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Project Acronym: PAFSE

Project title: Partnerships for Science Education

EDUCATIONAL SCENARIO
NON-COMMUNICABLE DISEASES
(ENGLISH VERSION)



**Escola Nacional
de Saúde Pública**

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Context

The educational system has a vital role in protecting children and youths' health and well-being.

The educational scenario supports teachers and school community in exploring societal concerns around the determinants of health and prevalence of non-communicable diseases (NCDs) - major causes of premature deaths (< 70 years) worldwide - using updated scientific evidence. The teaching-learning script supports students in understanding this public health threat and understand on how STEM (Science, Technology, Engineering, Mathematics) contribute to approach and fight the major challenges of public health, contribute to evidence-based personal decision-making and public policy. The scenario explores the most important influences on humans' health and strengths abilities to prevent NCDs, by creating awareness on healthy lifestyles, social and environmental influences, and modifiable risk factors. It also supports students' participation in civic society initiatives and in the design of local responses for the issue, while providing significant interactions with the community and STEM related professions (researchers, public health specialists, data scientists, policy makers, enterprises). The scenario is based on the mandatory curriculum of natural sciences at a European level and promotes the following fundamental learnings:

- Distinguish health from quality of life.
- Understand the main determinants of health and well-being.
- Characterize the main non-communicable diseases, indicating the prevalence of associated risk factors.
- Interpret information on the determinants of individual and community health, analysing their importance in the quality of life of a population.
- Critically analyse action strategies in the promotion of individual, family, and community health, starting from issues framed in local, regional, or national problems.

Scientific content and its relevance to public health education

NCDs are a leading cause of death, quality of life loss and disability worldwide, caused by a combination of genetic, physiological, environmental, and behavioural factors. Successful prevention and control of NCDs depends on the willingness of individuals to make early decisions that prevent or mitigate modifiable risk factors and their disposal to commit to healthy lifestyles. There is evidence that life-long health behaviours are shaped during childhood and adolescence and informed children and youths can also have a contribution for healthy families and sustainable communities. Over half of NCD-related deaths are associated with behaviours that begin or are reinforced during adolescence (WHO, 2022).

On the other hand, the onset of NCDs or related risk factors in children impacts learning achievements. Tobacco and alcohol use, bad nutrition and being physical inactive (*to mention only a few*) all keep children and adolescents from making the most of their education. Well-nourished, physically active children learn better. Overweight and obese children are more likely to suffer from depression, low self-esteem, and other behavioural and emotional difficulties as well as stigmatization, and social isolation. Tobacco (nicotine) and alcohol are addictive, and addiction impairs learning due to its impact in brain structure and function in children. Alcohol use also results in violence, road traffic injuries and unwanted pregnancies (*to mention only a few*), which contributes to school absenteeism.

However, there are gaps in students and citizens access to updated evidence regarding NCDs and health information that is written and simply handed out is often not effective in promoting healthy lifestyles. Active methods, such as face-to-face interactions, have been shown to be more effective in people engagement to promote health, prevent disease, cope with illness and disability, and better health outcomes. Fortunately, science curriculums at various levels promote knowledge development regarding NCDs and risks associated with smoking, alcohol consumption, unhealthy diets, physical inactivity, among others. Teachers are challenged to incorporate health and well-being as a central topic in their classes and in teaching science using high-level methods, high-quality learning objects, and updated evidence. This scenario supports them on this mission. It also challenges them to have a contribution for the community health by engaging families in educational activities and reaching the local community with inquiry-based projects and open schooling events led by students.



Subject: Science classes

Grade: 9th grade (+/- 14-15 years old students)

Title of educational scenario: individual and socioenvironmental influences on humans health and the burden of non communicable diseases.

Estimated duration

5 sessions of 40-45 minutes (lesson 1 – lesson 5)

5-6 sessions of 40-45 minutes for supplementary learning activities and school project (lesson 6 – lesson 12)

Classroom organization requirements

From lesson one to lesson five students work alone or occasionally in groups. During lessons 3, 4 and 5 they are asked to work in groups and the use of computer is required.

From lesson six to lesson twelve students form four- or five-member groups which conduct the school project. The use of computer may be required.

Content glossary

Air pollution. The presence of contaminant or pollutant substances in the air at a concentration that interferes with human health or welfare or produces other harmful environmental effects.

Burden of disease. The burden of disease is a measurement of the gap between a population's current health and the optimal state where all people attain full life expectancy without suffering major ill-health.

Capacity building. In health promotion, capacity building is the development of knowledge, skills, commitment, partnerships, structures, systems, and leadership to enable effective health promotion actions.

Community action for health. Community action for health refers to collective efforts by communities that are directed towards increasing community control over the determinants of health, and thereby improving health.

Collaboration. A recognized relationship among different sectors or groups, which have been formed to take action on an issue in a way that is more effective or sustainable than might be achieved by the public health sector acting alone.

Community participation. Procedures whereby members of a community participate directly in decision-making about developments that affect the community. It covers a spectrum of activities ranging from passive involvement in community life to intensive action-oriented participation in community development (including political initiatives and strategies).

Critical Thinking: The mental processes used when evaluating information that has been put forth as true. Consists of reflection, examination, and formation of judgement. Information is gathered through communication, experience, reasoning, and observation. While based on values of intellect, critical thinking goes beyond subject/matter division.

Determinants of health. The range of personal, social, economic, and environmental factors that determine the healthy life expectancy of individuals and populations.

Disease prevention. Disease prevention describes measures to reduce the occurrence of risk factors, prevent the occurrence of disease, to arrest its progress and reduce its consequences once established. Primary prevention is directed towards lowering the prevalence of risk factors common to a range of diseases (such as tobacco and alcohol use, obesity, and high blood pressure) in order to prevent the initial



occurrence of a disorder, for example through behaviour change advice. **Secondary prevention** is directed towards early detection of existing disease with a view to arresting or delaying the progression of the disease and its effects, for example through screening and other early detection programs such as routine health checks. **Tertiary prevention** generally refers to disease management strategies and/or rehabilitation intended to avoid or reduce the risk of deterioration or complications from established disease, for example through patient education and physical therapy.

Ecological Footprint. The impact of human activities measured in terms of the area of biologically productive land and water required to produce the goods consumed and to assimilate the wastes generated. More simply, it is the amount of the environment necessary to produce the goods and services necessary to support a particular lifestyle.

Equity/equitable. Equity means fairness. Equity in health means that peoples' needs guide the distribution of opportunities for well-being. Inequities occur as a consequence of differences in opportunity, which result, for example in unequal access to health services, nutritious food or adequate housing. In such cases, inequalities in health status arise as a consequence of inequities in opportunities in life.

Environmental determinants of health. The physical conditions in which people live and work that have an impact on health.

Evidence. Information such as analyzed data, published research findings, results of evaluations, prior experience, expert opinions, any or all of which may be used to reach conclusions on which decisions are based.

Evidence-based: Based on approaches that are proven effective with consistent results when making decisions related to countermeasure strategies and projects.

Health. A state of complete physical, social, and mental well-being, and not merely the absence of disease or infirmity.

Health behaviour. Any activity undertaken by an individual for the purpose of promoting, protecting, maintaining, or regaining health, whether or not such behaviour is objectively effective towards that end.

Health education. Health education is any combination of learning experiences designed to help individuals and communities improve their health by increasing knowledge, influencing motivation, and improving health literacy.

Health for All. The attainment by all the people of the world of a level of health that will permit them to lead a socially and economically productive life regardless of who they are or where they live.

Health literacy. Health literacy represents the personal knowledge and competencies that accumulate through daily activities, social interactions and across generations. Personal knowledge and competencies are mediated by the organizational structures and availability of resources that enable people to access, understand, appraise, and use information and services in ways that promote and maintain good health and well-being for themselves and those around them.

Health policy. Health policy refers to decisions, plans, and actions that are undertaken to achieve specific health care goals within a society.

Health promoting schools. A health promoting school can be characterised as a school constantly strengthening its capacity as a healthy setting for living, learning, and working.



Healthy life expectancy. Healthy life expectancy is a population-based measure of the proportion of expected life span estimated to be healthful and fulfilling, or free of illness, disease, and disability according to social norms and perceptions and professional standards.

Health promotion. Health promotion is the process of enabling people to increase control over, and to improve their health.

Health outcomes. A change in the health status of an individual, group or population that is attributable to a planned intervention or series of interventions, regardless of whether such an intervention was intended to change health status.

Health research. A systematic, thorough and formal process of inquiry or examination used to gather facts and information in order to understand, define and resolve a public health issue.

Health status. The state of health of a person or population assessed with reference to morbidity, impairments, anthropological measurements, mortality, and indicators of functional status and quality of life.

Incidence. The number of cases of disease that have their onset during a prescribed period of time. It is often expressed as a rate. Incidence is a measure of morbidity or other events that occur within a specified period of time.

Infectious. Capable of causing infection or disease by entrance of organisms (e.g., bacteria, viruses, protozoan, fungi) into the body, which then grow and multiply. Often used synonymously with “communicable.”

Life expectancy. The average number of years an individual of a given age is expected to live if current age-specific mortality rates continue to apply.

Life expectancy at birth. The average number of years that a newborn could expect to live, if he or she were to pass through life exposed to the sex- and age-specific death rates prevailing at the time of his or her birth, for a specific year, in a given country, territory, or geographic area.

Lifestyle. A way of living based on identifiable patterns of behaviour which are determined by the interplay between an individual's personal characteristics, social interactions, and socio-economic and environmental living conditions.

Morbidity. A measure of disease incidence or prevalence in a given population, location, or other grouping of interest.

Mortality. A measure of deaths in a given population, location, or other grouping of interest. The death rate; the ratio of the number of deaths per year to a given population.

Noncommunicable diseases. also known as chronic diseases, tend to be of long duration and are the result of a combination of genetic, physiological, environmental, and behavioural factors. The main types of NCD are cardiovascular diseases (such as heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma) and diabetes.

