
CONNECTING
CARE
A Multidisciplinary Panel Discussion
on the Use of Neutralizing Monoclonal Antibodies
in Ambulatory Patients With COVID-19
forefront
COLLABORATIVE

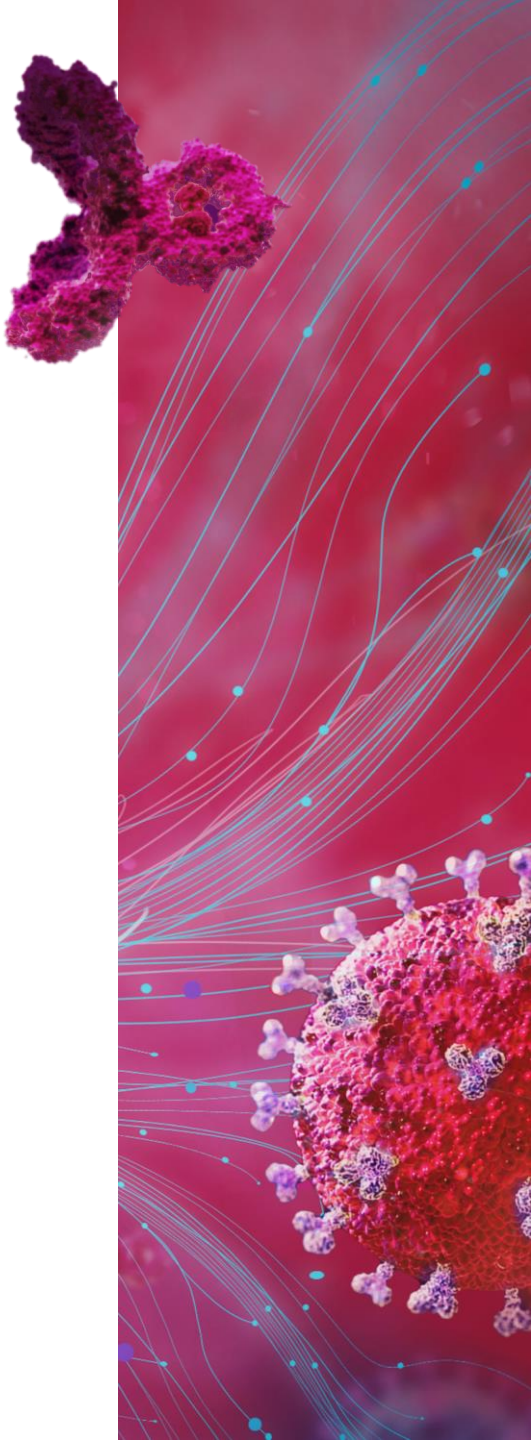
FACULTY AND DISCLOSURES

Karen Bloch, MD, MPH, FIDSA, FACP
Professor of Medicine,
Medical Director, COVID Infusion Clinic
Vanderbilt University Medical Center
Nashville, Tennessee

No relevant financial relationships to disclose

Jarrod W. Kile, RPh, BCPS
Clinical Pharmacy Specialist, Infectious Diseases
Co-Chair, Antimicrobial Stewardship Committee
Lehigh Valley Health Network
Allentown, Pennsylvania

Advisory Board
Shionogi Inc.



