

## Physical activity, contexts and effects on health

### *An Inserm collective expertise*

Physical activity comprises everyday physical exercise - at home, at work, while travelling - recreational physical activity, and practising a sport. According to the World Health Organisation, sport is therefore a “specialised and organised subset of physical activity”.

The Inserm collective expertise presented today, and carried out at the request of the French Ministry of Youth, Sports and Community Development (*ministère de la Jeunesse, des Sports et de la Vie associative*<sup>1</sup>), reviews the concept of physical activity, its social dimension and its importance in terms of public health. The environmental, social and psychological determinants at work in the practice of physical activity and its physiological and therapeutic effects are also investigated. The group of 16 experts brought together by Inserm sets out to analyse and summarise the international scientific and medical literature on these different aspects.

What are the effects of physical activity on well-being and quality of life? Can regular physical activity reduce mortality, limit weight increase, prevent cardiovascular diseases, obesity and cancer, and preserve mental health? What kinds of practices (and at what frequency and intensity) are needed to provide protection against these conditions or their risk factors and to contribute to treatment? These are some of the questions to which the experts have endeavoured to provide answers. The abuse of drugs in sports is an area of investigation in its own right and is outside the scope of this expertise.

### **Recent international recommendations define levels of physical activity that are beneficial to health**

In 2007, the American College of Sports Medicine and the American Heart Association jointly published a new set of recommended physical health activities for maintaining good health.

**Adults aged 18 to 65 years:** moderate-intensity aerobic (endurance) physical activity for a minimum of 30 minutes on five days each week, or vigorous-intensity aerobic physical activity for a minimum of 20 minutes on three days each week. Combinations of moderate- and vigorous-intensity activity can be performed to meet this recommendation. For example, a person can walk briskly for 30 minutes twice during the week and then jog for 20 minutes on two other days.

In addition to these endurance (aerobic) activities, it is recommended adults should perform activities that maintain or increase muscular strength and endurance. These muscular strength exercises should be performed on at least two, non-consecutive days each week, in the form of exercises using the major muscle groups (with 8 to 12 repetitions of each exercise). Moderate-to-high everyday activities performed for 10 minutes or more non-stop can be accumulated in order to reach the recommended level. The minimum duration for a significant session is 10 minutes.

**Children:** We do not possess sufficient data to draw up a precise picture of the amount and kind of physical activity required to have a positive effect on the immediate and future health of young people. However, the conclusions of recent consensus conferences all agree that a

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<sup>1</sup>As it was known until June 2007

daily minimum of 60 minutes of physical activity of moderate-to-high intensity, in the form of sports, games or everyday activities, is desirable for children.

**Adults aged 65 years and over:** the recommendations in terms of duration and frequency would appear to be the same as those advocated for young adults. However, for certain elderly subjects, an activity of moderate intensity will correspond to standard walking, while for others it will involve walking at a brisk pace. The recommendations emphasise the importance of diversifying the activities: balance activities should be added as a means of maintaining suppleness and guarding against falls, and moderate and intense activities may be combined. Everyday activities of moderate-to-high intensity lasting for at least 10 minutes (household tasks, gardening, etc.) may be accumulated in order to reach the recommended level.

#### **Recommended for the over 65-year-olds...**

-- **Muscle-strengthening exercises** (work against resistance) involving the major muscle groups, practised at least twice a week on non-consecutive days. These may include weight-lifting exercises. The intensity of the exercise may be modulated (considered as moderate or high) depending on the subject. It is suggested that 8 to 10 muscle groups (forearms, arms, shoulders, right and left quadriceps, etc.) should be worked. Exercises should be repeated from 10 to 15 times for each muscle group.

-- **Limbering up exercises** (neck, shoulder, waist, hip, etc.) on at least 2 days a week for at least 10 minutes so as to maintain the suppleness required for everyday activities.

