Sequence of educational sessions, by class, with the respective methodology applied and the clinical vignette used for each group:

Class		Methodology	Group	Clinical vignette	Eligible participants	Participants
1	11/11/2022	Traditional method	TM	2	38	15
2	16/12/2022	Concept mapping method	CM	3	41	19
3	17/03/2023	Traditional method	TM	3	40	11
4	28/04/2023	Concept mapping method	CM	2	40	9
5	02/06/2023	Traditional method	TM	1	41	9
6	06/10/2023	Concept mapping method	CM	1	38	18
7	10/11/2023	Traditional method	TM	2	38	17
8	15/12/2023	Concept mapping method	CM	3	37	14

Abbreviations: CM, concept map; TM, traditional method.

The texts of clinical vignettes 1, 2, and 3 are presented below, including the pre-class assignments and the complete vignettes discussed during the face-to-face sessions:

Clinical Vignette 1

Pre-class assignment	
Student 1 Pneumonologist	Imagine that you are a pulmonologist. Ms. Vitória Rodrigues, born on March 4, 1962, comes to your office for a COPD reassessment. She has COPD secondary to smoking, GOLD E, with 1 hospitalization for community-acquired pneumonia in 2018. She is an active smoker (65 pack-years), with one attempt to quit with intensive therapy (2018) and use of nicotine replacement therapy. She had a relapse into smoking in 2000 and currently smokes 20 cigarettes a day. She reports that she continues to be tired on moderate exertion and dyspnea on moderate exertion. She has had 1 infectious exacerbation since her last appointment, medicated by her family doctor with amoxicillin, prednisolone and albuterol in a regimen. Physical examination: 56 kg, 107/69 mmHg, BMI 21.6, lung sounds globally decreased, occasional rhonchi. No digital clubbing. She brings spirometry from 6 months before, which reveals FEV1/FVC 0.64, FEV1 71.1% predicted, FVC 91.1% predicted.
Student 2 Cardiologist	Imagine that you are a cardiologist. Mrs. Vitória Rodrigues, born on March 4, 1962, comes to your office for a reassessment of hypertension and dyslipidemia. She has a history of grade I systolic and diastolic hypertension (ESC) since 1992, which is usually well controlled. She has a history of dyslipidemia (SCORE 3%), also diagnosed in 1992, with a good response to the prescribed statin, although you suspect that adherence is not regular. She is also a heavy smoker (65 years old, with a previous attempt to quit smoking in 1998, but with a relapse in 2000; she currently smokes 20 cigarettes per day). Her father died of a stroke and her mother of complications from heart failure. She reports that she still feels tired during moderate exertion and dyspnea during moderate exertion, but she thinks it is due to the problem in her lungs. Physical examination: 56 kg, 107/69 mmHg, pulse 92 bpm, regular and rhythmic. BMI 21.6, S1 and S2 present, no murmurs. Lung sounds globally decreased; occasional rhonchi; no signs of stasis. Carotid artery: no changes. No peripheral edema. Good technical quality ABPM (79/79 measurements), average daytime BP 105/72 mmHg, average nighttime BP 114/74 mmHg. Blood work showed glucose 92 mg/dL, total cholesterol 243 mg/dL, HDL 46 mg/dL, LDL 143 mg/dL, triglycerides 298 mg/dL, creatinine 0.52 mg/dL, normal electrolytes, no microalbuminuria.
Student 3 Physiatrist	Imagine that you are a physiatrist. Mrs. Vitória Rodrigues, a secondary school teacher, born on March 4, 1962, comes to your office for a reassessment after completing the first series of treatments. She came to your office 3 months ago due to a new episode of worsening of her chronic low back pain, after falling from her own height at home. It was low back pain, non-radiating, mechanical in rhythm, high intensity (8/10) and with functional impairment. She was assessed in the ER, where fractures were ruled out. After her last appointment, she underwent muscle strengthening, hot thermotherapy, electrotherapy, and therapeutic massage. She has a note from the physiotherapist that she missed a few treatments without warning. She feels better, but still has pain when standing for long periods and this interferes with her ability to teach. Physical examination: No apparent spinal deformities or dysmetria, slight pain on palpation of the paravertebral muscles, no apparent contractures. Lumbar joint range of motion preserved, although pain is reported when flexing and extending the trunk. No changes in the tripod or Lasègue test. Brief neurological examination unremarkable. Imaging: CT multiple degenerative changes, especially L4-L5 and L5-S1, with no evident neurological impairment.
Student 4 Psychiatrist	Imagine that you are a psychiatrist. Mrs. Vitória Rodrigues, a secondary school teacher, born on March 4, 1962, comes to your office for a reassessment of her alcohol disorder. She is single, has no children and no family support (her father died 12 years ago from a stroke, her mother died 8 years ago from heart failure, and she has no siblings). She came to your clinic for the first time in 2014 due to alcohol abuse. She started drinking at the age of 18, binge drinking (parties, drinking to have fun). She started drinking regularly in 1986, when she was assigned to a school in Montemor. Initially, she drank to relax after classes; later "out of loneliness". In her first appointments, she was in contemplation and wanted to be "able to drink 1-2 glasses of wine and call it a day". She underwent detox after being hospitalized for pneumonia (she was told she had "alcoholic pneumonia"). She remained abstinent until early 2020. She attributes her relapse to the stress of online classes and the loneliness of the pandemic. She currently drinks 90-100 standard units per week (beer and whiskey). She drinks more than she intends to, feels a strong desire to drink during working hours; withdrawal symptoms if she

