Capital Health

INFECTION PREVENTION AND CONTROL

Health Care-Associated Infection (HAI) Definitions
May 28, 2012

The Capital Health Infection Prevention and Control (IPAC) department conducts ongoing surveillance and reports rates of HAI to the organization.

In addition, Capital Health is a member of the Canadian Nosocomial Infection Surveillance Program (CNISP) which is a collaborative effort of the Canadian Hospital Epidemiology Committee (CHEC), a subcommittee of the Association of Medical Microbiology and Infectious Disease (AMMI) Canada and the Centre for Communicable Diseases and Infection Control (CCDIC) of the Public Health Agency of Canada (PHAC). View the CNISP website here.

Transparency:

The consistent use of standard definitions ensures reliability in identifying health care-associated infections (HAI) for surveillance and reporting purposes. The following definitions are used by the Capital Health IPAC department when determining the organization's infection rates:

Infection: the entry into and multiplication of an infectious agent in the tissues of the host, resulting in apparent or inapparent illness in the host.

Health care-associated infection: infections that are not present or incubating at the time of admission to the hospital, but are associated with admission to or a procedure performed in a health care facility (i.e. occurs at least 72 hours after admission or is directly related to a previous hospitalization/procedure at the same facility). Health care-associated infections are referred to in this policy as HAI.

Community-associated infection: infections present or incubating on admission to hospital with no association to a recent hospitalization or procedure.

INFECTION	CRITERIA
Blood Stream Infections (BSI)	
Primary BSI	Must meet <u>one</u> of the following criteria: Recognized pathogen isolated from blood culture ***and*** pathogen is not related to infection at another site ***or*** <u>One</u> of the following: • fever greater than 38^{o}C • hypotension – systolic BP less than or equal to 90mmHg • chills ***and*** <u>any</u> of the following: • common skin contaminant isolated from two blood cultures • common skin contaminant isolated from blood culture from patient with intravascular access device ***and*** physician institutes appropriate antimicrobial therapy
Secondary BSI	<u>One</u> of the following with no other recognized cause: • fever greater than 38^{o}C • hypotension - systolic BP less than or equal to 90mmHg • oliguria – less than 20ml/hr ***and*** blood culture done and microorganisms or antigen detected in blood ***and*** microorganism isolated from blood culture is compatible with a related nosocomial infection at another site ***and*** physician institutes appropriate treatment for sepsis.

Central Venous Catheter (CVC) Associated BSI (CVC-BSI)	CVC-associated if catheter in place at onset of BSI or within the 48 hours before the onset of BSI (if CVC removed greater than 48 hours before onset there must be compelling evidence that the infection was associated with the CVC, e.g. purulent thrombophlebitis). **Criterion 1:** Recognized pathogen cultured from one or more blood culture(s), unrelated to infection at another site. ***or*** **Criterion 2:** <u>One or more</u> of: • fever (greater than 38°C) • chills, • hypotension • signs of infection of insertion site, tunnel or pocket ***and*** (a) common skin contaminant cultured from two or more blood cultures drawn on separate occasions. ***or*** (b) common skin contaminant cultured from one blood culture and the physician institutes appropriate antimicrobial therapy.
Pneumonia	See Appendix A (pg. 11) for the pneumonia algorithm. Pneumonia will be considered a HAI when: Documented aspiration occurred within 72 hours of admission (such as during intubation in the Operating Room or Emergency Department). Post-op pneumonia within 72 hours of admission with a normal CXR prior to OR. Readmission with diagnosis of pneumonia within 10 days of discharge. Ventilator-associated pneumonia (VAP) is pneumonia in persons who had a device to assist or control respirations within the 48-hour period before the onset of infection.
***Clostridium difficile* Infection (CDI)**	Presence of diarrhea or fever, abdominal pain and/or ileus, ***and*** a laboratory confirmation of a positive toxin assay for *C. difficile*. ***or*** a diagnosis of pseudomembranes on sigmoidoscopy or colonoscopy *or* histological / pathological diagnosis of CDI Diarrhea is defined as <u>one</u> of the following: • 6 or more watery stools in a 36 hour period

