ANNEX I

SUMMARY OF PRODUCT CHARACTERISTICS
This medicinal product is subject to additional monitoring. This will allow quick identification of new safety information. Healthcare professionals are asked to report any suspected adverse reactions. See section 4.8 for how to report adverse reactions.

1. **NAME OF THE MEDICINAL PRODUCT**

   Dupixent 300 mg solution for injection in pre-filled syringe
   Dupixent 300 mg solution for injection in pre-filled pen

2. **QUALITATIVE AND QUANTITATIVE COMPOSITION**

   **Dupilumab 300 mg solution for injection in pre-filled syringe**
   Each single-use pre-filled syringe contains 300 mg of dupilumab in 2 mL solution (150 mg/mL).

   **Dupilumab 300 mg solution for injection in pre-filled pen**
   Each single-use pre-filled pen contains 300 mg of dupilumab in 2 mL solution (150 mg/mL).

   Dupilumab is a fully human monoclonal antibody produced in Chinese Hamster Ovary (CHO) cells by recombinant DNA technology.

   For the full list of excipients, see section 6.1.

3. **PHARMACEUTICAL FORM**

   Solution for injection (injection)

   Clear to slightly opalescent, colourless to pale yellow sterile solution, which is free from visible particulates, with a pH of approximately 5.9.

4. **CLINICAL PARTICULARS**

4.1 **Therapeutic indications**

   **Atopic dermatitis**

   Adults and adolescents
   Dupixent is indicated for the treatment of moderate-to-severe atopic dermatitis in adults and adolescents 12 years and older who are candidates for systemic therapy.

   Children 6 to 11 years of age
   Dupixent is indicated for the treatment of severe atopic dermatitis in children 6 to 11 years old who are candidates for systemic therapy.

   **Asthma**

   Adults and adolescents
   Dupixent is indicated in adults and adolescents 12 years and older as add-on maintenance treatment for severe asthma with type 2 inflammation characterised by raised blood eosinophils and/or raised fraction of exhaled nitric oxide (FeNO), see section 5.1, who are inadequately controlled with high dose inhaled corticosteroids (ICS) plus another medicinal product for maintenance treatment.
Children 6 to 11 years of age
Dupixent is indicated in children 6 to 11 years old as add-on maintenance treatment for severe asthma with type 2 inflammation characterised by raised blood eosinophils and/or raised fraction of exhaled nitric oxide (FeNO), see section 5.1, who are inadequately controlled with medium to high dose inhaled corticosteroids (ICS) plus another medicinal product for maintenance treatment.

Chronic rhinosinusitis with nasal polyposis (CRSwNP)
Dupixent is indicated as an add-on therapy with intranasal corticosteroids for the treatment of adults with severe CRSwNP for whom therapy with systemic corticosteroids and/or surgery do not provide adequate disease control.

4.2 Posology and method of administration
Treatment should be initiated by healthcare professionals experienced in the diagnosis and treatment of conditions for which dupilumab is indicated (see section 4.1).

Posology

Atopic dermatitis

Adults
The recommended dose of dupilumab for adult patients is an initial dose of 600 mg (two 300 mg injections), followed by 300 mg given every other week administered as subcutaneous injection.

Adolescents (12 to 17 years of age)
The recommended dose of dupilumab for adolescent patients 12 to 17 years of age is specified in Table 1.

Table 1: Dose of dupilumab for subcutaneous administration in adolescent patients 12 to 17 years of age with atopic dermatitis

<table>
<thead>
<tr>
<th>Body weight of patient</th>
<th>Initial dose</th>
<th>Subsequent doses (every other week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 60 kg</td>
<td>400 mg (two 200 mg injections)</td>
<td>200 mg</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>600 mg (two 300 mg injections)</td>
<td>300 mg</td>
</tr>
</tbody>
</table>

Children 6 to 11 years of age
The recommended dose of dupilumab for children 6 to 11 years of age is specified in Table 2.

Table 2: Dose of dupilumab for subcutaneous administration in children 6 to 11 years of age with atopic dermatitis

<table>
<thead>
<tr>
<th>Body weight of patient</th>
<th>Initial dose</th>
<th>Subsequent doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 kg to less than 60 kg</td>
<td>300 mg (one 300 mg injection) on Day 1, followed by 300 mg on Day 15</td>
<td>300 mg every 4 weeks (Q4W)*, starting 4 weeks after Day 15 dose</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>600 mg (two 300 mg injections)</td>
<td>300 mg every other week (Q2W)</td>
</tr>
</tbody>
</table>

* The dose may be increased to 200 mg Q2W in patients with body weight of 15 kg to less than 60 kg based on physician’s assessment.

Dupilumab can be used with or without topical corticosteroids. Topical calcineurin inhibitors may be used, but should be reserved for problem areas only, such as the face, neck, intertriginous and genital areas.
Consideration should be given to discontinuing treatment in patients who have shown no response after 16 weeks of treatment for atopic dermatitis. Some patients with initial partial response may subsequently improve with continued treatment beyond 16 weeks. If dupilumab treatment interruption becomes necessary, patients can still be successfully re-treated.

Asthma

Adults and adolescents
The recommended dose of dupilumab for adults and adolescents (12 years of age and older) is:

- For patients with severe asthma and who are on oral corticosteroids or for patients with severe asthma and co-morbid moderate-to-severe atopic dermatitis or adults with co-morbid severe chronic rhinosinusitis with nasal polyposis, an initial dose of 600 mg (two 300 mg injections), followed by 300 mg every other week administered as subcutaneous injection.
- For all other patients, an initial dose of 400 mg (two 200 mg injections), followed by 200 mg every other week administered as subcutaneous injection.

Children 6 to 11 years of age
The recommended dose of dupilumab for paediatric patients 6 to 11 years of age is specified in Table 3.

Table 3: Dose of dupilumab for subcutaneous administration in children 6 to 11 years of age with asthma

<table>
<thead>
<tr>
<th>Body weight</th>
<th>Initial and subsequent doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 to less than 30 kg</td>
<td>100 mg every other week (Q2W) or 300 mg every four weeks (Q4W)</td>
</tr>
<tr>
<td>30 kg to less than 60 kg</td>
<td>200 mg every other week (Q2W) or 300 mg every four weeks (Q4W)</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>200 mg every other week (Q2W)</td>
</tr>
</tbody>
</table>

For paediatric patients (6 to 11 years old) with asthma and co-morbid severe atopic dermatitis, as per approved indication, the recommended dose should be followed in Table 2.

Patients receiving concomitant oral corticosteroids may reduce their steroid dose once clinical improvement with dupilumab has occurred (see section 5.1). Steroid reductions should be accomplished gradually (see section 4.4).

Dupilumab is intended for long-term treatment. The need for continued therapy should be considered at least on an annual basis as determined by physician assessment of the patient’s level of asthma control.

Chronic rhinosinusitis with nasal polyposis (CRSwNP)

The recommended dose of dupilumab for adult patients is an initial dose of 300 mg followed by 300 mg given every other week.

Dupilumab is intended for long-term treatment. Consideration should be given to discontinuing treatment in patients who have shown no response after 24 weeks of treatment for CRSwNP. Some patients with initial partial response may subsequently improve with continued treatment beyond 24 weeks.

Missed dose
If a dose is missed, the dose should be administered as soon as possible. Thereafter, dosing should resume at the regular scheduled time.
Special populations

Elderly (≥ 65 years)
No dose adjustment is recommended for elderly patients (see section 5.2).

Renal impairment
No dose adjustment is needed in patients with mild or moderate renal impairment. Very limited data are available in patients with severe renal impairment (see section 5.2).

Hepatic impairment
No data are available in patients with hepatic impairment (see section 5.2).

Body weight
No dose adjustment for body weight is recommended for patients with asthma 12 years of age and older or in adults with atopic dermatitis or CRSwNP (see section 5.2).

Paediatric patients
The safety and efficacy of dupilumab in children with atopic dermatitis below the age of 6 years have not been established. The safety and efficacy of dupilumab in children with a body weight < 15 kg have not been established (see section 5.2). No data are available.

The safety and efficacy of dupilumab in children with severe asthma below the age of 6 years have not been established (see section 5.2). No data are available.

CRSwNP does not normally occur in children. The safety and efficacy in children with CRSwNP below the age of 18 years have not been established (see section 5.2). No data are available.

Method of administration

Subcutaneous use

The dupilumab pre-filled pen is not intended for use in children below 12 years of age. For children 6 to 11 years of age with atopic dermatitis and asthma, the dupilumab pre-filled syringe is the presentation appropriate for administration to this population.

Dupilumab is administered by subcutaneous injection into the thigh or abdomen, except for the 5 cm around the navel. If somebody else administers the injection, the upper arm can also be used.

For the initial 600 mg dose, two 300 mg injections should be administered consecutively in different injection sites.

It is recommended to rotate the injection site with each injection. Dupilumab should not be injected into skin that is tender, damaged or has bruises or scars.

A patient may self-inject dupilumab or the patient's caregiver may administer dupilumab if their healthcare professional determines that this is appropriate. Proper training should be provided to patients and/or caregivers on the preparation and administration of dupilumab prior to use according to the Instructions for Use (IFU) section at the end of the package leaflet.

4.3 Contraindications
Hypersensitivity to the active substance or to any of the excipients listed in section 6.1.

4.4 Special warnings and precautions for use

Traceability
In order to improve the traceability of biological medicinal products, the name and the batch number of the administered product should be clearly recorded.

**Acute asthma exacerbations**

Dupilumab should not be used to treat acute asthma symptoms or acute exacerbations. Dupilumab should not be used to treat acute bronchospasm or status asthmaticus.

**Corticosteroids**

Systemic, topical, or inhaled corticosteroids should not be discontinued abruptly upon initiation of therapy with dupilumab. Reductions in corticosteroid dose, if appropriate, should be gradual and performed under the direct supervision of a physician. Reduction in corticosteroid dose may be associated with systemic withdrawal symptoms and/or unmask conditions previously suppressed by systemic corticosteroid therapy.

Biomarkers of type 2 inflammation may be suppressed by systemic corticosteroid use. This should be taken into consideration to determine type 2 status in patients taking oral corticosteroids (see section 5.1).

**Hypersensitivity**

If a systemic hypersensitivity reaction (immediate or delayed) occurs, administration of dupilumab should be discontinued immediately and appropriate therapy initiated. Cases of anaphylactic reaction, angioedema, and serum sickness/serum sickness-like reaction have been reported. Anaphylactic reactions and angioedema have occurred from minutes to up to seven days after the dupilumab injection (see section 4.8).

**Eosinophilic conditions**

Cases of eosinophilic pneumonia and cases of vasculitis consistent with eosinophilic granulomatosis with polyangiitis (EGPA) have been reported with dupilumab in adult patients who participated in the asthma development program. Cases of vasculitis consistent with EGPA have been reported with dupilumab and placebo in adult patients with co-morbid asthma in the CRSwNP development program. Physicians should be alert to vasculitic rash, worsening pulmonary symptoms, cardiac complications, and/or neuropathy presenting in their patients with eosinophilia. Patients being treated for asthma may present with serious systemic eosinophilia sometimes presenting with clinical features of eosinophilic pneumonia or vasculitis consistent with eosinophilic granulomatosis with polyangiitis, conditions which are often treated with systemic corticosteroid therapy. These events usually, but not always, may be associated with the reduction of oral corticosteroid therapy.

**Helminth infection**

Patients with known helminth infections were excluded from participation in clinical studies. Dupilumab may influence the immune response against helminth infections by inhibiting IL-4/IL-13 signaling. Patients with pre-existing helminth infections should be treated before initiating dupilumab. If patients become infected while receiving treatment with dupilumab and do not respond to anti-helminth treatment, treatment with dupilumab should be discontinued until infection resolves. Cases of enterobiasis were reported in children 6 to 11 years old who participated in the paediatric asthma development program (see section 4.8).

**Conjunctivitis and keratitis related events**

Conjunctivitis and keratitis related events have been reported with dupilumab, predominantly in atopic dermatitis patients. Some patients reported visual disturbances (e.g. blurred vision) associated with conjunctivitis or keratitis (see section 4.8).
Patients should be advised to report new onset or worsening eye symptoms to their healthcare provider. Patients treated with dupilumab who develop conjunctivitis that does not resolve following standard treatment or signs and symptoms suggestive of keratitis should undergo ophthalmological examination, as appropriate (see section 4.8).

**Atopic dermatitis or CRSwNP patients with comorbid asthma**

Patients on dupilumab for moderate-to-severe atopic dermatitis or severe CRSwNP who also have comorbid asthma should not adjust or stop their asthma treatments without consultation with their physicians. Patients with comorbid asthma should be monitored carefully following discontinuation of dupilumab.

**Vaccinations**

Live and live attenuated vaccines should not be given concurrently with dupilumab as clinical safety and efficacy has not been established. Immune responses to Tdap vaccine and meningococcal polysaccharide vaccine were assessed (see section 4.5). It is recommended that patients should be brought up to date with live and live attenuated immunisations in agreement with current immunisation guidelines prior to treatment with dupilumab.

**Sodium content**

This medicinal product contains less than 1 mmol sodium (23 mg) per 300 mg dose, that is to say essentially “sodium-free”.

### 4.5 Interaction with other medicinal products and other forms of interaction

Immune responses to vaccination were assessed in a study in which patients with atopic dermatitis were treated once weekly for 16 weeks with 300 mg of dupilumab. After 12 weeks of dupilumab administration, patients were vaccinated with a Tdap vaccine (T cell-dependent), and a meningococcal polysaccharide vaccine (T cell-independent) and immune responses were assessed 4 weeks later. Antibody responses to both tetanus vaccine and meningococcal polysaccharide vaccine were similar in dupilumab-treated and placebo-treated patients. No adverse interactions between either of the non-live vaccines and dupilumab were noted in the study.

Therefore, patients receiving dupilumab may receive concurrent inactivated or non-live vaccinations. For information on live vaccines see section 4.4.

In a clinical study of atopic dermatitis patients, the effects of dupilumab on the pharmacokinetics (PK) of CYP substrates were evaluated. The data gathered from this study did not indicate clinically relevant effects of dupilumab on CYP1A2, CYP3A, CYP2C19, CYP2D6, or CYP2C9 activity.

An effect of dupilumab on the PK of co-administered medications is not expected. Based on the population analysis, commonly co-administered medications had no effect on dupilumab pharmacokinetics on patients with moderate to severe asthma.

### 4.6 Fertility, pregnancy and lactation

**Pregnancy**

There is a limited amount of data from the use of dupilumab in pregnant women. Animal studies do not indicate direct or indirect harmful effects with respect to reproductive toxicity (see section 5.3). Dupilumab should be used during pregnancy only if the potential benefit justifies the potential risk to the foetus.
Breast-feeding

It is unknown whether dupilumab is excreted in human milk or absorbed systemically after ingestion. A decision must be made whether to discontinue breast-feeding or to discontinue dupilumab therapy taking into account the benefit of breast feeding for the child and the benefit of therapy for the woman.

Fertility

Animal studies showed no impairment of fertility (see section 5.3).

4.7 Effects on ability to drive and use machines

Dupilumab has no or negligible influence on the ability to drive or operate machinery.

4.8 Undesirable effects

Summary of the safety profile

The most common adverse reactions are injection site reactions (includes erythema, oedema, pruritus, pain, and swelling), conjunctivitis, conjunctivitis allergic, arthralgia, oral herpes, and eosinophilia. Rare cases of serum sickness, serum sickness-like reaction, anaphylactic reaction, and ulcerative keratitis have been reported (see section 4.4).

Tabulated list of adverse reactions

Dupilumab was studied in 12 randomised, placebo-controlled trials, including atopic dermatitis, asthma, and CRSwNP patients. The pivotal controlled studies involved 4,206 patients receiving dupilumab and 2,326 patients receiving placebo during the controlled period.

Listed in Table 4 are adverse reactions observed in clinical trials and/or postmarketing setting presented by system organ class and frequency, using the following categories: very common (≥ 1/10); common (≥ 1/100 to < 1/10); uncommon (≥ 1/1,000 to < 1/100); rare (≥ 1/10,000 to < 1/1,000); very rare (< 1/10,000). Within each frequency grouping, adverse reactions are presented in order of decreasing seriousness.

<table>
<thead>
<tr>
<th>MedDRA System Organ Class</th>
<th>Frequency</th>
<th>Adverse Reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infections and infestations</td>
<td>Common</td>
<td>Conjunctivitis*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oral herpes*</td>
</tr>
<tr>
<td>Blood and lymphatic system disorders</td>
<td>Common</td>
<td>Eosinophilia</td>
</tr>
<tr>
<td>Immune system disorders</td>
<td>Uncommon</td>
<td>Angioedema§</td>
</tr>
<tr>
<td></td>
<td>Rare</td>
<td>Anaphylactic reaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Serum sickness reaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Serum sickness-like reaction</td>
</tr>
<tr>
<td>Eye disorders</td>
<td>Common</td>
<td>Conjunctivitis allergic*</td>
</tr>
<tr>
<td></td>
<td>Uncommon</td>
<td>Keratitis*#</td>
</tr>
<tr>
<td></td>
<td>Rare</td>
<td>Blepharitis*†</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eye pruritus*†</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dry eye*†</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ulcerative keratitis*†††</td>
</tr>
<tr>
<td>Skin and subcutaneous tissue disorders</td>
<td>Uncommon</td>
<td>Facial rash§</td>
</tr>
<tr>
<td>Musculoskeletal and connective tissue disorders</td>
<td>Common</td>
<td>Arthralgia[^a]</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>--------</td>
<td>---------------</td>
</tr>
<tr>
<td>General disorders and administration site conditions</td>
<td>Common</td>
<td>Injection site reactions (includes erythema, oedema, pruritus, pain, and swelling)</td>
</tr>
</tbody>
</table>

[^a]: Eye disorders and oral herpes occurred predominately in atopic dermatitis studies.
[^b]: The frequencies for eye pruritus, blepharitis, and dry eye were common and ulcerative keratitis was uncommon in atopic dermatitis studies.
[^c]: From postmarketing reporting.

Description of selected adverse reactions

**Hypersensitivity**
Cases of anaphylactic reaction, angioedema, and serum sickness/serum sickness-like reaction have been reported following administration of dupilumab (see section 4.4).

**Conjunctivitis and keratitis related events**
Conjunctivitis and keratitis occurred more frequently in atopic dermatitis patients who received dupilumab compared to placebo in atopic dermatitis studies. Most patients with conjunctivitis or keratitis recovered or were recovering during the treatment period. In the long-term OLE atopic dermatitis study (AD-1225) at 3 years, the respective rates of conjunctivitis and keratitis remained similar to those in the dupilumab arm in the placebo controlled atopic dermatitis studies. Among asthma patients frequency of conjunctivitis and keratitis was low and similar between dupilumab and placebo. Among CRSwNP patients the frequency of conjunctivitis was higher in dupilumab than placebo, though lower than that observed in atopic dermatitis patients. There were no cases of keratitis reported in the CRSwNP development program (see section 4.4).

**Eczema herpeticum**
Eczema herpeticum was reported in < 1% of the dupilumab groups and in < 1% of the placebo group in the 16-week atopic dermatitis monotherapy adult studies. In the 52-week atopic dermatitis dupilumab + TCS adult study, eczema herpeticum was reported in 0.2% of the dupilumab + TCS group and 1.9% of the placebo + TCS group. These rates remained stable at 3 years in the long-term OLE study (AD-1225).

**Eosinophilia**
Dupilumab-treated patients had a greater mean initial increase from baseline in eosinophil count compared to patients treated with placebo. Eosinophil counts declined to near baseline levels during study treatment and returned to baseline during the asthma open-label extension safety study (TRAVERSE). The mean blood eosinophil levels decreased to below baseline by week 20 and was maintained up to 3 years in the long-term OLE study (AD-1225).

Treatment-emergent eosinophilia (≥ 5,000 cells/mcL) was reported in < 2% of dupilumab-treated patients and < 0.5% in placebo-treated patients (SOLO1, SOLO2, AD-1021, DRI12544, QUEST, SINUS-24 and SINUS-52 studies) (see section 4.4).

**Infections**
In the 16-week atopic dermatitis monotherapy clinical adult studies, serious infections were reported in 1.0% of patients treated with placebo and 0.5% of patients treated with dupilumab. In the 52-week atopic dermatitis CHRONOS adult study, serious infections were reported in 0.6% of patients treated with placebo and 0.2% of patients treated with dupilumab. The rates of serious infections remained stable at 3 years in the long-term OLE study (AD-1225).
No increase was observed in the overall incidence of infections with dupilumab compared to placebo in the safety pool for asthma clinical studies. In the 24-week safety pool, serious infections were reported in 1.0% of patients treated with dupilumab and 1.1% of patients treated with placebo. In the 52-week QUEST study, serious infections were reported in 1.3% of patients treated with dupilumab and 1.4% of patients treated with placebo.

No increase was observed in the overall incidence of infections with dupilumab compared to placebo in the safety pool for CRSwNP clinical studies. In the 52-week SINUS-52 study, serious infections were reported in 1.3% of patients treated with dupilumab and 1.3% of patients treated with placebo.

Immunogenicity

As with all therapeutic proteins, there is a potential for immunogenicity with dupilumab.

Anti-Drug-Antibodies (ADA) responses were not generally associated with impact on dupilumab exposure, safety, or efficacy.

Approximately 5% of patients with atopic dermatitis, asthma, or CRSwNP who received dupilumab 300 mg Q2W for 52 weeks developed ADA to dupilumab; approximately 2% exhibited persistent ADA responses and approximately 2% had neutralizing antibodies. Similar results were observed in paediatric patients (6 to 11 years of age) with atopic dermatitis who received dupilumab 200 mg Q2W or 300 mg Q4W for 16 weeks and patients (6 to 11 years of age) with asthma who received dupilumab 100 mg Q2W or 200 mg Q2W for 52 weeks. Similar ADA responses were observed in adult patients with atopic dermatitis treated with dupilumab for up to 3 years in the long-term OLE study (AD-1225).

Approximately 16% of adolescent patients with atopic dermatitis who received dupilumab 300 mg or 200 mg Q2W for 16 weeks developed antibodies to dupilumab; approximately 3% exhibited persistent ADA responses, and approximately 5% had neutralizing antibodies.

Approximately 9% of patients with asthma who received dupilumab 200 mg Q2W for 52 weeks developed antibodies to dupilumab; approximately 4% exhibited persistent ADA responses and approximately 4% had neutralizing antibodies.

Regardless of age or population, approximately 2 to 4% of patients in the placebo groups were positive for antibodies to dupilumab; approximately 2% exhibited persistent ADA response and approximately 1% had neutralizing antibodies.

Less than 1% of patients who received dupilumab at approved dosing regimens exhibited high titer ADA responses associated with reduced exposure and efficacy. In addition, there was one patient with serum sickness and one with serum sickness-like reaction (< 0.1%) associated with high ADA titers (see section 4.4).

Paediatric population

Atopic dermatitis

The safety of dupilumab was assessed in a study of 250 patients 12 to 17 years of age with moderate-to-severe atopic dermatitis (AD-1526). The safety profile of dupilumab in these patients followed through week 16 was similar to the safety profile from studies in adults with atopic dermatitis.

Asthma

A total of 107 adolescents aged 12 to 17 years with asthma were enrolled in the 52 week QUEST study. The safety profile observed was similar to that seen in adults.

The long-term safety of dupilumab was assessed in 89 adolescent patients who were enrolled in an open-label extension study in moderate-to-severe asthma (TRAVERSE). In this study, patients were
followed for up to 96 weeks. The safety profile of dupilumab in TRAVERSE was consistent with the safety profile observed in pivotal asthma studies for up to 52 weeks of treatment.

In children 6 to 11 years of age with moderate-to-severe asthma (VOYAGE), the additional adverse reaction of enterobiasis was reported in 1.8% (5 patients) in the dupilumab groups and none in the placebo group. All enterobiasis cases were mild to moderate and patients recovered with anti-helminth treatment without dupilumab treatment discontinuation.

In children 6 to 11 years of age with moderate-to-severe asthma, eosinophilia (blood eosinophils ≥ 3,000 cells/mcL or deemed by the investigator to be an adverse event) was reported in 6.6% of the dupilumab groups and 0.7% in the placebo group. Most eosinophilia cases were mild to moderate and not associated with clinical symptoms. These cases were transient, decreased over time, and did not lead to dupilumab treatment discontinuation.

**Long-term safety**

**Atopic dermatitis**
The safety profile of dupilumab + TCS (CHRONOS) in adult atopic dermatitis patients) through week 52 was consistent with the safety profile observed at week 16. The long-term safety of dupilumab was assessed in an open-label extension study in patients 6 to 17 years of age with moderate-to-severe atopic dermatitis (AD-1434). The safety profile of dupilumab in patients followed through week 52 was similar to the safety profile observed at week 16 in the AD-1526 and AD-1652 studies. The long-term safety profile of dupilumab observed in children and adolescents was consistent with that seen in adults with atopic dermatitis.

In a phase 3, multicentre, open label extension (OLE) study (AD-1225), the long-term safety of repeat doses of dupilumab was assessed in 2,677 adults with moderate-to-severe AD exposed to 300 mg weekly dosing (99.7%), including 347 who completed at least 148 weeks of the study. The long-term safety profile observed in this study up to 3 years was generally consistent with the safety profile of dupilumab observed in controlled studies.

**Asthma**
The safety profile of dupilumab in the 96 weeks long term safety study (TRAVERSE) was consistent with the safety profile observed in pivotal asthma studies for up to 52 weeks of treatment.

**CRSwNP**
The safety profile of dupilumab in adults with CRSwNP through week 52 was consistent with the safety profile observed at week 24.

**Reporting of suspected adverse reactions**

Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via the national reporting system listed in Appendix V.

**4.9 Overdose**

There is no specific treatment for dupilumab overdose. In the event of overdose, monitor the patient for any signs or symptoms of adverse reactions and institute appropriate symptomatic treatment immediately.
5. **PHARMACOLOGICAL PROPERTIES**

5.1 **Pharmacodynamic properties**

Pharmacotherapeutic group: Other dermatological preparations, agents for dermatitis, excluding corticosteroids, ATC code: D11AH05

**Mechanism of action**

Dupilumab is a recombinant human IgG4 monoclonal antibody that inhibits interleukin-4 and interleukin-13 signaling. Dupilumab inhibits IL-4 signaling via the Type I receptor (IL-4Rα/γc), and both IL-4 and IL-13 signaling through the Type II receptor (IL-4Rα/IL-13Rα). IL-4 and IL-13 are major drivers of human type 2 inflammatory disease, such as atopic dermatitis, asthma, and CRSwNP. Blocking the IL-4/IL-13 pathway with dupilumab in patients decreases many of the mediators of type 2 inflammation.

**Pharmacodynamic effects**

In atopic dermatitis clinical trials, treatment with dupilumab was associated with decreases from baseline in concentrations of type 2 immunity biomarkers, such as thymus and activation-regulated chemokine (TARC/CCL17), total serum IgE and allergen-specific IgE in serum. A reduction of lactate dehydrogenase (LDH), a biomarker associated with AD disease activity and severity, was observed with dupilumab treatment in adults and adolescents with atopic dermatitis.

In adult and adolescent patients with asthma, dupilumab treatment relative to placebo markedly decreased FeNO and circulating concentrations of eotaxin-3, total IgE, allergen specific IgE, TARC, and periostin, the type 2 biomarkers evaluated in clinical trials. These reductions in type 2 inflammatory biomarkers were comparable for the 200 mg Q2W and 300 mg Q2W regimens. In paediatric (6 to 11 years of age) patients with asthma, dupilumab treatment relative to placebo markedly decreased FeNO and circulating concentrations of total IgE, allergen specific IgE, and TARC, the type 2 biomarkers evaluated in clinical trials. These markers were near maximal suppression after 2 weeks of treatment, except for IgE which declined more slowly. These effects were sustained throughout treatment.

**Clinical efficacy and safety in atopic dermatitis**

*Adults with atopic dermatitis*

The efficacy and safety of dupilumab as monotherapy and with concomitant topical corticosteroids were evaluated in three pivotal randomised, double-blind, placebo-controlled studies (SOLO 1, SOLO 2, and CHRONOS) in 2,119 patients 18 years of age and older with moderate to severe atopic dermatitis (AD) defined by Investigator’s Global Assessment (IGA) score ≥ 3, an Eczema Area and Severity Index (EASI) score ≥ 16, and a minimum body surface area (BSA) involvement of ≥ 10%.

Eligible patients enrolled into the three studies had previous inadequate response to topical medication.

In all three studies, patients received 1) an initial dose of 600 mg dupilumab (two 300 mg injections) on day 1, followed by 300 mg once every two weeks (Q2W); 2) an initial dose of 600 mg dupilumab on day 1, followed by 300 mg once weekly (QW); or 3) matching placebo. Dupilumab was administered by subcutaneous (SC) injection in all studies. If needed to control intolerable symptoms of atopic dermatitis, patients were permitted to receive rescue treatment (which included higher potency topical steroids or systemic immunosuppressants) at the discretion of the investigator. Patients who received rescue treatment were considered non-responders.

SOLO 1 enrolled 671 patients (224 to placebo, 224 to dupilumab 300 mg Q2W, and 223 to dupilumab 300 mg QW) and had a treatment period of 16 weeks.
SOLO 2 enrolled 708 patients (236 to placebo, 233 to dupilumab 300 mg Q2W, and 239 to dupilumab 300 mg QW) and had a treatment period of 16 weeks.

CHRONOS enrolled 740 patients (315 to placebo + topical corticosteroid (TCS), 106 to dupilumab 300 mg Q2W + TCS, and 319 to dupilumab 300 mg QW + TCS) and had a treatment period of 52 weeks. Patients received dupilumab or placebo with concomitant use of TCS starting at baseline using a standardized regimen. Patients were also permitted to use topical calcineurin inhibitors (TCI).

Endpoints
In all three pivotal studies, the co-primary endpoints were the proportion of patients with IGA 0 or 1 (“clear” or “almost clear”) with a reduction of ≥ 2 points on a 0-4 IGA scale and the proportion of patients with improvement of at least 75 % in EASI (EASI-75) from baseline to week 16. Other evaluated outcomes included the proportion of patients with improvement of at least 50 % and 90 % in EASI (EASI-50 and EASI-90, respectively), reduction in itch as measured by the peak pruritus Numerical Rating Scale (NRS), and percent change in the SCORing Atopic Dermatitis (SCORAD) scale from baseline to week 16. Additional secondary endpoints included mean change from baseline to week 16 in the Patient Oriented Eczema Measure (POEM), Dermatology Life Quality Index (DLQI), and Hospital Anxiety and Depression Scale (HADS) scores. In CHRONOS, efficacy was also evaluated at week 52.

Baseline Characteristics
In the monotherapy studies (SOLO 1 and SOLO 2), across all treatment groups, the mean age was 38.3, the mean weight was 76.9 kg, 42.1 % were female, 68.1 % were white, 21.8 % were Asian, and 6.8 % were black. In these studies, 51.6 % of patients had a baseline IGA score of 3 (moderate AD), 48.3 % of patients had a baseline IGA of 4 (severe AD) and 32.4 % of patients had received prior systemic immunosuppressants. The baseline mean EASI score was 33.0, the baseline weekly averaged pruritus NRS was 7.4, the baseline mean SCORAD score was 67.8, the baseline mean POEM score was 20.5, the baseline mean DLQI was 15.0, and the baseline mean HADS total score was 13.3.

In the concomitant TCS study (CHRONOS), across all treatment groups, the mean age was 37.1, the mean weight was 74.5 kg, 39.7 % were female, 66.2 % were white, 27.2 % were Asian, and 4.6 % were black. In this study, 53.1 % of patients had a baseline IGA score of 3 and 46.9 % of patients had a baseline IGA of 4 and 33.6 % of patients received prior systemic immunosuppressants. The baseline mean EASI score was 32.5, the baseline weekly pruritus NRS was 7.3, the baseline mean SCORAD score was 66.4, the baseline mean POEM score was 20.1, the baseline mean DLQI was 14.5, and the baseline mean HADS total score was 12.7.

Clinical Response

16-week Monotherapy Studies (SOLO 1 and SOLO 2)

In SOLO 1 and SOLO 2, from baseline to week 16, a significantly greater proportion of patients randomised to dupilumab achieved an IGA 0 or 1 response, EASI-75, and/or an improvement of ≥ 4 points on the pruritus NRS compared to placebo (see Table 5).

A significantly greater proportion of patients randomised to dupilumab achieved a rapid improvement in the pruritus NRS compared to placebo (defined as ≥ 4-point improvement as early as week 2; p < 0.01) and the proportion of patients responding on the pruritus NRS continued to increase through the treatment period. The improvement in pruritus NRS occurred in conjunction with the improvement of objective signs of atopic dermatitis.

Figure 1 and Figure 2 show the mean percent change from baseline in EASI and the mean percent change from baseline in NRS, respectively up to week 16.

Table 5: Efficacy results of dupilumab monotherapy at week 16 (FAS)
<table>
<thead>
<tr>
<th>Patients randomised</th>
<th>Placebo</th>
<th>Dupilumab 300 mg Q2W</th>
<th>Dupilumab 300 mg QW</th>
<th>Placebo</th>
<th>Dupilumab 300 mg Q2W</th>
<th>Dupilumab 300 mg QW</th>
</tr>
</thead>
<tbody>
<tr>
<td>IGA 0 or 1%, % responders inspected</td>
<td>10.3%</td>
<td>37.9%e</td>
<td>37.2%e</td>
<td>8.5%</td>
<td>36.1%e</td>
<td>36.4%e</td>
</tr>
<tr>
<td>EASI-50, % responders inspected</td>
<td>24.6%</td>
<td>68.8%e</td>
<td>61.0%e</td>
<td>22.0%</td>
<td>65.2%e</td>
<td>61.1%e</td>
</tr>
<tr>
<td>EASI-75, % responders inspected</td>
<td>14.7%</td>
<td>51.3%e</td>
<td>52.5%e</td>
<td>11.9%</td>
<td>44.2%e</td>
<td>48.1%e</td>
</tr>
<tr>
<td>EASI-90, % responders inspected</td>
<td>7.6%</td>
<td>35.7%e</td>
<td>33.2%e</td>
<td>7.2%</td>
<td>30.0%e</td>
<td>30.5%e</td>
</tr>
<tr>
<td>EASI, LS mean % change from baseline (+/- SE)</td>
<td>-37.6% (3.28)</td>
<td>-72.3%e (2.63)</td>
<td>-72.0%e (2.56)</td>
<td>-30.9% (2.97)</td>
<td>-67.1%e (2.52)</td>
<td>-69.1%e (2.49)</td>
</tr>
<tr>
<td>SCORAD, LS mean % change from baseline (+/- SE)</td>
<td>-29.0% (3.21)</td>
<td>-57.7%e (2.11)</td>
<td>-57.0%e (2.11)</td>
<td>-19.7% (2.52)</td>
<td>-51.1%e (2.02)</td>
<td>-53.5%e (2.03)</td>
</tr>
<tr>
<td>Pruritus NRS, LS mean % change from baseline (+/- SE)</td>
<td>-26.1% (3.02)</td>
<td>-51.0%e (2.50)</td>
<td>-48.9%e (2.60)</td>
<td>-15.4% (2.98)</td>
<td>-44.3%e (2.28)</td>
<td>-48.3%e (2.35)</td>
</tr>
<tr>
<td>Number of patients with baseline pruritus NRS score &gt; 4</td>
<td>212</td>
<td>213</td>
<td>201</td>
<td>221</td>
<td>225</td>
<td>228</td>
</tr>
<tr>
<td>Pruritus NRS (≥ 4-point improvement), % responders inspected</td>
<td>12.3%</td>
<td>40.8%e</td>
<td>40.3%e</td>
<td>9.5%</td>
<td>36.0%e</td>
<td>39.0%e</td>
</tr>
</tbody>
</table>

LS = least squares; SE = standard error

a Full analysis set (FAS) includes all patients randomised.
b Responder was defined as a patient with IGA 0 or 1 (“clear” or “almost clear”) with a reduction of ≥ 2 points on a 0-4 IGA scale.
c Patients who received rescue treatment or with missing data were considered as non-responders.
d A significantly greater proportion of patients on dupilumab had improvement in pruritus NRS of ≥ 4 points compared to placebo at week 2 (p < 0.01).
e p-value < 0.0001

Figure 1: Mean percent change from baseline in EASI in SOLO 1a and SOLO 2a (FAS)b

SOLO 1 | SOLO 2

<table>
<thead>
<tr>
<th></th>
<th>SOLO 1 (FAS)a</th>
<th>SOLO 2 (FAS)b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placebo</td>
<td>224</td>
<td>224</td>
</tr>
<tr>
<td>Dupilumab 300 mg Q2W</td>
<td>223</td>
<td>236</td>
</tr>
<tr>
<td>Dupilumab 300 mg QW</td>
<td>233</td>
<td>239</td>
</tr>
</tbody>
</table>
LS = least squares

a In the primary analyses of the efficacy endpoints, patients who received rescue treatment or with missing data were considered non-responders.

b Full analysis set (FAS) includes all patients randomised.
LS = least squares  

\(^a\) In the primary analyses of the efficacy endpoints, patients who received rescue treatment or with missing data were considered non-responders  

\(^b\) Full analysis set (FAS) includes all patients randomised. 

Treatment effects in subgroups (weight, age, gender, race, and background treatment, including immunosuppressants) in SOLO 1 and SOLO 2 were consistent with the results in the overall study population.

**52-week concomitant TCS study (CHRONOS)**

In CHRONOS, a significantly greater proportion of patients randomised to dupilumab 300 mg Q2W + TCS achieved an IGA 0 or 1 response, EASI-75, and/or an improvement of \( \geq 4 \) points on the pruritus NRS from baseline to week 16 and week 52 compared to placebo + TCS (see Table 6).

A significantly greater proportion of patients randomised to dupilumab + TCS achieved a rapid improvement in the pruritus NRS compared to placebo + TCS (defined as \( \geq 4 \)-point improvement as early as week 2; \( p < 0.05 \)) and the proportion of patients responding on the pruritus NRS continued to increase through the treatment period. The improvement in pruritus NRS occurred in conjunction with the improvement of objective signs of atopic dermatitis.

Figure 3 and Figure 4 show the mean percent change from baseline in EASI and the mean percent change from baseline in NRS, respectively, up to week 52 in CHRONOS.

**Table 6: Efficacy results of dupilumab with concomitant TCS\(^a\) at week 16 and week 52 in CHRONOS**

<table>
<thead>
<tr>
<th>Patients randomised</th>
<th>week 16 (FAS)(^b)</th>
<th>week 52 (FAS Week 52)(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients randomised</td>
<td>Placebo + TCS</td>
<td>Dupilumab 300 mg Q2W + TCS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Placebo + TCS</td>
</tr>
<tr>
<td></td>
<td>315</td>
<td>106</td>
</tr>
<tr>
<td></td>
<td>319</td>
<td>264</td>
</tr>
<tr>
<td></td>
<td>89</td>
<td>270</td>
</tr>
<tr>
<td>Placebo + TCS</td>
<td>315</td>
<td>106</td>
</tr>
<tr>
<td>Dupilumab 300 mg Q2W + TCS</td>
<td>319</td>
<td>264</td>
</tr>
<tr>
<td></td>
<td>Placebo + TCS</td>
<td>106</td>
</tr>
<tr>
<td>Dupilumab 300 mg Q2W + TCS</td>
<td>264</td>
<td>89</td>
</tr>
<tr>
<td></td>
<td>Placebo + TCS</td>
<td>264</td>
</tr>
<tr>
<td>Dupilumab 300 mg QW + TCS</td>
<td>89</td>
<td>36.0 %(^f)</td>
</tr>
<tr>
<td></td>
<td>270</td>
<td>40.0 %(^f)</td>
</tr>
<tr>
<td>Placebo + TCS</td>
<td>315</td>
<td>106</td>
</tr>
<tr>
<td>Dupilumab 300 mg Q2W + TCS</td>
<td>319</td>
<td>264</td>
</tr>
<tr>
<td></td>
<td>Placebo + TCS</td>
<td>106</td>
</tr>
<tr>
<td>Dupilumab 300 mg QW + TCS</td>
<td>264</td>
<td>89</td>
</tr>
<tr>
<td></td>
<td>Placebo + TCS</td>
<td>264</td>
</tr>
<tr>
<td>Dupilumab 300 mg Q2W + TCS</td>
<td>89</td>
<td>36.0 %(^f)</td>
</tr>
<tr>
<td></td>
<td>270</td>
<td>40.0 %(^f)</td>
</tr>
</tbody>
</table>

\(^a\) In the primary analyses of the efficacy endpoints, patients who received rescue treatment or with missing data were considered non-responders  

\(^b\) Full analysis set (FAS) includes all patients randomised.  

\(^c\) IGA 0 or 1, % responders  

\(^d\) % responders  

\(^e\) Placebo + TCS  

\(^f\) Placebo + TCS
All patients were on background topical corticosteroids therapy and patients were permitted to use topical calcineurin inhibitors.

Full analysis set (FAS) includes all patients randomised. FAS week 52 includes all patients randomised at least one year before the cutoff date of the primary analysis.

Responder was defined as a patient with IGA 0 or 1 ("clear" or "almost clear") with a reduction of ≥2 points on a 0-4 IGA scale.

Patients who received rescue treatment or with missing data were considered as non-responders.

A significantly greater proportion of patients on dupilumab had improvement in pruritus NRS of ≥4 points compared to placebo at week 2 (p < 0.05).

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Number of patients with baseline pruritus NRS score ≥4</th>
</tr>
</thead>
<tbody>
<tr>
<td>EASI-50, % responders</td>
<td>37.5 %</td>
</tr>
<tr>
<td>EASI-75, % responders</td>
<td>23.2 %</td>
</tr>
<tr>
<td>EASI-90, % responders</td>
<td>11.1 %</td>
</tr>
<tr>
<td>EASI, LS mean % change from baseline (+/- SE)</td>
<td>-48.4 % (3.82)</td>
</tr>
<tr>
<td>SCORAD, LS mean % change from baseline (+/- SE)</td>
<td>-36.2 % (1.66)</td>
</tr>
<tr>
<td>Pruritus NRS, LS mean % change from baseline (+/- SE)</td>
<td>-30.3 % (2.36)</td>
</tr>
<tr>
<td>Number of patients with baseline pruritus NRS score ≥4</td>
<td>299</td>
</tr>
<tr>
<td>Pruritus NRS (≥4-point improvement), % responders</td>
<td>19.7 %</td>
</tr>
</tbody>
</table>

LS = least squares; SE = standard error

*a* All patients were on background topical corticosteroids therapy and patients were permitted to use topical calcineurin inhibitors.

*b* Full analysis set (FAS) includes all patients randomised. FAS week 52 includes all patients randomised at least one year before the cutoff date of the primary analysis.

*c* Responder was defined as a patient with IGA 0 or 1 ("clear" or "almost clear") with a reduction of ≥2 points on a 0-4 IGA scale.

*d* Patients who received rescue treatment or with missing data were considered as non-responders.

*e* A significantly greater proportion of patients on dupilumab had improvement in pruritus NRS of ≥4 points compared to placebo at week 2 (p < 0.05).

*f* p-value < 0.0001

*g* p-value = 0.0015

*h* p-value = 0.0003

*i* p-value = 0.0005
LS = least squares

In the primary analyses of the efficacy endpoints, patients who received rescue treatment or with missing data were considered non-responders.

FAS week 52 includes all patients randomised at least one year before the cutoff date of the primary analysis.

Treatment effects in subgroups (weight, age, gender, race, and background treatment, including immunosuppressants) in CHRONOS were consistent with the results in the overall study population.
Clinical response in patients not adequately controlled with, intolerant to, or for whom ciclosporin treatment was inadvisable (CAFE study)

CAFE study evaluated the efficacy of dupilumab compared to placebo during a 16-week treatment period, administered with concomitant TCS, in adult patients with AD who are not adequately controlled with, or are intolerant to, oral ciclosporin, or when this treatment is currently contraindicated or not medically advisable.

A total of 325 patients were enrolled, with 210 patients who were previously exposed to ciclosporin and 115 patients who have never been exposed to ciclosporin because ciclosporin treatment was medically inadvisable. The mean age was 38.4 years, 38.8% were female, the baseline mean EASI score was 33.1, the mean BSA was 55.7, the baseline weekly average pruritis NRS was 6.4, the baseline mean SCORAD score was 67.2, and the baseline mean DLQI was 13.8.

The primary endpoint was the proportion of patients with EASI-75 at week 16.

Primary and secondary endpoints for the 16 week CAFE study are summarized in table 7.

Table 7: Results of the primary and secondary endpoints in CAFE study

<table>
<thead>
<tr>
<th>Patients randomised</th>
<th>Placebo + TCS</th>
<th>Dupilumab 300 mg Q2W + TCS</th>
<th>Dupilumab 300 mg QW+TCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>EASI-75, % responders</td>
<td>108</td>
<td>107</td>
<td>110</td>
</tr>
<tr>
<td>EASI, LS mean % change from baseline (+/- SE)</td>
<td>29.6 %</td>
<td>62.6 %</td>
<td>59.1 %</td>
</tr>
<tr>
<td>Pruritus NRS, LS mean % change from baseline (+/- SE)</td>
<td>-46.6</td>
<td>-79.8</td>
<td>-78.2</td>
</tr>
<tr>
<td>Pruritus NRS, LS mean % change from baseline (+/- SE)</td>
<td>(2.76)</td>
<td>(2.59)</td>
<td>(2.55)</td>
</tr>
<tr>
<td>SCORAD, LS mean % change from baseline (+/- SE)</td>
<td>-25.4 %</td>
<td>-53.9 %</td>
<td>-51.7 %</td>
</tr>
<tr>
<td>SCORAD, LS mean % change from baseline (+/- SE)</td>
<td>(3.39)</td>
<td>(3.14)</td>
<td>(3.09)</td>
</tr>
<tr>
<td>DLQI, LS mean change from baseline (SE)</td>
<td>-29.5 %</td>
<td>-62.4 %</td>
<td>-58.3 %</td>
</tr>
<tr>
<td>DLQI, LS mean change from baseline (SE)</td>
<td>(2.55)</td>
<td>(2.48)</td>
<td>(2.45)</td>
</tr>
<tr>
<td>DLQI, LS mean change from baseline (SE)</td>
<td>-4.5</td>
<td>-9.5</td>
<td>-8.8</td>
</tr>
<tr>
<td>DLQI, LS mean change from baseline (SE)</td>
<td>(0.49)</td>
<td>(0.46)</td>
<td>(0.45)</td>
</tr>
</tbody>
</table>

(all p-values <0.0001)

In the subgroup of patients resembling the CAFE study population within the 52 week CHRONOS study, 69.6% of dupilumab 300 mg Q2W-treated patients reached EASI-75 vs 18.0% placebo-treated patients at week 16, and 52.4% of dupilumab 300 mg Q2W-treated vs 18.6% placebo-treated at week 52. In this subset, the percent change of pruritus NRS from baseline was -51.4% vs -30.2% at week 16 and -54.8% vs -30.9% at week 52, for the dupilumab 300 mg Q2W and placebo groups respectively.

Maintenance and durability of response (SOLO CONTINUE study)

To evaluate maintenance and durability of response, subjects treated with dupilumab for 16 weeks in SOLO 1 and SOLO 2 studies who achieved IGA 0 or 1 or EASI-75 were re-randomised in SOLO CONTINUE study to an additional 36-week treatment of dupilumab or placebo, for a cumulative 52-week study treatment. Endpoints were assessed at weeks 51 or 52.

The co-primary endpoints were the difference between baseline (week 0) and week 36 in percent change in EASI from SOLO 1 and SOLO 2 studies baseline and percentage of patients with EASI-75 at week 36 in patients with EASI-75 at baseline.

Patients who continued on the same dose regimen received in the SOLO 1 and SOLO 2 studies (300 mg Q2W or 300 mg QW) showed the optimal effect in maintaining clinical response while efficacy for other dose regimens diminished in a dose-dependent manner.

