In the Russian Federation (RF) 24% (34 million) citizens are (potentially) at high risk of experiencing an osteoporotic fracture. It is estimated that every minute in RF, 7 vertebral fractures occur in people older than 50 years, while a hip fracture occurs every 5 minutes. Extremely low rates of surgical treatment of hip fractures are observed throughout the country: following a hip fracture only 33-40% of people are hospitalized and only 13% receive operative treatment. As a result, an extremely high mortality rate (up to 45-52%) after hip fracture is observed in some Russian cities. Furthermore, many of those who sustain fractures and survive are not subsequently administered osteoporosis therapy to prevent further fractures.

There are many possible explanations for this high incidence of osteoporosis, including the latitude of the country; studies have shown that there is widespread vitamin D deficiency in the population at risk of fractures, however official recommendations on vitamin D have been designed for young populations only.

Problems with diagnosis also exist; medical institutions in the RF are underequipped with densitometers and densitometry is not reimbursed. However, over the last few years the government has paid more attention to the prevention of chronic non-infectious diseases, Russian citizens have been motivated to maintain healthy lifestyles, and Health Centres equipped with modern apparatus are currently being opened throughout the country. Unfortunately, at the present time osteoporosis is not in the sphere of interests of these centres.

**Key findings**

In 2010 the Russian population is estimated to be 142 million people, with 32% (45.5 million) aged 50 years or older. The average life expectancy in women (72 years) is significantly higher than in men (59 years). The Russian population is rapidly ageing and the number of people aged over 50 years will increase up to 48 million by 2020. It is predicted that the population of Russia will decrease to 110 million people by 2050 and as a result 56% of the population will be 50 or over and 20% will be over 70 years.

Owing to the ageing of the population, the number of people with osteoporosis is expected to increase by a third.

**Epidemiology**

Due to lack of official statistics, it is very difficult to determine the exact incidence of osteoporosis and associated fractures. Population-based studies carried out at the Institute of Rheumatology of the Russian Academy of Medical Sciences indicated that 33.8% of women and 26.9% of men over 50 had osteoporosis, while 43.3% of women and 44.1% of men had signs of osteopenia (fig 2). Thus, it can be estimated that currently, 14 million people in Russia (10% of the population) suffer from osteoporosis and 20 million have
osteopenia. This means that 34 million people are at high risk of fragility (osteoporotic) fractures.

According to the Federal Centre of Osteoporosis Prevention, among the urban population of the RF, 24% of women and 13% of men aged 50 years and over had a previous fracture. Based on the Russian Osteoporosis Association’s estimations, 3.8 million vertebral fractures occur annually due to osteoporosis. As a result, 7 vertebral fractures occur in people older than 50 years every minute, while a hip fracture occurs every 5 minutes in this population.

**Hip fractures**

An epidemiological study in Yaroslavl reported a hip fracture incidence of 29.5 per 10,000 population aged 50 years and over, rising to 676 per 10,000 population among women aged 95 and older. Extrapolating these data to the entire Russian population gives 134,225 cases of hip fracture annually. In retired people alone, 112,000 hip fractures occur annually. Thus by 2030, owing to the ageing of the population, it can be estimated that the number of hip fractures in this group will increase by 23% and reach 144,000 cases annually.

In Russia there is no unified standard of care for patients with hip fracture and an extremely low rate of surgical treatment of hip fracture is reported in the entire country; according to some studies, only 33-40% of people with hip fracture are hospitalized and only 13% receive surgical treatment. The reasons given for not admitting patients to hospital are the absence of surgical indications and the presence of contraindications (fig 4). Until now the conservative methods of hip fracture treatment, such as de-rotational boot and skeletal traction have remained widespread, even in hospitals. Approximately 24% of patients with hip fracture are not registered in the official statistics as they do not seek medical attention and are treated and managed by general practitioners (GP) only. A Total Hip Replacement operation is rarely performed on these patients. One of the main reasons for this is the limited funding as patients have to buy prostheses themselves. Hip replacement surgery is usually performed on arthritis patients as elective surgery.

Consequently, there is an extremely high mortality rate after hip fracture, reaching up to 45-52% during the first year after fracture in some Russian cities (fig 5). The lowest mortality is registered in Yaroslavl where it is mandatory to hospitalize all patients with hip fracture and 80% of these patients receive surgical treatment. Of the surviving hip fracture patients in

**Figure 2** Incidence of osteoporosis and osteopenia in men and women over 50 years old

![Graph showing incidence of osteoporosis and osteopenia in men and women over 50 years old.](image)

> Incidence of osteoporosis and osteopenia in RF according to densitometry (two localizations) in women and men aged 50 years and older


**Figure 3** Hip fractures projection in retired people by 2030

![Graph showing projection of hip fractures in retired people by 2030.](image)

