**Dupixent – Prix Galien 2021**

**DRUG OR DEVICE NAME**

Dupixent®

**COMPOUND TECHNICAL NAME**

*dupilumab*

**TRADE NAME**

Dupixent®

**DATE OF APPROVAL(S)**

* 03/28/2017 for adult patients with uncontrolled moderate-to-severe atopic dermatitis;
* 10/19/2018 as an add-on maintenance treatment for patients 12 years and older with uncontrolled moderate-to-severe eosinophilic or oral steroid dependent asthma;
* 03/11/2019 for adolescents aged 12 to 17 years with uncontrolled moderate-to-severe atopic dermatitis;
* 06/26/2019 as add-on maintenance treatment for adults with uncontrolled chronic rhinosinusitis with nasal polyposis;
* 05/26/2020 for patients aged 6 to 11 years with uncontrolled moderate-to-severe atopic dermatitis

**THERAPEUTIC CATEGORIES**

* Adult atopic dermatitis (Breakthrough Therapy designation; approved under Priority Review by FDA on March 28, 2017)
* Adolescent and adult asthma (approved by FDA on October 19, 2018)
* Adolescent atopic dermatitis (Breakthrough Therapy designation; approved under Priority Review by FDA on March 11, 2019)
* Adult chronic rhinosinusitis with nasal polyposis (approved under Priority Review by FDA on June 26, 2019)
* Pediatric atopic dermatitis (Breakthrough Therapy designation; approved for ages 6 to 11 years under Priority Review by FDA on May 26, 2020; ages 6 months to 5 years in development)
* Pediatric asthma (in development)
* Eosinophilic esophagitis (Orphan Drug designation; Breakthrough Therapy designation; in development)
* Chronic obstructive pulmonary disease with evidence of type 2 inflammation (in development)
* Prurigo nodularis (in development)
* Chronic spontaneous urticaria (in development)
* Chronic inducible urticaria – cold (in development)
* Bullous pemphigoid (Orphan Drug designation; in development)
* Chronic rhinosinusitis without nasal polyposis (in development)
* Allergic fungal rhinosinusitis (in development)
* Allergic bronchopulmonary aspergillosis (in development)
* Food allergies (in development)

**INDICATIONS (300 words max)**

**Current Word Count: 300**

Dupixent® (dupilumab) is a rare medicine that can treat a number of seemingly different serious diseases (previously “uncontrolled” with available medications, such as corticosteroids) including asthma, atopic dermatitis (eczema), and chronic rhinosinusitis with nasal polyposis (CRSwNP).1 Dupixent is a “first-in-class” medicine that inhibits signaling of interleukin-4 (IL-4) and interleukin-13 (IL-13).2 Its ability to successfully treat these seemingly different diseases (all of which frequently occur together in the same patient and are considered “co-morbid”) proves these diseases share an underlying pathologic mechanism – i.e., type 2 inflammation driven by IL-4 and IL-13.3

The unprecedented therapeutic benefit of Dupixent in these diseases shows the major driving role for IL-4 and IL-13: in uncontrolled moderate-to-severe asthma patients (suffering frequent exacerbations with only ~60% of normal lung function), Dupixent reduced asthma exacerbations by 56-81% and improved lung function by up to 33%;4 in moderate-to-severe atopic dermatitis patients (who had more than half their body surface covered by unrelentingly pruritic lesions), 42-75% saw an overall improvement of at least 75% with Dupixent across all three age groups;4 and in uncontrolled CRSwNP patients, Dupixent improved all anatomic and symptomatic endpoints while reducing the need for surgery by 83% and systemic corticosteroids by 75%.4 Moreover, patients simultaneously suffering from multiple co-existing diseases had benefits across the conditions.4 Importantly, Dupixent was well tolerated without the immunosuppressive side effects common to other classes of biologics, and in most studies decreased the risk of associated infections. 4

Dupixent is in clinical trials for pediatric atopic dermatitis (ages 6 months to 5 years) and type 2 inflammatory-associated diseases that often co-morbidly occur with the above diseases:

* Eosinophilic esophagitis5
* Chronic obstructive pulmonary disease with evidence of type 2 inflammation
* Prurigo nodularis
* Chronic spontaneous urticaria
* Chronic inducible urticaria – cold
* Bullous pemphigoid
* Chronic rhinosinusitis without nasal polyposis
* Allergic fungal rhinosinusitis
* Allergic bronchopulmonary aspergillosis
* Food allergies

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2. Gandhi NA, BL Bennett, NM Graham, et al. Targeting key proximal drivers of type 2 inflammation in disease. *Nat Rev Drug Discov.* 2016;15(1):35-50.

