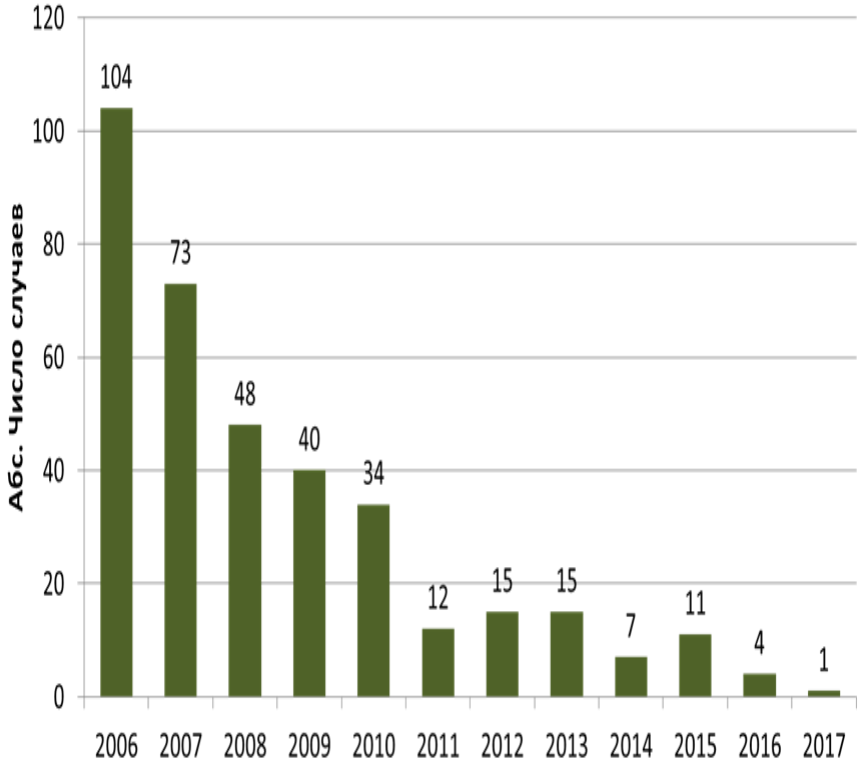
The risk of transmission of viral hepatitis in health care settings

Tatiana Semenenko, Arpik Asratyan

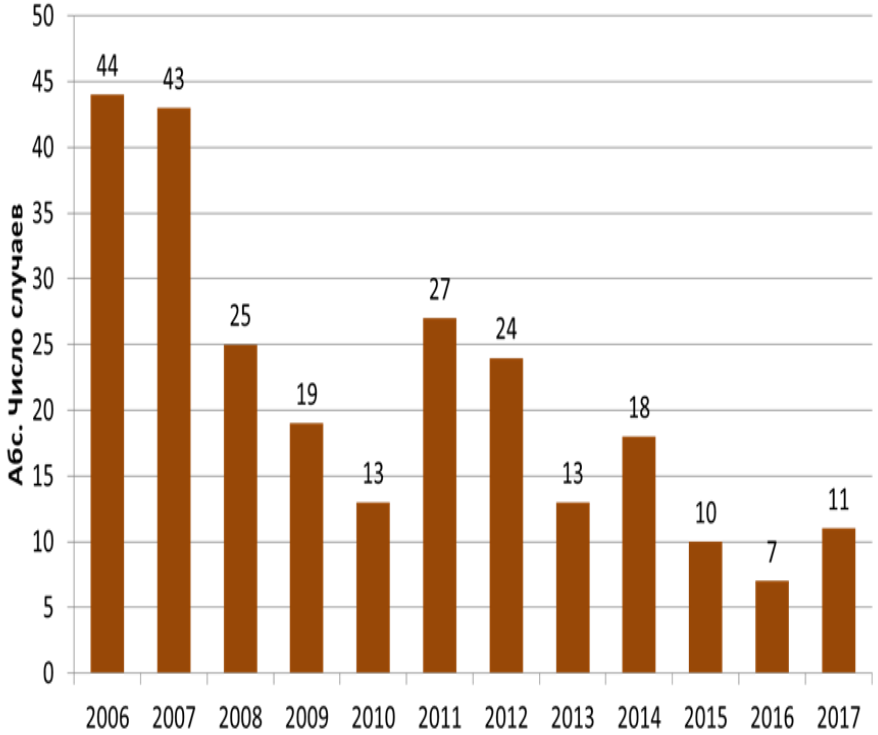
Gamaleya National Research Center for Epidemiology and Microbiology, Moscow

Absolute number of hepatitis B and C cases in health care settings in the Russian Federation: 2006 - 2017

