Important Safety Information

Hizentra treats various forms of primary immunodeficiency (PI) in patients age 2 and over.

WARNING: Thrombosis (blood clotting) can occur with immune globulin products, including Hizentra. Risk factors can include: advanced age, prolonged immobilization, a history of blood clotting or hyperviscosity (blood thickness), use of estrogens, installed vascular catheters, and cardiovascular risk factors.

If you are at high risk of thrombosis, your doctor will prescribe Hizentra at the minimum dose and infusion rate practicable and will monitor you for signs of thrombosis and hyperviscosity. Always drink sufficient fluids before administration.

Tell your doctor if you have had a serious reaction to other immune globulin medicines or have been told you also have a deficiency of the immunoglobulin called IgA, as you might not be able to take Hizentra.

Before being treated with Hizentra, inform your doctor if you are pregnant, nursing or plan to become pregnant. Vaccines (such as measles, mumps and rubella) might not work well if you are using Hizentra. Before receiving any vaccine, tell the healthcare professional you are being treated with Hizentra.

Please see brief summary of full prescribing information for Hizentra on adjacent page. For full prescribing information, including boxed warning and patient product information, please visit Hizentra.com.

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.fda.gov/medwatch, or call 1-800-FDA-1088.

**Shannon**

I received my diagnosis of PI at the end of my junior year of high school and started doing IVlg. It’s just that time in your life where you’re already experiencing so many changes, and then you get dealt this card. I’m thinking, I’m supposed to be going off to college. Can I even go off to college?

I switched to Hizentra my senior year of college and really like the convenience aspect of it. I don’t have to worry about scheduling my infusion on someone else’s time. Hizentra made me feel a lot better. Once I switched, I was mad at myself for not switching earlier.

I didn’t know anyone who was diagnosed with PI or had even heard of it, so I wondered why there wasn’t a program where I could talk to someone who knew what I was going through. After graduating I heard about the Voice2Voice program, and it was just what I wished I could have had when I went off to college.

The opportunity I have as a Voice2Voice advocate is really exciting to me—just being able to help people who are going through some of the things I went through a few years ago.*

---

You should not take Hizentra if you know you have hyperprolinemia (too much proline in your blood). **Infuse Hizentra under your skin only; do not inject into a blood vessel.**

Allergic reactions can occur with Hizentra. If your doctor suspects you are having a bad allergic reaction or are going into shock, treatment will be discontinued. Immediately tell your doctor or go to the emergency room if you have signs of such a reaction, including hives, trouble breathing, wheezing, dizziness, or fainting.

Tell your doctor about any side effects that concern you. Immediately report symptoms that could indicate a blood clot, including pain and/or swelling of an arm or leg, with warmth over affected area; discoloration in arm or leg; unexplained shortness of breath; chest pain or discomfort that worsens with deep breathing; unexplained rapid pulse; and numbness or weakness on one side of the body. Your doctor will also monitor symptoms that could indicate hemolysis (destruction of red blood cells), and other potentially serious reactions that have been seen with Ig treatment, including aseptic meningitis syndrome (brain swelling); kidney problems; and transfusion-related acute lung injury.

The most common drug-related adverse reactions in the clinical trial for Hizentra were swelling, pain, redness, heat or itching at the site of injection; headache; back pain; diarrhea; tiredness; cough; rash; itching; nausea and vomiting.

Hizentra is made from components of human blood. The risk of transmission of infectious agents, including viruses and, theoretically, the Creutzfeldt-Jakob disease (CJD) agent, cannot be completely eliminated.

*Voice2Voice advocates are not healthcare professionals or medical experts. For medical questions, please contact your physician. Voice2Voice advocates are compensated by CSL Behring LLC for their time and/or expenses.
Hizentra®, Immune Globulin Subcutaneous (Human), 20% Liquid
Initial U.S. Approval: 2010

BRIEF SUMMARY OF PRESCRIBING INFORMATION
These highlights do not include all the information needed to use HIZENTRA safely and effectively. See full prescribing information for HIZENTRA.

WARNING: THROMBOSIS
See full prescribing information for complete boxed warning.

- Thrombosis may occur with immune globulin products, including Hizentra. Risk factors may include: advanced age, prolonged immobilization, hypercoagulable conditions, history of venous or arterial thrombosis, use of estrogens, indwelling vascular catheters, hyperviscosity, and cardiovascular risk factors.
- For patients at risk of thrombosis, administer Hizentra at the minimum dose and infusion rate practicable. Ensure adequate hydration in patients before administration. Monitor for signs and symptoms of thrombosis and assess blood viscosity in patients at risk for hyperviscosity.

-----------------------------DOSAGE AND ADMINISTRATION---------------------------------

Hizentra is an Immune Globulin Subcutaneous (Human) (IGSC), 20% Liquid indicated for the treatment of primary immunodeficiency (PI) in adults and pediatric patients 2 years of age and older.

Initial U.S. Approval: 2010

Initial weekly dose = Previous IGIV dose (in grams) x 1.37

Dosage (2.2)
Before switching to Hizentra, obtain the patient’s serum IgG trough level to guide subsequent dose adjustments.

- Weekly: Start Hizentra 1 week after last IGIV infusion
  Initial weekly dose = Previous IGIV dose (in grams) x 1.37

- Biweekly: Start Hizentra 1 or 2 weeks after the last IGIV infusion or 1 week after the last weekly Hizentra/IGSC infusion. Administer twice the calculated weekly dose.
- Frequent dosing (2 to 7 times per week): Start Hizentra 1 week after the last IGIV or Hizentra/IGSC infusion. Divide the calculated weekly dose by the desired number of times per week.
- Adjust the dose based on clinical response and serum IgG trough levels.

Administration
- Infusion sites – 1 to 4 injection sites simultaneously, with at least 2 inches between sites.

<table>
<thead>
<tr>
<th>Infusion Parameters*</th>
<th>Infusion Number</th>
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<tr>
<td></td>
<td>1st</td>
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<tr>
<td>Volume (mL/site)</td>
<td>≤ 15</td>
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<tr>
<td>Rate (mL/hr/site)</td>
<td>15</td>
</tr>
</tbody>
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As tolerated

- Thrombosis may occur with immune globulin products, including Hizentra. Risk factors may include: advanced age, prolonged immobilization, hypercoagulable conditions, history of venous or arterial thrombosis, use of estrogens, indwelling vascular catheters, hyperviscosity, and cardiovascular risk factors.
- For patients at risk of thrombosis, administer Hizentra at the minimum dose and infusion rate practicable. Ensure adequate hydration in patients before administration. Monitor for signs and symptoms of thrombosis and assess blood viscosity in patients at risk for hyperviscosity.

-----------------------------DOSE FORMS AND STRENGTHS----------------------------------

0.2 g per mL (20%) protein solution for subcutaneous injection

-----------------------------CONTRAINDICATIONS--------------------------------------

- Anaphylactic or severe systemic reaction to human immune globulin or components of Hizentra, such as polysorbate 80
- Hyperprolinemia (type I or II) (Hizentra contains the stabilizer L-proline)
- IgA-deficient patients with antibodies against IgA and a history of hypersensitivity

-----------------------------WARNINGS AND PRECAUTIONS-----------------------------

- IgA-deficient patients with anti-IgA antibodies are at greater risk of severe hypersensitivity and anaphylactic reactions.
- Thrombosis may occur following treatment with immune globulin products, including Hizentra.
- Aseptic meningitis syndrome has been reported with IGIV or IGSC treatment.
- Monitor renal function, including blood urea nitrogen, serum creatinine, and urine output in patients at risk of acute renal failure.
- Monitor for clinical signs and symptoms of hemolysis.
- Monitor for pulmonary adverse reactions (transfusion-related acute lung injury [TRALI]).
- Hizentra is made from human plasma and may contain infectious agents, e.g., viruses, the variant Creutzfeldt-Jakob disease (vCJD) agent and, theoretically, the Creutzfeldt-Jakob disease (CJD) agent.

-----------------------------ADVERSE REACTIONS----------------------------------------

The most common adverse reactions observed in ≥5% of study subjects were local reactions (i.e., swelling, redness, heat, pain, and itching at the injection site), headache, dizziness, fatigue, back pain, nausea, pain in extremity, cough, rash, pruritus, vomiting, abdominal pain (upper), migraine, and pain.

To report SUSPECTED ADVERSE REACTIONS, contact CSL Behring Pharmacovigilance at 1-866-915-6958 or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

-----------------------------DRUG INTERACTIONS----------------------------------------

The passive transfer of antibodies may interfere with the response to live virus vaccines, and lead to misinterpretation of the results of serological testing.

-----------------------------USE IN SPECIFIC POPULATIONS---------------------------------

- Pregnancy: No human or animal data. Use only if clearly needed.
- Pediatric: No specific dose requirements are necessary to achieve the desired serum IgG levels.

Based on January 2015 revision
Help IG Living Magazine Go Green
Join our campaign to reduce unnecessary paper consumption!

Here's how you can help: If you can forgo receiving a hard copy of the magazine and utilize the digital version instead, go to www.IGLiving.com to select the Go Green tab to sign up for the electronic version and opt out of the print version.

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- Get notified and enjoy earlier online access to every new issue
- Print individual articles to keep or hand out to friends, family and care providers
- Easily share articles instantly on Social Media
- Read the issues anywhere at any time on all of your digital devices (smartphone, computer, iPad, tablet)
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About IG Living
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An Expanding IG Patient Landscape

WHEN WE LAUNCHED IG Living magazine in 2006, our intended main audience was primary immunodeficiency disease (PI) patients, the first and largest patient population treated with lifesaving immune globulin (IG) therapy. Over the years, the number of disease states treated with IG has considerably expanded, as has our coverage to reach and provide education and support for a greater number of patients and their caregivers.

Even considering the growth in IG therapy utilization, the more than 200 distinct PIs are still the diseases predominantly treated with IG today. So, in this issue, we pause to revisit our magazine’s debut roots by re-examining these now not-so-rare disorders. Immunologist Bob Geng, a regular contributor to IG Living, provides a brief overview in his article “A Primer on Primary Immunodeficiency Disorders” of what goes awry with the immune system to cause PIs, and then summarizes their different forms, characteristics and treatment.

One of the more frequently profiled PIs in the pages of IG Living is common variable immune deficiency (CVID), the most common form of PI that affects approximately one in 25,000 persons in the U.S. How CVID patients who are treated with IG fare runs the gamut; some live normal lives not hampered by chronic recurring infections, while others are not so fortunate and constantly struggle to function in the activities of daily living. Twins Emily and Amanda Gale are examples of the former. In our Let’s Talk profile, these inspirational college students discuss their fortunate early diagnoses and supportive upbringing that have led to highly active lives and promising careers.

Whether struggling to survive day-by-day or thriving as entrepreneurs like Emily and Amanda, all chronically ill patients should be encouraged to set goals to help cope with their illness and pave the way to achieve as much as possible. It is the intent of our article “Goal-Setting for the Chronically Ill: Planning for an Uncertain Future” to help guide patients to set realistic expectations for themselves to achieve whatever they seek to accomplish, be it for short-term or long-term ambitions.

Importantly, patients should recognize they don’t need to go through their chronic illness journey alone. One of the best ways to find solace and support is by connecting with others dealing with similar issues, and support groups can prove invaluable for this helpful interaction. In “Making Support Groups Work for You,” we highlight eight tips to help patients find and choose a support group, as well as how to determine if a group is a good fit for them.

As always, I hope you gain insight from the information presented and enjoy this edition of IG Living.

Ronale Tucker Rhodes, MS
Are Feelings of Depression Normal?

By Abbie Cornett

EQUALLY AS devastating as chronic illness is its silent partner: depression. If left untreated, depression can worsen the chronic medical condition or, at the very least, impede a patient’s improvement. I am frequently asked by patients if it is normal to feel depressed or to grieve after a diagnosis, and what they and their families can do to help reduce those feelings.

First, it is normal for people who have been diagnosed with a chronic illness to have feelings of sadness, loss, anger and grief as they learn to accept their illness and its impact on their lives. Unfortunately, many times, these feelings are pushed to the back burner by everyone, including patients, as the more pressing needs of the illness are met. But, this is a mistake, because depression can have as serious an influence on patients’ quality of life as does the chronic illness.

Patients can do many things to help lessen these feelings and learn to cope with the impact of their illness. A World of Psychology blog titled “Tips for Coping with a Chronic Illness” recommends the following:

• Be involved in your treatment. Becoming an active participant in treatment can decrease stress. Being involved means exploring all treatment options, developing relationships with providers, asking questions and expressing differing opinions. Also, choose treatment providers you can trust and who make you feel like a priority.
  • Follow a healthy diet. Follow special dietary instructions, if applicable, from your treatment provider, or be conscious of decisions when it comes to daily food intake.
  • Learn to accept your illness. Once you accept your illness, you can move on to doing what you can to live the best life.
  • Seek support. Do whatever you can to find hope such as reaching out to a support group, getting involved with others and sharing your experiences.
  • Consider your spiritual journey. Faith in a higher power and being involved in a congregation or spiritual group results in less stress and fewer physical symptoms, according to research.
  • Find gratitude. Find big and small things to be grateful for every day. Gratitude determines your attitude.

While feelings of depression may be normal after a chronic illness diagnosis, it is important to recognize when it’s time to seek professional help. According to the American Psychiatric Association’s diagnostic criteria for major depression, people must experience five or more of the symptoms listed below for a continuous period of at least two weeks. And, the symptoms must be present every day or nearly every day, and must cause significant distress or problems in daily life functioning:

• Feelings of sadness, hopelessness, depressed mood
• Loss of interest or pleasure in activities that used to be enjoyable
• Change in weight or appetite (either increase or decrease)
• Change in activity: psychomotor agitation (being more active than usual) or psychomotor retardation (being less active than usual)
• Insomnia (difficulty sleeping) or sleeping too much
• Feeling tired or not having any energy
• Feelings of guilt or worthlessness
• Difficulties concentrating and paying attention
• Thoughts of death or suicide

Even though being diagnosed with a chronic illness is a life-changing event, it doesn’t mean patients can’t find happiness. They need to be open to talking about feelings with family, friends and caregivers. And, they must remember that mental health is as important to quality of life as is physical health.

ABBIE CORNETT is the patient advocate for IG Living magazine. She can be reached at patient advocate@igliving.com or (800) 843-7477 x1366.