	• 3 or more unformed stools in a 24 hour period for at least 1 day and new or unusual for the patient • 8 or more unformed stools over 48 hours Note: If the information about the frequency and consistency of diarrhea is not available, a toxin-positive stool will be considered as a case. **Healthcare-associated CDAD** = A CDI infection is considered **"**healthcare-associated from our facility**"** if it meets the following criteria: Patient's CDI symptoms occur in our hospital greater than or equal to 72 hours after admission ***or*** Symptoms cause re-evaluation in a patient who had been hospitalized at our hospital and discharged within the previous 8 weeks.
Catheter Associated Urinary Tract Infections (CAUTI)	**Criteria A:** Patient had an indwelling urinary catheter in place at the time of specimen collection: ***and*** at least one of the following signs or symptoms with no other recognized cause: • fever (greater than 38°C), • suprapubic tenderness, or • costovertebral angle pain or tenderness ***and*** a positive urine culture of greater than or equal to 10^5 colony-forming units (CFU)/ml with no more than 2 species of microorganisms **Criteria B:** Patient had indwelling urinary catheter removed within the 48 hours prior to specimen collection: ***and*** at least one of the following signs or symptoms with no other recognized cause: • fever (greater than 38°C), • urgency, • frequency, • dysuria, • suprapubic tenderness, or • costovertebral angle pain or tenderness ***and*** a positive urine culture of greater than or equal to 10^5 colony-forming units (CFU)/ml with no more than 2 species of microorganisms.

Surgical Site Infections (SSI)	
Superficial Incision (SSI)	Infection occurs at incision site within 30 days ***and*** involves only skin and subcutaneous tissue ***and*** patient has at least <u>one</u> of the following: a) purulent drainage from superficial incision b) microorganism isolated from culture of fluid or tissue from superficial incision c) at least <u>one</u> of the following: • pain or tenderness • localized swelling • redness or heat, ***and*** superficial incision is deliberately opened by surgeon. d) surgeon/physician diagnosis
Deep Incision SSI	Infection occurs within 30 days of the procedure (with no implant) or within 1 year (with implant) and infection appears to be related to the operative procedure ***and*** involves deep soft tissue (e.g. fascial layers and muscle) of the incision ***and*** patient has at least <u>one</u> of the following: a) purulent drainage from the deep incision but not the organ space of the surgical site b) spontaneous dehiscence or incision deliberately opened by surgeon [culture (+) or not] when the patient has at least <u>one</u> of the following: fever greater than 38°C ***or*** localized pain or tenderness Note: when cultured, a culture negative finding does not meet this criterion c) an abscess/other evidence of infection is found on direct examination, during re-operation, or by histopathologic or radiologic exam. d) surgeon/ physician diagnosis. ***Infections that involve both the superficial and deep incisions should be classified as DI-SSI.***
Organ Space SSI	Infection occurs within 30 days of the procedure (with no implant) or within 1 year (with implant) and infection appears to be related to the operative procedure ***and*** involves any part of the anatomy (other than the incision, fascia, or muscle layers) that is opened or manipulated during the operative procedure ***and*** patient has at least <u>one</u> of the following: a) purulent drainage from a drain placed through a stab wound into the organ/space b) microorganisms isolated from culture of fluid or tissue from the organ space

	c) abscess/ infection involving organ/space found on direct exam during re-operation, or by histopathologic or radiologic exam. d) surgeon / physician diagnosis **An example is an appendectomy with subsequent sub-diaphragmatic abscess, which would be reported as an organ space SSI at the intra-abdominal specific site. Another example is a bowel resection with an intra-abdominal abscess detected on CT post-op.

