

# Answer paper

Examination: MEDSEM9\_H14\_ORD

## Assessment: MEDSEM9\_STATION16\_H14\_ORD

### Part 1:

Kari, 3 years old, was found by her parents sitting outside in the garden next to their barbecue with a bottle of lighter fluid in her hand. The bottle was open. She was coughing, had vomited on her dress, and the parents smelt petroleum from her mouth. The parents got frightened and brought her immediately to the nearby hospital.

You, as physician on duty at the hospital, examined her. She was awake, fully conscious, but still coughing. On auscultation of the lungs, you heard faint rales and crepitations (Norwegian: "knattre-lyder"). Otherwise, you made no special findings in the clinical examination.

#### Question 1:

What clinical condition do you suspect?

#### Answer:

Intoxication with petroleum fluid - Hydrocarbon poisoning

#### Question 2:

Which further examination would you order?

- CT scan of thorax
- Chest X-ray
- Transcutaneous measurement of blood gases: SpO<sub>2</sub> and pCO<sub>2</sub>

#### Answer:

Chest X-ray

### Part 2:

Kari, 3 years old, was found by her parents sitting outside in the garden next to their barbecue with a bottle of lighter fluid in her hand. The bottle was open. She was coughing, had vomited on her dress, and the parents smelt petroleum from her mouth. The parents got frightened and brought her immediately to the nearby hospital.

You, as physician on duty at the hospital, examined her. She was awake, fully conscious, but still coughing. On auscultation of the lungs, you heard faint rales and crepitations (Norwegian: "knattre-lyder"). Otherwise, you made no special findings in the clinical examination.

**You order a chest X-ray**

#### Question 1:

What are the possible findings of the chest X-ray? (several answers are possible)

- Pneumonitis
- Lobar pneumonia
- Air trapping
- Atelectasis
- Bronchiectasis
- No pathological findings
- Pneumothorax

#### Answer:

Pneumonitis  
Air trapping  
Atelectasis  
No pathological findings

**Part 3:**

Kari, 3 years old, was found by her parents sitting outside in the garden next to their barbecue with a bottle of lighter fluid in her hand. The bottle was open. She was coughing, had vomited on her dress, and the parents smelt petroleum from her mouth. The parents got frightened and brought her immediately to the nearby hospital.

You, as physician on duty at the hospital, examined her. She was awake, fully conscious, but still coughing. On auscultation of the lungs, you heard faint rales and crepitations (Norwegian: "knattre-lyder"). Otherwise, you made no special findings in the clinical examination. You order a chest X-ray.

**The chest x-ray showed no pathological findings at this stage**

**Question 1:**

How would you treat the girl? (several answers are possible)

- Observation
- Antibiotic treatment
- Inhaled corticosteroids
- Symptomatic treatment of possible respiratory complications

**Answer:**

Observation

Symptomatic treatment of possible respiratory complications

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**Question 2:**

What possible complications can you expect? (several answers are possible)

- X-ray consolidations indicating pneumonia
- Anemia
- Atelectasis
- Bronchial stricture
- Bronchial obstruction

**Answer:**

X-ray consolidations indicating pneumonia

Atelectasis

Bronchial obstruction

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**Question 3:**

What follow-up would you recommend for the girl?

**Answer:**

Chest x-ray after two to three weeks

## Assessment: MEDSEM9\_STATION17\_H14\_ORD

### Part 1:

Berit Hansen, 38 years old, gives birth to a boy following 39 weeks of gestation. The delivery is vaginal and without complications. After the umbilical cord has been cut the child struggles to establish their own respiration: the respiratory rate is irregular and there are clear subcostal and intercostal retractions. Five minutes after delivery the skin colour is pale over the entire body, the arms and legs hang limply but the child grimaces a bit when the midwife provides strong skin stimulation by drying the child with a coarse towel. The respiration now consists of individual gasps only. The heart rate is approximately 110 beats per minute.

#### Question 1:

What is the Apgar score five minutes after delivery?

- 4  
 5  
 6

#### Answer:

4

#### Question 2:

Which measures should be initiated immediately? (Several answers possible)

- Intubation and ventilator treatment  
 Ventilation using mask/bag  
 Supply of 100% oxygen via nasal catheter  
 Insertion of peripheral venous catheter (venflon)  
 Ensuring open airways  
 Cardiac compression

#### Answer:

Ventilation using mask/bag  
Ensuring open airways

### Part 2:

Berit Hansen, 38 years old, gives birth to a boy following 39 weeks of gestation. The delivery is vaginal and without complications. After the umbilical cord has been cut the child struggles to establish their own respiration: the respiratory rate is irregular and there are clear subcostal and intercostal retractions. Five minutes after delivery the skin colour is pale over the entire body, the arms and legs hang limply but the child grimaces a bit when the midwife provides strong skin stimulation by drying the child with a coarse towel. The respiration now consists of individual gasps only. The heart rate is approximately 110 beats per minute.

**The Apgar score five minutes after delivery is 4. Measures that should be initiated immediately are ensuring open airways and ventilation using mask/bag. These measures improve the situation but 20 minutes after delivery respiration remains unstable and the child is transferred to the neonatal intensive care unit for further observation and treatment. Here a capillary blood gas analysis is performed, showing [normal values] pH 7.15 [7.36 to 7.44], pCO<sub>2</sub> 8.3 [4.7 to 5.9] kPa, BE -9.2 mmol/L [-3 to 3] and lactate 8.8 [0.3 to 1.1] mmol/L.**

#### Question 1:

The capillary blood gas analysis shows that the patient has the following acid-base disorder

- Metabolic acidosis with respiratory compensation  
 Metabolic alkalosis with respiratory compensation  
 Respiratory acidosis with metabolic compensation  
 Combined respiratory acidosis and metabolic acidosis  
 Combined respiratory alkalosis and metabolic acidosis

#### Answer:

## Combined respiratory acidosis and metabolic acidosis

## Part 3:

Berit Hansen, 38 years old, gives birth to a boy following 39 weeks of gestation. The delivery is vaginal and without complications. After the umbilical cord has been cut the child struggles to establish their own respiration: the respiratory rate is irregular and there are clear subcostal and intercostal retractions. Five minutes after delivery the skin colour is pale over the entire body, the arms and legs hang limply but the child grimaces a bit when the midwife provides strong skin stimulation by drying the child with a coarse towel. The respiration now consists of individual gasps only. The heart rate is approximately 110 beats per minute. The Apgar score five minutes after delivery is 4. Measures that should be initiated immediately are ensuring open airways and ventilation using mask/bag. These measures improve the situation but 20 minutes after delivery respiration remains unstable and the child is transferred to the neonatal intensive care unit for further observation and treatment. Here a capillary blood gas analysis is performed, showing [normal values] pH 7.15 [7.36 to 7.44], pCO<sub>2</sub> 8.3 [4.7 to 5.9] kPa, BE -9.2 mmol/L [-3 to 3] and lactate 8.8 [0.3 to 1.1] mmol/L.

**The blood gas analysis shows combined respiratory and metabolic acidosis. Immediately after the results have come back, a midwife calls from the delivery suite explaining that the child's mother has a fever of 39 °C. The midwife also explains that the mother's waters broke 28 hours before delivery. The amniotic fluid was not discoloured.**

**The child has an oxygen saturation of 89% (measured on the right arm) with an oxygen supply of 5 l/min via a nasal catheter. The respiratory rate is 80-90 breaths/min and the child makes small "moaning sounds" with each breath. A quick physical examination identifies an uncharacteristic heart murmur.**

## Question 1:

Which diagnosis do you consider most likely?

- Congenital heart failure
- Sepsis
- Pneumonia
- RDS/surfactant deficiency
- Meconium aspiration

## Answer:

Sepsis

## Part 4:

Berit Hansen, 38 years old, gives birth to a boy following 39 weeks of gestation. The delivery is vaginal and without complications. After the umbilical cord has been cut the child struggles to establish their own respiration: the respiratory rate is irregular and there are clear subcostal and intercostal retractions. Five minutes after delivery the skin colour is pale over the entire body, the arms and legs hang limply but the child grimaces a bit when the midwife provides strong skin stimulation by drying the child with a coarse towel. The respiration now consists of individual gasps only. The heart rate is approximately 110 beats per minute. The Apgar score five minutes after delivery is 4. Measures that should be initiated immediately are ensuring open airways and ventilation using mask/bag. These measures improve the situation but 20 minutes after delivery respiration remains unstable and the child is transferred to the neonatal intensive care unit for further observation and treatment. Here a capillary blood gas analysis is performed, showing [normal values] pH 7.15 [7.36 to 7.44], pCO<sub>2</sub> 8.3 [4.7 to 5.9] kPa, BE -9.2 mmol/L [-3 to 3] and lactate 8.8 [0.3 to 1.1] mmol/L. The blood gas analysis shows combined respiratory and metabolic acidosis.

Immediately after the results have come back, a midwife calls from the delivery suite explaining that the child's mother has a fever of 39 °C. The midwife also explains that the mother's waters broke 28 hours before delivery. The amniotic fluid was not discoloured. The child has an oxygen saturation of 89% (measured on the right arm) with an oxygen supply of 5 l/min via a nasal catheter. The respiratory rate is 80-90 breaths/min and the child makes small "moaning sounds" with each breath. A quick physical examination identifies an uncharacteristic heart murmur.

**Sepsis is the most probable diagnosis.**

## Question 1:

Which measures should now be initiated? (several answers are possible)

- Insertion of peripheral venous catheter (venflon)
- Intravenous administration of aminopenicillin
- Intravenous administration of aminopenicillin and an aminoglycoside

- Intravenous fluid administration
- Blood transfusion.
- Treatment using CPAP (continuous positive airway pressure)
- Intubation and ventilator treatment
- Performing a blood culture

**Answer:**

Insertion of peripheral venous catheter (venflon)  
 Intravenous administration of aminopenicillin and an aminoglycoside  
 Intravenous fluid administration  
 Treatment using CPAP (continuous positive airway pressure)  
 Performing a blood culture

**Part 5:**

Berit Hansen, 38 years old, gives birth to a boy following 39 weeks of gestation. The delivery is vaginal and without complications. After the umbilical cord has been cut the child struggles to establish their own respiration: the respiratory rate is irregular and there are clear subcostal and intercostal retractions. Five minutes after delivery the skin colour is pale over the entire body, the arms and legs hang limply but the child grimaces a bit when the midwife provides strong skin stimulation by drying the child with a coarse towel. The respiration now consists of individual gasps only. The heart rate is approximately 110 beats per minute. The Apgar score five minutes after delivery is 4. Measures that should be initiated immediately are ensuring open airways and ventilation using mask/bag. These measures improve the situation but 20 minutes after delivery respiration remains unstable and the child is transferred to the neonatal intensive care unit for further observation and treatment. Here a capillary blood gas analysis is performed, showing [normal values] pH 7.15 [7.36 to 7.44], pCO<sub>2</sub> 8.3 [4.7 to 5.9] kPa, BE -9.2 mmol/L [-3 to 3] and lactate 8.8 [0.3 to 1.1] mmol/L. The blood gas analysis shows combined respiratory and metabolic acidosis. Immediately after the results have come back, a midwife calls from the delivery suite explaining that the child's mother has a fever of 39 °C. The midwife also explains that the mother's waters broke 28 hours before delivery. The amniotic fluid was not discoloured. The child has an oxygen saturation of 89% (measured on the right arm) with an oxygen supply of 5 l/min via a nasal catheter. The respiratory rate is 80-90 breaths/min and the child makes small "moaning sounds" with each breath. A quick physical examination identifies an uncharacteristic heart murmur. Sepsis is the most probable diagnosis.

**The patient should have a peripheral venous catheter sited for intravenous administration of fluids and intravenous antibiotic treatment using aminopenicillin and an aminoglycoside. Blood cultures should be performed before initiating antibiotic treatment. CPAP treatment should also be established.**

**After initiating these measures the situation is assessed and found to be stable. Blood tests are performed through ordinary venepuncture and these show Hb 18.8 g/dL, leukocytes 19 x 10<sup>9</sup> cells/L and CRP 4 mg/L.**

**Question 1:**

These blood tests show ...

- ... that the patient has anaemia.
- ... that the patient has polycythaemia.
- ... that the patient probably has a serious bacterial infection.
- ... that the patient probably does not have a serious bacterial infection.
- ... normal values, but do not exclude the possibility of the patient having a serious bacterial infection.

**Answer:**

... normal values, but do not exclude the possibility of the patient having a serious bacterial infection.

