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# VEPACHEDU EDUCATIONAL FOUNDATION

The Telangana Science Journal

Health and Nutrition

[TIACS-subscribe@yahoo.com](mailto:TIACS-subscribe@yahoo.com) (The Indian American Chemical Society)

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## Issue 205: Contents

Sleep in the Middle Age  
Stress Costs Economy  
Vaccines for Poor Children  
Fascinating Anatomy  
Food Problems and Allergies  
Lyme Disease  
Bisphenol A is not a Threat  
Cranberries  
Brussels Sprouts  
Tea  
Kiwifruit  
Oats  
Carcinogens in Meat  
Spinach Soup

## **Sleep in the Middle Age**

The January issue of the journal Perspectives on Psychological Science reports that there is an association between middle-age sleep and mental ability later in life, based on analyzed 50 years of sleep research<sup>1</sup>. A person at age 50 has slept approximately 17 years and people who live to age 85 may have slept nearly 248,200 hours at the rate of 8 hours per day, i.e., 10,341 days or 28 years.

**Issue 205**

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Insufficient sleep is associated with a number of chronic diseases and conditions—such as diabetes, cardiovascular disease, obesity, and depression—which threaten our nation’s health. Notably, insufficient sleep is associated with the onset of these diseases and also poses important implications for their management and outcome. As dangerous as driving while intoxicated, insufficient sleep is responsible for motor vehicle and machinery-related crashes, causing preventable substantial injury, disability and death each year in the US. More than one-quarter of the US population report occasionally not getting enough sleep, while nearly 10% experience chronic insomnia. However, new methods for assessing and treating sleep disorders bring hope to the millions suffering from insufficient sleep. Fundamental to the success of all of these efforts is the recognition that sufficient sleep is not a luxury, but a necessity, and is a “vital sign” of good health<sup>2</sup>.

Biological clock, also known a circadian rhythm, determines our sleep pattern and plays a role in our performance, according to a study reported in the Cell Press journal Current Biology<sup>3</sup>. A person’s personal best performance requires consideration of circadian phenotype, performance evaluation at different times of day, and analysis of performance as a function of time since entrained awakening<sup>4</sup>. The best predictor of how well a person performed at a given hour was the time elapsed since the entrained awakening, i.e., the time since they would have gotten up in the morning if left to their own devices, alarm clocks switched off. While an early riser may be at his or her best in the early afternoon, someone who sleeps late hits his or her peak much later at night.

## Stress Costs Economy

The U.S. leads the world in per capita health spending, but health outcomes are poorer than other industrialized nations. Researchers analyzed medical literature about 10 work-related triggers that lead to negative health outcomes—including unemployment, long hours, and feeling unfairly treated—and used survey data to determine their prevalence; and found that worker neuroses tended to mirror the health of the overall economy, resulting in \$190 billion in health-care expenses and over 120,000 deaths each year, according to the study to be published, submitted to Management Science<sup>5</sup>. Reasons for this loss include: the effect of individual behavioral choices such as diet and exercise on healthcare costs and mortality, management of healthcare delivery organizations, and large administrative cost burden due to inefficient and large U.S. healthcare system. In addition, layoffs and unemployment, lack of health insurance, shift work, long working hours, job insecurity, work-family conflict, low job control, high job demands, low social support at work, and low organizational justice are contributing factors.

Issue 205

5116 Kali Era, JAYA Year, PUSHYA Month  
2072 Vikramarka Era, JAYA Year, PUSHYA Month  
1936 Salivahana Era, VJAYA Year, PUSHYA Month  
2015 AD, JANUARY

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## Vaccines for Poor Children

At a Global Alliance for Vaccines and Immunization (GAVI) conference in Berlin, Microsoft founder Bill Gates and the British government topped the donations list at \$1.55 billion and \$1.5 billion respectively. Norway is offering \$969 million, the USA \$800 million and Germany \$720 million<sup>6</sup>. Bill Gates has dismissed criticism by health campaigners of the high prices of some vaccines, warning that it only serves to deter pharmaceutical companies from working on life-saving products for poor countries.