Primary and secondary endpoints for the 52 week SOLO CONTINUE study are summarized in table 8.
Table 8: Results of the primary and secondary endpoints in SOLO CONTINUE study

<table>
<thead>
<tr>
<th>Co-Primary Endpoints</th>
<th>Placebo</th>
<th>Dupilumab 300 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=83</td>
<td>Q8W N=84</td>
</tr>
<tr>
<td>LS mean change (SE)</td>
<td>21.7 (3.13)</td>
<td>6.8*** (2.43)</td>
</tr>
<tr>
<td>between baseline and week 36 in percent change in EASI Score from Parent Study baseline</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of patients with EASI-75 at week 36 for patients with EASI-75 at baseline, n (%)</td>
<td>24/79 (30.4%)</td>
<td>45/82* (54.9%)</td>
</tr>
</tbody>
</table>

**Key Secondary Endpoints**

| Percent of patients whose IGA response at week 36 was maintained within 1 point of baseline in the subset of patients with IGA (0,1) at baseline, n (%) | 18/63 (28.6%) | 32/64† (50.0%) | 41/66** (62.1%) | 89/126*** (70.6%) |
| Percent of patients with IGA (0,1) at week 36 in the subset of patients with IGA (0,1) at baseline, n (%) | 9/63 (14.3%) | 21/64† (32.8%) | 29/66** (43.9%) | 68/126*** (54.0%) |
| Percent of patients whose peak pruritus NRS increased by ≥ 3 points from baseline to week 35 in the subset of patients with peak pruritus NRS ≤ 7 at baseline, n (%) | 56/80 (70.0%) | 45/81 (55.6%) | 41/83† (49.4%) | 57/168*** (33.9%) |

P< 0.05, *P< 0.01, **P< 0.001, ***P≤ 0.0001

In SOLO CONTINUE, a trend for increased treatment-emergent ADA positivity with increased dosing intervals was observed. Treatment-emergent ADA: QW: 1.2 %; Q2W: 4.3 %; Q4W: 6.0 %; Q8W: 11.7 %. ADA responses lasting more than 12 weeks: QW: 0.0 %; Q2W: 1.4 %; Q4W: 0.0 %; Q8W: 2.6 %.

Quality of life/patient-reported outcomes in atopic dermatitis

In both monotherapy studies (SOLO 1 and SOLO 2), both dupilumab 300 mg Q2W and 300 mg QW groups significantly improved patient-reported symptoms and the impact of AD on sleep and health-related quality of life as measured by POEM and DLQI total scores, respectively, at 16 weeks compared to placebo. A significantly larger proportion of patients administered dupilumab groups had clinically meaningful reductions in POEM and DLQI total score (each defined as ≥ 4 points improvement) from baseline to week 16 compared to placebo group. In addition, anxiety and depression symptoms as measured by the HADS total score were significantly reduced in the dupilumab groups compared to placebo at 16 weeks. In a subset of patients with HADS-anxiety or HADS-depression subscale scores ≥ 8 at baseline (the cut-off value for anxiety or depression), a larger proportion of patients in the dupilumab groups achieved HADS-anxiety and HADS-depression scores < 8 at week 16 compared to placebo (See Table 9).

Table 9: Additional secondary endpoint results of dupilumab monotherapy at week 16

<table>
<thead>
<tr>
<th>Monotherapy</th>
<th>SOLO 1 at week 16</th>
<th>SOLO 2 at week 16</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Placebo</td>
<td>Dupilumab 300 mg Q2W</td>
</tr>
<tr>
<td>Patients randomised</td>
<td>224</td>
<td>224</td>
</tr>
</tbody>
</table>
### Monotherapy

<table>
<thead>
<tr>
<th></th>
<th>SOLO 1 at week 16</th>
<th>SOLO 2 at week 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLQI, LS mean change from baseline (SE)</td>
<td>-5.3 (0.50)</td>
<td>-9.3a (0.40)</td>
</tr>
<tr>
<td>POEM, LS mean change from baseline (SE)</td>
<td>-5.1 (0.67)</td>
<td>-11.6a (0.49)</td>
</tr>
<tr>
<td>HADS, LS mean change from baseline (SE)</td>
<td>-3.0 (0.65)</td>
<td>-5.2b (0.54)</td>
</tr>
</tbody>
</table>

|                               |                  |                  |                  |                  |                  |                  |
| Number of patients with DLQI ≥4 at baseline | 213 | 209 | 209 | 225 | 223 | 234 |
| DLQI (≥ 4-point improvement), % responders | 30.5 % | 64.1 %a | 58.4 %a | 27.6 % | 73.1 %a | 62.0 %a |

|                               |                  |                  |                  |                  |                  |                  |
| Number of patients with POEM ≥4 at baseline | 223 | 222 | 222 | 234 | 233 | 239 |
| POEM (≥ 4-point improvement), % responders | 26.9 % | 67.6 %a | 63.1 %a | 24.4 % | 71.7 %a | 64.0 %a |

|                               |                  |                  |                  |                  |                  |                  |
| Number of patients with HADS-anxiety ≥ 8 or HADS-depression ≥ 8 at baseline | 97 | 100 | 102 | 115 | 129 | 136 |
| Patients achieving HADS-anxiety and HADS-depression score < 8, % | 12.4 % | 41.0 %a | 36.3 %b | 6.1 % | 39.5 %a | 41.2 %a |

|                  |                  |                  |                  |                  |                  |                  |
| LS = least squares; SE = standard error |                  |                  |                  |                  |                  |                  |
| a p-value < 0.0001 |                  |                  |                  |                  |                  |                  |
| b p-value < 0.001 |                  |                  |                  |                  |                  |                  |

In the concomitant TCS study (CHRONOS), dupilumab 300 mg Q2W + TCS and dupilumab 300 mg QW + TCS improved patient-reported symptoms and the impact of AD on sleep and health-related quality of life as measured by POEM and DLQI total scores, respectively, at 52 weeks compared to placebo + TCS. A larger proportion of patients administered dupilumab 300 mg Q2W + TCS and 300 mg QW + TCS had clinically meaningful reductions in POEM and DLQI total score (each defined as ≥ 4-point improvement) from baseline to week 52 compared to the placebo + TCS. In addition, dupilumab 300 mg Q2W + TCS and 300 mg QW + TCS reduced anxiety and depression as measured by the HADS total score at 52 weeks compared to placebo + TCS. In a post-hoc analysis in a subset of patients with HADS-anxiety or HADS-depression subscale scores ≥ 8 at baseline (the cut-off value for anxiety or depression), a larger proportion of patients in the dupilumab 300 mg Q2W + TCS and
300 mg QW + TCS groups achieved HADS-anxiety and HADS-depression scores < 8 at week 52 compared to placebo + TCS (See Table 10).

Table 10: Other secondary endpoint results of dupilumab with concomitant TCS at week 16 and week 52 in CHRONOS

<table>
<thead>
<tr>
<th>Concomitant Use of TCS</th>
<th>CHRONOS at week 16</th>
<th>CHRONOS at week 52</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Placebo</td>
<td>Dupilumab 300 mg Q2W + TCS</td>
</tr>
<tr>
<td><strong>Patients randomised</strong></td>
<td>315</td>
<td>106</td>
</tr>
<tr>
<td>DLQI, LS mean change from baseline (SE)</td>
<td>-5.8 (0.34)</td>
<td>-10.0a (0.50)</td>
</tr>
<tr>
<td>POEM, LS mean change from baseline (SE)</td>
<td>-5.3 (0.41)</td>
<td>-12.7a (0.64)</td>
</tr>
<tr>
<td>HADS, LS mean change from baseline (SE)</td>
<td>-4.0 (0.37)</td>
<td>-4.9 (0.58)</td>
</tr>
<tr>
<td><strong>Number of patients with DLQI ≥ 4 at baseline</strong></td>
<td>300</td>
<td>100</td>
</tr>
<tr>
<td>DLQI (≥ 4-point improvement), % responders</td>
<td>43.0 %</td>
<td>81.0 %a</td>
</tr>
<tr>
<td><strong>Number of patients with POEM ≥ 4 at baseline</strong></td>
<td>312</td>
<td>106</td>
</tr>
<tr>
<td>POEM (≥ 4-point improvement), % responders</td>
<td>36.9 %</td>
<td>77.4 %a</td>
</tr>
<tr>
<td><strong>Number of patients with HADS-anxiety ≥ 8 or HADS-depression ≥ 8 at baseline</strong></td>
<td>148</td>
<td>59</td>
</tr>
<tr>
<td>Patients achieving HADS-anxiety and HADS-depression &lt; 8, %</td>
<td>26.4 %</td>
<td>47.5 %c</td>
</tr>
</tbody>
</table>

LS = least squares; SE = standard error

a p-value < 0.0001
b p-value < 0.001
c p-value < 0.05
Adolescents with atopic dermatitis (12 to 17 years of age)

The efficacy and safety of dupilumab monotherapy in adolescent patients was evaluated in a multicentre, randomised, double-blind, placebo-controlled study (AD-1526) in 251 adolescent patients 12 to 17 years of age with moderate-to-severe atopic dermatitis (AD) defined by Investigator’s Global Assessment (IGA) score ≥ 3 in the overall assessment of AD lesions on a severity scale of 0 to 4, an Eczema Area and Severity Index (EASI) score ≥ 16 on a scale of 0 to 72, and a minimum body surface area (BSA) involvement of ≥10%. Eligible patients enrolled into this study had previous inadequate response to topical medication.

Patients received 1) an initial dose of 400 mg dupilumab (two 200 mg injections) on day 1, followed by 200 mg once every other week (Q2W) for patients with baseline weight of < 60 kg or an initial dose of 600 mg dupilumab (two 300 mg injections) on day 1, followed by 300 mg Q2W for patients with baseline weight of ≥ 60 kg; 2) an initial dose of 600 mg dupilumab (two 300 mg injections) on day 1, followed by 300 mg every 4 weeks (Q4W) regardless of baseline body weight; or 3) matching placebo. Dupilumab was administered by subcutaneous (SC) injection. If needed to control intolerable symptoms, patients were permitted to receive rescue treatment at the discretion of the investigator. Patients who received rescue treatment were considered non-responders.

In this study, the mean age was 14.5 years, the median weight was 59.4 kg, 41.0% were female, 62.5% were White, 15.1% were Asian, and 12.0% were Black. At baseline 46.2% of patients had a baseline IGA score of 3 (moderate AD), 53.8% of patients had a baseline IGA of 4 (severe AD), the median BSA involvement was 56.5%, and 42.4% of patients had received prior systemic immunosuppressants. Also at baseline the mean Eczema Area and Severity Index (EASI) score was 35.5, the baseline weekly averaged pruritus Numerical Rating Scale (NRS) was 7.6, the baseline mean SCORing Atopic Dermatitis (SCORAD) score was 70.3, the baseline mean Patient Oriented Eczema Measure (POEM) score was 21.0, and the baseline mean Children Dermatology Life Quality Index (CDLQI) was 13.6. Overall, 92.0% of patients had at least one co-morbid allergic condition; 65.6% had allergic rhinitis, 53.6% had asthma, and 60.8% had food allergies. The co-primary endpoint was the proportion of patients with IGA 0 or 1 (“clear” or “almost clear”) at least 2-point improvement and the proportion of patients with EASI-75 (improvement of at least 75% in EASI), from baseline to week 16. Other evaluated outcomes included the proportion of subjects with EASI-50 or EASI-90 (improvement of at least 50% or 90% in EASI from baseline respectively), reduction in itch as measured by the peak pruritus NRS, and percent change in the SCORAD scale from baseline to week 16. Additional secondary endpoints included mean change from baseline to week 16 in the POEM and CDLQI scores.

Clinical Response

The efficacy results at week 16 for adolescent atopic dermatitis study are presented in Table 11.

<p>| Table 11: Efficacy results of dupilumab in the adolescent atopic dermatitis study at week 16 (FAS) |
|----------------------------------|-----------------|-----------------|-----------------|
|                                  | AD-1526(FAS)    |
|                                  | Placebo         | Dupilumab       |
|                                  |                 | 200 mg (&lt;60 kg) | 300 mg (≥60 kg) |
| Patients randomised             | 85a             | 82a             |
| IGA 0 or 1, % responders        | 2.4 %           | 24.4 %          |
| EASI-50, % responders           | 12.9 %          | 61.0 %          |
| EASI-75, % responders           | 8.2 %           | 41.5 %          |
| EASI-90, % responders           | 2.4 %           | 23.2 %          |
| EASI, LS mean % change from baseline (+/-SE) | -23.6 % (5.49) | -65.9 % (3.99) |</p>
<table>
<thead>
<tr>
<th>SCORAD, LS mean % change from baseline (+/- SE)</th>
<th>Placebo</th>
<th>Dupilumab 200 mg (&lt;60 kg) and 300 mg (≥60 kg) Q2W</th>
</tr>
</thead>
<tbody>
<tr>
<td>-17.6 %</td>
<td>-51.6 %</td>
<td></td>
</tr>
<tr>
<td>(3.76)</td>
<td>(3.23)</td>
<td></td>
</tr>
<tr>
<td>Pruritus NRS, LS mean % change from baseline (+/- SE)</td>
<td>-19.0 %</td>
<td>-47.9 %</td>
</tr>
<tr>
<td></td>
<td>(4.09)</td>
<td>(3.43)</td>
</tr>
<tr>
<td>Pruritus NRS (≥ 4-point improvement), % responders</td>
<td>4.8 %</td>
<td>36.6 %</td>
</tr>
<tr>
<td>BSA LS mean % change from baseline (+/- SE)</td>
<td>-11.7 %</td>
<td>-30.1 %</td>
</tr>
<tr>
<td></td>
<td>(2.72)</td>
<td>(2.34)</td>
</tr>
<tr>
<td>CDLQI, LS mean change from baseline (+/- SE)</td>
<td>-5.1</td>
<td>-8.5</td>
</tr>
<tr>
<td></td>
<td>(0.62)</td>
<td>(0.50)</td>
</tr>
<tr>
<td>CDLQI, (≥ 6-point improvement), % responders</td>
<td>19.7 %</td>
<td>60.6 %</td>
</tr>
<tr>
<td>POEM, LS mean change from baseline (+/- SE)</td>
<td>-3.8</td>
<td>-10.1</td>
</tr>
<tr>
<td></td>
<td>(0.96)</td>
<td>(0.76)</td>
</tr>
<tr>
<td>POEM, (≥ 6-point improvement), % responders</td>
<td>9.5 %</td>
<td>63.4 %</td>
</tr>
</tbody>
</table>

a Full Analysis Set (FAS) includes all patients randomised.
b Responder was defined as a subject with IGA 0 or 1 (“clear” or “almost clear”) with a reduction of ≥ 2 points on a 0-4 IGA scale.
c Patients who received rescue treatment or with missing data were considered as non-responders (58.8 % and 20.7 % in the placebo and dupilumab arms, respectively).

All p–values < 0.0001

A larger percentage of patients randomised to placebo needed rescue treatment (topical corticosteroids, systemic corticosteroids, or systemic non-steroidal immunosuppressants) as compared to the dupilumab group (58.8 % and 20.7 %, respectively).

A significantly greater proportion of patients randomised to dupilumab achieved a rapid improvement in the pruritus NRS compared to placebo (defined as ≥ 4-point improvement as early as week 4; nominal p< 0.001) and the proportion of patients responding on the pruritus NRS continued to increase through the treatment period (see Figure 5). The improvement in pruritus NRS occurred in conjunction with the improvement of objective signs of atopic dermatitis.

**Figure 5: Proportion of adolescent patients with ≥ 4-point improvement on the pruritus NRS in AD-1526 study a (FAS) b**

![Proportion of subjects with ≥ 4-point improvement on the pruritus NRS](image)

a In the primary analyses of the efficacy endpoints, subjects who received rescue treatment or with missing data were considered non-responders.
The dupilumab group significantly improved patient-reported symptoms, the impact of AD on sleep and health-related quality of life as measured by POEM, SCORAD, and CDLQI scores at 16 weeks compared to placebo.

The long-term efficacy of dupilumab in adolescent patients with moderate-to-severe AD who had participated in previous clinical trials of dupilumab was assessed in open-label extension study (AD-1434). Efficacy data from this study suggests that clinical benefit provided at week 16 was sustained through week 52.

**Paediatrics (6 to 11 years of age)**

The efficacy and safety of dupilumab in paediatric patients concomitantly with TCS was evaluated in a multicentre, randomised, double-blind, placebo-controlled study (AD-1652) in 367 subjects 6 to 11 years of age, with AD defined by an IGA score of 4 (scale of 0 to 4), an EASI score ≥ 21 (scale of 0 to 72), and a minimum BSA involvement of ≥ 15 %. Eligible patients enrolled into this trial had previous inadequate response to topical medication. Enrollment was stratified by baseline weight (< 30 kg; ≥ 30 kg).

Patients in the dupilumab Q2W + TCS group with baseline weight of < 30 kg received an initial dose of 200 mg on Day 1, followed by 100 mg Q2W from week 2 to week 14, and patients with baseline weight of ≥ 30 kg received an initial dose of 400 mg on Day 1, followed by 200 mg Q2W from week 2 to week 14. Patients in the dupilumab Q4W + TCS group received an initial dose of 600 mg on Day 1, followed by 300 mg Q4W from week 4 to week 12, regardless of weight. Patients were permitted to receive rescue treatment at the discretion of the investigator. Patients who received rescue treatment were considered non-responders.

In this study, the mean age was 8.5 years, the median weight was 29.8 kg, 50.1 % of patients were female, 69.2 % were White, 16.9 % were Black, and 7.6 % were Asian. At baseline, the mean BSA involvement was 57.6 %, and 16.9 % had received prior systemic non-steroidal immunosuppressants. Also, at baseline the mean EASI score was 37.9, and the weekly average of daily worst itch score was 7.8 on a scale of 0-10, the baseline mean SCORAD score was 73.6, the baseline POEM score was 20.9, and the baseline mean CDLQI was 15.1. Overall, 91.7 % of subjects had at least one co-morbid allergic condition; 64.4 % had food allergies, 62.7 % had other allergies, 60.2 % had allergic rhinitis, and 46.7 % had asthma.

The co-primary endpoint was the proportion of patients with IGA 0 or 1 (“clear” or “almost clear”) at least a 2-point improvement and the proportion of patients with EASI-75 (improvement of at least 75 % in EASI), from baseline to week 16. Other evaluated outcomes included the proportion of patients with EASI-50 and EASI-90 (improvement of at least 50 % and 90 % in EASI from baseline, respectively), percent change in EASI score from baseline to week 16, and reduction in itch as measured by the peak pruritus NRS (≥ 4-point improvement). Additional secondary endpoints included mean change from baseline to week 16 in the POEM and CDLQI scores.

**Clinical Response**

Table 12 presents the results by baseline weight strata for the approved dose regimens.

**Table 12: Efficacy results of dupilumab with concomitant TCS in AD-1652 at week 16 (FAS)**

<table>
<thead>
<tr>
<th></th>
<th>Dupilumab 300 mg Q4W³ + TCS</th>
<th>Placebo + TCS</th>
<th>Dupilumab 200 mg Q2W⁵ + TCS</th>
<th>Placebo + TCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>(N=122)</td>
<td>(N=123)</td>
<td>(N=59)</td>
<td>(N=62)</td>
<td></td>
</tr>
<tr>
<td>≥ 15 kg</td>
<td>32.8 %</td>
<td>11.4 %</td>
<td>39.0 %</td>
<td>9.7 %</td>
</tr>
<tr>
<td>IGA 0 or 1³, % responders⁴</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EASI-50, % responders&lt;sup&gt;c&lt;/sup&gt;</td>
<td>EASI-75, % responders&lt;sup&gt;c&lt;/sup&gt;</td>
<td>EASI-90, % responders&lt;sup&gt;c&lt;/sup&gt;</td>
<td>EASI, LS mean % change from baseline (+/- SE)</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------------------------------</td>
<td>----------------------------------</td>
<td>----------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>91.0 %</td>
<td>43.1 %</td>
<td>86.4 %</td>
<td>-82.1 % (2.37)</td>
</tr>
<tr>
<td></td>
<td>43.1 %</td>
<td>74.6 %</td>
<td>35.6 %</td>
<td>-48.6 % (2.46)</td>
</tr>
<tr>
<td></td>
<td>35.6 %</td>
<td>25.8 %</td>
<td>8.1 %</td>
<td>-80.4 % (3.61)</td>
</tr>
<tr>
<td></td>
<td>8.1 %</td>
<td>35.6 %</td>
<td>8.1 %</td>
<td>-48.3 % (3.63)</td>
</tr>
</tbody>
</table>

Full Analysis Set (FAS) includes all patients randomised.

<sup>b</sup> Responder was defined as a patient with an IGA 0 or 1 (“clear” or “almost clear”).

<sup>c</sup> Patients who received rescue treatment or with missing data were considered non-responders.

<sup>d</sup> At Day 1, patients received 600 mg of dupilumab (see section 5.2).

<sup>e</sup> At Day 1, patients received 400 mg (baseline weight ≥ 30 kg) of dupilumab.

A greater proportion of patients randomised to dupilumab + TCS achieved an improvement in the peak pruritus NRS compared to placebo + TCS (defined as ≥4-point improvement at week 4). See Figure 6.

**Figure 6: Proportion of paediatric patients with ≥4-point improvement on the peak pruritus NRS in AD-1652<sup>a</sup> (FAS)<sup>b</sup>**

---

<sup>a</sup> In the primary analyses of the efficacy endpoints, patients who received rescue treatment or with missing data were considered non-responders.

<sup>b</sup> Full Analysis Set (FAS) includes all patients randomised.

<sup>c</sup> At Day 1, patients received 600 mg of dupilumab (see section 5.2)

<sup>d</sup> At Day 1, patients received 400 mg (baseline weight ≥ 30 kg) of dupilumab
The dupilumab groups significantly improved patient-reported symptoms, the impact of AD on sleep and health-related quality of life as measured by POEM, SCORAD, and CDLQI scores at 16 weeks compared to placebo.

The long-term efficacy and safety of dupilumab + TCS in paediatric patients with moderate to severe atopic dermatitis who had participated in the previous clinical trials of dupilumab + TCS was assessed in an open-label extension study (AD-1434). Efficacy data from this trial suggests that clinical benefit provided at week 16 was sustained through week 52. Some patients receiving dupilumab 300 mg Q4W + TCS showed further clinical benefit when escalated to dupilumab 200 mg Q2W + TCS. The safety profile of dupilumab in patients followed through week 52 was similar to the safety profile observed at week 16 in the AD-1526 and AD-1652 studies.

Clinical efficacy and safety in asthma

The asthma development program included three randomised, double-blind, placebo-controlled, parallel-group, multi-centre studies (DRI12544, QUEST, and VENTURE) of 24 to 52 weeks in treatment duration which enrolled a total of 2,888 patients (12 years of age and older). Patients were enrolled without requiring a minimum baseline blood eosinophil or other type 2 inflammatory biomarkers (e.g. FeNO or IgE) level. Asthma treatment guidelines define type 2 inflammation as eosinophilia ≥ 150 cells/mcL and/or FeNO ≥ 20 ppb. In DRI12544 and QUEST, the pre-specified subgroup analyses included blood eosinophils ≥ 150 and ≥ 300 cells/mcL, FeNO ≥ 25 and ≥ 50 ppb.

DRI12544 was a 24-week dose-ranging study which included 776 patients (18 years of age and older). Dupilumab compared with placebo was evaluated in adult patients with moderate to severe asthma on a medium-to-high dose inhaled corticosteroid and a long acting beta agonist. The primary endpoint was change from baseline to week 12 in FEV1 (L). Annualised rate of severe asthma exacerbation events during the 24-week placebo controlled treatment period was also determined. Results were evaluated in the overall population (unrestricted by minimum baseline eosinophils or other type 2 inflammatory biomarkers) and subgroups based on baseline blood eosinophil count.

QUEST was a 52-week confirmatory study which included 1,902 patients (12 years of age and older). Dupilumab compared with placebo was evaluated in adult patients with persistent asthma on a medium-to-high dose inhaled corticosteroid and a second controller medication. Patients requiring a third controller were allowed to participate in this trial. Patients were randomised to receive either 200 mg (N=631) or 300 mg (N=633) Dupixent every other week (or matching placebo for either 200 mg (N = 317) or 300 mg (N= 321) every other week) following an initial dose of 400 mg, 600 mg or placebo respectively. The primary endpoints were the annualised rate of severe exacerbation events during the 52-week placebo controlled period and change from baseline in pre-bronchodilator FEV1 at week 12 in the overall population (unrestricted by minimum baseline eosinophils or other type 2 inflammatory biomarkers) and subgroups based on baseline blood eosinophil count and FeNO.

VENTURE was a 24-week oral corticosteroid-reduction study in 210 patients with asthma unrestricted by baseline type 2 biomarker levels who required daily oral corticosteroids in addition to regular use of high dose inhaled corticosteroids plus an additional controller. After optimizing the OCS dose during the screening period, patients received 300 mg dupilumab (n=103) or placebo (n=107) once every other week for 24 weeks following an initial dose of 600 mg or placebo. Patients continued to receive their existing asthma medicine during the study; however their OCS dose was reduced every 4 weeks during the OCS reduction phase (week 4-20), as long as asthma control was maintained. The primary endpoint was the percent reduction in oral corticosteroid dose assessed in the overall population, based on a comparison of the oral corticosteroid dose at weeks 20 to 24 that maintained asthma control with the previously optimized (at baseline) oral corticosteroid dose.

The demographics and baseline characteristics of these 3 studies are provided in Table 13 below.
### Table 13: Demographics and baseline characteristics of asthma trials

<table>
<thead>
<tr>
<th>Parameter</th>
<th>DRI12544 (n = 776)</th>
<th>QUEST (n = 1902)</th>
<th>VENTURE (n = 210)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (years) (SD)</td>
<td>48.6 (13.0)</td>
<td>47.9 (15.3)</td>
<td>51.3 (12.6)</td>
</tr>
<tr>
<td>% Female</td>
<td>63.1</td>
<td>62.9</td>
<td>60.5</td>
</tr>
<tr>
<td>% White</td>
<td>78.2</td>
<td>82.9</td>
<td>93.8</td>
</tr>
<tr>
<td>Duration of Asthma (years), mean ± SD</td>
<td>22.03 (15.42)</td>
<td>20.94 (15.36)</td>
<td>19.95 (13.90)</td>
</tr>
<tr>
<td>Never smoked, (%)</td>
<td>77.4</td>
<td>80.7</td>
<td>80.5</td>
</tr>
<tr>
<td>Mean exacerbations in previous year ± SD</td>
<td>2.17 (2.14)</td>
<td>2.09 (2.15)</td>
<td>2.09 (2.16)</td>
</tr>
<tr>
<td>High dose ICS use (%)†</td>
<td>49.5</td>
<td>51.5</td>
<td>88.6</td>
</tr>
<tr>
<td>Pre-dose FEV$_1$ (L) at baseline ± SD</td>
<td>1.84 (0.54)</td>
<td>1.78 (0.60)</td>
<td>1.58 (0.57)</td>
</tr>
<tr>
<td>Mean percent predicted FEV$_1$ at baseline (%)± SD</td>
<td>60.77 (10.72)</td>
<td>58.43 (13.52)</td>
<td>52.18 (15.18)</td>
</tr>
<tr>
<td>% Reversibility (± SD)</td>
<td>26.85 (15.43)</td>
<td>26.29 (21.73)</td>
<td>19.47 (23.25)</td>
</tr>
<tr>
<td>Mean ACQ-5 score (± SD)</td>
<td>2.74 (0.81)</td>
<td>2.76 (0.77)</td>
<td>2.50 (1.16)</td>
</tr>
<tr>
<td>Mean AQLQ score (± SD)</td>
<td>4.02 (1.09)</td>
<td>4.29 (1.05)</td>
<td>4.35 (1.17)</td>
</tr>
<tr>
<td>Atopic Medical History % Overall (AD %, NP %, AR %)</td>
<td>72.9 (8.0, 10.6, 61.7)</td>
<td>77.7 (10.3, 12.7, 68.6)</td>
<td>72.4 (7.6, 21.0, 55.7)</td>
</tr>
<tr>
<td>Mean FeNO ppb (± SD)</td>
<td>39.10 (35.09)</td>
<td>34.97 (32.85)</td>
<td>37.61 (31.38)</td>
</tr>
<tr>
<td>% patients with FeNO ppb ≥ 25</td>
<td>49.9</td>
<td>49.6</td>
<td>54.3</td>
</tr>
<tr>
<td>≥ 50</td>
<td>21.6</td>
<td>20.5</td>
<td>25.2</td>
</tr>
<tr>
<td>Mean total IgE IU/mL (± SD)</td>
<td>435.05 (753.88)</td>
<td>432.40 (746.66)</td>
<td>430.58 (775.96)</td>
</tr>
<tr>
<td>Mean baseline Eosinophil count (± SD) cells/mcL</td>
<td>350 (430)</td>
<td>360 (370)</td>
<td>350 (310)</td>
</tr>
<tr>
<td>% patients with EOS ≥ 150 cells/mcL</td>
<td>77.8</td>
<td>71.4</td>
<td>71.4</td>
</tr>
<tr>
<td>≥ 300 cells/mcL</td>
<td>41.9</td>
<td>43.7</td>
<td>42.4</td>
</tr>
</tbody>
</table>

ICS = inhaled corticosteroid; FEV$_1$ = Forced expiratory volume in 1 second; ACQ-5 = Asthma Control Questionnaire-5; AQLQ = Asthma Quality of Life Questionnaire; AD = atopic dermatitis; NP = nasal polyposis; AR = allergic rhinitis; FeNO = fraction of exhaled nitric oxide; EOS = blood eosinophil

*The population in dupilumab asthma trials included patients on medium and high dose ICS. The medium ICS dose was defined as equal to 500 mcg fluticasone or equivalent per day.

**Exacerbations**

In the overall population in DRI12544 and QUEST subjects receiving either dupilumab 200 mg or 300 mg every other week had significant reductions in the rate of severe asthma exacerbations compared to placebo. There were greater reductions in exacerbations in subjects with higher baseline levels of type 2 inflammatory biomarkers such as blood eosinophils or FeNO (Table 14 and Table 15).
Table 14: Rate of severe exacerbations in DRI12544 and QUEST (baseline blood eosinophil levels ≥ 150 and ≥ 300 cells/mcL)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Exacerbations per Year</th>
<th>Baseline blood EOS</th>
<th>% reduction</th>
<th>Exacerbations per Year</th>
<th>% reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Rate (95% CI)</td>
<td>Rate ratio</td>
<td>N</td>
<td>Rate (95% CI)</td>
</tr>
<tr>
<td>DRI12544 study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dupilumab 200 mg Q2W</td>
<td>120</td>
<td>0.29 (0.16, 0.53)</td>
<td>0.28a (0.14, 0.55)</td>
<td>72 %</td>
<td>65</td>
</tr>
<tr>
<td>Placebo</td>
<td>127</td>
<td>1.05 (0.69, 1.60)</td>
<td>0.29a (0.14, 0.55)</td>
<td>71 %</td>
<td>68</td>
</tr>
<tr>
<td>QUEST study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dupilumab 200 mg Q2W</td>
<td>437</td>
<td>0.45 (0.37, 0.54)</td>
<td>0.44a (0.34,0.58)</td>
<td>56%</td>
<td>264</td>
</tr>
<tr>
<td>Placebo</td>
<td>232</td>
<td>1.01 (0.81, 1.25)</td>
<td>0.34 (0.24,0.48)</td>
<td>66%</td>
<td>148</td>
</tr>
<tr>
<td>Dupilumab 300 mg Q2W</td>
<td>452</td>
<td>0.43 (0.36, 0.53)</td>
<td>0.40a (0.31,0.53)</td>
<td>60%</td>
<td>277</td>
</tr>
<tr>
<td>Placebo</td>
<td>237</td>
<td>1.08 (0.88, 1.33)</td>
<td>0.33a (0.23,0.45)</td>
<td>67%</td>
<td>142</td>
</tr>
</tbody>
</table>

All Severe Exacerbations

p-value = 0.0003, b p-value = 0.0001, c p-value = 0.0116, d p-value = 0.0024, e p-value < 0.0001

Table 15. Rate of severe exacerbations in QUEST defined by baseline FeNO subgroups

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Exacerbations per Year</th>
<th>FeNO ≥ 25 ppb</th>
<th>FeNO ≥ 50 ppb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Rate (95% CI)</td>
<td>Rate ratio (95% CI)</td>
</tr>
<tr>
<td>DRI12544 study</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dupilumab 200 mg Q2W</td>
<td>299</td>
<td>0.35 (0.27, 0.45)</td>
<td>0.35 (0.25, 0.50)a</td>
</tr>
<tr>
<td>Placebo</td>
<td>162</td>
<td>1.00 (0.78, 1.30)</td>
<td>0.31 (0.18, 0.52)a</td>
</tr>
<tr>
<td>Dupilumab 300 mg Q2W</td>
<td>310</td>
<td>0.43 (0.35, 0.54)</td>
<td>0.39 (0.28, 0.54)a</td>
</tr>
<tr>
<td>Placebo</td>
<td>172</td>
<td>1.12 (0.88, 1.43)</td>
<td>0.31 (0.19, 0.49)a</td>
</tr>
</tbody>
</table>

p-value < 0.0001

In the pooled analysis of DRI12544 and QUEST, hospitalisations and/or emergency room visits due to severe exacerbations were reduced by 25.5 % and 46.9 % with dupilumab 200 mg or 300 mg every other week, respectively.

Lung function

Clinically significant increases in pre-bronchodilator FEV₁ were observed at week 12 for DRI12544 and QUEST. There were greater improvements in FEV₁ in the subjects with higher baseline levels of type 2 inflammatory biomarkers such as blood eosinophils or FeNO (Table 16 and Table 17).
Significant improvements in FEV₁ were observed as early as week 2 following the first dose of dupilumab for both the 200 mg and 300 mg dose strengths and were maintained through week 24 (DRI12544) and week 52 in QUEST (see Figure 7).

Figure 7: Mean change from baseline in pre-bronchodilator FEV₁ (L) over time (baseline eosinophils ≥ 150 and ≥ 300 cells/mcL and FeNO ≥ 25 ppb) in QUEST

Table 16: Mean change from baseline in pre-bronchodilator FEV₁ at week 12 in DRI12544 and QUEST (baseline blood eosinophil Levels ≥ 150 and ≥ 300 cells/mcL)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Baseline blood EOS</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≥ 150 cells/mcL</td>
<td>≥ 300 cells/mcL</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>LS mean Δ from baseline L (%)</td>
<td>LS mean difference vs. placebo (95% CI)</td>
<td>LS mean Δ from baseline L (%)</td>
</tr>
<tr>
<td>DRI12544 study</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dupilumab 200 mg Q2W</td>
<td>120</td>
<td>0.32 (18.25)</td>
<td>0.23a (0.13, 0.33)</td>
</tr>
<tr>
<td>Dupilumab 300 mg Q2W</td>
<td>129</td>
<td>0.26 (17.1)</td>
<td>0.18b (0.08, 0.27)</td>
</tr>
<tr>
<td>Placebo</td>
<td>127</td>
<td>0.09 (4.36)</td>
<td></td>
</tr>
<tr>
<td>QUEST study</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dupilumab 200 mg Q2W</td>
<td>437</td>
<td>0.36 (23.6)</td>
<td>0.17c (0.11, 0.23)</td>
</tr>
<tr>
<td>Placebo</td>
<td>232</td>
<td>0.18 (12.4)</td>
<td></td>
</tr>
<tr>
<td>Dupilumab 300 mg Q2W</td>
<td>452</td>
<td>0.37 (25.3)</td>
<td>0.15e (0.09, 0.21)</td>
</tr>
<tr>
<td>Placebo</td>
<td>237</td>
<td>0.22 (14.2)</td>
<td></td>
</tr>
</tbody>
</table>

Table 17: Mean change from baseline in pre-bronchodilator FEV₁ at week 12 and week 52 in QUEST by baseline FeNO subgroups

<table>
<thead>
<tr>
<th>Treatment</th>
<th>At week 12</th>
<th>At week 52</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>LS mean Δ from baseline L (%)</td>
</tr>
<tr>
<td>FeNO ≥ 25 ppb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dupilumab 200 mg Q2W</td>
<td>288</td>
<td>0.44 (29.0 %)</td>
</tr>
<tr>
<td>Placebo</td>
<td>157</td>
<td>0.21 (14.1 %)</td>
</tr>
</tbody>
</table>
### Quality of life/patient-reported outcomes in asthma

Pre-specified secondary endpoint of ACQ-5 and AQLQ(S) responder rates were analysed at 24 weeks (DRI12544 and VENTURE) and at 52 weeks (QUEST). The responder rate was defined as an improvement in score of 0.5 or more (scale range 0-6 for ACQ-5 and 1-7 for AQLQ(S)). Improvements in ACQ-5 and AQLQ(S) were observed as early as week 2 and maintained for 24 weeks in DRI12544 study and 52 weeks in QUEST study. Similar results were observed in VENTURE. The ACQ-5 and AQLQ(S) responder rate results in patients with elevated baseline biomarkers of type 2 inflammation in QUEST at week 52 are presented in Table 18.

#### Table 18: ACQ-5 and AQLQ(S) responder rates at week 52 in QUEST

<table>
<thead>
<tr>
<th>PRO</th>
<th>Treatment</th>
<th>EOS ≥ 150 cells/mcL</th>
<th>EOS ≥ 300 cells/mcL</th>
<th>FeNO ≥ 25 ppb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Responder rate (%)</td>
<td>N</td>
<td>Responder rate (%)</td>
</tr>
<tr>
<td>ACQ-5</td>
<td>Dupilumab 200 mg Q2W</td>
<td>395</td>
<td>72.9</td>
<td>239</td>
</tr>
<tr>
<td></td>
<td>Placebo</td>
<td>201</td>
<td>64.2</td>
<td>124</td>
</tr>
<tr>
<td></td>
<td>Dupilumab 300 mg Q2W</td>
<td>408</td>
<td>70.1</td>
<td>248</td>
</tr>
<tr>
<td></td>
<td>Placebo</td>
<td>217</td>
<td>64.5</td>
<td>129</td>
</tr>
<tr>
<td>AQLQ(S)</td>
<td>Dupilumab 200 mg Q2W</td>
<td>395</td>
<td>66.6</td>
<td>239</td>
</tr>
<tr>
<td></td>
<td>Placebo</td>
<td>201</td>
<td>53.2</td>
<td>124</td>
</tr>
<tr>
<td></td>
<td>Dupilumab 300 mg Q2W</td>
<td>408</td>
<td>62.0</td>
<td>248</td>
</tr>
<tr>
<td></td>
<td>Placebo</td>
<td>217</td>
<td>53.9</td>
<td>129</td>
</tr>
</tbody>
</table>

*Oral corticosteroid reduction study (VENTURE)*

VENTURE evaluated the effect of dupilumab on reducing the use of maintenance oral corticosteroids. Baseline characteristics are presented in Table 13. All patients were on oral corticosteroids for at least 6 months prior to the study initiation. The baseline mean oral corticosteroid use was 11.75 mg in the placebo group and 10.75 mg in the group receiving dupilumab.

In this 24-week trial, asthma exacerbations (defined as a temporary increase in oral corticosteroid dose for at least 3 days) were reduced by 59 % in subjects receiving dupilumab compared with those receiving placebo (annualised rate 0.65 and 1.60 for the dupilumab and placebo group, respectively; rate ratio 0.41 [95% CI 0.26, 0.63]) and improvement in pre-bronchodilator FEV1 from baseline to week 24 was greater in subjects receiving dupilumab compared with those receiving placebo (LS mean difference for dupilumab versus placebo of 0.22 L [95% CI: 0.09 to 0.34 L]). Effects on lung function, on oral steroid and exacerbation reduction were similar irrespective of baseline levels of type 2
inflammatory biomarkers (e.g. blood eosinophils, FeNO). The ACQ-5 and AQLQ(S) were also assessed in VENTURE and showed improvements similar to those in QUEST.

The results for VENTURE by baseline biomarkers are presented in the Table 19.

**Table 19: Effect of dupilumab on OCS dose reduction, VENTURE (baseline blood eosinophil levels ≥ 150 and ≥ 300 cells/ml and FeNO ≥ 25 ppb)**

<table>
<thead>
<tr>
<th></th>
<th>Baseline blood EOS ≥ 150 cells/ml</th>
<th>Baseline blood EOS ≥ 300 cells/ml</th>
<th>FeNO ≥ 25 ppb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dupilumab 300 mg Q2W N=81</td>
<td>Placebo 300 mg Q2W N=69</td>
<td>Dupilumab 300 mg Q2W N=48</td>
</tr>
<tr>
<td><strong>Primary endpoint (week 24)</strong></td>
<td>Mean overall percent reduction from baseline (%)</td>
<td>75.91</td>
<td>46.51</td>
</tr>
<tr>
<td></td>
<td>Difference (% [95% CI]) (Dupilumab vs. placebo)</td>
<td>29.39b (15.67, 43.12)</td>
<td>36.83b (18.94, 54.71)</td>
</tr>
<tr>
<td></td>
<td>Median % reduction in daily OCS dose from baseline</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Percent reduction from baseline</td>
<td>100% 54.3</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>≥ 90 %</td>
<td>58.0</td>
<td>34.8</td>
</tr>
<tr>
<td></td>
<td>≥ 75 %</td>
<td>72.8</td>
<td>44.9</td>
</tr>
<tr>
<td></td>
<td>≥ 50 %</td>
<td>82.7</td>
<td>55.1</td>
</tr>
<tr>
<td></td>
<td>&gt; 0 %</td>
<td>87.7</td>
<td>66.7</td>
</tr>
<tr>
<td></td>
<td>No reduction or any increase in OCS dose, or dropped out of study</td>
<td>12.3</td>
<td>33.3</td>
</tr>
<tr>
<td><strong>Secondary endpoint (week 24)</strong></td>
<td>Proportion of patients achieving a reduction of OCS dose to &lt; 5 mg/day</td>
<td>77</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Odds ratio (95% CI)</td>
<td>4.29c (2.04, 9.04)</td>
<td>8.04d (2.71, 23.82)</td>
</tr>
</tbody>
</table>

*aModel estimates by logistic regression
b)p-value < 0.0001
c)p-value = 0.0001
d)p-value = 0.0002

**Long-term extension study (TRAVERSE)**

The long-term safety of dupilumab in 2,193 adults and 89 adolescents with moderate-to-severe asthma, including 185 adults with oral corticosteroid-dependent asthma, who had participated in previous clinical trials of dupilumab (DRI12544, QUEST, and VENTURE), was assessed in the open-label extension study (TRAVERSE) (see section 4.8). Efficacy was measured as a secondary endpoint, was similar to results observed in the pivotal studies and was sustained up to 96 weeks. In the adults with oral-corticosteroid-dependent asthma, there was sustained reduction in exacerbations and improvement in lung function up to 96 weeks, despite decrease or discontinuation of oral corticosteroid dose.
Paediatric study (6 to 11 years of age; VOYAGE)

The efficacy and safety of dupilumab in paediatric patients was evaluated in a 52-week multicentre, randomised, double-blind, placebo-controlled study (VOYAGE) in 408 patients 6 to 11 years of age, with moderate-to-severe asthma on a medium- or high-dose ICS and one controller medication or high dose ICS alone. Patients were randomised to dupilumab (N=273) or matching placebo (N=135) every other week based on body weight ≤ 30 kg or > 30 kg, respectively. The efficacy was evaluated in populations with type 2 inflammation defined as blood eosinophil levels of ≥ 150 cells/mcL or FeNO ≥ 20 ppb.

The primary endpoint was the annualised rate of severe exacerbation events during the 52-week placebo-controlled period and the key secondary endpoint was the change from baseline in pre-bronchodilator FEV₁ percent predicted at week 12. Additional secondary endpoints included mean change from baseline and responder rates in the ACQ-7-IA and PAQLQ(S)-IA scores.

The demographics and baseline characteristics for VOYAGE are provided in Table 20 below.

### Table 20. Demographics and baseline characteristics for VOYAGE

<table>
<thead>
<tr>
<th>Parameter</th>
<th>EOS ≥ 150 cells/mcL or FeNO ≥ 20 ppb (N = 350)</th>
<th>EOS ≥ 300 cells/mcL (N = 259)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (years) (SD)</td>
<td>8.9 (1.6)</td>
<td>9.0 (1.6)</td>
</tr>
<tr>
<td>% Female</td>
<td>34.3</td>
<td>32.8</td>
</tr>
<tr>
<td>% White</td>
<td>88.6</td>
<td>87.3</td>
</tr>
<tr>
<td>Mean body weight (kg)</td>
<td>36.09</td>
<td>35.94</td>
</tr>
<tr>
<td>Mean exacerbations in previous year (± SD)</td>
<td>2.47 (2.30)</td>
<td>2.64 (2.58)</td>
</tr>
<tr>
<td>ICS dose (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>55.7</td>
<td>54.4</td>
</tr>
<tr>
<td>High</td>
<td>43.4</td>
<td>44.4</td>
</tr>
<tr>
<td>Pre-dose FEV₁ (L) at baseline (± SD)</td>
<td>1.49 (0.41)</td>
<td>1.47 (0.42)</td>
</tr>
<tr>
<td>Mean percent predicted FEV₁ (%) (±SD)</td>
<td>77.89 (14.40)</td>
<td>76.85 (14.78)</td>
</tr>
<tr>
<td>Mean % Reversibility (± SD)</td>
<td>27.79 (19.34)</td>
<td>22.59 (20.78)</td>
</tr>
<tr>
<td>Mean ACQ-7-IA score (± SD)</td>
<td>2.14 (0.72)</td>
<td>2.16 (0.75)</td>
</tr>
<tr>
<td>Mean PAQLQ(S)-IA score (± SD)</td>
<td>4.94 (1.10)</td>
<td>4.93 (1.12)</td>
</tr>
<tr>
<td>Atopic Medical History % Overall (AD %, AR %)</td>
<td>94 (38.9, 82.6)</td>
<td>96.5 (44.4, 85.7)</td>
</tr>
<tr>
<td>Median total IgE IU/mL (± SD)</td>
<td>905.52 (1140.41)</td>
<td>1077.00 (1230.83)</td>
</tr>
<tr>
<td>Mean FeNO ppb (± SD)</td>
<td>30.71 (24.42)</td>
<td>33.50 (25.11)</td>
</tr>
<tr>
<td>% patients with FeNO ppb ≥ 20</td>
<td>58</td>
<td>64.1</td>
</tr>
<tr>
<td>Mean baseline Eosinophil count (± SD)</td>
<td>570 (380)</td>
<td>710 (360)</td>
</tr>
</tbody>
</table>
Exacerbations were defined as deterioration of asthma requiring the use of systemic corticosteroids for at least 3 days or hospitalisation or emergency room visit due to asthma that required systemic corticosteroids. Dupilumab significantly reduced the annualised rate of severe asthma exacerbation events during the 52-week treatment period compared to placebo in the population with the type 2 inflammation and in population defined by baseline blood eosinophils ≥ 300 cells/mcL or by baseline FeNO ≥ 20 ppb. Clinically significant improvements in percent predicted pre-bronchodilator FEV₁ were observed at week 12. Improvements were also observed for ACQ-7-IA and PAQLQ(S)-IA at week 24 and were sustained at week 52. Greater responder rates were observed for ACQ-7-IA and PAQLQ(S)-IA compared to placebo at week 24. The efficacy results for VOYAGE are presented in Table 21.

In the population with the type 2 inflammation, the LS mean change from baseline in pre-bronchodilator FEV₁ at week 12 was 0.22 L in the dupilumab group and 0.12 L in the placebo group, with an LS mean difference versus placebo of 0.10 L (95% CI: 0.04, 0.16). The treatment effect was sustained over the 52-week treatment period, with an LS mean difference versus placebo at week 52 of 0.17 L (95% CI: 0.09, 0.24).

In the population defined by baseline blood eosinophils ≥ 300 cells/mcL, the LS mean change from baseline in pre-bronchodilator FEV₁ at week 12 was 0.22 L in the dupilumab group and 0.12 L in the placebo group, with an LS mean difference versus placebo of 0.10 L (95% CI: 0.03, 0.17). The treatment effect was sustained over the 52-week treatment period, with an LS mean difference versus placebo at week 52 of 0.17 L (95% CI: 0.09, 0.26).

In both primary efficacy populations, there was a rapid improvement in FEF25-75% and FEV₁/FVC (onset of a difference was observed as early as week 2) and sustained over the 52-week treatment period, see Table 21.

