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THE VALUE OF LONGITUDINAL STUDIES OF SCHOOLCHILDREN'S HEALTH IN ACHIEVING A MORE EFFECTIVE YOUTH HEALTH CARE IN THE FUTURE

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Background.

Problems of preservation and improvement of schoolchildren's health are becoming more relevant, because the health status of children in Russia is gradually getting worse for the last three decades. This is confirmed by the official statistics data, results of preventive examinations of students and scientific research.

- The prevalence of so-called school-related health disorders is increasing.
- We include not only chronic disease but also functional disorders. Functional disorders are premorbid states that arise as a result of the impact of environmental factors and the learning process in school.
- We do not deny the role of genetic factors in the occurrence of these health problems.
- Functional disorders are transient violations and may occur during the implementation of preventive measures.
- However, in 25-30% of cases functional disorders can become chronic disease.
- Most functional disorders are presented in the International Classification of Diseases (10 revisions).

School-related functional disorders and chronic diseases do not lead to premature death and do not reduce life expectancy. However, they reduce the quality of life and limit the professional choice of school leavers. The prevention of school-related functional disorders and chronic diseases must begin from the moment when the child enters the kindergarten and school.

It is necessary to conduct longitudinal observations for the development and implementation of preventive and health actions depending on the different periods of child development from 7 to 18 years.

Longitudinal studies is the observation of the same group of children since entering school to high school graduation.

Longitudinal studies reveal the priorities of preventive work and medical activities in schools according to the age of students.

The aim

To analyze the prevalence of functional disorders and chronic diseases of Moscow schoolchildren in the dynamics of the study (grades 1 – 11) and to develop recommendations for the better Youth Health Care.

Materials and methods.

- From 2005 to 2015 the doctors of the Research Institute for Hygiene and Health of Children and Adolescents supervised 426 children (216 boys and 210 girls) in 4 Moscow schools in different administrative districts of Moscow.
- The examination of students was conducted annually at the same time (in April) directly in schools.
- Before each examination of the child we have obtained the informed consent of his/her parents.

The survey included:

- **pediatric examination**; a three-fold measurement of blood pressure;
- examination by an **orthopedist** (podiatrist) with the plantography;
- examination by an **ophthalmologist** with the definition of severity and functional parameters of vision;
- examination by a **neurologist** with the testing the detection of neuro-psychiatric disorders;
- the examination by an **otolaryngologist** using otorinoscopy;
- the examination by a **cardiologist**.

All the children were carried out 12-lead electrocardiography and clinical analysis of electrocardiograms.

We evaluated annually the physical development and puberty of all children.

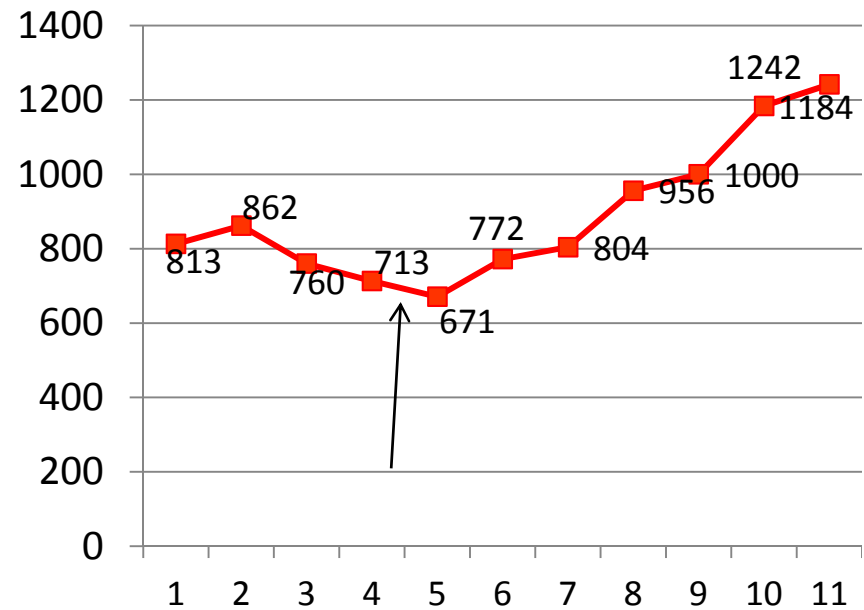
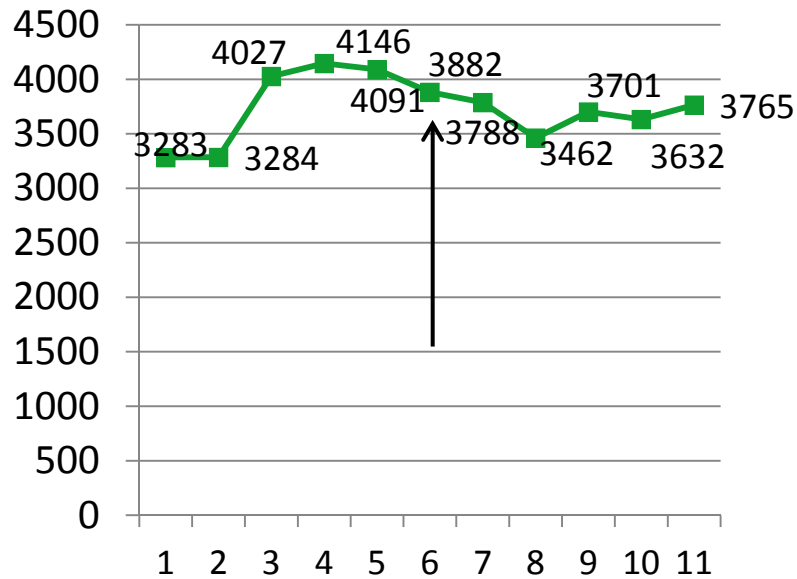
We also conducted the surveys of students to identify their complaints and questioning of parents to clarify the anamnesis (history of disease before diagnosis) and follow-up (history of the disease after diagnosis) of functional disorders and chronic disease among schoolchildren.

