COVID-19 - Ward (3.0)

Order Set Details

Type: **Order Set**

Version: **3.0**

Topic: **Corona virus infection**

Venue: **Inpatient**

Population: **Adult**

Owner: **OrderSet Department**

Keywords: **covid-19, corona virus, coronavirus**

Clinical Overview Synopses

ClinicalKey Clinical Overviews provide additional specific guidance for:
Coronavirus: novel coronavirus (COVID-19) infection

Guidance

Coronavirus (COVID-19), Clinical Overview Synopsis ~

KEY POINTS

- COVID-19 (coronavirus disease 2019) is respiratory tract infection due to a novel coronavirus, SARS-CoV-2 (initially called 2019-nCoV); as of March 11, 2020, extent of infection was declared pandemic by the WHO
- Virus is thought to be zoonotic in origin, but the animal reservoir is not yet known, and human-to-human transmission is widespread
- Infection ranges from asymptomatic to severe; symptoms include fever, cough, and (in moderate to severe cases) dyspnea; disease may evolve over the course of a week or more from mild to severe. Upper respiratory tract symptoms (eg, rhinorrhea, sore throat) are uncommon
- A significant proportion of clinically evident cases are severe; the mortality rate among diagnosed cases is generally about 2% to 3% but varies by country
- Infection should be suspected based on presentation with a clinically compatible history and known or likely exposure (eg, residence in or travel to an affected area within the past 14 days, exposure to a known or suspected case, exposure to a health care setting in which patients with severe respiratory tract infections are managed)
- Chest imaging in symptomatic patients almost always shows abnormal findings, usually including bilateral infiltrates; laboratory findings are variable but typically include lymphopenia and elevated lactate dehydrogenase and transaminase levels
- Diagnosis is confirmed by detection of viral RNA on polymerase chain reaction test of upper or lower respiratory tract specimens or serum specimens

- There is no specific antiviral therapy, although compassionate use and trial protocols for several agents are underway; treatment is largely supportive, consisting of supplemental oxygen and conservative fluid administration
- Most common complications are acute respiratory distress syndrome and septic shock; myocardial, renal, and multiorgan failure have been reported
- There is no vaccine available to prevent this infection; infection control measures are the mainstay of prevention (ie, hand and cough hygiene; physical distancing; standard, contact, and airborne precautions in health care)

URGENT ACTION

- Triage screening is recommended at registration for medical care to identify patients with symptoms and exposure history that suggest the possibility of COVID-19, and to promptly institute isolation measures
- Patients with respiratory distress require prompt administration of supplemental oxygen; patients with respiratory failure require intubation
- Patients in shock require urgent fluid resuscitation and administration of empiric antimicrobial therapy to cover possible bacterial pathogens and/or influenza

PITFALLS

- It is probable that persons with prodromal or asymptomatic infection may spread infection, making effective prevention more challenging; regardless, physical distancing is vital to slowing transmission enough to avoid overwhelming health systems
- Knowledge of this disease is incomplete and evolving; moreover, coronaviruses are known to mutate and recombine often, presenting an ongoing challenge to our understanding and to clinical management

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

Published By: Elsevier

Admission

Admit to Hospital
Admit to Observation
Diagnosis: _____
Condition: _____
Allergies: _____

Assessment Scales

Admission Criteria - Coronavirus

Guidance

Admission Criteria, COVID-19 ~

Nonsevere pneumonia

- Radiographic evidence of pneumonia; progressive clinical illness with indications for supplemental oxygen and hydration; inadequate care at home

- CDC provides guidance for determining whether the home is a suitable venue and patient and/or caregiver is capable of adhering to medical care recommendations and infection control measures

Criteria for ICU admission

- WHO provides criteria for severe pneumonia
  - Severe pneumonia characterized by tachypnea (respiratory rate greater than 30 breaths per minute), severe respiratory distress, inadequate oxygenation (eg, SpO_2 less than 90%)
- Pediatric criteria include central cyanosis or SpO_2 less than 90%; signs of severe respiratory distress (eg, grunting, chest retractions); inability to drink or breastfeed; lethargy, altered level of consciousness, seizures; severe tachypnea defined by age:
  - Younger than 2 months: 60 or more breaths per minute
  - Aged 2 to 11 months: 50 or more breaths per minute
  - Aged 1 to 5 years: 40 or more breaths per minute
- Presence of severe complications (eg, septic shock, acute respiratory distress syndrome)

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

Published By: Elsevier

Resuscitation Status

Resuscitation Status: Do not resuscitate

Advance Directive

Document an advance care plan in chart or that a discussion was held; place copy of plan on chart, if available

Quality Measure

NQF 0326. Advance Care Plan

Percentage of patients aged 65 years and older who have an advance care plan or surrogate decision maker documented in the medical record or documentation in the medical record that an advance care plan was discussed but the patient did not wish or was not able to name a surrogate decision maker or provide an advance care plan.

Steward: National Committee for Quality Assurance.

Use in Federal Program: Physician Quality Reporting System (PQRS).

Care Setting: Ambulatory Care: Clinician Office/Clinic, Hospital/Acute Care Facility, Other.

National Quality Forum-endorsed measure. Source

Published By: Elsevier

Vital Signs and Monitors

Vital Signs

Vital Signs Every 8 hours
Vital Signs Every 4 hours
Weight Once
Weight 1 time a day
Height Once

Monitoring

Cardiac monitor
Intake & Output

Activity

Up ad lib
Ambulate with assistance, 3 times a day
Bed to chair, 3 times a day
Bed rest with bathroom privileges
Bed rest with commode
Bed rest

Nursing

Assessments

Assess: Need for urinary catheter, every morning

Point of Care Testing

Fingerstick Glucose, Once
Fingerstick Glucose, 4 times a day; before meals and at bedtime, or every 6 hours if NPO

Notify Physician

Notify Physician for Heart rate less than 50 bpm or greater than 120 bpm
Notify Physician for Systolic BP less than 90 mmHg or greater than 160 mmHg
Notify Physician for Temperature less than 35 C or greater than 38 C
Notify Physician for Respiratory rate less than 10 breaths/min or greater than 24 breaths/min
Notify Physician for O2 sat less than 90 %
Notify Physician for Urine output less than 240 mL / 8 hr

Tubes and Drains

Minimize urinary catheter use and duration of use in all patients, particularly those at higher risk for CAUTI or mortality from catheterization such as women, the elderly, and patients with impaired immunity

Guidance

Indwelling Urethral Catheter

Consider indwelling urethral catheter use in the context of the following *appropriate* indications:

- Acute urinary retention or bladder outlet obstruction
- Need for accurate measurements of urinary output in critically ill patients
- Perioperative use for selected surgical procedures in patients undergoing urologic or other surgery on contiguous structures of the genitourinary tract
- Anticipated prolonged duration of surgery (remove catheters inserted for this reason in postanesthesia care unit)
- Expectation that patient will receive diuretics or large-volume infusions during surgery
- Need for intraoperative monitoring of urinary output
- Need to assist healing of open sacral or perineal wounds in patients with incontinence
- Requirement of prolonged immobilization (eg, because of a potentially unstable thoracic or lumbar spine or multiple traumatic injuries such as pelvic fractures)
- Improved comfort for end-of-life care

Avoid indwelling catheter use in the following circumstances, as they are *not appropriate* indications for indwelling catheter use:

- Substitution for nursing care of a patient or resident with incontinence
- Obtaining urine for culture or other diagnostic tests when the patient can voluntarily void
- Prolonged postoperative duration without appropriate indications (eg, structural repair of urethra or contiguous structures, prolonged effect of epidural anesthesia)

CDC. (2009 (2017 updates linked)). *Guideline for the Prevention of Catheter-Associated Urinary Tract Infections*. Source

Published By: Elsevier

Indwelling urinary catheter to gravity drainage
Discontinue indwelling urinary catheter

Precautions

Guidance

Transmission-Based Precautions, COVID-19 ~

Standard, contact, and airborne precautions should be implemented as soon as the diagnosis is suspected

- Immediately provide the patient with a face mask (or, if supplies are critically low, at least a cloth face cover) to reduce droplet spread and place the patient in a closed room pending further evaluation and disposition decisions. The closed room will ideally be one with structural and engineering safeguards

against airborne transmission (eg, negative pressure, frequent air exchange), *but* in the high-prevalence stages of the pandemic (with crowded hospitals), reserve negative pressure isolation rooms for the greatest needs (ie, aerosol-generating procedures; tuberculosis, measles, and varicella)