> Prognosis for 2030 year. The number of patients with HF among people of unworking age in RF (a 23% increase)

> Calculation carried out only regarding population aging

> Calculation carried out according to epidemiological data of Yaroslavl in 2008

**Figure 4** Type and percentage of medical care provided after hip fractures

![Graph showing type and percentage of medical care provided after hip fractures.](image)

> Performed X-ray

> Hospitalized

> Operated

> Type and percentage of medical care provided after hip fractures

> Proportion for 2030 year. The number of patients with HF among people of unworking age in RF (a 23% increase)

> Calculation carried out only regarding population aging

> Calculation carried out according to epidemiological data of Yaroslavl in 2008.
the Russian Federation, 33% remain bed-ridden and 42% are capable of only very limited physical activity. Only 15% are able to ambulate outside and only 9% return to their previous level of daily activities and physical ability (fig 6). Thus the quality of life and the mortality rates observed post hip fracture in the RF are clearly dependent on the type of treatment the patient received.

In 2008, the cost of in-patient treatment for a hip fracture with a hip endoprosthesis was 4,000 USD (120,000 rubles). If surgery was performed on all the Russian people who suffered a hip fracture, the total cost would be at least 458 million USD (13.8 billion rubles) per year.

**Vertebral fractures**

The Multicentre European Vertebral Osteoporosis Study (EVOS) indicated that vertebral fracture incidence in Russia is 10.3% in men and 12.7% in women 50 years or older. A study of a group of elderly people in Moscow showed an incidence of new vertebral fractures of 5.9% in men and 9.9% in women aged 50 years or older while the highest incidence rate occurred in the group of 75 years or older. Extrapolation of these data to the Russian population permits us to estimate that there might be 1 million new vertebral fractures per year in men and 2.8 million in women of 50 years or older in the RF. Only those with the most severe vertebral fractures are hospitalized, and modern methods of surgical treatment for pain relief, such as vertebroplasty or balloon-kyphoplasty are rarely used.

**Wrist fractures**

In a multicentre study covering 14 major cities of Russia, the incidence of wrist fracture was 200 per 100,000 in men and 563 per 100,000 in women aged 50 years or older. In cities such as Moscow, Tyumen, Khabarovsk and Yekaterinburg the wrist fracture incidence in women reached over 1,200 fractures per 100,000. In Russia, this type of fracture occurs twice as often as hip fractures and its incidence far exceeds that in other nearby countries owing to the effect of...
bad weather. The incidence of wrist fractures is substantially affected by weather conditions; slippery pavements from rain, snow and ice during the period from October to April increases wrist fracture occurrence almost three-fold.

**Diagnosis**

In the RF there are 167 DXA scanners. However, they are unevenly distributed throughout the country: half of them (52%) are placed in Moscow and the others are located in major hospitals of regional centres (fig 8). Even in the Moscow region only 63% of doctors have the option to refer their patients for densitometry. In the cities of Siberia and the Far East there are only 16 DXA machines. In general, DXA availability is 8.6 in Moscow and 0.6 scanners per million citizens in the rest of the country. A DXA examination is not included in the programme of state guarantees which means that patients have to pay for the test themselves.

**Reimbursement**

In the RF, medications for osteoporosis treatment are free of charge for disabled patients with severe osteoporosis only. The list of appropriate medications includes only Calcitonin salmon. Patient compliance with osteoporosis treatment is very low: 14% do not start the recommended treatment, and 16% discontinue it after 3 to 6 months. Among those who continue the treatment only 40% adhere regularly.

A study conducted by scientists at the Moscow Clinical and Research Institute (MONIKI) found that people with less severe osteoporosis and fractures were not administered anti-osteoporotic therapy for recurrent fracture prevention.

**Calcium and vitamin D**

The territory of the RF is located mostly north of the 55° northern latitude; this is a substantial risk factor for vitamin D deficiency in the population due to insufficient sunlight in the winter months. Thus, in recent years the incidence of rickets among Russian infants has ranged from 54% to 66% in some regions. In Yakutia, the average level of circulating 25OH-vitamin D in healthy children and adolescents was 14 ng/ml in winter. In winter, vitamin D deficiency is observed in 60% of healthy children and in 10% during summer time. In wintertime 32.5% of healthy children suffer from secondary hyperthyroidism.

Vitamin D deficiency has been investigated in post-menopausal women in Moscow (fig 9). The level of 25OH-vitamin D was >50 nmol/L in only 30% of this group. The lowest level of vitamin D was measured during the period from January to April. In Yekaterinburg among the elderly population, none had a normal vitamin D level by the end of the winter while the lowest level was observed in those with a history of hip fracture. As previously noted, the official recommendations on vitamin D deficiency refer only to children under two years old.