-- **Balance exercises** (walking along a line marked on the floor, stepping over blocks placed on this line, etc.) on 2 other days of the week so as to reduce the risks of injuries from falls in the case of the most sedentary members of this age group, for example those presenting a chronic disease.

## **Physical and sports activity in France: data and characteristics**

Recent studies rarely distinguish between sports activity in the strict sense of the term and physical activity in general. The evaluation of the physical activity levels of people living in France is therefore, for the most part, based on information provided on people involved in sporting or leisure activities as such. Statistics on physical activity in the workplace, while travelling or performing household activities (housework, DIY, gardening, etc.) are few and far between. However, two new French surveys cast fresh light on this field.

In its latest *Baromètre santé* (Health Barometer)<sup>2</sup>, Inpes (National Institute for Prevention and Health Education) has for the first time quantified the usual level of physical activity providing beneficial results for French people. In this survey, which was carried out in 2005 and involved a representative sample of the French population aged between 15 and 74 years, the physical activities were classified into categories defined according to intensity, with particular reference to walking. The categories range from intense activity, including sport, to moderate or zero activity. In order to be taken into account by the survey, an activity must be performed for at least 10 minutes per week.

During the week leading up to the survey, **46% of the persons surveyed performed a physical activity at a level leading to health benefits** i.e. for more than 10 minutes; 19% performed a high-intensity activity for more than two hours and **42% were situated under the 10-minute level.**

The preliminary results of the *Enquête Nationale Nutrition Santé (ENNS)* (National Nutrition Health Survey)<sup>3</sup> have just recently been made public. According to the responses to the

<sup>2</sup> ESCALON H, VUILLEMIN A, ERPELDING M-L, OPPERT JM. *Activité physique, sédentarité et surpoids*. Inpes

<sup>3</sup> [www.invs.sante.fr](http://www.invs.sante.fr)

IPAQ questionnaire (*International Physical Activity Questionnaire*), two-thirds (63%) of adults (18-74 years) living in metropolitan France in 2006 perform the equivalent of 30 minutes of moderate physical activity at least 5 times per week. As far as teenagers are concerned, the ENNS survey reports that, in the light of the replies to the YRBSS questionnaire (*Youth Risk Behavior Surveillance System*), 60% of young persons aged between 11 and 14 years perform the equivalent of at least 30 minutes of physical activity of moderate intensity 5 times a week. However, only 40% (45% of boys and 30% of girls) perform the equivalent of 30 minutes each day.

The international *Health Behaviour in School-aged Children* study (HBSC), conducted in 2001-2002, compared the performance of sports activity in pre-adolescents in several European and American countries. France is one of the countries with the lowest performance at that age.

### **Profiles and motivations of adults practising a sports activity**

The characteristics of persons practising a sports activity in France have been highlighted in various surveys.

Women more often indulge in sport for reasons of health or appearance whereas for men it is more a question of pleasure and competition. As people get older, the health factor becomes more predominant. Social context plays an important role: the greater the number of practitioners among one's friends and acquaintances, the more likely one is to practise a sport oneself.

The practice of leisure sports activities varies according to age and sex: children, teenagers and young adults practice more than their elders, and boys more than girls. Socio-economic variables also come into play:

**Educational level.** Those with at least one or two years of higher-education tend to practice more sports activities (88% of practitioners in 2003). Women with higher education have virtually the same level of sports activity as men.

**Income.** Wealthy people are more likely to practice a sports activity in an institutional organisation (clubs, centres, etc.) and are thus more likely to practice more regularly.

**Place of residence** and access to a favourable environment (facilities, parks, cycle tracks, etc.) plays an important part. In rural areas, the chances of practising a sports activity are less than in urban zones (towns with at least 100,000 inhabitants), and there is a greater likelihood of having a level of physical activity beneficial to health in towns of over 200,000 inhabitants.