Hepatitis B



Hepatitis C



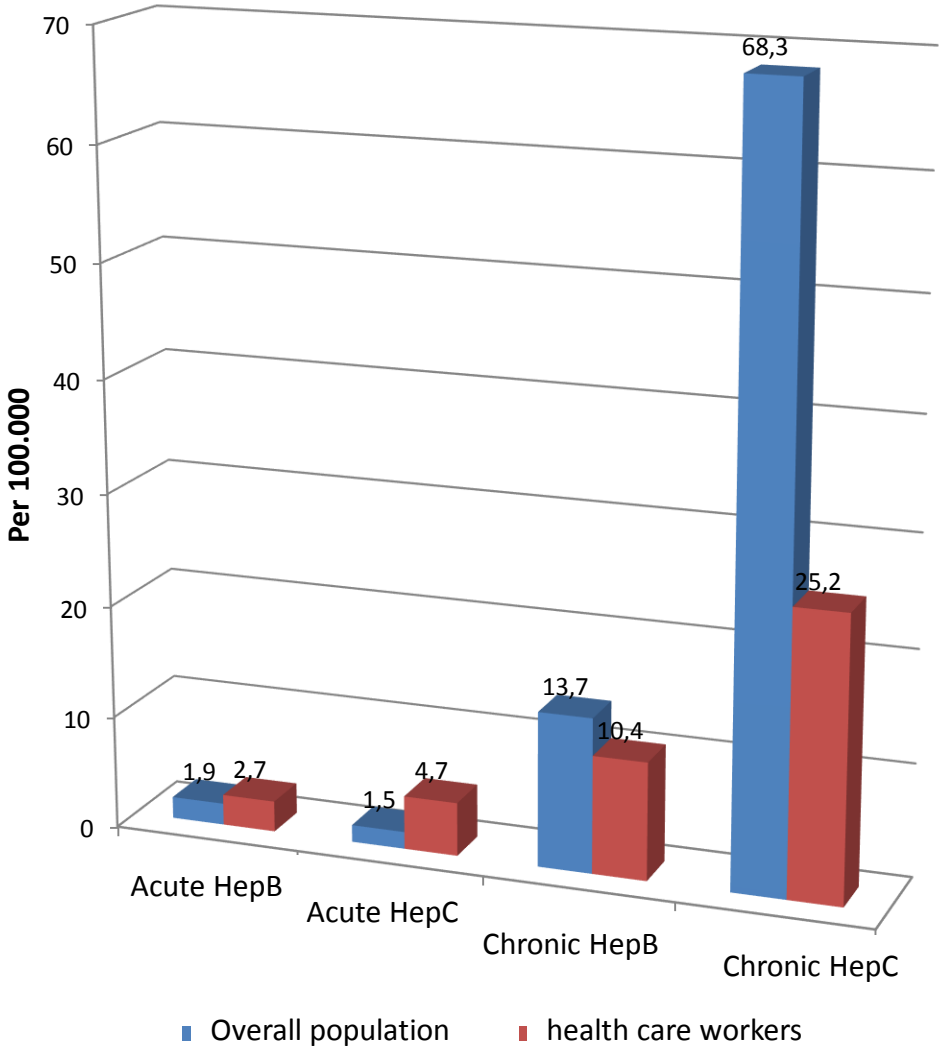
According to the data of Rospotrebnadzor in subjects of the Russian Federation (AIS Viral hepatitis, Reference center for monitoring of viral hepatitis)

The prevalence of acute and chronic hepatitis B and C in health care workers in Moscow 2017

The prevalence of **acute hepatitis B** in health care workers compared with the population of Moscow is 40% higher, and **acute hepatitis C** is higher by 3.1 times.

The prevalence of **chronic hepatitis B** is lower by 24%, **chronic hepatitis C** is lower by 63%.