In total, 25298 medical examinations and 3614 questionnaires were analyzed.

We used common statistical methods for annual quantitative analysis of the prevalence of functional disorders and chronic diseases.

Results

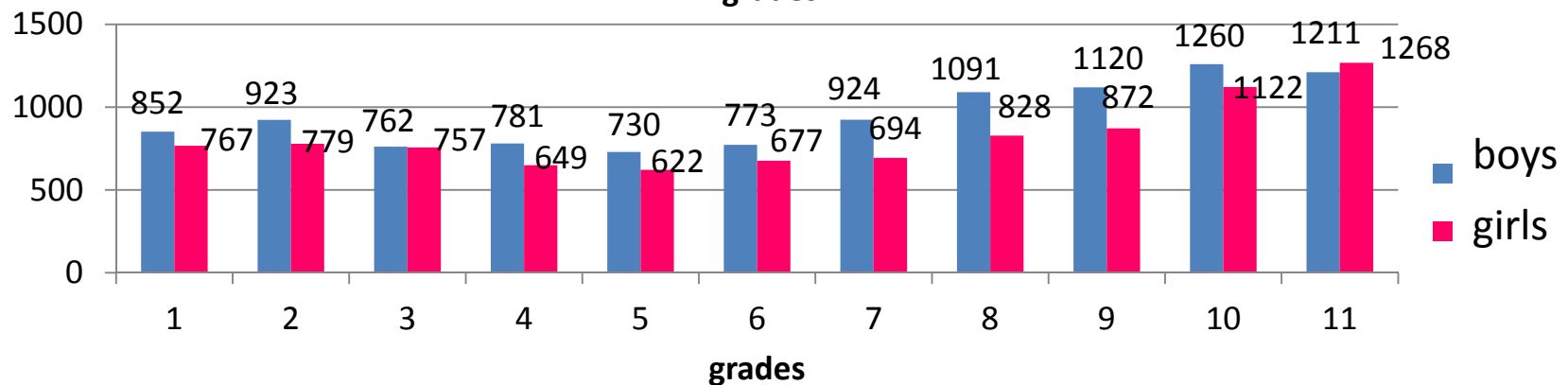
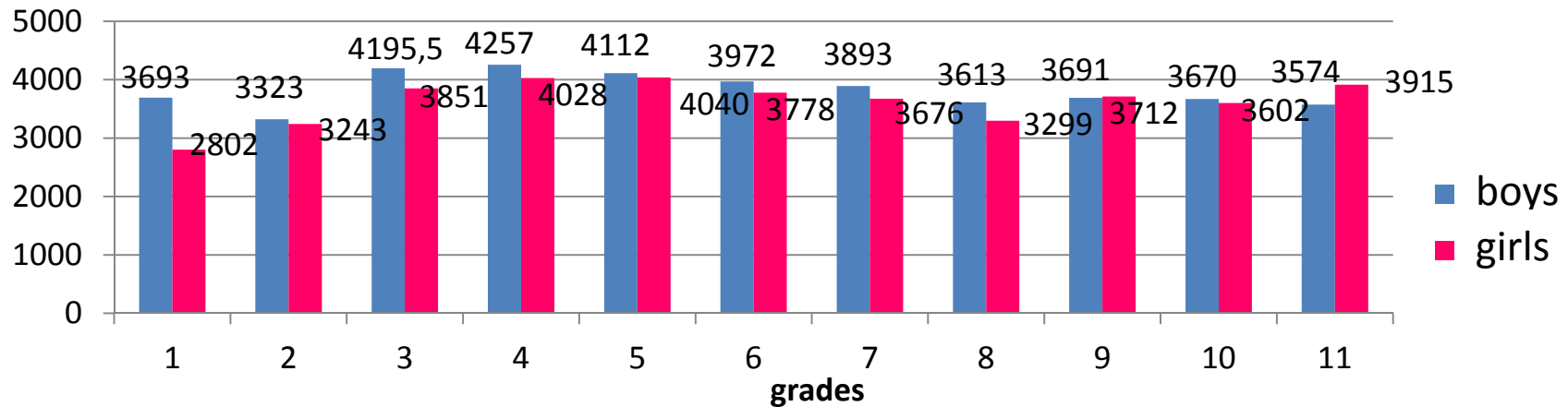
The results of longitudinal monitoring of health state of Moscow schoolchildren from the first to the eleventh grade (from 2004-2005 academic year to 2014-2015 academic year) show that the health of students is **getting progressively worse**: increased prevalence of functional disorders and chronic diseases.



For 11 years of observation the prevalence of functional disorders (left graph) has increased by 14.7% (from 3283‰ to 3765‰), and chronic diseases (right graph) – by 52.8% (from 813‰ to 1242‰).

