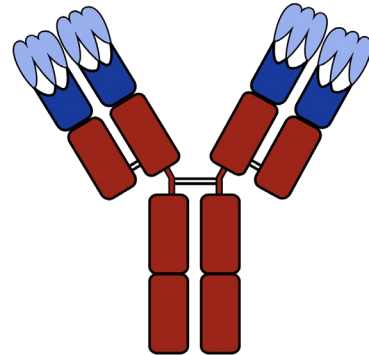


# Monoclonal Antibodies in Severe Asthma

Michelle Allsup & Rula Al-azzawi

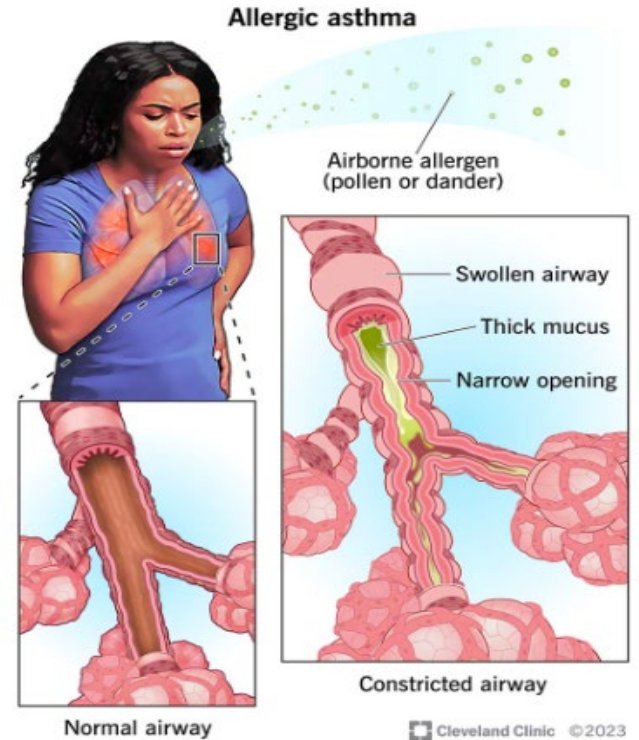
# What are Monoclonal Antibodies (mAbs)?

- Lab created proteins that mimic the immune system's natural antibodies. These antibodies target specific molecules involved in the inflammatory cascade found in asthma.
- Different monoclonal antibodies illicit different inflammatory responses in asthma.
  - Anti- IgE (immunoglobulin E)
  - Anti- IL-5R $\alpha$  (interleukin-5 receptor alpha)
  - Anti- IL-4R (interleukin-4 receptor)
  - Anti - TSLP (anti-thymic stromal lymphopoietin)



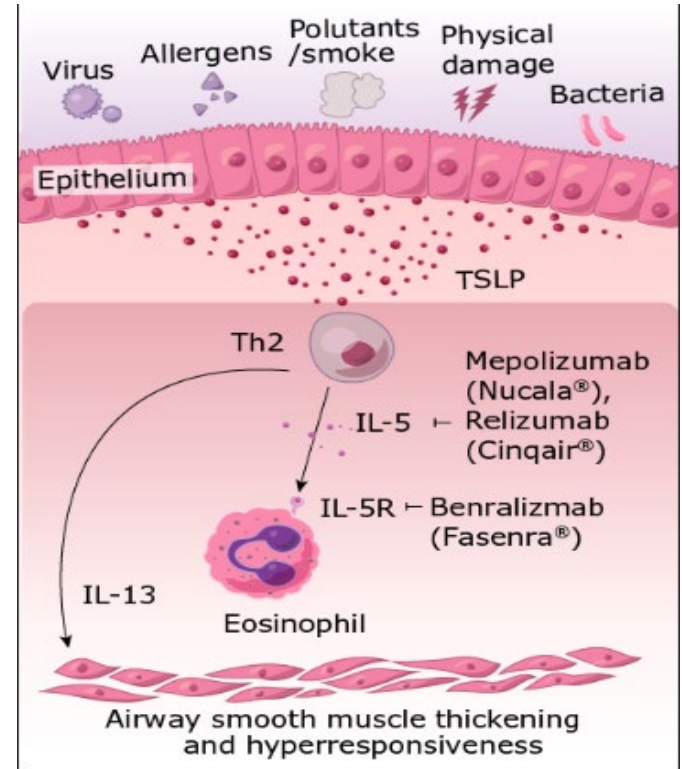
# Who needs mAbs?

