Monoclonal Antibody Therapy for COVID-19

Federal Bureau of Prisons

Clinical Guidance

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What's New

- On April 16, 2021, the FDA revoked the Emergency Use Authorization (EUA) for bamlanivimab *when administered alone* for the treatment of mild-to-moderate COVID-19 due to emerging resistance from SARS-CoV-2 viral variants. Bamlanivimab and etesevimab has received EUA for treatment of mild-to-moderate COVID-19. This document has been updated throughout to reflect this change.
- The EUA for casirivimab and imdevimab has been updated and changes made to reflect changes to the dose preparation and administration instructions.

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A. PURPOSE

The purpose of this document is to provide guidance on the use of monoclonal antibody (mAb) for the outpatient treatment of mild to moderate COVID-19 in patients with certain risk factors for severe COVID-19 illness.

B. INTRODUCTION

Infection with SARS-CoV-2, the virus that causes COVID-19, can lead to severe symptoms, hospitalization, and death. Two monoclonal antibody products have received FDA Emergency Use Authorization (EUA) for treatment of COVID-19 patients with mild to moderate symptoms and risk factors for severe illness.

- Studies have shown a 10% or greater absolute risk reduction in the need for emergency department visits and hospitalization with mAb treatment.
- Treatment has the potential to prevent progression to severe disease and decrease the number of inmates who need hospitalization in the local community, thereby reducing the overall strain on the healthcare system during times of peak SARS-CoV-2 transmission.
- Treatment appears to work best when started early after the diagnosis is made in appropriately-selected patients. For that reason, it is recommended that each newly diagnosed inmate with COVID-19 be assessed for possible treatment with this medication.
- To prepare for this as part of their COVID-19 pandemic response plan, each institution will need to assess their ability to administer an IV infusion in consultation with regional healthcare leadership.

➔ *In order to use these medications, institutions must be prepared to manage severe allergic reactions including anaphylaxis.*

➔ *Patients meeting criteria for treatment with monoclonal antibody will also meet criteria for medical isolation. Staff who have direct or close contact with the patient will need to wear PPE and follow procedures as described in Modules 2 and 3 of the BOP COVID-19 Pandemic Plan, which may be found at https://sallyport.bop.gov/co/hsd/infectious_disease/covid19/covid19_guidance.jsp#1_2.*

C. PATIENT SELECTION

All of the following criteria must be met in order for a patient to be considered for treatment with COVID-19 monoclonal antibody therapy:

- Positive results of direct SARS-CoV-2 viral testing *and*
- A clinical presentation of mild to moderate COVID-19 symptoms *and*
- Symptom onset within the 10 days preceding mAb treatment *and*
- Risk factors for severe COVID-19 illness (see Risk Factors for Severe COVID-19 Illness below) *and*
- Age ≥ 12 years old; weight ≥ 40 kg (88 lb)

CONFIRMED SARS-COV-2 INFECTION

Patients must have positive results of direct SARS-CoV-2 viral testing **no more than 10 days prior** to starting the mAb infusion.

➔ *Commercial lab PCR test, rapid PCR test (Abbott ID Now) or Rapid Ag test (BinaxNOW) are all acceptable means of confirming infection.*

Clinical Presentation

Patients with risk factors for severe COVID-19 illness and one or more of the following mild or moderate COVID-19 symptoms **may be considered for treatment** with mAbs for COVID-19:

- Fever
- Cough
- Sore throat
- Malaise
- Headache
- Muscle pain
- Gastrointestinal symptoms
- Shortness of breath with exertion.