Pneumococcus vaccine saves lives for about \$1,000 per life saved. The short-sighted humanitarian aid organization Médecins sans Frontières (MSF) last week called publicly for the two big pharma companies making the vaccine to drop the price to \$5 per child. Each child needs three doses of the vaccine. Instead of penalizing the pharma for developing the drug, MSF should pay the difference and make up the pharma's loss of \$ 955.00 at the price of \$5 suggested by MSF<sup>7</sup>, which focuses on \$19 bn in global sales of the vaccine since it launched, by GSK and Pfizer collectively; conveniently ignoring the facts of costs of development of such vaccines<sup>8</sup>: overall, vaccine prices have skyrocketed, with the Centers for Disease Control and Prevention's five recommended childhood shots costing \$937 per kid in 2014, compared with \$215 in 1986. Each dose of the pneumococcal disease vaccine has a list price of \$136. In the U.S., kids are required to get four doses before starting school. The price for Prevnar 13 has gone up by 6% each year since its FDA approval in 2010 in the US. Vaccines are more complicated--and expensive--to develop and to manufacture than ever. Vaccine plants cost \$600 million to build and one batch of Prevnar 13 takes two years of work. Developing its predecessor, Prevnar 7, took 14 years. It's a risky business developing vaccines, so the higher costs of vaccination; until the company recovers costs and makes some profit for investment in future medicines.

“The primary healthcare system in northern India, northern Nigeria and Pakistan are not well run, so whether it is immunizations or getting antibiotics, there needs to be effort putting in international help to get those things up to be very high quality,” Gates said. Pilot projects in Bihar, which has a population of more than 80 million, had increased the vaccination rate from 35% to over 80%.

Issue 205

5116 Kali Era, JAYA Year, PUSHYA Month  
2072 Vikramarka Era, JAYA Year, PUSHYA Month  
1936 Salivahana Era, VJAYA Year, PUSHYA Month  
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## Fascinating Anatomy

The male reproductive system is a fascinating area of the human anatomy, says Medical Daily Pulse<sup>9</sup>. Male fetuses start producing fetal erections as early as 16 weeks into their mother's pregnancy. An erection requires around 130 ml of blood. Most men experience an average of 11 erections each day, three to five of which occur in the sleep. Chicago's Smell and Taste Treatment and Research Foundation revealed in 1955 that the smell of doughnuts and black licorice increased blood flow to the penis by 32 percent. Smoking increases a man's risk for erectile dysfunction.

Between rodents and humans there is a striking conservation of relevant elements, including the basic anatomy of the penis, the mechanics of erection, and the neural structures regulating erection<sup>10</sup>. Erection results from stimuli which are either psychogenic or reflexogenic, or a combination thereof. The reflexogenic erection is an erection resulting from perception through senses, the five major sense organs. The psychogenic erection is caused by a fantasy. The third is nocturnal or an erection that occurs when men are in their REM cycle of sleep.

Erection is controlled by a reflex arc that is mediated in the sacral spinal cord. A reflex involves an afferent and efferent limb. The afferent limb consists of somatic afferent fibers from the genital region that travel through the pudental nerve into the sacral spinal cord. These fibers travel through the cauda equina and exit via the S2 to S4 nerve roots. Erectogenic stimuli are classified as contact (somesthetic) or noncontact, and their action in evoking erection is placed on a continuum of reflexivity. Psychogenic erections are due to stimulus in the brain, such as seeing naked female body or pictures in a magazine, or dreaming where the stimulus starts in the brain and goes down the spinal cord and through the T11-L2 center stimulates a psychogenic erection. The S2 to S4 center is a reflexic center.

The post-ganglionic parasympathetic fibers secrete nitric oxide, which causes relaxation of the smooth muscle of the corpus cavernosum and increases blood flow to the penile arteries. Consequently, the vascular sinusoids of the penis become engorged with blood and the result is an erection. This reflex is modulated by higher brainstem, subcortical and cortical centers. In addition, erectile function is influenced by hormonal factors such as testosterone.

Issue 205

5116 Kali Era, JAYA Year, PUSHYA Month  
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1936 Salivahana Era, VJAYA Year, PUSHYA Month  
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Penile fractures are not common, with the first case registered in 1924; since then, 1,600 cases have been recorded worldwide. Trauma during aggressive intercourse may result in a rupture of the tunica albuginea, the fibrous membrane that envelope the corpora cavernosa. As the penis undergoes its shape shifting transformation, the elastic tunica albuginea thins out and expands. However, when it expands or stretches too far, because the shaft unexpectedly bends or buckles, the membrane can tear or 'fracture'. Such a fracture usually occurs at the base of the penis<sup>11</sup>.