References
Dr. Riedl » There are no known effects of IVIG on the metabolism of small molecule drugs, which are the vast majority of medications used routinely for medical conditions. IVIG does reduce the efficacy of some vaccines due to binding of the antigens that stimulate the protective effect of immunizations. Theoretically, IVIG might interfere with the effect of monoclonal antibody medications due to possible anti-idiotypic antibodies — essentially, antibodies in IVIG that bind and neutralize the active sites of these engineered monoclonal antibody medications (anti-TNF drugs, etc.). However, this has never been proven and doesn’t appear to cause clinical problems for most people.

Dr. Harville » Unfortunately, this issue has not been well studied, which means there are no specific guidelines for leaky gut; however, there are some known issues. Leaky gut results in the loss of antibodies, which raises the risk for infections. This results in gastrointestinal inflammation, which can further exacerbate autoimmune disorders. It also allows potential toxic substances to enter the body, which may affect immune system function, as well as other body systems (for example, one form of autism may be a consequence of partially digested gliadin and casein entering the body and passing to the brain, thereby binding to endorphin receptors). That being said, it is not established that flares in autoimmunity related to leaky gut will affect or worsen CIDP. In fact, it is not established that anything leaking into the body from the intestines directly affects CIDP.

Leslie and Michelle » Yes. In fact, if you have a home infusion provider that offers a co-pay assistance program and you qualify, you may have no out-of-pocket expense. Part D plans differ in terms of cost and coverage, but no one Part D plan is better than another for approving treatment for MMN. The “formulary finder” on Medicare.gov will help you locate which plan covers your particular medication. But, be sure to also consider any other medications you are taking when deciding on the best plan.

Question » Are IVIG infusions in the home covered under Medicare Part D for MMN?

For several years, I have been receiving home infusions of intravenous immune globulin to treat multifocal motor neuropathy (MMN). I am fortunate to have a wonderful home infusion nurse who manages to always find a vein despite their terrible condition. Soon, I will be transitioning to Medicare. If I choose a Part D drug plan that will cover my medication, and if I am willing to pay all the coinsurance and out-of-pocket costs, including the home nurse cost, can I still continue having home infusions? Is there a particular Part D plan that covers the medication?

Question » Will leaky gut result in the progression of CIDP?

I have been diagnosed with chronic inflammatory demyelinating polyneuropathy (CIDP), and I’m wondering how leaky gut may affect me. Is it a contributing factor to the progression of CIDP? Would a diet that reduces leaky gut help?

Question » Does IVIG affect the metabolism of medications?

I was diagnosed with common variable immunodeficiency, and I am treated with intravenous immune globulin (IVIG) every four weeks. Can this disorder or the IVIG affect the metabolism of certain medications? My doctors say my medication levels are low.

» Have a question?

Email us at editor@IGLiving.com. Your information will remain confidential unless permission is given.

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LESLEY J. VAUGHAN, RPh, is senior vice president of clinical programs at NuFACTOR Specialty Pharmacy.
FACES OF IG

Join the conversation! Connect with other immune globulin patients through IG Living’s Facebook page at www.facebook.com/IGLivingMagazine. Each day, we post interesting articles and facts, as well as thought-provoking questions that you can weigh in on. These are some snapshots of what’s being discussed.

Do you suffer from arthritis?

I have had five surgeries, joint replacements and joint reconstructions because my arthritis is so bad, and I have three more to go. I’m about to get up, get dressed and drag myself to go get my intravenous immune globulin infusion. I’ve been sick for a week now with acute bronchitis. I try to embrace it all, but it gets so overwhelming at times that I just want to give up.

— DM Fritchley

Have you ever been surprised by a medical bill?

Many times. Then I spend endless hours talking to someone at the insurance company and the doctor’s office. Usually, the error is in the coding.

— J Sonkin

Medical services are the only service that can’t give you a concrete price at the time of service. Imagine getting your grocery bill weeks later.

— RL Fontenot

Yes, but I usually have good knowledge of my insurance coverage, and once I meet the deductible and maximum out-of-pocket, everything is free.

— D Sprayberry

Medical errors are the third-leading cause of death in the United States! Comments?

As a nurse, I notice how sloppily things are done in hospitals now. With continued Medicare cutbacks, staff has been drastically cut. We need more time-outs and more team meetings with patients and their families — better communication all around. I’m always amazed at how quickly my own views about a situation are dismissed.

— L Filite

Allow your primary care physicians to take care of you in the hospital. In Tucson, we have hospitalists who have no knowledge of our medical history, nor do they know us. Budget for more nurses, who are the frontline to each and every patient.

— J Sonkin

It can be devastating. I had a sinus surgery that was botched in 1992, and I’m still suffering from the effects.

— J Gardner
Making a difference in Our Patients’ Lives.

Specialty Solutions in Chronic Care

- Immune Globulin Intravenous
- Immune Globulin Subcutaneous
- Antihemophilic Factors

NuFACTOR has the distinction of carrying all U.S.-approved immune globulin products. Committed to exceptional customer service, product and patient safety, and secure product availability and affordability, we've earned the most respected name in homecare because our customers know we care about them. And that makes all the difference.

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PREVIOUSLY, WE discussed that the root cause of issues with DiGeorge syndrome (DGS) and partial DGS (PDGS) is the incorrect timing and sequence of events during the formation of structures in the developing embryo. This also results in the incorrect formation of many of the tissues and organs, which in turn produces the characteristic features of this disorder. The primary initial hallmark in DGS (before recognition that an immune problem exists) is malformations of the heart.

By about two weeks of gestation, rudimentary parts of tissues that will become the human heart are found in the chest of the developing embryo. By about three weeks, a “tube-like” structure is in place, ready to begin to fold upon itself to form parts of the heart. At about four weeks, folding has begun, and the individual chambers can be recognized. Between seven and eight weeks, the initial tube has folded and twisted into all the recognizable structures of the heart, with the fetal heart circulating blood through the fetus. As such, the heart primarily forms during the second month of gestation, or in the middle of the first trimester. Indeed, early developmental phases are occurring before the mother even knows she is pregnant.

As the heart is developing, a series of aortic arch vessels also develop in the chest, beginning as parallel structures mirrored on

Aortic Arches and Cardiac Development

A. By the fourth week of gestation, a series of parallel aortic arches are developed in the chest of the developing embryo. In the center is a tube-like structure that will twist and fold into a recognizable heart.

B. After the eighth week of gestation, parts of the aortic arches have regressed to form the recognizable distribution of vessels in the chest. The initial tube-like structure has folded and twisted to produce the four-chambered heart with appropriate valves and wall separations. By this time, it is fully functioning and pumping blood through the early fetal circulation.
both sides. During this time, segments of these vessels regress and disappear, eventually becoming the recognizable blood vessels of the chest (see figure). But, when the timing of the folding and twisting of the tube into the heart is off, causing the timing of the development and regression of the aortic arches to be off the mark, this results in the characteristic heart malformations found in DGS and PDGS.

When this occurs during early development, a condition known as truncus arteriosus may result, which means the tube-like structure of the early heart does not fold or twist, leaving a tube-like structure. But, when this occurs late during cardiac development, specific significant heart malformations may be absent. In addition, when the timing is off at different points in the second month of gestation, there may be vessels of the heart that develop too small or that don’t appropriately separate from each other, and valves that develop too small, do not fully develop or that fail to develop. Further, the walls inside the heart may not form to separate the vessels, resulting in ventricular septal defects and/or atrial septal defects. Additionally, the aortic arches may not grow and regress appropriately, which may result in what is called an interrupted aortic arch. And, in mild cases, a persistent patent ductus arteriosus may result.

Years ago, many of these conditions were fatal after birth. But, the advent of the use of prostaglandin revolutionized prevention of postnatal death, and pediatric cardiothoracic surgeons developed microscopic surgical techniques to repair the tiny, fragile hearts. As a consequence, when previously a poor outcome due to heart failure would have been likely, the heart could now be protected and repaired to function well. Once that occurred, the consequences of thymic malformation, immune problems and other features of DGS became more apparent.

We will continue with more discussion of these issues next time.

TERRY O. HARVILLE, MD, PhD, is medical director of the Special Immunology Laboratory at the University of Arkansas for Medical Sciences and a consultant for immunodeficiencies, autoimmunities and transplantation.
**Treatment**

GSK and Italian Partners File for SCID Gene Therapy in EU

GlaxoSmithKline and Italian partners Fondazione Telethon and Ospedale San Raffaele have submitted an application to the European Medicines Agency to market an investigational gene therapy for the treatment of children with adenosine deaminase severe combined immunodeficiency disease (ADA-SCID) for whom no suitable human stem cell donor is available. The submission is based on data from 18 children administered GSK2696273, the first of which was treated more than 13 years ago. Of these children, three needed either follow-up enzyme replacement therapy or a bone marrow transplant, but all are alive today, and they have had no significant tolerability events related to the therapy.

Approximately 14 children in Europe are born each year with ADA-SCID. These children rarely survive beyond 1 or 2 years old unless their immune function is restored. Treatment strategies center on antibiotics and antifungal treatments for serious infections, but most children ultimately need a bone marrow transplant from a matched donor. If these fail or no suitable donors are found, gene therapy could provide another option.

**Industry News**

Shire Combines with Baxalta, Launches MyIgCoPayCard

In June, Shire completed its combination with Baxalta, manufacturer of immune globulin (IG) products Gammagard S/D (indicated for intravenous infusion to treat primary immunodeficiency [PI], idiopathic thrombocytopenic purpura, chronic lymphocytic leukemia and Kawasaki disease), Gammagard Liquid (indicated for intravenous infusion to treat PI and multifocal motor neuropathy, and for subcutaneous infusion to treat PI) and HyQvia (indicated for subcutaneous infusion to treat PI).

Since the combination’s completion, Shire has announced its launch of the MyIgCoPayCard, a copay card for eligible patients living with PI to save up to a total of $5,000 on their deductible/copayment/coinsurance costs within a 12-month period on any Baxalta product, including both intravenous and subcutaneous administration routes. Those who are currently prescribed a Baxalta IG treatment can enroll by calling MyIgSource at (855) 250-5111 or going to www.myigsource.com/baxalta-treatments/copay-card.html. Individuals with PI who are already enrolled in one of Baxalta’s existing copay card programs will automatically be eligible for the incremental savings account for a total of up to $5,000 across all copay programs. However, patients’ providers should resubmit claims dated Feb. 22, 2016, or later for the incremental savings.

**Industry News**

CSL Plasma Raises Over $118,000 for IDF

In April through June, CSL Plasma donors and employees raised more than $118,000 for the Immune Deficiency Foundation (IDF). Funds raised will be used to support services, education and research for individuals with primary immunodeficiencies and their families.

“Year after year, CSL Plasma demonstrates their incredible commitment to people with primary immunodeficiency diseases by raising record funds for the Immune Deficiency Foundation,” said Marcia Boyle, IDF president and founder. “A contribution like this was raised because of the hard work and generosity of many — from center staff, plasma donors and local communities across the country. The funds will support the vital resources that we provide to thousands of individuals and families living with primary immunodeficiency. We are humbled by this gift and proud that CSL Plasma is a long-time partner, participating in the IDF Plasma Partners Program for 10 years.”

This year’s fundraising efforts resulted in a 17 percent-plus increase over the funds raised by CSL Plasma in 2015, which totaled $100,975. Since 2011, CSL Plasma has donated more than $499,000 to support the IDF vision and mission.

Industry News

CSL Behring Announces IG Research Grant Winners

CSL Behring has announced the two winners of its annual global Interlaken Leadership Awards, which provide monetary grants and/or product supply for investigational use to support research focusing on the potential role of immune globulin (IG) therapy in the treatment of neurological/neuromuscular disorders.

Dr. Anneke van der Kooi, a neuromyologist at the University of Amsterdam, will examine early intravenous IG (IVIG) treatment in newly diagnosed idiopathic inflammatory myopathies (myositis). “Idiopathic inflammatory myopathies (IIMs), or myositis, are associated with a high disease burden for patients,” said Dr. van der Kooi. “With this study, we hope to show that intravenous IG is a good candidate for induction treatment in IIMs to realize fast improvement and avoid muscle damage and even permanent disability.”

Lisa Christopher-Stine, MD, MPH, associate professor of medicine and neurology at Johns Hopkins University, will study low-dose IVIG and subcutaneous IG as a maintenance treatment of statin-induced anti-HMGCR-associated myopathy. “While no clinical trials have been performed to establish the efficacy of immunosuppressive medications for statin-induced anti-HMGCR-associated myopathy, retrospective studies show the promise of IVIG,” said Dr. Christopher-Stine. “The results from this study will aim to contribute to the design of future trials that will further define the role of IG in the treatment of patients with statin-associated immune-mediated necrotizing myopathy.”

More than $5 million in grants and study drug has been awarded by the Interlaken Leadership Awards over the past six years for research IG therapy in a variety of neurological/neuromuscular disorders, including neuromyelitis optica, Duchenne muscular dystrophy, complex regional pain syndrome, paraneoplastic syndromes, autoimmune peripheral neuropathies, Guillain-Barré syndrome and neuromuscular junction disorders such as myasthenia gravis and Lambert-Eaton myasthenic syndrome. The global review committee seeks proposals likely to advance innovative medical research and knowledge about the potential role of IG therapy to improve the lives of patients who have disabling neurological/neuromuscular conditions. All proposals received for the program are evaluated based on scientific merit, strength of hypothesis, relevance to neuroimmunology and feasibility.


Research

Study Sheds Light on Cause of CVID

While the biological basis of common variable immunodeficiency (CVID) has remained unclear, a study shows that aberrant B cell repertoire generation and selection, which yield a decrease in diversity within naive and memory B cell populations, may be a cause, and may drive a variety of outcomes, from impaired antibody responses to foreign and self (autoimmune) antigens to lymphoid cancers. In the study, researchers used high-throughput genomic DNA sequencing to explore immunoglobulin (Ig) heavy chain gene rearrangements in B cells from CVID patients versus control subjects. CVID patients displayed abnormal VDJ rearrangement (which occurs in developing lymphocytes during the early stages of B cell maturation) and, thus, abnormal formation of complementarity determining region 3 (CDR3), which is part of the Ig variable chains and central to the ability of B cells to recognize a wide range of antigens (foreign substances). The researchers then sorted B cell populations to retrieve the naive and memory B cells and detected decreased selection against antibodies with long CDR3 regions in CVID memory repertoires. They determined that these alterations could explain CVID and the autoimmune reactions detected in CVID patients.