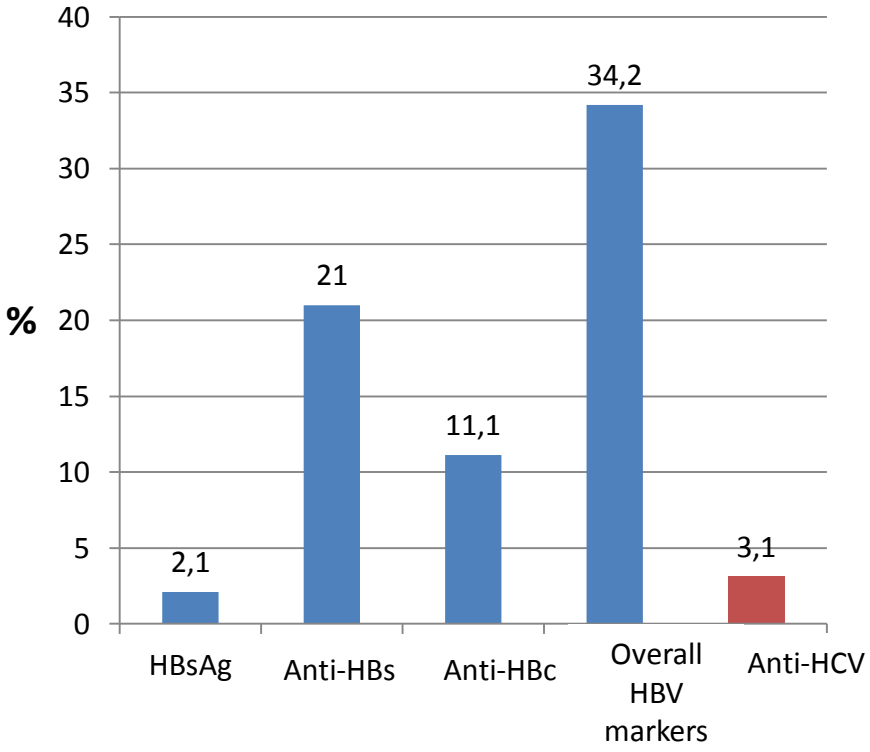
Assumed cause of such situation is an earlier detection of parenteral hepatitis in Moscow within health care workers, then in overall population.



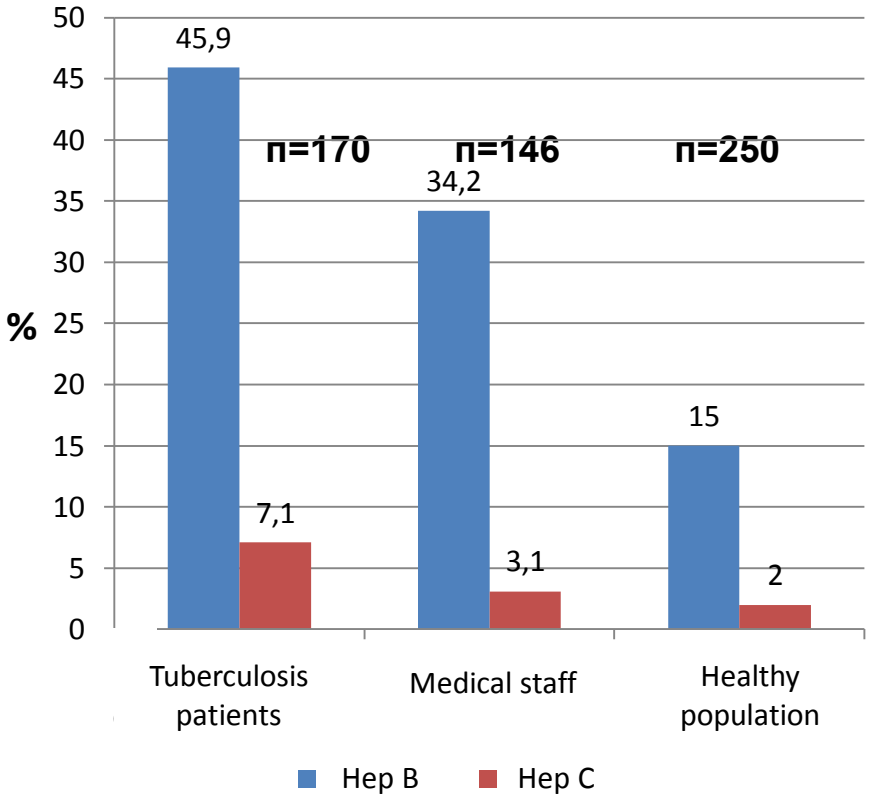
According to FBUZ "Center for Hygiene and Epidemiology in Moscow"

Parenteral viral hepatitis in tuberculosis hospital

Hepatitis B and C markers detection frequency among the medical staff of a tuberculosis hospital (n=146)

