Advances in kidney transplantation

Making the impossible possible

Kidney failure is a life-threatening condition faced each year by a growing number of Americans. When kidney failure reaches end-stage kidney disease, the only treatment options are dialysis or a kidney transplant.

Demand for kidney transplants is considerably higher than for any other organ. At the start of 2009, more than 78,000 people in the United States were on the waiting list to have a kidney transplant. In recent years, only about 11,000 deceased-donor kidney transplants were performed annually in the United States.

Fortunately, advances in kidney transplant procedures have expanded options for suitable donor kidneys in recent years. As a result, specialized transplant centers — including Mayo Clinic — are capable of performing successful kidney transplants that only a decade ago would have been thought impossible.

Faltering filters

Normally, every time your heart beats, about a fifth of your blood is

In a procedure called laparoscopic donor nephrectomy, a surgeon uses a scope to remove a donor’s kidney through a small incision in the abdomen.
diverted from the body’s largest artery (aorta) into your kidneys. There, wastes are removed and precise concentrations of water, salts and other substances in your blood are regulated before that blood is returned to the heart for recirculation. Of the 50 gallons of blood pumped through your kidneys each day, about half a gallon of waste products and excess water is passed out of your body as urine.

Healthy kidneys manage all of this with ease. However, if an underlying disorder such as diabetes or high blood pressure (hypertension) is destroying your kidneys’ filtering units (nephrons), your kidneys begin to fail and become less efficient at doing their job.

For some, kidney failure can be managed with dietary changes, medication and treatment of the underlying disorder. But if the kidneys still can’t perform their vital role of removing enough waste and fluid from the body, the next treatment option for end-stage kidney disease is typically dialysis or a kidney transplant.

Transplant options

In the past, age could be a roadblock when it came to donating a kidney or receiving a kidney transplant. Today, there are no absolute age restrictions for receiving a kidney transplant. However, to receive a kidney if you’re over 65, your health must be relatively good, aside from the kidney disease for which the transplant is being sought.

A single donated kidney can accomplish most of what a previously healthy pair of failed kidneys used to do. A living-donor kidney transplant can be the best option if a matching donor can be identified — generally, a donor who is a blood relative can provide a closer match. However, very good results also can be obtained with kidneys from living donors who are unrelated — such as spouses, in-laws or friends. Short of a living donor, the next option may be to get on a waiting list for a kidney from a deceased donor. However, the wait can be several years or longer.

Fortunately, advances in kidney transplant procedures are making transplants possible for people who previously wouldn’t have been considered good transplant recipients due to the likelihood of organ rejection. A vital piece in these advances has been discovering ways to overcome antibody barriers that would otherwise lead to rejection of a transplanted donor kidney.

Normally, antibodies help your immune system identify and fight off foreign bodies, such as bacteria and viruses. In the case of a transplanted kidney, the kidney recipient’s antibodies can be directed against other proteins such as those that determine blood type or special proteins — particularly human leukocyte antigens (HLA) — that may be part of the transplanted kidney tissue. Two techniques that have improved transplant results by removing antibodies are:

- **ABO incompatible living-donor kidney transplant** — ABO incompatibility refers to the immune reaction that occurs when different blood types — types A, B or O — are mixed together. Ideally, the kidney donor’s blood type is compatible with the transplant recipient’s. If there’s not a match, this living-donor transplant technique involves preconditioning the transplant recipient’s blood by cleansing it of antibodies. Preconditioning may include removing antibodies that cause rejection by filtering the blood (plasmapheresis), or by taking drugs that impair or decrease antibody activity. The transplant recipient’s antibodies are carefully monitored the first two weeks after transplant. If antibody levels get too high, additional plasmapheresis may be done.

- **Positive crossmatch kidney transplant** — When it’s determined that an intended transplant recipient carries antibodies that would attack the donated kidney, it’s called a positive crossmatch, and it makes organ rejection likely. However, performing blood preconditioning techniques similar to those used with ABO incompatible transplants makes it possible for some positive crossmatch transplants to be successful.

By receiving either an ABO incompatible or positive crossmatch living-donor transplant with proper blood preconditioning techniques, recipients can have a lower risk of rejection than would have previously been expected and thereby avoid being on the kidney transplant waiting list for several years. Success rates of ABO incompatible transplants are nearly equal to those done with blood-type-compatible recipients.
After your surgery

After a kidney transplant, you can expect an additional three to four weeks of very close monitoring from your doctors. Even with the best possible match between you and the donor, your immune system will try to reject the new kidney.

