INTRODUCTION
Blood has held a mysterious fascination for humans from the dawn of time. Blood transfusion is an important and life saving modality of treatment. There are continuing concerns over the safety of the nation's and the world's blood supply. The allogeneic blood supply is tested for antibodies to HIV 1/2, HTLV I/II, hepatitis B, hepatitis C (HCV) and syphilis. The need for new donor screening assays to protect the integrity and purity of the blood supply must be balanced against the loss of potential donors and the cost of developing and implementing these new screening assays. There has been great progress in the assurance and maintenance of the microbiological safety of the blood supply. Indeed, the risk of being infected by a unit of blood has decreased by three to four orders of magnitude over the past thirty years. Although the blood supply is already extremely safe, there are still concerns regarding the potential transmission of human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV).

Viral hepatitis is the term reserved for infections of the liver by one or more of the distinct hepatitis viruses. Five categories of viral agents have been implicated. Hepatitis A virus (HAV), Hepatitis B virus (HBV), two types of non-A, non-B hepatitis agents, one blood borne, the other enterically transmitted and the HBV associated delta agent.
Hepatitis B Virus

The disease known as hepatitis B is caused by the infectious hepatitis B virus (HBV). HBV alone is estimated to have infected 400 million people throughout the globe, making HBV one of the most common human pathogens. Hepatocellular carcinoma (HCC) one of the most common cancers afflicting humans, is primarily caused by chronic HBV infection.

Hepatitis B virus infection is a serious global health problem, with 2 billion people infected worldwide and 350 million suffering from chronic HBV infection. The 10th leading cause of death worldwide, HBV infections result in 5,00,000 to 1.2 million deaths per year caused by chronic hepatitis, cirrhosis and hepatocellular carcinoma. In western countries, the disease is relatively rare and acquired primarily in adulthood, whereas in Asia and most of Africa, chronic HBV infection is common and usually acquired perinatally or in childhood.

Hepatitis B virus is partial dsDNA virus belonging to Hepadnaviridae family. It has incubation period of 30-180 days. Concentrations of viral antigen and viral particles in the blood may reach 500µg/ml and 10 trillion particles per milliliter respectively. Electron microscopic studies have demonstrated three particulate forms of HBV. The most numerous are 22nm particles which appear as spherical or long filamentous forms, these are antigenically identical with the outer surface or coat of HBV (Figure 1). Outnumbered in serum by a factor of 100 or 1000 to 1 compared to the
Figure 1. Hepatitis B Particle Types
spheres and tubules are large 42 nm spherical particles which represent the intact hepatitis B virion. Antigen present in the antiserum obtained from hepatitis patients was originally called Australia antigen but is now referred to as hepatitis B surface antigen (HBsAg). The antigen expressed on the surface of the nucleocapsid core is referred to as hepatitis B core antigen (HBcAg). Naked core particles do not circulate in the serum. A third antigen hepatitis B e antigen (HBeAg) is a soluble, nonparticulate antigen which is found only in HBsAg positive serum.

Hepatitis B virus is present in the blood, saliva, semen, vaginal secretions, menstrual blood and to a lesser extent, perspiration, breast milk, tears and urine of infected individuals. HBV is resistant to breakdown, can survive outside the body and is easily transmitted through contact with infected body fluids. Contaminated needles causes 8-16 million HBV infections each year, compared with 2.3-4.7 million hepatitis C virus infections. HBV can be transmitted parenterally with the use of unsafe injections, intravenous drug use, unprotected sexual activities, blood transfusions, contaminated surgical instruments and donor organs.

Clinical symptoms of hepatitis B range from nonexistent to severe. Many individuals who get hepatitis B have mild symptoms or no symptoms at all. The symptoms may include fatigue, fever, loss of appetite, nausea, tenderness in the upper right side of the abdomen and jaundice.

More efficacious treatments, mass immunization programs and safe injection techniques are essential for eliminating HBV infection and
reducing global HBV related morbidity and mortality. Safe and effective vaccines against HBV infection have been available since 1982. Antiviral treatment is the only way to reduce morbidity and mortality from chronic HBV infection. Interferon alfa and lamivudine have been the primary treatments to date.

**Hepatitis C Virus**

HCV is a virus that accounts for a significant number of cases of viral hepatitis. The hallmarks of this RNA virus are its extensive genetic heterogeneity and high rate of chronic infections. Acute hepatitis C is very mild and often not clinically apparent.