- Allergic Asthma
  - This type of asthma is caused environmentally, and this patient population would benefit from using monoclonal antibody like omalizumab (Xolair).



# Who needs mAbs?

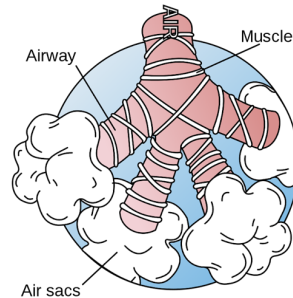
- Eosinophilic Asthma
  - This type of asthma is caused by white blood cells called eosinophils, and this patient population would benefit from using monoclonal antibody like mepolizumab (Nucala) or benralizumab (Fasenra).



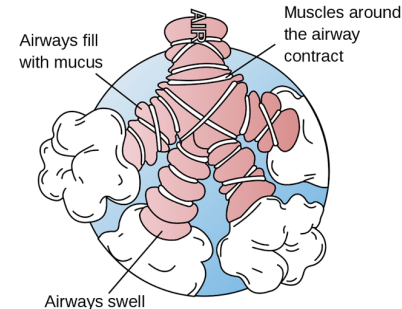
# Severe Asthma

- Unresponsive to optimal inhaled therapy of medium or high dose ICS-LABA or worsens when high dose treatment is decreased 'severe refractory asthma'
- Frequent asthma exacerbations  $\geq 2$  exacerbations per year requiring oral corticosteroids (OCS), or serious exacerbations  $\geq 1$  per year requiring hospitalization.

Before an asthma episode



After an asthma episode



# The mAbs

<b>Anti-IgE</b>	<b>Anti-IL-5 and Anti-IL-5R</b>	<b>Anti-IL-4R<math>\alpha</math></b>	<b>Anti-TSLP</b>
Xolair (Omalizumab)	Nucala (Mepolizumab) Cinqair (Reslizumab) Fasenra (Benralizumab)	Dupixent (Dupilumab)	Tezepelumab (Tezspire)

# Indications for use

Anti-IgE	Anti-IL-5R	Anti-IL-4R	Anti-TSLP
<ul style="list-style-type: none"><li>● Moderate to severe persistent asthma</li><li>● Chronic rhinosinusitis with nasal polyps</li><li>● IgE-mediated food allergy</li><li>● Chronic spontaneous urticaria</li></ul>	<ul style="list-style-type: none"><li>● Eosinophilic asthma</li><li>● Add-on maintenance treatment for chronic rhinosinusitis with nasal polyps</li><li>● Eosinophilic granulomatosis with polyangiitis</li><li>● Hypereosinophilic syndrome</li></ul>	<ul style="list-style-type: none"><li>● Eosinophilic asthma</li><li>● Atopic dermatitis</li><li>● Chronic rhinosinusitis with nasal polyposis</li><li>● Eosinophilic esophagitis</li><li>● Prurigo nodularis</li></ul>	<ul style="list-style-type: none"><li>● Exacerbations in the last year</li><li>● Uncontrolled on high dose ICS-LABA</li></ul>

