The main objective of this study was to estimate the decay of acquired colostral antibodies to Actinobacillus pleuropneumoniae serotype 2 in pigs. Data were obtained from pigs in an isolated cohort of 47 pigs born to five sows seropositive to A. pleuropneumoniae serotype 2. The pigs were examined serologically at 18 different times from birth until an age of about 22 weeks, using an A. pleuropneumoniae serotype 2-specific blocking enzyme-linked immunosorbent assay. Antibody concentration was expressed as an OD% derived from the optical density of the sample and the median from eight wells without serum on the same plate. A non-linear mixed model assuming a constant rate of decay (half-life) was specified and fitted to the serological data. To estimate the between-pig variability of different components, between-pig random effects of each component of the model were estimated. The estimated average half-life of acquired colostral antibodies was approximately 2 weeks, but there was a considerable variation between pigs (half-life ranged from 1-3 weeks). The duration until acquired colostral antibodies were no longer detectable ranged from 2 weeks to 2 months postpartum among the pigs in the study, mainly depending on the initial level of acquired colostral antibodies to A. pleuropneumoniae serotype 2.