Organ rejection may occur at any time after a transplant, but most occur within the first few weeks or months. Immunosuppressive drugs are used immediately after the transplant and for the rest of your life to prevent rejection. Other drugs may also be prescribed to help your body fight off infections. In addition, you’ll need to follow a post-transplant diet that’s low in fat, sugar and salt.

A kidney transplant offers no guarantees. Frequent blood tests during the first year after transplant are necessary to monitor how your body is accepting the new kidney.

Health tips

Getting social

As you age, it can be a challenge to develop or maintain ties with people outside of close friends and family. It may not be easy, but being part of a social group, whether it’s a formal support group, a church group, a club or just friends at the coffee shop, is proved to provide benefits, including:

- **Stress reduction** — Group involvement can help buffer day-to-day worries or help you get through a difficult time. It can also offer compassion, support, perspective, humor, inspiration, or even just a ride to the doctor or grocery store.
- **A sense of purpose** — Lending a hand or an ear to others in a group increases your sense of belonging and self-worth. Many groups do something to help others in the wider community.
- **Motivation** — Knowing that other members of your group will be meeting at 8 a.m. to exercise or do a volunteer project makes you feel needed and motivated to go.
- **Collective experience** — Comparing notes or brainstorming on certain aspects of your health may help you get more prompt or better health care. Shared experience can help build interconnections, bolster your mood and psychological health, and provide strength to deal with issues.
- **Staying sharp** — Engaging in conversation or activity with a variety of people has been linked in many studies to a slowing mental decline.

The ins and outs of living-donor kidney donation

Living kidney donors typically range in age from 18 to 70, are in good health, and — based on a pre-evaluation process — have normal kidney function and anatomy. Certain health conditions can rule out a live kidney donation, including diabetes, some cancers, intravenous drug use and certain infectious diseases, such as hepatitis or AIDS.

For someone who meets the donor criteria, donating one kidney generally doesn’t pose a major risk. Studies show that the remaining kidney will continue to do its job normally and will compensate for the loss of the other kidney. In fact, a recent study showed that people who give kidneys to others not only have a normal life span, but also have fewer kidney problems than does the general population — perhaps because they were healthier to start with.

After surgical removal of the kidney (nephrectomy), there’s no routine need for drugs or intense restrictions on diet for the donor.

The nephrectomy may be done in one of two ways:
- **Laparoscopic donor nephrectomy** — With the help of a scope, the surgeon locates, secures and removes the kidney through a small incision in the abdomen. This procedure allows for a faster recovery, and has become the preferred approach at many centers. Typically, two days are spent in the hospital and normal activities can often be resumed within about three weeks.
- **Traditional donor nephrectomy** — This involves making a larger incision on one side of the back through which the kidney can be removed. After this operation, kidney donors remain in the hospital for four to six days and can usually resume normal activities in five to six weeks.

Most living-donor kidneys begin functioning immediately after transplantation with fewer complications than those from deceased donors. Living-donor kidneys also tend to last longer than do deceased-donor kidneys. Generally, half of living-donor kidneys are still functioning 25 years after transplant, whereas half of deceased-donor kidneys fail in the first 10 years after transplant.
The B vitamins

Simplifying the complex

It’s nearly impossible to keep up with news regarding vitamin supplements — whether they’re good for you, bad for you or just a waste of money. This may be particularly true for the eight vitamins that make up the vitamin B complex.

Over the years, it’s been suggested that B vitamins may help reduce risk of cancer, heart attack, stroke and Alzheimer’s disease. In addition, they’ve taken on new life as the featured ingredients of products and supplements that claim they can boost energy levels.

However, recent research has mostly shown that B vitamin supplementation beyond the Recommended Dietary Allowance (RDA) probably isn’t beneficial. Still, supplementation with certain B vitamins may be recommended for older adults and others who don’t absorb B vitamins well or may have difficulty getting enough of them through their diet.

The B’s

The B vitamins are essential to health. Most help your body produce energy within cells. Individually, they’re involved in a diverse range of bodily functions. However, extra amounts of B vitamins won’t provide an energy-boosting effect. They’re mostly just excreted in the urine. And high doses of vitamin B-3 (niacin) or vitamin B-6 (pyridoxine) may cause side effects.