# Omalizumab (Xolair)

## MOA

- Anti-IgE

## Administration

- $\geq 6$  years old - 75 to 375 mg SC every 2 or 4 weeks

## Side Effects

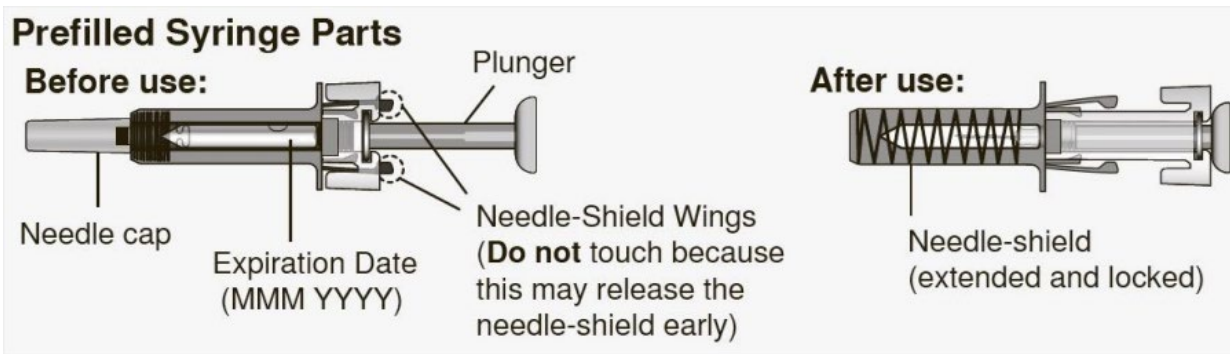
- Arthralgia, pain, fatigue, dizziness, dermatitis, ear ache, leg pain, arm pain

## Clinical Pearls

- Patients must have a positive skin-prick test or allergen-specific IgE to a perennial aeroallergen, and symptoms are not controlled by inhaled corticosteroids
- Anaphylaxis (black box warning) occurs most frequently with the one of the first 3 doses
- Must be administered in a healthcare setting with epinephrine available
- Reduced exacerbations by 25-50%



# Xolair Device



**XOLAIR 75 mg prefilled syringe with a blue needle-shield**



**XOLAIR 150 mg prefilled syringe with a purple needle-shield**



# Xolair - Patient Assistance

- Xolair Patient Assistance - available on website for non-government commercial plans
- Genetech Patient Foundation
  - Uninsured - income under \$150,000
  - Insured patients without coverage with incomes under \$150,000
  - Insured patients with coverage for a Genetech medicine: with unaffordable out-of-pocket costs or with household size and income within certain guidelines
- Not covered under Alabama Medicaid

# Mepolizumab (Nucala)

## MOA

- Anti- IL-5R

## Administration

- 6-11 years old: 40 mg administered SC once every 4 weeks
- ≥ 12 years old: 100 mg administered SC once every 4 weeks

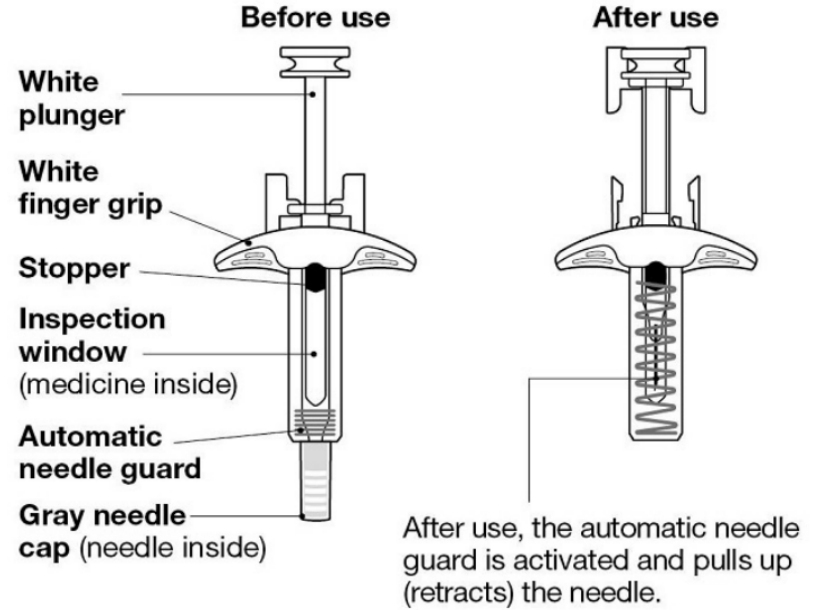
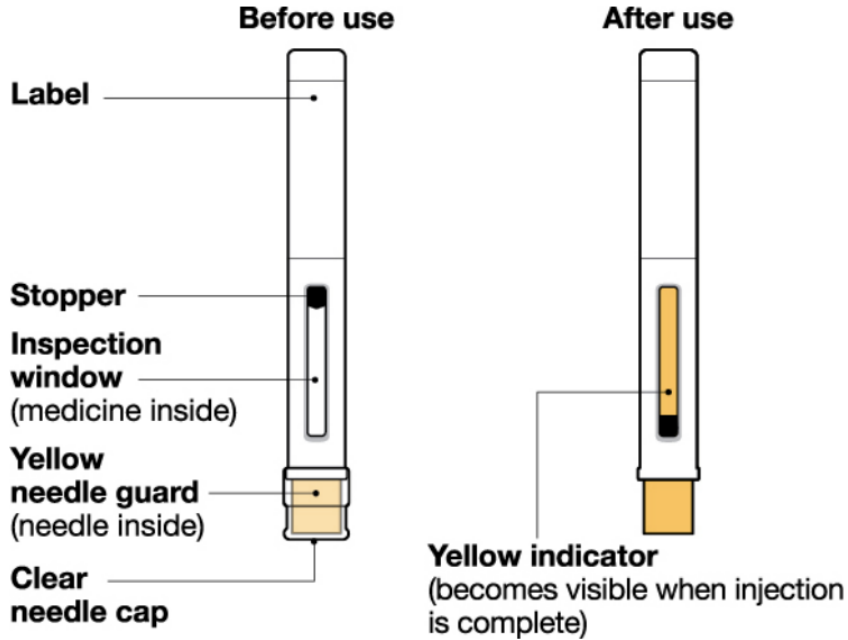
## Side effects