Partnerships for health. A recognized relationship between two or more partners to work cooperatively towards a set of shared health outcomes in a way that is more effective, efficient, sustainable, or equitable than could be achieved by one partner acting alone.

Prevalence. The number of cases of a disease, infected people, or people with some other attribute present during a particular interval of time.



Public health. An organized activity of society to promote, protect, improve, and – when necessary – restore the health of individuals, specified groups, or the entire population. It is a combination of sciences, skills and values that function through collective societal activities and involve programmes, services and institutions aimed at protecting and improving the health of all people.

Research. Activities designed to develop or contribute to knowledge, e.g., theories, principles, relationships, or the information on which these are based. Research may be conducted simply by observation and inference, or using experiment, in which the researcher alters or manipulates conditions in order to observe and study the consequences of doing so.

Risk: The possibility of an unwanted event; usually the possibility will be quantified as a probability and the event will be described in terms of its consequences, resulting in this definition of risk: Risk= Probability x Consequence

Skills for health (life skills). Skills for health consist of personal, interpersonal, cognitive, and physical skills that enable people to control and direct their lives, and to develop the capacity to live with and produce change in their environment to make it conducive to health.

Social capital. Social capital represents the degree of social cohesion that exists in communities. It refers to the processes between people that establish networks, norms, and social trust, and facilitate coordination and cooperation for mutual benefit.

Social determinants of health. The social determinants of health are the social, cultural, political, economic, and environmental conditions in which people are born, grow up, live, work and age, and their access to power, decision-making, money, and resources that give rise to these conditions of daily life.

Sustainability. Meeting the needs of the present without compromising the ability to meet future needs.

Sustainable behaviour. Behaviour that minimises the negative impact of one's actions on the physical, social, and economic environment.

Sustainable Development Goals (SDGs). Also known as the Global Goals, were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030. The 17 SDGs are integrated—that is, they recognize that action in one area will affect outcomes in others, and that development must balance social, economic, and environmental sustainability.

Well-being. Well-being is a positive state experienced by individuals and societies. Similar to health, it is a resource for daily life and is determined by social, economic, and environmental conditions.

Years of life lost (YLL). The number of years of life lost due to premature mortality.

Sources: [Public Health Agency of Canada](#); [EuroHealthNet](#); [National Library of Medicine](#); [WHO](#)

Pedagogical glossary

Active Learning. A teaching and learning approach that “engages students in the process of learning through activities and/or discussion in class, as opposed to passively listening to an expert. It emphasizes higher-order thinking and often involves group work.”

Brainstorming. Brainstorming is an instructional technique with several variations, that might take place within small groups or with the entire class. During brainstorming all students shortly express their ideas or concepts which are relevant to a given guiding question or central term. Criticism of the ideas is absent during brainstorming and its aim is the production of a lot and divergent ideas.



Collaborative learning. Collaborative learning is a didactic model that involves a set of instructional techniques, during which students cooperate and/or collaborate during the learning process, instead of the atomistic, and often rival, view of students by the traditional school. Collaborative learning can boost the learning outcomes, students' interests and participation and their collaboration and communication skills.

Debate Technique. A verbal technique used with the purpose of involving a group in a certain theme that will be exposed. This technique consists of dividing two or more subgroups in which each one participates in the discussion of a general theme and in the construction of a “general commitment” of all.

Group Work. Deepens knowledge, develops research and problem-solving skills; develops attitudes of participation, cooperation, creativity, and collaboration; develops teamwork attitudes, social skills, and knowledge.

Information. Facts, ideas, concepts, and data that have been recorded, analyzed, and organized in a way that facilitates interpretation and subsequent action.

Inquiry based learning. By the term inquiry-based learning we refer to the engagement of students in learning activities during which they practice several scientific inquiry skills. Students make use of these skills in order to answer scientific questions either posed by the students themselves or by the teacher, by the handling of authentic data, either experimentally collected by themselves or given already collected. Some common inquiry skills include constructing and using models, carrying out experiments, data collection and organisation, variable handling, data driven conclusion making and communicating over scientific issues.

Lifelong learning. A broad concept where education that is flexible, diverse, and available at different times and places is pursued throughout life. It takes place at all levels—formal, non-formal and informal—utilizing various modalities such as distance learning and conventional learning.

Project based learning. Project based learning is an instructional model of active learning. It has several forms, during which students work in groups on the development of projects, which often refer to authentic problems or situations approaching real life conditions. Project based learning includes the phases of project initiation, project development and project presentation.

Knowledge: a familiarity, awareness or understanding of someone or something, such as facts, information, descriptions, or skills, which is acquired through experience or education by perceiving, discovering, or learning.

Skill: The ability to carry out a task with pre-determined results often within a given amount of time, energy, or both. Skills can often be divided into domain general and domain-specific skills.

Indicative literature

Pizzi, M, and Vroman, K (2013). “Childhood obesity: effects on children’s participation, mental health, and psychosocial development.” *Occup Ther Health Care*, 27: 99-112.

Gunawardena, N, et al. (2016). “School-based intervention to enable school children to act as change agents on weight, physical activity, and diet of their mothers: a cluster randomized controlled trial.” *International Journal of Behavioural Nutrition and Physical Activity*, 13:45.

Fornari, L, et al. (2013). “Children First Study: how an educational program in cardiovascular prevention at school can improve parents’ cardiovascular risk.” *Eur J Prev Cardiol*, 20: 301–9.

He, F, et al. (2015). “School based education programme to reduce salt intake in children and their



families (School-EduSalt): cluster randomised controlled trial.” BMJ, 350: h770.

Miller, A, Lee, H, and Lumeng, J (2015). “Obesity-associated biomarkers and executive function in children.” *Pediatr Res*, 77: 143-7

Muller-Riemenschneider, F, et al. (2008). “Health-economic burden of obesity in Europe.” *Eur J Epidemiol*, 23: 499-509.

World Health Organization. (2002). *The world health report 2002: Reducing risks, promoting healthy life*. Geneva: World Health Organization.

Competences / Learning Goals

Key Competences

STEM / Personal, social, and learning to learn, citizenship.

Knowledge

Medical science concepts:

- Major NCDs
- Relationship between NCDs and risk factors.
- Long-term conditions related to NCDs.

Epidemiology and health economics concepts:

- Disease burden
- Indicators of disease burden.

Social and global health concepts:

- Health, health literacy, quality of life.
- Relationship between lifestyles and NCDs (determinants of health).
- Relationship between living conditions and NCDs (determinants of health).
- Sustainable Development Goals (SDG 3 and its relationship with other SDGs).
- Urbanization and environmental health challenges.
- Public policy on NCDs and their determinants.

Knowledge - outcome assessment:

1. Recognizes and characterizes the major NCDs.
2. Identifies the most important risk factors for each NCD.
3. Identifies measures and proposes general action to fight NCDs.
4. Defines burden of disease and identifies indicators to measure it.
5. Identifies the determinants of health and understands their relationship with NCDs and SDGs.

Skills (abilities/competences)

General: curiosity; collaboration; critical thinking; self-awareness, citizenship

Specific:

- Finding, analyzing, and interpreting scientific data, texts, and dynamic graphical representations to understand the burden of diseases.
- Understanding the difference between facts and opinions, understanding how to find fake claims, evaluate the reliability of health-related information, based on multiple factors affecting the reliability of information.
- Understanding the relevance of scientific evidence to explain phenomena related to health and illness and produce argumentation.
- Obtaining, assessing, and communicating evidence related to NCDs.



- Assessing personal and community risks and patterns of risky and protective behavior.
- Analyzing the consequences of healthy and unhealthy lifestyles on self and on the community.
- Analyzing the influence of living conditions on self and on the community.
- Understand appropriate strategies to reduce personal and community risk and get access to the relevant resources.

Skills – outcome assessment:

1. Selects concepts, indicators, and evidence to characterize disease burden.
2. Can anticipate the consequences of unhealthy lifestyles.
3. Can adopt a healthy lifestyle.
4. Feels able to propose concrete action towards adopting healthy lifestyles in his/her routine.
5. Feels able to influence the adoption of healthy lifestyles by others (e.g., family, peers, friends).
6. Selects appropriate sources to characterize NCDs from a scientific perspective.
7. Can identify the problems and challenges of the community in relation to NCDs, relate them with SDG 3 (health and well-being) and find the relevant resources to address them.

Affective /Attitudes/Behaviour (beliefs)

- Adopting general risk perception attitudes.
- Adopting attitudes towards minimizing the risk of NCDs (e.g., practicing physical exercise, limiting alcohol and sugar consumption, avoiding exposure to tobacco, protecting the environment).
- Adopting attitudes supporting health phenomena, sustainable development (target 3.4.1), urban and environmental health challenges.
- Engaging in public speaking and debating of measures to reduce risks, with a particular focus on public policy concerned with community health.

Affective, Attitudes and behavior - outcome assessment:

1. Believes that health is a fundamental component of quality of life.
2. Believes that lifestyles influence the incidence of NCDs.
3. Believes that is important to adopt a healthy lifestyle to prevent NCDs and stay healthy.
4. Reproves patterns of risky and unhealthy behavior in his/her living environment.
5. Adopts a healthy lifestyle.
6. Is committed to communicating and addressing the problems and challenges of the community in relation to the determinants of health and to contribute to the SDGs.
7. Attitude towards NCDs and a healthy lifestyle.

Learning goals and outcomes

- Uses online tools to plot tables, graphs, and maps, using updated data.
- Analyzes the consequences of healthy and unhealthy lifestyles on human beings and the environment.
- Obtains, evaluates, and communicates data and scientific information about NCDs.
- Uses evidence to build argumentation on NCDs.
- Gives examples of issues affecting the prevalence of NCDs in the community.
- Describes different approaches to protect, develop and influence community health.
- Uses evidence to propose measures and methods to fight NCDs and communicates them to the community leadership.