The real concern with B vitamins has to do with deficiencies. Deficiencies of certain B vitamins can lead to various symptoms. (See the chart on page 5.)

Deficiency is uncommon in countries where adequate nutrition typically isn’t a problem. But it can occur. Those at risk include:

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Radiation and early-stage breast cancer

A recent study found that reducing radiation treatments for certain early-stage breast cancers to 16 sessions given over the course of about three weeks appears to be just as effective as the standard treatment series of 25 treatments over five weeks.

Findings from the Canadian study were originally published in 2002 and updated in the fall of 2008. The updated study followed for 12 years more than 1,200 women who had undergone lumpectomies for early-stage, invasive breast cancer that hadn’t spread to the lymph nodes. Half of the women received the standard radiation treatment series over five weeks. The rest of the women were given a more intense course of radiation over just three weeks.

At the 10-year mark, researchers found similar cancer recurrence rates — between 6 and 7 percent — in the two groups of women.

Experts at Mayo Clinic now commonly employ this shorter course of treatment in selected women with early-stage breast cancer. Because of the decreased time commitment, the shorter course of radiation treatment is much more convenient and is also less expensive. However, there are still some situations in which a longer course of treatment may provide better outcomes, such as in women whose cancer has spread to the lymph nodes under the armpit.

Taking one blood pressure drug at night reduces side effects

If you take a drug to help control your blood pressure — especially at higher doses — you and your doctor may have had to deal with some type of side effect by switching medications or adjusting dosages.

With at least one drug — an extended-release formulation of the calcium channel blocker nifedipine (Procardia XL, others) — a recent study suggests that changing when you take it may reduce side effects.

The study, published in the August 2008 issue of the American Journal of Hypertension, randomly assigned 180 participants to take nifedipine at bedtime or in the morning. Side effects, such as leg swelling (edema), headache or rash were recorded.

Edema occurred in 13 percent of those who took nifedipine in the morning and in only 1 percent of those who took it at night. Overall, the rate of side effects was 17.5 percent with the morning group and 4 percent in the bedtime group. The effectiveness of the drug in terms of reducing blood pressure was similar in both groups.

Mayo Clinic experts view the study results positively, but the findings regarding this one drug may be of benefit to only a relatively small group of people. There are many other classes of blood pressure medications with varying side effects. Most blood pressure medications cause only mild side effects, if any, and are usually well tolerated.

Still, until more is known, if you’re experiencing side effects from nifedipine, you may want to talk to your doctor about changing the time that you take your blood pressure medication. Similar research may one day be done with other blood pressure drugs.
**Vitamin, RDA***