3. Data on file.

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**SUPPLEMENTAL INFORMATION**

**Additional Background Information about Dupixent® and Its Impact**

For years, patients with difficult-to-treat asthma, atopic dermatitis (AD, also known as eczema), and chronic rhinosinusitis with nasal polyposis (CRSwNP) suffered through immunosuppressive treatments, unsuccessful surgeries, and other procedures, often without any resolution of their symptoms. Many asthma patients struggled to breathe and maintain a normal life.1 Millions of atopic dermatitis patients struggled with relentless itching, sleep disorders, anxiety, depression and other issues and had exhausted all available treatments.2-4 Thousands of people with CRSwNP had to deal with constant nasal congestion and discharge, decreased ability to smell and taste, as well as facial pressure, with existing treatment options that often left patients with recurring symptoms.5

From the very first Dupixent AD studies, Regeneron heard from a number of patients and investigators who reached out to share their stories, often through tears. By addressing the key inflammatory cause of AD, Dupixent was able to significantly improve patients’ eczema – and give many back their lives as the first and only biologic approved for AD. Additionally, Dupixent is the only biologic approved for oral corticosteroid-dependent asthma, regardless of phenotype, and is the first available in the U.S. for at-home use, providing a critical new option for patients at serious risk for asthma attacks. Currently, Dupixent is the only biologic approved for CRSwNP, changing the treatment paradigm, and giving new hope to the many patients for whom systemic corticosteroids and surgery did not provide relief. The recent approvals of the Dupixent 200 and 300 mg pre-filled pens are an easy-to-use, convenient option – inclusive of technology that provides visual and audio cues, giving patients more support at home.

Across all approved indications globally, more than 260,000patients have been treated with Dupixent. In 2020, Dupixent achieved total annual global net product sales of $4.0448 billion.6

Many more patients can benefit in the coming years. In the U.S., uncontrolled, moderate-to-severe AD affects approximately 300,000 adults in the U.S., an estimated 389,000 adolescents and an estimated 320,000 children aged 6 to 11 years.6 AD is misunderstood as a superficial skin disease, but it is often associated with a debilitating rash, intense itching and skin lesions covering much of a person’s body, and problems with sleep and daily living.7-10 People with moderate-to-severe forms may not be able to control their symptoms with topical medications and need to be prescribed systemic steroids or broad immune-suppressant medicines,11-12 which run the risk of serious side effects if used long-term.13

Dupixent has revolutionized the treatment of this disease. In AD clinical studies, heavily pre-treated patients saw a remarkable approximately 75% average improvement from baseline and Dupixent was well tolerated, without the immunosuppressive side effects common to other classes of biologics.

Dupixent is also approved for use with other asthma medicines for the maintenance treatment of moderate-to-severe eosinophilic or oral steroid dependent asthma in patients aged 12 years and older whose asthma is not controlled with their current asthma medicines. Moderate-to-severe asthma affects approximately 775,000-900,000 people aged 12 years and older in the U.S. These patients experience difficulty breathing and are at risk of severe asthma attacks (exacerbations) requiring emergency room visits or hospitalizations.1 Oral corticosteroids can provide relief for severe, short-term symptoms, however, current asthma guidelines suggest limiting chronic use to the most severe patients due to the potential for serious side effects.14-16 After its approval in October 2018, Dupixent became the first biologic approved for both moderate and severe asthma patients with an eosinophilic phenotype (raised blood eosinophils), oral corticosteroid-dependent asthma (regardless of biomarkers) and with the potential for self-administration at home.17 In clinical studies, Dupixent significantly reduced asthma exacerbations, improved lung function and reduced or eliminated OCS use.