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

Published By: Elsevier

Transmission-Based Precautions

Categorize transmission-based precautions as follows:

- Assign a transmission-based precautions category if there is strong evidence of person-to-person transmission via one or more of:
  - Droplet
  - Contact
  - Airborne routes
  - Patient factors (e.g., diapered infants, diarrhea, draining wounds) that increase the risk of transmission
- Assign standard precautions if there is one of the following:
  - No evidence of person-to-person transmission by droplet, contact, or airborne routes
  - A low risk of person-to-person transmission and no evidence of health-care-associated transmission
- Also assign standard precautions to blood-borne pathogens (e.g., hepatitis B and C viruses, HIV) per universal precaution recommendations from the CDC
- Assume that every person is potentially infected or colonized with an organism that could be transmitted in the healthcare setting and apply standard infection control practices during the delivery of health care

For a list of the type and duration of precautions recommended for selected infections and conditions, click here

Centers for Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Diseases (NCEZID), Division of Healthcare Quality Promotion (DHQP). (2019). *Isolation Precautions*. Source

Published By: Elsevier

Precaution: Airborne
Precaution: Contact
Precaution: Droplet
Precaution: Standard

Patient Education

Patient education: Infection Education

Guidance

At Home Monitoring, COVID-19 ~

Patients who do not require admission should self-monitor temperature and symptoms, and they should return for reevaluation if symptoms worsen; deterioration may occur a week or more into the course of illness

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

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Household Members and Caregivers, COVID-19 ~

Household members/caregivers should:

- Ideally, wear face mask, gown, and gloves when caring for patient, and remove and discard all when leaving the room (do not reuse); however, if some of these supplies are absent, wear cloth face cover and scrupulously wash hands and laundry
    - Dispose of disposable items in a container lined with a trash bag that can be removed and tied off or sealed before disposal in household trash
- Wash hands for at least 20 seconds after all contact; an alcohol-based hand sanitizer is acceptable if soap and water are not available
- Not share personal items such as towels, dishes, or utensils before proper cleaning
- Wash laundry and high-touch surfaces frequently
    - Wear disposable gloves to handle dirty laundry and use highest possible temperatures for washing and drying, based on washing instructions on the items
    - Clean surfaces with diluted bleach solution or an EPA-approved disinfectant
- Restrict contact to minimum number of caregivers and, in particular, ensure that persons with underlying medical conditions are not exposed to the patient

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

Published By: Elsevier

Patient education: Airborne Precautions
Patient education: Responsibilities of provider concerning notification, including parent, guardian, public health authorities
Patient education: Tobacco/Second-Hand Smoke Counseling

Guidance

Counseling, Smoking Cessation/Tobacco Withdrawal

According to systematic reviews of smoking cessation programs for hospitalized patients:

- High-intensity behavioral counseling beginning during hospitalization and continuing for at least 1 month after discharge was more effective than either usual care or less intensive counseling

- The addition of nicotine replacement therapy resulted in further benefit
- Preoperative smoking interventions may reduce postoperative morbidity

Thomsen T, Villebro N, Møller AM. Interventions for preoperative smoking cessation. Cochrane Database Syst Rev. 2014;3, CD002294. Source

Rigotti NA, Clair C, Munafò MR, Stead LF. Interventions for smoking cessation in hospitalised patients. Cochrane Database Syst Rev. 2012;5(5), CD001837. Source

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Quality Measure

NQF 1651; NQF 1654; NQF 1656. Inpatient tobacco cessation bundle, includes discharge

NQF 1651; NQF 1654; and NQF 1656 are bundled, inpatient quality measures from the Joint Commission related to tobacco use screening and treatment, and referral to treatment at discharge.

1.) NQF 1651. TOB-1: Tobacco Use Screening.

- Hospitalized patients aged ≥18 years, who are screened during the hospital stay for tobacco use (cigarettes, smokeless tobacco, pipe and cigars) within the past 30 days. This measure is intended to be used as part of a set of linked measures addressing Tobacco Use. Source

2.) NQF 1654. TOB-2: Tobacco Use Treatment Provided or Offered and the subset measure TOB-2a Tobacco Use Treatment.

- The measure is reported as an overall rate, which includes all hospitalized patients aged ≥18 years, to whom tobacco use treatment was provided during the hospital stay, or offered and refused; and a second rate, a subset of the first, which includes only those patients who received tobacco use treatment during the hospital stay. These measures are intended to be used as part of a set of measures addressing Tobacco Use.
- **TOB-2**: The number of patients who received or refused practical counseling to quit AND received or refused FDA-approved cessation medications.
- **TOB-2a:** The number of patients who received practical counseling to quit AND received FDA-approved cessation medications. Source

3.) NQF1656. TOB-3: Tobacco Use Treatment Provided or Offered at Discharge and the subset measure

- **TOB-3a: Tobacco Use Treatment at Discharge.** The measure is reported as an overall rate which includes all hospitalized patients aged ≥18 years, to whom tobacco use treatment was provided, or

offered and refused, at the time of hospital discharge; and a second rate, a subset of the first, which includes only those patients who received tobacco use treatment at discharge. Treatment at discharge includes a referral to outpatient counseling and a prescription for one of the FDA-approved tobacco cessation medications. These measures are intended to be used as part of a set of linked measures addressing Tobacco Use.

- **TOB-3**: The number of patients who received or refused evidence-based outpatient counseling AND received or refused a prescription for FDA-approved cessation medication at discharge.
- **TOB-3a:** The number of patients who were referred to evidence-based outpatient counseling AND received a prescription for FDA-approved cessation medication at discharge. Source

Steward: Joint Commission. National Quality Strategy Priorities: Health and Well-Being.

Care Setting: Hospital/Acute Care Facility.

National Quality Forum-endorsed measures.

Published By: Elsevier

Respiratory

Oxygen Administration

Guidance

Oxygenation and Ventilation, COVID-19 ~

WHO provides specific guidance for oxygenation, and ventilation

- Begin supplemental oxygen when O_2 saturation falls below 90% to 92%
- Nasal cannula at 5 L/minute or face mask with reservoir bag at 10 to 15 L/minute
    - Titrate to reach SpO_2 of 94% or more initially
    - Once stable, target SpO_2 of 90% or higher in nonpregnant adults; 92% or higher in pregnant patients
    - In most children the target SpO_2 is 90% or greater; for those who require urgent resuscitation (eg, those with apnea or obstructed breathing, severe respiratory distress, central cyanosis, shock, seizures, or coma), a target SpO_2 of 94% or higher is recommended
- High-flow nasal oxygen or noninvasive ventilation has been used to achieve adequate oxygenation in some patients
    - High-flow nasal oxygen is recommended by Surviving Sepsis Campaign and NIH for COVID-19 patients who develop hypoxemic respiratory failure despite conventional oxygen therapy; there is some evidence that it averts the need for intubation and mechanical ventilation. Noninvasive positive pressure ventilation may be used if high-flow nasal oxygen is not available
    - However, there is concern that these techniques may result in higher risk of aerosolization of the virus. Additionally, sudden deterioration may require emergent intubation, which is associated with

more risk to both patient and provider. Therefore, some authorities reserve these options for settings in which airborne precautions can be taken and close monitoring provided

- Mechanical ventilation may become necessary for patients in whom oxygenation targets cannot be met with less invasive measures or who cannot maintain the work of breathing
    - Recommended settings are tidal volume of 4 to 8 mL/kg (predicted body weight) and inspiratory pressures less than 30 cm H_2O
    - In children, tidal volumes of 5 to 8 mL/kg (predicted body weight) for preserved lung compliance and 3 to 6 mL/kg for poor compliance; inspiratory pressures should be less than 28 cm H_2O
    - Use of PEEP may be necessary in patients with acute respiratory distress syndrome. Optimal regimen is not clearly defined, although guidelines suggest higher pressures (eg, more than 10 cm H_2O) rather than lower pressures. A protocol is available from ARDSnet
    - For patients with moderate to severe acute respiratory distress syndrome, prone positioning for 12 to 16 hours/day is recommended
        - Lateral decubitus position for pregnant women
- Extracorporeal membrane oxygenation has been used in severely ill patients, and it can be considered if resources and expertise are available

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

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Oxygen Nasal cannula 5 L/Minute ; titrate to oxygen saturation 94% or greater ; Step 1
Oxygen Nasal cannula 5 L/Minute ; titrate to oxygen saturation 90% or greater ; When stable, Step 2 for Non-pregnant adults
Oxygen Nasal cannula 5 L/Minute ; titrate to oxygen saturation 92% or greater ; When stable, Step 2 for Pregnant Adults

