

# SEASONAL VARIATION IN THE DIAGNOSIS OF PRIMARY BILIARY CIRRHOSIS

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**Background and Aims:** The aetiology of the autoimmune liver disease primary biliary cirrhosis (PBC) is unclear. Both genetic and environmental factors are likely to be involved. We have previously reported evidence of space-time clustering suggesting that a transient environmental agent may be involved in aetiology. The study aim was to further examine whether a transient environmental agent may contribute to the aetiology of PBC. We have analysed seasonal variation with respect to month of diagnosis using population-based data from northeast England over a defined temporal period (1987-2003).

**Methods:** Monthly expected ( $E$ ) numbers of cases were calculated under an assumption of a uniform distribution throughout the year. Observed counts ( $O$ ) were compared with the expected numbers. The chi-squared heterogeneity test was used to test for overall non-uniform variation and also for individual months. Poisson regression analysis was used to fit a sinusoidal (harmonic) model to the data, using month of diagnosis as a covariate in the model.

**Results:** The study analysed 1030 cases of PBC (931 females, 99 males) who were diagnosed during the period 1987 to 2003. The overall chi-squared heterogeneity test showed marginally statistically significant evidence for departure from the uniform distribution ( $P = 0.062$ ). Detailed analyses of individual months showed that there was a marked and highly statistically significant peak for diagnoses in the month of June ( $O = 115$ ,  $E = 84.7$ ,  $OE = 1.36$ ,  $P = 0.001$ ). Furthermore, Poisson modelling showed that there was evidence of sinusoidal patterning with a June peak ( $P = 0.012$ ) with goodness of fit ( $P = 0.302$ ) and estimated amplitude of 0.111 (standard error = 0.044).

**Conclusions:** These highly novel results provide further evidence for the involvement of a transient environmental agent in the aetiology of PBC, at least in some patients. Candidate agents include infections, atmospheric pollution or dietary factors.