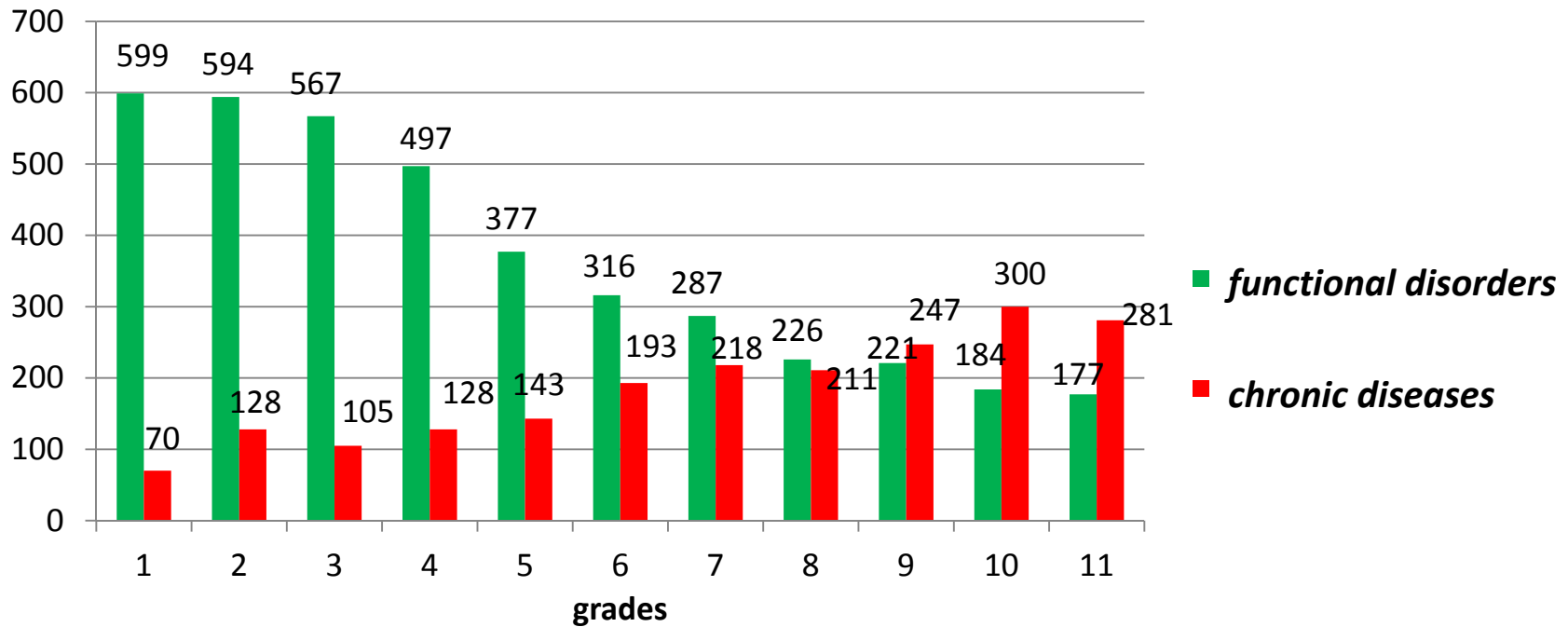
The changing in incidence is not linear. There are periods of some decline in the prevalence of functional disorders and chronic diseases and periods of rapid increase (grades 1-3, 7-8 and 9-11 especially).

The **most favorable** time for students is ages 10-12 (grades 4-6). At this stage the prevalence of functional disorders and chronic diseases reduced. Our opinion is that the academic load corresponds to the functional features of most children in this period.



Functional disorders (top graph) and chronic diseases (bottom graph)