**Part 6:**

Berit Hansen, 38 years old, gives birth to a boy following 39 weeks of gestation. The delivery is vaginal and without complications. After the umbilical cord has been cut the child struggles to establish their own respiration: the respiratory rate is irregular and there are clear subcostal and intercostal retractions. Five minutes after delivery the skin colour is pale over the entire body, the arms and legs hang limply but the child grimaces a bit when the midwife provides strong skin stimulation by drying the child with a coarse towel. The respiration now consists of individual gasps only. The heart rate is approximately 110 beats per minute. The Apgar score five minutes after delivery is 4. Measures that should be initiated immediately are ensuring open airways and ventilation using mask/bag. These measures improve the situation but 20 minutes after delivery respiration remains unstable and the child is transferred to the neonatal intensive care unit for further observation and treatment. Here a capillary blood gas analysis is performed, showing [normal values] pH 7.15 [7.36 to 7.44], pCO<sub>2</sub> 8.3 [4.7 to 5.9] kPa, BE -9.2 mmol/L [-3 to 3] and

lactate 8.8 [0.3 to 1.1] mmol/L. The blood gas analysis shows combined respiratory and metabolic acidosis. Immediately after the results have come back, a midwife calls from the delivery suite explaining that the child's mother has a fever of 39 °C. The midwife also explains that the mother's waters broke 28 hours before delivery. The amniotic fluid was not discoloured. The child has an oxygen saturation of 89% (measured on the right arm) with an oxygen supply of 5 l/min via a nasal catheter. The respiratory rate is 80-90 breaths/min and the child makes small "moaning sounds" with each breath. A quick physical examination identifies an uncharacteristic heart murmur. Sepsis is the most probable diagnosis. The patient should have a peripheral venous catheter sited for intravenous administration of fluids and intravenous antibiotic treatment using aminopenicillin and an aminoglycoside. Blood cultures should be performed before initiating antibiotic treatment. CPAP treatment should also be established. After initiating these measures the situation is assessed and found to be stable. Blood tests are performed through ordinary venepuncture and these show Hb 18.8 g/dL, leukocytes  $19 \times 10^9$  cells/L and CRP 4 mg/L.

**The blood tests show normal values, but do not exclude the possibility of the patient having a serious bacterial infection.**

**The patient is monitored for 24 hours at the neonatal intensive care unit. The next day, respiration is more stable and the patient can now manage periods without CPAP and has a respiratory rate of 50-60 breaths/min. There is still an audible murmur during heart auscultation and the murmur appears clearer than the previous day. New blood tests now show pH 7.23 [7.36 to 7.44], pCO<sub>2</sub> 5.9 [4.7 to 5.9] kPa, BE -5.2 [-3 to 3] mmol/L, lactate 5.4 [0.3 to 1.1] mmol/L, CRP 3 mg/L.**

### Question 1:

The blood gas analysis shows that the patient has the following acid-base disorder

- Metabolic acidosis with respiratory compensation
- Metabolic acidosis without respiratory compensation
- Respiratory acidosis with metabolic compensation
- Respiratory alkalosis without metabolic compensation
- Combined respiratory acidosis and metabolic acidosis

### Answer:

Metabolic acidosis without respiratory compensation

### Question 2:

Which diagnosis is now most probable?

- Congenital heart failure
- Sepsis
- Pneumonia
- RDS/surfactant deficiency
- Meconium aspiration

### Answer:

Congenital heart failure

## Part 7:

Berit Hansen, 38 years old, gives birth to a boy following 39 weeks of gestation. The delivery is vaginal and without complications. After the umbilical cord has been cut the child struggles to establish their own respiration: the respiratory rate is irregular and there are clear subcostal and intercostal retractions. Five minutes after delivery the skin colour is pale over the entire body, the arms and legs hang limply but the child grimaces a bit when the midwife provides strong skin stimulation by drying the child with a coarse towel. The respiration now consists of individual gasps only. The heart rate is approximately 110 beats per minute. The Apgar score five minutes after delivery is 4. Measures that should be initiated immediately are ensuring open airways and ventilation using mask/bag. These measures improve the situation but 20 minutes after delivery respiration remains unstable and the child is transferred to the neonatal intensive care unit for further observation and treatment. Here a capillary blood gas analysis is performed, showing [normal values] pH 7.15 [7.36 to 7.44], pCO<sub>2</sub> 8.3 [4.7 to 5.9] kPa, BE -9.2 mmol/L [-3 to 3] and lactate 8.8 [0.3 to 1.1] mmol/L. The blood gas analysis shows combined respiratory and metabolic acidosis. Immediately after the results have come back, a midwife calls from the delivery suite explaining that the child's mother has a fever of 39 °C. The midwife also explains that the mother's waters broke 28 hours before delivery. The amniotic fluid was not discoloured. The child has an oxygen saturation of 89% (measured on the right arm) with an oxygen supply of 5 l/min via a nasal catheter. The respiratory rate is 80-90 breaths/min and the child makes small "moaning sounds" with each breath. A quick physical examination identifies an uncharacteristic heart murmur. Sepsis is the most probable diagnosis. The patient should have a peripheral venous catheter sited for intravenous administration of

fluids and intravenous antibiotic treatment using aminopenicillin and an aminoglycoside. Blood cultures should be performed before initiating antibiotic treatment. CPAP treatment should also be established. After initiating these measures the situation is assessed and found to be stable. Blood tests are performed through ordinary venepuncture and these show Hb 18.8 g/dL, leukocytes  $19 \times 10^9$  cells/L and CRP 4 mg/L. The blood tests show normal values, but do not exclude the possibility of the patient having a serious bacterial infection. The patient is monitored for 24 hours at the neonatal intensive care unit. The next day, respiration is more stable and the patient can now manage periods without CPAP and has a respiratory rate of 50-60 breaths/min. There is still an audible murmur during heart auscultation and the murmur appears clearer than the previous day. New blood tests now show pH 7.23 [7.36 to 7.44], pCO<sub>2</sub> 5.9 [4.7 to 5.9] kPa, BE -5.2 [-3 to 3] mmol/L, lactate 5.4 [0.3 to 1.1] mmol/L, CRP 3 mg/L.

**The patient now presents with metabolic acidosis without respiratory acidosis. Congenital heart failure is now the most probable diagnosis.**

**An echocardiogram is performed, showing serious aortic stenosis and only limited amounts of blood passing through the aortic valve. There is a large right-left shunt through an open ductus arteriosus.**

### Question 1:

What would the oxygen saturation value (SaO<sub>2</sub> value) most probably be if measured on the patient's foot?

- Higher than the oxygen saturation value on the right hand
- Lower than the oxygen saturation value on the right hand
- Identical to the oxygen saturation value on the right hand

### Answer:

Lower than the oxygen saturation value on the right hand

### Question 2:

Which treatment measures should be initiated immediately?

- Administration of prostaglandin to keep the ductus arteriosus open
- Administration of ibuprofen to stimulate closing of the ductus arteriosus
- Administration of ACE inhibitor and diuretics to ease the work of the heart

### Answer:

Administration of prostaglandin to keep the ductus arteriosus open

## Part 8:

Berit Hansen, 38 years old, gives birth to a boy following 39 weeks of gestation. The delivery is vaginal and without complications. After the umbilical cord has been cut the child struggles to establish their own respiration: the respiratory rate is irregular and there are clear subcostal and intercostal retractions. Five minutes after delivery the skin colour is pale over the entire body, the arms and legs hang limply but the child grimaces a bit when the midwife provides strong skin stimulation by drying the child with a coarse towel. The respiration now consists of individual gasps only. The heart rate is approximately 110 beats per minute. The Apgar score five minutes after delivery is 4. Measures that should be initiated immediately are ensuring open airways and ventilation using mask/bag. These measures improve the situation but 20 minutes after delivery respiration remains unstable and the child is transferred to the neonatal intensive care unit for further observation and treatment. Here a capillary blood gas analysis is performed, showing [normal values] pH 7.15 [7.36 to 7.44], pCO<sub>2</sub> 8.3 [4.7 to 5.9] kPa, BE -9.2 mmol/L [-3 to 3] and lactate 8.8 [0.3 to 1.1] mmol/L. The blood gas analysis shows combined respiratory and metabolic acidosis.

Immediately after the results have come back, a midwife calls from the delivery suite explaining that the child's mother has a fever of 39 °C. The midwife also explains that the mother's waters broke 28 hours before delivery. The amniotic fluid was not discoloured. The child has an oxygen saturation of 89% (measured on the right arm) with an oxygen supply of 5 l/min via a nasal catheter. The respiratory rate is 80-90 breaths/min and the child makes small "moaning sounds" with each breath. A quick physical examination identifies an uncharacteristic heart murmur. Sepsis is the most probable diagnosis. The patient should have a peripheral venous catheter sited for intravenous administration of fluids and intravenous antibiotic treatment using aminopenicillin and an aminoglycoside. Blood cultures should be performed before initiating antibiotic treatment. CPAP treatment should also be established. After initiating these measures the situation is assessed and found to be stable. Blood tests are performed through ordinary venepuncture and these show Hb 18.8 g/dL, leukocytes  $19 \times 10^9$  cells/L and CRP 4 mg/L. The blood tests show normal values, but do not exclude the possibility of the patient having a serious bacterial infection. The patient is monitored for 24 hours at the neonatal intensive care unit. The next day, respiration is more stable and the patient can now manage periods without CPAP and has a respiratory rate of 50-60 breaths/min. There is still an audible murmur during heart auscultation and the murmur appears clearer than the previous day. New blood tests now show pH 7.23 [7.36 to 7.44], pCO<sub>2</sub> 5.9 [4.7 to 5.9] kPa, BE -5.2 [-3 to 3] mmol/L, lactate 5.4 [0.3 to 1.1] mmol/L, CRP 3 mg/L. The patient now presents with metabolic acidosis without respiratory acidosis. Congenital heart failure is now the most probable



diagnosis. An echocardiogram is performed, showing serious aortic stenosis and only limited amounts of blood passing through the aortic valve. There is a large right-left shunt through an open ductus arteriosus.

**The oxygen saturation level will most probably be lower on the patient's foot than on the patient's right hand due to the right-left shunt in the ductus arteriosus. Prostaglandin should be administered to the patient to keep the ductus arteriosus open.**

**The following note is entered in the patient's medical records: "Caution must be exercised when administering oxygen to this patient. If the oxygen saturation value (measured on the right hand) is higher than 80-85%, oxygen must not be administered."**

### **Question 1:**

What is the reason for this entry?

- Higher concentrations of oxygen could have a damaging effect on the heart musculature, particularly in a situation with an abnormally high strain on the heart.
- High concentrations of oxygen could increase the shunt in the ductus arteriosus, which in this case would exacerbate the patient's heart failure.
- High concentrations of oxygen dilate the pulmonary vessels, which in this case would reduce the shunt in the ductus arteriosus and "steal" blood from the system circulation.

### **Answer:**

High concentrations of oxygen dilate the pulmonary vessels, which in this case would reduce the shunt in the ductus arteriosus and "steal" blood from the system circulation.

## Assessment: MEDSEM9\_STATION18\_H14\_ORD

### Part 1:

Late on a Saturday night, 15-year old Harald is transported by ambulance to A&E (Norwegian: Akuttmottaket). The ambulance had been called to a young people's party earlier in the evening. When they arrived they were met by around twenty agitated young people who were talking over each other trying to explain that Harald had become "really unwell" as the evening progressed. The patient was found semi-conscious on a sofa in the living room, he was confused and slow but responded when addressed. It was clear that a substantial amount of alcohol had been consumed at the party, but the young man vehemently denied having taken any narcotic substances. "Harald is not like that" a girl cried out and "he didn't even have any beer tonight". Upon arrival to A&E the patient's state of consciousness remains unchanged. The skin is pale and clammy. The monitor shows a pulse of 175 beats per minute, blood pressure of 85/55 mmHg and SaO<sub>2</sub> of 99%. The patient is breathing rapidly and deeply with a rate of 45 breaths/minute. The body temperature is 39.1°C.

#### Question 1:

Which acute medical measures should be initiated first in this situation?

- Intravenous antibiotic treatment
- Intravenous fluid infusion
- Oxygen supply via nasal catheter

#### Answer:

Intravenous fluid infusion

### Part 2:

Late on a Saturday night, 15-year old Harald is transported by ambulance to A&E (Norwegian: Akuttmottaket). The ambulance had been called to a young people's party earlier in the evening. When they arrived they were met by around twenty agitated young people who were talking over each other trying to explain that Harald had become "really unwell" as the evening progressed. The patient was found semi-conscious on a sofa in the living room, he was confused and slow but responded when addressed. It was clear that a substantial amount of alcohol had been consumed at the party, but the young man vehemently denied having taken any narcotic substances. "Harald is not like that" a girl cried out and "he didn't even have any beer tonight". Upon arrival to A&E the patient's state of consciousness remains unchanged. The skin is pale and clammy. The monitor shows a pulse of 175 beats per minute, blood pressure of 85/55 mmHg and SaO<sub>2</sub> of 99%. The patient is breathing rapidly and deeply with a rate of 45 breaths/minute. The body temperature is 39.1°C.

**The patient is given an intravenous fluid infusion via a peripheral venous catheter (Venflon).**

**A quick physical examination shows normal auscultation findings across the heart and lungs and normal palpation findings in the abdomen. The patient does not appear to have a stiff neck but this is hard to determine. There is not a working ophthalmoscope in the examination room.**

#### Question 1:

Which diagnosis can probably be ruled out in this patient? (several answers are possible)

- Sepsis
- Meningitis
- Combined sepsis and meningitis
- Acute asthma attack
- Acute intoxication
- Acute gastroenteritis
- Bacterial pneumonia
- Intracranial bleed

#### Answer:

Acute asthma attack  
Acute gastroenteritis

**Part 3:**

Late on a Saturday night, 15-year old Harald is transported by ambulance to A&E (Norwegian: Akuttmottaket). The ambulance had been called to a young people's party earlier in the evening. When they arrived they were met by around twenty agitated young people who were talking over each other trying to explain that Harald had become "really unwell" as the evening progressed. The patient was found semi-conscious on a sofa in the living room, he was confused and slow but responded when addressed. It was clear that a substantial amount of alcohol had been consumed at the party, but the young man vehemently denied having taken any narcotic substances. "Harald is not like that" a girl cried out and "he didn't even have any beer tonight". Upon arrival to A&E the patient's state of consciousness remains unchanged. The skin is pale and clammy. The monitor shows a pulse of 175 beats per minute, blood pressure of 85/55 mmHg and SaO<sub>2</sub> of 99%. The patient is breathing rapidly and deeply with a rate of 45 breaths/minute. The body temperature is 39.1°C. The patient is given an intravenous fluid infusion via a peripheral venous catheter (Venflon). A quick physical examination shows normal auscultation findings across the heart and lungs and normal palpation findings in the abdomen. The patient does not appear to have a stiff neck but this is hard to determine. There is not a working ophthalmoscope in the examination room.