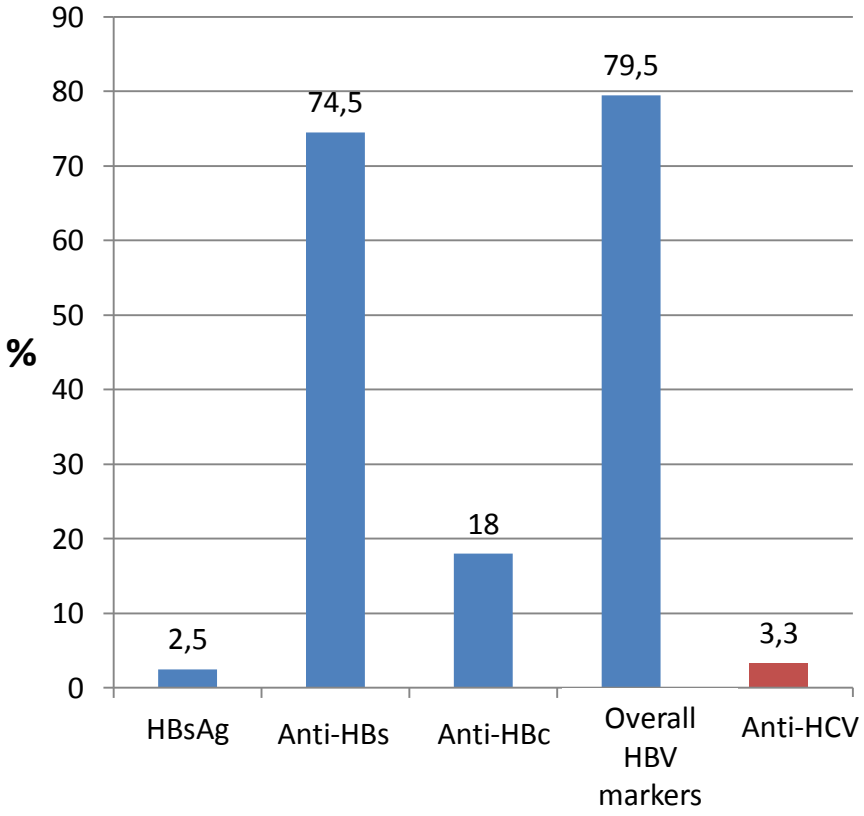


The frequency of hepatitis B and C markers detection in the tuberculosis hospital in comparison to healthy population

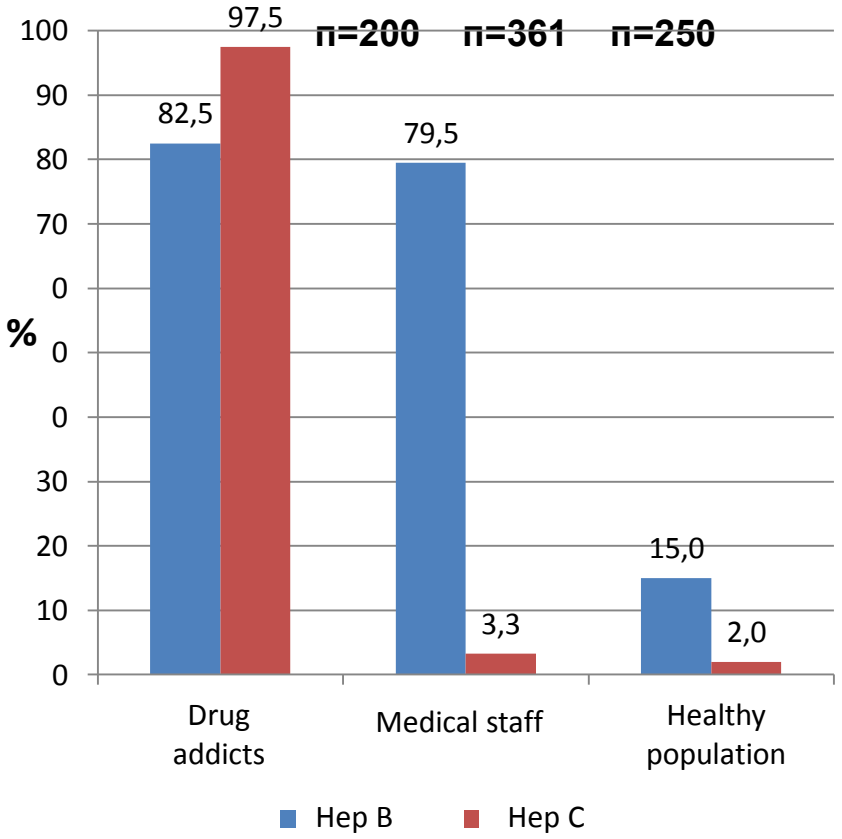


Parenteral viral hepatitis in drug treatment hospital

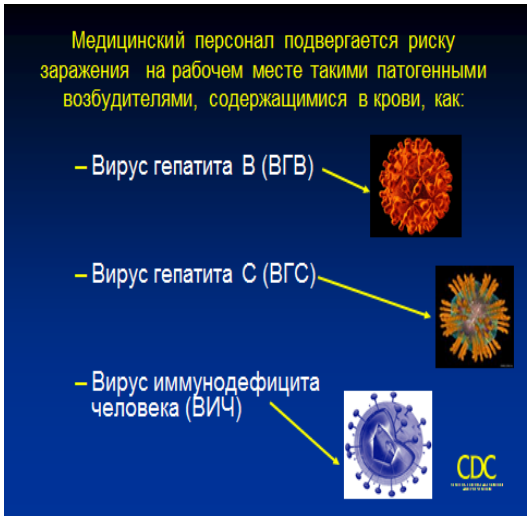
Hepatitis B and C markers detection frequency among the medical staff of a drug treatment hospital (n=361)