Monitoring

Oxygen saturation Every 8 hours
O2 saturation monitor

Diet

Diet: Regular
Diet: Regular (Low saturated fat and cholesterol, No added salt)
Diet: Regular (consistent carbohydrate)
Diet: Mechanical/dental soft
Diet: Full liquids
Diet: Clear liquids
Diet: Nothing by mouth
Diet: Nothing by mouth, except medications
Diet: Nothing by mouth (After Midnight)

Intravenous Fluids

Guidance

Intravenous Fluids, COVID-19 ~

WHO provides specific guidance for fluid management

Fluid management

- Overhydration should be avoided, because it may precipitate or exacerbate acute respiratory distress syndrome
- In patients with shock:
    - Administration of crystalloids is recommended (preferably buffered/balanced; eg, lactated Ringer solution); solutions such as hydroxyethyl starches, gelatins, dextrans, and albumin are not recommended according to Surviving Sepsis Campaign guideline on managing critically ill adults with COVID-19. WHO provides the following guidance:
        - Adults: administer 250 to 500 mL over the first 15 to 30 minutes; goal is mean arterial pressure of 60 to 65 mm Hg (if invasive pressure monitoring is available)
        - Children: 10 to 20 mL/kg bolus over the first 30 to 60 minutes
        - If there is no response to fluid bolus or if signs of fluid overload exist, discontinue or reduce fluid administration
        - For patients who respond to initial bolus and are without evidence of fluid overload, titrate continued fluid to achieve improvement in clinical signs (capillary refill, heart rate, tactile temperature of extremities, palpable pulses), urine output (0.5 mL/kg/hour in adults, 1 mL/kg/hour in children), and hemodynamic parameters (mean arterial pressure more than 65 mm Hg in adults)

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

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Saline Lock

Saline Lock

Intravenous Bolus

IV Bolus: Sodium Chloride 0.9%; 500 mL
IV Bolus: Sodium Chloride 0.9%; 1000 mL

Intravenous Infusion

IV infusion: Sodium Chloride 0.9% at 100 mL/hr
IV infusion: Dextrose 5% and Sodium Chloride 0.45% at 100 mL/hr
IV infusion: Dextrose 5% and Sodium Chloride 0.45% with Potassium Chloride 20 mEq/L at 100 mL/hr
IV infusion: Lactated Ringer's Solution at 100 mL/hr

Medications

Guidance

COVID-19 Medication Guidance, COVID-19 ~

At present, no specific antiviral agent is approved for treatment of this infection. Several existing antiviral agents are being used under clinical trial and compassionate use protocols based on in vitro activity (against this or related viruses) and on limited clinical experience

- Chloroquine and hydroxychloroquine have been used in China and South Korea, reportedly with favorable results, although details are lacking and follow-up studies have been less encouraging. Further trials are underway in Europe and the United States. Both are associated with QT prolongation and risk of cardiac arrhythmias
    - Azithromycin has been used in combination with hydroxychloroquine in some protocols; however, azithromycin is also associated with cardiac arrhythmias, and the possible increased risk posed by the combination must be considered
    - In the United States, emergency use authorization for chloroquine and hydroxychloroquine has been issued by FDA to permit use in hospitalized adult and adolescent patients for whom a clinical trial is not available or feasible
    - Surviving Sepsis Campaign guideline on managing critically ill adults with COVID-19 states that data are insufficient to make a recommendation on the use of these agents
    - In patients admitted to hospital with COVID-19, Infectious Diseases Society of America recommends hydroxychloroquine or chloroquine in the context of a clinical trial, and in combination with azithromycin only in the context of a clinical trial, based on evidence of very low certainty
    - NIH guidelines do not recommend for or against chloroquine or hydroxychloroquine because of insufficient data; they recommend against the addition of azithromycin to hydroxychloroquine. The guidelines note that when chloroquine or hydroxychloroquine is used, patients must be monitored for adverse effects, particularly prolonged QTc interval
- Remdesivir is an experimental antiviral agent with significant in vitro activity against coronaviruses and some evidence of efficacy in an animal model of MERS
    - Although not FDA-approved, remdesivir is in use for the indication; FDA has issued an emergency use authorization for use of IV remdesivir to treat hospitalized patients with COVID-19 who have severe disease, defined as SpO_2 of 94% or less on room air, requiring supplemental oxygen, mechanical ventilation, or extracorporeal membrane oxygenation
        - Preliminary results of the Adaptive COVID-19 Treatment Trial, a placebo-controlled randomized trial in 1063 patients, showed a statistically significant improvement in time to recovery and a nonsignificant trend in lower mortality; several other trials remain active, as well
- Lopinavir-ritonavir is FDA-approved for treatment of HIV infection. It has been used for other coronavirus infections; it was used empirically for SARS and is being studied in the treatment of MERS
    - In China this combination is used in conjunction with interferon alfa for treatment of some patients with COVID-19
        - Surviving Sepsis Campaign guideline on managing critically ill adults with COVID-19 recommends against use of recombinant interferons, based on lack of data in COVID-19 and on data from studies on MERS showing lack of efficacy
        - NIH COVID-19 treatment guideline recommends against use of interferon except in clinical trials
    - A trial in 199 patients with COVID-19 comparing lopinavir-ritonavir with standard care did not show a significant difference in time to improvement or in mortality at 28 days, nor were there differences in duration of viral RNA in oropharyngeal specimens
    - NIH COVID-19 treatment guideline and Surviving Sepsis Campaign guideline on managing critically ill adults with COVID-19 recommend against use of lopinavir-ritonavir
    - In patients admitted to hospital with COVID-19, Infectious Diseases Society of America recommends lopinavir-ritonavir only in the context of a clinical trial
- Immunomodulators are also being investigated for mitigation of cytokine release syndrome believed to be a factor in severe acute respiratory distress syndrome and shock in COVID-19
  (eg, tocilizumab and sarilumab are both monoclonal antibodies against interleukin-6 receptor)

    - Surviving Sepsis Campaign guideline on managing critically ill adults with COVID-19 states that data are insufficient to make a recommendation on the use tocilizumab; the guideline did not evaluate other monoclonal antibodies
    - In patients admitted to hospital with COVID-19, Infectious Diseases Society of America recommends tocilizumab only in the context of a clinical trial, based on evidence of very low certainty
    - NIH COVID-19 treatment guideline states that data are insufficient to recommend for or against use of these agents
- Studies on the therapeutic efficacy of convalescent plasma are underway in various countries. In the United States, authorization must be obtained through FDA
    - Surviving Sepsis Campaign guideline on managing critically ill adults with COVID-19 suggests that convalescent plasma not be used on the basis of data in other viral infections, lack of data in COVID-19, and uncertainties about safety
    - In patients admitted to hospital with COVID-19, Infectious Diseases Society of America recommends convalescent plasma in the context of a clinical trial, based on evidence of very low certainty
    - NIH COVID-19 treatment guideline states that data are insufficient to recommend for or against use of convalescent plasma or hyperimmune immunoglobulin
- Information on therapeutic trials and expanded access is available at ClinicalTrials.gov
- Corticosteroid therapy is not recommended for viral pneumonia but is suggested by some authorities for COVID-19 patients with refractory shock or acute respiratory distress syndrome
    - Surviving Sepsis Campaign guideline on managing critically ill adults with COVID-19 supports using corticosteroids in mechanically ventilated patients with COVID-19 and acute respiratory distress syndrome (but not those with respiratory failure in the absence of that syndrome) and in patients with COVID-19 and refractory shock; short-course, low-dose regimens are preferred
    - Similarly, Infectious Diseases Society of America suggests against the use of corticosteroids in hospitalized patients with COVID-19 and pneumonia, but it recommends their use in the context of a clinical trial for patients with COVID-19 and acute respiratory distress syndrome
    - NIH COVID-19 treatment guideline recommends against routine use in mechanically ventilated patients without acute respiratory distress syndrome, notes insufficient data to recommend for or against it in mechanically ventilated patients with that syndrome, and recommends low-dose corticosteroids in patients with refractory shock
- FDA is investigating a controversy that has arisen regarding the use of NSAIDs in patients with COVID-19; however, there is no published evidence connecting the use of NSAIDs with worsening COVID-19 symptoms
    - NIH COVID-19 treatment guideline recommends that use of acetaminophen and NSAIDs in patients with COVID-19 should not differ from that in patients without COVID-19
- Until a diagnosis of COVID-19 is confirmed by polymerase chain reaction test, appropriate antiviral or antimicrobial therapy for other viral pathogens (eg, influenza virus) or bacterial pathogens should be administered in accordance with the site of acquisition (hospital or community) and epidemiologic risk factors
    - Additionally, Surviving Sepsis Campaign guideline on managing critically ill adults with COVID-19 supports use of empiric antimicrobial therapy in mechanically ventilated patients with COVID-19 and respiratory failure, with daily consideration for de-escalation