A fourth variable is established when socio-professional category is matched with family life cycles defining the amount of time available for leisure activities. The likelihood of taking regular physical exercise is less in people who have young children, work in small companies or are self-employed.

### **Sports activity in children and adolescents**

Boys practise sports more than girls, and the gap widens with age. Moreover, children are more likely to practise a sports activity regularly if their parents do so, irrespective of socio-economic status.

Practice diminishes with age for everyone, but more for girls than for boys. This decline in sports activity among girls has been observed in most European countries and also in France. One of the factors explaining this phenomenon is the perception among parents of risk factors. A quarter of parents discourage their children aged between 5-12 years from practising sports with a high risk of accident. This attitude on the part of parents is directed more at boys (35%) than girls (17%), probably because of boys' tendency to choose higher-risk sports.

Adolescents are first of all drawn to a sport by a desire to let off steam, to relax and to have fun. This is followed by a wish to learn, to master a technique, to get out of the house and to

find something to do. The three reasons most often mentioned for giving up a sports activity are poor technique, the feeling of not being very proficient (especially for boys) and the constraints related to training (more for girls).

There is a “continuum” between practising sport when young and as an adult. The likelihood of practising a sports activity as an adult is greater if this was already a feature of childhood and adolescence.

### **Women do not practise as much as men**

From a very early age, physical exercise is significantly lower in girls than in boys. This difference occurs from the age of 4 years, remains constant in the 9-10 year age bracket and continues through adolescence. With girls, the level of physical and sports activity declines with age, regardless of the degree of activity (active, moderately active or inactive girls). The decline in physical activity is strongest during adolescence. The results point to two factors as being significantly associated with the decline in physical activity over this sensitive period: lack of time and the lack of help provided by parents and friends.

Girls mostly practise sports activities as a means of losing weight or having fun. During adolescence, physical and sports activities tend to become more organised and the fun factor is gradually replaced by objectives of health and physical condition.

Adolescent girls tend to under-rate and under-estimate their aptitude, their potential and their ability for sports and physical activity. Compared to boys, they cite a greater number of obstacles such as time, money, resources and safety. There are no recommendations for physical activity specifically aimed at adolescent girls.

When they reach adulthood, women expend less energy in their physical activities than men. And yet, few studies have focused exclusively on women. The factors influencing physical activity are age, the social role attached to physical activity, the encouragement of the family and environmental parameters.

### **The sports context in France today**

The practice of sports today encompasses sports at a popular level as organised by the clubs, high-level sport, nowadays virtually professionally organised by clubs, and physical activities practised by persons not affiliated to an association. To this should be added school sports practised on a voluntary basis in secondary schools plus outdoor sports not requiring membership of a club or federation (mountaineering, paragliding, windsurfing, etc.). These practices correspond to specific age groups and socio-cultural backgrounds and are sometimes the expression of a local or regional tradition (e.g. rugby in the south-west of France).

In recent years, sports enthusiasts in urban areas (individuals, families, groups of friends) have been demanding the creation of a coordinated network of bicycle tracks, and the development of itineraries (for running, roller-blading and walking) in parks and public gardens, along the banks of rivers, or of reserved and protected itineraries leading on to peri-urban areas.

The advent of the “leisure age” in the 1960s prompted the rise in growing numbers of independent sports activities at different levels of the population: the “second age” (people already too old, for example, to take part in competitive sports in a club), and the “third age” or “senior” category of society.

### **Promoting physical activity for all**

Strategies for promoting physical activity may include the launch of awareness campaigns on health aspects and the adaptation of messages to target populations. For example, there is a need for easy-to-remember criteria, clear instructions as to the amount of effort to devote to physical activity (30 minutes per day, to be taken from daily travel time; 400 metres correspond to a 5-minute walk). The effectiveness of the communication (messages, slogans, eye-catching formulas, etc.) is measured by the degree to which the message is

accompanied by initiatives at a practical, local level, if possible presented in an entertaining and “fun” way. In the view of the experts, such campaigns should, for example, single out the age group of young girls aged between 12 and 17 years because of the decline in physical activity in this category of the population.

