

Intravenous Immune Globulins (Asceniv, Bivigam, Flebogamma DIF, Gammagard Liquid, Gammagard S/D, Gammaked, Gammaplex, Gamunex-C, Octagam, Panzyga, Privigen)



When requesting Intravenous Immune Globulins (Asceniv, Bivigam, Flebogamma DIF, Gammagard Liquid, Gammagard S/D, Gammaked, Gammaplex, Gamunex-C, Octagam, Panzyga, Privigen), the individual requiring treatment must be diagnosed with an FDA-approved indication or an approved off-label compendial use and meet the specific coverage guidelines and applicable safety criteria for the covered indication.

FDA-approved Indications

Intravenous Immune globulin (IVIG) injection is indicated for the treatment of:

- Primary humoral immunodeficiency including but not limited to: congenital agammaglobulinemia, common variable immunodeficiency, x-linked agammaglobulinemia, Wiskott-Aldrich syndrome, and severe combined immunodeficiencies
- Idiopathic thrombocytopenia purpura (ITP) to raise platelet counts to prevent bleeding or to allow a patient with ITP to undergo surgery
- Chronic inflammatory demyelinating polyneuropathy (CIDP) to improve neuromuscular disability and impairment and for maintenance therapy to prevent relapse
- Multifocal motor neuropathy (MMN) to improve muscle strength and disability
- Prevention of bacterial infections in hypogammaglobulinemia and/or recurrent bacterial infections associated with B-cell chronic lymphocytic leukemia
- Prevention of coronary artery aneurysms associated with Kawasaki syndrome
- Dermatomyositis or polymyositis

Approved Off-label Compendial Uses

- Secondary humoral immunodeficiency
- Antibody-mediated rejection in solid organ transplant
- Autoimmune mucocutaneous blistering disease
- Cytomegalovirus (CMV) interstitial pneumonia
- Guillain-Barre syndrome
- Human immunodeficiency virus (HIV) associated thrombocytopenia
- Hepatitis C associated thrombocytopenia
- Treatment or post-exposure prophylaxis for tetanus
- Myasthenia gravis
- Lambert-Eaton myasthenic syndrome
- Multiple sclerosis
- Stiff-person syndrome
- Multiple myeloma

- Pure red blood cell aplasia (PRCA)
- Post-exposure prophylaxis of measles
- Post-exposure prophylaxis of varicella
- Feto-neonatal alloimmune thrombocytopenia
- For desensitization therapy prior to and immediately after solid organ transplantation
- Immunotherapy-related toxicities associated with checkpoint inhibitor therapy

Coverage Guidelines

Primary humoral immunodeficiency (PID)

Must have one of the following PID subtypes:

- Common variable immunodeficiency (CVID)
- X-linked agammaglobulinemia
- Congenital agammaglobulinemia
- Other agammaglobulinemia due to the absence of B-cells
- Severe combined immunodeficiency (SCID)
- Wiskott-Aldrich syndrome
- Hyper-Immunoglobulin M (IgM) syndromes
- IgG level lower than 250 mg/dL
- Ataxia telangiectasia
- DiGeorge syndrome
- Other combined immunodeficiencies with significant hypogammaglobulinemia
- Unspecified hypogammaglobulinemia
- IgG subclass deficiency
- Selective antibody deficiency (SAD)
- Other primary immune deficiency confirmed by genetic or molecular testing

For an initial authorization request:

- The requested product is prescribed by or in consultation with one of the following physician specialists: allergist, immunologist, otolaryngologist (ear, nose, and throat [ENT] physician), pulmonologist, or an infectious disease physician who treats patients with PID; AND
- For CVID, unspecified hypogammaglobulinemia, or other combined immunodeficiencies with significant hypogammaglobulinemia indication:
 - o The patient's pretreatment IgG level is below the normal range (age-related and according to the normal reference range for the reporting laboratory); AND
 - o The patient has an impaired antibody response (i.e., failure to produce antibodies to specific antigen); OR
 - o The patient has recurrent infections; OR
- For IgG subclass deficiency, selective antibody deficiency (SAD), or another confirmed primary immunodeficiency:
 - o The patient has an impaired antibody response (i.e., failure to produce antibodies to specific antigen); AND
 - o The patient has recurrent infections.

NOTE: An exception can be made for the impaired antibody response if, according to the prescriber, the delay caused by pre-vaccination and post-vaccination antibody measurement would be deleterious to the patient's health.

For re-authorization request:

- The patient has been diagnosed with a primary immunodeficiency and is continuing to receive benefit from the product (e.g., increased IgG levels, preventing or controlling infections).

Approval duration (initial and renewal): 12 months

Secondary humoral immunodeficiency:

Must have one of the following diseases/conditions:

- B-cell chronic lymphocytic leukemia
- Hematologic neoplasm-associated hypogammaglobulinemia
- Hypogammaglobulinemia after B-cell targeted therapies
- Post hematopoietic stem cell transplantation
- Human immunodeficiency virus (HIV) infection in pediatrics

For B-cell chronic lymphocytic leukemia

For an initial authorization request:

- The patient has an immunoglobulin G (IgG) level less than 600 mg/dL OR has a history of recurrent infections; AND
- The requested product is prescribed by or in consultation with an oncologist, hematologist, or infectious disease physician.