- Otherwise, treatment is largely supportive and includes oxygen supplementation and conservative fluid support

    - Role of low-molecular-weight heparin (beyond standard prophylaxis indications) is being studied, and some authorities recommend use of prophylactic regimens in any patient with COVID-19 and blood markers indicating coagulopathy (eg, marked elevation of D-dimer level, prolonged prothrombin time, platelet count of 100,000 cells/mm^3 or lower, fibrinogen level less than 2 g/L)
- Management of septic shock includes use of vasopressors if fluid administration does not restore adequate perfusion. Surviving Sepsis Campaign, NIH COVID-19 treatment guideline, and WHO provide

guidance specific to the treatment of shock in patients with COVID-19
    - In adults, begin with norepinephrine; epinephrine or vasopressin are preferred as second line over dopamine if norepinephrine is unavailable
        - Hemodynamic goal: mean arterial pressure of 60 to 65 mm Hg
    - In patients who do not respond adequately to usual doses of norepinephrine, Surviving Sepsis Campaign guideline on managing critically ill adults with COVID-19 recommends adding vasopressin rather than further titrating norepinephrine
    - For patients with COVID-19, refractory shock despite fluid and norepinephrine, and evidence of cardiac dysfunction, Surviving Sepsis Campaign guideline on managing critically ill adults with COVID-19 recommends adding dobutamine rather than further titrating norepinephrine
    - In children, epinephrine is considered the first line agent, and norepinephrine may be added if necessary

- Drug therapy

    - Antimalarial agents
        - Chloroquine
            - Infants, Children, and Adolescents weighing less than 50 kg : Efficacy and optimal dosing not established; however, based on extrapolation from pediatric dosing for other indications and comparative doses to the adult dosing regimen suggested for COVID-19, 8.3 mg (5 mg base)/kg/dose PO twice daily [Max: 500 mg/dose (300 mg base/dose)] is being used in limited pediatric dosing protocols; a 10-day course is being used in adult patients.
            - Adolescents weighing 50 kg or more : Data are limited; efficacy has not been established. 1000 mg PO on day 1 then 500 mg PO daily for 4 to 7 days suggested by FDA EUA statement. Based on extrapolation from pediatric dosing for other indications and comparative doses to the adult dosing regimen suggested for COVID-19, 8.3 mg (5 mg base)/kg/dose PO twice daily [Max: 500 mg/dose (300 mg base/dose)] is being used in limited pediatric dosing protocols; a 10-day course is being used in adult patients.
            - Adults weighing less than 50 kg : Data are limited; efficacy has not been established. 500 mg PO twice daily for 10 days is being evaluated alone and in combination.
            - Adults weighing 50 kg or more : Data are limited; efficacy has not been established. 1000 mg PO on day 1 then 500 mg PO daily for 4 to 7 days suggested by FDA EUA statement. 500 mg PO twice daily for 10 days is also being evaluated alone and in combination.
        - Hydroxychloroquine
            - Infants, Children, and Adolescents weighing less than 50 kg : Efficacy and optimal dosing not established; however, based on extrapolation from pediatric dosing for other indications and comparative doses to adult dosing regimens suggested for COVID-19, doses of 6.5 mg (5 mg base)/kg/dose PO every 12 hours [Max: 400 mg/dose (310 mg base/dose)] for 2 doses, then 3.25 mg (2.5 mg base)/kg/dose every 12 hours [Max: 200 mg/dose (155 mg base/dose)] are being used in limited pediatric dosing protocols; a 5- to 20-day course is being used in adult patients.
            - Adolescents weighing 50 kg or more : Data are limited; efficacy has not been established. 800 mg PO on day 1 then 400 mg PO daily for 4 to 7 days suggested by FDA EUA statement. Based on extrapolation from pediatric dosing for other indications and comparative doses to adult dosing regimens suggested for COVID-19, doses of 6.5 mg (5 mg base)/kg/dose PO every 12 hours [Max: 400 mg/dose (310 mg base/dose)] for 2 doses, then 3.25 mg (2.5 mg base)/kg/dose every 12 hours [Max: 200 mg/dose (155 mg base/dose)] are being used in limited pediatric dosing protocols; a 5- to 20-day course is being used in adult patients.

        - Adults weighing less than 50 kg : Data are limited; efficacy has not been established. Dosing regimens, alone and in combination, are being evaluated, including 400 mg PO twice daily on day 1 then 200 mg PO twice daily for 4 days; 200 mg PO twice daily for 5 to 20 days; and 200 mg PO three times daily for 10 days. Additional clinical evaluation is needed.
        - Adults weighing 50 kg or more : Data are limited; efficacy has not been established. 800 mg PO on day 1 then 400 mg PO daily for 4 to 7 days suggested by FDA EUA statement. Other dosing regimens, alone and in combination, are being evaluated, including 400 mg PO twice daily on day 1 then 200 mg PO twice daily for 4 days; 200 mg PO twice daily for 5 to 20 days; and 200 mg PO three times daily for 10 days. Additional clinical evaluation is needed.
    - Monoclonal antibodies
        - Tocilizumab
            - Tocilizumab Solution for injection; Adults: Available data are limited, and efficacy has not been established. Due to a lack of clinical data, the NIH COVID-19 treatment guidelines do not recommend for or against the use of IL-6 receptor inhibitors, such as tocilizumab. 4 to 8 mg/kg/dose (Usual dose: 400 mg; Max dose: 800 mg) IV once is being evaluated in combination with antiviral therapy. A second dose 8 to 12 hours after the first infusion may be considered. One protocol suggests a possible third dose 16 to 24 hours after the first dose.
        - Sarilumab
            - Sarilumab Solution for injection; Adults: Efficacy has not been established. 200 mg IV or subcutaneously once or 400 mg IV once is being evaluated in combination with antiviral therapy.

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

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Analgesics

Guidance

NSAIDs in Older Adults

Oral NSAIDs:

- **Increased risk** of gastrointestinal bleeding or peptic ulcer disease in high-risk groups, including those >75 years or taking oral or parenteral corticosteroids, anticoagulants, or antiplatelet agents (Quality of evidence: moderate; Strength of recommendation: Strong)
    - May exacerbate existing ulcers or cause new/additional ulcers
    - Avoid unless other alternatives are not effective and patient can take gastroprotective agent
- **Avoid** ketorolac in older adults due to the increased risk of gastrointestinal bleeding/peptic ulcer disease and acute kidney injury in older adults (Quality of evidence: moderate; Strength of recommendation: Strong)
    - Compared to patients younger than 65 years of age, the mean elimination half-life of ketorolac in the elderly is prolonged (7 hours after an IM dose and 6.1 hours after an oral dose)

- Use with **caution** in patients with heart failure who are asymptomatic and **avoid** in patients with symptomatic heart failure due to the potential to promote fluid retention and/or exacerbate heart failure (Quality of evidence: moderate; Strength of recommendation: Strong)
- **Avoid** in patients with chronic kidney disease stage 4 or higher (creatinine clearance <30 mL/min) as they may increase risk of acute kidney injury and further decline of renal function (Quality of evidence: moderate; Strength of recommendation: Strong)
    - This includes patients at risk for renal failure due to hypovolemia (dehydration)

By the 2019 American Geriatrics Society Beers Criteria® Update Expert Panel. American Geriatrics Society 2019 Updated AGS Beers Criteria® for Potentially Inappropriate Medication Use in Older Adults. J Am Geriatr Soc. 2019;67(4), 674–694. Source

Ketorolac Drug Monograph. ClinicalKey.

