

Prediction of morbidity in the population of urban territories in changing environment condition

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graph TD; A["Main domains of ecopathy"] --> B["Natural"]; A --> C["Anthropogenic"]; A --> D["Social"]; A --> E["Cultural"]
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**Main domains
of ecopathy**

Natural

Anthropogenic

Social

Cultural

The main causes of environmental health disturbances

Occupational factors

Air pollutions

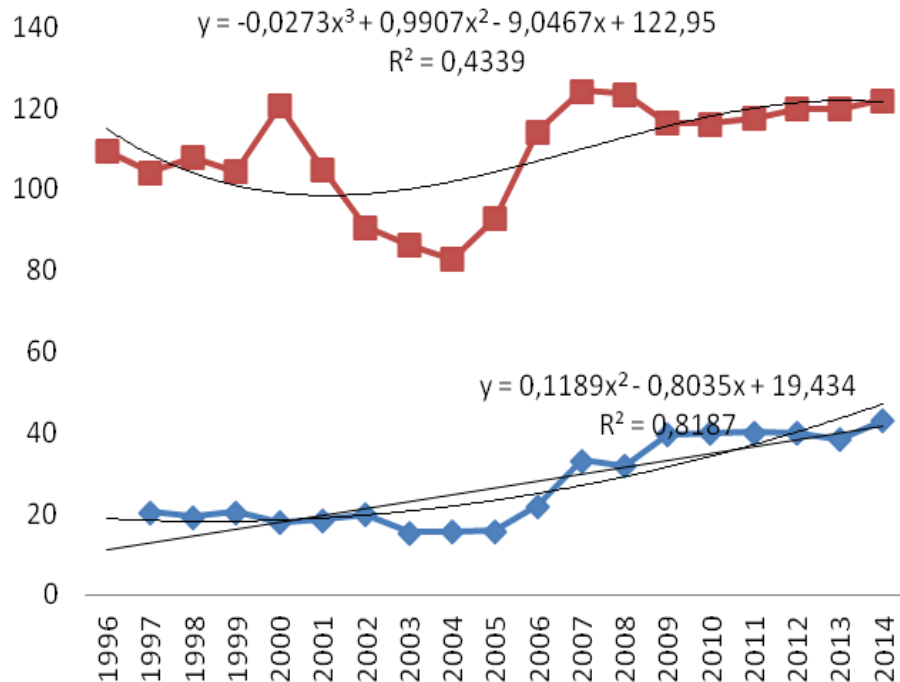
Drink water pollutions

Non balanced, dangerous nutrition

Psychological stresses

Radiological factors

Валовые выбросы в атмосферный воздух Братска, тыс т



- ♦ выбросы автотранспорта
- валовые выбросы от стац. Источников
- Линейная (выбросы автотранспорта)
- Полиномиальная (выбросы автотранспорта)
- Полиномиальная (валовые выбросы от стац. Источников)

Air pollution (C/RRfC)