**The group of experts recommends:**

→ **Organising large-scale information campaigns on the strength of the physical activity recommendations for the population as a whole, by involving different media and carrying out an in-depth evaluation of the impact of these campaigns.**

→ **Incorporating the family dimension in the information campaigns. The practice of sport in a family setting (children, parents, grandparents) not only increases physical activity, it also encourages contact between, and the needs of, each generation.**

→ **Prevailing upon companies to set aside areas for physical activities at the workplace during working hours. This implies the promotion of a corporate culture which integrates physical activity.**

→ **Adapting living areas and transport facilities to the needs of old people as a means of ensuring that they maintain a certain degree of autonomy.**

## **Physical activity: what are the health benefits?**

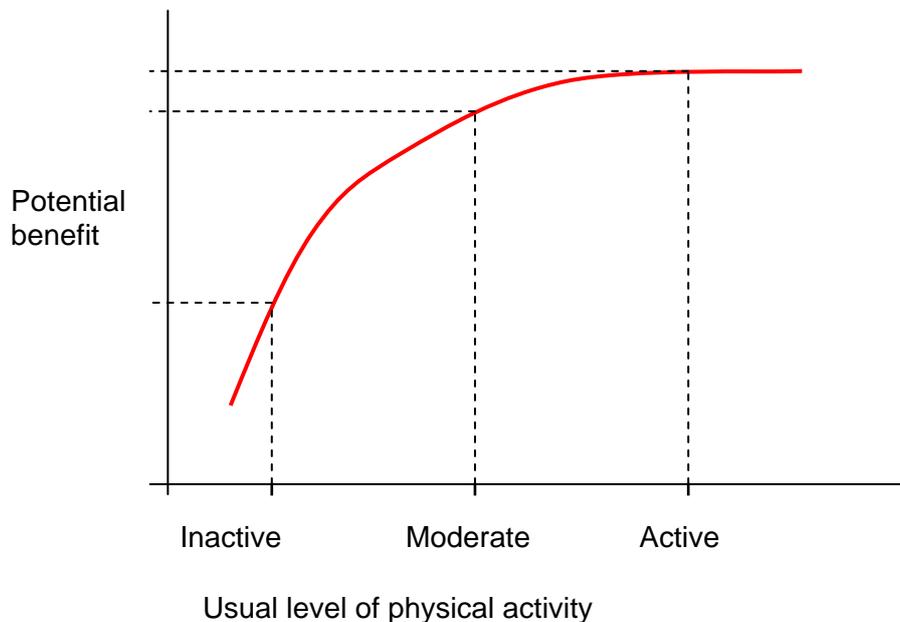
### **Effects on premature mortality**

A body of scientific studies on the relationship between physical activity and state of health has grown up over the past fifty years or more. At the beginning of the 1950s, a study comparing 30,000 bus drivers (supposedly not very active physically) with 20,000 bus conductors (supposedly active) revealed that the latter were less exposed to death for coronary reasons than the former.

Since the end of the 1980s, a substantial body of work has confirmed the existence of a link between physical activity and a reduction of premature mortality, taking all causes into account.

A prospective study published in late 2007 and concerning 250,000 persons, shows that a performance close to that of the recommendations for activity of moderate intensity (at least 3 hours per week), or for activity of high intensity (at least 30 minutes 3 times a week), leads to a reduction of mortality risk of the order of 30%.

→ Many works have focused on cardiovascular risk in view of the high mortality risks involved. Most of the studies suggest an inverse relation between physical activity and the rate of premature mortality by cardiovascular disease, in particular coronary disease. The dose-response relation between volume of physical activity and potential benefit (in terms of reduced mortality) shows that, even when practised to a moderate degree, physical activity brings a substantial benefit in health terms, as illustrated by the following chart.