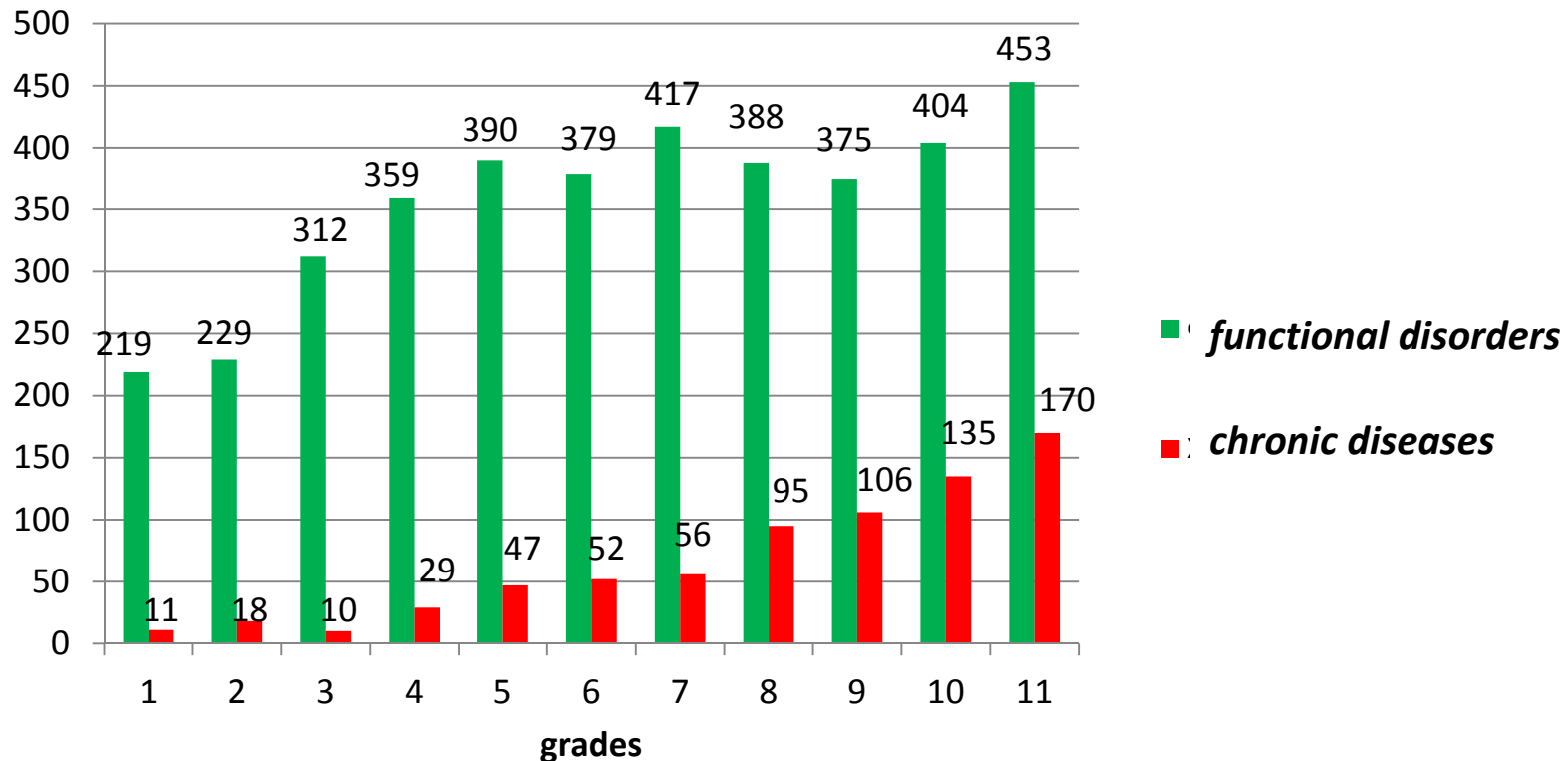
A significant increase in the frequency of chronic diseases (63.0%) in the boys group was observed, from 7-th to 10-th grade inclusive (from 773‰ to 1260‰); in the girls group (82.7%) – from the 8th to the 11th grade (from 694‰ to 1268‰). From 1-st to 10th grade the frequency of functional disorders and chronic diseases was higher among boys, but in the 11th grade – among girls.



Functional disorders and chronic diseases of the digestive system

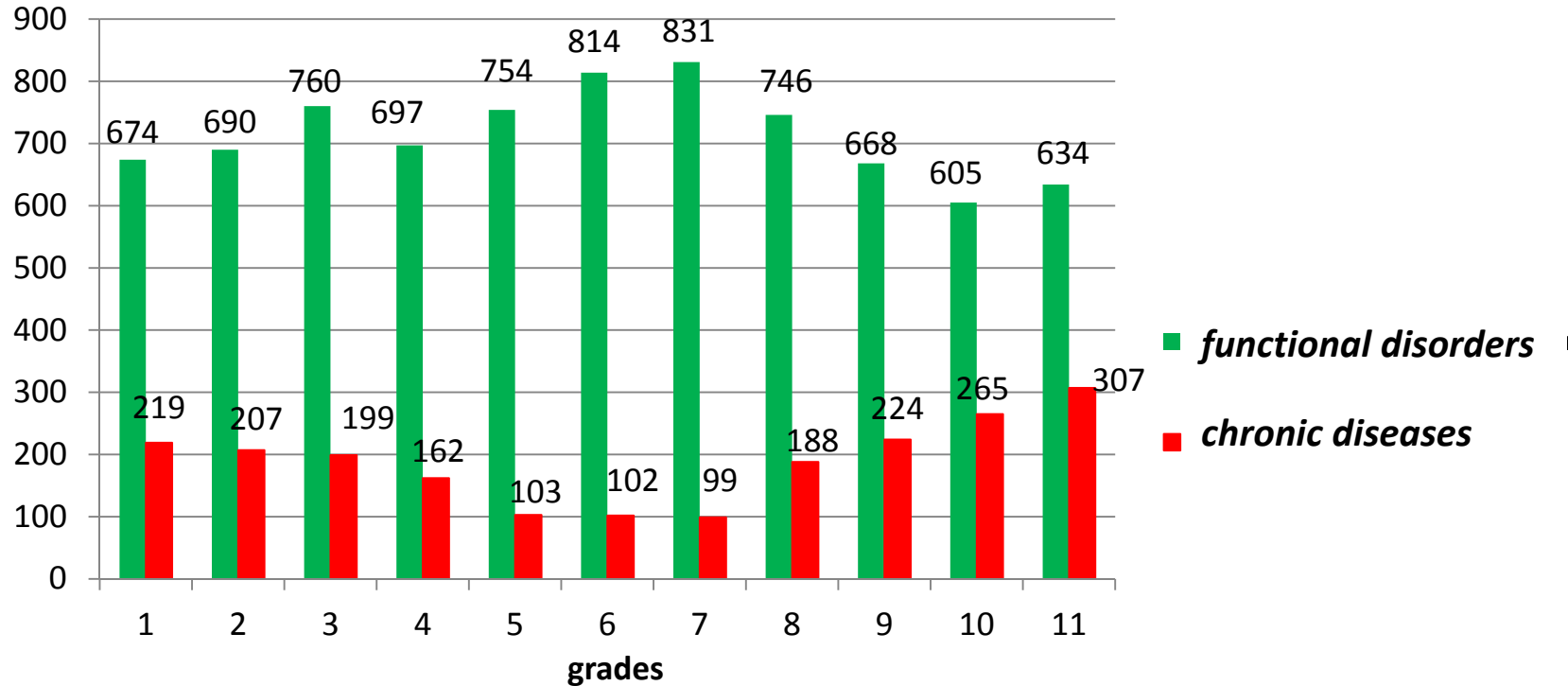
For 11 years of the observation the prevalence of functional disorders of the digestive system (biliary dyskinesia, dyspepsia, dyskinesia of stomach and intestines) has decreased (from 599‰ to 177‰).