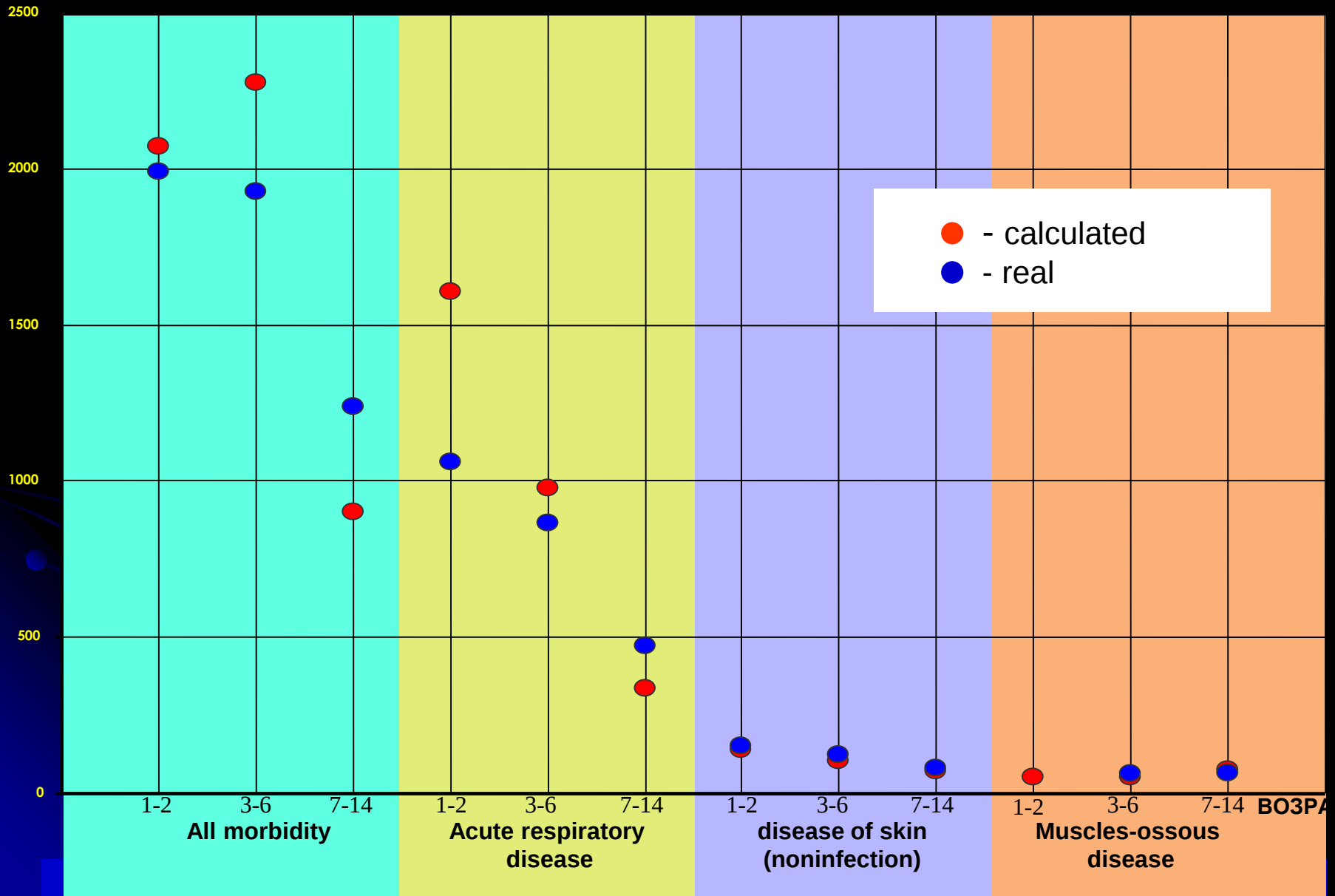


Concentration F in air 1,4-6,2 parts of Maximum allowable concentration

Index of hazard (all) $HI=28$

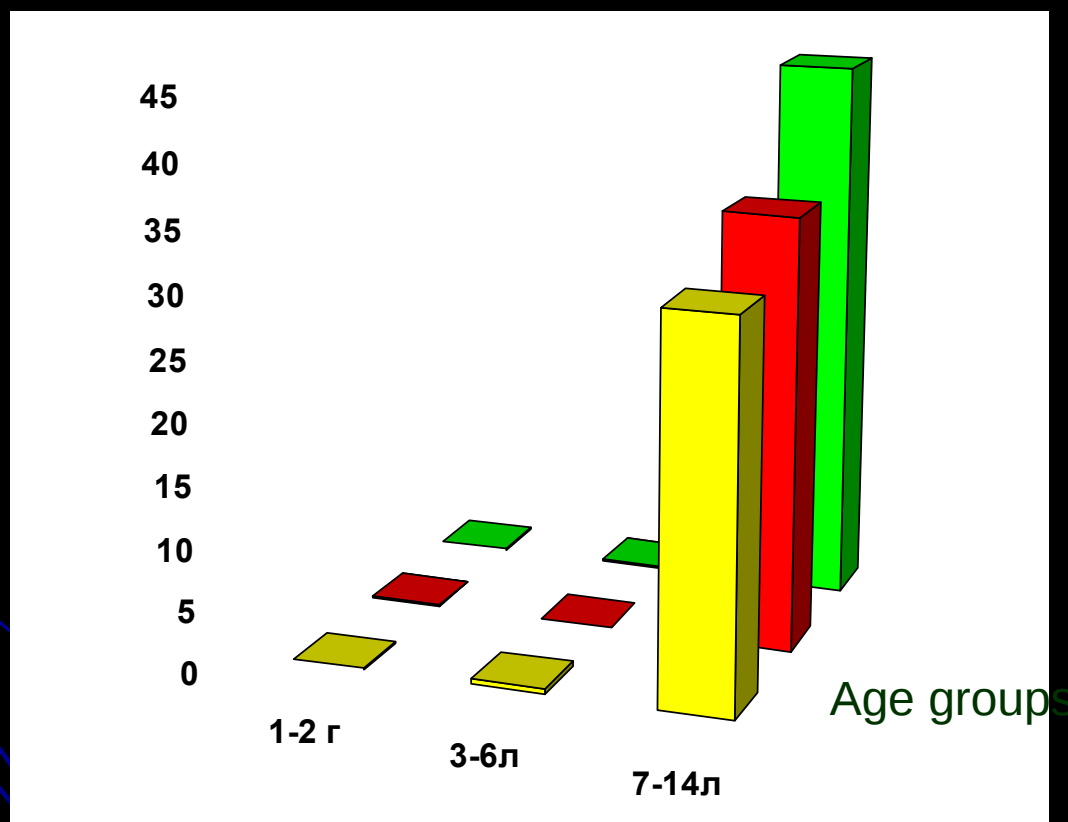
Risk for Osseous system $HI=1,9$

Verification of calculated results forecast « Shelekhov air pollution – children morbidity», ‰



(Baturin et al. 2004)

Results of forecasting « Shelekhov air pollution – muscles-osseous morbidity», ‰



2010



2000



1995

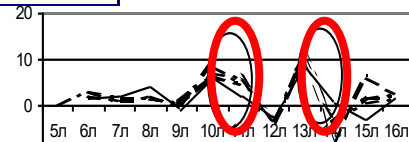
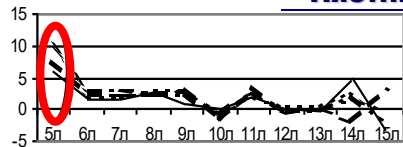


Growth of length and thickness of bones

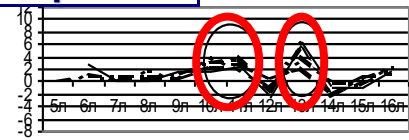
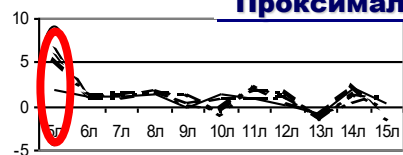
Intake group