Long Term Care Definitions

INFECTION	CRITERIA	COMMENTS
Common Cold/ Pharyngitis	The resident must have at least **two** of the following: a) Runny nose or sneezing, b) Stuffy nose (i.e. congestion), c) Sore throat or hoarseness or difficulty swallowing, d) Dry cough, e) Swollen or tender glands in the neck (cervical lymphadenopathy).	Fever may or many not be present. Symptoms must be new, and care must be taken to ensure that they are not caused by allergies.
Influenza-like illness (ILI)	**Both** of the following criteria must be met: Fever (greater than or equal to 38° C), ***and*** The resident must have at least **three** of the following: a) Chills, b) New headache or eye pain, c) Myalgias, d) Malaise or loss of appetite, e) Sore throat, f) New or increased dry cough.	The diagnosis can only be made during influenza season (November to April in Canada).
Pneumonia	**Both** of the following must be met: a) Interpretation of a CXR as demonstrating pneumonia, probable pneumonia, or the presence of an infiltrate. If a previous radiograph exists for comparison, the infiltrate should be new. b) The resident must have at least **two** of the signs and symptoms described under "other lower respiratory tract infections" (below).	Rule out non-infectious causes such as CHF.
Other lower	At least **three** of the following:	This diagnosis can only

INFECTION	CRITERIA	COMMENTS
respiratory tract infection (bronchitis, tracheobronchitis)	a) New or increased cough, b) New or increased sputum production, c) Fever (greater than or equal to 38° C), d) Pleuritic chest pain, e) New or increased physical findings on chest examination (rales, rhonchi, wheezes, bronchial breathing), f) **One** of the following: new/increased SOB or RR greater than 25 per minute *or* worsening mental or functional state.	be made if no chest film was obtained or if a radiograph failed to confirm the presence of pneumonia.
UTI (Urinary Tract Infection)	Only includes **symptomatic** UTI. **<u>One</u>** of the following must be met: The resident <u>does not</u> have an indwelling urinary catheter and has at least three of the following: a) Fever (greater than or equal to 38° C) or chills, b) New or increased burning pain on urination, frequency or urgency, c) New flank or suprapubic pain or tenderness, d) Change in character of urine, e) Worsening of mental or functional status. The resident <u>has an indwelling catheter</u> and has at least **<u>two</u>** of the following signs or symptoms: a) Fever (greater than or equal to 38°C) or chills, b) New flank or suprapubic pain or tenderness, c) Change in the character of the urine, d) Worsening of mental or functional status.	Asymptomatic bacteruria is defined as the presence of a positive urine culture in the absence of new signs and symptoms of a UTI. Asymptomatic bacteruria is not a collectable HAI as this may represent baseline status for many residents.

Eye, ear, nose & mouth **Conjunctivitis**	**<u>One</u>** of the following must be met: a) Pus appearing from one or both eyes, present for at least 24 hours. b) New or increased conjunctival redness, with or without itching or pain, present for at least 24 hours (pink eye).	Symptoms must not be due to allergy or trauma.
Ear infection	**<u>One</u>** of the following criteria: a) Diagnosis by a physician. b) New drainage from one or both ears (non-purulent drainage must be accompanied by additional symptoms such as ear pain or redness).	
Mouth or perioral infection	Oral and perioral infections, including oral candidiasis must be diagnosed by a physician.	
Sinusitis	The diagnosis of sinusitis must be made by a physician.	
Skin infection **Cellulitis/soft tissue/wound infection**	**<u>One</u>** of the following: a) Pus present at a wound, skin, or soft tissue site. b) The resident must have **<u>four or more</u>** of the following: • fever (greater than or equal to 38°C or worsening mental/functional status *and/or* at the affected site, the presence of new or increasing • heat, • redness, • swelling, • tenderness or pain, • serous drainage.	
Fungal skin infection	The resident must have **<u>both</u>**: (a) a maculopapular rash ***and*** (b) either physician diagnosis or laboratory confirmation.	
Herpes simplex and herpes zoster infection	For a diagnosis of cold sores or shingles, the resident must have **<u>both</u>**: ***(a)*** a vesicular rash ***and*** (b) either physician diagnosis or laboratory confirmation.	
Scabies	The resident must have **<u>both</u>**: (a) a maculopapular rash and/or itching rash ***and*** (b) either physician diagnosis or laboratory confirmation.	Care must be taken to ensure that rash is not allergic or secondary to skin irritation.