### Impact on well-being and quality of life

With children and adolescents, physical activity is considered as a means of combating excessive weight and obesity, and loss of academic and social interest. It is also a means of channelling aggressiveness, controlling attention, developing cognitive and social abilities, adapting to new situations and gaining in self-esteem. These advantages would seem to exist irrespective of the discipline practised. Young people with a physical activity have a better self-image and suffer from less anxiety than those who do not practise a physical activity.

With persons aged between 55 and 75 years and not suffering from any pathology, regular physical activity of moderate intensity has a beneficial effect on well-being (feeling of competence, good self-image, low degree of anxiety). In particular, the studies show that physical or sports exercise slightly but significantly increases the level of self-esteem. This increase is revealed more clearly with persons who initially have a poor opinion of themselves.

With advancing age, the regular practice of a physical activity helps to maintain autonomy and to preserve the quality of life. Programmes combining balance, lower-limb muscle strengthening, suppleness and/or endurance exercises help to reduce the risk of falls with old persons. Several studies have shown an incidence of hip fractures which is 20 to 40% lower in persons stating that they are physically active than with sedentary subjects. Similarly, regular physical activity is considered to be a factor in the prevention of cognitive disorders. Improved oxygenation of the brain through regular physical activity has a conclusive effect on old persons in terms of ability to react, memory and reasoning. **Physical activity reduces anxiety in the adult population as a whole. It reduces the level of depression in a wide variety of sectors of society and should be recommended in any treatment of depression.**

#### Reducing the levels of anxiety and depression: practical advice

- Aerobic (walking) or muscle-strengthening work; 3 to 5 times per week; moderate intensity: sequences of 30 minutes
- For at least 12 consecutive weeks
- In groups or individually with an instructor coach
- Effects apparent as from 8 weeks of practice

### Benefits for the musculoskeletal system

The inclusion of **muscle-strengthening** exercises in the new recommendations reflects the data obtained in recent years showing the beneficial effects of this kind of exercise on

muscle strength and endurance in middle-aged subjects (and complementing the data already known for old persons).

Physical activity through the mechanical stress exercised on the skeleton induces the **formation of osseous tissue**. Physical activity acts on the osseous mass, its density and texture. Benefits are also observed on the mechanical properties of the bone (increased resistance to fracture).

During the period of growth, physical activity plays an important role in the acquisition of osseous capital. The earlier physical activity is initiated, the greater the influence on the osseous capital. The more varied the mechanical stress, and the more it differs from the usual stress of running and walking, the greater the bone formation. This effect is particularly noticeable in the pre-pubescent child, and more so at the beginning than at the end of puberty. In other words, the prevention of bone loss crucially takes place during the period of growth. The practice of multi-activity sports seems to correspond to the best expected benefit during this period.

In the case of women, after a huge loss of osseous mass in the first years following the onset of menopause, average osseous loss settles at the rate of about 1% per year. A recent meta-analysis encompassing all the publications between 1966 and 1996 shows significantly that the regular practice of a physical activity can prevent and even reverse this bone loss linked to the ageing process with respect to both the vertebrae and the hip bone. Over the age of 70 years, physical activity continues to exercise a beneficial effect by diminishing (but not completely eradicating) the degree of bone loss.

**The risk of hip fractures is reduced by 6% for each increase of energy expenditure equivalent to 1 hour of walking per week. Women walking for at least 4 hours per week are 40% less at risk than sedentary women walking for less than 1 hour per week.**

**To preserve osseous capital, preference should be given to so-called “weight-bearing” activities**

Only “weight-bearing” exercises (running, bodybuilding, brisk walking, climbing stairs) have been shown to be effective. Exercises involving no weight-bearing (swimming, cycling) have little or no effect: depending on the different bone locations, osseous mineral density is 20 to 33% higher in gymnasts compared to swimmers and controls.

