

«Climate Change Impact on Public Health in the Russian Arctic»

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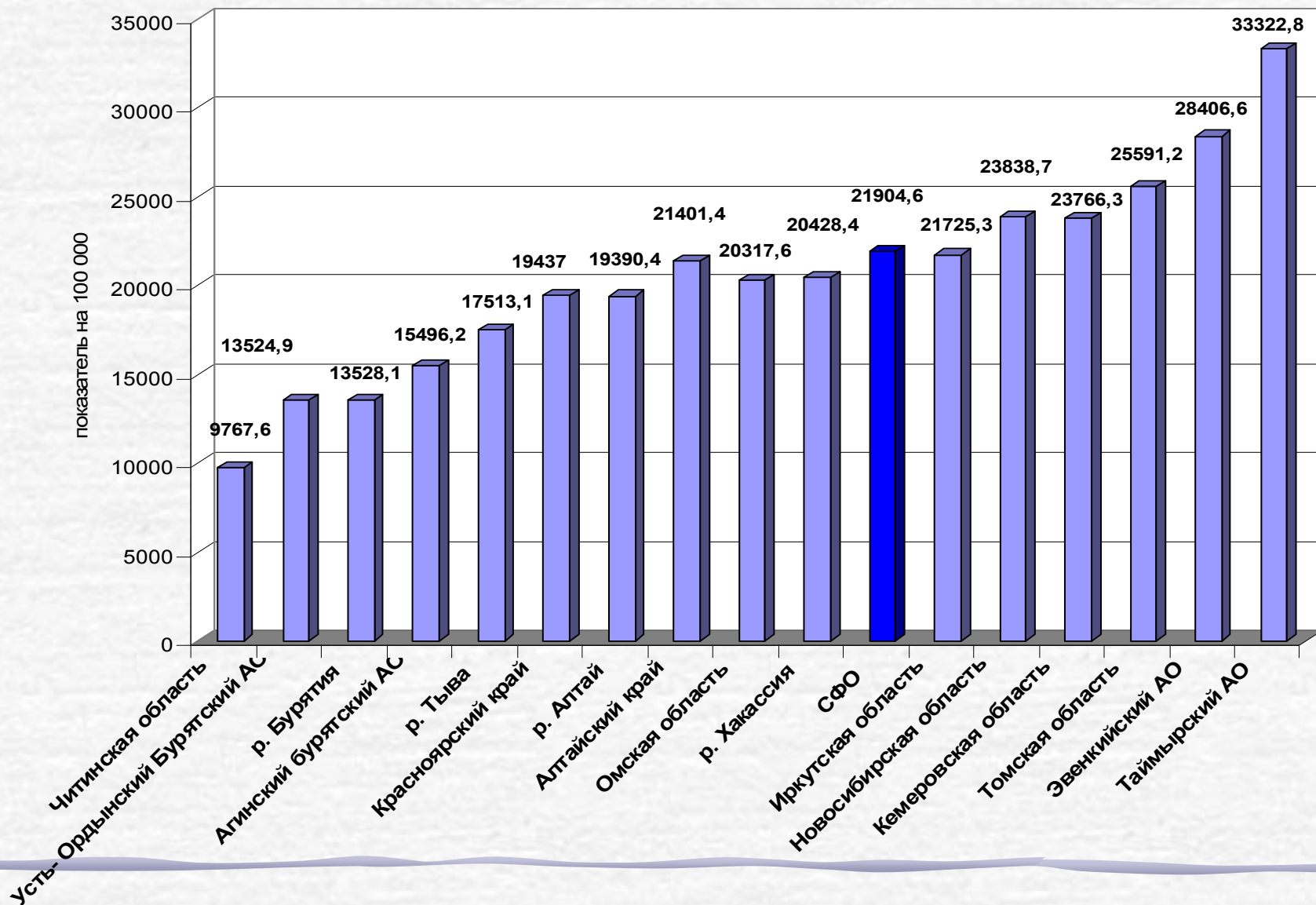
Climate and Environmental Changes and Infectious Diseases at the Territory of Siberian Arctic

