

## P11 Clinical microbiology II – examination in respiratory and GI infections

**To study:** Infections of various organs and organ systems (from textbooks, www etc.)

**From the spring term:** Microscopy, culture, biochemical identification

### Examination in respiratory tract infections

#### Task 1: Search for respiratory pathogens in clinical microbiology

With the help of your teacher and the slideshow, describe the following picture. Use the knowledge from this picture in the Task 2 and Task 3.

disc containing \_\_\_\_\_

possible pathogen \_\_\_\_\_

possible pathogens: \_\_\_\_\_

disc containing \_\_\_\_\_ and \_\_\_\_\_

possible pathogen (tiny, colourless colonies, haemolysis) \_\_\_\_\_

possible pathogen (something larger, white colonies, haemolysis) \_\_\_\_\_

line of \_\_\_\_\_ because of \_\_\_\_\_

Common pharyngeal flora consists mostly of

a) \_\_\_\_\_ appearance: \_\_\_\_\_

b) \_\_\_\_\_ appearance: \_\_\_\_\_

#### Task 2: Examination in acute bronchopneumonia

For this casuistic, documented by the order form, try to examine the corresponding specimen (sputum), to find a possible pathogen, make a conclusion and interpret the result. Step by step, fill in the individual fields in “the screen of laboratory information system”.

Kód pojistovny 1 1 1	požaduje dl A	IČP 7 2 1 2 3 4 5 6 Odbornost 7 8 9	Datum 1 5 : 1 2 : 0 8	Čís. dokladu	Poř. č.						
<b>POUKAZ NA VYŠETŘENÍ / OŠETŘENÍ</b>											
Pacient	Linda Green										
Č. pojistěnce	*1932										
Variabilní symbol	Accute bronchopneumonia, 38.5 °C, heavy diabetes										
Odeslán ad:	Kód náhrady										
Požadováno:	sputum for bacteriological examination										
Poznámka:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px;">72</td> <td>Dr. Michal Teplý</td> </tr> <tr> <td>123</td> <td>generální lékař</td> </tr> <tr> <td>456</td> <td>Čampositve 8, Brno</td> </tr> </table>					72	Dr. Michal Teplý	123	generální lékař	456	Čampositve 8, Brno
72	Dr. Michal Teplý										
123	generální lékař										
456	Čampositve 8, Brno										
VZP-06/1999	Dne: _____ razítko a podpis										

<b>Patient: Linda Green *1932 Dg.: Pneumonia</b>					
<b>Specimen: Sputum</b>		<b>Ordered by: Dr. Microbe Terrible</b>			
Bacterium A: description	Conclusion:	Interpretation		Microscopy result: Epithelial cells: _____ WBC-s _____ Bacteria (describe): _____	
Bacterium B: description	Conclusion:	Interpretation			
Bacterium C: description	Catalase	10 % NaCl	Hyaluronidase	Conclusion:	Interpretation
Antibiotic susceptibility test (bacterium C)			Final conclusion and recommendation for treatment:		

**a) Microscopy of sputum**

Look at the smear prepared from your specimen. Try to find the individual objects (bacteria, host cells). Fill in the field “Microscopy result”:

- +++ = more than 10 objects in the observation area
- ++ = less than 10 objects in the observation area
- + = only rare objects (one or less per an observation area)
- 0 = none

**b) Description of bacteria**

On the blood agar, describe the size, colour and haemolytic properties of the grown bacteria. Do not describe other characteristics. Take into account that there was no growth visible on Endo agar. Bacteria A and B should be bacteria considered to be parts of normal flora. Bacterium C will be a pathogenic bacterium that will be tested in detail in parts c) and d)

**c) Further tests**

Fill in the results of the catalase test, hyaluronidase test and of the growth on blood agar with 10 % NaCl for Bacterium C.

**d) Antibiotic susceptibility**

Fill in the antibiotic susceptibility test for Bacterium C. Always write down the name of the antibiotics and “S” or “R” (susceptible or resistant). Reference zones are written on your table.

**e) Final conclusion**

Try to formulate several words for the general practitioner. Especially try to find out (with the help of your teacher) which antibiotics would be the best choice.

**Task 3: Examination in acute tonsillitis**

Similarly as in the previous case, there is an order form. Try to examine the corresponding specimen (throat swab) to find a possible pathogen, make a conclusion and interpret the results. Step by step, fill in the individual fields in “the screen of laboratory information system”. The way of doing it is the same as in the previous task.