Persons with acute HCV infection typically are either asymptomatic or have a mild clinical illness, 60-70 percent have no discernible symptoms; 20-30 percent might have jaundice, and 10-20 percent might have non-specific symptoms (e.g.:- anorexia, malaise or abdominal pain). Clinical illness in patients with acute hepatitis C who seek medical care is similar to that of other types of viral hepatitis, and serological testing is necessary to determine the etiology of hepatitis in an individual patient. In ≤ 20% of these patients, onset of symptoms might precede anti-HCV seroconversion. Average time period from exposure to seroconversion is 8-9 weeks. Anti-HCV can be detected in 80% of patients within 15 weeks after exposure, in > 90% within 5 months after exposure, and in ≥ 97% by 6 months after exposure.
The course of acute hepatitis C is variable, although elevations in serum ALT levels, often in a fluctuating pattern, are its most characteristic feature. Normalization of ALT levels might occur and suggest full recovery, but this is frequently followed by ALT elevations that indicate progression to chronic disease.

Although factors predicting severity of liver disease have not been well defined, recent data indicate that increased alcohol intake, being aged > 40 years at infection, and being male are associated with more severe liver disease.

The primary markers for therapeutic response in hepatitis C are ALT and HCV RNA plasma levels. A sustained response is achieved when the HCV RNA viral load is undetectable 24 weeks following the end of treatment. The response to therapy may be monitored by measuring HCV RNA levels.

An association between the severity of liver pathology and virus load could suggest that HCV is directly cytopathic. HCV is detected in hepatocytes 1-2 days after experimental infection of chimpanzees and high levels of viremia during the first few days to weeks after HCV infection are generally not associated with biochemical or histologic evidence of disease in humans or chimpanzees. Quantification of serum HCV RNA levels during the acute phase of disease suggests that replication is maximal several weeks before elevation of liver enzyme values and can decline sharply thereafter.
This is consistent with the finding that more than 60-70% of hepatocytes are HCV antigen positive in some subjects with acute hepatitis C.

Most risk factors associated with transmission of HCV in the United States were identified in case control studies conducted during 1978 - 1986. These risk factors included:

- Sexual and household contact.
- Prenatal Transmission.
- Intra Venous drug use.
- Blood Transfusion.
- Nosocomial Transfusion.
- Occupational Exposures

Because of the insidious nature of chronic HCV infection, the first abnormality noted may be an elevated ALT routine blood testing. ALT can remain normal or can fluctuate.

Laboratory tests are used to diagnose infection and to screen blood donors and low risk population (those without risk factors) as well as to screen high risk population (immunocompromised patient and those with high risk factors). Risk population who should be screened includes:

- Persons who have ever injected illegal drugs.
- Recipients of blood products before 1992 or from donor who later became HCV-positives.
- Hemophiliacs or other receiving clotting-factor concentrates before 1987.
• Chronics hemodialysis patients.
• Organs, tissue or blood donors.
• Recipients of transplants before 1992.
• Individuals with persistently abnormal ALT.
• Symptomatic individuals.
• Individual with recognized exposure after needle stick sharp or mucosal exposure to HCV positive blood.
• Infants (older than 12 months) born to HCV-positive women

Diagnostic test for HCV infection are divided into serologic assay for antibodies and molecular test for viral particles.

The primarily serologic screening assay for HCV infection is the enzyme immune assay. It can be falsely positive especially in persons without signs of liver disease, such as blood donors or health care workers and therefore other tests must be used to confirm infection in these persons. Furthermore false negative test can occur in persons with immune compromised such as HIV 1 infection, patients with renal failure and those with HCV associated mixed cryoglobulinemia. The recombinant immunoblot assay has been used to confirm positive enzyme immunoassays.

In the United States two different regimens have been approved as therapy for hepatitis C: monotherapy with alpha interferon; combination therapy with alpha interferon and ribavirin. The best hope for a solution to the epidemic of HCV infection is the development of an effective vaccine.
It was shown that symptoms of acute HBV and HCV infection are directly related to age and the risk of chronic infection is inversely related to age. India has been placed in an intermediate zone according to prevalence of HBsAg infections and HCV infections. There is less data available in the field of age specific, sex specific and blood group specific prevalence of HBV and HCV infections. Thus a large-scale study is needed.