Exposed group

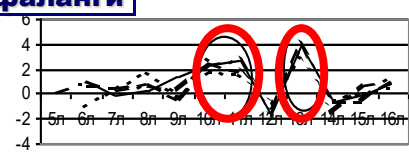
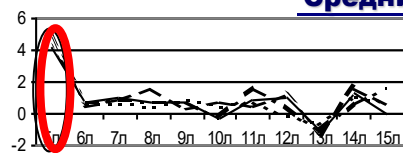
Пястные кости



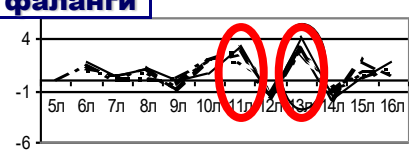
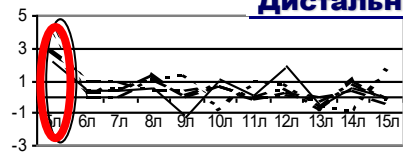
Проксимальные фаланги



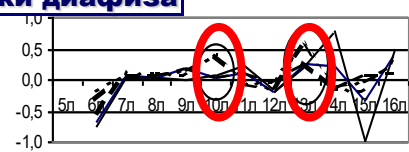
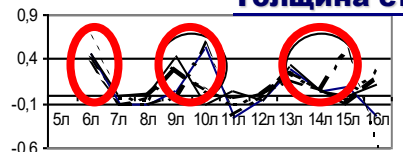
Средние фаланги



Дистальные фаланги



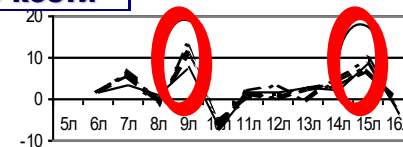
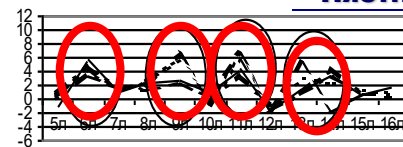
Толщина стенки диафиза



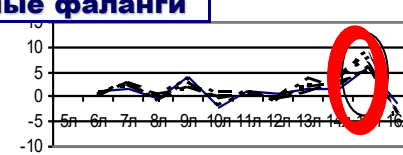
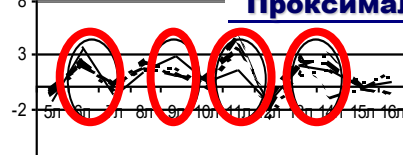
Female

Male

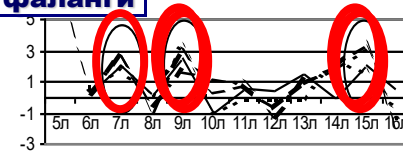
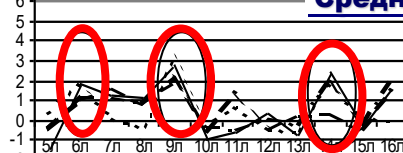
Пястные кости



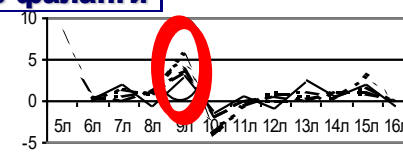
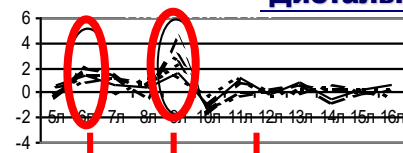
Проксимальные фаланги



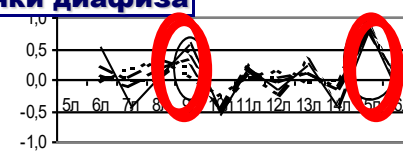
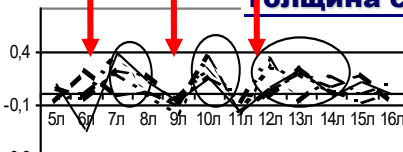
Средние фаланги