	doesn't drink anything until lunchtime; she has developed tolerance; 3 months ago she tripped and fell at home (she is undergoing physiotherapy); she has tried several times to cut down (without success). Adherence to appointments has been very irregular since the relapse. You feel that she does not take her medication regularly, especially at night (she often falls asleep on the sofa).
Student 5 Neurologist	Imagine that you are a neurologist. Mrs. Vitória Rodrigues, a secondary school teacher, born on March 4, 1962, comes to your appointment for a reassessment of mild to moderate bilateral tension-type headache (3-6/10), which is aggravated by menstrual period and work stress. She has had 1-2 episodes of headache per month, a little more in the months when there are school assessments. She has been using 4-6 etoricoxib tablets per month. She has had difficulty exercising or meditating, as suggested in the last appointment. Despite everything, she does not feel worse.
Face-to-face session	
Identification	Vitória Rodrigues, date of birth March 4, 1962.
Social and Family history	Chemistry teacher (high school) with a graduate degree. Single, no children. Father died 12 years ago from a stroke, mother died 8 years ago from complications of heart failure. No siblings. 2 cats.
Health problems	**Chronic Obstructive Pulmonary Disease** (COPD) – since Jan 5, 2018 COPD secondary to smoking, GOLD E, 1 hospitalization for CAP in 2018, usually 2 infectious exacerbations per year. FEV1/FVC 0.64, FEV1 71.1% predicted, FVC 91.1% predicted.
	Chronic Alcohol Abuse – since Mar 9, 2014 Admission for detoxification in 2018 (after hospitalization for pneumonia); relapse in 2020.
	Lumbar spine Syndrome Without Pain Irradiation – since Oct 31, 2010 Chronic recurrent low back pain, mechanical rhythm. CT scan showed multiple degenerative changes, especially L4-L5 and L5-S1, with no evident neurological impairment.
	Hypertension, uncomplicated – since April 5, 1992 Systolic-diastolic arterial hypertension, grade I (ESC).
	Dyslipidemia – since April 5, 1992 Total cholesterol 243 mg/dL, HDL 46 mg/dL, LDL 143 mg/dL, triglycerides 298 mg/dL. Risk of fatal CV events (SCORE 3%).
	Tension-Type Headache – since May 24, 1988 Mild to moderate bilateral tension-type headache (3-6/10), worsened with menstruation and work stress.
Chronic medication	Atorvastatin 20 mg – 1 tablet at dinner; Irbesartan 300 mg + hydrochlorothiazide 12.5mg – 1 tablet on an empty stomach; ASA 150mg – 1 tablet at lunch; Glycopyrronium (Seebry Breezhaler), 50mcg/dose – breakfast; Albuterol 100mcg/dose (pMDI) – 4 puffs as an emergency, if dyspnea worsens; Gabapentin 300mg – 1 tablet at bedtime; Cyanocobalamin + Pyridoxine + Thiamine, 0.2 mg + 200 mg + 100 mg – 1 tablet at breakfast; Etoricoxib 30mg 1 tablet SOS.
Regular follow-up appointments and exams	**Pneumology:** 3 appointments/year (COPD). Blood work, pulmonary function tests (spirometry, blood gas analysis).
	Cardiology: 1 appointment/year (high blood pressure and dyslipidemia). Blood work, Ambulatory Blood Pressure Monitoring (ABPM), echocardiogram.
	Neurology: 1 appointment/year (tension-type headache). Treatment optimization.
	Physical Medicine and Rehabilitation: 2 appointments/year; 30 treatments/year (recurrent low back pain), with muscle strengthening, hot thermotherapy, electrotherapy, therapeutic massage.
	Psychiatry: 8-12 appointments/year (alcohol abuse). Attendance has been very irregular.
	Family Medicine: 3 scheduled appointments + 2 open appointments per year.
Other information	Weight: 56 Kg, BMI: 21.6 Blood pressure: 107/69 mmHg GFR: 120 ml/min SCORE (risk of cardiovascular death): 3% Suemoto Infex (risk of all-cause mortality): 31% in 10 years