Published By: Elsevier

Acetaminophen Oral Tablet; 650 mg Every 4 hours (PRN: Pain, mild); Do not exceed 4000 mg acetaminophen in 24 hours from all sources
Acetaminophen 325 MG / HYDROcodone Bitartrate 5 MG Oral Tablet; 1 tablet(s) Every 4 hours (PRN: Pain, moderate); Do not exceed 4000 mg acetaminophen in 24 hours from all sources
Acetaminophen 325 MG / oxyCODONE Hydrochloride 5 MG Oral Tablet; 1 tablet(s) Every 6 hours (PRN: Pain, moderate); Do not exceed 4000 mg acetaminophen in 24 hours from all sources
Morphine Intravenous Injectable Solution; 2 mg Every 4 hours (PRN: pain, severe)
HYDROmorphone Intravenous Injectable Solution; 0.5 mg Every 4 hours (PRN: pain, severe)

Antacids

Aluminum Hydroxide 40 MG/ML / Magnesium Hydroxide 40 MG/ML / Simethicone 4 MG/ML Oral Suspension; 10 mL Every 6 hours (PRN: Heartburn)
Famotidine Oral Tablet; 20 mg Every 12 hours
Famotidine Intravenous Injectable Solution; 20 mg Every 12 hours
pantoprazole Oral Delayed Release Tablet; 40 mg Every 24 hours
pantoprazole Intravenous Injectable Solution; 40 mg Every 24 hours

Antidiarrheal Agents

Loperamide Oral Tablet ; 4 mg Once

Antiemetics

Ondansetron Oral Tablet; 4 mg Every 8 hours (PRN: Nausea/vomiting)
Ondansetron Intravenous Injectable Solution; 4 mg Every 8 hours (PRN: Nausea/vomiting)

Antipyretics

Acetaminophen Oral Tablet; 650 mg Every 4 hours (PRN: Temperature greater than 38 degree celsius); Do not exceed 4000 mg acetaminophen in 24 hours from all sources
Acetaminophen Rectal Suppository; 650 mg Every 4 hours (PRN: Temperature greater than 38 degree celsius); Do not exceed 4000 mg acetaminophen in 24 hours from all sources

Anxiolytics, Sedatives, and Hypnotics

Benzodiazepines may increase the risk of falls

Guidance

Benzodiazepine Risks, Elderly

Avoid benzodiazepines in older adults (Quality of evidence: moderate; Strength of recommendation: strong)

- Older adults have increased sensitivity to benzodiazepines and decreased metabolism of long-acting agents
- In general, all benzodiazepines **increase risk** of cognitive impairment, delirium, falls, fractures, and motor vehicle crashes in older adults
- May be appropriate for seizure disorders, rapid eye movement sleep behavior disorder, benzodiazepine withdrawal, ethanol withdrawal, severe generalized anxiety disorder, and periprocedural anesthesia

Nonbenzodiazepine benzodiazepine receptor agonist hypnotics have adverse events similar to those of benzodiazepines in older adults (eg, delirium, falls, fractures) (Quality of evidence: moderate; Strength of recommendation: strong)

By the 2019 American Geriatrics Society Beers Criteria® Update Expert Panel. American Geriatrics Society 2019 Updated AGS Beers Criteria® for Potentially Inappropriate Medication Use in Older Adults. J Am Geriatr Soc. 2019;67(4), 674–694. Source

Published By: Elsevier

LORazepam Oral Tablet; 1 mg Every 8 hours (PRN: Anxiety)
LORazepam Intravenous Injectable Solution; 0.5 mg Every 8 hours (PRN: Anxiety)

Laxatives/Stool Softeners

Bisacodyl Oral Tablet; 10 mg Every 24 hours (PRN: Constipation); Administer up to 3 times a week of either suppository or oral tablet
Bisacodyl Rectal Suppository; 10 mg Every 24 hours (PRN: Constipation); Administer up to 3 times a week of either suppository or oral tablet
Docusate Oral Capsule; 100 mg Every 24 hours
Magnesium Hydroxide 80 MG/ML Oral Suspension; 30 mL At bedtime (PRN: Constipation)
POLYETHYLENE GLYCOL 3350 Oral Solution; 17 grams Every 24 hours (PRN: Constipation)

Immunizations

Guidance

Immunization Schedule, Aged 19 Years or Older

Table 1. Recommended Adult Immuni ages 19 years or older, United States, 2

Always make recommendations by determining needed vaccines based on and other indications (Table 2), and reviewing special situations (Notes).

Table 1. By age

Table 2. By indications

Schedule Changes & Guidance

Resources for health care providers

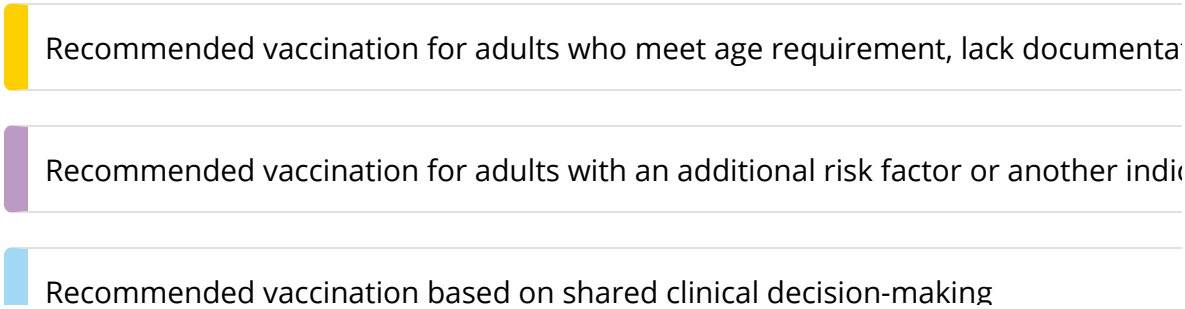
Resources for adults

Download Schedules App

- 8.5"x11" print color [6 pages]
- 8.5"x11" print black and white [6 pages]
- Compliant version of this schedule
- Vaccines in the Adult Immunization Schedule
- Learn how to display current schedules from your website.
- Hard copies of the schedule are available for free using the CDC-info c

Download Schedules App

Legend



Centers for Disease Control and Prevention, National Center for Immunization and Respiratory Diseases (NCIRD). (2020). *Recommended immunization schedule for adults aged 19 years or older, United States*. Source

Published By: Elsevier

Influenza vaccine Injectable Suspension Intramuscular Injectable Suspension; 0.5 mL Once

Quality Measure

NQF 1659. Influenza Immunization, Inpatient, 6 Months and Older, discharge

Inpatients aged ≥6 months, discharged during October, November, December, January, February or March, who are screened for influenza vaccine status and vaccinated prior to discharge, if indicated.

Steward: Centers for Medicare & Medicaid Services.

Use in Federal Program: Hospital Inpatient Quality Reporting.

Care Setting: Hospital/Acute Care Facility.

National Quality Forum-endorsed measure. Source

Published By: Elsevier

Pneumococcal polysaccharide vaccine 23 (PPSV23) Injectable Solution Intramuscular Injectable Solution; 0.5 mL Once
Pneumococcal conjugate vaccine 13 (PCV13) Prefilled Syringe Intramuscular Prefilled Syringe; 0.5 mL Once
acellular pertussis vaccine, inactivated / diphtheria toxoid vaccine, inactivated / tetanus toxoid vaccine, inactivated Intramuscular Injection; 0.5 mL Once
diphtheria toxoid vaccine, inactivated / tetanus toxoid vaccine, inactivated Intramuscular Injection; 0.5 mL Once

DVT Prophylaxis

Guidance

Prevention of VTE in Hospitalized Acutely Ill Medical Patients

According to **American College of Chest Physicians** Practice Guidelines:

- Use anticoagulant thromboprophylaxis with low-molecular-weight heparin (LMWH), low-dose unfractionated heparin (UFH) 2 or 3 times per day, or fondaparinux in acutely ill hospitalized medical patients at increased risk of thrombosis
- Do not use pharmacologic or mechanical prophylaxis in acutely ill, hospitalized medical patients at low risk of thrombosis. (Grade: 1B)
- Do not use anticoagulant thromboprophylaxis for acutely ill hospitalized medical patients who are bleeding or at high risk for bleeding. (Grade: 1B)
- Use mechanical thromboprophylaxis with graduated compression stockings (grade: 2C) or intermittent pneumatic compression (Grade: 2C) rather than no mechanical thromboprophylaxis in acutely ill hospitalized medical patients at increased risk of thrombosis who are bleeding or at high risk of major bleeding. When bleeding risk decreases and venous thromboembolism risk persists, substitute pharmacologic thromboprophylaxis for mechanical thromboprophylaxis. (Grade: 2B)
- Do not extend the duration of thromboprophylaxis beyond the period of patient immobilization or acute hospital stay in acutely ill hospitalized medical patients who receive an initial course of thromboprophylaxis. (Grade: 2B)

The ACCP recommends the Padua Prediction Score for judging hospitalized patients' risk. The Padua Prediction Score assigns points to
the 11 risk factors below. A cumulative score of 4 points or higher constitutes a high risk of venous thromboembolis

Padua Prediction Score is available here.