- Headache, injection site reaction, back pain, fatigue, hypersensitivity reactions

## Clinical Pearls

- May administer at home or in healthcare facility
- Possibility to reactivate herpes zoster
- Rare hypersensitivity reactions - anaphylaxis, angioedema, and bronchospasm
- Reduces exacerbations by 50%
- Median oral corticosteroid dose reduction: 50%

# Nucala Device



# Nucala Patient Assistance

- Nucala Copay Program - commercially insured patients
- GSK Patient Assistance Program
  - Eligible if
    - Uninsured
    - Medicare and other program requirements
    - Live in the US or Puerto Rico
    - Meet financial income eligibility criteria
- Not covered by Alabama Medicaid

# Reslizumab (Cinqair)

## MOA

- Anti- IL-5R

## Administration

- $\geq 18$  years old - 3 mg/kg once every 4 weeks by IV infusion over 20-50 minutes

## Side Effects

- Oropharyngeal pain

## Clinical Pearls

- Only weight based IV biologic approved for asthma
- Only Indicated for severe eosinophilic asthma
- Must be administered in a healthcare facility
- Box warning for anaphylaxis
- Reduces exacerbation by 50-60%
- No change in oral corticosteroid median dose

# Cinqair Device



CINQAIR is given by a healthcare provider using a 50-mL bag—the smallest IV bag available.



# Cinqair Patient Assistance

- Cinqair Cost Support Program
  - Commercial health insurance
- Others listed on website for Medicare
  - Patient Access Network Foundation (PANF)
  - Healthwell Foundation
  - Patient Advocate Foundation
- Uninsured
  - Teva Cares Foundation



# Benralizumab (Fasenra)

## MOA

- Anti- IL-5R

## Administration

- $\geq 12$  years old - 30 mg SC every 4 weeks for the first 3 doses, followed by every 8 weeks thereafter
- 6-11 years old -  $< 35$  kg: 10 mg SC every 4 weeks for first 3 doses, followed by once every 8 weeks;  $\geq 35$  kg: adult dose

## Side Effects

- Headache and pharyngitis

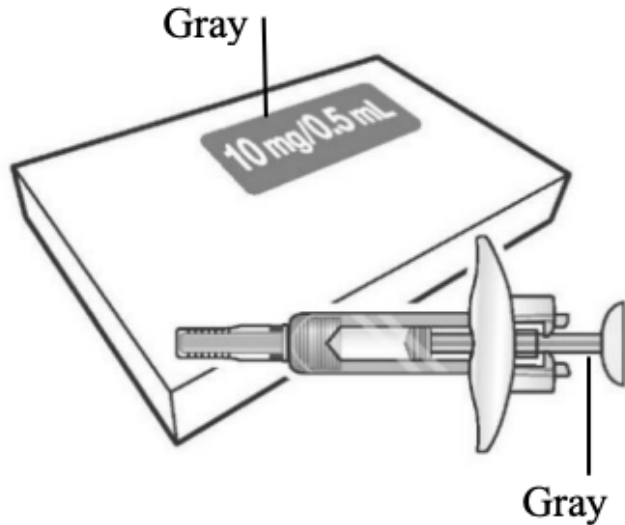
## Clinical Pearls

- Only subcutaneous biologic approved for asthma that allows for every 8-week administration after 1st 3 doses
- May administer at home or in healthcare facility
- Rare hypersensitivity reactions - anaphylaxis, angioedema, and bronchospasm
- Reduces exacerbations by 25-60%
- Median OCS dose reduction: 75%

