interoperable information technology (IT) environment that brings together personal health records, electronic health records (EHR’s), population health information, standards (data, technical, and security), and an interoperable health information exchange network [2]”.

The goal of NHIN is to improve the quality and efficiency of healthcare by establishing a secure, national, electronic, healthcare information exchange network by 2014 [1]. The NHIN will achieve its goals by developing the standards and infrastructure for a secure, nationwide data exchange, improving the coordination of medical care information among providers of all types, ensuring the availability, confidentiality, and security of health information, reducing both healthcare risks and costs that result from medical errors, inefficiencies, incomplete patient information, and improper medical

support [1]. In addition, consumers will be able to access and manage their personal health records via EHR’s[1]. Furthermore, consumers reserve the right to not allow their medical data to be exchanged within the network.

Twenty-four public and private entities (e.g., Centers for Disease Control and Prevention, Kaiser Permanente, and the Department of Defense) are currently participating in the NHIN Cooperative. Participants agree to support a set of NHIN Core Services that ensure private and reliable internet-based communication with other participants. Table 1 provides a brief summary of the initial Core Services. As of February 2009, the Social Security Administration and MedVirginia have successfully shared live data by means of the NHIN. Additional testing between NHIN pilot partners and refinement of the Core Services will continue throughout 2009. Governance and future expansion of the NHIN will remain the responsibility of the ONC; however, the network should ultimately be a self-sufficient public-private partnership that is managed in the private sector. ■

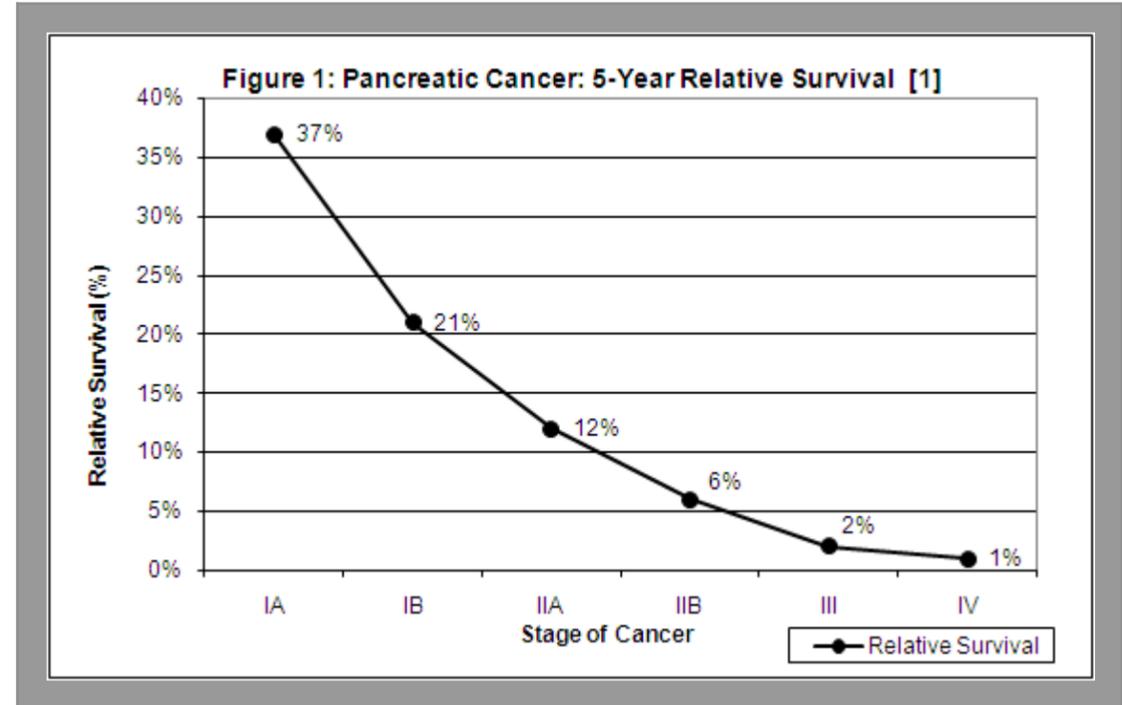
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Table 1. NHIN Core Services [1]