It should be noted that bodybuilding is effective because it increases muscle strength and hence the extent of the mechanical stress transmitted by the muscle on the bone.

### **Interest for the cardiovascular system and for the prevention of obesity and diabetes**

Numerous works have shown that physical exercise reduces cardiac morbidity and mortality thanks to an action on risk factors such as lipid profile, blood pressure, coagulation and physiology of the blood vessel walls (endothelium).

An organised programme of physical activity reduces blood pressure in hypertensive patients, on average by 11 mmHg for systolic blood pressure and by 8 mmHg for diastolic blood pressure. It reduces high blood pressure due to exertion in the same proportions. It postpones, and even eradicates, the need for treatment by medicinal drugs of a recently diagnosed high blood pressure. The mechanisms explaining this effect are as yet incompletely understood. Nevertheless, the following results have been shown: diminished peripheral arterial resistance, a reduction of endothelial dysfunction and neuro-hormonal abnormalities linked to high blood pressure, as well as increased sensitivity to insulin (implicated in the pathogenesis of high blood pressure).

Physical activity helps to improve the serous lipid profile with an average reduction of 3.7% in the triglyceride level and of 5% in the LDL-cholesterol level, and a 4.6% increase of the HDL-cholesterol level.

Physical activity makes it easier for people to give up smoking and reduces the depressive syndrome which has been identified as a high and frequent risk factor in the course of major cardiovascular events and a pejorative prognostic factor.

Together with diet, physical activity helps to control excess weight, with an increase of lean body mass and reduction of abdominal adiposity. There are many beneficial effects of physical activity for overweight persons. While the impact in terms of weight loss is modest, the repercussions for maintaining a particular weight after initial weight loss are substantial. The same holds true for improvement of obesity co-morbidities.

However, a greater volume of physical activity (in terms of duration and intensity) could prove necessary if the specific aim is to prevent an increase in weight. Consequently, it is suggested that adults should increase the duration (e.g. at least 45 to 60 minutes of moderate-intensity activity per day) and/or the intensity of the physical activity, or reduce their energy intake, in order to avoid putting on weight.

In France, efforts to limit the sedentary nature of modern life and to promote a regular physical activity of moderate intensity are two of the main strands of the National Nutrition Health Programme (PNNS) introduced by the Ministry of Health in 2001, and integrated in the Law governing public health policy of 9 August 2004. The group of experts therefore recommends that the **actions carried out within the framework of the PNNS should be coordinated with the campaigns designed to encourage the practice of a sports activity ("sport for all") conducted by the Ministry of Youth, Sports and Community Development.**

Physical activity also has a key role to play in the prevention of type 2 diabetes, cutting the risk of occurrence of diabetes in subjects presenting an intolerance to glucose by almost 60%. It is for this reason that physical activity is currently deemed a priority objective in the fight against the type 2 diabetes pandemic.

## Risks linked to excessive practice

**Traumatisms.** The regular practice of a physical activity may potentially give rise to a risk of injury. The type and seriousness of the injury depends in particular on the sports discipline, age and the conditions in which the sport is practised.

### Different traumatisms associated with each sport

- Swimming gives rise to the frequent occurrence of shoulder tendinitis (up to 21% of all injuries in certain studies).
- Cycling is responsible for frequent tendinopathies of the knee (13 for 100,000 km cycled).
- Running has attracted the largest number of studies (over 10 prospective studies referenced at the time of writing). This activity causes first of all patellar syndromes, tendinitis of the knee and ankle and fatigue fractures accounting in athletics for 8 to 20% of injuries according to the studies, compared to an average of 1% for other sports.

With the growing child, particular attention must be paid to the risks of overtaxing the growth cartilages (epiphyseal and apophyseal cartilages), still referred to as osteochondritis. These are much more frequent than the ligament, muscle and tendon injuries found in adults. In other words, this period of life calls for special surveillance which is not forthcoming for all sports at the present time.