Table 21: Rate of severe exacerbations, mean change from baseline in FEV₁, ACQ-7-IA and PAQLQ(S)-IA responder rates in VOYAGE

<table>
<thead>
<tr>
<th>Treatment</th>
<th>EOS ≥ 150 cells/mcL or FeNO ≥ 20 ppb</th>
<th>EOS ≥ 300 cells/mcL</th>
<th>FeNO ≥ 20 ppb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rate (95% CI)</td>
<td>Rate ratio (95% CI)</td>
<td>Rate (95% CI)</td>
</tr>
<tr>
<td>Dupilumab 100 mg Q2W (&lt;30 kg)/200 mg Q2W (≥30 kg)</td>
<td>236</td>
<td>0.305 (0.223, 0.416)</td>
<td>0.407 (0.274, 0.605)</td>
</tr>
<tr>
<td>Placebo</td>
<td>114</td>
<td>0.748 (0.542, 1.034)</td>
<td>0.84</td>
</tr>
</tbody>
</table>

Mean change from baseline in percent predicted FEV₁ at week 12

<table>
<thead>
<tr>
<th>Treatment</th>
<th>EOS ≥ 150 cells/mcL or FeNO ≥ 20 ppb</th>
<th>EOS ≥ 300 cells/mcL</th>
<th>FeNO ≥ 20 ppb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rate (95% CI)</td>
<td>Rate ratio (95% CI)</td>
<td>Rate (95% CI)</td>
</tr>
<tr>
<td>Dupilumab 100 mg Q2W (&lt;30 kg)/200 mg Q2W (≥30 kg)</td>
<td>236</td>
<td>0.305 (0.223, 0.416)</td>
<td>0.407 (0.274, 0.605)</td>
</tr>
<tr>
<td>Placebo</td>
<td>114</td>
<td>0.748 (0.542, 1.034)</td>
<td>0.84</td>
</tr>
<tr>
<td>Dupilumab 100 mg Q2W (&lt;30 kg)/200 mg Q2W (≥30 kg)</td>
<td>229</td>
<td>10.53</td>
<td>5.21</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.14, 8.27)</td>
<td></td>
</tr>
<tr>
<td>Placebo</td>
<td>110</td>
<td>5.32</td>
<td></td>
</tr>
</tbody>
</table>

Mean change from baseline in percent predicted FEF 25-75% at week 12

<table>
<thead>
<tr>
<th>N</th>
<th>LS mean Δ from baseline</th>
<th>LS mean difference vs. placebo (95% CI)</th>
<th>N</th>
<th>LS mean Δ from baseline</th>
<th>LS mean difference vs. placebo (95% CI)</th>
<th>N</th>
<th>LS mean Δ from baseline</th>
<th>LS mean difference vs. placebo (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dupilumab 100 mg Q2W (&lt;30 kg)/200 mg Q2W (≥30 kg)</td>
<td>229</td>
<td>16.70</td>
<td>11.93</td>
<td>168</td>
<td>16.91</td>
<td>13.92</td>
<td>141</td>
<td>17.96</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(7.44, 16.43)</td>
<td></td>
<td></td>
<td>(8.89, 18.95)</td>
<td></td>
<td></td>
<td>(8.30, 19.65)</td>
</tr>
<tr>
<td>Placebo</td>
<td>110</td>
<td>4.76</td>
<td></td>
<td>80</td>
<td>2.99</td>
<td></td>
<td>62</td>
<td>3.98</td>
</tr>
</tbody>
</table>

Mean change from baseline in FEV1/FVC % at week 12

<table>
<thead>
<tr>
<th>N</th>
<th>LS mean Δ from baseline</th>
<th>LS mean difference vs. placebo (95% CI)</th>
<th>N</th>
<th>LS mean Δ from baseline</th>
<th>LS mean difference vs. placebo (95% CI)</th>
<th>N</th>
<th>LS mean Δ from baseline</th>
<th>LS mean difference vs. placebo (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dupilumab 100 mg Q2W (&lt;30 kg)/200 mg Q2W (≥30 kg)</td>
<td>229</td>
<td>5.67</td>
<td>3.73</td>
<td>168</td>
<td>6.10</td>
<td>4.63</td>
<td>141</td>
<td>6.84</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.25, 5.21)</td>
<td></td>
<td></td>
<td>(2.97, 6.29)</td>
<td></td>
<td></td>
<td>(3.08, 6.81)</td>
</tr>
<tr>
<td>Placebo</td>
<td>110</td>
<td>1.94</td>
<td></td>
<td>80</td>
<td>1.47</td>
<td></td>
<td>62</td>
<td>1.89</td>
</tr>
</tbody>
</table>

**ACQ-7-IA at week 24**

<table>
<thead>
<tr>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dupilumab 100 mg Q2W (&lt;30 kg)/200 mg Q2W (≥30 kg)</td>
<td>236</td>
<td>79.2</td>
<td>1.82</td>
<td>175</td>
<td>80.6</td>
<td>2.79</td>
<td>141</td>
<td>80.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.02, 3.24)</td>
<td></td>
<td></td>
<td>(1.43, 5.44)</td>
<td></td>
<td></td>
<td>(1.21, 5.59)</td>
</tr>
<tr>
<td>Placebo</td>
<td>114</td>
<td>69.3</td>
<td></td>
<td>84</td>
<td>64.3</td>
<td></td>
<td>62</td>
<td>66.1</td>
</tr>
</tbody>
</table>

**PAQLQ(S)-IA at week 24**

<table>
<thead>
<tr>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dupilumab 100 mg Q2W (&lt;30 kg)/200 mg Q2W (≥30 kg)</td>
<td>211</td>
<td>73.0</td>
<td>1.57</td>
<td>158</td>
<td>72.8</td>
<td>1.84</td>
<td>131</td>
<td>75.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.87, 2.84)</td>
<td></td>
<td></td>
<td>(0.92, 3.65)</td>
<td></td>
<td></td>
<td>(0.95, 4.61)</td>
</tr>
<tr>
<td>Placebo</td>
<td>107</td>
<td>65.4</td>
<td></td>
<td>81</td>
<td>63.0</td>
<td></td>
<td>61</td>
<td>67.2</td>
</tr>
</tbody>
</table>

*The responder rate was defined as an improvement in score of 0.5 or more (scale range 0-6 for ACQ-7-IA and 1-7 for PAQLQ(S))*

Significant improvements in percent predicted FEV1 were observed as early as week 2 and were maintained through week 52 in VOYAGE study.

Improvements in percent predicted FEV1 over time in VOYAGE are shown in Figure 8.
In VOYAGE, in the population with the type 2 inflammation, the mean annualised total number of systemic corticosteroid courses due to asthma was reduced by 59.3% versus placebo (0.350 [95% CI: 0.256, 0.477] versus 0.860 [95% CI: 0.616, 1.200]). In the population defined by baseline blood eosinophils $\geq 300$ cells/mcL, the mean annualised total number of systemic corticosteroid courses due to asthma was reduced by 66.0% versus placebo (0.274 [95% CI: 0.188, 0.399] versus 0.806 [95% CI: 0.563, 1.154]).

Dupilumab improved the overall health status as measured by the European Quality of Life 5-Dimension Youth Visual Analog Scale (EQ-VAS) in both the type 2 inflammation and the baseline blood eosinophil count of $\geq 300$ cells/mcL populations at week 52; the LS mean difference versus placebo was 4.73 (95% CI: 1.18, 8.28), and 3.38 (95% CI: -0.66, 7.43), respectively.

Dupilumab reduced the impact of paediatric patient’s asthma on the caregiver quality of life as measured by the Paediatric Asthma Quality of Life Questionnaire (PACQLQ) in both the type 2 inflammation and the baseline blood eosinophil count of $\geq 300$ cells/mcL population at week 52; the LS mean difference versus placebo was 0.47 (95% CI: 0.22, 0.72), and 0.50 (95% CI: 0.21, 0.79), respectively.

Clinical efficacy in chronic rhinosinusitis with nasal polyposis (CRSwNP)

The chronic rhinosinusitis with nasal polyposis (CRSwNP) development program included two randomised, double-blind, parallel-group, multicentre, placebo-controlled studies (SINUS-24 and SINUS-52) in 724 patients aged 18 years and older on background intranasal corticosteroids (INCS). These studies included patients with severe CRSwNP despite prior sino-nasal surgery or treatment with, or who were ineligible to receive, systemic corticosteroids in the past 2 years. Rescue with systemic corticosteroids or surgery was allowed during the studies at the investigator’s discretion. In SINUS-24, a total of 276 patients were randomised to receive either 300 mg dupilumab (N=143) or placebo (N=133) every other week for 24 weeks. In SINUS-52, 448 patients were randomised to receive either 300 mg dupilumab (N=150) every other week for 52 weeks, 300 mg dupilumab (N=145) every other week until week 24 followed by 300 mg dupilumab every 4 weeks until week 52, or placebo (N=153). All patients had evidence of sinus opacification on the Lund MacKay (LMK) sinus CT scan and 73 % to 90 % of patients had opacification of all sinuses. Patients were stratified based on their histories of prior surgery and co-morbid asthma/nonsteroidal anti-inflammatory drug exacerbated respiratory disease (NSAID-ERD).

The co-primary efficacy endpoints were change from baseline to week 24 in bilateral endoscopic nasal polyps score (NPS) as graded by central blinded readers, and change from baseline to week 24 in nasal congestion/obstruction score averaged over 28 days (NC), as determined by patients using a daily diary. For NPS, polyps on each side of the nose were graded on a categorical scale (0=no polyps; 1=small polyps in the middle meatus not reaching below the inferior border of the middle turbinate; 2=polyps reaching below the lower border of the middle turbinate; 3=large polyps reaching the lower border of the inferior turbinate or polyps medial to the middle turbinate; 4=large polyps causing...
complete obstruction of the inferior nasal cavity. The total score was the sum of the right and left scores. Nasal congestion was rated daily by the subjects on a 0 to 3 categorical severity scale (0=no symptoms; 1=mild symptoms; 2=moderate symptoms; 3=severe symptoms).

In both studies, key secondary end-points at week 24 included change from baseline in: LMK sinus CT scan score, total symptoms score (TSS), University of Pennsylvania smell identification test (UPSIT), daily loss of smell, and 22-item Sino-Nasal Outcome Test (SNOT-22). In the pool of the two studies, the reduction in the proportion of patients rescued with systemic corticosteroid and/or sino-nasal surgery as well as the improvement in FEV$_1$ in the asthma subgroup were evaluated. Additional secondary endpoints included 6-item Asthma Control Questionnaire (ACQ-6) in the co-morbid asthma subgroup.

The demographics and baseline characteristics of these 2 studies are provided in Table 22 below.

**Table 22: Demographics and baseline characteristics of CRSwNP studies**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SINUS-24 (N=276)</th>
<th>SINUS-52 (N=448)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (years) (SD)</td>
<td>50.49 (13.39)</td>
<td>51.95 (12.45)</td>
</tr>
<tr>
<td>% Male</td>
<td>57.2</td>
<td>62.3</td>
</tr>
<tr>
<td>Mean CRSwNP duration (years)(SD)</td>
<td>11.11 (9.16)</td>
<td>10.94 (9.63)</td>
</tr>
<tr>
<td>Patients with ≥ 1 prior surgery (%)</td>
<td>71.7</td>
<td>58.3</td>
</tr>
<tr>
<td>Patients with systemic corticosteroid use in the previous 2 years (%)</td>
<td>64.9</td>
<td>80.1</td>
</tr>
<tr>
<td>Mean Bilateral endoscopic NPS$^a$ (SD), range 0–8</td>
<td>5.75 (1.28)</td>
<td>6.10 (1.21)</td>
</tr>
<tr>
<td>Mean Nasal congestion (NC) score$^a$ (SD) range 0–3</td>
<td>2.35 (0.57)</td>
<td>2.43 (0.59)</td>
</tr>
<tr>
<td>Mean LMK sinus CT total score$^a$ (SD), range 0–24</td>
<td>19.03 (4.44)</td>
<td>17.96 (3.76)</td>
</tr>
<tr>
<td>Mean Smell test (UPSIT) score$^a$ (SD), range 0–40</td>
<td>14.56 (8.48)</td>
<td>13.61 (8.02)</td>
</tr>
<tr>
<td>Mean loss of smell score$^a$ (AM), (SD) range 0–3</td>
<td>2.71 (0.54)</td>
<td>2.75 (0.52)</td>
</tr>
<tr>
<td>Mean SNOT-22 total score$^a$ (SD), range 0–110</td>
<td>49.40 (20.20)</td>
<td>51.86 (20.90)</td>
</tr>
<tr>
<td>Mean Rhinosinusitis severity scale$^a$ (VAS), (SD) 0–10 cm</td>
<td>7.68 (2.05)</td>
<td>8.00 (2.08)</td>
</tr>
<tr>
<td>Mean blood eosinophils (cells/mcL)(SD)</td>
<td>437 (333)</td>
<td>431 (353)</td>
</tr>
<tr>
<td>Mean total IgE IU/mL (SD)</td>
<td>211.97 (275.73)</td>
<td>239.84 (341.53)</td>
</tr>
<tr>
<td>Atopic (type 2 inflammatory disease) Medical History % Overall</td>
<td>75.4 %</td>
<td>82.4 %</td>
</tr>
<tr>
<td>Asthma (%)</td>
<td>58.3</td>
<td>59.6</td>
</tr>
<tr>
<td>Mean FEV$_1$ (L)(SD)</td>
<td>2.69 (0.96)</td>
<td>2.57 (0.83)</td>
</tr>
<tr>
<td>Mean FEV$_1$ percent predicted (%)(SD)</td>
<td>85.30 (20.23)</td>
<td>83.39 (17.72)</td>
</tr>
<tr>
<td>Mean ACQ-6 score$^a$ (SD)</td>
<td>1.62 (1.14)</td>
<td>1.58 (1.09)</td>
</tr>
<tr>
<td>NSAID-ERD (%)</td>
<td>30.4</td>
<td>26.8</td>
</tr>
</tbody>
</table>

$^a$Higher scores indicate greater disease severity except UPSIT where higher scores indicate lower disease severity; SD=standard deviation; AM = morning; NPS = nasal polyps score; UPSIT = University of Pennsylvania smell identification test; SNOT-22 = 22-item Sino-Nasal Outcome Test; VAS = visual analogue scale; FEV$_1$ = Forced expiratory volume in 1 second; ACQ-6 = Asthma Control Questionnaire-6; NSAID-ERD= aspirin/nonsteroidal anti-inflammatory drug exacerbated respiratory disease

Clinical Response (SINUS-24 and SINUS-52)

The results for primary and secondary endpoints in CRSwNP studies are presented in the Table 23.
Table 23: Results of the primary and secondary endpoints in CRSwNP trials

<table>
<thead>
<tr>
<th></th>
<th>Placebo (n=133)</th>
<th>Dupilumab 300mg Q2W (n=143)</th>
<th>LS mean difference vs. placebo (95%CI)</th>
<th>Placebo (n=153)</th>
<th>Dupilumab 300mg Q2W (n=295)</th>
<th>LS mean difference vs. placebo (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary endpoints at week 24</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scores</td>
<td>Baseline mean</td>
<td>LS mean change</td>
<td>Baseline mean</td>
<td>LS mean change</td>
<td>Baseline mean</td>
<td>LS mean change</td>
</tr>
<tr>
<td>NPS</td>
<td>5.86</td>
<td>0.17</td>
<td>5.64</td>
<td>-1.89</td>
<td>-2.06 (-2.43, -1.69)</td>
<td>5.96</td>
</tr>
<tr>
<td>NC</td>
<td>2.45</td>
<td>-0.45</td>
<td>2.26</td>
<td>-1.34</td>
<td>-0.89 (-1.07, -0.71)</td>
<td>2.38</td>
</tr>
<tr>
<td><strong>Key secondary endpoints at week 24</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scores</td>
<td>Baseline mean</td>
<td>LS mean change</td>
<td>Baseline mean</td>
<td>LS mean change</td>
<td>Baseline mean</td>
<td>LS mean change</td>
</tr>
<tr>
<td>LMK sinus CT scan score</td>
<td>19.55</td>
<td>-0.74</td>
<td>18.55</td>
<td>-8.18</td>
<td>-7.44 (-8.35, -6.53)</td>
<td>17.65</td>
</tr>
<tr>
<td>Total symptom score</td>
<td>7.28</td>
<td>-1.17</td>
<td>6.82</td>
<td>-3.77</td>
<td>-2.61 (-3.04, -2.17)</td>
<td>7.08</td>
</tr>
<tr>
<td>UPSIT</td>
<td>14.44</td>
<td>0.70</td>
<td>14.68</td>
<td>11.26</td>
<td>10.56 (8.79, 12.34)</td>
<td>13.78</td>
</tr>
<tr>
<td>Loss of smell</td>
<td>2.73</td>
<td>-0.29</td>
<td>2.70</td>
<td>-1.41</td>
<td>-1.12 (-1.31, -0.93)</td>
<td>2.72</td>
</tr>
<tr>
<td>SNOT-22</td>
<td>50.87</td>
<td>-9.31</td>
<td>48.0</td>
<td>-30.43</td>
<td>-21.12 (-25.17, -17.06)</td>
<td>53.48</td>
</tr>
<tr>
<td>VAS</td>
<td>7.96</td>
<td>-1.34</td>
<td>7.42</td>
<td>-4.54</td>
<td>-3.20 (-3.79, -2.60)</td>
<td>7.98</td>
</tr>
</tbody>
</table>

A reduction in score indicates improvement, except UPSIT where an increase indicates improvement. Total symptom score is a composite severity score consisting of the sum of daily symptoms of NC, loss of smell, and anterior/posterior rhinorrhea.

NC = nasal congestion, NPS = nasal polyposis score; LMK = Lund-MacKay total CT score; UPSIT = University of Pennsylvania smell identification test; SNOT-22 = 22-item Sino-Nasal Outcome Test; TSS = total symptom score; VAS = visual analogue scale for rhinosinusitis (all p-values < 0.0001, nominal for VAS)

The results of SINUS-52 study at week 52 are presented in Table 24.
<table>
<thead>
<tr>
<th></th>
<th>Placebo (n=153)</th>
<th>Dupilumab 300mg Q2W (n=150)</th>
<th>LS mean difference vs. placebo (95%CI)</th>
<th>Dupilumab 300mg Q2W-Q4W (n=145)</th>
<th>LS mean difference vs. placebo (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline mean</td>
<td>LS mean change</td>
<td>Baseline mean</td>
<td>LS mean change</td>
<td>Baseline mean</td>
</tr>
<tr>
<td>NPS</td>
<td>5.96</td>
<td>0.15</td>
<td>6.07</td>
<td>-2.24</td>
<td>6.29</td>
</tr>
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<td></td>
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<tr>
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<td></td>
</tr>
<tr>
<td>NC</td>
<td>2.38</td>
<td>-0.37</td>
<td>2.48</td>
<td>-1.35</td>
<td>2.44</td>
</tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>LMK sinus CT scan score</td>
<td>17.65</td>
<td>0.11</td>
<td>18.42</td>
<td>-6.83</td>
<td>17.81</td>
</tr>
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</tr>
<tr>
<td>Total symptom score</td>
<td>7.08</td>
<td>-0.94</td>
<td>7.31</td>
<td>-3.79</td>
<td>7.28</td>
</tr>
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</tr>
<tr>
<td>UPSIT</td>
<td>13.78</td>
<td>-0.77</td>
<td>13.46</td>
<td>9.53</td>
<td>13.60</td>
</tr>
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</tr>
<tr>
<td>Loss of Smell</td>
<td>2.72</td>
<td>-0.19</td>
<td>2.81</td>
<td>-1.29</td>
<td>2.73</td>
</tr>
<tr>
<td></td>
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<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>SNOT-22</td>
<td>53.48</td>
<td>-8.88</td>
<td>50.16</td>
<td>-29.84</td>
<td>51.89</td>
</tr>
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<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>VAS</td>
<td>7.98</td>
<td>-0.93</td>
<td>8.24</td>
<td>-4.74</td>
<td>7.78</td>
</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>

A reduction in score indicates improvement, except UPSIT where an increase indicates improvement. Total symptom score is a composite severity score consisting of the sum of daily symptoms of NC, loss of smell, and anterior/posterior rhinorrhea.

NC = nasal congestion, NPS = nasal polyposis score; LMK = Lund-MacKay total CT score; UPSIT = University of Pennsylvania smell identification test; SNOT-22 = 22-item Sino-Nasal Outcome Test; TSS = total symptom score; VAS = visual analogue scale for rhinosinusitis (all p-values < 0.0001)

Statistically significant and clinically meaningful efficacy was observed in SINUS-24 with regard to improvement in bilateral endoscopic NPS score at week 24. In the post-treatment period when patients were off dupilumab, the treatment effect diminished over time (see Figure 9a). Similar results were also seen in SINUS-52 at both week 24 and week 52 with a progressive improvement over time (see Figure 9b).
Figure 9. LS mean change from baseline in bilateral nasal polyps score (NPS) in SINUS-24 and SINUS-52 - ITT population.

In both studies, significant improvements in NC and daily loss of smell severity were observed as early as the first assessment at week 4. The LS mean difference for NC at week 4 in the dupilumab group versus placebo was -0.41 (95% CI: -0.52, -0.30) in SINUS-24 and -0.37 (95% CI: -0.46, -0.27) in SINUS-52. The LS mean difference for loss of smell at week 4 in the dupilumab group versus placebo was -0.34 (95% CI: -0.44, -0.25) in SINUS-24 and -0.31 (95% CI: -0.41, -0.22) in SINUS-52. A reduction in the proportion of patients with anosmia was observed in SINUS-24 and SINUS-52. At baseline, 74 % to 79 % of patients had anosmia, which was reduced to 24 % in SINUS-24 and 30 % in SINUS-52 at week 24, compared to no change in placebo. Improvement in nasal peak inspiratory flow (NPIF) was observed in SINUS-24 and SINUS-52 at week 24. The LS mean difference in the dupilumab group versus placebo was 40.4 L/min (95% CI: 30.4, 50.4) and 36.6 L/min (95% CI: 28.0, 45.3), respectively.

Among the patients with rhinosinusitis VAS score > 7 at baseline, a higher percentage of patients achieved VAS ≤ 7 in the dupilumab group compared with the placebo group (83.3 % versus 39.4 % in SINUS-24 and 75.0 % versus 39.3 % in SINUS-52) at week 24.

In the pre-specified multiplicity-adjusted pooled analysis of two studies, treatment with dupilumab resulted in significant reduction of systemic corticosteroid use and need for sino-nasal surgery versus placebo (HR of 0.24; 95% CI: 0.17, 0.35) (see Figure 10). The proportion of patients who required systemic corticosteroids was reduced by 74 % (HR of 0.26; 95% CI: 0.18, 0.38). The total number of systemic corticosteroid courses per year was reduced by 75 % (RR of 0.25; 95% CI: 0.17, 0.37). The mean individual annualised prescribed total dose of systemic corticosteroids (in mg) during the treatment period was 71 % lower in the pooled dupilumab group compared with the pooled placebo group (60.5 [531.3] mg versus 209.5 [497.2] mg, respectively). The proportion of patients who required surgery was reduced by 83 % (HR of 0.17; 95% CI: 0.07, 0.46).
The effects of dupilumab on the primary endpoints of NPS and nasal congestion and the key secondary endpoint of LMK sinus CT scan score were consistent in patients with prior surgery and without prior surgery.

In patients with co-morbid asthma, significant improvements in FEV$_1$ and ACQ-6 were observed at week 24 irrespective of baseline blood eosinophil levels. The pooled LS Mean change from baseline in FEV$_1$ at week 24 for dupilumab 300 mg Q2W was 0.14 vs -0.07 L for placebo, for a difference of 0.21 L (95% CI: 0.13, 0.29). In addition, improvements in FEV$_1$ were noted from the first post-baseline assessment, at week 8 in SINUS-24 and week 4 in SINUS-52. Improvements in ACQ-6 in patients with co-morbid asthma were observed in both studies. A response was defined as an improvement in score of 0.5 or more. The LS mean difference in the dupilumab group versus placebo at week 24 was -0.76 (95% CI: -1.00 to -0.51) in SINUS-24 and -0.94 (95% CI: -1.19, -0.69) in SINUS-52.

The ACQ-6 responder rate for dupilumab 300 mg Q2W for SINUS-24 at week 24 was 56 % versus 28 % in placebo (odds ratio 3.17; 95% CI: 1.65, 6.09). The ACQ-6 responder rate for dupilumab 300 mg Q2W for SINUS-52 was 46 % versus 14 % placebo at week 52 (odds ratio 7.02; 95% CI: 3.10, 15.90).

In patients with NSAID-ERD, the effects of dupilumab on the primary endpoints of NPS and NC and the key secondary endpoint of LMK sinus CT scan score were consistent with that observed in the overall CRSwNP population.

Paediatric population

**Atopic dermatitis**

The safety and efficacy of dupilumab have been established in 12 to 17 years old with moderate-to-severe atopic dermatitis in study AD-1526 which included 251 adolescents. The safety and efficacy of dupilumab have been established in 6 to 11 years old with severe atopic dermatitis in study AD-1652 which included 367 paediatric patients. Use is supported by study AD-1434 which enrolled patients who had completed AD-1526 (136 moderate and 64 severe at the time of enrolment in study AD-1434) and patients who had completed study AD-1652 (110 moderate and 72 severe at the time of enrolment in study AD-1434). The safety and efficacy were generally consistent between children 6 to 11 years old, adolescent, and adult patients with atopic dermatitis (see section 4.8). Safety and efficacy in paediatric patients < 6 years of age with atopic dermatitis have not been established.

**Asthma**

A total of 107 adolescents aged 12 to 17 years with moderate to severe asthma were enrolled in QUEST study and received either 200 mg (N=21) or 300 mg (N=18) dupilumab (or matching placebo either 200 mg [N=34] or 300 mg [N=34]) every other week. Efficacy with respect to severe asthma exacerbations and lung function was observed in both adolescents and adults. For both the 200 mg and
300 mg every other week doses, significant improvements in FEV₁ (LS mean change from baseline at week 12) were observed (0.36 L and 0.27 L, respectively). For the 200 mg every other week dose, patients had a reduction in the rate of severe exacerbations that was consistent with adults. The safety profile in adolescents was generally similar to the adults.

A total of 89 adolescents aged 12 to 17 years with moderate-to-severe asthma were enrolled in the open label long-term study (TRAVERSE). In this study, efficacy was measured as a secondary endpoint, was similar to results observed in the pivotal studies and was sustained up to 96 weeks.

A total of 408 children aged 6 to 11 years with moderate-to-severe asthma was enrolled in the VOYAGE study, which evaluated doses of 100 mg Q2W and 200 mg Q2W. The efficacy of dupilumab 300 mg Q4W in children aged 6 to 11 years is extrapolated from the efficacy of 100 mg and 200 mg Q2W in VOYAGE and 200 mg and 300 mg Q2W in adults and adolescents (QUEST). Patients who completed the treatment period of the VOYAGE study could participate in the open label extension study (EXCURSION). Eighteen patients (≥ 15 kg to < 30 kg) out of 365 patients were exposed to 300 mg Q4W in this study, and the safety profile was similar to that seen in VOYAGE. Safety and efficacy in paediatric patients < 6 years of age with asthma have not been established.

The European Medicines Agency has deferred the obligation to submit the results of studies with dupilumab in one or more subset of the paediatric population in atopic dermatitis and asthma (see section 4.2 for information on paediatric use). The European Medicines Agency has waived the obligation to submit the results of studies with dupilumab in all subsets of the paediatric population in the treatment of nasal polyposis (see section 4.2 for information on paediatric use).

### 5.2 Pharmacokinetic properties

The pharmacokinetics of dupilumab is similar in patients with atopic dermatitis, asthma, and CRSwNP.

#### Absorption

After a single subcutaneous (SC) dose of 75-600 mg dupilumab to adults, median times to maximum concentration in serum (tₘₐₓ) were 3-7 days. The absolute bioavailability of dupilumab following a SC dose is similar between AD, asthma, and CRSwNP patients, ranging between 61 % and 64 %, as determined by a population pharmacokinetics (PK) analysis.

Steady-state concentrations were achieved by week 16 following the administration of 600 mg starting dose and 300 mg dose every other week or 300 mg dose every other week without a loading dose. Across clinical trials, the mean ±SD steady-state trough concentrations ranged from 69.2±36.9 mcg/mL to 80.2±35.3 mcg/mL for 300 mg dose and from 29.2±18.7 to 36.5±22.2 mcg/mL for 200 mg dose administered every other week to adults.

#### Distribution

A volume of distribution for dupilumab of approximately 4.6 L was estimated by population PK analysis, indicating that dupilumab is distributed primarily in the vascular system.

#### Biotransformation

Specific metabolism studies were not conducted because dupilumab is a protein. Dupilumab is expected to degrade to small peptides and individual amino acids.
Elimination

Dupilumab elimination is mediated by parallel linear and nonlinear pathways. At higher concentrations, dupilumab elimination is primarily through a non-saturable proteolytic pathway, while at lower concentrations, the non-linear saturable IL-4Rα target-mediated elimination predominates. After the last steady state dose, the median time for dupilumab concentrations to decrease below the lower limit of detection, estimated by population PK analysis, was 6-7 weeks for the 300 mg Q4W regimen, 9 weeks for the 200 mg Q2W regimen, 10-11 weeks for the 300 mg Q2W regimen, and 13 weeks for the 300 mg QW regimen.

Linearity/non-linearity

Due to nonlinear clearance, dupilumab exposure, as measured by area under the concentration-time curve, increases with dose in a greater than proportional manner following single SC doses from 75-600 mg.

Special populations

Gender

Gender was not found to be associated with any clinically meaningful impact on the systemic exposure of dupilumab determined by population PK analysis.

Elderly

Of the 1,472 patients with atopic dermatitis exposed to dupilumab in a phase 2 dose-ranging study or phase 3 placebo-controlled studies, a total of 67 were 65 years or older. Although no differences in safety or efficacy were observed between older and younger adult atopic dermatitis patients, the number of patients aged 65 and over is not sufficient to determine whether they respond differently from younger patients.

Age was not found to be associated with any clinically meaningful impact on the systemic exposure of dupilumab determined by population PK analysis. However, there were only 61 patients over 65 years of age included in this analysis.

Of the 1,977 patients with asthma exposed to dupilumab, a total of 240 patients were 65 years or older and 39 patients were 75 years or older. Efficacy and safety in this age group were similar to the overall study population.

There were only 79 patients older than 65 years with CRSwNP exposed to dupilumab among them 11 patients were 75 years and older.

Race

Race was not found to be associated with any clinically meaningful impact on the systemic exposure of dupilumab by population PK analysis.

Hepatic impairment

Dupilumab, as a monoclonal antibody, is not expected to undergo significant hepatic elimination. No clinical studies have been conducted to evaluate the effect of hepatic impairment on the pharmacokinetics of dupilumab.

Renal impairment

Dupilumab, as a monoclonal antibody, is not expected to undergo significant renal elimination. No clinical studies have been conducted to evaluate the effect of renal impairment on the pharmacokinetics of dupilumab. Population PK analysis did not identify mild or moderate renal impairment as having a clinically meaningful influence on the systemic exposure of dupilumab. Very limited data are available in patients with severe renal impairment.
Body weight
Dupilumab trough concentrations were lower in subjects with higher body weight with no meaningful impact on efficacy. There were only 6 patients exposed to dupilumab with body weight ≥130 kg in CRSwNP clinical studies.

Paediatric population

Atopic dermatitis
The pharmacokinetics of dupilumab in paediatric patients (<6 years of age) or body weight <15 kg with atopic dermatitis has not been studied.

For adolescents 12 to 17 years of age with atopic dermatitis receiving every other week dosing (Q2W) with either 200 mg (<60 kg) or 300 mg (≥60 kg), the mean ± SD steady state trough concentration of dupilumab was 54.5±27.0 mcg/mL.

For children 6 to 11 years of age with atopic dermatitis receiving every four week dosing (Q4W) with 300 mg (≥15 kg) in AD-1652, the mean ± SD steady-state trough concentration was 76.3±37.2 mcg/mL. At week 16 in AD-1434 in children 6 to 11 years of age who initiated every four week dosing (Q4W) with 300 mg (≥15 kg), and whose dose was increased to every other week dosing (Q2W) with 200 mg (≥15 to < 60 kg) or 300 mg (≥60 kg), the mean±SD steady-state trough concentration was 108±53.8 mcg/mL. For children 6 to 11 years of age receiving 300 mg Q4W, initial doses of 300 mg on Days 1 and 15 produce similar steady-state exposure as an initial dose of 600 mg on Day 1, based on PK simulations.

Asthma
The pharmacokinetics of dupilumab in paediatric patients (<6 years of age) with asthma has not been studied.

A total of 107 adolescents aged 12 to 17 years with asthma were enrolled in QUEST study. The mean ±SD steady-state trough concentrations of dupilumab were 107±51.6 mcg/mL and 46.7±26.9 mcg/mL, respectively, for 300 mg or 200 mg administered every other week. No age-related pharmacokinetic difference was observed in adolescent patients after correction for body weight.

In the VOYAGE study, dupilumab pharmacokinetics was investigated in 270 patients with moderate-to-severe asthma following subcutaneous administration of either 100 mg Q2W (for 91 children weighing <30 kg) or 200 mg Q2W (for 179 children weighing ≥30 kg). The volume of distribution for dupilumab of approximately 3.7 L was estimated by population PK analysis. Steady-state concentrations were achieved by week 12. The mean ± SD steady-state trough concentration was 58.4±28.0 mcg/mL and 85.1±44.9 mcg/mL, respectively. Simulation of a 300 mg Q4W subcutaneous dose in children aged 6 to 11 years with body weight of ≥15 kg to <30 kg and ≥30 kg to <60 kg resulted in predicted steady-state-trough concentrations similar to the observed trough concentrations of 200 mg Q2W (≥30 kg) and 100 mg Q2W (<30 kg), respectively. In addition, simulation of a 300 mg Q4W subcutaneous dose in children aged 6 to 11 years with body weight of ≥15 kg to <60 kg resulted in predicted steady-state trough concentrations similar to those demonstrated to be efficacious in adults and adolescents. After the last steady state dose, the median time for dupilumab concentrations to decrease below the lower limit of detection, estimated by population PK analysis, was 14 to 18 weeks for 100 mg Q2W, 200 mg Q2W or 300 mg Q4W.

CRSwNP
CRSwNP does not normally occur in children. The pharmacokinetics of dupilumab in paediatric patients (<18 years of age) with CRSwNP has not been studied.

5.3 Preclinical safety data

Non-clinical data reveal no special hazard for humans based on conventional studies of repeated dose toxicity (including safety pharmacology endpoints) and toxicity to reproduction and development.
The mutagenic potential of dupilumab has not been evaluated; however monoclonal antibodies are not expected to alter DNA or chromosomes.

Carcinogenicity studies have not been conducted with dupilumab. An evaluation of the available evidence related to IL-4Rα inhibition and animal toxicology data with surrogate antibodies does not suggest an increased carcinogenic potential for dupilumab.

During a reproductive toxicology study conducted in monkeys, using a surrogate antibody specific to the monkey IL-4Rα, no fetal abnormalities were observed at dosages that saturate the IL-4Rα.

An enhanced pre- and post-natal developmental study revealed no adverse effects in maternal animals or their offspring up to 6 months post-partum/post-birth.

Fertility studies conducted in male and female mice using a surrogate antibody against IL-4Rα showed no impairment of fertility (see section 4.6).

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

arginine hydrochloride
histidine
polysorbate 80 (E433)
sodium acetate trihydrate
glacial acetic acid (E260)
sucrose
water for injections

6.2 Incompatibilities

In the absence of compatibility studies, this medicinal product must not be mixed with other medicinal products.

6.3 Shelf life

3 years.

If necessary, pre-filled syringes or pre-filled pens may be kept at room temperature up to 25°C for a maximum of 14 days. Do not store above 25°C. If the carton needs to be removed permanently from refrigerator, the date of removal may be recorded on the outer carton. After removal from the refrigerator, Dupixent must be used within 14 days or discarded.

6.4 Special precautions for storage

Store in a refrigerator (2°C - 8°C).

Do not freeze.

Store in the original carton in order to protect from light.

6.5 Nature and contents of container

Dupixent 300 mg solution for injection in pre-filled syringe
2 mL solution in a siliconised type-1 clear glass pre-filled syringe with or without needle shield, with a fixed 27 gauge 12.7 mm (½ inch), thin wall stainless steel staked needle.
Pack size:
- 1 pre-filled syringe
- 2 pre-filled syringes
- Multipack containing 3 (3 packs of 1) pre-filled syringes
- Multipack containing 6 (3 packs of 2) pre-filled syringes

Dupixent 300 mg solution for injection in pre-filled pen
2 mL solution in a siliconised type-1 clear glass syringe in a pre-filled pen, with a fixed 27 gauge 12.7 mm (½ inch), thin wall stainless steel staked needle.

Pack size:
- 1 pre-filled pen
- 2 pre-filled pens
- 3 pre-filled pens
- 6 pre-filled pens

Not all pack sizes may be marketed.

6.6 Special precautions for disposal and other handling

After removing the 300 mg pre-filled syringe or pre-filled pen from the refrigerator, it should be allowed to reach room temperature up to 25°C by waiting for 45 min before injecting Dupixent.

The pre-filled syringe or the pre-filled pen should not be exposed to heat or direct sunlight and should not be shaken.

Any unused medicinal product or waste material should be disposed of in accordance with local requirements. After use, place the pre-filled syringe or the pre-filled pen into a puncture-resistant container and discard as required by local regulations. Do not recycle the container.

7. MARKETING AUTHORISATION HOLDER

sanofi-aventis groupe
54, rue La Boétie
75008 Paris
France

8. MARKETING AUTHORISATION NUMBER(S)

EU/1/17/1229/001
EU/1/17/1229/002
EU/1/17/1229/003
EU/1/17/1229/004
EU/1/17/1229/005
EU/1/17/1229/006
EU/1/17/1229/007
EU/1/17/1229/008
EU/1/17/1229/017
EU/1/17/1229/018
EU/1/17/1229/019
EU/1/17/1229/020
9. DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

Date of first authorisation: 26 September 2017

10. DATE OF REVISION OF THE TEXT

Detailed information on this medicinal product is available on the website of the European Medicines Agency http://www.ema.europa.eu
This medicinal product is subject to additional monitoring. This will allow quick identification of new safety information. Healthcare professionals are asked to report any suspected adverse reactions. See section 4.8 for how to report adverse reactions.

1. **NAME OF THE MEDICINAL PRODUCT**

Dupixent 200 mg solution for injection in pre-filled syringe
Dupixent 200 mg solution for injection in pre-filled pen

2. **QUALITATIVE AND QUANTITATIVE COMPOSITION**

**Dupilumab 200 mg solution for injection in pre-filled syringe**

Each single-use pre-filled syringe contains 200 mg of dupilumab in 1.14 mL solution (175 mg/mL).

**Dupilumab 200 mg solution for injection in pre-filled pen**

Each single-use pre-filled pen contains 200 mg of dupilumab in 1.14 mL solution (175 mg/mL).

Dupilumab is a fully human monoclonal antibody produced in Chinese Hamster Ovary (CHO) cells by recombinant DNA technology.

For the full list of excipients, see section 6.1.

3. **PHARMACEUTICAL FORM**

Solution for injection (injection)

Clear to slightly opalescent, colourless to pale yellow sterile solution, which is free from visible particulates, with a pH of approximately 5.9.

4. **CLINICAL PARTICULARS**

4.1 **Therapeutic indications**

**Atopic dermatitis**

**Adults and adolescents**

Dupixent is indicated for the treatment of moderate-to-severe atopic dermatitis in adults and adolescents 12 years and older who are candidates for systemic therapy.

**Children 6 to 11 years of age**

Dupixent is indicated for the treatment of severe atopic dermatitis in children 6 to 11 years old who are candidates for systemic therapy.

**Asthma**

**Adults and adolescents**

Dupixent is indicated in adults and adolescents 12 years and older as add-on maintenance treatment for severe asthma with type 2 inflammation characterised by raised blood eosinophils and/or raised fraction of exhaled nitric oxide (FeNO), see section 5.1, who are inadequately controlled with high dose inhaled corticosteroids (ICS) plus another medicinal product for maintenance treatment.
Children 6 to 11 years of age
Dupixent is indicated in children 6 to 11 years old as add-on maintenance treatment for severe asthma with type 2 inflammation characterised by raised blood eosinophils and/or raised fraction of exhaled nitric oxide (FeNO), see section 5.1, who are inadequately controlled with medium to high dose inhaled corticosteroids (ICS) plus another medicinal product for maintenance treatment.

4.2 Posology and method of administration

Treatment should be initiated by healthcare professionals experienced in the diagnosis and treatment of conditions for which dupilumab is indicated (see section 4.1).

Posology

Atopic dermatitis

Adults
The recommended dose of dupilumab for adult patients is an initial dose of 600 mg (two 300 mg injections), followed by 300 mg given every other week administered as subcutaneous injection.

Adolescents (12 to 17 years of age)
The recommended dose of dupilumab for adolescent patients 12 to 17 years of age is specified in Table 1.

<table>
<thead>
<tr>
<th>Body weight of patient</th>
<th>Initial dose</th>
<th>Subsequent doses (every other week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 60 kg</td>
<td>400 mg (two 200 mg injections)</td>
<td>200 mg</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>600 mg (two 300 mg injections)</td>
<td>300 mg</td>
</tr>
</tbody>
</table>

Children 6 to 11 years of age
The recommended dose of dupilumab for children 6 to 11 years of age is specified in Table 2.

<table>
<thead>
<tr>
<th>Body weight of patient</th>
<th>Initial dose</th>
<th>Subsequent doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 kg to less than 60 kg</td>
<td>300 mg (one 300 mg injection) on Day 1, followed by 300 mg on Day 15</td>
<td>300 mg every 4 weeks (Q4W)*, starting 4 weeks after Day 15 dose</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>600 mg (two 300 mg injections)</td>
<td>300 mg every other week (Q2W)</td>
</tr>
</tbody>
</table>

* The dose may be increased to 200 mg Q2W in patients with body weight of 15 kg to less than 60 kg based on physician’s assessment.

Dupilumab can be used with or without topical corticosteroids. Topical calcineurin inhibitors may be used, but should be reserved for problem areas only, such as the face, neck, intertriginous and genital areas.

Consideration should be given to discontinuing treatment in patients who have shown no response after 16 weeks of treatment for atopic dermatitis. Some patients with initial partial response may subsequently improve with continued treatment beyond 16 weeks. If dupilumab treatment interruption becomes necessary, patients can still be successfully re-treated.

Asthma
**Adults and adolescents**

The recommended dose of dupilumab for adults and adolescents (12 years of age and older) is:

- An initial dose of 400 mg (two 200 mg injections), followed by 200 mg given every other week administered as subcutaneous injection.
- For patients with severe asthma and who are on oral corticosteroids or for patients with severe asthma and co-morbid moderate-to-severe atopic dermatitis or adults with co-morbid severe chronic rhinosinusitis with nasal polyposis, an initial dose of 600 mg (two 300 mg injections), followed by 300 mg every other week administered as subcutaneous injection.

**Children 6 to 11 years of age**

The recommended dose of dupilumab for paediatric patients 6 to 11 years of age is specified in Table 3.

**Table 3: Dose of dupilumab for subcutaneous administration in children 6 to 11 years of age with asthma**

<table>
<thead>
<tr>
<th>Body weight</th>
<th>Initial and subsequent doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 to less than 30 kg</td>
<td>100 mg every other week (Q2W) or 300 mg every four weeks (Q4W)</td>
</tr>
<tr>
<td>30 kg to less than 60 kg</td>
<td>200 mg every other week (Q2W) or 300 mg every four weeks (Q4W)</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>200 mg every other week (Q2W)</td>
</tr>
</tbody>
</table>

For paediatric patients (6 to 11 years old) with asthma and co-morbid severe atopic dermatitis, as per approved indication, the recommended dose should be followed in Table 2.

Patients receiving concomitant oral corticosteroids may reduce their steroid dose once clinical improvement with dupilumab has occurred (see section 5.1). Steroid reductions should be accomplished gradually (see section 4.4).

Dupilumab is intended for long-term treatment. The need for continued therapy should be considered at least on an annual basis as determined by physician assessment of the patient’s level of asthma control.

**Missed dose**

If a dose is missed, the dose should be administered as soon as possible. Thereafter, dosing should resume at the regular scheduled time.

**Special populations**

**Elderly (≥ 65 years)**

No dose adjustment is recommended for elderly patients (see section 5.2).

**Renal impairment**

No dose adjustment is needed in patients with mild or moderate renal impairment. Very limited data are available in patients with severe renal impairment (see section 5.2).

**Hepatic impairment**

No data are available in patients with hepatic impairment (see section 5.2).

**Body weight**

No dose adjustment for body weight is recommended for patients with asthma 12 years of age and older or in adults with atopic dermatitis (see section 5.2).
Paediatric patients

The safety and efficacy of dupilumab in children with atopic dermatitis below the age of 6 years have not been established. The safety and efficacy of dupilumab in children with a body weight < 15 kg have not been established (see section 5.2). No data are available.

The safety and efficacy of dupilumab in children with severe asthma below the age of 6 years have not been established (see section 5.2). No data are available.

Method of administration

Subcutaneous use

The dupilumab pre-filled pen is not intended for use in children below 12 years of age. For children 6 to 11 years of age with atopic dermatitis, and asthma, the dupilumab pre-filled syringe is the presentation appropriate for administration to this population.

Dupilumab is administered by subcutaneous injection into the thigh or abdomen, except for the 5 cm around the navel. If somebody else administers the injection, the upper arm can also be used.

For the initial 400 mg dose, two 200 mg injections should be administered consecutively in different injection sites.

It is recommended to rotate the injection site with each injection. Dupilumab should not be injected into skin that is tender, damaged or has bruises or scars.

A patient may self-inject dupilumab or the patient's caregiver may administer dupilumab if their healthcare professional determines that this is appropriate. Proper training should be provided to patients and/or caregivers on the preparation and administration of dupilumab prior to use according to the Instructions for Use (IFU) section at the end of the package leaflet.

4.3 Contraindications

Hypersensitivity to the active substance or to any of the excipients listed in section 6.1.

4.4 Special warnings and precautions for use

Traceability

In order to improve the traceability of biological medicinal products, the name and the batch number of the administered product should be clearly recorded.

Acute asthma exacerbations

Dupilumab should not be used to treat acute asthma symptoms or acute exacerbations. Dupilumab should not be used to treat acute bronchospasm or status asthmaticus.

Corticosteroids

Systemic, topical, or inhaled corticosteroids should not be discontinued abruptly upon initiation of therapy with dupilumab. Reductions in corticosteroid dose, if appropriate, should be gradual and performed under the direct supervision of a physician. Reduction in corticosteroid dose may be associated with systemic withdrawal symptoms and/or unmask conditions previously suppressed by systemic corticosteroid therapy.

Biomarkers of type 2 inflammation may be suppressed by systemic corticosteroid use. This should be taken into consideration to determine type 2 status in patients taking oral corticosteroids (see section 5.1).
Hypersensitivity

If a systemic hypersensitivity reaction (immediate or delayed) occurs, administration of dupilumab should be discontinued immediately and appropriate therapy initiated. Cases of anaphylactic reaction, angioedema, and serum sickness/serum sickness-like reaction have been reported. Anaphylactic reactions and angioedema have occurred from minutes to up to seven days after the dupilumab injection (see section 4.8).

Eosinophilic conditions

Cases of eosinophilic pneumonia and cases of vasculitis consistent with eosinophilic granulomatosis with polyangiitis (EGPA) have been reported with dupilumab in adult patients who participated in the asthma development program. Cases of vasculitis consistent with EGPA have been reported with dupilumab and placebo in adult patients with co-morbid asthma in the CRSwNP development program. Physicians should be alert to vasculitic rash, worsening pulmonary symptoms, cardiac complications, and/or neuropathy presenting in their patients with eosinophilia. Patients being treated for asthma may present with serious systemic eosinophilia sometimes presenting with clinical features of eosinophilic pneumonia or vasculitis consistent with eosinophilic granulomatosis with polyangiitis, conditions which are often treated with systemic corticosteroid therapy. These events usually, but not always, may be associated with the reduction of oral corticosteroid therapy.

Helminth infection

Patients with known helminth infections were excluded from participation in clinical studies. Dupilumab may influence the immune response against helminth infections by inhibiting IL-4/IL-13 signaling. Patients with pre-existing helminth infections should be treated before initiating dupilumab. If patients become infected while receiving treatment with dupilumab and do not respond to anti-helminth treatment, treatment with dupilumab should be discontinued until infection resolves. Cases of enterobiasis were reported in children 6 to 11 years old who participated in the paediatric asthma development program (see section 4.8).

Conjunctivitis and keratitis related events

Conjunctivitis and keratitis related events have been reported with dupilumab, predominantly in atopic dermatitis patients. Some patients reported visual disturbances (e.g. blurred vision) associated with conjunctivitis or keratitis (see section 4.8).

Patients should be advised to report new onset or worsening eye symptoms to their healthcare provider. Patients treated with dupilumab who develop conjunctivitis that does not resolve following standard treatment or signs and symptoms suggestive of keratitis should undergo ophthalmological examination, as appropriate (see section 4.8).