Sergey V. Netesov

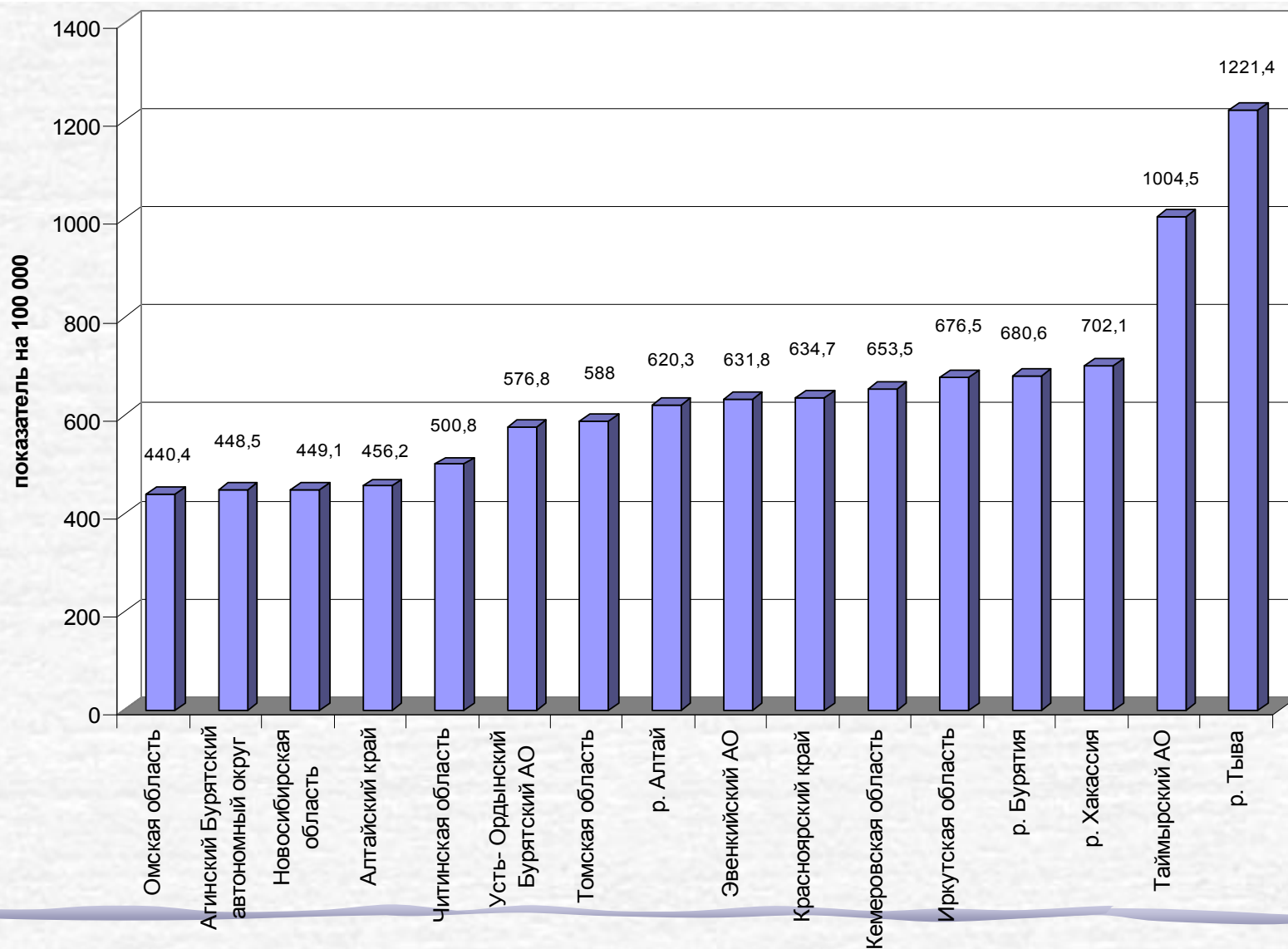
Novosibirsk State University

Novosibirsk, Russian Federation

Total and regional infectious disease morbidity at the territory of Siberian Federal District in 2005



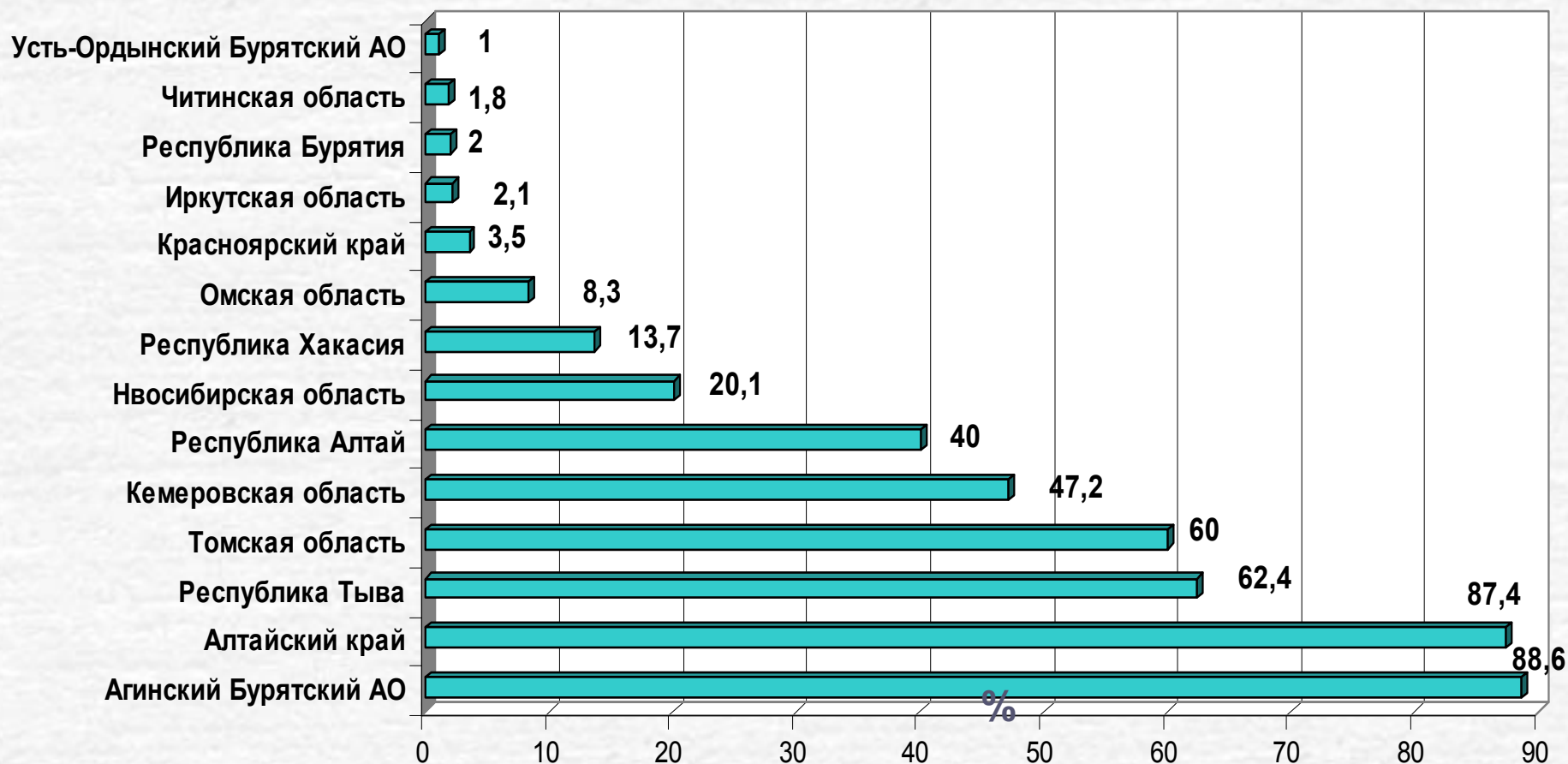
Acute intestinal disease morbidity in different regions of Siberian Federal District in 2001 - 2005