The frequency of hepatitis B and C markers detection in the tuberculosis hospital and healthy population



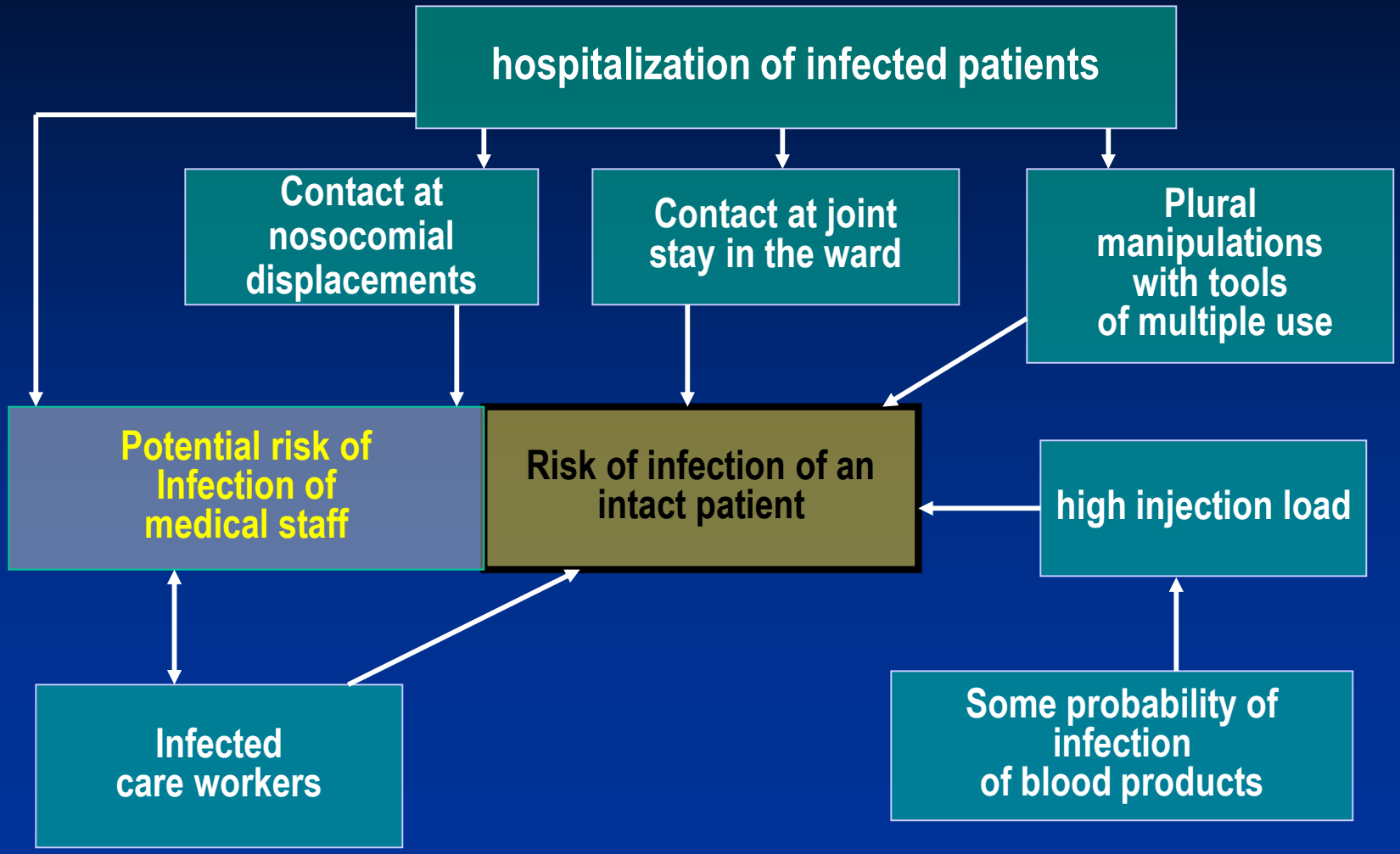
The risk of hospital-acquired infection with parenteral hepatitis viruses depends on:



- art and urgency of medical care
- non-compliance with personal safety rules in case of work with infectious materials
- proportion of HBV and HCV infected patients in health facilities
- epidemic risk in individual methods of treatment and diagnosis, due to technical features of equipment
- violations of disinfection and sterilization rules
- maintenance of minimal risk of infection with HBV and HCV during blood transfusions