Assessment methods

- Outcome assessment
 - Quantitative – questionnaire in paper.
 - Qualitative - students project: a. systems map; b. Infographic
- Process assessment - *assessment of the teaching-learning sequence* – observation grid: reaching the target audience, and extent; implementation of the scenario as planned; run of the learning scenario



as expected/organizational issues to be solved; duration of the teaching-learning sequence; number of people exposed; score for likeability – students (“how fun was it to do”/ how fun would be to do again/ how could it be better).

Content (relevant to learning goals & research topics)

STEM content

- Data science on the determinants of health
- Concepts and indicators of disease burden.
- Major noncommunicable diseases. Heart disease, cancer, chronic respiratory disease, diabetes.
- Epidemiology of NCDs.
- Physiopathology and major risk factors for NCDs.
- Data science representations of health and disease phenomena.

Non-STEM content

- Living conditions, urban and modern living, lifestyles.
- Quality and trustfulness of information sources, facts, opinions, fact-checking techniques.

Digital Learning Objects (DLOs) and Digital Educational Resources (DERs)

New:

- Concept of health (*infographic*) [ER1 – ER3]
- Health as a component of quality of life (*infographic*) [ER4 – ER11]
- Health determinants: lifestyles and living conditions (*infographic*) [ER12 – ER22]
- Health determinants and SDGs (*infographic*) [ER23 – ER24]
- SDG 3 relates to other SDGs (*set of infographics*) [ER25 – ER29]
- General attributes of a healthy community (*images*) (*video*) [ER30 – ER32]
- Features of positive neighborhoods: healthy & eco-friendly (*infographic*) [ER33]
- Health and disease burden - concepts and indicators - LY, QALY, YLD, YLL, premature death (*infographic*) [ER34 – ER38]
- Disease burden of NCDs (*infographic*) [ER39 – ER47]
- NCDs, risk factors, lifestyles, relevant individual action (infographics) [ER48 – ER64]
 - Cardiovascular Disease [ER54 – ER64]
 - Chronic Obstructive Pulmonary Disease [ER65 – ER69]
 - Cancer [ER70 – ER76]
 - Diabetes [ER77 – ER83]
- Concepts related with NCDs (*game*) [LO84 – LO85]
- Template for system mapping by students (*ppt file*)

The system map as a tool to support understanding of the dynamics of science and social aspects surrounding the prevalence of *non-communicable diseases* from a system thinking perspective. The tool makes visible the connections between risk factors (e.g., high sugar intake), diseases (e.g., diabetes) and long-term conditions related with NCDs (e.g., vision loss).

- Template for students to describe facts about NCDs.
- Template for students to design scientific posters.
- Primary prevention (*infographic*) [ER86-87]
- Secondary prevention (*infographic*) [ER88]
- Tertiary prevention (*infographic*) [ER89]



Available resources (link):

Session 1 and 2:

https://www.canva.com/design/DAE1uXuidgU/xrIbZb3qQFNayVF6LNcKSQ/view?utm_content=DAE1uXuidgU&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

Session 3:

https://www.canva.com/design/DAE8eFZ0_Jw/y3C8AmhA5bH1GYsDtWEt7A/view?utm_content=DAE8eFZ0_Jw&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

Session 4 and 5:

https://www.canva.com/design/DAE8eYgMIVQ/VBiMXKzqbpf4HxNdysS9GA/view?utm_content=DAE8eYgMIVQ&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

From other sources/high-quality platforms:

- Determinants of health

[Life expectancy 2002-2019 Europe - EUROSTAT dynamic map \[LO15\]](#)

[Life expectancy at birth 2019 Europe, regions, cities- EUROSTAT dynamic map \[LO16-18\]](#)

- Health and disease burden [ER 47]

[Eurostat \(europa.eu\)](#)

[Diabetes prevalence](#)

[Cancer incidence, 2017](#)

[Eurostat \(europa.eu\)](#)

[WHO GLOBAL HEALTH ESTIMATES 2019](#)

[Noncommunicable diseases \(who.int\)](#)

Link for the resources (*under development*):

Session 1 and 2: <https://www.canva.com/design/DAE1uXuidgU/xrIbZb3qQFNayVF6LNcKSQ/edit>

Session 3: https://www.canva.com/design/DAE8eFZ0_Jw/y3C8AmhA5bH1GYsDtWEt7A/edit

Session 4 and 5: <https://www.canva.com/design/DAE8eYgMIVQ/VBiMXKzqbpf4HxNdysS9GA/edit>

Supplementary learning objects and educational resources:

- Risk factors for NCDs

Risk factors summary [OMS \[ER\]](#)

Risk factors [preventable OMS \[ER\]](#)

Tobacco [How Smoking Kills - YouTube \[ER\]](#)

- Non-communicable diseases incidence

NCDs cases by cause (cardiovascular disease, diabetes, cancer) [EUROSTAT: Population \[LO\]](#)

Europe distribution [Cancer incidence - interactive map \[LO\]](#)

Europe distribution [Diabetes \(% population\) - interactive map \[LO\]](#)

Europe distribution [Cardiovascular disease - interactive map \[LO\]](#)

- Non-communicable diseases burden

Global health estimates Deaths 2019 [World Bank database \[LO\]](#)

Global health estimates DALYs 2019 [World Bank database \[LO\]](#)

World distribution [NCD global mortality - interactive map \[LO\]](#)

World distribution [NCDs global premature deaths OMS - table \[LO\]](#)

World distribution [NCDs deaths by cause OMS - table \[LO\]](#)

World distribution [Major causes of death - interactive map \[LO\]](#)

World distribution [Cancer deaths by type - interactive map \[LO\]](#)

World distribution [Stroke deaths rates \[LO\]](#)



- Urbanisation

European project [Lisbon case study Urban environment and health in Lisbon, Portugal, 2017 - YouTube](#) [ER]

Project for public spaces [Healthy places](#) [ER]

Project for public spaces [Placemaking guidelines and initiatives](#) [ER]

Project for public spaces [Questions healthy places](#) [ER]

Tool for [Place Standard](#) [LO]

- Heart disease

[Ataque cardíaco – Astrazeneca video](#) [ER]

[Insuficiência Cardíaca – SPC video](#) [ER]

[O que é a insuficiência cardíaca – Astrazeneca article](#) [ER]

[WHO: animated video on heart disease 1 \(risk factors\)](#) [ER]

[WHO: animated video on heart disease 2 \(who should I ask for health advice\)](#) [ER]

[WHO: animated video on heart disease 3 \(How can I help my family get healthy?\)](#) [ER]

[Move with heart - NIH video \(healthy behaviours\)](#) [ER]

[Heart and sleep - NIH video \(Get Enough Sleep\)](#) [ER]

[Exercise \(Testimonial of a Youth\)- NIH video](#) [ER]

[Exercise \(Fact sheet youths\) - NIH infograph](#) [ER]

[Heart failure clinical overview and management \(video\)](#) [ER]

[Heart Failure causes \(video\)](#) [ER]

- Chronic respiratory disease

[O que é a Doença Pulmonar Obstrutiva Crónica – Astrazeneca article](#) [ER]

[COPD - Nucleus Health video](#)-[ER]

- Cancer

[What Is Cancer? - video FuseSchool](#) [ER]

[What causes cancer - video](#) [ER]

[What causes cancer - video](#) [ER]

[How does cancer spread through the body - video](#) [ER]

- Tobacco

[EUROSTAT: Smoking of tobacco products by sex, age, and country of citizenship](#) [LO]

[EUROSTAT: Frequency of alcohol consumption by sex, age, and country of birth](#) [LO]

[EUROSTAT: Health-enhancing physical activity by sex, age, and country of citizenship](#) [LO]

[WHO: Ban tobacco advertising, promotion, and sponsorship](#) [ER]

[WHO: Commit to quit tobacco](#) [ER]

[WHO: infographic tobacco 1](#) [ER]

[WHO: infographic tobacco 2](#) [ER]

[How smoking kills - video American Lung Cancer Screening Initiative](#) [ER]

- Diabetes

[What is type 1 diabetes - video Diabetes UK](#) [ER]

[What is type 2 diabetes - video Diabetes UK](#) [ER]

[Calculadora risco diabetes - APDP](#) [LO]

[Diabetes - fatores de risco - infografia DGS](#) [ER]

[Diabetes na adolescência - video DGS](#) [ER]

[Diabetes - avaliação de risco - folheto DGS](#) [ER]

[Diabetes infographic 1 - WHO](#) [ER]

[Diabetes infographic 2 - WHO](#) [ER]

[Diabetes type 1 and 2 - text - WHO Europe](#) [ER]



Teaching -learning activities

Principal target:

Science classes

9th grade (+/- 15 years old students)

4-6 sessions/classes of 40-45 minutes

Science teachers integrate other colleagues in the enactment of the scenario (e.g., ICT, visual education, mathematics, and English teachers), as the implementation of scenario aims to be interdisciplinary.

Prerequisite knowledge and skills

Use of internet, use of web search engines, tools of Microsoft Office software (basic level), English (basic level).

Lesson 1: Health, quality of life, and wellbeing

At the end of lesson 1 students should be able to:

- Define health and quality of life and explain how they are related.
- Identify the general components of health and quality of life.
- Explain the general factors that influence humans' health.
- Identify general actions that can benefit the health and quality of life of the community.

➤ brainstorming on the concept of health.

This initial activity aims to assess general preconceptions and misconceptions of the students on the topic of health. Students are asked to pick 1 to 3 post-its and complete the phrase “A youth is healthy when...”. Each student should produce between 1 to 3 phrases, write them in post-its and fix them on the white board or flip chart.

The teacher organizes their ideas in the three components of health: physical, mental and social.

Photos are taken and information is kept for next lessons (the teacher uses the information also to solve misconceptions and false claims this point forward).

The following Digital Learning Objects should be used at this stage: **concept and dimensions of health [ER1]**

Students get that health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (WHO, 1948). Is also the ability of every citizen to adapt and manage physical, social, and emotional challenges (Huber, 2011).

Students understand the difference between the three components – physical (absence of disease, illness, to be fit and able to perform daily tasks), mental (realization of one's worth and potential, being able to cope with normal type of stress and to feel good, to work productively and participate in contributing to the collective good), social (being able to create and sustain social relationships, have friends and have a sense of being supported).