For a re-authorization request:

- The patient is experiencing a positive response to therapy (e.g., maintaining an increased IgG trough level or a decrease in the number of infections).

Approval duration (initial): 4 months

Approval duration (renewal): 12 months

For hematologic neoplasm-associated hypogammaglobulinemia or hypogammaglobulinemia after B-cell targeted therapies

NOTE: Examples of B-cell targeted therapy are chimeric antigen receptor (CAR) T cell therapy (e.g., Kymriah [tisagenlecleucel injection], Abecma [idecabtagene vicleucel injection], Breyanzi [lisocabtagene maraleucel injection], Tecartus [brexucabtagene autoleucel injection], Yescarta [axicabtagene ciloleucel injection]), a rituximab product, and Besponsa (inotuzumab ozogamicin injection).

For an initial authorization request:

- Has an immunoglobulin G (IgG) level less than 600 mg/dL; AND
- Has recurrent or severe infections or has high risk of infection; AND
- The requested product is prescribed by or in consultation with an oncologist, hematologist, infectious disease physician, or immunologist.

For a re-authorization request:

- The patient is experiencing a positive response to therapy (e.g., maintaining an increased IgG trough level or a decrease in the number of infections).

Approval duration (initial and renewal): 6 months

For post hematopoietic stem cell transplantation (HCT)

For an initial authorization request

- Has had a HCT within the previous year; AND
- Has an immunoglobulin G (IgG) level less than 600 mg/dL OR has multiple myeloma or malignant macroglobulinemia; AND
- Has a significant risk of having frequent and/or severe infections; AND
- The requested product is prescribed by or in consultation with a hematologist, oncologist, or infectious disease physician.

For a re-authorization request:

- The patient is experiencing a positive response to therapy (e.g., maintaining an increased IgG trough level, controlling the number of infections, or a decrease in the number of infections).

Approval duration (initial): 3 months**Approval duration (renewal): 6 months**

HIV-Infection in pediatrics

For an initial authorization request:

- Has hypogammaglobulinemia (i.e., IgG less than 400 mg/dL); OR
- Functional antibody deficiency is demonstrated by poor specific antibody titers (i.e., does not develop specific antibody response against protein and polysaccharide antigens); OR
- Functional antibody deficiency is demonstrated by the patient having recurrent (2 or more per year) serious infections (e.g., bacteremia, meningitis, pneumonia) despite administration of combination antiretroviral therapy and appropriate antimicrobial prophylaxis; AND
- Is receiving combination antiretroviral therapy; AND
- Is less than 18 years of age; AND
- The requested product is prescribed by or in consultation with an infectious disease specialist or an immunologist.

For a re-authorization request:

- The frequency and/or severity of infections have decreased.

Approval duration (initial): 6 months**Approval duration (renewal): 12 months****Chronic inflammatory demyelinating polyneuropathy (CIDP)**

For an initial authorization request:

- The requested product is prescribed by or in consultation with a neurologist; AND
- Electrodiagnostic studies support the diagnosis of CIDP.

For a re-authorization request:

- Must have a clinically significant improvement in neurologic symptoms (e.g., improvement in disability, nerve conduction study results improved or stabilized, physical examination show improvement in neurological symptoms, strength, and sensation).

Approval duration (initial): 3 months
Approval duration (renewal): 12 months

Immune thrombocytopenia (ITP)

NOTE: The diagnosis of Immune thrombocytopenia (ITP) encompasses previous nomenclature, such as Idiopathic Thrombocytopenia, Idiopathic Thrombocytopenia Purpura, Immune Thrombocytopenic Purpura.

For an initial authorization request:

- The requested product is prescribed by or in consultation with a hematologist; AND
- The patient is pregnant; OR
- The requested product is being used to increase platelet count before surgical or dental procedures; OR
- The patient is less than 18 years of age; OR
- The patient is 18 years of age or older; AND
 - o Has tried a systemic corticosteroid (e.g., prednisone); OR
 - o Has an urgent need to increase the platelet count quickly; OR
 - o Has a contraindication to a systemic corticosteroid.

For a re-authorization request:

- The patient is responding to therapy (e.g., increased platelet counts, absence of significant bleeding, or preventing hemorrhage/ensuring adequate platelet count in order for delivery in pregnant patients).
- **Approval duration (pregnancy): 6 months**
- **Approval duration (prior to surgical or dental procedures): 1 month**
- **Approval duration (initial and renewal): 12 months**

Kawasaki disease

- The requested product is prescribed by or in consultation with a pediatric cardiologist or a pediatric infectious disease physician.

Approval duration: 3 months

Multifocal motor neuropathy (MMN)

For an initial authorization request:

- Diagnosis is supported by weakness without sensory abnormalities, upper motor neuron signs, or marked bulbar involvement and meets one of the following:
 - o Diagnosis is supported by nerve conduction studies that demonstrate motor conduction block or probable motor conduction block; OR
 - o Patient has multifocal motor neuropathy without conduction block; OR
 - o Diagnosis is supported by a motor nerve biopsy or by a magnetic resonance imaging (MRI) neurography; AND
- The requested product is prescribed by or in consultation with a neurologist.