# Fasenra Device

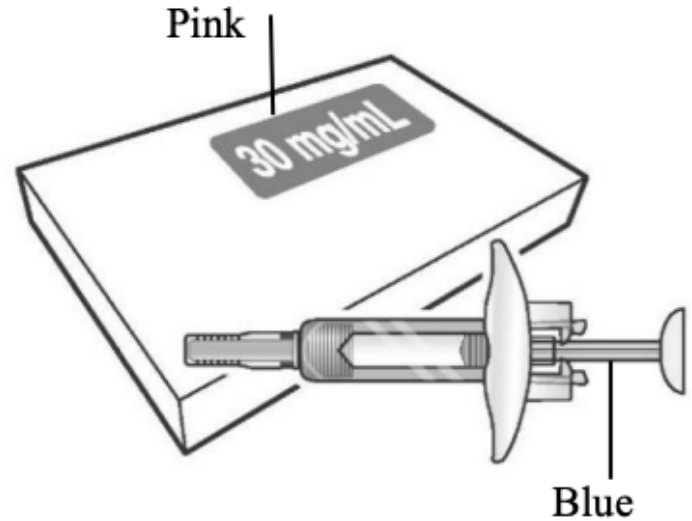
FASENRA 10 mg (10 mg/0.5 mL)

prefilled syringe with a gray plunger rod



FASENRA 30 mg (30 mg/mL)

prefilled syringe with a blue plunger rod



# Fasenra Patient Assistance

- **Fasenra 360 Savings Program**
  - Commercial insurance
  - Resident of US or US territories
  - Not enrolled in a government-funded program
- **Denied Patient Savings Program**
  - Commercial insurance
  - Prior authorization and PA appeal denied by insurance company
  - Prescribed for an approved use
- **Not covered by Alabama Medicaid**

# Dupilumab (Dupixent)

## MOA

- Anti-IL-4R

## Side Effects

- Injection site reaction, oropharyngeal pain, and eosinophilia

## Clinical Pearls

- Also FDA approved for atopic dermatitis, chronic rhinosinusitis with nasal polyps, eosinophilic esophagitis, and prurigo nodularis

## Clinical Pearls (Continued)

- May administer at home or in healthcare facility
- Rare hypersensitivity reactions - anaphylaxis, angioedema, and bronchospasm
- Hypereosinophilia (count  $\geq 1500/\text{mCL}$  - can persist after 6 months in 14% of the 4-25% of patients that are affected. Not suggest to use if blood eosinophils are  $> 1500/\text{mCL}$
- Reduces exacerbations by 50-70%
- Median OCS dose reduction: 70%

# Dupixent Administration

## Asthma

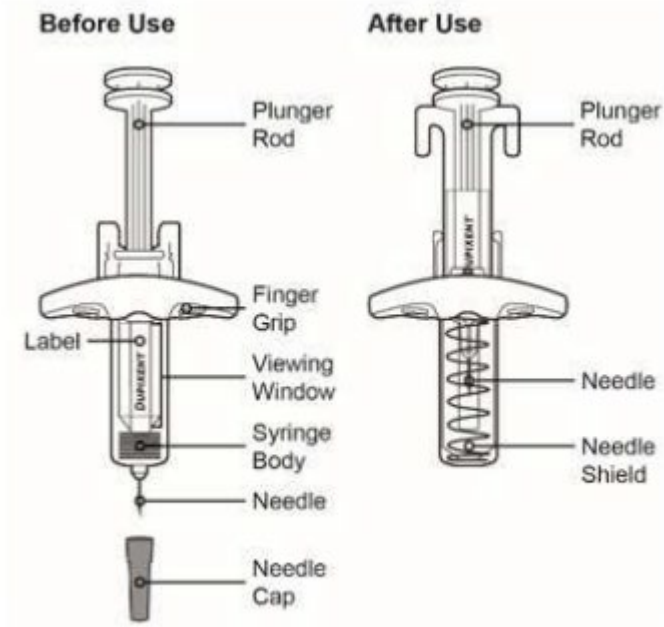
*Dosage in Adult and Pediatric Patients 12 Years and Older (2.4):*