Atopic dermatitis or CRSwNP patients with comorbid asthma

Patients on dupilumab for moderate-to-severe atopic dermatitis or severe CRSwNP who also have comorbid asthma should not adjust or stop their asthma treatments without consultation with their physicians. Patients with comorbid asthma should be monitored carefully following discontinuation of dupilumab.

Vaccinations

Live and live attenuated vaccines should not be given concurrently with dupilumab as clinical safety and efficacy has not been established. Immune responses to TdaP vaccine and meningococcal polysaccharide vaccine were assessed (see section 4.5). It is recommended that patients should be brought up to date with live and live attenuated immunisations in agreement with current immunisation guidelines prior to treatment with dupilumab.
Sodium content

This medicinal product contains less than 1 mmol sodium (23 mg) per 200 mg dose, that is to say essentially “sodium-free”.

4.5 Interaction with other medicinal products and other forms of interaction

Immune responses to vaccination were assessed in a study in which patients with atopic dermatitis were treated once weekly for 16 weeks with 300 mg of dupilumab. After 12 weeks of dupilumab administration, patients were vaccinated with a Tdap vaccine (T cell-dependent), and a meningococcal polysaccharide vaccine (T cell-independent) and immune responses were assessed 4 weeks later. Antibody responses to both tetanus vaccine and meningococcal polysaccharide vaccine were similar in dupilumab-treated and placebo-treated patients. No adverse interactions between either of the non-live vaccines and dupilumab were noted in the study.

Therefore, patients receiving dupilumab may receive concurrent inactivated or non-live vaccinations. For information on live vaccines see section 4.4.

In a clinical study of atopic dermatitis patients, the effects of dupilumab on the pharmacokinetics (PK) of CYP substrates were evaluated. The data gathered from this study did not indicate clinically relevant effects of dupilumab on CYP1A2, CYP3A, CYP2C19, CYP2D6, or CYP2C9 activity.

An effect of dupilumab on the PK of co-administered medications is not expected. Based on the population analysis, commonly co-administered medications had no effect on dupilumab pharmacokinetics on patients with moderate to severe asthma.

4.6 Fertility, pregnancy and lactation

Pregnancy

There is a limited amount of data from the use of dupilumab in pregnant women. Animal studies do not indicate direct or indirect harmful effects with respect to reproductive toxicity (see section 5.3). Dupilumab should be used during pregnancy only if the potential benefit justifies the potential risk to the foetus.

Breast-feeding

It is unknown whether dupilumab is excreted in human milk or absorbed systemically after ingestion. A decision must be made whether to discontinue breast-feeding or to discontinue dupilumab therapy taking into account the benefit of breast feeding for the child and the benefit of therapy for the woman.

Fertility

Animal studies showed no impairment of fertility (see section 5.3).

4.7 Effects on ability to drive and use machines

Dupilumab has no or negligible influence on the ability to drive or operate machinery.
4.8 Undesirable effects

Summary of the safety profile

The most common adverse reactions are injection site reactions (includes erythema, oedema, pruritus, pain and swelling), conjunctivitis, conjunctivitis allergic, arthralgia, oral herpes, and eosinophilia. Rare cases of serum sickness, serum sickness-like reaction, anaphylactic reaction, and ulcerative keratitis have been reported (see section 4.4).

Tabulated list of adverse reactions

Dupilumab was studied in 12 randomised, placebo-controlled trials, including atopic dermatitis, asthma, and CRSwNP patients. The pivotal controlled studies involved 4,206 patients receiving dupilumab and 2,326 patients receiving placebo during the controlled period.

Listed in Table 4 are adverse reactions observed in clinical trials and/or postmarketing setting presented by system organ class and frequency, using the following categories: very common (≥ 1/10); common (≥ 1/100 to < 1/10); uncommon (≥ 1/1,000 to < 1/100); rare (≥ 1/10,000 to < 1/1,000); very rare (< 1/10,000). Within each frequency grouping, adverse reactions are presented in order of decreasing seriousness.

Table 4: List of adverse reactions

<table>
<thead>
<tr>
<th>MedDRA System Organ Class</th>
<th>Frequency</th>
<th>Adverse Reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infections and infestations</strong></td>
<td>Common</td>
<td>Conjunctivitis*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oral herpes*</td>
</tr>
<tr>
<td><strong>Blood and lymphatic system disorders</strong></td>
<td>Common</td>
<td>Eosinophilia</td>
</tr>
<tr>
<td><strong>Immune system disorders</strong></td>
<td>Uncommon</td>
<td>Angioedema*</td>
</tr>
<tr>
<td></td>
<td>Rare</td>
<td>Anaphylactic reaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Serum sickness reaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Serum sickness-like reaction</td>
</tr>
<tr>
<td><strong>Eye disorders</strong></td>
<td>Common</td>
<td>Conjunctivitis allergic*</td>
</tr>
<tr>
<td></td>
<td>Uncommon</td>
<td>Keratitis*†</td>
</tr>
<tr>
<td></td>
<td>Rare</td>
<td>Blepharitis*†</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eye pruritus*†</td>
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<tr>
<td></td>
<td></td>
<td>Dry eye*†</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ulcerative keratitis*†</td>
</tr>
<tr>
<td><strong>Skin and subcutaneous tissue disorders</strong></td>
<td>Uncommon</td>
<td>Facial rash*</td>
</tr>
<tr>
<td><strong>Musculoskeletal and connective tissue disorders</strong></td>
<td>Common</td>
<td>Arthralgia*</td>
</tr>
<tr>
<td><strong>General disorders and administration site conditions</strong></td>
<td>Common</td>
<td>Injection site reactions (includes erythema, oedema, pruritus, pain, and swelling)</td>
</tr>
</tbody>
</table>

*Eye disorders and oral herpes occurred predominately in atopic dermatitis studies.
†The frequencies for eye pruritus, blepharitis, and dry eye were common and ulcerative keratitis was uncommon in atopic dermatitis studies.
‡From postmarketing reporting.

Description of selected adverse reactions

Hypersensitivity
Cases of anaphylactic reaction, angioedema, and serum sickness/serum sickness-like reaction have been reported following administration of dupilumab (see section 4.4).

**Conjunctivitis and keratitis related events**
Conjunctivitis and keratitis occurred more frequently in atopic dermatitis patients who received dupilumab compared to placebo in atopic dermatitis studies. Most patients with conjunctivitis or keratitis recovered or were recovering during the treatment period. In the long-term OLE atopic dermatitis study (AD-1225) at 3 years, the respective rates of conjunctivitis and keratitis remained similar to those in the dupilumab arm in the placebo controlled atopic dermatitis studies. Among asthma patients frequency of conjunctivitis and keratitis was low and similar between dupilumab and placebo. Among CRSwNP patients the frequency of conjunctivitis was higher in dupilumab than placebo, though lower than that observed in atopic dermatitis patients. There were no cases of keratitis reported in the CRSwNP development program (see section 4.4).

**Eczema herpeticum**
Eczema herpeticum was reported in < 1 % of the dupilumab groups and in < 1 % of the placebo group in the 16-week atopic dermatitis monotherapy adult studies. In the 52-week atopic dermatitis dupilumab + TCS adult study, eczema herpeticum was reported in 0.2 % of the dupilumab + TCS group and 1.9 % of the placebo + TCS group. These rates remained stable at 3 years in the long-term OLE study (AD-1225).

**Eosinophilia**
Dupilumab-treated patients had a greater mean initial increase from baseline in eosinophil count compared to patients treated with placebo. Eosinophil counts declined to near baseline levels during study treatment and returned to baseline during the asthma open-label extension safety study (TRAVERSE). The mean blood eosinophil levels decreased to below baseline by week 20 and was maintained up to 3 years in the long-term OLE study (AD-1225).

Treatment-emergent eosinophilia (≥ 5,000 cells/mcL) was reported in < 2 % of dupilumab-treated patients and < 0.5 % in placebo-treated patients (SOLO1, SOLO2, AD-1021, DRI12544, QUEST, SINUS-24 and SINUS-52 studies) (see section 4.4).

**Infections**
In the 16-week atopic dermatitis monotherapy clinical adult studies, serious infections were reported in 1.0 % of patients treated with placebo and 0.5 % of patients treated with dupilumab. In the 52-week atopic dermatitis CHRONOS adult study, serious infections were reported in 0.6 % of patients treated with placebo and 0.2 % of patients treated with dupilumab. The rates of serious infections remained stable at 3 years in the long-term OLE study (AD-1225).

No increase was observed in the overall incidence of infections with dupilumab compared to placebo in the safety pool for asthma clinical studies. In the 24-week safety pool, serious infections were reported in 1.0% of patients treated with dupilumab and 0.7% of patients treated with placebo. In the 52-week QUEST study, serious infections were reported in 1.3% of patients treated with dupilumab and 1.4% of patients treated with placebo.

No increase was observed in the overall incidence of infections with dupilumab compared to placebo in the safety pool for CRSwNP clinical studies. In the 52-week SINUS-52 study, serious infections were reported in 1.3% of patients treated with dupilumab and 1.3% of patients treated with placebo.

**Immunogenicity**
As with all therapeutic proteins, there is a potential for immunogenicity with dupilumab.

Anti-Drug-Antibodies (ADA) responses were not generally associated with impact on dupilumab exposure, safety, or efficacy.

Approximately 5 % of patients with atopic dermatitis, asthma, or CRSwNP who received dupilumab 300 mg Q2W for 52 weeks developed ADA to dupilumab; approximately 2 % exhibited persistent
ADA responses and approximately 2% had neutralizing antibodies. Similar results were observed in paediatric patients (6 to 11 years of age) with atopic dermatitis who received dupilumab 200 mg Q2W or 300 mg Q4W for 16 weeks and patients (6 to 11 years of age) with asthma who received dupilumab 100 mg Q2W or 200 mg Q2W for 52 weeks. Similar ADA responses were observed in adult patients with atopic dermatitis treated with dupilumab for up to 3 years in the long-term OLE study (AD-1225).

Approximately 16% of adolescent patients with atopic dermatitis who received dupilumab 300 mg or 200 mg Q2W for 16 weeks developed antibodies to dupilumab; approximately 3% exhibited persistent ADA responses, and approximately 5% had neutralizing antibodies.

Approximately 9% of patients with asthma who received dupilumab 200 mg Q2W for 52 weeks developed antibodies to dupilumab; approximately 4% exhibited persistent ADA responses and approximately 4% had neutralizing antibodies.

Regardless of age or population, approximately 2 to 4% of patients in the placebo groups were positive for antibodies to dupilumab; approximately 2% exhibited persistent ADA response and approximately 1% had neutralizing antibodies.

Less than 1% of patients who received dupilumab at approved dosing regimens exhibited high titer ADA responses associated with reduced exposure and efficacy. In addition, there was one patient with serum sickness and one with serum sickness-like reaction (<0.1%) associated with high ADA titers (see section 4.4).

Paediatric population

Atopic dermatitis

The safety of dupilumab was assessed in a study of 250 patients 12 to 17 years of age with moderate-to-severe atopic dermatitis (AD-1526). The safety profile of dupilumab in these patients followed through week 16 was similar to the safety profile from studies in adults with atopic dermatitis.

Asthma

A total of 107 adolescents aged 12 to 17 years with asthma were enrolled in the 52 week QUEST study. The safety profile observed was similar to that seen in adults.

The long-term safety of dupilumab was assessed in 89 adolescent patients who were enrolled in an open-label extension study in moderate-to-severe asthma (TRAVERSE). In this study, patients were followed for up to 96 weeks. The safety profile of dupilumab in TRAVERSE was consistent with the safety profile observed in pivotal asthma studies for up to 52 weeks of treatment.

In children 6 to 11 years of age with moderate-to-severe asthma (VOYAGE), the additional adverse reaction of enterobiasis was reported in 1.8% (5 patients) in the dupilumab groups and none in the placebo group. All enterobiasis cases were mild to moderate and patients recovered with anti-helminth treatment without dupilumab treatment discontinuation.

In children 6 to 11 years of age with moderate-to-severe asthma, eosinophilia (blood eosinophils ≥ 3,000 cells/mcL or deemed by the investigator to be an adverse event) was reported in 6.6% of the dupilumab groups and 0.7% in the placebo group. Most eosinophilia cases were mild to moderate and not associated with clinical symptoms. These cases were transient, decreased over time, and did not lead to dupilumab treatment discontinuation.

Long-term safety

Atopic dermatitis

The safety profile of dupilumab + TCS (CHRONOS) in adult atopic dermatitis patients) through week 52 was consistent with the safety profile observed at week 16. The long-term safety of dupilumab was
assessed in an open-label extension study in patients 6 to 17 years of age with moderate-to-severe atopic dermatitis (AD-1434). The safety profile of dupilumab in patients followed through week 52 was similar to the safety profile observed at week 16 in the AD-1526 and AD-1652 studies. The long-term safety profile of dupilumab observed in children and adolescents was consistent with that seen in adults with atopic dermatitis.

In a phase 3, multicentre, open label extension (OLE) study (AD-1225), the long-term safety of repeat doses of dupilumab was assessed in 2,677 adults with moderate-to-severe AD exposed to 300 mg weekly dosing (99.7 %), including 347 who completed at least 148 weeks of the study. The long-term safety profile observed in this study up to 3 years was generally consistent with the safety profile of dupilumab observed in controlled studies.

Asthma
The safety profile of dupilumab in the 96 weeks long term safety study (TRAVERSE) was consistent with the safety profile observed in pivotal asthma studies for up to 52 weeks of treatment.

CRSwNP
The safety profile of dupilumab in adults with CRSwNP through week 52 was consistent with the safety profile observed at week 24.

Reporting of suspected adverse reactions
Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via the national reporting system listed in Appendix V.

4.9 Overdose
There is no specific treatment for dupilumab overdose. In the event of overdose, monitor the patient for any signs or symptoms of adverse reactions and institute appropriate symptomatic treatment immediately.

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: Other dermatological preparations, agents for dermatitis, excluding corticosteroids, ATC code: D11AH05

Mechanism of action
Dupilumab is a recombinant human IgG4 monoclonal antibody that inhibits interleukin-4 and interleukin-13 signaling. Dupilumab inhibits IL-4 signaling via the Type I receptor (IL-4Rα/γc), and both IL-4 and IL-13 signaling through the Type II receptor (IL-4Rα/IL-13Rα). IL-4 and IL-13 are major drivers of human type 2 inflammatory disease, such as atopic dermatitis and asthma. Blocking the IL-4/IL-13 pathway with dupilumab in patients decreases many of the mediators of type 2 inflammation.

Pharmacodynamic effects
In atopic dermatitis clinical trials, treatment with dupilumab was associated with decreases from baseline in concentrations of type 2 immunity biomarkers, such as thymus and activation-regulated chemokine (TARC/CCL17), total serum IgE and allergen-specific IgE in serum. A reduction of lactate dehydrogenase (LDH), a biomarker associated with AD disease activity and severity, was observed with dupilumab treatment in adults and adolescents with atopic dermatitis.
In adult and adolescent patients with asthma, dupilumab treatment relative to placebo markedly decreased FeNO and circulating concentrations of eotaxin-3, total IgE, allergen specific IgE, TARC, and periostin, the type 2 biomarkers evaluated in clinical trials. These reductions in type 2 inflammatory biomarkers were comparable for the 200 mg Q2W and 300 mg Q2W regimens. In paediatric (6 to 11 years of age) patients with asthma, dupilumab treatment relative to placebo markedly decreased FeNO and circulating concentrations of total IgE, allergen specific IgE, and TARC, the type 2 biomarkers evaluated in clinical trials. These markers were near maximal suppression after 2 weeks of treatment, except for IgE which declined more slowly. These effects were sustained throughout treatment.

Clinical efficacy and safety in atopic dermatitis

Adolescents with atopic dermatitis (12 to 17 years of age)

The efficacy and safety of dupilumab monotherapy in adolescent patients was evaluated in a multicentre, randomised, double-blind, placebo-controlled study (AD-1526) in 251 adolescent patients 12 to 17 years of age with moderate-to-severe atopic dermatitis (AD) defined by Investigator’s Global Assessment (IGA) score \( \geq 3 \) in the overall assessment of AD lesions on a severity scale of 0 to 4, an Eczema Area and Severity Index (EASI) score \( \geq 16 \) on a scale of 0 to 72, and a minimum body surface area (BSA) involvement of \( \geq 10 \% \). Eligible patients enrolled into this study had previous inadequate response to topical medication.

Patients received 1) an initial dose of 400 mg dupilumab (two 200 mg injections) on day 1, followed by 200 mg once every other week (Q2W) for patients with baseline weight of < 60 kg or an initial dose of 600 mg dupilumab (two 300 mg injections) on day 1, followed by 300 mg Q2W for patients with baseline weight of \( \geq 60 \) kg; 2) an initial dose of 600 mg dupilumab (two 300 mg injections) on day 1, followed by 300 mg every 4 weeks (Q4W) regardless of baseline body weight; or 3) matching placebo. Dupilumab was administered by subcutaneous (SC) injection. If needed to control intolerable symptoms, patients were permitted to receive rescue treatment at the discretion of the investigator. Patients who received rescue treatment were considered non-responders.

In this study, the mean age was 14.5 years, the median weight was 59.4 kg, 41.0 % were female, 62.5 % were White, 15.1 % were Asian, and 12.0 % were Black. At baseline 46.2 % of patients had a baseline IGA score of 3 (moderate AD), 53.8 % of patients had a baseline IGA of 4 (severe AD), the mean BSA involvement was 56.5 %, and 42.4 % of patients had received prior systemic immunosuppressants. Also at baseline the mean Eczema Area and Severity Index (EASI) score was 35.5, the baseline weekly averaged pruritus Numerical Rating Scale (NRS) was 7.6, the baseline mean SCORing Atopic Dermatitis (SCORAD) score was 70.3, the baseline mean Patient Oriented Eczema Measure (POEM) score was 21.0, and the baseline mean Children Dermatology Life Quality Index (CDLQI) was 13.6. Overall, 92.0 % of patients had at least one co-morbid allergic condition; 65.6 % had allergic rhinitis, 53.6 % had asthma, and 60.8 % had food allergies.

The co-primary endpoint was the proportion of patients with IGA 0 or 1 ("clear" or "almost clear") least a 2-point improvement and the proportion of patients with EASI-75 (improvement of at least 75 % in EASI), from baseline to week 16. Other evaluated outcomes included the proportion of subjects with EASI-50 or EASI-90 (improvement of at least 50 % or 90 % in EASI from baseline respectively), reduction in itch as measured by the peak pruritus NRS, and percent change in the SCORAD scale from baseline to week 16. Additional secondary endpoints included mean change from baseline to week 16 in the POEM and CDLQI scores.

Clinical Response

The efficacy results at week 16 for adolescent atopic dermatitis study are presented in Table 5.
Table 5: Efficacy results of dupilumab in the adolescent atopic dermatitis study at week 16 (FAS)

<table>
<thead>
<tr>
<th>Patients randomised</th>
<th>Placebo</th>
<th>Dupilumab</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>85a</td>
<td>82a</td>
</tr>
<tr>
<td>IGA 0 or 1, % responders&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.4 %</td>
<td>24.4 %</td>
</tr>
<tr>
<td>EASI-50, % responders&lt;sup&gt;c&lt;/sup&gt;</td>
<td>12.9 %</td>
<td>61.0 %</td>
</tr>
<tr>
<td>EASI-75, % responders&lt;sup&gt;c&lt;/sup&gt;</td>
<td>8.2 %</td>
<td>41.5 %</td>
</tr>
<tr>
<td>EASI-90, % responders&lt;sup&gt;c&lt;/sup&gt;</td>
<td>2.4 %</td>
<td>23.2 %</td>
</tr>
<tr>
<td>EASI, LS mean % change from baseline (+/SE)</td>
<td>-23.6 %</td>
<td>-65.9 %</td>
</tr>
<tr>
<td></td>
<td>(5.49)</td>
<td>(3.99)</td>
</tr>
<tr>
<td>SCORAD, LS mean % change from baseline (+/SE)</td>
<td>-17.6 %</td>
<td>-51.6 %</td>
</tr>
<tr>
<td></td>
<td>(3.76)</td>
<td>(3.23)</td>
</tr>
<tr>
<td>Pruritus NRS, LS mean % change from baseline (+/SE)</td>
<td>-19.0 %</td>
<td>-47.9 %</td>
</tr>
<tr>
<td></td>
<td>(4.09)</td>
<td>(3.43)</td>
</tr>
<tr>
<td>Pruritus NRS (&gt;4-point improvement), % responders&lt;sup&gt;c&lt;/sup&gt;</td>
<td>4.8 %</td>
<td>36.6 %</td>
</tr>
<tr>
<td>BSA LS mean % change from baseline (+/SE)</td>
<td>-11.7 %</td>
<td>-30.1 %</td>
</tr>
<tr>
<td></td>
<td>(2.72)</td>
<td>(2.34)</td>
</tr>
<tr>
<td>CDLQI, LS mean change from baseline (+/SE)</td>
<td>-5.1 %</td>
<td>-8.5</td>
</tr>
<tr>
<td></td>
<td>(0.62)</td>
<td>(0.50)</td>
</tr>
<tr>
<td>CDLQI, (&gt;6-point improvement), % responders</td>
<td>19.7 %</td>
<td>60.6 %</td>
</tr>
<tr>
<td>POEM, LS mean change from baseline (+/SE)</td>
<td>-3.8 %</td>
<td>-10.1</td>
</tr>
<tr>
<td></td>
<td>(0.96)</td>
<td>(0.76)</td>
</tr>
<tr>
<td>POEM, (&gt;6-point improvement), % responders</td>
<td>9.5 %</td>
<td>63.4 %</td>
</tr>
</tbody>
</table>

<sup>a</sup> Full Analysis Set (FAS) includes all patients randomised.
<sup>b</sup> Responder was defined as a subject with IGA 0 or 1 ("clear" or "almost clear") with a reduction of ≥ 2 points on a 0-4 IGA scale.
<sup>c</sup> Patients who received rescue treatment or with missing data were considered as non-responders (58.8 % and 20.7 % in the placebo and dupilumab arms, respectively).

All p-values < 0.0001

A larger percentage of patients randomised to placebo needed rescue treatment (topical corticosteroids, systemic corticosteroids, or systemic non-steroidal immunosuppressants) as compared to the dupilumab group (58.8 % and 20.7 %, respectively).

A significantly greater proportion of patients randomised to dupilumab achieved a rapid improvement in the pruritus NRS compared to placebo (defined as ≥ 4-point improvement as early as week 4; nominal p < 0.001) and the proportion of patients responding on the pruritus NRS continued to increase through the treatment period (see Figure 1). The improvement in pruritus NRS occurred in conjunction with the improvement of objective signs of atopic dermatitis.
The dupilumab group significantly improved patient-reported symptoms, the impact of AD on sleep and health-related quality of life as measured by POEM, SCORAD, and CDLQI scores at 16 weeks compared to placebo.

The long-term efficacy of dupilumab in adolescent patients with moderate-to-severe AD who had participated in previous clinical trials of dupilumab was assessed in open-label extension study (AD-1434). Efficacy data from this study suggests that clinical benefit provided at week 16 was sustained through week 52.

Paediatrics (6 to 11 years of age)

The efficacy and safety of dupilumab in paediatric patients concomitantly with TCS was evaluated in a multicentre, randomised, double-blind, placebo-controlled study (AD-1652) in 367 subjects 6 to 11 years of age, with AD defined by an IGA score of 4 (scale of 0 to 4), an EASI score ≥ 21 (scale of 0 to 72), and a minimum BSA involvement of ≥ 15 %. Eligible patients enrolled into this trial had previous inadequate response to topical medication. Enrollment was stratified by baseline weight (< 30 kg; ≥ 30 kg).

Patients in the dupilumab Q2W + TCS group with baseline weight of < 30 kg received an initial dose of 200 mg on Day 1, followed by 100 mg Q2W from week 2 to week 14, and patients with baseline weight of ≥ 30 kg received an initial dose of 400 mg on Day 1, followed by 200 mg Q2W from week 2 to week 14. Patients in the dupilumab Q4W + TCS group received an initial dose of 600 mg on Day 1, followed by 300 mg Q4W from week 4 to week 12, regardless of weight. Patients were permitted to receive rescue treatment at the discretion of the investigator. Patients who received rescue treatment were considered non-responders.

In this study, the mean age was 8.5 years, the median weight was 29.8 kg, 50.1 % of patients were female, 69.2 % were White, 16.9 % were Black, and 7.6 % were Asian. At baseline, the mean BSA involvement was 57.6 %, and 16.9 % had received prior systemic non-steroidal immunosuppressants. Also, at baseline the mean EASI score was 37.9, and the weekly average of daily worst itch score was 7.8 on a scale of 0-10, the baseline mean SCORAD score was 73.6, the baseline POEM score was 20.9, and the baseline mean CDLQI was 15.1. Overall, 91.7 % of subjects had at least one co-morbid
allergic condition; 64.4 % had food allergies, 62.7 % had other allergies, 60.2 % had allergic rhinitis, and 46.7 % had asthma.

The co-primary endpoint was the proportion of patients with IGA 0 or 1 (“clear” or “almost clear”) at least a 2-point improvement and the proportion of patients with EASI-75 (improvement of at least 75 % in EASI), from baseline to week 16. Other evaluated outcomes included the proportion of patients with EASI-50 and EASI-90 (improvement of at least 50 % and 90 % in EASI from baseline, respectively), percent change in EASI score from baseline to week 16, and reduction in itch as measured by the peak pruritus NRS (≥ 4-point improvement). Additional secondary endpoints included mean change from baseline to week 16 in the POEM and CDLQI scores.

**Clinical Response**

Table 6 presents the results by baseline weight strata for the approved dose regimens.

### Table 6: Efficacy results of dupilumab with concomitant TCS in AD-1652 at week 16 (FAS)*

<table>
<thead>
<tr>
<th></th>
<th>Dupilumab 300 mg Q4W + TCS</th>
<th>Placebo + TCS</th>
<th>Dupilumab 200 mg Q2W + TCS</th>
<th>Placebo + TCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>(N=122)</td>
<td></td>
<td></td>
<td>(N=59)</td>
<td></td>
</tr>
<tr>
<td>≥ 15 kg</td>
<td>32.8 %</td>
<td>11.4 %</td>
<td>39.0 %</td>
<td>9.7 %</td>
</tr>
<tr>
<td>IGA 0 or 1b, % respondersc</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EASI-50, % respondersc</td>
<td>91.0 %</td>
<td>43.1 %</td>
<td>86.4 %</td>
<td>43.5 %</td>
</tr>
<tr>
<td>EASI-75, % respondersc</td>
<td>69.7 %</td>
<td>26.8 %</td>
<td>74.6 %</td>
<td>25.8 %</td>
</tr>
<tr>
<td>EASI-90, % respondersc</td>
<td>41.8 %</td>
<td>7.3 %</td>
<td>35.6 %</td>
<td>8.1 %</td>
</tr>
<tr>
<td>EASI, LS mean % change from baseline (+/-SE)</td>
<td>-82.1 % (2.37)</td>
<td>-48.6 % (2.46)</td>
<td>-80.4 % (3.61)</td>
<td>-48.3 % (3.63)</td>
</tr>
<tr>
<td>SCORAD, LS mean % change from baseline (+/- SE)</td>
<td>-62.4 % (2.13)</td>
<td>-29.8 % (2.26)</td>
<td>-62.7 % (3.14)</td>
<td>-30.7 % (3.28)</td>
</tr>
<tr>
<td>Pruritus NRS, LS mean % change from baseline (+/- SE)</td>
<td>-54.6 % (2.89)</td>
<td>-25.9 % (2.90)</td>
<td>-58.2 % (4.01)</td>
<td>-25.0 % (3.95)</td>
</tr>
<tr>
<td>Pruritus NRS (≥ 4-point improvement), % respondersc</td>
<td>50.8 %</td>
<td>12.3 %</td>
<td>61.4 %</td>
<td>12.9 %</td>
</tr>
<tr>
<td>BSA LS mean change from baseline (+/- SE)</td>
<td>-40.5 (1.65)</td>
<td>-21.7 (1.72)</td>
<td>-38.4 (2.47)</td>
<td>-19.8 (2.50)</td>
</tr>
<tr>
<td>CDLQI, LS mean change from baseline (+/-SE)</td>
<td>-10.6 (0.47)</td>
<td>-6.4 (0.51)</td>
<td>-9.8 (0.63)</td>
<td>-5.6 (0.66)</td>
</tr>
<tr>
<td>CDLQI, (≥ 6-point improvement), % responders</td>
<td>77.3 %</td>
<td>38.8 %</td>
<td>80.8 %</td>
<td>35.8 %</td>
</tr>
<tr>
<td>POEM, LS mean change from baseline (+/- SE)</td>
<td>-13.6 (0.65)</td>
<td>-5.3 (0.69)</td>
<td>-13.6 (0.90)</td>
<td>-4.7 (0.91)</td>
</tr>
<tr>
<td>POEM, (≥ 6-point improvement), % responders</td>
<td>81.7 %</td>
<td>32.0 %</td>
<td>79.3 %</td>
<td>31.1 %</td>
</tr>
</tbody>
</table>

* Full Analysis Set (FAS) includes all patients randomised.

b Responder was defined as a patient with an IGA 0 or 1 (“clear” or “almost clear”).

c Patients who received rescue treatment or with missing data were considered as non-responders.

d At Day 1, patients received 600 mg of dupilumab (see section 5.2).

e At Day 1, patients received 400 mg (baseline weight ≥ 30 kg) of dupilumab.
A greater proportion of patients randomised to dupilumab + TCS achieved an improvement in the peak pruritus NRS compared to placebo + TCS (defined as ≥4-point improvement at week 4). See Figure 2.

**Figure 2: Proportion of paediatric patients with ≥ 4-point improvement on the peak pruritus NRS in AD-1652**

![Figure 2](image)

- In the primary analyses of the efficacy endpoints, patients who received rescue treatment or with missing data were considered non-responders.
- Full Analysis Set (FAS) includes all patients randomised.
- At Day 1, patients received 600 mg of dupilumab (see section 5.2)
- At Day 1, patients received 400 mg (baseline weight ≥ 30 kg) of dupilumab

The dupilumab groups significantly improved patient-reported symptoms, the impact of AD on sleep and health-related quality of life as measured by POEM, SCORAD, and CDLQI scores at 16 weeks compared to placebo.

The long-term efficacy and safety of dupilumab + TCS in paediatric patients with moderate to severe atopic dermatitis who had participated in the previous clinical trials of dupilumab + TCS was assessed in an open-label extension study (AD-1434). Efficacy data from this trial suggests that clinical benefit provided at week 16 was sustained through week 52. Some patients receiving dupilumab 300 mg Q4W + TCS showed further clinical benefit when escalated to dupilumab 200 mg Q2W + TCS. The safety profile of dupilumab in patients followed through week 52 was similar to the safety profile observed at week 16 in the AD-1526 and AD-1652 studies.

**Adults with atopic dermatitis**

For clinical data in adults with atopic dermatitis please refer to the dupilumab 300 mg Summary of Product Characteristics.

**Clinical efficacy and safety in asthma**

The asthma development program included three randomised, double-blind, placebo-controlled, parallel-group, multi-centre studies (DRI12544, QUEST, and VENTURE) of 24 to 52 weeks in treatment duration which enrolled a total of 2,888 patients (12 years of age and older). Patients were enrolled without requiring a minimum baseline blood eosinophil or other type 2 inflammatory biomarkers (e.g. FeNO or IgE) level. Asthma treatment guidelines define type 2 inflammation as eosinophilia ≥ 150 cells/mcL and/or FeNO ≥ 20 ppb. In DRI12544 and QUEST, the pre-specified subgroup analyses included blood eosinophils ≥ 150 and ≥ 300 cells/mcL, FeNO ≥ 25 and ≥ 50 ppb.

DRI12544 was a 24-week dose-ranging study which included 776 patients (18 years of age and older). Dupilumab compared with placebo was evaluated in adult patients with moderate to severe asthma on
a medium-to-high dose inhaled corticosteroid and a long acting beta agonist. The primary endpoint was change from baseline to week 12 in FEV_{1} (L). Annualised rate of severe asthma exacerbation events during the 24-week placebo controlled treatment period was also determined. Results were evaluated in the overall population (unrestricted by minimum baseline eosinophils or other type 2 inflammatory biomarkers) and subgroups based on baseline blood eosinophil count.

QUEST was a 52-week confirmatory study which included 1,902 patients (12 years of age and older). Dupilumab compared with placebo was evaluated in 107 adolescent and 1,795 adult patients with persistent asthma on a medium-to-high dose inhaled corticosteroid (ICS) and a second controller medication. Patients requiring a third controller were allowed to participate in this trial. Patients were randomised to receive either 200 mg (N=631) or 300 mg (N=633) Dupixent every other week (or matching placebo for either 200 mg (N = 317) or 300 mg (N= 321) every other week) following an initial dose of 400 mg, 600 mg or placebo respectively. The primary endpoints were the annualised rate of severe exacerbation events during the 52-week placebo controlled period and change from baseline in pre-bronchodilator FEV_{1} at week 12 in the overall population (unrestricted by minimum baseline eosinophils or other type 2 inflammatory biomarkers) and subgroups based on baseline blood eosinophil count and FeNO.

VENTURE was a 24-week oral corticosteroid-reduction study in 210 patients with asthma unrestricted by baseline type 2 biomarker levels who required daily oral corticosteroids in addition to regular use of high dose inhaled corticosteroids plus an additional controller. After optimizing the OCS dose during the screening period, patients received 300 mg dupilumab (n=103) or placebo (n=107) once every other week for 24 weeks following an initial dose of 600 mg or placebo. Patients continued to receive their existing asthma medicine during the study; however their OCS dose was reduced every 4 weeks during the OCS reduction phase (week 4-20), as long as asthma control was maintained. The primary endpoint was the percent reduction in oral corticosteroid dose assessed in the overall population, based on a comparison of the oral corticosteroid dose at weeks 20 to 24 that maintained asthma control with the previously optimized (at baseline) oral corticosteroid dose.

The demographics and baseline characteristics of these 3 studies are provided in Table 7 below.

Table 7: Demographics and baseline characteristics of asthma trials

<table>
<thead>
<tr>
<th>Parameter</th>
<th>DRI12544 (n = 776)</th>
<th>QUEST (n = 1902)</th>
<th>VENTURE (n=210)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (years) (SD)</td>
<td>48.6 (13.0)</td>
<td>47.9 (15.3)</td>
<td>51.3 (12.6)</td>
</tr>
<tr>
<td>% Female</td>
<td>63.1</td>
<td>62.9</td>
<td>60.5</td>
</tr>
<tr>
<td>% White</td>
<td>78.2</td>
<td>82.9</td>
<td>93.8</td>
</tr>
<tr>
<td>Duration of Asthma (years), mean ± SD</td>
<td>22.03 (15.42)</td>
<td>20.94 (15.36)</td>
<td>19.95 (13.90)</td>
</tr>
<tr>
<td>Never smoked, (%)</td>
<td>77.4</td>
<td>80.7</td>
<td>80.5</td>
</tr>
<tr>
<td>Mean exacerbations in previous year ± SD</td>
<td>2.17 (2.14)</td>
<td>2.09 (2.15)</td>
<td>2.09 (2.16)</td>
</tr>
<tr>
<td>High dose ICS use (%)α</td>
<td>49.5</td>
<td>51.5</td>
<td>88.6</td>
</tr>
<tr>
<td>Pre-dose FEV_{1} (L) at baseline ± SD</td>
<td>1.84 (0.54)</td>
<td>1.78 (0.60)</td>
<td>1.58 (0.57)</td>
</tr>
<tr>
<td>Mean percent predicted FEV_{1} at baseline (%)(± SD)</td>
<td>60.77 (10.72)</td>
<td>58.43 (13.52)</td>
<td>52.18 (15.18)</td>
</tr>
<tr>
<td>% Reversibility (± SD)</td>
<td>26.85 (15.43)</td>
<td>26.29 (21.73)</td>
<td>19.47 (23.25)</td>
</tr>
<tr>
<td>Mean ACQ-5 score (± SD)</td>
<td>2.74 (0.81)</td>
<td>2.76 (0.77)</td>
<td>2.50 (1.16)</td>
</tr>
<tr>
<td>Mean AQLQ score (± SD)</td>
<td>4.02 (1.09)</td>
<td>4.29 (1.05)</td>
<td>4.35 (1.17)</td>
</tr>
</tbody>
</table>
Table 8: Rate of severe exacerbations in DRI12544 and QUEST (baseline blood eosinophil levels ≥ 150 and ≥ 300 cells/mcL)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Baseline blood EOS</th>
<th>Exacerbations per Year</th>
<th>% reduction</th>
<th>Exacerbations per Year</th>
<th>% reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≥150 cells/mcL</td>
<td>≥300 cells/mcL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>Rate (95% CI)</td>
<td>Rate ratio (95% CI)</td>
<td>N</td>
<td>Rate (95% CI)</td>
</tr>
<tr>
<td>All Severe Exacerbations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DRI12544 study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dupilumab 200 mg Q2W</td>
<td>120</td>
<td>0.29 (0.16, 0.53)</td>
<td>0.28^</td>
<td>72 %</td>
<td>65</td>
</tr>
<tr>
<td>Dupilumab 300 mg Q2W</td>
<td>129</td>
<td>0.28 (0.16, 0.50)</td>
<td>0.27^</td>
<td>73 %</td>
<td>64</td>
</tr>
<tr>
<td>Placebo</td>
<td>127</td>
<td>1.05 (0.69, 1.60)</td>
<td></td>
<td></td>
<td>68</td>
</tr>
<tr>
<td>QUEST study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dupilumab 200 mg Q2W</td>
<td>437</td>
<td>0.45 (0.37, 0.54)</td>
<td>0.44^</td>
<td>56 %</td>
<td>264</td>
</tr>
<tr>
<td>Placebo</td>
<td>232</td>
<td>1.01 (0.81, 1.25)</td>
<td></td>
<td></td>
<td>148</td>
</tr>
<tr>
<td>Dupilumab 300 mg Q2W</td>
<td>452</td>
<td>0.43 (0.36, 0.53)</td>
<td>0.40^</td>
<td>60 %</td>
<td>277</td>
</tr>
<tr>
<td>Placebo</td>
<td>237</td>
<td>1.08 (0.88, 1.33)</td>
<td></td>
<td></td>
<td>142</td>
</tr>
</tbody>
</table>

*p-value = 0.0003, ^p-value = 0.0001, ~p-value = 0.0116, ~p-value = 0.0024, ~p-value < 0.0001

Table 9: Rate of severe exacerbations in QUEST defined by baseline FeNO subgroups

ICS = inhaled corticosteroid; FEV₁ = Forced expiratory volume in 1 second; ACQ-5 = Asthma Control Questionnaire-5; AQLQ = Asthma Quality of Life Questionnaire; AD = atopic dermatitis; NP = nasal polyposis; AR = allergic rhinitis; FeNO = fraction of exhaled nitric oxide; EOS = blood eosinophil
### Table 10: Mean change from baseline in pre-bronchodilator FEV1 at week 12 in DRI12544 and QUEST (baseline blood eosinophil Levels ≥ 150 and ≥ 300 cells/mcL)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Baseline blood EOS</th>
<th>DRI12544 study</th>
<th>QUEST</th>
<th>QUEST: Blood eosinophils ≥ 150 cells/mcL</th>
<th>QUEST: Blood eosinophils ≥ 300 cells/mcL</th>
<th>QUEST: FeNO ≥ 25 ppb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>LS mean Δ from baseline L (%)</td>
<td>LS mean difference vs. placebo (95% CI)</td>
<td>Number</td>
<td>LS mean Δ from baseline L (%)</td>
<td>LS mean difference vs. placebo (95% CI)</td>
</tr>
<tr>
<td>≥ 150 cells/mcL</td>
<td></td>
<td></td>
<td></td>
<td>≥ 300 cells/mcL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td>N</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p-value < 0.0001

In the pooled analysis of DRI12544 and QUEST, hospitalisations and/or emergency room visits due to severe exacerbations were reduced by 25.5 % and 46.9 % with dupilumab 200 mg or 300 mg every other week, respectively.

*Lung function*

Clinically significant increases in pre-bronchodilator FEV1 were observed at week 12 for DRI12544 and QUEST. There were greater improvements in FEV1 in the subjects with higher baseline levels of type 2 inflammatory biomarkers such as blood eosinophils or FeNO (Table 10 and Table 11).

Significant improvements in FEV1 were observed as early as week 2 following the first dose of dupilumab for both the 200 mg and 300 mg dose strengths and were maintained through week 24 (DRI12544) and week 52 in QUEST (see Figure 3).
Table 11: Mean change from baseline in pre-bronchodilator FEV₁ at week 12 and week 52 in QUEST by baseline FeNO subgroups

<table>
<thead>
<tr>
<th>Treatment</th>
<th>At week 12</th>
<th>At week 52</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>LS mean Δ from baseline L (%)</td>
</tr>
<tr>
<td>FeNO ≥ 25 ppb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dupilumab 200 mg Q2W</td>
<td>288</td>
<td>0.44 (29.0 %)</td>
</tr>
<tr>
<td>Placebo</td>
<td>157</td>
<td>0.21 (14.1 %)</td>
</tr>
<tr>
<td>Dupilumab 300 mg Q2W</td>
<td>295</td>
<td>0.45 (29.8 %)</td>
</tr>
<tr>
<td>Placebo</td>
<td>167</td>
<td>0.21 (13.7 %)</td>
</tr>
<tr>
<td>FeNO ≥ 50 ppb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dupilumab 200 mg Q2W</td>
<td>114</td>
<td>0.53 (33.5 %)</td>
</tr>
<tr>
<td>Placebo</td>
<td>69</td>
<td>0.23 (14.9 %)</td>
</tr>
<tr>
<td>Dupilumab 300 mg Q2W</td>
<td>113</td>
<td>0.59 (37.6 %)</td>
</tr>
<tr>
<td>Placebo</td>
<td>73</td>
<td>0.19 (13.0 %)</td>
</tr>
</tbody>
</table>

<sup>a</sup>p-value < 0.0001, <sup>b</sup>p-value = 0.0004, <sup>c</sup>p-value = 0.0008, <sup>d</sup>p-value = 0.0063, <sup>e</sup>p-value < 0.0001

Quality of life/patient-reported outcomes in asthma

Pre-specified secondary endpoint of ACQ-5 and AQLQ(S) responder rates were analysed at 24 weeks (DRI12544 and VENTURE) and at 52 weeks (QUEST). The responder rate was defined as an improvement in score of 0.5 or more (scale range 0-6 for ACQ-5 and 1-7 for AQLQ(S)). Improvements in ACQ-5 and AQLQ(S) were observed as early as week 2 and maintained for 24 weeks in DRI12544 study and 52 weeks in QUEST study. Similar results were observed in VENTURE. The ACQ-5 and AQLQ(S) responder rate results in patients with elevated baseline biomarkers of type 2 inflammation in QUEST at week 52 are presented in Table 12.
**Oral corticosteroid reduction study (VENTURE)**

VENTURE evaluated the effect of dupilumab on reducing the use of maintenance oral corticosteroids. Baseline characteristics are presented in Table 7. All patients were on oral corticosteroids for at least 6 months prior to the study initiation. The baseline mean oral corticosteroid use was 11.75 mg in the placebo group and 10.75 mg in the group receiving dupilumab.

In this 24-week trial, asthma exacerbations (defined as a temporary increase in oral corticosteroid dose for at least 3 days) were reduced by 59% in subjects receiving dupilumab compared with those receiving placebo (annualised rate 0.65 and 1.60 for the dupilumab and placebo group, respectively; rate ratio 0.41 [95% CI 0.26, 0.63]) and improvement in pre-bronchodilator FEV₁ from baseline to week 24 was greater in subjects receiving dupilumab compared with those receiving placebo (LS mean difference for dupilumab versus placebo of 0.22 L [95% CI: 0.09 to 0.34 L]). Effects on lung function, on oral steroid and exacerbation reduction were similar irrespective of baseline levels of type 2 inflammatory biomarkers (e.g. blood eosinophils, FeNO). The ACQ-5 and AQLQ(S) were also assessed in VENTURE and showed improvements similar to those in QUEST.

The results for VENTURE by baseline biomarkers are presented in the Table 13.

### Table 13: Effect of dupilumab on OCS dose reduction, VENTURE (baseline blood eosinophil levels ≥ 150 and ≥ 300 cells/mcL and FeNO ≥ 25 ppb)

<table>
<thead>
<tr>
<th></th>
<th>Baseline blood EOS ≥ 150 cells/mcL</th>
<th>Baseline blood EOS ≥ 300 cells/mcL</th>
<th>FeNO ≥ 25 ppb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dupilumab 300 mg Q2W N=81</td>
<td>Placebo  N=69</td>
<td>Dupilumab 300 mg Q2W N=48</td>
</tr>
<tr>
<td><strong>Primary endpoint (week 24)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent reduction in OCS from baseline (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean overall percent reduction from baseline</td>
<td>75.91</td>
<td>46.51</td>
<td>79.54</td>
</tr>
<tr>
<td>Difference (% [95% CI]) (Dupilumab vs. placebo)</td>
<td>29.39b (15.67, 43.12)</td>
<td>36.83b (18.94, 54.71)</td>
<td>34.53b (19.08, 49.97)</td>
</tr>
<tr>
<td>Median % reduction in daily OCS dose from baseline</td>
<td>100</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Percent reduction from baseline</td>
<td>54.3</td>
<td>33.3</td>
<td>60.4</td>
</tr>
<tr>
<td>100% %</td>
<td>58.0</td>
<td>34.8</td>
<td>66.7</td>
</tr>
<tr>
<td>≥ 75%</td>
<td>72.8</td>
<td>44.9</td>
<td>77.1</td>
</tr>
<tr>
<td>≥ 50%</td>
<td>82.7</td>
<td>55.1</td>
<td>85.4</td>
</tr>
<tr>
<td>&gt; 0 %</td>
<td>87.7</td>
<td>66.7</td>
<td>85.4</td>
</tr>
<tr>
<td>No reduction or any increase in OCS dose, or dropped out of study</td>
<td>12.3</td>
<td>33.3</td>
<td>14.6</td>
</tr>
</tbody>
</table>

**Secondary endpoint (week 24)**

| Proportion of patients achieving a reduction of OCS dose to < 5 mg/day | 77 | 44 | 84 | 40 | 79 | 34 |
| Odds ratio (95% CI) | 4.29<sup>c</sup> | 8.04<sup>d</sup> | 7.21<sup>b</sup> |
| (2.04, 9.04) | (2.71, 23.82) | (2.69, 19.28) |

<sup>a</sup>Model estimates by logistic regression
<sup>b</sup>p-value < 0.0001
<sup>c</sup>p-value = 0.0001
<sup>d</sup>p-value = 0.0002

**Long-term extension study (TRAVERSE)**

The long-term safety of dupilumab in 2,193 adults and 89 adolescents with moderate-to-severe asthma, including 185 adults with oral corticosteroid-dependent asthma, who had participated in previous clinical trials of dupilumab (DRI12544, QUEST, and VENTURE), was assessed in the open-label extension study (TRAVERSE) (see section 4.8). Efficacy was measured as a secondary endpoint, was similar to results observed in the pivotal studies and was sustained up to 96 weeks. In the adults with oral-corticosteroid-dependent asthma, there was sustained reduction in exacerbations and improvement in lung function up to 96 weeks, despite decrease or discontinuation of oral corticosteroid dose.

**Paediatric study (6 to 11 years of age; VOYAGE)**

The efficacy and safety of dupilumab in paediatric patients was evaluated in a 52-week multicentre, randomised, double-blind, placebo-controlled study (VOYAGE) in 408 patients 6 to 11 years of age, with moderate-to-severe asthma on a medium- or high-dose ICS and one controller medication or high dose ICS alone. Patients were randomised to dupilumab (N=273) or matching placebo (N=135) every other week based on body weight ≤ 30 kg or > 30 kg, respectively. The efficacy was evaluated in populations with type 2 inflammation defined as blood eosinophil levels of ≥ 150 cells/mcL or FeNO ≥ 20 ppb.

The primary endpoint was the annualised rate of severe exacerbation events during the 52-week placebo-controlled period and the key secondary endpoint was the change from baseline in pre-bronchodilator FEV₁ percent predicted at week 12. Additional secondary endpoints included mean change from baseline and responder rates in the ACQ-7-IA and PAQLQ(S)-IA scores.