**Acute asthma attack and acute gastroenteritis can probably be ruled out in this patient. After the intravenous fluid infusion has been ongoing for around 15 minutes the scope shows a pulse of 160 beats per minute, blood pressure of 95/60 mmHg and SaO<sub>2</sub> of 98%. The patient's state of consciousness remains unchanged.**

**Question 1:**

Which five supplementary examinations would you prioritise in the next hour? (several answers possible)

- Thorax x-ray
- ECG
- Echocardiogram
- CT scan of the head
- Abdominal ultrasound
- Orientational blood tests
- Urine dipsticks
- Blood culture
- Spinal puncture
- Spirometry

**Answer:**

Thorax x-ray  
CT scan of the head  
Orientational blood tests  
Blood culture  
Spinal puncture

**Question 2:**

Which treatment will you initiate before the blood test results are back?

- Intravenous administration of a pressor (medication to increase blood pressure)
- Oxygen supply via nasal catheter
- Intravenous antibiotic treatment

**Answer:**

Intravenous antibiotic treatment

**Part 4:**

Late on a Saturday night, 15-year old Harald is transported by ambulance to A&E (Norwegian: Akuttmottaket). The ambulance had been called to a young people's party earlier in the evening. When they arrived they were met by around twenty agitated young people who were talking over each other trying to explain that Harald had become "really unwell" as the evening progressed. The patient was found semi-conscious on a sofa in the living room, he was confused and slow but responded when addressed. It was clear that a substantial amount of alcohol had been consumed at the party, but the young man vehemently denied having taken any narcotic substances. "Harald is not like that" a girl cried out and "he didn't even have any beer tonight". Upon arrival to A&E the patient's state of consciousness remains unchanged. The skin is pale and clammy. The monitor shows a pulse of 175 beats per minute, blood pressure of 85/55 mmHg and SaO<sub>2</sub> of 99%. The patient is breathing rapidly and deeply with a rate of 45 breaths/minute. The body temperature is 39.1°C. The patient is given an intravenous fluid infusion via a peripheral

venous catheter (Venflon). A quick physical examination shows normal auscultation findings across the heart and lungs and normal palpation findings in the abdomen. The patient does not appear to have a stiff neck but this is hard to determine. There is not a working ophthalmoscope in the examination room. Acute asthma attack and acute gastroenteritis can probably be ruled out in this patient. After the intravenous fluid infusion has been ongoing for around 15 minutes the scope shows a pulse of 160 beats per minute, blood pressure of 95/60 mmHg and SaO<sub>2</sub> of 98%. The patient's state of consciousness remains unchanged.

**The examinations that should be prioritised are orientational blood tests, blood culture, thorax x-ray, CT scan of head and spinal puncture. Intravenous antibiotic treatment should also be initiated.**

**After a short time the first blood test results are back (reference ranges in parenthesis):**

**Hb 14.7 (13.4–17.0) g/dl**

**Leukocytes 15.4 (3.6–9.3) x 10<sup>9</sup> cells/litre**

**Thrombocytes 256 (145–348) x 10<sup>9</sup> cells/litre**

**CRP 26 (< 4) mg/l**

**Sodium 143 (137–144) mmol/l**

**Potassium 6.6 (3.5–4.4) mmol/l**

**Creatinine 98 (60–105) µmol/l**

**pH 6.96 (7.36–7.44)**

**pCO<sub>2</sub> 3.2 (4.7–5.9) kPa**

**BE -26.4 (-3–3) mmol/l**

**Concentration of alcohol in blood 0.0.**

### Question 1:

What do the blood gas analysis and electrolytes show? (several answers possible)

- Hyperkalaemia
- Hypokalaemia
- Metabolic acidosis with partial respiratory compensation
- Metabolic acidosis without respiratory compensation
- Metabolic alkalosis
- Respiratory acidosis
- Respiratory alkalosis

### Answer:

Hyperkalaemia

Metabolic acidosis with partial respiratory compensation

### Part 5:

Late on a Saturday night, 15-year old Harald is transported by ambulance to A&E (Norwegian: Akuttmottaket). The ambulance had been called to a young people's party earlier in the evening. When they arrived they were met by around twenty agitated young people who were talking over each other trying to explain that Harald had become "really unwell" as the evening progressed. The patient was found semi-conscious on a sofa in the living room, he was confused and slow but responded when addressed. It was clear that a substantial amount of alcohol had been consumed at the party, but the young man vehemently denied having taken any narcotic substances. "Harald is not like that" a girl cried out and "he didn't even have any beer tonight". Upon arrival to A&E the patient's state of consciousness remains unchanged. The skin is pale and clammy. The monitor shows a pulse of 175 beats per minute, blood pressure of 85/55 mmHg and SaO<sub>2</sub> of 99%. The patient is breathing rapidly and deeply with a rate of 45 breaths/minute. The body temperature is 39.1°C. The patient is given an intravenous fluid infusion via a peripheral venous catheter (Venflon). A quick physical examination shows normal auscultation findings across the heart and lungs and normal palpation findings in the abdomen. The patient does not appear to have a stiff neck but this is hard to determine. There is not a working ophthalmoscope in the examination room. Acute asthma attack and acute gastroenteritis can probably be ruled out in this patient. After the intravenous fluid infusion has been ongoing for around 15 minutes the scope shows a pulse of 160 beats per minute, blood pressure of 95/60 mmHg and SaO<sub>2</sub> of 98%. The patient's state of consciousness remains unchanged. The examinations that should be prioritised are orientational blood tests, blood culture, thorax x-ray, CT scan of head and spinal puncture. Intravenous antibiotic treatment should also be initiated. After a short time the first blood test results are back (reference ranges in parenthesis):

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Leukocytes 15.4 (3.6–9.3) x 10<sup>9</sup> cells/litre

Thrombocytes 256 (145–348) x 10<sup>9</sup> cells/litre

CRP 26 (< 4) mg/l

Sodium 143 (137–144) mmol/l

Potassium 6.6 (3.5–4.4) mmol/l

Creatinine 98 (60–105) µmol/l

pH 6.96 (7.36–7.44)  
 pCO<sub>2</sub> 3.2 (4.7–5.9) kPa  
 BE –26.4 (–3–3) mmol/l  
 Concentration of alcohol in blood 0.0.

**The blood tests show that the patient has serious metabolic acidosis with partial respiratory compensation. He also has hyperkalaemia.**

**It took some time to notify the patient's parents but one of the nurses in the admissions ward has finally succeeded in getting hold of Harald's mother by telephone. She is able to inform us that her son has seemed a bit lethargic and "under the weather" for a few weeks whilst also complaining of thirst. In the last couple of days he has been drinking several litres of mineral water each day and has been visiting the toilet much more frequently. He has been getting up to go to the toilet several times at night which he never used to do before.**

### Question 1:

Which blood tests should be ordered in light of the information provided by Harald's mother?

- Bilirubin
- Blood sugar
- proBNP

### Answer:

Blood sugar

## Part 6:

Late on a Saturday night, 15-year old Harald is transported by ambulance to A&E (Norwegian: Akuttmottaket). The ambulance had been called to a young people's party earlier in the evening. When they arrived they were met by around twenty agitated young people who were talking over each other trying to explain that Harald had become "really unwell" as the evening progressed. The patient was found semi-conscious on a sofa in the living room, he was confused and slow but responded when addressed. It was clear that a substantial amount of alcohol had been consumed at the party, but the young man vehemently denied having taken any narcotic substances. "Harald is not like that" a girl cried out and "he didn't even have any beer tonight". Upon arrival to A&E the patient's state of consciousness remains unchanged. The skin is pale and clammy. The monitor shows a pulse of 175 beats per minute, blood pressure of 85/55 mmHg and SaO<sub>2</sub> of 99%. The patient is breathing rapidly and deeply with a rate of 45 breaths/minute. The body temperature is 39.1°C. The patient is given an intravenous fluid infusion via a peripheral venous catheter (Venflon). A quick physical examination shows normal auscultation findings across the heart and lungs and normal palpation findings in the abdomen. The patient does not appear to have a stiff neck but this is hard to determine. There is not a working ophthalmoscope in the examination room. Acute asthma attack and acute gastroenteritis can probably be ruled out in this patient. After the intravenous fluid infusion has been ongoing for around 15 minutes the scope shows a pulse of 160 beats per minute, blood pressure of 95/60 mmHg and SaO<sub>2</sub> of 98%. The patient's state of consciousness remains unchanged. The examinations that should be prioritised are orientational blood tests, blood culture, thorax x-ray, CT scan of head and spinal puncture. Intravenous antibiotic treatment should also be initiated. After a short time the first blood test results are back (reference ranges in parenthesis):

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 Concentration of alcohol in blood 0.0.

The blood tests show that the patient has serious metabolic acidosis with partial respiratory compensation. He also has hyperkalaemia. It took some time to notify the patient's parents but one of the nurses in the admissions ward has finally succeeded in getting hold of Harald's mother by telephone. She is able to inform us that her son has seemed a bit lethargic and "under the weather" for a few weeks whilst also complaining of thirst. In the last couple of days he has been drinking several litres of mineral water each day and has been visiting the toilet much more frequently. He has been getting up to go to the toilet several times at night which he never used to do before.

**Harald's blood sugar was substantially elevated with a value of 31.9 mmol/l (reference range 3.7-5.1 mmol/l). The patient has diabetes mellitus. (Blood sugar should have been measured by the ambulance personnel or immediately after admission – a mistake has been made here).**

**Question 1:**

Patients with diabetes mellitus have high urine production (diuresis) because ...

- ... high blood sugar dilates the afferent arterioles, thus increasing the glomerular filtration rate
- ... high blood sugar inhibits re-absorption of sodium in the distal tubules
- ... high blood sugar increases osmolarity in urine, inhibiting re-absorption of water in the distal tubules and collecting duct

**Answer:**

... high blood sugar increases osmolarity in urine, inhibiting re-absorption of water in the distal tubules and collecting duct

**Part 7:**

Late on a Saturday night, 15-year old Harald is transported by ambulance to A&E (Norwegian: Akuttmottaket). The ambulance had been called to a young people's party earlier in the evening. When they arrived they were met by around twenty agitated young people who were talking over each other trying to explain that Harald had become "really unwell" as the evening progressed. The patient was found semi-conscious on a sofa in the living room, he was confused and slow but responded when addressed. It was clear that a substantial amount of alcohol had been consumed at the party, but the young man vehemently denied having taken any narcotic substances. "Harald is not like that" a girl cried out and "he didn't even have any beer tonight". Upon arrival to A&E the patient's state of consciousness remains unchanged. The skin is pale and clammy. The monitor shows a pulse of 175 beats per minute, blood pressure of 85/55 mmHg and SaO<sub>2</sub> of 99%. The patient is breathing rapidly and deeply with a rate of 45 breaths/minute. The body temperature is 39.1°C. The patient is given an intravenous fluid infusion via a peripheral venous catheter (Venflon). A quick physical examination shows normal auscultation findings across the heart and lungs and normal palpation findings in the abdomen. The patient does not appear to have a stiff neck but this is hard to determine. There is not a working ophthalmoscope in the examination room. Acute asthma attack and acute gastroenteritis can probably be ruled out in this patient. After the intravenous fluid infusion has been ongoing for around 15 minutes the scope shows a pulse of 160 beats per minute, blood pressure of 95/60 mmHg and SaO<sub>2</sub> of 98%. The patient's state of consciousness remains unchanged. The examinations that should be prioritised are orientational blood tests, blood culture, thorax x-ray, CT scan of head and spinal puncture. Intravenous antibiotic treatment should also be initiated. After a short time the first blood test results are back (reference ranges in parenthesis):

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Creatinine 98 (60–105) µmol/l

pH 6.96 (7.36–7.44)

pCO<sub>2</sub> 3.2 (4.7–5.9) kPa

BE -26.4 (-3–3) mmol/l

Concentration of alcohol in blood 0.0.

The blood tests show that the patient has serious metabolic acidosis with partial respiratory compensation. He also has hyperkalaemia. It took some time to notify the patient's parents but one of the nurses in the admissions ward has finally succeeded in getting hold of Harald's mother by telephone. She is able to inform us that her son has seemed a bit lethargic and "under the weather" for a few weeks whilst also complaining of thirst. In the last couple of days he has been drinking several litres of mineral water each day and has been visiting the toilet much more frequently. He has been getting up to go to the toilet several times at night which he never used to do before. Harald's blood sugar was substantially elevated with a value of 31.9 mmol/l (reference range 3.7–5.1 mmol/l). The patient has diabetes mellitus. (Blood sugar should have been measured by the ambulance personnel or immediately after admission – a mistake has been made here).

