

Example Cases and Scoring Guides

Supplemental file 1

Below are examples of three cases and their corresponding scoring guides and GPT-4 answers. Here, they are translated to English, whereas the original Swedish versions were used in the study. More cases and their top-tier doctor responses are publicly available in Swedish at the web site of The Swedish Association of General Practice (SFAM):

<https://sfam.se/specialistexamen/>

Case 1

Bengt, 76 years old, comes for an annual check-up for diabetes and hypertension. You don't know him from before. His wife is accompanying him, and they tell you that he has generally deteriorated in the last year. He is tired and feels weak, has a headache, has a poor appetite, is dizzy and falls easily, coughs a bit, feels sick and has become more forgetful.

Before the doctor's appointment: blood pressure 130/70, height 177 cm, weight 71 kg, pulse 95/minute. Drugs: Metformin 500 mg 2x2, Felodipine 10 mg 1x1, Enalapril 5 mg 1x1. The medicine list also contains Betolvidon 1 mg 1x1 and Folicin 1 mg 1x1, but he is out of these medications.

Lab: HbA1C 34, fasting blood glucose 7.6. ALT 0.36. Creatinine 67. Potassium 4.5. Cholesterol 3.8. Cobalamin 291. Folate 8.

Please note that the units of the blood tests were not stated in the case, but they are expressed in the standard units used in Sweden: HbA1C: mmol/mol, glucose: mmol/L, ALT: μ kat/L, Creatinine: μ mol/L, Potassium: mmol/L, Cholesterol: mmol/L, Cobalamin: pmol/L, Folate: nmol/L.

Scoring guide for case 1

- Does the answer mention the need to let them talk and provide more information? (0.5 p)
- Does it prioritise reasonably between the various problems? (0.5p)
- Does it suggest an ECG? (0.75p)
- Does it suggest haemoglobin (Hb)? (0.75p)
- Does it suggest a neurological examination? (0.5p)
- Does it express the need to assess his alcohol consumption? (0.5p)
- Does it mention heart disease/failure as a possible diagnosis? (0.5p)
- Does it mention low blood pressure as a possible diagnosis? (0.5p)
- Does it mention low blood sugar (hypoglycaemia) as a possible diagnosis? (0.5p)
- Does it mention anaemia as a possible diagnosis? (0.5p)
- Does it mention memory loss/dementia as a possible diagnosis? (0.5p)
- Does it mention inactivity as a possible diagnosis? (0.5p)
- Does it suggest a review of his medications? (2p)
- Does it suggest reducing the metformin dose? (0.5p)
- Does it suggest reducing the felodipine dose? (0.5p)
- Does it suggest a trial of reduced enalapril dose? (0.5p)

GPT-4 response to Case 1

The most significant problem in this scenario is Bengt's general deterioration over the past year, which includes fatigue, weakness, headaches, poor appetite, dizziness, falls, coughing, nausea and increased forgetfulness. These symptoms can be signs of several different medical conditions, including heart disease, neurological conditions, lung disease, kidney disease, or even mental health conditions such as depression. It is important to identify the cause of these symptoms in order to provide appropriate treatment.

Other aspects to consider include Bengt's diabetes and hypertension, both of which appear to be under control based on his blood pressure and HbA1c values. His medication should also be reviewed, especially since he has run out of Betolvidone and Folacin. Betolvidon (beta blocker) is used to treat high blood pressure and heart disease, and it can be dangerous to suddenly stop taking it. Folacin (folic acid) is important for cell growth and development, and deficiency can lead to anaemia.

To investigate Bengt's symptoms further, I would like to do a thorough physical examination and possibly order additional laboratory tests. A neurological examination may be appropriate given his dizziness, falls and increased forgetfulness. A chest x-ray may be appropriate given his cough. Additional blood tests may include thyroid-stimulating hormone (TSH) and free T4 to rule out thyroid disease, which can cause fatigue and weakness.