The demographics and baseline characteristics for VOYAGE are provided in Table 14 below.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>EOS ≥ 150 cells/mcL or FeNO ≥ 20 ppb (N = 350)</th>
<th>EOS ≥ 300 cells/mcL (N = 259)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (years) (SD)</td>
<td>8.9 (1.6)</td>
<td>9.0 (1.6)</td>
</tr>
<tr>
<td>% Female</td>
<td>34.3</td>
<td>32.8</td>
</tr>
<tr>
<td>% White</td>
<td>88.6</td>
<td>87.3</td>
</tr>
<tr>
<td>Mean body weight (kg)</td>
<td>36.09</td>
<td>35.94</td>
</tr>
<tr>
<td>Mean exacerbations in previous year (± SD)</td>
<td>2.47 (2.30)</td>
<td>2.64 (2.58)</td>
</tr>
</tbody>
</table>
Table 14. Demographics and baseline characteristics for VOYAGE

<table>
<thead>
<tr>
<th>Parameter</th>
<th>EOS ≥ 150 cells/mcL or FeNO ≥ 20 ppb (N = 350)</th>
<th>EOS ≥ 300 cells/mcL (N = 259)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICS dose (%) Medium</td>
<td>55.7</td>
<td>54.4</td>
</tr>
<tr>
<td>ICS dose (%) High</td>
<td>43.4</td>
<td>44.4</td>
</tr>
<tr>
<td>Pre-dose FEV₁ (L) at baseline (± SD)</td>
<td>1.49 (0.41)</td>
<td>1.47 (0.42)</td>
</tr>
<tr>
<td>Mean percent predicted FEV₁ (%) (±SD)</td>
<td>77.89 (14.40)</td>
<td>76.85 (14.78)</td>
</tr>
<tr>
<td>Mean % Reversibility (± SD)</td>
<td>27.79 (19.34)</td>
<td>22.59 (20.78)</td>
</tr>
<tr>
<td>Mean ACQ-7-IA score (± SD)</td>
<td>2.14 (0.72)</td>
<td>2.16 (0.75)</td>
</tr>
<tr>
<td>Mean PAQLQ(S)-IA score (± SD)</td>
<td>4.94 (1.10)</td>
<td>4.93 (1.12)</td>
</tr>
<tr>
<td>Atopic Medical History % Overall (AD %, AR %)</td>
<td>94 (38.9, 82.6)</td>
<td>96.5 (44.4, 85.7)</td>
</tr>
<tr>
<td>Median total IgE IU/mL (± SD)</td>
<td>905.52 (1140.41)</td>
<td>1077.00 (1230.83)</td>
</tr>
<tr>
<td>Mean FeNO ppb (± SD)</td>
<td>30.71 (24.42)</td>
<td>33.50 (25.11)</td>
</tr>
<tr>
<td>% patients with FeNO ppb ≥ 20</td>
<td>58</td>
<td>64.1</td>
</tr>
<tr>
<td>Mean baseline Eosinophil count (± SD) cells/mcL</td>
<td>570 (380)</td>
<td>710 (360)</td>
</tr>
<tr>
<td>% patients with EOS ≥ 150 cells/mcL</td>
<td>94.6</td>
<td>0</td>
</tr>
<tr>
<td>% patients with EOS ≥ 300 cells/mcL</td>
<td>74</td>
<td>100</td>
</tr>
</tbody>
</table>

ICS = inhaled corticosteroid; FEV₁ = Forced expiratory volume in 1 second; ACQ-7-IA = Asthma Control Questionnaire-7 Interviewer Administered; PAQLQ(S)-IA = Paediatric Asthma Quality of Life Questionnaire with Standardised Activities–Interviewer Administered; AD = atopic dermatitis; AR = allergic rhinitis; EOS = blood eosinophil; FeNO = fraction of exhaled nitric oxide

Exacerbations were defined as deterioration of asthma requiring the use of systemic corticosteroids for at least 3 days or hospitalisation or emergency room visit due to asthma that required systemic corticosteroids. Dupilumab significantly reduced the annualised rate of severe asthma exacerbation events during the 52-week treatment period compared to placebo in the population with the type 2 inflammation and in population defined by baseline blood eosinophils ≥ 300 cells/mcL or by baseline FeNO ≥ 20 ppb. Clinically significant improvements in percent predicted pre-bronchodilator FEV₁ were observed at week 12. Improvements were also observed for ACQ-7-IA and PAQLQ(S)-IA at week 24 and were sustained at week 52. Greater responder rates were observed for ACQ-7-IA and PAQLQ(S)-IA compared to placebo at week 24. The efficacy results for VOYAGE are presented in Table 15.

In the population with the type 2 inflammation, the LS mean change from baseline in pre-bronchodilator FEV₁ at week 12 was 0.22 L in the dupilumab group and 0.12 L in the placebo group, with an LS mean difference versus placebo of 0.10 L (95% CI: 0.04, 0.16). The treatment effect was sustained over the 52-week treatment period, with an LS mean difference versus placebo at week 52 of 0.17 L (95% CI: 0.09, 0.24).

In the population defined by baseline blood eosinophils ≥ 300 cells/mcL, the LS mean change from baseline in pre-bronchodilator FEV₁ at week 12 was 0.22 L in the dupilumab group and 0.12 L in the
placebo group, with an LS mean difference versus placebo of 0.10 L (95% CI: 0.03, 0.17). The
treatment effect was sustained over the 52-week treatment period, with an LS mean difference versus
placebo at week 52 of 0.17 L (95% CI: 0.09, 0.26).

In both primary efficacy populations, there was a rapid improvement in FEF25-75% and FEV1/FVC
(onset of a difference was observed as early as week 2) and sustained over the 52-week treatment
period, see Table 15.

**Table 15: Rate of severe exacerbations, mean change from baseline in FEV1, ACQ-7-IA and PAQLQ(S)-IA
responder rates in VOYAGE**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>EOS ≥ 150 cells/mL or FeNO ≥ 20 ppb</th>
<th>EOS ≥ 300 cells/mL</th>
<th>FeNO ≥ 20 ppb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N Rate (95% CI) Rate ratio (95% CI)</td>
<td>N Rate (95% CI) Rate ratio (95% CI)</td>
<td>N Rate (95% CI) Rate ratio (95% CI)</td>
</tr>
<tr>
<td>Dupilumab 100 mg Q2W (&lt;30 kg)/200 mg Q2W (≥30 kg)</td>
<td>236 0.305 (0.223, 0.416) 0.407 (0.274, 0.605)</td>
<td>175 0.235 (0.160, 0.345) 0.353 (0.222, 0.562)</td>
<td>141 0.271 (0.170, 0.432) 0.384 (0.227, 0.649)</td>
</tr>
<tr>
<td>Placebo</td>
<td>114 0.748 (0.542, 1.034)</td>
<td>84 0.665 (0.467, 0.949)</td>
<td>62 0.705 (0.421, 1.180)</td>
</tr>
</tbody>
</table>

**Mean change from baseline in percent predicted FEV1 at week 12**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N LS mean Δ from baseline LS mean difference vs. placebo (95% CI)</th>
<th>N LS mean Δ from baseline LS mean difference vs. placebo (95% CI)</th>
<th>N LS mean Δ from baseline LS mean difference vs. placebo (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dupilumab 100 mg Q2W (&lt;30 kg)/200 mg Q2W (≥30 kg)</td>
<td>229 10.53 (2.14, 8.27)</td>
<td>168 10.15 (1.76, 8.88)</td>
<td>141 11.36 (2.54, 10.93)</td>
</tr>
<tr>
<td>Placebo</td>
<td>110 5.32 (2.99, 7.74)</td>
<td>80 4.83 (2.45, 6.76)</td>
<td>62 4.62 (2.22, 7.02)</td>
</tr>
</tbody>
</table>

**Mean change from baseline in percent predicted FEF25-75% at week 12**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N LS mean Δ from baseline LS mean difference vs. placebo (95% CI)</th>
<th>N LS mean Δ from baseline LS mean difference vs. placebo (95% CI)</th>
<th>N LS mean Δ from baseline LS mean difference vs. placebo (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dupilumab 100 mg Q2W (&lt;30 kg)/200 mg Q2W (≥30 kg)</td>
<td>229 16.70 (7.44, 16.43)</td>
<td>168 16.91 (8.89, 18.95)</td>
<td>141 17.96 (8.30, 19.65)</td>
</tr>
<tr>
<td>Placebo</td>
<td>110 4.76 (2.99, 7.74)</td>
<td>80 2.99 (1.22, 4.76)</td>
<td>62 3.98 (2.22, 5.76)</td>
</tr>
</tbody>
</table>

**Mean change from baseline in FEV1/FVC % at week 12**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N LS mean Δ from baseline LS mean difference vs. placebo (95% CI)</th>
<th>N LS mean Δ from baseline LS mean difference vs. placebo (95% CI)</th>
<th>N LS mean Δ from baseline LS mean difference vs. placebo (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dupilumab 100 mg Q2W (&lt;30 kg)/200 mg Q2W (≥30 kg)</td>
<td>229 5.67 (2.25, 5.21)</td>
<td>168 6.10 (2.97, 6.29)</td>
<td>141 6.84 (3.08, 6.81)</td>
</tr>
<tr>
<td>Placebo</td>
<td>110 1.94 (1.22, 2.66)</td>
<td>80 1.47 (0.74, 2.20)</td>
<td>62 1.89 (1.01, 2.77)</td>
</tr>
</tbody>
</table>

ACQ-7-IA at week 24


### Table 1: Responder rate % OR vs. placebo (95% CI)

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dupilumab</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 mg Q2W (&lt;30 kg)</td>
<td>236</td>
<td>79.2</td>
<td>1.82 (1.02, 3.24)</td>
<td>175</td>
<td>80.6</td>
<td>2.79 (1.43, 5.44)</td>
<td>141</td>
<td>80.9</td>
<td>2.60 (1.21, 5.59)</td>
</tr>
<tr>
<td>200 mg Q2W (≥30 kg)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Placebo</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>114</td>
<td>69.3</td>
<td></td>
<td>84</td>
<td>64.3</td>
<td></td>
<td>62</td>
<td>66.1</td>
<td></td>
</tr>
</tbody>
</table>

### PAQLQ(S)-IA at week 24

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dupilumab</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 mg Q2W (&lt;30 kg)</td>
<td>211</td>
<td>73.0</td>
<td>1.57 (0.87, 2.84)</td>
<td>158</td>
<td>72.8</td>
<td>1.84 (0.92, 3.65)</td>
<td>131</td>
<td>75.6</td>
<td>2.09 (0.95, 4.61)</td>
</tr>
<tr>
<td>200 mg Q2W (≥30 kg)</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Placebo</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>107</td>
<td>65.4</td>
<td></td>
<td>81</td>
<td>63.0</td>
<td></td>
<td>61</td>
<td>67.2</td>
<td></td>
</tr>
</tbody>
</table>

*The responder rate was defined as an improvement in score of 0.5 or more (scale range 0-6 for ACQ-7-IA and 1-7 for PAQLQ(S)).

Significant improvements in percent predicted FEV1 were observed as early as week 2 and were maintained through week 52 in VOYAGE study.

Improvements in percent predicted FEV1 over time in VOYAGE are shown in Figure 4.

**Figure 4**: Mean change from baseline in percent predicted pre-bronchodilator FEV1 (L) over time in VOYAGE (baseline blood eosinophils ≥ 150 cells/mL or FeNO ≥ 20 ppb, baseline eosinophils ≥ 300 cells/mL, and baseline FeNO ≥ 20 ppb)

In VOYAGE, in the population with the type 2 inflammation, the mean annualised total number of systemic corticosteroid courses due to asthma was reduced by 59.3% versus placebo (0.350 [95% CI: 0.256, 0.477] versus 0.860 [95% CI: 0.616, 1.200]). In the population defined by baseline blood eosinophils ≥ 300 cells/mL, the mean annualised total number of systemic corticosteroid courses due to asthma was reduced by 66.0% versus placebo (0.274 [95% CI: 0.188, 0.399] versus 0.806 [95% CI: 0.563, 1.154]).

Dupilumab improved the overall health status as measured by the European Quality of Life 5-Dimension Youth Visual Analog Scale (EQ-VAS) in both the type 2 inflammation and the baseline blood eosinophil count of ≥ 300 cells/mL populations at week 52; the LS mean difference versus placebo was 4.73 (95% CI: 1.18, 8.28), and 3.38 (95% CI: -0.66, 7.43), respectively.

Dupilumab reduced the impact of paediatric patient’s asthma on the caregiver quality of life as measured by the Paediatric Asthma Quality of Life Questionnaire (PACQLQ) in both the type 2 inflammation and the baseline blood eosinophil count of ≥ 300 cells/mL population at week 52; the
LS mean difference versus placebo was 0.47 (95% CI: 0.22, 0.72), and 0.50 (95% CI: 0.21, 0.79), respectively.

Paediatric population

Atopic dermatitis

The safety and efficacy of dupilumab have been established in 12 to 17 years old with moderate-to-severe atopic dermatitis in study AD-1526 which included 251 adolescents. The safety and efficacy of dupilumab have been established in 6 to 11 years old with severe atopic dermatitis in study AD-1652 which included 367 paediatric patients. Use is supported by study AD-1434 which enrolled patients who had completed AD-1526 (136 moderate and 64 severe at the time of enrolment in study AD-1434) and patients who had completed study AD-1652 (110 moderate and 72 severe at the time of enrolment in study AD-1434). The safety and efficacy were generally consistent between children 6 to 11 years old, adolescent, and adult patients with atopic dermatitis (see section 4.8). Safety and efficacy in paediatric patients < 6 years of age with atopic dermatitis have not been established.

Asthma

A total of 107 adolescents aged 12 to 17 years with moderate to severe asthma were enrolled in QUEST study and received either 200 mg (N=21) or 300 mg (N=18) dupilumab (or matching placebo either 200 mg [N=34] or 300 mg [N=34]) every other week. Efficacy with respect to severe asthma exacerbations and lung function was observed in both adolescents and adults. For both the 200 mg and 300 mg every other week doses, significant improvements in FEV1 (LS mean change from baseline at week 12) were observed (0.36 L and 0.27 L, respectively). For the 200 mg every other week dose, patients had a reduction in the rate of severe exacerbations that was consistent with adults. The safety profile in adolescents was generally similar to the adults.

A total of 89 adolescents aged 12 to 17 years with moderate-to-severe asthma were enrolled in the open label long-term study (TRAVERSE). In this study, efficacy was measured as a secondary endpoint, was similar to results observed in the pivotal studies and was sustained up to 96 weeks.

A total of 408 children aged 6 to 11 years with moderate-to-severe asthma was enrolled in the VOYAGE study, which evaluated doses of 100 mg Q2W and 200 mg Q2W. The efficacy of dupilumab 300 mg Q4W in children aged 6 to 11 years is extrapolated from the efficacy of 100 mg and 200 mg Q2W in VOYAGE and 200 mg and 300 mg Q2W in adults and adolescents (QUEST). Patients who completed the treatment period of the VOYAGE study could participate in the open label extension study (EXCURSION). Eighteen patients (≥ 15 kg to < 30 kg) out of 365 patients were exposed to 300 mg Q4W in this study, and the safety profile was similar to that seen in VOYAGE. Safety and efficacy in paediatric patients < 6 years of age with asthma have not been established.

The European Medicines Agency has deferred the obligation to submit the results of studies with dupilumab in one or more subset of the paediatric population in atopic dermatitis and asthma (see section 4.2 for information on paediatric use).

5.2 Pharmacokinetic properties

The pharmacokinetics of dupilumab is similar in patients with atopic dermatitis and asthma.

Absorption

After a single subcutaneous (SC) dose of 75-600 mg dupilumab to adults, median times to maximum concentration in serum (t_max) were 3-7 days. The absolute bioavailability of dupilumab following a SC dose is similar between AD and asthma patients, ranging between 61 % and 64 %, as determined by a population pharmacokinetics (PK) analysis.

Steady-state concentrations were achieved by week 16 following the administration of 600 mg starting dose and 300 mg dose every other week. Across clinical trials, the mean ±SD steady-state trough
concentrations ranged from 69.2±36.9 mcg/mL to 80.2±35.3 mcg/mL for 300 mg dose and from 29.2±18.7 to 36.5±22.2 mcg/mL for 200 mg dose administered every other week to adults.

**Distribution**

A volume of distribution for dupilumab of approximately 4.6 L was estimated by population PK analysis, indicating that dupilumab is distributed primarily in the vascular system.

**Biotransformation**

Specific metabolism studies were not conducted because dupilumab is a protein. Dupilumab is expected to degrade to small peptides and individual amino acids.

**Elimination**

Dupilumab elimination is mediated by parallel linear and nonlinear pathways. At higher concentrations, dupilumab elimination is primarily through a non-saturable proteolytic pathway, while at lower concentrations, the non-linear saturable IL-4R α target-mediated elimination predominates. After the last steady state dose, the median time for dupilumab concentrations to decrease below the lower limit of detection, estimated by population PK analysis, was 6-7 weeks for the 300 mg Q4W regimen, 9 weeks for the 200 mg Q2W regimen, 10-11 weeks for the 300 mg Q2W regimen, and 13 weeks for the 300 mg QW regimen.

**Linearity/non-linearity**

Due to nonlinear clearance, dupilumab exposure, as measured by area under the concentration-time curve, increases with dose in a greater than proportional manner following single SC doses from 75-600 mg.

**Special populations**

**Gender**

Gender was not found to be associated with any clinically meaningful impact on the systemic exposure of dupilumab determined by population PK analysis.

**Elderly**

Of the 1,472 patients with atopic dermatitis exposed to dupilumab in a phase 2 dose-ranging study or phase 3 placebo-controlled studies, a total of 67 were 65 years or older. Although no differences in safety or efficacy were observed between older and younger adult atopic dermatitis patients, the number of patients aged 65 and over is not sufficient to determine whether they respond differently from younger patients.

Age was not found to be associated with any clinically meaningful impact on the systemic exposure of dupilumab determined by population PK analysis. However, there were only 61 patients over 65 years of age included in this analysis.

Of the 1,977 patients with asthma exposed to dupilumab, a total of 240 patients were 65 years or older and 39 patients were 75 years or older. Efficacy and safety in this age group were similar to the overall study population.

**Race**

Race was not found to be associated with any clinically meaningful impact on the systemic exposure of dupilumab by population PK analysis.

**Hepatic impairment**
Dupilumab, as a monoclonal antibody, is not expected to undergo significant hepatic elimination. No clinical studies have been conducted to evaluate the effect of hepatic impairment on the pharmacokinetics of dupilumab.

Renal impairment
Dupilumab, as a monoclonal antibody, is not expected to undergo significant renal elimination. No clinical studies have been conducted to evaluate the effect of renal impairment on the pharmacokinetics of dupilumab. Population PK analysis did not identify mild or moderate renal impairment as having a clinically meaningful influence on the systemic exposure of dupilumab. Very limited data are available in patients with severe renal impairment.

Body weight
Dupilumab trough concentrations were lower in subjects with higher body weight with no meaningful impact on efficacy.

Paediatric population

Atopic dermatitis
The pharmacokinetics of dupilumab in paediatric patients (< 6 years of age) or body weight < 15 kg with atopic dermatitis has not been studied.

For adolescents 12 to 17 years of age with atopic dermatitis receiving every other week dosing (Q2W) with either 200 mg (<60 kg) or 300 mg (≥60 kg), the mean ±SD steady state trough concentration of dupilumab was 54.5±27.0 mcg/mL.

For children 6 to 11 years of age with atopic dermatitis receiving every four week dosing (Q4W) with 300 mg (≥ 15 kg) in AD-1652, the mean ± SD steady-state trough concentration was 76.3±37.2 mcg/mL. At week 16 in AD-1434 in children 6 to 11 years of age who initiated every four week dosing (Q4W) with 300 mg (≥ 15 kg), and whose dose was increased to every other week dosing (Q2W) with 200 mg (≥ 15 to < 60 kg) or 300 mg (≥ 60 kg), the mean±SD steady-state trough concentration was 108±53.8 mcg/mL. For children 6 to 11 years of age receiving 300 mg Q4W, initial doses of 300 mg on Days 1 and 15 produce similar steady-state exposure as an initial dose of 600 mg on Day 1, based on PK simulations.

Asthma
The pharmacokinetics of dupilumab in paediatric patients (< 6 years of age) with asthma has not been studied.

A total of 107 adolescents aged 12 to 17 years with asthma were enrolled in QUEST study. The mean ±SD steady-state trough concentrations of dupilumab were 107±51.6 mcg/mL and 46.7±26.9 mcg/mL, respectively, for 300 mg or 200 mg administered every other week. No age-related pharmacokinetic difference was observed in adolescent patients after correction for body weight.

In the VOYAGE study, dupilumab pharmacokinetics was investigated in 270 patients with moderate-to-severe asthma following subcutaneous administration of either 100 mg Q2W (for 91 children weighing < 30 kg) or 200 mg Q2W (for 179 children weighing ≥ 30 kg). The volume of distribution for dupilumab of approximately 3.7 L was estimated by population PK analysis. Steady-state concentrations were achieved by week 12. The mean ± SD steady-state trough concentration was 58.4±28.0 mcg/mL and 85.1±44.9 mcg/mL, respectively. Simulation of a 300 mg Q4W subcutaneous dose in children aged 6 to 11 years with body weight of ≥ 15 kg to < 30 kg and ≥ 30 kg to < 60 kg resulted in predicted steady-state-trough concentrations similar to the observed trough concentrations of 200 mg Q2W (≥ 30 kg) and 100 mg Q2W (< 30 kg), respectively. In addition, simulation of a 300 mg Q4W subcutaneous dose in children aged 6 to 11 years with body weight of ≥ 15 kg to < 60 kg resulted in predicted steady-state trough concentrations similar to those demonstrated to be efficacious in adults and adolescents. After the last steady state dose, the median time for dupilumab concentrations to decrease below the lower limit of detection, estimated by population PK analysis, was 14 to 18 weeks for 100 mg Q2W, 200 mg Q2W or 300 mg Q4W.
5.3 Preclinical safety data

Non-clinical data reveal no special hazard for humans based on conventional studies of repeated dose toxicity (including safety pharmacology endpoints) and toxicity to reproduction and development.

The mutagenic potential of dupilumab has not been evaluated; however monoclonal antibodies are not expected to alter DNA or chromosomes.

Carcinogenicity studies have not been conducted with dupilumab. An evaluation of the available evidence related to IL-4Rα inhibition and animal toxicology data with surrogate antibodies does not suggest an increased carcinogenic potential for dupilumab.

During a reproductive toxicology study conducted in monkeys, using a surrogate antibody specific to the monkey IL-4Rα, no fetal abnormalities were observed at dosages that saturate the IL-4Rα.

An enhanced pre- and post-natal developmental study revealed no adverse effects in maternal animals or their offspring up to 6 months post-partum/post-birth.

Fertility studies conducted in male and female mice using a surrogate antibody against IL-4Rα showed no impairment of fertility (see section 4.6).

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

arginine hydrochloride
histidine
polysorbate 80 (E433)
sodium acetate trihydrate
glacial acetic acid (E260)
sucrose
water for injections

6.2 Incompatibilities

In the absence of compatibility studies, this medicinal product must not be mixed with other medicinal products.

6.3 Shelf life

3 years.

If necessary, pre-filled syringes or pre-filled pens may be kept at room temperature up to 25°C for a maximum of 14 days. Do not store above 25°C. If the carton needs to be removed permanently from refrigerator, the date of removal may be recorded on the outer carton. After removal from the refrigerator, Dupixent must be used within 14 days or discarded.

6.4 Special precautions for storage

Store in a refrigerator (2°C - 8°C).

Do not freeze.

Store in the original carton in order to protect from light.
6.5 Nature and contents of container

Dupixent 200 mg solution for injection in pre-filled syringe
1.14 mL solution in a siliconised type-1 clear glass pre-filled syringe with needle shield, with a fixed 27 gauge 12.7 mm (½ inch), thin wall stainless steel staked needle.

Pack size:
- 1 pre-filled syringe
- 2 pre-filled syringes
- Multipack containing 3 (3 packs of 1) pre-filled syringes
- Multipack containing 6 (3 packs of 2) pre-filled syringes

Dupixent 200 mg solution for injection in pre-filled pen
1.14 mL solution in a siliconised type-1 clear glass syringe in a pre-filled pen, with a fixed 27 gauge 12.7 mm (½ inch), thin wall stainless steel staked needle.

Pack size:
- 1 pre-filled pen
- 2 pre-filled pens
- 3 pre-filled pens
- 6 pre-filled pens

Not all pack sizes may be marketed.

6.6 Special precautions for disposal and other handling

After removing the 200 mg pre-filled syringe or pre-filled pen from the refrigerator, it should be allowed to reach room temperature up to 25°C by waiting for 30 min before injecting Dupixent.

The pre-filled syringe or the pre-filled pen should not be exposed to heat or direct sunlight and should not be shaken.

Any unused medicinal product or waste material should be disposed of in accordance with local requirements. After use, place the pre-filled syringe or the pre-filled pen into a puncture-resistant container and discard as required by local regulations. Do not recycle the container.

7. MARKETING AUTHORISATION HOLDER

sanofi-aventis groupe
54, rue La Boétie
75008 Paris
France

8. MARKETING AUTHORISATION NUMBER(S)

EU/1/17/1229/009
EU/1/17/1229/010
EU/1/17/1229/011
EU/1/17/1229/012
EU/1/17/1229/013
EU/1/17/1229/014
EU/1/17/1229/015
EU/1/17/1229/016
9. DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

Date of first authorisation: 26 September 2017

10. DATE OF REVISION OF THE TEXT

Detailed information on this medicinal product is available on the website of the European Medicines Agency http://www.ema.europa.eu
1. NAME OF THE MEDICINAL PRODUCT
Dupixent 100 mg solution for injection in pre-filled syringe

2. QUALITATIVE AND QUANTITATIVE COMPOSITION
Each single-use pre-filled syringe contains 100 mg of dupilumab in 0.67 mL solution (150 mg/mL).
Dupilumab is a fully human monoclonal antibody, produced in Chinese Hamster Ovary (CHO) cells by recombinant DNA technology.
For the full list of excipients, see section 6.1.

3. PHARMACEUTICAL FORM
Solution for injection (injection)
Clear to slightly opalescent, colourless to pale yellow sterile solution, which is free from visible particulates, with a pH of approximately 5.9.

4. CLINICAL PARTICULARS
4.1 Therapeutic indications
Dupixent is indicated in children 6 to 11 years old as add-on maintenance treatment for severe asthma with type 2 inflammation characterised by raised blood eosinophils and/or raised fraction of exhaled nitric oxide (FeNO), see section 5.1, who are inadequately controlled with medium to high dose inhaled corticosteroids (ICS) plus another medicinal product for maintenance treatment.

4.2 Posology and method of administration
Treatment should be initiated by healthcare professionals experienced in the diagnosis and treatment of conditions for which dupilumab is indicated (see section 4.1).

Posology

Children 6 to 11 years of age
The recommended dose of dupilumab for paediatric patients 6 to 11 years of age is specified in Table 1.
### Table 1: Dose of dupilumab for subcutaneous administration in children 6 to 11 years of age with asthma

<table>
<thead>
<tr>
<th>Body weight</th>
<th>Initial and subsequent doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 to less than 30 kg</td>
<td>100 mg every other week (Q2W) or 300 mg every four weeks (Q4W)</td>
</tr>
<tr>
<td>30 kg to less than 60 kg</td>
<td>200 mg every other week (Q2W) or 300 mg every four weeks (Q4W)</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>200 mg every other week (Q2W)</td>
</tr>
</tbody>
</table>

For paediatric patients (6 to 11 years old) with asthma and co-morbid severe atopic dermatitis, as per approved indication, the recommended dose should be followed in Table 2 of 300 mg SmPC.

Patients receiving concomitant oral corticosteroids may reduce their steroid dose once clinical improvement with dupilumab has occurred (see section 5.1). Steroid reductions should be accomplished gradually (see section 4.4).

Dupilumab is intended for long-term treatment. The need for continued therapy should be considered at least on an annual basis as determined by physician assessment of the patient’s level of asthma control.

**Missed dose**

If a dose is missed, the dose should be administered as soon as possible. Thereafter, dosing should resume at the regular scheduled time.

**Special populations**

*Elderly (≥ 65 years)*

No dose adjustment is recommended for elderly patients (see section 5.2).

*Renal impairment*

No dose adjustment is needed in patients with mild or moderate renal impairment. Very limited data are available in patients with severe renal impairment (see section 5.2).

*Hepatic impairment*

No data are available in patients with hepatic impairment (see section 5.2).

*Paediatric patients*

The safety and efficacy of dupilumab in children with severe asthma below the age of 6 years have not been established. No data are available.

**Method of administration**

**Subcutaneous use**

Dupilumab is administered by subcutaneous injection into the thigh or abdomen, except for the 5 cm around the navel. If somebody else administers the injection, the upper arm can also be used.

It is recommended to rotate the injection site with each injection. Dupilumab should not be injected into skin that is tender, damaged or has bruises or scars.
The patient's caregiver may administer dupilumab if their healthcare professional determines that this is appropriate. Proper training should be provided to patient’s caregiver on the preparation and administration of dupilumab prior to use according to the Instructions for Use (IFU) section at the end of the package leaflet.

4.3 Contraindications

Hypersensitivity to the active substance or to any of the excipients listed in section 6.1.

4.4 Special warnings and precautions for use

Traceability

In order to improve the traceability of biological medicinal products, the name and the batch number of the administered product should be clearly recorded.

Acute asthma exacerbations

Dupilumab should not be used to treat acute asthma symptoms or acute exacerbations. Dupilumab should not be used to treat acute bronchospasm or status asthmaticus.

Corticosteroids

Systemic, topical, or inhaled corticosteroids should not be discontinued abruptly upon initiation of therapy with dupilumab. Reductions in corticosteroid dose, if appropriate, should be gradual and performed under the direct supervision of a physician. Reduction in corticosteroid dose may be associated with systemic withdrawal symptoms and/or unmask conditions previously suppressed by systemic corticosteroid therapy.

Biomarkers of type 2 inflammation may be suppressed by systemic corticosteroid use. This should be taken into consideration to determine type 2 status in patients taking oral corticosteroids (see section 5.1).

Hypersensitivity

If a systemic hypersensitivity reaction (immediate or delayed) occurs, administration of dupilumab should be discontinued immediately and appropriate therapy initiated. Cases of anaphylactic reaction, angioedema, and serum sickness/serum sickness-like reaction have been reported. Anaphylactic reactions and angioedema have occurred from minutes to up to seven days after the dupilumab injection (see section 4.8).

Eosinophilic conditions

Cases of eosinophilic pneumonia and cases of vasculitis consistent with eosinophilic granulomatosis with polyangiitis (EGPA) have been reported with dupilumab in adult patients who participated in the asthma development program. Cases of vasculitis consistent with EGPA have been reported with dupilumab and placebo in adult patients with co-morbid asthma in the CRSwNP development program. Physicians should be alert to vasculitic rash, worsening pulmonary symptoms, cardiac complications, and/or neuropathy presenting in their patients with eosinophilia. Patients being treated for asthma may present with serious systemic eosinophilia sometimes presenting with clinical features of eosinophilic pneumonia or vasculitis consistent with eosinophilic granulomatosis with polyangiitis, conditions which are often treated with systemic corticosteroid therapy. These events usually, but not always, may be associated with the reduction of oral corticosteroid therapy.

Helminth infection
Patients with known helminth infections were excluded from participation in clinical studies. Dupilumab may influence the immune response against helminth infections by inhibiting IL-4/IL-13 signaling. Patients with pre-existing helminth infections should be treated before initiating dupilumab. If patients become infected while receiving treatment with dupilumab and do not respond to anti-helminth treatment, treatment with dupilumab should be discontinued until infection resolves. Cases of enterobiasis were reported in children 6 to 11 years old who participated in the paediatric asthma development program (see section 4.8).

Conjunctivitis and keratitis related events

Conjunctivitis and keratitis related events have been reported with dupilumab, predominantly in atopic dermatitis patients. Some patients reported visual disturbances (e.g. blurred vision) associated with conjunctivitis or keratitis (see section 4.8).

Patients should be advised to report new onset or worsening eye symptoms to their healthcare provider. Patients treated with dupilumab who develop conjunctivitis that does not resolve following standard treatment or signs and symptoms suggestive of keratitis should undergo ophthalmological examination, as appropriate (see section 4.8).

Atopic dermatitis or CRSwNP patients with comorbid asthma

Patients on dupilumab for moderate-to-severe atopic dermatitis or severe CRSwNP who also have comorbid asthma should not adjust or stop their asthma treatments without consultation with their physicians. Patients with comorbid asthma should be monitored carefully following discontinuation of dupilumab.

Vaccinations

Live and live attenuated vaccines should not be given concurrently with dupilumab as clinical safety and efficacy has not been established. Immune responses to Tdap vaccine and meningococcal polysaccharide vaccine were assessed (see section 4.5). It is recommended that patients should be brought up to date with live and live attenuated immunisations in agreement with current immunisation guidelines prior to treatment with dupilumab.

Sodium content

This medicinal product contains less than 1 mmol sodium (23 mg) per 100 mg dose, that is to say essentially “sodium-free”.

4.5 Interaction with other medicinal products and other forms of interaction

Immune responses to vaccination were assessed in a study in which patients with atopic dermatitis were treated once weekly for 16 weeks with 300 mg of dupilumab. After 12 weeks of dupilumab administration, patients were vaccinated with a Tdap vaccine (T cell-dependent), and a meningococcal polysaccharide vaccine (T cell-independent) and immune responses were assessed 4 weeks later. Antibody responses to both tetanus vaccine and meningococcal polysaccharide vaccine were similar in dupilumab-treated and placebo-treated patients. No adverse interactions between either of the non-live vaccines and dupilumab were noted in the study.

Therefore, patients receiving dupilumab may receive concurrent inactivated or non-live vaccinations. For information on live vaccines see section 4.4.

In a clinical study of atopic dermatitis (AD) patients, the effects of dupilumab on the pharmacokinetics (PK) of CYP substrates were evaluated. The data gathered from this study did not indicate clinically relevant effects of dupilumab on CYP1A2, CYP3A, CYP2C19, CYP2D6, or CYP2C9 activity.
An effect of dupilumab on the PK of co-administered medications is not expected. Based on the population analysis, commonly co-administered medications had no effect on dupilumab pharmacokinetics on patients with moderate to severe asthma.

4.6 Fertility, pregnancy and lactation

Pregnancy

There is a limited amount of data from the use of dupilumab in pregnant women. Animal studies do not indicate direct or indirect harmful effects with respect to reproductive toxicity (see section 5.3). Dupilumab should be used during pregnancy only if the potential benefit justifies the potential risk to the foetus.

Breast-feeding

It is unknown whether dupilumab is excreted in human milk or absorbed systemically after ingestion. A decision must be made whether to discontinue breast-feeding or to discontinue dupilumab therapy taking into account the benefit of breast feeding for the child and the benefit of therapy for the woman.

Fertility

Animal studies showed no impairment of fertility (see section 5.3).

4.7 Effects on ability to drive and use machines

Dupilumab has no or negligible influence on the ability to drive or operate machinery.

4.8 Undesirable effects

Summary of the safety profile

The most common adverse reactions are injection site reactions (includes erythema, oedema, pruritus, pain and swelling), conjunctivitis, conjunctivitis allergic, arthralgia, oral herpes, and eosinophilia. Rare cases of serum sickness, serum sickness-like reaction, anaphylactic reaction, and ulcerative keratitis have been reported (see section 4.4).

Tabulated list of adverse reactions

Dupilumab was studied in 12 randomised, placebo-controlled trials, including atopic dermatitis, asthma, and CRSwNP patients. The pivotal controlled studies involved 4,206 patients receiving dupilumab and 2,326 patients receiving placebo during the controlled period.

Listed in Table 2 are adverse reactions observed in clinical trials and/or postmarketing setting presented by system organ class and frequency, using the following categories: very common (≥ 1/10); common (≥ 1/100 to < 1/10); uncommon (≥ 1/1,000 to < 1/100); rare (≥ 1/10,000 to < 1/1,000); very rare (< 1/10,000). Within each frequency grouping, adverse reactions are presented in order of decreasing seriousness.

<table>
<thead>
<tr>
<th>Table 2: List of adverse reactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>MedDRA System Organ Class</td>
</tr>
<tr>
<td>Infections and infestations</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Blood and lymphatic system disorders</td>
</tr>
<tr>
<td>Immune system disorders</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
### Description of selected adverse reactions

**Hypersensitivity**
Cases of anaphylactic reaction, angioedema, and serum sickness/serum sickness-like reaction have been reported following administration of dupilumab (see section 4.4).

**Conjunctivitis and keratitis related events**
Conjunctivitis and keratitis occurred more frequently in atopic dermatitis patients who received dupilumab compared to placebo in atopic dermatitis studies. Most patients with conjunctivitis or keratitis recovered or were recovering during the treatment period. In the long-term OLE atopic dermatitis study (AD-1225) at 3 years, the respective rates of conjunctivitis and keratitis remained similar to those in the dupilumab arm in the placebo controlled atopic dermatitis studies. Among asthma patients frequency of conjunctivitis and keratitis was low and similar between dupilumab and placebo. Among CRSwNP patients the frequency of conjunctivitis was higher in dupilumab than placebo, though lower than that observed in atopic dermatitis patients. There were no cases of keratitis reported in the CRSwNP development program (see section 4.4).

**Eczema herpeticum**
Eczema herpeticum was reported in < 1 % of the dupilumab groups and in < 1 % of the placebo group in the 16-week atopic dermatitis monotherapy adult studies. In the 52-week atopic dermatitis dupilumab + TCS adult study, eczema herpeticum was reported in 0.2 % of the dupilumab + TCS group and 1.9 % of the placebo + TCS group. These rates remained stable at 3 years in the long-term OLE study (AD-1225).

**Eosinophilia**
Dupilumab-treated patients had a greater mean initial increase from baseline in eosinophil count compared to patients treated with placebo. Eosinophil counts declined to near baseline levels during study treatment and returned to baseline during the asthma open-label extension safety study (TRAVERSE). The mean blood eosinophil levels decreased to below baseline by week 20 and was maintained up to 3 years in the long-term OLE study (AD-1225).

Treatment-emergent eosinophilia (≥ 5,000 cells/mcL) was reported in < 2 % of dupilumab-treated patients and < 0.5 % in placebo-treated patients (SOLO1, SOLO2, AD-1021, DRI12544, QUEST, SINUS-24 and SINUS-52 studies) (see section 4.4).
Infections

In the 16-week atopic dermatitis monotherapy clinical adult studies, serious infections were reported in 1.0% of patients treated with placebo and 0.5% of patients treated with dupilumab. In the 52-week atopic dermatitis CHRONOS adult study, serious infections were reported in 0.6% of patients treated with placebo and 0.2% of patients treated with dupilumab. The rates of serious infections remained stable at 3 years in the long-term OLE study (AD-1225).

No increase was observed in the overall incidence of infections with dupilumab compared to placebo in the safety pool for asthma clinical studies. In the 24-week safety pool, serious infections were reported in 1.0% of patients treated with dupilumab and 1.1% of patients treated with placebo. In the 52-week QUEST study, serious infections were reported in 1.3% of patients treated with dupilumab and 1.4% of patients treated with placebo.

No increase was observed in the overall incidence of infections with dupilumab compared to placebo in the safety pool for CRSwNP clinical studies. In the 52-week SINUS-52 study, serious infections were reported in 1.3% of patients treated with dupilumab and 1.3% of patients treated with placebo.

Immunogenicity

As with all therapeutic proteins, there is a potential for immunogenicity with dupilumab.

Anti-Drug-Antibodies (ADA) responses were not generally associated with impact on dupilumab exposure, safety, or efficacy.

Approximately 5% of patients with atopic dermatitis, asthma, or CRSwNP who received dupilumab 300 mg Q2W for 52 weeks developed ADA to dupilumab; approximately 2% exhibited persistent ADA responses and approximately 2% had neutralizing antibodies. Similar results were observed in paediatric patients (6 to 11 years of age) with atopic dermatitis who received dupilumab 200 mg Q2W or 300 mg Q4W for 16 weeks and patients (6 to 11 years of age) with asthma who received dupilumab 100 mg Q2W or 200 mg Q2W for 52 weeks. Similar ADA responses were observed in adult patients with atopic dermatitis treated with dupilumab for up to 3 years in the long-term OLE study (AD-1225).

Approximately 16% of adolescent patients with atopic dermatitis who received dupilumab 300 mg or 200 mg Q2W for 16 weeks developed antibodies to dupilumab; approximately 3% exhibited persistent ADA responses, and approximately 5% had neutralizing antibodies.

Approximately 9% of patients with asthma who received dupilumab 200 mg Q2W for 52 weeks developed antibodies to dupilumab; approximately 4% exhibited persistent ADA responses and approximately 4% had neutralizing antibodies.

Regardless of age or population, approximately 2 to 4% of patients in the placebo groups were positive for antibodies to dupilumab; approximately 2% exhibited persistent ADA response and approximately 1% had neutralizing antibodies.

Less than 1% of patients who received dupilumab at approved dosing regimens exhibited high titer ADA responses associated with reduced exposure and efficacy. In addition, there was one patient with serum sickness and one with serum sickness-like reaction (< 0.1%) associated with high ADA titers (see section 4.4).

Paediatric population

Atopic dermatitis

The safety of dupilumab was assessed in a study of 250 patients 12 to 17 years of age with moderate-to-severe atopic dermatitis (AD-1526). The safety profile of dupilumab in these patients followed through week 16 was similar to the safety profile from studies in adults with atopic dermatitis.
**Asthma**

A total of 107 adolescents aged 12 to 17 years with asthma were enrolled in the 52 week QUEST study. The safety profile observed was similar to that seen in adults.

The long-term safety of dupilumab was assessed in 89 adolescent patients who were enrolled in an open-label extension study in moderate-to-severe asthma (TRAVERSE). In this study, patients were followed for up to 96 weeks. The safety profile of dupilumab in TRAVERSE was consistent with the safety profile observed in pivotal asthma studies for up to 52 weeks of treatment.

In children 6 to 11 years of age with moderate-to-severe asthma (VOYAGE), the additional adverse reaction of enterobiasis was reported in 1.8% (5 patients) in the dupilumab groups and none in the placebo group. All enterobiasis cases were mild to moderate and patients recovered with anti-helminth treatment without dupilumab treatment discontinuation.

In children 6 to 11 years of age with moderate-to-severe asthma, eosinophilia (blood eosinophils $\geq 3,000$ cells/mcL or deemed by the investigator to be an adverse event) was reported in 6.6% of the dupilumab groups and 0.7% in the placebo group. Most eosinophilia cases were mild to moderate and not associated with clinical symptoms. These cases were transient, decreased over time, and did not lead to dupilumab treatment discontinuation.

**Long-term safety**

**Atopic dermatitis**

The safety profile of dupilumab + TCS (CHRONOS) in adult atopic dermatitis patients) through week 52 was consistent with the safety profile observed at week 16. The long-term safety of dupilumab was assessed in an open-label extension study in patients 6 to 17 years of age with moderate-to-severe atopic dermatitis (AD-1434). The safety profile of dupilumab in patients followed through week 52 was similar to the safety profile observed at week 16 in the AD-1526 and AD-1652 studies. The long-term safety profile of dupilumab observed in children and adolescents was consistent with that seen in adults with atopic dermatitis.

In a phase 3, multicentre, open label extension (OLE) study (AD-1225), the long-term safety of repeat doses of dupilumab was assessed in 2,677 adults with moderate-to-severe AD exposed to 300 mg weekly dosing (99.7%), including 347 who completed at least 148 weeks of the study. The long-term safety profile observed in this study up to 3 years was generally consistent with the safety profile of dupilumab observed in controlled studies.

**Asthma**

The safety profile of dupilumab in the 96 weeks long term safety study (TRAVERSE) was consistent with the safety profile observed in pivotal asthma studies for up to 52 weeks of treatment.

**CRSwNP**

The safety profile of dupilumab in adults with CRSwNP through week 52 was consistent with the safety profile observed at week 24.

**Reporting of suspected adverse reactions**

Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via the national reporting system listed in Appendix V.

**4.9 Overdose**
There is no specific treatment for dupilumab overdose. In the event of overdose, monitor the patient for any signs or symptoms of adverse reactions and institute appropriate symptomatic treatment immediately.

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: Other dermatological preparations, agents for dermatitis, excluding corticosteroids, ATC code: D11AH05

Mechanism of action

Dupilumab is a recombinant human IgG4 monoclonal antibody that inhibits interleukin-4 and interleukin-13 signaling. Dupilumab inhibits IL-4 signaling via the Type I receptor (IL-4Rα/γc), and both IL-4 and IL-13 signaling through the Type II receptor (IL-4Rα/IL-13Rα). IL-4 and IL-13 are major drivers of human type 2 inflammatory disease, such as atopic dermatitis and asthma. Blocking the IL-4/IL-13 pathway with dupilumab in patients decreases many of the mediators of type 2 inflammation.

Pharmacodynamic effects

In atopic dermatitis clinical trials, treatment with dupilumab was associated with decreases from baseline in concentrations of type 2 immunity biomarkers, such as thymus and activation-regulated chemokine (TARC/CCL17), total serum IgE and allergen-specific IgE in serum. A reduction of lactate dehydrogenase (LDH), a biomarker associated with AD disease activity and severity, was observed with dupilumab treatment in adults and adolescents with atopic dermatitis.

In adult and adolescent patients with asthma, dupilumab treatment relative to placebo markedly decreased FeNO and circulating concentrations of eotaxin-3, total IgE, allergen specific IgE, TARC, and periostin, the type 2 biomarkers evaluated in clinical trials. These reductions in type 2 inflammatory biomarkers were comparable for the 200 mg Q2W and 300 mg Q2W regimens. In paediatric (6 to 11 years of age) patients with asthma, dupilumab treatment relative to placebo markedly decreased FeNO and circulating concentrations of total IgE, allergen specific IgE, and TARC, the type 2 biomarkers evaluated in clinical trials. These markers were near maximal suppression after 2 weeks of treatment, except for IgE which declined more slowly. These effects were sustained throughout treatment.

For clinical data in adults, adolescents, and children 6 to 11 years old with atopic dermatitis please refer to the dupilumab 300 mg and 200 mg Summary of Product Characteristics.

Clinical efficacy and safety in asthma

For clinical data in adults and adolescents with asthma please refer to the dupilumab 300 mg and 200 mg Summary of Product Characteristics.

Paediatric study (6 to 11 years of age; VOYAGE)

The efficacy and safety of dupilumab in paediatric patients was evaluated in a 52-week multicentre, randomised, double-blind, placebo-controlled study (VOYAGE) in 408 patients 6 to 11 years of age, with moderate-to-severe asthma on a medium- or high- dose ICS and one controller medication or high dose ICS alone. Patients were randomised to dupilumab (N=273) or matching placebo (N=135) every other week based on body weight ≤ 30 kg or > 30 kg, respectively. The efficacy was evaluated in
populations with type 2 inflammation defined as blood eosinophil levels of ≥ 150 cells/mcL or FeNO ≥ 20 ppb.

The primary endpoint was the annualised rate of severe exacerbation events during the 52-week placebo-controlled period and the key secondary endpoint was the change from baseline in pre-bronchodilator FEV1 percent predicted at week 12. Additional secondary endpoints included mean change from baseline and responder rates in the ACQ-7-IA and PAQLQ(S)-IA scores. The demographics and baseline characteristics for VOYAGE are provided in Table 3 below.

