



UNWIND AGING

Companion to

TOP 10 LPI

micronutrients

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Companion of Top 10 micronutrients from LPI

(listed below are Health Issues arising from Deficiencies)

Vitamin B6

Deficiency - Potential Health Problems:

Microcytic Anemia: A type of anemia characterized by smaller-than-normal red blood cells, leading to fatigue, weakness, shortness of breath, and pale skin. [Microcytic Hypochromic Anemia - StatPearls - NCBI Bookshelf](#)

Skin Problems: B6 deficiency can manifest as dermatitis (skin inflammation), cheilosis (cracks at the corners of the mouth), and glossitis (inflamed tongue). [Vitamin B6 - Health Professional Fact Sheet - NIH Office of Dietary Supplements](#)

Neurological Issues: In severe cases, B6 deficiency can lead to seizures, peripheral neuropathy (numbness and tingling in the hands and feet), and cognitive impairment. [Nutritional Deficiencies as a Seizure Trigger | Epilepsy Foundation](#)

Weakened Immune Function: B6 is essential for a healthy immune system. Deficiency can increase susceptibility to infections. [Vitamin B6 - Health Professional Fact Sheet - NIH Office of Dietary Supplements](#)

Mood Disorders: Depression and confusion have been associated with B6 deficiency. [Vitamin B6 level is associated with symptoms of depression - PubMed](#)

Specific Populations at Risk:

Older Adults: Reduced dietary intake and impaired absorption can increase the risk of deficiency in this population. [Vitamin B6 Deficiency - StatPearls - NCBI Bookshelf](#)

People with Certain Medical Conditions: Kidney disease, autoimmune disorders, and certain gastrointestinal conditions can impair B6 absorption or increase its excretion. [Signs and Symptoms of Vitamin B6 Deficiency - Health](#)

Pregnant and Breastfeeding Women: Increased B6 requirements during pregnancy and lactation can put these women at risk if their intake is ²inadequate. [Effect of energy restriction and exercise on vitamin B-6 status of women during lactation](#)

People taking Certain Medications: Some medications, like isoniazid (used to treat tuberculosis), can interfere with B6 metabolism.

Vitamin B12

Deficiency Symptoms/Health Problems

Megaloblastic Anemia: A type of anemia characterized by larger-than-normal red blood cells, leading to fatigue, weakness, shortness of breath, and pale skin. [Vitamin B12 Deficiency Anemia - Johns Hopkins Medicine](#)

Neurological Symptoms: Nerve damage can cause numbness and tingling in the hands and feet, difficulty walking, memory loss, and even dementia in severe cases. [Vitamin B12 Deficiency: Symptoms, Causes & Treatment - Cleveland Clinic](#)

Other Symptoms: Glossitis (inflammation of the tongue), mouth ulcers, loss of appetite and weight loss, irritability or mood changes, depression, vision problems [Vitamin B12 Deficiency: Causes, Symptoms, and Treatment - WebMD](#)

Populations at Risk

Older Adults: Reduced dietary intake and impaired absorption can increase the risk of deficiency in this population. [Vitamin B12-Deficiency Anemia | NHLBI, NIH](#)

People with Certain Medical Conditions: Conditions affecting the stomach or small intestine, such as atrophic gastritis, pernicious anemia, Crohn's disease, celiac disease, and gastric bypass surgery; other conditions like

diabetes, HIV/AIDS, and certain cancers [Vitamin B12 Deficiency: Causes, Symptoms, and Treatment - WebMD](#)

People taking Certain Medications: Some medications can interfere with B12 absorption or utilization, including proton pump inhibitors (PPIs), metformin, certain antibiotics, and colchicine [Vitamin B12 Deficiency: Symptoms, Causes & Treatment - Cleveland Clinic](#)

Vegans and Vegetarians: Since B12 is primarily found in animal products, people following these diets are at a higher risk unless they take supplements or consume fortified foods. [Vitamin B12–Deficiency Anemia | NHLBI, NIH](#)

Vitamin C

Deficiency Symptoms/Health Problems

Scurvy: A condition characterized by fatigue, weakness, bleeding gums, easy bruising, slow wound healing, and joint pain.