For a re-authorization request:

- An individual has improvement in neurologic symptoms. (e.g., improvement in disability, grip strength improvement [measured with dynamometer], physical examination shows improvement in neurological symptoms and strength)

Approval duration (initial): 6 months
Approval duration (renewal): 12 months

Antibody-mediated rejection (ABMR) in transplantation

- The requested product is prescribed by or in consultation with a physician affiliated with a transplant center.

Approval duration: 12 months

Autoimmune mucocutaneous blistering diseases (pemphigus vulgaris, pemphigus foliaceus, bullous pemphigoid, mucous membrane pemphigoid, and epidermolysis bullosa acquisita)

For an initial authorization request:

- Has tried both a systemic corticosteroid and an immunosuppressive agent (e.g., azathioprine, cyclophosphamide, methotrexate, cyclosporine, mycophenolate, tacrolimus) unless contraindicated to both agents; OR
- Has rapid, debilitating, progressive disease that cannot be controlled with a systemic corticosteroid and an immunosuppressive agent; OR
- Has a serious disease that there is inadequate time for therapy with a systemic corticosteroid and an immunosuppressive agent to have a rapid enough effect; AND
- The requested product is prescribed by or in consultation with a dermatologist.

For a re-authorization request:

- An individual is responding to therapy (e.g., previous lesions are healing or there are fewer new lesions).

Approval duration (initial): 6 months
Approval duration (renewal): 12 months

Cytomegalovirus (CMV) interstitial pneumonia

- Has cancer or transplant-related infection; AND
- The requested product is prescribed by or in consultation with an oncologist, hematologist, or an infectious disease physician.

Approval duration: 2 months

Dermatomyositis or polymyositis

For an initial authorization request:

- Patient must meet one of the following criteria:
 - Has or had an elevated creatine kinase (CK) level; OR
 - Other measures support the diagnosis, including but not limited to, skin manifestations, autoantibody testing, muscle biopsy results, electromyographic (EMG) findings; AND
- Has tried a systemic corticosteroid unless contraindicated; AND
- Has tried an immunosuppressive agent (e.g., azathioprine, methotrexate, cyclosporine, cyclophosphamide, mycophenolate) unless contraindicated; AND
- The requested product is prescribed by or in consultation with a neurologist or a rheumatologist.

For a re-authorization request:

- An individual is responding to therapy (e.g., improved muscle strength, neuromuscular symptoms, or functional ability).

Approval duration (initial): 6 months

Approval duration (renewal): 12 months

For desensitization therapy prior to and immediately after solid organ transplantation

- The requested product is prescribed by or in consultation with physician affiliated with a transplant center.

Approval duration: 12 months

Guillain Barre Syndrome (GBS)

For an initial authorization request:

- The requested product will be initiated within 2 weeks and no longer than 4 weeks of onset of neuropathic symptoms (weakness, inability to stand or walk without assistance, respiratory or bulbar weakness) OR the patient has had a relapse but had an initial response to IVIG; AND
- The requested product is prescribed by or in consultation with a neurologist or a specialist with experience in diagnosing and treating patients with GBS.

For a re-authorization request:

- The request is for second course of therapy (has not received more than 2 courses of therapy); AND
- Has been at least 3 weeks after the first course.

Approval duration (initial and renewal): 1 month

Human Immunodeficiency Virus (HIV)- or Hepatitis C- Associated Thrombocytopenia

- Is receiving antiviral therapy; AND
- The requested product is prescribed by or in consultation with an infectious disease specialist, a physician who specializes in the treatment of HIV infection, a gastroenterologist, hepatologist, or a liver transplant physician.

Approval duration: 1 month

Lambert-Eaton Myasthenic Syndrome (LEMS)

For an initial authorization request:

- Has paraneoplastic LEMS; OR
- Has non-paraneoplastic LEMS and has tried at least one of the following: a systemic corticosteroid, azathioprine, or another immunosuppressive agent (e.g., cyclosporine, mycophenolate); OR
- Has non-paraneoplastic LEMS and has contraindications to both a corticosteroid and azathioprine and/or other immunosuppressive agents; AND
- The requested product is prescribed by or in consultation with a neurologist; AND

- The patient is having refractory weakness after symptomatic treatment of LEMS with an amifampridine product (e.g., Firdapse, Ruzurgi), guanidine, or pyridostigmine.

For a re-authorization request:

- Has shown a response to therapy (e.g., improved muscle strength, other clinical response) or continued effectiveness.

Approval duration (initial): 1 month

Approval duration (renewal): 12 months

Multiple sclerosis (MS)

For acute severe exacerbation or relapses:

- Has not responded to or had a significant adverse reaction with systemic corticosteroids or plasma exchange OR has a contraindication to systemic corticosteroids; AND
- Is already on maintenance therapy for MS, will be starting therapy for MS OR is pregnant or post-partum and maintenance therapy is not clinically appropriate; AND
- The requested product is prescribed by or in consultation with a neurologist or physician who specializes in the treatment of MS.