### Table 3: Demographics and baseline characteristics for VOYAGE

<table>
<thead>
<tr>
<th>Parameter</th>
<th>EOS ≥ 150 cells/mcL or FeNO ≥ 20 ppb (N = 350)</th>
<th>EOS ≥ 300 cells/mcL (N = 259)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (years) (SD)</td>
<td>8.9 (1.6)</td>
<td>9.0 (1.6)</td>
</tr>
<tr>
<td>% Female</td>
<td>34.3</td>
<td>32.8</td>
</tr>
<tr>
<td>% White</td>
<td>88.6</td>
<td>87.3</td>
</tr>
<tr>
<td>Mean body weight (kg)</td>
<td>36.09</td>
<td>35.94</td>
</tr>
<tr>
<td>Mean exacerbations in previous year (± SD)</td>
<td>2.47 (2.30)</td>
<td>2.64 (2.58)</td>
</tr>
<tr>
<td>ICS dose (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>55.7</td>
<td>54.4</td>
</tr>
<tr>
<td>High</td>
<td>43.4</td>
<td>44.4</td>
</tr>
<tr>
<td>Pre-dose FEV1 (L) at baseline (± SD)</td>
<td>1.49 (0.41)</td>
<td>1.47 (0.42)</td>
</tr>
<tr>
<td>Mean percent predicted FEV1 (%) (±SD)</td>
<td>77.89 (14.40)</td>
<td>76.85 (14.78)</td>
</tr>
<tr>
<td>Mean % Reversibility (± SD)</td>
<td>27.79 (19.34)</td>
<td>22.59 (20.78)</td>
</tr>
<tr>
<td>Mean ACQ-7-IA score (± SD)</td>
<td>2.14 (0.72)</td>
<td>2.16 (0.75)</td>
</tr>
<tr>
<td>Mean PAQLQ(S)-IA score (± SD)</td>
<td>4.94 (1.10)</td>
<td>4.93 (1.12)</td>
</tr>
<tr>
<td>Atopic Medical History % Overall (AD %, AR %)</td>
<td>94 (38.9, 82.6)</td>
<td>96.5 (44.4, 85.7)</td>
</tr>
<tr>
<td>Median total IgE IU/mL (± SD)</td>
<td>905.52 (1140.41)</td>
<td>1077.00 (1230.83)</td>
</tr>
<tr>
<td>Mean FeNO ppb (± SD)</td>
<td>30.71 (24.42)</td>
<td>33.50 (25.11)</td>
</tr>
<tr>
<td>% patients with FeNO ppb ≥ 20</td>
<td>58</td>
<td>64.1</td>
</tr>
<tr>
<td>Mean baseline Eosinophil count (± SD) cells/mcL</td>
<td>570 (380)</td>
<td>710 (360)</td>
</tr>
<tr>
<td>% patients with EOS ≥ 150 cells/mcL</td>
<td>94.6</td>
<td>0</td>
</tr>
<tr>
<td>≥ 300 cells/mcL</td>
<td>74</td>
<td>100</td>
</tr>
</tbody>
</table>

ICS = inhaled corticosteroid; FEV1 = Forced expiratory volume in 1 second; ACQ-7-IA = Asthma Control Questionnaire-7 Interviewer Administered; PAQLQ(S)-IA = Paediatric Asthma Quality of Life Questionnaire with Standardised Activities–Interviewer Administered; AD = atopic dermatitis; AR = allergic rhinitis; EOS = blood eosinophil; FeNO = fraction of exhaled nitric oxide
Exacerbations were defined as deterioration of asthma requiring the use of systemic corticosteroids for at least 3 days or hospitalisation or emergency room visit due to asthma that required systemic corticosteroids. Dupilumab significantly reduced the annualised rate of severe asthma exacerbation events during the 52-week treatment period compared to placebo in the population with the type 2 inflammation and in population defined by baseline blood eosinophils ≥ 300 cells/mcL or by baseline FeNO ≥ 20 ppb. Clinically significant improvements in percent predicted pre-bronchodilator FEV₁ were observed at week 12. Improvements were also observed for ACQ-7-IA and PAQLQ(S)-IA at week 24 and were sustained at week 52. Greater responder rates were observed for ACQ-7-IA and PAQLQ(S)-IA compared to placebo at week 24. The efficacy results for VOYAGE are presented in Table 4.

In the population with the type 2 inflammation, the LS mean change from baseline in pre-bronchodilator FEV₁ at week 12 was 0.22 L in the dupilumab group and 0.12 L in the placebo group, with an LS mean difference versus placebo of 0.10 L (95% CI: 0.04, 0.16). The treatment effect was sustained over the 52-week treatment period, with an LS mean difference versus placebo at week 52 of 0.17 L (95% CI: 0.09, 0.24).

In the population defined by baseline blood eosinophils ≥ 300 cells/mcL, the LS mean change from baseline in pre-bronchodilator FEV₁ at week 12 was 0.22 L in the dupilumab group and 0.12 L in the placebo group, with an LS mean difference versus placebo of 0.10 L (95% CI: 0.03, 0.17). The treatment effect was sustained over the 52-week treatment period, with an LS mean difference versus placebo at week 52 of 0.17 L (95% CI: 0.09, 0.26).

In both primary efficacy populations, there was a rapid improvement in FEF25-75% and FEV₁/FVC (onset of a difference was observed as early as week 2) and sustained over the 52-week treatment period, Table 4.

### Table 4: Rate of severe exacerbations, mean change from baseline in FEV₁, ACQ-7-IA and PAQLQ(S)-IA responder rates in VOYAGE

<table>
<thead>
<tr>
<th>Treatment</th>
<th>EOS ≥ 150 cells/mcL or FeNO ≥ 20 ppb</th>
<th>EOS ≥ 300 cells/mcL</th>
<th>FeNO ≥ 20 ppb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annualised severe exacerbations rate over 52 weeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>Rate (95% CI)</td>
<td>Rate ratio (95% CI)</td>
</tr>
<tr>
<td>Dupilumab 100 mg Q2W (&lt;30 kg)/200 mg Q2W (≥30 kg)</td>
<td>236</td>
<td>0.305 (0.223, 0.416)</td>
<td>0.407 (0.274, 0.605)</td>
</tr>
<tr>
<td>Placebo</td>
<td>114</td>
<td>0.748 (0.542, 1.034)</td>
<td>0.665 (0.467, 0.949)</td>
</tr>
<tr>
<td></td>
<td>Mean change from baseline in percent predicted FEV₁ at week 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>LS mean Δ from baseline</td>
<td>LS mean difference vs. placebo (95% CI)</td>
</tr>
<tr>
<td>Dupilumab 100 mg Q2W (&lt;30 kg)/200 mg Q2W (≥30 kg)</td>
<td>229</td>
<td>10.53 (2.14, 8.27)</td>
<td>168</td>
</tr>
<tr>
<td>Placebo</td>
<td>110</td>
<td>5.32 (2.14, 8.27)</td>
<td>80</td>
</tr>
<tr>
<td>Mean change from baseline in percent predicted FEF25-75% at week 12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>LS mean Δ from baseline</td>
<td>LS mean difference vs. placebo (95% CI)</td>
</tr>
<tr>
<td>Dupilumab 100 mg Q2W (&lt;30 kg)/200 mg Q2W (≥30 kg)</td>
<td>229</td>
<td></td>
<td>168</td>
</tr>
<tr>
<td>Placebo</td>
<td>110</td>
<td></td>
<td>80</td>
</tr>
</tbody>
</table>
### Dupilumab 100 mg Q2W (<30 kg)/200 mg Q2W (≥30 kg)

<table>
<thead>
<tr>
<th>N</th>
<th>LS mean Δ from baseline</th>
<th>LS mean difference vs. placebo (95% CI)</th>
<th>N</th>
<th>LS mean Δ from baseline</th>
<th>LS mean difference vs. placebo (95% CI)</th>
<th>N</th>
<th>LS mean Δ from baseline</th>
<th>LS mean difference vs. placebo (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>229</td>
<td>16.70</td>
<td>(7.44, 16.43)</td>
<td>168</td>
<td>16.91</td>
<td>(8.89, 18.95)</td>
<td>141</td>
<td>17.96</td>
<td>(8.30, 19.65)</td>
</tr>
<tr>
<td>168</td>
<td>16.91</td>
<td>(8.89, 18.95)</td>
<td>141</td>
<td>17.96</td>
<td>(8.30, 19.65)</td>
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<td></td>
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<tr>
<td>168</td>
<td>16.91</td>
<td>(8.89, 18.95)</td>
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<td></td>
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<tr>
<td>141</td>
<td>17.96</td>
<td>(8.30, 19.65)</td>
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</tbody>
</table>

### Placebo

<table>
<thead>
<tr>
<th>N</th>
<th>LS mean Δ from baseline</th>
<th>OR vs. placebo (95% CI)</th>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
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</thead>
<tbody>
<tr>
<td>236</td>
<td>79.2</td>
<td>1.82</td>
<td>175</td>
<td>80.6</td>
<td>2.79</td>
<td>141</td>
<td>80.9</td>
<td>2.60</td>
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<tr>
<td>114</td>
<td>69.3</td>
<td></td>
<td>84</td>
<td>64.3</td>
<td></td>
<td>62</td>
<td>66.1</td>
<td></td>
</tr>
<tr>
<td>107</td>
<td>65.4</td>
<td></td>
<td>81</td>
<td>63.0</td>
<td></td>
<td>61</td>
<td>67.2</td>
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</table>

### ACQ-7-IA at week 24<sup>a</sup>

<table>
<thead>
<tr>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>211</td>
<td>73.0</td>
<td>1.57</td>
<td>158</td>
<td>72.8</td>
<td>1.84</td>
<td>131</td>
<td>75.6</td>
<td>2.09</td>
</tr>
<tr>
<td>107</td>
<td>65.4</td>
<td></td>
<td>81</td>
<td>63.0</td>
<td></td>
<td>61</td>
<td>67.2</td>
<td></td>
</tr>
</tbody>
</table>

### PAQLQ(S)-IA at week 24<sup>a</sup>

<table>
<thead>
<tr>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
<th>N</th>
<th>Responder rate %</th>
<th>OR vs. placebo (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>211</td>
<td>73.0</td>
<td>1.57</td>
<td>158</td>
<td>72.8</td>
<td>1.84</td>
<td>131</td>
<td>75.6</td>
<td>2.09</td>
</tr>
<tr>
<td>107</td>
<td>65.4</td>
<td></td>
<td>81</td>
<td>63.0</td>
<td></td>
<td>61</td>
<td>67.2</td>
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</tr>
</tbody>
</table>

<sup>a</sup>The responder rate was defined as an improvement in score of 0.5 or more (scale range 0-6 for ACQ-7-IA and 1-7 for PAQLQ(S))

**Significant improvements in percent predicted FEV<sub>1</sub> were observed as early as week 2 and were maintained through week 52 in VOYAGE study.**

**Improvements in percent predicted FEV<sub>1</sub> over time in VOYAGE are shown in Figure 1.**

**Figure 1: Mean change from baseline in percent predicted pre-bronchodilator FEV<sub>1</sub> (L) over time in VOYAGE** (baseline blood eosinophils ≥ 150 cells/mcL or FeNO ≥ 20 ppb, baseline eosinophils ≥ 300 cells/mcL, and baseline FeNO ≥ 20 ppb)

**Baseline blood eosinophils ≥ 150**  **Baseline blood eosinophils ≥ 300 cells/mcL**  **Baseline FeNO ≥ 20 ppb**
In VOYAGE, in the population with the type 2 inflammation, the mean annualised total number of systemic corticosteroid courses due to asthma was reduced by 59.3% versus placebo (0.350 [95% CI: 0.256, 0.477] versus 0.860 [95% CI: 0.616, 1.200]). In the population defined by baseline blood eosinophils ≥ 300 cells/mcL, the mean annualised total number of systemic corticosteroid courses due to asthma was reduced by 66.0% versus placebo (0.274 [95% CI: 0.188, 0.399] versus 0.806 [95% CI: 0.563, 1.154]).

Dupilumab improved the overall health status as measured by the European Quality of Life 5-Dimension Youth Visual Analog Scale (EQ-VAS) in both the type 2 inflammation and the baseline blood eosinophil count of ≥ 300 cells/mcL populations at week 52; the LS mean difference versus placebo was 4.73 (95% CI: 1.18, 8.28), and 3.38 (95% CI: -0.66, 7.43), respectively.

Dupilumab reduced the impact of paediatric patient’s asthma on the caregiver quality of life as measured by the Paediatric Asthma Quality of Life Questionnaire (PACQLQ) in both the type 2 inflammation and the baseline blood eosinophil count of ≥ 300 cells/mcL population at week 52; the LS mean difference versus placebo was 0.47 (95% CI: 0.22, 0.72), and 0.50 (95% CI: 0.21, 0.79), respectively.

Paediatric population

Asthma

A total of 107 adolescents aged 12 to 17 years with moderate to severe asthma were enrolled in QUEST study and received either 200 mg (N=21) or 300 mg (N=18) dupilumab (or matching placebo either 200 mg [N=34] or 300 mg [N=34]) every other week. Efficacy with respect to severe asthma exacerbations and lung function was observed in both adolescents and adults. For both the 200 mg and 300 mg every other week doses, significant improvements in FEV_1 (LS mean change from baseline at week 12) were observed (0.36 L and 0.27 L, respectively). For the 200 mg every other week dose, patients had a reduction in the rate of severe exacerbations that was consistent with adults. The safety profile in adolescents was generally similar to the adults.

A total of 89 adolescents aged 12 to 17 years with moderate-to-severe asthma were enrolled in the open label long-term study (TRAVERSE). In this study, efficacy was measured as a secondary endpoint, was similar to results observed in the pivotal studies and was sustained up to 96 weeks.

A total of 408 children aged 6 to 11 years with moderate-to-severe asthma was enrolled in the VOYAGE study, which evaluated doses of 100 mg Q2W and 200 mg Q2W. The efficacy of dupilumab 300 mg Q4W in children aged 6 to 11 years is extrapolated from the efficacy of 100 mg and 200 mg Q2W in VOYAGE and 200 mg and 300 mg Q2W in adults and adolescents (QUEST). Patients who completed the treatment period of the VOYAGE study could participate in the open label extension study (EXCURSION). Eighteen patients (≥ 15 kg to < 30 kg) out of 365 patients were exposed to 300 mg Q4W in this study, and the safety profile was similar to that seen in VOYAGE. Safety and efficacy in paediatric patients < 6 years of age with asthma have not been established.

The European Medicines Agency has deferred the obligation to submit the results of studies with dupilumab in one or more subset of the paediatric population in atopic dermatitis and asthma (see section 4.2 for information on paediatric use).

5.2 Pharmacokinetic properties
The pharmacokinetics of dupilumab is similar in patients with atopic dermatitis and asthma.

Absorption

After a single subcutaneous (SC) dose of 75-600 mg dupilumab to adults, median times to maximum concentration in serum (t_{max}) were 3-7 days. The absolute bioavailability of dupilumab following a SC dose is similar between AD and asthma patients, ranging between 61 % and 64 %, as determined by a population pharmacokinetics (PK) analysis.

Steady-state concentrations were achieved by week 16 following the administration of 600 mg starting dose and 300 mg dose every other week. Across clinical trials, the mean ±SD steady-state trough concentrations ranged from 69.2±36.9 mcg/mL to 80.2±35.3 mcg/ml for 300 mg dose and from 29.2±18.7 to 36.5±22.2 mcg/mL for 200 mg dose administered every other week to adults.

Distribution

A volume of distribution for dupilumab of approximately 4.6 L was estimated by population PK analysis, indicating that dupilumab is distributed primarily in the vascular system.

Biotransformation

Specific metabolism studies were not conducted because dupilumab is a protein. Dupilumab is expected to degrade to small peptides and individual amino acids.

Elimination

Dupilumab elimination is mediated by parallel linear and nonlinear pathways. At higher concentrations, dupilumab elimination is primarily through a non-saturable proteolytic pathway, while at lower concentrations, the non-linear saturable IL-4R α target-mediated elimination predominates. After the last steady state dose, the median time for dupilumab concentrations to decrease below the lower limit of detection, estimated by population PK analysis, was 6-7 weeks for the 300 mg Q4W regimen, 9 weeks for the 200 mg Q2W regimen, 10-11 weeks for the 300 mg Q2W regimen, and 13 weeks for the 300 mg QW regimen.

Linearity/non-linearity

Due to nonlinear clearance, dupilumab exposure, as measured by area under the concentration-time curve, increases with dose in a greater than proportional manner following single SC doses from 75-600 mg.

Special populations

Gender

Gender was not found to be associated with any clinically meaningful impact on the systemic exposure of dupilumab determined by population PK analysis.

Elderly

Of the 1,472 patients with atopic dermatitis exposed to dupilumab in a phase 2 dose-ranging study or phase 3 placebo-controlled studies, a total of 67 were 65 years or older. Although no differences in safety or efficacy were observed between older and younger adult atopic dermatitis patients, the number of patients aged 65 and over is not sufficient to determine whether they respond differently from younger patients.

Age was not found to be associated with any clinically meaningful impact on the systemic exposure of dupilumab determined by population PK analysis. However, there were only 61 patients over 65 years of age included in this analysis.
Of the 1,977 patients with asthma exposed to dupilumab, a total of 240 patients were 65 years or older and 39 patients were 75 years or older. Efficacy and safety in this age group were similar to the overall study population.

**Race**
Race was not found to be associated with any clinically meaningful impact on the systemic exposure of dupilumab by population PK analysis.

**Hepatic impairment**
Dupilumab, as a monoclonal antibody, is not expected to undergo significant hepatic elimination. No clinical studies have been conducted to evaluate the effect of hepatic impairment on the pharmacokinetics of dupilumab.

**Renal impairment**
Dupilumab, as a monoclonal antibody, is not expected to undergo significant renal elimination. No clinical studies have been conducted to evaluate the effect of renal impairment on the pharmacokinetics of dupilumab. Population PK analysis did not identify mild or moderate renal impairment as having a clinically meaningful influence on the systemic exposure of dupilumab. Very limited data are available in patients with severe renal impairment.

**Body weight**
Dupilumab trough concentrations were lower in subjects with higher body weight with no meaningful impact on efficacy.

**Paediatric population**

**Asthma**
The pharmacokinetics of dupilumab in paediatric patients (< 6 years of age) with asthma has not been studied.

A total of 107 adolescents aged 12 to 17 years with asthma were enrolled in QUEST study. The mean ±SD steady-state trough concentrations of dupilumab were 107±51.6 mcg/mL and 46.7±26.9 mcg/mL, respectively, for 300 mg or 200 mg administered every other week. No age-related pharmacokinetic difference was observed in adolescent patients after correction for body weight.

In the VOYAGE study, dupilumab pharmacokinetics was investigated in 270 patients with moderate-to-severe asthma following subcutaneous administration of either 100 mg Q2W (for 91 children weighing < 30 kg) or 200 mg Q2W (for 179 children weighing ≥30 kg). The volume of distribution for dupilumab of approximately 3.7 L was estimated by population PK analysis. Steady-state concentrations were achieved by week 12. The mean ± SD steady-state trough concentration was 58.4±28.0 mcg/mL and 85.1±44.9 mcg/mL, respectively. Simulation of a 300 mg Q4W subcutaneous dose in children aged 6 to 11 years with body weight of ≥15 kg to <30 kg and ≥30 kg to <60 kg resulted in predicted steady-state trough concentrations similar to the observed trough concentrations of 200 mg Q2W (≥30 kg) and 100 mg Q2W (<30 kg), respectively. In addition, simulation of a 300 mg Q4W subcutaneous dose in children aged 6 to 11 years with body weight of ≥15 kg to <60 kg resulted in predicted steady-state trough concentrations similar to those demonstrated to be efficacious in adults and adolescents. After the last steady state dose, the median time for dupilumab concentrations to decrease below the lower limit of detection, estimated by population PK analysis, was 14 to 18 weeks for 100 mg Q2W, 200 mg Q2W or 300 mg Q4W.

5.3 **Preclinical safety data**

Non-clinical data reveal no special hazard for humans based on conventional studies of repeated dose toxicity (including safety pharmacology endpoints) and toxicity to reproduction and development.
The mutagenic potential of dupilumab has not been evaluated; however monoclonal antibodies are not expected to alter DNA or chromosomes.

Carcinogenicity studies have not been conducted with dupilumab. An evaluation of the available evidence related to IL-4Rα inhibition and animal toxicology data with surrogate antibodies does not suggest an increased carcinogenic potential for dupilumab.

During a reproductive toxicology study conducted in monkeys, using a surrogate antibody specific to the monkey IL-4Rα, no fetal abnormalities were observed at dosages that saturate the IL-4Rα.

An enhanced pre- and post-natal developmental study revealed no adverse effects in maternal animals or their offspring up to 6 months post-partum/post-birth.

Fertility studies conducted in male and female mice using a surrogate antibody against IL-4Rα showed no impairment of fertility (see section 4.6).

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

arginine hydrochloride
histidine
polysorbate 80 (E433)
sodium acetate trihydrate
glacial acetic acid (E260)
sucrose
water for injections

6.2 Incompatibilities

In the absence of compatibility studies, this medicinal product must not be mixed with other medicinal products.

6.3 Shelf life

3 years.

If necessary, pre-filled syringes may be kept at room temperature up to 25°C for a maximum of 14 days. Do not store above 25°C. If the carton needs to be removed permanently from refrigerator, the date of removal may be recorded on the outer carton. After removal from the refrigerator, Dupixent must be used within 14 days or discarded.

6.4 Special precautions for storage

Store in a refrigerator (2°C - 8°C).

Do not freeze.

Store in the original carton in order to protect from light.

6.5 Nature and contents of container

0.67 mL solution in a siliconised type-1 clear glass pre-filled syringe with needle shield, with a fixed 27 gauge 12.7 mm (½ inch), thin wall stainless steel staked needle.

Pack size:
• 2 pre-filled syringes
• Multipack containing 6 (3 packs of 2) pre-filled syringes

6.6 Special precautions for disposal and other handling

After removing the 100 mg pre-filled syringe from the refrigerator, it should be allowed to reach room temperature up to 25°C by waiting for 30 min before injecting Dupixent.

The pre-filled syringe should not be exposed to heat or direct sunlight and should not be shaken.

Any unused medicinal product or waste material should be disposed of in accordance with local requirements. After use, place the pre-filled syringe into a puncture-resistant container and discard as required by local regulations. Do not recycle the container.

7. MARKETING AUTHORISATION HOLDER

sanofi-aventis groupe
54, rue La Boétie
75008 Paris
France

8. MARKETING AUTHORISATION NUMBER(S)

EU/1/17/1229/021
EU/1/17/1229/022

9. DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

Date of first authorisation: 26 September 2017

10. DATE OF REVISION OF THE TEXT

Detailed information on this medicinal product is available on the website of the European Medicines Agency http://www.ema.europa.eu
ANNEX II

A. MANUFACTURER(S) OF THE BIOLOGICAL ACTIVE SUBSTANCE(S) AND MANUFACTURER(S) RESPONSIBLE FOR BATCH RELEASE

B. CONDITIONS ORRESTRICTIONS REGARDING SUPPLY AND USE

C. OTHER CONDITIONS AND REQUIREMENTS OF THE MARKETING AUTHORISATION

D. CONDITIONS ORRESTRICTIONS WITH REGARD TO THE SAFE AND EFFECTIVE USE OF THE MEDICINAL PRODUCT
A. MANUFACTURER(S) OF THE BIOLOGICAL ACTIVE SUBSTANCE(S) AND MANUFACTURER(S) RESPONSIBLE FOR BATCH RELEASE

Name and address of the manufacturer(s) of the biological active substance(s)
REGENERON PHARMACEUTICALS INC.
81 Columbia Turnpike
RENSSELAER
NEW YORK 12144
UNITED STATES

Regeneron Ireland Designated Activity Company (DAC)
Ballycummin
Raheen Business Park
Limerick
Ireland

Genzyme Flanders BVBA
Cipalstraat 8,
B-2440 Geel
Belgium

Name and address of the manufacturer(s) responsible for batch release

SANOFI WINTHROP INDUSTRIE
1051 Boulevard Industriel,
76580 LE TRAIT,
FRANCE

Sanofi-Aventis Deutschland GmbH
Brüningstrasse 50
Industriepark Hoechst
65926 FRANKFURT AM MAIN
GERMANY

Genzyme Ireland Limited
IDA Industrial Park
Old Kilmeaden Road
Waterford
Ireland

The printed package leaflet of the medicinal product must state the name and address of the manufacturer responsible for the release of the concerned batch.

B. CONDITIONS OR RESTRICTIONS REGARDING SUPPLY AND USE

Medicinal product subject to restricted medical prescription (see Annex I: Summary of Product Characteristics, section 4.2).

C. OTHER CONDITIONS AND REQUIREMENTS OF THE MARKETING AUTHORISATION

- Periodic Safety Update Reports (PSURs)

The requirements for submission of PSURs for this medicinal product are set out in the list of Union reference dates (EURD list) provided for under Article 107c(7) of Directive 2001/83/EC and
any subsequent updates published on the European medicines web-portal.

D. CONDITIONS OR RESTRICTIONS WITH REGARD TO THE SAFE AND EFFECTIVE USE OF THE MEDICINAL PRODUCT

- **Risk Management Plan (RMP)**

  The marketing authorisation holder (MAH) shall perform the required pharmacovigilance activities and interventions detailed in the agreed RMP presented in Module 1.8.2 of the marketing authorisation and any agreed subsequent updates of the RMP.

  An updated RMP should be submitted:
  - At the request of the European Medicines Agency;
  - Whenever the risk management system is modified, especially as the result of new information being received that may lead to a significant change to the benefit/risk profile or as the result of an important (pharmacovigilance or risk minimisation) milestone being reached.
ANNEX III

LABELLING AND PACKAGE LEAFLET
A. LABELLING
1. NAME OF THE MEDICINAL PRODUCT

Dupixent 300 mg solution for injection in pre-filled syringe
dupilumab

2. STATEMENT OF ACTIVE SUBSTANCE(S)

Each pre-filled syringe contains 300 mg of dupilumab in 2 mL solution (150 mg/mL).

3. LIST OF EXCIPIENTS

Excipients: arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic acid (E260), sucrose, water for injections.

4. PHARMACEUTICAL FORM AND CONTENTS

Solution for injection

1 pre-filled syringe
2 pre-filled syringes

5. METHOD AND ROUTE(S) OF ADMINISTRATION

For single use only
Read the package leaflet before use.
Subcutaneous use
Do not shake
Open here

6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN

Keep out of the sight and reach of children.

7. OTHER SPECIAL WARNING(S), IF NECESSARY

8. EXPIRY DATE

EXP
Date of removal from the refrigerator: / / /
9. **SPECIAL STORAGE CONDITIONS**

Store in a refrigerator. Do not freeze.
Time out of refrigeration should not exceed a maximum of 14 days at temperature below 25 °C.
Store in the original carton in order to protect from light.

10. **SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE**

11. **NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER**

sanofi-aventis groupe
54, rue La Boétie
75008 Paris
France

12. **MARKETING AUTHORISATION NUMBER(S)**

EU/1/17/1229/001 1 pre-filled syringe
EU/1/17/1229/002 2 pre-filled syringes

13. **BATCH NUMBER**

Lot

14. **GENERAL CLASSIFICATION FOR SUPPLY**

15. **INSTRUCTIONS ON USE**

16. **INFORMATION IN BRAILLE**

Dupixent 300 mg syringe

17. **UNIQUE IDENTIFIER – 2D BARCODE**

2D barcode carrying the unique identifier included.

18. **UNIQUE IDENTIFIER - HUMAN READABLE DATA**

PC
SN
NN
### 1. NAME OF THE MEDICINAL PRODUCT

Dupixent 300 mg solution for injection in pre-filled syringe dupilumab

### 2. STATEMENT OF ACTIVE SUBSTANCE(S)

Each pre-filled syringe contains 300 mg of dupilumab in 2 mL solution (150 mg/mL).

### 3. LIST OF EXCIPIENTS

Excipients: arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic acid (E260), sucrose, water for injections.

### 4. PHARMACEUTICAL FORM AND CONTENTS

Solution for injection

Multipack: 3 (3 packs of 1) pre-filled syringes
Multipack: 6 (3 packs of 2) pre-filled syringes

### 5. METHOD AND ROUTE(S) OF ADMINISTRATION

For single use only
Read the package leaflet before use.
Subcutaneous use
Do not shake
Open here

### 6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN

Keep out of the sight and reach of children.

### 7. OTHER SPECIAL WARNING(S), IF NECESSARY

### 8. EXPIRY DATE

EXP
Date of removal from the refrigerator: / / /
9. SPECIAL STORAGE CONDITIONS

Store in a refrigerator. Do not freeze.
Time out of refrigeration should not exceed a maximum of 14 days at temperature below 25 °C.
Store in the original carton in order to protect from light.

10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE

11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER

sanofi-aventis groupe
54, rue La Boétie
75008 Paris
France

12. MARKETING AUTHORISATION NUMBER(S)

EU/1/17/1229/003 3 pre-filled syringes (3 packs of 1)
EU/1/17/1229/004 6 pre-filled syringes (3 packs of 2)

13. BATCH NUMBER

Lot

14. GENERAL CLASSIFICATION FOR SUPPLY

15. INSTRUCTIONS ON USE

Dupixent 300 mg syringe

16. INFORMATION IN BRAILLE

Dupixent 300 mg syringe

17. UNIQUE IDENTIFIER – 2D BARCODE

2D barcode carrying the unique identifier included.

18. UNIQUE IDENTIFIER - HUMAN READABLE DATA

PC
SN
NN
1. **NAME OF THE MEDICINAL PRODUCT**

Dupixent 300 mg solution for injection in pre-filled syringe
dupilumab

2. **STATEMENT OF ACTIVE SUBSTANCE(S)**

Each pre-filled syringe contains 300 mg of dupilumab in 2 mL solution (150 mg/mL).

3. **LIST OF EXCIPIENTS**

Excipients: arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic acid (E260), sucrose, water for injections.

4. **PHARMACEUTICAL FORM AND CONTENTS**

**Solution for injection**

1 pre-filled syringe
2 pre-filled syringes
Component of a multipack, can’t be sold separately.

5. **METHOD AND ROUTE(S) OF ADMINISTRATION**

For single use only
Read the package leaflet before use.
Subcutaneous use
Do not shake
Open here

6. **SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN**

Keep out of the sight and reach of children.

7. **OTHER SPECIAL WARNING(S), IF NECESSARY**

8. **EXPIRY DATE**

EXP
Date of removal from the refrigerator:  /  /  /
9. **SPECIAL STORAGE CONDITIONS**

Store in a refrigerator. Do not freeze.
Time out of refrigeration should not exceed a maximum of 14 days at temperature below 25 °C.
Store in the original carton in order to protect from light.

10. **SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE**

11. **NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER**

sanofi-aventis groupe
54, rue La Boétie
75008 Paris
France

12. **MARKETING AUTHORISATION NUMBER(S)**

EU/1/17/1229/003 3 pre-filled syringes (3 packs of 1)
EU/1/17/1229/004 6 pre-filled syringes (3 packs of 2)

13. **BATCH NUMBER**

Lot

14. **GENERAL CLASSIFICATION FOR SUPPLY**

Medicinal product subject to medical prescription.

15. **INSTRUCTIONS ON USE**

16. **INFORMATION IN BRAILLE**

Dupixent 300 mg syringe

17. **UNIQUE IDENTIFIER – 2D BARCODE**

18. **UNIQUE IDENTIFIER - HUMAN READABLE DATA**
1. NAME OF THE MEDICINAL PRODUCT AND ROUTE(S) OF ADMINISTRATION

Dupixent 300 mg injection
dupilumab
Subcutaneous use

2. METHOD OF ADMINISTRATION

3. EXPIRY DATE

EXP

4. BATCH NUMBER

Lot

5. CONTENTS BY WEIGHT, BY VOLUME OR BY UNIT

300 mg/2 mL

6. OTHER
1. **NAME OF THE MEDICINAL PRODUCT**

Dupixent 300 mg solution for injection in pre-filled syringe dupilumab

2. **STATEMENT OF ACTIVE SUBSTANCE(S)**

Each pre-filled syringe contains 300 mg of dupilumab in 2 mL solution (150 mg/mL).

3. **LIST OF EXCIPIENTS**

Excipients: arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic acid (E260), sucrose, water for injections.

4. **PHARMACEUTICAL FORM AND CONTENTS**

Solution for injection

1 pre-filled syringe with needle shield
2 pre-filled syringes with needle shield

5. **METHOD AND ROUTE(S) OF ADMINISTRATION**

For single use only
Read the package leaflet before use.
Subcutaneous use
Do not shake
Open here

6. **SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN**

Keep out of the sight and reach of children.

7. **OTHER SPECIAL WARNING(S), IF NECESSARY**

8. **EXPIRY DATE**

EXP
Date of removal from the refrigerator: / / /
9. SPECIAL STORAGE CONDITIONS

Store in a refrigerator. Do not freeze.
Time out of refrigeration should not exceed a maximum of 14 days at temperature below 25 °C.
Store in the original carton in order to protect from light.

10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE

11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER

sanofi-aventis groupe
54, rue La Boétie
75008 Paris
France

12. MARKETING AUTHORISATION NUMBER(S)

EU/1/17/1229/005 1 pre-filled syringe with needle shield
EU/1/17/1229/006 2 pre-filled syringes with needle shield

13. BATCH NUMBER

Lot

14. GENERAL CLASSIFICATION FOR SUPPLY

15. INSTRUCTIONS ON USE

Dupixent 300 mg syringe

16. INFORMATION IN BRAILLE

17. UNIQUE IDENTIFIER – 2D BARCODE

2D barcode carrying the unique identifier included.

18. UNIQUE IDENTIFIER - HUMAN READABLE DATA

PC
SN
NN
1. NAME OF THE MEDICINAL PRODUCT

Dupixent 300 mg solution for injection in pre-filled syringe dupilumab

2. STATEMENT OF ACTIVE SUBSTANCE(S)

Each pre-filled syringe contains 300 mg of dupilumab in 2 mL solution (150 mg/mL).

3. LIST OF EXCIPIENTS

Excipients: arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic acid (E260), sucrose, water for injections.

4. PHARMACEUTICAL FORM AND CONTENTS

Solution for injection

Multipack: 3 (3 packs of 1) pre-filled syringes with needle shield
Multipack: 6 (3 packs of 2) pre-filled syringes with needle shield

5. METHOD AND ROUTE(S) OF ADMINISTRATION

For single use only
Read the package leaflet before use.
Subcutaneous use
Do not shake
Open here

6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN

Keep out of the sight and reach of children.

7. OTHER SPECIAL WARNING(S), IF NECESSARY

8. EXPIRY DATE

EXP
Date of removal from the refrigerator: / / /
9. SPECIAL STORAGE CONDITIONS

Store in a refrigerator. Do not freeze.
Time out of refrigeration should not exceed a maximum of 14 days at temperature below 25 °C.
Store in the original carton in order to protect from light.

10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE

11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER

sanofi-aventis groupe
54, rue La Boétie
75008 Paris
France

12. MARKETING AUTHORISATION NUMBER(S)

EU/1/17/1229/007 3 pre-filled syringes with needle shield (3 packs of 1)
EU/1/17/1229/008 6 pre-filled syringes with needle shield (3 packs of 2)

13. BATCH NUMBER

Lot

14. GENERAL CLASSIFICATION FOR SUPPLY

15. INSTRUCTIONS ON USE

16. INFORMATION IN BRAILLE

Dupixent 300 mg syringe

17. UNIQUE IDENTIFIER – 2D BARCODE

2D barcode carrying the unique identifier included.

18. UNIQUE IDENTIFIER - HUMAN READABLE DATA

PC
SN
NN
1. **NAME OF THE MEDICINAL PRODUCT**

Dupixent 300 mg solution for injection in pre-filled syringe dupilumab

2. **STATEMENT OF ACTIVE SUBSTANCE(S)**

Each pre-filled syringe contains 300 mg of dupilumab in 2 mL solution (150 mg/mL).

3. **LIST OF EXCIPIENTS**

Excipients: arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic acid (E260), sucrose, water for injections.

4. **PHARMACEUTICAL FORM AND CONTENTS**

Solution for injection

1 pre-filled syringe with needle shield
2 pre-filled syringes with needle shield
Component of a multipack, can’t be sold separately.

5. **METHOD AND ROUTE(S) OF ADMINISTRATION**

For single use only
Read the package leaflet before use.
Subcutaneous use
Do not shake
Open here

6. **SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN**

Keep out of the sight and reach of children.

7. **OTHER SPECIAL WARNING(S), IF NECESSARY**

8. **EXPIRY DATE**

EXP
Date of removal from the refrigerator: / / /
9. **SPECIAL STORAGE CONDITIONS**

Store in a refrigerator. Do not freeze.
Time out of refrigeration should not exceed a maximum of 14 days at temperature below 25 °C.
Store in the original carton in order to protect from light.

10. **SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE**

11. **NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER**

sanofi-aventis groupe
54, rue La Boétie
75008 Paris
France

12. **MARKETING AUTHORISATION NUMBER(S)**

EU/1/17/1229/007 3 pre-filled syringes with needle shield (3 packs of 1)
EU/1/17/1229/008 6 pre-filled syringes with needle shield (3 packs of 2)

13. **BATCH NUMBER**

Lot

14. **GENERAL CLASSIFICATION FOR SUPPLY**

Medicinal product subject to medical prescription.

15. **INSTRUCTIONS ON USE**

16. **INFORMATION IN BRAILLE**

Dupixent 300 mg syringe

17. **UNIQUE IDENTIFIER – 2D BARCODE**

18. **UNIQUE IDENTIFIER - HUMAN READABLE DATA**
MINIMUM PARTICULARS TO APPEAR ON SMALL IMMEDIATE PACKAGING UNITS
LABEL
Pre-filled syringe with needle shield 300 mg

1. NAME OF THE MEDICINAL PRODUCT AND ROUTE(S) OF ADMINISTRATION

Dupixent 300 mg injection
dupilumab
Subcutaneous use

2. METHOD OF ADMINISTRATION

3. EXPIRY DATE

EXP

4. BATCH NUMBER

Lot

5. CONTENTS BY WEIGHT, BY VOLUME OR BY UNIT

300 mg/2 mL

6. OTHER
PARTICULARS TO APPEAR ON THE OUTER PACKAGING
OUTER CARTON
Pre-filled pen 300 mg

1. NAME OF THE MEDICINAL PRODUCT

Dupixent 300 mg solution for injection in pre-filled pen
dupilumab

2. STATEMENT OF ACTIVE SUBSTANCE(S)

Each pre-filled pen contains 300 mg of dupilumab in 2 mL solution (150 mg/mL).

3. LIST OF EXCIPIENTS

Excipients: arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic acid (E260), sucrose, water for injections.

4. PHARMACEUTICAL FORM AND CONTENTS

Solution for injection

1 pre-filled pen
2 pre-filled pens
3 pre-filled pens
6 pre-filled pens

5. METHOD AND ROUTE(S) OF ADMINISTRATION

For single use only
Read the package leaflet before use.
Subcutaneous use
Do not shake
Open here

6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN

Keep out of the sight and reach of children.

7. OTHER SPECIAL WARNING(S), IF NECESSARY
8. **EXPIRY DATE**

   EXP
   Date of removal from the refrigerator: / / /

9. **SPECIAL STORAGE CONDITIONS**

   Store in a refrigerator. Do not freeze.
   Time out of refrigeration should not exceed a maximum of 14 days at temperature below 25 °C.
   Store in the original carton in order to protect from light.

10. **SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE**

11. **NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER**

   sanofi-aventis groupe
   54, rue La Boétie
   75008 Paris
   France

12. **MARKETING AUTHORISATION NUMBER(S)**

   EU/1/17/1229/017 1 pre-filled pen
   EU/1/17/1229/018 2 pre-filled pens
   EU/1/17/1229/019 3 pre-filled pens
   EU/1/17/1229/020 6 pre-filled pens

13. **BATCH NUMBER**

   Lot

14. **GENERAL CLASSIFICATION FOR SUPPLY**

15. **INSTRUCTIONS ON USE**

16. **INFORMATION IN BRAILLE**

   Dupixent 300 mg pen

17. **UNIQUE IDENTIFIER – 2D BARCODE**

   2D barcode carrying the unique identifier included.
18. UNIQUE IDENTIFIER - HUMAN READABLE DATA

<table>
<thead>
<tr>
<th>PC</th>
<th>SN</th>
<th>NN</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINIMUM PARTICULARS TO APPEAR ON SMALL IMMEDIATE PACKAGING UNITS</td>
<td></td>
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<td>---------------------------------------------------------------</td>
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<tr>
<td><strong>LABEL</strong></td>
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<tr>
<td>Pre-filled pen 300 mg</td>
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<tr>
<td>Dupixent 300 mg injection</td>
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<tr>
<td>dupilumab</td>
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<tr>
<td>Subcutaneous use</td>
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<tr>
<th>2. METHOD OF ADMINISTRATION</th>
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<th>3. EXPIRY DATE</th>
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<td>Lot</td>
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<th>5. CONTENTS BY WEIGHT, BY VOLUME OR BY UNIT</th>
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<td>300 mg/2 mL</td>
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<table>
<thead>
<tr>
<th>6. OTHER</th>
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</table>
PARTICULARS TO APPEAR ON THE OUTER PACKAGING

OUTER CARTON

Pre-filled syringe with needle shield 200 mg

1. NAME OF THE MEDICINAL PRODUCT

Dupixent 200 mg solution for injection in pre-filled syringe
dupilumab

2. STATEMENT OF ACTIVE SUBSTANCE(S)

Each pre-filled syringe contains 200 mg of dupilumab in 1.14 mL solution (175 mg/mL).

3. LIST OF EXCIPIENTS

Excipients: arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic acid (E260), sucrose, water for injections.

4. PHARMACEUTICAL FORM AND CONTENTS

Solution for injection

1 pre-filled syringe with needle shield
2 pre-filled syringes with needle shield

5. METHOD AND ROUTE(S) OF ADMINISTRATION

For single use only
Read the package leaflet before use.
Subcutaneous use
Do not shake
Open here

6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN

Keep out of the sight and reach of children.

7. OTHER SPECIAL WARNING(S), IF NECESSARY

8. EXPIRY DATE

EXP
Date of removal from the refrigerator: / / /
9. SPECIAL STORAGE CONDITIONS

Store in a refrigerator. Do not freeze.
Time out of refrigeration should not exceed a maximum of 14 days at temperature below 25 °C.
Store in the original carton in order to protect from light.

10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE

11. NAME AND ADDRESS OF THE MARKETING AUTHORIZATION HOLDER

sanofi-aventis groupe
54, rue La Boétie
75008 Paris
France

12. MARKETING AUTHORIZATION NUMBER(S)

EU/1/17/1229/009 1 pre-filled syringe with needle shield
EU/1/17/1229/010 2 pre-filled syringes with needle shield

13. BATCH NUMBER

Lot

14. GENERAL CLASSIFICATION FOR SUPPLY

15. INSTRUCTIONS ON USE

16. INFORMATION IN BRAILLE

Dupixent 200 mg syringe

17. UNIQUE IDENTIFIER – 2D BARCODE

2D barcode carrying the unique identifier included.

18. UNIQUE IDENTIFIER - HUMAN READABLE DATA

PC
SN
NN
PARTICULARS TO APPEAR ON THE OUTER PACKAGING
OUTER CARTON
Pre-filled syringe with needle shield 200 mg - Multipack (contains Blue Box)

1. NAME OF THE MEDICINAL PRODUCT

Dupixent 200 mg solution for injection in pre-filled syringe
dupilumab

2. STATEMENT OF ACTIVE SUBSTANCE(S)

Each pre-filled syringe contains 200 mg of dupilumab in 1.14 mL solution (175 mg/mL).

3. LIST OF EXCIPIENTS

Excipients: arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic
acid (E260), sucrose, water for injections.

4. PHARMACEUTICAL FORM AND CONTENTS

Solution for injection

Multipack: 3 (3 packs of 1) pre-filled syringes with needle shield
Multipack: 6 (3 packs of 2) pre-filled syringes with needle shield

5. METHOD AND ROUTE(S) OF ADMINISTRATION

For single use only
Read the package leaflet before use.
Subcutaneous use
Do not shake
Open here

6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT
OF THE SIGHT AND REACH OF CHILDREN

Keep out of the sight and reach of children.

7. OTHER SPECIAL WARNING(S), IF NECESSARY

8. EXPIRY DATE

EXP
Date of removal from the refrigerator: / / /
9. SPECIAL STORAGE CONDITIONS

Store in a refrigerator. Do not freeze.
Time out of refrigeration should not exceed a maximum of 14 days at temperature below 25 °C.
Store in the original carton in order to protect from light.

10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE

11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER

sanofi-aventis groupe
54, rue La Boétie
75008 Paris
France

12. MARKETING AUTHORISATION NUMBER(S)

EU/1/17/1229/011 3 pre-filled syringes with needle shield (3 packs of 1)
EU/1/17/1229/012 6 pre-filled syringes with needle shield (3 packs of 2)

13. BATCH NUMBER

Lot

14. GENERAL CLASSIFICATION FOR SUPPLY

15. INSTRUCTIONS ON USE

Dupixent 200 mg syringe

16. INFORMATION IN BRAILLE

Dupixent 200 mg syringe

17. UNIQUE IDENTIFIER – 2D BARCODE

2D barcode carrying the unique identifier included.

18. UNIQUE IDENTIFIER - HUMAN READABLE DATA

PC
SN
NN
1. **NAME OF THE MEDICINAL PRODUCT**

Dupixent 200 mg solution for injection in pre-filled syringe
dupilumab

2. **STATEMENT OF ACTIVE SUBSTANCE(S)**

Each pre-filled syringe contains 200 mg of dupilumab in 1.14 mL solution (175 mg/mL).

3. **LIST OF EXCIPIENTS**

Excipients: arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic acid (E260), sucrose, water for injections.

4. **PHARMACEUTICAL FORM AND CONTENTS**

Solution for injection

1 pre-filled syringe with needle shield
2 pre-filled syringes with needle shield
Component of a multipack, can’t be sold separately.

5. **METHOD AND ROUTE(S) OF ADMINISTRATION**

For single use only
Read the package leaflet before use.
Subcutaneous use
Do not shake
Open here

6. **SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN**

Keep out of the sight and reach of children.

7. **OTHER SPECIAL WARNING(S), IF NECESSARY**

8. **EXPIRY DATE**

EXP
Date of removal from the refrigerator: / / /
9. SPECIAL STORAGE CONDITIONS

Store in a refrigerator. Do not freeze.
Time out of refrigeration should not exceed a maximum of 14 days at temperature below 25 °C.
Store in the original carton in order to protect from light.

10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE

11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER

sanoﬁ-aventis groupe
54, rue La Boëtie
75008 Paris
France

12. MARKETING AUTHORISATION NUMBER(S)

EU/1/17/1229/011 3 pre-ﬁlled syringes with needle shield (3 packs of 1)
EU/1/17/1229/012 6 pre-ﬁlled syringes with needle shield (3 packs of 2)

13. BATCH NUMBER

Lot

14. GENERAL CLASSIFICATION FOR SUPPLY

Medicinal product subject to medical prescription.

15. INSTRUCTIONS ON USE

16. INFORMATION IN BRAILLE

Dupixent 200 mg syringe

17. UNIQUE IDENTIFIER – 2D BARCODE

18. UNIQUE IDENTIFIER - HUMAN READABLE DATA
### MINIMUM PARTICULARS TO APPEAR ON SMALL IMMEDIATE PACKAGING UNITS

**LABEL**
Pre-filled syringe with needle shield 200 mg

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<thead>
<tr>
<th>1. NAME OF THE MEDICINAL PRODUCT AND ROUTE(S) OF ADMINISTRATION</th>
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<tbody>
<tr>
<td>Dupixent 200 mg injection</td>
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<tr>
<td>dupilumab</td>
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<tr>
<td>Subcutaneous use</td>
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<table>
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<tr>
<th>2. METHOD OF ADMINISTRATION</th>
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<th>3. EXPIRY DATE</th>
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<tr>
<td>Lot</td>
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<table>
<thead>
<tr>
<th>5. CONTENTS BY WEIGHT, BY VOLUME OR BY UNIT</th>
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<tbody>
<tr>
<td>200 mg/1.14 mL</td>
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<table>
<thead>
<tr>
<th>6. OTHER</th>
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</thead>
</table>
### PARTICULARS TO APPEAR ON THE OUTER PACKAGING

**OUTER CARTON**
Pre-filled pen 200 mg

### 1. NAME OF THE MEDICINAL PRODUCT

Dupixent 200 mg solution for injection in pre-filled pen dupilumab

### 2. STATEMENT OF ACTIVE SUBSTANCE(S)

Each pre-filled pen contains 200 mg of dupilumab in 1.14 mL solution (175 mg/mL).

### 3. LIST OF EXCIPIENTS

Excipients: arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic acid (E260), sucrose, water for injections.

### 4. PHARMACEUTICAL FORM AND CONTENTS

Solution for injection

- 1 pre-filled pen
- 2 pre-filled pens
- 3 pre-filled pens
- 6 pre-filled pens

### 5. METHOD AND ROUTE(S) OF ADMINISTRATION

For single use only
Read the package leaflet before use.
Subcutaneous use
Do not shake
Open here

### 6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN

Keep out of the sight and reach of children.

### 7. OTHER SPECIAL WARNING(S), IF NECESSARY

### 8. EXPIRY DATE

EXP
Date of removal from the refrigerator: / / /
9. SPECIAL STORAGE CONDITIONS

Store in a refrigerator. Do not freeze.
Time out of refrigeration should not exceed a maximum of 14 days at temperature below 25 °C.
Store in the original carton in order to protect from light.