Дистальные фаланги



Толщина стенки диафиза

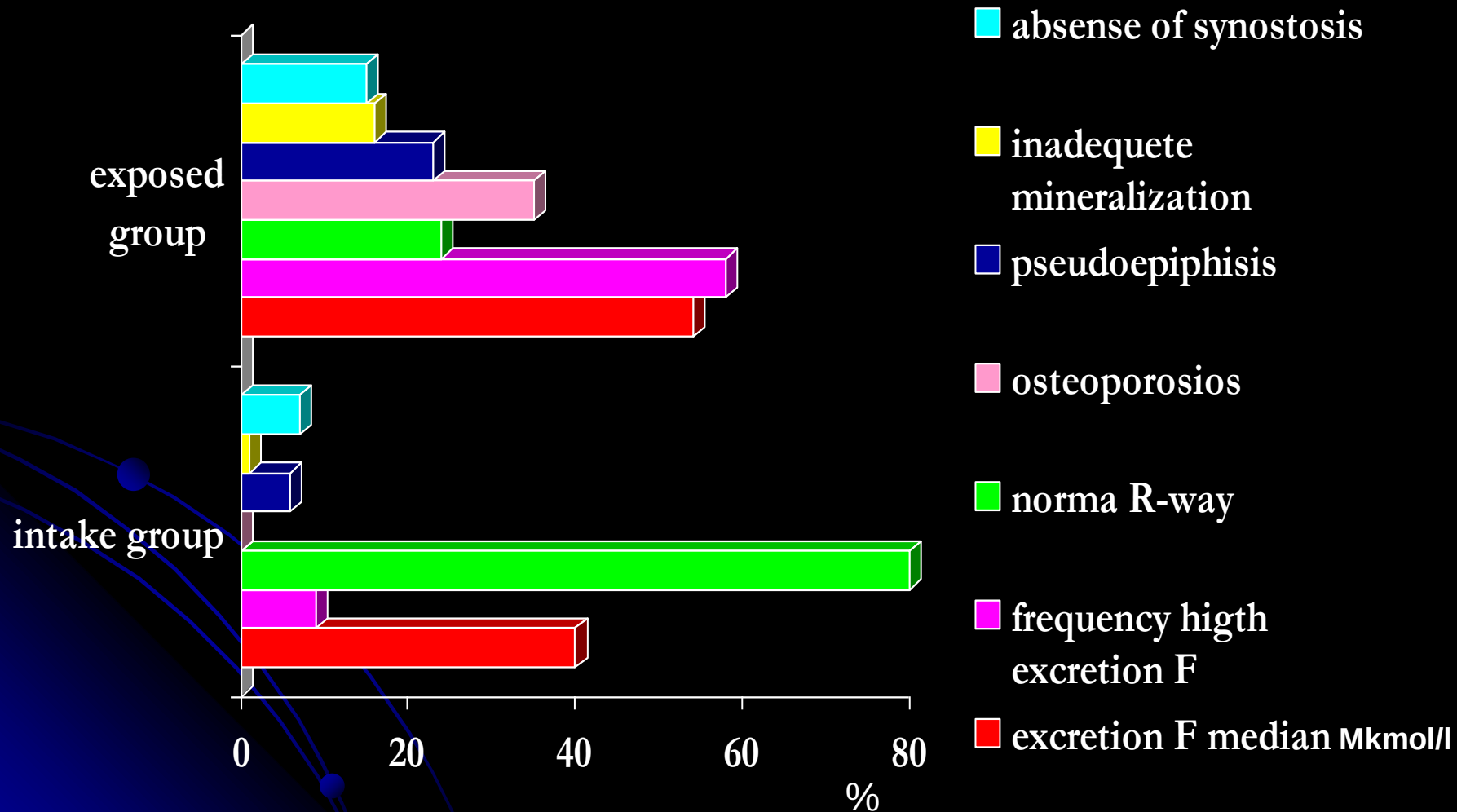


Female

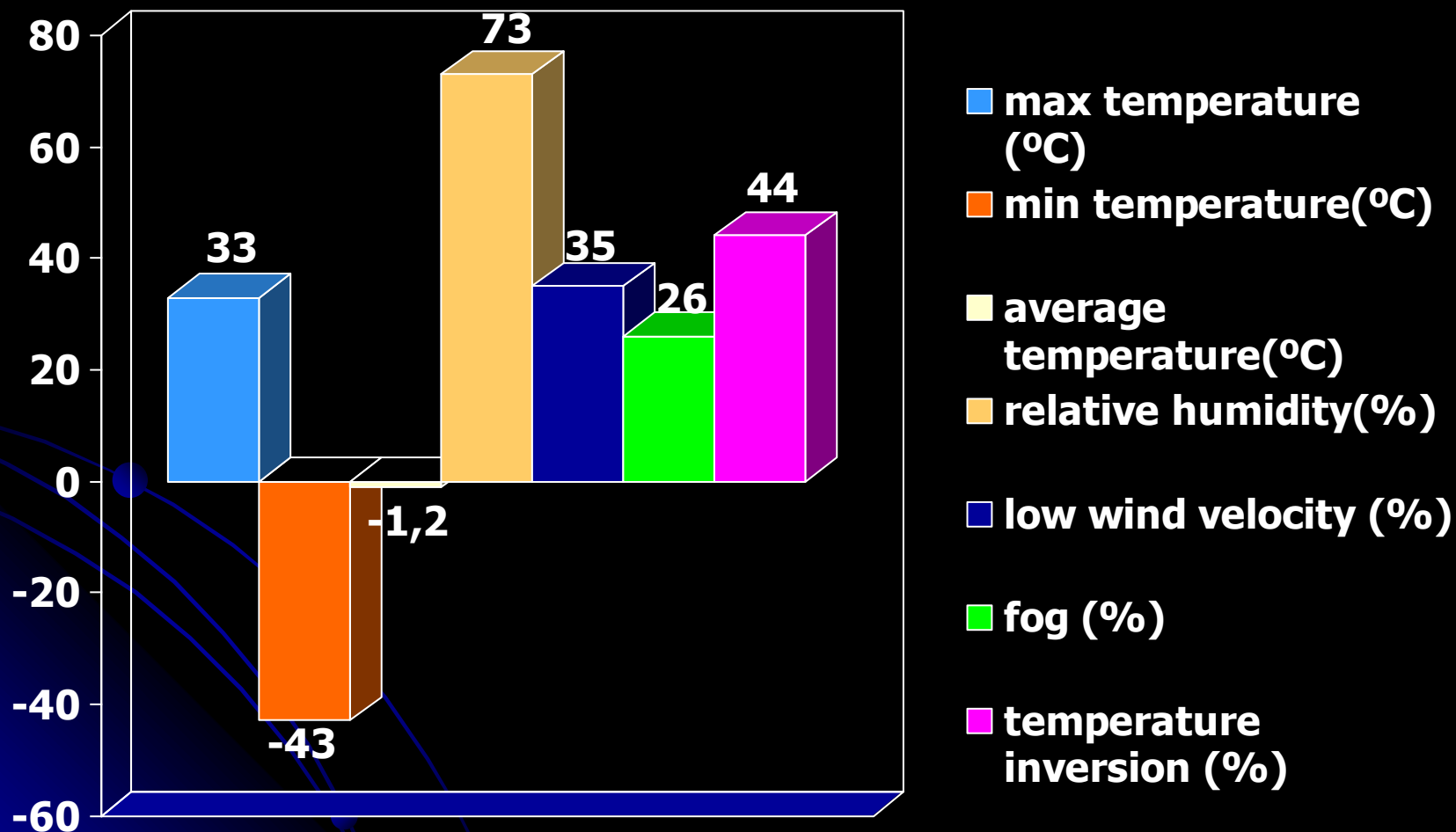
Male