**IN THE NEWS**

**Medicines**

**European Commission Approves Strimvelis to Treat ADA-SCID**

The European Commission (EC) has approved Strimvelis, an ex-vivo stem cell gene therapy, for the treatment of severe combined immunodeficiency due to adenosine deaminase deficiency (ADA-SCID). Developed by GlaxoSmithKline (GSK) and Italian companies Fondazione Telethon and Ospedale San Raffaele, Strimvelis is the first corrective gene therapy for children to secure regulatory approval anywhere in the world. It is indicated for the treatment of patients with ADA-SCID for whom no suitable human leukocyte antigen (HLA)-matched related stem cell donor is available.

Strimvelis is administered only once and does not depend on a third-party donor. With the therapy, the patient’s own bone marrow cells are removed, and a normal copy of the ADA gene is inserted into the cells using a vector. The gene-corrected cells are then re-introduced into the patient through an intravenous infusion, after which some of the cells go back to the bone marrow. Patients are pretreated with low-dose chemotherapy to enhance the engraftment of the gene-modified cells in their bone marrow.

EC approval is based on data collected from 18 children treated with Strimvelis in a pivotal study, all of whom were alive three years post-treatment. All of the children are alive today with a median follow-up duration of seven years. According to GSK, a significant reduction in infections has been documented, and no leukemic events have been observed to date. “Today’s approval is the result of many years’ work with our collaborators in Milan and is the next step toward bringing life-changing treatment to patients with ADA-SCID and their families,” said Martin Andrews, head of the rare disease unit at GSK.

“This is the start of a new chapter in the treatment of rare genetic diseases, and we hope that this therapeutic approach could also be used to help patients with other rare diseases in the future.”

Study results are published in the April 29 issue of *Blood*.


**People & Places**

With approval from the U.S. Food and Drug Administration, CSL Behring is commencing operations in its newly expanded facility in Kankakee, Ill., that will increase plasma processing and albumin product capacity. The expansion was necessary due to the growing worldwide demand for CSL Behring’s immune globulin and albumin therapies.

**Biotest Pharmaceuticals Corp.** has opened a new 15,000-square-foot plasma collection facility in Jacksonville, N.C. The facility will add 50 new jobs with career opportunities available for licensed practical nurses/registered nurses, phlebotomists and various other positions.

The Immune Deficiency Foundation (IDF) has added six new patients and caregivers to its PI CONNECT Governance Committee, a group that advises appropriate and sensitive policies, as well as guides patient engagement for PI CONNECT, the IDF Patient-Powered Research Network. The committee consists of clinicians, members of the IDF Board of Trustees and the IDF Medical Advisory Committee, patients and caregivers from the primary immunodeficiency (PI) community, and representatives of IDF and the U.S. Immunodeficiency Network (USID-NET). The Governance Committee members now include Barb Ballard; Francisco Bonilla, MD, PhD; John M. Boyle, PhD; Colleen Brock; Charlotte Cunningham-Rundles, MD, PhD; Terry Halper, MPH; Sumathi Iyengar, MD; Judy Kozulak; Richard Low; Felicia Morton; Brian Rath; John Seymour, PhD, LMFT; James Severin; Heather Smith; and Kathleen Sullivan, MD, PhD. IDF staff committee members include Marcia Boyle, John G. Boyle, Tara Caulder, Erica Hebrank, Erin Poff and Christopher Scalchunes.
In a recent study, intravenous immune globulin (IVIG) effectively treated patients with active systemic lupus erythematosus (SLE) and concomitant infection, as well as hematological and cardiac involvement. Researchers looked at 52 patients (mean age 33.2 years, 45 of whom were women) with SLE from January 2001 to February 2011 at a lupus unit in a London hospital who received at least one cycle of IVIG of 400 mg/kg/day for five days. Twenty-seven patients received IVIG for active disease and concomitant infection, and 26 patients had IVIG as refractory or resistant to standard therapy.

Nine patients with active disease and concomitant infections experienced complete remission after IVIG treatment, while eight had partial remission and eight experienced no response. Seventeen (62.96 percent) experienced total or partial response. Six patients in the refractory to standard therapy cohort experienced complete remission, while 12 had partial remission and eight had no response. Eighteen patients (69.23 percent) had total or partial response, with relapse experienced by seven patients (mean time 8.9 months).

“The indications for IVIG in the SLE patients were mainly cutaneous, hematological, neuropsychiatric and heart involvements,” the researchers wrote. “IVIG does not seem an effective therapeutic tool for aggressive cutaneous lupus patients, considering the short-term improvement, cost and limited availability of this treatment, especially now that new biologic agents can represent an alternative strategy.”

Researchers at King’s College London have identified a new gene, PIM1, which could be an effective target for innovative treatments and therapies for psoriasis, an autoimmune disease. In the study, scientists injected the IL-22 cytokine, a protein that sends messages between cells, into models of normal human skin in mice. The changes that subsequently occurred in the skin were reminiscent of psoriasis. Injecting an antibody to block the IL-22 cytokine caused these changes to reverse. Then, using computer analysis (called integrative biology), they compared data from the human skin models with existing gene datasets and identified the gene PIM1 as one of the genes “switched on” by the presence of IL-22. Further, they showed that a small molecule drug blocking PIM1 was effective in models of psoriasis. They concluded that the link between the IL-22 cytokine, which causes inflammation, and subsequent changes in the PIM1 gene suggests a direct link between PIM1 and psoriasis.

“We have been able to confirm that the protein IL-22 causes inflammatory changes in human skin contributing to psoriasis,” said Professor Frank Nestle from the St. John’s Institute of Dermatology at Guy’s and St. Thomas’ NHS Foundation Trust and King’s College London. “The most exciting part of the study was that detailed analysis of genes induced by IL-22 in skin allowed us to uncover a novel treatment target for this disease. We are hopeful that our research will lead to the development of new approaches for the treatment of this common and irritating skin condition.”
TREATHMENT OPTIONS for multiple sclerosis (MS) have advanced tremendously over the last several decades. Once, MS was a condition for which treatment centered on controlling symptoms and exacerbations and preventing complications, but today’s treatment options have had an enormous impact on the morbidity, mortality and quality of life of people living with MS. Additionally, much more is known about the condition itself, including the various forms of MS, which determine course of treatment and ultimate outcomes. One treatment that remains an option today for some forms of MS is intravenous immune globulin (IVIG).

Understanding MS
MS is a disease of the central nervous system, affecting the brain, spinal cord and optic nerves. In persons with MS, myelin, which serves as a neurotransmitter, is replaced with plaque, resulting in an interruption of nerve signals. Because the central nervous system is affected, there are a multitude of symptoms that can be experienced, both initially and/or ongoing (Table 1).

Like many other neurological conditions, the initial symptoms of MS can mimic a variety of disease states. Sadly, there is no single test for MS. A full neurological examination and other diagnostic tests are conducted to rule out other conditions and arrive at a diagnosis of MS. These tests include MRI of the brain and spinal cord to look for plaque, tests of the cerebral spinal fluid to look for proteins that indicate an immune response, and evoked potential tests that evaluate and measure response to nerve stimulation. Additionally, blood work is typically tested again to check for any possible cause of symptoms.

Forms of MS and Treatment
There are four different forms of MS, including a clinically isolated syndrome (CIS). CIS is the initial episode of symptoms that may eventually lead to a diagnosis of MS. The symptoms are similar to those that someone with MS will experience during an exacerbation and can include visual disturbance and/or numbness and tingling in the extremities. At the time of the CIS, diagnostic tests are conducted, and an MS diagnosis may or may not be made. If lesions are found, it’s likely to lead to an MS diagnosis. Not everyone diagnosed with MS will have a

Table 1. Symptoms of Multiple Sclerosis
- Numbness, tingling or weakness in one or more extremities
- Visual disturbances: vision loss, double vision, pain with eye movement
- Mobility issues: loss of balance, lack of coordination, unsteady gait
- Slurred speech
- Fatigue
- Dizziness
- Bowel and bladder dysfunction: retention or incontinence
- Sexual dysfunction
- Cognitive changes, memory issues, difficulty focusing and/or problem-solving
- Emotional lability, mood swings, depression

Table 2. RRMS Medications

<table>
<thead>
<tr>
<th>Medication</th>
<th>Route of Administration</th>
<th>Manufacturer</th>
</tr>
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<tbody>
<tr>
<td>Avonex</td>
<td>Intramuscular</td>
<td>Biogen</td>
</tr>
<tr>
<td>Betaseron</td>
<td>Intramuscular</td>
<td>Bayer</td>
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<td>Copaxone</td>
<td>Intramuscular</td>
<td>Teva Neuroscience</td>
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<td>Extavia</td>
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<td>Glatopa</td>
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<td>EMD Serono</td>
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<td>Aubagio</td>
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<td>Gilenya</td>
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<td>Tecfidera</td>
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<td>Lemtrada</td>
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<td>Novantrone</td>
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<td>Tysabri</td>
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CIS. There is evidence that IVIG is effective in treating CIS, and it should be considered as a therapeutic option, particularly when other MS medications are not a treatment option.

Relapsing-remitting MS (RRMS) is a second form. In RRMS, periods of flare-ups are followed by complete or near-complete recovery. This is the most common form of MS for which most of the U.S. Food and Drug Administration (FDA)-approved treatments are indicated (Table 2). There have been clinical trials of IVIG to treat RRMS; however, the data is conflicting. Some IVIG trials show a positive effect on RRMS in which the time between relapses is lengthened and brain lesion formation may be slowed. Other trials do not show any efficacy. There is also evidence that IVIG is successful in reducing postpartum relapses, especially important since immunomodulatory drugs are contraindicated during pregnancy and while breastfeeding.1

Because so many interferon medications, as well as Tysabri, have been approved by FDA, IVIG is not routinely prescribed to treat RRMS. And, many doctors do not consider it a treatment option because some studies show no improvement. However, if Tysabri or interferon medications have been tried and either do not work, have intolerable side effects or are contraindicated, some doctors will prescribe IVIG.

Several health plans will also consider coverage of IVIG for RRMS if it is documented that other medications were tried and failed, are not tolerated or are contraindicated. These health plans will also consider coverage during postpartum and breastfeeding.

The other two forms of MS are primary progressive (PPMS) and secondary progressive (SPMS). In PPMS, there are not any flares, but there is a progression in symptoms over time. There may be periods when the disease is not active and the symptoms appear stable, but there is never really any improvement in symptoms. SPMS can appear similar to RRMS, but over time, there is no recovery after flares and, eventually, there is only disease progression. IVIG has shown no improvement in symptoms in PPMS or SPMS. Additionally, the treatments used for RRMS are not effective in progressive forms of MS. Treatment of these types typically involves symptom management, physical and occupational therapy and maintaining a healthy and stress-free lifestyle as much as possible.

Future Hope for IVIG to Treat MS?

During the last several decades, many promising treatments for MS have emerged. These treatments, which include IVIG in some circumstances, allow people living with MS to lead healthier lives. As more research is conducted to determine the positive effects of IVIG to treat MS, it’s possible that this lifesaving therapy will play a greater role in the maintenance of this disease.

MICHELLE GREER, RN, is senior vice president of sales for NuFACTOR Specialty Pharmacy.

Reference
Although there are more than 200 identified PIs, the more common and classically described represent the hallmarks of these disorders.
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— Lori K.
**Parent**

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• Should you suffer a lapse in your insurance, simply contact a IgIQ Care Coordinator and we will take care of the rest

“At the Immune Deficiency Foundation, we often talk to patients who lose their insurance coverage and we see firsthand how stressful this situation can be. This program not only helps people continue their life-saving treatments but also provides security for the future. It is a valuable option for our patient community.”

— Marcia Boyle
President and Founder, Immune Deficiency Foundation

*Certain limitations apply—see program Terms and Conditions at www.cslbehringassurance.com.
The first primary immunodeficiency disease (PI) was described in 1952 by Colonel Ogden Bruton. He wrote about a young boy suffering recurrent respiratory infections due to inability to make specific antibodies, who was successfully treated with immune globulin (IG) replacement therapy. This famous case—later coined “Bruton’s agammaglobulinemia” caused by a genetic defect in B-cell maturation found on the X chromosome—led to the birth of the field of PIs.

Fortunately, PIs are not common disorders. However, they are not as rare as some have previously believed. There are currently more than 200 characterized distinct PIs, and that number is growing due to advances in immunology and genetics. The prevalence of diagnosed PI in the U.S. is approximately one in 2,000 patients, and the incidence of newly diagnosed PI is approximately one in 10,000 patients. This is likely an underestimate, though, since it takes into account only the diagnosed cases, and there are many cases that persist for long periods without a proper diagnosis.

Review of the Immune System

Before delving into an in-depth discussion of the various types of PIs, it is important to review the basic workings of the human immune system. The immune system is divided into the innate and the adaptive systems. The innate system is nonspecific, but it is the first line of host defense. The cells associated with the innate system include neutrophils, macrophages and dendritic cells. The humoral components of the innate system include complement proteins and other molecules that defend against microbes in a nonspecific fashion.

The adaptive immune system, on the other hand, is specific and has immunologic memory. The cells involved in the adaptive system are B and T cells. T cells are further divided into T-helper cells and cytotoxic T cells. The humoral components include the immunoglobulins: IgM, IgG, IgA and IgE.

Of all the PI conditions, around 65 percent are antibody deficiencies that are a result of some form of defect in immunoglobulin production. Around 5 percent are pure T cell deficiencies, 15 percent are combined cellular and antibody deficiencies, 10 percent are disorders of the innate immune cells and 5 percent are complement deficiencies and other disorders of the innate immune system.

Antibody Deficiencies

One of the most frequently diagnosed antibody deficiencies is common variable immune deficiency (CVID). Rather than one single disorder, CVID actually represents a whole spectrum of conditions. It can often present later in life, frequently in the third to fourth decades of life. Only a few identified single gene defects have been found, but the majority of cases are associated with unknown mechanisms. The B cell count may be depressed or normal, but it is always associated with low IgG plus either low IgA or IgM. There are poor specific antibody titers and poor responses to vaccines. The conservative estimate on prevalence is around one in 25,000.