<b>Initial Loading Dose</b>	<b>Subsequent Dosage</b>
400 mg (two 200 mg injections)	200 mg every 2 weeks (Q2W)
Or	
600 mg (two 300 mg injections)	300 mg every 2 weeks (Q2W)
<b>Dosage for patients with oral corticosteroid-dependent asthma or with co-morbid moderate-to-severe atopic dermatitis or adults with co-morbid chronic rhinosinusitis with nasal polyposis</b>	
600 mg (two 300 mg injections)	300 mg every 2 weeks (Q2W)

*Dosage in Pediatric Patients 6 to 11 Years of Age (2.4):*

<b>Body Weight</b>	<b>Initial Dose and Subsequent Dosage</b>
15 to less than 30 kg	300 mg every four weeks (Q4W)
≥30 kg	200 mg every other week (Q2W)

# Dupixent Device



# Dupixent Patient Assistance

- Dupixent MyWay copay card
  - Commercial insurances - health insurance exchanges, federal employee plans, or state employee plans
  - Resident of US, DC, Puerto Rico, Guam, or USVI
  - Prescribed for an indication approved by the FDA
- Dupixent MyWay Patient Assistance Program
  - For uninsured
  - If Medicaid does not cover
- Not covered on Alabama Medicaid

# Tezepelumab (Tezspire)

## MOA

- Anti-TSLP (thymic stromal lymphopoietin): binds circulating TSLP and inhibits it to prevent inflammation in the asthma pathway

## Administration

- ≥ 12 years old: 210 mg subcutaneously every 4 weeks

## Side Effects

- Pharyngitis, arthralgia, back pain

## Clinical Pearls

- May administer at home or in health care facility
- Greater clinical benefit in patients with higher blood eosinophils and/or higher FeNO
- 56-71% reduction in asthma exacerbations
  - 41% decrease in patients with eosinophil counts < 300/mcL
- No change in OCS median dose



# Tezpire Device



# Tezspire Patient Assistance

- Tezspire Together Fast Start Program
  - Commercial insurance only
- Tezspire Together Copay Program
  - Commercial insurance only
- Not covered by Alabama Medicaid

# Managing Side Effects of Monoclonal Antibodies

- Injection site reactions: using a cold compress
- Headaches/pain: acetaminophen or ibuprofen
- Upper respiratory site infections: will need to go to a healthcare setting
- Allergic reactions: will need to go to a healthcare setting immediately

# Quiz Questions

1. Which type of severe asthma is most likely to benefit from a monoclonal antibody targeting IgE?
  - a. Eosinophilic asthma with high blood eosinophil count
  - b. Allergic asthma with high blood IgE levels
  - c. Neutrophilic asthma with frequent infections
  - d. Non-allergic asthma with unknown triggers

# Quiz Questions

2. Monoclonal antibodies are typically used as a first-line treatment for severe asthma.

- a. True
- b. False

# Quiz Questions

3. Which of the following is a common side effect of monoclonal antibody treatment for asthma?

- a. Improved lung function
- b. Increased risk of upper respiratory infections
- c. Faster-acting bronchodilation
- d. Reduced dependence on inhaled corticosteroids

# Quiz Questions

4. A key factor in determining if a patient with severe asthma is a candidate for monoclonal antibodies is:
- a. Age of the patient
  - b. Response to current asthma medications
  - c. Severity of allergy symptoms
  - d. Presence of other chronic illnesses

# Quiz Questions

5. When compared to traditional asthma medications, monoclonal antibodies are administered:
- a. More frequently through a nebulizer
  - b. Less frequently, often via injection
  - c. Orally, with faster absorption rates
  - d. Topically, for direct airway delivery



