Pneumonia in the Nursing Home Setting

Teresa Lubowski, Pharm. D., B.S., CPHQ Director, Quality Improvement Medication Safety HQIC Antibiotic Stewardship Workgroup Lead HQIC Opioid and ADE Workgroup Lead

Melanie Ronda, MSN, RN, LTC-CIP, CPHQ Assistant Director, Infection Prevention Specialist Nursing Home Lead: NJ, NY, Ohio Quality Improvement Initiative Task Lead

NY DOH Presentation 1-26-23

This material was prepared by IPRO, a Quality Innovation Network-Quality Improvement Organization under contract with the Centers for Medicare & Medicaid Services (CMS), an agency of the U.S. Department of Health and Human Services. The content presented does not necessarily reflect CMS policy. 12SOW-IPRO-QIN-T1-A2-23-870



Learning Objectives

- Review upper and lower respiratory tract infection sites and associated organisms.
- Describe pneumonia severity assessment resources.
- Identify empiric bacterial pneumonia treatment regimens including duration of therapy.
- List treatment options for COVID infection including time to start.
- Analyze a pneumonia case study.



Pneumonia Epidemiology

- Occurs in approximately 1-2 residents for every 1000 days of NH residence.
- NH residents with pneumonia that require hospitalization can have a mortality rate ranging from 13-41%
- Organism overwhelms the host defense, and the pathogen replication initiates an immune response leading to inflammation and alveolar irritation and impairment resulting in symptoms.
- Approximately 80% of NH residents with pneumonia exhibit 3 or fewer respiratory signs or symptoms, but 92% have at least one identifiable respiratory manifestation.



Respiratory tract infections are common. They range from the common cold to pneumonia.

- Common Cold
 - An upper respiratory tract infection that can be caused by many different viruses. Treatment is supportive care (rest, fluids, analgesics) and time.
- Acute Bronchitis
 - Inflammation of the large airways. The vast majority (90%) of these infections are caused by viruses. Distinguishing this infection from pneumonia can be challenging.

• Influenza

• A viral infection most common in the winter months (October through March). The best way to avoid this infection is by getting a yearly influenza vaccination or "flu shot."

• Pneumonia

• Inflammation of the lung. In adults, about one-fourth of these are caused by viruses with the remainder caused by bacteria. The diagnosis is made, in part, using a chest X-ray.

AHRQ Antibiotic Stewardship Toolkit- Respiratory Tract Infection



Upper or Lower Respiratory Tract Infection Descriptions

Sinusitis

Inflammation and infection of the sinuses; 98% caused by viruses and usually part of a common cold.

Strep Throat

Infection of the tonsils and posterior oropharynx. Caused by group A *Streptococcus*. Requires a diagnostic test.

Bronchitis

Inflammation and infection of the large airways; 90% caused by viruses.



Common Cold

Infection caused by many different viruses. Affects sinuses and throat and may also cause headache, fatigue, low-grade fever.

Laryngitis

Hoarse voice; inflammation and infection of the vocal cords; nearly always a viral infection and usually part of a common cold.

Pneumonia

Inflammation and infection of lung tissue; ~75% caused by bacteria.



Quality Innovation Network -Quality Innovement Organizations CENTERS FOR MEDICARE & MEDICAID SERVICES IQUALITY IMPROVEMENT & INNOVATION GROU

Bronchitis Versus Pneumonia

Acute Bronchitis

- Definition: Self-limited inflammation of bronchi, the large airways of the lung
- Cause: Viral (with rare exception)*
- Symptoms:
 - Cough for 5 days to 3 weeks
 - Fever unusual (unless influenza)
 - 50% have sputum production
- Diagnostic studies:
 - Normal to slightly elevated WBC
 - No specific chest film findings

Pneumonia

- Definition: Inflammation or infection of the lung tissue
- Cause: ~75% bacteria, ~25% viral
- Symptoms:
 - Cough, fever, sputum production common, chest wall pain
- Diagnostic studies:
 - Elevated WBC
 - Chest films show infiltrates, possible effusions

*Bacterial causes include *Mycoplasma pneumoniae, Chlamydia pneumoniae, and Bordetella pertussis, which causes whooping cough.* Bordetella is the only one of these that requires antibiotic treatment.³

IPRO QIN-QIO Quality Innovation Network -Quality Improvement Organizations CENTERS FOR MEDICARE & MEDICAID SERVICES IQUALITY IMPROVEMENT & INNOVATION GROUP

Pneumonia Symptoms

- New cough
- Dyspnea
- Pleural Pain
- Sweating
- Fever- Temperature > or = 38C
- Shivers
- Aches and pains
- Sputum production
- New and localizing chest examination signs





- CURB-65 (1pt each): if score = 0-1, patient may be treated as an outpatient. Residents with 2 or more points have mortality greater than 9.2% and require hospital admission.
 - decreased Consciousness
 - increased blood **U**rea nitrogen BUN
 - **R**espiratory rate >30/min
 - **B**P < 90 systolic or diastolic < 60
 - age >65 years)



PSI Scoring System (CAP)- Class I-V

Patient characteristics	Points assigned				
Demographic factors		Points total	Risk Class	Mortality	Patient Care
Age (1 point/year)				Detec	
Men	Age (yr)			Rates	Location
Women	Age (yr)-10	. 51		0 10/	Outractionst
Nursing home resident	+10	< 51	I	0.1%	Outpatient
Comorbid illnesses		F1 + 20		0 00/	Outractionst
Neoplastic disease	+30	51 to 70	11	0.6%	Outpatient
Liver disease	+20	74 + 00		2.00/	
Congestive heart failure	+10	71 to 90		2.8%	ideally, in an
Cerebrovascular disease	+10				observation unit
Renal disease	+10				observation unit
Physical examination findings					with re-evaluation
Altered mental status	+20				
Respiratory rate ≥ 30 breaths/minute	+20				
Systolic blood pressure < 90 mm Hg	+20	91 to 130	IV	8 2%	Innatient
Temperature < 30°C or ≥ 40°C	+15	51 (0 150	IV	0.270	inputient
Pulse ≥ 125 beats/minute	+10	> 130	V	29.2%	Innatient likely
Laboratory findings		> 150	v	23.270	inputient, interv
PH < 7.35	+30				ICU
Blood urea nitrogen > 10.7 mmol/L	+20				
Sodium < 130 mEq/L	+20				
Glucose > 13.9 mmol/L	+10				
Hematocrit < 30%	+10				

https://www.mdcalc.com/calc/33/psi-port-score-pneumonia-severity-index-cap

+10

+10

 $PO_2 < 60 \text{ mm Hg} (or SaO_2 < 90\%)$

Pleural effusion



CAP Likely Pathogens- Johns Hopkins Guide 2023

Commonly seen organisms listed below:

- <u>Streptococcus pneumoniae</u>
- Haemophilus influenzae
- <u>Klebsiella pneumoniae</u>
- Moraxella catarrhalis
- <u>Chlamydophila pneumoniae</u>
- Legionella species
- Mycoplasma pneumoniae
- Viruses: influenza A, RSV, parainfluenza, adenovirus, human metapneumovirus, rhinovirus, COVID
 - A CDC report of extensive microbiologic testing of 2,300 adults hospitalized for CAP showed the most common pathogens were <u>rhinovirus</u> (9%), <u>influenza</u> (6%) and <u>S. pneumonia</u> (5%), no pathogen detected in 62%[19].
- Occasional pathogens that may need to be considered in the setting of suspected community-acquired pneumonia, e.g., if immunocompromised or other special situations:
 - Mycobacterium tuberculosis
 - <u>Nocardia</u>
 - Group A Streptococcus
 - Neisseria meningiditis
 - Anaerobes (aspiration pneumonia)



Risk Factors for Colonization with a Resistant Organism- NH

- History of colonization with a resistant organism
- Recent antibiotic therapy (< 90 days)
- Recent hospitalization (< 90 days)
- Dependency in ADL requiring frequent contact with caregivers
- Dialysis
- Wounds (pressure ulcers)
- Indwelling devices (urinary catheters, feeding tubes etc)
- Lung disease (COPD or bronchiectasis)



Diagnostic Testing and Laboratory Values

- Chest X-ray nearly always shows an infiltrate
- Sputum Culture and Gram Stain important if resident has risk factors for resistant organisms



Diagnostic Tests

Gram stain and sputum culture

Respiratory viral panel

Coronavirus infection or COVID-19 PCR

Streptococcus pneumoniae urinary antigen (Ag)

Legionella urinary Ag



AHRQ Antibiotic Stewardship Toolkit- Respiratory Tract Infection



- Up to 70% of CAP without pathogen identified.
- Initiate antibiotics within 4 hours, but now recommended as soon as possible and prior to patient leaving the ER for hospitalized patients. If septic shock, administer within 1 hour.
- Patients should show a clinical response within 48-72 hours of antibiotic administration. If not consider a non-responder and re-evaluate for pathogen and treatment.
- Duration of therapy 5 day minimum. Most recommend patients be afebrile for 48-72 hours with supplemental oxygen and stable vitals.



The AHRQ Four Moments of Antibiotic Decision Making



- 1. Does the resident have symptoms that suggest an infection? Can we try symptomatic treatment and active monitoring?
- 2. What type of infection is it? Have we collected appropriate cultures and diagnostic tests before starting antibiotics? What empiric therapy should we initiate?
- 3. What duration of antibiotic therapy is needed for the resident's diagnosis?
- 4. It's been 2–3 days since we started antibiotics. Re-evaluate the resident and review results of diagnostic tests. Can we stop antibiotics? Can we narrow therapy?



ality Innovation Network ality Innovation Network ality Improvement Organizations ITERS FOR MEDICARE & MEDICAID SERVICES ALITY IMPROVEMENT & INNOVATION GROUP

Loeb Criteria to Initiate Antibiotics - Pneumonia

Lower respiratory tract infection with temp >38.9 °C (102 °F)	At least one of the following criteria	Respiratory rate >25 breaths / minute
with temp >37.9 ℃ (100 ℃F) or 1.5 ℃ (2.4 ℃F) above baseline	 Both of the following criteria Cough, AND At least one of the following criteria Pulse >100 beats / minutes Rigors 	 Delirium Respiratory rate >25 breaths / minute
afebrile with COPD and >65 years old	 Both of the following criteria New or increased cough Purulent sputum production 	
afebrile without COPD	 All of the following criteria New cough Purulent sputum production At least one of the following criteria Delirium 	Respiratory rate >25 breaths / minute
with new infiltrate on chest X-ray consistent with pneumonia	At least one of the following criteria Productive cough Respiratory rate >25 breaths / minutesize 	Temp >37.9 °C (100 °F) or 1.5 °C (2.4 °F) above baseline te
Note: Consider ordering chest X-ray and CBC Antibiotics should not be used for up t	C with differential for febrile residents with co to 24 h after large-volume aspiration in those	ıgh and any of these criteria (HR >100, worsening mental status, or rigors) without COPD but with temp ≤38.9ºC (102 ºF) and non-productive cough



Empiric Antibiotic Therapy - Start with IV or IM

- Ceftriaxone 500mg IM daily or Cefotaxime 1gm IM q12h for 1-3 days. Switch to oral regimen to finish therapy.
- Oral regimen
 - Cefpodoxime 200mg bid or Cefuroxime 500mg bid or Augmentin 875mg/125mg bid AND macrolide (azithromycin 500mg x1 then 250mg qd) or doxycycline 100mg bid

OR

• Respiratory Quinolone- Levofloxacin 750mg qd or Moxifloxacin 400mg qd

Metlay et al. ATS Diagnosis and Treatment of Adults with Community Acquired Pneumonia. Practice Guidelines August 2019



Empiric Antibiotic Therapy - Oral Only

• Oral regimen

 Cefpodoxime 200mg bid or Cefuroxime 500mg bid or Augmentin 875mg/125mg bid AND macrolide (azithromycin 500mg x1 then 250mg qd) or doxycycline 100mg bid