Clinical Vignette 2

Pre-class assignment	
Student 1 Cardiologist	Imagine that you are a cardiologist. Mr. Macário Ferreira, born on May 3, 1960, comes to your office for a reassessment of hypertension and dyslipidemia. He has a history of grade I systolic and diastolic hypertension (ESC) since 1998, which has not always been well controlled. He has a history of dyslipidemia (SCORE 6%), diagnosed in 1992, with a good response to the prescribed statin, although he suspects that adherence is not regular. He is also a smoker, currently smoking 20 cigarettes a day, has a tobacco history of 31 cigarettes, and has never tried to quit smoking. He comes to your office for monitoring and to show his exams. He reports that his feet have been swollen in recent months, which he believes is due to a more sedentary lifestyle. Physical examination: 86 kg, BMI 27.6 kg/m2. BP 147/98 mmHg, pulse: 92 bpm, regular and rhythmic, S1 and S2 rhythmic, without murmurs. Globally decreased lung sounds, occasional rhonchi, without signs of pulmonary congestion. Carotid artery: no changes. Bilateral peripheral malleolar edema ++. Good technical quality ABPM (85/86 measurements), average daytime BP 143/92mmHg, average nighttime BP 124/74mmHg. The analyses show blood glucose 92mg/dL, total cholesterol 203 mg/dL, HDL 46 mg/dL, LDL 129 mg/dL, triglycerides 138 mg/dL, Cr 1.35 mg/dL, normal electrolytes, no microalbuminuria.
Student 2 Pneumonologist	Imagine that you are a pulmonologist. Mr. Macário Ferreira, born on May 3, 1960, comes to your office for a COPD reevaluation. This is a case of COPD secondary to smoking, GOLD B, without previous hospitalizations, with two exacerbations in the last year treated by the family doctor. He is an active smoker (31 pack-years), never made any attempts to quit smoking. In the last 2 years, since he became unemployed, he is smoking more. He reports fatigue on major exertion. He brings the spirometry results, performed that morning, which show FEV1/FVC 0.68, FEV1 72.4% predicted, FVC 91.1% predicted. Physical examination: 86 kg, 147/98 mmHg, BMI 27.6, Lung sounds globally decreased, occasional rhonchi.
Student 3 Physiatrist	Imagine that you are a physiatrist. Mr. Macário Ferreira, unemployed, restaurant entrepreneur until 2020, born on 03-05-1960, comes to your office for reevaluation after having completed the first series of treatments. He came to your clinic 3 months ago due to a new episode of exacerbation of his recurrent neck pain. It was non-radiating neck pain, mechanical rhythm, intensity 6-7/10 and with functional impairment. After the last appointment, he underwent muscle strengthening, hot thermotherapy, electrotherapy and therapeutic massage. He has a note from the physiotherapist that he missed treatment a few times without warning. He feels better, but still has pain. Physical examination: no apparent deformities of the spine or dysmetria, he has mild pain on palpation of the cervical muscles, without apparent contractures. He has pain on flexion and extension of the neck. Brief neurological examination unremarkable. Imaging: CT shows multiple degenerative alterations, especially C3-C4, C4-C5 and C5-C6, with no evident neurological impairment.
Student 4 Psychiatrist	Imagine that you are a psychiatrist. Mr. Macário Ferreira, born on 03-05-1960, comes to your office for reassessment of a depressive disorder. He is married and has 3 daughters (Felicidade 1983, Paz 1985 and Dores 1989). He has 4 grandchildren, 2 from each of his oldest daughters. They all live in greater Lisbon. He was a restaurant manager until 2020. His wife and two daughters worked at his restaurant. After the first lockdown due to the Covid-19 pandemic, the restaurant closed and he became unemployed. Since then, he has smoked 20 cigarettes/day (before, he smoked less than 10 cigarettes/day). He prefers to spend the day alone, isolated from his family, and avoids leaving the house because he lacks motivation to go out.
Student 5 Family physician	Imagine that you are a family doctor. Mr. Macário Ferreira, born on 03-05-1960, comes to your appointment (appointment on January 12th), referred by the SNS24 [a Portuguese national health service portal that, among others, can refer patients with acute problems to a primary care provider] due to fever (38.8ºC), productive cough and worsening dyspnea with 36 hours of evolution. He did a SARS-COV-2 antigen test in the morning which was negative. Fever had sudden onset, with a maximum temperature of 38.8ºC, and the temperature was reduced with paracetamol for a period of 6-8 hours. He reported worsening of his usual cough (increased frequency, purulence and quantity of secretions), with no aggravating or relieving factors. He feels short of breath with moderate exertion. He has been taking paracetamol 1000 mg 8/8h and has increased his fluid intake. He is afraid that he may have to be hospitalized. He is a 31 pack-years smoker.