I would also like to discuss Bengt's lifestyle, including diet, exercise, alcohol and tobacco use, as these factors may affect his health. Also, I would like to know more about his mental health, as depression can cause many of the symptoms he is experiencing.

Finally, I would like to follow up with Bengt and his wife regularly to monitor his condition and adjust his treatment if necessary.

Note that GPT-4 interpreted the medicine "Betolvidone" as a beta blocker, when it is in fact the brand name of a vitamin B12 supplement in Sweden.

Case 2

Filip's parents have scheduled an appointment with you at the clinic because Filip has a poor appetite. He suffers from abdominal pain and intermittent diarrhoea. The symptoms have been present for about a year. Occasionally, he also experiences joint pain. Filip is 11 years old, perceived by his parents as small and thin, and his younger sister is almost as tall as him. His mother is worried about Filip being short for his age and whether his symptoms need further investigation. His father is less concerned, recalling his own late puberty and being the shortest in his class for a long time.

When Filip is asked to describe his symptoms, he points to his parents, but he politely answers a few supplementary questions himself.

Physical examination:

General Appearance: Not noticeably thin, seems energetic and happy. Mouth and throat: normal. Lymph nodes in the neck, axillae, and groin: normal. Thyroid: not enlarged. Heart/lungs: Normal findings. Abdomen: Non-tender without abnormal findings. Joints: No signs of joint disease.

Scoring guide for case 2

- Does the answer mention gluten intolerance (celiac disease) as a possible diagnosis? (1p)
- Does it mention lactose intolerance as a possible diagnosis? (1p)
- Does it mention inflammatory bowel disease as a possible diagnosis? (1p)
- Does it mention gastrointestinal symptoms related to anxiety and social circumstances as a possible cause? (1p)
- Does it mention constipation as a possible diagnosis? (1p)
- Does it mention the need to ask about diet and bowel habits as part of the consultation? (0.5p)
- Does it mention the need to ask about signs of puberty as part of the consultation? (0.25p)
- Does it mention the need to ask about school and friends as part of the consultation? (0.25p)
- Does the answer suggest testing for glucose levels? (0.5p)
- Does the answer suggest conducting inflammatory marker tests, such as CRP (C-reactive protein)? (0.5p)
- Does the answer suggest measuring weight and height? (0.5p)
- Does the answer suggest conducting a test for gluten intolerance (anti-tissue transglutaminase (TTG) antibody)? (0.5p)
- Does the answer suggest requesting and evaluating the school nurse's records of growth curves as part of the assessment? (1p)
- In the case of normal test results and growth measurements, does the answer suggest reassurance and no further evaluation? (1p)

GPT-4 response to Case 2

We have both Filip's persistent stomach issues and loss of appetite, as well as his parents' concerns about his growth and development. It is important to take these concerns seriously and investigate them thoroughly to rule out any potential medical conditions that might be underlying them.

One aspect to consider is Filip's family history. The father's comment about his own late puberty might be relevant, as growth and development often follow family patterns. However, this should not be used as an excuse not to investigate Filip's symptoms.

Another aspect to consider is Filip's joint pain. Even though there are no signs of joint changes in his status, joint pain can be a symptom of various conditions, including inflammatory bowel diseases such as Crohn's disease or ulcerative colitis, which can also cause stomach issues and affect growth.

To further investigate Filip's symptoms, I would suggest the following:

1. Blood tests to check his general health, including blood cells, liver and kidney function, inflammation, and nutritional status. Specific tests for celiac disease and inflammatory bowel diseases may also be appropriate, given his symptoms.
2. Stool samples to check for signs of infection or inflammation in the intestines.
3. Growth curve and pubertal development should be closely monitored. If there are deviations, it might be appropriate to refer Filip to a pediatric endocrinologist for further investigation.
4. A dietitian can be helpful in evaluating Filip's diet and providing advice on how to increase his appetite and nutritional intake.