Services	Description
Messaging Platform	The essential protocols required for message transport
Authorization Framework	Provides the framework for authorization of exchanges of health information
Subject Discovery	Ability to search for an individual and determine if they are known within a NHIN participant's network
Query for Documents	Ability to search for a document (health information) for a specific individual
Retrieve Documents	Ability to retrieve or transport a document for an individual from another NHIN participant
Audit Log Query Service	Ability to request and retrieve an audit log of requests and access to health information.
Consumer Preferences	Ability to exchange consumer-defined preferences in association with the exchange of patient health information.
Health Information Event Messaging Service	Ability to keep updated on changes to specific health information for an individual through a “publish and subscribe” model.
NHIE Service Registry Service	Common network registry that allows the discovery of other NHIN participants and the services they offer. Nationwide Health Information Exchange (NHIE)
Authorized Case Follow up	Re-identification and follow up of anonymous cases identified during BioSurveillance, public health reporting and quality reporting

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the funding nearly quadrupled [2]. The majority of the research has been targeted to the treatment of pancreatic cancer. Major campaigns have commenced hoping to raise awareness and interest in this devastating illness. Individuals with pancreatic cancer, like Patrick Swayze, have become advocates. With the help of the advocates and the increasing awareness of the disease, research funding will increase, subsequently providing better prevention and treatment. ■

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For your information

If you want a copy of your exam results, please complete and sign a release form while you are visiting the Clinic for your examination. The form is called *Privacy Act Disclosure Authorization and Accounting Record (DAAR)*, or NASA Form 1536.

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Pancreatic Cancer- A Silent Killer

BY: MELISSA HALM, MPH

Pancreatic cancer has posed problems for the medical community. Over the last 25 years, the mortality rate for pancreatic cancer has remained constant, at approximately 11 deaths per 100,000 population [2, 4]. Although pancreatic cancer accounts “for only 2% of the new cancer diagnoses in a year,” it is “the 4th leading cause of cancer death in the United States.” [1,2].

The high mortality rate is partly due to the difficulty in diagnosing pancreatic cancer. Pancreatic cancer is typically found after the cancer has already metastasized to other organs [1,2]. Once the cancer has started to metastasize outside the pancreas, treatment becomes more difficult and less successful. The difficulty in diagnosing pancreatic cancer arises due to three facts [1]:

- Pancreatic tumors are virtually undetectable during routine physical examinations due to the location behind the stomach.
- A blood screening test is currently not available to test for pancreatic cancer.
- Symptoms are generic and typically do not present until metastasis has occurred.

Symptoms associated with pancreatic cancer are non-specific. The symptoms include radiating abdominal pain, jaundice, loss of appetite, depression, and weight loss [3]. Individuals with more common conditions and diseases, like hepatitis or other infectious processes, experience similar symptoms. The process of ruling out the other more common conditions could further delay diagnosis and appropriate treatment of pancreatic cancer.

The diagnosis of pancreatic cancer requires extensive testing, usually including high-resolution imagery, such as computerized tomography (CT) scan and magnetic resonance imaging (MRI); endoscopic procedures, such as endoscopic retrograde cholangiopancreatography (ERCP) and endoscopic ultrasound (EUS); and biopsies. These procedures are also used to determine the stage of the cancer. The stage of cancer is determined by the extent of metastasis. The

stages range from IA to IV, where the cancer cells in stage IV have metastasized passed the surrounding lymph nodes to other organs [1,3]. Pancreatic cancer requires aggressive treatment, including surgery, radiation therapy, and chemotherapy. The Whipple procedure removes the head of the pancreas, gallbladder, and portions of the small intestines, bile ducts, and area lymph nodes [1,3]. Distal pancreatectomy removes part of the body and tail of the pancreas, as well as the spleen [3]. Both procedures should be performed by experienced surgeons due to the risk of the surgery [3].