## Food Problems and Allergies

Food problems include food allergies, food intolerance or sensitivity, and celiac disease.

**Food Allergies:** An allergic reaction is an abnormal immune-system response. It creates proteins in blood called immunoglobulin E (IgE) antibodies. It has specific symptoms that happen within minutes or hours. They may include itching, hives, eczema, trouble breathing, vomiting, stomach pain, and diarrhea. In severe cases, an allergic reaction can lead to anaphylactic shock, a sharp drop in blood pressure that can cause a person to stop breathing and can affect the heart. To know for certain if a child has an allergy, history of a child's reactions to certain foods, blood and skin tests and a controlled food challenge under medical supervision are taken into consideration.

Body's defenses react to a usually harmless substance, such as pollen, animal dander, or food. Almost anything can trigger an allergic reaction, which can range from mild and annoying to sudden and life-threatening.

Pollen from trees, grasses, and weeds can trigger hay fever or seasonal allergies, with symptoms like sneezing, runny nose, nasal congestion, and itchy, watery eyes. Treatments include over-the-counter products, prescription drugs, and allergy shots. Prevent symptoms by staying inside on windy days when pollen counts are high, closing windows, and running the air conditioning.

Proteins secreted by oil glands in an animal's skin and present in their saliva can cause allergic reactions for some people. The allergy can take two or more years to develop and symptoms may not go away until months after being away from the animal. If your pet is causing allergies, make your bedroom a pet-free

Issue 205

5116 Kali Era, JAYA Year, PUSHYA Month  
2072 Vikramarka Era, JAYA Year, PUSHYA Month  
1936 Salivahana Era, VJAYA Year, PUSHYA Month  
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zone, avoid carpets, and wash him regularly. A HEPA filter and frequent vacuuming may also help. Allergy shots may be beneficial.

Dust mites are microscopic organisms that live in house dust. They thrive in high humidity and feed on the dead skin cells of people and pets, as well as on pollen, bacteria, and fungi. Help prevent dust mite allergies by covering mattresses, pillows, and box springs, using hypoallergenic pillows, washing sheets weekly in hot water, and keeping the house free of dust collecting-items such as stuffed animals, curtains, and carpet.

People who are allergic to stings can have a severe or even life-threatening reaction. Symptoms include extensive swelling and redness from the sting or bite that may last a week or more, nausea, fatigue, and low-grade fever. In rare cases when insect bites cause a severe reaction (anaphylaxis), symptoms may include difficulty breathing, swelling around the face, throat, or mouth, racing pulse, an itchy rash or hives, dizziness, or a sharp drop in blood pressure. If you're severely allergic, you should get epinephrine immediately after a sting. Allergy shots are recommended to prevent anaphylaxis for some stings.

Molds make allergens, irritants, and in some cases, potentially toxic substances. Inhaling or touching mold (magnified here) or mold spores may cause allergic reactions in some people. There are many types of mold. They all need moisture to grow. They can be found in damp areas such as basements or bathrooms, as well as in grass or mulch. Avoid activities that trigger symptoms, such as raking leaves. Ventilate moist areas in your home.

Milk, shellfish, eggs, and nuts are among the most common foods that cause allergies. An allergic reaction usually happens within minutes of eating the offending food. Symptoms, which can include breathing problems, hives, vomiting, diarrhea, and swelling around the mouth, can be severe. Avoid all foods that you are allergic to. If you're exposed to them, you may need an epinephrine injection.

Latex in gloves, condoms, and some medical devices can trigger a latex allergy. Symptoms include skin rash, eye irritation, runny nose, sneezing, wheezing, and skin or nose itching. Allergic reactions can range from skin redness and itching to anaphylaxis, a serious reaction which can cause difficulty breathing, and hives. If you're allergic, wear a MedicAlert bracelet and carry an epinephrine kit.

Issue 205

5116 Kali Era, JAYA Year, PUSHYA Month  
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1936 Salivahana Era, VJAYA Year, PUSHYA Month  
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Symptoms of allergies to medications, such as penicillin or aspirin, can range from mild to life-threatening and can include hives, itchy eyes, congestion, and swelling in the face, mouth and throat. It's best to avoid the drug altogether. But if you're exposed, your doctor may recommend treating mild symptoms with antihistamines or steroids. For severe allergy symptoms, you may need epinephrine.