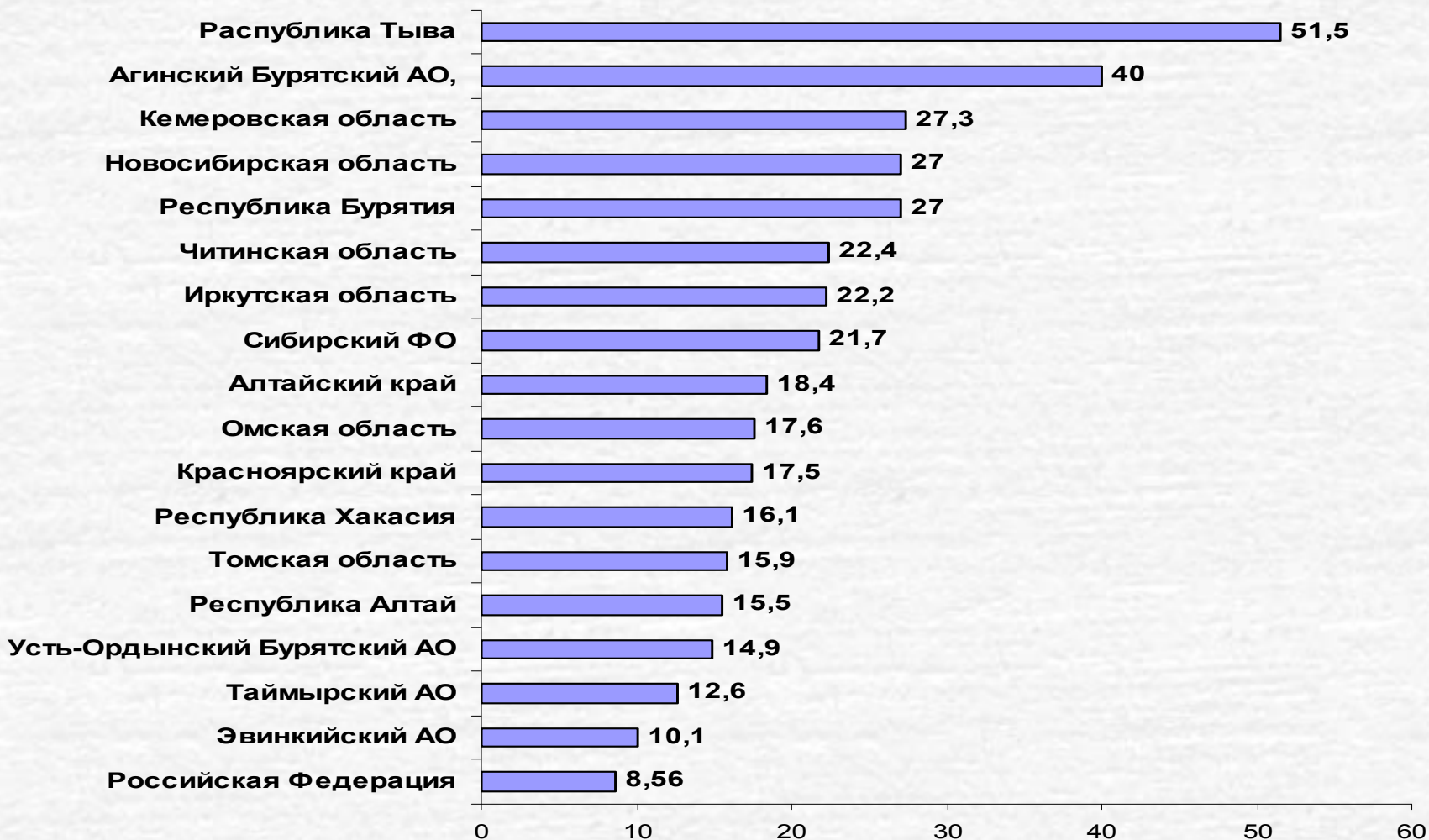
The tick borne encephalitis morbidity at different regions of Siberian Federal District in 2001 - 2005.