➔ *Symptom onset must be within the 10 days preceding mAb treatment.*

Risk Factors for Severe COVID-19 Illness

Treatment is indicated for patients who are ≥ 18 year old with *at least one* of the following risk factors for progression to severe disease:

- Body mass index (BMI) ≥35
- Chronic kidney disease (CKD)
- Type 1 or type 2 diabetes
- Immunosuppressive disease
- ≥ 65 years of age
- Are currently receiving immunosuppressive treatment
- ≥ 55 years of age AND one of the following:
  - cardiovascular disease (CVD)
  - hypertension
  - chronic obstructive pulmonary disease (COPD) or other chronic respiratory disease

Exclusions to Treatment with Monoclonal Antibody for COVID-19

Treatment is not authorized by the FDA EUA for use in patients with any of the following conditions:

- Hospitalized due to COVID-19
- Require oxygen therapy due to COVID-19, OR
- Require an increase in baseline oxygen flow rate due to COVID-19 in those on chronic oxygen therapy due to underlying non-COVID-19 related comorbidity

Patients with any of the following criteria should be excluded from further evaluation for treatment with mAbs for COVID-19 based on clinical indicators of severe infection:

- Oxygen saturation (SpO2) ≤ 93% on room air
- Respiratory rate ≥ 30 per minute
- Heart rate ≥125 per minute

➔ *Inmates with clinical indicators of severe COVID-19 illness should be considered for transfer to an outside hospital, as clinically indicated.*

Other criteria which may exclude a patient from treatment include:

- Pregnancy and lactation: Safety and efficacy of COVID-19 mAbs are not known in these populations. Treatment may be considered on a case-by-case basis.
- COVID-19 monoclonal antibodies should not be administered to anyone with known allergies to any of the components used in the formulation of the interventions

PATIENT PRIORITY LEVELS

When quantities of bamlanivimab and etesevimab or casirivimab and imdevimab are limited, patients may need to be prioritized for treatment. The following are suggested priority criteria for use in these situations, which may be adapted as appropriate and as needed dependent upon circumstances at each institution.

PRIORITY 1 PATIENT CRITERIA:

- Three or more risk factors for progression to severe disease ***or***
- ≤ 3 days of symptoms ***or***
- Any one of the following risk factors:
  - Body mass index (BMI) ≥35
  - Type 1 or type 2 diabetes
  - ≥ 65 years of age

PRIORITY 2 PATIENT CRITERIA:

- Two or more risk factors for progression to severe disease

PRIORITY 3 PATIENT CRITERIA:

- One risk factor for progression to severe disease

➔ *Contact the Regional Medical Director (RMD) to discuss any proposed deviation from the above criteria.*
➔ *Submission and approval of a non-formulary request is required prior to initiation of either medication.*

D. MEDICATIONS

At this time two monoclonal antibody therapies have received Emergency Use Authorization from the FDA for patients who are COVID-19 positive. They are considered to be reasonable treatment options for COVID-19 patients who are at high risk for progression to severe disease or hospitalization (see *Patient Selection* above). It is important for the patient to make an informed decision about treatment, taking into account both the potential benefit of the treatment and the limited safety and efficacy data upon which the EUA decision was based.

- **BAMLANIVIMAB AND ETESEVIMAB** (administered together) are both recombinant neutralizing human IgG1k monoclonal antibodies to the spike protein of SARS-CoV-2. Bamlanivimab and etesevimab bind to the spike protein, blocking attachment to the human ACE2 receptor.
- **CASIRIVIMAB AND IMDEVIMAB** (administered together) are recombinant human (IgG1κ and IgG1λ, respectively) monoclonal antibodies to the spike protein of SARS-CoV-2. Casirivimab and imdevimab bind to non-overlapping epitopes of the spike protein receptor binding domain, blocking attachment to the human ACE2 receptor.

➔ *The FDA Fact Sheet for Health Care Providers Emergency Use Authorization of bamlanivimab and etesevimab can be found here:* https://www.fda.gov/media/145802/download

➔ *The FDA Fact Sheet for Health Care Providers Emergency Use Authorization of casirivimab and imdevimab can be found here:* https://www.fda.gov/media/145611/download

E. PATIENT EDUCATION

- Prior to administration of a mAb for COVID-19, the healthcare provider should communicate information consistent with the "Fact Sheet for Patients, Parents and Caregivers" (and provide a copy of the Fact Sheet) to include:
  - FDA has authorized the emergency use of mAbs for the treatment of mild to moderate COVID-19 in adults (weighing at least 40 kg) with positive results of direct SARS-CoV-2 viral testing, and who are at high risk for progressing to severe COVID-19 and/or hospitalization.
  - The significant known and potential risks and benefits of mAbs for COVID-19, and the extent to which such potential risks and benefits are unknown.
  - Information on available alternative treatments and the risks and benefits of those alternatives.
- Obtain informed consent from the patient prior to preparing IV solution.