Fragrances found in products like perfumes, scented candles, laundry detergent, and cosmetics can cause mild to severe health problems. For most people, symptoms ease up once the scent is gone. For some, repeated exposures cause more symptoms that happen more often and last longer. There's some question whether fragrance reactions are a true allergy or simply your body's response to an irritant.

A protein in their droppings can be a troublesome allergen. It can be difficult to get rid of cockroaches from your home, especially in a warm climate, or if you live in an apartment building where bugs can pass back and forth between neighbors. Treat for roaches by using pesticides, keeping a clean kitchen, and repairing cracks and holes in floors, walls, and windows to stop them from entering your home.

**Food Intolerance or Sensitivity:** A person with a food intolerance or sensitivity is missing an enzyme that lets their body process the food correctly. Food intolerance can result in bloating, diarrhea, and gas. It can be detected by a blood test. Unlike an allergic reaction, food sensitivity doesn't involve an immune system response. The immune system makes another type of antibody, called immunoglobulin G (IgG), which some laboratories claim indicates food sensitivity.

**Celiac Disease:** With celiac disease, gluten causes the immune system to attack the lining of the intestine, making the person sick. About 1% of the population is thought to have celiac disease. The condition is confirmed through blood work and an intestinal biopsy.

Some of the tests are marketed directly to consumers and can cost in the hundreds of dollars. But allergists caution the tests give people too many "false positive" results, which incorrectly point to a food sensitivity, to be reliable. A study involving 21,305 adults published in January 2013 in PLoS One found no evidence that an IgG antibody test indicates a food sensitivity.

Issue 205

5116 Kali Era, JAYA Year, PUSHYA Month  
2072 Vikramarka Era, JAYA Year, PUSHYA Month  
1936 Salivahana Era, VJAYA Year, PUSHYA Month  
2015 AD, JANUARY

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## Lyme Disease

Lyme disease is an infection that is transmitted through the bite of a tick infected with a bacterium called *Borrelia burgdorferi*. Ticks typically get the bacterium by biting infected animals, like deer and mice. Most people who get tick bites do not get Lyme disease. Not all ticks are infected, and the risk for contracting the disease increases the longer the tick is attached to the body.

Within one to four weeks of being bitten by an infected tick, most people will experience some symptoms of Lyme disease. A circular, expanding rash (erythema migrans) at the site of the bite develops in about 70%-80% of cases. Some people report flu-like symptoms at this stage, including fever, chills, headaches, fatigue, swollen lymph nodes, joint pain, and muscle aches.

If the disease is not detected and treated in its early stages, it can extend to more areas of the body, affecting the joints, heart, and nervous system (after several weeks to months after the initial bite). Additional rashes may occur, and there may be intermittent periods of pain and weakness in the arms or legs. Facial-muscle paralysis (Bell's palsy), headaches, and poor memory are other symptoms at this stage, along with a rapid heartbeat and some loss of control of facial muscles.

This is the most serious stage of the disease, when treatment was either not successful or never started (usually occurring many months after the initial bite). Joint inflammation (arthritis), typically in the knees, becomes apparent, and may become chronic. The nervous system can develop abnormal sensation because of disease of peripheral nerves (peripheral neuropathy), and confusion. Heart problems are less common, but can include inflammation of the heart muscle and an irregular beat.

Infected people and pets cannot transmit the disease to humans unless an infected tick falls off the animal and then bites a person. Insects such as mosquitoes, flies, or fleas cannot spread the disease to humans either. Avoid tick bites whenever possible by staying clear of grassy or wooded areas, especially May to July. Cover your body head-to-toe when entering possible tick-infested areas. Apply an insect repellent containing DEET directly to your skin. Insect repellents containing permethrin can be applied to clothes to kill ticks on contact, but never apply to the skin. When coming in from outdoors inspect your body thoroughly for ticks; do the same for pets. Wash your skin and scalp to knock off any ticks that are only loosely attached.