Students recognize that health is a fundamental human right and an investment in a democratic and just society: “the extent to which an individual or group is able, on one hand, to realize aspirations and satisfy needs and, on the other hand, to change or cope with the environment; health is therefore seen as a resource for everyday life, not the objective of living: it is a positive concept emphasizing social and personal resources as well as physical capabilities (WHO, 1994).

The following Digital Learning Objects should be used at this stage: **concept and dimensions of health [ER2 – ER3]**

➤ classroom discussion

The teacher asks students about the difference between health and quality of life.

The discussion is conducted in a way students recognize that health is an essential component of quality of life. Students understand that quality of life represents the degree to which an individual enjoys important life-long possibilities and feels satisfied overall. In the discussion, becomes clear that quality



of life is an individual perception of position in life, within the context of the culture and values, and in relation to individual goals, expectations, standards and concerns.

Students understand that health is not only a determinant of life expectancy, but also of the functional capabilities that, in turn, influence quality of life. Students are introduced to the individual dimension (perception about physical or mental health) and the community dimension (availability of community resources, which influences individual perceptions of health and functional status).

The following Digital Learning Objects should be used at this stage: **health as a component of quality of life [ER4-ER7]**

➤ **classroom discussion**

The teacher asks students about the components of quality of life (*What means having a good quality of life? What aspects mainly contribute to your quality of life?*).

Each student picks one sticky note and writes its major source of quality of life.

Groups are organized (3-4 students) and each student discusses with the other members his/her response. The group members, with the support of the teacher, choose to elect a couple of ideas that are presented in the front of the class, by one representative of each group.

The teacher moderates the discussion and takes photos to the white board (where sticky notes are with the ideas).

Then students are introduced to the factors that influence health and quality of life. The following Digital Learning Objects should be used at this stage: **quality of life wheel [ER8-ER10]**

The teacher proposes students to think about the school community with a particular focus on the environmental and housing conditions, local resources, infrastructures and services. Then students are asked to think about problems, issues and solutions that may benefit the community health and quality of life. Then group work is organized [ER11]

➤ **group work:**

- i. "What are the major sources of health and quality of life in our community?"
- ii. "What are the major issues affecting health and quality of life in our community?"
- ii. "Which proposals do you have to increase health and quality of life of our community?"

Students work in groups to answer the questions.

Responses may be written on paper. They should be kept for the students' project.

Assessment task: Assessment Questionnaire- Knowledge, Skills, Beliefs, attitudes, and behavior

Lesson 2: determinants of health

At the end of lesson 2 students should be able to:

- ✓ Identify and explain the determinants of health.
- ✓ Explain the major sources of health and quality of life.
- ✓ Explain why SDG3 is related with the other SDGs.
- ✓ Explain the attributes of healthy communities.

The teaching-learning script starts with the following questions:

- i. Has the expectancy of life increased or decreased in the past 100 years?
- ii. Do people live longer or less today than they did at the beginning of the century? Why?

[ER12-ER13] may be used at this stage. Students communicate their responses to the entire class. Then they are asked to look to [ER13] and explain and interpret the title of the article published in the Journal *Washington Post* in november 2019.



This initial activity aims to assess general preconceptions and misconceptions of the students on the topic of expectancy of life, reliable sources of health information and map:

- ✓ their initial perceptions on the need to search for information to base their answers.
- ✓ their initial perceptions on reliable sources of health information.
- ✓ their initial ability to discuss if the source of information is trustworthy and if the information is updated or outdated.
- ✓ their initial perceptions on the determinants of health (if they think that expectancy of life is influenced by the country and place of living or born)
- ✓ their initial perceptions on the need to implement fact checking routines to avoid false ideas and claims.

The notes taken by the teacher during this activity are revisited later (the teacher uses it to address the need of having credible sources of information, implementing fact checking routines to formulate ideas and avoid false claims).

Then the teacher explains that life expectancy has more than doubled since 1900. In 1950 a human being could expect to live 46 years, on average. In 2000, 67 years. The expectancy of life for a baby born today is more than 77 years. In the beginning of the 22nd century, a human born can expect to live up to 82 years. This is explained by a combination of factors, which may be linked with advances in medicine, economic development, individual choices in relation to health and improved living conditions. The following resources should be used at this stage: **life expectancy at birth, 2002- 2019, source Eurostat (map) [ER14]**

The teacher asks students to look at the graph and find if there are differences in the expectancy of life between boys and girls. The following resources should be used at this stage: **life expectancy at birth, 2019, source Eurostat (map) [ER15]**

However, health conditions around the world and in countries belonging to the same continent differ. The teacher shows that in Europe, the actual expectancy of life at birth is superior to 80 years in Portugal, Greece, and Cyprus, but is around 75 years in Latvia and Lithuania. The following resources should be used at this stage: **life expectancy at birth, 2019, regions, source Eurostat (map) [ER16]**

The teacher explains that in the North and Center of Portugal, the expectancy of life is superior to Algarve region. Even at the same city, the expectancy of life may differ. According to the Euro-healthy project, over a distance of only eight kilometers across the metro line, Lisbon life expectancy for those born in São Domingos de Benfica is 80.7 years. While a person born in the Santa Maria Maior neighborhood will on average live 74.5 years.

These differences are mainly driven by differences in economic development, social and labour conditions, access to high-quality education, lifestyles, dynamics of local environments, and access to healthcare services. So, all these are determinants of health. The following resources should be used at this stage: **life expectancy at birth, 2019, regions, source Eurostat (map) [ER17-ER19]**

The teacher explains that to improve health, reduce illness, and have great quality of life we need to consider lifestyles - individual choices in relation to health, including choices concerning eating, physical activity, sexual behaviour, tobacco use, substance use, etc. - but also the environment, social relationships and living conditions.

Students understand their power to make choices that prevent poor health and certain medical conditions, such as non-communicable diseases, and the influence they may have on peers' choices. Living conditions also influence health and quality of life and refer to the contexts in which people live and work; to the influences that surrounding environment and society have on people lives and well-being. These could be the general socioeconomic conditions, working environment, access to housing, education, employment, healthcare services, culture, the city policy (urban health perspective), the



access to water and fresh food, etc. The following resources are used at this stage: **the main determinants of health [ER20-ER21]**

➤ **debate:**

- i. Lifestyles (individual choices in relation to health) are influenced by environmental factors? By living environments?

Students are asked to answer if lifestyles and living conditions influence each other and are invited to give some examples. They recognize, for instance, that if someone lives in a community where fruit and vegetables are easily assessable, will probably eat healthier, and this is a protective factor for NCDs. They understand that there are several environmental factors that may encourage or restrict mobility, such as having conditions to walk or cycle to and from school, doing exercise and playing in free time. [ER22] may be used at this stage.

Then the teacher explains that living conditions related to Agenda for Sustainable Development of the United Nations. These influences are more difficult, but not impossible, to change, as they ask for concerted action from community members and society as a whole. The following resources should be used at this stage: **social and environmental determinants of health with link to the sustainable development goals [ER23-ER24]**.

[ER24] is printed. 1 copy is provided to each student. Students are invited to link each determinant of health to one sustainable development goal. The teacher collects the responses and asks students to justify the connection.

The teacher summarizes by highlighting that each determinant of health may be linked with multiple sustainable development goals. Example: **housing is strongly connected with SDG 1, SDG3, SDG 8, SDG 9, SDG 10, SDG 11.**

➤ **Debate:**

“Is SDG 3 – good health and well-being – connected with the other SDGs?”

[ER25] may be used at this stage.

The teacher explains that the best way to understand how SDGs are interrelated is by mapping the attributes of a healthy community.

The following resources should be used at this stage: **SDG 3 connected with SDG 8, 16 and 11 [ER 26]**. When we think about a community plenty of health and quality of life, some attributes immediately come up: people are employed and have a good work, business get the money they need to survive and grow, people pay affordable prices for goods and have access to healthcare services. Institutions are effective in their work, accountable, inclusive, buildings and infrastructure are energy efficient, employers and employees are committed to a positive environment that promotes health and well-being. Institutions deliver people-centered services and appropriate social support to those in a vulnerable situation. The houses are affordable, people earn a sustainable living in the place, and are comfortable with living there.

The following resources should be used at this stage: **SDG 3 connected with SDG 11, 13 and 15 [ER27]**. People have access to local, affordable, and nutritious food, and there are public places to play and exercise, that residents use also to connect with each other. A healthy community is also a place where residents are connected by the purpose of reducing the ecological footprint and engage public and private initiatives with this aim. Public policy creates opportunities for people to contribute to community gardens, to grow fruits and vegetables, sell in local markets and consume it.

The following resources should be used at this stage: **SDG 3 connected with SDG 11, 9, 7 and 12 [ER28]**. Residents use soft transportation modes, such as bicycles, in their routines, and have access to good and affordable public transportation network, that allows them to stay active and independent so they can participate in social life and to access services. It is a place that provides accessible and barrier-free public spaces and buildings. There is no energy poverty because people have access to clean and affordable energy, use it in a sustainable manner and avoid waste, houses indoor temperatures around



18 degrees, according to the recommendations of WHO. Unsustainable modes of production, harmful for life on land and below water, are rejected by the community. Deforestation, food insecurity, abusive use of antibiotics and pesticides are rejected, due to their effects on the planet and consequences for human health.

These resources should be used at this stage: **SDG 3 connected with SDG 4, 6, 1, 2 and 10 [ER29]**. The community moves together towards supporting people in situation of hunger and poverty, stimulates children and youths to go to school and achieve good results, doesn't accept unequal and/or unjust distribution of opportunities among members, has access to high quality water and sanitation, and to information that is fundamental to make choices concerning their health.

The teacher asks students to visualize the images and mentions that they are relative to the features of healthy & eco-friendly neighborhoods. Students are asked to describe what they see. The following resources should be used at this stage: **some features of positive neighborhoods: healthy & eco-friendly [ER 30-32]**.