But the prevalence of chronic diseases of the digestive system has increased (from 211‰ to 281‰). It happened because there were many new cases of gastroduodenitis and peptic ulcer disease in 8-11 grades.



Functional visual impairment and chronic eye diseases

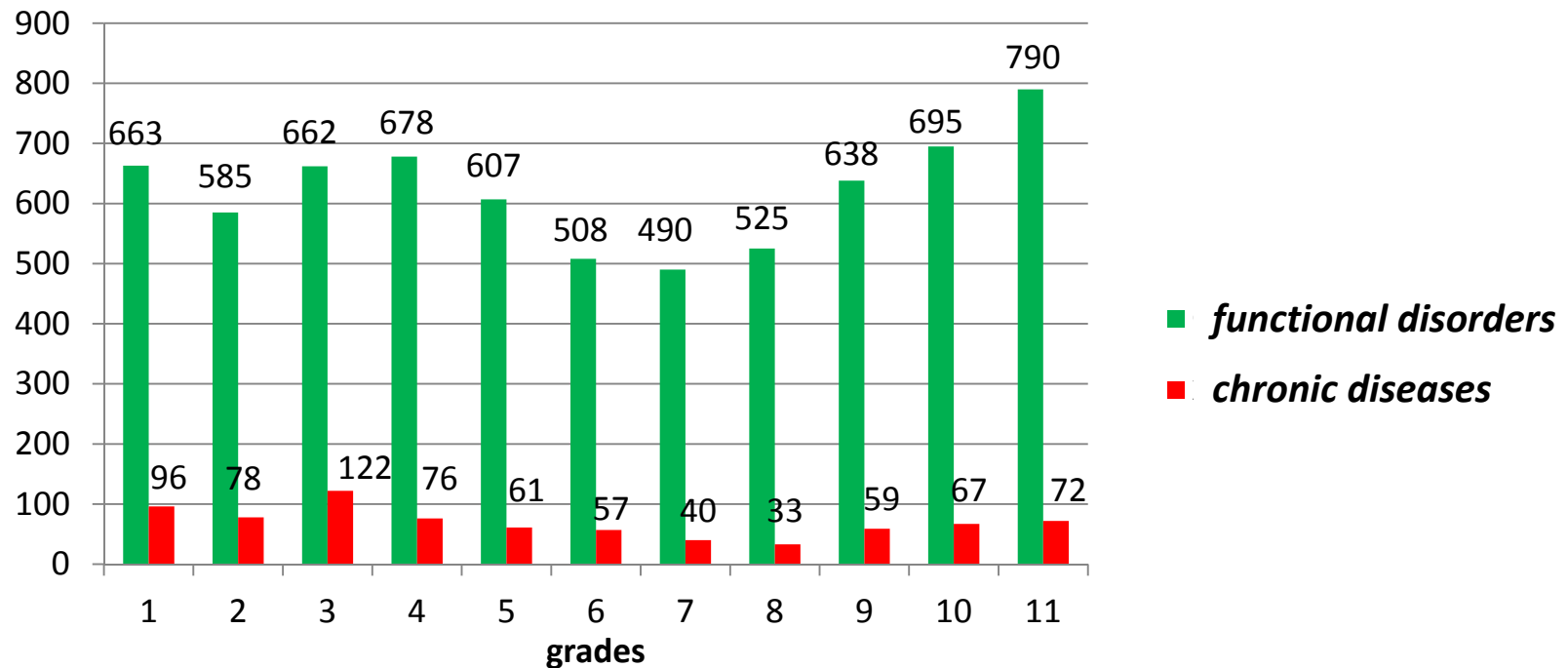
Among the observed students per year the frequency of functional visual impairment (mild myopia and spasm of accommodation) has increased (for 11 years from 219‰ to 453‰). At the same the prevalence of chronic eye diseases (especially myopia of medium or high degree) has increased from 11‰ to 170‰. Myopia progresses very quickly in some students – by 1.5-2.5 dioptre per year.



Functional disorders and chronic diseases of the musculoskeletal system

Frequency of functional disorders of the musculoskeletal system (disorders of posture and flattening of the foot) was at the same level and then declined during school period in students from 8 to 11 grades (from 746‰ to 634‰).