Gastroenteritis	**<u>One</u>** of the following: a) Two or more loose or watery stools above what is normal for the resident within a 24-hour period. b) Two or more episodes of vomiting in a 24 hour period. c) Both of the following: • a stool culture positive for a pathogen or a toxin assay positive for *C. difficile* toxin and • at least one symptom or sign compatible wit GI tract infection (nausea, vomiting, abdominal pain or tenderness, diarrhea).	Care must be taken to rule out non-infectious causes.
SYSTEMIC INFECTIONS		
Primary Bloodstream infection	<u>One</u> of the following: a) Two or more blood cultures positive for the same organism. b) A single blood culture documented with an organism thought not to be a contaminant and at least one of the following: • fever (greater than or equal to 38 ° C, • new hypothermia (less than 34.5 ° C, or does not register on thermometer being used, • a drop is systolic blood pressure of greater than 30 mm HG from baseline, or • worsening mental or functional status.	BSI related to infection at another site is reported as secondary BSI and are not included as separate infections.
Unexplained febrile episode	The resident must have documentation in the medical record of fever greater than or equal to 38°C on two or more occasions at least 12 hours apart in any 3 day period with no known infectious or non-infectious cause.	

REFERENCES:

Primary and Secondary BSI:
Canadian Nosocomial Infections Surveillance Program (2009). Point Prevalence Survey for Health Care Associated Infections.

CVC-BSI:
Canadian Nosocomial Infection Surveillance Program (2009). Surveillance for Central Venous Catheter Associated Blood Stream Infections (CVC-BSI) in Intensive Care Units
2009 CVC-BSI Surveillance Protocol.

Pneumonia:
Centers for Disease Control and Prevention (2008). CDC/NHSN surveillance definition of health care–associated infection and criteria for specific types of infections in the acute care setting. *American Journal of Infection Control*, 36(5) 309-332.