Then the teacher uses [ER33] to explain that the configuration of public space influences people health:

- ✓ Promoting mobility, walking, outdoor activities, physical exercise, contact with nature and social relationships.
- ✓ Contribute to low carbon dioxide emissions to the atmosphere, to carbon fixation through photosynthesis, to the supply of oxygen, which improves air quality and prevents respiratory and cardiovascular diseases.
- ✓ Promote people use for walking and the adoption of soft modes of transport (e.g., bicycles, scooters), which influences the functional decline of adults and elderly people.
- ✓ Influence people's exposure to environmental hazards, such as stress and heat, which are risk factors for strokes.
- ✓ Encourage the use of public transport, through providing a transportation network that is ecological and accessible.
- ✓ Promote the consumption of fresh products through purchasing in local markets.
- ✓ Promote urban gardens, where people can grow food and plants, learn new knowledge, and develop skills, meet the neighbors, and improve their physical and mental health. Cultivation must be based on the principles of sustainability, using traditional agricultural practices, reuse of generated resources, such as organic fertilizer or wastewater in closed cycles.
- ✓ Encourage participation in awareness-raising initiatives on global risks to public health.
- ✓ Encourage civic participation with a view to contributing to better solutions in terms of public policy.

Assessment task: Assessment Questionnaire- Knowledge, Skills, Beliefs, attitudes, and behavior

Lesson 3: NCDs burden

At the end of lesson 3 students should be able to:

- Define disease burden.
- Identify indicators to measure disease burden.
- Understand how the burden of a disease is estimated.
- Select appropriate sources to characterize the burden of diseases from a scientific perspective.

The teaching-learning script starts with a discussion of the concept of burden of disease.

The teacher asks students to identify a couple of serious diseases.

Then students are encouraged to complete the sentence "A disease is serious when...". [ER 34] may be used at this stage. Each student must produce 2-3 different sentences and read them.

A flipchart or whiteboard is used to distribute the ideas. Then the teacher distributes the ideas into 3 categories: mortality; poor health and quality of life; disability.



The teacher directs the discussion in a way students can understand that a disease is serious not only when it causes many deaths, but also when it affects people's daily lives, independence, abilities, relationships, and quality of life.

Road accidents can be given as an example of a serious public health problem that causes many deaths and disability in young people. Diabetes also, due to a frequent complication – retinopathy – causes vision loss and, in advanced stages, blindness. Mental illness also, due to the impact in relationships, frequent absences at school and work, and loss of quality of life.

Then students are introduced to the concepts and indicators of disease burden and understand that NCDs are leading causes of death and disability adjusted life years (DALYs) worldwide. The following resources should be used at this stage:

- **concept of disease burden [ER35]**
- **indicators of disease burden (DALY, YLD, YLL, premature death) [ER36-38]**
- **global DALYs by cause 2019 [ER39]**

Then the teacher asks students what the leading causes of deaths are, loss of quality of life and disability in the world [ER39].

The teacher explains that the burden of non-communicable diseases is increasing worldwide due to changes in lifestyles. The following resources should be used at this stage: **burden of non-communicable diseases [ER40]**.

The teacher explains the increasing burden of non-communicable diseases by using [ER41-42].

➤ **classroom discussion**

The teacher asks the classroom if there are modifiable risk factors for non-communicable diseases connected with people's lifestyles. Students are asked to give some examples.

The following resources should be used at this stage: **CVD Burden attributable to modifiable risk factors [ER43]**.

The teacher explains that non-communicable diseases are on the top causes of death worldwide by using the following Digital learning objects: **ischemic cardiac disease, stroke, cancer, chronic respiratory diseases, diabetes on the top 10 causes of death [ER44]**. Then the teacher explains that non-communicable diseases are on the top causes of poor health, disability, and premature deaths worldwide by using the following Digital learning objects: **ischemic cardiac disease, stroke, cancer, chronic respiratory diseases, diabetes, on the top 10 causes of disease burden [ER45-ER46]**

➤ **group work (the availability of laptops or tablets for group work is required)**

[LO 47] is used at this stage. Students are organized in groups (1 group – 1 topic). Each group uses a laptop to explore databases (among other relevant links) that retrieve information on NCDs burden.

They describe major NCDs (diabetes, cardiovascular disease, chronic respiratory disease, cancer) according to the available indicators of burden. They are asked to identify the source and reference period of data.



The following questions and sources of evidence may be used for this purpose:

Question	Topic	Proposed source of evidence
1. How many cases of diabetes were active in Portugal in 2011? The percentage of population with this condition was higher in Portugal or in Spain? And comparing to other countries, such as Switzerland?	Diabetes	Eurostat (europa.eu)
2. Which percentage of diabetics had the Portuguese population, in 2019? And in 2010? Is the prevalence of diabetes growing?	Diabetes	Diabetes prevalence
3. How many new cases of cancer were registered in Portugal in 2017? In 1990 the number of cases was superior, or inferior? Is the incidence growing?	Cancer	Cancer incidence, 2017
4. In 2017 the incidence of cancer was superior in Portugal than in Italy? And comparing to other countries, such as Poland?	Cancer	Cancer incidence, 2017
5. How many cases of heart disease were active in Portugal in 2011? The prevalence of heart disease was higher in Portugal or in France? And comparing to other countries, such as Switzerland?	Heart disease	Eurostat (europa.eu)
6. How many deaths in the world were due to ischemic heart disease, stroke, chronic obstructive pulmonary disease, and diabetes, in 2019? Rank them in the leading causes of death.	Heart disease Respiratory disease Diabetes	WHO GLOBAL HEALTH ESTIMATES 2019
7. Which proportion of global deaths in 2019 is attributable to NCDs?	Non communicable diseases	WHO GLOBAL HEALTH ESTIMATES 2019
8. How many disability-adjusted life years (DALYs) were registered due to ischemic heart disease, stroke, chronic obstructive pulmonary disease, and diabetes, in 2019? Rank them in the leading causes of disability.	Non communicable diseases	WHO GLOBAL HEALTH ESTIMATES 2019
9. Which proportion of global DALYs was attributable to NCDs, in 2019?	Non communicable diseases	WHO GLOBAL HEALTH ESTIMATES 2019
10. Which proportion of premature death due to major NCDs can be prevented? Identify 5 risk factors for NCDs.	Non communicable diseases	NONCOMMUNICABLE DISEASES (WHO.INT)

Assessment task: Assessment Questionnaire- Knowledge, Skills, Beliefs, attitudes, and behavior

Lesson 4: major non-communicable diseases

At the end of lesson 4 students should be able to:

- Identify and characterize the major NCDs.
- Select appropriate sources to characterize NCDs from a scientific perspective.
- Identify the most common symptoms of each NCD.
- Identify the most important risk factors for each NCD.
- Identify individual actions that can prevent NCDs.
- Identify and explain the major components of a healthy lifestyle.
- Propose actions to be implemented at the community level to prevent NCDs.



From the previous lesson, students already recognize the most important non-communicable diseases. This lesson explores each NCD, risk factors and preventive actions at the individual and community level to mitigate their burden.

The teacher starts by presenting the agenda for the lesson by using [ER 48-49].

➤ **Classroom discussion**

Students are asked to pick 1 to 3 post-its and complete the phrase “We can prevent non-communicable diseases by...” [ER50]. Each student should produce between 1 to 3 ideas, write them in post-its and fix them on the white board or flip chart. Photos are taken and information is kept for next lessons, particularly for the school project.

The teacher explains that the incidence of non-communicable diseases is influenced by a couple of factors that elevate the risk gradually over the life course and that can be modified through healthy lifestyles. The following resources should be used at this stage: **modifiable risk factors** [ER51-53].

Then the teacher explores in detail the burden of chronic cardiovascular diseases: ischemic heart disease and stroke. The following resources should be used at this stage: **cardiovascular diseases** [ER54-55].

The teacher explains the pathophysiology of **ischemic heart disease**, burden, risk factors, consequences, and preventive action. The following resources should be used at this stage: **cardiovascular diseases** [ER56-58]. **After presenting ER 57, the teacher asks students to identify symptoms of heart attack.**

The teacher goes into detail on pathophysiology of **stroke**, burden, risk factors, consequences, and preventive action. The following resources should be used at this stage: **cardiovascular diseases** [ER59-63]. **After presenting ER 61, the teacher asks students to identify the symptoms of a stroke.** The teacher summarizes preventive actions for cardiovascular diseases in two types: primary prevention (avoids disease) and secondary prevention (limits disease progression and disability in people with the disease). The following resources should be used at this stage: **primary and secondary prevention** [ER64].

The teacher goes into detail on pathophysiology of **chronic pulmonary disease**, burden, risk factors, consequences, and preventive action. The following resources should be used at this stage: **chronic pulmonary disease** [ER65-68]. **After presenting [ER 67], the teacher asks students to identify symptoms of exacerbation of chronic pulmonary disease.**

The teacher summarizes preventive actions for chronic pulmonary disease in two types: primary prevention (avoids disease) and secondary prevention (limits disability in people with the disease). The following resources should be used at this stage: **primary and secondary prevention** [ER69].

The teacher goes into detail on pathophysiology of **cancer**, burden, risk factors, consequences, and preventive action. The following resources should be used at this stage: **cancer** [ER70-75]. **After presenting ER 71, the teacher asks students to identify the most common organ affected by cancer. After presenting [ER 73] the teacher asks students to identify two symptoms of cancer.**

The teacher summarizes preventive actions for cancer in two types: primary prevention (avoids disease) and secondary prevention (limits disability in people with the disease). The following resources should be used at this stage: **primary and secondary prevention** [ER76].