American Society of Hematology (ASH) Guidelines

- Acutely ill medical patients: ASH *suggests* using UFH, LMWH, or fondaparinux rather than no parenteral anticoagulant. (Conditional recommendation, low certainty in the evidence of effects)
- Critically ill medical patients: AHS *recommends* using UFH or LMWH over no UFH or LMWH (strong recommendation, moderate certainty in the evidence of effects) and *suggests* using LMWH over UFH. (Conditional recommendation, moderate certainty in the evidence of effects)
- DOAC vs LMWH in acutely ill medical patients:
    - In acutely ill hospitalized medical patients, the ASH guideline panel *recommends* using LMWH over DOACs for VTE prophylaxis. (Strong recommendation, moderate certainty in the evidence of effects)
    - In acutely ill hospitalized medical patients, the ASH guideline panel *recommends* inpatient VTE prophylaxis with LMWH only, rather than inpatient and extended-duration outpatient VTE prophylaxis with DOACs. (Strong recommendation, moderate certainty in the evidence of effects)

The **American College of Physicians (ACP)** guideline differ slightly from those of the American College of Chest Physicians, particularly with respect to the use of mechanical prophylaxis. According to the ACP:

- Individually assess the risks of thromboembolism and bleeding in medical patients before administering prophylaxis. (Strong recommendation, moderate-quality evidence)

- Administer pharmacologic prophylaxis with heparin or a related drug in medical patients (including those with stroke), unless the risk of bleeding exceeds the likely benefits.(Strong recommendation, moderate-quality evidence)
- Do not administer mechanical prophylaxis with graduated compression stockings. (Strong recommendation, moderate-quality evidence). In patients at high risk for bleeding events or in whom heparin is contraindicated for other reasons, intermittent pneumatic compression may be a reasonable option

The **National Institute for Health and Care Excellence (NICE)** guideline recommends to:

- Screen patients with an approved tool. The NICE recommended tool can be found here
- Offer pharmacological VTE prophylaxis for a minimum of 7 days to acutely ill medical patients whose risk of VTE outweighs their risk of bleeding:
- Use low-molecular-weight heparin (LMWH) as first-line treatment
- If LMWH is contraindicated use fondaparinux sodium
- If using pharmacological VTE prophylaxis for people with renal impairment choose either LMWH or unfractionated heparin (UFH)
- If needed, reduce the dose of LMWH and UFH for people with renal impairment. Base the decision on multidisciplinary or senior opinion, or locally agreed protocols

Specific recommendations for people with cancer, under palliative care, admitted to critical care, and who have psychiatric illness are found in the NICE guideline.

Qaseem A, Chou R, Humphrey LL, Starkey M, Shekelle P . Clinical Guidelines Committee of the American College of Physicians. Venous thromboembolism prophylaxis in hospitalized patients: a clinical practice guideline from the American College of Physicians. Ann Intern Med. 2011;155(9), 625-632. Source

Guyatt GH, Akl EA, Crowther M, Gutterman DD, Schuünemann HJ; American College of Chest Physicians Antithrombotic Therapy and Prevention of Thrombosis Panel. Executive summary: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Chest. 2012;141(2 Suppl), 7S-47S. Source

National Institute for Health and Care Excellence (NICE). (2019). *Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism*. Source

Schünemann HJ, Cushman M, Burnett AE, et al. American Society of Hematology 2018 guidelines for management of venous thromboembolism: prophylaxis for hospitalized and nonhospitalized medical patients. Blood Adv. 2018;2(22), 3198-3225. Source

Published By: Elsevier

Quality Measure

NQF 0371. Venous Thromboembolism Prophylaxis

This measure assesses the number of patients who received venous thromboembolism prophylaxis or have documentation why no venous thromboembolism prophylaxis was given the day of or the day after hospital admission or surgery end date for surgeries that start the day of or the day after hospital admission. This measure is part of a set of six nationally implemented prevention and treatment measures that address venous thromboembolism .

Exclusions:

- Patients less than 18 years of age
- Patients who have a length of stay (LOS) less than two days and greater than 120 days
- Patients with Comfort Measures Only documented on day of or day after hospital arrival
- Patients enrolled in clinical trials related to VTE
- Patients who are direct admits to intensive care unit (ICU), or transferred to ICU the day of or the day after hospital admission with ICU LOS greater than or equal to one day
- Patients with ICD-9-CM Principal Diagnosis Code of Mental Disorders or Stroke.
- Patients with ICD-9-CM Principal or Other Diagnosis Codes of Obstetrics or VTE.
- Patients with ICD-9-CM Principal Procedure Code of Surgical Care Improvement Project (SCIP) VTE selected surgeries

VTE-2: ICU Venous Thromboembolism Prophylaxis, VTE-3: Venous Thromboembolism Patients with Anticoagulation Overlap Therapy, VTE-4: Venous Thromboembolism Patients Receiving Unfractionated Heparin with Dosages/Platelet Count Monitoring, VTE-5: Venous Thromboembolism Warfarin Therapy Discharge Instructions and VTE-6: Hospital Acquired Potentially-Preventable Venous Thromboembolism that are used in The Joint Commission's accreditation process.

Steward: The Joint Commission.

Use in Federal Program: Hospital Inpatient Quality Reporting, Meaningful Use Stage 2 (EHR Incentive Program) - Hospitals, CAHs.

Care Setting: Hospital/Acute Care Facility.

National Quality Forum-endorsed measure. Source

Published By: Elsevier

No Prophylaxis

Venous thromboembolism prophylaxis not required - document reason in patient chart
Venous thromboembolism prophylaxis contraindicated - document reason in patient chart

Mechanical Devices

Mechanical methods of prophylaxis against deep vein thrombosis (DVT) such as graduated compression stockings (GCS) and/or intermittent pneumatic compression (IPC) should be used primarily in patients at high risk for bleeding

Guidance

Mechanical Methods, Deep Vein Thrombosis Prophylaxis

Published guidelines have different recommendations on the use of mechanical compression devices to prevent deep vein thrombosis:

- The American College of Chest Physicians recommends using mechanical thromboprophylaxis with graduated compression stockings (Grade 2C) or intermittent pneumatic compression (Grade 2C) rather than no mechanical thromboprophylaxis for acutely ill hospitalized medical patients at increased risk of thrombosis who are bleeding or at high risk for major bleeding
- When bleeding risk decreases, and venous thromboembolism risk persists, these guidelines suggest substituting pharmacologic thromboprophylaxis for mechanical thromboprophylaxis. (Grade 2B)
- The American College of Physicians recommends *against* the use of mechanical prophylaxis with graduated compression stockings (GCS). (Strong recommendation, moderate-quality evidence)
- A systematic review found that GCS are effective in reducing the risk of DVT, but the evidence is stronger for general and orthopedic surgery patients than medical patients.
- In addition, a systematic review suggests that thigh-high stockings were non-statistically more effective than knee-high stocking, but patient preference may increase the likelihood of using knee-high stockings.

Do not offer anti-embolism stockings to people who have:

- Suspected or proven peripheral arterial disease
- Peripheral arterial bypass grafting
- Peripheral neuropathy or other causes of sensory impairment
- Any local conditions in which anti-embolism stockings may cause damage – for example, fragile ‘tissue paper’ skin, dermatitis, gangrene or recent skin graft
- Known allergy to material of manufacture
- Severe leg edema
- Major limb deformity or unusual leg size or shape preventing correct fit

Do not offer anti-embolism stockings for VTE prophylaxis to people who are admitted for acute stroke. Consider intermittent pneumatic compression for VTE prophylaxis for people who are immobile and admitted with acute stroke. If using, start it within 3 days of acute stroke

Guyatt GH, Akl EA, Crowther M, et al. Executive summary: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Chest. 2012;141(2 Suppl), 7s-47s. Source

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Wade R, Paton F, Rice S, et al. Thigh length versus knee length antiembolism stockings for the prevention of deep vein thrombosis in postoperative surgical patients; a systematic review and network meta-analysis. BMJ open. 2016;6(2), e009456. Source

Sachdeva A et al. Graduated compression stockings for prevention of deep vein thrombosis. Cochrane Database Syst Rev. 12, CD001484, 2014. Source

Published By: Elsevier

Apply sequential compression device
Apply thigh-high graduated compression stockings
Apply knee-high graduated compression stockings

Medications

Medical patients at increased risk of DVT should receive thromboprophylaxis with LMWH, LDUH, or fondaparinux as soon as no high risk of bleeding is present

Guidance

Prevention of VTE in Hospitalized Acutely Ill Medical Patients

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- If needed, reduce the dose of LMWH and UFH for people with renal impairment. Base the decision on multidisciplinary or senior opinion, or locally agreed protocols

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Published By: Elsevier

Modify the dose of enoxaparin in patients with severe renal insufficiency (CrCl less than 30 mL/min) and morbidly obese patients (BMI greater than or equal to 35 mg/m2)

Guidance

Enoxaparin, DVT Prophylaxis - Medical

For venous thromboembolism (VTE) prophylaxis including deep venous thrombosis (DVT) prophylaxis or pulmonary embolism prophylaxis:

For general medical adult patients with risk factors for DVT due to restrictive mobility during acute illness, e.g.