HOW TO CLAIM CREDIT

This activity is accredited for AMA, AANP, ANCC, and ACPE credit

To claim your credit, complete the evaluation at the end of the presentation

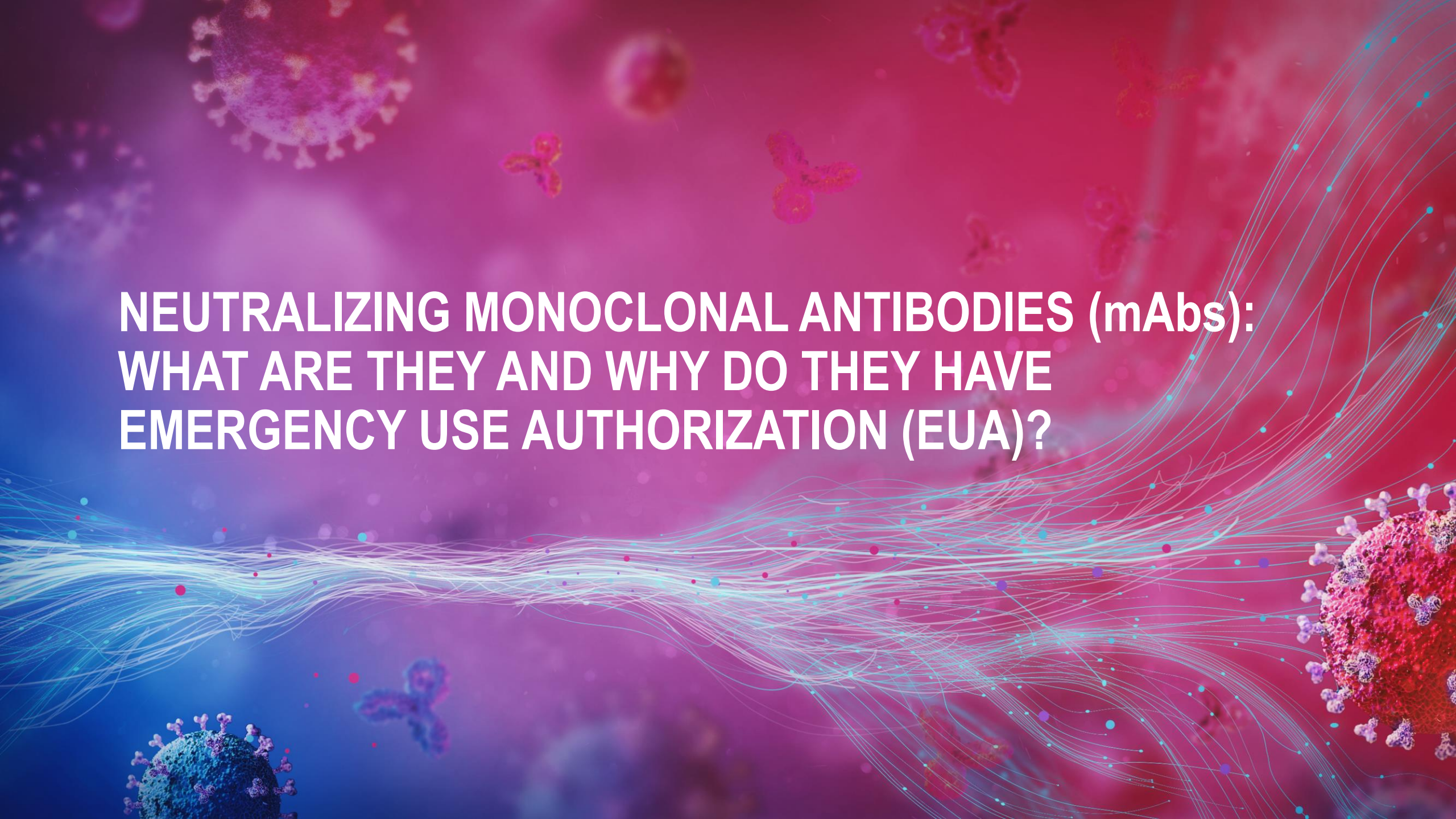
WE ENCOURAGE INTERACTION

Polling questions

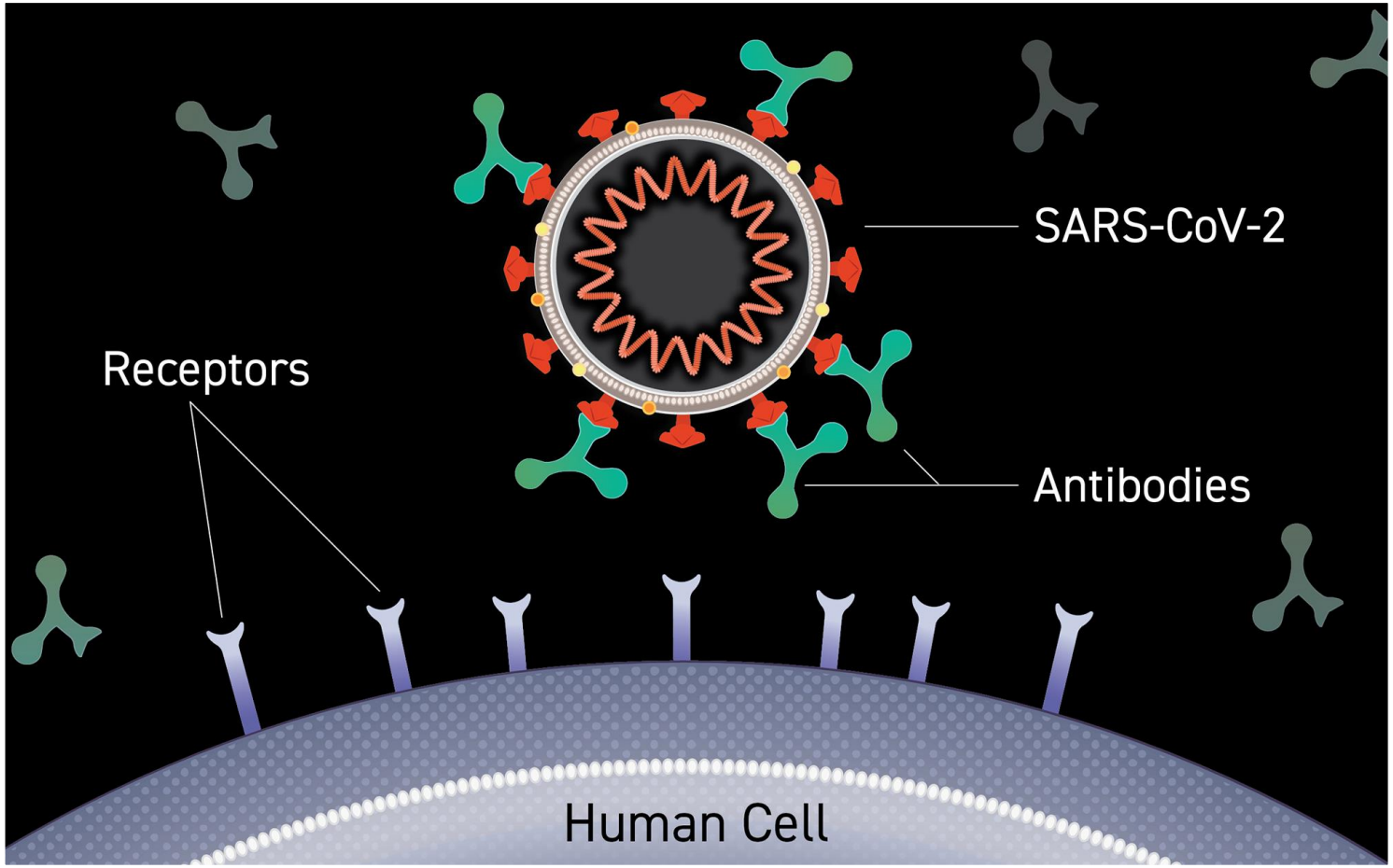
Submit your questions anytime

This continuing medical education activity will include reference(s) to unlabeled or unapproved uses of drugs or devices.

NEUTRALIZING MONOCLONAL ANTIBODIES (mAbs): WHAT ARE THEY AND WHY DO THEY HAVE EMERGENCY USE AUTHORIZATION (EUA)?

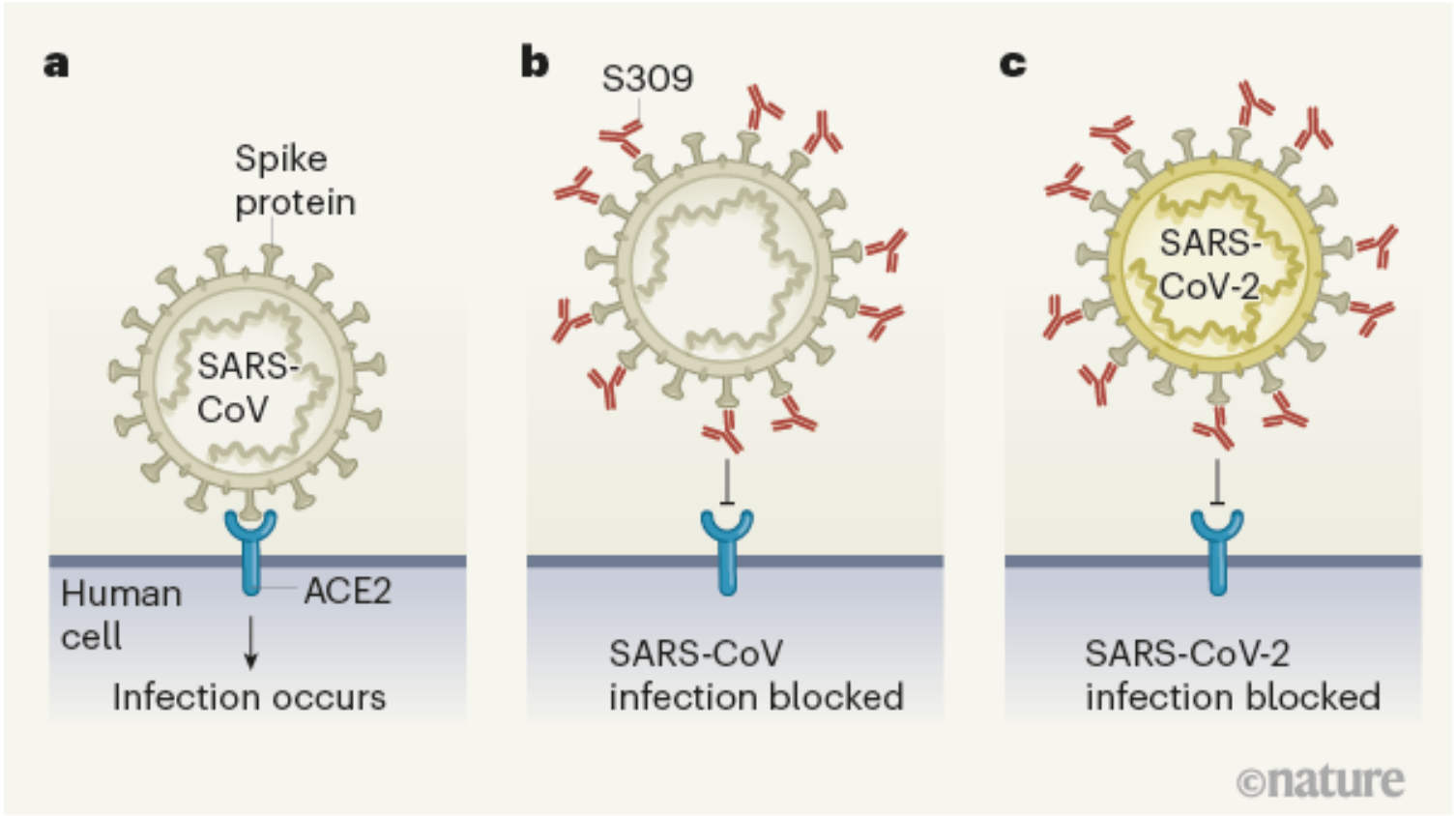


WHAT IS A NEUTRALIZING mAb?



https://www.nih.gov/news-events/news-releases/clinical-trials-monoclonal-antibodies-preventcovid-19-now-enrolling. Accessed February 2, 2021.

HOW DO NEUTRALIZING mAbs WORK?



ACE2=angiotensin-converting enzyme.

1. https://www.nature.com/articles/d41586-020-01816-5. Accessed February 4, 2021. 2. Pinto D, et al. *Nature*. 2020;583(7815):290-295.

WHAT NEUTRALIZING mAbs HAVE EUA?

Bamlanivimab[1]

Single mAb

Casirivimab/ imdevimab[2]

Combination mAb

Bamlanivimab/ etesevimab[3]

Combination mAb

1. https://www.covid19.lilly.com/assets/pdf/bamlanivimab/lilly-antibodies-playbook.pdf. Accessed January 11, 2021.
2. https://www.regeneron.com/casirivimabimdevimab. Accessed January 11, 2021.
3. https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-authorizes-monoclonal-antibodies-treatment-covid-19-0. Accessed February 10, 2021.

EXPERT PANEL GUIDELINES

National Institutes of Health

INSUFFICIENT DATA
to recommend for or against use

IDSA
Infectious Diseases Society of America

Recommend **AGAINST** routine use in ambulatory patients with COVID-19

In patients at high-risk a **REASONABLE** treatment option (uncertain benefit and risk)

PEDIATRIC CONSENSUS STATEMENT

Recommend **AGAINST** routine use in children and adolescents

COVID-19 is usually mild, so there is limited evidence of safety and efficacy in this population

Wolf J, et al. *J Pediatric Infect Dis Soc*. 2021.

WHICH OF THE FOLLOWING STATEMENTS REGARDING NEUTRALIZING mAbs FOR TREATING COVID-19 BEST APPLY TO YOUR PRACTICE?

A. Have prescribed neutralizing mAbs

B. Have administered neutralizing mAbs

C. Never utilized neutralizing mAbs in treatment of COVID-19

D. Plan to utilize neutralizing mAbs in treatment of COVID-19

WHY WERE THESE GRANTED EUA STATUS?

SINGLE NEUTRALIZING mAb[1]

ORIGINAL ARTICLE

SARS-CoV-2 Neutralizing Antibody LY-CoV555 in Outpatients with Covid-19

Peter Chen, M.D., Ajay Nirula, M.D., Ph.D., Barry Heller, M.D., Robert L. Gottlieb, M.D., Ph.D., Joseph Boscia, M.D., Jason Morris, M.D., Gregory Huhn, M.D., M.P.H.T.M., Jose Cardona, M.D., Bharat Mocherla, M.D., Valentina Stosor, M.D., Imad Shawa, M.D., Andrew C. Adams, Ph.D., Jacob Van Naarden, B.S., Kenneth L. Custer, Ph.D., Lei Shen, Ph.D., Michael Durante, M.S., Gerard Oakley, M.D., Andrew E. Schade, M.D., Ph.D., Janelle Sabo, Pharm.D., Dipak R. Patel, M.D., Ph.D., Paul Klekotka, M.D., Ph.D., and Daniel M. Skovronsky, M.D., Ph.D., for the BLAZE-1 Investigators*

COMBINATION NEUTRALIZING mAb[2]

ORIGINAL ARTICLE

REGN-COV2, a Neutralizing Antibody Cocktail, in Outpatients with Covid-19

D.M. Weinreich, S. Sivapalasingam, T. Norton, S. Ali, H. Gao, R. Bhore, B.J. Musser, Y. Soo, D. Rofail, J. Im, C. Perry, C. Pan, R. Hosain, A. Mahmood, J.D. Davis, K.C. Turner, A.T. Hooper, J.D. Hamilton, A. Baum, C.A. Kyratsous, Y. Kim, A. Cook, W. Kampman, A. Kohli, Y. Sachdeva, X. Graber, B. Kowal, T. DiCioccio, N. Stahl, L. Lipsich, N. Braunstein, G. Herman, and G.D. Yancopoulos, for the Trial Investigators*

