Chlamydiae are bacteria that have adapted to a wide range of hosts. In cats, infections with *Chlamydia felis* predominate, although infections with other chlamydial species have also been detected, including *Chlamydophila psittaci*, *Chlamydia suis*, and *Neochlamydia hartmanellae*. *Chlamydia felis* is a common infectious agent in cats, which mainly causes conjunctivitis. Direct contact between cats or via fomites. Cats with clinical ocular signs are considered the major source for spread of infection because the appearance of conjunctivitis parallels ocular shedding of chlamydiae. However, shedding can continue for a period after clinical signs have resolved. Ocular shedding of chlamydiae from healthy cats, cats in contact with cats with conjunctivitis, cats with a previous history of conjunctivitis, and cats previously vaccinated against *C felis* has also been described.

Because chlamydiae are known to cause reproductive disorders in humans and several other animal species, it has long been speculated that these bacteria may also cause reproductive problems in cats. Circum-

**Objective**—To investigate shedding of chlamydiae from conjunctiva and genital tracts of cats without clinical signs of conjunctivitis or other infectious disease in relation to their titers of serum antibodies against chlamydiae and to serum amyloid A (SAA) and serum α₁-acid glycoprotein (AGP) concentrations.

**Animals**—62 healthy cats.

**Procedures**—Serum from each cat was analyzed for antibodies against chlamydiae and for SAA and AGP concentrations. Swab samples from the conjunctival sac and genital tract were analyzed with a real-time PCR assay for *Chlamydiaceae*.

**Results**—4 of 8 of cats with high antibody titers (ie, 1,600) shed chlamydiae, but only from the conjunctiva. Chlamydiae could not be detected in samples from cats with lower antibody titers nor from any genital tract samples. In cats with antibody titers of 1,600, mean ± SD SAA concentration was significantly higher when chlamydiae were detected in conjunctival swab samples (3.9 ± 1.0 mg/L) than when no chlamydiae were detected (1.4 ± 1.0 mg/L). However, SAA concentration was greater than the limit for an acute-phase response in only one of those cats. There was no significant difference in serum AGP concentrations between cats with high titers that were or were not shedding chlamydiae. Nine of 30 (30%) cats (5 with and 4 without detectable serum antibodies against chlamydiae) that had been mated developed reproductive disorders.

**Conclusions and Clinical Relevance**—Clinically normal cats with high chlamydiae-specific antibody titers can shed and thus transmit chlamydiae. Venereal spread from cats without clinical signs of infection is likely not common. (Am J Vet Res 2011;72:806–812)
stantial evidence for a role for chlamydiae in abortions in cats has been presented.\textsuperscript{13,14} Experimental inoculation of chlamydiae into cats’ oviducts causes salpingitis\textsuperscript{11}; genital shedding, occasionally in conjunction with a mucopurulent vaginal discharge,\textsuperscript{9} following experimental infection with chlamydiae has been described by several authors.\textsuperscript{7–9,16} Vaginal shedding of chlamydiae from infected cats has been reported to occur for several weeks to months,\textsuperscript{7–10} but it is unknown whether vernal transmission occurs and, if so, whether it is of epidemiological importance in cats.

Exposure to chlamydiae is common among pet cats as indicated by the fact that the seroprevalence among healthy pet cats is quite high (5% to 11%).\textsuperscript{12–14} In a previous study,\textsuperscript{15} conducted by our research group, most healthy cats that were seropositive for \textit{C. felis} had low antibody titers, and it is not known to what extent these animals pose a risk of transmitting chlamydiae to other cats. In a study by Gunn-Moore et al,\textsuperscript{17} most cats had comparatively higher antibody titers.

The acute-phase response, a reaction that occurs after any tissue injury, is a part of the innate host defense system.\textsuperscript{20} The response can be initiated by various causes (eg, infections, trauma, or immunologic reactions). The acute-phase response causes systemic effects such as fever and leukocytosis as well as changes in concentrations of plasma proteins called APPs, some of which decrease in concentration (negative APPs) and others of which increase in concentration (positive APPs). The APPs have been studied less in cats than in dogs and are still not widely used diagnostically in routine small animal practice. In cats, SAA and AGP are considered the most relevant positive APPs.\textsuperscript{21,22} Increases in circulating concentrations of APPs have been detected in both acute and chronic infections, and an interesting characteristic of APPs is the possibility of their use in the diagnosis of subclinical disease.\textsuperscript{20} In human medicine, APPs are sometimes used as indicators of chronic low-grade inflammation (eg, genital tract infections with chlamydiae) or cardiovascular disease.\textsuperscript{23,24}