- *Moderate to severe congestive heart failure*
- *Severe respiratory disease*
- *Patients who are confined to bed and have 1 or more of the following risk factors:*
  - *Active cancer*
  - *History of VTE*
  - *Sepsis*
  - *Acute neurological disease*
  - *Inflammatory bowel disease*
- *Adults:* 40 mg subcutaneous daily for up to 14 days

For thrombosis prophylaxis in patients with obesity:
NOTE: Although previous clinical practice guidelines recommended weight-based dosing for VTE prophylaxis in obese patients, current guidelines do not provide specific dosing recommendations but suggest an increased dose may be required.

- *Adults:* 0.5 mg/kg subcutaneous once or twice daily
- Anti-factor Xa concentrations may be monitored with dosage adjustments considered to achieve an anti-factor Xa concentration of 0.2—0.5 International Units/mL

For patients with a CrCl less than 30 mL/minute:

- *Adults:* 30 mg subcutaneously once daily

For thrombosis prophylaxis in perioperative patients, pregnant females, and patients that need interruption in vitamin K antagonists (VKA) therapy, consult the reference.

Enoxaparin Drug Monograph. ClinicalKey.

Nutescu EA, Spinler SA, Wittkowsky A, et al. Low-molecular-weight heparins in renal impairment and obesity: available evidence and clinical practice recommendations across medical and surgical settings. Ann Pharmacother. 2009;43(6), 1064-1083. Source

Published By: Elsevier

Enoxaparin Subcutaneous Injectable Solution; 40 mg Every 24 hours
Avoid the use of fondaparinux in patients weighing less than 50 kg, the elderly, and frail patients

Guidance

Fondaparinux, DVT Prophylaxis

Avoid the use of fondaparinux in patients weighing <50 kg, the elderly, and frail patients because bleeding complications may be increased.

Falck-Ytter Y, Francis CW, Johanson NA, et al. Prevention of VTE in orthopedic surgery patients: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Chest. 2012;141(2 Suppl), e278S-e325S. Source

Published By: Elsevier

fondaparinux Subcutaneous Prefilled Syringe; 2.5 mg Every 24 hours
heparin Subcutaneous Injectable Solution; 5000 Units Every 8 hours

Laboratory

Guidance

Laboratory Testing, COVID-19 ~

Laboratory testing recommendations:

- Positive identification of SARS-CoV-2 (2019-nCoV) RNA by polymerase chain reaction test is considered confirmation of diagnosis
- Routine blood work is not diagnostic, but a pattern of typical abnormalities is emerging in case series of hospitalized patients:
    - Leukopenia may be observed and relative lymphopenia is common, especially in patients with more severe illness
    - Anemia was noted in about half of patients in one series
    - Both elevated and low platelet counts have been seen
    - A prolonged prothrombin time has been reported
    - Levels of D-dimer and fibrinogen may be elevated
    - Elevated levels of lactate dehydrogenase and liver enzymes (ALT and AST) are common
    - Serum procalcitonin levels are usually within reference range; elevated levels have been seen in patients with secondary infection
    - Serum levels of some other acute phase reactants (eg, C-reactive protein, ferritin) are elevated in most patients, as is the erythrocyte sedimentation rate
- Lactate level of 2 mmol/L or higher suggests presence of septic shock

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

Published By: Elsevier

Chemistry

Lab: Basic Metabolic Profile, Once
Lab: Comprehensive Metabolic Panel, Once
Lab: Brain Natriuretic Peptide, Once
Lab: C-Reactive Protein, Once
Lab: D-Dimer, Quantitative, Once
Lab: Fibrinogen , Once
Lab: Ferritin , Once
Lab: Hepatic Function Panel , Once
Lab: Lactic Acid, Venous, Once

Guidance

Lactate, COVID-19 ~

Lactate level of 2 mmol/L or higher suggests presence of septic shock

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

Published By: Elsevier

Lab: Lipid Panel, Once
Lab: Procalcitonin , Once

Guidance

Blood Chemistry, Non-ST-elevation Acute Coronary Syndrome

AHA/ACC Recommendations for Biomarkers Used for Prognosis, Early Risk Stratification and Diagnosis:

Class I Recommendation

- Serial cardiac troponin I or T levels (when a contemporary assay is used) should be obtained at presentation and 3 to 6 hours after symptom onset in all patients who present with symptoms consistent with ACS to identify a rising and/or falling pattern of values. (Level of Evidence: A)
- Additional troponin levels should be obtained beyond 6 hours after symptom onset in patients with normal troponin levels on serial examination when changes on ECG and/or clinical presentation confer an intermediate or high index of suspicion for ACS. (Level of Evidence: A)
- If the time of symptom onset is ambiguous, the time of presentation should be considered the time of onset for assessing troponin values. (Level of Evidence: A)
- The presence and magnitude of troponin elevations are useful for short- and long-term prognosis. (Level of Evidence: B)

Class IIa Recommendation

- It is reasonable to obtain a fasting lipid profile in patients with NSTE-ACS, preferably within 24 hours of presentation. (Level of Evidence: C)

Class IIb

- Measurement of B-type natriuretic peptide or N-terminal pro–B-type natriuretic peptide may be considered to assess risk in patients with suspected ACS. (Level of Evidence: B)

Class III: No Benefit

- With contemporary troponin assays, creatine kinase myocardial isoenzyme (CK-MB) and myoglobin are not useful for diagnosis of ACS. (Level of Evidence: A)

Amsterdam E, Wenger N, Brindis R, et al. 2014 AHA/ACC Guideline for the Management of Patients With Non–ST-Elevation Acute Coronary Syndromes. A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. Circulation. 2014;130, e344-e426. Source

Published By: Elsevier

Hematology

Lab: Complete Blood Count (CBC), Once
Lab: Erythrocyte sedimentation rate (ESR) , Once
Lab: Glycohemoglobin A1C, Once
Lab: Prothrombin time (PT) with INR, Once
Lab: Prothrombin time (PT) with INR, Every morning
Lab: Partial Thromboplastin Time, Once

Microbiology

Blood culture, Once (1 of 2)
Blood culture, Once (2 of 2)
Gram stain, culture and sensitivity, Sputum, Once

Guidance

Sputum Testing, COVID-19 ~

Collect a sputum specimen if a productive cough is present:

Lower respiratory tract

- A deep cough sputum specimen (collected after mouth rinse) is also acceptable
    - WHO advises against attempts to induce sputum, because the process may increase aerosolization and risk of transmission

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

Published By: Elsevier

Gram stain, culture and sensitivity, Urine, Once
Influenza A/B PCR, Nose , Once

Guidance

Influenza A/B Antigen, Respiratory Illness ~

Nasal *Influenza A* and *B virus* antigen

- Obtain nasal swab samples to test for influenza in patients with suspected viral pneumonia

- Use a rapid influenza diagnostic test if it will change the care of the patient or of other patients. The following factors warrant such testing:
    - Hospitalized patients
    - Patients with high-risk conditions
    - Documentation of institutional outbreaks

    - Atypical timing (eg, summer months in temperate climates)
        - Under these circumstances, viral culture is recommended to confirm positive results from rapid tests and to identify strain
- Antigen detection tests: rapid influenza diagnostic tests are usually available at the point of care
    - Performed on nasal or nasopharyngeal swab or aspirate
    - Some can distinguish influenza A from influenza B but cannot identify specific strain
    - Sensitivity is 50% to 70%
    - Specificity is 90% to 95%

Influenza Clinical Overview. ClinicalKey.

