InAbled Cities
physical activity · health · inclusion

PRACTICAL INTERVENTION METHODOLOGY (IO1)

CONTRIBUTION TO WP2 – DESIGN OF PROJECT METHODOLOGY

ONCE UNIVERSITY SCHOOL OF PHYSIOTHERAPY

Co-funded by the
Erasmus+ Programme
of the European Union

This report was coordinated and drafted by:

- University Medical Center Radboudumc
- ONCE University School of Physiotherapy

With the support of:

- Europe Region of World Physiotherapy (ERWP)
- The Municipality of Bologna
- The Municipality of Sevilla la Nueva
- Sport and Citizenship Think tank

Main authors: Irene Rodríguez-Andonaegui (ONCE); Susana García-Juez (ONCE); Ana Varas-de la Fuente (ONCE); Joao Mota-da Sousa (ONCE); Guiomar Martin-San Gil (ONCE).

This document is made in English, Italian and Spanish. In case of any contradiction or inconsistencies between what the English language version of the Practical Intervention Methodology says and what the Spanish and Italian languages versions of the Practical Intervention Methodology say, the English language version of the Practical Intervention Methodology shall prevail.

INDEX

1. INTRODUCTION

The project "InAbled Cities: Developing Inclusive Urban Environments for Physical Activity for People with Disabilities and Senior Citizens" is a consortium of several European organizations, which have joined forces with the main objective of promoting Physical Activity (PA) in urban environments among people over 65 and people with disabilities. This project focuses on this target group due to the fact that they are a growing population in Europe at risk of frailty. Additionally, they have been among the groups most affected by the restrictions caused by the COVID-19 pandemic, and their physical, psychological and emotional condition has been seriously impaired.

Within the PREPARATION PHASE of the project, it is necessary to develop the methodology to be used later in the IMPLEMENTATION PHASE. This methodology is strongly supported by the extensive research of previous experiences in other European and worldwide cities, collected in the document "Desk Research on Good Practices", as well as in the previous analysis of the needs and barriers of the target population of the pilot territories and the development of mechanisms for the involvement of the communities, or "Citizen Engagement Strategy". Finally, for the correct methodological development of the project, it was essential to have the necessary technical knowledge to be able to adequately design the interventions, so an exhaustive search of the most recent scientific literature on physical activity and therapeutic exercise has been carried out.

All this information is included in this document, which has 2 differentiated parts. In the first part, all the previous information necessary to properly implement the "InAbled Cities" project is mentioned (developed to a greater or lesser degree depending on whether reference is made to documents created specifically on the section in question). In the second part, the Practical Intervention Methodology on delivering physical activity exercises for elderly and disabled people within urban centers itself is detailed.

Finally, we cannot forget that the whole project is structured around the creation of the InAbled Cities App (IC App), which is the final objective of the IMPLEMENTATION PHASE, and will allow the engagement and adherence of the members of the target populations in the practice of physical activity. For this reason, this document includes the characteristics considered necessary for the App, as well as indications on its structure and operation.

We feel that it is important to mention that the intervention will be directed by physiotherapists as they are considered the best qualified professionals for this purpose. According to the Europe Region world Physiotherapy[1]: "Physiotherapy involves specific interventions to individuals and populations where movement and function are, or may be, threatened by illness, ageing, injury, pain, disability, disease, disorder or environmental factors. Such interventions are designed and prescribed to develop, restore and maintain optimal health". These interventions are performed by physiotherapists who "are autonomous health professionals are responsible for developing, maintaining or restoring motor function and movement throughout the lifespan using evidence-based practice. They relieve pain and treat or prevent physical conditions associated with injury, disease or other impairment".[1]

Moreover, the prevention and promotion of health in a healthy population, also through physical activity, is a legal competence of physiotherapists or specialized medical professionals, as indicated in different regulations such as the Spanish law for the organization of health professions.[2]

1.1 Practical Intervention Methodology Objectives

Practical Intervention Methodology (PIM) main objectives are:

- Gather the scientific and technical information necessary to develop the activities corresponding to the IMPLEMENTATION PHASE in the pilot territories.
- Serve as inspiration for any municipality wishing to implement actions similar to this project.

- Develop the procedures to be followed in the pilot activities.
- Describe the necessary characteristics of the InAbled Cities App so that the pilot actions can be carried out.
- Compile the necessary indications for the correct development of the App.

2. TARGET POPULATION AND CATEGORIZATION

The InAbled Cities project target groups are older adults (≥65 years old) and adult people with disabilities (≥18 years old). The group of people with disabilities includes all types of physical or motor, sensory, organic or visceral, intellectual, psychic or multiple disabilities. This gives us a very heterogeneous population, with users having quite different functional situations and fitness states. Our main objective is that users do physical activity autonomously through the use of the IC App, with no physiotherapist to guide them. In order to avoid people in good shape getting bored or more sedentary people setting too difficult goals, it is fundamental to set a customized starting point, a baseline based on physical and functional capabilities of each user. This should prevent users from getting injured and dropping out. To do this, there are different tests and questionnaires in the scientific literature. As users will be autonomously answering the questions to establish their PA baseline (there will not be any physiotherapist to run these tests), we have discarded complex ways of categorizing our population, and have selected a small and easy survey for this objective. This will allow the categorization process to be very simple and time effective, making the App very user friendly.

The following categories are proposed taking into account the functional capacity, autonomy and level of usual PA of the potential users of the App (elderly and people with disabilities) and using some of the most generally used PA guidelines[3-11] and PA tests[12-15] as inspiration. The 5 categories are:

- **CATEGORY 1**: people over 65 years old and/or with disabilities that cannot get up from a chair or are in a wheelchair, but can go out to the street with or without the help of a caregiver.
- **CATEGORY 2**: people over 65 years old and/or with disabilities that can get up from a chair with technical or a caregiver's help, but cannot walk around or need the help of 2 caregivers to do it. They do not feel safe walking, even on flat surfaces, and have serious balance problems (very high risk of falls).

- **CATEGORY 3**: people over 65 years old and/or with disabilities that need help from a caregiver or need walkers, crutches or any other mobility aid to wander around (even at home) or get up from a chair. They do not feel safe on uneven floors or stairs, and have balance problems. They are usually afraid of falling when walking, even on flat surfaces (high risk of falls).
- **CATEGORY 4**: people over 65 years old and/or with disabilities that can wander around freely, but only with the help of a cane or caregiver on the street. At home, they do not use any technical or caregiver's help and have no difficulties getting up from a chair. They do not feel completely safe on uneven floors or stairs, and have small balance problems. They are usually afraid of falling when walking on uneven surfaces (moderate risk of falls).
- **CATEGORY 5**: people over 65 years old and/or and people with disabilities that can wander around freely, without any technical aid or help from a caregiver. They feel safe in different terrain conditions (stairs, uneven floors, etc.), have no balance problems (they are not afraid of falling -low risk of falls-) and have no difficulties getting up from a chair.

People over 65 years old and/or people with disabilities that cannot get up from a chair or are in a wheelchair, and cannot go out to the street are out of our target population. Likewise, category 5 people with above-average physical capacity are not eligible for this program, as it is designed for a wide range of people aged 65+ or disabled with average or below-average physical capacity.

To be classified into one of these categories, we propose a few yes/no questions that resemble a diagnostic algorithm, to make it easy for our target population or people with no health care background (e.g. users' relatives) that assist them.

The three questions have been selected thinking of: basic daily life's functional capacities (walking, getting up from a chair…), the need of any support for

performing them (technical or/and caregiver's help) and the risk of falls. The final result is shown in **Figure 1**.

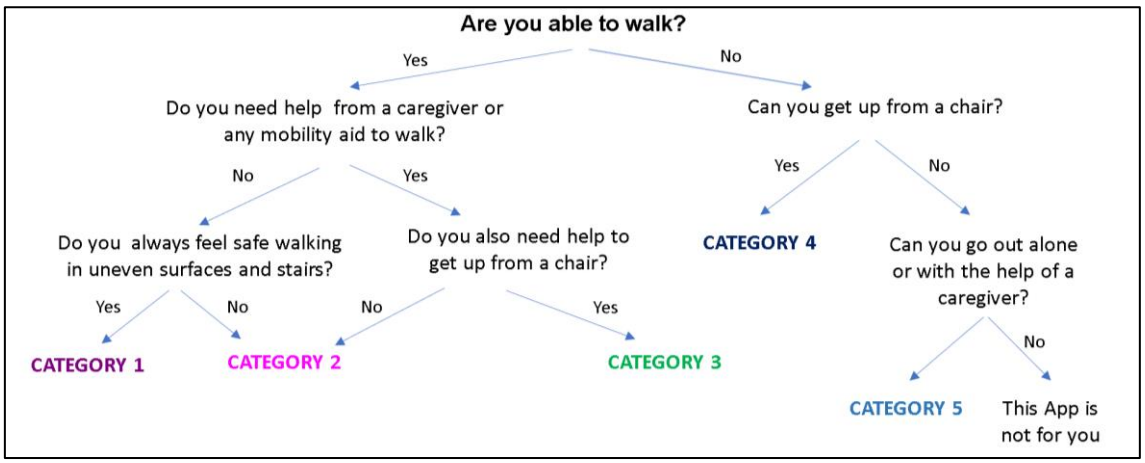

Figure 1: InAbled Cities categorization algorithm.

3. HOW TO IDENTIFY BARRIERS TO PHYSICAL ACTIVITY IN THE TARGET POPULATION

Before starting the implementation of the InAbled Cities project, it is necessary to reflect on these 2 questions:

- Why doesn't our target population do PA?
- What can we do to get them to participate more?

In order to answer them, and thus be able to create a work methodology that encourages participation in project activities and, in general, that promotes PA, the following actions have been carried out:

- Root Cause Analysis (RCA) for identifying existing barriers (individual, social, environmental…) and needs faced by people over 65 years old and/or with disabilities for participating in physical activities within urban environments. RCA was implemented by 2 focus groups composed of people over 65 years old and/or with disabilities in each pilot territory.
- A survey for our target group and caregivers for identifying existing barriers to participation in physical activities within urban areas and the needs of their target group.

For more information about this, please check deliverable 2.2 “Methodology of Root Cause Analysis and focus groups implementation”. The final product of all this work has been the matrix of barriers and needs of the target population, which is detailed below in **Figure 2**.

Among the facilitators, we can see that some of the most important are social contact, that the programs are continuous, that the activity is fun and takes place in a local environment, and that this environment is safe and well cared for. These aspects have been taken into account when choosing the locations where the PA sessions will take place. In addition, group exercises have been developed to generate more fun dynamics and the App will have a Chat to encourage social contact.

	Barriers	Facilitators
Bologna	Laziness	Social contacts
(urban) &	Cultural differences	Continuity of programs
Guadalupe	Financial contributions	Activity aimed at the area
(rural)	Lack of motivation	Easy to use
	Physical difficulty	Knowledge that exercise is healthy
	Not feeling safe	Fun
	Lack of time	Exercise is good for self-reliance
	COVID-regulations	Good accessibility of facilities
	Complicated technology	
	Poor infrastructure	
	Poorly accessible facilities	
	Nuisance caused by burglars	
	Insufficient walking/cycling paths	
	Insufficient seating options	
Bologna	Dependency on others for PA	Maintained environment
(urban)	Poor road safety	
	Absence of parks	
	Insufficient control by police	
	insufficient control by a muni-	
	cipality or neighbourhood team	
Guadalupe	Health complaints	Having a dog
(rural)	Heat	Feeling safe
	Insufficient knowledge of the	
	benefits of exercise	
	Insufficient safety of	
	walking paths/sidewalks	

Figure 2. Matrix of barriers and needs.

4. URBAN ENVIRONMENTS

While the factors to be taken into account by cities to ensure infrastructures that promote physical activity among their citizens is not the primary focus of this document, it is interesting to reflect on some main points in this regard, since they may be of help to other cities wishing to implement the InAbled Cities project in the future, or simply wishing to promote PA among their citizens.

The way cities are planned, designed and renewed is strongly associated with the resulting levels of physical activity and health for both individuals and communities. Whether or not an individual, group or whole community will be physically active is influenced by a variety of factors (**Figure 3**, World Health Organization and the Healthy Cities movement recommendations).[16]

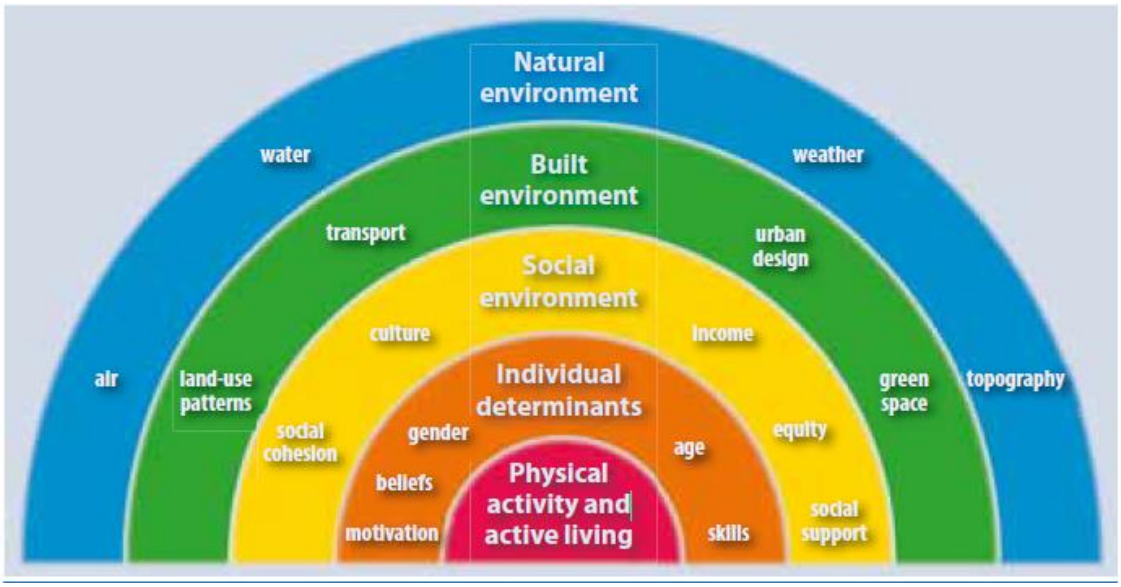

Figure 3. Factors influencing physical activity in communities.
Source: WHO (adapted from Dahlgren).[16]

Recommendations for the cities are:

- Increase access to active spaces. Set up playgrounds, sporting areas, trails, paths and parks within walking or wheeling distance. Provide well-

maintained and safe parks and play areas for children (such as playgrounds, wading pools, outdoor skating rinks, skateboard parks, sports fields and cycle lanes, tracks and paths). Provide free or subsidized access to swimming pools and other facilities to children and youth, older adults and people with disabilities.

- Improve accessibility to public transport and/or provide transport to recreation facilities for people with disabilities, older adults and families in disadvantaged circumstances.
- Increase efforts to involve people with disabilities and chronic illnesses (of all ages) in appropriate physical activity. This will require improvements in accessibility in the built and natural environment and a stronger role by health professionals and caregivers in long-term care facilities.
- Encourage cycling as a mode of transport for all ages by enforcing slower speed limits for cars on city streets, giving higher priority to cyclists in transport policies, building cycle lanes, tracks and paths, improving road design and offering cycling training to young people, old people and women in ethnic minority groups.
- Avoid:
    - Lack of vegetation;
    - Absence of benches or fountains;
    - Paucity of elements that facilitate exercise intensity (stairs, ramps or sand);
    - High levels of pollution, noise or car traffic;
    - Safety or criminality associated issues.

5. STRATEGIES ON ENGAGEMENT AND METHODOLOGIES TO FOSTER ADHERENCE TO PHYSICAL ACTIVITY

To promote project activities and involve elderly and citizens with disabilities into active participation in pilot actions, a logical frame of action was developed: the Citizen Engagement Strategy (CES). CES was developed by specialists on communication and citizens engagement of the city of Bologna with support of external experts.