The clinical presentation of CVID is characterized by recurrent respiratory infections and gastrointestinal infections. It is also associated with complications of autoimmune disease, chronic lung disease, inflammatory gastrointestinal disease and malignancies. Treatment includes IG replacement therapy and, in some cases, prophylactic antibiotics. The incidence of autoimmune complications rises when there is a lack of class switched memory B cells. Unfortunately, the average time from symptom onset to diagnosis is still over a decade due to poor recognition and lack of early diagnostic testing.

The most common form of antibody deficiency is selective IgA deficiency with an incidence of one out of 400.

As mentioned, agammaglobulinemia was the first discovered PI. Bruton’s agammaglobulinemia represents 90 percent of all cases and only presents in boys, since it is an X-linked disorder. An autosomal recessive form also exists and represents about 10 percent of cases. This condition is also associated with absence of B cells along with absence of immunoglobulin. The classic presentation includes respiratory tract infections, diarrhea, meningitis, cellulitis and sepsis. Treatment includes IG replacement therapy, and some experts advocate for the use of prophylactic antibiotics.

The most common form of antibody deficiency is selective IgA deficiency with an incidence of one out of 400. Most patients are asymptomatic, but some individuals may develop frequent and longer respiratory infections, allergic disease and autoimmune disease (such as celiac disease). Selective IgA defi-
ciency patients need careful monitoring by an immunologist since some of these cases may evolve into CVID.

When the number of B cells and the quantity of immunoglobulins are normal, their function can still be abnormal. This is the case for specific antibody deficiency (SAD), which is diagnosed by testing against titers to the 23 serotypes of Streptococcus pneumoniae, or pneumococcus. SAD patients demonstrate an inadequate level of post-vaccination titers to 50 percent of the pneumococcal serotypes. Clinical features of SAD include frequent respiratory infections and allergic disease. Treatment includes antibiotic prophylaxis and IG replacement therapy.

The first class of immunoglobulins produced is IgM. When the body is incapable of switching to other classes of immunoglobulins, hyper-IgM syndrome occurs either because T helper cells are unable to communicate effectively to B cells or the actual machinery of class switching is dysfunctional. Clinical presentation is similar to severe forms of CVID. IgM levels do not need to be significantly elevated, and sometimes they can be normal appearing. However, the other classes of immunoglobulins are extremely low. Treatment includes IG replacement therapy, as well as bone marrow transplant.

**DiGeorge Syndrome**

One of the classic defects mainly affecting T cells is DiGeorge syndrome, which was discovered in 1965 by Dr. Angelo DiGeorge. These patients have a deletion of chromosome 22q11, which affects thymic development. Characteristics include typical facial features of hypertelorism, anti-mongoloid slant of eyes and low-set ears. Only 0.5 percent of all cases are “complete DiGeorge” syndrome. Other clinical presentations can include cardiac malformations, speech delay, cellular immunodeficiency, low serum calcium and autoimmunity. A very small number of partial DiGeorge patients do eventually need IG replacement therapy due to poor production of B cells caused by insufficient T-cell stimulation.

**Cellular Defects of the Innate Immune System**

A number of distinct cellular disorders of the innate system are generally caused by defects of neutrophil function. Neutrophils are the body’s first cellular line of defense against invading microbes. They can either be defective due to an inability to produce necessary compounds to destroy ingested microbes, as in the case of chronic granulomatous disease (CGD); an inability to release synthesized compounds that can destroy ingested microbes, as in Chediak-Higashi syndrome; or an inability to migrate out of the blood vessels into the areas of microbe invasion, as is the case in leukocyte adhesion deficiencies (LADs).

CGD is a condition in which there is impaired ability for neutrophils to generate reactive oxygen species and bleach to destroy ingested microorganisms. It occurs in one out of 200,000 people. The inheritance pattern can be both X-linked (65 percent) and autosomal recessive (35 percent). Clinical presentation can include pneumonia, skin abscesses and development of granulomas. Common invading organisms include Staph aureus, Burkholderia, Serratia, Nocardia and Aspergillus. Acute treatment includes antibiotics and antifungals targeted toward the invading organisms. Chronic management includes prophylactic therapy often involving Bactrim, antifungals with
Aspergillus coverage and interferon gamma for immunomodulation. Currently, the only approved definitive therapy is bone marrow/stem cell transplant.

Chediak-Higashi syndrome is a disorder that results in neutrophils with giant granules and an inability to mobilize the enzymes in the granules. The defect is in the LYST gene that results in impaired lysosomal trafficking. The clinical presentation includes albinism in the eyes and skin, frequent bacterial infections, neurologic defects and metallic silver-gray sheen in the hair. Treatment is bone marrow/stem cell transplantation, which improves the immunologic defects but does not lead to cure of the neurologic defects.

LAD is characterized into types I, II and III. Types I and III are similar, both caused by an inability of white cells in the blood vessels to migrate out of the vessels into the affected tissue. As a result, the white blood cells are trapped in the blood vessels, keeping them from getting to the areas of infection/inflammation, where they are needed to combat invading microbes. LAD type II is caused by an inability to control the rolling of white blood cells in the blood vessels so they are unable to slow down in order to migrate out of the vessels. All LAD types can cause a delayed separation of the umbilical cord, dental disease, high white blood cell count, bacterial infections of the skin and infections in the gastrointestinal and respiratory tracts. Clinical presentation can vary in severity.

Complement Disorders

The complement system can be activated through three different pathways: classical, alternative and mannose-binding lectin. Defects can occur in each of those pathways. In addition to these pathways, the complement system is divided into early components and late components of activation. Defects in early components generally result in a clinical presentation of both immunodeficiency and autoimmunity. Defects in late components result in susceptibility to disseminated meningococcal infections. Lastly, aside from the main components of complement activation, there can also be defects that occur in associated components, which can lead to a variety of clinical diseases, ranging from hemolytic uremic syndrome and kidney dysfunction to hereditary angioedema.

Hyper IgE Syndromes

There are two main types of hyper IgE syndrome: autosomal dominant Job’s syndrome and autosomal recessive hyper IgE.

Job’s syndrome patients can present with distinctive facial features of wide nasal width, facial asymmetry and hypertelorism. From an immunodeficiency perspective, they can present with recurrent boils due to Staph aureus infections, eczema, Candida yeast infections, high blood eosinophil counts and lung abscesses. The mechanism of disease is a defect in the cell-signaling molecule STAT3.

Autosomal recessive hyper IgE syndrome does not present with any typical facial features. These patients suffer from recurrent respiratory infections, as well as skin infections with herpes virus, human papilloma virus and molluscum infections. They can also present with a significant amount of allergic disease. The known mechanism of disease is a defect in the molecule DOCK8.

Susceptibility to Atypical Mycobacterial Infections

Patients who are susceptible to atypical mycobacterial infections are prone to nontuberculosis Mycobacterium, including Mycobacterium avium, fortuitum, bovis and Bacillus Calmette–Guérin. In addition, they demonstrate susceptibility to salmonella, which is an intracellular bacteria, but is not a mycobacteria. The normal clearance of intracellular bacteria requires normal function of Interleuken-12 (IL-12) and interferon gamma. Normal function means the innate immune system starts producing IL-12 to stimulate T cells that in turn produce interferon gamma to stimulate the innate cells (macrophages) to kill bacteria. There are many steps in this process, so defects along any of the steps in the IL-12 and interferon-gamma pathway can lead to an abnormal clearance of intracellular bacteria. Patients who have a defect in the interferon-gamma receptor have a worse prognosis, and patients with defects in the IL-12 receptor have a better prognosis in general because they can be treated with interferon-gamma supplementation (Actimmune).

More PIs, Growing Insight

There are more than 200 distinct types of PIs that have been described, and more PIs are being discovered given our advances in understanding basic immunology and genetics. This article touched only on some of the common and classically described syndromes. As such, it is not meant to be an exhaustive list of all PIs. Through patients with these disorders, the scientific community is gaining invaluable insights into the workings of the human immune system and how small defects can lead to immense changes and profound disease.

BOB GENG, MD, MA, studied medicine at Washington University School of Medicine in St. Louis, where he also completed his residency training in internal medicine. He is currently an assistant professor in allergy and immunology at the University of California, San Diego. Dr. Geng received his bachelor’s and Master of Arts degrees in Georgetown University’s School of Foreign Service.
Goal-Setting for the Chronically Ill: Planning for an Uncertain Future

Learning how to set attainable goals can give patients a sense of purpose and accomplishment.

By Trudie Mitschang
JACK CANFIELD, THE popular motivational speaker and co-author of the *Chicken Soup for the Soul* book series, is frequently quoted on the importance of goal-setting. “Successful people maintain a positive focus in life no matter what is going on around them,” says Canfield. “They stay focused on their past successes rather than their past failures, and on the next action steps they need to take to get them closer to the fulfillment of their goals, rather than all the other distractions that life presents to them.”

Most would agree that Canfield’s observations are sound, but for individuals living with chronic illness, the prospect of goal-setting is a bit more complex. What some might refer to as “life’s distractions” are, for the chronically ill, more like daily roadblocks to accomplishing even basic tasks. Often, the ability to simply make afternoon plans can seem daunting, making long-term goal-setting feel like an impossible task. “Chronic illness presents us with very real limitations,” says mental health expert Sharilyn Johnson, MFT. “It is normal to experience grief regarding the loss of our former life and abilities. Life can improve, but it will require us to focus on the positive aspects of what we can still accomplish. Setting goals is an important part of this process because it gives you hope and purpose.”

Holistic life coach Julie Holliday agrees, noting that it’s important to set realistic expectations when it comes to identifying goals to avoid setting oneself up for failure: “The purpose of goals is to motivate; don’t allow them to be used as a stick to beat yourself up with. It can be so easy to turn our goals into pressure, which then turns into stress and tension, but stress and tension have nothing to offer our health and happiness!”

The Benefits of Goal-Setting

Living with a chronic illness is unpredictable. Some days, a person will feel well enough to socialize with friends and go to the mall. The next day, that person can’t get out of bed. This kind of uncertainty saps not only physical strength, but also mental focus and the ability to view oneself in a positive light. For patients who flounder when it comes to maintaining motivation for goal-setting, it’s helpful to note that even healthy people struggle with setting and achieving goals. Resistance to change is a common struggle, no matter how motivated one may feel at the outset. Whether the goal is to exercise more, spend less or lose that last 10 pounds, the feelings of accomplishment and self-confidence that occur when a goal is achieved almost universally make the struggle to get there worth the effort. For the chronically ill, setting even a short list of goals with measurable action steps can help reduce feelings of fear and provide a much-needed sense of purpose.

“Pain doesn’t have to take away your ability to pursue meaningful goals. You can take pleasure and pride in working toward small, manageable goals. They matter and they make a difference,” says
**Goal Setting in Six Simple Steps**

1. **Write down the goals, and review them often.** The physical act of writing down a goal makes it real and tangible. When writing, intentional language should be used such as inserting the word “will” instead of “would like to” or “might.” For example, if the goal is to begin a walking plan, it should be phrased: “I will take a 15-minute morning walk five days a week starting January 15.” This goal statement has power and helps a person visualize actually following through on the intention.

2. **Choose one health-related goal.** An individual should consider a goal that would lead to feeling a bit healthier when it is reached. Maybe it’s to research one’s illness to feel more empowered when speaking with a physician. Dietary and lifestyle goals that give improved stamina or help a person sleep better may also be helpful.

3. **Start slow.** If the goal is to gain strength, one shouldn’t start by joining a gym and trying a 30-minute workout on day one. That will only result in a setback. Instead, a better start might be to try some home exercise videos that focus on easy yoga moves. As goals are reviewed and one gets stronger, stamina and motivation will increase.

4. **Break goals into manageable segments.** Maybe a person wants to try a new elimination diet to see if that helps relieve symptoms. Rather than eliminating all white flour, sugar, dairy and processed foods, consider cutting out one food group at a time. Or, if the goal is to learn about an illness, take one month to focus on reading a book on the subject and another month to focus on online research.

5. **Review frequently.** A specific time frame for reviewing goals, either weekly or monthly, should be set, and review periods should be conscientiously observed. During the review period, goals should be looked at and their value reassessed. Was the goal too ambitious? Did the person try doing too much at once? Did an unexpected health setback prevent achieving the goals for that month? The plan should be altered and adjusted as needed.

6. **Go easy.** No matter how well one lays out goals or commits to achieving them, the fact is a chronic illness does retain a measure of control over what can and cannot be achieved on any given day. As such, a person should rest, regroup and start over as often as needed.

**Setting S.M.A.R.T. Goals**

The S.M.A.R.T. acronym for goal-setting is a popular term that refers to goals that are Specific, Measurable, Achievable, Relevant and Timely. Consider the phrase: “I hope I can lose 10 pounds by summer.” What transforms that wishful thinking into an actual S.M.A.R.T. goal is putting some parameters around the what, how and when of the proposed plan. “I will lose 10 pounds in the next 90 days by exercising five times a week” changes the hope to a goal. Here is a breakdown of each segment of S.M.A.R.T. goal-setting to help patients get started:

- **Specific:** The goal must be clear and well-defined. Vague or generalized goals are unhelpful because they don’t provide sufficient direction. Clarifying what one wants to achieve and when to
achieve it will make it that much easier to succeed.

- **Measurable:** Include precise amounts, dates and deadlines in goals so success can be measured. If the goal is simply defined as "to reduce expenses," there is no way of knowing if the goal will be successful. Without a way to measure success, a person will miss out on the celebration that comes with knowing he or she has actually achieved something.

- **Attainable:** Make sure it’s possible to achieve the goals that are set. For instance, if someone is currently inactive and gets winded when walking around the block, participating in a triathlon next year may not be attainable. That said, dream big, but without setting yourself up for failure.

- **Relevant:** Goals should be relevant to core values. By keeping goals aligned with spiritual and personal values, a person will avoid internal conflicts and resistance that can sabotage success later.

- **Timely:** Give goals a deadline. Again, this means that a person knows when he or she can celebrate success. When working on a deadline, a sense of urgency increases and achievement will come that much quicker.

Identifying the motivation for achieving a goal is also a key component to actually achieving it. If the goal is to develop a habit of daily or weekly exercise, the “why” might be to develop enough stamina to play with the kids. Or perhaps a person wants to travel and needs more stamina to do so. For others, the motivation may be to look and feel better and improve self-esteem. The point is, the why for one person may be quite different from the why for someone without a chronic health struggle, but defining the motivation for each of the goals is the first step to gaining the momentum needed to succeed.