Approval duration: 1 month

Approval duration for pregnant or post-partum: 6 months

Multiple myeloma

For an initial authorization request:

- Has, or is at risk of, severe recurrent infections; AND
- The requested product is prescribed by or in consultation with a hematologist, oncologist, or infectious disease specialist.

Approval duration (initial): 6 months

Approval duration (renewal): 12 months

Myasthenia Gravis

For an initial authorization request for short-term (acute) use:

- Has an exacerbation of myasthenia gravis; OR
- Requires stabilization of myasthenia gravis before surgery; OR
- Has started on an immunosuppressive drug (e.g., azathioprine, cyclosporine, cyclophosphamide, mycophenolate, methotrexate, tacrolimus) and is waiting for full effect; OR
- Is starting therapy with a corticosteroid and IVIG is being given to prevent or minimize exacerbations; AND
- The requested product is prescribed by or in consultation with a neurologist; OR
- Continuation of therapy in patients using immune globulin for short-term (acute) use; (to allow for one course of therapy).

Approval duration: 5 days

For an initial authorization request for maintenance use:

- Has refractory myasthenia gravis; AND
- Has tried pyridostigmine; AND

- Has tried at least one of the following immunosuppressive agents and had an inadequate response: azathioprine, cyclosporine, cyclophosphamide, mycophenolate, methotrexate, tacrolimus; AND
- The requested product is prescribed by or in consultation with a neurologist.

Approval duration: 12 months

For a re-authorization request for maintenance use:

- Is responding to IVIG therapy (e.g., improvement in weakness [bulbar, limb, or respiratory], improvement with ocular symptoms).

Approval duration: 12 months

Stiff-person syndrome (Moersch-Woltman Syndrome)

For an initial authorization request:

- Has tried a benzodiazepine (e.g., diazepam) or baclofen OR has contraindication to both therapies; AND
- The requested product is prescribed by or in consultation with a neurologist.

For a re-authorization request:

- Is responding to therapy (e.g., reduced stiffness or frequency of spasms, ability to walk unassisted).

Approval duration (initial): 3 months

Approval duration (renewal): 12 months

Pure Red Blood Cell Aplasia (PRCA)

For an initial authorization request:

- Has tried a systemic corticosteroid (e.g., prednisone); AND
- Has tried either cyclophosphamide or cyclosporine; AND
- The requested product is prescribed by or in consultation with one of the following specialist: an infectious disease specialist, immunologist, hematologist, or transplant specialist.

For a re-authorization request:

- Is responding to therapy with an increase in hemoglobin and reticulocytosis.

Approval duration (initial and renewal): 1 month

Parvovirus B19 infection

For an initial authorization request:

- Has an immunodeficiency condition (e.g., patients with HIV infection, solid organ transplant, chemotherapy for hematologic malignancy); AND
- The requested product is prescribed by or in consultation with one of the following specialists: an infectious disease specialist, immunologist, hematologist, or transplant specialist.

For a re-authorization request:

- Had a response to previous IVIG therapy.

Approval duration (initial): 2 months
Approval duration (renewal): 6 months

Post-exposure prophylaxis for varicella OR treatment or post-exposure prophylaxis for tetanus

- VariZIG (varicella zoster immune globulin [human]) is not available OR it cannot be administered within 10 days of exposure; OR
- For tetanus treatment or post-exposure, when tetanus immune globulin is not available.

Approval duration: single dose

Passive immunization for measles, post-exposure prophylaxis

- Patient is immunocompromised and has been exposed to measles; OR
- Patient is pregnant and has been exposed to measles AND does not have evidence of immunity to measles (i.e., does not have a history of the disease or age-appropriate vaccination).

Approval duration: single dose

Thrombocytopenia, Feto-neonatal alloimmune

- The requested product is prescribed by or in consultation with a hematologist or an obstetrician.

Approval duration: 6 months

Immunotherapy-related toxicities associated with checkpoint inhibitor therapy

Examples of checkpoint inhibitors are Keytruda (pembrolizumab injection), Opdivo (nivolumab injection), Yervoy (ipilimumab injection), Tecentriq (atezolizumab injection), Bavencio (avelumab injection), Imfinze (durvalumab injection), Libtayo (cemiplimab injection), Jemperli (dostarlimab injection).

For an initial authorization request:

- The patient has tried a systemic corticosteroid (e.g., prednisone, methylprednisolone) and has not adequately responded to therapy; OR
- IVIG is being started with a systemic corticosteroid; OR
- A corticosteroid is contraindicated.

For a re-authorization request:

- The patient is having a positive response to therapy and extended therapy is required.

Approval duration (initial): 1 months
Approval duration (renewal): 6 months

Dosing Recommendations

Flebogamma/Octagam

Primary immunodeficiency (PI): the recommended dose is 300 to 600 mg/kg administered every 3 to 4 weeks

Immune thrombocytopenia (ITP): the recommended dose is 1 g/kg administered intravenously daily for 2 consecutive days

Gammagard Liquid

PI: the recommended dose is 300 to 600 mg/kg administered intravenously every 3 to 4 weeks. For subcutaneous administration, the recommended dose is 1.37 x previous intravenous dose divided by number of weeks between intravenous doses.

