SUMMARY AND CONCLUSIONS
A total of 8331 serum specimens from general and diseased population of Tamilnadu and around, 73 body fluids other than blood from diseased individuals and 17 batches of normal human immunoglobulin preparations were analysed for the immunological markers of HBV infection.

161 patients with liver diseases were evaluated for the biochemical markers of liver injury while 352 patients with liver diseases were histopathologically analysed.

A scrutiny of the data arrived at, revealed the following conclusions:

1. Among the four serological methods adopted viz. agar gel diffusion (AGD), rheophoresis (RP), counter immunoelectrophoresis (CEP) and Reversed passive haemagglutination (RPHA) the RPHA has emerged as the most sensitive technique both for the detection and quantitation of HBsAg and for followup of HBsantigenaemia (P < 0.0001).

2. Of the two easily available methods (AGD and RP) for antigenic subtyping of HBsAg and HBe system screening, Rheophoresis turned out to be a more sensitive technique (P < 0.001). A reusable rheophoresis template set was locally devised, which proved to be a satisfactory device both for HBs system, and HBe system
screening and for antigenic subtyping studies.

3. A serological survey conducted in this study to trace the carrier rate of HBsAg in and around Tamilnadu revealed a near uniform figure for Tamilnadu (3.48%), Kerala (3.00%) and Karnataka (2.73%) while Andhra Pradesh (Tirupathi) showed an increased carrier rate (6.48%). However RPHA brought out 20.14; 4.00, 11.82 and 14.47 percent HBsAg positivity in these places respectively. In Madras 1.58% of the voluntary donors and 5.08% professional blood donors were proved to be HBsAg carriers by CEP. The RPHA figures in these groups increased to 13.79% and 23.59% respectively.

4. When the association of HBsAg with blood groups could not be confirmed in this study, an occupational influence over HBsAg carriage emerged sharply. The factory workers (3.71%) and the hospital personale (4.59%) were mainly involved.

5. An interesting pattern of HBsAg subtype distribution was observed in and around Tamilnadu. Madras being a cosmopolitan city and Tirupathy being place of pilgrimage, an admixture of subtypes were observed in these places (adr, adw, and ayw) while far interior towns like Tinneveli and Trivandrum had only 'adw' and in Bangalore both 'adw' and 'ayw' subtypes. The proportion of these subtypes differed with the places of study.
6. As against the uniformly low incidence observed by others, HBsAg was detected in 15.09% of the HBsAg positive general population of Tamilnadu (the blood donors and prospective blood donors) with similar increasing incidences in the neighbouring states.

7. While the sex incidence of HBsAg carrier rate among the general population of Madras was found to have the male: female ratio of only 1.1: 1.0, in population with liver diseases it turned out to be 1: 1.12. This edging difference is to be considered curious with the existing impression on sex incidence of HBsAg. Besides this, the age incidence has also shown a comparative sparing of females (both normal and diseases) of 21-40 years by the HBV. Hormonal influence was proposed to explain this phenomenon.

8. Analysis of the patients with liver diseases revealed the hepatitis B virus as the commoner agent in acute viral hepatitis and chronic active hepatitis in Tamilnadu as judged by immunological and histopathological studies (65.55% and 72.97%) HBsAg positivity in histologically proven acute viral hepatitis and chronic active hepatitis respectively.
9. Besides further reporting the incidence of HBsAg in leprosy (7.82%) leukaemia (2.00%) and in sexually transmitted diseases (10.37%), a 5.21% carrier rate is reported in children suffering from asthmatic bronchitis. This may mean that asthmatic bronchitis could be classified along with 'HBv affinity' diseases.

10. Beside the demonstration of HBsAg in body fluids like ascitic fluid, bile and pleural fluid, a simultaneous and periodic testing of HBsAg in blood and ascitic fluid showed different patterns of response which was well correlated with the clinical outcome in those patients.

11. The epidemiological characterization of HBv infection has shown a gradual increase from January 1976 to December 1978. Besides it has shown an approximately regular peaks of HBv infection in the summer months of April and May. It is proposed as due to the aftermath of the irrational practice of injections during the winter fevers.

12. While injections happened to be the major mode of HBv infection in Tamilnadu (26.15%), traumatic exposure (11.10%) nonparenteral hepatitis (7.07%) and association hepatitis (2.19%) are to be considered as entities of equal concern.
13. It is observed in the present study that the post injury and post association hepatitis had the minimum incubation period significantly (P < 0.01) differing from post-transfusion, post-operation and post injection hepatitis.

14. The general outcome of the liver disease as followed in the present study at Madras showed 28.46% chronicity and 3.56% case fatality.