COMBINATION NEUTRALIZING mAb[3]

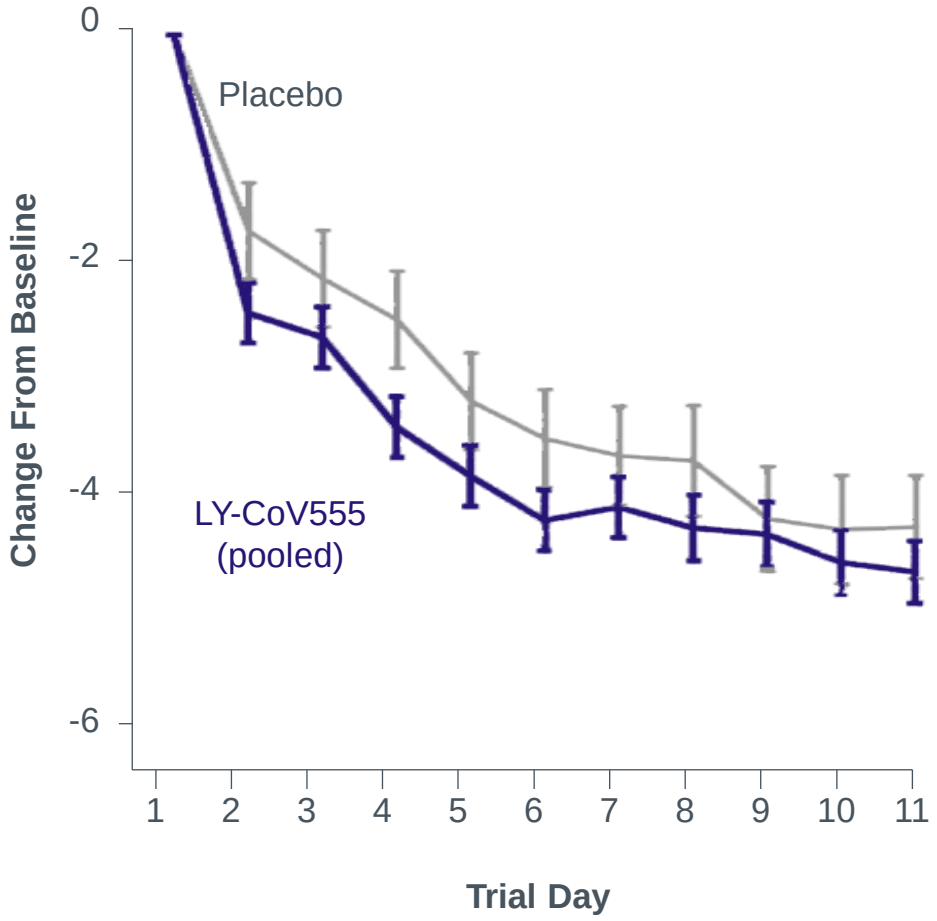
JAMA | Original Investigation

Effect of Bamlanivimab as Monotherapy or in Combination With Etesevimab on Viral Load in Patients With Mild to Moderate COVID-19
A Randomized Clinical Trial

Robert L. Gottlieb, MD, PhD; Ajay Nirula, MD, PhD; Peter Chen, MD; Joseph Boscia, MD; Barry Heller, MD; Jason Morris, MD, MS; Gregory Huhn, MD, MPHTM; Jose Cardona, MD; Bharat Mocherla, MD; Valentina Stosor, MD; Imad Shawa, MD; Princy Kumar, MD; Andrew C. Adams, PhD; Jacob Van Naarden, BS; Kenneth L. Custer, PhD; Michael Durante, MS; Gerard Oakley, MD; Andrew E. Schade, MD, PhD; Timothy R. Holzer, PhD; Philip J. Ebert, PhD; Richard E. Higgs, PhD; Nicole L. Kallewaard, PhD; Janelle Sabo, PharmD; Dipak R. Patel, MD, PhD; Paul Klekotka, MD, PhD; Lei Shen, PhD; Daniel M. Skovronsky, MD, PhD

1. Chen P, et al. *N Engl J Med*. 2020. 2. Weinreich DM, et al. *N Engl J Med*. 2020. 3. Gottlieb RL, et al. *JAMA*. 2021.

BAMLANIVIMAB: SYMPTOM IMPROVEMENT ACROSS 8 MEASURED DOMAINS



	Delta Value (95% CI)
Day 2	-0.79 (-1.35 to -0.24)
Day 3	-0.57 (-1.12 to -0.01)
Day 4	-1.04 (-1.60 to -0.49)
Day 5	-0.73 (-1.28 to -0.17)
Day 6	-0.79 (-1.35 to -0.23)
Day 7	-0.50 (-1.06 to 0.07)
Day 8	-0.65 (-1.28 to -0.02)
Day 9	-0.15 (-0.75 to 0.45)
Day 10	-0.32 (-0.94 to 0.29)
Day 11	-0.44 (-1.02 to 0.15)

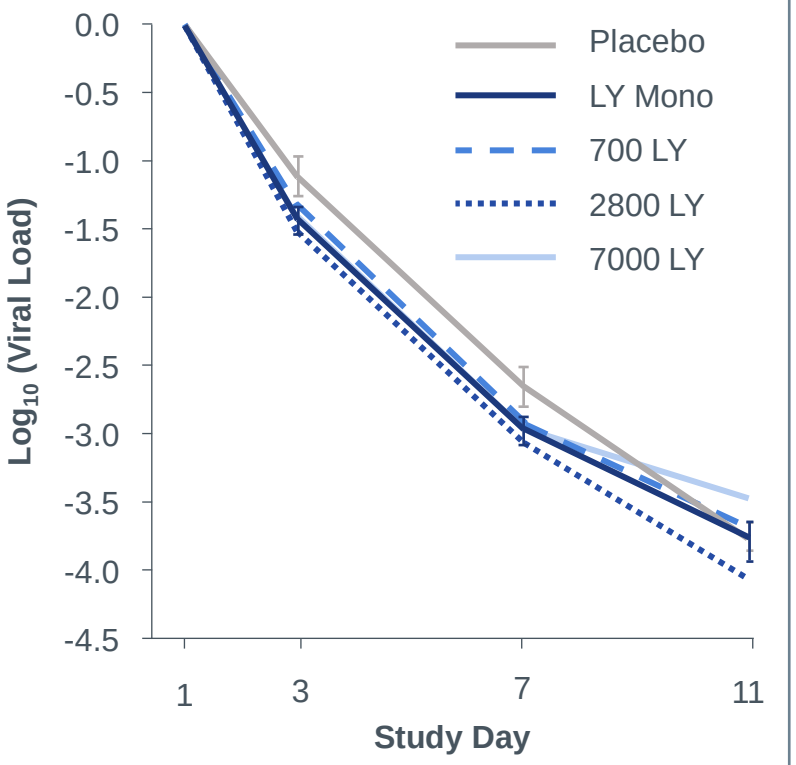
STUDY LIMITATIONS

Nasopharyngeal viral swab, although not yet validated, was used as a marker for viral load in the lungs and to correlate with clinical outcomes.

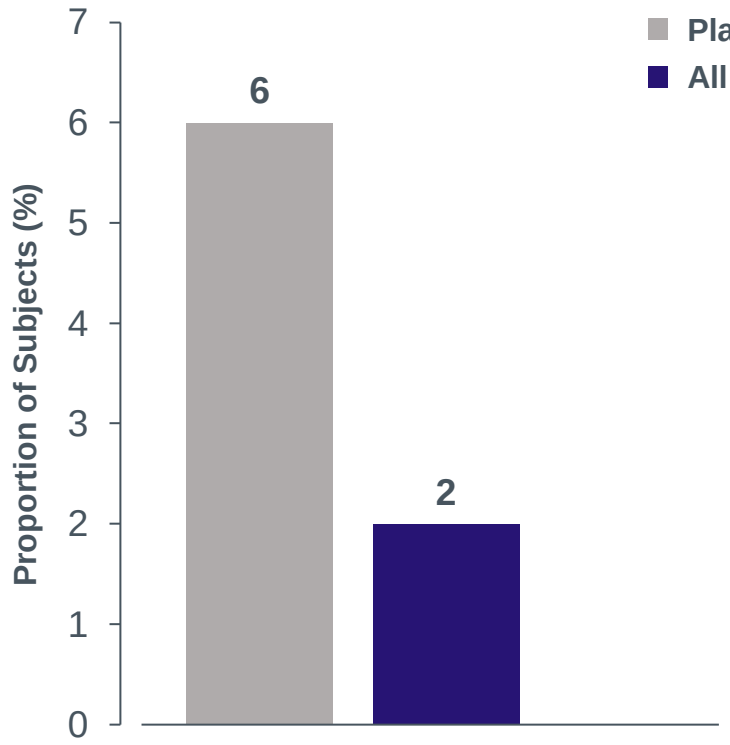
Chen P, et al. *N Engl J Med*. 2020.