	Physical examination: alert, oriented in time and space, respiratory rate 18, peripheral O2 saturation in room ar 92%, BP 136/78mmHg, rhythmic pulse 98 ppm. No oropharyngeal hyperemia, no exudates; no adenopathies; Lung auscultation: prolonged expiratory time and occasional rhonchi, crackling rales in the middle third of the right hemithorax.
Face-to-face session	
Identification	Macário Ferreira, date of birth May 3, 1960.
Social and Family history	Grade 9; restaurant manager until 2020. Married since 1982 (Esperança) with 3 daughters who live in greater Lisbon: Felicidade (1983), Paz (1985) and Dores (1989). 4 grandchildren.
Health problems	**Depressive disorder** – since Jan 5, 2020
	Tension-Type Headache – since Aug 8, 2019 Bilateral tension headache, moderate to severe (4-8/10), worsened during periods of poor sleep and with work stress. Has been taking analgesics 3x/week.
	Chronic Obstructive Pulmonary Disease (COPD) – since Jan 5, 2018 COPD secondary to smoking, GOLD B, no hospitalizations; 2 exacerbations in the last year. FEV1/FVC 0.68, FEV1 72.4% predicted, FVC 91.1% predicted.
	Cervical Spine Syndrome – since Oct 31, 2010 Chronic recurrent neck pain, mechanical rhythm. CT scan showed multiple degenerative changes, especially C3-C4, C4-C5 and C5-C6, with no evident neurological involvement.
	Hypertension, uncomplicated – since July 8, 1998
	Dyslipidemia – since April 5, 1992 Total cholesterol 203 mg/dL, HDL 46 mg/dL, LDL 129 mg/dL, triglycerides 138 mg/dL. Risk of fatal CV events (SCORE 1%).
	Tobacco use disorder – since April 5, 1979; 31 packs-year.
Chronic medication	Simvastatin 20 mg – 1 tablet at dinner Lercanidipine 20 mg – 1 tablet at dinner Indacaterol (Onbrez Breezhaler) 150mcg/capsule – breakfast Trazodone 150 mg – 1/3 tablet at bedtime Sertraline 50mg – 1 tablet at breakfast and ½ tablet at bedtime Paracetamol 1000 mg – 1 tablet as an emergency Cyclobenzaprine 10 mg – 1 tablet as an emergency at night
Regular follow-up appointments and exams	**Cardiology:** 1 appointment/year (high blood pressure). Blood work, echocardiogram and annual ABPM.
	Pneumology: 3 appointments/year (COPD). Blood work, pulmonary function tests (spirometry, blood gas analysis).
	Physical Medicine and Rehabilitation: 3 appointments/year (recurrent neck pain). He has been doing muscle strengthening, hot thermotherapy, electrotherapy, therapeutic massage.
	Psychiatry: 8-12 appointments/year (depression).
	Family Medicine: 3 scheduled appointments + 1 open appointment every 2 months.
Other information	Weight: 86Kg, BMI: 27.6 Blood pressure: 147/88 mmHg GFR: 85.9 ml/min SCORE (risk of cardiovascular death): 6% Suemoto Infex (risk of all-cause mortality): 35% in 10 years.