➔ *The FDA Fact Sheet for Patients, Parents and Caregivers Emergency Use Authorization of bamlanivimab and etesevimab can be found here:* https://www.fda.gov/media/145803/download

➔ *The FDA Fact Sheet for Patients, Parents and Caregivers Emergency Use Authorization of casirivimab and imdevimab can be found here*: https://www.fda.gov/media/145612/download

F. DOSING, ADMINISTRATION, AND STORAGE

ADULT DOSING

- **BAMLANIVIMAB AND ETESEVIMAB**
  - Bamlanivimab 700 mg and etesevimab 1400 mg as a single-dose IV infusion (administered together)
  - Administered as soon as possible after a positive SARS-CoV-2 test and within 10 days of symptom onset.
- **CASIRIVIMAB AND IMDEVIMAB**
  - Casirivimab 1200 mg and imdevimab 1200 mg as a single dose IV infusion (administered together)
  - Administered as soon as possible after a positive SARS-CoV-2 test and within 10 days of symptom onset.

➔ *There are no dosing adjustments recommended for renal or hepatic impairment.*

PREPARATION

Solution for infusion of either mAb should be prepared by a qualified healthcare professional using aseptic technique:

- Remove the vials from refrigerated storage and allow to equilibrate to room temperature for approximately 20 minutes before preparation. Do not expose to direct heat. Do not shake the vial.

- Inspect visually for particulate matter and discoloration.
  - Bamlanivimab and etesevimab is a clear to opalescent and colorless to slightly yellow to slightly brown solution.
  - Casirivimab and imdevimab should be clear to slightly opalescent, colorless to pale yellow.

DILUTION

BAMLANIVIMAB AND ETESEVIMAB

Dilute bamlanivimab and etesevimab using one250 mL prefilled 0.9% Sodium Chloride Injection bag for intravenous infusion according to the following instructions:

1. Withdraw 20 mL from ONE bamlanivimab vial and 40 mL from TWO etesevimab vials
2. Transfer all 60 mL to the 0.9% Sodium Chloride Injection infusion bag.
3. Discard any product remaining in the vial.
4. Gently invert IV bag by hand approximately 10 times to mix. **Do not shake**.

- **This product is preservative-free and therefore should NOT be prepared in advance.**
  - The diluted infusion solution should be administered **immediately** after it is prepared.
  - If the product is prepared in a *biological safety cabinet or laminar flow hood*, under USP <797> standards, and immediate administration is not possible, the diluted bamlanivimab and etesevimab infusion solution may be stored for up to 24 hours at refrigerated temperature (2°C to 8°C [36°F to 46°F]) or up to 7 hours at room temperature (20°C to 25°C [68°F to 77°F]) including infusion time. If refrigerated, allow the infusion solution to equilibrate to room temperature for approximately 20 minutes prior to administration.

CASIRIVIMAB AND IMDEVIMAB

Dilute both casirivimab and imdevimab using one 250 mL prefilled 0.9% Sodium Chloride Injection bag for intravenous infusion according to the following instructions:

1. Withdraw 10 mL of casirivimab and 10 mL of imdevimab from each respective vial using two separate syringes and dilute together in the infusion bag containing 0.9% Sodium Chloride Injection.
2. Discard any product remaining in the vials.
3. Gently invert infusion bag by hand approximately 10 times to mix. **Do not shake.**

- **This product is preservative-free and therefore should NOT be prepared in advance.**
  - The diluted infusion solution should be administered **immediately** after it is prepared.
  - If the product is prepared in a *biological safety cabinet or laminar flow hood*, under USP <797> standards, store the diluted casirivimab and imdevimab infusion solution in the refrigerator between 2°C to 8°C (36°F to 46°F) for no more than 36 hours and at room temperature up to 25°C (77°F) for no more than 4 hours, including infusion time. If refrigerated, allow the infusion solution to equilibrate to room temperature for approximately 30 minutes prior to administration.