It has been demonstrated in studies in different population groups in the RF that dietary calcium intake is generally low. Thus, children 10-15 years old consume on average less than a glass of milk or other dairy products per day. In the Moscow population the calcium intake was within normal limits in only 6% of male adolescents, and in none of the females. The territory of the RF is located mostly north of the 55° northern latitude; this is a substantial risk factor for vitamin D deficiency in the population due to insufficient sunlight in the winter months. Thus, in recent years the incidence of rickets among Russian infants has ranged from 54% to 66% in some regions. In Yakutia, the average level of circulating 25OH-vitamin D in healthy children and adolescents was 14 ng/ml in winter. In winter, vitamin D deficiency is observed in 60% of healthy children and in 10% during summer time. In wintertime 32.5% of healthy children suffer from secondary hyperthyroidism.

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level of calcium consumption influences bone mineralization. A significant decrease of dietary calcium intake was observed in students, female doctors of reproductive age, and postmenopausal women. Interestingly, the lowest level was noted in the days of Orthodox Lent.

The Institute of Nutrition of the Russian Academy of Medical Sciences of the Russian Federation has also analyzed diet in different age groups of the Russian population, according to the Russian monitoring of economic status and health of the population for 8 years (1994-2003), in a sample of more than 9,000 people. The lowest level of dietary calcium intake was found in men and women older than 55 years and in the group of 18-30 years. Consumption of dairy products was lowest in the urban populations.

Research examining general awareness of osteoporosis showed that half of the people understand that dairy products are the main source of calcium; informed people drink more milk; 36% of people believe that dairy products are harmful for elderly people. Only 69% of people with osteoporosis take calcium and vitamin D supplementation.

There are products fortified with calcium available in the RF, but no fortification with vitamin D.

**Prevention, education, government policy**

In recent years the RF government has paid more attention to the problems of chronic non-infectious disease prevention, and many programmes have been developed around exercise, nutrition and adopting a healthy lifestyle. However, as mentioned in the overview, osteoporosis is not a priority for the recently opened Health Centres in the RF.

Although osteoporosis is not considered to be a socially important problem in the country, as far back as 1997 the Ministry of Public Health of the RF declared that Centres of Osteoporosis Prevention should be opened on the premises of major multi-field hospitals. To date, 29 centres of osteoporosis prevention are officially registered and operating in Russia. There are at least 50 Public Health Units providing specialized care for osteoporosis patients in the RF. Two or three new Osteoporosis Centres are opened every year with the principal tasks of these centres to provide specialized care to people with osteoporosis, education programmes for doctors, and self-management programmes for patients and carers.

There is a lack of specialized doctors in the field of bone and osteoporosis in the RF. In one study, 19% of certified doctors could not state any method of examination for osteoporosis. Only 19% of doctors recommended densitometry to patients taking corticosteroids and 34% did not refer such patients for further examination.

The Russian Osteoporosis Association (RAOP) was established in 1995 and is a member of the International Osteoporosis Foundation (IOF). It unites efforts of doctors of various specialties involved in the process of medical care of patients with osteoporosis. A society of patients with osteoporosis, ‘Towards a life without osteoporosis’ (RPA) is also a member of IOF. Over the past 15 years, three Russian Symposia on Osteoporosis and three Congresses on Osteoporo-
sis have been held. In 2009 the Russian Osteoporosis Association issued the 2nd edition of Clinical Guidelines on Diagnosis, Prevention and Treatment of Osteoporosis; unfortunately this is not used by the Ministry of Public Health and Social Development of the RF and other health authorities in taking administrative and political decisions.

The Russian Association on Osteoporosis has developed a unified education programme for patients with osteoporosis (Health school ‘Osteoporosis’), recommended by the Training and Methodical Association of Russian Universities on Medical and Pharmaceutical Education as a manual for the system of advanced professional education of doctors.16

**Recommendations**

Clearly there is a great need in the RF for improvements in epidemiological study of osteoporotic fractures and the education of health care professionals. The following measures are thus recommended:

- The collection of official statistics on fragility fractures, especially hip, vertebral and wrist and consideration of the establishment of a Fracture Registry in the RF
- Support for epidemiological research on osteoporosis and fractures
- The provision of surgical care after hip fracture; this will have a dramatic effect on morbidity and mortality rates in the RF
- Reimbursement of DXA in high-risk individuals and wider accessibility and availability of DXA testing
- Wider availability of anti-osteoporosis medications
- Official guidelines are needed for the prevention, treatment and management of osteoporosis, in particular for post-hip fracture care
- Official recommendations are needed for calcium and vitamin D in all population groups
- Improved continuing education for all health and medical professionals involved in the care of people with osteoporosis and fractures
- Support for widespread education and prevention programmes (including lifestyle management) for the general public

**References**