(Shalina et al. 2008)

Characteristic of groups adolescents

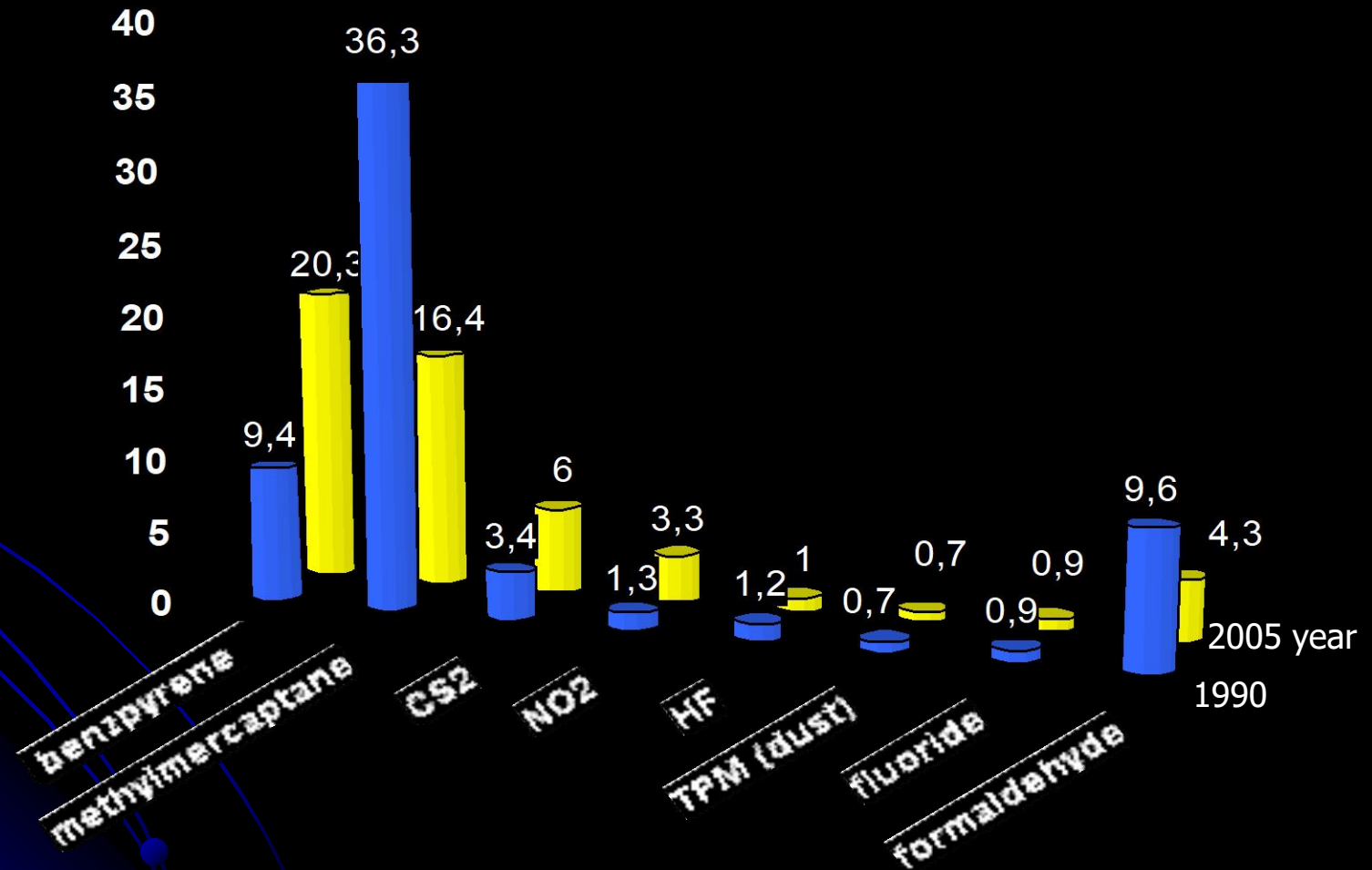


Meteorological conditions of Bratsk (Irkutsk region)