Most recently, Dupixent was the first FDA-approved medicine for adults with uncontrolled CRSwNP. An estimated 90,000 people have CRSwNP in the U.S. and they suffer from a range of debilitating symptoms caused by obstruction of their sinuses and nasal passages.6 These patients can have other type 2 inflammatory diseases as well, which adds to their overall burden of disease.5 Common care for these patients includes systemic steroids or nasal surgery, which often do not provide complete disease control.5 In clinical studies, Dupixent significantly reduced nasal polyp size, improved congestion and loss of smell, while also reducing the need for surgery and systemic corticosteroids.17 With its approval in CRSwNP, another condition with underlying type 2 inflammation, Dupixent’s ability to target this important biological driver of disease was further cemented.

Many people who have been involved in the development of Dupixent have a personal connection to atopic and allergic diseases, which bolsters their commitment to addressing the unmet needs of people with diseases exacerbated by type 2 inflammation. In the early 1990s, the father of George D. Yancopoulos, M.D., Ph.D., President and Chief Scientific Officer at Regeneron, developed severe AD while undergoing lung cancer treatment, and Dr. Yancopoulos witnessed the severity of this disease first-hand. It was in part this experience that motivated Dr. Yancopoulos to initiate and relentlessly lead this program for more than 30 years. Remarkably, his own daughter subsequently developed serious atopic dermatitis and asthma, and she is currently a successful responder to Dupixent treatment. The person who confirmed Dupixent’s action in living cells was Jamie Orengo, Ph.D., Director of Immunology and Inflammation at Regeneron, who is a caregiver to her three children with AD and other allergic diseases.

This commitment to developing a safe and effective first-of-its-kind treatment for AD has been shown in the more than 20 completed and ongoing clinical trials of Dupixent in AD, including an extensive Phase 3 clinical program of six trials in more than 2,400 patients worldwide.18

**Regeneron and Sanofi are committed to bring Dupixent to younger patients with severe AD because of stories like the following from a physician who reached out in a letter.**

“*I met this family when she was first admitted to my children’s hospital (transferred by ambulance from a community hospital ~3 hours away). Prior treatment had been cycles of prednisone, oral anti-Staph antibiotics, pound jars of triamcinolone and chronic daily sedating antihistamines.*

*The family was in crisis. During hospitalizations from November through February, this girl was miserable, and unable to interact with hospital staff….THIS IS A TRULY HORRIBLE DISEASE...we had to restrain her so wouldn’t scratch herself constantly and bleed and get infections.*”This is how she looked when she was admitted:



“*After three doses of dupilumab, she is a pistol*…*THIS IS WHAT DUPILUMAB CAN DO*:”



*“We all want you to know how grateful we are for dupilumab...[My patient’s] quality of life has vastly improved, and so has mine…* *As a scientist, I don’t think there is anything more rewarding than seeing that you can use the power of science to do this, to change a little girl’s life…and I think that’s why many of us do what we do…”*

**Many patients with AD have proactively contacted Regeneron and Sanofi to tell us how Dupixent has changed their lives or shared their experiences publicly:**

*“Getting access to Dupixent remains the single most significant thing that has ever happened to me. It has changed the course of my life in ways that were unimaginable only a few years ago.” –Sirish (adult with AD), via email6*

*Images provided by Sirish during the clinical trial:*

Graphical user interface, application

Description automatically generated

*“…I am so passionate about Dupixent. This drug has been life changing for me…” –Sue (adult with AD), via email6*

*“After two weeks my old skin started to shed and I had new, normal skin for the first time in my life…I don’t think I slept a full night in my entire adolescence…This medicine [Dupixent] has totally changed my way of life.” –Anne (adult with AD), via email6*

*"Dupixent has been life changing for me. I was diagnosed at age 6 and I am currently 32 years of age. I have severe eczema and typically dress completely covered to prevent the stares, questions and comments. I have not been able to wear my wedding ring for 7 years because of the dyshidrotic eczema on my hands. I have never been bowling with my children, the oldest being 12. I have a hard time allowing anyone to touch me because my skin is so hypersensitive, it drives me insane. I have never slept all the way through the night. My self-esteem is highly affected and exercise is nearly impossible with the sweat pouring and irritating the wounds. Sometimes, just getting out of bed, walking, or taking a shower is enough to send me to tears. Dupixent has given me a new life. It has given me life back. I now know what all eczema took from me and I am forever grateful for the opportunity to be on this medication." –Nicole19*