Clinical Vignette 3

Pre-class assignment	
Student 1 Allergologist	Imagine that you are an Allergologist and that it is December. Mrs. Cândida Figueiredo, born on 08-11-1977, comes to your office for a reassessment of her asthma and allergic rhinitis. In the last month, she reports having had daytime and nighttime symptoms at least twice a week, using bronchodilators 3-4 times a week, and reports having limited physical activity. As a child, she was hospitalized multiple times for bronchiolitis and received prolonged oral corticosteroid therapy. She also underwent subcutaneous immunotherapy (mites and grasses) in the early 1990s. Currently, her symptoms usually worsen during the winter. Chronic medication: budesonide + formoterol 320 µg/dose + 9 µg/dose (dry powder device, at breakfast, dinner and in SOS), mometasone 50 µg/dose, nasal spray suspension (dinner), liraglutide 6mg/mL (2mg at dinner), sertraline 50mg (1 tablet at breakfast), alprazolam 1mg, modified release (1 tablet at bedtime), ebastine (1 tablet SOS), naproxen, 500mg (1 tablet SOS). She brings the spirometry performed that morning, which shows FEV1/FVC 0.68, FEV1 69% predicted, after bronchodilation 87% predicted. Physical examination 114 kg, BMI 39.6 kg/m2, BP 107/69 mmHg, Lung sounds present and symmetrical, with generalized wheezing.
Student 2 Orthopedist	Imagine that you are an orthopedist. Mrs. Cândida Figueiredo, born on 08-11-1977, comes to your office for a reassessment of her knee osteoarthritis. She has an appointment every 6 months. She has osteoarthritis of the internal compartment of both knees, with chronic pain, moderate on the right (4-6/10) and mild on the left (3-4/10). She has undergone MFR treatments with muscle strengthening, hot thermotherapy, electrotherapy, and therapeutic massage, with significant symptomatic improvement.
Student 3 Psychiatrist	Imagine that you are a psychiatrist. Mrs. Cândida Figueiredo, born on 08-11-1977, comes to your consultation for reassessment of her anxiety disorder. She has completed 12th grade and works as a secretary in a dentist's office. She is married to Fernando, 44 years old, and has a son, André, 13 years old. Her father is 78 years old (obesity, hypertension and acute myocardial infarction at 68 years old) and her mother is 73 years old (allergic rhinitis, asthma, osteoarthritis of the knees and hands, anxiety disorder) and they live in Vila do Conde. She has 2 brothers, aged 42 and 36, who live in Póvoa de Varzim and Aveiro. She has a generalized anxiety disorder. Initially, she had psychic anxiety, initial insomnia, muscle tension, fasciculations, xerostomia, palpitations and chest tightness. Currently, she continues to have occasional anxiety and has periods of fasciculations and palpitations.
Student 4 Endocrinologist	Imagine that you are an endocrinologist. Mrs. Cândida Figueiredo, born on 08-11-1977, comes to your office for a reassessment of her obesity. She has been obese since at least her late adolescence, which has worsened throughout her adult life. Currently, her BMI is 36 kg/m2, her BP is 112 cm, and she has acanthosis in the thigh and armpit folds. She has a history of gestational diabetes (2009), and her last blood glucose level was 99 mg/dL. She also has dyslipidemia (last assessment with total cholesterol 213 mg/dL, HDL 51 mg/dL, LDL 126 mg/dL, triglycerides 178 mg/dL). She has been receiving nutritional consultations, around 4 times a month, and has difficulty following the proposed diet plan. Physical examination: weight 114 kg, BMI 39.6 kg/m2, BP 107/69 mmHg,
Student 5 Family physician	Imagine that you are a family physician. Your patient, Mrs. Cândida Figueiredo, born on 08-11-1977, comes for an open appointment. She comes with dysuria, increased urinary frequency and bladder tenesmus that have been present for 16 hours. She denies hematuria, fever or lower back pain. She denies leucorrhea. She has never had any similar episode. She thinks it is a urinary tract infection. Physical examination: alert, oriented in time and space. Tympanic temperature 36.8ºC. Murphy's sign negative.
Face-to-face session	
Identification	Cândida Figueiredo, date of birth November 8, 1977.
Social and Family history	Grade 12, works as a secretary in a dentist office. Married (Fernando, 44 years old), one son (André, 13 years old). Father, 78 years old (obesity, hypertension and acute myocardial infarction at 68 years old) and mother 73 years old (allergic rhinitis, asthma, osteoarthritis of knees and hands, anxiety