→ *Casirivimab and imdevimab carton and vial labels may instead be labeled REGN10933 and REGN10987 respectively.*

TABLE 1: DILUTION AND ADMINISTRATION INSTRUCTIONS FOR MONOCLONAL ANTIBODIES FOR COVID-19

Drug (dose and volume to withdrawal from vial)	Number of vials	Volume of 0.9% Sodium Chloride required for dilution	Total Volume for Infusion	Maximum Infusion Rate	Minimum Infusion Time
Bamlanivimab[1] (700mg/20mL)	1 vial	250 mL	310 mL	310mL/hr[4]	60 minutes[4]
Etesevimab[1] (700mg/20mL)	2 vials				
Casirivimab[2] (1200mg/10mL)	1 vial of 11.1 mL *or* 4 vials of 2.5 mL[3]	250 mL	270 mL	310 mL/hr	52 minutes
Imdevimab[2] (1200mg/10mL)	1 vial of 11.1 mL *or* 4 vials of 2.5 mL[3]				

NOTE: casirivimab = REGN10933; imdevimab = REGN10987
[1] 700 mg of Bamlanivimab and 1400 mg of Etesevimab are to be administered together as a single interavenous infusion for a combined 2,100mg dose.
[2]1,200 mg of Casirivimab and 1,200 mg of Imdevimab are to be administered together as a single intravenous infusion for a combined 2,400 mg dose.
[3] One 11.1 mL vial of one antibody may be prepared with four 2.5 mL vials of the other antibody to create one treatment course.
[4] For patients weighing less than 50kg, the maximum infusion rate is 266 mL/hr and the minimum infusion time is 70 minutes.

ADMINISTRATION

The infusion solution should be administered by a qualified healthcare professional using the following instructions:

1. Gather the recommended materials for infusion:
   - Polyvinylchloride (PVC) infusion set containing a 0.20/0.22 micron in-line polyethersulfone (PES) filter
2. Attach the infusion set to the IV bag
3. Prime the infusion set
4. Administer the entire infusion solution in the bag via **IV infusion pump or gravity** over at least 60 minutes
   - If no pump is utilized, calculate the drip rate to ensure that the medication is delivered within required timeframe
   - The drip factor is included on the tubing package and is provided in gtts/ml
   - The formula for calculating drip rate is drip factor * infusion amount / 60 = number of drops per minute.
     - Examples:
       - Drip factor of 10 gtts/ml (200*10/60= 33.3 gtts/min)
       - Drip factor of 15 gtts/ml (200*15/60= 50 gtts/min)

(steps for administration continued on next page)

   - The prepared infusion solution should not be administered simultaneously with any other medication.
5. Once infusion is complete, flush the infusion line to ensure delivery of the required dose
6. Discard unused product
7. Clinically monitor patients during administration and observe patients for at least 1 hour after infusion is complete

ADVERSE EVENTS

There are limited clinical data available for bamlanivimab, etesevimab, casirivimab, or imdevimab. Serious and unexpected adverse events may occur that have not been previously reported with use.