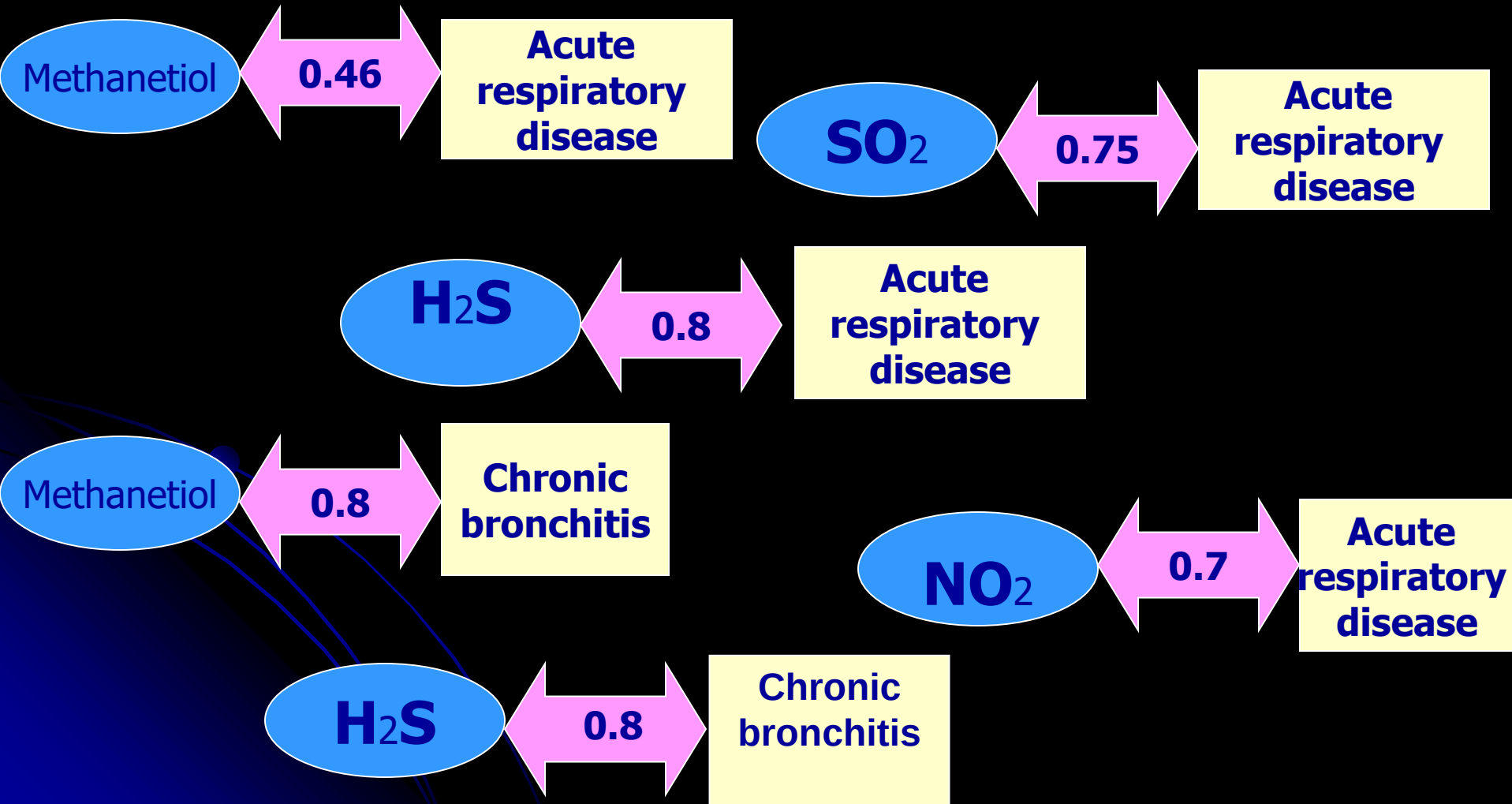
Air pollution

(parts of Maximum allowable concentration (MAC))



Correlation (Rs) between air pollution and incidence of respiratory organs

(on weekly data)



Forecast of the children incidence

$$Y = Z - 1,69 \times X_1 + 3,2 \times X_2 + 16,8 \times X_3 + 0,0085 \times X_4 + 245,2 \times X_5 + 23,2 \times X_6$$

где

Y - incidence (per 1000 children)

Z - average incidence in intake territory

X_1 - T ($^{\circ}\text{C}$)

X_2 - humidity (%),

X_3 - vel. wind (m/s)

X_4 - atm. pressury (mm Hg)

X_5 - summary air pollution F-containing (HI)

X_6 - summary air pollution S-containing (HI)