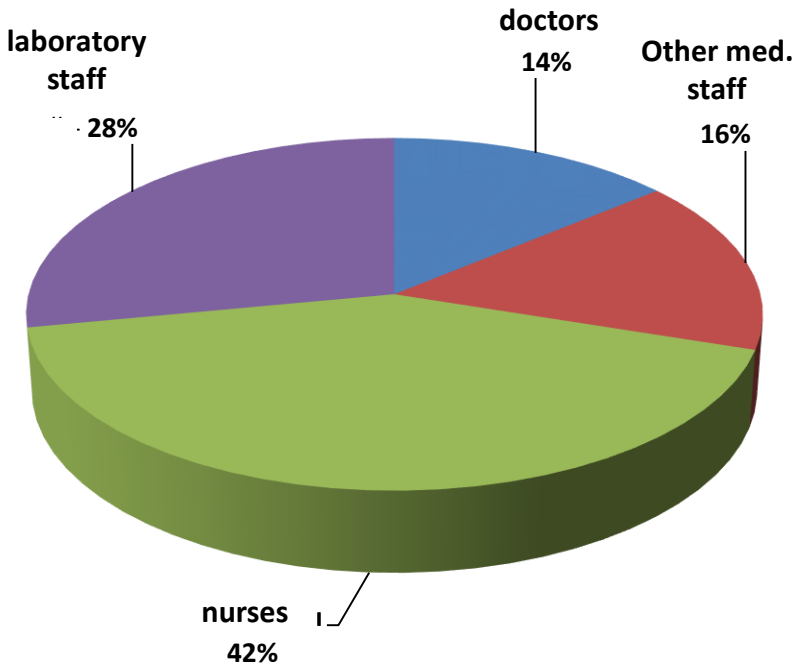
Akimkin V. G., Semenenko T. A. et al. "Epidemiology of hepatitis B and C in health care facilities". Moscow, 2013

Risk of infection with hepatitis viruses in medical facility

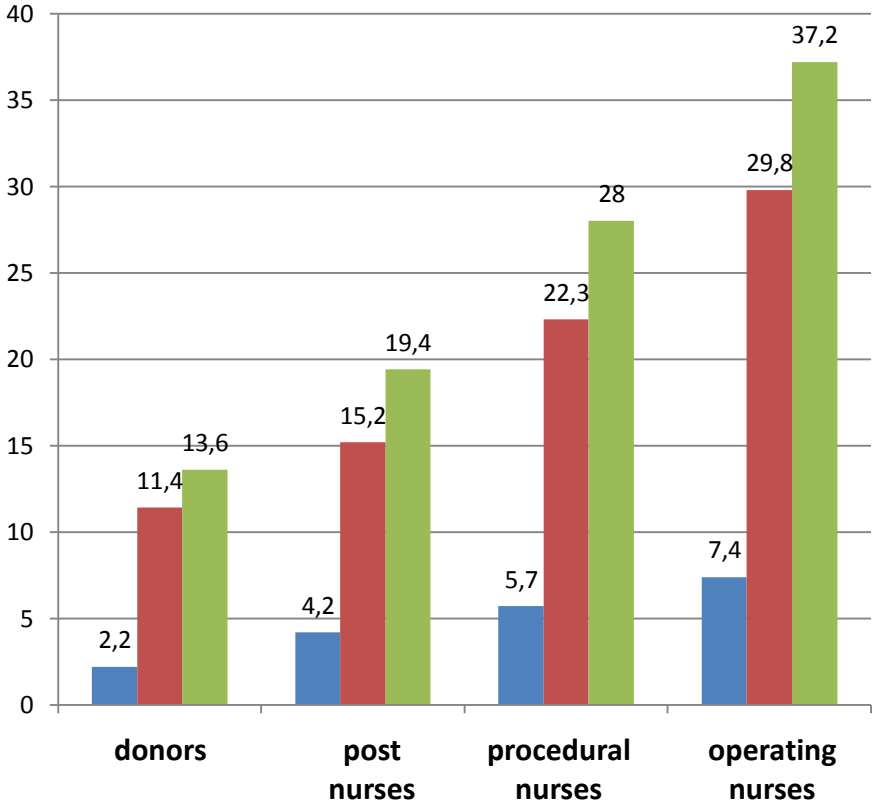


Infection of medical staff depending on professional duties

Infection of medical personnel depending on professional duties (n=238).



The frequency of detection of HBV markers in nurses of different profiles (n=184).