10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE

11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER

sanofi-aventis groupe
54, rue La Boétie
75008 Paris
France

12. MARKETING AUTHORISATION NUMBER(S)

EU/1/17/1229/013 1 pre-filled pen
EU/1/17/1229/014 2 pre-filled pens
EU/1/17/1229/015 3 pre-filled pens
EU/1/17/1229/016 6 pre-filled pens

13. BATCH NUMBER

Lot

14. GENERAL CLASSIFICATION FOR SUPPLY

15. INSTRUCTIONS ON USE

16. INFORMATION IN BRAILLE

Dupixent 200 mg pen

17. UNIQUE IDENTIFIER – 2D BARCODE

2D barcode carrying the unique identifier included

18. UNIQUE IDENTIFIER - HUMAN READABLE DATA

PC
SN
MINIMUM PARTICULARS TO APPEAR ON SMALL IMMEDIATE PACKAGING UNITS

LABEL
Pre-filled pen 200 mg

1. NAME OF THE MEDICINAL PRODUCT AND ROUTE(S) OF ADMINISTRATION

Dupixent 200 mg injection
dupilumab
Subcutaneous use

2. METHOD OF ADMINISTRATION

3. EXPIRY DATE

EXP

4. BATCH NUMBER

Lot

5. CONTENTS BY WEIGHT, BY VOLUME OR BY UNIT

200 mg/1.14 mL

6. OTHER
| **PARTICULARS TO APPEAR ON THE OUTER PACKAGING** |
| **OUTER CARTON** |
| Pre-filled syringe with needle shield 100 mg |

| **1. NAME OF THE MEDICINAL PRODUCT** |
| Dupixent 100 mg solution for injection in pre-filled syringe dupilumab |

| **2. STATEMENT OF ACTIVE SUBSTANCE(S)** |
| Each pre-filled syringe contains 100 mg of dupilumab in 0.67 mL solution (150 mg/mL). |

| **3. LIST OF EXCIPIENTS** |
| Excipients: arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic acid (E260), sucrose, water for injections. |

| **4. PHARMACEUTICAL FORM AND CONTENTS** |
| Solution for injection |
| 2 pre-filled syringes with needle shield |

| **5. METHOD AND ROUTE(S) OF ADMINISTRATION** |
| For single use only. |
| Read the package leaflet before use. |
| Subcutaneous use. |
| Do not shake. |
| Open here. |

| **6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN** |
| Keep out of the sight and reach of children. |

| **7. OTHER SPECIAL WARNING(S), IF NECESSARY** |

| **8. EXPIRY DATE** |
| EXP |
| Date of removal from the refrigerator: / / / |

| **9. SPECIAL STORAGE CONDITIONS** |
| Store in a refrigerator. Do not freeze. |
Time out of refrigeration should not exceed a maximum of 14 days at temperature below 25 °C. Store in the original carton in order to protect from light.

10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE

11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER

sanofi-aventis groupe
54, rue La Boétie
75008 Paris
France

12. MARKETING AUTHORISATION NUMBER(S)

EU/1/17/1229/021 2 pre-filled syringes with needle shield

13. BATCH NUMBER

Lot

14. GENERAL CLASSIFICATION FOR SUPPLY

15. INSTRUCTIONS ON USE

16. INFORMATION IN BRAILLE

Dupixent 100 mg syringe

17. UNIQUE IDENTIFIER – 2D BARCODE

2D barcode carrying the unique identifier included.

18. UNIQUE IDENTIFIER - HUMAN READABLE DATA

PC
SN
NN
PARTICULARS TO APPEAR ON THE OUTER PACKAGING
OUTER CARTON
Pre-filled syringe with needle shield 100 mg - Multipack (contains Blue Box)

1. NAME OF THE MEDICINAL PRODUCT

Dupixent 100 mg solution for injection in pre-filled syringe dupilumab

2. STATEMENT OF ACTIVE SUBSTANCE(S)

Each pre-filled syringe contains 100 mg of dupilumab in 0.67 mL solution (150 mg/mL).

3. LIST OF EXCIPIENTS

Excipients: arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic acid (E260), sucrose, water for injections.

4. PHARMACEUTICAL FORM AND CONTENTS

Solution for injection

Multipack: 6 (3 packs of 2) pre-filled syringes with needle shield

5. METHOD AND ROUTE(S) OF ADMINISTRATION

For single use only.
Read the package leaflet before use.
Subcutaneous use.
Do not shake.
Open here.

6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN

Keep out of the sight and reach of children.

7. OTHER SPECIAL WARNING(S), IF NECESSARY

8. EXPIRY DATE

EXP
Date of removal from the refrigerator: / / /

9. SPECIAL STORAGE CONDITIONS
Store in a refrigerator. Do not freeze.
Time out of refrigeration should not exceed a maximum of 14 days at temperature below 25 °C.
Store in the original carton in order to protect from light.

10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE

11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER
sanofi-aventis groupe
54, rue La Boétie
75008 Paris
France

12. MARKETING AUTHORISATION NUMBER(S)
EU/1/17/1229/022 6 pre-filled syringes with needle shield (3 packs of 2)

13. BATCH NUMBER
Lot

14. GENERAL CLASSIFICATION FOR SUPPLY

15. INSTRUCTIONS ON USE

16. INFORMATION IN BRAILLE
Dupixent 100 mg syringe

17. UNIQUE IDENTIFIER – 2D BARCODE
2D barcode carrying the unique identifier included.

18. UNIQUE IDENTIFIER - HUMAN READABLE DATA
PC
SN
NN
1. NAME OF THE MEDICINAL PRODUCT

Dupixent 100 mg solution for injection in pre-filled syringe
dupilumab

2. STATEMENT OF ACTIVE SUBSTANCE(S)

Each pre-filled syringe contains 100 mg of dupilumab in 0.67 mL solution (150 mg/mL).

3. LIST OF EXCIPIENTS

Excipients: arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic
acid (E260), sucrose, water for injections.

4. PHARMACEUTICAL FORM AND CONTENTS

Solution for injection

2 pre-filled syringes with needle shield
Component of a multipack, can’t be sold separately.

5. METHOD AND ROUTE(S) OF ADMINISTRATION

For single use only.
Read the package leaflet before use.
Subcutaneous use.
Do not shake.
Open here.

6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT
OF THE SIGHT AND REACH OF CHILDREN

Keep out of the sight and reach of children.

7. OTHER SPECIAL WARNING(S), IF NECESSARY

8. EXPIRY DATE

EXP
Date of removal from the refrigerator: / / /
9. SPECIAL STORAGE CONDITIONS

Store in a refrigerator. Do not freeze.  
Time out of refrigeration should not exceed a maximum of 14 days at temperature below 25 °C. 
Store in the original carton in order to protect from light.

10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE

11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER

sanofi-aventis groupe  
54, rue La Boétie  
75008 Paris  
France

12. MARKETING AUTHORISATION NUMBER(S)

EU/1/17/1229/022 6 pre-filled syringes with needle shield (3 packs of 2)

13. BATCH NUMBER

Lot

14. GENERAL CLASSIFICATION FOR SUPPLY

Medicinal product subject to medical prescription.

15. INSTRUCTIONS ON USE

16. INFORMATION IN BRAILLE

Dupixent 100 mg syringe

17. UNIQUE IDENTIFIER – 2D BARCODE

18. UNIQUE IDENTIFIER - HUMAN READABLE DATA
MINIMUM PARTICULARS TO APPEAR ON SMALL IMMEDIATE PACKAGING UNITS LABEL
Pre-filled syringe with needle shield 100 mg

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<th>1. NAME OF THE MEDICINAL PRODUCT AND ROUTE(S) OF ADMINISTRATION</th>
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<tbody>
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<td>Subcutaneous use</td>
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<th>2. METHOD OF ADMINISTRATION</th>
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<th>3. EXPIRY DATE</th>
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<th>4. BATCH NUMBER</th>
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<td>Lot</td>
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<table>
<thead>
<tr>
<th>5. CONTENTS BY WEIGHT, BY VOLUME OR BY UNIT</th>
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<tbody>
<tr>
<td>100 mg/0.67 mL</td>
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B. PACKAGE LEAFLET
Package leaflet: Information for the user

Dupixent 300 mg solution for injection in pre-filled syringe
dupilumab

This medicine is subject to additional monitoring. This will allow quick identification of new safety information. You can help by reporting any side effects you may get. See the end of section 4 for how to report side effects.

Read all of this leaflet carefully before you start using this medicine because it contains important information for you.
- Keep this leaflet. You may need to read it again.
- If you have any further questions, ask your doctor, pharmacist or nurse.
- This medicine has been prescribed for you only. Do not pass it on to others. It may harm them, even if their signs of illness are the same as yours.
- If you get any side effects, talk to your doctor, pharmacist or nurse. This includes any possible side effects not listed in this leaflet. See section 4.

What is in this leaflet
1. What Dupixent is and what it is used for
2. What you need to know before you use Dupixent
3. How to use Dupixent
4. Possible side effects
5. How to store Dupixent
6. Contents of the pack and other information

1. What Dupixent is and what it is used for

What Dupixent is
Dupixent contains the active substance dupilumab.

Dupilumab is a monoclonal antibody (a type of specialised protein) that blocks the action of proteins called interleukins (IL)-4 and IL-13. Both play a major role in causing the signs and symptoms of atopic dermatitis, asthma, and chronic rhinosinusitis with nasal polyposis (CRSwNP).

What Dupixent is used for
Dupixent is used to treat adults and adolescents 12 years and older with moderate-to-severe atopic dermatitis, also known as atopic eczema. Dupixent is also used to treat children 6 to 11 years old with severe atopic dermatitis. Dupixent may be used with eczema medicines that you apply to the skin or it may be used on its own.

Dupixent is also used with other asthma medicines for the maintenance treatment of severe asthma in adults, adolescents, and children aged 6 years and older whose asthma is not controlled with their current asthma medicines (e.g. corticosteroids).

Dupixent is also used with other medicines for the maintenance treatment of CRSwNP in adults whose disease is not controlled with their current CRSwNP medicines. Dupixent can also reduce the need for surgery and the need for systemic corticosteroid use.

How Dupixent works
Using Dupixent for atopic dermatitis (atopic eczema) can improve the condition of your skin and reduce itching. Dupixent has also been shown to improve symptoms of pain, anxiety, and depression associated with atopic dermatitis. In addition, Dupixent helps improve your sleep disturbance and overall quality of life.
Dupixent helps prevent severe asthma attacks (exacerbations) and can improve your breathing. Dupixent may also help reduce the amount of another group of medicines you need to control your asthma, called oral corticosteroids, while preventing severe asthma attacks and improving your breathing.

2. What you need to know before you use Dupixent

Do not use Dupixent
- if you are allergic to dupilumab or any of the other ingredients of this medicine (listed in section 6).
- if you think you may be allergic, or you are not sure, ask your doctor, pharmacist or nurse for advice before using Dupixent.

Warnings and precautions
Talk to your doctor, pharmacist or nurse before using Dupixent:

Dupixent is not a rescue medicine and should not be used to treat a sudden asthma attack.

Allergic reactions
- Rarely, Dupixent can cause serious side effects, including allergic (hypersensitivity) reactions and anaphylactic reaction and angioedema. These reactions can occur from minutes until seven days after Dupixent administration. You must look out for signs of these conditions (i.e. breathing problems, swelling of the face, lips, mouth, throat or tongue, fainting, dizziness, feeling lightheaded (low blood pressure), fever, general ill feeling, swollen lymph nodes, hives, itching, joint pain, skin rash) while you are taking Dupixent. Such signs are listed under “Serious side effects” in section 4.
- Stop using Dupixent and tell your doctor or get medical help immediately if you notice any signs of an allergic reaction.

Eosinophilic conditions
- Rarely patients taking an asthma medicine may develop inflammation of blood vessels or lungs due to an increase of certain white blood cells (eosinophilia).
- It is not known whether this is caused by Dupixent. This usually, but not always, happens in people who also take a steroid medicine which is being stopped or for which the dose is being lowered.
- Tell your doctor immediately if you develop a combination of symptoms such as a flu-like illness, pins and needles or numbness of arms or legs, worsening of pulmonary symptoms, and/or rash.

Parasitic (intestinal parasites) infection
- Dupixent may weaken your resistance to infections caused by parasites. If you already have a parasitic infection it should be treated before you start treatment with Dupixent.
- Check with your doctor if you have diarrhoea, gas, upset stomach, greasy stools, and dehydration which could be a sign of a parasitic infection.
- If you live in a region where these infections are common or if you are travelling to such a region check with your doctor.

Asthma
If you have asthma and are taking asthma medicines, do not change or stop your asthma medicine without talking to your doctor. Talk to your doctor before you stop Dupixent or if your asthma remains uncontrolled or worsens during treatment with this medicine.

Eye problems
Talk to your doctor if you have any new or worsening eye problems, including eye pain or changes in vision.
Children and adolescents

- The safety and benefits of Dupixent are not yet known in children with atopic dermatitis below the age of 6.
- The safety and benefits of Dupixent are not yet known in children with asthma below the age of 6.
- CRSwNP does not normally occur in children. The safety and benefits of Dupixent are not yet known in children with CRSwNP below the age of 18 years.

Other medicines and Dupixent

Tell your doctor or pharmacist

- if you are using, have recently used or might use any other medicines.
- if you have recently had or are due to have a vaccination.

Other medicines for asthma

Do not stop or reduce your asthma medicines, unless instructed by your doctor.

- These medicines (especially ones called corticosteroids) must be stopped gradually.
- This must be done under the direct supervision of your doctor and dependent on your response to Dupixent.

Pregnancy and breast-feeding

- If you are pregnant, think you may be pregnant, or are planning to have a baby, ask your doctor for advice before using this medicine. The effects of this medicine in pregnant women are not known; therefore, it is preferable to avoid the use of Dupixent in pregnancy unless your doctor advises to use it.
- If you are breast-feeding or are planning to breast-feed, talk to your doctor before using this medicine. You and your doctor should decide if you will breast-feed or use Dupixent. You should not do both.

Driving and using machines

Dupixent is unlikely to influence your ability to drive and use machines.

Dupixent contains sodium

This medicine contains less than 1 mmol sodium (23 mg) per 300 mg dose, that is to say essentially “sodium-free”.

3. How to use Dupixent

Always use this medicine exactly as your doctor or pharmacist has told you. Check with your doctor or pharmacist if you are not sure.

How Dupixent is given

Dupixent is given by injection under the skin (subcutaneous injection).

How much Dupixent you will receive

Your doctor will decide which dose of Dupixent is right for you.

Recommended dose in adults with atopic dermatitis

For patients with atopic dermatitis, the recommended dose of Dupixent is:

- An initial dose of 600 mg (two 300 mg injections)
- Followed by 300 mg given every other week by subcutaneous injection.

Recommended dose in adolescents with atopic dermatitis

The recommended dose of Dupixent for adolescents (12 to 17 years of age) with atopic dermatitis is based on body weight:
Recommended dose in children with atopic dermatitis

The recommended dose of Dupixent for children (6 to 11 years of age) with atopic dermatitis is based on body weight:

<table>
<thead>
<tr>
<th>Body Weight of Patient</th>
<th>Initial Dose</th>
<th>Subsequent Doses (every other week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 60 kg</td>
<td>400 mg (two 200 mg injections)</td>
<td>200 mg</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>600 mg (two 300 mg injections)</td>
<td>300 mg</td>
</tr>
</tbody>
</table>

* The dose may be increased to 200 mg every other week based on the doctor’s opinion.

Recommended dose in adult and adolescent patients with asthma (12 years of age and older)

For patients with severe asthma and who are on oral corticosteroids or for patients with severe asthma and co-morbid moderate-to-severe atopic dermatitis or adults with co-morbid severe chronic rhinosinusitis with nasal polyposis, the recommended dose of Dupixent is:

- An initial dose of 600 mg (two 300 mg injections)
- Followed by 300 mg given every other week administered as subcutaneous injection.

For all other patients with severe asthma, the recommended dose of Dupixent is:
- An initial dose of 400 mg (two 200 mg injections)
- Followed by 200 mg given every other week administered as subcutaneous injection.

Recommended dose children with asthma

The recommended dose of Dupixent for children (6 to 11 years of age) with asthma is based on body weight:

<table>
<thead>
<tr>
<th>Body Weight of Patient</th>
<th>Initial and Subsequent Doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 to less than 30 kg</td>
<td>100 mg every other week or 300 mg every 4 weeks</td>
</tr>
<tr>
<td>30 kg to less than 60 kg</td>
<td>200 mg every other week or 300 mg every 4 weeks</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>200 mg every other week</td>
</tr>
</tbody>
</table>

For patients 6 to 11 years old with asthma and coexisting severe atopic dermatitis, your doctor will decide which dose of Dupixent is right for you.

Recommended dose in adults with chronic rhinosinusitis with nasal polyposis (CRSwNP)

In CRSwNP, the recommended first dose of Dupixent is 300 mg followed by 300 mg given every two weeks by subcutaneous injection.

**Injecting Dupixent**

Dupixent is given by injection under your skin (subcutaneous injection). You and your doctor or nurse should decide if you should inject Dupixent yourself.

Before injecting Dupixent yourself you must have been properly trained by your doctor or nurse. Your Dupixent injection may also be given by a caregiver after proper training by a doctor or nurse.
Each pre-filled syringe contains one dose of Dupixent (300 mg). Do not shake the pre-filled syringe.

Read carefully the “Instructions for Use” included at the end of the package leaflet before using Dupixent.

**If you use more Dupixent than you should**
If you use more Dupixent than you should or the dose has been given too early, talk to your doctor, pharmacist or nurse.

**If you forget to use Dupixent**
If you have forgotten to inject a dose of Dupixent, talk to your doctor, pharmacist or nurse.

**If you stop using Dupixent**
Do not stop using Dupixent without speaking to your doctor first.

If you have any further questions on the use of this medicine, ask your doctor, pharmacist or nurse.

4. **Possible side effects**

Like all medicines, this medicine can cause side effects, although not everybody gets them.

Dupixent can cause serious side effects, including rare allergic (hypersensitivity) reactions, including anaphylactic reaction; the signs of allergic reaction or anaphylactic reaction may include:

- breathing problems
- swelling of the face, lips, mouth, throat or tongue (angioedema)
- fainting, dizziness, feeling lightheaded (low blood pressure)
- fever
- general ill feeling
- swollen lymph nodes
- hives
- itching
- joint pain
- skin rash

If you develop an allergic reaction, stop using Dupixent and talk to your doctor right away.

**Other side effects**

**Common** (may affect up to 1 in 10 people):
- injection site reactions (i.e. redness, swelling, itching, pain)
- eye redness and itching
- eye infection
- cold sores (on lips and skin)
- joint pain (arthritis)

**Uncommon** (may affect up to 1 in 100 people):
- swelling of the face, lips, mouth, throat or tongue (angioedema)
- eyelid itching, redness and swelling
- inflammation of the eye surface, sometimes with blurred vision (keratitis)
- facial rash or redness
- eye dryness

**Rare** (may affect up to 1 in 1,000 people):
• ulcers on the outer clear layer of the eye, sometimes with blurred vision (ulcerative keratitis)

Additional side effects in children 6 to 11 years old with asthma

**Common**: pinworms (enterobiasis)

**Reporting of side effects**

If you get any side effects, talk to your doctor, pharmacist or nurse. This includes any possible side effects not listed in this leaflet. You can also report side effects directly via the national reporting system listed in Appendix V. By reporting side effects you can help provide more information on the safety of this medicine.

5. **How to store Dupixent**

Keep this medicine out of the sight and reach of children.

Do not use this medicine after the expiry date which is stated on the label and carton after EXP. The expiry date refers to the last day of that month.

Store in a refrigerator (2°C to 8°C). If necessary, pre-filled syringes may be kept at room temperature up to 25°C for a maximum of 14 days. Do not store above 25°C. If you need to permanently remove the carton from the refrigerator, write down the date of removal in the space provided on the outer carton, and use Dupixent within 14 days.

Store in the original carton to protect from light.

Do not use this medicine if you notice that the medicine is cloudy, discoloured, or has particles in it. Do not throw away any medicines via wastewater or household waste. Ask your doctor, pharmacist or nurse how to throw away medicines you no longer use. These measures will help protect the environment.

6. **Contents of the pack and other information**

**What Dupixent contains**

- The active substance is dupilumab.
- Each pre-filled syringe contains 300 mg of dupilumab in 2 mL solution for injection (injection).
- The other ingredients are arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic acid (E260), sucrose, water for injections.

**What Dupixent looks like and contents of the pack**

Dupixent is a clear to slightly opalescent, colourless to pale yellow solution supplied in a glass pre-filled syringe with or without needle shield.

Dupixent is available as 300 mg pre-filled syringes in a pack containing 1 or 2 pre-filled syringes or in a pack containing 3 (3 packs of 1) or 6 (3 packs of 2) pre-filled syringes.

Not all pack sizes may be marketed.

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**This leaflet was last revised in**

Detailed information on this medicine is available on the European Medicines Agency web site:
http://www.ema.europa.eu

<------------------------------------------------------------------------------------------------------------------------>
Dupixent 300 mg solution for injection in a pre-filled syringe with needle shield
dupilumab

Instructions for use

The parts of the Dupixent pre-filled syringe with needle shield are shown in this picture.

Important information
This device is a single-use pre-filled syringe. It contains 300 mg of Dupixent for injection under the skin (subcutaneous injection).

You must not try to give yourself or someone else the injection unless you have received training from your healthcare professional. In adolescents 12 years and older, it is recommended that Dupixent be administered by or under supervision of an adult. In children less than 12 years of age, Dupixent should be given by a caregiver.

- Read all of the instructions carefully before using the syringe.
- Check with your healthcare professional how often you will need to inject the medicine.
- Ask your healthcare professional to show you the right way to use the syringe before you inject for the first time.
- Change the injection site for each injection.
- Do not use the syringe if it has been dropped on a hard surface or damaged.
- Do not use the syringe if the needle cap is missing or not securely attached.
- Do not touch the plunger rod until you are ready to inject.
- Do not inject through clothes.
- Do not get rid of any air bubbles in the syringe.
- To help prevent accidental needle injury, each pre-filled syringe has a needle shield that is automatically activated to cover the needle after you have given your injection.
- Never pull back on the plunger rod.
- Do not re-use the syringe.

How to Store Dupixent

- Keep the syringe(s) out of the reach of children.
- Keep unused syringes in the original carton and store in the refrigerator between 2°C and 8°C.
- Do not keep Dupixent at room temperature (< 25°C) for more than 14 days. If you need to permanently remove the carton from the refrigerator, write down the date of removal in the space provided on the outer carton, and use Dupixent within 14 days.
- Do not shake the syringe at any time.
• Do not heat the syringe.
• Do not freeze the syringe.
• Do not place the syringe into direct sunlight.

Step 1: Remove

Remove the syringe from the carton by holding the middle of the syringe body.

⚠️ Do not pull off the needle cap until you are ready to inject.

⚠️ Do not use the syringe if it has been dropped on a hard surface or damaged.

Step 2: Prepare

Ensure you have the following:
• the Dupixent pre-filled syringe
• 1 alcohol wipe*
• 1 cotton ball or gauze*
• a puncture-resistant container* (See Step 12)

*Items not included in the carton

Look at the label:
• Check the expiry date.
• Check that you have the correct product and dose.

⚠️ Do not use the syringe if the expiry date has passed.

⚠️ Do not keep Dupixent at room temperature for more than 14 days.

Step 3: Inspect

Look at the medicine through the viewing window on the syringe:
Check if the liquid is clear and colourless to pale yellow.

_Note: You may see an air bubble; this is normal._

⚠️ **Do not use the syringe if the liquid is discoloured or cloudy, or if it contains flakes or particles.**

### Step 4: Wait 45 minutes

Lay the syringe on a flat surface for at least 45 minutes and let it get to room temperature naturally.

⚠️ **Do not warm the syringe in a microwave, hot water, or direct sunlight.**

⚠️ **Do not place the syringe in direct sunlight.**

⚠️ **Do not keep Dupixent at room temperature for more than 14 days.**

### Step 5: Choose

Select the injection site.
- You can inject into your thigh or belly (stomach), except for the 5 cm around your navel.
- If somebody else gives you the injection, they can also use your upper arm.
- Change the injection site for each injection.
Do not inject into skin that is tender, damaged or has bruises or scars.

Step 6: Clean

Wash your hands.

Clean the injection site with an alcohol wipe.

Let your skin dry before injecting.

Do not touch the injection site again or blow on it before the injection.

Step 7: Pull

Hold the syringe in the middle of the syringe body with the needle pointing away from you and pull off the needle cap.

Do not put the needle cap back on.
Do not touch the needle.

Inject your medicine immediately after removing the needle cap.

Step 8: Pinch

Pinch a fold of skin at the injection site, as shown in the picture.

Step 9: Insert

Insert the Needle completely into the fold of skin at roughly a 45º angle.
Step 10: Push

Relax the pinch.

Push the plunger rod down slowly and steadily as far as it will go until the syringe is empty.

Note: You will feel some resistance. This is normal.

Step 11: Release and Remove

Lift your thumb to release the plunger rod until the needle is covered by the needle shield and then remove the syringe from the injection site.

Lightly press a cotton ball or gauze on the injection site if you see any blood.

⚠️ Do not put the needle cap back on.

⚠️ Do not rub your skin after the injection.
Step 12: Dispose

Dispose of the syringe and the needle cap in a puncture-resistant container.

⚠️ **Do not put the needle cap back on.**

Always keep the container out of the reach of children.
**Dupixent 300 mg solution for injection in a pre-filled syringe**

dupilumab

**Instructions for use**

The parts of the Dupixent pre-filled syringe are shown in this picture.

*The device may have either a soft or hard Needle Cap.*

**Important information**

This device is a single-use pre-filled syringe. It contains 300 mg of Dupixent for injection under the skin (subcutaneous injection).

You must not try to give yourself or someone else the injection unless you have received training from your healthcare professional. In adolescents 12 years and older, it is recommended that Dupixent be administered by or under supervision of an adult. In children less than 12 years of age, Dupixent should be given by a caregiver.

- Read all of the instructions carefully before using the syringe.
- Check with your healthcare professional how often you will need to inject the medicine.
- Ask your healthcare professional to show you the right way to use the syringe before you inject for the first time.
- Change the injection site for each injection.
- **Do not** use the syringe if it has been damaged.
- **Do not** use the syringe if the needle cap is missing or not securely attached.
- **Do not** touch the plunger rod until you are ready to inject.
- **Do not** inject through clothes.
- **Do not** get rid of any air bubbles in the syringe.
- **Never** pull back on the plunger rod.
- **Do not** re-use the syringe.

**How to Store Dupixent**

- Keep the syringe(s) out of the reach of children.
- Keep unused syringes in the original carton and store in the refrigerator between 2°C and 8°C.
- **Do not** keep Dupixent at room temperature (< 25°C) for more than 14 days. If you need to permanently remove the carton from the refrigerator, write down the date of removal in the space provided on the outer carton, and use Dupixent within 14 days.
- **Do not** shake the syringe at any time.
- **Do not** heat the syringe.
- **Do not** freeze the syringe.
• Do not place the syringe into direct sunlight.

Step 1: Remove

Remove the syringe from the carton by holding the middle of the syringe body.

⚠️ Do not pull off the needle cap until you are ready to inject.

⚠️ Do not use the syringe if it has been damaged.

Step 2: Prepare

Ensure you have the following:

• the Dupixent pre-filled syringe
• 1 alcohol wipe*
• 1 cotton ball or gauze*
• a puncture-resistant container* (See Step 12)

*Items not included in the carton

Look at the label:

• Check the expiry date.
• Check that you have the correct product and dose.

⚠️ Do not use the syringe if the expiry date has passed.

⚠️ Do not keep Dupixent at room temperature for more than 14 days.

Step 3: Inspect

Look at the medicine in the syringe:

Check if the liquid is clear and colourless to pale yellow.

Note: You may see an air bubble; this is normal.
Do not use the syringe if the liquid is discoloured or cloudy, or if it contains flakes or particles.

Step 4: Wait 45 minutes

Lay the syringe on a flat surface for at least 45 minutes and let it get to room temperature naturally.

Do not warm the syringe in a microwave, hot water, or direct sunlight.

Do not place the syringe in direct sunlight.

Do not keep Dupixent at room temperature for more than 14 days.

Step 5: Choose

Select the injection site.

- You can inject into your thigh or belly (stomach), except for the 5 cm around your navel.
- If somebody else gives you the injection, they can also use your upper arm.
- Change the injection site for each injection.

Do not inject into skin that is tender, damaged or has bruises or scars.
Step 6: Clean

Wash your hands.

Clean the injection site with an alcohol wipe.

Let your skin dry before injecting.

⚠️ Do not touch the injection site again or blow on it before the injection.

Step 7: Pull

Hold the syringe in the middle of the syringe body with the needle pointing away from you and pull off the needle cap.

⚠️ Do not put the needle cap back on.

⚠️ Do not touch the needle.

Inject your medicine immediately after removing the needle cap.
Step 8: Pinch

Pinch a fold of skin at the injection site, as shown in the picture.

Step 9: Insert

Insert the needle into the fold of skin at roughly a 45° angle.

Step 10: Push

Relax the pinch.
Push the plunger rod down slowly and steadily as far as it will go until the syringe is empty.

*Note: You will feel some resistance. This is normal.*

![Image of injection]

**Step 11: Remove**

Pull the needle out of the skin at the same angle it was inserted.

⚠️ **Do not put the needle cap back on.**

Lightly press a cotton ball or gauze on the injection site if you see any blood.

⚠️ **Do not rub your skin after the injection.**

![Image of needle being removed]

**Step 12: Dispose**

Dispose of the syringe and the needle cap in a puncture-resistant container.

⚠️ **Do not put the needle cap back on.**

Always keep the container out of the reach of children.
1. What Dupixent is and what it is used for

What Dupixent is
Dupixent contains the active substance dupilumab.

Dupilumab is a monoclonal antibody (a type of specialised protein) that blocks the action of proteins called interleukins (IL)-4 and IL-13. Both play a major role in causing the signs and symptoms of atopic dermatitis, asthma, and chronic rhinosinusitis with nasal polyposis (CRSwNP).

What Dupixent is used for
Dupixent is used to treat adults and adolescents 12 years and older with moderate-to-severe atopic dermatitis, also known as atopic eczema. Dupixent is also used to treat children 6 to 11 years old with severe atopic dermatitis (see section Children and adolescents). Dupixent may be used with eczema medicines that you apply to the skin or it may be used on its own.

Dupixent is also used with other asthma medicines for the maintenance treatment of severe asthma in adults, adolescents, and children aged 6 years and older whose asthma is not controlled with their current asthma medicines (e.g. corticosteroids).

Dupixent is also used with other medicines for the maintenance treatment of CRSwNP in adults whose disease is not controlled with their current CRSwNP medicines. Dupixent can also reduce the need for surgery and the need for systemic corticosteroid use.

How Dupixent works
Using Dupixent for atopic dermatitis (atopic eczema) can improve the condition of your skin and reduce itching. Dupixent has also been shown to improve symptoms of pain, anxiety, and depression associated with atopic dermatitis. In addition, Dupixent helps improve your sleep disturbance and overall quality of life.
Dupixent helps prevent severe asthma attacks (exacerbations) and can improve your breathing. Dupixent may also help reduce the amount of another group of medicines you need to control your asthma, called oral corticosteroids, while preventing severe asthma attacks and improving your breathing.

2. What you need to know before you use Dupixent

Do not use Dupixent
- if you are allergic to dupilumab or any of the other ingredients of this medicine (listed in section 6).
- if you think you may be allergic, or you are not sure, ask your doctor, pharmacist or nurse for advice before using Dupixent.

Warnings and precautions
Talk to your doctor, pharmacist or nurse before using Dupixent:

Dupixent is not a rescue medicine and should not be used to treat a sudden asthma attack.

Allergic reactions
- Rarely, Dupixent can cause serious side effects, including allergic (hypersensitivity) reactions and anaphylactic reaction and angioedema. These reactions can occur from minutes until seven days after Dupixent administration. You must look out for signs of these conditions (i.e. breathing problems, swelling of the face, lips, mouth, throat or tongue, fainting, dizziness, feeling lightheaded (low blood pressure), fever, general ill feeling, swollen lymph nodes, hives, itching, joint pain, skin rash) while you are taking Dupixent. Such signs are listed under “Serious side effects” in section 4.
- Stop using Dupixent and tell your doctor or get medical help immediately if you notice any signs of an allergic reaction.

Eosinophilic conditions
- Rarely patients taking an asthma medicine may develop inflammation of blood vessels or lungs due to an increase of certain white blood cells (eosinophilia).
- It is not known whether this is caused by Dupixent. This usually, but not always, happens in people who also take a steroid medicine which is being stopped or for which the dose is being lowered.
- Tell your doctor immediately if you develop a combination of symptoms such as a flu-like illness, pins and needles or numbness of arms or legs, worsening of pulmonary symptoms, and/or rash.

Parasitic (intestinal parasites) infection
- Dupixent may weaken your resistance to infections caused by parasites. If you already have a parasitic infection it should be treated before you start treatment with Dupixent.
- Check with your doctor if you have diarrhoea, gas, upset stomach, greasy stools, and dehydration which could be a sign of a parasitic infection.
- If you live in a region where these infections are common or if you are travelling to such a region check with your doctor.

Asthma
If you have asthma and are taking asthma medicines, do not change or stop your asthma medicine without talking to your doctor. Talk to your doctor before you stop Dupixent or if your asthma remains uncontrolled or worsens during treatment with this medicine.

Eye problems
Talk to your doctor if you have any new or worsening eye problems, including eye pain or changes in vision.
Children and adolescents
- The Dupixent pre-filled pen is not intended for use in children below 12 years of age. For children aged 6-11 years with atopic dermatitis and asthma, contact your doctor who will prescribe the appropriate Dupixent pre-filled syringe.
- The safety and benefits of Dupixent are not yet known in children with atopic dermatitis below the age of 6.
- The safety and benefits of Dupixent are not yet known in children with asthma below the age of 6.
- CRSwNP does not normally occur in children. The safety and benefits of Dupixent are not yet known in children with CRSwNP below the age of 18 years.

Other medicines and Dupixent
Tell your doctor or pharmacist
- if you are using, have recently used or might use any other medicines.
- if you have recently had or are due to have a vaccination.

Other medicines for asthma
Do not stop or reduce your asthma medicines, unless instructed by your doctor.
- These medicines (especially ones called corticosteroids) must be stopped gradually.
- This must be done under the direct supervision of your doctor and dependent on your response to Dupixent.

Pregnancy and breast-feeding
- If you are pregnant, think you may be pregnant, or are planning to have a baby, ask your doctor for advice before using this medicine. The effects of this medicine in pregnant women are not known; therefore, it is preferable to avoid the use of Dupixent in pregnancy unless your doctor advises to use it.
- If you are breast-feeding or are planning to breast-feed, talk to your doctor before using this medicine. You and your doctor should decide if you will breast-feed or use Dupixent. You should not do both.

Driving and using machines
Dupixent is unlikely to influence your ability to drive and use machines.

Dupixent contains sodium
This medicine contains less than 1 mmol sodium (23 mg) per 300 mg dose, that is to say essentially “sodium-free”.

3. How to use Dupixent
Always use this medicine exactly as your doctor or pharmacist has told you. Check with your doctor or pharmacist if you are not sure.

How Dupixent is given
Dupixent is given by injection under the skin (subcutaneous injection).

How much Dupixent you will receive
Your doctor will decide which dose of Dupixent is right for you.

Recommended dose in adults with atopic dermatitis
For patients with atopic dermatitis, the recommended dose of Dupixent is:
- An initial dose of 600 mg (two 300 mg injections)
- Followed by 300 mg given every other week by subcutaneous injection.
Recommended dose in adolescents with atopic dermatitis
The recommended dose of Dupixent for adolescents (12 to 17 years of age) with atopic dermatitis is based on body weight:

<table>
<thead>
<tr>
<th>Body Weight of Patient</th>
<th>Initial Dose</th>
<th>Subsequent Doses (every other week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 60 kg</td>
<td>400 mg (two 200 mg injections)</td>
<td>200 mg</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>600 mg (two 300 mg injections)</td>
<td>300 mg</td>
</tr>
</tbody>
</table>

Recommended dose in children with atopic dermatitis
The recommended dose of Dupixent for children (6 to 11 years of age) with atopic dermatitis is based on body weight:

<table>
<thead>
<tr>
<th>Body Weight of Patient</th>
<th>Initial Dose</th>
<th>Subsequent Doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 kg to less than 60 kg</td>
<td>300 mg (one 300 mg injection) on Day 1, followed by 300 mg on Day 15</td>
<td>300 mg every 4 weeks*, starting 4 weeks after Day 15 dose</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>600 mg (two 300 mg injections)</td>
<td>300 mg every other week</td>
</tr>
</tbody>
</table>

* The dose may be increased to 200 mg every other week based on the doctor’s opinion.

Recommended dose in adult and adolescent patients with asthma (12 years of age and older)
For patients with severe asthma and who are on oral corticosteroids or for patients with severe asthma and co-morbid moderate-to-severe atopic dermatitis or adults with co-morbid severe chronic rhinosinusitis with nasal polyposis, the recommended dose of Dupixent is:
- An initial dose of 600 mg (two 300 mg injections)  
- Followed by 300 mg given every other week administered as subcutaneous injection.

For all other patients with severe asthma, the recommended dose of Dupixent is:
- An initial dose of 400 mg (two 200 mg injections)  
- Followed by 200 mg given every other week administered as subcutaneous injection.

Recommended dose children with asthma
The recommended dose of Dupixent for children (6 to 11 years of age) with asthma is based on body weight:

<table>
<thead>
<tr>
<th>Body Weight of Patient</th>
<th>Initial and Subsequent Doses</th>
</tr>
</thead>
</table>
| 15 to less than 30 kg  | 100 mg every other week      
|                        | or                          
|                        | 300 mg every 4 weeks        |
| 30 kg to less than 60 kg | 200 mg every other week      
|                        | or                          
|                        | 300 mg every 4 weeks        |
| 60 kg or more          | 200 mg every other week      |

For patients 6 to 11 years old with asthma and coexisting severe atopic dermatitis, your doctor will decide which dose of Dupixent is right for you.

Recommended dose in adults with chronic rhinosinusitis with nasal polyposis (CRSwNP)
In CRSwNP, the recommended first dose of Dupixent is 300 mg followed by 300 mg given every two weeks by subcutaneous injection.
Injecting Dupixent
Dupixent is given by injection under your skin (subcutaneous injection). You and your doctor or nurse should decide if you should inject Dupixent yourself.

Before injecting Dupixent yourself you must have been properly trained by your doctor or nurse. Your Dupixent injection may also be given by a caregiver after proper training by a doctor or nurse.

Each pre-filled pen contains one dose of Dupixent (300 mg). Do not shake the pre-filled pen.

Read carefully the “Instructions for Use” included at the end of the package leaflet before using Dupixent.

If you use more Dupixent than you should
If you use more Dupixent than you should or the dose has been given too early, talk to your doctor, pharmacist or nurse.

If you forget to use Dupixent
If you have forgotten to inject a dose of Dupixent, talk to your doctor, pharmacist or nurse.

If you stop using Dupixent
Do not stop using Dupixent without speaking to your doctor first.

If you have any further questions on the use of this medicine, ask your doctor, pharmacist or nurse.

4. Possible side effects

Like all medicines, this medicine can cause side effects, although not everybody gets them.

Dupixent can cause serious side effects, including rare allergic (hypersensitivity) reactions, including anaphylactic reaction; the signs of allergic reaction or anaphylactic reaction may include:

- breathing problems
- swelling of the face, lips, mouth, throat or tongue (angioedema)
- fainting, dizziness, feeling lightheaded (low blood pressure)
- fever
- general ill feeling
- swollen lymph nodes
- hives
- itching
- joint pain
- skin rash

If you develop an allergic reaction, stop using Dupixent and talk to your doctor right away.

Other side effects

Common (may affect up to 1 in 10 people):

- injection site reactions (i.e. redness, swelling, itching, pain)
- eye redness and itching
- eye infection
- cold sores (on lips and skin)
- joint pain (arthritis)

Uncommon (may affect up to 1 in 100 people):

- swelling of the face, lips, mouth, throat or tongue (angioedema)
- eyelid itching, redness and swelling
• inflammation of the eye surface, sometimes with blurred vision (keratitis)
• facial rash or redness
• eye dryness

**Rare** (may affect up to 1 in 1,000 people):
• ulcers on the outer clear layer of the eye, sometimes with blurred vision (ulcerative keratitis)

**Additional side effects in children 6 to 11 years old with asthma**
**Common:** pinworms (enterobiasis)

**Reporting of side effects**
If you get any side effects, talk to your doctor, pharmacist or nurse. This includes any possible side effects not listed in this leaflet. You can also report side effects directly via the national reporting system listed in **Appendix V**. By reporting side effects you can help provide more information on the safety of this medicine.

5. **How to store Dupixent**

Keep this medicine out of the sight and reach of children.

Do not use this medicine after the expiry date which is stated on the label and carton after EXP. The expiry date refers to the last day of that month.

Store in a refrigerator (2°C to 8°C). If necessary, pre-filled pens may be kept at room temperature up to 25°C for a maximum of 14 days. Do not store above 25°C. If you need to permanently remove the carton from the refrigerator, write down the date of removal in the space provided on the outer carton, and use Dupixent within 14 days.

Store in the original carton to protect from light.

Do not use this medicine if you notice that the medicine is cloudy, discoloured, or has particles in it. Do not throw away any medicines via wastewater or household waste. Ask your doctor, pharmacist or nurse how to throw away medicines you no longer use. These measures will help protect the environment.

6. **Contents of the pack and other information**

**What Dupixent contains**
• The active substance is dupilumab.
• Each pre-filled pen contains 300 mg of dupilumab in 2 mL solution for injection (injection).
• The other ingredients are arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic acid (E260), sucrose, water for injections.

**What Dupixent looks like and contents of the pack**
Dupixent is a clear to slightly opalescent, colourless to pale yellow solution supplied in a pre-filled pen.

Dupixent is available as 300 mg pre-filled pens in a pack containing 1, 2, 3, or 6 pre-filled pens.

Not all pack sizes may be marketed.

**Marketing Authorisation Holder**
sanofi-aventis groupe
54, rue La Boétie
For any information about this medicine, please contact the local representative of the Marketing Authorisation Holder:

**België/Belgique/Belgien**
Sanofi Belgium
Tél/Tel: +32 (0)2 710 54 00

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United Kingdom (Northern Ireland)
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Tel: +44 (0) 800 035 2525

This leaflet was last revised in

Detailed information on this medicine is available on the European Medicines Agency web site:
http://www.ema.europa.eu

<------------------------------------------------------------------------------------------------------------------------>
Dupixent 300 mg solution for injection in a pre-filled pen
Dupilumab

Instructions for use

The parts of the Dupixent pre-filled pen are shown in this picture.

Important information

This device is a single-use pre-filled pen. It contains 300 mg of Dupixent for injection under the skin (subcutaneous injection).

You must not try to give yourself or someone else the injection unless you have received training from your healthcare professional. In adolescents 12 years and older, it is recommended that Dupixent be administered by or under supervision of an adult. The Dupixent pre-filled pen is only for use in adults and children aged 12 years and older.

- Read all of the instructions carefully before using the pre-filled pen.
- Ask your healthcare professional how often you will need to inject the medicine.
- Choose a different injection site for each injection
- Do not use the pre-filled pen if it has been damaged.
- Do not use the pre-filled pen if the green cap is missing or not securely attached.
- Do not press or touch the yellow needle cover with your fingers.
- Do not inject through clothes.
- Do not remove the green cap until just before you give the injection.
- Do not try to put the green cap back on the pre-filled pen.
- Do not re-use the pre-filled pen.

How to Store Dupixent

- Keep the pre-filled pen(s) and all medicines out of the reach of children.
- Keep unused pre-filled pens in the original carton and store in the refrigerator between 2°C and 8°C.
- Store pre-filled pens in the original carton to protect it from light.
- Do not keep pre-filled pens at room temperature (<25°C) for more than 14 days. If you need to permanently remove the carton from the refrigerator, write down the date of removal in the space provided on the outer carton, and use Dupixent within 14 days.
- Do not shake the pre-filled pen at any time.
- Do not heat the pre-filled pen.
- Do not freeze the pre-filled pen.
- Do not place the pre-filled pen into direct sunlight.

A: Prepare
A1. Gather supplies

Ensure you have the following:
A2. Look at the label

- Confirm that you have the correct product and dose.

A3. Check expiry date

- Check the expiry date.

⚠️ Do not use the pre-filled pen if the expiry date has passed.

⚠️ Do not keep Dupixent at room temperature for more than 14 days.

A4. Check the medicine

Look at the medicine through the window on the pre-filled pen.

Check if the liquid is clear and colourless to pale yellow.

*Note: You may see an air bubble; this is normal.*

⚠️ Do not use the pre-filled pen if the liquid is discolored or cloudy, or if it contains visible flakes or particles.

⚠️ Do not use the pre-filled pen if the window is yellow.
A5: Wait 45 minutes

Lay the pre-filled pen on a flat surface and let it naturally warm up at room temperature (less than 25°C) for at least 45 minutes.

Do not warm the pre-filled pen in a microwave, hot water, or direct sunlight.
Do not put the pre-filled pen into direct sunlight.
Do not keep Dupixent at room temperature for more than 14 days.

B. Choose your injection site
B1. Recommended injection sites are:

- Thigh
- Stomach except for the 5 cm around your belly button (navel).
- Upper Arm If a caregiver gives your dose, they can also use the outer area of the upper arm.

Choose a different injection site for each Dupixent injection.
Do not inject through clothes.
Do not inject into skin that is tender, damaged, bruised or scarred.
B2. Wash your hands

B3. Prepare the injection site

- Clean the injection site with an alcohol wipe.
- Let your skin dry before injecting.

⚠️ Do not touch the injection site again or blow on it before the injection.

C. Give injection
C1. Remove green cap

Pull the green cap straight off

Do not twist the green cap off.

Do not remove the green cap until you are ready to inject.

Do not press or touch the yellow needle cover with your fingers. The needle is inside.

⚠️ Do not put the green cap back on the pre-filled pen after you have removed it.
C2. Place

- When placing the yellow needle cover on your skin, hold the pre-filled pen so that you can see the window.
- Place the yellow needle cover on your skin at approximately a 90-degree angle.

⚠️ Do not press or touch the yellow needle cover with your fingers. The needle is inside.

C3. Press down

Press the pre-filled pen firmly against your skin until you cannot see the yellow needle cover, and hold.

- There will be a “click” when the injection starts.
- The window will start to turn yellow.

The injection can take up to 20 seconds.
C4. Hold firmly

Keep holding the pre-filled pen firmly against your skin.

- You may hear a second click.
- Check that the entire window has turned to yellow.
- Then slowly count to 5.
- Then lift the pen up off the skin, your injection is complete.

If the window does not turn completely yellow, remove the pen and call your healthcare provider.

⚠️ Do not give yourself a second dose without speaking to your healthcare provider.

C5. Remove

- After you have completed your injection pull straight up to remove pre-filled pen from the skin and dispose of immediately as described in section D.

- If you see any blood at the site, lightly dab a cotton ball or gauze pad.

⚠️ Do not rub your skin after the injection.
D. Dispose

- Dispose of the pre-filled pens, (needle inside), and green caps in a puncture resistant container right away after use.

**Do not** dispose of (throw away) pre-filled pens (needle inside), and green caps in your household trash.

⚠️ **Do not put the green cap back on.**
Package leaflet: Information for the user

Dupixent 200 mg solution for injection in pre-filled syringe
dupilumab

This medicine is subject to additional monitoring. This will allow quick identification of new safety information. You can help by reporting any side effects you may get. See the end of section 4 for how to report side effects.

Read all of this leaflet carefully before you start using this medicine because it contains important information for you.

- Keep this leaflet. You may need to read it again.
- If you have any further questions, ask your doctor, pharmacist or nurse.
- This medicine has been prescribed for you only. Do not pass it on to others. It may harm them, even if their signs of illness are the same as yours.
- If you get any side effects, talk to your doctor, pharmacist or nurse. This includes any possible side effects not listed in this leaflet. See section 4.

What is in this leaflet
1. What Dupixent is and what it is used for
2. What you need to know before you use Dupixent
3. How to use Dupixent
4. Possible side effects
5. How to store Dupixent
6. Contents of the pack and other information

1. What Dupixent is and what it is used for

What Dupixent is
Dupixent contains the active substance dupilumab.