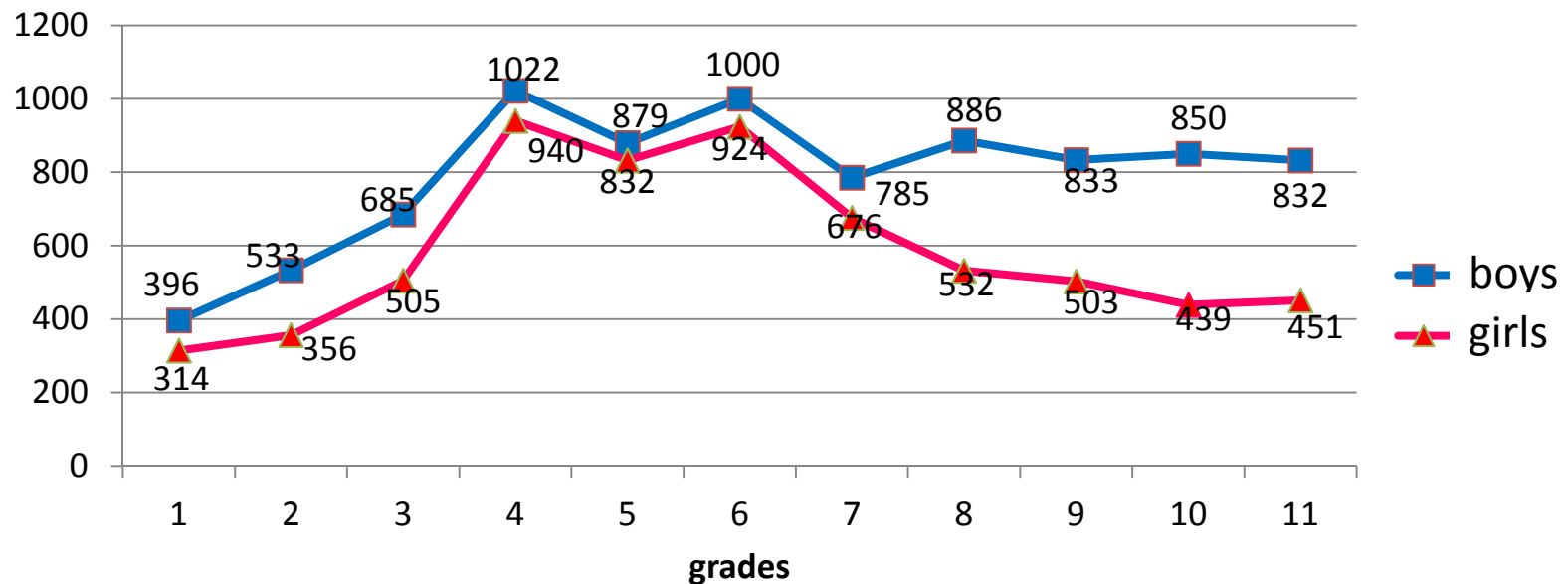
The prevalence of chronic diseases of the musculoskeletal system decreased from 1 to 5 grades (from 219‰ to 103‰) due to the reduction in the number of cases of flatfoot in students. Then the indicator was at the same level all the time. Since 8th grade, the prevalence began to increase (from 188‰ to 307‰) due to the emergence of new cases of scoliosis.



Functional mental disorders and chronic mental diseases

Frequency of functional mental disorders (asthenia and neurotic disorders) was at the same level from 1 to 6 grades (663-607‰), and then it decreased to 490-525‰ and increased again to 790‰ in grades 9-11.

The prevalence of chronic mental diseases varies within 33-122‰.



Functional disorders of the cardiovascular system

Functional disorders of the cardiovascular system are among the most common functional disorders.

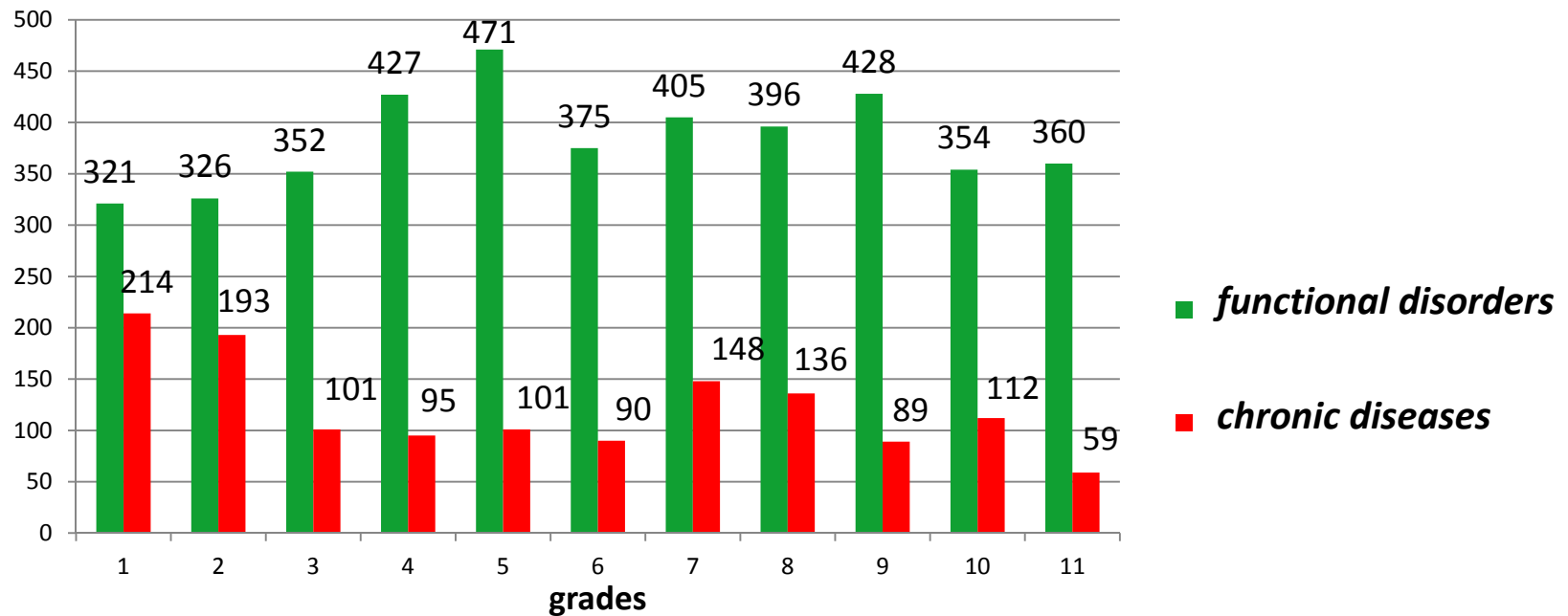
The frequency of these disorders begins to increase in children aged 8-9. At this time the majority of children have functional heart murmurs.