**Patients with diabetes mellitus have high urine production (diuresis) because high blood sugar increases osmolarity in urine, inhibiting re-absorption of water in the distal tubules and collecting duct. Osmolarity also increases in plasma, which has consequences on brain function and may contribute to Harald's consciousness reaction.**

**Question 1:**

Why does increased osmolarity in plasma have consequences on brain function?

- Water passes out of the nerve cells due to osmosis, shrinking the cells and altering brain function.
- Water passes into the nerve cells due to osmosis, enlarging the cells and causing brain oedemas in the patient.

- The sodium/potassium pump in the nerve cell membrane is affected, causing abnormal intracellular ion concentration and altering brain function.

**Answer:**

Water passes out of the nerve cells due to osmosis, shrinking the cells and altering brain function.

**Part 8:**

Late on a Saturday night, 15-year old Harald is transported by ambulance to A&E (Norwegian: Akuttmottaket). The ambulance had been called to a young people's party earlier in the evening. When they arrived they were met by around twenty agitated young people who were talking over each other trying to explain that Harald had become "really unwell" as the evening progressed. The patient was found semi-conscious on a sofa in the living room, he was confused and slow but responded when addressed. It was clear that a substantial amount of alcohol had been consumed at the party, but the young man vehemently denied having taken any narcotic substances. "Harald is not like that" a girl cried out and "he didn't even have any beer tonight". Upon arrival to A&E the patient's state of consciousness remains unchanged. The skin is pale and clammy. The monitor shows a pulse of 175 beats per minute, blood pressure of 85/55 mmHg and SaO<sub>2</sub> of 99%. The patient is breathing rapidly and deeply with a rate of 45 breaths/minute. The body temperature is 39.1°C. The patient is given an intravenous fluid infusion via a peripheral venous catheter (Venflon). A quick physical examination shows normal auscultation findings across the heart and lungs and normal palpation findings in the abdomen. The patient does not appear to have a stiff neck but this is hard to determine. There is not a working ophthalmoscope in the examination room. Acute asthma attack and acute gastroenteritis can probably be ruled out in this patient. After the intravenous fluid infusion has been ongoing for around 15 minutes the scope shows a pulse of 160 beats per minute, blood pressure of 95/60 mmHg and SaO<sub>2</sub> of 98%. The patient's state of consciousness remains unchanged. The examinations that should be prioritised are orientational blood tests, blood culture, thorax x-ray, CT scan of head and spinal puncture. Intravenous antibiotic treatment should also be initiated. After a short time the first blood test results are back (reference ranges in parenthesis):

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Concentration of alcohol in blood 0.0.

The blood tests show that the patient has serious metabolic acidosis with partial respiratory compensation. He also has hyperkalaemia. It took some time to notify the patient's parents but one of the nurses in the admissions ward has finally succeeded in getting hold of Harald's mother by telephone. She is able to inform us that her son has seemed a bit lethargic and "under the weather" for a few weeks whilst also complaining of thirst. In the last couple of days he has been drinking several litres of mineral water each day and has been visiting the toilet much more frequently. He has been getting up to go to the toilet several times at night which he never used to do before. Harald's blood sugar was substantially elevated with a value of 31.9 mmol/l (reference range 3.7–5.1 mmol/l). The patient has diabetes mellitus. (Blood sugar should have been measured by the ambulance personnel or immediately after admission – a mistake has been made here). Patients with diabetes mellitus have high urine production (diuresis) because high blood sugar increases osmolarity in urine, inhibiting re-absorption of water in the distal tubules and collecting duct. Osmolarity also increases in plasma, which has consequences on brain function and may contribute to Harald's consciousness reaction.

**Water passes out of the nerve cells due to increased osmolarity in plasma, shrinking the cells and altering brain function.**

**The diagnosis of diabetes mellitus is often made by examining a urine sample.**

**Question 1:**

If a urine sample from Harald is examined using dipsticks, which fields will show strong positive values? (several answers possible)

- Glucose
- Ketone bodies
- Blood/erythrocytes
- Nitrate

Leukocytes

**Answer:**

Glucose

Ketone bodies

**Part 9:**

Late on a Saturday night, 15-year old Harald is transported by ambulance to A&E (Norwegian: Akuttmottaket). The ambulance had been called to a young people's party earlier in the evening. When they arrived they were met by around twenty agitated young people who were talking over each other trying to explain that Harald had become "really unwell" as the evening progressed. The patient was found semi-conscious on a sofa in the living room, he was confused and slow but responded when addressed. It was clear that a substantial amount of alcohol had been consumed at the party, but the young man vehemently denied having taken any narcotic substances. "Harald is not like that" a girl cried out and "he didn't even have any beer tonight". Upon arrival to A&E the patient's state of consciousness remains unchanged. The skin is pale and clammy. The monitor shows a pulse of 175 beats per minute, blood pressure of 85/55 mmHg and SaO<sub>2</sub> of 99%. The patient is breathing rapidly and deeply with a rate of 45 breaths/minute. The body temperature is 39.1°C. The patient is given an intravenous fluid infusion via a peripheral venous catheter (Venflon). A quick physical examination shows normal auscultation findings across the heart and lungs and normal palpation findings in the abdomen. The patient does not appear to have a stiff neck but this is hard to determine. There is not a working ophthalmoscope in the examination room. Acute asthma attack and acute gastroenteritis can probably be ruled out in this patient. After the intravenous fluid infusion has been ongoing for around 15 minutes the scope shows a pulse of 160 beats per minute, blood pressure of 95/60 mmHg and SaO<sub>2</sub> of 98%. The patient's state of consciousness remains unchanged. The examinations that should be prioritised are orientational blood tests, blood culture, thorax x-ray, CT scan of head and spinal puncture. Intravenous antibiotic treatment should also be initiated. After a short time the first blood test results are back (reference ranges in parenthesis):

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**The dipstick examination of a urine sample from Harald showed a strong positive for glucose and ketone bodies. Some ketone bodies are acids, explaining why the patient suffers from serious metabolic acidosis (ketoacidosis).**

**Question 1:**

Why do large quantities of ketone bodies form in a patient with untreated diabetes mellitus?

- Insulin deficiency means that large quantities of protein are broken down to amino acids which in turn are broken down into ketone bodies.
- Insulin deficiency results in uncontrolled breakdown of fatty acids and what the body is unable to metabolise is converted into ketone bodies.



- Insulin deficiency results in uncontrolled breakdown of glycogen with the excess converted to ketone bodies.

### Answer:

Insulin deficiency results in uncontrolled breakdown of fatty acids and what the body is unable to metabolise is converted into ketone bodies.

### Part 10:

Late on a Saturday night, 15-year old Harald is transported by ambulance to A&E (Norwegian: Akuttmottaket). The ambulance had been called to a young people's party earlier in the evening. When they arrived they were met by around twenty agitated young people who were talking over each other trying to explain that Harald had become "really unwell" as the evening progressed. The patient was found semi-conscious on a sofa in the living room, he was confused and slow but responded when addressed. It was clear that a substantial amount of alcohol had been consumed at the party, but the young man vehemently denied having taken any narcotic substances. "Harald is not like that" a girl cried out and "he didn't even have any beer tonight". Upon arrival to A&E the patient's state of consciousness remains unchanged. The skin is pale and clammy. The monitor shows a pulse of 175 beats per minute, blood pressure of 85/55 mmHg and SaO<sub>2</sub> of 99%. The patient is breathing rapidly and deeply with a rate of 45 breaths/minute. The body temperature is 39.1°C. The patient is given an intravenous fluid infusion via a peripheral venous catheter (Venflon). A quick physical examination shows normal auscultation findings across the heart and lungs and normal palpation findings in the abdomen. The patient does not appear to have a stiff neck but this is hard to determine. There is not a working ophthalmoscope in the examination room. Acute asthma attack and acute gastroenteritis can probably be ruled out in this patient. After the intravenous fluid infusion has been ongoing for around 15 minutes the scope shows a pulse of 160 beats per minute, blood pressure of 95/60 mmHg and SaO<sub>2</sub> of 98%. The patient's state of consciousness remains unchanged. The examinations that should be prioritised are orientational blood tests, blood culture, thorax x-ray, CT scan of head and spinal puncture. Intravenous antibiotic treatment should also be initiated. After a short time the first blood test results are back (reference ranges in parenthesis):

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**Insulin deficiency results in uncontrolled breakdown of fatty acids; what the body is unable to metabolise is converted into ketone bodies. In untreated or undiagnosed diabetes, ketoacidosis can often be triggered/exacerbated by an acute infection, as we are now suspecting in Harald.**

### Question 1:

Why can an acute infection trigger/exacerbate ketoacidosis in a person with untreated or undiagnosed diabetes?

- An acute infection triggers a physical stress response releasing adrenaline and cortisol, among others, these hormones counteract the effect of insulin.

- An acute infection activates the immune system which in turn results in increased release of fatty acids.
- An acute infection results in increased consumption of glucose from activated leukocytes and any penetrating micro-organisms.

**Answer:**

An acute infection triggers a physical stress response releasing adrenaline and cortisol, among others, these hormones counteract the effect of insulin.

## Assessment: MEDSEM9\_STATION19\_H14\_ORD

### Part 1:

Hans Christian Andersen is 8 years old. He visits the general practitioner with both his parents who explain that they have become more and more concerned for him over the last few months. He appears to be "clumsy" when walking and when standing up from lying down he puts his hands on his knees and pushes, almost "climbing up" his own legs. They first discovered this a few months ago but as it has been developing very slowly it is hard to establish when the illness started. They explain that he learned to sit when he was 9 months old, walked at 20 months and spoke two-word sentences at the age of 2.5 years. You perform a physical examination and notice that the leg musculature appears fairly thick and well-developed but he also has poor strength during plantar flexion of the sole of the foot and he is unable to stand on his toes. Tendon reflexes are difficult to trigger, particularly in the lower extremities and there are no signs of spasticity.

#### Question 1:

How do you evaluate the information concerning developmental "milestones"?

Sitting at 9 months [pull-down menu]

Walked at 20 months [pull-down menu]

Speaking two-word sentences at 2.5 years of age [pull-down menu]

#### Answer:

Sitting at 9 months = **normal**

Walked at 20 months = **delayed**

Speaking two-word sentences at 2.5 years of age = **normal**

#### Question 2:

Which diagnosis is most probable for Hans Christian?

- Cerebral palsy
- Brain tumour
- Muscular dystrophy
- Guillan-Barré syndrome
- Cerebral stroke

#### Answer:

Muscular dystrophy

### Part 2:

Hans Christian Andersen is 8 years old. He visits the general practitioner with both his parents who explain that they have become more and more concerned for him over the last few months. He appears to be "clumsy" when walking and when standing up from lying down he puts his hands on his knees and pushes, almost "climbing up" his own legs. They first discovered this a few months ago but as it has been developing very slowly it is hard to establish when the illness started. They explain that he learned to sit when he was 9 months old, walked at 20 months and spoke two-word sentences at the age of 2.5 years. You perform a physical examination and notice that the leg musculature appears fairly thick and well-developed but he also has poor strength during plantar flexion of the sole of the foot and he is unable to stand on his toes. Tendon reflexes are difficult to trigger, particularly in the lower extremities and there are no signs of spasticity.

**It is normal to sit at the age of 9 months and to speak two-word sentences at the age of 2.5 years but first walking at the age of 20 months is indicative of delayed motor development. Muscular dystrophy is the most probable diagnosis for Hans Christian.**

#### Question 1:

Which supplementary examinations are especially relevant in patients when there is a strong clinical suspicion of muscular dystrophy? (several answers possible)

- Genetic testing

- Measuring CK in serum
- Measuring ASAT in serum
- Measuring bilirubin in serum
- MRI examination of the skeletal muscles
- EEG
- Echocardiography
- Urine dipstick analysis

**Answer:**

Genetic testing  
Measuring CK in serum  
Echocardiography  
Urine dipstick analysis

**Part 3:**

Hans Christian Andersen is 8 years old. He visits the general practitioner with both his parents who explain that they have become more and more concerned for him over the last few months. He appears to be "clumsy" when walking and when standing up from lying down he puts his hands on his knees and pushes, almost "climbing up" his own legs. They first discovered this a few months ago but as it has been developing very slowly it is hard to establish when the illness started. They explain that he learned to sit when he was 9 months old, walked at 20 months and spoke two-word sentences at the age of 2.5 years. You perform a physical examination and notice that the leg musculature appears fairly thick and well-developed but he also has poor strength during plantar flexion of the sole of the foot and he is unable to stand on his toes. Tendon reflexes are difficult to trigger, particularly in the lower extremities and there are no signs of spasticity. It is normal to sit at the age of 9 months and to speak two-word sentences at the age of 2.5 years but first walking at the age of 20 months is indicative of delayed motor development. Muscular dystrophy is the most probable diagnosis for Hans Christian.

**Genetic testing, measuring CK in plasma, echocardiography and urine dipstick analysis are particularly relevant in patients when there is a strong clinical suspicion of muscular dystrophy.**

**The assessment of Hans Christian shows that he suffers from Duchenne muscular dystrophy. This disease is inherited in an X-linked recessive pattern (but some cases are caused by fresh mutations). Both parents are healthy.**

**Question 1:**

If Hans Christian's disease is hereditary (i.e. not a fresh mutation), which of the parents is the most likely carrier of the disease-causing allele?

