Lawsonia intracellularis is the cause of porcine proliferative enteropathy, one of the major causes of antibiotics usage in modern pig production. L. intracellularis is an obligate intracellular bacterium preferable infecting epithelial cells of pigs intestine. We have demonstrated earlier, that a primary L. intracellularis experimental infection in pigs protects against re-colonisation (re-infection) with a virulent L. intracellularis isolate. After re-infection the animals had reduced L. intracellularis colonisation of the intestinal mucosa compared to controls, no bacterial shedding and no increase in acute phase response after challenge with a pathogenic isolate. Here we show results from measurements of serology as well as cell-mediated immune responses from this experiment. We found that Lawsonia-specific IgA peaked in serum around day 17-24 after a primary infection in experimentally infected piglets where after it levelled off. There was no boost in this response after re-infection, but boosting was observed with serum IgG, resulting in an increasing IgG/IgA index. Local secretory IgA, on the other hand were low following a primary infection, probably due to age-related effects, but exhibited a high, but short-lasting peak after re-infection. Specific IFN responses were also measured using a whole blood IFN-γ assay. These were very high in challenge infected and re-infected animals as compared to controls. These specific immune responses may contribute to the explanation of mechanisms behind the observed protection against re-infection with L. intracellularis.