	disorder). Live in Vila do Conde. 2 brothers, 42 and 36 years old, who live in Póvoa de Varzim and Aveiro.
Health problems	**Anxiety disorder** – since Dec 19, 2021 Generalized anxiety disorder. Currently, she has occasional anxiety and has periods of fasciculations and palpitations.
	Knee Osteoarthritis – since Jan 5, 2018 Internal compartment osteoarthritis of both knees, with chronic pain, moderate on the right (4-6/10) and mild on the left (3-4/10).
	Dyslipidemia – since Feb 24, 2009 Total cholesterol 213 mg/dL, HDL 51 mg/dL, LDL 126 mg/dL, triglycerides 178 mg/dL. Risk of fatal CV events (SCORE 0%).
	Obesity – since April 5, 1995 Obesity since late adolescence, which worsened throughout adulthood. She has a history of gestational diabetes (2009), last blood glucose 99 mg/dL.
	Allergic rhinitis – since June 8, 1988 Moderate persistent allergic rhinitis, controlled with medication.
	Asthma – since April 5, 1983 Submitted to subcutaneous immunotherapy (dust mites and grasses) in the early 1990s.
Chronic medication	Budesonide + formoterol 320 µg/dose + 9 µg/dose – breakfast and dinner (and SOS) Mometasone 50 µg/dose, nasal spray suspension – dinner Liraglutide 6mg/mL – 2mg at dinner Sertraline 50mg – 1 tablet at breakfast Alprazolam 1mg, modified release – 1 tablet at bedtime Ebastine – 1 tablet in SOS Naproxen, 500mg – 1 tablet SOS
Regular follow-up appointments and exams	**Allergology**: 3 appointments/year (asthma and allergic rhinitis). Blood work, PFTs (spirometry, blood gas analysis).
	Orthopedics: 2 appointments/year (knee osteoarthritis). She has been doing muscle strengthening, hot thermotherapy, electrotherapy, therapeutic massage.
	Psychiatry: 5 appointments/year (anxiety disorder).
	Endocrinology: 3 appointments/year + 4 nutrition appointments per month (obesity).
	Family Medicine: 3 scheduled appointments + 2 open appointments per year.
Other information	Weight: 114Kg, BMI: 39.6 Blood pressure: 107/69 mmHg GFR: 114 ml/min SCORE (risk of cardiovascular death): 0% Suemoto Infex (risk of all-cause mortality): not applicable.