DATA FROM FACT SHEET FOR EUA: BAMLANIVIMAB

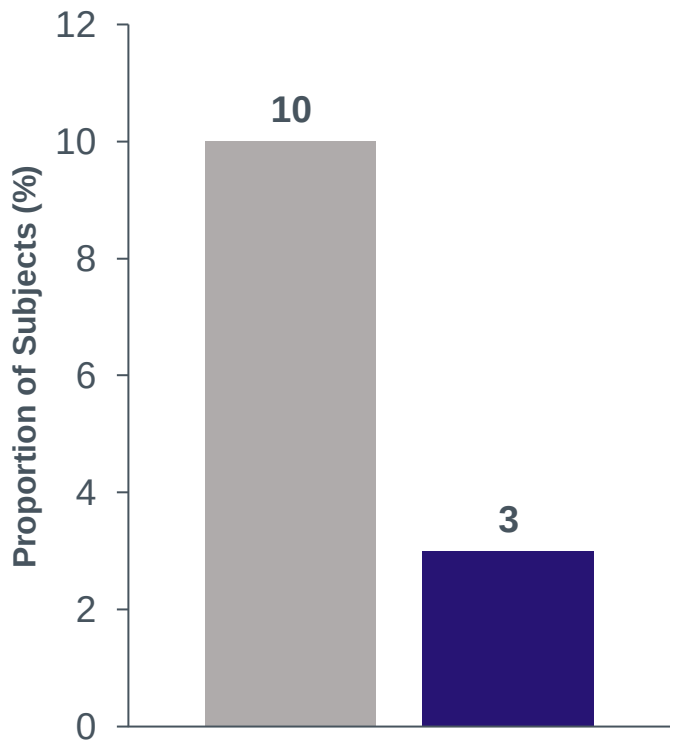
EFFECT ON VIRAL LOAD



HOSPITALIZATION OR ED VISITS IN 28 DAYS



HOSPITALIZATION OR ED VISITS IN 28 DAYS, HIGH-RISK SUBJECTS

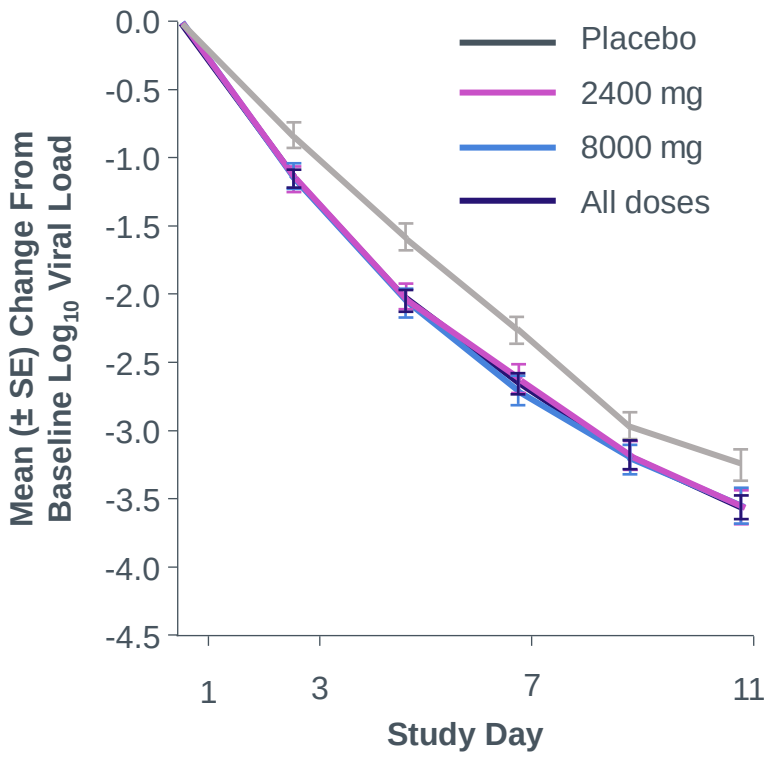


LY Mono=all bamlanivimab doses. 700 LY=bamlanivimab 700 mg. 2800 LY=bamlanivimab 2800 mg. 7000 LY=bamlanivimab 7000 mg. ED=emergency department.

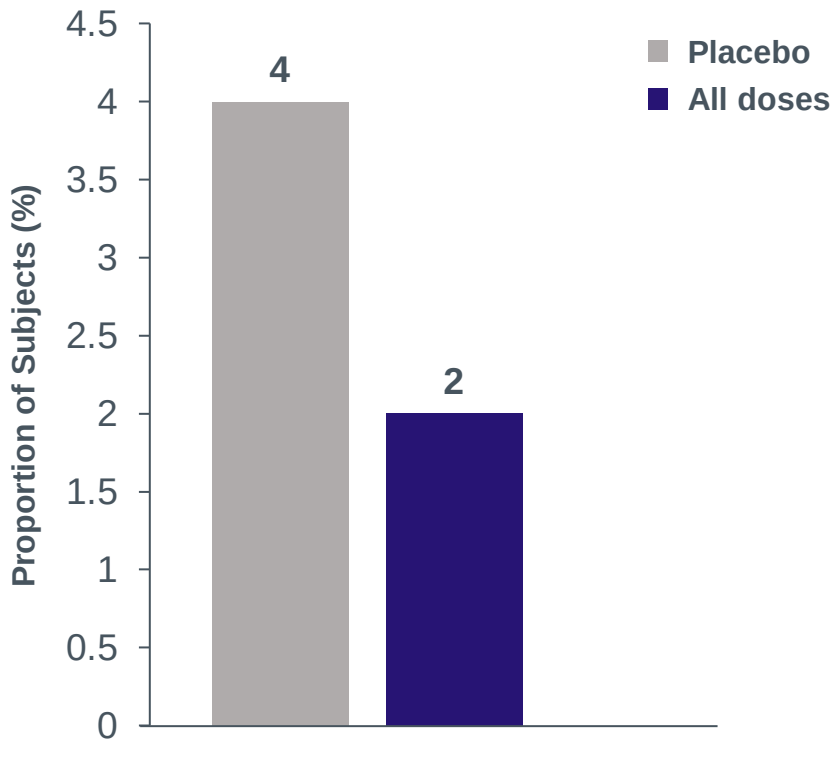
https://www.fda.gov/media/143603/download. Accessed February 2, 2021.

DATA FROM FACT SHEET FOR EUA: CASIRIVIMAB/IMDEVIMAB

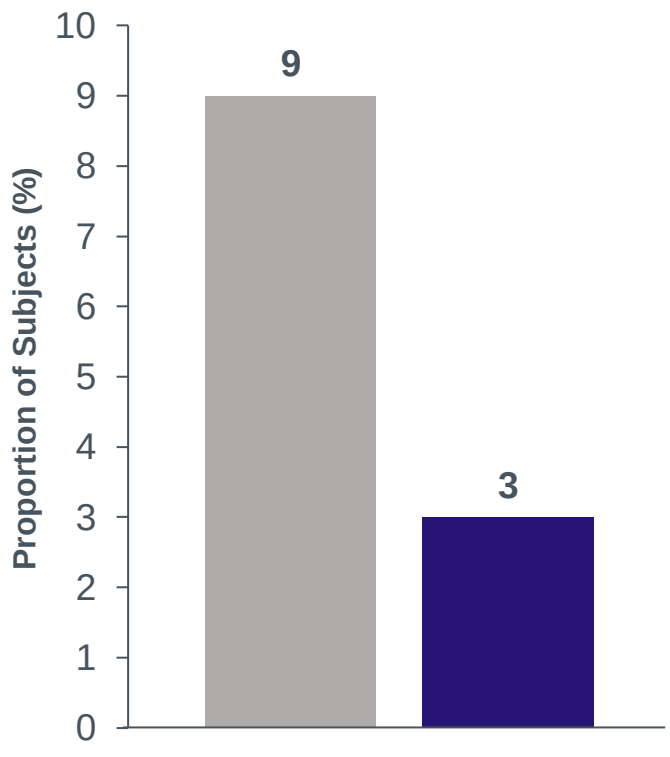
EFFECT ON VIRAL LOAD



HOSPITALIZATION OR ED VISITS IN 28 DAYS



HOSPITALIZATION OR ED VISITS IN 28 DAYS, HIGH-RISK SUBJECTS



https://www.fda.gov/media/143892/download. Accessed February 2, 2021.


WHAT ARE THE EUA CRITERIA?

WHAT ARE THE EUA CRITERIA?

CLINICAL FACTORS

Positive direct SARS-CoV-2 viral test

Mild to moderate COVID-19

Within 10 days of symptom onset

Age ≥12 years and >40 kg

At high risk for **progressing to severe COVID-19 and/or hospitalization**

https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization#coviddrugs. Accessed January 11, 2021.

WHO IS HIGH RISK?

BMI ≥35

Chronic kidney disease

Diabetes mellitus

Immunosuppressive disease or treatment

Age ≥65 years

Age ≥55-64 years and have
- Cardiovascular disease
- Hypertension
- Chronic pulmonary disease

BMI=body mass index.

1. https://www.covid19.lilly.com/assets/pdf/bamlanivimab/lilly-antibodies-playbook.pdf. Accessed January 11, 2021.
2. https://www.regeneron.com/casirivimabimdevimab. Accessed January 11, 2021.

WHO IS HIGH RISK (PEDIATRICS)?

Age 12-17 years of age and have one of the following

- BMI ≥85th percentile for age and gender
- Sickle cell disease
- Congenital or acquired cardiac disease
- Neurodevelopmental disorder
- Medical-related technological dependence
- Asthma or chronic respiratory disease requiring daily medication

1. https://www.covid19.lilly.com/assets/pdf/bamlanivimab/lilly-antibodies-playbook.pdf. Accessed January 11, 2021.
2. https://www.regeneron.com/casirivimabimdevimab. Accessed January 11, 2021.

WHEN ARE NEUTRALIZING mAbs NOT INDICATED?