OR

• Respiratory Quinolone- Levofloxacin 750mg qd or Moxifloxacin 400mg qd

Metlay et al. ATS Diagnosis and Treatment of Adults with Community Acquired Pneumonia. Practice Guidelines August 2019



FDA-approved antiviral drugs recommended by CDC to treat Influenza

Generic	Trade Name	Dose	Indication	Dosage form	SIG	Other info
Oseltamivir phosphate	Tamiflu	30mg, 45mg, 75mg, 6mg/mL	Early influenza tx in people ≥ 14 days Influenza Ppx in people ≥ 1 year	Capsule, liquid suspension	Tx: 75mg BID x 5 days Ppx: 75mg QD x 10 days	Efficacy not established after 48 hours of sx.
Zanamivir	Relenza	5mg	Early tx of flu in people ≥ 7 years Influenza Ppx in people ≥ 5 years	Inhalation	Tx: 10mg BID x 5 days Ppx: 10mg QD x 10-28 days	NOT recommended for people with COPD or asthma NOT proven effective for Ppx in nursing home residents.
Peramivir	Rapivab	600mg	Early tx of acute uncomplicated influenza in people ≥ 18 years who have been symptomatic for no	IV	Once for minimum 15 mins	Efficacy not established for serious influenza requiring hospitalization.
Baloxavir marboxil	Xofluza	20mg, 40mg	Early tx of acute uncomplicated influenza in people ≥12 yrs	Tablet	40-80kg: two 20mg QD ≥ 80kg : two 40mg QD	Avoid coadministration with dairy products, polyvalent cation containing antacids or laxatives

Administer approved antiviral treatments within 48 hours of symptom onset.

What you should know about flu antiviral drugs [Internet]. Centers for Disease Control and Prevention. Centers for Disease Control and Prevention; 2022 [cited 2022Oct18]. Available from: https://www.cdc.gov/flu/treatment



COVID Therapeutics - Outpatient

- For patients at high risk of progressing to severe COVID-19, preferred therapies
 - Ritonavir-boosted nirmatrelvir (Paxlovid) dose is 2 pink tablets of nirmatrelvir with 1 white tablet of ritonavir by mouth 2 times each day (in the morning and in the evening) for 5 days. For each dose, take all 3 tablets at the same time. Dose adjusted for renal impairment.
 - Remdesivir (Veklury) dose is 200mg IV x1, then 100mg IV qd X3 days in outpatient setting.
- Alternate therapy if neither of preferred therapies are available
 - Molnupiravir (Lagevrio) dose is 800mg (four 200mg capsules) q12h for 5 days



NIH COVID-19 Guideline: Non-Hospitalized

Table 2a. Therapeutic Management of Nonhospitalized Adults With COVID-19

Last Updated: September 26, 2022

Patient Disposition	Panel's Recommendations
Does Not Require Hospitalization or Supplemental Oxygen	 For All Patients All patients should be offered symptom management (AIII). The Panel recommends against the use of dexamethasone^a or other systemic corticosteroids in the absence of another indication (AIIb). For Patients Who Are at High Risk of Progressing to Severe COVID-19^b Preferred therapies. Listed in order of preference: Ritonavir-boosted nirmatrelvir (Paxlovid)^{c.d} (Alla) Remdesivir^{d.e} (BIIa) Alternative therapies. For use ONLY when neither of the preferred therapies are available, feasible to use, or clinically appropriate. Listed in alphabetical order: Bebtelovimab^f (CIII)
	Molnupiravir ^{d.g.h} (<u>CIIa</u>)
Discharged From Hospital Inpatient Setting in Stable Condition, Even if Receiving Supplemental Oxygen	The Panel recommends against continuing the use of remdesivir (Alla), dexamethasone ^a (Alla), or baricitinib (Alla) after hospital discharge.

Each recommendation in the Guidelines receives 2 ratings that reflect the strength of the recommendation and the quality of the evidence that supports it. See Guidelines Development for more information.

U.S. Department of Health and Human Services. (n.d.). *Clinical management of adults summary*. National Institutes of Health. Retrieved December 5, 2022, from https://www.covid19treatmentguidelines.nih.gov/management/clinical-management-of-adults/clinical-management-of-adults/summary/



FDA Updates on Bebtelovimab

- As of November 30, 2022, the U.S. Food and Drug Administration announced that Bebtelovimab is not currently authorized for emergency use in the U.S. because it is not expected to neutralize Omicron subvariants BQ.1 and BQ.1.1., according to data included in the <u>Health Care Provider Fact Sheet</u>.
- The Panel now **recommends against** the use of **Bebtelovimab** for the treatment of nonhospitalized patients with COVID-19 who are at high risk of progressing to severe COVID-19 (AIII)

U.S. Department of Health and Human Services. (n.d.). *What's new*. National Institutes of Health. Retrieved December 9, 2022, from https://www.covid19treatmentguidelines.nih.gov/about-the-guidelines/whats-new/



Center for Drug Evaluation and Research. (n.d.). FDA announces Bebtelovimab is not currently authorized in the US. U.S. Food and Drug Administration. Retrieved December 6, 2022, from https://www.fda.gov/drugs/drug-safety-and-availability/fda-announces-bebtelovimab-not-currently-authorized-any-us-region

As of December 28, 2022, the antiviral drugs:

- Ritonavir-boosted nirmatrelvir (Paxlovid)
- ► Remdesivir, and
- ➤ Molnupiravir

are expected to continue to be active against the currently circulating Omicron subvariants for mild to moderate COVID-19 in nonhospitalized adults who are at high risk of progressing to severe COVID-19.



What are Paxlovid, Lagevrio and Veklury?