Issue 205

5116 Kali Era, JAYA Year, PUSHYA Month  
2072 Vikramarka Era, JAYA Year, PUSHYA Month  
1936 Salivahana Era, VJAYA Year, PUSHYA Month  
2015 AD, JANUARY

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## Bisphenol A is not a Threat

European Food Safety Authority (EFSA)'s comprehensive re-evaluation of bisphenol A (BPA) exposure and toxicity concludes that BPA poses no health risk to consumers of any age group (including unborn children, infants and adolescents) at current exposure levels. Exposure from the diet or from a combination of sources (diet, dust, cosmetics and thermal paper) is considerably under the safe level (the "tolerable daily intake" or TDI). BPA is a chemical compound used in the manufacture of food contact materials such as re-usable plastic tableware and can coatings (mainly protective linings). Another widespread use of BPA is in thermal paper commonly used in till/cash register receipts. Residues of BPA can migrate into food and beverages and be ingested by the consumer; BPA from other sources including thermal paper, cosmetics and dust can be absorbed through the skin and by inhalation<sup>12</sup>.

## Cranberries

Cranberries are harvested in the fall, creating a plentiful supply for the winter months. Cup fresh or ½ cup of dried, tiny ruby red berries equals a fruit serving and they're a good source of vitamin C, fiber, antioxidants and proanthocyanidins. A recent review published in the international journal Advances in Nutrition concluded that cranberry proanthocyanidins may be responsible for cranberries' popularity in reducing the incidence of urinary tract infections, stomach ulcers, gum disease, and they may also improve heart health and temper inflammation. Enjoy dried cranberries in salads, yogurt, and quinoa/rice dishes, or even in a trail mix for on-the-go snacking.

## Brussels Sprouts

Brussels Sprouts are a cruciferous vegetable, a cousin of cauliflower and broccoli. These veggies are known for their antioxidants that help keep inflammation and chronic diseases (like heart disease) in check. A ½ cup of steamed sprouts provides just 30 calories, 3 grams of fiber and 2 grams of protein. They're also an excellent source of vitamin C, and a good source of folate (folic acid).

Issue 205

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1936 Salivahana Era, VJAYA Year, PUSHYA Month  
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## Tea

Tea (from the Amoy tē of southern Fujian province) and Chai (from the Cantonese chàh of Guangzhou (Canton)) are two pronunciations for the same word character for bitter herb in Chinese, which was picked up as Chai by Northern Indian languages, Persian, Arabic, Urdu, Turkish, Slavic Russian, etc., and as Tea by Dravidian languages, English, German etc<sup>13</sup>. Tea is an aromatic beverage commonly prepared by pouring hot or boiling water over cured leaves of the *Camellia sinensis*, an evergreen shrub native to India and Asia. During the British Indian empire time, the British found native wild tea growing in Assam<sup>14</sup>. In recent years, thousands of scientific studies have been published revealing that tea contains potent antioxidants that may promote heart health, aid in fighting some types of cancer and neurological disorders, and even boost metabolism.



Fresh leaves from Assam contain 22.2% polyphenols, 17.2% protein, 4.3% caffeine, 27.0% crude fiber, 0.5% starch, 3.5% reducing sugars, 6.5% pectins, 2.0% ether extract and 5.6% ash. Per 100 g, the leaf is reported to contain 293 calories, 8.0 g H<sub>2</sub>O, 24.5 g protein, 2.8 g fat, 58.8 g total carbohydrate, 8.7 g fiber, 5.9 g ash, 327 mg Ca, 313 mg P, 24.3 mg Fe, 50 mg Na, 2700 ug beta-carotene equivalent, 0.07 mg thiamine, 0.8 mg riboflavin, 7.6 mg niacin, and 9 mg ascorbic acid<sup>15</sup>.

Rank	Scientific Name /Common Name
Kingdom	<u>Plantae</u> – Plants
Subkingdom	<u>Tracheobionta</u> – Vascular plants
Superdivision	<u>Spermatophyta</u> – Seed plants
Division	<u>Magnoliophyta</u> – Flowering plants
Class	<u>Magnoliopsida</u> – Dicotyledons
Subclass	<u>Dilleniidae</u>
Order	<u>Theales</u>
Family	<u>Theaceae</u> – Tea family

Issue 205

5116 Kali Era, JAYA Year, PUSHYA Month  
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Rank	Scientific Name /Common Name
Genus	<i>Camellia</i> L. – camellia
Species	<i>Camellia sinensis</i> (L.) Kuntze – tea

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## Kiwifruit

Kiwifruit (a type of berry) serving (2 kiwis) has twice the vitamin C of an orange, more potassium than a banana and the fiber of a bowl of whole grain cereal, and less than 100 calories! They can be added to cereals, pancakes, salads, or even as a yogurt topping.