Hospitalization due to COVID-19

Oxygen requirements

- New need for supplemental oxygen
- Increase in baseline oxygen flow rate due to COVID-19

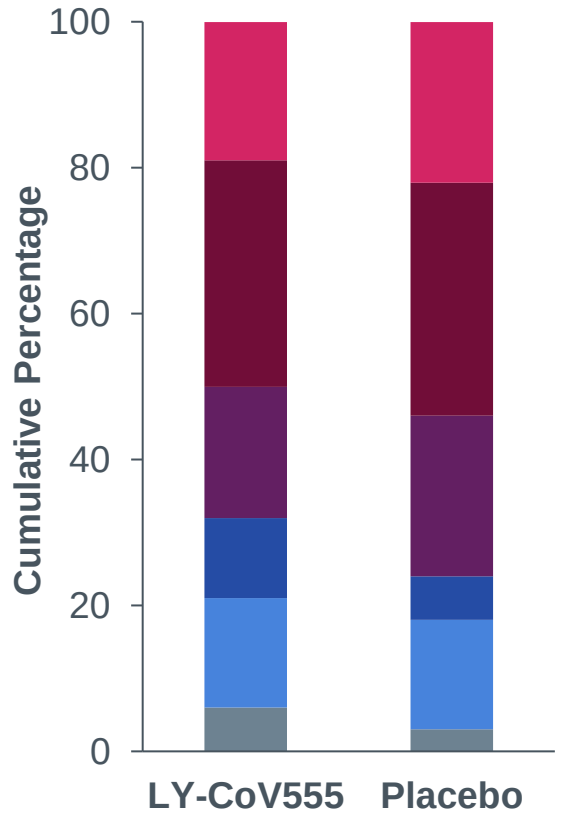
PREGNANCY AND BREASTFEEDING NOT CONTRAINDICATIONS

1. https://www.covid19.lilly.com/assets/pdf/bamlanivimab/lilly-antibodies-playbook.pdf. Accessed January 11, 2021.
2. https://www.regeneron.com/casirivimabimdevimab. Accessed January 11, 2021.

mAbs IN HOSPITALIZED PATIENTS

PULMONARY ORDINAL OUTCOME ON DAY 5

		LY-CoV555	Placebo
Category		Number of Patients (%)	
Better	1	31 (19.3)	33 (22.0)
	2	50 (31.1)	48 (32.0)
	3	29 (18.0)	231 (20.7)
	4	17 (10.6)	11 (7.3)
	5	25 (15.5)	22 (14.7)
	6	8 (5.0)	5 (3.3)
Worse	7	1 (0.6)	0 (0.0)



- Can independently undertake usual activities with minimal or no symptoms
- No supplemental oxygen; symptomatic and unable to independently undertake usual activities
- Supplemental oxygen <4 L/min
- Supplemental oxygen ≥4 L/min or end-organ manifestations
- Noninvasive ventilation, high-flow oxygen, or severe stroke (NIHSS score >14)
- Invasive ventilation, ECMO, mechanical circulatory support, renal replacement therapy, or vasopressor
- Death

Summary odds ratio:
0.85 (95% CI, 0.56-1.29); *P*=0.45

STUDY LIMITATIONS: It is not possible to make definitive statements about the safety of LY-CoVSSS compared with placebo because the sample size was smaller and the duration of follow-up was shorter than planned.

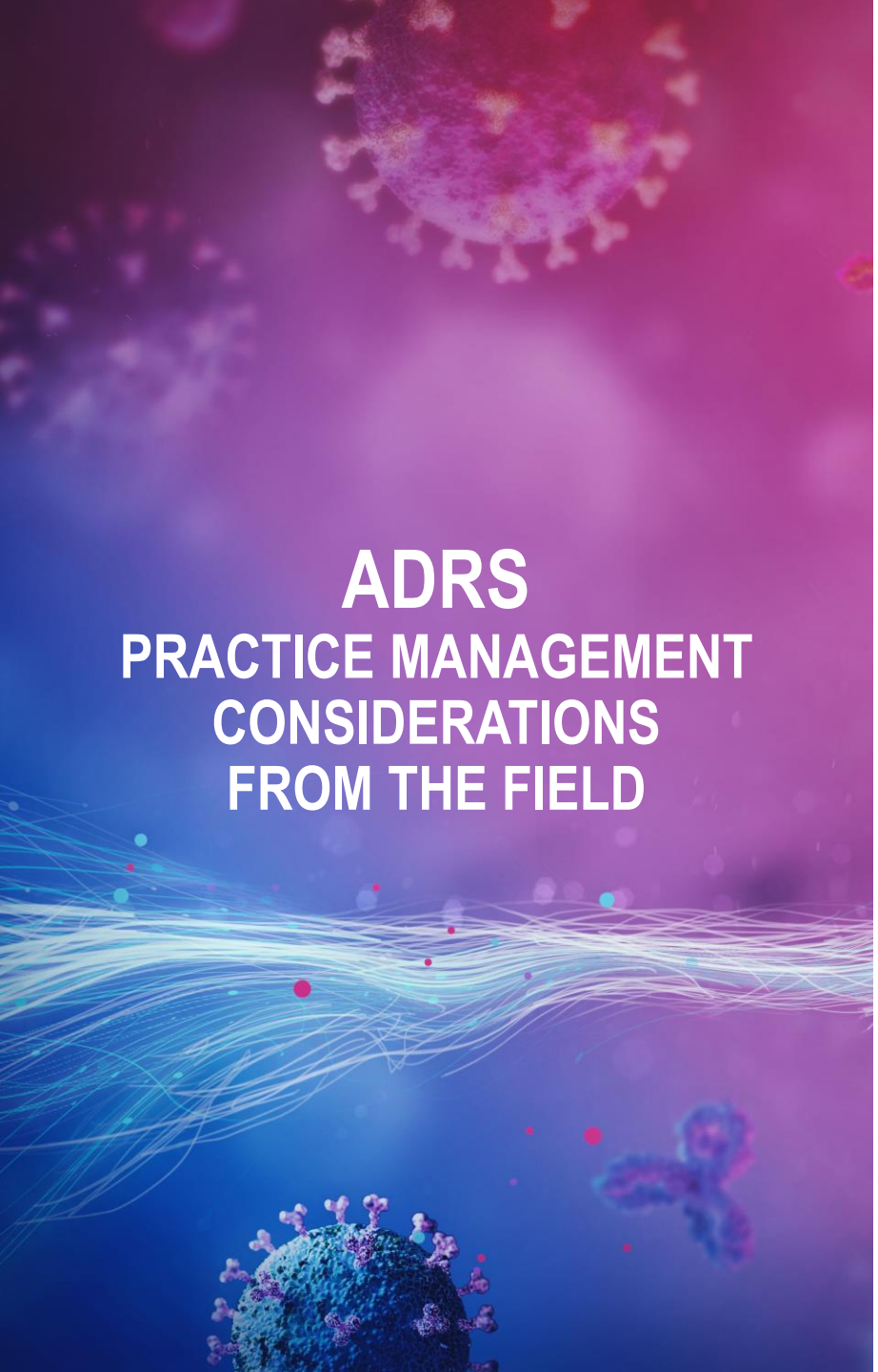
Lundgren JD, et al. *N Engl J Med.* 2020.

REMINDER

Submit questions for faculty response

Prepare for polling questions by texting
“**ReachMD**” to **22333**


WHAT HAPPENS DURING AND AFTER AN INFUSION?
What are the safety profiles of neutralizing mAb therapies?



ADRS
PRACTICE MANAGEMENT CONSIDERATIONS FROM THE FIELD

6 **ED visits following infusion**

13 **COVID-related hospital admissions post infusion**

5 **Current post-infusion deaths noted**

- Passive data collection
- Causality to infusion or COVID cannot be made

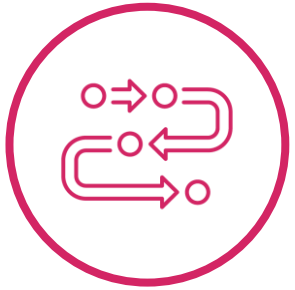
ADRS=adverse drug-related symptoms.

Data pull (1/29/21) kindly by Dr. Amy Slenker LVPG-Division of Infectious Diseases.

ADRS

PRACTICE MANAGEMENT CONSIDERATIONS FROM THE FIELD (CONT.)

NEED A PROCESS IN PLACE BEFORE YOU START YOUR PROGRAM



Passive reporting by patients vs actively engaging patients for ADRS

HOW DO PATIENTS REPORT ADRS?

- Phone number
- Email address
- Patient portal reminders
- Actively call patients

UTILIZE YOUR PHARMACISTS!

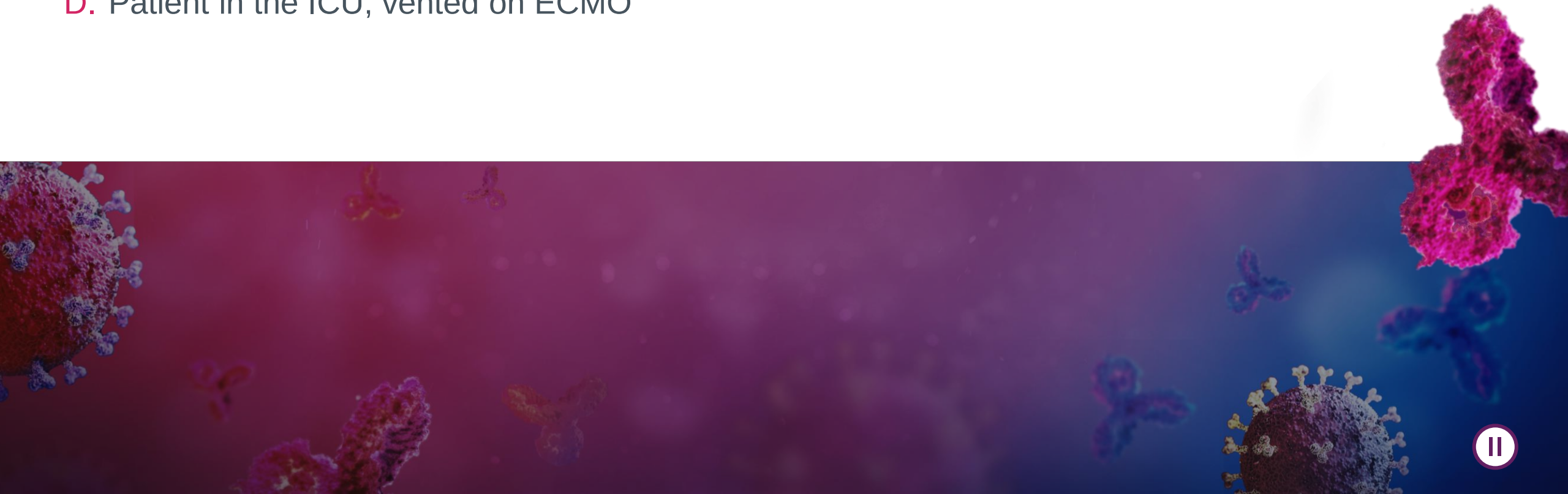
WHICH OF THE FOLLOWING COVID-POSITIVE PATIENTS WOULD NOT BE APPROPRIATE FOR ADMINISTRATION OF A NEUTRALIZING mAb?