Multifocal motor neuropathy (MMN): The recommended dose is 0.5 to 2.4 g/kg per month based on clinical response

Gammagard S/D

PI: the recommended dose is 300 to 600 mg/kg administered every 3 to 4 weeks

B-cell chronic lymphocytic leukemia: The recommended dose is 400 mg/kg every 3 to 4 weeks

Kawasaki syndrome: The recommended dose is a single 1 g/kg or a dose of 400 mg/kg for 4 consecutive days beginning within seven days of the onset of fever

ITP: the recommended dose is 1 g/kg. The need for additional doses can be determined by clinical response and platelet count. Up to three separate doses may be given on alternate days if required.

Gammaked/Gamunex-C

PI: the recommended dose is 300 to 600 mg/kg administered intravenously every 3 to 4 weeks. For subcutaneous administration, the recommended dose is 1.37 x current IV dose in grams/IV dose intervals in weeks

ITP: the recommended dose is 2 g/kg, divided in two doses of 1 g/kg given intravenously on two consecutive days or into five doses of 0.4 g/kg given on five consecutive days.

Chronic inflammatory demyelinating polyneuropathy (CIPD): the recommended dose is loading dose 2 g/kg administered intravenously in divided doses over 2 to 4 consecutive days following with maintenance dose of 1 g/kg is administered over 1 day or divided into 2 doses of 0.5 g/kg given on 2 consecutive days, every 3 weeks.

Gammaplex

PI: The recommended dose is 300 to 800 mg/kg administered every 3-4 weeks

ITP: The recommended dose is 1 g/kg administered intravenously for 2 consecutive days

Privigen

PI: The recommended dose is 200 to 800 mg/kg administered intravenously every 3-4 weeks

ITP: The recommended dose is 1 g/kg administered intravenously for 2 consecutive days

CIPD: The recommended dose is loading dose 2 g/kg administered intravenously in divided doses over 2 to 5 consecutive days following with maintenance dose of 1 g/kg administered in 1 to 2 infusions on consecutive days, every 3 weeks.

Panzyga

PI: The recommended dose is 300 to 600 mg/kg administered intravenously every 3-4 weeks

ITP: The recommended dose is 1 g/kg administered intravenously on 2 consecutive days

CIDP: The recommended loading dose is 1g/kg given on 2 consecutive days. Maintenance dose is 1-2g/kg every 3 weeks divided in 2 doses given over 2 consecutive days.

Bivigam

PI: The recommended dose is 300 to 800 mg/kg administered every 3-4 weeks

Asceniv

PI: The recommended dose is 300 to 800 mg/kg administered every 3-4 weeks.