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## Oats

Oats will fill you up (1 cup of cooked oats has 4 grams of filling fiber and 5 grams of protein), and studies show that they are powerful weapons against heart disease and diabetes, as well as improve digestion. Some of the most exciting research about oats centers on its role in weight management. One study at the University of Sydney found that participants fed 38 foods rated oatmeal third overall for increasing feelings of fullness. Other studies show that oats trigger satiety hormones to help curb hunger and appetite.

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## Carcinogens in Meat

Two types of potential carcinogens may be found in grilled meats. One type (polycyclic aromatic hydrocarbons, PAHs) is found in the flames and smoke that are created when fat and juices drip from meat onto a heat source. The PAHs then stick to the surface of the meat. The other type (heterocyclic amines, HCAs) is formed when high temperatures cause a chemical reaction between naturally occurring amino acids and sugars in the meat and the creatine found in muscle tissue.

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## Spinach Soup<sup>16</sup>

*Ingredients:* 2 cups, 1/2-inch cubes country-style sourdough bread; 2 tablespoons, extra-virgin olive oil; 1 clove, garlic, minced; 1 tablespoon, finely chopped fresh rosemary, or 1 teaspoon dried; 1 tablespoon, butter; 1 medium onion, coarsely chopped; 1 clove, garlic, minced; 1 tablespoon, finely chopped fresh

Issue 205

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rosemary, or 1 teaspoon dried; 1/4 teaspoon salt; Freshly ground pepper to taste; 2 cups, diced peeled red potatoes; 4 cups, reduced-sodium chicken broth, vegetable broth or water; 6 cups, fresh spinach or chard leaves, tough stems removed; Freshly grated nutmeg for garnish.

*Instructions:* To prepare croutons: Preheat oven to 375°F. Toss bread cubes, oil, garlic and rosemary in a large bowl until well combined. Spread in a single layer on a large baking sheet. Bake until golden and crisp, 12 to 15 minutes. Meanwhile, to prepare soup: Melt butter in a large saucepan over medium heat. Add onion, garlic, rosemary, salt and pepper, reduce heat to medium-low and cook, stirring occasionally, for 5 minutes. Stir in potatoes and cook, stirring occasionally, for 3 minutes. Pour in broth (or water). Bring to a simmer over medium heat and cook until the potatoes are soft, about 15 minutes. Stir in spinach (or chard) and continue to simmer until the greens are tender, about 10 minutes more. Puree the soup with an immersion blender or regular blender (in batches), leaving it a little chunky if desired. (Use caution when pureeing hot liquids.)

Source: The primary sources cited above, New York Times (NYT), Washington Post (WP), Mercury News, Bayarea.com, Chicago Tribune, USA Today, Intellihealthnews, Deccan Chronicle (DC), the Hindu, Hindustan Times, Times of India, AP, Reuters, AFP, womenfitness.net, about.com etc.

Om! Asatoma Sadgamaya, Tamasoma Jyotirgamaya, Mrityorma Amritamgamaya, Om Shantih, Shantih, Shantih!  
(Aum! Lead the world from wrong path to the right path, from ignorance to knowledge, from mortality to immortality, and peace!)

<sup>1</sup> Sleep, available at: <http://www.intelihealth.com/news/good-sleep-in-middle-age-may-pay-benefits-later?level=0> ; accessed on 26 January 2015.

<sup>2</sup> Sleep, available at: <http://www.cdc.gov/sleep/>; accessed on 26 January 2015.

<sup>3</sup> Sleep, available at: <http://www.cdc.gov/sleep/>; accessed on 26 January 2015.

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Issue 205

5116 Kali Era, JAYA Year, PUSHYA Month  
2072 Vikramarka Era, JAYA Year, PUSHYA Month  
1936 Salivahana Era, VJAYA Year, PUSHYA Month  
2015 AD, JANUARY

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Issue 205

5116 Kali Era, JAYA Year, PUSHYA Month  
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