<https://my.clevelandclinic.org/health/diseases/24318-scurvy>

Impaired Immune Function: Vitamin C deficiency can weaken the immune system, making individuals more susceptible to infections. [Vitamin C and Immune Function](#)

Skin Problems: Dry skin, rough skin, and corkscrew-shaped hair. [Vitamin C Deficiency](#)

Anemia: Vitamin C deficiency can contribute to iron-deficiency anemia. [Vitamin C Deficiency Anemia](#)

Populations at Risk

People with limited access to fresh fruits and vegetables: Those who consume a diet low in fruits and vegetables, especially citrus fruits, berries, and leafy greens, are at risk.

Smokers: Smoking increases the need for Vitamin C, and smokers may require additional intake to meet their needs. [Vitamin C - Health Professional Fact Sheet](#)

People with certain medical conditions: Certain conditions can affect vitamin C absorption or increase its excretion, such as malabsorption disorders, kidney disease, and cancer. [Vitamin C](#)

Infants fed evaporated or boiled milk: These milk products lose Vitamin C during processing and may require supplementation. [Vitamin C](#)

Vitamin D

Deficiency Symptoms/Health Problems

Rickets in children: A condition characterized by soft and weak bones, leading to skeletal deformities, delayed growth, and muscle weakness. [Rickets - Mayo Clinic](#)

Osteomalacia in adults: Softening of the bones, causing bone pain, muscle weakness, and increased risk of fractures. [Osteomalacia - Mayo Clinic](#)

Increased risk of osteoporosis: Vitamin D deficiency can contribute to decreased bone density and increased risk of fractures, especially in older adults. [Vitamin D and Your Health: Breaking Old Rules, Raising New Hopes](#)

Impaired immune function: Vitamin D plays a role in immune system regulation, and deficiency can increase susceptibility to infections. [Role of Vitamin D in the Immune System](#)

Increased risk of certain chronic diseases: Research suggests a link between Vitamin D deficiency and an increased risk of various conditions, including heart disease, cancer, diabetes, and autoimmune diseases. [Vitamin D and Health](#)

Populations at Risk

People with limited sun exposure: Individuals who spend most of their time indoors or live in areas with limited sunlight exposure are at risk, as the body primarily synthesizes Vitamin D from sunlight. [Vitamin D](#)

People with darker skin pigmentation: Darker skin pigmentation reduces the skin's ability to produce Vitamin D from sunlight. [Vitamin D](#)

Older adults: The skin's ability to synthesize Vitamin D decreases with age, and older adults may also have reduced dietary intake. [Vitamin D](#)

People with certain medical conditions: Conditions affecting fat absorption, such as Crohn's disease and celiac disease, can impair Vitamin D absorption. [Vitamin D](#)

Breastfed infants: Breast milk may not provide enough Vitamin D, and supplementation may be necessary. [Vitamin D](#)

Vitamin E

Deficiency Symptoms/Health Problems

Neuromuscular Problems: Vitamin E deficiency can lead to muscle weakness, loss of coordination, and difficulty walking. It can also cause nerve damage (peripheral neuropathy), leading to numbness and tingling in the hands and feet. [Vitamin E Deficiency - StatPearls - NCBI Bookshelf](#)

Vision Problems: Retinopathy (damage to the retina) can occur due to Vitamin E deficiency, potentially leading to vision impairment. [Vitamin E](#)

Weakened Immune System: Vitamin E plays a role in immune function, and deficiency can increase susceptibility to infections. [Vitamin E](#)

Populations at Risk

- **People with Fat Malabsorption Disorders:** Conditions such as Crohn's disease, cystic fibrosis, and certain liver diseases can impair the absorption of fat-soluble vitamins like Vitamin E, increasing the risk of deficiency. [Vitamin E](#)
 - **Premature Infants:** Premature babies may have low Vitamin E levels at birth and may require supplementation. [Vitamin E](#)
 - **People with Rare Genetic Disorders:** Certain genetic disorders affecting Vitamin E metabolism or transport can lead to deficiency even with adequate intake. [Vitamin E Deficiency - StatPearls - NCBI Bookshelf](#)
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Vitamin K

Deficiency Symptoms/Health Problems

- **Easy Bruising and Bleeding:** Vitamin K deficiency can lead to easy bruising, bleeding from wounds or gums, nosebleeds, and heavy menstrual bleeding.

[Vitamin K Deficiency - StatPearls - NCBI Bookshelf](#)

- **Hemorrhagic Disease of the Newborn:** In rare cases, severe Vitamin K deficiency in newborns can cause bleeding within the brain or other organs, potentially leading to serious complications.