<table>
<thead>
<tr>
<th>Vitamin</th>
<th>Food sources</th>
<th>Can you get too much?</th>
<th>Role</th>
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<tbody>
<tr>
<td>B-1 (thiamin), 1.2 mg**</td>
<td>Grain products, pork</td>
<td>No known reports of adverse effects.</td>
<td>Affects enzymes that influence muscles, nerves and heart.</td>
</tr>
<tr>
<td>B-2 (riboflavin), Women 1.1 mg Men 1.3 mg</td>
<td>Dairy, eggs, spinach, nuts, grains</td>
<td>No known reports of adverse effects.</td>
<td>Helps produce niacin from certain amino acids. Helps maintain health of skin, eyes and nerves.</td>
</tr>
<tr>
<td>B-3 (niacin), Women 14 mg Men 16 mg</td>
<td>Meat, fish, poultry, legumes and enriched grains</td>
<td>With supplements, you’re unlikely to have side effects with daily intake below 50 mg. Taking more is best done under a doctor’s supervision, as several side effects may occur.</td>
<td>Helps keep your digestive system, nerves, skin, eyes and hair healthy. Helps in the formation of a brain chemical, called serotonin, that’s important to mental health; insulin; red blood cells; and infection-fighting antibodies.</td>
</tr>
<tr>
<td>B-6 (pyridoxine), Women 1.5 mg Men 1.7 mg</td>
<td>Meats, whole and fortified grains, nuts and legumes</td>
<td>Large doses of over 100 mg daily may cause nerve damage over time and are unlikely to alleviate carpal tunnel syndrome, as some claim.</td>
<td>Makes red blood cells. Up to 800 mcg of folic acid daily — from food or, if needed, a supplement — may help ward off cognitive decline and possibly lower Alzheimer’s risk. For older adults, adults who consume alcohol, and others who may not be getting or absorbing enough folate, supplementation may help reduce cancer risk, particularly of the colon and breast, and may help reduce risk of cardiovascular disease. Makes red blood cells and plays an essential role in cell metabolism and nerve and brain function. Older adults should consume extra vitamin B-12 from fortified foods or a supplement to avoid deficiency.</td>
</tr>
<tr>
<td>B-9 (folate or folic acid), 400 mcg***</td>
<td>Fortified grains, spinach, legumes, avocados, broccoli and citrus fruits</td>
<td>High folate intake can mask vitamin B-12 deficiency, allowing nerve and cognitive deterioration that can occur with B-12 deficiency to go unchecked. This can typically be remedied by taking a supplement containing 100 percent of the Daily Value of both folic acid and vitamin B-12.</td>
<td>Makes red blood cells. Up to 800 mcg of folic acid daily — from food or, if needed, a supplement — may help ward off cognitive decline and possibly lower Alzheimer’s risk. For older adults, adults who consume alcohol, and others who may not be getting or absorbing enough folate, supplementation may help reduce cancer risk, particularly of the colon and breast, and may help reduce risk of cardiovascular disease. Makes red blood cells and plays an essential role in cell metabolism and nerve and brain function. Older adults should consume extra vitamin B-12 from fortified foods or a supplement to avoid deficiency.</td>
</tr>
<tr>
<td>B-12 (cyano-cobalamin), 2.4 mcg</td>
<td>Animal products and fortified foods such as cereal</td>
<td>No known reports of adverse effects.</td>
<td>Makes red blood cells and plays an essential role in cell metabolism and nerve and brain function. Older adults should consume extra vitamin B-12 from fortified foods or a supplement to avoid deficiency.</td>
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**Older adults** — In adults over 65, the ability to absorb vitamin B-12 from the gut often diminishes, and a number of factors may contribute to inadequate nutrition. Up to 15 percent of older adults may be deficient in vitamin B-12. Also, a disease called pernicious anemia occurs when antibodies block a special protein needed for absorption.

**Very strict vegetarians, most often vegans** — People who avoid meat and dairy may have trouble getting enough vitamin B-12, yet it typically takes years or even decades for deficiencies to develop.

**People who have problems that affect digestion** — Surgical removal of part of the small intestine, gastric bypass surgery, and diseases such as Crohn’s or celiac disease, can affect the ability to absorb nutrients. Dialysis also may affect vitamin B levels.

**People who smoke or regularly drink more than one alcoholic beverage daily** — Smoking can cause deficiency of vitamin B-6. Long-term, excessive alcohol consumption can impair the intake and digestion of vitamins B-1 (thiamin), folate and B-12.

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**Bottom line**

The chart below can help you sort out the details. But for most, a balanced diet provides all of the B vitamins needed for optimal health. However, older adults may need to also take a vitamin supplement or consume extra vitamin B-12 from fortified foods.

If you need additional supplementation, a multivitamin containing about 100 percent of the Daily Value of the B vitamins listed in the chart is usually sufficient. Supplementing beyond that probably isn’t of benefit and may cause harm.
Healthy disputes

Recognizing what connects you

Deciding whether to go out for lunch seemed like a simple decision. Unfortunately, coming to an agreement was anything but simple. Some couples end up shouting. Others bury their anger. But other couples allow their differences to strengthen their relationship.

Depending on how disagreements are managed, they can improve your relationship. You’re bound to have points where you reach an impasse. But there are things you can do to take your relationship forward and even enhance it.

Behind the scenes

If you’ve been in a relationship a long time, you know what to expect in many situations. Time spent with someone also figures into how you address differences. In addition to past hurt feelings, disagreements may have at their base:

- Old resentments — Resentment is the offspring of anger that’s not been dealt with. If your tendency is to bury or “stuff” your anger so that others aren’t aware of it, you’re brewing resentment in its place.
- Power struggles — How you face differences with your partner is influenced by your internal mindset. Thinking in terms of who wins or who loses jeopardizes the use of compromise or negotiation.
- The drive to be right — Many couples use their energy to be right rather than connected. This mode of operation thrives on the desire for fairness and correctness to navigate through disagreements rather than working out a solution.
- Differences in perception or memories — All memory is subjective. This can be relevant when a disagreement centers on something that took place in the past — even if it was just an hour or two ago. Two people encountering the same situation inevitably pick up on different things and form different memories.