Community-Acquired Pneumonia in Adults Clinical Overview. ClinicalKey.

Published By: Elsevier

Influenza A/B PCR, Sputum , Once
Methicillin-resistant S. aureus (MRSA) Culture, Nose, Once
Mycoplasma pneumoniae Culture, Sputum , Once
Contact Local Public Health Department for Positive SARS-CoV-2 Polymerase Chain Reaction results
Real-Time Polymerase chain reaction for SARS-CoV-2; Nasopharyngeal swab, Once

Guidance

Pharyngeal Swab, COVID-19 ~

CDC provides specific instructions for collection and handling of specimens.

Upper Respiratory Tract Swab

- Nasopharyngeal swab is preferred; oropharyngeal swab may be submitted in addition, if obtained. Only synthetic fiber swabs with plastic shafts are acceptable. If both are submitted, they may be placed in the same container
- For nasopharyngeal specimen, insert swab into nostril parallel to palate. Leave swab in place for a few seconds to absorb secretions
- For oropharyngeal specimen, swab the posterior pharynx, avoiding tongue and tonsils

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

Published By: Elsevier

Real-Time Polymerase chain reaction for SARS-CoV-2; Oropharyngeal swab, Once

Guidance

Pharyngeal Swab, COVID-19 ~

CDC provides specific instructions for collection and handling of specimens.

Upper Respiratory Tract Swab

- Nasopharyngeal swab is preferred; oropharyngeal swab may be submitted in addition, if obtained. Only synthetic fiber swabs with plastic shafts are acceptable. If both are submitted, they may be placed in the same container
- For nasopharyngeal specimen, insert swab into nostril parallel to palate. Leave swab in place for a few seconds to absorb secretions
- For oropharyngeal specimen, swab the posterior pharynx, avoiding tongue and tonsils

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

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Real-time polymerase chain reaction (RT-PCR), sputum , Once ; For SARS-CoV-2
Respiratory Syncytial Virus (RSV) Antigen, Nose , Once

Urine

Lab: Urinalysis, Once
Lab: Pregnancy Test, Urine, Once
Lab: Drug Screen, Urine , Once

Radiology

Guidance

Imaging, COVID-19 ~

Chest imaging (eg, plain radiography, CT) has shown abnormalities in most reported patients; it usually shows bilateral involvement, varying from consolidation in more severely ill patients to ground-glass opacities in less severe and recovering pneumonia

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

Published By: Elsevier

Plain Films

X-ray, Chest PA/lateral, Once; History: [add diagnosis, symptom(s)]; Question: [add reason for study]
X-ray, Chest PA (Portable), Once; History: [add diagnosis, symptom(s)]; Question: [add reason for study]

CT Scan

Guidance

CT Scan, COVID-19 ~

CT appears to be more sensitive than plain radiographs, but normal CT appearance does not exclude COVID-19

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

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CT, Chest with IV contrast ; History: [add diagnosis, symptom(s)] ; Question: [add reason for study]
CT, Chest without IV contrast ; History: [add diagnosis, symptom(s)] ; Question: [add reason for study]

Diagnostic Studies

Electrocardiogram, with at least 12 leads ; History: [add diagnosis, symptom(s)] ; Question: [add reason for study]

Consults

Consult: Public Health ; History: [add reason for consult] ; Question: [add reason for consult] ; further evaluation and management
Consult: Infectious Disease ; History: [add diagnosis, symptom(s)] ; Question: [add reason for consult] ; further evaluation and management

Guidance

Infectious Disease Referral, COVID-19 ~

Consult infectious disease specialist to coordinate diagnosis and management with public health authorities

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

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Consult: Pulmonary Medicine (Pulmonology) ; History: [add diagnosis, symptom(s)] ; Question: [add reason for consult] ; further evaluation and management

Guidance

Pulmonology Referral, COVID-19 ~

Consult pulmonologist to aid in obtaining deep specimens for diagnosis and managing mechanical ventilation if necessary

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

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Consult: Clinical Social Work; History: [add diagnosis, symptom(s)]; Question: [add reason for consult]
Consult: Dietitian; History: [add diagnosis, symptom(s)]; Question: [add reason for consult]
Consult: Pharmacy; History: [add diagnosis, symptom(s)]; Question: [add reason for consult]
Consult: Occupational Therapy; History: [add diagnosis, symptom(s)]; Question: [add reason for consult]
Consult: Physical Therapy; History: [add diagnosis, symptom(s)]; Question: [add reason for consult]

Modules

Guidance

COVID-19 Module Use, COVID-19 ~

Please note that the Medication Infusion Module and the Mechanical Ventilation Module are not COVID-specific. COVID-specific guidance is below:

Medication Infusion

Management of septic shock includes use of vasopressors if fluid administration does not restore adequate perfusion. Surviving Sepsis Campaign, NIH COVID-19 treatment guideline, and WHO provide guidance specific to the treatment of shock in patients with COVID-19

- In adults, begin with norepinephrine; epinephrine or vasopressin are preferred as second line over dopamine if norepinephrine is unavailable
    - Hemodynamic goal: mean arterial pressure of 60 to 65 mm Hg
- In patients who do not respond adequately to usual doses of norepinephrine, Surviving Sepsis Campaign guideline on managing critically ill adults with COVID-19 recommends adding vasopressin rather than

further titrating norepinephrine

- For patients with COVID-19, refractory shock despite fluid and norepinephrine, and evidence of cardiac dysfunction, Surviving Sepsis Campaign guideline on managing critically ill adults with COVID-19 recommends adding dobutamine rather than further titrating norepinephrine
- In children, epinephrine is considered the first line agent, and norepinephrine may be added if necessary

WHO, NIH, and Surviving Sepsis Campaign provide specific guidance for oxygenation, ventilation, and fluid management in COVID-19

- Patients with severe respiratory distress, obstructed or absent breathing, central cyanosis, shock, seizures, or coma require aggressive airway management (which may include intubation) and oxygen
- Oxygenation and ventilation
    - Begin supplemental oxygen when O_2 saturation falls below 90% to 92%
    - Nasal cannula at 5 L/minute or face mask with reservoir bag at 10 to 15 L/minute
        - Titrate to reach SpO_2 of 94% or more initially
        - Once stable, target SpO_2 of 90% or higher in nonpregnant adults; 92% or higher in pregnant patients
        - In most children the target SpO_2 is 90% or greater; for those who require urgent resuscitation (eg, those with apnea or obstructed breathing, severe respiratory distress, central cyanosis, shock, seizures, or coma), a target SpO_2 of 94% or higher is recommended
    - High-flow nasal oxygen or noninvasive ventilation has been used to achieve adequate oxygenation in some patients
        - High-flow nasal oxygen is recommended by Surviving Sepsis Campaign and NIH for COVID-19 patients who develop hypoxemic respiratory failure despite conventional oxygen therapy; there is some evidence that it averts the need for intubation and mechanical ventilation. Noninvasive positive pressure ventilation may be used if high-flow nasal oxygen is not available
        - However, there is concern that these techniques may result in higher risk of aerosolization of the virus. Additionally, sudden deterioration may require emergent intubation, which is associated with more risk to both patient and provider. Therefore, some authorities reserve these options for settings in which airborne precautions can be taken and close monitoring provided
    - Mechanical ventilation may become necessary for patients in whom oxygenation targets cannot be met with less invasive measures or who cannot maintain the work of breathing
        - Recommended settings are tidal volume of 4 to 8 mL/kg (predicted body weight) and inspiratory pressures less than 30 cm H_2O
        - In children, tidal volumes of 5 to 8 mL/kg (predicted body weight) for preserved lung compliance and 3 to 6 mL/kg for poor compliance; inspiratory pressures should be less than 28 cm H_2O
        - Use of PEEP may be necessary in patients with acute respiratory distress syndrome. Optimal regimen is not clearly defined, although guidelines suggest higher pressures (eg, more than 10 cm H_2O) rather than lower pressures. A protocol is available from ARDSnet
        - For patients with moderate to severe acute respiratory distress syndrome, prone positioning for 12 to 16 hours/day is recommended
            - Lateral decubitus position for pregnant women
    - Extracorporeal membrane oxygenation has been used in severely ill patients, and it can be considered if resources and expertise are available

ClinicalKey. (2020). *Coronavirus: novel coronavirus (COVID-19) infection*. Source

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Glucose Management - Module
Respiratory Therapy - Module
Immunizations, Adult - Module
Smoking Cessation/Tobacco Withdrawal - Inpatient Module
Pressure Injury Management - Module