The highest levels of functional disorders of the cardiovascular system are observed at the age of 10-12 years.

Then the indicators are falling.

Among girls the rate has been decreasing faster than among boys.

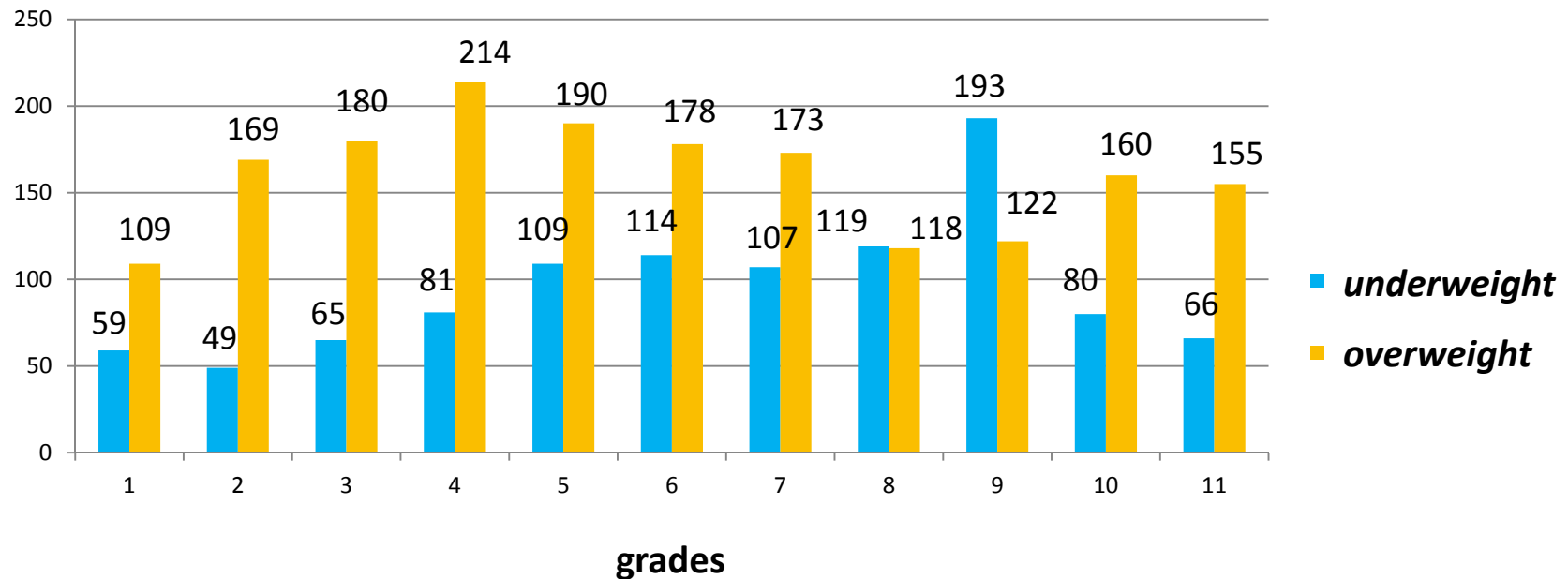
At the age of 13-18 years 25-35% of boys have borderline arterial hypertension.



Functional disorders and chronic diseases of the upper respiratory tract

For 11 years of the observation the prevalence of functional disorders of the upper respiratory tract is mostly at one level (320-470‰).