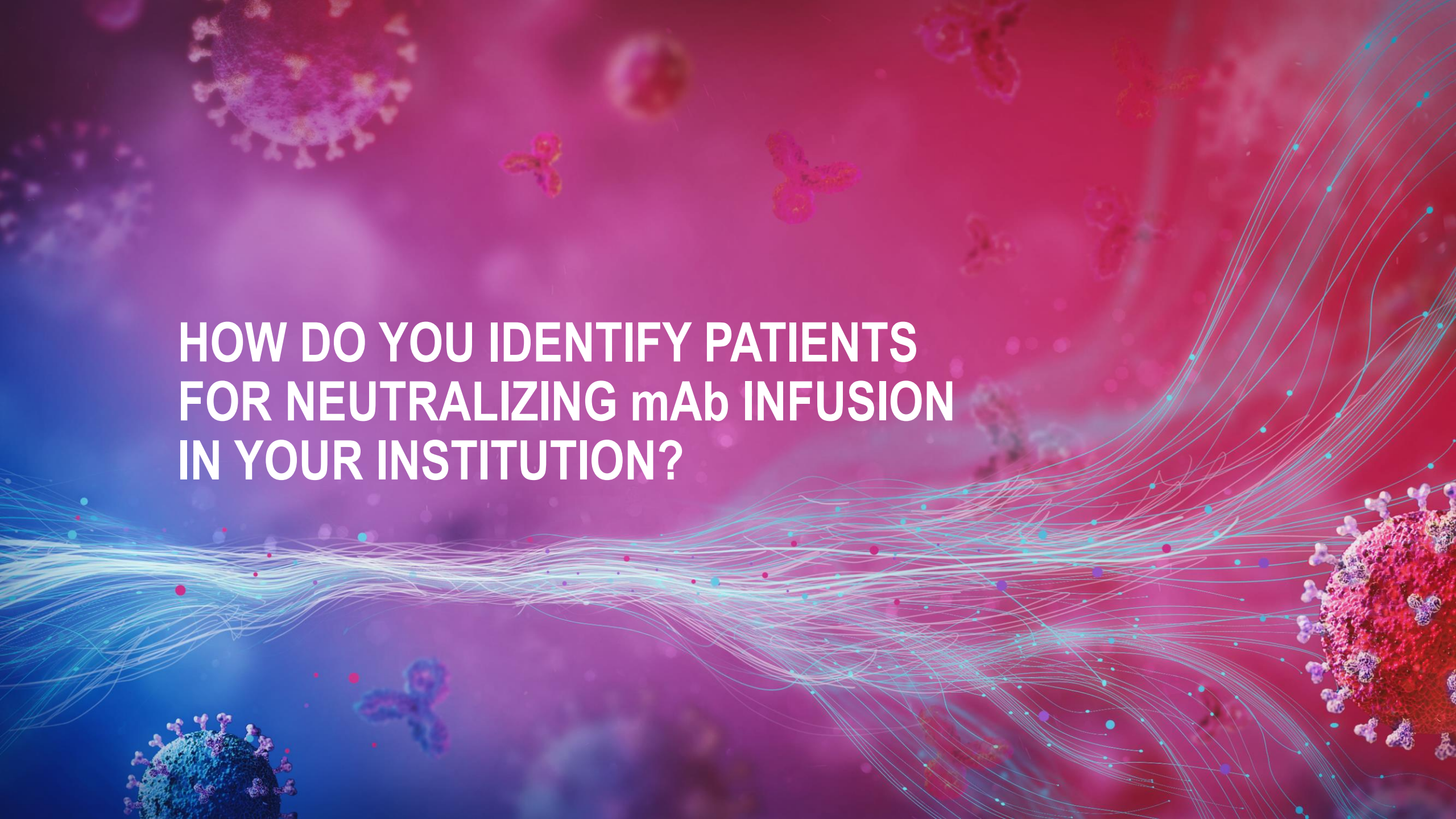
A. Patient in an Emergency Department with CKD on room air

B. Patient in an infusion center on chemotherapy and on continuous, unchanged supplemental O_2

C. Patient in a nursing home with stable COPD on room air

D. Patient in the ICU, vented on ECMO




HOW DO YOU IDENTIFY PATIENTS
FOR NEUTRALIZING mAb INFUSION
IN YOUR INSTITUTION?

Bamlanivimab Selection Criteria

Patients must have positive diagnostic PCR test for SARS-CoV-2 with onset of symptoms within 10 **days** of planned administration

AND

Fit one of the following priority level tiers

Priority Level Tier ONE	
Age ≥65yrs **AND** ≥1 of the high-risk criteria	Age ≥18yrs **AND** BMI >35 **AND** ≥ 1 high-risk criteria
Priority Level Tier TWO	
Age ≥65yrs	Age ≥18yrs **AND** BMI >35
Priority Level Tier THREE	
12-64yrs **AND** ≥2 high-risk EUA criteria	Age 12-17yrs **AND** any one of the following: • BMI above the 85th percentile for age/gender from CDC growth charts: https://www.cdc.gov/growthcharts/clinical_charts.htm • Congenital or acquired chronic heart disease • Neurodevelopmental disorders (e.g. Cerebral palsy, Huntington's disease) • Known history of active sickle cell disease • Chronic trach patients • Chronic respiratory disease that requires chronic medication management (e.g. asthma)

Priority Level Tier FOUR

12-64yrs **AND** 1 high-risk criteria

- Chronic hypertension
- chronic cardiac disease
- chronic respiratory disease (typically requiring ongoing medical assessments)

HIGH RISK CRITERIA

- BMI > 35
- Chronic Kidney Disease (eGFR < 50)
- Diabetes (on long term oral medication(s) and/or insulin)
- Currently immunosuppressed, defined as any one of these:
  - >20 mg prednisone (or equivalent steroid) daily for 2 weeks or greater
  - Chemotherapy in the past 3 months
  - Treatment with active biologic agent in past 3 months
  - Organ transplant on active immune suppression
  - Other high dose immune suppression used for medical treatment
  - HIV with CD4 < 200
  - Congenital immune deficiency
- COPD
- Chronic cardiac disease (documented CAD, CHF, cardiomyopathy)

Exclusion Criteria:

- Patients hospitalized with COVID -19 illness
- Patients who require oxygen or increase of chronic oxygen needs due to COVID -19 illness
- COVID-19 infection, but failure to meet above inclusion criteria
- Weight < 40 kg

Exclusions for Therapy:

- Symptoms of COVID ≥10 days
- Hospitalized due to COVID-19
- NEW Requirement for Oxygen therapy due to COVID-19
- Increased oxygen flow rate requirement due to COVID-19 when previously on oxygen therapy

Inclusion for Therapy:

Patients must have **positive diagnostic test** for SARS-CoV-2 with onset of symptoms within **10 days** of planned administration

AND

Weigh ≥40kg

AND

Fit ONE of the following criteria:

Age ≥ 65 years

_____Patients aged 18 years or older **AND** 1 or more high-risk criteria *(listed below)*

_____Age ≥55 **AND** either cardiovascular disease **OR** hypertension **OR** COPD

_____12-17 years **AND** one of the following:

- _____BMI 85th percentile for height and weight based on CDC growth chart
- _____Sickle cell disease
- _____Congenital or acquired heart disease
- _____Neurodevelopmental disorder *(example: cerebral palsy)*
- _____Chronic tracheostomy, PEG or positive pressure ventilation
- _____Asthma or chronic respiratory disease that requires daily medication for control

Any pediatric patients referred to the program will be reviewed in conjunction with our pediatric infectious diseases colleague

HIGH RISK CRITERIA

___BMI > 35

___Chronic Kidney Disease *(eGFR < 50)*

___Diabetes *(on long term oral medication(s) and/or insulin)*

___Currently immunosuppressed, defined as any one of these:

- ___>20 mg prednisone *(or equivalent steroid)* daily for 2 weeks or greater
- ___Chemotherapy in the past 3 months
- ___Treatment with active biologic agent in past 3 months
- ___Organ transplant on active immune suppression
- ___Other high dose immune suppression used for medical treatment
- ___HIV with CD4 < 200
- ___Congenital immune deficiency

___COPD

___Chronic cardiac disease *(documented CAD, CHF, cardiomyopathy)*

1. https://www.covid19.lilly.com/assets/pdf/bamlanivimab/lilly-antibodies-playbook.pdf. Accessed January 11, 2021.
2. https://www.regeneron.com/casirivimabimdevimab. Accessed January 11, 2021.