Classification of biological fluids potentially transmitting viruses of hepatitis B, C, D и G

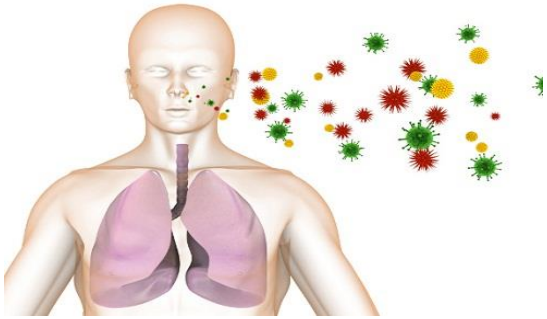
(OSHA classification system)

- blood, blood components, blood products
- sperm and vaginal secrets
- cerebrospinal, pleural, pericardial, synovial, peritoneal and other fluids
- biological fluids contaminated with blood (urine, vomit, sputum, etc.)

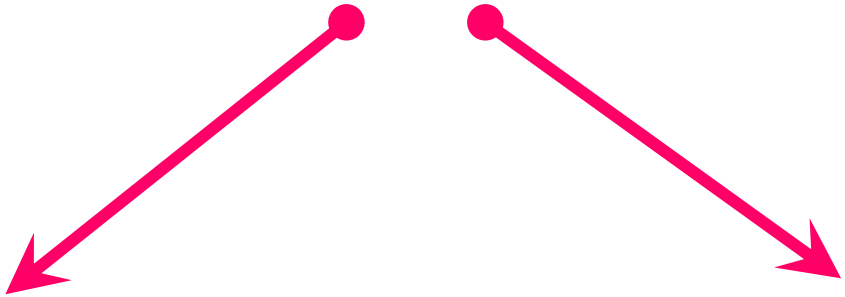
In group of patients with destructive forms of tuberculosis, blood in sputum was found in 100 % of cases. HBV DNA and HCV RNA were found in 15%.

It is established that **sputum** can serve as a transfer factor not only for Mycobacterium tuberculosis, but also HBV and HCV.

Thus, there is a possibility of the natural way of transmission of these infections in nosocomial foci.



Prevention



Specific

(vaccination)

Hepatitis B

Non-specific

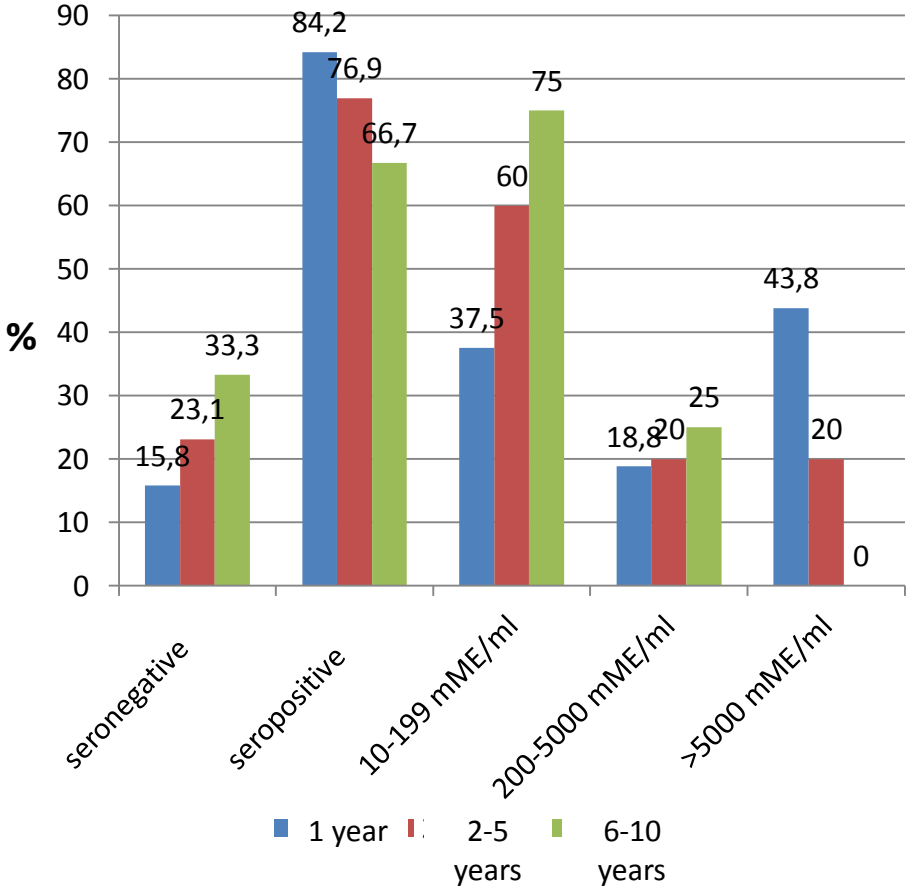
(universal measures)