References

1. Bivigam® 10% liquid [prescribing information]. Boca Raton, FL: ADMA Biologics, Inc.; July 2019.
2. Murrell D, Pena S, Joly P, et al. Diagnosis and management of pemphigus: Recommendations of an international panel of experts. *J Am Acad Dermatol*. 2020;82(3):575-585.
3. Flebogamma® 5% DIF solution [prescribing information]. Los Angeles, CA: Grifols USA, LLC; September 2019.
4. Flebogamma DIF 10% solution [prescribing information]. Los Angeles, CA: Grifols USA, LLC; September 2019.
5. Gammagard Liquid 10% solution [prescribing information]. Lexington, MA: Baxalta US Inc.; March 2021.
6. Gammagard S/D IgA < 1 mcg/mL in a 5% solution [prescribing information]. Lexington, MA: Baxalta US Inc.; August 2017.
7. Gammaked™ 10% solution [prescribing information]. Fort Lee, NJ: Kedrion Biopharma, Inc.; January 2020.
8. Gammaplex® 5% solution [prescribing information]. Durham, NC: BPL USA Inc.; September 2019.
9. Gamunex®-C 10% liquid [prescribing information]. Los Angeles, CA: Grifols USA, LLC; January 2020.
10. Octagam® 5% liquid [prescribing information]. Hoboken, NJ: Octapharma USA, Inc.; April 2022.
11. Octagam® 10% liquid [prescribing information]. Hoboken, NJ: Octapharma USA, Inc.; April 2022.
12. Privigen® 10% liquid [prescribing information]. Kankakee, IL: CSL Behring LLC; March 2022.
13. 2022.
14. McLean HQ, Fiebelkorn AP, Temte JL, Wallace GS; Centers for Disease Control and Prevention. Prevention of measles, rubella, congenital rubella syndrome, and mumps, 2013: summary recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep*. 2013;62:1-34.
15. Bonilla FA, Khan DA, Ballas ZK, et al. Practice parameter for the diagnosis and management of primary immunodeficiency. *J Allergy Clin Immunol*. 2015;136(5):1186-205.
16. Panzyga 10% liquid [prescribing information]. New York, NY: Pfizer Laboratories; January 2021.
17. Asceniv 10% liquid [prescribing information]. Boca Raton, FL: ADMA Biologics; April 2019.
18. Bonilla FA, Barlan I, Chapel H, et al. International Consensus Document (ICON): Common variable immunodeficiency disorders. *J Allergy Clin Immunol Pract*. 2016;4(1):38-59.
19. Perez EE, Orange JS, Bonilla F, et al. Update on the use of immunoglobulin in human disease: A review of evidence. *J Allergy Clin Immunol*. 2017;139(3S):S1-S46.
20. Wasserman RL, Lumry W, Harris J, et al. Efficacy, safety, and pharmacokinetics of a new 10% liquid intravenous immunoglobulin containing high titer neutralizing antibody to RSV and other respiratory viruses in subjects with primary immunodeficiency disease. *J Clin Immunol*. 2016;36:590-599.
21. Otani S, Davis AK, Cantwell L, et al. Evolving experience of treating antibody-mediated rejection following lung transplantation. *Transpl Immunol*. 2014;31(2):75-80.
22. The NCCN Chronic Lymphocytic Leukemia/Small Lymphocytic Lymphoma Clinical Practice Guidelines in Oncology (version 4.2020 – December 20, 2019) 2020 National Comprehensive Cancer Network, Inc. Available at: <http://www.nccn.org>. Accessed on September 20, 2022.
23. Anderson D, Ali K, Blanchette V, et al. Guidelines on the use of intravenous immune globulin for hematologic conditions. *Transfus Med Rev*. 2007;21(2 Suppl 1):s9-56.
24. Neunert C, Terrell DR, Arnold DM, et al. American Society of Hematology 2019 guidelines for immune thrombocytopenia. *Blood Adv*. 2019;3(23):3829-3866.
25. Neunert C, Lim W, Crowther M, et al. The American Society of Hematology 2011 evidenced-based practice guideline for immune thrombocytopenia. *Blood*. 2011;117:4190-4207.
26. Gammaplex 10% liquid [prescribing information]. Durham, NC: BPL USA, Inc.; October 2019.
27. American Academy of Pediatrics. Kawasaki disease. In: Kimberlin DW, Barnett ED, Lynfield R, Sawyer MH, eds. Red Book; 2021 Report of the Committee on Infectious Diseases, 32nd Ed. American Academy of Pediatrics;2021:457-464.
28. UK National Health Service. Clinical Guidelines for Immunoglobulin Use. November 2019. [http://igd.mdsas.com/wp-content/uploads/NHSE Commissioning Criteria for the use of Ig V1.4 November 2019.pdf](http://igd.mdsas.com/wp-content/uploads/NHSE_Commissioning_Criteria_for_the_use_of_Ig_V1.4_November_2019.pdf). Accessed September 20, 2022.
29. Ahmed AR. Use of intravenous immunoglobulin therapy in autoimmune blistering diseases. *Int Immunopharmacol*. 2006;6(4):557-578.
30. Enk A and the European Dermatology Forum Guideline Subcommittee. Guidelines of the use of high-dose intravenous immunoglobulin in dermatology. *Eur J Dermatol*. 2009;19:90-98.
31. Gurean HM, Jeph S, Ahmed AR. Intravenous immunoglobulin therapy in autoimmune mucocutaneous blistering diseases: a review of the evidence for its efficacy and safety. *Am J Clin Dermatol*. 2010;11:315-326.
32. The NCCN Prevention and Treatment of Cancer-Related Infections Clinical Practice Guidelines in Oncology (version 1.45.2021 – July 2, 2021). 2021 National Comprehensive Cancer Network, Inc. Available at <http://www.nccn.org>. Accessed on September 20, 2022.
33. Elovaara I, Apostolski S, Van Doorn P, et al. EFNS task force on the use of intravenous immunoglobulin in treatment of neurological diseases. *Eur J Neurol*. 2008;15:893-908.
34. Aggarwal R, Charles-Schoeman C, Schessl J, et al. Prospective, double-blind, randomized, placebo-controlled, phase III study evaluating efficacy and safety of Octagam 10% in patients with dermatomyositis (ProDERM Study). *Medicine (Baltimore)*. 2021;100(1):e23677. Doi: 10.1097/MD.00000000000023677.