The main aim of CES is to provide communication methodologies and tools for the engagement of the target population into pilot project activities and maintaining their motivation to participate in physical activities within urban centers after the project ends.

To develop CES, a Steering Committee, Extended working group, and Focus groups with members of the target population were created. The index of the final content of CES is the following (for more information about this, please direct to CES itself):

- Guidelines for the drafting of the CES;
- Levels of target group engagement and participation in project implementation;
- Stages of target group involvement in project activities;
- Methods and tools for implementing CES;
- Guiding principles for implementing CES;
- Procedures and indicators for evaluating CES implementation and results;
- Directions for implementing a training session on the CES.

6. PHYSICAL ACTIVITY GENERAL GUIDELINES

This section summarizes general information on the recommendations for the design of physical activity programs in the target population of our project. This information is derived from an extensive bibliography search of scientific articles to obtain the best available updated evidence.

6.1 Precautions Before Starting to Exercise

This section describes the aspects to be taken into account before starting to exercise in order to prevent risks.

The American College of Sports Medicine (ACSM) describes exercise preparticipation health screening recommendations. Most people can start exercising without visiting a doctor first, but, in other cases, it is advisable to have a specialist certify the suitability of physical activity. Points to consider before starting to exercise or increasing the intensity of the exercise are: current activity level, signs/symptoms of certain diseases and planned exercise intensity. The ACSM proposes the flow chart shown in **Figure 4** for preparticipation health screening.[17]

Another tool is the Physical Activity Readiness Questionnaire + (PAR-Q+). It is the improved version of PAR-Q. It is applicable to persons of all ages and individuals living with chronic medical conditions.

PAR-Q+ is validated[18] and is used worldwide by organizations to quickly and easily assess the existence of health risks before starting a physical activity program. It consists of two parts the first of which contains 7 simple questions about the health of the person who wants to start a physical activity program (the original PAR-Q). If one or more of the questions are answered positively, the second part of the questionnaire is carried out.

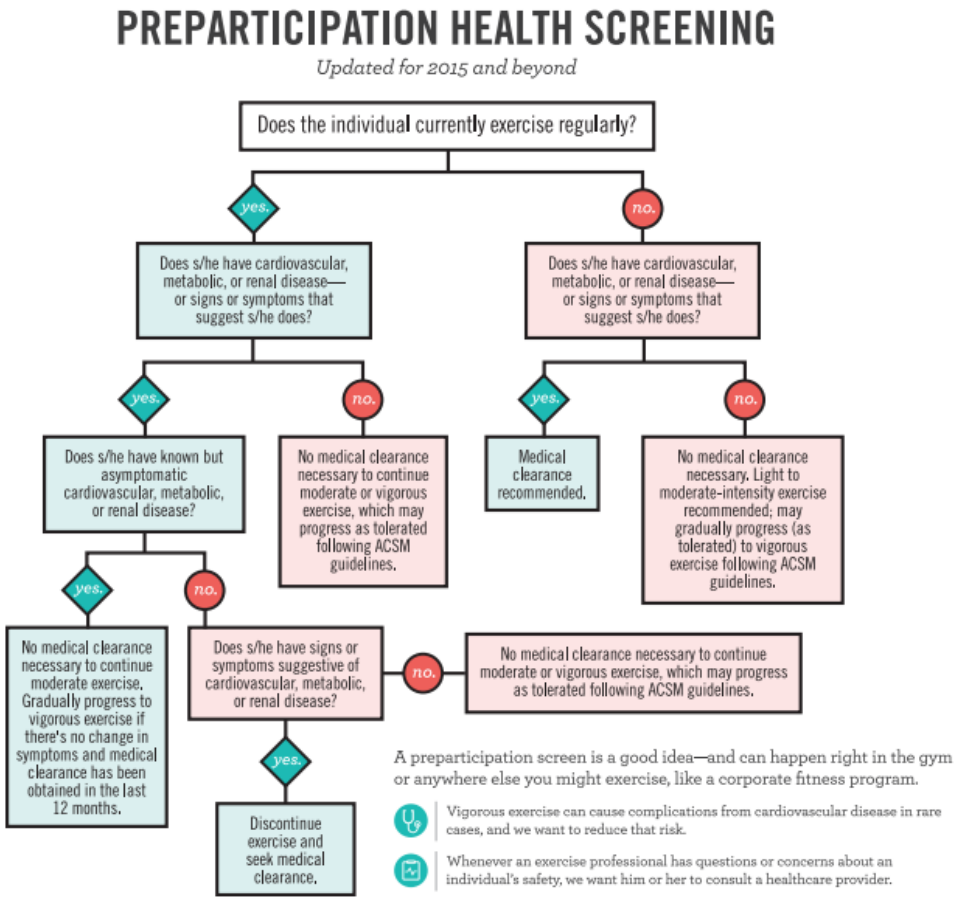

Figure 4. Preparticipation in PA health screening proposed by ACSM.

The questionnaire results indicate whether the person can begin the physical activity program in a reasonably safe manner, or whether he or she should consult with his or her physician before starting.

Persons at low risk can exercise at low to moderate intensities with minimal to no supervision; persons at intermediate risk should exercise under the guidance of appropriately trained, qualified exercise professionals; and persons at high risk should exercise in medically supervised settings that include qualified exercise professionals. Appropriate intensity and mode progression of physical activity and exercise is critical throughout the risk continuum.[19]

It was clearly established that the risks of being physically inactive far outweigh the small, transient risks seen after acute exercise in both asymptomatic and symptomatic populations across the lifespan.

6.2 Key Guidelines for Safe Physical Activity

To do physical activity safely and reduce risk of injuries and other adverse events, people should:

- Understand the risks, yet be confident that physical activity can be safe for almost everyone.
- Choose types of physical activity that are appropriate for their current fitness level and health goals, because some activities are safer than others.
- Increase physical activity gradually over time to meet key guidelines or health goals. Inactive people should "start low and go slow" by starting with lower intensity activities and gradually increasing how often and how long activities are done.
- Protect themselves by using appropriate gear and sports equipment, choosing safe environments, following rules and policies, and making sensible choices about when, where, and how to be active.
- Be under the care of a health care provider if they have chronic conditions or symptoms. People with chronic conditions and symptoms can consult a health care professional or physical activity specialist about the types and amount of activity appropriate for them.[3]

6.3 General Recommendations for Physical Activity

In this section we summarize the recommendations established by the different international organizations for the design of physical activity programs for an agreed set of health outcomes and population groups.

6.3.1 Recommendations for adults over 65 years old including those with chronic conditions and those living with disability

Strong recommendation.

The key guidelines for adults also apply to adults over 65 including those with chronic conditions and those living with disabilities. In addition, this group should also take into account the following key guidelines:

- As part of their weekly physical activity, older adults should do varied multicomponent physical activity that emphasizes functional balance and strength training as well as aerobic activities at moderate or greater intensity on 3 or more days a week, to enhance functional capacity and to prevent falls.[4]
- Older adults should determine their level of effort for physical activity relative to their level of fitness.
- Older adults with chronic conditions should understand whether and how their conditions affect their ability to do regular physical activity safely.
- Do at least 150 minutes of moderate intensity activity a week or 75 minutes of vigorous intensity activity if they are already active, or a combination of both.
- When older adults cannot do 150 minutes of moderate-intensity aerobic activity a week because of chronic conditions, they should be as physically active as their abilities and conditions allow, even if it is just light activity.[3,5]

6.3.2 Recommendations for people living with disability

- The evidence for those without disability and the resulting recommendations were extrapolated to be applicable to people with disability in general.[4]
- Adults with chronic conditions or disabilities, who are able, should do at least 150 minutes (2 hours and 30 minutes) to 300 minutes (5 hours) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) to

150 minutes (2 hours and 30 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Preferably, aerobic activity should be spread throughout the week.

- Adults with chronic conditions or disabilities, who are able, should also do muscle-strengthening activities of moderate or greater intensity and that involve all major muscle groups on 2 or more days a week, as these activities provide additional health benefits.
- The easiest way to increase activity levels is to build activity into the things we do every day, like going to work, shopping and seeing friends[4].
- When adults with chronic conditions or disabilities are not able to meet the above key guidelines, they should engage in regular physical activity according to their abilities and should avoid inactivity.
- Adults with chronic conditions or symptoms should be under the care of a healthcare provider. People with chronic conditions can consult a healthcare professional or physical activity specialist about the types and amounts of activity appropriate for their abilities and chronic conditions.
- For both adults with chronic conditions and adults with disabilities the type and amount of physical activity should be determined by a person's abilities and the severity of the chronic condition. For many chronic conditions, physical activity provides therapeutic benefits and is part of recommended treatment for the condition. However, the Guidelines do not refer to therapeutic exercise or rehabilitation, except in the context of how physical activity for disease prevention and general health benefits can be done by people with chronic conditions.[3]

Physical Activity in Adults with Specific Physical Disabilities:

- For many types of physical disabilities, the improvements have been shown with multicomponent physical activity programs that included aerobic activity (commonly walking), muscle-strengthening, and balance-training activities.[3]

Potential specific benefits include:

- Parkinson's disease: Improved physical function, including walking, balance, muscle strength, and disease-specific motor scores.
- Multiple sclerosis: Improved physical function, including walking speed and endurance, and fitness. Physical activity does not appear to exacerbate multiple sclerosis.
- Spinal cord injury: Improved walking function, wheelchair skills, muscular strength, and upper extremity function. Benefits can be seen with recent or older injuries and across severities of spinal cord injury.
- Stroke: Improved walking function, such as walking velocity or endurance.

Adults with physical disabilities can consult with a healthcare professional or physical activity specialist to match a physical activity plan to their abilities.[3]

6.3.3 Recommendations for adults (aged 18–64 years) including those with chronic conditions and those living with disability

Strong recommendation.

Should undertake regular physical activity:

- For substantial health benefits, adults should do at least 150 minutes (2 hours and 30 minutes) to 300 minutes (5 hours) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) to 150 minutes (2 hours and 30 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Preferably, aerobic activity should be spread throughout the week (when not contraindicated for those with chronic conditions).[3,4]
- Additional health benefits are gained by engaging in physical activity beyond the equivalent of 300 minutes (5 hours) of moderate-intensity physical activity a week.

Adults should also do muscle-strengthening activities at moderate or greater intensity that involve all major muscle groups on 2 or more days a week, as these provide additional health benefits.[3,4]

6.4 Physical Activity Intensity

6.4.1 Absolute intensity

Metabolic calculations and tables (METs): Absolute rates of energy expenditure during physical activity are commonly described as light, moderate, or vigorous intensity. Energy expenditure is expressed by multiples of the metabolic equivalent of task (MET), where 1 MET is the rate of energy expenditure while sitting at rest:

- Light-intensity activity is non-sedentary waking behavior that requires less than 3.0 METs; examples include walking at a slow or leisurely pace (2 mph / 3.22Km/h or less), cooking activities, or light household chores.
- Moderate-intensity activity requires 3.0 to less than 6.0 METs; examples include walking briskly (2.5 to 4 mph / 4.02 or 6.44 Km/h), playing doubles tennis, or raking the yard.
- Vigorous-intensity activity requires 6.0 or more METs; examples include jogging, running, carrying heavy groceries or other loads upstairs, shoveling snow, or participating in a strenuous fitness class.[3]

To graduate intensity based on METs, it is recommended to use the last 2011 compendium available in different languages on the following website constantly updated: Compendia - Compendium of Physical Activities (google.com)

6.4.2 Aerobic exercise

Number of steps: Another option is to graduate the physical activity intensity based on the number of steps measured by a pedometer.

Averaged approximately 4.400 steps/day had significantly lower mortality rates during a follow-up of 4.3 years compared with the least active women who took

approximately 2.700 steps/day; as more steps per day were accrued, mortality rates progressively decreased before leveling at approximately 7.500 steps/day.[20,21]

One way to set a step goal is the following:

- To determine one's usual daily steps, a person uses a pedometer or fitness tracker to count the number of steps taken on several ordinary days with no episodes of walking for exercise. Suppose the average is about 5,000 steps a day. (Most of those steps are light-intensity activity).
- With the pedometer or fitness tracker, the person measures the number of steps taken during a 10-minute walk. Suppose this is 1,000 steps. For a goal of 20 minutes of walking, the goal would total 2,000 steps (1,000 times 2).
- To calculate a daily step goal, add the usual daily steps (5,000) to the steps required for a 20-minute walk (2,000), to get the total steps per day (5,000 + 2,000 = 7,000).

Then, each week, the person gradually increases the number of total steps a day until the step goal is reached. Rate of progression should be individualized. Some people who start out at 5,000 steps a day can add 500 steps per day each week (10%). Others, who are less fit and starting out at a lower number of steps, should add a smaller number of steps each week.

6.4.3 Strength exercise

Time: For strength exercises, another way to measure exercise is time. Evidence tells us that it is better to work between 8-12 repetition, between 3-5 sets, when using moderate loads (40%-70% 1RM). If we establish a direct correspondence between the optimal execution time (concentric, isometric and eccentric phase), for example 2-3 seconds, for that exercise at that load, it will be possible to substitute the number of repetitions for time. It is called "*time under tension*". For this type of work, 30 seconds would be adequate. Of course, each subject has a different optimal execution speed, according to their strength profile. He may even feel the need to rest mid-set. For this

reason, working through time under tension allows people with different execution speeds to train at the same intensity level.[22]

For aerobic exercise, it is recommended at least moderate intensity accumulated in minimally 10 minute bouts, and add up to at least 150 minutes over the week. The evidence suggests that 30 minutes of daily moderate to vigorous physical activity accumulated, in addition to habitual daily activities, in healthy older adults is equivalent to taking approximately 7,000-10,000 steps/day.[20]

6.4.4 Relative intensity

Rating of Perceived Exertion (RPE): Modified Borg Scale of Perceived Exertion is a scale to subjective perception of effort on a scale of 1 to 10 (1 rest and 10 maximal effort). There is no total consensus between the graduation on the scale and the level of exercise intensity. After reviewing the different studies published on the subject,[3,23,24] we will use the following ranges:

1. Light intensity, work on sensations 1 to 3.
2. Moderate intensity, work on sensations 3 to 5.
3. Vigorous intensity, work on sensations 5 to 8.

Modified Borg RPE Scale		**Borg RPE Scale**	
0	Rest	6	No exertion at all
1	Really Easy	7	Extremely light
		8	
		9	Very Light
2	Easy	10	
		11	Light

		12	
3	Moderate	13	Somewhat Hard
4	Sort of hard	14	
5	Hard	15	Hard (Heavy)
6		16	
7	Really Hard	17	Very Hard
8		18	
9	Really Really Hard	19	Extremely Hard
10	Maximal, Just like my hard-est race	20	Maximal

Borg Scale of Perceived Exertion[24] which rates exertion on a scale of 6-20, can also be used.

Talk testing: Talk test is a subjective method of regulating exercise intensity and has been recommended:

1- For light intensity, comfortable speech is possible.
2- For moderate intensity, speech is limited to short phrases.
3- For vigorous intensity, speech is very difficult (comfortable speech is not possible).

Table 1. American College of Sports Medicine physical activity intensity classification for cardiorespiratory endurance and resistance exercise.[23,24]

Exercise intensity	VO_2R or HRR (%)	HRmax (%)	RPE	Talk test	METs (by age)			1RM (%)
					20-39 yr	40-64 yr	≥65 yr	
Light	30-39	57-64	1-3	Comfortably speech is possible	2,4-4,7	2,0-3,9	1,6-3,1	30-49
Moderate	40-59	65-75	3-5	Speech limited to short phrases	4,8-7,1	4,0-5,9	3,2-4,7	50-69
Vigorous	60-84	76-96	5-8	Speech is very difficult (Comfortable speech is not possible)	7,2-10,1	6,0-8,4	4,8-6,7	70-84

VO_2R: Oxygen Uptake Reserve. HRR: Heart Rate Reserve. HRmax: Maximum Heart Rate. RPE: Rating of Perceived Exertion (Modified Borg Scale). MET: Metabolic Equivalent of Task. 1RM: One-repetition maximum.