EMR REPORT ELEMENTS

PRACTICE MANAGEMENT CONSIDERATIONS FROM THE FIELD

Age	Last BMI	Diabetes?	Last GFR	Current Medications	Problem List	Order Date	Reviewed	Symptom Onset	
80 y.o.	28.5	Yes	44	aspirin 81 mg chewable tablet; chlorthalidone tablet; eplerenone (INSPRA) 25 mg tablet; ezetimibe (ZETIA) 10 mg tablet; fexofenadine (ALLEGRA ALLERGY) 180 mg tablet; indomethacin (INDOCIN) 25 mg capsule; insulin glargine (LANTUS U-100 INSULIN) 100 unit/mL injection; lansoprazole (PREVACID) 30 mg capsule; lisinopriL (PRINIVIL,ZESTRIL) 40 mg tablet; magnesium 200 mg tablet; metFORMIN XR (GLUCOPHATE-XR) 500 mg 24 hr tablet; metoprolol succinate XL (TOPROL-XL) 50 mg 24 hr tablet; MULTIVITAMIN ORAL; simvastatin (ZOCOR) 40 mg tablet; UBIDECARENONE (COQ-10 ORAL)	Infectious Disease Problems: Tinea pedis; Other: Type 2 aneurysm (AAA) (CMS/HCC); CAD in native artery; Pseudophakia; Mixed hyperlipidemia; Shoulder pain; Hypertension; Low back pain; Gastroesophageal reflux disease; Obstructive sleep apnea syndrome; Diabetes mellitus (CMS/HCC); History of primary laryngeal cancer; Seborrheic keratosis; Fatty liver; COVID-19 virus infection	01/18/2021	✓		
79 y.o.		No		bamlanivimab (LY-CoV555) 700 mg in NS 200 mL - COMPOUNDED; bisoprolol (ZEBETA) 5 mg tablet; Bystolic 5 mg tablet; Dulera 100-5 mcg/actuation inhaler; Eliquis 5 mg tablet ANTICOAGULANT; furosemide (LASIX) 20 mg tablet	Heart murmur; Malignant neoplasm of prostate (CMS/HCC); Asthma; COVID-19 virus infection	01/19/2021	✓		
76 y.o.	32.6	No	>60	There are too many medications to display. Please see the patient's chart for a complete list of medications.		01/18/2021	✓	1/14/2021	
76 y.o.	26.8	Yes	52	acetaminophen (TYLENOL) 325 mg tablet; aspirin 325 mg tablet; atorvastatin (LIPITOR) 40 mg tablet; benzonatate (TESSALON) 100 mg capsule; blood sugar diagnostic (glucose blood) strip; blood-glucose meter misc; cyanocobalamin (vitamin B-12) 1,000 mcg tablet; lancets misc; losartan (COZAAR) 25 mg tablet; metFORMIN (GLUCOPHAGE) 1,000 mg tablet;	Type 2 diabetes mellitus (CMS/HCC); Deviated nasal septum; Anxiety disorder; Hyperlipidemia; Atherosclerosis of coronary artery; Acquired trigger finger; Sensorineural hearing loss, bilateral; Obstructive sleep apnea syndrome, severe; Moderate episode of recurrent major depressive disorder (CMS/HCC); Vasomotor rhinitis; Dry eyes; Combined form of	01/18/2021	✓		

REMINDER

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WHAT DOES THE NEUTRALIZING mAb INFUSION PROGRAM LOOK LIKE IN YOUR INSTITUTIONS?

What surprised you the most?

What barriers have you faced?

KEY MESSAGES

This will require resources

Engage the public

Engage providers in your network

Don’t forget to review your data→ can you do better?

- Groups served
- Time from positive test until infusion
- General health after infusion (5-14 days)
- Admissions
- ADRS, etc

THERAPY ADMINISTRATION

Can only use 0.9% sodium chloride for Injection

Polyvinyl chloride (PVC), polyethylene (PE)-lined PVC, or polyurethane (PU) infusion set

In-line or add-on 0.2 micron polyethersulfone (PES) filter

Vial(s)

- Pharmacy preparation of bag or connection devices

Timing

- Prep time until delivery= realistically is 1-1.5 hours
  - Vials must come to room temperature prior to dilution
- 1 hour infusion
- 1 hour monitoring
- **4 hours per patient**

1. https://www.covid19.lilly.com/assets/pdf/bamlanivimab/lilly-antibodies-playbook.pdf. Accessed January 11, 2021.
2. https://www.regeneron.com/casirivimabimdevimab. Accessed January 11, 2021.

START SMALL

FIND OUT WHAT WORKS LOGISTICALLY FOR YOU!

Early December — Early February

Site 1
7 days a week
42 slots a week

Site 2
Monday-Friday
adds 15 slots
a week

Site 3
Monday-Friday
adds 20 slots
a week

Site 4
Wednesday-Friday
adds 18 slots
a week

Site 5
7 days a week
adds 24 slots
a week

Site 6
Monday-Friday
adds 10 slots
a week

TOTAL SLOTS PER WEEK

129

Data pull kindly by Mr. Jarrod Kile.

WHAT IS YOUR GREATEST CHALLENGE IN THE USE OF NEUTRALIZING mAbs?

A. I am concerned about the safety of these therapies
B. I am unclear who the right patients are
C. I am not in a large medical center, so I am not clear how to connect patients with an infusion center
D. It is too late by the time that I see patients
E. I don’t know how to get infusions covered
F. Other

WAYS TO MOVE FORWARD WITH PATIENT SELECTION

PROSPECTIVELY LOOK FOR PATIENTS

Equitable | Labor intensive | Slower initially

PASSIVELY WAIT FOR PATIENTS

Less equitable | Not nearly as labor intensive | More rapid start up

LVHN EXPERIENCE

612
mAb referrals

247
infusions

87%
Caucasian

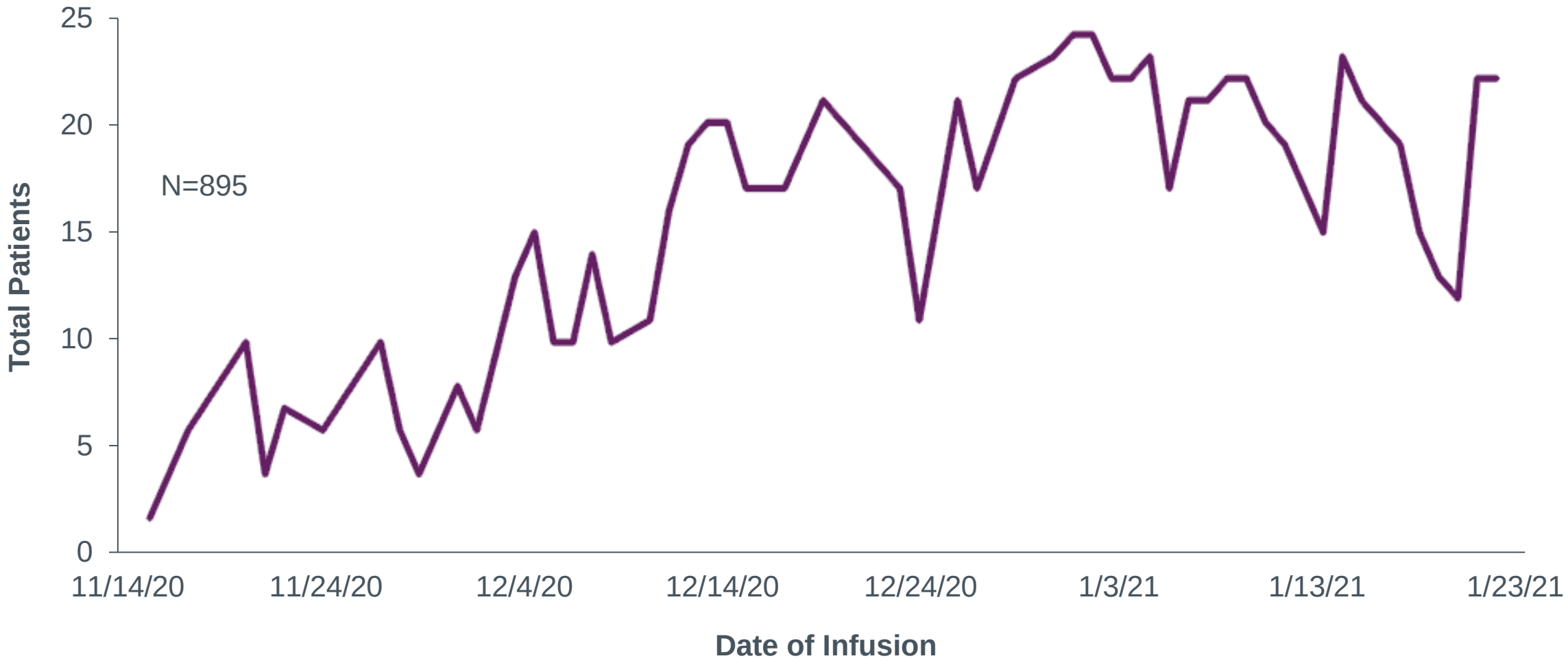
RISK FACTORS	
	% of Cohort
Chronic kidney disease	19%
Chronic obstructive pulmonary disorder	23%
Diabetes	29%
Age ≥65	43%
Immunocompromised	15%

CHARACTERISTICS	
Age Range	% of Cohort
20-29	2%
30-39	3%
40-49	10%
50-59	15%
60-69	24%
70-79	20%
80-89	15%
≥90	11%

LVHN=Lehigh Valley Health Network.
Data pull kindly by Mr. Jarrod Kile.