While the cause of pancreatic cancer is still an enigma, there are a number of known risk factors of pancreatic cancer. The risk factors include increasing age; male gender; African American; smoker; obesity; consuming a high-fat diet; diabetes; chronic pancreatitis; liver cirrhosis; exposure to certain pesticides, dyes, and chemicals; family history of pancreatic cancer; genetic mutations; exposure to Helicobacter pylori; and an increased amount of stomach acid [1,3,4]. The risk of developing pancreatic cancer in men is only slightly higher than in women [1]. The risk for pancreatic cancer in African Americans is 50% greater than in Whites [4]. The reason for this increased risk in unknown [4]. Individuals who smoke are twice as likely to develop pancreatic cancer compared to individuals who do not smoke [4]. A number of the noted risk factors, like smoking, obesity, dietary habits, can be changed to help decrease the risk of developing pancreatic cancer.

The relative survival of individuals with pancreatic cancer increases the earlier the cancer is diagnosed and treated. Figure 1, located on page 5, depicts the 5-year relative survival of individuals with pancreatic cancer. Relative survival is the ratio of the proportion of pancreatic cancer survivors to the proportion of expected survivors in a pancreatic cancer-free population over a 5-year period. As the stage of cancer increases, the 5-year relative survival dramatically decreases.

Historically, pancreatic cancer research funding has been very limited. However, between 2000 and 2006,

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Vitamin D, continued from page 1

Medicine Clinic patients and found approximately 50% of people tested had levels of vitamin D less than 30 nanograms per milliliter (ng/mL), which we would consider vitamin D deficient.”

Dr. McMonigal described the following four-point clinical management plan to raise 25(OH)D to optimal levels:

- The current optimal/desired range for this test is 30-80 ng/mL.
- If lab tests indicate 25(OH)D levels are 30 ng/mL or higher, the recommended Vitamin D dose is 1,000 IU daily or 50,000 IU once a month (maintenance dose).
- If lab tests indicate 25(OH)D levels are 20-29 ng/mL, the recommended treatment plan is 50,000 IU once a week for four weeks, then revert to maintenance dosing (1,000 IU per day or 50,000 IU once a month). Recheck levels in 4-6 months.
- If lab tests indicate 25(OH)D levels are below 20 ng/mL, the recommended treatment plan is 50,000 IU once a week for six to eight weeks, then revert to maintenance dosing (1,000 IU daily or 50,000 IU once a month). Recheck levels in 4-6 months.

It is important to note that other causes, such as celiac sprue or other malabsorption conditions, must be ruled out before designation of appropriate treatment.

A note of caution was made by Dr. McMonigal, “Since the FDA does not currently oversee dietary supplements, it is important to consider the manufacturer of the vitamin supplements and assure yourself you are dealing with a reputable source or company.” Dr. McMonigal further notes, “We recommend a pharmaceutical grade product (i.e. meets the safety and effectiveness standards for drugs under the Food, Drug and Cosmetic Act) for those needing vitamin supplements to increase their Vitamin D levels.”

In addition to supplements, Table 2, lists selected food sources of vitamin D.

Finally, though these recent findings and studies have caused more awareness of the importance of vitamin D and subsequent supplementation, some in the population mistakenly believe they can raise their vitamin D

Table 2: Selected Food Sources of Vitamin D [1]

FOOD	IUs per serving	Percent Daily Values (DV)
Cod liver oil, 1 tablespoon	1,360	340
Salmon, cooked, 3.5 ounces	360	90
Mackerel, cooked, 3.5 ounces	345	90
Tuna Fish, canned in oil, 3 ounces	200	50
Sardines, canned in oil, drained, 1.75 ounces	250	70
Milk, nonfat, reduced fat, and whole, vitamin D-fortified, 1 cup	98	25
Margarine, fortified, 1 tablespoon	60	15
Ready-to-eat cereal, fortified with 10% of the DV for vitamin D, 0.75-1 cup (more heavily fortified cereals might provide more of the DV)	40	10
Egg, 1 whole (vitamin D is found in yolk)	20	6
Liver, beef, cooked, 3.5 ounces	15	4
Cheese, Swiss, 1 ounce	12	4

levels by over-exposing themselves to sunlight [4]. Skin cancers remain the most common type of cancer today, despite the use of sunblock lotions and other sun barriers. A healthy balance must be maintained in sufficient sun exposure for required vitamin D synthesis without causing an increase in personal risk of skin cancer. Discussion with your personal physician is always advised regarding estimation of risks, true vitamin D levels and any therapy.■

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