Duplicumab is a monoclonal antibody (a type of specialised protein) that blocks the action of proteins called interleukins (IL)-4 and IL-13. Both play a major role in causing the signs and symptoms of atopic dermatitis and asthma.

What Dupixent is used for
Dupixent is used to treat adults and adolescents 12 years and older with moderate-to-severe atopic dermatitis, also known as atopic eczema. Dupixent is also used to treat children 6 to 11 years old with severe atopic dermatitis. Dupixent may be used with eczema medicines that you apply to the skin or it may be used on its own.

Dupixent is also used with other asthma medicines for the maintenance treatment of severe asthma in adults, adolescents, and children aged 6 years and older whose asthma is not controlled with their current asthma medicines (e.g. corticosteroids).

How Dupixent works
Using Dupixent for atopic dermatitis (atopic eczema) can improve the condition of your skin and reduce itching. Dupixent has also been shown to improve symptoms of pain, anxiety, and depression associated with atopic dermatitis. In addition, Dupixent helps improve your sleep disturbance and overall quality of life.

Dupixent helps prevent severe asthma attacks (exacerbations) and can improve your breathing. Dupixent may also help reduce the amount of another group of medicines you need to control your asthma, called oral corticosteroids, while preventing severe asthma attacks and improving your breathing.
2. What you need to know before you use Dupixent

Do not use Dupixent

- if you are allergic to dupilumab or any of the other ingredients of this medicine (listed in section 6).
- if you think you may be allergic, or you are not sure, ask your doctor, pharmacist or nurse for advice before using Dupixent.

Warnings and precautions

Talk to your doctor, pharmacist or nurse before using Dupixent:

Dupixent is not a rescue medicine and should not be used to treat a sudden asthma attack.

Allergic reactions

- Rarely, Dupixent can cause serious side effects, including allergic (hypersensitivity) reactions and anaphylactic reaction and angioedema. These reactions can occur from minutes until seven days after Dupixent administration. You must look out for signs of these conditions (i.e. breathing problems, swelling of the face, lips, mouth, throat or tongue, fainting, dizziness, feeling lightheaded (low blood pressure), fever, general ill feeling, swollen lymph nodes, hives, itching, joint pain, skin rash) while you are taking Dupixent. Such signs are listed under “Serious side effects” in section 4.
- Stop using Dupixent and tell your doctor or get medical help immediately if you notice any signs of an allergic reaction.

Eosinophilic conditions

- Rarely patients taking an asthma medicine may develop inflammation of blood vessels or lungs due to an increase of certain white blood cells (eosinophilia).
- It is not known whether this is caused by Dupixent. This usually, but not always, happens in people who also take a steroid medicine which is being stopped or for which the dose is being lowered.
- Tell your doctor immediately if you develop a combination of symptoms such as a flu-like illness, pins and needles or numbness of arms or legs, worsening of pulmonary symptoms, and/or rash.

Parasitic (intestinal parasites) infection

- Dupixent may weaken your resistance to infections caused by parasites. If you already have a parasitic infection it should be treated before you start treatment with Dupixent.
- Check with your doctor if you have diarrhoea, gas, upset stomach, greasy stools, and dehydration which could be a sign of a parasitic infection.
- If you live in a region where these infections are common or if you are travelling to such a region check with your doctor.

Asthma

If you have asthma and are taking asthma medicines, do not change or stop your asthma medicine without talking to your doctor. Talk to your doctor before you stop Dupixent or if your asthma remains uncontrolled or worsens during treatment with this medicine.

Eye problems

Talk to your doctor if you have any new or worsening eye problems, including eye pain or changes in vision.
Children and adolescents
- The safety and benefits of Dupixent are not yet known in children with atopic dermatitis below the age of 6.
- The safety and benefits of Dupixent are not yet known in children with asthma below the age of 6.

Other medicines and Dupixent
Tell your doctor or pharmacist
- if you are using, have recently used or might use any other medicines.
- if you have recently had or are due to have a vaccination.

Other medicines for asthma
Do not stop or reduce your asthma medicines, unless instructed by your doctor.
- These medicines (especially ones called corticosteroids) must be stopped gradually.
- This must be done under the direct supervision of your doctor and dependent on your response to Dupixent.

Pregnancy and breast-feeding
- If you are pregnant, think you may be pregnant, or are planning to have a baby, ask your doctor for advice before using this medicine. The effects of this medicine in pregnant women are not known; therefore, it is preferable to avoid the use of Dupixent in pregnancy unless your doctor advises to use it.
- If you are breast-feeding or are planning to breast-feed, talk to your doctor before using this medicine. You and your doctor should decide if you will breast-feed or use Dupixent. You should not do both.

Driving and using machines
Dupixent is unlikely to influence your ability to drive and use machines.

Dupixent contains sodium
This medicine contains less than 1 mmol sodium (23 mg) per 200 mg dose, that is to say essentially “sodium-free”.

3. How to use Dupixent
Always use this medicine exactly as your doctor or pharmacist has told you. Check with your doctor or pharmacist if you are not sure.

How Dupixent is given
Dupixent is given by injection under the skin (subcutaneous injection).

How much Dupixent you will receive
Your doctor will decide which dose of Dupixent is right for you.

Recommended dose in adolescents with atopic dermatitis
The recommended dose of Dupixent for adolescents (12 to 17 years of age) with atopic dermatitis is based on body weight:

<table>
<thead>
<tr>
<th>Body Weight of Patient</th>
<th>Initial Dose</th>
<th>Subsequent Doses (every other week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 60 kg</td>
<td>400 mg (two 200 mg injections)</td>
<td>200 mg</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>600 mg (two 300 mg injections)</td>
<td>300 mg</td>
</tr>
</tbody>
</table>

Recommended dose in children with atopic dermatitis
The recommended dose of Dupixent for children (6 to 11 years of age) with atopic dermatitis is based on body weight:
<table>
<thead>
<tr>
<th>Body Weight of Patient</th>
<th>Initial Dose</th>
<th>Subsequent Doses</th>
</tr>
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<tbody>
<tr>
<td>15 kg to less than 60 kg</td>
<td>300 mg (one 300 mg injection) on Day 1, followed by 300 mg on Day 15</td>
<td>300 mg every 4 weeks*, starting 4 weeks after Day 15 dose</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>600 mg (two 300 mg injections)</td>
<td>300 mg every other week</td>
</tr>
</tbody>
</table>

* The dose may be increased to 200 mg every other week based on the doctor’s opinion.

Recommended dose in adult and adolescent patients with asthma (12 years of age and older)
For most patients with severe asthma, the recommended dose of Dupixent is:
- An initial dose of 400 mg (two 200 mg injections)
- Followed by 200 mg given every other week administered as subcutaneous injection.

For patients with severe asthma and who are on oral corticosteroids or for patients with severe asthma and co-morbid moderate-to-severe atopic dermatitis or adults with co-morbid severe chronic rhinosinusitis with nasal polyposis, the recommended dose of Dupixent is:
- An initial dose of 600 mg (two 300 mg injections)
- Followed by 300 mg given every other week administered as subcutaneous injection.

Recommended dose children with asthma
The recommended dose of Dupixent for children (6 to 11 years of age) with asthma is based on body weight:

<table>
<thead>
<tr>
<th>Body Weight of Patient</th>
<th>Initial and Subsequent Doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 to less than 30 kg</td>
<td>100 mg every other week or 300 mg every 4 weeks</td>
</tr>
<tr>
<td>30 kg to less than 60 kg</td>
<td>200 mg every other week or 300 mg every 4 weeks</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>200 mg every other week</td>
</tr>
</tbody>
</table>

For patients 6 to 11 years old with asthma and coexisting severe atopic dermatitis, your doctor will decide which dose of Dupixent is right for you.

Injecting Dupixent
Dupixent is given by injection under your skin (subcutaneous injection). You and your doctor or nurse should decide if you should inject Dupixent yourself.

Before injecting Dupixent yourself you must have been properly trained by your doctor or nurse. Your Dupixent injection may also be given by a caregiver after proper training by a doctor or nurse.

Each pre-filled syringe contains one dose of Dupixent (200 mg). Do not shake the pre-filled syringe.

Read carefully the “Instructions for Use” included at the end of the package leaflet before using Dupixent.

If you use more Dupixent than you should
If you use more Dupixent than you should or the dose has been given too early, talk to your doctor, pharmacist or nurse.

If you forget to use Dupixent
If you have forgotten to inject a dose of Dupixent, talk to your doctor, pharmacist or nurse.
If you stop using Dupixent
Do not stop using Dupixent without speaking to your doctor first.

If you have any further questions on the use of this medicine, ask your doctor, pharmacist or nurse.

4. Possible side effects

Like all medicines, this medicine can cause side effects, although not everybody gets them.

Dupixent can cause serious side effects, including rare allergic (hypersensitivity) reactions, including anaphylactic reaction; the signs of allergic reaction or anaphylactic reaction may include:

- breathing problems
- swelling of the face, lips, mouth, throat or tongue (angioedema)
- fainting, dizziness, feeling lightheaded (low blood pressure)
- fever
- general ill feeling
- swollen lymph nodes
- hives
- itching
- joint pain
- skin rash

If you develop an allergic reaction, stop using Dupixent and talk to your doctor right away.

Other side effects

Common (may affect up to 1 in 10 people):
- injection site reactions (i.e. redness, swelling, itching, pain)
- eye redness and itching
- eye infection
- cold sores (on lips and skin)
- joint pain (arthralgia)

Uncommon (may affect up to 1 in 100 people):
- swelling of the face, lips, mouth, throat or tongue (angioedema)
- eyelid itching, redness and swelling
- inflammation of the eye surface, sometimes with blurred vision (keratitis)
- facial rash or redness
- eye dryness

Rare (may affect up to 1 in 1,000 people):
- ulcers on the outer clear layer of the eye, sometimes with blurred vision (ulcerative keratitis)

Additional side effects in children 6 to 11 years old with asthma
Common: pinworms (enterobiasis)

Reporting of side effects

If you get any side effects, talk to your doctor, pharmacist or nurse. This includes any possible side effects not listed in this leaflet. You can also report side effects directly via the national reporting system listed in Appendix V. By reporting side effects you can help provide more information on the safety of this medicine.

5. How to store Dupixent
Keep this medicine out of the sight and reach of children.

Do not use this medicine after the expiry date which is stated on the label and carton after EXP. The expiry date refers to the last day of that month.

Store in a refrigerator (2°C to 8°C). If necessary, pre-filled syringes may be kept at room temperature up to 25°C for a maximum of 14 days. Do not store above 25°C. If you need to permanently remove the carton from the refrigerator, write down the date of removal in the space provided on the outer carton, and use Dupixent within 14 days.

Store in the original carton to protect from light.

Do not use this medicine if you notice that the medicine is cloudy, discoloured, or has particles in it. Do not throw away any medicines via wastewater or household waste. Ask your doctor, pharmacist or nurse how to throw away medicines you no longer use. These measures will help protect the environment.

6. Contents of the pack and other information

What Dupixent contains
- The active substance is dupilumab.
- Each pre-filled syringe contains 200 mg of dupilumab in 1.14 mL solution for injection (injection).
- The other ingredients are arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic acid (E260), sucrose, water for injections.

What Dupixent looks like and contents of the pack
Dupixent is a clear to slightly opalescent, colourless to pale yellow solution supplied in a glass pre-filled syringe.

Dupixent is available as 200 mg pre-filled syringes in a pack containing 1 or 2 pre-filled syringes or in a pack containing 3 (3 packs of 1) or 6 (3 packs of 2) pre-filled syringes.

Not all pack sizes may be marketed.

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For any information about this medicine, please contact the local representative of the Marketing Authorisation Holder:

<table>
<thead>
<tr>
<th>Country</th>
<th>Contact Information</th>
</tr>
</thead>
</table>
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This leaflet was last revised in

Detailed information on this medicine is available on the European Medicines Agency web site:
http://www.ema.europa.eu
**Dupixent 200 mg solution for injection in a pre-filled syringe with needle shield**

dupilumab

**Instructions for use**

The parts of the Dupixent pre-filled syringe with needle shield are shown in this picture.

**Important information**

This device is a single-use pre-filled syringe. It contains 200 mg of Dupixent for injection under the skin (subcutaneous injection).

You must not try to give yourself or someone else the injection unless you have received training from your healthcare professional. In adolescents 12 years and older, it is recommended that Dupixent be administered by or under supervision of an adult. In children less than 12 years of age, Dupixent should be given by a caregiver.

- Read all of the instructions carefully before using the syringe.
- Check with your healthcare professional how often you will need to inject the medicine.
- Ask your healthcare professional to show you the right way to use the syringe before you inject for the first time.
- Change the injection site for each injection.
- **Do not** use the syringe if it has been dropped on a hard surface or damaged.
- **Do not** use the syringe if the needle cap is missing or not securely attached.
- **Do not** touch the plunger rod until you are ready to inject.
- **Do not** inject through clothes.
- **Do not** get rid of any air bubbles in the syringe.
- To help prevent accidental needle injury, each pre-filled syringe has a needle shield that is automatically activated to cover the needle after you have given your injection.
- **Never** pull back on the plunger rod.
- **Do not** re-use the syringe.

**How to Store Dupixent**

- Keep the syringe(s) out of the reach of children.
- Keep unused syringes in the original carton and store in the refrigerator between 2°C and 8°C.
• **Do not** keep Dupixent at room temperature (< 25°C) for more than 14 days. If you need to permanently remove the carton from the refrigerator, write down the date of removal in the space provided on the outer carton, and use Dupixent within 14 days.
• **Do not** shake the syringe at any time.
• **Do not** heat the syringe.
• **Do not** freeze the syringe.
• **Do not** place the syringe into direct sunlight.

**Step 1: Remove**

Remove the syringe from the carton by holding the middle of the syringe body.

⚠️ **Do not pull off the needle cap until you are ready to inject.**

⚠️ **Do not use the syringe if it has been dropped on a hard surface or damaged.**

![Syringe and carton](image)

**Step 2: Prepare**

Ensure you have the following:
- the Dupixent pre-filled syringe
- 1 alcohol wipe*
- 1 cotton ball or gauze*
- a puncture-resistant container* (See Step 12)

*Items not included in the carton

Look at the label:
- Check the expiry date.
- Check that you have the correct product and dose.

⚠️ **Do not use the syringe if the expiry date has passed.**

⚠️ **Do not keep Dupixent at room temperature for more than 14 days.**

![Expiry Date](image)
Step 3: Inspect

Look at the medicine through the viewing window on the syringe:

Check if the liquid is clear and colourless to pale yellow.

*Note: You may see an air bubble; this is normal.*

⚠️ **Do not use the syringe if the liquid is discoloured or cloudy, or if it contains flakes or particles.**

Step 4: Wait 30 minutes

Lay the syringe on a flat surface for at least 30 minutes and let it get to room temperature naturally.

⚠️ **Do not warm the syringe in a microwave, hot water, or direct sunlight.**

⚠️ **Do not place the syringe in direct sunlight.**

⚠️ **Do not keep Dupixent at room temperature for more than 14 days.**

Step 5: Choose

Select the injection site.

- You can inject into your thigh or belly (stomach), except for the 5 cm around your navel.
- If somebody else gives you the injection, they can also use your upper arm.
- Change the injection site for each injection.
Do not inject into skin that is tender, damaged or has bruises or scars.

Step 6: Clean
Wash your hands.
Clean the injection site with an alcohol wipe.
Let your skin dry before injecting.

Do not touch the injection site again or blow on it before the injection.

Step 7: Pull
Hold the syringe in the middle of the syringe body with the needle pointing away from you and pull off the needle cap.

Do not put the needle cap back on.
Do not touch the needle.

Inject your medicine immediately after removing the needle cap.

Step 8: Pinch

Pinch a fold of skin at the injection site, as shown in the picture.

Step 9: Insert

Insert the Needle completely into the fold of skin at roughly a 45° angle.

Step 10: Push
Relax the pinch.

Push the plunger rod down slowly and steadily as far as it will go until the syringe is empty.

Note: You will feel some resistance. This is normal.

Step 11: Release and Remove

Lift your thumb to release the plunger rod until the needle is covered by the needle shield and then remove the syringe from the injection site.

Lightly press a cotton ball or gauze on the injection site if you see any blood.

⚠️ Do not put the needle cap back on.

⚠️ Do not rub your skin after the injection.

Step 12: Dispose

Dispose of the syringe and the needle cap in a puncture-resistant container.

⚠️ Do not put the needle cap back on.
Always keep the container out of the reach of children.
Package leaflet: Information for the user

Dupixent 200 mg solution for injection in pre-filled pen
dupilumab

This medicine is subject to additional monitoring. This will allow quick identification of new safety information. You can help by reporting any side effects you may get. See the end of section 4 for how to report side effects.

Read all of this leaflet carefully before you start using this medicine because it contains important information for you.
- Keep this leaflet. You may need to read it again.
- If you have any further questions, ask your doctor, pharmacist or nurse.
- This medicine has been prescribed for you only. Do not pass it on to others. It may harm them, even if their signs of illness are the same as yours.
- If you get any side effects, talk to your doctor, pharmacist or nurse. This includes any possible side effects not listed in this leaflet. See section 4.

What is in this leaflet
1. What Dupixent is and what it is used for
2. What you need to know before you use Dupixent
3. How to use Dupixent
4. Possible side effects
5. How to store Dupixent
6. Contents of the pack and other information

1. What Dupixent is and what it is used for

What Dupixent is
Dupixent contains the active substance dupilumab.

Dupilumab is a monoclonal antibody (a type of specialised protein) that blocks the action of proteins called interleukins (IL)-4 and IL-13. Both play a major role in causing the signs and symptoms of atopic dermatitis and asthma.

What Dupixent is used for
Dupixent is used to treat adults and adolescents 12 years and older with moderate-to-severe atopic dermatitis, also known as atopic eczema. Dupixent is also used to treat children 6 to 11 years old with severe atopic dermatitis (see section Children and adolescents). Dupixent may be used with eczema medicines that you apply to the skin or it may be used on its own.

Dupixent is also used with other asthma medicines for the maintenance treatment of severe asthma in adults, adolescents, and children aged 6 years and older whose asthma is not controlled with their current asthma medicines (e.g. corticosteroids).

How Dupixent works
Using Dupixent for atopic dermatitis (atopic eczema) can improve the condition of your skin and reduce itching. Dupixent has also been shown to improve symptoms of pain, anxiety, and depression associated with atopic dermatitis. In addition, Dupixent helps improve your sleep disturbance and overall quality of life.

Dupixent helps prevent severe asthma attacks (exacerbations) and can improve your breathing. Dupixent may also help reduce the amount of another group of medicines you need to control your asthma, called oral corticosteroids, while preventing severe asthma attacks and improving your breathing.
2. What you need to know before you use Dupixent

Do not use Dupixent
- if you are allergic to dupilumab or any of the other ingredients of this medicine (listed in section 6).
- if you think you may be allergic, or you are not sure, ask your doctor, pharmacist or nurse for advice before using Dupixent.

Warnings and precautions
Talk to your doctor, pharmacist or nurse before using Dupixent:

Dupixent is not a rescue medicine and should not be used to treat a sudden asthma attack.

Allergic reactions
- Rarely, Dupixent can cause serious side effects, including allergic (hypersensitivity) reactions and anaphylactic reaction and angioedema. These reactions can occur from minutes until seven days after Dupixent administration. You must look out for signs of these conditions (i.e. breathing problems, swelling of the face, lips, mouth, throat or tongue, fainting, dizziness, feeling lightheaded (low blood pressure), fever, general ill feeling, swollen lymph nodes, hives, itching, joint pain, skin rash) while you are taking Dupixent. Such signs are listed under “Serious side effects” in section 4.
- Stop using Dupixent and tell your doctor or get medical help immediately if you notice any signs of an allergic reaction.

Eosinophilic conditions
- Rarely patients taking an asthma medicine may develop inflammation of blood vessels or lungs due to an increase of certain white blood cells (eosinophilia).
- It is not known whether this is caused by Dupixent. This usually, but not always, happens in people who also take a steroid medicine which is being stopped or for which the dose is being lowered.
- Tell your doctor immediately if you develop a combination of symptoms such as a flu-like illness, pins and needles or numbness of arms or legs, worsening of pulmonary symptoms, and/or rash.

Parasitic (intestinal parasites) infection
- Dupixent may weaken your resistance to infections caused by parasites. If you already have a parasitic infection it should be treated before you start treatment with Dupixent.
- Check with your doctor if you have diarrhoea, gas, upset stomach, greasy stools, and dehydration which could be a sign of a parasitic infection.
- If you live in a region where these infections are common or if you are travelling to such a region check with your doctor.

Asthma
If you have asthma and are taking asthma medicines, do not change or stop your asthma medicine without talking to your doctor. Talk to your doctor before you stop Dupixent or if your asthma remains uncontrolled or worsens during treatment with this medicine.

Eye problems
Talk to your doctor if you have any new or worsening eye problems, including eye pain or changes in vision.
Children and adolescents
- The Dupixent pre-filled pen is not intended for use in children below 12 years of age. For children aged 6-11 years with atopic dermatitis and asthma, contact your doctor who will prescribe the appropriate Dupixent pre-filled syringe.
- The safety and benefits of Dupixent are not yet known in children with atopic dermatitis below the age of 6.
- The safety and benefits of Dupixent are not yet known in children with asthma below the age of 6.

Other medicines and Dupixent
Tell your doctor or pharmacist
- if you are using, have recently used or might use any other medicines.
- if you have recently had or are due to have a vaccination.

Other medicines for asthma
Do not stop or reduce your asthma medicines, unless instructed by your doctor.
- These medicines (especially ones called corticosteroids) must be stopped gradually.
- This must be done under the direct supervision of your doctor and dependent on your response to Dupixent.

Pregnancy and breast-feeding
- If you are pregnant, think you may be pregnant, or are planning to have a baby, ask your doctor for advice before using this medicine. The effects of this medicine in pregnant women are not known; therefore, it is preferable to avoid the use of Dupixent in pregnancy unless your doctor advises to use it.
- If you are breast-feeding or are planning to breast-feed, talk to your doctor before using this medicine. You and your doctor should decide if you will breast-feed or use Dupixent. You should not do both.

Driving and using machines
Dupixent is unlikely to influence your ability to drive and use machines.

Dupixent contains sodium
This medicine contains less than 1 mmol sodium (23 mg) per 200 mg dose, that is to say essentially “sodium-free”.

3. How to use Dupixent
Always use this medicine exactly as your doctor or pharmacist has told you. Check with your doctor or pharmacist if you are not sure.

How Dupixent is given
Dupixent is given by injection under the skin (subcutaneous injection).

How much Dupixent you will receive
Your doctor will decide which dose of Dupixent is right for you.

Recommended dose in adolescents with atopic dermatitis
The recommended dose of Dupixent for adolescents (12 to 17 years of age) with atopic dermatitis is based on body weight:

<table>
<thead>
<tr>
<th>Body Weight of Patient</th>
<th>Initial Dose</th>
<th>Subsequent Doses (every other week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 60 kg</td>
<td>400 mg (two 200 mg injections)</td>
<td>200 mg</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>600 mg (two 300 mg injections)</td>
<td>300 mg</td>
</tr>
</tbody>
</table>
Recommended dose in children with atopic dermatitis
The recommended dose of Dupixent for children (6 to 11 years of age) with atopic dermatitis is based on body weight:

<table>
<thead>
<tr>
<th>Body Weight of Patient</th>
<th>Initial Dose</th>
<th>Subsequent Doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 kg to less than 60 kg</td>
<td>300 mg (one 300 mg injection) on Day 1, followed by 300 mg on Day 15</td>
<td>300 mg every 4 weeks*, starting 4 weeks after Day 15 dose</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>600 mg (two 300 mg injections)</td>
<td>300 mg every other week</td>
</tr>
</tbody>
</table>

* The dose may be increased to 200 mg every other week based on the doctor’s opinion.

Recommended dose in adult and adolescent patients with asthma (12 years of age and older)
For most patients with severe asthma, the recommended dose of Dupixent is:
- An initial dose of 400 mg (two 200 mg injections)
- Followed by 200 mg given every other week administered as subcutaneous injection.

For patients with severe asthma and who are on oral corticosteroids or for patients with severe asthma and co-morbid moderate-to-severe atopic dermatitis or adults with co-morbid severe chronic rhinosinusitis with nasal polyposis, the recommended dose of Dupixent is:
- An initial dose of 600 mg (two 300 mg injections)
- Followed by 300 mg given every other week administered as subcutaneous injection.

Recommended dose children with asthma
The recommended dose of Dupixent for children (6 to 11 years of age) with asthma is based on body weight:

<table>
<thead>
<tr>
<th>Body Weight of Patient</th>
<th>Initial and Subsequent Doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 to less than 30 kg</td>
<td>100 mg every other week or 300 mg every 4 weeks</td>
</tr>
<tr>
<td>30 kg to less than 60 kg</td>
<td>200 mg every other week or 300 mg every 4 weeks</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>200 mg every other week</td>
</tr>
</tbody>
</table>

For patients 6 to 11 years old with asthma and coexisting severe atopic dermatitis, your doctor will decide which dose of Dupixent is right for you.

Injecting Dupixent
Dupixent is given by injection under your skin (subcutaneous injection). You and your doctor or nurse should decide if you should inject Dupixent yourself.

Before injecting Dupixent yourself you must have been properly trained by your doctor or nurse. Your Dupixent injection may also be given by a caregiver after proper training by a doctor or nurse.

Each pre-filled pen contains one dose of Dupixent (200 mg). Do not shake the pre-filled pen.

Read carefully the “Instructions for Use” included at the end of the package leaflet before using Dupixent.

If you use more Dupixent than you should
If you use more Dupixent than you should or the dose has been given too early, talk to your doctor, pharmacist or nurse.
If you forget to use Dupixent
If you have forgotten to inject a dose of Dupixent, talk to your doctor, pharmacist or nurse.

If you stop using Dupixent
Do not stop using Dupixent without speaking to your doctor first.

If you have any further questions on the use of this medicine, ask your doctor, pharmacist or nurse.

4. Possible side effects

Like all medicines, this medicine can cause side effects, although not everybody gets them.

Dupixent can cause serious side effects, including rare allergic (hypo sensitivity) reactions, including anaphylactic reaction; the signs of allergic reaction or anaphylactic reaction may include:

- breathing problems
- swelling of the face, lips, mouth, throat or tongue (angioedema)
- fainting, dizziness, feeling lightheaded (low blood pressure)
- fever
- general ill feeling
- swollen lymph nodes
- hives
- itching
- joint pain
- skin rash

If you develop an allergic reaction, stop using Dupixent and talk to your doctor right away.

Other side effects

Common (may affect up to 1 in 10 people):
- injection site reactions (i.e. redness, swelling, itching, pain)
- eye redness and itching
- eye infection
- cold sores (on lips and skin)
- joint pain (arthritis)

Uncommon (may affect up to 1 in 100 people):
- swelling of the face, lips, mouth, throat or tongue (angioedema)
- eyelid itching, redness and swelling
- inflammation of the eye surface, sometimes with blurred vision (keratitis)
- facial rash or redness
- eye dryness

Rare (may affect up to 1 in 1,000 people):
- ulcers on the outer clear layer of the eye, sometimes with blurred vision (ulcerative keratitis)

Additional side effects in children 6 to 11 years old with asthma
Common: pinworms (enterobiasis)

Reporting of side effects
If you get any side effects, talk to your doctor, pharmacist or nurse. This includes any possible side effects not listed in this leaflet. You can also report side effects directly via the national reporting system listed in Appendix V. By reporting side effects you can help provide more information on the safety of this medicine.
5. **How to store Dupixent**

Keep this medicine out of the sight and reach of children.

Do not use this medicine after the expiry date which is stated on the label and carton after EXP. The expiry date refers to the last day of that month.

Store in a refrigerator (2°C to 8°C). If necessary, pre-filled pens may be kept at room temperature up to 25°C for a maximum of 14 days. Do not store above 25°C. If you need to permanently remove the carton from the refrigerator, write down the date of removal in the space provided on the outer carton, and use Dupixent within 14 days.

Store in the original carton to protect from light.

Do not use this medicine if you notice that the medicine is cloudy, discoloured, or has particles in it. Do not throw away any medicines via wastewater or household waste. Ask your doctor, pharmacist or nurse how to throw away medicines you no longer use. These measures will help protect the environment.

6. **Contents of the pack and other information**

**What Dupixent contains**
- The active substance is dupilumab.
- Each pre-filled pen contains 200 mg of dupilumab in 1.14 mL solution for injection (injection).
- The other ingredients are arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate, glacial acetic acid (E260), sucrose, water for injections.

**What Dupixent looks like and contents of the pack**
Dupixent is a clear to slightly opalescent, colourless to pale yellow solution supplied in a pre-filled pen.

Dupixent is available as 200 mg pre-filled pens in a pack containing 1, 2, 3, or 6 pre-filled pens.

Not all pack sizes may be marketed.

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This leaflet was last revised in

Detailed information on this medicine is available on the European Medicines Agency web site:  
http://www.ema.europa.eu

<------------------------------------------------------------------------------------------------->
Dupixent 200 mg solution for injection in a pre-filled pen
Dupilumab

Instructions for use

The parts of the Dupixent pre-filled pen are shown in this picture.

![Diagram of the Dupixent pre-filled pen](image)

Important information
This device is a single-use pre-filled pen. It contains 200 mg of Dupixent for injection under the skin (subcutaneous injection).

You must not try to give yourself or someone else the injection unless you have received training from your healthcare professional. In adolescents 12 years and older, it is recommended that Dupixent be administered by or under supervision of an adult. The Dupixent pre-filled pen is only for use in adults and children aged 12 years and older.

- Read all of the instructions carefully before using the pre-filled pen.
- Ask your healthcare professional how often you will need to inject the medicine.
- Choose a different injection site for each injection
- Do not use the pre-filled pen if it has been damaged.
- Do not use the pre-filled pen if the yellow cap is missing or not securely attached.
- Do not press or touch the orange needle cover with your fingers.
- Do not inject through clothes.
- Do not remove the yellow cap until just before you give the injection.
- Do not try to put the yellow cap back on the pre-filled pen.
- Do not re-use the pre-filled pen.

How to Store Dupixent

- Keep the pre-filled pen(s) and all medicines out of the reach of children.
- Keep unused pre-filled pens in the original carton and store in the refrigerator between 2°C and 8°C.
- Store pre-filled pens in the original carton to protect it from light.
- Do not keep pre-filled pens at room temperature (<25°C) for more than 14 days. If you need to permanently remove the carton from the refrigerator, write down the date of removal in the space provided on the outer carton, and use Dupixent within 14 days.
- Do not shake the pre-filled pen at any time.
- Do not heat the pre-filled pen.
- Do not freeze the pre-filled pen.
- Do not place the pre-filled pen into direct sunlight.

A: Prepare
A1. Gather supplies
Ensure you have the following:

- the Dupixent pre-filled pen
- 1 alcohol wipe*
- 1 cotton ball or gauze*
- a puncture-resistant container* (See Step D)

*Items not included in the carton

A2. Look at the label

- Confirm that you have the correct product and dose.

A3. Check expiry date

- Check the expiry date.

⚠️ Do not use the pre-filled pen if the expiry date has passed.

⚠️ Do not keep Dupixent at room temperature for more than 14 days.

A4. Check the medicine

Look at the medicine through the window on the pre-filled pen.

Check if the liquid is clear and colourless to pale yellow.

Note: You may see an air bubble; this is normal.

⚠️ Do not use the pre-filled pen if the liquid is discolored or cloudy, or if it contains visible flakes or particles.

⚠️ Do not use the pre-filled pen if the window is yellow.
A5: Wait 30 minutes

Lay the pre-filled pen on a flat surface and let it naturally warm up at room temperature (less than 25°C) for at least 30 minutes.

⚠️ Do not warm the pre-filled pen in a microwave, hot water, or direct sunlight.
⚠️ Do not put the pre-filled pen into direct sunlight.
⚠️ Do not keep Dupixent at room temperature for more than 14 days.

B. Choose your injection site
B1. Recommended injection sites are:

- Thigh
- Stomach except for the 5 cm around your belly button (navel).
- Upper Arm If a caregiver gives your dose, they can also use the outer area of the upper arm.

Choose a different injection site for each Dupixent injection.

⚠️ Do not inject through clothes.
⚠️ Do not inject into skin that is tender, damaged, bruised or scarred.
B2. Wash your hands

B3. Prepare the injection site

- Clean the injection site with an alcohol wipe.
- Let your skin dry before injecting.

⚠️ Do not touch the injection site again or blow on it before the injection.

C. Give injection
C1. Remove yellow cap

Pull the yellow cap straight off.

Do not twist the yellow cap off.

Do not remove the yellow cap until you are ready to inject.

Do not press or touch the orange needle cover with your fingers. The needle is inside.

⚠️ Do not put the yellow cap back on the pre-filled pen after you have removed it.
C2. Place

- When placing the orange needle cover on your skin, hold the pre-filled pen so that you can see the window.

- Place the orange needle cover on your skin at approximately a 90-degree angle.

⚠️ Do not press or touch the orange needle cover with your fingers. The needle is inside.

C3. Press down

Press the pre-filled pen firmly against your skin until you cannot see the orange needle cover, and hold.

- There will be a “click” when the injection starts.
- The window will start to turn yellow.

The injection can take up to 20 seconds.
**C4. Hold firmly**

Keep holding the pre-filled pen firmly against your skin.

- You may hear a second click.
- Check that the entire window has turned to yellow.
- Then slowly count to 5.
- Then lift the pen up off the skin, your injection is complete.

If the window does not turn completely yellow, remove the pen and call your healthcare provider.

⚠️ **Do not give yourself a second dose without speaking to your healthcare provider.**

**C5. Remove**

- After you have completed your injection pull straight up to remove pre-filled pen from the skin and dispose of immediately as described in section D.

- If you see any blood at the site, lightly dab a cotton ball or gauze pad.

⚠️ **Do not rub your skin after the injection.**
D. Dispose

- Dispose of the pre-filled pens, (needle inside), and yellow caps in a puncture resistant container right away after use.

**Do not** dispose of (throw away) pre-filled pens (needle inside), and yellow caps in your household trash.

⚠️ **Do not put the yellow cap back on.**
Package leaflet: Information for the user

Dupixent 100 mg solution for injection in pre-filled syringe
dupilumab

This medicine is subject to additional monitoring. This will allow quick identification of new safety information. You can help by reporting any side effects you may get. See the end of section 4 for how to report side effects.

Read all of this leaflet carefully before you start using this medicine because it contains important information for you.
- Keep this leaflet. You may need to read it again.
- If you have any further questions, ask your doctor, pharmacist or nurse.
- This medicine has been prescribed for you only. Do not pass it on to others. It may harm them, even if their signs of illness are the same as yours.
- If you get any side effects, talk to your doctor, pharmacist or nurse. This includes any possible side effects not listed in this leaflet. See section 4.

What is in this leaflet
1. What Dupixent is and what it is used for
2. What you need to know before you use Dupixent
3. How to use Dupixent
4. Possible side effects
5. How to store Dupixent
6. Contents of the pack and other information

1. What Dupixent is and what it is used for

What Dupixent is
Dupixent contains the active substance dupilumab.

Dupilumab is a monoclonal antibody (a type of specialised protein) that blocks the action of proteins called interleukins (IL)-4 and IL-13. Both play a major role in causing the signs and symptoms of asthma.

What Dupixent is used for
Dupixent is used with other asthma medicines for the maintenance treatment of severe asthma in adults, adolescents, and children aged 6 years and older whose asthma is not controlled with their current asthma medicines (e.g. corticosteroids).

How Dupixent works
Dupixent helps prevent severe asthma attacks (exacerbations) and can improve your breathing. Dupixent may also help reduce the amount of another group of medicines you need to control your asthma, called oral corticosteroids, while preventing severe asthma attacks and improving your breathing.

2. What you need to know before you use Dupixent

Do not use Dupixent
• if you are allergic to dupilumab or any of the other ingredients of this medicine (listed in section 6).
• if you think you may be allergic, or you are not sure, ask your doctor, pharmacist or nurse for advice before using Dupixent.

Warnings and precautions
Talk to your doctor, pharmacist or nurse before using Dupixent:

Dupixent is not a rescue medicine and should not be used to treat a sudden asthma attack.

Allergic reactions
• Rarely, Dupixent can cause serious side effects, including allergic (hypersensitivity) reactions and anaphylactic reaction and angioedema. These reactions can occur from minutes until seven days after Dupixent administration. You must look out for signs of these conditions (i.e. breathing problems, swelling of the face, lips, mouth, throat or tongue, fainting, dizziness, feeling lightheaded (low blood pressure), fever, general ill feeling, swollen lymph nodes, hives, itching, joint pain, skin rash) while you are taking Dupixent. Such signs are listed under “Serious side effects” in section 4.
• Stop using Dupixent and tell your doctor or get medical help immediately if you notice any signs of an allergic reaction.

Eosinophilic conditions
• Rarely patients taking an asthma medicine may develop inflammation of blood vessels or lungs due to an increase of certain white blood cells (eosinophilia).
• It is not known whether this is caused by Dupixent. This usually, but not always, happens in people who also take a steroid medicine which is being stopped or for which the dose is being lowered.
• Tell your doctor immediately if you develop a combination of symptoms such as a flu-like illness, pins and needles or numbness of arms or legs, worsening of pulmonary symptoms, and/or rash.

Parasitic (intestinal parasites) infection
• Dupixent may weaken your resistance to infections caused by parasites. If you already have a parasitic infection it should be treated before you start treatment with Dupixent.
• Check with your doctor if you have diarrhoea, gas, upset stomach, greasy stools, and dehydration which could be a sign of a parasitic infection.
• If you live in a region where these infections are common or if you are travelling to such a region check with your doctor.

Asthma
If you have asthma and are taking asthma medicines, do not change or stop your asthma medicine without talking to your doctor. Talk to your doctor before you stop Dupixent or if your asthma remains uncontrolled or worsens during treatment with this medicine.

Eye problems
Talk to your doctor if you have any new or worsening eye problems, including eye pain or changes in vision.

Children and adolescents
• The safety and benefits of Dupixent are not yet known in children with asthma below the age of 6.

Other medicines and Dupixent
Tell your doctor or pharmacist
• if you are using, have recently used or might use any other medicines.
• if you have recently had or are due to have a vaccination.

Other medicines for asthma
Do not stop or reduce your asthma medicines, unless instructed by your doctor.
- These medicines (especially ones called corticosteroids) must be stopped gradually.
- This must be done under the direct supervision of your doctor and dependent on your response to Dupixent.

**Pregnancy and breast-feeding**
- If you are pregnant, think you may be pregnant, or are planning to have a baby, ask your doctor for advice before using this medicine. The effects of this medicine in pregnant women are not known; therefore, it is preferable to avoid the use of Dupixent in pregnancy unless your doctor advises to use it.
- If you are breast-feeding or are planning to breast-feed, talk to your doctor before using this medicine. You and your doctor should decide if you will breast-feed or use Dupixent. You should not do both.

**Driving and using machines**
Dupixent is unlikely to influence your ability to drive and use machines.

**Dupixent contains sodium**
This medicine contains less than 1 mmol sodium (23 mg) per 100 mg dose, that is to say essentially “sodium-free”.

3. **How to use Dupixent**

Always use this medicine exactly as your doctor or pharmacist has told you. Check with your doctor or pharmacist if you are not sure.

**How Dupixent is given**
Dupixent is given by injection under the skin (subcutaneous injection).

**How much Dupixent you will receive**
Your doctor will decide which dose of Dupixent is right for you.

**Recommended dose children with asthma**
The recommended dose of Dupixent for children (6 to 11 years of age) with asthma is based on body weight:

<table>
<thead>
<tr>
<th>Body Weight of Patient</th>
<th>Initial and Subsequent Doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 to less than 30 kg</td>
<td>100 mg every other week or 300 mg every 4 weeks</td>
</tr>
<tr>
<td>30 kg to less than 60 kg</td>
<td>200 mg every other week or 300 mg every 4 weeks</td>
</tr>
<tr>
<td>60 kg or more</td>
<td>200 mg every other week</td>
</tr>
</tbody>
</table>

For patients 6 to 11 years old with asthma and coexisting severe atopic dermatitis, your doctor will decide which dose of Dupixent is right for you.

**Injecting Dupixent**
Dupixent is given by injection under your skin (subcutaneous injection). You and your doctor or nurse should decide if you should inject Dupixent yourself.

Before injecting Dupixent yourself you must have been properly trained by your doctor or nurse. Your Dupixent injection may also be given by a caregiver after proper training by a doctor or nurse.
Each pre-filled syringe contains one dose of Dupixent (100 mg). Do not shake the pre-filled syringe.

Read carefully the “Instructions for Use” included at the end of the package leaflet before using Dupixent.

If you use more Dupixent than you should
If you use more Dupixent than you should or the dose has been given too early, talk to your doctor, pharmacist or nurse.

If you forget to use Dupixent
If you have forgotten to inject a dose of Dupixent, talk to your doctor, pharmacist or nurse.

If you stop using Dupixent
Do not stop using Dupixent without speaking to your doctor first.

If you have any further questions on the use of this medicine, ask your doctor, pharmacist or nurse.

4. Possible side effects

Like all medicines, this medicine can cause side effects, although not everybody gets them.

Dupixent can cause serious side effects, including rare allergic (hypersensitivity) reactions, including anaphylactic reaction; the signs of allergic reaction or anaphylactic reaction may include:

- breathing problems
- swelling of the face, lips, mouth, throat or tongue (angioedema)
- fainting, dizziness, feeling lightheaded (low blood pressure)
- fever
- general ill feeling
- swollen lymph nodes
- hives
- itching
- joint pain
- skin rash

If you develop an allergic reaction, stop using Dupixent and talk to your doctor right away.

Other side effects

Common (may affect up to 1 in 10 people)
- injection site reactions (i.e. redness, swelling, itching, pain)
- eye redness and itching
- eye infection
- cold sores (on lips and skin)
- joint pain (arthralgia)

Uncommon (may affect up to 1 in 100 people):
- swelling of the face, lips, mouth, throat or tongue (angioedema)
- eyelid itching, redness and swelling
- inflammation of the eye surface, sometimes with blurred vision (keratitis)
- facial rash or redness
- eye dryness

Rare (may affect up to 1 in 1,000 people):
- ulcers on the outer clear layer of the eye, sometimes with blurred vision (ulcerative keratitis)
Additional side effects in children 6 to 11 years old with asthma
Common: pinworms (enterobiasis)

Reporting of side effects
If you get any side effects, talk to your doctor, pharmacist or nurse. This includes any possible side
effects not listed in this leaflet. You can also report side effects directly via the national reporting
system listed in Appendix V. By reporting side effects you can help provide more information on the
safety of this medicine.

5. How to store Dupixent

Keep this medicine out of the sight and reach of children.

Do not use this medicine after the expiry date which is stated on the label and carton after EXP. The
expiry date refers to the last day of that month.

Store in a refrigerator (2°C to 8°C). If necessary, pre-filled syringes may be kept at room temperature
up to 25°C for a maximum of 14 days. Do not store above 25°C. If you need to permanently remove
the carton from the refrigerator, write down the date of removal in the space provided on the outer
carton, and use Dupixent within 14 days.

Store in the original carton to protect from light.

Do not use this medicine if you notice that the medicine is cloudy, discoloured, or has particles in it.
Do not throw away any medicines via wastewater or household waste. Ask your doctor, pharmacist or
nurse how to throw away medicines you no longer use. These measures will help protect the
environment.

6. Contents of the pack and other information

What Dupixent contains
• The active substance is dupilumab.
• Each pre-filled syringe contains 100 mg of dupilumab in 0.67 mL solution for injection (injection).
• The other ingredients are arginine hydrochloride, histidine, polysorbate 80 (E433), sodium acetate,
glacial acetic acid (E260), sucrose, water for injections.

What Dupixent looks like and contents of the pack
Dupixent is a clear to slightly opalescent, colourless to pale yellow solution supplied in a glass pre-
filled syringe.

Dupixent is available as 100 mg pre-filled syringes in a pack containing 2 pre-filled syringes or in a
pack containing 6 (3 packs of 2) pre-filled syringes.

Not all pack sizes may be marketed.

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Manufacturer
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This leaflet was last revised in

Detailed information on this medicine is available on the European Medicines Agency web site:
http://www.ema.europa.eu
Dupixent 100 mg solution for injection in a pre-filled syringe with needle shield
dupilumab

Instructions for use

The parts of the Dupixent pre-filled syringe with needle shield are shown in this picture.

![Syringe diagram]

Important information
This device is a single-use pre-filled syringe. It contains 100 mg of Dupixent for injection under the skin (subcutaneous injection).

You must not try to give the injection to the child unless you have received training from a healthcare professional. In children less than 12 years of age, Dupixent should be given by a caregiver.

- Read all of the instructions carefully before using the syringe.
- Check with a healthcare professional how often you will need to inject the medicine.
- Ask a healthcare professional to show you the right way to use the syringe before you inject for the first time.
- Change the injection site for each injection.
- **Do not** use the syringe if it has been dropped on a hard surface or damaged.
- **Do not** use the syringe if the needle cap is missing or not securely attached.
- **Do not** touch the plunger rod until you are ready to inject.
- **Do not** inject through clothes.
- **Do not** get rid of any air bubbles in the syringe.
- To help prevent accidental needle injury, each pre-filled syringe has a needle shield that is automatically activated to cover the needle after you have given your injection.
- **Never** pull back on the plunger rod.
- **Do not** re-use the syringe.

How to Store Dupixent
Keep the syringe(s) out of the reach of children.
Keep unused syringes in the original carton and store in the refrigerator between 2°C and 8°C.
Do not keep Dupixent at room temperature (< 25°C) for more than 14 days. If you need to permanently remove the carton from the refrigerator, write down the date of removal in the space provided on the outer carton, and use Dupixent within 14 days.
Do not shake the syringe at any time.
Do not heat the syringe.
Do not freeze the syringe.
Do not place the syringe into direct sunlight.

Step 1: Remove

Remove the syringe from the carton by holding the middle of the syringe body.

⚠️ Do not pull off the needle cap until you are ready to inject.

⚠️ Do not use the syringe if it has been dropped on a hard surface or damaged.

Step 2: Prepare

Ensure you have the following:
- the Dupixent pre-filled syringe
- 1 alcohol wipe*
- 1 cotton ball or gauze*
- a puncture-resistant container* (See Step 12)

*Items not included in the carton

Look at the label:
- Check the expiry date.
- Check that you have the correct product and dose.

⚠️ Do not use the syringe if the expiry date has passed.

⚠️ Do not keep Dupixent at room temperature for more than 14 days.
Step 3: Inspect

Look at the medicine through the viewing window on the syringe:

Check if the liquid is clear and colourless to pale yellow.

*Note: You may see an air bubble; this is normal.*

⚠️ **Do not use the syringe if the liquid is discoloured or cloudy, or if it contains flakes or particles.**

Step 4: Wait 30 minutes

Lay the syringe on a flat surface for at least 30 minutes and let it get to room temperature naturally.

⚠️ **Do not warm the syringe in a microwave, hot water, or direct sunlight.**

⚠️ **Do not place the syringe in direct sunlight.**

⚠️ **Do not keep Dupixent at room temperature for more than 14 days.**
Step 5: Choose

Select the injection site.
- You can inject into the thigh, outer area of the upper arm or belly (stomach), except for the 5 cm around the navel.
- Change the injection site for each injection.

⚠️ Do not inject into skin that is tender, damaged or has bruises or scars.

Step 6: Clean

Wash your hands.

Clean the injection site with an alcohol wipe.

Let the skin dry before injecting.

⚠️ Do not touch the injection site again or blow on it before the injection.

Step 7: Pull
Hold the syringe in the middle of the syringe body with the needle pointing away from you and pull off the needle cap.

⚠️ **Do not put the needle cap back on.**

⚠️ **Do not touch the needle.**

Inject the medicine immediately after removing the needle cap.

### Step 8: Pinch

Pinch a fold of skin at the injection site, as shown in the picture.

### Step 9: Insert

Insert the Needle completely into the fold of skin at roughly a 45° angle.
Step 10: Push

Relax the pinch.

Push the plunger rod down slowly and steadily as far as it will go until the syringe is empty.

*Note: You will feel some resistance. This is normal.*

Step 11: Release and Remove

Lift your thumb to release the plunger rod until the needle is covered by the needle shield and then remove the syringe from the injection site.

Lightly press a cotton ball or gauze on the injection site if you see any blood.

⚠️ **Do not put the needle cap back on.**

⚠️ **Do not rub the skin after the injection.**
Step 12: Dispose

Dispose of the syringe and the needle cap in a puncture-resistant container.

⚠️ Do not put the needle cap back on.

Always keep the container out of the reach of children.