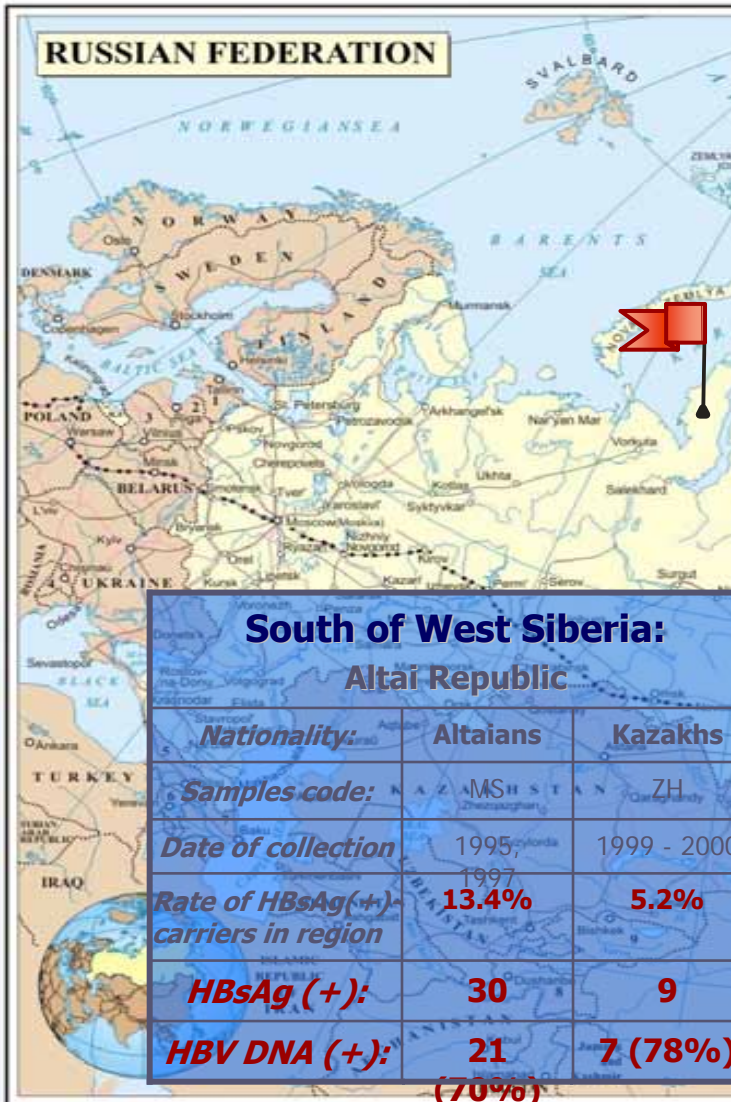
The percentage of people who was vaccinated against tick borne encephalitis virus at different regions of SFD in 2005



Comparative hepatitis morbidity in different regions of SFD during 2001- 2005 per 100 000



Map 1. Hepatitis prevalence information (the data of SRC VB Vector Hepatitis Lab)



North of Siberia: Yamalo-Nenetsky Autonomous Area	
<i>Nationalities:</i>	Khants, Komi, Nenets, Kets, others... A lot of mixes between them.
<i>Samples codes:</i>	PRI, KAT, SCH, OLP, MUJ, VOS, SAM, SHU, PIT, Th.
<i>Dates of collection</i>	1992-1993, 2000-2005
<i>Rate of HBsAg(+)-carriers in region</i>	0.9 - 3.2%
<i>HBsAg (+):</i>	53
<i>HBV DNA (+):</i>	34 (64%)

South of West Siberia: Altai Republic		
<i>Nationality:</i>	Altaians	Kazakhs
<i>Samples code:</i>	MS	ZH
<i>Date of collection</i>	1995, 1997	1999 - 2000
<i>Rate of HBsAg(+)-carriers in region</i>	13.4%	5.2%
<i>HBsAg (+):</i>	30	9
<i>HBV DNA (+):</i>	21	7 (78%)

Irkutsk Region: Alarsky and Irkutsky districts		
<i>Nationality:</i>	Buryats	Russians
<i>Samples code:</i>	AL	MG, LIS
<i>Date of collection</i>	2005	2003 - 2005
<i>Rate of HBsAg(+)-carriers in region</i>	8.2%	3.6%
<i>HBsAg (+):</i>	40	9
<i>HBV DNA (+):</i>	24 (60%)	8 (89%)