The value of discussing difficult emotions with someone you love is to strengthen and enhance the connection between you both.

Make the connection

Here are some techniques that may help you turn differences with your partner into better connections:

- Slow down — People in long-term relationships may sometimes make assumptions about what their partner is saying, feeling or thinking. As a result, disagreements may become caught up in these assumptions. If this happens, one of the best things you can do is to slow the conversation by practicing mirroring.

Mirroring is a technique that allows two people stuck in an argument or disagreement to step back and clearly listen to each other’s point of view. This technique is a process where partners take turns. One talks, then the other mirrors — or describes — what was heard. The first speaker then clarifies and the other mirrors. Then it’s done the other way around, with the other person speaking first. Thus, a new way to dialogue, communicate and comment is being developed.

Start by allowing your partner to make a point without interruption. When that’s done you mirror back what’s just been said — “This is what I heard you say … Is that right?”

Allow your partner to correct, enlarge upon or agree with your statement and continue on in the same manner. Doing so allows for your partner to be heard and to be clearly understood. It can be cumbersome at first, but mirroring your partner’s points can slow the conversation and create clarity.

- Avoid confusing anger with sadness — Disappointments are inevitable. How you react to disappointments can make a difference in how well you communicate with each other. You may be prone to react to slights by getting angry, but at the root of most disappointment is sadness. Often, it may seem easier or more natural to get angry rather than be sad.

If you find you’re angry a lot of the time, ask yourself what you’re angry about. Are you actually disappointed? If it’s disappointment, it may be tolerable to just let it go. Or, if you can’t let it go, you may find it helpful to think it through and then sit down with your partner to talk about why it makes you sad, rather than to bury it or to explode.

- Try positive sentiment override (PSO) — Psychologist, marriage therapist and author John Gottman, Ph.D., is credited with coining the term “PSO,” a process healthy couples use naturally. Essentially, PSO involves mentally stepping back from a situation where your partner may have annoyed or aggravated you, and realizing that there’s much more to love about your partner than to dislike. Although a particular situation may have made you angry, PSO can help you override or transcend irritation by recognizing the good in your partner.

Sometimes, arguments occur when a couple reaches a new level of intimacy that may actually feel threatening. In fact, it can be a new opportunity to become more comfortable with one another.

If need be, get help

Sometimes, professional help is necessary to help untangle the complexities that may come between you and your partner.

You may find help from a counselor or psychotherapist who has experience in marriage or family counseling and therapy.
Foot drop

Getting your gait back

It seemed to happen during a bout of back pain. One morning you woke up and tripped on the way to the bathroom. That’s when you discovered that no matter how hard you tried, you couldn’t lift the front of your foot by bending at the ankle. Your doctor says it’s foot drop.

Every time you take a step, the front part of your foot and ankle flexes slightly upward, allowing your foot to swing freely under your body and land gently on the ground. This flexing begins as an electrical signal in the brain, which travels along nerves to the appropriate leg. A key link is the peroneal nerve. This passes over a bulge of bone on the outer side of your leg, just below the knee.

When the nerves of these pathways aren’t functioning properly, foot drop may develop suddenly or gradually. It may result in a complete or partial loss of function. Foot drop can be associated with numbness or tingling in the foot — or with radiating pain from a compressed nerve in the knee or back.

The main problem with foot drop is difficulty walking. Without adjustment, your toes drag along the ground and your foot may slap down as you take a step.

Many causes

Among older adults, common causes of foot drop include:

- A compressed nerve in the lower back — A ruptured disk in the spine or narrowing of openings through which nerves pass in the spine may press on nerves.

- Peroneal nerve problems — This nerve can be compressed where it passes through a “tunnel” and is vulnerable, such as when you have a leg cast or kneel or cross your legs for long periods. Progressive nerve damage associated with diabetes can lead to foot drop. Mass lesions such as tumors or cysts can also compress the nerve, as can injuries to the knee area or a broken leg.