- There is a potential for serious hypersensitivity reaction, including anaphylaxis, with administration of these medications. If signs and symptoms of a clinically significant hypersensitivity reaction or anaphylaxis occur, immediately discontinue administration and initiate appropriate medications and/or supportive therapy.
- Infusion-related reactions have been observed with administration of these medications. Signs and symptoms of infusion-related reactions may include:
  - Fever, chills, nausea, headache, bronchospasm, hypotension, angioedema, throat irritation, rash including urticaria, pruritus, myalgia, dizziness.
- If an infusion-related reaction occurs, consider slowing or stopping the infusion and administer appropriate medications and/or supportive care.
- The prescribing health care provider and/or the provider's designee are/is responsible for **mandatory reporting of all medication errors and serious adverse events** potentially related to mAb treatment within **7 calendar days** from the onset of the event.
  - Submit adverse event reports to FDA MedWatch: *https://www.accessdata.fda.gov/scripts/medwatch/index.cfm*
    - The reports should include unique identifiers and the words "[*name of mAb*] treatment under Emergency Use Authorization (EUA)" in the description section of the report.
    - A copy of the FDA MedWatch form should also be submitted to the manufacturer. The address for each is listed in the mAb EUA.
  - Adverse events should also be reported on the *BOP Adverse Events Dashboard*

STORAGE

- Both therapies are to be stored under refrigeration in unopened vials at 2°C to 8°C (36°F to 46°F) in the original carton to protect from light. Do not freeze, shake, or expose to direct light.

NURSING PROTOCOL FOR ADMINISTERING MONOCLONAL ANTIBODY INFUSION

The high transmissibility of SARS-CoV-2 may lead to widespread transmission, which often places increased demands on health care staff. The Nursing Protocol for Administering Monoclonal Antibody Infusion (see Appendix 1) has been developed to extend the capacity of health care staff to offer this treatment to more patients. Use of this protocol requires approval by the institution clinical director and documentation of training for each staff member who will utilize them.

Appendix 2 Protocol for Allergic Reactions to Monoclonal Antibody Infusions has been modified from the standard nursing protocol for allergic reactions to be specific for reactions to this medication.

APPENDIX 1. Nursing Protocol for Administering Monoclonal Antibody Infusions

All of the following criteria must be met in order for a patient to be considered for treatment with COVID-19 monoclonal antibody therapy. See below for a more detailed description.

- Positive results of direct SARS-CoV-2 viral testing *and*
- A clinical presentation of mild to moderate COVID-19 symptoms *and*
- Symptom onset within the 10 days preceding mAb treatment *and*
- Certain risk factors for severe COVID-19 illness *and*
- Age ≥ 18 years old; weight ≥ 40 kg (88 lb). (Patients between the ages of 12 and 18 years are not covered in this protocol.)

Patients meeting criteria for treatment with monoclonal antibody will also meet criteria for medical isolation. Staff who have direct or close contact with the patient will need to wear PPE and follow procedures as described in Modules 2 and 3 of the BOP COVID-19 Pandemic Plan.
https://sallyport.bop.gov/co/hsd/infectious_disease/covid19/covid19_guidance.jsp#1_2

PRESENTING PROBLEM: Patient is COVID-19 Positive

1. Confirm positive results of direct SARS-CoV-2 viral testing **no more than 10 days prior** to starting the mAb infusion.
2. Commercial lab PCR test, rapid PCR test (Abbott ID Now) or Rapid Ag test (BinaxNOW) are all acceptable means of confirming infection.

Subjective:

1. Onset and duration of COVID-19 symptoms
2. Nature of symptoms
   a. Loss of sense of taste or smell
   b. Reported fever
   c. Cough
   d. Sore Throat
   e. Malaise
   f. Headache
   g. Muscle Pain
   h. GI Symptoms: N/V/D
   i. Shortness of Breath w/ Exertion
3. Known history of allergies
   a. Food
   b. Medication
   c. Insects
4. Current medications including over the counter medications

Objective:

1. Vital Signs always including pulse oximetry
2. Positive COVID-19 Test Results; specimen must have been obtained within ten days prior to starting monoclonal antibody. Rapid molecular or antigen testing is acceptable.
3. Weight and BMI
4. Respiratory status
   a. Airway status
   b. Respiratory effort
   c. Lung sounds