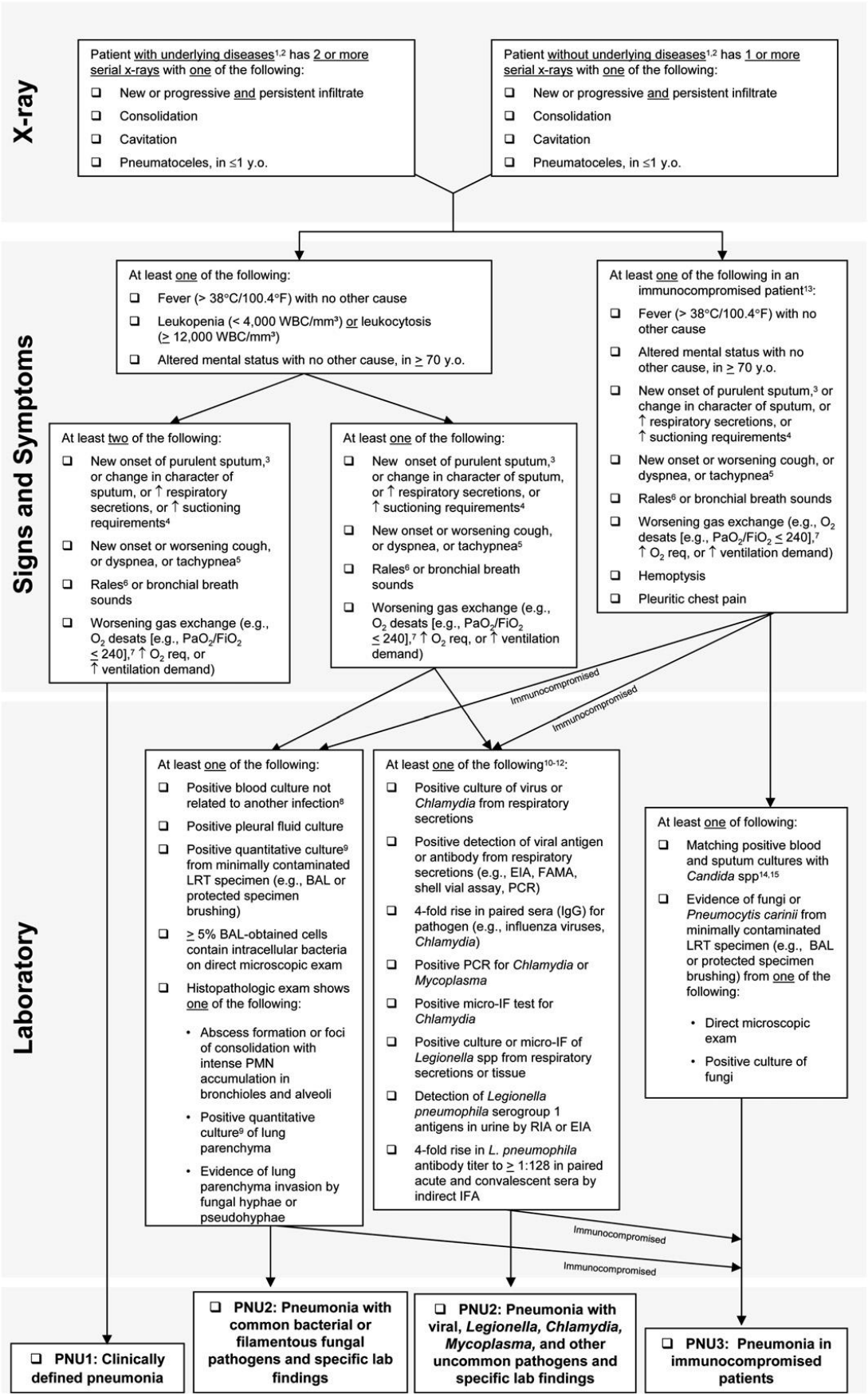
CDI:
Canadian Nosocomial Infection Surveillance Program (2010). Surveillance for *Clostridium difficile*-associated infection (CDI) within healthcare institutions.

SSI:
Centers for Disease Control and Prevention (2008). CDC/NHSN surveillance definition of health care–associated infection and criteria for specific types of infections in the acute care setting. *American Journal of Infection Control*, 36(5) 309-332.

CAUTI:
Centers for Disease Control and Prevention (2009). Guideline for Prevention of Catheter-associated Urinary Tract Infections. Retrieved from http://www.cdc.gov/hicpac/cauti/001_cauti.html

LTC:
McGeer, A., Campbell, B., Emori, T.G., Hierhoizer, W.J., Jackson, M.M., Nicolle, L.E., Peppler, C., Rivera, a., Schollenberger, D.G., Simor, A.E., Smith, P.W., Wang, E.E-L. (1991). Definitions of infection for surveillance in long-term care facilities. *American Journal of Infection Control*. 19 (1), 1-7.