Hepatitis B

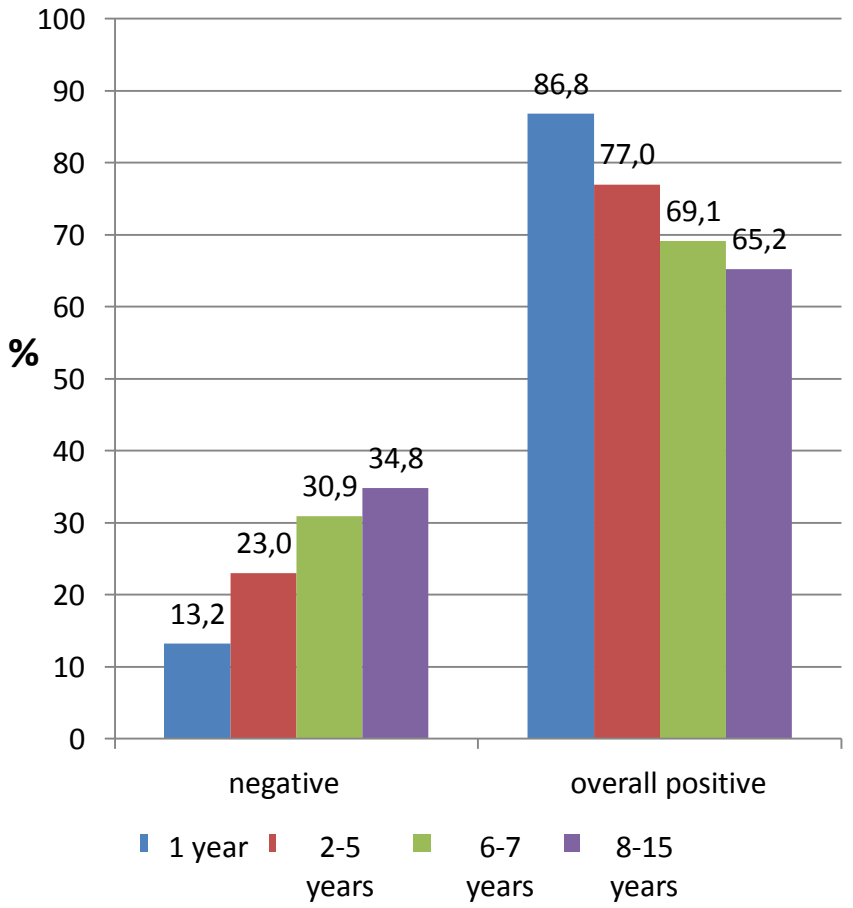
Hepatitis C

The detection frequency of postvaccinal HBV antibodies in medical personnel, depending on the time of vaccination

Tuberculosis hospital (n=146)



Narcological hospital (n=361)



METHODICAL INSTRUCTIONS MI 3.1.2792-103.1.

PREVENTION OF INFECTIOUS DISEASES

EPIDEMIOLOGICAL SURVEILLANCE OF HEPATITIS B

Revaccinations against Hepatitis B every 5 years is a subject to health care workers who have received a full course of vaccination, by introducing one booster dose of the vaccine according to the instructions for its use.

Revaccination against HBV every 3 years is a subject to hemodialysis patients who have received a full course of vaccination, by introducing one booster dose of the vaccine containing twice the amount of the antigen.

SN 3.1.3112-13
«Hepatits C virus prevention»
Capture VIII.

Prevention of hepatitis C virus infection in health care

8.4. Cases of hepatitis C virus infection can be considered to be associated with medical care in the following case :

detection of epidemiological connection between cases of hepatitis C using molecular biological analysis (genotyping, sequencing of variable regions of the HCV genome) of blood sera (plasma) samples from the patient and persons considered as a source of infection in the presence of a mandatory comparison group

Algorithm of analysis of the epidemiological relationship between infection cases with HCV and HBV

1. Collection of blood plasma samples of patients with HBV/HCV, presumably epidemiologically related (experimental group)
2. Detection of pathogen NA in samples
3. Identification of the virus genotype (subtype)
4. Selection of a comparison group that is not epidemiologically related to the experimental group, but with identical genotype (subtype) and place of residence
5. Sequencing of the hypervariable region of the virus genome isolated from the samples of experimental and control groups
6. Phylogenetic analysis of sequenced sequences

Chulanov V.P., 2017

Conclusion

- The strategic objective of health care is to ensure the quality of medical care and create a safe environment for patients and staff in organizations engaged in medical activities;
- Hepatitis B and C continue to be occupational diseases of health care workers;
- An effective measure of prevention of hepatitis B is vaccination;
- Universal prevention measures are the basis for protecting patients and health care workers from HCV infection;
- The use of molecular biological methods allows to confirm or refute the hypothesis of epidemiological connection of hepatitis B or C cases in health care settings.
- Prevention strategies should be encouraged in order to eliminate or minimize transmission risks