Inclusion Criteria	**Exclusion Criteria**
Signs/Symptoms of mild to moderation COVID-19 illness *(refer to mAb Therapy for COVID-19 Clinical Guidance for a list of common signs/symptoms)* *AND* At least one of the following risk factors for severe COVID-19 Illness: • Body mass index (BMI) ≥35 • Chronic kidney disease (CKD) • Type 1 or type 2 diabetes • Immunosuppressive disease • ≥ 65 years of age • Are currently receiving immunosuppressive treatment • ≥ 55 years of age AND one of the following: ➢ cardiovascular disease (CVD) ➢ hypertension ➢ chronic obstructive pulmonary disease (COPD) or other chronic respiratory disease	• Currently hospitalized due to COVID-19 • Require oxygen therapy due to COVID-19 • Require an increase in baseline oxygen flow rate due to COVID-19 in those on chronic oxygen therapy due to underlying non-COVID-19 related comorbidity • Oxygen saturation (SpO2) ≤ 93% on room air • Respiratory rate ≥ 30 per minute • Heart rate ≥ 125 per minute • Known allergies to any of the components used in the formulation of the interventions • Weight less than 40 kg (88 lbs) • Pregnancy and lactation (Safety and efficacy of COVID-19 mAbs are not known in these populations. Treatment may be considered on a case-by-case basis.)

Assessment:

1. Potential for ineffective airway clearance related to COVID-19
2. Potential for impaired oxygenation secondary to COVID-19

Plan:

1. If patient meets inclusion criteria for administering medication obtain informed consent for:
   a. Bamlanivimab 700 mg and etesevimab 1400mg as single IV infusion over at least 60 minutes *OR* Casirivimab 1200mg and Imdevimab 1200mg as single IV infusion over at least 52 minutes (refer to Table 1 for additional information on infusion rates and times).
      ➔ *Both infusions require a non-formulary request to be submitted and approved.*
   b. 0.9% Normal Saline Flush, 30 ml, IV, post administration of mAb
   c. Monitor patient for allergic reaction throughout and for at least one hour post administration

2. For instructions on preparation and infusion of mAbs, refer to the BOP Clinical Guidance on Monoclonal Antibody Therapy for COVID-19.
3. Allergic reaction: If patient develops an allergic reaction to the medication, proceed to the attached Allergic Reaction Protocol (Differs slightly from National Nursing Allergic Reaction Protocol)
4. If patient does not meet inclusion criteria for administration of mAb for COVID-19, continue to monitor as clinically indicated or transfer to local hospital for further monitoring and treatment.
5. Contact the ordering provider for any questions or concerns identified while evaluating the patient, administering the mAb, and during the one hour post-infusion monitoring period.

Patient Education:

1. Discuss with patient that an adverse reaction may occur, and that they will be monitored throughout and at least one hour post infusion. If any reaction is suspected, the patient should report to staff immediately.
2. Patient will not be able to receive the COVID vaccine for at least 90 days post-infusion

Disposition:

1. Maintain in medical isolation until patient meets current criteria for release.

APPENDIX 2. PROTOCOL FOR ALLERGIC REACTIONS TO MONOCLONAL ANTIBODY INFUSIONS

PRESENTING PROBLEM: Allergic Reaction to the monoclonal antibody treatment

Subjective:

1. Onset and duration of symptoms
2. Nature of symptoms
    a. Difficulty breathing, swelling of throat, cough
    b. Rash, itch, hives
    c. Sneezing, watering eyes
3. Known history of allergies
    a. Food
    b. Medication
    c. Insects
4. Signs and Symptoms Specific for mAbs:
        a. Fever
        b. Chills,
        c. Nausea
        d. Headache
        e. Bronchospasm
        f. Hypotension
        g. Dizziness
        h. Angioedema
        i. Throat Irritation
        j. Rash Including urticarial, pruritus, myalgia
5. Current medications including over the counter medications

Objective:

1. Vital Signs always including pulse oximetry
2. Respiratory status
    a. Airway status
    b. Respiratory effort
    c. Lung sounds
3. Location of any erythema, urticaria, edema, insect stinger

Assessment:

1. Ineffective airway clearance related to pharyngeal swelling
2. Risk for decreased cardiac output related to allergic response
3. Risk for alteration in skin integrity related to allergic response
4. Alteration in comfort related to allergic response/sneezing
5. Potential for Impaired spontaneous ventilation

Plan:

1. Monitor the patients vitals throughout the infusion:
   a. Q15 minutes x 4, then
   b. Q30 minutes x2, and
   c. PRN
2. Minor allergic reaction, if a reaction is suspected, and is minor,
   a. Slow the infusion down to see if this helps.
   b. Considering administering the medications contained with the moderate allergic reaction section below
3. Moderate allergic reaction, as defined as generalized rash, scratchy throat, or difficulty breathing with O2 saturations <95% :
   a. Stop infusion
   b. Administer Oxygen to maintain saturations >95%
   c. Administer **diphenhydramine (Benadryl) 50 mg** IV Push
   d. Administer albuterol 0.083% metered dose inhaler (MDI) with spacer if wheezing is present; may repeat every 20 minutes for a total of three treatments. If patient cannot use MDI, albuterol 0.083% solution, 2.5 mg via nebulizer may be used. Follow BOP Pandemic Plan Module 7 for Aerosol Generating Procedures.
   e. Loosen tight clothing and provide calm environment
   f. If based on the nurse's assessment, taking into consideration hours of operations of the department and physician availability, the nurse can determine that the patient is safe to release back to the housing unit, or transfer to the local ER.
4. Severe reaction (*true anaphylaxis*) characterized by hypotension, inability to speak, severe dyspnea, etc.:
   a. Notify operations LT to initiate transport to local ER without delay.
   b. Administer **Epinephrine Auto-Injector** (Epi-Pen) subcutaneously into mid-outer thigh. May repeat every 5-15 minutes, not to exceed a total of three doses
   c. Place patient in supine position, unless respiratory status requires elevation of the head. Place pregnant patients on their left side.
   d. Monitor vitals every 5 minutes and continuous SpO2
   e. Oxygen 15 liters via NRB, monitor O2 Sat.
   f. Establish IV access with 1 liter of normal saline solution at KVO.
   g. If hypotensive (SBP<100 mmHg), administer fluid bolus in 500 ml increments checking vital signs after each bolus to a total dose of 2000 ml.
   h. If a patient is taking a beta-blocker (most end in –lol; e.g. metoprolol, propranolol, timolol), and is not responding to epi injections, then consider administering glucagon 1-5 mg, IV, over 5 minutes (Glucagon emergency kits only contain 1 mg solution)
   i. Time permitting; consider administering items identified in the Moderate Allergic Reaction section if not already done.

Patient Education:

1. Discuss with patient what caused the allergic reaction and possible methods to avoid exposure in the future.
2. If allergen is unknown, discuss possible suspects with patient. Encourage patient to start journal if appropriate documenting meals, medications, activities, etc.

3. Ensure that patient is fully aware of any changes to his medication regimen ordered by on call provider.
4. Ensure that patient is aware of any newly diagnosed allergens and what groups or classes of foods and medications to avoid.
5. If allergic reaction becomes more severe, report this change to medical.

Disposition:

1. See EMR Disposition field. Mark appropriate response.
2. If the patient was evaluated for a *moderate* reaction, then they will need to follow up the next AM for reevaluation.
3. If the patient was evaluated for a *SEVERE* reaction, then the patient will need to follow-up upon return from the hospital, and if they return after-hours, they will need to ensure they come to medical first thing in the AM for reevaluation.

Adverse Reaction Reporting:

Mandatory reporting of any adverse reaction is required **within 7 calendar days** from the onset of the event. Please report the adverse reaction through the BOP's and FDA's Reporting Systems and to the mAb manufacturer. Links are provided below.

- BOP's Medication Event Reporting Form
- Submit adverse event reports to FDA MedWatch. *https://www.accessdata.fda.gov/scripts/medwatch/index.cfm*
- A copy of the FDA MedWatch form should also be submitted to the manufacturer address listed in the mAb EUA.