35. Marfo K, Lu A, Ling M, Akalin E. Desensitization protocols and their outcome. *Clin J Am Soc Nephrol*. 2011;6:922-936.
36. Zachary AA, Leffell MS. Desensitization for solid organ and hematopoietic stem cell transplantation. *Immunol Rev*. 2014;258:183-207.
37. Colvin MM, Cook JL, Chang P, et al; American Heart Association Heart Failure and Transplantation Committee of the Council on Clinical Cardiology; American Heart Association Heart Failure and Transplantation Committee of the Council on Cardiopulmonary Critical Care, Perioperative and Resuscitation, et al. Antibody-mediated rejection in cardiac transplantation emerging knowledge in diagnosis and management: a scientific statement from the American Heart Association. *Circulation*. 2015;131:1608-1639.
38. Hughes RA, Wijdicks EF, Barohn R, et al. Quality Standards Subcommittee of the American Academy of Neurology. Practice parameter: immunotherapy for Guillain-Barre syndrome: report of the Quality Standards Subcommittee of the American Academy of Neurology. *Neurology*. 2003;61:736-740. Guideline Reaffirmed January 22, 2022.
39. Van Doorn P, Kuitwaard K, Walgaard C, et al. IVIG treatment and prognosis in Guillain-Barre Syndrome. *J Clin Immunol*. 2010;30 Suppl 1:s74-78.
40. Tomblyn M, Chiller T, Einsele H, et al; Center for International Blood and Marrow Research; National Marrow Donor program; European Blood and Marrow Transplant Group; American Society of Blood and Marrow Transplantation; Canadian Blood and Marrow Transplant Group; Infectious Diseases Society of America; Society for Healthcare Epidemiology of America; Association of Medical Microbiology and Infectious Disease Canada; Centers for Disease Control and Prevention. Guidelines for preventing infectious complications among hematopoietic cell transplantation recipients: A global perspective. *Biol Blood Marrow Transplant*. 2009;1:1143-1238.
41. Panel on Opportunistic Infections in HIV-Exposed and HIV-Infected Children. Guidelines for the prevention and treatment of opportunistic infections among HIV-exposed and HIV-infected children. Department of Health and Human Services. Last review December 9, 2019. Available at: https://clinicalinfo.hiv.gov/sites/default/files/guidelines/documents/OI_Guidelines_Pediatrics.pdf. Accessed September 2022.
42. American Academy of Pediatrics. Human Immunodeficiency Virus Infection. In: Kimberlin DW, Barnett ED, Lynfield R, Sawyer MH, eds. Red Book®: 2021 Report of the Committee on Infectious Diseases. American Academy of Pediatrics; 2021:427-440.
43. The NCCN Multiple Myeloma Clinical Practice Guidelines in Oncology (version 7.2021 – April 26, 2021) 2021 National Comprehensive Cancer Network, Inc. Available at <http://www.nccn.org>. Accessed on September 22, 2022.
44. National Multiple Sclerosis Society. Relapse management. Available at: <http://www.nationalmssociety.org/For-Professionals/Clinical-Care/Managing-MS/Relapse-Management>. Accessed on September 20, 2022.
45. Hachem RR, Yusen RD, Meyers BF, et al. Anti-human leukocyte antigen antibodies and preemptive antibody-directed therapy after lung transplantation. *J Heart Lung Transplant*. 2010;29:973..
46. Lejeune A, Martin L, Santibanez S, et al. Postexposure prophylaxis with intravenous immunoglobulin G prevents infants from getting measles. *Acta Paediatr*. 2017;1066(1):174-177.
47. American Academy of Pediatrics. Varicella-Zoster Infections. In: Kimberlin DW, Barnett ED, Lynfield R, Sawyer MH, eds. Red Book®: 2021 Report of the Committee on Infectious Diseases, 32nd Ed. American Academy of Pediatrics; 2021:831-843.
48. VariZIG® for intramuscular injection [prescribing information]. Roswell, GA: Saol Therapeutics, Inc.; September 2021.
49. Centers for Disease Control and Prevention. Tetanus. Available at: <https://www.cdc.gov/tetanus/clinicians.html>. Accessed on September 29, 2022.
50. Broliden K, Tolfenstam T, Norbeck O. Clinical aspects of parvovirus B19 infection. *J Intern Med*. 2006;260:285-304.
51. Symington A, Paes B. Fetal and neonatal alloimmune thrombocytopenia: harvesting the evidence to develop a clinical approach to management. *Am J Perinatal*. 2011;28:137-144.
52. Townsley DM. Hematologic complications of pregnancy. *Semin Hematol*. 2013;50:222-231.
53. Fillit H, Hess G, Hill J, et al. IV immunoglobulin is associated with a reduced risk of Alzheimer disease and related disorders. *Neurology*. 2009;73:180-185.
54. Dodel R, Rominger A, Bartenstein P, et al. Intravenous immunoglobulin for treatment of mild-to-moderate Alzheimer's disease: a phase 2, randomised, double-blind, placebo-controlled, dose-finding trial. *Lancet Neurol*. 2013;12:233-243.
55. From the Global Strategy for Asthma Management and Prevention, Global Initiative for Asthma (GINA) 2020. Available at: <http://www.ginaasthma.org/>. Accessed on September 28, 2022.
56. Eichenfield LF, Ahluwalia J, Waldman A, et al. Current guidelines for the evaluation and management of atopic dermatitis: A comparison of the Joint Task Force Practice Parameter and American Academy of Dermatology Guidelines. *J Allergy Clin Immunol*. 2017;139(4S):S49-S57.
57. Vollmer-Conna U, Hickie I, Hadzi-Paylovic D, et al. Intravenous immunoglobulin is ineffective in the treatment of patients with chronic fatigue syndrome. *Am J Med*. 1997;103:38-43.
58. Goebel A, Baranowski A, Maurer K, et al. Intravenous immunoglobulin treatment of the complex regional pain syndrome: A randomized trial. *Ann Intern Med*. 2010;152:152-158.