1. ESTONIA 4. BELARUS 7. AZERBAIJAN
 2. LATVIA 5. GEORGIA 8. TAJIKISTAN
 3. LITHUANIA 6. ARMENIA 9. KYRGYZSTAN

0 400 800 1200 1600 km
 0 200 400 800 1000 mi

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

The infectious disease morbidity at the Hanti-Mansy autonomous district in 2006-2007 in comparison with the same data for all Russia (per 100 000)

Disease	2007	2006
Salmonellosis	66,8/35,5	68,98
Acute intest.disease, determined etiology	264/114,6	261,4
Acute intest.disease, nd. et.	574/337	566,9
Pertussis	11,4/5,66	6,17
Scarlet fever	65,5	44,58
Varicella-Zoster	1322,4	588,7
Tuberculosis	87,05/74,1	84,9
Lambliasis	145,3	134,5
Toxocarosis	4,62	5,35
Ascariasis	67,75	41,74
Opisthorchiasis	739,3	961,7
Echinococcosis	0,27	0,0

The hepatitis and HIV morbidity at the Hanti-Mansy autonomous district in 2006-2007 in comparison with the same data for all Russia (per 100 000)

Disease	2007	2006
Total acute hepatitis	19,9/20,45	26,56
Hepatitis A	7,51/10,23	9,82
Hepatitis B	4,49/5,26	7,05
Hepatitis C	6,9/3,57	8,13
HIV-carriers	64,5/19,6	60,71

The natural foci disease morbidity at the Hanti-Mansy autonomous district in 2006-2007 in comparison with the same data for all Russia (per 100 000)

Disease	2007	2006
Tularemia	1,47/0,08	0
Brucellosis	0,13/0,2	0.14
Hemorrhagic fever with renal syndrom	0,4/3,58	0,4
Tick-borne encephalitis virus	0,67/2,21	2,17
Lyme disease	1,68/5,5	3,12
Yersiniosis (pseudotuberculosis)	10,32/3,33	12,67

The situation with the most bothering infectious diseases in the Far Eastern Federal District of Russia in 2005:

- 1. **Acute intestinal infections: dysentery in Chukotka autonomous region – 208,4 per 100 000 (in Russia – 25,1 in 2006); salmonellosis in Magadan region – 105,5 (3,5 times higher than average in Russia – 31,77 in 2005)**
- 2. **Tuberculosis – 30% higher than in total Russia; in Koryak autonomous region – 417,85 per 100000 (in Russia – 70,96)**
- 3. **Hepatitis A – 30% higher than average in Russia; in Chukotka Region – 344,26 per 100 000 (in Russia – 10,23 in 2006)**

The reasons for emergence of infections

- ✓ **1. Carrying infections with migratory birds (influenza virus of H5 subtype)**
- ✓ 2. Invasion of humans to the new territories with previously unknown animals or insects.
- ✓ 3. The industrial breeding of new species of animals.
- ✓ 4. Introduction of the new species of animals to new territories.
- ✓ 5. The global warming.
- ✓ 6. The creation of the new conditions for animals and insects.
- ✓ 7. The new technologies introduction.

The reasons for emergence of infections

- 1. Carrying infections with migratory birds (influenza virus of H5 subtype)
- 2. Invasion of humans to the new territories with previously unknown animals or insects (tick-borne encephalitis in 1937-1940 in Far East).**
- 3. The industrial breeding of new species of animals.
- 4. Introduction of the new species of animals to new territories.
- 5. The global warming.
- 6. The creation of the new conditions for animals and insects.
- 7. The new technologies introduction.

The reasons for emergence of infections

- 1. Carrying infections with migratory birds (influenza virus of H5 subtype)
- 2. Invasion of humans to the new territories with previously unknown animals or insects.
- 3. The industrial breeding of rare species of animals (palm-civettes, SARS-coronavirus).**
- 4. Introduction of the new species of animals to new territories.
- 5. The global warming.
- 6. The creation of the new conditions for animals and insects.
- 7. The new technologies introduction.

The reasons for emergence of infections

- 1. Carrying infections with migratory birds (influenza virus of H5 subtype)
- 2. Invasion of humans to the new territories with previously unknown animals or insects.
- 3. The industrial breeding of rare species of animals.
- 4. Introduction of the new species of animals to new territories: musk rat – Omsk hemorrhagic fever; american mink - (Lyme disease?); nutria (?).**
- 5. The global warming.
- 6. The creation of the new conditions for animals and insects.
- 7. The new technologies introduction.

Musk rat in West Siberia



The reasons for emergence of infections

- 1. Carrying infections with migratory birds (influenza virus of H5 subtype)
- 2. Invasion of humans to the new territories with previously unknown animals or insects.
- 3. The industrial breeding of new species of animals.
- 4. Introduction of the new species of animals to new territories.
- 5. The global warming (West Nile encephalitis virus in Siberia).**
- 6. The creation of the new conditions for animals and insects.
- 7. The new technologies introduction.

West Nile virus, Russia, 2003-2007.