[1. Vitamin K Deficiency - MSD Manuals](#)

- **Poor Bone Health:** Vitamin K is involved in bone mineralization, and deficiency can contribute to decreased bone density and increased risk of fractures. [1. Vitamin K Deficiency - StatPearls - NCBI Bookshelf](#)

Populations at Risk

- **Newborns:** Newborns have low Vitamin K levels at birth and are at risk of hemorrhagic disease of the newborn unless they receive a Vitamin K injection shortly after birth. [Vitamin K and newborn babies - Better Health Channel](#)
- **People with Fat Malabsorption Disorders:** Conditions such as celiac disease, cystic fibrosis, and certain liver diseases can impair the absorption of fat-soluble vitamins like Vitamin K. [Vitamin K Deficiency - StatPearls - NCBI Bookshelf](#)
- **People taking Certain Medications:** Some medications, like long-term antibiotic use or blood thinners, can interfere with Vitamin K production or function. [Vitamin K Deficiency - StatPearls - NCBI Bookshelf](#)
- **Older Adults:** Reduced dietary intake, decreased gut bacteria, and medications can increase the risk of deficiency in this population. [Vitamin K Deficiency - StatPearls - NCBI Bookshelf](#)

Calcium

Deficiency Symptoms/Health Problems

- **Hypocalcemia:** This condition occurs when blood calcium levels are abnormally low. Symptoms can include muscle cramps, numbness and tingling in the hands and feet, seizures, confusion, and irregular heartbeat.

[Hypocalcemia - StatPearls - NCBI Bookshelf](#)

- **Osteoporosis:** Long-term calcium deficiency can contribute to decreased bone density and increased risk of fractures.

[Calcium - Health Professional Fact Sheet - NIH Office of Dietary Supplements](#)

- **Rickets in children:** Calcium deficiency can cause rickets, a condition where bones become soft and weak, leading to skeletal deformities and delayed growth. [Rickets and osteomalacia - NHS](#)
- **Osteomalacia in adults:** Similar to rickets, osteomalacia causes softening of the bones, leading to bone pain, muscle weakness, and increased risk of fractures. [Rickets and osteomalacia | nidirect](#)

Populations at Risk

- **Postmenopausal women:** Hormonal changes during menopause can increase the risk of bone loss and calcium deficiency.
- [Calcium - Health Professional Fact Sheet - NIH Office of Dietary Supplements](#)
- **People with lactose intolerance or dairy allergies:** These individuals may have difficulty consuming adequate calcium from dairy products, which are a major source of dietary calcium.
- **People with certain medical conditions:** Conditions that affect calcium absorption or increase its excretion, such as Crohn's disease, celiac disease, kidney disease, and hyperparathyroidism, can increase the risk of deficiency.

[Bones - Crohn's & Colitis UK](#)

- **Vegans and vegetarians:** Plant-based diets may be lower in calcium if not carefully planned to include calcium-rich sources like leafy greens, fortified plant milk, and tofu.

[Calcium intake in vegan and vegetarian diets: A systematic review and Meta-analysis](#)

Magnesium

Deficiency Symptoms/Health Problems

- **Muscle cramps and tremors:** Magnesium deficiency can lead to involuntary muscle contractions, spasms, and tremors.
- [8 magnesium deficiency symptoms \(and 9 high magnesium foods\) | University Health Center - University of Nebraska–Lincoln](#)

- **Fatigue and Weakness:** Inadequate magnesium levels can cause fatigue, weakness, and decreased energy levels.
- [Magnesium deficiency - symptoms, causes, treatment & prevention - Healthdirect](#)
- **Nausea and Vomiting:** Magnesium deficiency can also affect the digestive system, causing nausea and vomiting.

[8 magnesium deficiency symptoms \(and 9 high magnesium foods\) | University Health Center - University of Nebraska–Lincoln](#)

- **Loss of Appetite:** Another gastrointestinal symptom of magnesium deficiency is a decreased appetite.

[Magnesium deficiency - symptoms, causes, treatment & prevention - Healthdirect](#)

- **Numbness and Tingling:** In more severe cases, deficiency can cause numbness and tingling sensations, particularly in the extremities.
- [1. Hypomagnesemia: What It Is, Causes, Symptoms & Treatment - Cleveland Clinic](#)
- **Abnormal Heart Rhythms:** Magnesium plays a role in regulating heart rhythm, and deficiency can lead to irregular heartbeats.
- [Does Magnesium Help With Heart Palpitations? - Cleveland Clinic Health Essentials](#)

Populations at Risk

- **Older Adults:** Age-related changes in the digestive system and decreased dietary intake can increase the risk of magnesium deficiency in older individuals.
- [Magnesium - Health Professional Fact Sheet - NIH Office of Dietary Supplements](#)
- **People with Gastrointestinal Disorders:** Conditions like Crohn's disease, celiac disease, and chronic diarrhea can impair magnesium absorption.