6.5 Exercise Programs Duration

Even though both WHO[4] and U.S. Department of Health and Human Services[3] guidelines recommend doing PA on a regular basis, beneficial exercise programs found in the literature vary from 8 to 12 weeks in length (most frequently 12 weeks). However, this program duration is due to scientific research time limitations. Thus, we recommend to try to implement long term actions, and if that is not possible, actions with at least 12 weeks period.

6.6 Appropriate Types and Amounts of Activity

People can reduce their risk of injury by choosing appropriate types of activity. The safest activities are moderate intensity, low impact, and do not involve purposeful collision or contact. Also, it´s fundamental to perform adequate amounts of activity and set proper personal goals. Performing a variety of different physical activities may also reduce the risk of overuse injury.

General guidance for inactive people and those with low levels of physical activity on how to increase physical activity:

- Use relative intensity (intensity of the activity relative to a person's fitness) to guide the level of effort for aerobic or muscle-strengthening physical activity.
- Generally, start with relatively moderate-intensity activity. Avoid relatively vigorous-intensity activity, such as shoveling heavy snow or running. Adults with low fitness may need to start with light activity, or a mix of light-to-moderate-intensity activity.
- First, increase the number of minutes per session (duration) and the number of days a week (frequency) of moderate-intensity activity. Later, if desired, increase the intensity.
- Pay attention to the relative size of the increase in physical activity each week, as this is related to injury risk. For example, a 20-minute increase each week is safer for a person who already does 200 minutes a week of jogging (a 10% increase) than in a person who does 40 minutes a week (a 50% increase).

The available scientific evidence suggests that adding a small and comfortable amount of light- to moderate-intensity activity, such as walking 5 to 15 minutes per session, 2 to 3 times a week, to one's usual activities results in a low risk of musculoskeletal injury and no known risk of severe cardiac events. Because this range is rather wide, people should consider three factors when individualizing their rate of increase: age, level of fitness, and level of experience.[7]

6.7 Recommendations to Design Exercises for Older Adults

6.7.1 To improve strength

1. Intervene on large muscle groups: quadriceps, gluteus, hamstrings, pectoral, dorsal, deltoid, biceps and triceps;
2. Perform muscle strengthening exercises 3 times a week on alternate days;
3. Perform 3 sets of 8 repetitions of each exercise;
4. Start with an intensity of 40% (moderate effort) and;

5. Increase as the subject adapts.[7]

6.7.2 To improve flexibility

- Stretch in joints' natural positions, preferably with global postures;
- Perform stretching at least 3 times a week. They should be an integral part of the warm-up and relaxation exercises;
- Exercises must be performed with slow movements, followed by a static stretch that is maintained between 15 to 20 seconds;
- Perform 3 to 5 repetitions of each exercise;
- A stretching session should last between 15 to 30 minutes;
- Do not apply in cases of acute muscle or tendon inflammation, or capsuloligamentous or nerve injuries in acute phase.[7]

6.7.3 To improve resistance

- Perform movements that involve body displacement in a sustained way, such as walking, Nordic Walking (walking with poles), practicing cross-country skiing, running, cycling...
- Very active people can practice endurance-enhancing exercise every day.
- For active people, it is recommended going for a walk daily.
- For fragile people, it is recommended going out to the street daily.
- For very active people, carry out this type of exercise 1 hour per session.
- For active people, between 40 to 60 minutes per session.
- For people with fragility, go for a walk of about 30 minutes per session. If due to their physical condition they cannot do this amount of exercise in a row, you can walk 3 periods of about 10 minutes.
- For all levels, times can be accumulated throughout the day, as long as physical activity lasts a minimum of 10 minutes.
- If physical activity is vigorous, the times are reduced by half, provided that physical activity lasts at least 10 minutes.
- The two types of activity (moderate and vigorous) can be combined.

- The appropriate level in which people should move must be rated by themselves as light or moderate. This is the level that allows you to talk to another person while you do the exercise.
- Another way to control effort can be through the control of Heart Rate (HR). To know the maximum HR that can be reached by exercising, the following formula must be used: 170 - age. For example, a person who is 70 years old should not exceed 100 beats per minute while doing exercise.[7]

6.7.4 To improve balance

- The programmes with the best evidence are the Otago Exercise Programme (OEP),[26] Tai Chi, and the Falls Management Exercise programme (FaME -sometimes called PSI). Evidence suggests that new programmes such as Lifestyle integrated Functional Exercise (LiFE) might achieve similar or even better results.

6.8 Recommendations to Design Trails

- Identify public spaces potentially suitable for designing walking trails or exercises situated close to the recruitment centers.
- Exclude spaces with at least one of the following environmental restrictions that might negatively influence walking:
    - No accessibility by public transportation.
    - Lack of vegetation.
    - Absence of benches or fountains.
    - Presence of very long or high slopes.
    - Scarcity of elements that facilitate exercise intensity (stairs, ramps or sand).
    - High levels of pollution, noise or car traffic.
    - Safety or criminality issues.

- Measure urban elements of intensity (stairs, ramps and types of surfaces) in terms of length, slope and height using, for example, laser rangefinder.
- Develop a scoring table to classify the intensity of each urban element based on the energy expenditure requirements for the physical activities that each urban element demands.
- Design various intensity level trails (low, moderate and high) at each public space, combining the urban elements previously scored.
- To facilitate access and achieve a training effect, trails can be continuous and circular, with several points of access and with no traffic lights or other obstacles to walking.
- Make a map with the trails.[27]

6.9 Recommended General Structure of the Exercise Session

- Minimum 5 minutes of warm-up.
- Minimum 20 to 30 minutes of training or main activity (multicomponent physical activity that includes balance training, muscle strengthening, flexibility and aerobic activities).
- Minimum 5 minutes of cool down.[28]

7. INABLED CITIES PHYSICAL ACTIVITY GUIDELINES

Based on extensive bibliography research, we have designed efficient physical activity methodologies and exercises for older adults and people with disabilities within urban spaces.

7.1 InAbled Cities Exercise Session Structure

Our practical application of all these principles would be:

1. A light warm up, following a protocol of getting out of home and approaching green environments
2. 1 or 2 balance exercises, at the beginning in order to have all the possible energy available. Category 1 should include here some upper body flexibility exercises.
3. Between 3 to 5 strength exercises, at least one for each part of the body. Priority for lower body on category 1, 2 or 3; upper body on 4 or 5.
4. 1 or 2 flexibility exercises.
5. Aerobic exercise (between 10 and 30 minutes).
6. Optionally, some of the group exercises can be carried out.
7. Finish the session with a cool down.
8. The session should not take more than 1 hour.

Model Session:	
Warm up	The warm-up and cool-down are a guided set of actions that take the user from home to the outdoors at the beginning and back home at the end of the workout.
Balance Strength Flexibility	Balance, strength, and flexibility (short efforts) are categories of exercises that demand a higher amount of energy per unit of time so we do them at the beginning.
Aerobic	We leave aerobic activity for the end of the session once all systems are properly activated. We should aim for continuous activity for at least 10 minutes.

Group exercises Cool down	Group exercises are another category of exercises, in which more than one user participates, who can communicate to meet using the chat.

7.2 Optimal Recommended Dose

Exercise is the universal pill for almost all diseases and especially for our elderly and/or people with disabilities populations. Like all medicines, it is necessary to apply the right dosage. Not too little and not too much. In this way, we will avoid frustration, dropout and fatigue, as well as overtraining and undertraining.

Adults over 65 and people with disabilities should perform multicomponent functional physical activity that emphasizes balance and muscle strengthening 3 or more days a week, as well as at least 5 days a week of moderate to vigorous intensity aerobic exercise. If this is not possible, get as close as possible to these figures:

- Time per session: between 40 minutes and 1 hour.
- Short efforts (strength, balance and flexibility exercises): between 3 and 5 exercises per session.
- Long efforts (aerobic exercises): periods of a minimum of 10 minutes of light intensity (RPE* 1-3) or in periods of any duration of moderate to vigorous intensity (RPE* 3-8),[6] accumulating a minimum of 30 total minutes of light intensity or 20 minutes of moderate to vigorous intensity per day and at least a total of 150 minutes to 300 minutes per week of light intensity or 75 minutes of vigorous intensity per week or a combination of both.

*About RPE remember: Rating of Perceived Exertion is measured using the modified Borg scale ranging from 0 (no exertion) to 10 (maximal exertion).

7.3 General Progression Criteria

Here is some useful information for exercisers or their caregivers to help them know if the exercise is adequate or if it is being done at the appropriate load. If not, it is recommended to change the exercise or the load.[29] Following these simple instructions will allow for safe exercise and safe progression over time.

7.3.1 Short effort exercises

In the following table general progression criteria for strength exercises can be consulted. If the exercise and the load are adequate, 3 to 4 sets (each set of 8-12 repetitions) can be performed in 30 seconds, being the time needed to recover less than 2 minutes and the person exercising feeling the need to stop due to fatigue only occasionally.

	Maybe this exercise is too demanding for me!	*This exercise is perfect for me!*	*I can move forward!*
No. sets	**1-2**	**3-4**	**More than 4**
Work	**15 sec.**	**30 sec.**	**45 sec.**
Rest	**More than 4 min.**	**Less than 2 min.**	**Less than 1 min**
Stops	**Necessary**	**Occasional**	**No need to stop**

Load measurement

The exercises have been designed always thinking about the resistance of gravity, for outdoor environments and without the need of fitness equipment (such as weights or rubber bands). Accuracy in load measurement is limited. Taking this into account, we can regulate the load indirectly focusing on the following parameters[30]:

	Easier (-)	Harder (+)
Support base	More stable	Less stable
Angle	Vector of force and gravity closer to 90º	Vector of force and gravity almost parallel (0º)
Type of contraction	Isometric and eccentric	Concentric and eccentric, plyometric
Execution speed	Without requirement	Fast concentric, slow eccentric
Multi tasking	Single task	Combined upper and lower limb tasks, cognitive tasks

Strength exercises progress by increasing speed, as more repetitions the person does in the same work time the harder it gets.

Balance exercises progress in quality. Once a balance exercise gets easy, the person should try doing it for a longer period of time, or doing it with their eyes closed. Then, when this gets easy too, start doing another exercise, more complicated.

7.3.2 Long effort exercises

Aerobic exercises progress by increasing each week, about 10% more steps. Also, can be increased velocity, unlevel, time, distance and/or intensity in RPE and talk test. You can also increase the number of days you walk. The ideal is to walk every day.

Exercise intensity	Time	Distance	Speed	Steps	%HRR*	RPE**	Talk test
Light	≤30 min	≤ 3 Km	≤ 3,22 km/h	≤ 4.400 steps/day	30-39	1-3	Comfortable speech is possible
Moderate	30 min	3-5 km	4,02-6,44 Km/h	4.400-7.500 steps/day	40-59	3-5	Speech limited to short phrases
Vigorous	≥30 min	5-10 km	≥ 6,44 km/h	≥ 7.500 steps/day	60-84	5-8	Speech is very difficult

*%HRR: Percentage of Heart Rate Reserve.

**RPE: Rating of Perceived Exertion (Modified Borg Scale).

7.4 Exercise Code Number

It is a 3 alphanumeric characters code associate with each exercise. In the case of strength and balance exercises:

- First characters refer to the category the exercise belongs to (a number between 1 to 5).
- The second character, in the case of strength exercises, refers to whether it is an upper, lower body or trunk/global exercise (1 for lower body, 2 for upper body and 3 for trunk or global). In the case of balance exercises, it will be a B.
- The third character indicates the order in which the exercises will appear to the user, either by complexity or priority. 1 will be the easiest and basic to start in each category, and the others will be increasingly complex and less priority (from 1, 2, 3...).

Example: **4.2.1.** means that the exercise belongs to category four, it involves the upper limb group of exercises, and that it´s the easiest exercise, so the user must start with it. Based on the progression criteria described above, if it is easy for the user, he should move on to next exercise, 4.2.2., or even change category, going to the first exercise of upper limb of the next harder category (5.2.1). If the user finds it difficult, he can try the lower category group of exercises for upper limb (3.2.1).

For flexibility exercises, the code consists on 3 characters:

- First an F, to indicate the type of exercise.
- Then, a character that refers to the part of the body involved in the exercise (1 for lower body, 2 for upper body and 3 for trunk or global)
- Lastly, a number starting from 1, for identification purposes.

In the case or warm up/cool down protocols, and group exercises, it will only be composed of 2 digits.

- First, a letter (W for warm up in categories 1 and 2, A for warm up in categories 3-5, C for cool down in categories 1 and 2, O for cool down in categories 3-5 and finally G for group exercises).
- Second, a number starting from 1, stating the order in which the Warm up/ cool down protocols should be performed. In the case of group exercises, the number is just to facilitate identification.

A more detailed description of the exercises designed for each section of the exercise session, classified by category and arranged in order of difficulty, can be found in *Annex 1*.

7.5 InAbled Cities Exercise Matrix

All previous information can be organized in a matrix that correlates target groups, environments/urban spots and exercises.

Group exercises are another category of exercises, in which more than one user participates. Users can communicate to meet through the chat. Below is an example of this. Please check the color chart for environment information:

- Blue: Swimming pool/ lake or river
- Grey: Park/garden with benches
- Green: Forest
- Red: Bike Lane.
- Orange: Walking circuits, trails.

CATEGORY	WARM UP	BALANCE	STRENGTH	FLEXIBILITY	AEROBIC	COOL DOWN
1	Protocol 1, 2	-	Arm curl	Analytic and global	Swimming Exercise in water	Protocol 1, 2

			Leg extension (if possible)	stretching exercise list		
2	Protocol 1, 2	Get up Walk sideways	Overhead press Hip flexion	Analytic and global stretching exercise list	Little walk	Protocol 1, 2
3	Protocol 3, 4, 5	Walk and turn Hands supported walk	Sit to stand Vertical push ups	Analytic and global stretching exercise list	Walking	Protocol 3, 4, 5
4	Protocol 3, 4, 5	Semi tandem walk	Hands supported squat Pull ups, feet on the floor	Analytic and global stretching exercise list	Walking/Nordic walk Cycling Swimming	Protocol 3, 4, 5
5	Protocol 3, 4, 5	Tandem walk Stay on one leg	Single leg squat Push ups	analytic and global stretching exercise list	Cycling walking	Protocol 3, 4, 5

8. HEALTHY HABITS INFORMATION

In this section, we include important information to improve the quality of life of elderly and people living with disabilities. This information will be included in the InAbled Cities App as a way that the App's impact on users' health is as beneficial and comprehensive as possible.

8.1 Sleep

Along with a balanced diet and regular exercise, sleep is one of the pillars of a healthy lifestyle. Getting the sleep that your body needs is essential for your health and well-being. To get good sleep, you need a good bedtime.

Follow these tips to establish healthy sleep habits:

- Keep a consistent sleep schedule. Get up at the same time every day, even on weekends or vacations.
- Set a bedtime early enough so you can get at least 7-8 hours of sleep.
- Do not go to bed unless you are sleepy.
- If you don't fall asleep after 20 minutes, get out of bed. Go for a quiet activity without much exposure to light. It is especially important not to use electronic devices (cell phones, tablets, computers...).
- Use your bed only for sleeping.
- Make your bedroom quiet and relaxing. Keep the room at a pleasant, cool temperature.
- Limit exposure to bright light at night.
- Do not eat a large meal before bedtime. If you are hungry at night, eat a light, healthy snack.
- Exercise regularly and maintain a healthy diet.
- Avoid long naps (more than 20-40 min).
- Avoid caffeine in the afternoon or evening.
- Avoid drinking alcohol before bedtime.
- Reduce fluid intake before bedtime.