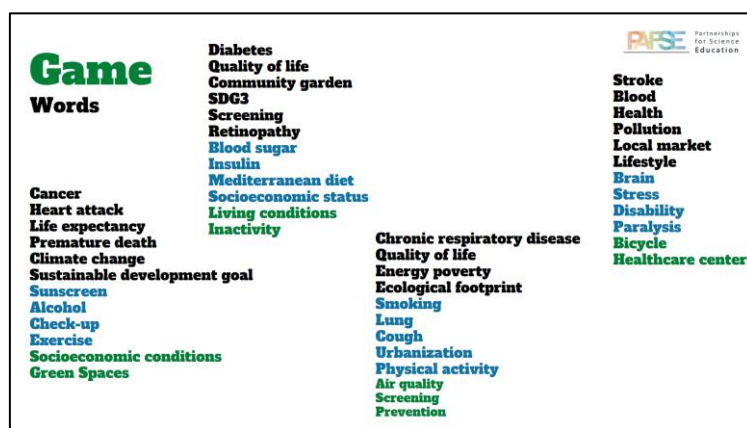
The teacher goes into detail on pathophysiology of **diabetes**, burden, risk factors, consequences, and preventive action. The following resources should be used at this stage: **diabetes** [ER77-82].



The teacher summarizes preventive actions for diabetes in two types: primary prevention (avoids disease) and secondary prevention (limits disability in people with the disease). The following resources should be used at this stage: **primary and secondary prevention [ER83]**.

➤ **Game competition – to describe and explain relevant concepts [LO 84-85]**

A set of words/concepts related to NCDs are mapped in cards. Students are organized in groups of 5-6. Each group is given a set of words which they distribute randomly between the members without showing the cards to each other (e.g.: 1 group – 10 to 12 cards). Each member is given 60 seconds to explain the word/concept in hand to other members, without showing or using that one particular word. When the time is out, the words that were identified right brings one point to the group.



➤ **group work** (the availability of paper is required)

[LO 86] may be used at this stage. Students are organized into 2 groups. In 5 minutes, they should propose at least five actions for primary and secondary prevention of non-communicable diseases. The teacher attributes one topic to each group:

Group 1: primary prevention [ER87]

Group 2: secondary prevention [ER88]

At the end, the teacher explains that when primary and secondary prevention fail is fundamental to invest in tertiary prevention to limit the complications of the disease. The following resources should be used at this stage: **tertiary prevention [ER89]**.

Assessment task 1: build a systems map (qualitative assessment)

The availability of a laptop is required.

Students come back to their initial groups (4-5 members) to build a systems map (using a provided online template). Each group is asked to:

- identify and represent the relationships between risk factors, lifestyles, urban and modern living, and medical conditions related to a specific major NCD (e.g., diabetes).
- use their system map to build argumentation about the interrelationships between lifestyles, living conditions and a specific NCD (e.g., diabetes).
- Justify the system map with evidence and use their representation to reason about the key behavioral and environmental factors linked with the burden of NCDs.

After building and presenting the systems map students are challenged to build a scientific poster about NCDs (group work). This is the school project described down, in autonomous section.

Tip1: using ppt file or canva file to design the systems map.

Tip2: photos are taken to be used as learning objects for students' projects.

➤ **Suggested homework**

Students perform research work with the purpose of identifying more scientific evidence about diabetes, cardiovascular diseases, chronic respiratory diseases, cancer, with a particular focus on the risk factors (e.g.: high sugar intake, smoking) and actions to fight them at the individual and community level. They are asked to identify the source of the evidence.

Assessment task 2: Assessment Questionnaire- Knowledge, Skills, Beliefs, attitudes, and behavior (quantitative assessment)

Supplementary learning resources and educational activities

During lesson 5 (or in the sessions devoted to the development of the research project) is organized:

1. Conference with STEM professionals

The conference may be organized at the school or stakeholder location and promotes an interaction between students and STEM professionals, such as medical experts, policy makers, public health authorities, officer of the municipality working on urban and environmental health, data scientists, technology developers, researchers of PAFSE consortium.

Students are oriented by the teacher to pose questions to the experts with a particular focus on:

- a) academic choices and career paths.
- b) reasons to adopt a career that contributes to better public health.
- b) identifying actions to fight NCDs in their community. for better expectancy and quality of life for all.

2. Visits to organizations interested in STEM and public health education:

- a. INSA (national public health laboratory - department of non-communicable diseases)
<https://www.insa.min-saude.pt/>
- b. FCT NOVA (visit to laboratories)
<https://www.fct.unl.pt/>
- c. Sporting Clube Portugal (visit to stadium or Cristiano Ronaldo Academy)
<https://www.sporting.pt/>
- d. Auchan Portugal (visit of a nutritionist to the school with an activity on food and the environment)
<https://www.auchan.pt/>
- e. Holon Farmacies (various activities on nutrition, pharmacology and health)
<https://www.farmaciasholon.pt/>
- f. Águas de Portugal (Waters of Portugal - Environmental Education Center Water at 360°)
<https://www.adp.pt/pt/comunicacao/agua-a-360%C2%BA/?id=197>
- g. SILab (visit to the Social Innovation Laboratory of Instituto Superior Técnico – University of Lisbon)
<http://silab.tecnico.ulisboa.pt/>
- h. ATEC – Training Center – visit to the Academy to present professional training of a technical nature
<https://www.atec.pt/>
- i. Escola Nacional de Saúde Pública (<https://www.ensp.unl.pt/>) – activity on STEM myths and professions with challenges on SDG 3 (in relation to others) and guests from various areas and from other institutions such as Chaperone (<https://chaperone.online>) and ICNOVA (<https://www.icnova.fcsh.unl.pt/en/homepage-2/>)



(The list of partnerships will continue to be updated until the end of the project. You can consult all our partnerships here: <https://pafse.eu/pt/partes-interessadas-pafse/>)

School Research Project

Overview. The project is based on guided research about social and environmental issues around NCDs, with a particular focus on the contribute of the school for a healthy community and on the general attributes of healthy communities. Students will be developing digital skills (e.g. finding, reviewing, organising and sharing information effectively, handling data appropriately, using different online resources and tools to study), acquire socio-scientific argumentation skills and improve communication and collaboration skills while understanding the multiplicity of factors leading to non-communicable diseases and mapping solutions for reducing or mitigating their impact at the school community with the support of stakeholders. At the end of the teaching-learning sequence, students will have developed the ability to explain how scientific knowledge and processes may contribute to the resolution of a socioscientific issue related to public health and to recognize dimensions of the issue that cannot be addressed by science.

In a first stage, students will be elaborating with the teacher on the principal research question, goals, data collection methods and instruments. They will be improving inquiry-based investigation skills to answer the questions of a socioscientific issue related to non-communicable diseases and their environmental determinants.

What are the **major determinants** of non-communicable diseases incidence?



Which **environmental factors** influence the incidence of non-communicable diseases in the school community?

Then students perform inquiry-based activities, administer the data collection instruments, analyse results, extract conclusions, and propose priorities for action. In the end, they will have created a poster that identifies strengths of the school and their surrounding area in a public health perspective, as well as identified areas for improvement that may be addressed by community stakeholders (students, residents, organisations, policy makers).

Relevance. Scientific evidence shows that the way public place functions, looks and feels influences health, wellbeing, and incidence of diseases. With the project students will be contributing to tackle inequalities by identifying potential strengths and weaknesses of spaces located at the school and in the neighbourhood, with a particular attention to the access of vulnerable groups. Based on the collected evidence, they will suggest actions and efforts for different stakeholders, according to the fields where they are needed most.

Estimated duration. The school research project starts after lesson five and has an estimated duration of 5-6 sessions of 45 minutes.

Session 1-2: research administration

The teacher organizes groups, each group addresses 1 topic connected with the environmental influences of non-communicable diseases in the school community:

- A. Accessibility, transportation options and security
- B. Public green and social spaces
- C. School environment



The teacher discusses with students' possible questions to assess the attributes of the communities in the subjects and possible methods to get the answers. The application of an online questionnaire is suggested but other data collection methods (e.g.: observations, interviews) may be considered. The advantages and limitations of the alternatives are discussed.

A brainstorming of possible questions to address the topics is promoted by the teacher. Then the following may be presented to complete the task:

▪ **Accessibility, transportation options and security (Group 1)**

Can you walk from home to school?

Are there enough routes for walking and cycling to go to school?

The streets are flat and accessible for everyone?

Is easy for people with physical disabilities to use the streets?

Are there bike paths to go to school?

Are walking and cycling given priority over cars and other traffic as much as possible?

Are routes good quality, attractive and pleasant to use?

Do routes meet the needs of everyone, whatever their age or mobility, and is there seating for those who need it?

Is the nearest public transport closer to school?

Is public transport to go to school good?

Is public transport to go to school affordable?

Are bus stops and stations in convenient places?

Is public transport safe and easy to access, whatever people's age or mobility?

Are there many cars on the roads surrounding the school?

Is there too much traffic surrounding the school? Why?

▪ **Public green and social spaces (Group 2)**

Is the nearest park closer? What is the distance from the school to the park?

Is the park a place where you would choose to meet your friends?

Is the park accessible for people with special needs?

There are conditions in the park for playing and exercising?

There are facilities in the park to exercise?

There are facilities in the park to play and have joy with your family and friends?

There are enough places in the park to sit down?

There are places to seat that are clean, comfortable, conveniently located?

Do people have a choice of places to sit, either in the sun or shade?

Do vehicles dominate or block space dedicated to pedestrians or bicycles?

Do you feel secure in public space around school, during the day? And at night?

Is the area free of violence and antisocial behaviour?

Is the area safe for everyone, whatever their age, sex, ethnic group, religious beliefs, sexuality or disability?

Do people feel safe both at school and when out and about?

Are there any social activities organized in the public space surrounding school?

Is easy for people with special needs to join those activities?

How many different types of activities are occurring in public space surrounding school- people walking, eating, playing baseball, chess, relaxing, reading?

Are there organized activities/initiatives ongoing in public space surrounding school?

Are there any local initiatives that encourage social interaction?

Are there any recreative events like art displays and performances occurring to celebrate local artists and cultures?

Are there any natural features in urban space, such as street trees or plantings in plazas?

Is there any market with fresh products (e.g., vegetables, fruit, fish, etc.)?

Are there regular farmers markets at already existing properties, like building plazas, parking lots or streets?