- The father
- The mother
- Both

**Answer:**

The mother

**Part 4:**

Hans Christian Andersen is 8 years old. He visits the general practitioner with both his parents who explain that they have become more and more concerned for him over the last few months. He appears to be "clumsy" when walking and when standing up from lying down he puts his hands on his knees and pushes, almost "climbing up" his own legs. They first discovered this a few months ago but as it has been developing very slowly it is hard to establish when the illness started. They explain that he learned to sit when he was 9 months old, walked at 20 months and spoke two-word sentences at the age of 2.5 years. You perform a physical examination and notice that the leg musculature appears fairly thick and well-developed but he also has poor strength during plantar flexion of the sole of the foot and he is unable to stand on his toes. Tendon reflexes are difficult to trigger, particularly in the lower extremities and there are no signs of spasticity. It is normal to sit at the age of 9 months and to speak two-word sentences at the age of 2.5 years but first walking at the age of 20 months is indicative of delayed motor development. Muscular dystrophy is the most probable diagnosis for Hans Christian. Genetic testing, measuring CK in plasma, echocardiography and urine dipstick analysis are particularly relevant in patients when there is a strong clinical suspicion of muscular dystrophy. The assessment of Hans Christian shows that he suffers from Duchenne muscular dystrophy. This disease is inherited in an X-linked recessive pattern (but some cases are caused by fresh mutations). Both parents are healthy.

**If Hans Christian's disease is hereditary (not a fresh mutation) the mother will be the most likely carrier of the disease-causing allele. She is currently pregnant and has been for an ultrasound where she was told that**

everything looked fine and that she was most probably carrying a girl.

**Question 1:**

What is the probability of Hans Christian's unborn sister developing Duchenne muscular dystrophy as she grows up?

- 50% probability
- 25% probability
- Nearly 0% probability

**Answer:**

Nearly 0% probability

**Part 5:**

Hans Christian Andersen is 8 years old. He visits the general practitioner with both his parents who explain that they have become more and more concerned for him over the last few months. He appears to be "clumsy" when walking and when standing up from lying down he puts his hands on his knees and pushes, almost "climbing up" his own legs. They first discovered this a few months ago but as it has been developing very slowly it is hard to establish when the illness started. They explain that he learned to sit when he was 9 months old, walked at 20 months and spoke two-word sentences at the age of 2.5 years. You perform a physical examination and notice that the leg musculature appears fairly thick and well-developed but he also has poor strength during plantar flexion of the sole of the foot and he is unable to stand on his toes. Tendon reflexes are difficult to trigger, particularly in the lower extremities and there are no signs of spasticity. It is normal to sit at the age of 9 months and to speak two-word sentences at the age of 2.5 years but first walking at the age of 20 months is indicative of delayed motor development. Muscular dystrophy is the most probable diagnosis for Hans Christian. Genetic testing, measuring CK in plasma, echocardiography and urine dipstick analysis are particularly relevant in patients when there is a strong clinical suspicion of muscular dystrophy. The assessment of Hans Christian shows that he suffers from Duchenne muscular dystrophy. This disease is inherited in an X-linked recessive pattern (but some cases are caused by fresh mutations). Both parents are healthy. If Hans Christian's disease is hereditary (not a fresh mutation) the mother will be the most likely carrier of the disease-causing allele. She is currently pregnant and has been for an ultrasound where she was told that everything looked fine and that she was most probably carrying a girl.

**Hans Christian attends regular check-ups during his childhood. Muscle function continues to deteriorate and from the age of 14 he becomes more and more dependent on his wheelchair.**

**Question 1:**

Which potential complications is it important to be particularly aware of in this situation? (several answers possible)

- Pressure ulcers (decubitus)
- Heart failure
- Benign muscle tumours
- Depression
- Urinary tract infections
- Airway infections
- Gastro-oesophageal reflux
- Asthma
- Coeliac disease

**Answer:**

Pressure ulcers (decubitus)  
Heart failure  
Depression  
Airway infections

## Assessment: MEDSEM9\_STATION20\_H14\_ORD

### Part 1:

Petter Nilsen is 20 months old the first time he visits the general practitioner. He was born in Norway to ethnically Norwegian parents and has not visited any other countries. The mother explains that he has been largely healthy since birth with the exception of a few episodes of the cold, particularly just after starting going to a nursery. However, in recent weeks she has noticed that he has been pale and a bit lethargic and she would like a "thorough check-up".

Upon physical examination Petter is found to be in relatively good general condition but the mother's description of him being "pale and a bit lethargic" seems to be accurate. His pulse is regular with a rate of 135 beats per minute. Respiration is unrestricted with a rate of 26 breaths per minute. Body temperature is 37.1 °C. There is a systolic murmur across the heart, normal findings during lung auscultation and normal palpation findings in the abdomen. The skin is dry and warm.

#### Question 1:

How do you assess Petter's pulse and respiratory rate?

- Pulse is normal but the respiratory rate is too high
- Pulse is too high but the respiratory rate is normal
- Both the pulse and respiratory rate are too high

#### Answer:

Pulse is too high but the respiratory rate is normal

### Part 2:

Petter Nilsen is 20 months old the first time he visits the general practitioner. He was born in Norway to ethnically Norwegian parents and has not visited any other countries. The mother explains that he has been largely healthy since birth with the exception of a few episodes of the cold, particularly just after starting going to a nursery. However, in recent weeks she has noticed that he has been pale and a bit lethargic and she would like a "thorough check-up". Upon physical examination Petter is found to be in relatively good general condition but the mother's description of him being "pale and a bit lethargic" seems to be accurate. His pulse is regular with a rate of 135 beats per minute. Respiration is unrestricted with a rate of 26 breaths per minute. Body temperature is 37.1 °C. There is a systolic murmur across the heart, normal findings during lung auscultation and normal palpation findings in the abdomen. The skin is dry and warm.

**Petter has a normal respiratory rate but the pulse is too high.**

#### Question 1:

Which diagnosis do you consider most likely at this point in time?

- Anaemia
- Heart failure
- Arrhythmia

#### Answer:

Anaemia

### Part 3:

Petter Nilsen is 20 months old the first time he visits the general practitioner. He was born in Norway to ethnically Norwegian parents and has not visited any other countries. The mother explains that he has been largely healthy since birth with the exception of a few episodes of the cold, particularly just after starting going to a nursery. However, in recent weeks she has noticed that he has been pale and a bit lethargic and she would like a "thorough check-up". Upon physical examination Petter is found to be in relatively good general condition but the mother's description of him being "pale and a bit lethargic" seems to be accurate. His pulse is regular with a rate of 135 beats per minute. Respiration is unrestricted with a rate of 26 breaths per minute. Body temperature is 37.1 °C. There is a systolic murmur across the heart, normal findings during lung auscultation and normal palpation findings in the abdomen. The skin is dry and warm. Petter has a normal respiratory rate but the pulse is too high.

**Anaemia is the most probable diagnosis.**

**A number of blood samples are collected from Petter. A selection of these show [reference ranges]: Hb 8.7**

g/dL [10.5 – 14.0], MCV 69 fl [70 – 92], leukocytes 8.5 [4.5 – 15.0] x 10<sup>9</sup> cells/L, thrombocytes 249 [145-390] x 10<sup>9</sup> cells/L, reticulocytes 24 [30 – 100] x 10<sup>9</sup> cells/L, CPR 2 [< 4] mg/L, bilirubin 8 [5 – 25] µmol/L.

### Question 1:

Which type of anaemia does Petter have?

- Haemolytic anaemia
- Secondary anaemia due to a chronic inflammatory reaction
- Iron deficiency anaemia
- Aplastic anaemia
- Thalassaemia
- Secondary anaemia due to leukaemia

### Answer:

Iron deficiency anaemia

## Part 4:

Petter Nilsen is 20 months old the first time he visits the general practitioner. He was born in Norway to ethnically Norwegian parents and has not visited any other countries. The mother explains that he has been largely healthy since birth with the exception of a few episodes of the cold, particularly just after starting going to a nursery. However, in recent weeks she has noticed that he has been pale and a bit lethargic and she would like a "thorough check-up". Upon physical examination Petter is found to be in relatively good general condition but the mother's description of him being "pale and a bit lethargic" seems to be accurate. His pulse is regular with a rate of 135 beats per minute. Respiration is unrestricted with a rate of 26 breaths per minute. Body temperature is 37.1 °C. There is a systolic murmur across the heart, normal findings during lung auscultation and normal palpation findings in the abdomen. The skin is dry and warm. Petter has a normal respiratory rate but the pulse is too high. Anaemia is the most probable diagnosis. A number of blood samples are collected from Petter. A selection of these show [reference ranges]: Hb 8.7 g/dL [10.5 – 14.0], MCV 69 fl [70 – 92], leukocytes 8.5 [4.5 – 15.0] x 10<sup>9</sup> cells/L, thrombocytes 249 [145-390] x 10<sup>9</sup> cells/L, reticulocytes 24 [30 – 100] x 10<sup>9</sup> cells/L, CPR 2 [< 4] mg/L, bilirubin 8 [5 – 25] µmol/L.

**Petter most probably has iron deficiency anaemia and this is confirmed through further blood tests that, among other things, show low ferritin levels.**

### Question 1:

Which two questions is it particularly important to ask Petter's mother to establish the underlying cause of the iron deficiency? (several answers possible)

- "Have you seen any blood in Petter's stools?"
- "Does Petter appear to experience pain anywhere?"
- "Have you seen any blood in Petter's urine?"
- "What does Petter normally eat?"
- "Does he ever experience yellow discolouration of the skin or eyes?"

### Answer:

"Have you seen any blood in Petter's stools?"

"What does Petter normally eat?"

## Part 5:

Petter Nilsen is 20 months old the first time he visits the general practitioner. He was born in Norway to ethnically Norwegian parents and has not visited any other countries. The mother explains that he has been largely healthy since birth with the exception of a few episodes of the cold, particularly just after starting going to a nursery. However, in recent weeks she has noticed that he has been pale and a bit lethargic and she would like a "thorough check-up". Upon physical examination Petter is found to be in relatively good general condition but the mother's description of him being "pale and a bit lethargic" seems to be accurate. His pulse is regular with a rate of 135 beats per minute. Respiration is unrestricted with a rate of 26 breaths per minute. Body temperature is 37.1 °C. There is a systolic murmur across the heart, normal findings during lung auscultation and normal palpation findings in the abdomen. The skin is dry and warm. Petter has a normal respiratory rate but the pulse is too high. Anaemia is the most probable diagnosis. A number of blood samples are collected from Petter. A selection of these show [reference ranges]: Hb 8.7 g/dL [10.5 – 14.0], MCV 69 fl [70 – 92], leukocytes 8.5 [4.5 – 15.0] x 10<sup>9</sup> cells/L, thrombocytes 249 [145-390] x 10<sup>9</sup> cells/L, reticulocytes 24 [30 – 100] x 10<sup>9</sup> cells/L, CPR 2 [< 4] mg/L, bilirubin 8 [5 – 25] µmol/L. Petter most probably has

iron deficiency anaemia and this is confirmed through further blood tests that, among other things, show low ferritin levels.

**It is particularly important to ask whether Petter has experienced any blood in the stools and what he normally eats. His mother explains that his stools have always been unremarkable. With regard to nutrition, Petter was exclusively breastfed until he was around six months old, after which he was gradually introduced to other foods. He now eats a lot of baby porridge. And he really likes full-fat milk.**

### Question 1:

Which measures would you initiate? (several answers possible)

- Prescribe iron supplements
- Initiate investigation for coeliac disease
- Recommend a reduced intake of full-fat milk
- Ask that the patient returns with a stool sample to exclude intestinal bleeding
- Refer to the closest children's outpatient clinic for further investigation
- Make an appointment for a check-up with the general practitioner in 1-2 months

### Answer:

Prescribe iron supplements

Recommend a reduced intake of full-fat milk

Make an appointment for a check-up with the general practitioner in 1-2 months

## Part 6:

Petter Nilsen is 20 months old the first time he visits the general practitioner. He was born in Norway to ethnically Norwegian parents and has not visited any other countries. The mother explains that he has been largely healthy since birth with the exception of a few episodes of the cold, particularly just after starting going to a nursery. However, in recent weeks she has noticed that he has been pale and a bit lethargic and she would like a "thorough check-up". Upon physical examination Petter is found to be in relatively good general condition but the mother's description of him being "pale and a bit lethargic" seems to be accurate. His pulse is regular with a rate of 135 beats per minute. Respiration is unrestricted with a rate of 26 breaths per minute. Body temperature is 37.1 °C. There is a systolic murmur across the heart, normal findings during lung auscultation and normal palpation findings in the abdomen. The skin is dry and warm. Petter has a normal respiratory rate but the pulse is too high. Anaemia is the most probable diagnosis. A number of blood samples are collected from Petter. A selection of these show [reference ranges]: Hb 8.7 g/dL [10.5 – 14.0], MCV 69 fl [70 – 92], leukocytes 8.5 [4.5 – 15.0] x 10<sup>9</sup> cells/L, thrombocytes 249 [145-390] x 10<sup>9</sup> cells/L, reticulocytes 24 [30 – 100] x 10<sup>9</sup> cells/L, CPR 2 [< 4] mg/L, bilirubin 8 [5 – 25] µmol/L. Petter most probably has iron deficiency anaemia and this is confirmed through further blood tests that, among other things, show low ferritin levels. It is particularly important to ask whether Petter has experienced any blood in the stools and what he normally eats. His mother explains that his stools have always been unremarkable. With regard to nutrition, Petter was exclusively breastfed until he was around six months old, after which he was gradually introduced to other foods. He now eats a lot of baby porridge. And he really likes full-fat milk.