- Establish a relaxing and consistent bedtime routine. Allow at least 30 minutes to give your mind time to wind down after a busy day. Here are some options to consider as you develop your own bedtime routine:
    - Shut off all electronic devices at least 30 minutes before bedtime.
    - Take a warm shower or bath and brush your teeth.
    - Read a book or write in a diary.
    - Turn the lights out at bedtime.[31]

8.2 Nutrition (Healthy Diet)

A healthy diet helps to protect against malnutrition in all its forms, as well as noncommunicable diseases such as diabetes, heart disease, stroke and cancer. Unhealthy diet and lack of physical activity are leading global risks to health.

Follow these tips to establish a healthy diet:

- Watch your total calorie intake. Energy intake (calories) should be in balance with energy expenditure.
- Aim for a healthy weight. To avoid unhealthy weight gain less than 30% of total energy intake should come from fats.
- Eat light meals several times a day.
- Be careful with saturated fats (found in fatty meat, butter, palm and coconut oil, cream, cheese, ghee and lard).
- It is suggested that the intake of saturated fats (found in fatty meat, butter, cheese,…) should be reduced to less than 10% of total energy intake.
- Industrially-produced *trans*-fats are not part of a healthy diet and should be avoided (found in baked and fried foods, and pre-packaged snacks and foods, such as frozen pizza, pies, cookies, biscuits, wafers, and cooking oils and spreads).
- Limiting intake of free sugars to less than 50-60 gr of total energy intake is part of a healthy diet. A further reduction to less than 25-30 gr of total energy intake is suggested for additional health benefits. Free sugars are

all sugars added to foods or drinks by the manufacturer, cook or consumer, as well as sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates.

- Remember fruit, vegetables, legumes (e.g. lentils and beans), nuts and whole grains (e.g. unprocessed maize, millet, oats, wheat and brown rice). At least 400 g (i.e. five portions) of fruit and vegetables per day, excluding potatoes, sweet potatoes, cassava and other starchy roots.
- Season meals nicely with little salt. Less than 5 g of salt (equivalent to about one teaspoon) per day. Salt should be iodized. Helps to prevent hypertension, and reduces the risk of heart disease and stroke in the adult population.
- Drink water frequently, even if you don't feel thirsty, to stay well hydrated.
- Calcium and vitamin D are the building blocks of your bones. Eat calcium-rich foods (milk, yoghurt and cheese) every day. We get vitamin D from the sun and from certain foods. Sunbathe with caution for 10 to 15 minutes a day and eat oily fish frequently. Any treatment for osteoporosis should always include a calcium and vitamin D supplement.
- Remember that fish is a source of high biological value protein, as well as omega-3 fatty acids.
- Foods and servings that should be consumed daily:
    - Foods rich in complex carbohydrates (pasta, rice, whole wheat bread, oatmeal, etc.) every day between 4 and 6 servings, depending on the degree of physical activity performed by the person.
    - 5 servings of fruits and vegetables a day as a minimum. If possible one of the servings of vegetables to be raw (salads) and if possible, one of the fruits to be a citrus fruit.
    - 2 or 3 servings of dairy products, in case of people with hyperlipidemia problems (high levels of fat in the blood), preferably choose skimmed or semi-skimmed.

- 1 to 3 servings of protein-rich foods (meat or fish or eggs or legumes), alternating consumption on different days of the week. Preferably low-fat meats (veal, lean pork, free-range animals), alternating between oily fish (sardines, anchovies, salmon) and white fish (whiting, hake, others).
- 1 serving of nuts (almonds, walnuts, hazelnuts) or olives.
- 30 g to 50 g per day of vegetable fats (oils) for culinary preparations, of which 30 g of Extra Virgin Olive Oil.
- Adequate hydration, 4 to 6 glasses a day of water or infusions.
- Use traditional culinary preparations of Mediterranean food with proximity and seasonal products.
- Foods that should be consumed occasionally:
  - Sausages and red meat.
  - Soft drinks and alcohol.
  - Industrial pastries.
  - Processed foods.
  - Salt, reduce or eliminate its consumption. It can be substituted by aromatic herbs.[32]

8.3 Risk of Falls

More than one out of four people who are 65 and older fall each year, and over 3 million are treated in emergency departments annually for fall injuries.

Four things you can do to prevent falls:

1. Speak up: Talk openly with your healthcare provider about fall risks and prevention. Tell a provider right away if you fall, worry about falling, or feel unsteady. Have your doctor or pharmacist review all the medicines you take, even over-the-counter medicines. As you get older, the way medicines work in your body can change. Some medicines, or combinations of medicines, can make you sleepy or dizzy and can cause you to fall. Ask your provider about taking vitamin D supplements to improve bone, muscle, and nerve health.

2. Keep moving: Begin an exercise program, like InAbled Cities, to improve your leg strength and balance. Exercises that improve balance and make your legs stronger and lower your chances of falling. It also helps you feel better and more confident. An example of this kind of exercise is Tai Chi. Lack of exercise leads to weakness and increases your chances of falling. Ask your doctor or healthcare provider about the best type of exercise program for you.
3. Get an annual eye exam: Once a year, check with your eye doctor, and update your eyeglasses, if needed. You may have a condition like glaucoma or cataracts that limits your vision. Poor vision can increase your chances of falling. Also, have your healthcare provider check your feet once a year. Discuss proper footwear, and ask whether seeing a foot specialist is advised.
4. Make your home safer. Remove clutter and tripping hazards:
    - Remove things you can trip over (like papers, books, clothes, and shoes) from stairs and places where you walk.
    - Remove small throw rugs or use double-sided tape to keep the rugs from slipping.
    - Keep items you use often in cabinets you can reach easily without using a step stool.
    - Have grab bars put in next to and inside the tub, and next to the toilet.
    - Use non-slip mats in the bathtub and on shower floors.
    - Improve the lighting in your home. As you get older, you need brighter lights to see well. Hang light-weight curtains or shades to reduce glare.
    - Have handrails and lights installed on all staircases.
    - Wear well-fitting shoes with good support inside and outside the house.[26,33]

8.4 How to Train

You can design your own training session. Different organisations, including the WHO recommend:

- Perform multicomponent exercise or varied exercises that include strength and balance exercises.
- Perform at least 5 days a week, 30 minutes to 1 hour of aerobic exercise at moderate intensity or 20 minutes to 40 minutes of moderate-to-vigorous intensity or mix both. If possible, do it every day. Also, it can be done in several periods per day in bouts of at least 10 minutes of light intensity or bouts of any length of moderate-to-vigorous physical activity.
- Perform at least 3 days a week, balance, strength and flexibility exercises, 3 to 5 different exercises each day. If possible, every other day, especially strengthening exercises.
- A training session should contain the following:
    - 5 minutes of warm-up.
    - 20 or 30 minutes of multicomponent physical activity that includes 3 to 5 different exercises of balance, strength and flexibility exercises,
    - At least 30 minutes of aerobic exercises, such as walking, with an intensity of at least 4 of rating of perceived exertion or speech limited to short phrases.
    - You can also do some group exercises as a complementary activity. You can use the application's chat to meet up.
    - 5 minutes to cool down.

- If it is not possible for you to perform this amount of exercise, get as close to it as possible. Everything counts to improve your health.

8.5 Brain Training

Cognitive health is the ability to clearly think, learn, and remember. It is an important component of performing everyday activities. Cognitive health is just one aspect of overall brain health. While some factors affecting brain health cannot be changed, there are many lifestyle changes that might make a difference:

- Get recommended health screenings.
- Manage chronic health problems like diabetes, high blood pressure, depression, and high cholesterol.
    - Consult with your health care provider about the medicines you take and possible side effects on memory, sleep, and brain function.
    - Reduce risk for brain injuries due to falls and other accidents.
    - Limit use of alcohol (some medicines can be dangerous when mixed with alcohol).
    - Quit smoking, if you currently smoke. Also avoid other nicotine products such as chewing tobacco.
    - Get enough sleep, generally seven to eight hours each night.

- Manage High Blood Pressure: not only helps your heart, but may help your brain too. Intensive lowering of blood pressure (even below the previous standard target of 140 for systolic blood pressure) lowers the risk for mild cognitive impairment, which is a risk factor for dementia. High blood pressure often does not cause signs of illness that you can see or feel. Routine visits to your doctor will help pick up changes in your blood pressure, even though you might feel fine. To control or lower high blood pressure, your doctor may suggest exercise, changes in your diet, and if needed — medications. These steps can help protect your brain and your heart.
- Eat Healthy Foods: A healthy diet can help reduce the risk of many chronic diseases such as heart disease or diabetes. It may also help keep your brain healthy.

- Be Physically Active: Being physically active, — through regular exercise, household chores, or other activities — has many benefits. It can help you:
    - Keep and improve your strength.
    - Have more energy.
    - Improve your balance.
    - Prevent or delay heart disease, diabetes, and other concerns
    - Perk up your mood and reduce depression.

  Studies link ongoing physical activity with benefits for the brain and cognition as well.

- Keep Your Mind Active: Being intellectually engaged may benefit the brain. People who engage in personally meaningful activities, such as volunteering or hobbies, say they feel happier and healthier. Learning new skills may improve your thinking ability, too. Lots of activities can keep your mind active. For example, read books and magazines. Play games. Take or teach a class. Learn a new skill or hobby. Work or volunteer.
- Stay Connected with Social Activities: Connecting with other people through social activities and community programs can keep your brain active and help you feel less isolated and more engaged with the world around you. Participating in social activities may lower the risk for some health problems and improve well-being. People who engage in personally meaningful and productive activities with others tend to live longer, boost their mood, and have a sense of purpose. Studies show that these activities seem to help maintain their well-being and may improve their cognitive function. So, visit with family and friends. Consider volunteering for a local organization or join a group focused on a hobby you enjoy. Join a walking group with other older adults. Check out programs available through your Area Agency on Aging, senior center, or other community organizations. Increasingly, there are groups that meet online too,

providing a way to connect from home with others who share your interests or to get support.

- Manage Stress: Stress is a natural part of life. Short-term stress can even focus our thoughts and motivate us to take action. However, over time, chronic stress can change the brain, affect memory, and increase the risk for Alzheimer's and related dementias. To help manage stress and build the ability to bounce back from stressful situations, there are many things you can do:
    - Exercise regularly. Practicing tai-chi or going for a walk, especially in nature, can restore a sense of well-being.
    - Write in a diary. Putting your thoughts or worries on paper can help you let go of an issue or see a new solution.
    - Try relaxation techniques. Practices such as mindfulness — which involves focusing awareness on the present moment without judgment — or breathing exercises can help your body relax. These can help lower blood pressure, lessen muscle tension, and reduce stress.
    - Stay positive. Release grudges or things beyond your control, practice gratitude, or pause to enjoy the simple things, like the comfort of a cup of tea or the beauty of a sunrise.

- Things you can do to train your brain:
    - To improve your memory, pay attention to your surroundings in the street when you go for a walk, and observe anything that catches your eye.
    - To improve your spatial orientation, try to notice the places you pass by when you go for a walk, and make different itineraries, do not always go through the same streets.
    - To improve your temporal orientation, go for a walk without a visible watch; try to walk for 30 minutes and when you finish, check how long it took you.

- Get in touch with other people, especially with those who transmit optimism and well-being.
- Always look for the positive side of your daily life experiences.
- Accept the changes your body undergoes during the aging process.
- Rest only as long as necessary; there must be a balance between rest and activity.
- Relax, dedicate 5 minutes to think about positive things.[34]

9. INTERVENTION DESCRIPTION

This section describes the actions to be carried out during the IMPLEMENTATION PHASE of the project, as well as its schedule. On the other hand, the steps to follow to create a map of points of interest in the participating municipalities where the pilot actions of the project will be carried out, are detailed.

9.1 Points of Interest (POI) Map

In relation to the development of the InAbled Cities App, which aims to be a guide for the promotion of physical activity in urban environments for the elderly and people with disabilities, there is one aspect of vital importance, the selection of the most appropriate places for physical activity. Here we detail the process of selecting spots in the pilot territories to create maps of the cities with possible spots to exercise, specific to each population, that can be used during pilot actions:

1- Cities will be contacted to report on the existence of green areas, sports facilities, walking and cycling paths or trails, and equipment such as bicycles or elliptical bikes.

2- The cities will provide documentation containing general points of interest and green spaces, as well as detailed information on available facility (e.g.: I migliori parchi di Bologna | Zero or Giardino del Velodromo | Comune di Bologna)

3- These spaces and facilities will be visited, taking advantage of scheduled training sessions (see below) for exercise specialists and communication managers.

4- During the visit, the most appropriate points of interest will be selected based on the recommendations mentioned above. If there are no circuits, they will be designed with 3 different degrees of difficulty, taking into account the distances to be covered and the difficulty of the terrain due to the presence of stairs or a steeper slope. Finally, photos will be taken to be included in the App.

9.2 Description of Pilot Actions

9.2.1 Training sessions

The main aim of this action is to deliver the project methodology to the specialists to be involved in the implementation of project pilot actions.

The training sessions (TS) that will be implemented within a 2-days program, and will take place in the locations selected for this project, namely, Bologna (November 29-30, 2021) and Sevilla la Nueva (May 2022), corresponding to the Multiplier Sport Events (MSE) 1-4.

TS will consist of parallel sessions, one directed to physical activity managers and other directed to communication managers.

9.2.2 Physical activity managers

The main aim of this TS is to deliver the Practical Intervention Methodology (PIM) to the physical activity managers that will take part in the pilot actions described below. The physical activity managers will preferably be physiotherapists, for the reasons described earlier in this document, but could also be other health professionals (such as nurses, occupational therapists...) and graduates in movement and sport sciences (supervised by physiotherapists and only for the healthy population) if necessary due to not obtaining a sufficient number of volunteer physiotherapists for the project.

The training will be provided by physiotherapists expert in therapeutic exercise and physical activity.

The main topics that will be discussed are:

- Aims of the project and aims of the pilot rounds.
- Benefits of PA, and in particular, its benefits when it is done outdoors, thus providing physical activity managers (PAM) with a base of knowledge of the fundamentals of our project, and some tools to help them answer participants´ questions and motivate them.

- Knowledge on PA: Since the PAMs will be in charge of guiding the participants in the PA sessions, they must have the necessary knowledge on this subject to be able to do so, effectively and safely. They will be informed about:
    - General WHO recommendations on PA.
    - Ways of grading PA intensity.
    - How to progress through the training sessions safely to avoid injury.
    - Components of a proper training session.
    - Scales of perceived exertion so that they can teach them to the participants, enabling them to control PA intensity autonomously.

- Functional categories in our project: categorization algorithm.
- What the pilot rounds will consist of and their participation in them (detailed below).
- InAbled Cities App: general aspects about its use and structure. This information will be expanded later when the App is more developed.

On the second day of the TS, the PAM will be shown examples of exercises and how the complete list of exercises is organized in the PIM. Also, some of them will be practiced by simulating a real PA session in one of the locations selected for this purpose, so that they become fully familiar with the PIM.

In order to support the TS, documentation will be created and delivered to the physical activity managers, summarizing all the information provided. In addition, the PAM will have access to the full version of the PIM to be able to expand on this information if they wish. Finally, they will be provided with a means of contact with the researchers so that they can resolve their doubts about the methodology of the project or about PA at any time.

9.2.3 Communication managers

The main aim of this training is to present Citizens Engagement Strategy (CES) to communication managers (CM) from local organizations, working with elderly and disabled people, interested in the project implementation.