West Nile virus

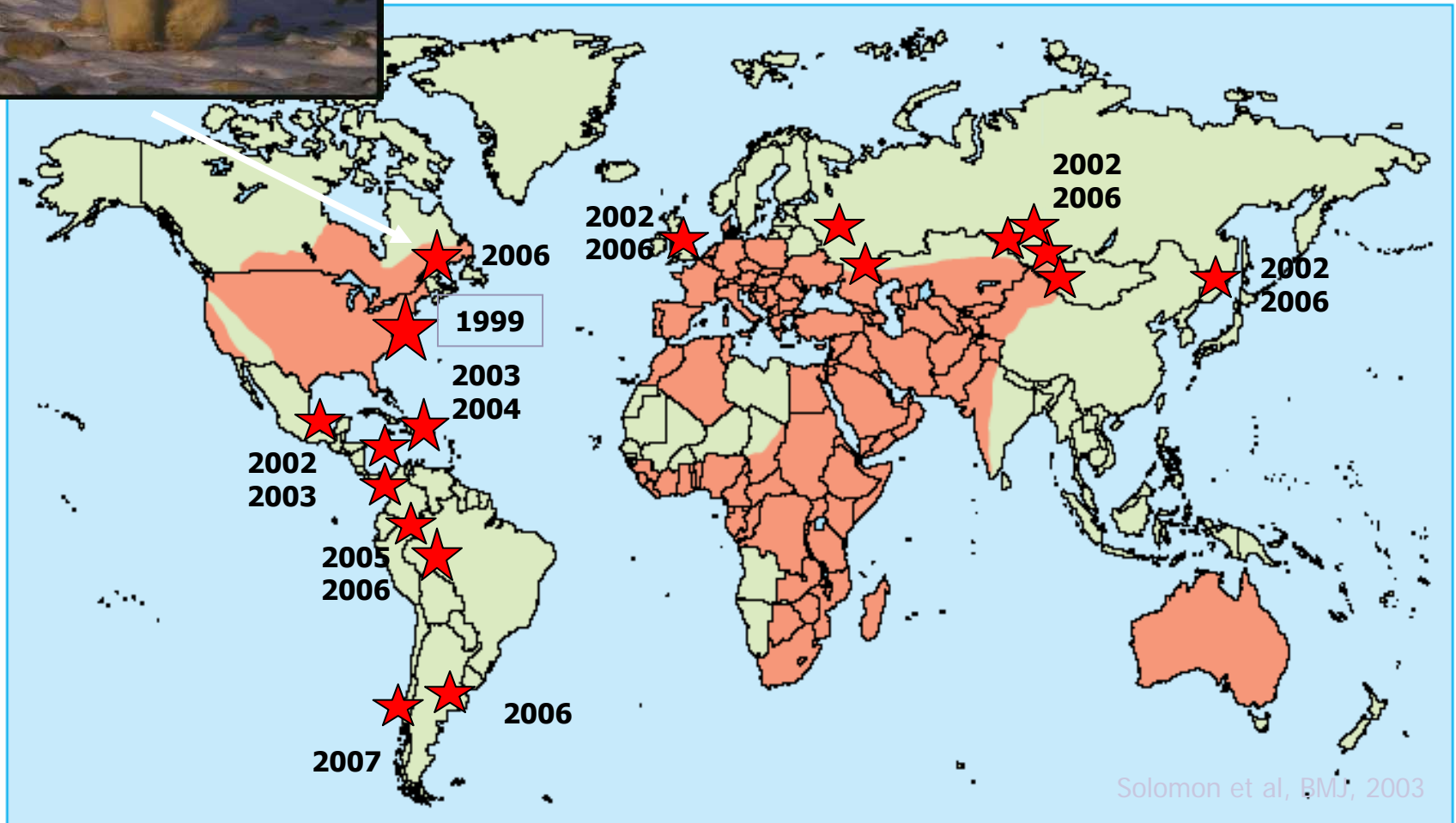


Fig 1 Approximate global distribution of West Nile virus (or its subtype, Kunjin virus)

The reasons for emergence of infections

- 1. Carrying infections with migratory birds (influenza virus of H5 subtype)
- 2. Invasion of humans to the new territories with previously unknown animals or insects.
- 3. The industrial breeding of new species of animals.
- 4. Introduction of the new species of animals to new territories.
- 5. The global warming.
- 6. **The creation of the new conditions for animal (garbage places - rabies) and insect breeding(used tires - mosquitoes, malaria).**
- 7. The new technologies introduction.

The reasons for emergence of infections

- 1. Carrying infections with migratory birds (influenza virus of H5 subtype)
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- 6. The creation of the new conditions for animals and insects.
- 7. The new technologies introduction (air conditioners – legionellosis; Biisk, Altay region and Ekaterinburg).**