Outpatient COVID-19 Therapeutics



Covid-19 Therapeutics. COVID-19 Therapeutics | HHS/ASPR. (n.d.). Retrieved December 13, 2022, from https://aspr.hhs.gov/COVID-19/Therapeutics/Pages/default.aspx



Standard Renal 2 Pfizer 2 Pfizer **PAXLOVID**[™] **PAXLOVID**[™] (nirmatrelvir tablets; ritonavir tablets), (nirmatrelvir tablets; ritonavir tablets), co-packaged for oral use co-packaged for oral use Each carton contains 30 tablets in 5 blister cards Each carton contains 20 tablets in 5 blister cards Each blister card contains 6 tablets: Each blister card contains 4 tablets: 4 nirmatrelvir tablets (150 mg each) 2 nirmatrelvir tablets (150 mg each) 2 ritonavir tablets (100 mg each) 2 ritonavir tablets (100 mg each) 300 mg; 100 mg Dose Pack 150 mg; 100 mg Dose Pack Morning Dose - Take all 3 tablets at the same time from Morning Dose - Take both tablets at the same time from the morning dose portion of the blister card (yellow side). the morning dose portion of the blister card (white side). Evening Dose - Take all 3 tablets at the same time from Evening Dose - Take both tablets at the same time from the evening dose portion of the blister card (blue side). the evening dose portion of the blister card (pink side). For use under Emergency Use Authorization. Rx only For use under Emergency Use Authorization. Rx only

Paxlovid Product Information: https://www.paxlovid.com/



Standard



Renal

QIN-QIO

iQUALITY IMPROVEMENT & INNOVATION GROUP

Important to know

Administration Instructions

Inform patients to take PAXLOVID with or without food as instructed. Advise patients to swallow all tablets for PAXLOVID whole and not to chew, break, or crush the tablets. Alert the patient of the importance of completing the full 5-day treatment course and to continuing isolation in accordance with public health recommendations to maximize viral clearance and minimize transmission of SARS-CoV-2. If the patient misses a dose of PAXLOVID within 8 hours of the time it is usually taken, the patient should take it as soon as possible and resume the normal dosing schedule. If the patient misses a dose by more than 8 hours, the patient should not take the missed dose and instead take the next dose at the regularly scheduled time. The patient should not double the dose to make up for a missed dose *[see Dosage and Administration (2.1)]*.

Paxlovid Product Information: https://www.paxlovid.com/

Labeling.pfizer.com. (n.d.). Retrieved December 13, 2022, from https://labeling.pfizer.com/ShowLabeling.aspx?id=16474#S7.3



Lagevrio



Lagevrio (molnupiravir) Product Information https://www.molnupiravir-us.com/

Dunleavy, K. (2022, July 8). FDA is letting pharmacists prescribe Pfizer's paxlovid but won't do the same for Merck's lagevrio. Fierce Pharma. Retrieved December 13, 2022, from https://www.fiercepharma.com/pharma/fda-letting-pharmacists-prescribe-pfizers-paxlovid-wont-do-same-mercks-lagevrio *VEKLURY® (remdesivir) 100 mg for injection, lyophilized powder.* (n.d.). Retrieved December 13, 2022, from https://www.vekluryhcp.com/downloads/information_for_payer_and_trade_organizations.pdf

Veklury



Veklury Product Information https://www.vekluryhcp.com/



Q | N - Q | O Quality Innovation Network -Quality Improvement Organizations CENTERS FOR MEDICARE & MEDICAID SERVICES IQUALITY IMPROVEMENT & INNOVATION GROUP

Medication Comparison:

Drug Name	Paxlovid (nirmatrelvir/ritonavir)	Lagevrio (molnupiravir)	Veklury (remdesivir)
Route of Administration	PO Administer with or without food. Swallow tablets whole; do not open, break, or crush	PO Administer with or without food. Swallow capsules whole; do not open, break, or crush	IV infusion
ΜΟΑ	Viral protease inhibitor that halts viral replication	Nucleoside analog that inhibits viral replication by viral mutagenesis	Nucleotide analog ribonucleic acid (RNA) polymerase inhibitor that halts viral replication
Authorized Use	Treatment	of mild to moderate COVID-19	
Manufacturer	Pfizer, Inc.	Merck Sharp & Dohme Corp., a subsidiary of Merck & Co., Inc.	Gilead Sciences, Inc.
FDA Approval	EUA December 22, 2021	EUA December 23, 2021	October 22, 2020
Side-by-Side Overview of Therapeutics Authorized o been moved to the ASPR COVID-19 website. For the Therapeutics/Documents/side-by-side-overview pdf	r Approved for the Prevention of COVID-19 Infection or Tre most recent version of the page, please visit: https://asp	eatment of Mild-Moderate COVID-19 has c.hhs.gov/COVID-19/ QIN-Q	• Healthcentric Advisors Q N - Q O • Qlarant Quality Innovation Network - Quality Improvement Organizations CENTERS FOR MEDICARE & MEDICAID SERVICES iQUALITY IMPROVEMENT & INNOVATION GROUP

Labeling.pfizer.com, (n.d.), Retrieved December 13, 2022, from https://labeling.pfizer.com/ShowLabeling.aspx?id=16474#S7.3

Medication Comparison:

Drug Name	Paxlovid (nirmatrelvir/ritonavir)	Lagevrio (molnupiravir)	Veklury (remdesivir)
History Requirements	Assessment of renal health (eGFR) Assessment of hepatic health	Assessment of pregnancy status and oral contraceptive use Assessment of breastfeeding status	Assessment of renal health (eGFR), hepatic health and prothrombin time
Prescribing Window	Initiate <u>within 5 days</u> of symptom onset and positive SARS-CoV-2 viral test	Initiate <u>within 5 days</u> of symptom onset and positive SARS-CoV-2 viral test	Initiate <u>within 7 days</u> of symptom onset and positive SARS-CoV-2 viral test



Paxlovid COVID Rebound

COVID-19 rebound after Paxlovid and Molnupiravir during January-June 2022

Lindsey Wang, Nathan A. Berger, Pamela B. Davis, David C. Kaelber, Nora D. Volkow, ⁽ⁱ⁾ Rong Xu **doi:** https://doi.org/10.1101/2022.06.21.22276724

This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should *not* be used to guide clinical practice.

Conclusion:

COVID-19 rebound occurred both after Paxlovid and Molnupiravir, especially in patients with underlying medical conditions. This indicates that **COVID-19 rebound is not unique to Paxlovid** and the **risks were similar for Paxlovid and Molnupiravir**. For both drugs the rates of COVID-19 rebound increased with time after treatments.

