

## Incidence, prevalence, and genotypic characterization of human parvovirus B19 and human herpesvirus 6/7 in children with measles- and rubella-like illness in Iran

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### Introduction:

In common, Human Parvovirus B19 (B19V), Human Herpesvirus 6 (HHV-6) and Human Herpesvirus 7 (HHV-7) establish infection following initial exposure and seroconversion. As B19V, HHV-6 and HHV-7 infections are often associated with fever and rash, and can be mistakenly reported as measles or rubella infections. Differential diagnosis of B19V, HHV-6 and HHV-7 illness is necessary for case management and also for public health control activities, particularly in outbreak situations in which measles or rubella are suspected.

### Material and methods:

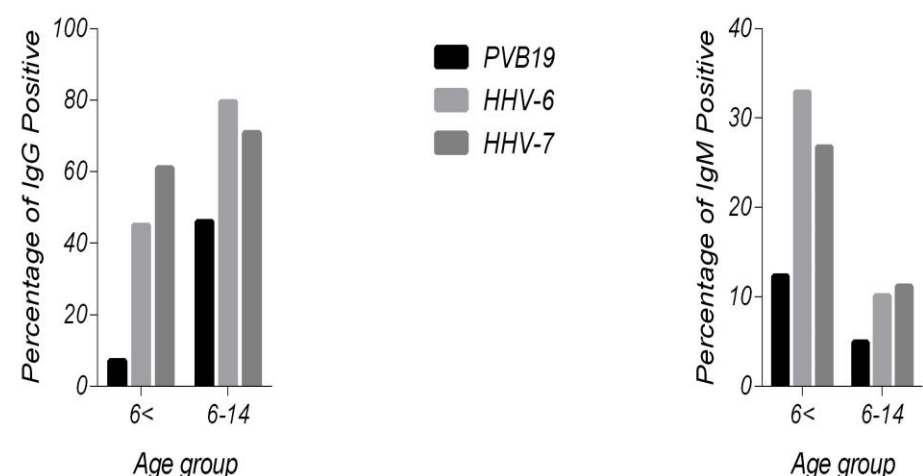
To investigate the causative role of B19V, HHV-6 and HHV-7 infections in children with measles- and rubella-like illness, a total of 650 sera from children with exanthema were tested for presence and incidence of B19V, HHV-6 and HHV-7 by determining the anti-IgG and -IgM antibodies by ELISA as well as Viral DNA detection by nested PCR. DNA positive samples were assessed further for determination of sequence analysis by d Sanger sequencing method.

### Results:

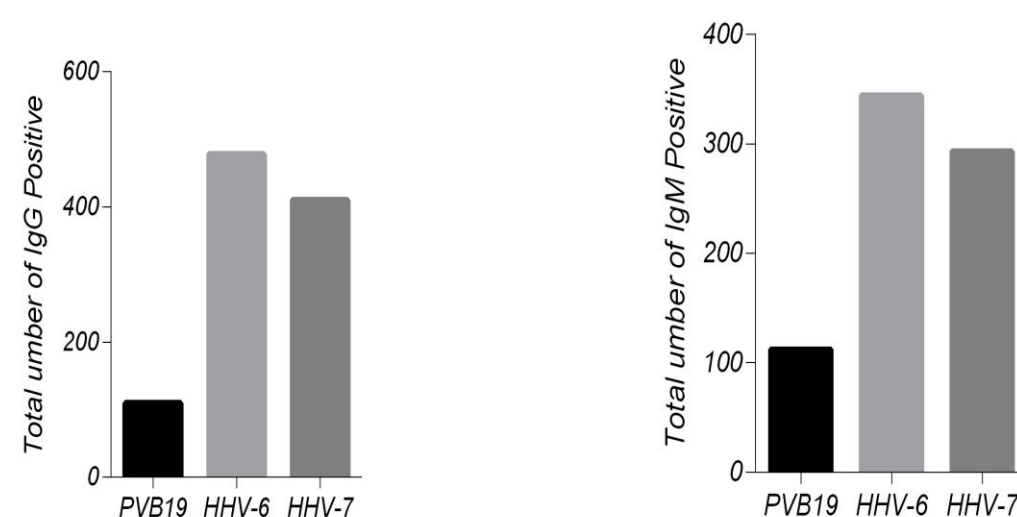
Out of 650 patients, 112 (17.2%) patients were positive for B19V-IgM, 110 (16.92%) for B19V-IgG, 344 (43%) for HHV-6-IgM, 478 (65%) for HHV-6-IgG, 293 (38%) for HHV-7-IgM, and 410 (57%) for HHV-7-IgG antibodies, respectively. The positivity rate of B19V, HHV-6 and HHV-7 - IgG antibodies were increased with age; seroprevalence rates in children under 6-year-old was 7.11% ,45%, and 61% as compared to 46 %, 79.5%, and 70.91% for age groups 6–14 years old, respectively.