**Focus on What Can Be Controlled**

In the early stages of diagnosis, many patients focus on learning all they can about their disease state, seeking alternative treatment plans and attempting to become healthy again. Unfortunately, just as patients can’t control whether or not they developed a chronic illness, they are also unable to control whether or not they get well. If patients make their goal to cure themselves of their illness, they’re setting a goal that is out of their control to achieve. This can lead to frustration, stress and feelings of discouragement. Instead, they should focus on things they can control. For example, choosing to eat five servings of fruits and vegetables a day is a health-related goal that is realistic and achievable. Likewise, practicing mindful meditation and deep breathing upon waking each day, taking three five-minute stretch breaks throughout the day and setting aside 20 minutes daily to read a motivational book are positive goals that are completely within patients’ power to accomplish.

**Breaking Through Barriers**

There are several common barriers that can be overcome during the goal-setting process. While everyone experiences resistance to change, some issues are unique to those with chronic illness:

- **Self-victimization.** When faced with an ongoing health condition, it is easy to feel like a victim of unfair circumstances. The act of setting and achieving even small daily goals can help a person break out of the negative cycle of emotions and begin to accept a new normal. If the illness has made the person feel isolated, for example, a productive goal might be to join an online support group or start a blog to document the journey and connect with others.

- **Hopelessness.** A chronic health condition is like a roller-coaster ride that never ends. There tend to be dramatic highs and lows, with surprises around each corner. The feeling that “things will never level out” can produce feelings of hopelessness and despair. The good news is, the simple act of writing down goals and planning for a future, while uncertain, can still hold tremendous promise and potential.

- **Underestimating abilities.** When a person has had a life-altering trauma or loss in function, it is going to take some deep reflection and ingenuity to determine how to adapt. But with a strong desire to live a productive, fulfilling life, there can be surprises in store. That person may not be able to perform tasks as efficiently as before, but just might uncover some new skills and talents when pressing forward.

**TRUDIE MITSCHANG** is a contributing writer for IG Living magazine.

**References**


Making Support Groups Work for You

Patients can use these eight tips to ensure a support group is the right fit for them.

By Dana Henry

PATIENTS ARE often interested in joining a support group but don’t know where to start. Or, some may have had a bad experience in a support group and feel nervous about trying again. These eight tips can help patients navigate the process of finding the right group for them.

1. Learn where to find reputable support groups.

Finding the right group is sometimes more complicated than doing an Internet search. By digging deeper, patients can find a greater variety of groups. Susan Rieger, a licensed clinical social worker who facilitates and participates in several support groups in the Kansas City area, suggests contacting local hospitals to find groups associated with their complementary medicine programs. Patients can also contact nonprofit organizations that support people living with their medical condition. Their staff can help locate support groups in different areas. The Mayo Clinic recommends contacting local resources such as libraries, community centers and places of worship.¹
2. Know what to expect.

When looking for support groups, patients can get a sense of a group’s focus and format from descriptions in newsletters or online. Every group should provide guidelines for participation. That document should be available at meetings and will most likely be read aloud before each meeting starts. These guidelines help make the group a safe space for everyone who attends and provide a basis for speaking up if the group seems to be veering from shared expectations.

By definition, support groups deal with difficult subject matter and situations. The skills and background of the group facilitator are essential when strong dynamics arise in a group, Rieger says. To help evaluate the facilitator’s experience and philosophy, she suggests calling him or her ahead of time. Patients can use that call to ask the facilitator about his or her leadership strategies and about the group’s size and dynamics. Rieger’s own philosophy about facilitating groups is that creating a safe space is even more important than providing information.

3. Try out different types of groups.

When people think of support groups, the image of a large, sterile room usually comes to mind, one where people sit in a circle taking turns talking about their problems. Though this model certainly exists, support isn’t limited to this approach. One alternative is structured educational groups that focus on a topic and are led by a subject-matter expert. Another alternative is groups that have an activity at their core such as groups focused on recreation and creativity.

Rieger, who is a professional dancer, loves to include movement in her groups because, aside from the health benefits of staying active, movement connects all aspects of who we are: physical, emotional, spiritual and intellectual. In cities around the country, there are support groups that incorporate all kinds of activities, from knitting to writing to yoga. So if the more traditional talk-driven groups aren’t a patient’s first choice, there are myriad ways to find support and connect with others.

4. Take advantage of what makes support groups unique.

Support groups provide a space that is unlike any other point of contact in the healthcare system. Unlike the one-on-one relationship patients have with care providers, where there is no reference for what they are feeling other than themselves, the support group allows patients to share their experiences with others who are going through something similar, as well as learn from those who have been there. This dynamic can be extremely therapeutic.

“It does so much good for comforting people about the things that they think are unusual or specific to them,” Rieger says. “There is no one who understands their experience better than someone who has experienced it themselves.” She adds that there’s a normalizing effect when patients learn they are not alone in what they are feeling. Knowing that many people living with chronic health issues feel anxiety about their condition, for example, can go a long way toward alleviating that anxiety — or at least make living with it more manageable.

“What’s really helped me about groups is being in a room full of people who have the same issues and discuss those issues openly,” says Chris,* who has participated in support groups since 2015. “From an early age, I’ve had the idea that talking about my struggles — including my health struggles — was a sign of weakness. Support groups have shown me that’s not the case. The strongest people are those who bravely face their challenges every day.”

According to the Mayo Clinic, participation in support groups confers several emotional and practical benefits. Emotional benefits include feeling less isolated, gaining a sense of empowerment and improving coping skills. Practical benefits include developing a clearer understanding of what to expect, getting practical advice or information about treatment options, and comparing notes about resources such as doctors and alternative options.

Perhaps the most important benefit of support groups is that they help participants cultivate relationships, many of which last long after the group has stopped meeting. “Support groups offer support in a way that individual therapy never could, in that this group of people could go on to become an ongoing support system for you,” Rieger says. She’s seen people from her groups exchange contact information and incorporate group participants into their ongoing support system. Those connections can be central to resilience, healing and endurance. For example, Rieger notes that building a support system is a known way to counter depression.

5. Make sure the group is emotionally safe.

Above all, support groups need to be emotionally safe for those who attend. They need to be spaces where introverts and extroverts feel they have equal time to talk. They need to be

*Last name omitted upon request
Hizentra is the only subcutaneous Ig treatment with over **70,000 patient-years** of experience

**Important Safety Information**

Hizentra treats various forms of primary immunodeficiency (PI) in patients age 2 and over.

**WARNING:** Thrombosis (blood clotting) can occur with immune globulin products, including Hizentra. Risk factors can include: advanced age, prolonged immobilization, a history of blood clotting or hyperviscosity (blood thickness), use of estrogens, installed vascular catheters, and cardiovascular risk factors.

If you are at high risk of thrombosis, your doctor will prescribe Hizentra at the minimum dose and infusion rate practicable and will monitor you for signs of thrombosis and hyperviscosity. Always drink sufficient fluids before administration.

Tell your doctor if you have had a serious reaction to other immune globulin medicines or have been told you also have a deficiency of the immunoglobulin called IgA, as you might not be able to take Hizentra.

You should not take Hizentra if you know you have hyperprolinemia (too much proline in your blood).

**Infuse Hizentra under your skin only; do not inject into a blood vessel.**

Allergic reactions can occur with Hizentra. If your doctor suspects you are having a bad allergic reaction or are going into shock, treatment will be discontinued. Immediately tell your doctor or go to the emergency room if you have signs of such a reaction, including hives, trouble breathing, wheezing, dizziness, or fainting.

Tell your doctor about any side effects that concern you. Immediately report symptoms that could indicate a blood clot, including pain and/or swelling of an arm or leg, with warmth over affected area; discoloration in arm or leg; unexplained shortness of breath; chest pain or discomfort that worsens with deep breathing; unexplained rapid pulse; and numbness or weakness on one side of the body. Your doctor will also monitor...
Sign up at voice2voice4pi.com.

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PI Support From a Personal Point of View

If you are a Hizentra patient or caregiver, sign up for Voice2Voice to connect with others who have walked in your shoes. Along with offering encouragement and sharing personal experiences, your Voice2Voice advocate can answer non-medical questions* and connect you to helpful resources.

We’d love to hear from you. If you or someone in your care is currently using Hizentra to manage PI and you’d like to share your story, we encourage you to apply to become a Voice2Voice advocate.

Before being treated with Hizentra, inform your doctor if you are pregnant, nursing or plan to become pregnant. Vaccines (such as measles, mumps and rubella) might not work well if you are using Hizentra. Before receiving any vaccine, tell the healthcare professional you are being treated with Hizentra.

Please see brief summary of full prescribing information for Hizentra on adjacent page. For full prescribing information, including boxed warning and patient product information, please visit Hizentra.com.

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.fda.gov/medwatch, or call 1-800-FDA-1088.

*Voice2Voice advocates are not healthcare professionals or medical experts. For medical questions, please contact your physician. Voice2Voice advocates are compensated by CSL Behring LLC for their time and/or expenses.

Hizentra®, Immune Globulin Subcutaneous (Human), 20% Liquid

Initial U.S. Approval: 2010

BRIEF SUMMARY OF PRESCRIBING INFORMATION

These highlights do not include all the information needed to use HIZENTRA safely and effectively. See full prescribing information for HIZENTRA.

WARNING: THROMBOSIS
See full prescribing information for complete boxed warning.

- Thrombosis may occur with immune globulin products, including Hizentra. Risk factors may include: advanced age, prolonged immobilization, hypercoagulable conditions, history of venous or arterial thrombosis, use of estrogens, indwelling vascular catheters, hyperviscosity, and cardiovascular risk factors.
- For patients at risk of thrombosis, administer Hizentra at the minimum dose and infusion rate practicable. Ensure adequate hydration in patients before administration. Monitor for signs and symptoms of thrombosis and assess blood viscosity in patients at risk for hyperviscosity.

INDICATIONS AND USAGE

Hizentra is an Immune Globulin Subcutaneous (Human) (IGSC), 20% Liquid indicated for the treatment of primary immunodeficiency (PI) in adults and pediatric patients 2 years of age and older.

DOSAGE AND ADMINISTRATION

For subcutaneous infusion only. Do not inject into a blood vessel. Administer at regular intervals from daily up to every two weeks (biweekly).

DOSAGE (2.2)
Before switching to Hizentra, obtain the patient’s serum IgG trough level to guide subsequent dose adjustments.

- **Weekly**: Start Hizentra 1 week after last IGIV infusion
  
  Initial weekly dose = Previous IGIV dose (in grams) × 1.37
  
  No. of weeks between IGIV doses

- **Biweekly**: Start Hizentra 1 or 2 weeks after the last IGIV infusion or 1 week after the last weekly Hizentra/IGSC infusion. Administer twice the calculated weekly dose.

- **Frequent dosing (2 to 7 times per week)**: Start Hizentra 1 week after the last IGIV or Hizentra/IGSC infusion. Divide the calculated weekly dose by the desired number of times per week.

- **Adjust the dose** based on clinical response and serum IgG trough levels.

Administration

Infusion sites — 1 to 4 injection sites simultaneously, with at least 2 inches between sites.

<table>
<thead>
<tr>
<th>Infusion Parameters</th>
<th>Infusion Number</th>
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<tr>
<td>Volume (mL/site)</td>
<td>≤ 15 ≤ 20 ≤ 25</td>
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<tr>
<td>Rate (mL/hr/site)</td>
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As tolerated

-----------------------------DOSAGE FORMS AND STRENGTHS---------------------------------

0.2 g per mL (20%) protein solution for subcutaneous injection

CONTRAINdications

- Anaphylactic or severe systemic reaction to human immune globulin or components of Hizentra, such as polysorbate 80
- Hyperprolinemia (type I or II) (Hizentra contains the stabilizer L-proline)
- IgA-deficient patients with antibodies against IgA and a history of hypersensitivity

WARNINGS AND PRECAUTIONS

- IgA-deficient patients with anti-IgA antibodies are at greater risk of severe hypersensitivity and anaphylactic reactions.
- Thrombosis may occur following treatment with immune globulin products, including Hizentra.
- Aseptic meningitis syndrome has been reported with IGIV or IGSC treatment.
- Monitor renal function, including blood urea nitrogen, serum creatinine, and urine output in patients at risk of acute renal failure.
- Monitor for clinical signs and symptoms of hemolysis.
- Monitor for pulmonary adverse reactions (transfusion-related acute lung injury [TRALI])
- Hizentra is made from human plasma and may contain infectious agents, e.g., viruses, the variant Creutzfeldt-Jakob disease (vCJD) agent and, theoretically, the Creutzfeldt-Jakob disease (CJD) agent.

ADVERSE REACTIONS

The most common adverse reactions observed in ≥5% of study subjects were local reactions (i.e., swelling, redness, heat, pain, and itching at the injection site), headache, diarrhea, fatigue, back pain, nausea, pain in extremity, cough, rash, pruritus, vomiting, abdominal pain (upper), migraine, and pain.

To report SUSPECTED ADVERSE REACTIONS, contact CSL Behring Pharmacovigilance at 1-866-915-6958 or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

DRUG INTERACTIONS

The passive transfer of antibodies may interfere with the response to live virus vaccines, and lead to misinterpretation of the results of serological testing.

USE IN SPECIFIC POPULATIONS

- Pregnancy: No human or animal data. Use only if clearly needed.
- Pediatric: No specific dose requirements are necessary to achieve the desired serum IgG levels.

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If you answer YES to any of these questions, call 1-877-355-IGIQ (4447) Monday–Friday, 8 AM to 8 PM ET.
spaces in which all information shared is held in confidence. They even need to be safe spaces to not speak if a participant wants to listen but doesn’t feel comfortable sharing. If a group doesn’t have guidelines, doesn’t seem to follow its guidelines or feels unsafe in any other way, patients should trust their instincts and either take steps to improve the group or move on to one that is emotionally safe.

In addition to its guidelines, signs that a group is emotionally safe include participants practicing good listening skills (e.g., making eye contact, not talking while someone is sharing, not checking cell phones), practicing fairness in terms of how much time each person has to speak (e.g., not allowing individuals to dominate the conversation, not allowing extroverts to do most of the talking), honoring confidentiality (e.g., not talking about a participant in his or her absence, not divulging something to the group that a participant shared with only one person) and refraining from giving unwanted advice.