*"I have had AD for at least 67 years of my 70 years on this earth. My life as a child was hell because of weeping medicated baths and teasing by other children. My adult life has also been equally affected by the use of corticosteroids on my skin, which is now permanently affected due to chronic steroids. When my new dermatologist brought up Dupixent about six months ago I was skeptical and scared. I started March 22. I STOPPED itching in 24 hours. It has been a MIRACLE.” –Pinkas18*

*"I love Dupixent! Before I started injections I was beyond miserable. If there’s a worse word for it... I’ve been using Dupixent since January 17, 2018 and within the first day of taking it I noticed a drastic change. The itch started to cease quickly and all of my eczema patches started to dry up and peel off. After about a month, many of my active spots healed. The hyperpigmentation on my face, hands and legs have lightened up. My derm said hyperpig can take a year to go away. I’m fine with that because I never thought I’d be able to look myself in the mirror and not cry. I rejoice quite often because I have a normal life again. I can cook, clean and go to work consistently without having to book an appointment.” –Sam19*

*"I’ve been suffering from eczema my entire life. In the past few years I’ve had major break outs, really major. You know, the ones when you can’t sleep, stop scratching, and you’re covered in sores. Nothing works, not even rounds and rounds of prednisone where the only thing you get are horrible side effects. Ugh! No fun. I’ve taken Dupixent 5 times so far, one being the initial dose of 2 units and the other 3 self-administered and it’s been a miracle for me. I also suffer from hideous asthma (of course) and my side effect from Dupixent has been NO asthma episodes! Already! I feel like I’d imagine a normal person feels. I CAN BREATHE AND DO THINGS! And I’m not dying of asthma attacks all the time…There aren’t enough stars to rate Dupixent as high as I want to. It really is magical unicorn fairy dust!!" –Zia19*

**U.S. physicians have also spoke out that they are impressed that Dupixent has lived up to its promise as the first biologic medicine to target the underlying type 2 inflammation in AD:**

*“We heard many times that patients even considered suicide because their disease was so bad. Some said they were about to destroy their marriage, and one patient was about to close his law office. But this drug basically enabled them to have a life.” -Dr. Emma Guttman-Yassky, Mount Sinai21*

**Dupixent has also been shown to improve lung function in moderate-to-severe asthma patients. The reaction from patients and U.S. physicians to Dupixent has been overwhelmingly positive.**

“*My son has poorly controlled asthma despite adhering to his medication regime and being extremely well cared for by his consultant. [Dupixent] offers him the chance to live with improved breath – breathing is overlooked by those of us fortunate enough to enjoy good health!” –Natalie22*

*"This medication appears to have efficacy in a much broader range of patients than the currently available biologics. It has the potential to be a game changer for some patients, but we won't really know until it is out in the real world." –Dr. Sally Wenzel, University of Pittsburgh23*

**Dupixent has shown promising results for trials studying its use for patients with eosinophilic esophagitis (EoE), which was granted Orphan Drug Designation by the FDA. Although it is a rare disease, EoE has a large impact on patients’ lives.**

*Patients with EoE saw a remarkable 69% reduction in disease symptoms with Dupixent, compared to 32% for placebo.23 Dupixent is the first and only biologic to show positive and clinically-meaningful results in this population as part of a Phase 3 trial. Dupixent may improve underlying biological processes related to tissue damage in EoE, as shown by the normalization of expression of genes association with scarring and barrier function in these patients.25*

“*The hardest part, I would say, of this disease on my life probably was in high school. I was extremely small for my age. I was 15 and was about 60 pounds and I was around 4’5” or 4’6”, so I clearly looked very different than the rest of my friends. And as a freshman in high school it’s hard in general. Everyone has a tough time, but having a disease that makes you look and feel so isolated and different. That was a really big challenge.” – Jori, person with EoE6*

*“My husband has EoE. And then three of our four kids. Charlie is eleven; and Gage is nine; and Tinley is six. The kids definitely have different takes on the disease. With Charlie not having a feeding tube and he has a lot more in his diet, it’s easier for him. Gage hates all of it. He hates the disease and he hates that he has a feeding tube, and he wants it to all go away.” – Kara, caregiver to family with EoE6*

We believe that future generations will look back and regard Dupixent as a significant landmark in the management of chronic type 2 inflammatory conditions. This biological treatment is a tangible demonstration of how addressing the root cause of a problem can bring exciting, multi-tasking innovative therapies for diseases with high unmet medical needs.

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