**The patient was prescribed an iron supplement. And the physician recommended reducing full-fat milk intake. A check-up has been agreed in 1-2 months.**

**However, after two weeks Petter returns with his mother. They have now asked for an urgent appointment and the mother explains that Petter had managed to get hold of the iron solution prescribed at the last appointment earlier that day. When she discovered him he was sat on the floor attempting to drink the solution. She is uncertain how long he has been sat there for and how much he has managed to drink. Petter is unwell and appears to be suffering from abdominal pain. A quick physical examination is unremarkable.**

### Question 1:

Which measures do you initiate?

- Send Petter and his mother home but recommend that they call later that day if the general condition worsens.
- Take blood tests to map Petter's iron stores before sending him and his mother home but agree to call them in a couple of days when the test results are available.
- Make a referral to admit Petter to the closest children's ward for immediate help.

### Answer:

Make a referral to admit Petter to the closest children's ward for immediate help.



**Part 7:**

Petter Nilsen is 20 months old the first time he visits the general practitioner. He was born in Norway to ethnically Norwegian parents and has not visited any other countries. The mother explains that he has been largely healthy since birth with the exception of a few episodes of the cold, particularly just after starting going to a nursery. However, in recent weeks she has noticed that he has been pale and a bit lethargic and she would like a "thorough check-up". Upon physical examination Petter is found to be in relatively good general condition but the mother's description of him being "pale and a bit lethargic" seems to be accurate. His pulse is regular with a rate of 135 beats per minute. Respiration is unrestricted with a rate of 26 breaths per minute. Body temperature is 37.1 °C. There is a systolic murmur across the heart, normal findings during lung auscultation and normal palpation findings in the abdomen. The skin is dry and warm. Petter has a normal respiratory rate but the pulse is too high. Anaemia is the most probable diagnosis. A number of blood samples are collected from Petter. A selection of these show [reference ranges]: Hb 8.7 g/dL [10.5 – 14.0], MCV 69 fl [70 – 92], leukocytes 8.5 [4.5 – 15.0] x 10<sup>9</sup> cells/L, thrombocytes 249 [145-390] x 10<sup>9</sup> cells/L, reticulocytes 24 [30 – 100] x 10<sup>9</sup> cells/L, CPR 2 [< 4] mg/L, bilirubin 8 [5 – 25] µmol/L. Petter most probably has iron deficiency anaemia and this is confirmed through further blood tests that, among other things, show low ferritin levels. It is particularly important to ask whether Petter has experienced any blood in the stools and what he normally eats. His mother explains that his stools have always been unremarkable. With regard to nutrition, Petter was exclusively breastfed until he was around six months old, after which he was gradually introduced to other foods. He now eats a lot of baby porridge. And he really likes full-fat milk. The patient was prescribed an iron supplement. And the physician recommended reducing full-fat milk intake. A check-up has been agreed in 1-2 months. However, after two weeks Petter returns with his mother. They have now asked for an urgent appointment and the mother explains that Petter had managed to get hold of the iron solution prescribed at the last appointment earlier that day. When she discovered him he was sat on the floor attempting to drink the solution. She is uncertain how long he has been sat there for and how much he has managed to drink. Petter is unwell and appears to be suffering from abdominal pain. A quick physical examination is unremarkable.

**Petter was admitted for immediate help at the closest children's ward. Further investigation luckily did not show any signs of serious iron poisoning and the patient was discharged the following day.**

**Petter returns for the scheduled check-up with the general practitioner after 1-2 months. He is in good condition and his Hb values are normal.**

**You do not see the family again for one more year. Again the main issue is that Petter appears "pale and lethargic". The mother is wondering whether he might be suffering from iron deficiency anaemia again? This time a selection of blood tests show [reference ranges]: Hb 8.1 g/dL [10.5 – 14.0], MCV 83 fl [70 – 92], leukocytes 39.5 [4.5 – 15.0] x 10<sup>9</sup> cells/L, thrombocytes 89 [145-390] x 10<sup>9</sup> cells/L, reticulocytes 21 [30 – 100] x 10<sup>9</sup> cells/L, CPR 3 [< 4] mg/L, bilirubin 6 [5 – 25] µmol/L.**

**Question 1:**

Which type of anaemia is Petter most likely to have now?

- Haemolytic anaemia
- Secondary anaemia due to a chronic inflammatory reaction
- Iron deficiency anaemia
- Aplastic anaemia
- Thalassaemia
- Secondary anaemia due to leukaemia

**Answer:**

Secondary anaemia due to leukaemia

**Part 8:**

Petter Nilsen is 20 months old the first time he visits the general practitioner. He was born in Norway to ethnically Norwegian parents and has not visited any other countries. The mother explains that he has been largely healthy since birth with the exception of a few episodes of the cold, particularly just after starting going to a nursery. However, in recent weeks she has noticed that he has been pale and a bit lethargic and she would like a "thorough check-up". Upon physical examination Petter is found to be in relatively good general condition but the mother's description of him being "pale and a bit lethargic" seems to be accurate. His pulse is regular with a rate of 135 beats per minute. Respiration is unrestricted with a rate of 26 breaths per minute. Body temperature is 37.1 °C. There is a systolic murmur across the heart, normal findings during lung auscultation and normal palpation findings in the abdomen. The skin is dry and warm. Petter has a normal respiratory rate but the pulse is too high. Anaemia is the most probable diagnosis. A number of blood samples are collected from Petter. A selection of these show [reference ranges]: Hb 8.7 g/dL [10.5 – 14.0], MCV 69 fl [70 – 92], leukocytes 8.5 [4.5 – 15.0] x 10<sup>9</sup> cells/L, thrombocytes 249 [145-390] x 10<sup>9</sup> cells/L, reticulocytes 24 [30 – 100] x 10<sup>9</sup> cells/L, CPR 2 [< 4] mg/L, bilirubin 8 [5 – 25] µmol/L. Petter most probably has iron deficiency anaemia and this is confirmed through further blood tests that, among other things, show low ferritin levels. It is particularly important to ask whether Petter has experienced any blood in the stools and what he normally eats. His mother explains that his stools have always been unremarkable. With regard to nutrition, Petter was

exclusively breastfed until he was around six months old, after which he was gradually introduced to other foods. He now eats a lot of baby porridge. And he really likes full-fat milk. The patient was prescribed an iron supplement. And the physician recommended reducing full-fat milk intake. A check-up has been agreed in 1-2 months. However, after two weeks Petter returns with his mother. They have now asked for an urgent appointment and the mother explains that Petter had managed to get hold of the iron solution prescribed at the last appointment earlier that day. When she discovered him he was sat on the floor attempting to drink the solution. She is uncertain how long he has been sat there for and how much he has managed to drink. Petter is unwell and appears to be suffering from abdominal pain. A quick physical examination is unremarkable. Petter was admitted for immediate help at the closest children's ward. Further investigation luckily did not show any signs of serious iron poisoning and the patient was discharged the following day. Petter returns for the scheduled check-up with the general practitioner after 1-2 months. He is in good condition and his Hb values are normal. You do not see the family again for one more year. Again the main issue is that Petter appears "pale and lethargic". The mother is wondering whether he might be suffering from iron deficiency anaemia again? This time a selection of blood tests show [reference ranges]: Hb 8.1 g/dL [10.5 – 14.0], MCV 83 fl [70 – 92], leukocytes 39.5 [4.5 – 15.0] x 10<sup>9</sup> cells/L, thrombocytes 89 [145-390] x 10<sup>9</sup> cells/L, reticulocytes 21 [30 – 100] x 10<sup>9</sup> cells/L, CPR 3 [< 4] mg/L, bilirubin 6 [5 – 25] µmol/L.

**Petter most probably has secondary anaemia due to leukaemia. He is therefore admitted to the closest children's ward for further investigation.**

### Question 1:

Which two supplementary examinations are particularly informative in the investigation of potential leukaemia? (several answers possible)

- Thorax x-ray
- ECG
- Spinal puncture/spinal fluid analysis
- CT scan of the head
- Microscopy of bone marrow aspirate
- Spirometry

### Answer:

Spinal puncture/spinal fluid analysis  
Microscopy of bone marrow aspirate

### Part 9:

Petter Nilsen is 20 months old the first time he visits the general practitioner. He was born in Norway to ethnically Norwegian parents and has not visited any other countries. The mother explains that he has been largely healthy since birth with the exception of a few episodes of the cold, particularly just after starting going to a nursery. However, in recent weeks she has noticed that he has been pale and a bit lethargic and she would like a "thorough check-up". Upon physical examination Petter is found to be in relatively good general condition but the mother's description of him being "pale and a bit lethargic" seems to be accurate. His pulse is regular with a rate of 135 beats per minute. Respiration is unrestricted with a rate of 26 breaths per minute. Body temperature is 37.1 °C. There is a systolic murmur across the heart, normal findings during lung auscultation and normal palpation findings in the abdomen. The skin is dry and warm. Petter has a normal respiratory rate but the pulse is too high. Anaemia is the most probable diagnosis. A number of blood samples are collected from Petter. A selection of these show [reference ranges]: Hb 8.7 g/dL [10.5 – 14.0], MCV 69 fl [70 – 92], leukocytes 8.5 [4.5 – 15.0] x 10<sup>9</sup> cells/L, thrombocytes 249 [145-390] x 10<sup>9</sup> cells/L, reticulocytes 24 [30 – 100] x 10<sup>9</sup> cells/L, CPR 2 [< 4] mg/L, bilirubin 8 [5 – 25] µmol/L. Petter most probably has iron deficiency anaemia and this is confirmed through further blood tests that, among other things, show low ferritin levels. It is particularly important to ask whether Petter has experienced any blood in the stools and what he normally eats. His mother explains that his stools have always been unremarkable. With regard to nutrition, Petter was exclusively breastfed until he was around six months old, after which he was gradually introduced to other foods. He now eats a lot of baby porridge. And he really likes full-fat milk. The patient was prescribed an iron supplement. And the physician recommended reducing full-fat milk intake. A check-up has been agreed in 1-2 months. However, after two weeks Petter returns with his mother. They have now asked for an urgent appointment and the mother explains that Petter had managed to get hold of the iron solution prescribed at the last appointment earlier that day. When she discovered him he was sat on the floor attempting to drink the solution. She is uncertain how long he has been sat there for and how much he has managed to drink. Petter is unwell and appears to be suffering from abdominal pain. A quick physical examination is unremarkable. Petter was admitted for immediate help at the closest children's ward. Further investigation luckily did not show any signs of serious iron poisoning and the patient was discharged the following day. Petter returns for the scheduled check-up with the general practitioner after 1-2 months. He is in good condition and his Hb values are normal. You do not see the family again for one more year. Again the main issue is that Petter appears "pale and lethargic". The mother is wondering whether he might be suffering from iron deficiency anaemia again? This time a selection of blood tests show [reference ranges]: Hb 8.1 g/dL [10.5 – 14.0], MCV 83 fl [70 – 92], leukocytes 39.5 [4.5 – 15.0] x 10<sup>9</sup> cells/L, thrombocytes 89 [145-390] x 10<sup>9</sup> cells/L, reticulocytes 21 [30 – 100] x

$10^9$  cells/L, CPR 3 [ $< 4$ ] mg/L, bilirubin 6 [5 – 25]  $\mu\text{mol/L}$ . Petter most probably has secondary anaemia due to leukaemia. He is therefore admitted to the closest children's ward for further investigation.

**Spinal puncture/spinal fluid analysis and microscopy of bone marrow aspirate are particularly informative in the investigation of potential leukaemia.**

**In Petter the microscopy of the bone marrow aspirate showed typical characteristics of acute lymphatic leukaemia and malign white blood cells were found in the spinal fluid. The latter indicates that the disease has spread to the central nervous system.**

### Question 1:

How is acute lymphatic leukaemia in the central nervous system treated? (several answers possible)

- Injection of cytostatic medication (chemotherapy) directly to the spinal duct
- Intense cytostatic courses administered as normal (i.e. in blood)
- Radiation of the central nervous system.
- Bone marrow transplantation.

### Answer:

Injection of cytostatic medication (chemotherapy) directly to the spinal duct  
Intense cytostatic courses administered as normal (i.e. in blood)

## Assessment: MEDSEM9\_STATION21\_H14\_ORD

### Part 1:

Your patient is 29 years old and consults you because she wants her intrauterine device (IUD) removed as she intends to become pregnant. Her menstrual period is 28-30 days.

She is obese, her record says BMI 35. For three years she has been treated for hypertension using an ACE inhibitor. There are several people in her close family who are treated for hypertension and type 2 diabetes.

Besides her obesity and hypertension she is healthy. She has never been pregnant.

Her blood pressure is now 145/95. Normal urine dipsticks.

#### Question 1:

What are your considerations with respect to her hypertensive disorder and desire for pregnancy?

- Adjust the dosage of the ACE inhibitor to get the blood pressure below 140/90
- Change her medication to an angiotensin II receptor inhibitor, for example losartan
- Change her medication to an a - b blocker such as labetalol

#### Answer:

Change her medication to an a - b blocker such as labetalol

### Part 2:

Your patient is 29 years old and consults you because she wants her intrauterine device (IUD) removed as she intends to become pregnant. Her menstrual period is 28-30 days. She is obese, her record says BMI 35. For three years she has been treated for hypertension using an ACE inhibitor. There are several people in her close family who are treated for hypertension and type 2 diabetes. Besides her obesity and hypertension she is healthy. She has never been pregnant. Her blood pressure is now 145/95. Normal urine dipsticks.