**Arthritis.** The intensive practice of sports, particularly in such sports as football, hockey and tennis, is open to arthrogenic risk, especially after a first accident (e.g. anterior cruciate ligament of the knee) or in the case of morphological abnormalities.

On the other hand, moderate physical activity may have a beneficial effect on arthritis. When properly adapted to each person, it actually improves functional capacity and reduces the pain associated with this condition.

**Addiction.** Recent works have put the number of persons in the general sports population liable to gradually slip into addiction at about 4%. The clinical signs for describing addiction to physical activity have been matched with the criteria concerning addictions to psychoactive substances. The validity of this relationship is, however, subject to the validation of criteria for which there is as yet no consensus.

However, gender (girls are less vulnerable), type of sport (individual or team sport, etc), level of practice, socio-familial environment, "thrill-seeking", etc. are all factors amplifying or limiting this vulnerability . The experts note that the small fraction of subjects vulnerable to addiction particularly concerns a significant section of persons involved in long-distance running, marathons and body building. (These are sports for which a large body of data is available). These enthusiasts, despite a quasi-professional kind of training schedule, are nonetheless "amateur" athletes not belonging to any club or federation. As such, they do not have the benefit of an institutional or medical organisation capable of detecting, diagnosing and monitoring those who might be prone to addiction.

**In the light of all the data analysed, the group of experts emphasises the need to appraise the notion of benefit/risk as precisely as possible. This has not as yet been exhaustively evaluated**, particularly with respect to the type of sport practised, its intensity and frequency, and the age of the person in question.

## **Physical activity: treatment or complementary treatment of the most frequent chronic diseases**

In the case of patients over the age of 50 years and suffering from chronic illness, specific recommendations were updated in 2007 by the American College of Sports Medicine and the American Heart Association. The recommendations in terms of duration and frequency appear to be identical to those recommended for young adults: aerobic-type activities (endurance) of moderate intensity for a minimum of 30 minutes per day, 5 days a week, or of high intensive for 20 minutes per day, 3 days a week. However, subjects with a chronic illness (for which a physical activity is a therapy) must respect the precautions inherent in this disease (example of cardiovascular diseases). They must therefore follow a programme of physical activity adapted to their pathology and evolving in line with the improvement or worsening of this pathology.

Physical activity is a full-fledged treatment in the course of such chronic incapacitating affections as chronic obstructive pulmonary disease (COPD), ischemic cardiovascular diseases and metabolic diseases such as type 2 diabetes. It actually reduces the functional consequences of these diseases by improving the physical abilities of patients. In addition, it acts directly on the development of these diseases, resulting in a dramatic decrease in morbidity and cardiovascular mortality.

Physical activity is henceforth recommended in the field of **cardiovascular diseases**, both as a means of preventing their occurrence and of limiting their consequences once they have occurred. The principal affections concerned are coronaropathy, chronic heart failure and arteriopathy of the lower limbs. On the other hand, there is still a shortage of experimental proof concerning the impact of physical activity on cerebrovascular diseases.

Once diabetes is installed, physical activity facilitates glycaemic homeostasis on both the hyper- and hypo-glycaemic side. Physical activity can thus lighten the medicinal treatment. It delays the apparition of those degenerative complications which make diabetes such a serious disease. These effects are explained, at least in part by the reduction of insulin resistance, the improvement of transport and the use of muscle glucose, and reduced hepatic production of glucose

**Physical activity is the most effective therapeutic tool in the treatment of dyspnea and chronic obstructive pulmonary disease (COPD).**

### **Sport and asthma: a new era**

The days when the practice of sport was discouraged for persons suffering from asthma are long gone, and the result is that asthmatics are in much better condition than in the past. Although it is not prescribed in the strict sense of the term, physical activity should be widely recommended for these subjects.