Initial treatments depend on the cause of the foot drop, the severity of loss of function and how long you’ve had it. In some cases, rest — in addition to avoiding any triggering actions such as leg crossing or kneeling — may be the best course. A re-evaluation of options may be needed if, over the course of weeks or months, the foot drop isn’t improving or is getting worse. Some type of surgery may be the next step.

Potential procedures may include removal of a ruptured disk, enlarging one of the natural openings in the spine, or the removal or release of tissues that may be compressing the peroneal nerve.

For complete foot drop that occurs suddenly, early surgical procedures may be warranted. It’s generally thought that the sooner a more severe nerve compression problem can be corrected, the better.

Permanent drop

In some people, foot drop gets progressively worse or doesn’t get better, despite treatment. For permanent foot drop, the main treatment option is a plastic brace that can be worn inside a shoe that supports the foot, making walking easier. Some may be able to get by wearing a supportive, high-top boot. Physical therapy can help strengthen the muscles that are working and should be started once a foot drop is detected. More importantly, a physical therapist can teach you how to keep your Achilles tendon flexible. This tendon can tighten over time, eventually making it impossible to raise the front of your foot without corrective surgery.

In some with long-standing, complete foot drop, a tendon transfer may be an option. This involves transferring one end of a working tendon in your leg to a point on the foot, allowing the reattached tendon to raise the front of the foot. A physical therapist can help you learn to walk with the altered tendon.
Second opinion

Questions and our answers

Q: My grandson has several energy drinks a day. Is this bad for his health?

A: It certainly could be. Energy drinks come in a variety of formulations, but most contain lots of caffeine and sugar — and possibly herbal stimulants and a supplementary amino acid known as taurine. However, it can be difficult to determine what’s in them or how much.

Having an occasional energy drink isn’t necessarily bad, especially those that contain about the same amount of caffeine as a cup or two of coffee, and a similar amount of sugar as a can of soda. But many energy drinks contain much higher amounts of caffeine and other substances.

High amounts of caffeine and sugar — and whatever herbal stimulants may be added — can have a variety of serious effects. They may cause a markedly faster heartbeat, irritability, nervousness, impaired sleep and nausea. In addition, the acids and sugars in these drinks promote tooth decay and the sugar contains a lot of extra calories and little other nutritional value.

By itself, massive amounts of caffeine can increase your blood pressure and sometimes impair blood flow to your heart. It may trigger abnormal heart rhythms, which can be life-threatening in some people. Increased risk of a potential heart problem rises when energy drinks are consumed along with alcohol, when you’re dehydrated, or when consumed quickly before a sporting event. Serious medical problems, including fainting or even a heart attack can occur due to consumption of energy drinks in these situations.

It’s important to educate your grandson about the potential hazards of energy drinks. Perhaps you can encourage him to read labels to determine the contents and amount of caffeine, among other ingredients. It may be helpful to remind your grandson that the best route to a healthy, energetic life is to get adequate sleep, regular exercise and to eat a healthy diet.

Q: How much vitamin A is too much?

A: Based on recommendations from the Institute of Medicine, the maximum daily intake of vitamin A from food and supplements shouldn’t exceed 10,000 international units (IU) for healthy adults. Getting more than that may put you at risk of vitamin A toxicity. Toxic symptoms can develop if too much vitamin A is consumed over a short period of time — something that’s usually attributable to excess intake of vitamin A supplements. These signs and symptoms may include nausea and vomiting, headache, dizziness, blurred vision and muscle problems.

Vitamin A is stored in your body’s fat. Taking too much over time may increase risk of liver abnormalities and reduce bone mineral density.

Vitamin A deficiency is rarely seen in the United States among healthy people, and supplementation is seldom necessary. However, there’s an increased risk of vitamin A deficiency in people who have malabsorption or malnutrition after undergoing gastric bypass surgery.

Vitamin A deficiency is the third most common nutritional deficiency in the world and is common in developing countries. It results in decreased vision, blindness, poor bone growth and less effective immune system function. Treatment reduces the risk of complications and death, especially among children.

Vitamin A is found in foods from animal sources, such as liver, eggs, and dairy products fortified with vitamin A. Your body also converts substances in red, yellow, orange and dark green plants into vitamin A. For adults, the recommended amount is 3,000 IU for men and 2,310 IU for women.

Have a question or comment?
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