APPENDIX A


X-ray
Patient with underlying diseases[1,2] has 2 or more serial x-rays with one of the following:
❑ New or progressive and persistent infiltrate
❑ Consolidation
❑ Cavitation
❑ Pneumatoceles, in ≤1 y.o.
Patient without underlying diseases[1,2] has 1 or more serial x-rays with one of the following:
❑ New or progressive and persistent infiltrate
❑ Consolidation
❑ Cavitation
❑ Pneumatoceles, in ≤1 y.o.
Signs and Symptoms
At least one of the following:
❑ Fever (> 38°C/100.4°F) with no other cause
❑ Leukopenia (< 4,000 WBC/mm³) or leukocytosis (≥ 12,000 WBC/mm³)
❑ Altered mental status with no other cause, in ≥ 70 y.o.
At least one of the following in an immunocompromised patient[13]:
❑ Fever (> 38°C/100.4°F) with no other cause
❑ Altered mental status with no other cause, in ≥ 70 y.o.
❑ New onset of purulent sputum,[3] or change in character of sputum, or ↑ respiratory secretions, or ↑ suctioning requirements[4]
❑ New onset or worsening cough, or dyspnea, or tachypnea[5]
❑ Rales[6] or bronchial breath sounds
❑ Worsening gas exchange (e.g., O_2 desats [e.g., $PaO_2/FiO_2 \leq 240$],[7] ↑ O_2 req, or ↑ ventilation demand)
❑ Hemoptysis
❑ Pleuritic chest pain
At least two of the following:
❑ New onset of purulent sputum,[3] or change in character of sputum, or ↑ respiratory secretions, or ↑ suctioning requirements[4]
❑ New onset or worsening cough, or dyspnea, or tachypnea[5]
❑ Rales[6] or bronchial breath sounds
❑ Worsening gas exchange (e.g., O_2 desats [e.g., $PaO_2/FiO_2 \leq 240$],[7] ↑ O_2 req, or ↑ ventilation demand)
At least one of the following:
❑ New onset of purulent sputum,[3] or change in character of sputum, or ↑ respiratory secretions, or ↑ suctioning requirements[4]
❑ New onset or worsening cough, or dyspnea, or tachypnea[5]
❑ Rales[6] or bronchial breath sounds
❑ Worsening gas exchange (e.g., O_2 desats [e.g., $PaO_2/FiO_2 \leq 240$],[7] ↑ O_2 req, or ↑ ventilation demand)
Immunocompromised
Immunocompromised
Laboratory
At least one of the following:
❑ Positive blood culture not related to another infection[8]
❑ Positive pleural fluid culture
❑ Positive quantitative culture[9] from minimally contaminated LRT specimen (e.g., BAL or protected specimen brushing)
❑ ≥ 5% BAL-obtained cells contain intracellular bacteria on direct microscopic exam
❑ Histopathologic exam shows one of the following:
• Abscess formation or foci of consolidation with intense PMN accumulation in bronchioles and alveoli
• Positive quantitative culture[9] of lung parenchyma
• Evidence of lung parenchyma invasion by fungal hyphae or pseudohyphae
At least one of the following[10-12]:
❑ Positive culture of virus or *Chlamydia* from respiratory secretions
❑ Positive detection of viral antigen or antibody from respiratory secretions (e.g., EIA, FAMA, shell vial assay, PCR)
❑ 4-fold rise in paired sera (IgG) for pathogen (e.g., influenza viruses, *Chlamydia*)
❑ Positive PCR for *Chlamydia* or *Mycoplasma*
❑ Positive micro-IF test for *Chlamydia*
❑ Positive culture or micro-IF of *Legionella* spp from respiratory secretions or tissue
❑ Detection of *Legionella pneumophila* serogroup 1 antigens in urine by RIA or EIA
❑ 4-fold rise in *L. pneumophila* antibody titer to ≥ 1:128 in paired acute and convalescent sera by indirect IFA
At least one of following:
❑ Matching positive blood and sputum cultures with *Candida* spp[14,15]
❑ Evidence of fungi or *Pneumocytis carinii* from minimally contaminated LRT specimen (e.g., BAL or protected specimen brushing) from one of the following:
• Direct microscopic exam
• Positive culture of fungi
Immunocompromised
Immunocompromised
❑ PNU1: Clinically defined pneumonia
❑ PNU2: Pneumonia with common bacterial or filamentous fungal pathogens and specific lab findings
❑ PNU2: Pneumonia with viral, *Legionella, Chlamydia, Mycoplasma,* and other uncommon pathogens and specific lab findings
❑ PNU3: Pneumonia in immunocompromised patients