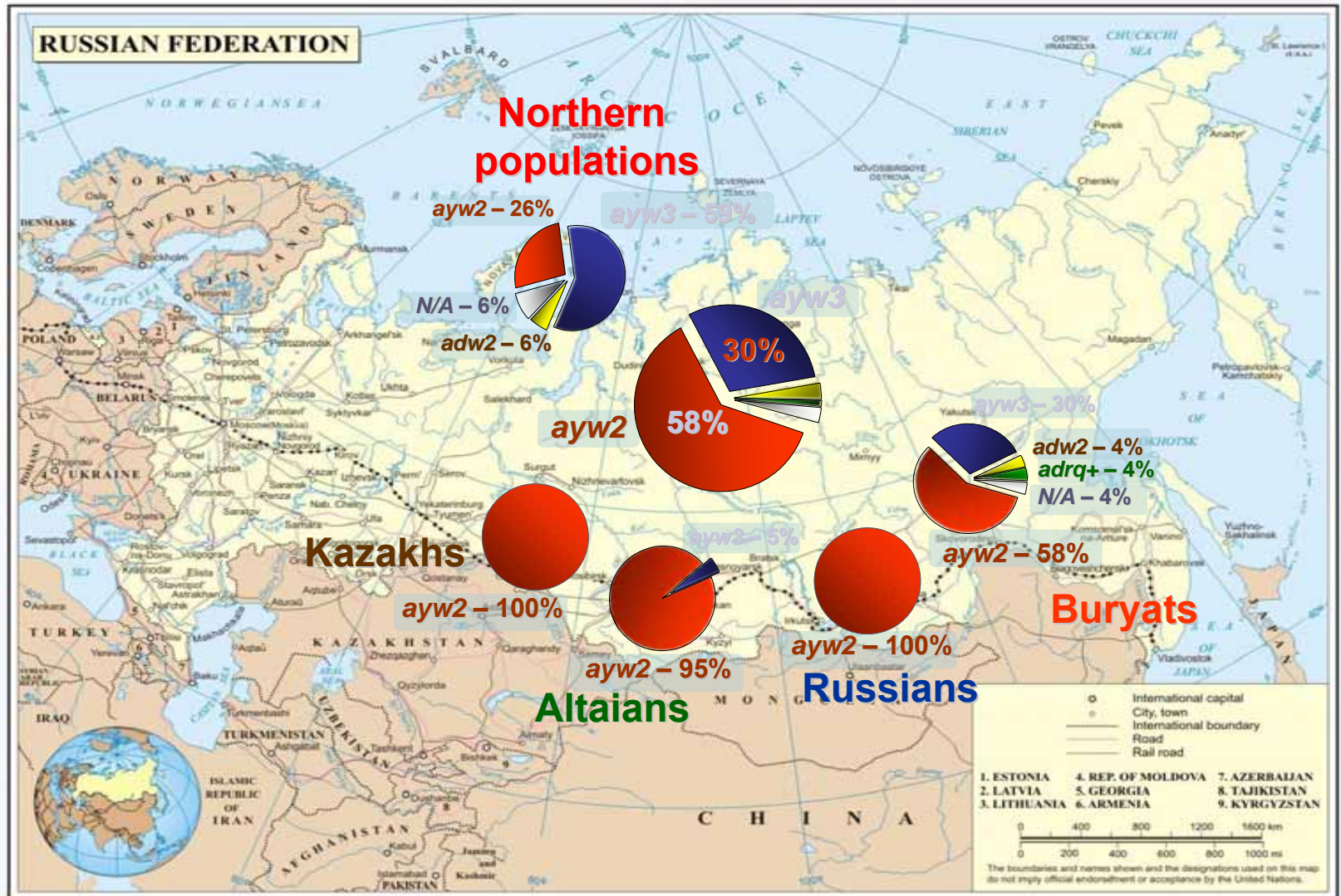
Conclusions

- 1. There are three main groups of infections which are much more prevalent in Siberian Arctic than in European Russia and in the south of Siberia: gastrointestinal infections, tuberculosis and HIV.**
- 2. Varicella-zoster, hepatitis A, salmonellosis and rubella infections need to be controlled by vaccinations because of high incidence.**
- 3. A few more infections may come to Siberian Arctic very soon during the global warming and intensive flow of people: West Nile virus, tick-borne encephalitis virus, other arboviral infections.**
- 4. For early detection of emerging infections the thorough monitoring of acute arboviral and zoonotic infections of migrating wild animals and birds both in animals and mosquitoes is highly required in the Siberian Arctic.**
- 5. The further strengthening of research capacity of Russia, China and Mongolia in this area of research would be extremely useful for early warning, in case of appearance of the new emerging infections, for Russia, other CIS countries, European and Asian countries and even USA and Canada.**

Thank you for attention!!!
Спасибо за внимание !!!