The training will provide professionals with communication methodologies and tools for the engagement of elderly and disabled people into pilot project activities, and for maintaining their motivation to continue doing PA within urban centers after the project ends.

The training will be provided by city communication managers with support of external experts on communication and citizens engagement strategies.

The TS will consist of these key aspects:

- Aims of the project and of the TS.
- The implications of adopting a hooking strategy: what is required from me?
- Opportunities and costs of implementing an engagement strategy.
- The hooking strategy for the implementation of physical activities for the target group: What are the steps? Who does what?

9.2.4 Joint actions

PAM and CM will meet during the second day of the training sessions. In this meeting, they will get to know each other and create a basis for smooth cooperation during the pilot rounds.

They will also exchange ideas on possible locations for the development of the PA sessions with the adults over 65 and people with disability participating in the project. Visits will also be made to the chosen locations to check their suitability. Outdoor and indoor locations will be selected because, although the main aim of InAbled Cities is that people do PA outdoors, indoors locations will be necessary too to anticipate bad climate situations (rain, high or very low temperatures) that could endanger the health condition of the participants. In any case, outdoor locations should be prioritized. The locations selected will be named Points of Interest (POI) from here on in the document.

With the information obtained from these activities, a map of the municipality will be developed detailing the best locations for conducting PA, that will be used for the creation of the InAbled Cities App.

9.3 First Pilot Round

Pilot Round 1 (PR1) is aimed at testing and validating PIM with a special focus on adjusting it to urban locations. It will also provide content for development of InAbled Cities App and test it.

PR1 will start on Monday, march 21st, 2022 and will last 16 weeks (about 4 months), ending in July. The first 2 weeks will be dedicated to:

- Create intervention units (IU) composed of a PAM, a CM and between 5-12 participants (people over 65 and people with disabilities) depending on the needs of the group. Participants that know each other and have similar functional capacities will be located in the same units.

  This division into IU will facilitate the development of activities and generate a relationship of trust between participants and professionals. These units will be in direct contact with the facilitator of the project (person in charge of the project in the pilot territories) for coordination purposes.
- "Train" the IU: project documentation will be provided to managers. Also, an explanatory session between managers and the facilitator of the project will be held to discuss and clarify methodological doubts. Also, an online meeting with the developers of project methodology can be held if necessary.
- Make initial contacts with participants to set the first plenary session date and hour.
- Create a communication channel between members of the IU.
- Prepare the evaluation of the PR1.

The last 2 weeks will be dedicated to recollect evaluation data. Pilot physical activity actions will be implemented by PAM and CM from local organisations

working with elderly and people with disabilities, with administrative support of local authorities (cities).

9.3.1 Joint actions

At the start of the first week of the PR1, PAM and CM will meet with the participants in a joint session in an indoor POI to:

- Make any modifications necessary in the intervention units.
- Inform the participants about how the program and the training sessions are going to develop.
- Show the participants the InAbled Cities App and its use.

9.3.2 Physical activity managers

In this phase of the project, PAM's main role will consist of delivering PA sessions to participants, and motivating them to do the same by themselves.

They will carry out two types of actions:

- Face to face one hour PA sessions. PAM will meet in a POI with their group of participants, with the help and collaboration of the CM of their intervention unit. They will develop a standard session, designed for this purpose by the research team, which will correspond to the "Guided Training" section of the InAbled Cities App. This session will have been practiced beforehand in the TS. PAM will try to teach the participants all exercises highlighting the proper way of doing them, avoiding harmful movements.

  In the first of these sessions, the PAM will have to categorize the participants in one of the corresponding functional categories, in order to individualize their exercises (an attempt will be made to group participants of similar functional categories in the IU). Likewise, the PAM should adjust the intensity volume of the exercises to the physical possibilities of each participant, so that the sessions are not excessively light or hard, which would favor dropouts or could even generate an injury. Also, the participants can switch to a higher or lower functional

category, to adjust even more the exercises if necessary. This adjustment should occur throughout all PA sessions, in addition to teaching participants the progression criteria so that they can advance in their training autonomously and safely.
Finally, the InAbled Cities App will be tried out.

These sessions will be carried out with a minimum interval of 72 hours at the beginning, in order to allow an adequate recovery time, which could be reduced to 48 hours in the following weeks of training. In any case, it will never be carried out on 2 consecutive days.

- Control phone calls. In these calls, the PAM will follow up on the PA performed weekly by the participants, to motivate them to continue and answer any questions that may have arisen with the exercises. They will also remind them of tips on how to perform the exercises properly to prevent injuries.

The way in which these 2 actions are distributed throughout the duration of PR1 is detailed below. As it can be seen, 2 options have been designed. The first one is the preferred one, since it best meets the expectations and needs of the participants as expressed in actions previously carried out (2.2, matrix of people needs). The second option has been designed to reduce the demands on the volunteer professionals involved and to facilitate their recruitment if necessary.

- Option A:
    - Start of Physical Activity (PA) sessions: April 4th.
        - Initial joint organizational session.
        - Weeks 1-4: 2 sessions/week of one hour of face-to-face PA.
        - Weeks 5-12: 1 session/week of one hour of face-to-face PA.
    - End of PA sessions: July 1st.

- Option B:
    - Start of Physical Activity (PA) sessions: April 4th.
        - Initial joint organizational session.
        - Weeks 1-3: 2 sessions/week of one hour of face-to-face PA.
        - Weeks 4-8: 1 session/week of one hour of face-to-face PA.
        - Weeks 9-12: alternate 1 session/week of one hour of face-to-face PA with 1 control phone call a week.
    - End of PA sessions: July 1st.

To carry out all activities, PAM will have at their disposal the whole list of exercises designed for this project, described in detail, with the video recordings.
Also, at the end of the PA sessions, PAM will have to complete 3 measures to evaluate the intervention:

- Acceptability of Intervention Measure (AIM)
- Intervention Appropriateness Measure (IAM)
- Feasibility of Intervention Measure (FIM)

These 3 measures are scales of 4 questions with 5 closed answer options, from completely disagree to completely agree. For this purpose, they will use the CASTOR platform.

9.3.3 Communication managers

Communication managers are a key element in the development of the pilot actions, as they are responsible, as described in the Citizen Engagement Strategy, for engaging and maintaining the interest of the participants. Their role in the PR1 will consist of:

- Passing CHAMPS questionnaire to participants at the beginning of the PR1.
- Informing the target population about the project.

- Maintaining the interest of the participants by contacting with the participants by phone or email to remind them of the PA sessions and telling them that they should do other sessions on their own throughout the week. The recommended frequency is once every 10-15 days, but may be modified at the discretion of the CM.
- Organize socio-cultural events in the context of their functions as social assets in the community, before or after which participants can meet to do PA sessions.

At the end of PR1, they will make a call to the participants to collect data needed for the evaluation. This data will consist of:

- Passing System Usability Scale, for the evaluation of the App. It consists of a 10 item-questionnaire with five response options for respondents; from Strongly agree to Strongly disagree. For this purpose, they will use the CASTOR platform.
- Passing CHAMPS questionnaire to participants.

The CM will be provided with a template with the data to be filled in and/or questionnaires to be passed to the participants.
Also, at the end of the PA sessions, CM will have to fill out Acceptability of Intervention Measure (AIM), Intervention Appropriateness Measure (IAM) and Feasibility of Intervention Measure (FIM). For this purpose, they will use the CASTOR platform.

9.4 Evaluation Period

After the finishing of PR1, it will start an evaluation period that will have a duration of 2 months (July and August).
During this period, all data regarding the PIM, CES and InAbled Cities App will be analyzed. Using the results from this analysis, improvement strategies for the Pilot Round 2 will be designed.

In this period, all the changes necessary for the improved strategies will be prepared and implemented.

9.5 Second Pilot Round

Pilot Round 2 (PR2) is aimed at validating Practical Intervention Methodology and InAbled Cities App for their further use by other cities interested in promotion of physical activity for their elderly and disabled citizens.
PR2 will start in September 2022 and will last 16 weeks (about 4 months), ending in December 2022.

Again, PR2 actions will be implemented by PAM and CM from local organisations working with elderly and disabled people with administrative support of local authorities (cities).
"Intervention units" from PR1 will be reactivated, as well as new ones will be created, to group all new volunteers that want to participate in the project.

9.5.1 Joint actions

At the start of the first week of the PR2, PAM and CM will meet with the participants in a joint session in an indoor POI to:

- Form the intervention units, trying to group participants that know each other and/or have similar functional capacities.
- Inform the participants about how the program and the training sessions are going to develop.
- Show the participants the InAbled Cities App and its use so they can become familiar with it.

9.5.2 Physical activity managers

In PR2, PAM will carry out the same actions as described for PR1. The main difference between PR1 and PR2 will be that in the face-to-face sessions more time will be dedicated to getting participants accustomed to using the App as a guide for their training sessions.

At the suggestion of the PAMs, paper exercise guides will be created by category, with information on completion and progress, so that participants without a mobile phone can also attend FP2. Also, as aerobic exercises, such as walking or cycling, are not very attractive to users, group exercises will be added as foreseen in the exercise session structure of this document and others proposed by the PAS, which could not be included in the IC App, to encourage social interaction. Otherwise, the actions will be identical to those described in PR1.

Likewise, the distribution between the face-to-face PA sessions and the control phone calls will be different, since in this second round the aim is to encourage the autonomous performance of PA and the use of the App. It will be as follows (again, 2 options have been designed):

- Option A:
    - Start of Physical Activity sessions: September 19th.
        - Initial joint organizational session.
        - Weeks 1-8: 1 session/week of one hour of face-to-face PA.
        - Weeks 9-12: 1 control call per week.
    - End of PA sessions: December 11th.

An option B was created due to the delay in the availability of the final Spanish version of the IC App:

- Option B:
    - Start of Physical Activity sessions: September 19th.
        - Initial joint organizational session.
        - Weeks 1-4: 2 session/week of one hour of face-to-face PA.
        - Weeks 5-8: 1 session/week of one hour of face-to-face PA.
        - Weeks 9-12: 1 control call per week.
    - End of PA sessions: December 11th.

9.5.3 Communication Managers

The actions of the CMs will be the same as described for PR1, including the final data collection call.

9.6 Gantt Chart

2022											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			PILOT ROUND 1					PILOT ROUND 2			

1. Pilot Round 1:
    a. Start date: March 21st. First 2 weeks of preparation (initial contacts with users, training "intervention units").
    b. Start of Physical Activity sessions: April 4th.
        i. Initial joint organizational session.
        ii. Weeks 1-4: 2 sessions/week of one hour of face-to-face PA.
        iii. Weeks 5-12: 1 session/week of one hour of face-to-face PA.
    c. End of PA sessions: July 1st (Easter week free).

2. Pilot Round 2:
    a. Start date: September 5th. First 2 weeks of preparation (initial contacts with users, training "intervention units").
    b. Start of Physical Activity sessions: September 19th.
        i. Initial joint organizational session.
        ii. Weeks 1-8: 1 session/week of one hour of face-to-face PA.
        iii. Weeks 9-12: 1 control call per week.
    c. End of PA sessions: December 11th.

10. REFERENCES

1. Europe region World Physiotherapy [Webpage]. Brussels: Europe region World Physiotherapy; 2022 [access March 04, 2022]. What is physiotherapy?. Available in: https://www.erwcpt.eu/physiotherapy_and_practice/what_is_physiotherapy
2. Ordenación de las profesiones sanitarias. Ley 44/2003, de 21 de noviembre. Boletín Oficial del Estado, nº 280, (22/11/2023).
3. U.S. Department of Health and Human Services. Physical Activity Guidelines for Americans, 2nd edition. Washington, DC: U.S. Department of Health and Human Services; 2018.
4. Bull FC, Al-Ansari SS, Biddle S, Borodulin K, Buman MP, Cardon G et al. World Health Organization 2020 guidelines on physical activity and sedentary behaviour. Br J Sports Med. 2020;54(24):1451–1462.
5. NHS [Homepage]. London: National Health Service-UK; 2021 [updated august 04, 2021; access October 14, 2021]. Live well. Exercise. Available in: https://www.nhs.uk/live-well/exercise/
6. European Commission. Directorate-General for Education, Youth, Sport and Culture. Mapping on Access to Sport for People with Disabilities. Brussels: European Commission; 2018.
7. Consejo Superior de Deportes de España. Guia de actividad física para el envejecimiento activo de las personas mayores. Muy activas, activas y frágiles. Consejo Superior de Deportes de España; 2011.
8. Ríos-Hernández M (coordinator), Hueli-Amador JM, Arráez-Martínez JM, Bazalo-Gallego P, Enciso-Enciso M, Jiménez-Galván E et al. El acceso a la práctica de la actividad física y el deporte por parte de los colectivos específicos. Las personas con discapacidad. In: Consejo Superior de Deportes de España. Plan integral para la actividad fisica y el deporte; 2009.p.62-70.
9. Pont-Geis P (coordinator), Llano-Ruiz M, Soler-Villa A, Burriel-Paloma JC, Casajús-Mallén JA, Matínez-Fontecha C. El acceso a la práctica de la actividad física y el deporte por parte de los colectivos específicos. Actividad física y deporte en las personas mayores. In: Consejo Superior de

Deportes de España. Plan integral para la actividad fisica y el deporte; 2009.p.70-78.

10. Area de gobierno de empleo y servicios a la ciudadania. Dirección General de Mayores. Ayuntamiento de Madrid. Ejercicio físico para todos los mayores: moverse es cuidarse. Madrid: Ayuntamiento de Madrid; 2007.
11. Ministry of Education and Culture, Department of Culture, Physical Activity and Youth Policy of Finland. The National Policy Programme for Older People's Physical Activity. Health and well-being from physical activity;2012.
12. Cid-Ruzafa J, Damián-Moreno J. Valoración de la discapacidad física: el indice de Barthel. Rev Esp Salud Pública. 1997; 71(2): 127-137. Erratum in: Rev Esp Salud Pública. 1997;71(4):411-418.
13. Viosca E, Martínez JL, Almagro PL, Gracia A, González C. Proposal and validation of a new functional ambulation classification scale for clinical use. Arch Phys Med Rehabil. 2005;86(6):1234-1238.
14. Ureña R, Chiclana F, Gonzalez-Alvarez A, Herrera-Viedma E, Moral-Munoz JA. m-SFT: A Novel Mobile Health System to Assess the Elderly Physical Condition. Sensors [Internet]. 2020 [access April 20, 2021]; 20(5):1462 [17]. Available from: http://dx.doi.org/10.3390/s20051462
15. Stanmore E. Developing, Testing, and Implementing a Falls Prevention and Healthy Ageing App (Keep-On-Keep-Up) for Older Adults. In: Gerontological Society of America 2021 Annual Scientific Meeting. USA: Innov Aging [Internet]. 2021 [access April 20, 2021];5(Suppl 1):516[1]. Available from: https://doi.org/10.1093/geroni/igab046.1990
16. Edwards P, Tsouros A. Promoting physical activity and active living in urban. Copenhagen: WHO Regional Office for Europe; 2006. p. 9–20.
17. ACSM [Homepage]. Indianapolis: American College of Sports Medicine; 2021 [updated October 01, 2021; access October 14, 2021]. Preparticipation Screening Flow Chart. Available in: https://www.acsm.org/docs/default-source/default-document-library/read-research/acsm-risk-stratification-chart.pdf?sfvrsn=7b8b1dcd_6