Is there any community garden?
Is there any discussion or initiative ongoing about the design of public space?
Is there any discussion or initiative ongoing about planting trees?
Is there any discussion or initiative ongoing about water saving?
Is there any discussion or initiative ongoing about energy saving?

▪ **School environment (Group 3)**

Are there facilities to park a bicycle at school?
Are there any bins at school to deposit paper and plastic, for recycling purposes?
Are there facilities to repair objects near school, such as bicycles?
Are there facilities to leave used clothes and toys?
Are there solar panels at school?
Is there any strategy ongoing to save energy?
Is there any strategy ongoing to avoid waste of water?
During meals at school is usual to throw away food?
Is there any strategy ongoing to avoid food waste?
Is there a range of spaces (indoor, outdoor, purpose-built, and more informal) where students can meet?
Is there a range of spaces to enjoy leisure and sporting activities?
Is there too much noise at school?
Is there any community garden at the school? Are you interested in contributing to it?
Do organisations such as local authorities and health services actively work with the school to understand needs?
Is there any initiative or channel connecting students and teachers with municipalities, such as “school parliament”?

After finishing the list of questions, students prepare the data collection instrument.

Is suggested that they work in groups and use a laptop to build an online questionnaire in Google forms. To conclude the preparation of the survey the teacher supports students in:

- ✓ writing the introductory text (HEADER)
 - Project title/Project acronym
 - Summary description of the project
 - Why is the project relevant/project goals
 - Who is implementing the project and where.
- ✓ configure the questions (WHAT)
 - turning questions into sentences
 - defining a scale for responses options
- ✓ identifying the target group (WHO)
- ✓ defining a strategy and activities to achieve the target (HOW)
- ✓ defining the minimum number of responses from the target (EXPECTED RESULTS)
- ✓ establish a timeline for collecting the responses (WHEN)
- ✓ which events may constraint data collection (RISKS)
- ✓ which strategy to track results (CONTROL procedures)

Examples of scale:

1- strongly disagree; 2 – disagree; 3- not disagree, not agree 4- agree; 5 – strongly agree
2- definitely false; 2 – false; 3 – not false, not true; 4 – true; 5-definitely true
3- extremely unlikely; 2 – unlikely; 3 – not unlikely, not likely; 4 – likely; 5-extremely likely.
1 – yes; 2 – no

Example 1:

Can you walk from home to school?
Is possible to walk from home to school.



Response options: 1-strongly disagree; 2 – disagree; 3- not disagree, not agree 4- agree; 5 – fully agree.

Example 2:

Is the nearest public transport closer to school?

The nearest public transport is closer to school.

Response options: 1-strongly disagree; 2 – disagree; 3- not disagree, not agree 4- agree; 5 – fully agree.

Example 3:

Is there any local market with fresh products (e.g., vegetables, fruit, fish, etc.)?

There is a local market with fresh products (e.g., vegetables, fruit, fish, etc.)?

Response options: 1-yes; 2 – no.

Example 4:

Are there regular farmers markets at already existing and centrally located properties, like building plazas, parking lots or streets?

There are regular farmers markets at already existing properties, like building plazas, parking lots or streets.

3- extremely unlikely; 2 – unlikely; 3 – not unlikely, not likely; 4 – likely; 5-extremely likely.

Session 3: data analysis

After administering the survey and collecting the minimum number of responses, an Excel file may be downloaded from google forms. Alternatively, if the questionnaire is administered in paper, students prepare a file with the questions and distribution of responses. The teacher reminds students about the relevance of the project and supports each group of students in preparing tables, graphics and then promotes a debate around the results.

Session 4-5: presentation of evidence

Session 4 starts with the discussion of the best presentation format of the project results.

The output is produced and should describe the research question, methodology, results, conclusions, and recommendations arising from the inquiry-based project. A poster is suggested, it can be built in paper or Canva software.

Then students discuss with the teacher the organisation of a forum for presentation and discussion of the output that invites students, teachers, parents, social partners of the local community to participate and engage in a debate.

Session 6: open schooling event

During session 6 students will be holding a community event to share the results of their research with the participation of students, teachers, parents, social partners of the local community.

Each group will be presenting their evidence and informing the public about the questions they have addressed in the project while improving communication skills and developing responsible citizenship.

- Each project output (e.g.: poster) is presented by the students in a community setting (e.g., exposition center, municipality, garden, museum, science fair).
- Students will communicate policy measures using science-based argumentation. Students appeal to action of all in the health of the community, providing great understanding that health literacy and health promotion is a responsibility of all, not only of the ministry of health or healthcare providers.
- Students, parents, school community and relevant local stakeholders attend the event and understand how the prevalence of NCDs is influenced by a set of common behavioral factors related with lifestyles but also social and environmental factors. They also get high-level understanding on strategies to minimize the phenomena and how they may have an influence on the relevant settings (e.g., home, school, workplace, public space at the community).



Suggested printing (to be available at the wall where the project is developed): “You choose, ONE Life, TWO Directions” [LO 92].

Suggested complementary readings for teachers:

1. Watch this video.

Lisbon case study Urban environment and health, 2017 - YouTube

2. Take a look at these infographics and texts!

Healthy places

Placemaking guidelines and initiatives

3. Perform this assessment.

Place Standard

Teaching-learning process for school project (summary):

1. Collection of evidence.
2. Evaluation of the evidence based on criteria and selection of the relevant and non-biased information.
3. Identify effective presentation formats.
4. Produce the output (e.g.: scientific poster)
5. Present the output in open schooling event.

Expected outcomes of the teaching-learning process (summary):

- Students will be able to incorporate evidence coming from trustful data sources to support their ideas and arguments.
- Students will be able to communicate the merits and limitations of various data and data collection processes considered in the work process.
- Students will be able to identify and communicate factors that inhibit or promote healthy behaviours in their community.
- Students will be able to identify and communicate evidence-based policy measures to prevent and manage NCDs in their community.
- Students will be able to use non-biased data to justify policy choices.

Target Audience for Recommendations

School community and local stakeholders: students, parents, municipalities, healthcare providers, local enterprises.

Public Debate and Recommendations (based on research results)

Presentation of the project results by students in a community setting and dissemination of evidence recommendations via social, community and conventional media.

Main Partner responsible: UNL (School of Public Health)



Assessment Questionnaire- Knowledge, Skills, Beliefs, attitudes, and behavior

Scenario topic: Non-Communicable Diseases

Knowledge	
1. Recognizes and characterizes the major NCDs.	<p>Question 1.1: What are the main non communicable diseases? A) gastrointestinal diseases, cancer, diabetes, road traffic accidents. B) cancer, cardiovascular diseases, chronic obstructive pulmonary diseases, diabetes. C) diabetes, oral diseases, urinary diseases, cancer.</p> <p>Question 1.2: What are the most frequent symptoms of heart attack? A) chest pain, light-headedness, breathlessness. B) blurred vision, confusion, paralysis of one side of the body. C), light-headedness, breathlessness, cough.</p> <p>Question 1.3: What are the most frequent symptoms of cancer? A) fever, fatigue, weight loss B) blurred vision, paralysis of one side of the body. C), light-headedness, cough, increased appetite.</p> <p>Question 1.4: What are the most frequent symptoms of a stroke? A) fever, chest pain, cough B) blurred vision, fever, paralysis of 1 side of the body. C) pain, swelling, cough, increased appetite.</p> <p>Question 1.5: What are the most frequent symptoms of ischemic heart disease? A) chest pain, heart palpitations, breathlessness. B) fever, cough, increased appetite. C) blurred vision, confusion, paralysis of 1 side of the body.</p>
2. Identifies the most important risk factors for each NCD.	<p>Question 2.1: What are the main risk factors for ischemic heart disease? A) pollution, smoking, alcohol consumption, fatty diet. B) exposition to dusts and chemicals at work, inactivity, diet rich in vegetables. C) Exposition to ultraviolet radiation, exposition to solid fuels, chronic infections.</p> <p>Question 2.2: What are the main risk factors for cancer? A) inactivity, high sugar intake, stress. B) Exposition to ultraviolet radiation, air pollution, smoking, alcohol consumption. C) stress, diet rich in vegetables, exposition to dusts and chemicals at work.</p> <p>Question 2.3: What are the main risk factors for diabetes? A) overweight, inactivity, abdominal fat. B) Exposition to ultraviolet radiation, chronic infections, stress. C) pollution, smoking, diet full of vegetables.</p>
3. Identifies measures and proposes general action to fight NCDs.	<p>Question 3.1: Identify appropriate actions to have a healthy lifestyle and prevent the major non-communicable diseases: A) avoid pollution, alcohol, tobacco, and drugs consumption, adopt fat diet, avoid stress and physical exercise. B) adopt a meat-free diet, consume food supplements and practice exercise. C) avoid the sun and plant-based foods, drink soda and use public transport. D) adopt the Mediterranean diet, travel on foot or by bicycle and enjoy green spaces.</p>