Moreover, physical activity contributes to the (additional) treatment of many other pathologies, and in particular neurological diseases (multiple sclerosis, hemiplegia, etc.) and rheumatic diseases (inflammatory diseases, arthritis, etc.).

**The group of experts recommends a programme tailor-made to the needs of each patient for best results on both the evolution of these pathologies and on their functional consequences, and at minimum risk.**

## **Promoting the preventive and therapeutic dimension of physical activity**

In the opinion of those involved in physical and sports activity as well as health experts, the accent should be put on the impact of physical activity on health (taking into account age, sex and handicap) and on the necessary prevention of accidents in function of the type of sports activity.

**The group of experts therefore recommends:**

**→ Making sports and health professionals more aware of (and giving them training in) the preventive dimension of physical activity**

→ Training medical students by incorporating into their medical studies a special module on physical activity in the management of chronic pathologies

→ Providing training for general practitioners and specialists confronted on a daily basis with pathologies of the musculoskeletal system and with the consequences of a sedentary lifestyle (rheumatologists, cardiologists, pneumologists, orthopedists, neurologists, geriatricians, physiotherapists, sports doctors)

→ Making patients aware of the benefits of physical activity in the treatment of their condition

## **Summary: the 10 principal observations**

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- Regular physical and sports activity is a major determinant of the state of health of individuals and sections of the population at all ages of life.
  - The practice of physical and sports activities is determined by individual, social and environmental factors.
  - The regular practice of a physical and sports activity, even of moderate intensity, reduces mortality and increases the quality of life.
  - The regular practice of a physical and sports activity, even of moderate intensity, is a major factor in the prevention of the principal chronic pathologies (cancer, cardiovascular diseases, diabetes, etc.).
  - The regular practice of a physical and sports activity ensures that children and adolescents grow harmoniously.
  - The regular practice of a physical and sports activity helps to prevent osteoporosis, particularly with women, and enables old people to maintain autonomy.

- The regular practice of a physical and sports activity helps to control body weight with adults and children.
  - The regular practice of a physical and sports activity is associated with improved mental health (anxiety, depression).
  - The resumption of a regular and suitable physical activity is a major element in the treatment of the principal chronic pathologies (ischemic cardiopathy, chronic obstructive pulmonary disease (COPD), obesity and type 2 diabetes, neurological, rheumatic and degenerative diseases, etc.).
  - The health risks involved in the practice of a physical and sports activity are minimised by the respect of elementary precautions, an adapted medical follow-up and competent supervision.
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## Summary: the 10 principal recommendations

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- To inform the population of the health benefits to be derived from a regular practice of a physical and sports activity, in particular by means of general-public or targeted campaigns for the dissemination of the current recommendations concerning physical activity.
  - To monitor, within the framework of a health watch mechanism, the level of physical activity and sports practice of the population through the use of standardised instruments.
  - To promote physical and sports activity beneficial to health by means of a multi-sector approach bringing together operators from the sports, health, education, corporate, transport spheres, etc. as part of a political commitment at national level.
  - To provide training to professionals from the health field and from the physical and sports activity sphere in the preventive and therapeutic aspects of physical activity, in the context of initial and continuing training.
  - To identify and promote new professions for instructors/coordinators in physical and sports activity, specialising in prevention or therapy education, with a view to setting up and securing the long-term development of joint actions and individualised management.
  - To foster research on the relationships between environmental determinants (urban planning) and individual causal factors (behaviour) in the regular practice of physical or sports activity.
  - To continue work on the mechanisms of the beneficial effects of physical and sports activity in the prevention and treatment of the principal chronic pathologies.
  - To focus research on the definition of physical and sports activity protocols adapted to specific sectors of the population or to given pathologies.
  - To launch in-depth research programmes on accidents linked to the practice of physical and sports activities and the prevention of damage to health.
  - To initiate research into the cost-benefit ratio of physical and sports activity in the prevention and treatment of the principal chronic pathologies.
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