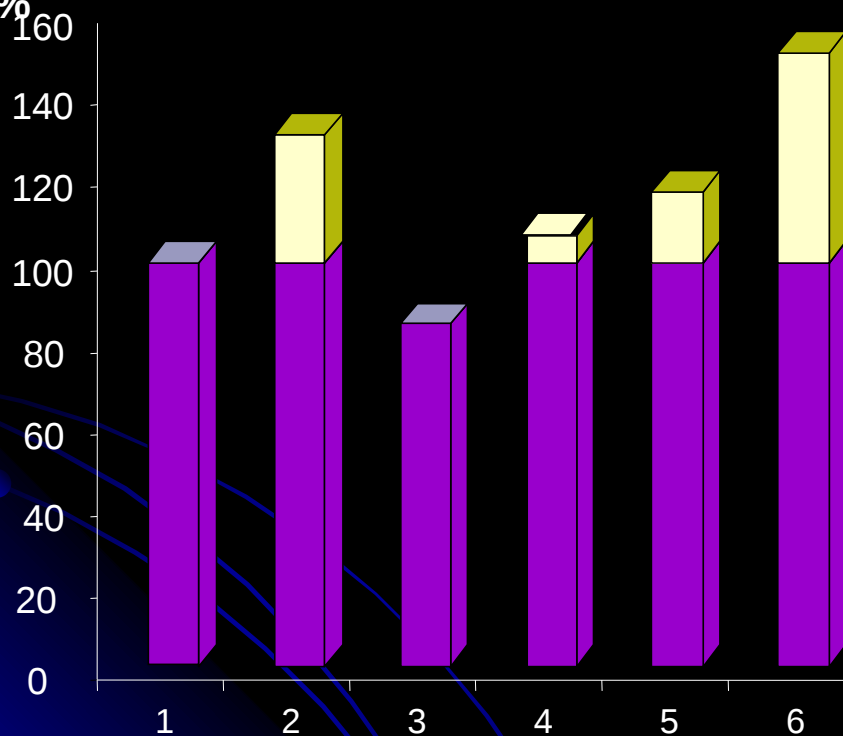
$R^2 = 0,93$

Divergent calculated and real incidence Bratsk = 16,2 %, Shelekhov = 9,5 %

The forecast of children's respiratory incidence

Attributive risk,

%



1 – average meteorological parameters, pollution < MAC

2 – average meteorological parameters pollution P = 43, low wind velocity

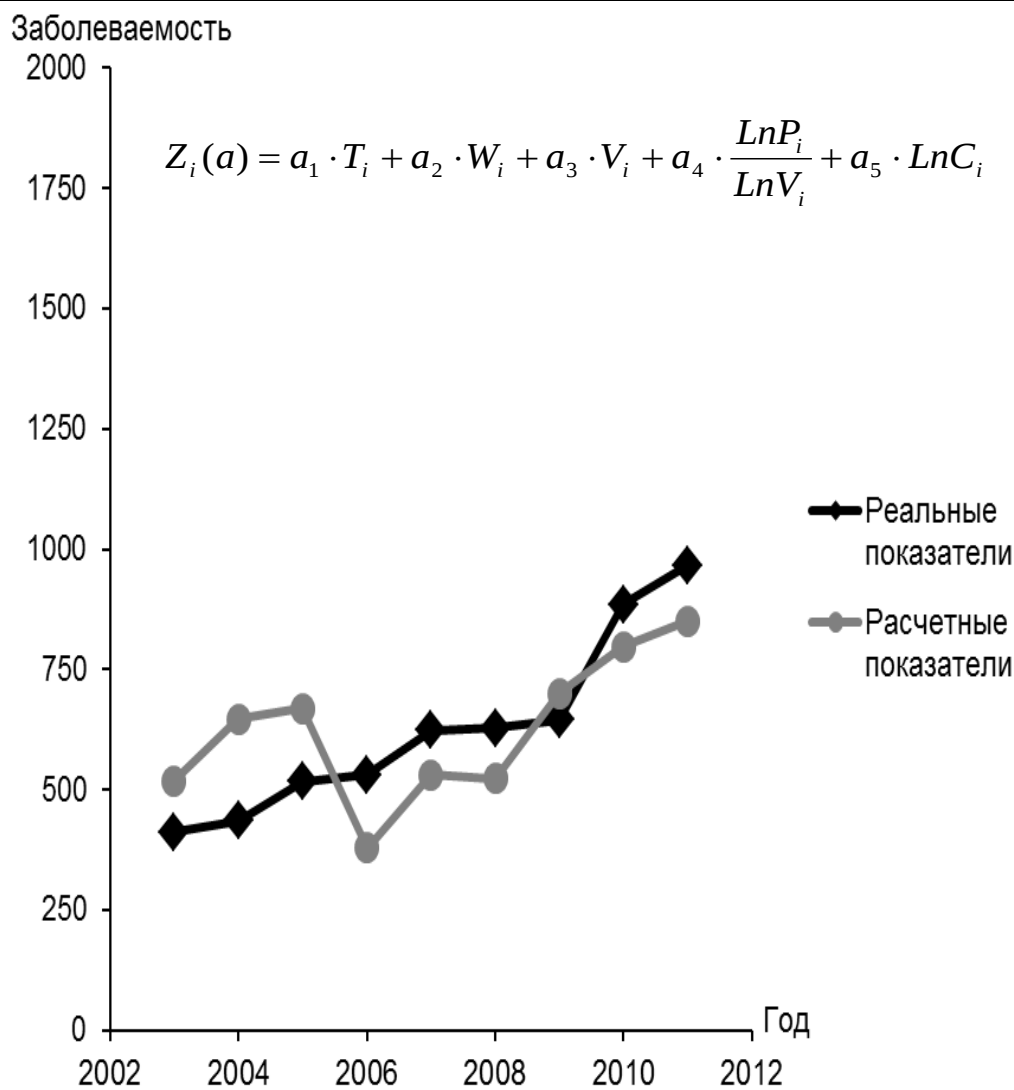
3 – average meteorological parameters, pollution < MAC, 80% humidity