You decide to change to labetalol.

#### Question 1:

What would then be your advice to her

- Remove the IUD and check blood pressure 1-2 weeks from now
- Remove her IUD and ask her to contact you as soon as she gets pregnant to check the blood pressure and adjust the dosage of labetalol
- Check blood pressure 4-6 weeks from now and wait to remove the IUD

#### Answer:

Remove the IUD and check blood pressure 1-2 weeks from now

Check blood pressure 4-6 weeks from now and wait to remove the IUD

### Part 3:

Your patient is 29 years old and consults you because she wants her intrauterine device (IUD) removed as she intends to become pregnant. Her menstrual period is 28-30 days. She is obese, her record says BMI 35. For three years she has been treated for hypertension using an ACE inhibitor. There are several people in her close family who are treated for hypertension and type 2 diabetes. Besides her obesity and hypertension she is healthy. She has never been pregnant. Her blood pressure is now 145/95. Normal urine dipsticks. You decide to change to labetalol.

#### Question 1:

Any other considerations you may have at this consultation in relation to her obesity?

#### Answer:

Dietary and physical activity history and advice: 5 points

Same but also glucose tolerance test: 6 points

If only dietary advice is answered: 3 points

#### Part 4:

Your patient is 29 years old and consults you because she wants her intrauterine device (IUD) removed as she intends to become pregnant. Her menstrual period is 28-30 days. She is obese, her record says BMI 35. For three years she has been treated for hypertension using an ACE inhibitor. There are several people in her close family who are treated for hypertension and type 2 diabetes. Besides her obesity and hypertension she is healthy. She has never been pregnant. Her blood pressure is now 145/95. Normal urine dipsticks. You decide to change to labetalol.

**She agrees to wait to remove the IUD.**

**At her next consultation 5 weeks later her blood pressure is 150/95. She started an exercise and dietary programme two weeks ago. The glucose tolerance test you advised her to do showed fasting glucose of 5.8 mmol/l and a 2 h value of 8.0 mmol/l, indicating a moderate glucose intolerance. She indicates that she is very eager to start trying to become pregnant.**

#### Question 1:

How would you now advise her?

- Remove the IUD now, check blood pressure every second week from now, after having adjusted the dosage of labetalol and encourage her to continue the exercise and dietary programme
- Wait to remove the IUD, adjust the labetalol dosage, encourage her to continue the exercise and dietary programme and check blood pressure 6 weeks from now. Aim to remove the IUD when blood pressure is satisfactory and the effect of the exercise and dietary programme is apparent
- Refer her to hospital for consultation by obstetrical and endocrinological specialists

#### Answer:

Remove the IUD now, check blood pressure every second week from now, after having adjusted the dosage of labetalol and encourage her to continue the exercise and dietary programme

Wait to remove the IUD, adjust the labetalol dosage, encourage her to continue the exercise and dietary programme and check blood pressure 6 weeks from now. Aim to remove the IUD when blood pressure is satisfactory and the effect of the exercise and dietary programme is apparent

#### Part 5:

Your patient is 29 years old and consults you because she wants her intrauterine device (IUD) removed as she intends to become pregnant. Her menstrual period is 28-30 days. She is obese, her record says BMI 35. For three years she has been treated for hypertension using an ACE inhibitor. There are several people in her close family who are treated for hypertension and type 2 diabetes. Besides her obesity and hypertension she is healthy. She has never been pregnant. Her blood pressure is now 145/95. Normal urine dipsticks. You decide to change to labetalol. She agrees to wait to remove the IUD. At her next consultation 5 weeks later her blood pressure is 150/95. She started an exercise and dietary programme two weeks ago. The glucose tolerance test you advised her to do showed fasting glucose of 5.8 mmol/l and a 2 h value of 8.0 mmol/l, indicating a moderate glucose intolerance. She indicates that she is very eager to start trying to become pregnant.

**5 months later her BMI was reduced to 32 and her blood pressure was 135/80 after adjustments of the labetalol dosage. You remove the IUD and 4 months after that she is 10 weeks pregnant and consults you for antenatal care.**

**Her blood pressure is 130/80, urine negative, and you take standard antenatal care blood samples. One week ago she had an ultrasound showing a 9-week sized vital foetus.**

#### Question 1:

Which considerations would you have now, including other investigations at the present visit?

- Stop the labetalol treatment as her blood pressure is fine and check blood pressure at four-week intervals, do a glucose tolerance test at 26-28 weeks and refer her to an obstetrical specialist if blood pressure rises.
- Continue labetalol treatment at the current dosage and check blood pressure every two-four weeks and do another glucose tolerance test now. Advise a specialist consultation at 22-24 weeks even if the pregnancy seems to develop satisfactorily and the glucose tolerance test is normal.
- Refer her now to an obstetrical specialist for immediate follow-up of the pregnancy.

**Answer:**

Stop the labetalol treatment as her blood pressure is fine and check blood pressure at four-week intervals, do a glucose tolerance test at 26-28 weeks and refer her to an obstetrical specialist if blood pressure rises. Continue labetalol treatment at the current dosage and check blood pressure every two-four weeks and do another glucose tolerance test now. Advise a specialist consultation at 22-24 weeks even if the pregnancy seems to develop satisfactorily and the glucose tolerance test is normal.

**Part 6:**

Your patient is 29 years old and consults you because she wants her intrauterine device (IUD) removed as she intends to become pregnant. Her menstrual period is 28-30 days. She is obese, her record says BMI 35. For three years she has been treated for hypertension using an ACE inhibitor. There are several people in her close family who are treated for hypertension and type 2 diabetes. Besides her obesity and hypertension she is healthy. She has never been pregnant. Her blood pressure is now 145/95. Normal urine dipsticks. You decide to change to labetalol. She agrees to wait to remove the IUD. At her next consultation 5 weeks later her blood pressure is 150/95. She started an exercise and dietary programme two weeks ago. The glucose tolerance test you advised her to do showed fasting glucose of 5.8 mmol/l and a 2 h value of 8.0 mmol/l, indicating a moderate glucose intolerance. She indicates that she is very eager to start trying to become pregnant. 5 months later her BMI was reduced to 32 and her blood pressure was 135/80 after adjustments of the labetalol dosage. You remove the IUD and 4 months after that she is 10 weeks pregnant and consults you for antenatal care. Her blood pressure is 130/80, urine negative, and you take standard antenatal care blood samples. One week ago she had an ultrasound showing a 9-week sized vital foetus.

**You continue labetalol treatment and blood pressure remains stable. The specialist consultation at 24 weeks showed a foetus of normal size (25-50 percentile) and satisfactory other findings. Repeated glucose tolerance test at 29 weeks shows mild glucose intolerance (fasting glucose 5.6, 2 h value 8.1).**

**At the consultation at 32 weeks her blood pressure has risen slightly to 145/90, urine is normal, but she complains of a moderate headache. Her weight has increased by 1.5 kilos in the last two weeks. She feels she has "swollen". Foetal movements are normal. The symphysis-fundal height follows the curve.**

**Question 1:**

How would you manage her case now?

- Increase the dosage of labetalol to normalise her blood pressure, take relevant blood samples and make another appointment for around 2 weeks from now and ask her to call you if she does not feel well.
- Refer her to an obstetrical specialist/hospital immediately.
- Continue with the same dosage of labetalol, take relevant blood samples and ask her to come back for a check 3-4 days later and call you if she gets worse.

**Answer:**

Refer her to an obstetrical specialist/hospital immediately.

Continue with the same dosage of labetalol, take relevant blood samples and ask her to come back for a check 3-4 days later and call you if she gets worse.

## Assessment: MEDSEM9\_STATION22\_H14\_ORD

### Part 1:

You are a general practitioner and are seeing a 36-year old woman for postpartum control 5 weeks after she gave birth to her first baby.

She is generally healthy. Her pregnancy was uncomplicated although she felt exhausted and was very anxious about the birth. Her baby was delivered by vacuum-extraction which she experienced as very traumatic. She lost much more than the average amount of blood.

She had a lot of pain in the first 2-3 weeks after birth and gave up breastfeeding. She still has a slight but decreasing dark vaginal discharge. She has not lost any weight.

She continuously feels tired, has sleeping problems even though her baby sleeps from midnight to 06:00, and is exhausted after a minimal amount of housework. Currently her husband is on summer holiday and he takes care of the baby most of the time. She feels cold all the time. She is not using any drugs except an iron supplement.

#### Question 1:

Mention 4 possible cause(s) of her miserable feeling.

#### Answer:

Post partum depression (2p)

Hypothyroidism (2p)

Anemia (1 p)

Urogenital infection (endometritis/ UVI) (1 p)

### Part 2:

You are a general practitioner and are seeing a 36-year old woman for postpartum control 5 weeks after she gave birth to her first baby. She is generally healthy. Her pregnancy was uncomplicated although she felt exhausted and was very anxious about the birth. Her baby was delivered by vacuum-extraction which she experienced as very traumatic. She lost much more than the average amount of blood. She had a lot of pain in the first 2-3 weeks after birth and gave up breastfeeding. She still has a slight but decreasing dark vaginal discharge. She has not lost any weight. She continuously feels tired, has sleeping problems even though her baby sleeps from midnight to 06:00, and is exhausted after a minimal amount of housework. Currently her husband is on summer holiday and he takes care of the baby most of the time. She feels cold all the time. She is not using any drugs except an iron supplement.

#### Question 1:

You find her haemoglobin to be satisfactory (11.1 g/l). Which other 3-4 blood tests would you take?

#### Answer:

Thyroid status (TSH, Free T4): 3 p If onl "Thyroid status: 2 p

CRP, Leukocyte count (1p , also if only one of these is given)

Urine stix(1 p)

### Part 3:

You are a general practitioner and are seeing a 36-year old woman for postpartum control 5 weeks after she gave birth to her first baby. She is generally healthy. Her pregnancy was uncomplicated although she felt exhausted and was very anxious about the birth. Her baby was delivered by vacuum-extraction which she experienced as very traumatic. She lost much more than the average amount of blood. She had a lot of pain in the first 2-3 weeks after birth and gave up breastfeeding. She still has a slight but decreasing dark vaginal discharge. She has not lost any weight. She continuously feels tired, has sleeping problems even though her baby sleeps from midnight to 06:00, and is exhausted after a minimal amount of housework. Currently her husband is on summer holiday and he takes care of the baby most of the time. She feels cold all the time. She is not using any drugs except an iron supplement.

**You find thyroid status, CRP, leucocyte count and urine stix to be normal.**

**Question 1:**

What do you now consider the most probable diagnosis?

**Answer:**

Post partum depression (6p)

Addisons disease (1 p)

**Part 4:**

You are a general practitioner and are seeing a 36-year old woman for postpartum control 5 weeks after she gave birth to her first baby. She is generally healthy. Her pregnancy was uncomplicated although she felt exhausted and was very anxious about the birth. Her baby was delivered by vacuum-extraction which she experienced as very traumatic. She lost much more than the average amount of blood. She had a lot of pain in the first 2-3 weeks after birth and gave up breastfeeding. She still has a slight but decreasing dark vaginal discharge. She has not lost any weight. She continuously feels tired, has sleeping problems even though her baby sleeps from midnight to 06:00, and is exhausted after a minimal amount of housework. Currently her husband is on summer holiday and he takes care of the baby most of the time. She feels cold all the time. She is not using any drugs except an iron supplement. You find thyroid status, CRP, leucocyte count and urine stix to be normal.

**Question 1:**

How frequent is postpartum depression?

- 5 %
- 10 %
- 20 %

**Answer:**

5 %

10 %

20 %

**Question 2:**

How would you evaluate the seriousness of her depression?

**Answer:**

Suicidal thoughts (3p)

Edinburgh postnatal depression scale (EPDS) (1 p)

Familial relations (1p)

Evaluate her actual ability to take care of her child (1p)



## Assessment: MEDSEM9\_STATION23\_H14\_ORD

### Part 1:

20-year old healthy woman working as an assistant at a nursing home. She tells you that she has almost stopped smoking.

This is her first pregnancy, which has been uncomplicated so far except that she has had two episodes of small vaginal bleeds at 12 and 19 weeks of gestation. She is now 25 weeks pregnant.

She sees you for a routine antenatal visit. She feels well, except for “a little influenza-like cold”. There are a lot of foetal movements. You find normal stable blood pressure, urine stix shows leucocytes +1, traces of blood, otherwise negative. The symphysis-fundal height follows the reference curve. The weight gain is adequate.

Foetal heart rate is 136.

She mentions that for 4-5 days she has had a menstruation-like discomfort. She has had coitus three times in the last week. Yesterday she noted mucus-like vaginal discharge with tinges of blood. There is still some discharge today, but less. The menstruation-like discomfort is still there, perhaps a little better.

### Question 1:

Mention four probable differential diagnoses.