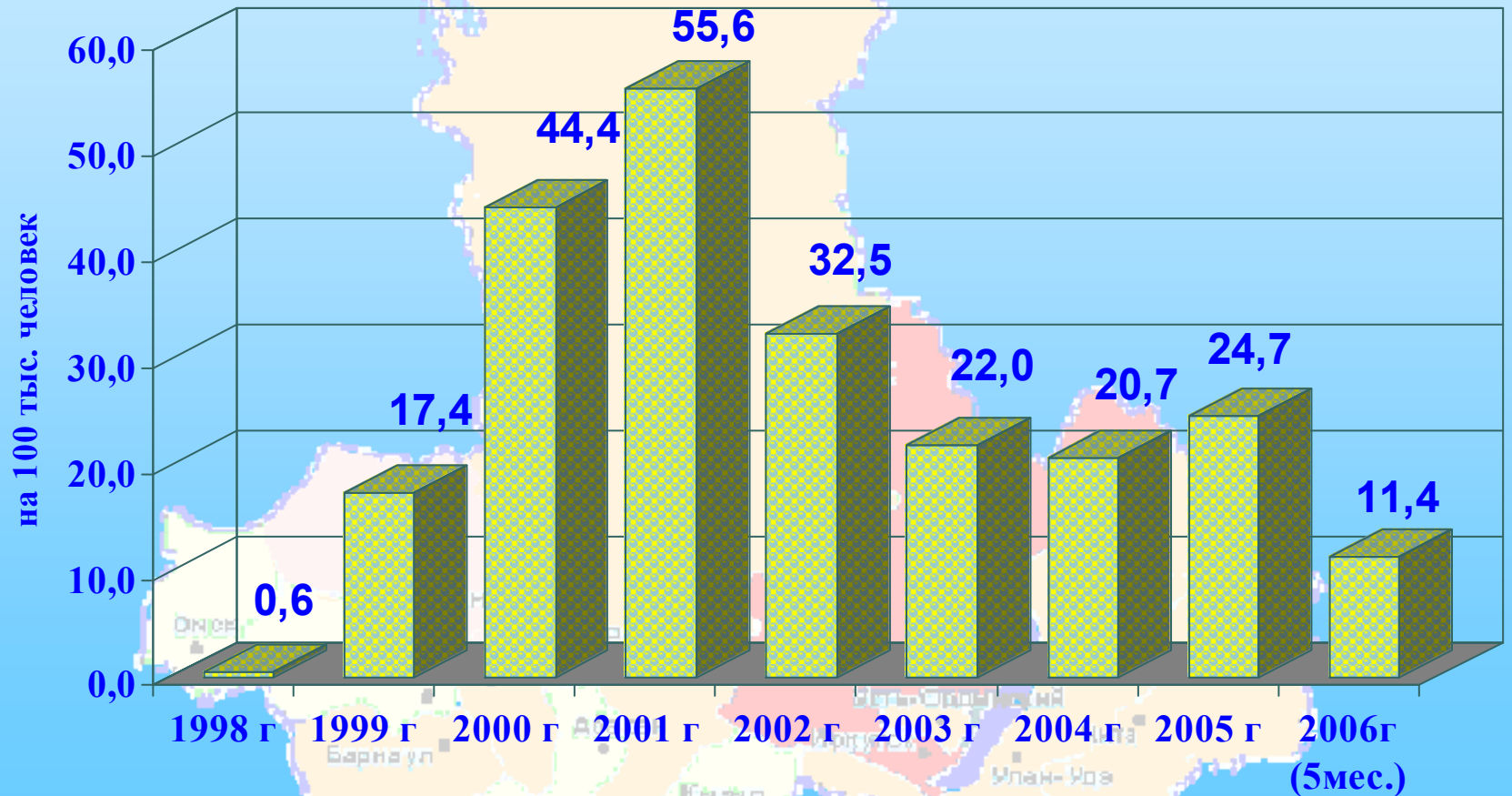


Map 3. HBsAg subtypes in Siberia (the data of SRC VB Vector Hepatitis Lab)



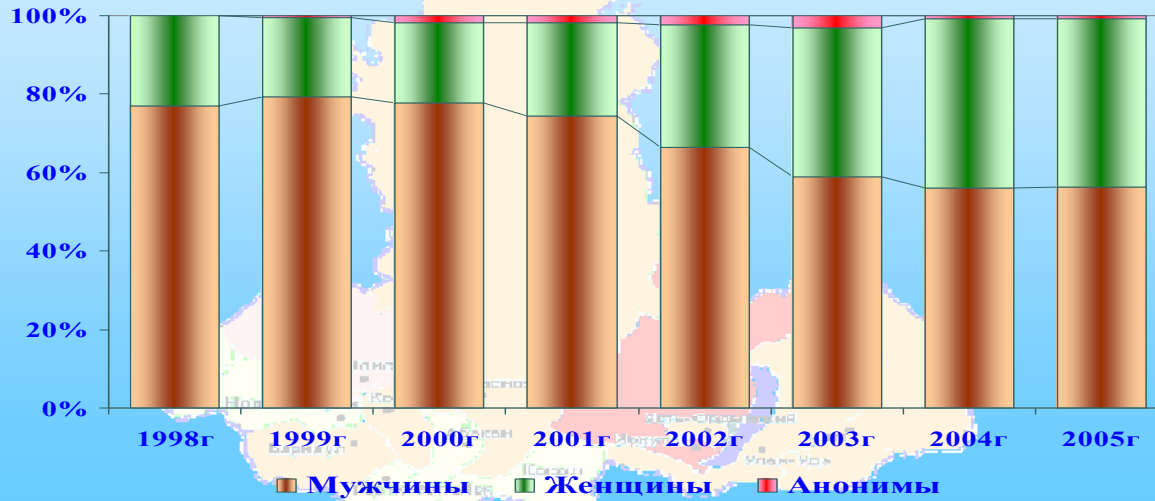


Этапы развития эпидемии ВИЧ-инфекцией в Сибири





Распределение ВИЧ-инфицированных по половому признаку в Сибири в 1998-2005 гг.



Распределение ВИЧ-инфицированных по возрасту в Сибири в 1998-2005 гг.