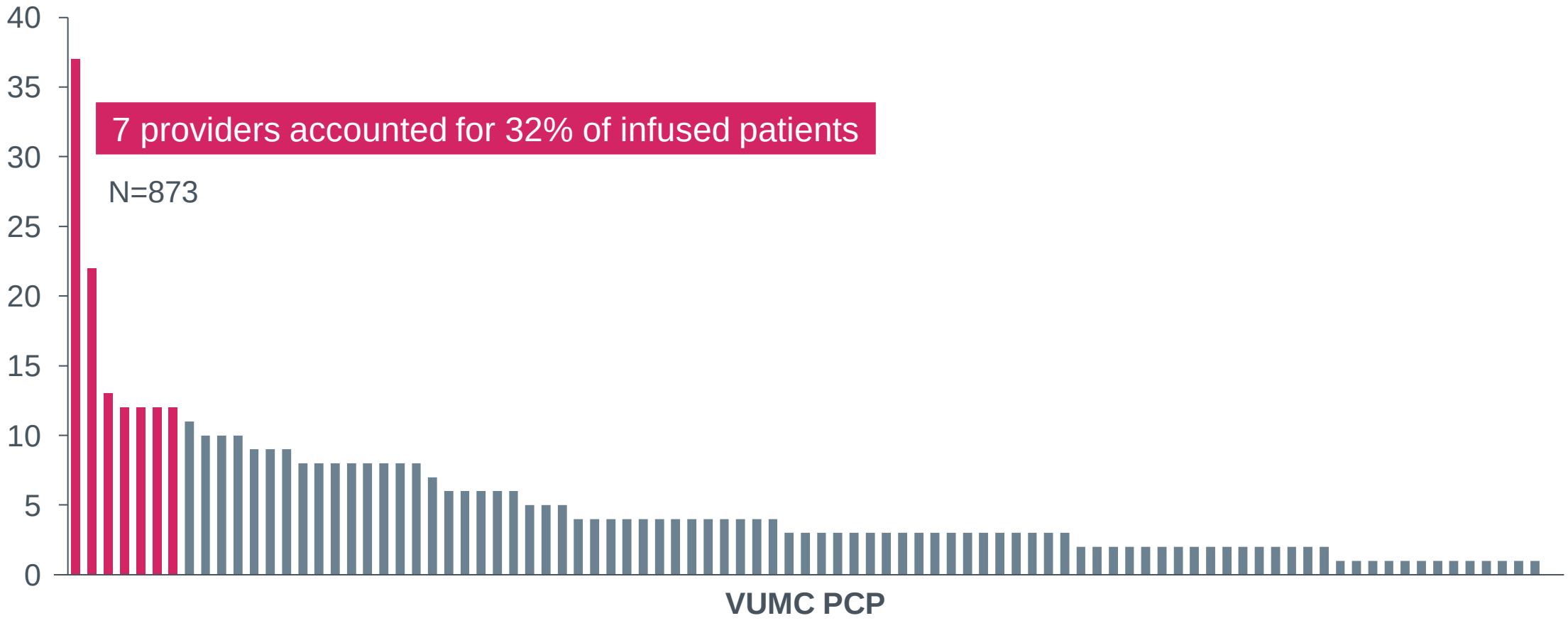
VUMC PATIENT INFUSIONS

TREND OVER TIME



Data pull kindly (1/28/21) by Dr. Karen Bloch.

INFUSIONS BY PRIMARY CARE PROVIDER (PCP)



VUMC=Vanderbilt University Medical Center.
Data pull kindly (1/26/21) by Dr. Karen Bloch.

SUMMARY

Individualize workflow
for your facility/site

Process needs to capture patients
early in disease

Benefits

- Decreases rates of hospitalization for high-risk populations
- Decreases burden on over-extended hospitals and staffs

THANK YOU!

Slides, including explanations to the pre-/post-test questions, can be found in the PDF resource associated with this activity.

Q&A


PRE-/POST-TEST QUESTIONS

A 45-year-old man is referred for consideration of nAb therapy. He notes onset of cough and fever 2 days ago. A nasal swab is positive for SARS-CoV-2 by PCR.

WHICH OF THE FOLLOWING CONDITIONS WOULD MAKE THIS PATIENT ELIGIBLE FOR nAb THERAPY BASED ON THE CURRENT EUAs?

A. Human immunodeficiency virus (HIV) with CD4 count <200
B. Cirrhosis
C. Hypertension
D. Coronary artery disease
E. Injection drug use

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The FDA emergency use authorization (EUA) for monoclonal antibodies defines high-risk patients to include:

Age ≥18 years AND one of the following:
- BMI ≥35
- Chronic kidney disease
- Diabetes
- Immunosuppressive disease
- Currently receiving immunosuppressive treatment

≥65 years of age

≥55 years of age AND one of the following:
- Cardiovascular disease
- Hypertension
- Chronic obstructive pulmonary disease/ other chronic respiratory disease

12-17 years of age AND have
BMI ≥85th percentile for their age and gender based on CDC growth charts, OR sickle cell disease, OR congenital or acquired heart disease, OR neurodevelopmental disorders, OR a medical-related technological dependence, OR asthma, reactive airway or other chronic respiratory disease that requires daily medication for control

Immunosuppressive is not specifically defined in the EUA but would include primary conditions such as chronic variable immunodeficiency (CVID) and secondary conditions such as HIV with CD4 count of <200 or organ transplantation.

Cardiovascular disease, including hypertension and coronary artery disease are defined as high-risk conditions for patients older than 54 years of age. Cirrhosis and injection drug use are not included as high-risk conditions in the EUAs.

Food and Drug Administration. Fact Sheet For Health Care Providers Emergency Use Authorization (EUA) Of Bamlanivimab. https://www.fda.gov/media/143603/download. Published December 2020. Food and Drug Administration. Coronavirus (COVID-19) Update: FDA Authorizes Monoclonal Antibodies for Treatment of COVID-19. https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-authorizes-monoclonal-antibodies-treatment-covid-19. Published November 21, 2020.

TREATMENT WITH BAMLANIVIMAB AND CASIRIVIMAB/IMDEVIMAB IS ASSOCIATED WITH WHICH OF THE FOLLOWING?

A. Reduction in hospitalization and emergency room visits
B. Reduction in death from COVID-19
C. Shortened duration of patient isolation
D. Reduction in rates of secondary transmission of infection

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Clinical trials for the mAbs showed a reduction in hospitalizations and emergency room visits that was most pronounced in patients at high risk for developing severe disease. The number of patients studied was not sufficient to evaluate for an effect on mortality. Treatment with neutralizing mAbs does not shorten the CDC recommendations for duration of isolation for COVID-19. While the clinical trials did show a decrease in SARS-CoV-2 nasopharyngeal viral loads, there was no evidence in these trials that treatment reduced transmission.

Chen P, Nirula A, Heller B, et al. SARS-CoV-2 Neutralizing Antibody LY-CoV555 in Outpatients with Covid-19. *NEJM*. 2020. Weinreich DM, Sivapalasingam S, Norton T, et al. REGN-COV2, a Neutralizing Antibody Cocktail, in Outpatients with Covid-19. *NEJM*. 2020. https://www.cdc.gov/coronavirus/2019-ncov/hcp/duration-isolation.html

WHICH OF THE FOLLOWING WOULD MAKE A PATIENT INELIGIBLE FOR NEUTRALIZING mAbs THERAPY BASED ON THE CURRENT EUAs?

A. Pregnancy
B. New need for supplemental oxygen
C. Evaluation in the emergency department
D. Chest imaging with ground glass opacities
E. Creatinine of 2.8

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C. Evaluation in the emergency department

D. Chest imaging with ground glass opacities

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Based on the current EUAs, neutralizing mAbs are not authorized for use in patients who are hospitalized, require oxygen therapy due to COVID-19, or require an increase in baseline oxygen flow rate due to COVID-19. In these populations, treatment is not associated with improved outcomes.

There are limited data on the use of neutralizing mAbs in pregnant women or nursing mothers. The EUAs specify that neutralizing mAbs can be considered in high-risk patients in whom the potential benefit outweighs the potential risk for the mother and fetus. The NIH treatment guidelines recommend that neutralizing mAbs should not be withheld from a pregnant individual who has a condition that poses a high risk to progression to severe COVID-19.

There is no restriction of use of neutralizing mAbs for patients with COVID-19 and laboratory or imaging abnormalities.

National Institutes of Health. COVID-19 Treatment Guidelines Panel's Statement on the Emergency Use Authorization of Bamlanivimab for the Treatment of COVID-19. https://www.covid19treatmentguidelines.nih.gov/statement-on-bamlanivimab-eua/ Last updated November 18, 2020. National Institutes of Health. COVID-19 Treatment Guidelines Panel's Statement on the Emergency Use Authorization of the Casirivimab Plus Imdevimab Combination for the Treatment of COVID-19. https://www.covid19treatmentguidelines.nih.gov/statement-on-casirivimab-plus-imdevimab-eua/ Last updated December 2, 2020.

WHICH IS A NOT AN APPROPRIATE SPOT FOR INFUSION OF NEUTRALIZING mAbs?

A. Emergency department
B. Infusion center
C. Nursing home
D. Prison
E. None of the above

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B. Infusion center
C. Nursing home
D. Prison
E. None of the above

If proper steps are followed as outlined (prepared and infused by a qualified healthcare professional) in the EUA, nearly any site can be utilized for administration of neutralizing mAbs.

http://pi.lilly.com/eua/bamlanivimab-eua-factsheet-hcp.pdf. https://www.regeneron.com/sites/default/files/treatment-covid19-eua-fact-sheet-for-hcp.pdf.