15. Subtyping studies revealed a high incidence of 'adr' in the general population (39.13%) as well as in patients with liver diseases (57.56%) when compared to other studies in India. Thus HBsAg/adr could be considered as a population marker for Tamil Nadu. In the patients with liver diseases adr and ayw (ayw₃ and ayw₂) were detected in about equal proportions.

16. In consonance with the view that HBsAg may indicate infectivity and active multiplication of the virus, a high incidence of this antigen was observed in patients with liver diseases. Further a fairly high incidence of HBsAg in general population and the prospective blood donors should give rise to an alarming concern with regard to the selection of donors in the blood banks of Tamil Nadu.

17. The simultaneous and periodic detection
of HBeAg in HBsAg positive followup patients showed
different pattern of their occurrence in different
liver diseases, leading to the proposition that the
HBeAg which becomes undetectable along with HBsAg
in viral hepatitis might after a varying period of
HBV dormancy in the liver, reoccur after a fresh course
of HBV multiplication as in chronic active hepatitis.
The time lapse in the reoccurrence might be influenced
by the degree of liver damage and delimiting host
factors. As disease progresses this HBeAg positivity
continues until such time cirrhosis is established
and HBV multiplication ceased.

18. No correlation was observed between
HBeAg and antigenic subtypes, thus deviating from
the earlier observations that some subtype may be
more virulant than the others. Further an indirect
evidence for transition of replacement from one subtype
to the other was obtained in this followup study.

19. The HBsAg followup studies in liver
diseases showed that the duration of antigen positivity
has no relationship with the severity of liver damage
in the acute stage whereas in chronic active hepatitis,
the longer the duration of its detection more fatal
the outcome.
20. The high incidence of the liver cell membrane autoantibodies in patients with HBsAg positive liver diseases in this study may indicate two possibilities

a. It may reflect a higher tendency of these individuals for autoimmune disease or

b. The HBv virus may be directly implicated in the production of LMA in these patients.

21. In HBsAg positive cases of acute hepatitis, a correlative increase of SGPT was observed and the transaminases showed a protracted rise. In chronic active hepatitis, a higher level of SGOT over SGPT was observed and in cirrhosis the reversal of the albumin globulin ratio was not much pronounced. In HBsAg negative acute hepatitis, the SGPT did not show as high a level as obtained in HBsAg positive cases and the elevated transaminases levels fell over a shorter time course. In chronic active hepatitis, the HBsAg negative cases had lower levels of SGPT and in all cases of cirrhosis the albumin globulin reversal was more pronounced. While the HBsAg negative group showed a marked increase in the beta and gamma globulin fractions, the HBsAg positive cases revealed an elevation
of alpha 1 and alpha 2. The assessment of the LDH isoenzymes in the present study has shown low levels of slow moving isoenzymes (LDH 4 and 5) in HBsAg negative cases and high levels of the same in the HBsAg positive group. An extravasal between LDH 4 and 5 was observed in HBsAg positive chronic active hepatitis and hepatoma cases.

Thus in the background of the noise produced by overlapping biochemical profiles, some clear cut distinctions are yet discernible between the HBsAg positive and negative cases.

22. The prospective study conducted on post transfusion hepatitis revealed a fairly high incidence of the disease (13.33%) and the fact that some of the HBsAg negative donor blood gave rise to HBsAg negative icteric disease shows that non-B agent may also be involved in PTH. The high relative incidence of 'e' antigen in donors and recipients further confirms the belief that HBsAg is associated with infectivity.

23. The recent epidemic of jaundice at Tirupathur was traced in this study to the batch of immunoglobulin contaminated with HBsAg which led to further detailed investigation of many batches of commercial immunoglobulin preparations, 83.25% of which were positive for HBsAg. Proper legislations are required
for banning such preparations and strict procedural measures should be laid down to prevent such contaminated preparations being marketed.

24. Chloroform and acetone extracts of Eclipta alba, and Phyllanthus niruri showed possible antiviral effect as verified in this study by immunological methods. Since loss of immunogenicity could not be taken to mean loss of viral activity further studies are required to confirm the antiviral property of these agents. However the physicochemical characterization of the active principle by their U.V and I.R. spectra shows that they may be plant steroids, thus explaining the clinical benefit observed in vivo.

In a well worn ledger with a love laboured scrawl, Baruch S. Blumberg has chronicled his scientific experiences with a saying, 'Scientists are trained to break things down into pieces and surprisingly little time is spent putting things back together'. This humble work at the Institute of Microbiology, Madras Medical College, Madras-3 has attempted to brief the facts, figures and procured data with an earnest view to put things into a shape in this part of the country, Tamilnadu.