18. Warburton DER, Jamnik VK, Bredin SSD, Gledhill N, PAR-Q+ Research Collaboration. The Physical Activity Readiness Questionnaire (PAR-Q+) and electronic Physical Activity Readiness Medical Examination (ePARmed-X+). Health Fitness J Can. 2011;4(2):3–23.
19. Bredin SS, Gledhill N, Jamnik VK, Warburton DE. PAR-Q+ and ePARmed-X+: new risk stratification and physical activity clearance strategy for physicians and patients alike. Can Fam Physician. 2013;59(3):273-7.
20. Tudor-Locke C, Craig CL, Aoyagi Y, Bell RC, Croteau KA, De Bourdeaudhuij I et al. How many steps/day are enough? For older adults and special populations. Int J Behav Nutr Phys Act [Internet]. 2011 [access October 15, 2021];8:80[19]. Available from: https://ijbnpa.biomedcentral.com/articles/10.1186/1479-5868-8-80
21. Lee I, Shiroma EJ, Kamada M, Bassett DR, Matthews CE, Buring JE. Association of Step Volume and Intensity With All-Cause Mortality in Older Women. JAMA Intern Med. 2019;179(8):1105–1112.
22. Morin JB, Samozino P. Interpreting power-force-velocity profiles for individualized and specific training. Int J Sports Physiol Perform. 2016;11(2):267–72.
23. Garber CE, Blissmer B, Deschenes MR, Franklin BA, Lamonte MJ, Lee IM et al; American College of Sports Medicine. American College of Sports Medicine position stand. Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. Med Sci Sports Exerc. 2011;43(7):1334-59.
24. American College of Sports Medicine. ACSM's Guidelines for Exercise Testing and Prescription. 9th. ed. Baltimor and Philadelphia: Wolters Kluwer Health, Lippincott Williams & Wilkins; 2013.
25. Borg GA. Psychophysical bases of perceived exertion. Med Sci Sports Exerc. 1982;14(5):377–381.
26. Campbell AJ, Robertson MC. Otago exercise programme to prevent falls in older adults [Internet]. Wellington: ACC; 2007 [access October 08,

2021]. Available from: https://www.livestronger.org.nz/assets/Uploads/acc1162-otago-exercise-manual.pdf

27. Arbillaga-Etxarri A, Torrent-Pallicer J, Gimeno-Santos E, Barberan-Garcia A, Delgado A, Balcells E et al; Urban Training™ Study Group. Validation of Walking Trails for the Urban Training™ of Chronic Obstructive Pulmonary Disease Patients. PLoS One [internet]. 2016 [access October 08, 2021];11(1):e0146705[11]. Available from: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0146705
28. Área delegada de deporte. Dirección general de deporte. Catálogo digital de publicaciones técnicas. Madrid es Deporte. Ayuntamiento de Madrid; 2020.
29. Dhahbi W, Chaabene H, Chaouachi A, Padulo J, G Behm D, Cochrane J et al. Kinetic analysis of push-up exercises: a systematic review with practical recommendations. Sports Biomech. 2018;1–40.
30. McGill SM, Cannon J, Andersen JT. Muscle activity and spine load during pulling exercises: influence of stable and labile contact surfaces and technique coaching. J Electromyogr Kinesiol. 2014;24(5):652–65.
31. AASM [Homepage]. Darien, Illinois: American Academy of Sleep Medicine; 2020 [updated august, 2020; access October 14, 2021]. Sleep education guideline. Available in: https://sleepeducation.org/20
32. Diet, nutrition and the prevention of chronic diseases: report of a Joint WHO/FAO Expert Consultation. WHO Technical Report Series, No. 916. Geneva: World Health Organization; 2003.
33. Clinical Excellence Commission for the Centre for Population Health. NSW Ministry of Health of Australia. Staying active and on your feet. NSW Ministry of Health of Australia; 2013.
34. NIA [Homepage]. Bethesda, Maryland: National Institute on Aging. National Institutes of Health; 2020 [updated October 01, 2020; access October 14, 2021]. Cognitive health and older adults. Available in: https://www.nia.nih.gov/health/cognitive-health-and-older-adults#mind

35. Freitas SR, Mendes B, Le Sant G, Andrade RJ, Nordez A, Milanovic Z. Can chronic stretching change the muscle-tendon mechanical properties? A review. Scand J Med Sci Sports. 2018;28(3):794–806.
36. Herbert RD, de Noronha M, Kamper SJ. Stretching to prevent or reduce muscle soreness after exercise. Cochrane Libr [Internet]. 2011 [access October 08, 2021]; Disponible en: http://dx.doi.org/10.1002/14651858.cd004577.pub3
37. Yeung SS, Yeung EW, Gillespie LD. Interventions for preventing lower limb soft-tissue running injuries. Cochrane Libr [Internet]. 2011 [access October 08, 2021]; Disponible en: http://dx.doi.org/10.1002/14651858.cd001256.pub2
38. Grigoletto A, Mauro M, Maietta Latessa P, Iannuzzi V, Gori D, Campa F et al. Impact of different types of physical activity in green urban space on adult health and behaviors: A systematic review. Eur J Investig Health Psychol Educ. 2021;11(1):263–75.
39. Izquierdo M, Merchant RA, Morley JE, Anker SD, Aprahamian I, Arai H et al. International Exercise Recommendations in Older Adults (ICFSR): Expert Consensus Guidelines. J Nutr Health Aging. 2021;25(7):824-853.

11. RELATION OF ABBREVIATIONS

- 1RM: One-repetition maximum.
- ACSM: American College of Sports Medicine.
- AIM: Acceptability of Intervetion Measure.
- CES: Citizen Engagement Strategy.
- CM: Communication Managers.
- FIM: Feasibility of Intervetion Measure.
- IAM: Intervention Appropriateness Measure.
- IC: InAbled Cities.
- IC App: InAbled Cities App.
- IU: Intervention Units.
- HRmax: Maximum Heart Rate.
- HRR: Heart Rate Reserve.
- MET: Metabolic Equivalent of Task.
- PA: Physical Activity.
- PAR-Q+: Physical Activity Readiness Questionnaire +.
- PIM: Practical Intervention Methodology.
- POI: Points of Interest
- PR1: Pilot Round 1
- PR2: Pilot Round 2
- RCA: Root Cause Analysis.
- RPE: Rating of Perceived Exertion (Modified Borg Scale).
- TS: Training Sessions
- VO_2R: Oxygen Uptake Reserve.

12. ANNEXES

12.1. Annex 1

12.1.1 Exercises description and progression

Warm up

This sequence of exercises is designed for the start of any training session, be it for strength, balance, flexibility or aerobics. It is the way to prepare the body and mind for physical activity, taking the person out of his house and taking him to a green environment.

Categories 1 and 2.
• **W1:** Leave home taking with you all the material you are going to need (water, maybe an old sock). Make sure that you have eaten enough food, that you have rested well and that you will be able to hydrate yourself true out of the workout. • **W2**: Get outside and go. • **W3:** Breathe deeply, filling your lungs with air. • **W4:** Increase speed progressively, heading to the training spot, or to the starting point. • **W5:** When you get there, put unnecessary items aside. Make sure the wheelchair is in a flat place and if possible, put the brakes on it. • **W6:** Make circles with your arms back and forth five times. • **W7:** Make some pull-push movements in the air with both arms, five to the front and five to the sky. • **W8:** Try to touch the ground with your fingertips and straighten up again five times. • **W9:** Cross your fingers in front and rotate the trunk to both sides. • **W10:** If possible, make some little movements with your legs. Extend your knees, make circles with your feet. Use your arms if it is necessary, to help.

Categories 3, 4 and 5.
• **A1:** Leave home taking with you all the material you are going to need to perform the exercises. Make sure that you have eaten enough food, that you have rested well and that you will be able to hydrate yourself true out of the workout. Comfortable clothes are recommended. • **A2:** Take a look at your map • **A3:** Get outside and start walking. • **A4:** Breathe deeply, filling your lungs with air. • **A5:** Increase speed progressively, heading to the training spot, or to the starting point. • **A6:** When you get there, put unnecessary items aside. Find a fixed point to grab in case you lose your balance. • **A7:** Make circles with your arms back and forth five times. • **A8:** Try to touch the ground with your fingertips and straighten up again five times. • **A9:** Cross your fingers in front with your elbows extended and turn the trunk to both sides. • **A10:** Make circles with your tiptoe on the floor. • **A11:** Do five little squats. • **A12:** Get on your tiptoes five times. Now you're ready to start!

Balance exercises

Balance exercises must be performed after the warm up, and before the strength exercises. We use that also as part of the activation process and we need all the available energy to perform that.

Codification: it does not make sense to assign the second digit of the exercise code to the part of the body in use. We put a B to refer to balance instead. All the other digits mean the same.

Category 2

Exercise code number:	2.B.1.
Name:	Stand up.
Description:	Look for a wall or horizontal bar in a garden or a park with good views. With or without help, try to get up from your chair (brakes on) and stand with as much support as you need. From this position, if you feel confident, stretch your arms up. To progress in the difficulty of this exercise, try to move more slowly. Next, try to do the exercise with your eyes closed.
Range of work time:	90 sec.
Recommended environment:	Park with flat floor and a horizontal bar.

Category 3

Exercise code number:	3.B.1.
Name:	Walk sideways.
Description:	Look for a flat area, clear of holes or bumps, looking at a wall or a fence, place your hands on a wall in order to keep your balance. From this position walk sideways with the trunk straight. Do 3 steps to the right and 3 steps to the left. To progress in the difficulty of this exercise, try to move more slowly. Next, try to do the exercise with your eyes closed.
Range of work time:	90 sec.
Recommended environment:	Park with flat floor.

Exercise code number:	3.B.2.
Name:	Up step backwards.
Description:	Look for a step with a handrail where you can hold on. Start with both feet down the step, get up with on foot backwards slowly. Do it alternately. To progress in the difficulty of this exercise, try to move more slowly. Next, try to do the exercise with your eyes closed.
Range of work time:	90 sec.
Recommended environment:	Park with stairs with a handrail.

Exercise code number:	3.B.3.
Name:	Walk and turn.

Description:	Find two trees or any other object you can hold on to, that are approximately 1 meter apart. Place yourself between the 2 objects looking at one of them. With your hands resting on the first tree, turn and grab the other tree. Do it slowly, and with the help of another person to avoid falling. To progress in the difficulty of this exercise, try to move more slowly. Next, try to do the exercise with your eyes closed.
Range of work time:	90 sec.
Recommended environment:	Park with flat floor and trees.

Category 4

Exercise code number:	4.B.1.
Name:	Walk sideways 1.
Description:	Look for a flat area, clear of holes or bumps. From your position walk sideways with the trunk straight. Try not to grab but do it if you need to. To progress in the difficulty of this exercise, try to move more slowly. Next, try to do the exercise with your eyes closed.
Range of work time:	90 sec.
Recommended environment:	Flat floor without slopes.

Exercise code number:	4.B.2.
Name:	Tandem walk.
Description:	Stand beside a line of trees or a bench or a wall, if needed. From this position try to walk with your feet almost on the same line. You can do it forward and backward, always maintaining stability. To progress in the difficulty of this exercise, try to move more slowly. Next, try to do the exercise with your eyes closed.
Range of work time:	90 sec.
Recommended environment:	Flat floor without slopes.

Exercise code number:	4.B.3.
Name:	Down step backwards.

Description:	Look for a step with a handrail where you can hold on. Start with both feet on the step, get down with one foot backwards slowly. Do it alternately. To progress in the difficulty of this exercise, try to move more slowly. Next, try to do the exercise with your eyes closed.
Range of work time:	90 sec.
Recommended environment:	Park with stairs with a handrail.

Category 5

Exercise code number:	5.B.1.
Name:	One leg stand 1.
Description:	Stand on one leg with hands on a tree. If possible, remove one hand or both keep your position. Do one set with each leg, trying to keep your balance. Look ahead, staring into a fixed point and trying to keep your abs tight. To progress in the difficulty of this exercise, try to move more slowly. Next, try to do the exercise with your eyes closed.
Range of work time:	90 sec.
Recommended environment:	Flat floor without slopes.

Exercise code number:	5.B.2.
Name:	Walk on tiptoe on a line.
Description:	Draw a line on the ground about 10 meters long. Walk following this line trying not to lose stability, Look forward and walk on your tiptoe! To progress in the difficulty of this exercise, try to move more slowly. Next, try to do the exercise with your eyes closed.
Range of work time:	90 sec.
Recommended environment:	Flat floor without slopes.

Exercise code number:	5.B.3.
Name:	Walking on heels on a line.

Description:	Draw a line on the ground about 10 meters long. Walk following this line trying not to lose stability, Look forward and walk on your heels! To progress in the difficulty of this exercise, try to move more slowly. Next, try to do the exercise with your eyes closed.
Range of work time:	90 sec.
Recommended environment:	Flat floor without slopes.

Exercise code number:	5.B.4.
Name:	Walk backwards on a line.
Description:	Draw a line on the ground about 10 meters long. Walk following this line trying not to lose stability. Before you start, guarantee that there is nothing in your way. Make sure you don't drape your feet. To progress in the difficulty of this exercise, try to move more slowly. Next, try to do the exercise with your eyes closed.
Range of work time:	90 sec.
Recommended environment:	Flat floor without slopes.

Exercise code number:	5.B.5.
Name:	Tandem walk on a line.
Description:	Draw a line on the ground about 10 meters long. Walk over this line trying not to lose stability, like an acrobat. As you get confident, try to bring the front heel together with the rear toe. Look ahead and keep your balance.

	To progress in the difficulty of this exercise, try to move more slowly. Next, try to do the exercise with your eyes closed.
Range of work time:	90 sec.
Recommended environment:	Flat floor without slopes.

Strength exercises

Please note that our proposal for the strength exercises category is based on the functional training model, where we do not focus on the muscle analytical function, but on the functionality and the movement of multiple joints combined. We can identify, within the upper body exercises, pushing and pulling movements, depending on whether we move the hand closer or away from the midline. In the lower extremity, we can divide the movements between those performed with the foot on the ground or those with the foot in the air.

Category 1

Exercise code number:	1.1.1.
Name:	Toe up and down.
Description:	Transfer to a bench. In case you can do little movement with your lower limbs try to move your ankles, fingers up and down, without moving your knee. Do it slowly with both feet, as many times as possible. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Try to keep your back straight. In case you have not any functionality on your legs skip category 1.1.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park with wheelchair and park with bench.

Exercise code number:	1.1.2.
Name:	Knees raise 1.

Description:	Transfer to a bench. In case you can do little movement with your lower limbs try to move your knee, up and down. Even if you can't, try to take your heel off the ground. Do it alternately with both legs, as many times as possible. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Try to keep your back straight. Look at your knees.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park with wheelchair and park with bench.

Exercise code number:	1.1.3.
Name:	Knees extension.
Description:	Transfer to a bench. In case you can do little movement with your lower limbs try to extend your knee. Only the intention matters, you don't need to get to the top. Do it as many times as possible. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Try to keep your back straight. Look at your feet going up.

Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park with wheelchair and park with bench.

Exercise code number:	1.1.4.
Name:	Toe up and down with knee extension.
Description:	Transfer to a bench. Just in case you can keep your knee extended. Try to go up to the maximum extension of the knee and hold movements on your ankle, fingers up and down. Hold as much as you can, doing slow movements. Do it as many times as possible. Do one set with each leg. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	It is normal to feel some tightness in the back of your knee and your quadriceps will tire.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park with wheelchair and park with bench.

Exercise code number:	1.2.1.
Name:	Push the wall.
Description:	Seated in the wheelchair, place your hands on a wall in front of you, open your hands at the height and

	width of your shoulders, and push the wall trying to move your chair backwards. Do it as many times as possible, pushing as strong as you can. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Try not to raise your shoulder towards your ear. In case you have not any functionality on your arms skip category 1.2.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park with wheelchair.

Exercise code number:	1.2.2.
Name:	Stand up.
Description:	Seated in the wheelchair, place the chair near a vertical pole or behind a bench with the brakes on. Hold your hands there and with the strength of your arms and your back, try to get up from the chair. Hold in this position as long as you can. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.

Important details:	Once more, remember to put on the brakes. Try to activate muscles on your back between your scapula, with the intention of joining them when climbing.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park with wheelchair.