[Magnesium - Health Professional Fact Sheet - NIH Office of Dietary Supplements](#)

- **People with Diabetes:** People with diabetes may have increased magnesium loss through urine, increasing their risk of deficiency.
- [Hypomagnesemia in Type 2 Diabetes: A Vicious Circle?](#)
- **People with Alcohol Dependence:** Excessive alcohol intake can interfere with magnesium absorption and increase its excretion.
- [Lower Serum Magnesium Concentrations are associated With Specific Heavy Drinking Markers, Pro-Inflammatory Response and Early-Stage Alcohol-associated Liver Injury - Oxford Academic](#)

Potassium

Deficiency Symptoms/Health Problems

- **Muscle weakness and cramps:** Potassium is essential for muscle function, and deficiency can lead to muscle weakness, cramps, and even paralysis in severe cases. [Hypokalemia - StatPearls - NCBI Bookshelf](#)
- **Fatigue and Weakness:** Low potassium levels can disrupt the body's electrolyte balance, leading to feelings of tiredness and overall weakness.

[Low Potassium Level Causes \(Hypokalemia\) - Cleveland Clinic](#)

- **Constipation:** Potassium deficiency can slow down the digestive system, leading to constipation.

[Low Potassium Level Causes \(Hypokalemia\) - Cleveland Clinic](#)

- **Irregular Heartbeat (Arrhythmia):** Potassium plays a crucial role in regulating heart rhythm, and deficiency can cause abnormal heartbeats, which can be dangerous. [Low blood potassium - UF Health](#)
- **High Blood Pressure:** Studies have shown a link between low potassium intake and increased blood pressure.

Populations at Risk

- **People with certain medical conditions:** Certain conditions can increase the risk of potassium deficiency, such as kidney disease, vomiting, diarrhea, eating disorders, and those taking certain medications like diuretics.

[1. Hypokalemia - StatPearls - NCBI Bookshelf](#)

- **People with excessive sweating:** Athletes or individuals who sweat excessively may lose significant amounts of potassium, increasing their risk of deficiency. [Low Potassium Level Causes \(Hypokalemia\) - Cleveland Clinic](#)
- **People on restrictive diets:** Diets low in fruits and vegetables can lead to inadequate potassium intake.

Zinc

Deficiency Symptoms/Health Problems

- **Impaired Growth and Development:** Zinc is crucial for growth, especially in children and adolescents. Deficiency can lead to stunted growth, delayed sexual development, and impaired cognitive function. Zinc Deficiency
- **Impaired Immune Function:** Zinc plays a vital role in immune system function. Deficiency can lead to increased susceptibility to infections and slower wound healing. The Role of Zinc in Antiviral Immunity
- **Hair Loss:** Zinc deficiency can contribute to hair loss or thinning hair. Zinc and hair loss: Things to know
- **Skin Problems:** Skin lesions, rashes, and delayed wound healing can also be signs of zinc deficiency. Zinc Deficiency
- **Loss of Appetite and Taste:** Zinc is important for taste perception. Deficiency can lead to a decreased appetite and altered sense of taste. Zinc Deficiency: Symptoms, Diagnosis, and More

Populations at Risk

- **People with gastrointestinal disorders:** Conditions that affect nutrient absorption, like Crohn's disease and celiac disease, can increase the risk of zinc deficiency. Zinc Deficiency
 - **Vegetarians and vegans:** Plant-based diets may contain less bioavailable zinc compared to animal sources, increasing the risk of deficiency if not carefully planned. Zinc: Fact Sheet for Health Professionals
 - **Pregnant and breastfeeding women:** Increased zinc requirements during pregnancy and lactation can put these women at risk if their intake is inadequate. Zinc
 - **Older adults:** Reduced dietary intake and decreased absorption can contribute to zinc deficiency in older adults. Zinc
 - **Vegetarians and vegans:** Plant-based diets may contain less bioavailable zinc compared to animal sources, increasing the risk of deficiency if not carefully planned. [Zinc](#)
 - **Pregnant and breastfeeding women:** Increased zinc requirements during pregnancy and lactation can put these women at risk if their intake is inadequate. [Zinc](#)
 - **Older adults:** Reduced dietary intake and decreased absorption can contribute to zinc deficiency in older adults. [Zinc](#)
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Iron