To evaluate emotional safety, Rieger encourages participants to ask themselves several questions. Does it feel like you are being listened to? Is one person dominating? Also, how anxious do you feel in the space? While some anxiety is normal for everyone before attending a support group, especially for the first time, an ongoing high level of anxiety could be an indication that the space isn’t safe for a person.

“‘The last time I attended one of my support groups, I had so much anxiety about what had happened during the meeting that I felt my own health was at risk,’” Chris says. This was a red flag he couldn’t ignore. After careful consideration, he decided not to go back to that particular group, “I didn’t know how I could return and preserve my personal health and well-being.”

Other red flags include the following:1

• Groups that promise a cure for your condition
• Meetings that are largely focused on complaining
• Facilitators or participants who urge you to stop your medical treatment
• Participants who are disruptive or who judge your decisions or actions
• Pressure to purchase products or services
• High attendance fees

If patients find themselves in a situation that prompts them to leave a group, they should remember that not all groups are created equal. Patients can have a bad experience in one group without giving up on support groups entirely. With some time and effort, they should be able to find another group that will serve them well.

6. Remember that you decide what to share.

When patients attend a support group, they need to set their own boundaries. They have the right to share only what they want to share, even if everyone is opening up in deeply personal ways. They have the right to try a group out a few times until they know it’s a safe space for them and what role the group can play in their journey. “You are your own monitor,” Rieger says. “Other than sharing your [first] name, you get to decide when it’s time to talk and how vulnerable to be.”

Perhaps the most important benefit of support groups is that they help participants cultivate relationships, many of which last long after the group has stopped meeting.

7. Know that seeking support doesn’t make you weak.

Getting support doesn’t make people weak. It makes them strong — and the experience can make them even stronger. Research has shown that people who take part in support groups have less anxiety, stress, emotional distress, fatigue and pain, as well as improved mood, self-image and feelings of being in control.2

8. Give it a try.

If patients are still on the fence about attending a support group, Rieger’s advice is simple: “Try it one time and see if it feels right.” If not, no big loss. But if they enjoy it, they have plenty to gain.

DANA HENRY is a writer and editor in the Kansas City area who specializes in science, medicine and health.

References

Immune Dysregulation and Malabsorption

Patients with many types of primary immunodeficiencies suffer from malabsorption caused by GI disorders, which can be treated through diet, supplements and medications.

By Alexandra F. Freeman, MD, and Kirsten L. Zambell, PhD, RD
THE LUNGS, GASTROINTESTINAL (GI) tract and skin are the organs most affected in patients with primary immune deficiencies (PIs). Because these organs are in direct contact with the outside world, they are constantly exposed to foreign material that must be fended off with resident immune cells. Therefore, when the immune system doesn’t work correctly, both disordered inflammation and chronic infection are seen.

GI disorders are one of the most common disorders in PIs. The GI tract houses the most lymphocytes of any organ in the body and is the source of large amounts of immunoglobulins. Indeed, the GI tract is exposed to many pathogenic and nonpathogenic microbes, many of which are part of the important normal flora of the intestines. As such, the immune system of the GI tract has to be tightly regulated to allow the “good” microbes in and keep the “bad” microbes out.

Frequently, PI patients affected by GI disorders suffer from malabsorption. Following is a discussion of the signs and symptoms of malabsorption, PIs most associated with malabsorption and some approaches to therapy.

What Is Malabsorption?

Malabsorption occurs when nutrients are not properly absorbed from the diet by the gut. In most instances of malabsorption, fat is not absorbed normally. Fat malabsorption is also associated with improper absorption of other nutrients, including vitamins A, D, E and K. Certain types of infections, gut surgeries, inflammatory bowel diseases/disorders and some medications can cause malabsorption. In PIs, malabsorption is seen most frequently in the setting of inflammatory bowel disease, small bowel enteropathy and chronic infection. Symptoms of malabsorption include bloating, cramping, gas, diarrhea, fatty stools, malnutrition and weight loss. To diagnose malabsorption, tests such as stool cultures, endoscopy and blood tests are conducted.

PI Conditions That May Result in Malabsorption

Following are some of the main PIs associated with GI disease, which can lead to malabsorption.

X-linked agammaglobulinemia (XLA) or related conditions with absence of immunoglobulins. Diarrhea occurs in about 10 percent to 20 percent of individuals due to chronic infection and/or inflammation. The infections can be from bacteria such as Salmonella, viruses such as enterovirus, or parasites such as giardia, and are difficult to clear due to the absence of secreted antibody. There is an increase in GI cancers as well in XLA.

CD40 ligand deficiency/hyper IgM syndrome. Similar to XLA, there is an absence of many antibodies, including very low levels of secretory IgA and low levels of IgG. This can lead to chronic infection. Compared with XLA, individuals with CD40 ligand deficiency can have chronic cryptosporidia infection, which is a parasitic infection that can be very difficult to treat and can cause chronic diarrhea. This can also lead to liver disease.

Common variable immunodeficiency (CVID). GI disease is common with CVID, presenting frequently as celiac-like disease with malabsorption or as inflammatory bowel disease. An inflammatory hepatitis (liver inflammation) may be present as well.

Severe combined immunodeficiency (SCID). SCID often presents with diarrhea and failure to gain weight or grow. Because this is a very severe combined (T and B lymphocyte) immunodeficiency, these complications are frequently due to infections.

Chronic granulomatous disease (CGD). GI disease is fairly common in CGD, a neutrophil defect PI, and typically presents as an inflammatory bowel disease similar to Crohn’s disease, but with more inflammation in the colon. Because the small intestine is not usually as affected, there often is not as much malabsorption; however, a protein-losing enteropathy may be present, which causes low levels of albumin protein.

In PIs, malabsorption is seen most frequently in the setting of inflammatory bowel disease, small bowel enteropathy and chronic infection.

Wiskott-Aldrich syndrome (WAS). Bloody diarrhea from inflammatory bowel disease may be one of the presenting signs in WAS due to the combination of a lymphocyte immunodeficiency and thrombocytopenia.

Immunodysregulation polyendocrinopathy enteropathy X-linked syndrome (IPEX). With IPEX, the lack of regulatory T cells, the lymphocytes that help prevent autoimmunity, leads frequently to an early onset (frequently infancy) of inflammatory bowel disease that may be severe and require intravenous nutrition. Some presentations of other PIs such as gain-of-function STAT1 can look like IPEX and cause early onset inflammatory bowel disease as well.
Tricho-hepato-enteric syndrome (THE). THE is an extremely rare syndrome that presents in early infancy with severe diarrhea. There is immune deficiency present as well, usually affecting the lymphocytes and sometimes antibody production. These children frequently require intravenous nutrition.

How Is Malabsorption Treated?

Diet. In general, eating a small meal or snack every three to four hours is recommended for malabsorption. Meals and snacks should be low in fiber, fat, lactose and other sugars to help minimize symptoms and promote good nutrition. Since fluid is lost in diarrhea, consuming adequate fluids is also important. The following suggestions meet the needs of most people. However, if patients experience worsening symptoms after eating a recommended food, they should avoid that food until they recover.

To stay adequately hydrated, beverages should be chosen that are low in added sugars and caffeine-free. Recommended choices include water, rehydration beverages (Pedialyte, Gatorade), lactose-free liquid supplements (Boost, Ensure), sugar-free beverages and caffeine-free coffee and tea. Since fruit juices are high in sugar, juice can be diluted with equal parts water. Alcoholic beverages should be avoided.

Lactose is a type of sugar found in milk and other dairy products. Even if patients are not normally lactose-intolerant, they may temporarily be unable to digest lactose during periods of malabsorption. Therefore, lactose-free milk is recommended (Lactaid). Lactose-free milk alternatives such as soy, rice and almond milk are also appropriate. Yogurt is naturally low in lactose and should be well-tolerated. Yogurts containing nuts or dried fruits should be avoided as they are hard to digest. Cheese is also a low-lactose food and can be consumed in moderate amounts. All dairy products consumed should be low-fat or nonfat.

Grains can be a rich source of fiber in the diet so it is important that they are chosen carefully when experiencing malabsorption. Foods made from enriched or refined grains tend to be lower in fiber. Good choices include white bread, white rice and white pasta. When looking at nutrition labels, patients should choose grains that have less than 2 grams of fiber per serving. Whole wheat bread, whole wheat pasta and brown rice should be avoided.

Similar to grains, fruits and vegetables may also be high in fiber. Following a low-fiber diet does not mean avoiding these foods entirely. Low-fiber fruit options include ripe bananas, melons, fruits canned in water or 100% fruit juice and fruit juice
without pulp. All other raw fruits (besides ripe bananas and melons) should be avoided along with dried fruit and fruits canned in heavy syrup. Most well-cooked vegetables without peels or skins are tolerated. However, it is recommended to avoid broccoli, Brussels sprouts, cabbage, corn, cauliflower and greens. All raw and fried vegetables should be avoided as well.

Protein-rich foods are generally well-tolerated as long as they are lean and prepared without added fat. Good choices include tender, well-cooked beef, pork, skinless poultry, fish and eggs. If nut butters are preferred, they should be the smooth kind. High-fat meats, including fried options, sausage, bacon and hot dogs should be avoided.

Foods high in fat may increase diarrhea. Therefore, foods such as butter, margarine, oils, cream, mayonnaise, gravies, heavy sauces, salad dressings and rich baked goods/desserts should be limited. Fats should be limited to no more than 8 teaspoons per day.

Many patients find it helpful to keep a food and symptom diary to help identify well-tolerated foods and foods that make symptoms worse.

Supplements. If malabsorption is prolonged, individuals may require supplemental vitamins, especially the fat-soluble vitamins A, D, E and K. These vitamins are essential for proper health and are involved in vision, immune function, bone health and blood clotting. Vitamins may be provided in an alternative, water-soluble form or provided intravenously.

Malabsorption may result in weight loss because some of the calories consumed are not absorbed by the gut. To provide calories without making symptoms worse, dietitians and doctors may recommend an alternative type of fat called medium chain triglyceride oil (MCT oil). This type of fat is easily absorbed and well-tolerated.

Medications. Medications to treat malabsorption in PI depend on the etiology of the GI disease. It is important to initially confirm the absence of an infection causing the diarrhea. For some infectious causes of persistent diarrhea such as giardia or Clostridium difficile, there are specific antibiotic-type therapies. However, for some infections, treatment is difficult. Norovirus, which is a common cause of stomach flu vomiting and diarrhea can cause persistent diarrhea and lead to malabsorption with some PIs such as with CVID. Therapy is difficult as antivirus medications do not have much activity against Norovirus. There are reports of some people responding to therapies such as oral immune globulin or antibiotics with some activity.

If an infection causing the malabsorption is excluded, then upper or lower endoscopy with biopsies performed by a gastroenterologist can determine if there is inflammatory bowel disease. In this setting, immune-suppressant medications may need to be given. In CGD, for instance, prednisone and medications such as 6-mercaptopurine (6-MP) may help to reduce the diarrhea. Because these medications weaken the immune system in individuals with already weak immune systems, it is important that a multidisciplinary team is involved, including immunology or infectious diseases, gastroenterology and nutrition specialists.

If Malabsorption is Prolonged, Individuals May Require Supplemental Vitamins, Especially The Fat-Soluble Vitamins A, D, E and K.

A Multidisciplinary Approach

GI disease and malabsorption are common in PIs and can be caused by disordered inflammation such as autoimmunity or by chronic infection. A multidisciplinary approach with treatment of the underlying causes of the inflammation or infection, along with dietary measures and vitamin/nutrient supplementation, can improve general health, as well as growth and development in children.

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Sources

Authors’ Note
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PROFILE: Emily and Amanda Gale

By Trudie Mitschang

TWIN SISTERS Emily and Amanda Gale were both diagnosed with primary immunodeficiency disease (PI) at age 15. But their diagnoses have not stopped these busy college seniors from pursuing the activities they love, including pole vaulting, deep-sea fishing and running two successful businesses. These inspirational young adults refuse to let chronic illness define who they are or limit what they plan to achieve.

Trudie: Tell us how your individual diagnoses came about.

Emily: During the summer before my sophomore year of high school, my cardiologist found an atrial septal defect (ASD) that required surgery. I had a device placed in my heart that covered the 8-by-11 mm hole, and four days later, I had a reaction. I began to deal with incapacitating migraines, as well as numbness and tingling throughout my body. I would lose complete feeling of limbs and start to see auras. My sister had already been diagnosed with common variable immune deficiency (CVID), which led us to realize that I, too, needed to be tested. After blood work, I was diagnosed with hypogammaglobulinemia.

Amanda: In high school, my cheerleading coach noticed my sister and I both got sick more often than the rest of the girls on the team. Our mom took both of us to our pediatrician to explain the situation, and he decided to do some blood work. My IgG and IgA levels were very low, so we started to see an immunologist. A few months later, I was diagnosed with CVID.

Trudie: What is your treatment plan?

Emily: In high school, I was treated a couple of times with subcutaneous immune globulin (SCIG), but I experienced bad side effects. After discussing it with my doctor, it was decided to do treatments only when necessary rather than weekly. I now get blood work monthly to make sure my IgG levels do not drop too much or too quickly.

Amanda: I was originally treated monthly with intravenous immune globulin, but I struggled with severe side effects. I soon switched to 3 grams of SCIG weekly while I was in high school, and I am now treated with 6 grams a week. The higher dose helps keep my energy levels up. I currently handle all of my infusion needs, from ordering my medications and supplies, to poking myself with the needles. I schedule my own doctor appointments, take care of my in-home treatments and travel with my medications during track season.

Trudie: You are both athletes. How has PI impacted your activity levels?

Emily: It is a true challenge when the one thing that becomes your release from reality also reminds you of the realities of your disease. I had to gauge my energy levels to know when it was time to stop in order to compete in an upcoming meet. Along with this, I had to learn to be honest with myself and my coaches. It became imperative that I communicate and listen to signs of weakness coming on.

Amanda: Early in my diagnosis, I struggled with chronic fatigue, and I still do. I went from being an active girl, running around and pole vaulting, to being barely able to walk up a flight of stairs. I needed an elevator pass at school and could barely practice. We were very fortunate to have such a patient coach. Over time, infusions helped me regain my strength. My practices have gotten better, but I still have to be very careful not to overexert or deplete my energy.

Trudie: What has been the most difficult part of this journey?