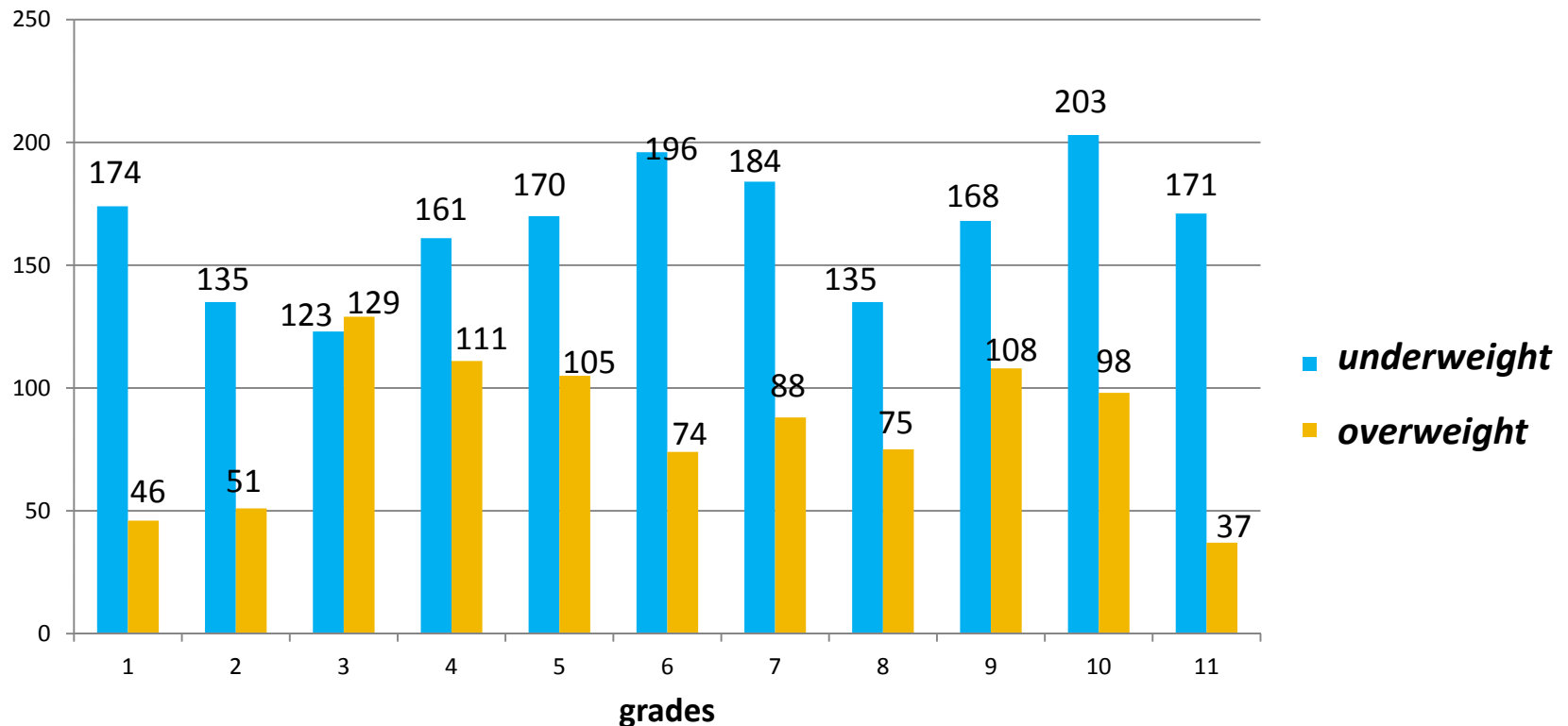
The frequency of chronic diseases of the upper respiratory tract is gradually reducing from 214‰ to 59‰.



The prevalence of overweight and underweight among boys

In the process of longitudinal observation we studied physical development of students. In boys group the prevalence of overweight, including obesity is 109-214%. The frequency of overweight in boys – high school graduates is 155%.

The prevalence of underweight varies within 59 -118%. The frequency of underweight in boys – high school graduates is 66%.



The prevalence of overweight and underweight among girls

Girls have underweight more often than boys. The prevalence of underweight varies from 123 to 203‰. The frequency of underweight among girls – high school graduates is 171‰. The prevalence of overweight, including obesity, is 37-129‰ among girls. The frequency of overweight in girls– high school graduates is 37‰.

Brief results of the longitudinal study

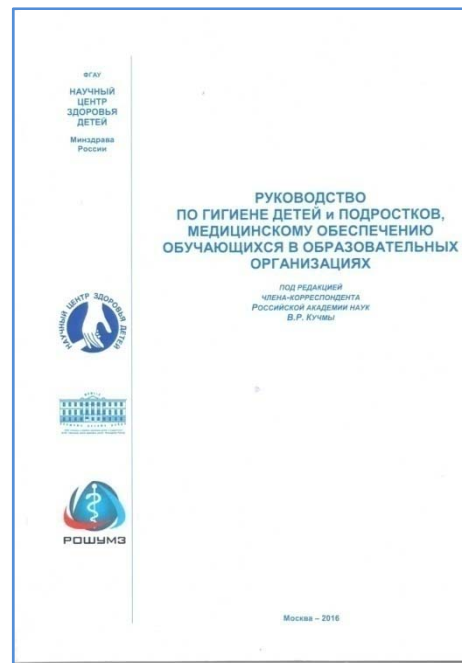
The **most unfavorable** period is the learning stage from 8th to 11th grade, because in these years the incidence of chronic diseases of the digestive system increases by 33%, of the musculoskeletal system - by 63.3% ($p < 0.05$), of neurotic disorders by 50.5% ($p < 0.001$), of myopia (medium or high degree) - by 78.9% ($p < 0.001$).

The prevalence of mild myopia increases sharply from 3th to 11th grade ($p < 0.001$).

In the period of active growth, physical and mental development, puberty, the student's body is especially sensitive to action of stress factors: excessive academic load, unfavorable family situations, emotional overstrain in preparing for and passing exams, eating disorders, low physical activity, computer and Internet addiction, smoking, alcohol, drugs.

School health care should be actively engaged in the prevention of school-related functional disorders and chronic diseases.

Research Institute for Hygiene and Health of Children and Adolescents has developed guidelines for the prevention of school-related diseases and functional disorders for doctors and nurses of School Health Care.



РОШУМЗ



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ЧАСТЬ ШЕСТАЯ

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Thank you for your attention!
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