Patients with COVID-19 rebound had significantly higher prevalence of underlying medical conditions than those without.



Paxlovid COVID Rebound

Recommendations for Healthcare Providers

For patients with COVID-19 rebound:

- There is currently no evidence that additional treatment for COVID-19 is needed for COVID-19 rebound.
- Advise people with COVID-19 rebound to follow CDC's guidance on isolation and take
 precautions to prevent further transmission. Patients should re-isolate for at least 5 days. Per
 CDC guidance, they can end their re-isolation period after 5 full days if fever has resolved for
 24 hours (without the use of fever-reducing medication) and symptoms are improving. The
 patient should wear a mask for a total of 10 days after rebound symptoms started.
- Consider clinical evaluation of patients who have COVID-19 rebound and symptoms that persist or worsen.



Paxlovid COVID Rebound

Pfizer will conduct a randomized placebo-controlled trial in patients with "COVID-19 rebound" following an initial treatment course of PAXLOVID to evaluate a subsequent 5-day treatment course of PAXLOVID. Pfizer will provide topline results by September 30, 2023.

Pfizer will conduct a randomized controlled trial to evaluate different durations of PAXLOVID treatment in immunocompromised patients with mild-to-moderate COVID-19. Pfizer will provide topline results by September 30, 2023.



Paxlovid (nirmatrelvir and ritonavir) Patient Eligibility Screening Checklist Tool for Prescribers (Table)

PAXLOVID Patient Eligibility Screening Checklist Tool for Prescribers

Other Drugs with Established and Other Potentially Significant Drug Interactions with PAXLOVID (listed alphabetically by generic name)

Interaction Codes:

Coadministration of this drug with PAXLOVID is CONTRAINDICATED. For further information, refer to the Fact Sheet for Healthcare Providers and the individual Prescribing Information for the drug.

Coadministration of this drug with PAXLOVID should be avoided and/or holding of this drug, dose adjustment of this drug, or special monitoring is necessary. Consultation with the prescriber of the potentially interacting drug is recommended. For further information, refer to the Health Care Provider Fact Sheet and the individual Prescribing Information for the drug.