The viral DNA for B19V, HHV-6, and HHV-7 were detected by a nested-PCR in 63 (71%) 271 (81%) and 167 (57%) of patients, respectively. Phylogenetic analysis of the NS1-VPu1 region of B19V, IE-A region of HHV-6, and glycoprotein B of HHV-7 revealed that all Iranian B19V strains belonged to genotype 1 while there are very low genetic differences between HHV-6/7 Iranian strains and reference viruses.

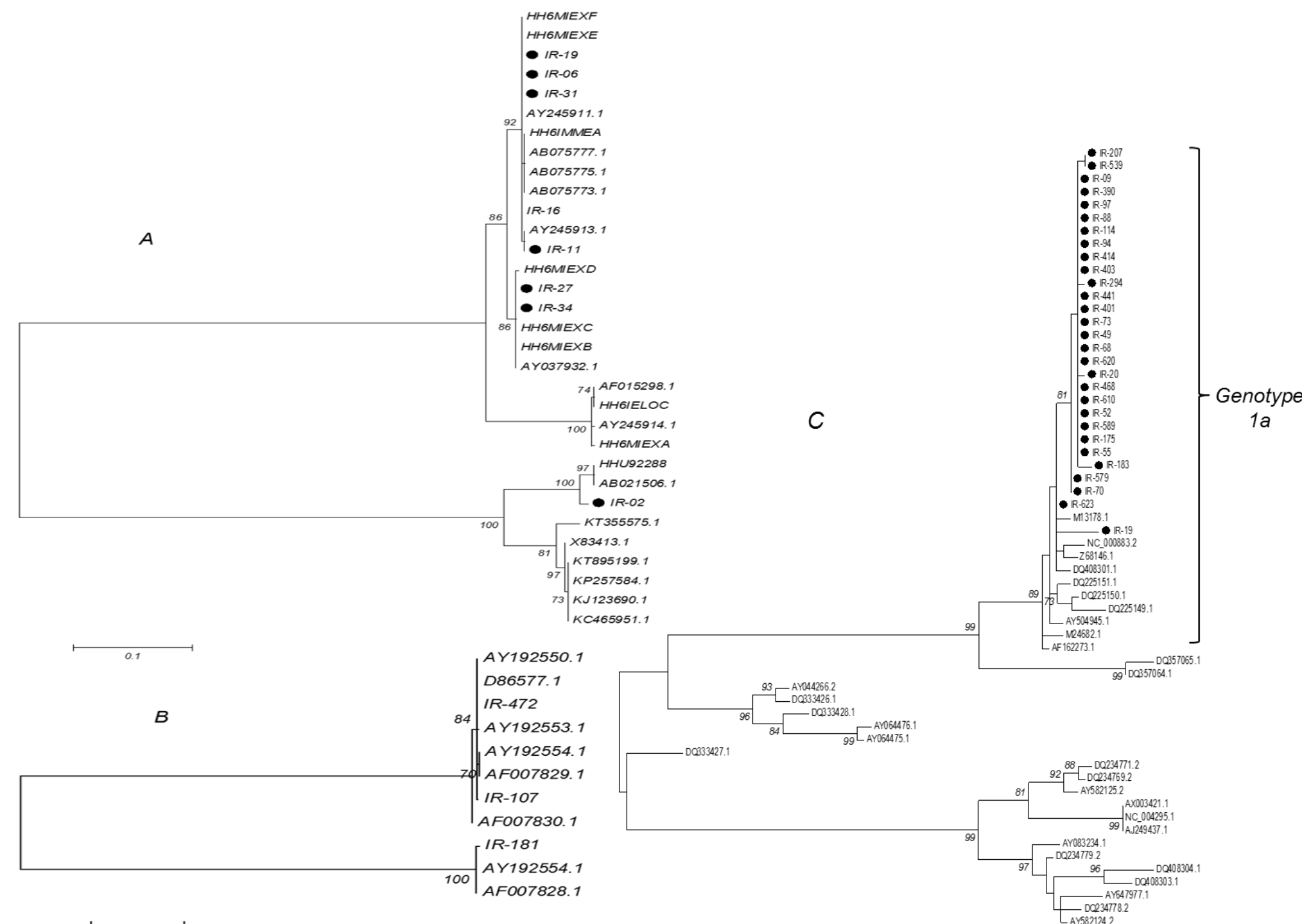
A



B



A-Percentage of IgM and IgG against PVB19, HHV-6 and 7 in age groups. B-Total number of IgG and IgM against PVB19, HHV-6 and 7,



A, B and C. Phylogenetic analysis of HHV-6, HHV-7 and PVB19, respectively.

### Conclusion:

The current study demonstrated the first epidemiological analysis and genotype characterization of B19V, HHV-6 and HHV-7 among large population of children with suspected measles and/rubella illness. The results of this study may aid the surveillance programs aiming at eradicating measles/rubella viruses in Iran, as infections with B19V, HHV-6 and HHV-7 can be mistakenly reported as measles or rubella if laboratory testing is not conducted. In addition, these results can be useful in determining appropriate immunization policies if a vaccine become available against B19V, HHV-6, and HHV-7 in near future.