Exercise code number:	1.2.3.
Name:	Push the wall sideways.
Description:	Seated in the wheelchair, place one hand on a wall on your side, hand at the height of your shoulder, and push the wall trying to move your body side to side. Do it as many times as possible, pushing as strong as you can. Do one set with each arm. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Your shoulder should not be above or inside. Remember to put your breaks on and be careful not to fall.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park with wheelchair.

Exercise code number:	1.2.4.

Name:	Raise your arms.
Description:	With your elbows slightly bent, raise your arms forward, as high as you can. Do it as many times as possible. Go up as fast as you can and try to hold the way down. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	You must turn the palm of your hands outwards as you go up.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park with wheelchair.

Exercise code number:	1.2.5.
Name:	Vertical push up 1.
Description:	Seated in the wheelchair, place your hands on the armrests slightly in front of the body. With the strength of your arms and chest, push the armrests down and try to get up from the chair. Do it as many times as possible. Go up as fast as you can and try to hold the way down. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set,

	and increase progressively the number of sets until you reach 4.
Important details:	Your hands should not be behind your shoulders.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park with wheelchair.

Exercise code number:	1.2.6.
Name:	Up a hill or ramp.
Description:	Drive your wheelchair up a hill or ramp with or without the help of your caregiver. Try to do the climbs as fast as you can. You can do as many climbs as possible each set. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Pay attention going down. Choose a ramp with a low slope.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park with wheelchair.

Exercise code number:	1.3.1.
Name:	Lean sideways sitting.

Description:	Sitting in the wheelchair, lean your torso sideways with the intention of touching the ground with your hand. If you master it, you can do it in different directions and increase the speed. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Keep your balance all the time and make sure your brakes are on.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park with wheelchair.

Exercise code number:	1.3.2.
Name:	Throw and pick 1.
Description:	Sitting in the wheelchair, grab a sock with sand (filled and packed). Throw it in the air and pick it up again, with both hands. As you gain confidence, launch it higher and in different directions without it falling. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.

Important details:	Keep your balance all the time and make sure your brakes are on.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park with wheelchair.

Category 2

Exercise code number:	2.1.1.
Name:	Vertical push up 2.
Description:	Sitting with your hands resting on the armrests, use force to detach your gluteal region of the seat and get up. It is not necessary to completely detach the gluteal region from the seat. Try to hold in this position as long as you can throughout the set. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Your hands should not be behind your shoulders. In case you have not any functionality on your arms skip category 2.2.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots.

Exercise code number:	2.1.2.
Name:	Get up 1.
Description:	Sitting on a bench with your hands on your knees, use force to detach your gluteal region of the seat and get up. It is not necessary to completely detach the gluteal region from the seat. Do as many reps as you can throughout the set.

	To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Your feet should be flat on the ground, slightly hip-width apart and your feet below your knees.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots.

Exercise code number:	2.1.3.
Name:	Stand up longer.
Description:	Stand with your arms resting on a tree, a pole, or the back of a garden bench. Hold on as long as possible. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Your feet should be flat on the ground, slightly hip-width apart and your feet below your knees
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots. Flat floor without slopes.

Exercise code number:	2.1.4.
Name:	Little squats 1.
Description:	Stand with your arms resting on a tree, a pole, or the back of a garden bench. Do little flexion and extension movement of the knee. Do as many reps as you can throughout the set. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Your feet should be flat on the ground, slightly wider than hip-width apart. When lowering the gluteal region should go back, the knees should not advance to the feet.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots. Flat floor without slopes.

Exercise code number:	2.2.1.
Name:	Biceps curl 1.
Description:	Using a sock with sand (packed and tied) or a water bottle (full) or other small heavy object (the weight should be such that it is a little difficult to handle): bend and extend your elbow. Do it slowly, as many reps as you can throughout the set. You should keep the shoulder relaxed and feel the front of the arm working hard. Do it with both arms alternately.

	To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	You should not swing your trunk or put your elbow behind your shoulder.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots.

Exercise code number:	2.2.2.
Name:	Elbow extension.
Description:	Using a sock with sand (packed and tied) or a water bottle (full) or other small heavy object (the weight should be such that it is a little difficult to handle): bend and extend your elbow, with your hand in the back of the head. Do it slowly, as many reps as you can throughout the set. You should keep the shoulder relaxed and feel the back of the arm working hard. Do it with both arms alternately. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.

Important details:	The arm and trunk should not move during the exercise. Just raise and lower the hand.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots.

Exercise code number:	2.2.3.
Name:	Diagonal flexion shoulder 1.
Description:	Using a sock with sand (packed and tied) or a water bottle (full) or other small heavy object (the weight should be such that it is a little difficult to handle): Do the diagonal, drawing sword movement letting your hand rotate out. Right hand, from the left pocket, to the top right, left hand, from the right pocket to the top left. Do it slowly, as many reps as you can throughout the set. You should keep the elbow extended and you cannot feel pain on your shoulders. Do it with both arms alternately. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	You must turn the palms of your hand outwards as you go up.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots.

Exercise code number:	2.2.4.
Name:	Ballistic shoulder rotation 1.
Description:	Sitting sideways to a wall or tree and with a small weight or sand sock (packed and tied) in hand (the weight should be such that it is a little difficult to handle). The arm separated 130º and a little ahead from the trunk. The elbow flexed 90º and resting on the wall/tree, should be vertical. Do short movements moving your hand back and forward. Do it as fast as you can. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Keep your trunk and abdomen as stable as possible.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Park or forest.

Exercise code number:	2.3.1.
Name:	Straightening of the trunk.
Description:	Take a seat on a bench. Using a sock with sand (packed and tied) or a water bottle (full) or other small heavy object (the weight should be such that it is a little difficult to handle), leave it on the floor between your legs. Take the object located on the floor between your feet, and lift it up towards the chest, bending the elbow, accompanying the

	straightening of the trunk. Do it slowly, as many reps as you can throughout the set. Do it with both arms alternately. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Keep your gaze forward during the execution of the exercise and activate the muscles of your back.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots.

Exercise code number:	2.3.2.
Name:	Throw and pick 2.
Description:	Sitting on a garden bench grab a sock with sand (filled and packed). The weight should be such that it is a little difficult to handle. Throw it in the air and pick it up again, alternately, from the right hand to the left hand. As you gain confidence, launch it higher and in different directions without it falling. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.

Important details:	Keep your balance all the time and stop the set if you need to pick it up from the floor (in case of falling).
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park with wheelchair.

Category 3

Exercise code number:	3.1.1.
Name:	Get up 2.
Description:	Sitting with your hands on your knees, use force to detach your gluteal region of the seat and get up. It is not necessary to completely get to stand. Do as many reps as you can throughout the set. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Your feet should be flat on the ground, slightly wider than hip-width apart. When lowering the gluteal region should go back, the knees should not advance to the feet.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots.

Exercise code number:	3.1.2.
Name:	Little squats 2.
Description:	Standing with your hands resting on a tree or on the back of a garden bench, do small squats. Shift the weight backwards without putting your knees forward or inside. Do as many reps as you can throughout the set.

	To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Your feet should be flat on the ground, slightly wider than hip-width apart. When lowering the gluteal region should go back, the knees should not advance to the feet.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots.

Exercise code number:	3.1.3.
Name:	From one leg to the other.
Description:	Standing with your hands resting on one wall, alternately transfer your body weight from one leg to the other. If you feel confident you can take off your feet opposite to the load. Do it slowly, trying to hold around two seconds on each side. Imagine you are dancing. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Activate your abdominal muscles and keep your gaze forward.

Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots.

Exercise code number:	3.1.4.
Name:	Tiptoe.
Description:	Standing with your hands resting on a wall or a garden bench, try to shift your weight forward and stand on your toes, taking off your heel. Do it slowly, as many reps as you can throughout the set. You will notice your calves working. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Your feet should be wider than hip-width apart.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots.

Exercise code number:	3.1.5.
Name:	Knees raise 2.
Description:	Standing behind a garden bench, rest your hands on the back of a bench. From this position raise one of your knees to 90 degrees and try to hold the whole set. Do it with one leg and then with the other. If

	you are feeling confident, raise your hand, leg side in the air. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Keep your balance and hold your gaze ahead.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots.

Exercise code number:	3.2.1.
Name:	Standing push up.
Description:	Standing, feet on the floor half a meter from a wall, with your hands resting on a wall aligned with your shoulders, perform pushing movements against the wall. Go down slowly, go up fast. Do as many reps as you can throughout the set. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Make sure that throughout the exercise your shoulders do not rise. Try to activate your abdominal muscles.
Range of work time:	45 sec.

Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots and a wall.

Exercise code number:	3.2.2.
Name:	Biceps curl 2.
Description:	Find a tree branch with a suitable weight, or any other small heavy object (the weight should be such that it is a little difficult to handle). With this you stand up and do elbow flexion and extension. Go up faster, go down slowly. Do as many reps as you can throughout the set. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	You should not swing your trunk or put your elbow behind your shoulder.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots. Forests.

Exercise code number:	3.2.3.
Name:	Seated upright bench press.
Description:	Seated on a garden bench, slide to the end of the seat and lean back. Leaning on the back, with the tree branch in your hands, push the branch of a tree

	upward, from your chest to the top. Do as many reps as you can throughout the set. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	You should not raise your shoulders or put your elbow behind them.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots. Forests.

Exercise code number:	3.2.4.
Name:	One-handed inclined rowing.
Description:	Standing with one hand resting on the back of a garden bench and the trunk bent forward pull a sand sock (packed and tied) until your arm is aligned with your trunk. Start with your elbow fully extended and as you are going up, bend it. Do as many reps as you can throughout the set. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.

Important details:	Try to keep your back stable and your gaze straight ahead. Focus on your scapulae movement. Your elbow should not go too much backwards from your shoulder.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots. Forests.

Exercise code number:	3.2.5.
Name:	Ballistic shoulder rotation 2.
Description:	Sitting sideways to a wall or tree and with a small weight or sand sock (packed and tied) in hand (the weight should be such that it is a little difficult to handle). The arm separated 130º and a little ahead from the trunk. The elbow flexed 90º and resting on the wall/tree, should be vertical. Do short movements moving your hand back and forward. Do it as fast as you can. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Keep your trunk and abdomen as stable as possible.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Park or forest.

Exercise code number:	3.3.1.
Name:	Lean sideways stand.
Description:	Find a place in the garden with no objects around. Stand with your feet apart. Spread your arms 90º. From this position lean to both sides trying with your hand to touch the knee of the same side. Do it on both sides as fast as you can. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Keep your abdomen as stable as possible.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Park or forest.

Exercise code number:	3.3.2.
Name:	Lawn mower 1.
Description:	Standing, with the trunk slightly inclined forward and with one foot behind the other. We lean on a bench or similar with the hand of the forward foot, for stability. With the other hand, hold a sand sock (packed and tied) and oull it towards the ribs (the weight should be such that it is a little difficult to handle). Start with your elbow fully extended and as you are going up, bend it. At the same time, turn

	your body to the same side of the arm you are moving. Do as many reps as you can throughout the set. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Try to keep your back stable and your gaze straight ahead. Focus on your scapulae movement. Your elbow should not go too much backwards from your shoulder.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots. Forests.

Category 4

Exercise code number:	4.1.1.
Name:	Get up 3.
Description:	Choose a place to sit. From this position sit and get up as many times as possible with the help of your arms if necessary. Try to keep your back stable and your gaze straight ahead. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Your feet should be flat on the ground, slightly wider than hip-width apart. When lowering the gluteal region should go back, the knees should not advance to the feet.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots.

Exercise code number:	4.1.2.
Name:	One leg stand 2.
Description:	Stand with one hand supported and stay at one leg throughout the set. If you need to stop in the middle of the sets, do it. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set,

	and increase progressively the number of sets until you reach 4.
Important details:	Keep your balance, activate your abs and keep your gaze ahead.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots.

Exercise code number:	4.1.3.
Name:	One leg stand and move the other 1.
Description:	Stand on your side with one hand resting on the back of a bench. With one leg on the ground, move the other leg back and forth slowly. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Keep your balance, activate your abs and keep your gaze ahead.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots.

Exercise code number:	4.1.4.
Name:	One leg stand and move the other 2.

Description:	Stand on your side with one hand resting on the back of a bench. With one leg on the ground, move the other side to side slowly. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Keep your balance, activate your abs and keep your gaze ahead.
oRange of work time:	45 min.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots.

Exercise code number:	4.1.5.
Name:	Walk sideways 2.
Description:	Walk sideways without the help of hands. Five steps to the right, five steps to the left. Bend your knee and hip a little when your foot touches the ground. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Your feet should be flat on the ground, slightly wider than hip-width apart. When lowering the gluteal region should go back, the knees should not advance to the feet.

Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots.

Exercise code number:	4.2.1.
Name:	Inclined push up.
Description:	Standing with your hands resting on the back of a street bench aligned with your shoulder, your feet apart resting on the floor (at least 1 meter away from the bench), perform pushing movements against the bench. Your chest goes up and down while you stretch and bend your elbows. Go down slowly, go up fast. Do as many reps as you can throughout the set. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	You should not swing your trunk or put your elbow behind your shoulder.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Park.

Exercise code number:	4.2.2.
Name:	Raising arms alternately.

Description:	Standing with your hands resting on the back of a street bench aligned with your shoulders, your feet apart resting on the floor (at least 1 meter away from the bench), alternately raise one hand. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Try to keep your abdomen in and keep breathing.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Park.

Exercise code number:	4.2.3.
Name:	Bird wing.
Description:	With a sand sock (packed and tied) in each hand, perform bird wing movements, separating both hands, from your pockets to your front. Do it with your hands in front of the torso and do not exceed 90º. Do it slowly, as many reps as you can throughout the set. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	As you go up, keep your shoulders down.

Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Park or forest.

Exercise code number:	4.2.4.
Name:	Ballistic shoulder rotation 3.
Description:	Sitting on the side of a wall or tree and with a small weight or sand sock (packed and tied) in hand (the weight should be such that it is a little difficult to handle). The foot nearer the wall/tree should be behind the other one, with the knee extended. Place your arm with the elbow flexed 90º resting on the wall/tree. The forearm should be vertical. The arm should be separated 130º and a little ahead from the trunk. Do short movements moving your hand back and forth. Do it as fast as you can. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Keep your trunk and abdomen as stable as possible.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Park or forest.

Exercise code number:	4.2.5.
Name:	Hanging.
Description:	Hang from a tree or a high point and hold in this position as much as you can. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Be careful going down and make sure you don´t hurt your fingers.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Park or forest.

Exercise code number:	4.3.1.
Name:	Hips extension.
Description:	Standing with your hands resting on the back of a street bench aligned with your shoulders, your feet apart resting on the floor (at least 1 meter away from the bench), alternately lift each of the legs back. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.

Important details:	Keep your trunk and abdomen as stable as possible and don´t stop breathing.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Park or forest.

Exercise code number:	4.3.2.
Name:	Diagonal flexion shoulder 2.
Description:	Standing, bring the socks with sand (packed and tied) from the ground up, finishing with the arm stretched out above the head (palm of your hand up). Bend your knees on your way down to the floor and extend them on the way up. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Try to keep your back stable and your gaze straight ahead.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Park or forest.

Exercise code number:	4.3.3.
Name:	Lawn mower 2.

Description:	Standing with the foot of the side you will be working backwards from the other foot with the knee extended, and the advanced leg flexed around 70º. Trunk bent forward. Pull a sand sock (packed and tied) towards the ribs. Start with your elbow fully extended and as you are going up, bend it. At the same time, turn your body to the same side of the arm you are moving. Do as many reps as you can throughout the set. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Try to keep your back stable and your gaze straight ahead. Focus on your scapulae movement. Your elbow should not go too much backwards from your shoulder.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots. Forests.