	Drug		Drug Class			Interaction			
	digoxin		Cardiac glyco	oside			***		
	dihydroergotamine		Ergot derivat	tive		XXX			
	diltiazem		Calcium char	nnelblocker			***		
	dranedarone		Antiarrhythm	nic		NOX.			
				t acting an	tiviral				
Drug	Drug Class		Interaction			100			
abemaciclib	Anticancer drug					-	***		
alfuzosin	Alpha 1-adrenorecepto	r.	XXX	I blocker			+++		
	antagonist			90			***		
amiodarone	Antiarrhythmic		XXX			XXX			
amlodipine	Calcium channel blocke	r		osteroid			***		
apalutamide	Anticancer drug	· ·	XXX	t acting an	tiviral				
bedaguiline	Antimycobacterial						***		
bepridil	Antiarrhythmic			1					
hetamethasone	Systemic corticosteroid	· · · · · · · · · · · · · · · · · · ·				-			
oc competition of the									
bosentan	Endothelin receptor and	tagooist					2.2.2		
bosentan budesonide	Endothelin receptor and Systemic corticostero	PAVION	ID Patient Eli	eihilitu Cen	aning	Chackli	int Tool f	or Droce	riborr
bosentan budesonide bupropion	Endothelin receptor and Systemic corticostero Antidepressant	PAXLOV	ID Patient Eli	gibility Scr	eening	g Checkli	ist Tool f	or Press	ribers
bosentan budesonide bupropion carbamazepine	Endothelin receptor and Systemic corticostero Antidepressant Anticonvulsant	PAXLOV	ID Patient Eli	gibility Scr	eening	; Checkli	ist Tool f	or Press	ribers
bosentan budesonide bupropion carbamazepine certitnib	Endothelin receptor an Systemic corticostero Antidepressant Anticonvulsant Anticancer drug	PAXLOV	ID Patient Eli	gibility Scr	eening Dru	g Checkli	ist Tool f	or Press	ribers
bosentan budesonide bupropion carbamazepine ceritinib ciclesonide	Endothelin receptor and Systemic corticostero Antidepressant Anticonvulsant Anticancer drug Systemic corticostero	PAXLOV Drug rifabutin	ID Patient Eli	gibility Scr	eening Dru Ant	g Checkli ng Class timycobact	ist Tool fo	or Press	ribers Interactio Code
bosentan budesonide bupropion carbamazepine certinib ciclesonide clarithromycin	Endothelin receptor an Systemic corticostero Antidepressant Anticanvulsant Anticancer drug Systemic corticostero Anti-infective	PAXLOV Drug rifabutin rifampin	ID Patient Eli	gibility Scr	Drs Ant	g Checkli ng Class timycobact timycobact	erial erial	or Press	tribers
bosentan budesonide bupropion carbamazepine certinib ciclesonide clarithromycin clozapine	Endothelin receptor an Systemic corticostero Antidepressant Anticonvulsant Anticancer drug Systemic corticostero Anti-infective Antipsychotic	PAXLOV Drug rifabutin rifampin rivarosab	/ID Patient Eli	gibility Scr	eening Dra Ant Ant	g Checkli ng Class timycobact timycobact ticoagulant	erial erial	or Presc	interactio Code
bosentan budesonide bupropion carbamazepine certinitb ciclesonide clarithromycin clozapine colchicine	Endothelin receptor an Systemic corticostero Antidepressant Anticonvulsant Anticancer drug Systemic corticostero Anti-infective Antipsychotic Anti-gout	PAXLOV Drug rifabutin rifampin rivaroxab selmetere	/ID Patient Eli	gibility Scr	Dry Ant Ant Lon	g Checkli ng Class timycobact timycobact ticozgulant ng-acting be valet	erial erial erial eta-adrenoc	or Press	Interactio Code
bosentan budesonide bupropion carbamazepine certtinib ciclesonide clarithromycin clozapine colchicine cyclosporine	Endothelin receptor and Systemic corticostero Antidepressant Anticonvulsant Anticancer drug Systemic corticostero Anti-Infective Antipsychotic Anti-gout Immunosuppressant	PAXLOV Drug rifabutin rifampin rivarosab salmetero sildenafil	ID Patient Eli	gibility Scr	Dru Ant Ant Lon ago	g Checkli ag Class timycobacti timycobacti ticoagulant ticoagulant ag-acting ba onist F5 inhibitoo	erial erial eta-edrenoc	eptor	Interaction Code
bosentan budesonide bupropion carbamazepine certtintb ciclesonide clarithromycin clozapine colchicine cyclosporine dabigatran	Endothelin receptor and Systemic corticostero Antidepressant Anticancer drug Systemic corticostero Anti-infective Antipsychotic Anti-gout Immunosuppressant Anticoagulants	PAXLOV Drug rifabutin rifampin rivaroxab salmetero sildenafil pulmonar	ID Patient Eli	gibility Scr sed for	Anti Anti Anti Lon ago POI	g Checkli ag Class timycobact timycobact ticoagulant rg-acting be onist ES inhibitor	erial erial erial eta-adrenoc	eptor	Interactio Code
bosentan budesonide bupropion carbamazepine ceritinib ciclesonide clarithromycin clozapine colchicine cyclosporine dabigatran dasabuvir	Endothelin receptor and Systemic corticostero Antidepressant Anticonvulsant Anticancer drug Systemic corticostero Anti-Infective Antipsychotic Anti-gout Immunosuppressant Anticoagulants Hepatitis C direct acti	PAXLOV Drug rifabutin rifampin rivaroxab salmetero sildenafil pulmonar sinolimus	an al (Revatio [®]) when u y arterial hyperte	sed for rision	Pol	g Checkli ag Class timycobact timycobact ticregulant rg-acting be onist ES inhibitor munosuppr	erial erial eta-adrenoc	or Press	ribers Interactio Code
bosentan budesonide bupropion carbamazepine certitnib ciclesonide clarithromycin clozapine colchicine cyclosporine dabigatran dasatuwir dasatunib	Endothelin receptor and Systemic corticostero Antidepressant Anticonvulsant Anticancer drug Systemic corticostero Anti-Infective Anti-systemic Anti-gout Immunosuppressant Anticogulants Hepatitis C direct acti Anticancer drug	PAXLOV Drug rifabutin rifampin rivaroxab salmetere sildenafil pulmonar sindimus sofosbuvi	All Patient Eli an al (Revatio*) when u y arterial hyperter r/valpatasvir/ vox	sed for nsion	Anti Anti Anti Lon ago POI Imr Hep	g Checkli ag Class timycobacti timycobacti ticoagulant tg-acting ba prist ES inhibitor munosuppr patitis C dir	erial erial eta-adrenoc r rescant rect acting a	aptor ntiviral	interaction Code
bosentan budesonide bupropion carbamazepine certinib ciclesonide clarithromycin clozapine colchicine cyclosporine dabigatran dasabuvir dasatinib desamethasone	Endothelin receptor an Systemic corticostero Antidepressant Anticonvulsant Anticancer drug Systemic corticostero Anti-infective Antipsychotic Anti-gout Immunosuppressant Anticagulants Hepatitis C direct acti Anticancer drug Systemic corticostero	PAXLOV Drug rifabutin rifampin rivarosab salmetero sildenafil pulmonar sinolimus sofiosbuvi St. John's	/ID Patient Eli an (Revatio*) when u ry arterial hyperter r/velpatasvir(/ vox	sed for rsion laprevir perforatum)	eening Ant Ant Lon ago POI Imr Hey Hey	g Checkli ag Class timycobacti timycobacti ticoegulant tig-acting ba- sist ES inhibitor munosuppr patitis C dir rbal produc	erial erial erial eta-adrenoc r ressant rect acting a rt	eptor ntiviral	interactio Code 2004
bosentan budesonide bupropion carbamazepine ceritintb ciclesonide clarithromycin clozapine colchicine cyclosporine dabigatran dasabuvir dasatinib dexamethasone	Endothelin receptor an Systemic corticostero Antidepressant Anticanvulsant Anticanvulsant Anticanoer drug Systemic corticostero Anti-infective Antipsychotic Anti-gout Immunosuppressant Anticoagulants Hepatitis C direct acti Anticancer drug Systemic corticostero	PAXLOV Drug rifabutin rifampin rivaroxab aalmeters sildenafil pulmonar sinolimus sofosbuvi St. John's t. John's	ID Patient Eli an d (Revatio*) when u y arterial hyperter r/velpatasvir/ vox	sed for sisten ilaprevir perforatum)	eening Ant Ant Lon ago POI Imr Hep Hec Imr	g Checkli ag Class timycobact timycobact ticogulant ig-acting bo exist ES inhibitor munosuppr patitis C dir rbai produc munosuppr	erial erial erial eria-edrenoc r reccant ecct acting a t vescant	eptor eptor	ribers Interactio Code