# Quiz Questions

6. Which monoclonal antibodies must be administered in a healthcare setting? (Select all that apply)

- a. Omalizumab (Xolair)
- b. Mepolizumab (Nucala)
- c. Reslizumab (Cinqair)
- d. Benralizumab (Fasenra)
- e. Dupilumab (Dupixent)
- f. Tezepelumab (Tezspire)

# Resources

1. <https://ginasthma.org/wp-content/uploads/2023/09/GINA-Severe-Asthma-Guide-2023-WEB-WMS.pdf>
2. [https://www.gene.com/download/pdf/xolair\\_prescribing.pdf](https://www.gene.com/download/pdf/xolair_prescribing.pdf)
3. [https://www.xolair.com/?utm\\_source=google&utm\\_medium=cpc&utm\\_campaign=2023\\_Xolair\\_Branding\\_Google;S;PH;BR;RES;DTC;BR;S;PH;BR;ONC;DTC;BR&utm\\_content=General%20Exact&utm\\_term=xolair&gclid=CjwKCAjwoPOwBhAeEiwAJuXRh6zYijSFtjox2I4-zBF\\_OHW5WTEJXwKHWC7Qj0UdQok6ZHtMBy5nhoCEX8QAvD\\_BwE&gclid=aw.ds](https://www.xolair.com/?utm_source=google&utm_medium=cpc&utm_campaign=2023_Xolair_Branding_Google;S;PH;BR;RES;DTC;BR;S;PH;BR;ONC;DTC;BR&utm_content=General%20Exact&utm_term=xolair&gclid=CjwKCAjwoPOwBhAeEiwAJuXRh6zYijSFtjox2I4-zBF_OHW5WTEJXwKHWC7Qj0UdQok6ZHtMBy5nhoCEX8QAvD_BwE&gclid=aw.ds)
4. <https://www.xolair.com/allergic-asthma.html>
5. [https://gskpro.com/content/dam/global/hcpportal/en\\_US/Prescribing\\_Information/Nucala/pdf/NUCALA-PI-PIL-IFU-COMBINED.PDF](https://gskpro.com/content/dam/global/hcpportal/en_US/Prescribing_Information/Nucala/pdf/NUCALA-PI-PIL-IFU-COMBINED.PDF)
6. <https://www.gskforyou.com/programs/prescription-medicine-patient-assistance/>
7. <https://www.nucala.com/severe-asthma/savings-and-support/co-pay-program/>
8. <https://www.cinqair.com/globalassets/cinqair/prescribinginformation.pdf>
9. <https://www.cinqair.com/savings-and-support/>
10. [https://den8dhaj6zs0e.cloudfront.net/50fd68b9-106b-4550-b5d0-12b045f8b184/3647bed4-ce91-4fe7-9bc5-32dbee73f80a/3647bed4-ce91-4fe7-9bc5-32dbee73f80a\\_viewable\\_rendition\\_v.pdf](https://den8dhaj6zs0e.cloudfront.net/50fd68b9-106b-4550-b5d0-12b045f8b184/3647bed4-ce91-4fe7-9bc5-32dbee73f80a/3647bed4-ce91-4fe7-9bc5-32dbee73f80a_viewable_rendition_v.pdf)
11. <https://www.fasenra.com/savings-support>
12. [https://www.regeneron.com/downloads/dupixent\\_fpi.pdf](https://www.regeneron.com/downloads/dupixent_fpi.pdf)
13. [https://www.regeneron.com/downloads/dupixent\\_200mg\\_ifu.pdf](https://www.regeneron.com/downloads/dupixent_200mg_ifu.pdf)
14. <https://www.dupixent.com/support-savings/cost-insurance>
15. [https://den8dhaj6zs0e.cloudfront.net/50fd68b9-106b-4550-b5d0-12b045f8b184/e306dc06-d580-4457-b15f-9f28545ad63a/e306dc06-d580-4457-b15f-9f28545ad63a\\_viewable\\_rendition\\_v.pdf](https://den8dhaj6zs0e.cloudfront.net/50fd68b9-106b-4550-b5d0-12b045f8b184/e306dc06-d580-4457-b15f-9f28545ad63a/e306dc06-d580-4457-b15f-9f28545ad63a_viewable_rendition_v.pdf)
16. <https://www.tezspirehcp.com/practice-and-patient-tools-and-resources/patient-support-program.html>