59. Goebel A, Bisla J, Carganillo R, et al. Low-dose intravenous immunoglobulin treatment for long-standing complex regional pain syndrome: A randomized trial. *Ann Intern Med.* 2017;167(7):476-483.
60. Chrissafidou A, Malek M, Musch E. Experimental study on the use of intravenous immunoglobulin in patients with steroid-resistant Crohn's disease. *Gastroenterol.* 2007;45:605-608.
61. Balfour-Lynn IM, Mohan U, Bush A, Rosenthal M. Intravenous immunoglobulin for cystic fibrosis lung disease: a case series of 16 children. *Arch Dis Child.* 2004;89:315-319.
62. Relkin NR, Thomas RG, Rissman RA, et al. A phase 3 trial of IV immunoglobulin for Alzheimer disease. *Neurology.* 2017;88(18):1768-1775.
63. Colagiuri S, Leong GM, Thayer Z, et al. Intravenous immunoglobulin therapy for autoimmune diabetes mellitus. *Clin Exp Rheumatol.* 1996;14 Suppl 15:S93-97.
64. Heinze E. Immunoglobulins in children with autoimmune diabetes mellitus. *Clin Exp Rheumatol.* 1996;14 Suppl 15:S99-102.
65. Caro XJ, Winter EF, Dumas AJ. A subset of fibromyalgia patients have findings suggestive of chronic inflammatory demyelinating polyneuropathy and appear to respond to IVIG. *Rheumatology (Oxford).* 2008;47:208-211.
66. Sanders DB, Wolfe GI, Benatar M, et al. International consensus guidance for management of myasthenia gravis: Executive summary. *Neurology.* 2016;87(4):419-425.
67. Eid AJ, Ardura MI, AST Infectious Disease Community of Practice. Human parvovirus B19 in solid organ transplantation: Guidelines from the American Society of Transplantation Infectious Diseases Community of Practice. *Clin Transplant.* 2019 Sep;33(9):e13535.
68. Van den Bergh PY, van Doorn PA, Hadden RD, et al. European Academy of Neurology/Peripheral Nerve Society guideline on diagnosis and treatment of chronic inflammatory demyelinating polyradiculoneuropathy: Report of a joint Task Force – Second revision. *J Peripher Nerv Syst.* 2021 Sep;26(3):242-268.
69. Practice Committee of the American Society for Reproductive Medicine. The role of immunotherapy in in vitro fertilization: a guideline. *Fertil Steril.* 2018;110:387-400. Available at: www.asrm.org. Accessed on August, 20 2021.
70. Branch DW, Peaceman AM, Druzin M, et al. A multicenter, placebo-controlled pilot study of intravenous immune globulin treatment of antiphospholipid syndrome during pregnancy. The Pregnancy Loss Study Group. *Am J Obstet Gynecol.* 2000;182(1 Pt 1):122-127.
71. Stephenson MD, Kutteh WH, Purkiss S, et al. Intravenous immunoglobulin and idiopathic secondary recurrent miscarriage: a multicentered, randomized, placebo-controlled trial. *Hum Reprod.* 2010;25:2203-2209.
72. Ata B, Lin Tan S, Shehata F, et al. A systematic review of intravenous immunoglobulin for treatment of unexplained recurrent miscarriage. *Fertil Steril.* 2011;95:1080-1085.
73. The Practice Committee of the American Society for Reproductive Medicine. Evaluation and treatment of recurrent pregnancy loss: a committee opinion. *Fertil Steril.* 2012;95:1103-1111.
74. The NCCN Management of Immunotherapy-Related Toxicities Clinical Practice Guidelines in Oncology (version 1.2020 – December 16, 2019). 2020 National Comprehensive Cancer Network, Inc. Available at: <http://www.nccn.org>. Accessed on September 28, 2022.
75. Brahmer JR, Lacchetti C, Schneider BJ, et al. Management of immune-related adverse events in patients treated with immune checkpoint inhibitor therapy: American Society of Clinical Oncology Clinical Practice Guideline. *J Clin Oncol.* 2018;36:1714-1768.
76. Garces JC, Biusti S, Giusti S, et al. Antibody-mediated rejection: A review. *Ochsner J.* 2017;17(1):46-55.
77. Wan SS, Yin TD, Wyburn K, et al. The treatment of antibody-mediated rejection in kidney transplantation: An updated systematic review and meta-analysis. *Transplantation.* 2018;102(4):557-568.
78. Kidney Disease: Improving Global Outcomes (KDIGO) Transplant Work Group. KDIGO clinical practice guideline for the care of kidney transplant recipients. *Am J Transplant.* 2009;9 Suppl 3:S1
79. Witt CA, Gaut JP, Yusen RD, et al. Acute antibody-mediated rejection after lung transplantation. *J Heart Lung Transplant.* 2013;32:1034.
80. Immune globulin. Lexi-Drugs. Lexicomp. Wolters Kluwer Health, Inc. Riverwoods, IL. [Updated; June 16, 2021; Accessed June 29, 2021].