	<p>Question 3.2: As a citizen, what can you do to fight non-communicable diseases? Please identify the most important actions:</p> <p>A) Commit to SDG 11 (sustainable cities and communities), to SDG 13 (climate action) and to the Mediterranean diet.</p> <p>B) Commit to SDG 17 (partnerships for the goals), to the use of car as principal transportation mode and to vegan diet.</p> <p>C) Commit to SDG 3 (Health and Well-Being), to recycle and to the use of the car as principal transportation mode.</p>
4. Defines burden of disease and identifies indicators to measure it.	<p>Question 4.1: What is disease burden?</p> <p>A) the impact of the problem in terms of public health.</p> <p>B) the impact of the problem from an economic perspective.</p> <p>C) the impact of the problem from an environmental perspective.</p> <p>Question 4.2: Which indicator is used to measure disease burden?</p> <p>A) DALYs (disability adjusted life years).</p> <p>B) Number of deaths.</p> <p>C) Costs incurred by the health system.</p>
5. Identifies the determinants of health and understands their relationship with NCDs and SDGs.	<p>Question 5.1: The major determinants of health are:</p> <p>A) genetics, access to healthcare, family history of disease.</p> <p>B) unhealthy diet, inactivity, stress.</p> <p>C) energy poverty, unaffordable prices, access to healthcare.</p> <p>Question 5.2: SDG 3 (Health and Well-being) is connected with SDG 11 (Sustainable Cities and Communities) because:</p> <p>A) in a healthy community "people have access to local, affordable and nutritious food, live in a sustainable, inclusive, and climate-friendly environment that promotes well-being".</p> <p>B) in a healthy community "access to justice for all is assured".</p> <p>C) in a healthy community "infrastructure for the use of car as transportation mode is promoted".</p>
Skills	
1. Selects concepts, indicators, and evidence to characterize disease burden.	<p>Question 1.1: You aim to characterize the burden of diabetes. Which indicator would you select?</p> <p>A) number of deaths/100.000 people.</p> <p>B) number of citizens with the disease.</p> <p>C) premature mortality and years lived with poor health.</p>
2. Can anticipate the consequences of unhealthy lifestyles and risky behavior (e.g., smoking).	<p>Question 2.1: Urbanization, pollution, smoking, alcohol consumption, diet full of fat and inactivity are risk factors for non-communicable diseases. Considering that factors that elevate disease risk accumulate gradually over the life course, identify the most important consequences of having these conditions present in your lifestyle:</p> <p>A) Abdominal fat, overweight, hypertension.</p> <p>B) Mental disease, hypertension, underweight.</p> <p>C) Fatigue, weight loss, hypertension.</p>
3. Can adopt a healthy lifestyle.	<p>Question 3.1: I will try to adopt a healthy lifestyle (avoid stress, polluted environments, consume alcohol, tobacco, drugs, fat diets, inactivity) in the next three months:</p> <p>1) definitely true... 5) definitely false.</p>



	<p>Question 3.2: I feel able to resist peer pressure regarding unhealthy options (e.g., smoking, drinking, not practicing physical exercise, foods full of fat): 1) definitely true... 5) definitively false.</p> <p>Question 3.3: I feel capable of identifying the attributes of healthy lifestyles and acting based on it. 1) definitely true... 5) definitively false.</p> <p>Question 3.4: If I want, I can adopt a healthy lifestyle during the next three months. 1) definitely true... 5) definitely false.</p> <p>Question 3.5: For me, smoking, consuming alcohol, not practicing physical exercise, and having a diet full of fat, during the next three months, is: 1) definitely possible ... 5) definitely impossible.</p> <p>Question 3.6: For me, adopting a healthy lifestyle during the next three months, would be: 1) very important... 5) very insignificant.</p> <p>Question 3.7: I will be able to find the necessary strategies and resources for adopting a healthy lifestyle in the next three months: 1) very probable... 5) very improbable.</p>
<p>4. Feels able to propose concrete action towards adopting healthy lifestyles in his/her routine.</p>	<p>Question 4.1: I feel able to identify relevant actions for adopting a healthy lifestyle in my routine: 1) definitively true... 5) definitively false.</p> <p>Question 4.2: I feel able to change my routine in order to adopt a healthy lifestyle. 1) definitely true... 5) definitively false.</p>
<p>5. Feels able to influence the adoption of healthy lifestyles by others (e.g., family, peers, friends).</p>	<p>Question 5.1: I feel able to propose actions to be taken at my home environment which promote a healthy lifestyle: 1) definitely true... 5) definitively false.</p> <p>Question 5.2: I will try to influence the adoption of healthy lifestyles by others (family, friends): 1) definitely true... 5) definitively false.</p>
<p>6. Selects appropriate sources to characterize NCDs from a scientific perspective.</p>	<p>Question 6.1: I believe that to find valid information, based on science, about health and diseases, I should consult the following sources: A) scientists, scientific publications, WHO webpages and databases. B) newspapers, google, YouTube. C) friends, journalists, social media.</p>



<p>7. Can identify the problems and challenges of the community in relation to NCDs, relate them with SDG 3 (health and well-being) and find the relevant resources to address them.</p>	<p>Question 7.1: I feel able to identify the attributes of healthy communities: 1) definitely true... 5) definitely false.</p> <p>Question 7.2: I feel able to identify the problems and challenges of my community in relation to health and well-being: 1) definitely true... 5) definitely false.</p> <p>Question 7.3: I feel capable of proposing actions that benefit the health and well-being of my community. 1) definitely true... 5) definitely false.</p> <p>Question 7.4: To address the problems and challenges of my community in relation to health and well-being (SDG 3) I should understand the attributes of sustainable communities (SDG 11) and targets of climate action (SDG 13): 1) strongly agree... 5) strongly disagree.</p>
<p>Beliefs, attitudes and behavior</p>	<p>Instructions: There are no correct or incorrect answers; we are only interested in knowing your perspective.</p>
<p>1. Believes that health is a fundamental component of quality of life.</p>	<p>Question 1.1: Health is a fundamental component of quality of life: 1) strongly agree... 5) strongly disagree.</p> <p>Question 1.2: I am capable of adopting a lifestyle that benefits health and quality of life: 1) Strongly agree... 5) Strongly disagree.</p>
<p>2. Believes that lifestyles influence the incidence of NCDs.</p>	<p>Question 2.1: Lifestyles and living environments influence the incidence of non-communicable diseases (e.g.: cancer, cardiovascular diseases): 1) strongly disagree... 5) strongly agree.</p> <p>Question 2.2: Alcohol abuse influences the incidence of non-communicable diseases (e.g.: cancer, cardiovascular diseases): 1) strongly disagree... 5) strongly agree.</p> <p>Question 2.3: Diet influences the incidence of non-communicable diseases (e.g.: cancer, cardiovascular diseases). 1) strongly disagree... 5) strongly agree.</p> <p>Question 2.4: Smoking influences the incidence of non-communicable diseases (e.g.: cancer, cardiovascular diseases): 1) strongly disagree... 5) strongly agree.</p> <p>Question 2.5: Inactivity influences the incidence of non-communicable diseases (e.g.: cancer, cardiovascular diseases): 1) strongly disagree... 5) strongly agree.</p> <p>Question 2.6: Access to fresh products (for example, fish, vegetables, fruits) influences the incidence of non-communicable diseases (e.g.: cancer, cardiovascular diseases): 1) strongly disagree... 5) strongly agree.</p> <p>Question 2.7: Pollution influences the incidence of non-communicable diseases (e.g.: cancer, cardiovascular diseases): 1) strongly disagree... 5) strongly agree.</p>



<p>3. Believes that is important to adopt a healthy lifestyle to prevent NCDs and stay healthy.</p>	<p>Question 3.1: Youths should adopt healthy lifestyles to prevent non-communicable diseases and stay healthy in older ages: 1) strongly disagree... 5) strongly agree.</p> <p>Question 3.2: The adoption of a healthy lifestyle will reduce my risk of having a non-communicable disease and dying prematurely from it: 1) strongly disagree... 5) strongly agree.</p>
<p>4. Reproves patterns of risky and unhealthy behavior in his/her living environment.</p>	<p>Question 4.1: The adoption of a healthy lifestyle will ruin my image: 1) strongly disagree... 5) strongly agree.</p> <p>Question 4.2: For me the adoption of a healthy lifestyle in the next three months, would be: 1) Bad... 5) Good.</p> <p>Question 4.3: For me to adopt a healthy lifestyle, in the next three months, would be: 1) useless... 5) useful.</p> <p>Question 4.4: I don't accept risky behavior in my living environments (e.g., sedentary lifestyle, smoking, drugs consumption): 1) definitely true... 5) definitely false.</p>
<p>5. Adopts a healthy lifestyle.</p>	<p>Question 5.1: I plan to not smoke in the next three months: 1) definitely true... 5) definitely false.</p> <p>Question 5.2: I plan to not consume alcohol, drugs and other substance use in the next three months: 1) definitely true... 5) definitely false.</p> <p>Question 5.3: I plan to do physical exercise at least 60 minutes every day in the next three months: 1) definitely true... 5) definitely false.</p> <p>Question 5.4: I plan to follow low-fat and low-sugar diet, or Mediterranean Diet, in the next three months: 1) definitely true... 5) definitely false.</p> <p>Question 5.5: I plan to avoid stress and polluted environments in the next three months: 1) definitely true... 5) definitely false.</p> <p>Question 5.6: Among the following statements, choose the one that best describes what you think: 1) I do not have a healthy lifestyle, and I also have no intention of doing so. 2) I do not have a healthy lifestyle, but I have been thinking about that possibility. 3) I never or rarely have a healthy lifestyle, but soon I will start doing it on a regular basis. 4) I adopt a healthy lifestyle regularly. 5) For more than six months I have always or almost always followed a healthy lifestyle. 6) For several years now, I have adopted a healthy lifestyle, and I will continue to do so.</p>



<p>6. Is committed to communicate and address the problems and challenges of the community in relation to the determinants of health and to contribute to the SDGs.</p>	<p>Question 6.1: I intend to identify and address the problems of the community in relation to the environmental determinants of health: 1) Strongly disagree... 5) Strongly agree.</p> <p>Question 6.2: Among the following statements, choose the one that best describes what you think: 1) I am not contributing to my community health, and I also have no intention of doing so. 2) I am not contributing to my community health, but I have been thinking about the possibility of starting to do so. 3) I am never or rarely have been contributing to my community health, but soon I will start doing it on a regular basis. 4) I am contributing to my community health regularly. 5) For more than six months I have always or almost always been contributing to my community health. 6) For several years now, I have been contributing to my community health, and I will continue to do so.</p>
<p>7. Attitude towards NCDs and a healthy lifestyle.</p>	<p>Question 7.1 For me, non-communicable diseases are: Very harmful: ____: ____: ____: ____: ____: beneficial</p> <p>Question 7.2: For me, to adopt a healthy lifestyle is: harmful : ____: ____: ____: ____: ____: beneficial pleasant : ____: ____: ____: ____: ____: unpleasant good : ____: ____: ____: ____: ____: bad worthless : ____: ____: ____: ____: ____: valuable enjoyable : ____: ____: ____: ____: ____: unenjoyable</p>