Exercise code number:	4.3.4.
Name:	Deadlift 1.
Description:	Standing with your feet and knees apart, grab a branch of a tree or any other samall heavy object (the weight should be such that it is a little difficult to handle) from the ground up to the vertical position, using your legs and glutes. The tree branch

	must rise and fall from the ground as close to you as possible. Do as many reps as you can throughout the set. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	The arms should remain relaxed although the grip should be firm. Keep your gaze straight ahead.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Forests or garden.

Category 5

Exercise code number:	5.1.1.
Name:	Get up 4.
Description:	Choose a place to sit. From this position sit and get up as many times as possible. Try to keep your back stable and your gaze straight ahead. Do not use your hands. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Your feet should be flat on the ground, slightly wider than hip-width apart. When lowering the gluteal region should go back, the knees should not advance to the feet.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Street, park.

Exercise code number:	5.1.2.
Name:	Lunges.
Description:	Stand between a curb or a step on the ground. Leave one foot up (on the step) and the other down (on the ground). From this position, perform squats, moving your weight backwards, without putting your knees forward, with your back straight and looking forward. Go down slowly and go up explosively. Do

	it each set with one leg up and then the other. Do as many reps as you can throughout the set. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Your feet should be flat on the ground, slightly wider than hip-width apart. When lowering the gluteal region should go back, the knees should not advance to the feet.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Street, park.

Exercise code number:	5.1.3.
Name:	Vertical jumps.
Description:	Standing with your feet together, jump in the same place as fast as you can throughout the set. Get as high as you can and try no to stop until the time ends. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	You will feel your calves burning.
Range of work time:	45 sec

Range of rest time:	2 min.
Recommended environment:	Street, park

Exercise code number:	5.1.4.
Name:	Lateral jumps.
Description:	Standing with your feet together, jump side to side as fast as you can throughout the set. Get as high as you can. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	You will feel your calves burning. Keep your balance.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Street, park.

Exercise code number:	5.1.5.
Name:	Go up.
Description:	Standing, place one of your feet on the seat of a garden bench, the other foot on the ground. From this position try to climb, until both feet are up. Do it alternately with one leg up and then the other. Do as many reps as you can throughout the set.

	To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Activate your abs and keep your balance.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Street, park.

Exercise code number:	5.1.6.
Name:	Single leg squat.
Description:	Sitting on a garden bench, try to get up using only one leg resting on the ground, the other stretched forward. Do it alternately during the set: first right leg, then left leg. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Your feet should be flat on the ground, slightly wider than hip-width apart. When lowering the gluteal region should go back, the knees should not advance to the feet.
Range of work time:	45 sec.
Range of rest time:	2 min.

Recommended environment:	Street, park with bench.

Exercise code number:	5.2.1.
Name:	Lying push ups.
Description:	Lying on the floor, place your hands next to your shoulders and push the floor to go up, extending your elbows. Do it with your trunk stable and knees on the ground. Get up fast and get down as slow as you can. Do as many reps as you can throughout the set. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Try not to raise your shoulders to your ear.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Park with grass.

Exercise code number:	5.2.2.
Name:	Pull up.
Description:	Hang from a horizontal bar or a tree branch and with the force of your arms pull up. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set,

	and increase progressively the number of sets until you reach 4.
Important details:	If you can´t get up that easily, just do the downs, helping you get up with a step or jumping.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Street, park with bar and/or trees.

Exercise code number:	5.2.3.
Name:	Vertical push up 3.
Description:	Starting from the sitting position on a bench, take your gluteal region out of the seat, leaving your legs semi-extended and your hand resting on the seat. From this position, push the seat up and down, shift your elbows to the sides and never back. Do as many reps as you can throughout the set. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Be careful, your hands should not be behind your shoulders.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Street park with a bench.

Exercise code number:	5.2.4.
Name:	Arms circles.
Description:	Find a place with a good view, stand with your feet together. Spread your arms below 90º of elevation and from this position make forward and backward circles as fast as you can. You should move your shoulders without raising them, not your wrists. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	You should not bring your shoulder to your ear.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Park, forest with nice views.

Exercise code number:	5.3.1.
Name:	Full snatch.
Description:	Sitting on a bench with a sandy sock in each hand or any other samall heavy object (the weight should be such that it is a little difficult to handle), get up from the chair and stretch both arms up. Do it as fast as you can without rest. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work

	time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	You should rotate your arm out (palm to the side) when you lift it.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Street Park with a bench.

Exercise code number:	5.3.2.
Name:	Burpees.
Description:	Hands and feet resting on the floor, suspended trunk. From this position, stand up energetically and go back down. Do it as fast as you can without ever resting your torso on the ground. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Keep your abs and back muscles activated and don´t stop breathing.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Street Park with grass.

Exercise code number:	5.3.3.
Name:	Lawn mower 3.

Description:	Standing with the foot of the side you will be working backwards from the other foot with the knee extended, and the advanced leg flexed around 70º. Trunk bent forward. Pull a sand sock (packed and tied) towards the ribs (the weight should be such that it is a little difficult to handle). Start with your elbow fully extended and as you are going up, bend it. At the same time, turn your body to the same side of the arm you are moving. Do as many reps as you can throughout the set. To progress in the difficulty of this exercise, increase work time and reduce rest time. For example: 1 min work time with 1:45 rest time, 1:15 work time with 1:30 rest time. Also, start with just 1 set, and increase progressively the number of sets until you reach 4.
Important details:	Try to keep your back stable and your gaze straight ahead. Focus on your scapulae movement. Your elbow should not go too much backwards from your shoulder.
Range of work time:	45 sec.
Range of rest time:	2 min.
Recommended environment:	Easy access park, with seating spots. Forests.

Flexibility

Flexibility is an exercise category itself. It is not a part of the warm up or the cool down procedures. Stretching is not the best way to increase range of movement. It doesn't prevent injuries, or muscle pain after exercise. Stretching interventions with 3-8 weeks duration do not seem to change either the muscle or the tendon properties. Dynamic stretching gets faster results than static or passive stretching. Eccentric contraction demonstrates better results in terms of range of motion.[35-37]

Flexibility exercises are divided by parts of the body. First it is recommended to evaluate the areas of the body that require mobility work. The person should be able to perform the exercise or switch to another. We must try to reach the end of the joint path without pain, follow exercise instructions.

Lower body:
• **F.1.1.:** Standing, bend your knee and grab your leg with your hand. With the hand on the leg, force the stretch a little while with the other hand supporting yourself. Do it for 45 seconds each side. • **F.1.2.:** From standing, try to touch the ground without bending your knees. You should feel tension on the back of your legs. If you are sitting in a wheelchair, do the same, leaving your foot on a small wall or on the seat of a garden bench. Do it for 45 seconds each side. • **F.1.3.:** Delay one of your feet with the sole of the foot on the ground, and push the wall in front of you. You should notice tension in the calf of your back leg. Do it for 45 seconds each side. • **F.1.4.:** Sitting on the edge of a bench, move both knees from one side to the other, keeping your waist stable. Stay there 45 seconds on each side.

Upper Body:
• **F.2.1.:** Standing or sitting in your wheelchair, pull over to a wall next to you. Put your hand behind your head and push your elbow against the wall. You should feel tension in the chest and axillary area. Do it for 45 seconds each side. • **F.2.2.:** Standing or sitting on a garden bench, bend your neck forward, letting the weight of gravity act. You can stretch the arm on the side that pulls you the most, down to the ground. Stay there 45 seconds each side. • **F.2.3.:** In a place of your choice, sitting or standing, interlock your fingers and place them behind your neck. From this position try to bring your elbows together in front. Do it dynamically, slowly throughout the entire range of motion during 45 seconds. • **F.2.4.:** Sitting or standing, cross your arm in front of your chest and stay there 45 seconds. With the other hand, force the stretch at the elbow, do it once with each side. • **F.2.5.:** Sitting with your back straight and your eyes closed, join your palms together in front of your chest, your thumbs touching the chest. If the stretch isn't enough, interlock your fingers and straighten your elbows forward. Stay there 45 seconds.

Spine:
• **F.3.1.:** From standing or sitting. Lean the trunk to the right and left by placing one hand on the ribs and the other stretched up. Do it for 45 seconds each side. • **F.3.2.:** Standing with your knees bent or sitting, lean your torso forward trying to touch the ground with your fingers. Stay in this position for 45 seconds.

- **F.3.3.:** Intercross your fingers in front and slowly turn your torso from side to side. Perform the movement slowly, with your head as well. Do it for 45 seconds each side.

Aerobic exercises

Walking is an easy activity, performed every day by people to move from one place to another, so it does not require special skills or particular training to be performed. This kind of activity does not require particular equipment, people can wear what they prefer and walking can be considered as a workout or a recreational activity, such as walking the dog, but in any case, it is a good way to maintain a healthy lifestyle. If we include walking within a training program, it is necessary to establish optimal intensity and duration parameter.[38]

The minutes accumulated per week are more important for the progression than the intensity and duration of each session, since the objective is to add minutes of moderate physical activity. For users with a better level of physical activity that achieve a good number of minutes it will be more important to know the speed and characteristics of the terrain, in order to monitor the walking intensity. GPS would be an important feature.

In this section, the patient should have the option to choose between free walking, free cycling or a closed circuit. Free walking and circuits are available also for persons driving a wheelchair. In that case you should mark routes with no unlevel difficulty and enough space for the chair.

- ❖ Circuit: closed routes associated with a difficulty color code. The person will be able to choose between 3 possible circuits of different difficulty.

The circuits will be classified based on a difficult color code: green (moderate), yellow (moderate-intense) and red (intense)[39] to make them more user friendly. This will be done according to the contents explained in section “General Activity Guidelines: Long Efforts”.

Group exercises

Group exercises are an exercise category itself. It is not a part of the previous types of exercises that are general and are not divided by categories. They are proposed to promote socialization.

Codification: We put a G to refer to a group and a digit indicates the order in which the exercises will appear to the user, either by complexity or priority.

Exercise code number	G.1
Name	Golf with brooms
Supplies	One broom One box One small ball for each participant, better if the balls are of different colors
Preparation	The balls are put on the floor and the box is placed sideway on the floor far from where the ball is put.
Description	Using the broom as a golf stick, beating his ball to put them in the box in turns. The winner is the one who puts his ball in the box in the fewest strokes. In the event of a tie the play must be repeated until the tie is broken.

Exercise code number	G.2
Name	Bottle bowling
Supplies	Ten plastic bottles with a little water or sand Two medium balls
Preparation	Plastic bottles are placed as bowling pins are placed in a bowling alley. Forming a triangle. Players are 5 m away from the bottles, although the distance can be changed to make the game more difficult or easier.

Description	Each player will have two chances to throw the ball to knock down the bottles in turns, five rounds. After the play of each player, the player must go for the balls to give them to the next player and if he/she knocks down some or all the bottles, have to put them back. The winner is the one who has managed to throw all the bottles to the ground in the fewest attempts. In the event of a tie the play must be repeated until the tie is broken.

Exercise code number	G.3
Name	Hoop shoot
Supplies	One ring, medium box or cube Two balls
Preparation	Ring, box or cube is placed on the floor or in a tree. Players are 5 m away from the ring, box or cube, although the distance can be changed to make the game more difficult or easier.
Description	Each player will have two chances to throw the ball and try to put it inside the ring, box or cube in turns, five rounds. After the play of each player, the player must go for the balls to give them to the next player. The winner is the one who manages to fit the most balls possible. In the event of a tie the play must be repeated until the tie is broken.

Exercise code number	G.4
Name	Pass the stick

Supplies	Two sticks
Preparation	Two persons, one in front of the other, holding a stick on one end with their right hand. The other end of the stick rests on the ground. The distance between them can be changed to make the game more difficult or easier.
Description	Each player has to pass the stick to the other player without it touching the ground. It can be done simultaneously or in turns. The winner is the one who drops the stick the least.

Exercise code number	G.5
Name	Pass the stick in a circle
Supplies	One stick
Preparation	People are standing in a circle. The distance between them can be changed to make the game more difficult or easier.
Description	Players have to pass the stick to the right or to the left from one player to another. The winner is the one who drops the stick least.

Exercise code number	G.6
Name	Pass the ball in line
Supplies	One ball
Preparation	Several people positioned in line. The distance between them can be changed to make the game more difficult or easier.
Description	Each player has to pass the ball to the person behind them, turning to the right, from the first to the last.

	Then, the ball will come back from the last to the first, receiving the ball from the person behind by turning to the left. The ball should never be thrown. Do this as fast as you can. If the ball falls, the one who drops it must go to pick it up. The winner is the one who drops the ball the least.

Exercise code number	G.7
Name	Pass the ball
Supplies	One ball
Preparation	Two people one in front of the other. The distance between them can be changed to make the game more difficult or easier.
Description	Each player has to pass the ball, throwing it. The winner is the one who drops the ball least.

Exercise code number	G.8
Name	Tug of war
Supplies	One rope
Preparation	Equal numbers of participants are arranged at both ends of a strong rope. In the middle of the rope a parallel line is drawn on the ground. Each of the participants must grab the rope with both hands looking for a wide support of the lower extremity.
Description	Pulling the rope, the objective of the game is that the rival team crosses the line drawn on the ground, in order to win.

Exercise code number	G.9
Name	Mikado
Supplies	One large stick for each player One small stick
Preparation	Sitting in the wheelchair or standing, each player must pick up a long stick. The short stick remains on the ground between players.
Description	With the tip of the long stick and with a single touch each player must try to throw the short stick in the air. The winner is the one who manages to throw it the highest.

Exercise code number	5.G.1
Name	Hopscotch.
Supplies	One small stone. One chalk.
Preparation	Draw the floor with the chalk: -Three equal squares with the number one, two and three in it. -Then two squares are painted, one with the number four and next to it another with the number five. -The top square is occupied by the number six -and the last two are also double squares with the numbers seven and eight. -Then another floor with a single square with the number 9. Next, a square with the number ten.
Description	The game starts by throwing a small stone on square number 1, trying to make the stone fall inside the

	square without touching the outer stripes. Now start jumping hopscotch without stepping on the stripes, keeping the balance until you reach the fourth floor where there are two squares and we can support both feet (one on number 4 and one on number 5). We continue to number 6 on one foot and again, we support both feet, one on the 7 and the other on the 8; we continue jumping to number 10. Now we must return to number 1, turning around in a jump, (always without stepping on the stripes) and undo the same path to number 1 where we will bend down to pick up the stone without supporting the other foot. If we have not hit a line, we continue the game, now throwing the stone in square number 2 and repeating the same thing. If the stone does not fall into the square number 2 or touch a line, the turn passes to the next player. The objective is to throw the stone in all the squares in succession. Whoever finishes first wins.

Cool down protocol

Categories 1 and 2.
• **C1:** Get back on your wheelchair and start your way home. • **C2:** Pay attention to your breath, feeling your lungs with air. • **C3:** Stop once you find a safe spot to park. Put the brakes on. • **C4:** Maybe it is time to drink some water. Do it slowly! • **C5:** Even if you feel warm, keep your clothes on. Don't get cold! • **C6:** If you can, raise your arms up and down while you breathe. • **C7:** Time to go back home. Drive your wheelchair carefully. • **C8:** Once at home feel free to eat something, take a shower and have a rest. • **C9:** Make sure you have between 24 and 48 hours gap before the next session.

Categories 3, 4 and 5.
• **O1:** Keep walking and progressively reduce speed. • **O2:** Breathe deeply while you raise both arms up and down. • **O3:** Maybe it is time to drink some water. Do it slowly! • **O4:** Even if you feel warm, keep your clothes on. Don't get cold! • **O5:** If you need, you can now sit for a few minutes. • **O6:** It is time to go back home. Keep walking! • **O7:** Once at home feel free to eat something, take a shower and have a rest. • **O8:** Make sure you have between 24 and 48 hours gap before the next session.