### Answer:

Post coital bleeding (1p)

False labour (Braxton-Hicks contractions: Norwegian: kynnere) (1p)

Preterm labour (3p)

Urinary tract infection (1p)

### Part 2:

20-year old healthy woman working as an assistant at a nursing home. She tells you that she has almost stopped smoking. This is her first pregnancy, which has been uncomplicated so far except that she has had two episodes of small vaginal bleeds at 12 and 19 weeks of gestation. She is now 25 weeks pregnant. She sees you for a routine antenatal visit. She feels well, except for “a little influenza-like cold”. There are a lot of foetal movements. You find normal stable blood pressure, urine stix shows leucocytes +1, traces of blood, otherwise negative. The symphysis-fundal height follows the reference curve. The weight gain is adequate. Foetal heart rate is 136. She mentions that for 4-5 days she has had a menstruation-like discomfort. She has had coitus three times in the last week. Yesterday she noted mucus-like vaginal discharge with tinges of blood. There is still some discharge today, but less. The menstruation-like discomfort is still there, perhaps a little better.

**You suspect preterm labour.**

### Question 1:

What additional investigations would you then perform in your own office to come closer to a diagnosis?

- Digital vaginal exploration
- Palpation of uterus and digital vaginal exploration
- Palpation of uterus and vaginal inspection

### Answer:

Palpation of uterus and vaginal inspection

**Part 3:**

20-year old healthy woman working as an assistant at a nursing home. She tells you that she has almost stopped smoking. This is her first pregnancy, which has been uncomplicated so far except that she has had two episodes of small vaginal bleeds at 12 and 19 weeks of gestation. She is now 25 weeks pregnant. She sees you for a routine antenatal visit. She feels well, except for "a little influenza-like cold". There are a lot of foetal movements. You find normal stable blood pressure, urine stix shows leucocytes +1, traces of blood, otherwise negative. The symphysis-fundal height follows the reference curve. The weight gain is adequate. Foetal heart rate is 136. She mentions that for 4-5 days she has had a menstruation-like discomfort. She has had coitus three times in the last week. Yesterday she noted mucus-like vaginal discharge with tinges of blood. There is still some discharge today, but less. The menstruation-like discomfort is still there, perhaps a little better. You suspect preterm labour.

**When you palpate the uterus she says it is painful, especially the lower part. The uterus is soft.**

**When you perform a vaginal inspection there is blood-tinged mucus/discharge around the cervix, which is intact and the external os is closed. You perform a C-reactive protein test (CRP) which shows 21, i.e. moderately increased.**

**Question 1:**

What do you now consider the most probable diagnosis?

**Answer:**

Urinary tract infection (1p)

Cervical/vaginal infection (2 p)

Chorioamnionitis (6p)

**Part 4:**

20-year old healthy woman working as an assistant at a nursing home. She tells you that she has almost stopped smoking. This is her first pregnancy, which has been uncomplicated so far except that she has had two episodes of small vaginal bleeds at 12 and 19 weeks of gestation. She is now 25 weeks pregnant. She sees you for a routine antenatal visit. She feels well, except for "a little influenza-like cold". There are a lot of foetal movements. You find normal stable blood pressure, urine stix shows leucocytes +1, traces of blood, otherwise negative. The symphysis-fundal height follows the reference curve. The weight gain is adequate. Foetal heart rate is 136. She mentions that for 4-5 days she has had a menstruation-like discomfort. She has had coitus three times in the last week. Yesterday she noted mucus-like vaginal discharge with tinges of blood. There is still some discharge today, but less. The menstruation-like discomfort is still there, perhaps a little better. You suspect preterm labour. When you palpate the uterus she says it is painful, especially the lower part. The uterus is soft. When you perform a vaginal inspection there is blood-tinged mucus/discharge around the cervix, which is intact and the external os is closed. You perform a C-reactive protein test (CRP) which shows 21, i.e. moderately increased.

**You think you cannot exclude chorioamnionitis, although she may also have UTI and a vaginal infection too.**

**Question 1:**

How would you then handle her case further?

- Take urine and vaginal samples for bacterial culture and start treating her UTI and suspected chorioamnionitis, and ask her to come back 3 days later when the bacterial tests are ready
- As for 1. but admit her to hospital after 3 days if symptoms have not clearly improved
- Admit her to hospital as an emergency case

**Answer:**

Admit her to hospital as an emergency case

## Assessment: MEDSEM9\_STATION24\_H14\_ORD

### Part 1:

You are a general practitioner. A 34-year old woman visits you because she has been trying to become pregnant for the last 2 years. She stopped taking her contraception (contraceptive pills) two years ago. She is married and of normal weight. She is otherwise healthy and uses no medication. She had her last gynaecological examination 3 years ago.

#### Question 1:

What information will you consider most relevant from her medical history? Please provide six short sentences/keywords describing factors in her history that may affect her fertility.

#### Answer:

Smoking (1p), regular and normal periodic bleeding (1p), dysmenorrhoea (1p), previous pelvic inflammatory disease (1p), any previous pelvic surgery (1p), previous pregnancies and eventually outcomes (1p).

#### Question 2:

Which examinations will you, as a GP, carry out and which clinical tests will you perform? Please describe particular findings that might be of importance in women suffering from infertility.

#### Answer:

Gynaecological examination or inspection/palpation (1p), cervical smear/cytology (1p), test on chlamydia infection (1p), cervicitis (decreased penetration of sperm through the cervical canal) (1p), tender nodule(s) in the fornix posterior (endometriosis) (1p), palpable adnexal mass (ovarian endometriosis, ovarian cyst, sactosalpinges) (1p)

#### Question 3:

You inform her that you also need some information regarding her partner. What information from **his** medical history is relevant, and which tests should be performed?  
(Please provide three relevant questions about his medical history and one test).

#### Answer:

Any previous serious illness (1.5p), any previous testicular/scrotal disease (1.5p), previous pregnancies with other partner (1.5p), semen analysis (1.5p).

### Part 2:

You are a general practitioner. A 34-year old woman visits you because she has been trying to become pregnant for the last 2 years. She stopped taking her contraception (contraceptive pills) two years ago. She is married and of normal weight. She is otherwise healthy and uses no medication. She had her last gynaecological examination 3 years ago.

**She informs you that she had pelvic inflammatory disease (chlamydia infection) when she was 17 years old. Her periodic bleeding is regular and normal, but she suffers from increasing dysmenorrhoea. Her partner is previously healthy and has two children from his previous marriage.**

#### Question 1:

Given this information, what are the two most likely causes of infertility in this couple?

#### Answer:

Tubal damage due to previous PID (pelvic inflammatory disease) (3p)  
Endometriosis (3p)

**Part 3:**

You are a general practitioner. A 34-year old woman visits you because she has been trying to become pregnant for the last 2 years. She stopped taking her contraception (contraceptive pills) two years ago. She is married and of normal weight. She is otherwise healthy and uses no medication. She had her last gynaecological examination 3 years ago. She informs you that she had pelvic inflammatory disease (chlamydia infection) when she was 17 years old. Her periodic bleeding is regular and normal, but she suffers from increasing dysmenorrhea. Her partner is previously healthy and has two children from his previous marriage.

**You inform her that tubal damage or endometriosis are the most likely causes of her infertility and decide that you will perform further examinations in order to evaluate whether she ovulates, whether her tubes are damaged and whether she has endometriosis.**

**Question 1:**

Which (only one) of the following sexual hormones would you measure in order to examine whether she ovulates?

- s-Oestrogen
- s-Progesterone
- s-LH (luteinising hormone)
- s-FSH (follicle-stimulating hormone)
- s-SHGB (sex-hormone binding globulin)
- s-Testosterone
- s-AMH (anti-Müllerian hormone)
- s-HCG (human chorionic gonadotropin)
- s-Prolactin

**Answer:**

s-Progesterone

**Question 2:**

When, during the menstrual cycle, would you measure the serum concentration of this hormone?

- Day 1-3
- Day 12-14
- Day 21-23

**Answer:**

Day 21-23

**Question 3:**

Name three possible methods for evaluation of tubal patency.

**Answer:**

HSG (hydrosalpingography) (1.5p)

Laparoscopic pertubation (1.5p)

Sonography with contrast (1.5p)

**Part 4:**

You are a general practitioner. A 34-year old woman visits you because she has been trying to become pregnant for the last 2 years. She stopped taking her contraception (contraceptive pills) two years ago. She is married and of normal weight. She is otherwise healthy and uses no medication. She had her last gynaecological examination 3 years ago. She informs you that she had pelvic inflammatory disease (chlamydia infection) when she was 17 years old. Her periodic bleeding is regular and normal, but she suffers from increasing dysmenorrhea. Her partner is previously healthy and has two children from his previous marriage. You inform her that tubal damage or endometriosis are the most likely causes of her infertility and decide that you will perform further examinations in order to evaluate whether she ovulates, whether her tubes are damaged and whether she has endometriosis.

**Question 1:**

Tubal patency may be diagnosed by hysterosalpingography (HSG), sonography with contrast or laparoscopic pertubation. Which procedure will you recommend to the woman in this case, and why?

**Answer:**

Laparoscopic pertubation (2p).

Simultaneously diagnose (2p) and eventually treatment (2p) of endometriosis.

## Assessment: MEDSEM9\_STATION25\_H14\_ORD

### Part 1:

A 48-year old woman visits you as her general practitioner because she has been suffering from hot flushes and irregular vaginal bleeding for the last six months. She also feels tired and that she lacks her usual level of energy. She wonders whether she may be climacteric.

#### Question 1:

Which three sexual hormones from the list below would you check in order to examine whether she is climacteric?

s-Oestrogen [pull-down menu]  
 s-Progesterone [pull-down menu]  
 s-LH (luteinising hormone) [pull-down menu]  
 s-FSH (follicle-stimulating hormone) [pull-down menu]  
 s-SHGB (sex-hormone binding globulin) [pull-down menu]  
 s-Testosterone [pull-down menu]  
 s-AMH [pull-down menu]  
 s-HCG [pull-down menu]  
 s-Prolactin [pull-down menu]

#### Answer:

s-Oestrogen = **yes**  
 s-Progesterone = **no**  
 s-LH (luteinising hormone) = **yes**  
 s-FSH (follicle-stimulating hormone) = **yes**  
 s-SHGB (sex-hormone binding globulin) = **no**  
 s-Testosterone = **no**  
 s-AMH = **no**  
 s-HCG = **no**  
 s-Prolactin = **no**

#### Question 2:

Which other medical condition (one) should be excluded as a cause of her symptoms and complaints and what blood tests would you take (two) in order to exclude this condition?

#### Answer:

Hypothyroidism (2p)  
 Thyroidea stimulating hormone (thyrotropine) (s-TSH) (2p)  
 Free thyroxine (s-FT4) (2p)

### Part 2:

A 48-year old woman visits you as her general practitioner because she has been suffering from hot flushes and irregular vaginal bleeding for the last six months. She also feels tired and that she lacks her usual level of energy. She wonders whether she may be climacteric.

**You require s-oestrogen, s-LH and s-FSH, as well as s-TSH (thyroidea-stimulating hormone) and FT4 (free thyroxine) in order to exclude hypothyroidism. The results of the blood tests show that s-oestrogen is low and that the serum concentration of both LH and FSH are elevated. s-TSH and s-FT4 are normal.**

**The woman visits you again 8 weeks later. She feels worse, mainly because of hot flushes. She has had one menstrual period since her last visit. She wants to discuss any treatment options.**

#### Question 1:

What is the most effective treatment for relief of such symptoms?

#### Answer:

Hormone replacement therapy (6p)

**Part 3:**

A 48-year old woman visits you as her general practitioner because she has been suffering from hot flushes and irregular vaginal bleeding for the last six months. She also feels tired and that she lacks her usual level of energy. She wonders whether she may be climacteric. You require s-oestrogen, s-LH and s-FSH, as well as s-TSH (thyroidea-stimulating hormone) and FT4 (free thyroxine) in order to exclude hypothyroidism. The results of the blood tests show that s-oestrogen is low and that the serum concentration of both LH and FSH are elevated. s-TSH and s-FT4 are normal. The woman visits you again 8 weeks later. She feels worse, mainly because of hot flushes. She has had one menstrual period since her last visit. She wants to discuss any treatment options.

**Question 1:**

Hormone replacement therapy (HRT) is contraindicated in some women. Which previous conditions should be ruled out before you eventually prescribe HRT (max. points if four conditions)?

**Answer:**

Women with a history of:

Breast cancer (2p), coronary heart disease (1p), venous tromboembolism (1.5p), active liver disease (1.5p). A history of oestrogen-dependent tumors (endometrial cancer) and previous stroke may also give 1.5p (maximum 6p in total).

**Part 4:**

A 48-year old woman visits you as her general practitioner because she has been suffering from hot flushes and irregular vaginal bleeding for the last six months. She also feels tired and that she lacks her usual level of energy. She wonders whether she may be climacteric. You require s-oestrogen, s-LH and s-FSH, as well as s-TSH (thyroidea-stimulating hormone) and FT4 (free thyroxine) in order to exclude hypothyroidism. The results of the blood tests show that s-oestrogen is low and that the serum concentration of both LH and FSH are elevated. s-TSH and s-FT4 are normal. The woman visits you again 8 weeks later. She feels worse, mainly because of hot flushes. She has had one menstrual period since her last visit. She wants to discuss any treatment options.

**Her medical history implies no contraindications for hormone replacement therapy. After receiving information about implications and risks, she wants to try HRT in order to relieve symptoms and improve quality of life.**

**Question 1:**

Which of the following medication options would you recommend for her?

- Systemic oestrogen
- Systemic combination of oestrogen and progestin
- Vaginal oestrogen

**Answer:**

Systemic combination of oestrogen and progestin