4 – average meteorological parameters to the index of sulfure pollution P= 18

5 – average meteorological parameters to the index of fluoride pollution P= 6

6 – negative meteorological conditions for dispersion, winter (t= - 22°C), P=43

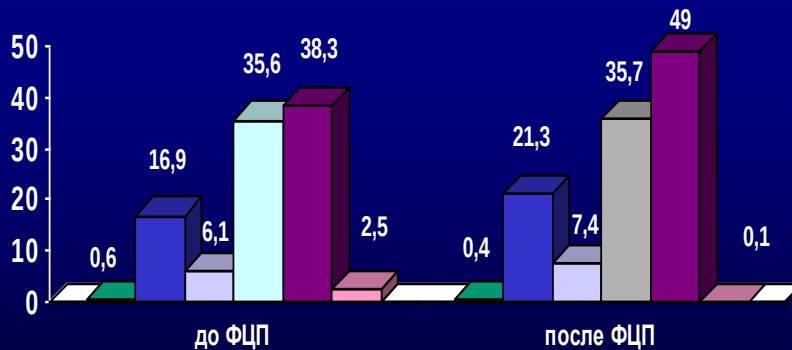
Result of medical socio-ecological model



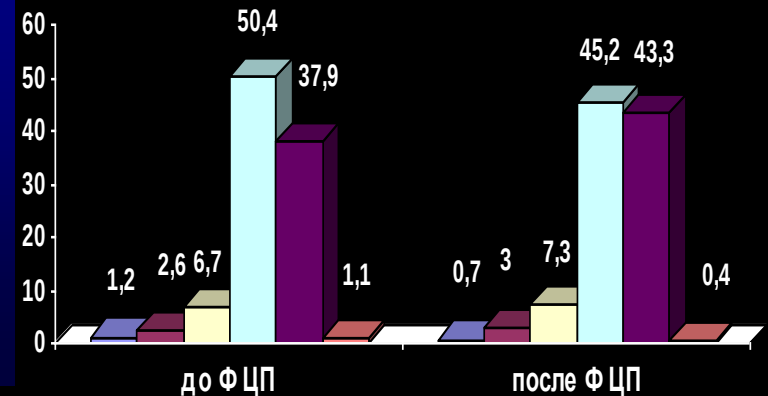
- The average calculated data were as follows: in children - 1756 cases per 1000 persons (95% confidence interval 1126 - 2386 ‰), in adolescents - 1256 ‰ (1122 - 1391 ‰), in adults 846 ‰ (558 - 1134 ‰). Comparison of calculated and actual incidence rates showed: the actual indicator in children exceeded the upper limit of the estimated incidence by 3.6%, adolescents by 6.7%. Primary morbidity is 8.5% below the lower estimated border In the adult population in recent years. Note that the mean differences in all groups are statistically insignificant ($p > 0.05$), which reflects the good approximating properties of the model and allows using it for further research

Assessment of a contribution of factors to incidence

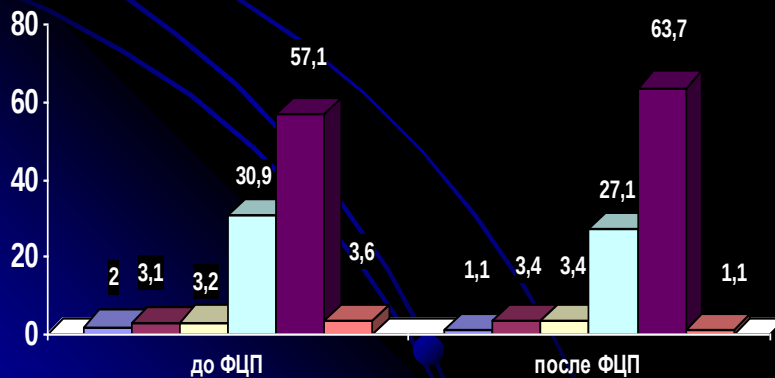
children



adults

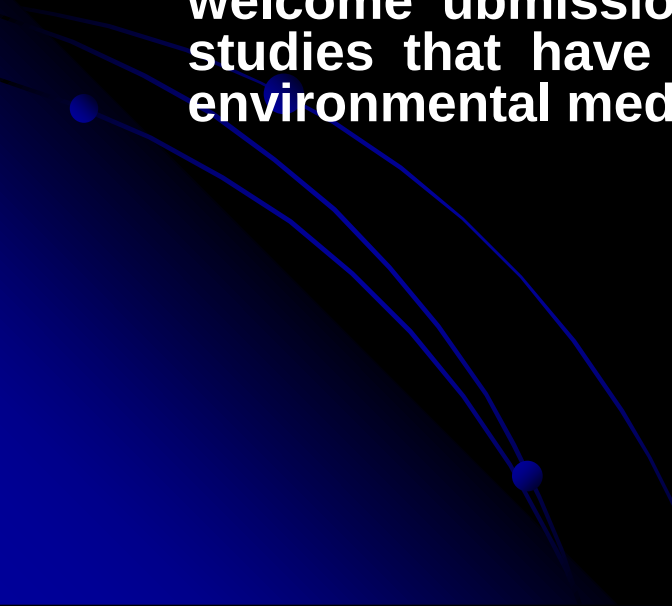


adolescents



the received results testify about

- preservation of the significant contribution of technogenic pollution to variability of incidence of the population,
- a bigger role of social factors in formation of health of teenagers

- Finally, physician/scientists are directing or collaborating in multidisciplinary research that capitalizes on both clinical knowledge in individuals and epidemiologic information from populations and results in new knowledge of clinically translatable value. They work on a wide variety of research topics and use a full range of clinical, epidemiologic and environmental health science skills to shed light on the environmental exposures and complex causal pathways that underlie the pathogenesis and progression of disease
 - Environmental medicine is not just about clinical practice for patients concerned about environmental diseases; thus, we welcome submissions of epidemiologic and communitybased studies that have relevance to the public health practice of environmental medicine
- 



Thank for your attention!

12 7 2005