Emily: The most difficult part of this journey was the first year following my...
diagnosis. During that time, I was dealing with side effects from the ASD repair device, as well as weakness from my immune system. I was prescribed anti-seizure medication to keep the ASD repair side effects at bay. I overcame this rough year by focusing on what I enjoyed most: pole vaulting. In three short months, my high school coach helped me improve my personal best by three feet, earning me a spot at the state meet.

**Amanda:** To go from pole vaulting 12 feet in the air and then not being able to walk up a flight of stairs was very difficult. Infusions helped with my fatigue. I had to learn how to balance my energy expenditure. The only time I was able to have a successful track meet was to avoid stairs that day, keep warm-up jumps to a minimum and do as little as possible to save myself for competitions. Gatorade was very helpful as well; I always felt sugar gave me energy.

**Trudie:** Where do you get your drive and ambition?

**Emily:** My parents taught me that you reap what you sow. With this, I have always found that I had high expectations for myself. I believe that my ambition comes from my desire to be successful. I don’t want to look back at a time in my life and wonder if I could have achieved something if I had worked harder.

**Amanda:** Both our parents have always been hard workers and modeled that for us. Being high achievers has always come natural to us.

**Trudie:** How do you maintain a positive attitude?

**Emily:** Having supportive parents is such a huge help in my life. I know I can always get emotional and physical help when I need it. Having a twin who goes through the same challenges that I do is truly a blessing.

**Amanda:** Some of the best things I can do for myself is normalize my illness. By being open and honest with myself and talking about it, it becomes normal and natural. Journaling my anxieties and fears has always been helpful. Then, I can go back in a few weeks and realize I never had to worry.

**Trudie:** What advice would you offer a young person with a chronic illness diagnosis?

**Emily:** I would want them to know that their disease does not define who they are. I wish I could say it gets better; however, that’s not always the case. In some ways, it does get easier as you learn to manage it; yet, the disease itself can be taxing and exhausting. I would tell them to talk about it as much as they can. I found that doing so normalized the situation and allowed me to grasp that I am not broken. And, of course, I would say to make plans and hope for new adventures, but always carry a big eraser. Having this mindset allows me to move forward when the day doesn’t go as I had hoped.

**Amanda:** I would tell them to never give up. With hard work and diligence, their goals can be accomplished. Be honest with yourself, know your physical limitations and work through it.

**Trudie:** Tell us about your entrepreneurial pursuits.

**Emily:** In high school, we ran a cupcake business called Twin Bakers. It was very successful. We baked for homecomings, birthday parties and events.

**Amanda:** We currently have a new business, In Salt We Trust, selling women’s and kids’ SPF performance clothing to anglers and saltwater enthusiasts. We both have a passion for boating, fishing, scuba diving, lobstering and being out on the water. After graduating, we plan to pursue an MBA or go to law school, and we feel starting our own business can help prepare us for our futures. We are creating a zebra fish shirt, from which our profits will be donated to the Immune Deficiency Foundation.

**Trudie:** What has being diagnosed with PI taught you about yourself?

**Emily:** My mom calls my sister and me type-triple-A personalities because we love for things to be orderly, planned and perfectly placed. But, being diagnosed with PI has taught me how to take a step back and realize that I cannot control my surroundings.

**Amanda:** I have learned how to prepare for the unexpected and be ready for whatever may come my way. I need to know my limitations and remember to always put my health first. PI does not define me, but it is a part of me.

**TRUDIE MITSCHANG** is a contributing writer for IG Living magazine.
PATIENT PERSPECTIVE

Maybe It’s as Simple as a Cat in the Hat, How Nice Would Be That?

By Stacy Oliver

It really does get complicated this autoimmune stuff, IG infusions alone are enough to make anyone grumpy and huff. I’m tired of the appointments, all the meds and being poked, I wish it were funny, but I don’t get the joke. Sometimes I’m so tired I can’t keep my eyes open, And I trip and fall over seemingly nothing. Just when I think I’ve hit an emotional wall, A tiny voice inside of me says, “No you haven’t, not at all.”

Get comfy on the couch, grab a lemonade and a snack, Get it together, there’s a whole world for you to attack. Stop trying to make it so hard and so blucky, There’s a bigger picture and the view isn’t so yucky. When you fall down there’s nowhere to go but up! Your glass is half full, drink from your cup.

Do the projects you’ve put off for another day, Now is the time to let your creativity flow away. Paint that picture, teach that class, Cook that recipe, don’t be afraid to break out from the pack. Wear the big purple hat you always thought was pretty, But thought other people would think was silly. I’ll let you in on a secret: Nobody really cares. So be the person you want with all your glorious flair.

No one is like you, so special, unique. Be a voice, a part of the change you seek. You have a chance to change lives, You can open other people’s eyes.

But, most importantly, try to be kind, Not just to others, but yourself is whom I have in mind. We are so hard on ourselves, give yourself a break, Treat yourself as well as you’d treat others, you deserve to feel great. Yes, you’re tired, then rest as much as you need, Life doesn’t run at just one speed. Everyone trips, even Olympic runners fall down, So you get a hitch in your giddy-up, don’t let that give you a frown.

If you’re reading this magazine, you’ve found a place of understanding, People here are like you and know taking IG is demanding. I wish diagnoses could be written by Dr. Seuss, Simple, silly and not so obtuse. The diseases alone are tough enough, If a “Cat in a Hat” described them, seems they wouldn’t seem so tough.

Live life to the fullest you can. My wish for you all, With as little pain as possible, And without any falls. But when there is a little glitch, My hope is that a fit you won’t pitch. You’ll start to giggle and soon others will too, The huge problem will diminish right in front of you. We can only hope somewhere there is really a cat in a hat, And take some comfort in that.

STACY OLIVER was diagnosed in 2008 with multifocal motor neuropathy (MMN). She is the assistant director of the Center for the Writing Arts at Northwestern University, and she is working on her supersecret identity as Neuropathy Girl, who will one day save the world after her infusion and a nap.
Alternative Therapies

By Ilana Jacqueline

IN THE PAST, I’ve tried multiple treatments for my migraines. I’ve taken major painkillers, over-the-counter migraine medications and even had Botox injected into my face, head and neck. But before the botulism, there was craniosacral therapy.

Nobody wants to be on expensive, side-effect-inducing and body-poisoning prescriptions. In fact, chronic illness patients will usually try anything and everything to avoid them. But, we are also the most vulnerable group to snake oil salesmen. These fast-talking, pyramid-scheming con artists use fake science, meaningless research (usually conducted by paid “scientists” of their own choosing) and claim to be able to produce incredible results such as “cure cancer” or “treat all diseases.” Sound too good to be true? Good thinking. It is.

For me, holistic medicine has been kind of a roulette wheel. I grew up in a household in which holistic medicine was the first line of defense. And, boy, can I tell you that having an undiagnosed immune deficiency and trying to beat an infection with acupuncture alone can make you really, really critical of the entire concept of holistic care. Especially when you’re surrounded by people who seem to respond well to holistic care and holistic care alone.

There is an increasingly popular cultural movement away from Western medicine and toward treatments that focus on preventive care and anti-medication treatments. Holistic care is a wide and varied field that includes treatments such as acupuncture, aromatherapy, Bach flower therapy, biofeedback, chelation therapy, craniosacral therapy, colon hydrotherapy, dietary supplements, homeopathy, hypnotherapy, massage therapy, meditation, naturopathic medicine, reflexology, Reiki and trigger point therapy — just to name a few.

For me, hands-on alternative treatments like this, as well as massage therapy and chiropractic care, are what work for me. It takes some digging and some experimenting to see if these treatments are beneficial. But, since many of these treatments are noninvasive, there appears to be a greater sense of reward than risk. Of course, there is also a greater risk of just making a total fool of yourself, too. Is chanting and chewing basil leaves under a full moon really a cure for asthma?

So, how can you tell if an alternative therapy is right for you? Do your research. Start by looking up the description online, ask other patients about their experiences and then directly ask the practitioners if they’ve treated patients with your condition. At the end of the day, the best way to know if a treatment will work for you, ironically, works just as it would with Western medicine: by trial and error.

Don’t let others discourage your exploration, and listen to your body’s response: Don’t keep trying to find a positive response in a treatment that just isn’t providing one.

ILANA JACQUELINE is a 26-year-old dysautonomia and primary immune deficiency disease patient from South Florida. She’s been writing professionally since 2004 on everything from health and wellness to celebrities and beauty. Her blog www.letsfeelbetter.com is both a personal collection of anecdotes about life with chronic illness, as well as a resource for patients of all ages.
WHEN CHILDREN ARE sick, it’s expected that they are relieved from their chores and household duties until they get better. For instance, if a child has the flu, he or she certainly shouldn’t be forced to get out of bed to vacuum the carpet. After all, rest is needed to recover. The challenge, however, comes when children have a chronic illness — one that doesn’t go away after a few days. Parents can’t take away all responsibilities from their chronically ill children simply because they don’t feel well, especially if they don’t feel well much of the time.

But, it’s hard not to coddle chronically ill children, especially when they’re sick. When it comes to expectations and responsibility, it’s tempting for parents to want to cut our children a little slack. Maybe a lot of slack. After all, they already have so much to deal with. It’s not fair to ask them to take on the same amount of household duties as their healthy siblings, is it? Asking them to mow the lawn every week or take the garbage to the curb would be too much.

But if our goal in raising our children is to help them mature into responsible adults who are active in their communities and families, and become contributing members of society, we’re not doing them any favors by giving them a free pass when it comes to household responsibility.

Our tendency as parents may be to try to make life better, to take away the burden, because we feel it’s unfair that our children must face the additional challenge of chronic illness. Indeed, it’s very normal for parents or guardians to want to make things “fair” by lessening the load for their chronically ill children (and possibly heaping extra responsibility onto the healthy siblings). But, although it’s tempting to let these kids off the hook when it comes to chores and responsibilities, they need to be treated like anyone else if they’re going to grow into mature, well-rounded adults who are equipped to handle the challenges that life brings. So the question is: As a community of parents with chronically ill kids, how do we make sure we don’t “spoil” them because of their medical condition?

Assign Responsibilities Early On

Everyone faces challenges in life. Unfortunately for chronically ill children, their challenges start early in life, often at birth. Because of this, parents of these children must work extra hard to avoid instilling the mindset in their kids that their illness makes them exempt from contributing to the family.

All kids, regardless of their health status, should begin a routine of involvement in household chores and duties. This helps them feel like active and helpful family members, and also teaches life skills and instills a sense of accomplishment. From a young age, kids can begin simple tasks like dressing themselves, making their beds, cleaning up messes and putting their toys away. As they grow, responsibilities can be added such as washing dishes, feeding and caring for pets, cooking and doing laundry. Of course, during times of extreme fatigue or when a child’s symptoms are at their worst, these responsibilities can be lightened or handed over to a sibling or parent for the day.
Use Treatment Time as a Teaching Tool

Weekly or monthly immune globulin infusions can seem like a burden at times, especially to children, but as the main treatment for primary immunodeficiency disease (PI), they’re not going away. Since this necessary, time-consuming therapy is a regular part of life for PI kids, parents might as well use it as a teaching tool.

Including kids in the planning of their infusions can help them build a structured healthcare routine they’ll carry into adulthood. At the beginning of each month, ask them to look at the weekly calendar with you. Look at what activities are planned, and ask them when they could squeeze in time for an infusion, and which activities they might have to skip or reschedule to make that happen. When kids are involved in these decisions, they get a chance to practice life skills such as time management and setting priorities, all while improving self-discipline.

Teach Kids to “Pay It Forward”

From the time of their diagnosis, chronically ill children receive a lot of help from a lot of people. Sometimes, with all of the attention focused on them by doctors and family members, these kids may get the idea that the world revolves around them. Parents should point out to their children that their well-being depends upon a group of people working together in a tight-knit support circle.

In order to combat too much self-focus from early on, parents should instill in their children the value of helping others, just as they have been helped by those in their support network. To do this, help children choose a cause that means something to them. For example, if a little boy is fascinated by firemen, he and his parents could bake cookies together and bring them to the local fire station.2 If a teenage girl loves animals, she could volunteer at the animal shelter or offer to walk a neighbor’s dog. For a boy who dreams of being in the Army or Marines when he grows up, parents can help him put together a care package to send a soldier overseas.2

Encourage children to go through their old toys or clothes to find things they don’t use anymore and donate them to the needy. Pay a visit to the local care facility for the elderly, or stop by the homeless shelter or soup kitchen and volunteer for an evening. Spending time around those less fortunate is a concrete way to teach kids that everyone has challenges, and that they come in many forms.

These are just a few examples of ways to pay it forward, but the possibilities are endless. Find out what interests your children, and be creative!

Walking a Fine Line

Parents raising chronically ill children can feel like they’re walking a fine line between giving their children adequate care and attention, and not coddling them too much. As much as we’d like to relieve them of their burden so they can just be kids, it’s not possible. The focus of our parenting efforts should be on training our kids to manage their responsibilities (both in their daily lives and in their healthcare) to their full capability, which may change from time to time, depending on the state of their health. By keeping this ultimate goal in mind and instilling a sense of personal responsibility in children from early on, they should develop into mature individuals who are ready to take control of their health.

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References

Our tendency as parents may be to try to make life better, to take away the burden, because we feel it’s unfair that our children must face the additional challenge of chronic illness.
“HAVE YOU TRIED vitamin supplements?” It’s a common and universally annoying suggestion made to primary immunodeficiency (PI) patients by any number of well-meaning friends and family members. While the advice is overly simplistic and certainly not a “cure,” the fact is, some nutritional supplements may be helpful when it comes to dealing with disease symptoms and medication side effects. Which ones to choose and how much to take are where recommendations vary. For PI patients considering a nutritional supplement regimen, it’s advisable to consult with their physicians and/or pharmacists first to discuss any possible drug interactions and concerns. For those deciding to peruse the vitamin aisle, here’s a list of some of the most common go-to supplements linked to immune support:

• Vitamin C is known as an antioxidant and is commonly used for preventing and treating colds and cold symptoms. Vitamin C is also thought to increase the production of white blood cells. Because the body doesn’t produce or store it, daily intake of vitamin C is essential, and supplements are available in chewable, capsule and liquid form.

• Zinc plays an important role in the health of the immune system, specifically related to proper functioning of T cells. Zinc supplements are widely used to treat colds, prevent respiratory infections, boost the immune system and treat certain skin conditions.