It is important to communicate clearly with Filip's parents and involve Filip himself in discussions about his health and any further investigations. This can help alleviate concerns and ensure that everyone agrees on the plan going forward.

Case 3

Astrid, 87 years old, has been living in a special care facility for 2 months, where you are the responsible physician. She had breast cancer two years ago, which was treated with breast resection. Following her recovery, she was able to live independently, without requiring assistance. Follow-up checks were unremarkable, and she was prescribed antiestrogen therapy.

About 3.5 months ago, Astrid experienced numbness and some weakness in her right hand, and an outpatient CT scan was ordered. However, before the scan, her symptoms worsened, including motor aphasia and epileptic seizures which were difficult to control with treatment. The CT scan revealed brain metastases likely originating from the breast tumour. She was started on betamethasone to reduce intracranial swelling, with a plan to gradually reduce the dose. She declined palliative radiation therapy and was offered a place in the care facility. At the first meeting with you there, she was ambulatory, could manage her activities of daily living, understood everything said but could not speak coherently. She exhibited a heightened emotional sensitivity, as is sometimes observed after a brain injury, which prompted a trial of mood-stabilising medication (Citalopram 10 mg x 1).

A week later, Astrid's condition deteriorated, with instability while walking, frequent falls, weakness in her right leg, and confusion.

Upon examination, the only new findings were difficulty rising from bed and a flaccid paralysis in her right arm. She still had motor aphasia.

Astrid's daughter contacts you after your visit to the facility, inquiring about the ongoing care and treatment of her mother.

Scoring guide for case 3

- Does the response recognize and characterise this as a palliative care situation? (1.5p)
- Does the response suggest a palliative care discussion with Astrid and her daughter? (1.5p)
- Does the response suggest a medication review with an emphasis on discontinuing non-essential medications? (1.5p)
- Does the response analyse and compare the suitability of continued treatment at the care facility versus hospitalisation in this case? (1.5p)
- Does the response emphasise attentive and compassionate nursing care? (1.5p)
- Does the response propose the use of palliative medications, such as those for symptom relief and pain management? (1.5p)
- Does the response mention the possibility of applying for a “caregiver's allowance” (to support individuals caring for a terminally ill family member)? (1p)

GPT-4 response to Case 3

The first thing that comes to mind is that Astrid has progressive neurological symptoms due to brain metastases from her previous breast cancer. These symptoms include numbness and weakness in her right hand, motor aphasia, epileptic seizures, and now also weakness in her right leg and confusion. These symptoms affect her ability to perform daily activities and her quality of life.

Other aspects to consider include:

1. Astrid's mental health: She has shown signs of "heightened emotional sensitivity," which could be a symptom of brain damage. She has also started taking citalopram, a mood-stabilising medication. It is important to monitor her mental health and adjust her treatment as needed.
2. Astrid's physical health: She has become increasingly weak and has difficulty getting out of bed. It is important to ensure she receives the physical assistance she needs to prevent falls and injuries.
3. Astrid's wishes: She has declined palliative radiotherapy. It is important to respect her decision and focus on providing her with the best possible quality of life.
4. Communication with the family: Astrid's daughter is worried and wants to know more about her mother's care. It is important to maintain open and honest communication with the family and provide them with the information and support they need.

To manage this situation, I would first reassure Astrid's daughter that we are doing everything we can to take care of Astrid and provide her with the best possible quality of life. I would explain that Astrid's symptoms are due to her brain metastases and that we are focusing on alleviating these symptoms and improving her quality of life. I would also explain that we are monitoring Astrid's mental health and adjusting her treatment as needed.

I would also discuss the possibility of involving a palliative care team to provide additional support and expertise. These teams can help with pain relief, symptom management, psychological support, and spiritual care.

Finally, I would assure Astrid's daughter that we will keep her informed of any changes in Astrid's condition and that we are always available to answer questions and discuss concerns.