bosentan budesonide bupropion carbamazepine certinitb ciclesonide clarithromycin clozapine colchicine cyclosporine dabigatran dasabuvir dasatnib dexamethasone	Endothelin receptor and Systemic corticostero Antidepressant Anticanvulsant Anticancer drug Systemic corticostero Anti-infective Anti-syschotic Anti-gout Immunosuppressant Anticoagulants Hepatitis C direct acti Anticancer drug Systemic corticostero	PAXLOV Drug rifabutin rifampin rivarosab salmeterc sildenafil pulmonar sirolimus sofosbuvi St. John's tacroimu trazodoni	/ID Patient Eli an di (Revatio*) when v ryvarterial hyperter ryvarterial hyperter ryvarterial hyperter g	sed for rsion laprevir perforatum)	eening Ant Ant Ant Lon ago POI Imr Hep Hec Imr Ant	g Checkli ag Class timycobact timycobact ticogulant rg-acting bo vist ES inhibitor munosuppr tabi produc munosuppr tidepressan	efial efial efial eta-adrenoc r rescant rect acting a et ecsant rt	eptor ntiviral	ribers Interaction Code 2000
bosentan budesonide bupropion carbamazepine ceritinib ciclesonide clarithromycin clozapine colchicine cyclosporine dabigatran dasabuvir dasatinib dexamethasone	Endothelin receptor an Systemic corticostero Antidepressant Anticonvulsant Anticonvulsant Anticancer drug Systemic corticostero Anti-Infective Antipsychotic Anti-gout Immunosuppressant Anticoagulants Hepatitis C direct acti Anticancer drug Systemic corticostero prenytom pinozide corticostero	PAXLOV Drug rifabutin rifampin rivarosab salmeterc siderafil pulmanar dirollmus sofosbuvi St. John's tacroimu trazodoni triamcino	All Patient Eli an an an al (Revatio") when u y arterial hyperter r/volpatasvir/ voo Wort (hypericum s e lone	sed for nsion laprovir perforatum)	Anti Anti Anti Lon ago POI Imr Heg Her Imr Anti Sys	g Checkli ag Class timycobact timycobac	erial erial erial eta-edrenoc r rescant escant escant escant t t cossant it cossant it	er Presc	ribers Interactio Code
bosentan budesonide bupropion carbamazepine certimib ciclesonide clarithromycin clozapine colchicine cyclosporine dasigatran dasatuwir dasatunib dexamethasone	Endothelin receptor a Systemic corticostero Antidepressant Anticonvulsant Anticonvulsant Anticoncer drug Systemic corticostero Anti-Infective Anti-gout Immunosupressant Anticoagulants Hepatitis C direct acti Anticancer drug Systemic corticostero premyoan pinozide prodisone progefreone	PAXLOV Drug rifabutin rifampin rivaroxab salmetere sidenafi pulmus sofosbuvi St. John's tacroimu trazodoni triazodani	All Patient Eli an al (Revatio*) when u y arterial hypertei r/valpataswir/ vool Wort (hypericum s e lone	sed for nsion laprevir perforatum)	Anti Anti Anti Lon ago POI Imr Hey Hey Imr Anti Sys	g Checkli ag Class timycobact timycobact ticogulant geacting ba- orist ES inhibitor munosuppr tabli produc munosuppr tidopressan temic corti fative/hypr	erial eria erial eria erial erial eria erial eria eria eria eria eria eria eria eria	eptor ntiviral	interactio Code 2000 2000
bosentan budesonide bupropion carbamazepine certinib ciclesonide clarithromycin clozapine colchicine cyclosporine dasigatran dasabuvir dasatinib desamethasone	Endothelin receptor an Systemic corticostero Antidepressant Anticonvulsant Anticonvulsant Anticancer drug Systemic corticostero Anti-Infective Anti-gout Immunosuppressant Anticagulants Hepatitis C direct acti Anticancer drug Systemic corticostero prenycom pinozide prednisene propafenone propafenone	PAXLOV Drug rifabutin rifampin rivaroxab salmetere sidenafil pulmonae sideshuki St. John's tacrošmu trazodoni triazolam venetocia	All Patient Eli an al (Revatio*) when u y arterial hyperter r/valpatasvir/ vox Wort (hypericum s a lone	sed for nsion laprevir perforatum)	eening Anti Anti Anti Lon ago POI Hey Hey Hey Sys Sed Anti	g Checkli ag Class timycobact timycobact ticogulant yg-acting bo onist ES inhibitor munosuppr tible pressan tidepressan tidepressan tidepressan tidepressan tidepressan tidepressan	erial erial	eptor ntiviral	interactio Code 2004 2004 2004
bosentan budesonide bupropion carbamazepine certinib ciclesonide clarithromycin clozapine colchicine cyclosporine dabigatran dasatinib dexamethasone	Endothelin receptor an Systemic corticostero Antidepressant Anticanvulsant Anticanvulsant Anticancer drug Systemic corticostero Anti-infective Antipsychotic Anti-gout Immunosuppressant Anticagulants Hepatitis C direct acti Anticancer drug Systemic corticostero propafenone propafenone propafenone propafenone	PAXLOV Drug rifabutin rifampin rivaroxab salmeters sildenafil pulmonar sinolimus sofosbuvi St. John's tacroimu traaodoni triasolam venetocla vinblastin venetocla	ID Patient Eli an d (Revatio*) when u y arterial hyperter r/valpatasvir/ vox Wort (hypericum 6 lone	sed for nsion laprevir perforatum)	eening Anti Anti Anti Lon Anti Hey Hey Hey Sys Sed Anti Anti	g Checkli ag Class timycobact timycobact timycobact ticoogulant g-acting be orist ES inhibitor munosuppr patitis C dir thai produc thai produc thai produc tabue/hypr ticore dir ticancer dir ticancer dir ticancer dir	erial erial erial eta-edrenoc eta-edrenoc r essant ti costeroid rotic ug ug	eptor ntiviral	interactio Code 2005 2005
bosentan budesonide bupropion carbamazepine ceritintb ciclesonide clarithromycin clozapine colchicine cyclosporine dabigatran dasabuvir dasatnib dexamethasone	Endothelin receptor and Systemic corticostero Antidepressant Anticancer drug Systemic corticostero Anti-infective Anti-infective Anti-syschotic Anti-gout Immunosuppressant Anticoagulants Hepatitis C direct acti Anticancer drug Systemic corticostero premosin prenzide prednisene propafenone propafenone groposphene quetiapine	PAXLOV Drug rifabutin rifampin rivarosab salmeterc sildenafil pulmonar cirolimus sofosbuvi St. John's tacrolimus trazodoni triazolam venetocla vinblastin vincirstim	/ID Patient Eli an of (Revatio*) when u ny arterial hyperter r/velpatasvir/ vox Wort (hypericum s fone ine ine ine	sed for rsion laprevir perforatum)	eening Ant Ant Ant Lon POI Imr Hee Imr Ant Sys Sed Ant Ant Ant	g Checkli ag Class timycobact timycobact timycobact ticogulant gracting be visit ES inhibitor munosuppr tidepressan teahic corti fative/hyper tidepressan teancer din teancer din teancer din	efial efial efial eta-adrenoc r rescant vect acting a t t rescant vit costeroid notic vasant vit costeroid vasant vit assert vit vasant vit vasatta vit vasant vit vasant vit vasant vit vasant vit vasant vit vasant vit vit vasant vit vas vit vas vit vas vit vas vit vas vit vas vit vas vit vas vit vas vit vas vit vas vit vas vit vit vas vi vi vas vit vi vi vi vi vi vi vi vi vi vi vi vi vi	eptor entiviral	ribers Interaction Code NOON NOON