Deficiency Symptoms/Health Problems

- **Iron-Deficiency Anemia:** A common type of anemia characterized by a decrease in red blood cells or hemoglobin, leading to fatigue, weakness, shortness of breath, pale skin, and brittle nails. [[Iron-Deficiency Anemia - Mayo Clinic](#)]
- **Fatigue and Weakness:** Even without anemia, low iron levels can cause fatigue, weakness, and decreased energy levels. [[Iron deficiency - Symptoms and causes - NHS](#)]
- **Shortness of Breath:** Iron is essential for carrying oxygen throughout the body, and deficiency can lead to shortness of breath, especially during physical activity. [[Iron deficiency - Symptoms and causes - NHS](#)](<https://www.nhs.uk/>)
- **Pale Skin:** Iron deficiency can cause a decrease in blood flow to the skin, resulting in pale skin. [[Iron deficiency - Symptoms and causes - NHS](#)]
- **Brittle Nails:** Iron deficiency can weaken nails, making them brittle and prone to breaking. [[Iron deficiency - Symptoms and causes - NHS](#)](<https://www.nhs.uk/>)
- **Other Symptoms:** Iron deficiency can also cause headaches, dizziness, cold hands and feet, and inflammation of the tongue (glossitis). [[Iron deficiency - Symptoms and causes - NHS](#)](<https://www.nhs.uk/>)

Populations at Risk

- **Women of childbearing age:** Menstrual blood loss increases iron requirements, putting women of reproductive age at higher risk of deficiency. [[Iron-deficiency anemia](#)]
- **Pregnant women:** Increased blood volume and the needs of the developing fetus increase iron demands during pregnancy. [[Iron Needs During Pregnancy](#)]
- **Infants and young children:** Rapid growth and development increase iron requirements, making infants and young children susceptible to deficiency. [[Iron deficiency in infants and children](#)]
- **People with certain medical conditions:** Certain conditions can affect iron absorption or increase iron loss, such as gastrointestinal disorders, heavy menstrual bleeding, and chronic diseases. [[Iron-Deficiency Anemia](#)]
www.medindia.net
- **Frequent blood donors:** Blood donation can deplete iron stores, increasing the risk of deficiency. [[Blood Donation and Iron](#)]

Important Note

If you suspect you may have an iron deficiency, it's important to consult with a healthcare professional for proper diagnosis and treatment.

Taking Too Much Iron

While iron is essential, excessive intake can also be harmful. Iron overload can damage organs like the liver, heart, and pancreas. Symptoms of iron overload can include:

- Abdominal pain
- Nausea and vomiting
- Fatigue
- Joint pain
- Skin discoloration (bronzing)
- Liver damage
- Heart problems
- Diabetes

It's crucial to take iron supplements only under the guidance of a healthcare professional and avoid exceeding the recommended daily intake. Iron Overload

CoQ10

Deficiency Symptoms/Health Problems

- **Fatigue and Muscle Weakness:** CoQ10 plays a vital role in energy production within cells. Deficiency can lead to fatigue, muscle weakness, and exercise intolerance. [CoQ10 Deficiency](#)
- **Increased Oxidative Stress:** CoQ10 acts as an antioxidant, protecting cells from damage caused by free radicals. Deficiency can lead to increased oxidative stress, which may contribute to various health problems.
- **Cardiovascular Problems:** CoQ10 is particularly important for heart health. Deficiency has been associated with an increased risk of heart failure, high blood pressure, and other cardiovascular issues. [Coenzyme Q10](#)
- **Neurological Problems:** CoQ10 is also involved in brain function. Deficiency has been linked to neurological disorders such as migraines, Parkinson's disease, and Alzheimer's disease. [Coenzyme Q10](#)

Populations at Risk

- **Older Adults:** CoQ10 levels naturally decline with age, increasing the risk of deficiency in older individuals.
 - **People with Certain Medical Conditions:** Certain conditions can affect CoQ10 levels or increase the body's need for it, such as heart disease, diabetes, cancer, and mitochondrial disorders.
 - **People Taking Statin Medications:** Statin drugs, commonly used to lower cholesterol, can also reduce CoQ10 levels.
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**Thank You for Your Interest
In the Companion of the Top 10
micronutrients from the
Linus Pauling Institute**