Kód pojišťovny 1 1 1	posílá dle díl A	IČP 7 2 1 2 3 4 5 6	Datum 1 5 : 1 2 : 0 8	Čís. dokladu	Poř. č.
<b>POUKAZ NA VYŠETŘENÍ / OŠETŘENÍ</b>				provedl díl B	
Pacient Martin Blue	accute tonsillitis, 38.8 °C			IČP	
Č. pojistěnce *1991	Kód náhrady			Odbornost	
Variabilní symbol				Var. symbol	
Odeslán ad:				Datum	
Požadováno:	throat swab for bacteriological examination			Kód	
Poznámka:	Dr. Microbe Terrible generální praktičtí lékař Champsotíve 8, Brno			Poč.	
72 123 456	razítko a podpis lékaře			1	
Dne:			2		
razítko a podpis			3		
			4		
			5		
			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		

Patient: Martin Blue		*1991		Dg.: Accute tonsillitis		
Specimen: Throat swab		Ordered by: Dr. Microbe Terrible				
Bacterium A: description	Conclusion:	Interpretation				
Bacterium B: description	Conclusion:	Interpretation				
Bacterium C: description	Cata-lase	Bile- -aesc.	PYR	CAMP	Conclusion:	Interpretation
Antibiotic susceptibility test (bacterium C)				Final conclusion and recommendation for treatment:		

**Task 4: Suitable specimens for various respiratory infections**

Using slideshow, find suitable way of examination for various clinical situations

Suspicion for	Type of specimen	Suspicion for	Type of specimen
rhinitis		bronchitis	
sinusitis		acute pneumonia (expectoration of pus)	
pharyngitis		subacute pneumonia (dry cough)	
influenza		lung aspergilosis	

**Examination in gastrointestinal system**

**Task 5: Examination in acute diarrhoea**

In this case, stool was sent to the laboratory. We have to know, that stool normally contains strictly anaerobic flora, but this cannot be found during normal examination, as normal examination is only aerobic. Even enterococci are only found in blood agar is used, and this is not part of routine examination of stool. On the other hand, members of *Enterobacteriaceae* family are often found in stool – both parts of normal flora (with some strains with elevated virulence, for example EPEC for *E. coli*) and obligatory pathogens (*Salmonella*). – The stool specimens are observed after 24 hours (direct result of Endo agar and XLD agar) and 48 hours (direct result of *Campylobacter* examination on CCDA agar and *Yersinia* examination on CIN agar, and subcultures from selenite broth on Endo agar and MAL agar). The 24 h examination was already performed in your case. Fill in results of 48 h examination and try to make a final conclusion.

Kód pojišťovny 1 1 1	peřaduje díl A	IČP 7 2 1 2 3 4 5 6	Datum	Čís. dokladu	Poř. č.
		Odbornost 7 8 9	1 5:1 2:0 8	provedl A B	
<b>POUKAZ NA VYŠETŘENÍ / OŠETŘENÍ</b>					
Pacient	Cecilia Brown				
Č. pojištění	*1983		Dg:	Acute diarrhoea	
Variabilní symbol					
Odeslán ad:					
	Kód náhrady				
<b>Požadováno:</b>					
Stool for bacteriological examination					
<b>Poznámka:</b>					
72 123 456	Dr. Michal Těmle generální praktičer Čampositve 8, Brno				
razítko a podpis lékaře					
Dne:					
razítko a podpis					
VZP-06x/1999					

Patient Cecilia Brown, *1984      Dg.: Accute diarrhoea					
Endo agar (24 h)	XLD agar (24 h)	Endo agar (subcultivation)	MAL agar (subcultivation)	CIN agar (48 h)	CCDA agar (48 h)
<i>E. coli</i>	negative			Final conclusion and interpretation	
More tests					
HAJNA medium					
Serotypisation	Dental students do not perform this part				

**Task 6: Stool samples for different types of pathogens and toxins**

For some purposes, it is possible to send rectal swabs, while for others, it is necessary to send a piece of stool, sometimes even refrigerated.

Watch the next table. For dental students it is already filled in.

Stool sent for	Type of specimen	Stool sent for	Type of specimen
bacteriology	<i>Anal/rectal swab (Amies)</i>	virology – virus isolation	<i>Nut-sized piece of stool (cooling necessary!)</i>
mycology	<i>Anal/rectal swab (Amies or FungiQuick)</i>	parasitology	<i>Nut-sized piece of stool (cooling not necessary)</i>
virology – antigen detection	<i>Nut-sized piece of stool (cooling not necessary)</i>	detection of the <i>Clostridium difficile</i> toxin	<i>Nut-sized piece of stool (cooling not necessary)</i>