• Ginger root is best known as a remedy for stomach upset and nausea. It can also be used to relieve joint and muscle pain, as well as some symptoms of rheumatoid arthritis.

• Garlic enjoys a long history of use for boosting the immune system, fighting infections and preventing illness. Some studies support the ability of garlic to suppress certain bacteria, viruses and fungi, including yeast infections and candida.

• Probiotics are beneficial bacteria cultures that establish a stronghold in the large intestine and benefit health by crowding out harmful bacteria, boosting immune function in the intestine and possibly strengthening the body’s immune system. Long-term use of antibiotics can upset the natural balance in the intestine, and probiotics can help repopulate good bacteria.

• Fish oil is rich in omega-3 fatty acids and offers wide-ranging health benefits, including lowered blood pressure and decreased risk of heart attack and stroke. Research shows that omega-3 fatty acids reduce inflammation and may help lower the risk of chronic illness such as heart disease, cancer and arthritis. Omega-3 fatty acids are highly concentrated in the brain and appear to be important for cognitive and behavioral function, too.

Should PI patients take supplements? The answer seems to depend upon whom you ask. On the con side, nutritional supplements are not monitored or regulated by the U.S. Food and Drug Administration, which means that the dose of the active compounds may be inaccurate or sometimes unknown. It also means that they may contain other substances not listed on the label, which could be harmful to individuals with a compromised immune system. On the plus side, many supplements do have ample research supporting the anecdotal evidence of their benefits, and many patients living with chronic illness successfully use vitamins and supplements on a daily basis. The bottom line for those considering a new supplement regimen is to discuss their options with their physician first. It’s also a good idea to keep a health diary to track any positive or adverse reactions and report those findings to their doctor.

TRUDIE MITSCHANG is a contributing writer for *IG Living* magazine.
According to the GNC website, zinc is an essential mineral that is a component of more than 300 enzymes needed to repair wounds, maintain fertility in adults and growth in children, synthesize protein, help cells reproduce, preserve vision, boost immunity and protect against free radicals, among other functions. 100 capsules, $3.99; GNC.com

Emergen-C Immune +
This popular supplement is said to support the immune system with nutrients, including vitamins D and B, plus a proprietary complex with beta-glucans and arabinogalactans. It also contains electrolytes (potassium, sodium, calcium, magnesium, phosphorus and key antioxidants), vitamin C, zinc and manganese. $11.99; Available at local drugstores and at drugstore.com

GNC Zinc 30 MG
According to the GNC website, zinc is an essential mineral that is a component of more than 300 enzymes needed to repair wounds, maintain fertility in adults and growth in children, synthesize protein, help cells reproduce, preserve vision, boost immunity and protect against free radicals, among other functions. 100 capsules, $3.99; GNC.com

Puritan’s Pride Ginger Relief Ginger Root
According to the product label, the active constituents in ginger promote digestive health. Ginger is also good for alleviating occasional motion sickness. 100 capsules, $4.49; Puritan.com

Sundown Naturals Odorless Garlic
Sundown Naturals Odorless Garlic provides the goodness of pure garlic oil, minus the unpleasant aftertaste. The 1,000 mg softgels undergo a specialized cold processing method that preserves the naturalness of garlic while reducing the odor. 100 softgels, $5.99; Walgreens.com

Vitamins and Supplements

Prescript-Assist Broad Spectrum Probiotic Prebiotic Complex
Unlike fragile probiotics that require refrigeration, Prescript-Assist is a proprietary formulation of 29 naturally resilient strains that support the body’s natural intestinal balance. It claims to be clinically proven to enhance gastrointestinal health and promote a healthy balance of good bacteria in the gut. 90 capsules, $69; Amazon.com

Nordic Naturals Omega-3
This supplement contains purified deep sea fish oil from anchovies and sardines. 1,000 mg capsules also contain lemon flavoring to mask any fish aftertaste. $12.99; vitaminshoppe.com
**BOOK CORNER**

**Chasing Normal: From Marathons to Invisible Illness**

Author: Elena Schwartz  
Publisher: Palmetto Publishing Group

This powerful and enlightening book takes readers on the journey of a perfectionist marathon runner who develops a chronic illness, dysautonomia, that will change her life forever. It is written by the patient herself, who gives an inside look at how chronic illness turns the lives of successful, young adults upside down. Specifically, it shows how hard-working individuals are broken by chronic illness; the adversity people face when they have an illness yet look healthy; how little awareness of invisible disabilities like dysautonomia cause patients problems in everyday life; the problems with conventional treatment of chronic conditions; how invisible illness often causes mental illness, including anxiety and depression; the positives that can come out of invisible illness; and how others can help people with chronic illness without changing their everyday life.

**Hope Beyond Illness: A Guide to Living Well with a Chronic Condition**

Author: Shulamit Lando  
Publisher: Amazon Digital Services

In this memoir, Shulamit Lando recounts her experience with multiple sclerosis. She describes how she refused to let conventional medicine dictate its depressing message to her and how she used her body and her mind as a healing laboratory to combat the illness. After every chapter, she provides tips to give readers the most effective tools from different therapeutic approaches. The book is intended, through her guidance and experience, to help readers learn ways to deal with overwhelming feelings and be able to allow calm and healing into their lives.

**You Are Stronger Than You Know: Words of Hope and Encouragement for Someone Living with Chronic Illness**

Author: A Blue Mountain Arts Collection  
Publisher: Blue Mountain Arts

Filled with words of comfort and compassion, this book encourages those with chronic illness to see today and every day as a victory, a blessing and an opportunity for gratitude, peace and acceptance. It is written to inspire readers to let go of what they can’t control and do the best they can with what they have here and now. And, it serves as a reminder that individuals with chronic illness are still capable of great things.

**Young, Sick, and Invisible: A Skeptic’s Journey with Chronic Illness**

Author: Ania Bula  
Publisher: Pitchstone Publishing

Drawing on her own deeply personal experiences, Ania Bula explores what it is like to live with unseen chronic disabilities. She paints a picture of what it is like to be diagnosed with two lifelong debilitating conditions as a young adult and relates the challenges and frustrations of dealing with predatory alternative medicine practitioners, arrogant doctors, indifferent bureaucracies and well-meaning friends and family who always seem to say either the wrong thing or nothing at all. As she discovered, suddenly everyone’s aunt is a health expert and everyone’s fad diet is a cure.

With honesty and humor, she shares her journey of pain, suffering and, ultimately, coping, both to help others gain some understanding about what it is like to live with chronic illness — and to help those who might similarly suffer feel less alone so that they, too, might start living again.

**new and useful reading**
For a more comprehensive list of resources, visit the Resources page at [IGLiving.com](http://www.IGLiving.com).

### Ataxia Telangiectasia (A-T)
- **WEBSITES**
  - A-T Children’s Project: [www.atcp.org](http://www.atcp.org)

### Chronic Inflammatory Demyelinating Polyneuropathy (CIDP)
- **WEBSITES**
  - GBS/CIDP Foundation International: [www.gbs-cidp.org](http://www.gbs-cidp.org)
  - The Foundation for Peripheral Neuropathy: [www.foundationforpn.com](http://www.foundationforpn.com)

### Evans Syndrome
- **ONLINE PEER SUPPORT**
  - Evans Syndrome Research and Support Group: [www.evanssyndrome.org](http://www.evanssyndrome.org)

### Guillain-Barré Syndrome (GBS)
- **WEBSITES**
  - GBS/CIDP Foundation International: [www.gbs-cidp.org](http://www.gbs-cidp.org)
  - The Foundation for Peripheral Neuropathy: [www.foundationforpn.com](http://www.foundationforpn.com)
  - GBS/CIDP Foundation International Discussion Forums: [forum.gbs-cidp.org/forum/main-forum](http://forum.gbs-cidp.org/forum/main-forum)

### Idiopathic Thrombocytopenic Purpura (ITP)
- **WEBSITES**
  - ITP Support Association – UK: [www.itpsupport.org.uk](http://www.itpsupport.org.uk)
  - Platelet Disorder Support Association: [www.pdsa.org](http://www.pdsa.org)

### Kawasaki Disease
- **WEBSITES**
  - American Heart Association: [www.heart.org/HEARTORG/Conditions/More/CardiovascularConditions/Childhood/Kawasaki-Disease_UCM_308777_Article.jsp#T1T2boePWE0](http://www.heart.org/HEARTORG/Conditions/More/CardiovascularConditions/Childhood/Kawasaki-Disease_UCM_308777_Article.jsp#T1T2boePWE0)
  - Kawasaki Disease Foundation: [www.kdfoundation.org](http://www.kdfoundation.org)
  - KidsHealth: [kidshealth.org/parent/medical/heart/kawasaki.html](http://kidshealth.org/parent/medical/heart/kawasaki.html)

### Mitochondrial Disease
- **WEBSITES**
  - United Mitochondrial Disease Foundation: [www.umdf.org](http://www.umdf.org)
  - MitoAction: [www.mitoaction.org](http://www.mitoaction.org)

### Multifocal Motor Neuropathy (MMN)
- **WEBSITES**
  - The Foundation for Peripheral Neuropathy: [www.foundationforpn.com](http://www.foundationforpn.com)

### Multiple Sclerosis (MS)
- **WEBSITES**
  - All About Multiple Sclerosis: [www.mult-sclerosis.org/index.html](http://www.mult-sclerosis.org/index.html)
  - Multiple Sclerosis Association of America: [www.msaa.org](http://www.msaa.org)
  - Multiple Sclerosis Foundation: [www.msfocus.org](http://www.msfocus.org)
  - National Multiple Sclerosis Society: [www.nationalmsociety.org](http://www.nationalmsociety.org)
  - ONLINE PEER SUPPORT
    - Friends with MS: [www.FriendsWithMS.com](http://www.FriendsWithMS.com)
    - MSWorld’s Chat and Message Board: [www.msworld.org](http://www.msworld.org)

### Myasthenia Gravis (MG)
- **WEBSITES AND CHAT ROOMS**
  - Myasthenia Gravis Foundation of America (MGFA): [www.myasthenia.org](http://www.myasthenia.org)
  - ONLINE PEER SUPPORT
    - Genetic Alliance: [www.geneticalliance.org](http://www.geneticalliance.org)

### Myositis
- **WEBSITES**
  - Myositis Association Community Forum: [www.myositis.org.uk](http://www.myositis.org.uk)
  - Myositis Support Group – UK: [www.myositis.org.uk](http://www.myositis.org.uk)

### Peripheral Neuropathy (PN)
- **WEBSITES**
  - Neuropathy Action Foundation: [www.neuropathyaction.org](http://www.neuropathyaction.org)
  - Western Neuropathy Association: [www.prhelp.org](http://www.prhelp.org)
  - Texas Chapter of the Neuropathy Association: [www.handsfeetheart.org](http://www.handsfeetheart.org)
  - The Foundation for Peripheral Neuropathy: [www.foundationforpn.com](http://www.foundationforpn.com)

### Primary Immune Deficiency Disease (PI)
- **WEBSITES**
  - Immune Deficiency Foundation: [www.primaryimmune.org](http://www.primaryimmune.org)
  - Jeffrey Modell Foundation: [www.info4pi.org](http://www.info4pi.org)
  - The National Institute of Child Health and Human Development (NICHD): [www.nichd.nih.gov/Pages/index.aspx](http://www.nichd.nih.gov/Pages/index.aspx)
  - American Academy of Allergy, Asthma & Immunology: [www.aaaai.org](http://www.aaaai.org)
  - International Patient Organisation for Primary Immunodeficiencies (IPPO) — UK: [www.ipopi.org](http://www.ipopi.org)
  - New England Primary Immunodeficiency Network: [www.neipin.org](http://www.neipin.org)
  - Rainbow Allergy-Immunology: [www.uhospitals.org/rainbow/services/allergy-immunology](http://www.uhospitals.org/rainbow/services/allergy-immunology)
  - ONLINE PEER SUPPORT
    - IDF Common Ground: [www.idfcommonground.org](http://www.idfcommonground.org)
    - IDF Discussion Forum: [idffriends.org/forum](http://idffriends.org/forum)
    - IDF Friends: [idffriends.org](http://idffriends.org)
    - Jeffrey Modell Foundation Facebook Page: [www.facebook.com/IMFworld](http://www.facebook.com/IMFworld)
    - Michigan Immunodeficiency Foundation: [www.facebook.com/groups/108048062584350](http://www.facebook.com/groups/108048062584350)

### Pemphigus and Pemphigoid
- **WEBSITES**
  - The International Pemphigus and Pemphigoid Foundation: [www.pemphigus.org](http://www.pemphigus.org)

### Scleroderma
- **WEBSITES**
  - Scleroderma Foundation: [www.scleroderma.org](http://www.scleroderma.org)
  - Scleroderma Research Foundation: [www.srfcure.org](http://www.srfcure.org)
  - Johns Hopkins Scleroderma Center: [www.hopkinsscleroderma.org](http://www.hopkinsscleroderma.org)
  - ONLINE PEER SUPPORT
    - Scleroderma Support Group: [www.sclero.org/support/forums/a-to-z.html](http://www.sclero.org/support/forums/a-to-z.html)

### Stiff Person Syndrome (SPS)
- **WEBSITES**
  - American Autoimmune Related Diseases Association Inc.: [www.aarda.org](http://www.aarda.org)
  - Genetic Alliance: [www.geneticalliance.org](http://www.geneticalliance.org)
  - Living with Stiff Person Syndrome (personal account): [www.livingwithsp.com](http://www.livingwithsp.com)
  - Stiff Person Syndrome: [www.stiffpersonsyndrome.net](http://www.stiffpersonsyndrome.net)

### Pediatric Autoimmune Neuropsychiatric Disorder Associated with Streptococcus (PANDAS)
- **WEBSITES**
  - P.A.N.D.A.S. Network: [pandasnetwork.org](http://pandasnetwork.org)

### Stiff Person Syndrome (SPS)
- **WEBSITES**
  -彩虹过敏-免疫学:/www.uhospitals.org/rainbow/services/allergy-immunology
  - ONLINE PEER SUPPORT
    - IDF Common Ground: [www.idfcommonground.org](http://www.idfcommonground.org)
    - IDF Discussion Forum: [idffriends.org/forum](http://idffriends.org/forum)
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    - IDF Discussion Forum: [idffriends.org/forum](http://idffriends.org/forum)
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