PAXLOVID Patient Eligibility Screening Checklist Tool for Prescribers

See table in Paxlovid Patient Eligibility Screening Checklist Tool for Prescribershttps://www.fda.gov/media/158165/download

Covid-19 Therapeutics. COVID-19 Therapeutics | HHS/ASPR. (n.d.). Retrieved December 14, 2022, from https://aspr.hhs.gov/COVID-19/Therapeutics/Pages/default.aspx



... ***

COVID-19 Drug Interaction Checker

 University of Liverpool offers an <u>online COVID-19 Drug Interaction</u> <u>Checker</u> that can be utilized to check for drug interactions

COVID-19 Drug Interactions		UNIVERSITY OF LIVERPOOL		
	Interaction Checkers	Prescribing Resources	Contact Us	
Interactions with selected WHO Es	sential Medicines and Paxlovid (nirn	natrelvir/ritonavir) now available in the Pre	escribing Resources section - click here for the PDF.	

If a drug is not listed below it cannot automatically be assumed it is safe to coadminister

COVID Drugs	Co-medications	Drug Interactions Check COVID/COVID drug interactions
Search drugs C	Search co-medications Q	Drug Interactions will
• A-Z • Class • Trade	A-Z Class	be displayed here
Selected Drugs will be displayed here.	Selected Co-medications will be displayed here	
Anakinra (i	Abacavir (i)	
Azithromycin	Abemaciclib (i)	

Liverpool covid-19 interactions. Liverpool COVID-19 Interactions. (n.d.). Retrieved June 2, 2022, from https://www.covid19-druginteractions.org/checker



The AHRQ Four Moments of Antibiotic Decision Making



- Does the resident have symptoms that suggest an infection? Can we try symptomatic treatment and active monitoring?
- 2. What type of infection is it? Have we collected appropriate cultures and diagnostic tests before starting antibiotics? What empiric therapy should we initiate?
- 3. What duration of antibiotic therapy is needed for the resident's diagnosis?
- 4. It's been 2–3 days since we started antibiotics. Re-evaluate the resident and review results of diagnostic tests. Can we stop antibiotics? Can we narrow therapy?



36

Vaccine Updates

- Pneumococcal vaccine changes-
 - PneumoRecs VaxAdvisor: Vaccine Provider App | CDC
 - <u>Pneumococcal Vaccine Recommendations | CDC</u>



Influenza vaccination

- Influenza Information for Healthcare Professionals | CDC
- <u>Post-acute and Long-term Care Facility Toolkit: Influenza Vaccination</u> among Healthcare Personnel | Seasonal Influenza (Flu) | CDC
- Increase Influenza Vaccination Coverage among your Health Care Personnel | Seasonal Influenza (Flu) | CDC
 - Implementing a workplace vaccination requirement is the most effective strategy to increase influenza vaccination coverage among HCP in post-acute and facilities.



COVID-19 Vaccine

- Primary Series Any issues?
- Bivalent vaccine <u>It's Worth a Shot IPRO NQIIC</u>



TOOLS & RESOURCES

A variety of curated tools and resources to guide and assist you in this effort.

- <u>COVID-19 Bivalent Quality Improvement Action Plan</u>
- COVID-19 Booster Power Point for Resident & Family Council Meetings
- <u>COVID-19 Vaccine Booster Campaign</u>
- COVID-19 Vaccine Flyer basic information on vaccine safety and efficacy
- COVID-19: How to Protect Yourself and Stay Healthy.
- Influenza, Pneumococcal and COVID-19 Immunization Toolkit
- Paxlovid Patient Eligibility Screening Checklist for Prescribers
- <u>Vaccinations for Adults</u> an IPRO-developed PowerPoint for community providers to offer education on vaccinations in adults
- <u>Value in Vaccination Video Series</u>
- AMDA Guidance, Resources and Tools
- <u>CDC National Healthcare Safety Network (NHSN) Long-term Care Facility COVID-</u>
 <u>19 Module</u>

OIN-010

Quality Improvement Organizations
 CENTERS FOR MEDICARE & MEDICAID SERVICES
 iQUALITY IMPROVEMENT & INNOVATION GROUP

- Polly Taylor, 82-year-old female long-term care resident at Coles South Side Nursing Home. She has early dementia, diabetes, and status post stroke 3 years ago with continued left-sided weakness and mechanical soft diet with nectar liquids.
 - What is/are Polly's risk of respiratory complications?





- Early on Tuesday morning, Polly's cheeks were flushed and she had increased confusion. Polly's vital signs were T-99, P-86, b/p 122/70, R-24, SPO2-92%.
 - Does Polly have a fever? Do you need more information? What is your next step?
- Tuesday at 4PM: Polly has a fever of 102. She has begun coughing and seems distressed. SPO2-90%.
 - Next steps?



Questions- Contact Information

Teresa Lubowski, Pharm. D., B.S., CPHQ Director, Quality Improvement Medication Safety HQIC Antibiotic Stewardship Workgroup Lead HQIC Opioid and ADE Workgroup Lead IPRO 3525 Quackerbridge Rd Suite 6700 Hamilton NJ 08619 Office Phone 609-556-6119 E-mail- <u>tlubowski@ipro.org</u> Better Healthcare, Realized Melanie Ronda, MSN, RN, LTC-CIP, CPHQ Assistant Director, Health Care Quality Improvement Nursing Home Lead, NY, NJ, Ohio Infection Prevention Specialist **IPRO** Main: 518-426-3300

Direct: 518-320-3513 Cell: 518-331-8074 Fax: 518-426-3418 mronda@ipro.org