After experimental ocular or intranasal infection with chlamydiae in cats, bacteremia and systemic spread within the body have been described, in addition to the commonly reported ocular signs.\textsuperscript{7,16} Signs of systemic infection, including fever and elevated concentrations of AGP, have been detected in cats that develop conjunctivitis but not in those that fail to do so.\textsuperscript{7} It is unknown whether healthy cats that shed chlamydiae develop an inflammatory response that contributes to pathological changes. It has been suggested that chronic carriage of the bacteria or immunologic mechanisms may contribute to ocular signs in cats with chlamydiosis.\textsuperscript{25} as is the case in the pathogenesis of trachoma and genital tract disease in humans.\textsuperscript{26} To our knowledge, APPs have not previously been used for evaluation of subclinical chlamydial infections in cats, and it is not known whether subclinical infections with chlamydiae cause an increase in APP concentrations. The purpose of the study reported here was to determine shedding of chlamydiae from the conjunctiva and reproductive tract of healthy cats in relation to serum titers of antibodies against chlamydiae and concentrations of SAA and AGP.

**Materials and Methods**

**Cats**—Owners of purebred cats were informed of the study via the websites of cat breed associations. Sixty-five cats were initially available for the study; however, 3 cats were excluded because of previous vaccination against chlamydiosis. Thus, 62 cats (29 owners) were included in the study. All cats that were included in the study had no signs of conjunctivitis or other infectious disease and were not vaccinated against chlamydiosis. Efforts were made to include cats if there was some suspicion that they might be infected with chlamydiae (eg, cats that had been evaluated before mating within the previous year and had had serum antibodies against chlamydiae at that time). The cats were of 13 different breeds, and 1 cat was of mixed breed. Purebred cats were selected because they typically have antibodies against chlamydiae more commonly than do mixed-breed cats.\textsuperscript{18} The mean age of the cats was 2.4 years (range, 6 weeks to 10 years). There were 39 sexually intact females, 2 neutered females, 18 sexually intact males, and 3 neutered males. For all cats, information was collected regarding history of conjunctivitis and reproductive disorders. The number of cats in the present household, whether the cat came from a household with ≥6 adult cats, and whether the cat had participated in cat shows or had been mated were also recorded.

**Ethical considerations**—The study was approved by the Uppsala Ethical Committee for Animal Research and the Swedish Animal Welfare Agency. All cat owners gave their informed written consent for inclusion of their pet in the study.

**Blood sample collection and analysis**—A blood sample (1.5 to 2.0 mL) was obtained from each cat by means of venipuncture of a cephalic vein and placed into a test tube without additives. Serum was collected and analyzed for antibodies against chlamydiae with an in-house ELISA.\textsuperscript{4} Peroxidase-conjugated goat antibody against cat IgG\textsuperscript{b} was used as the secondary antibody. Plates precoated with antigen extracted from embryonic bodies of \textit{C. psittaci}\textsuperscript{c} were used. The positive cut-off value was set at a titer of 200 on the basis of a comparison with an indirect immunofluorescence method.\textsuperscript{5} Serum amyloid concentration was analyzed by use of an immunoturbidimetric method that is used in humans and that has been validated for use in cats.\textsuperscript{27} Serum AGP concentration was analyzed with a species-specific commercial single radial immunodiffusion test for use in cats.\textsuperscript{28} The cutoff value for an acute-phase response was set at 0.65 g/L for AGP and 5 mg/L for SAA.\textsuperscript{27,28}

**Collection of swab samples**—In each cat, the conjunctival sacs and genital tract (vagina or preputial mucosa) were swabbed with cotton-tipped swabs. For each cat, samples from both eyes were pooled for analysis. Specimens were sent to the laboratory in plastic test tubes without transport medium or other additives.
Detection of *Chlamydiaceae* by use of a real-time PCR assay—According to the protocol by Sachse and Hotzel,29 DNA was extracted from the swab samples for PCR analysis. A tube containing water was included as a negative preparation control for each fifth sample. Analyzes were performed by use of a real-time PCR assay (developed by Everett et al35), which targeted the 23S ribosomal DNA specific for the family *Chlamydiaceae*. Samples were run in duplicate. The primer pair and probe used were as follows: forward primer, 5′-GAA AAG AAC CCT TGT TAA GGG AG-3′; reverse primer, 5′-CTT AAC TCC CTG GCT CAT CAT GGA-3′ and 6-carboxy-fluorescein–labeled probe (for the PCR product), 5′-6-FAM-AAG GCA CGC TGT CAA C-BHQ-1-3′.30

In addition, an IAC was used in this assay and was run on each sample. An IAC acts as a sensitive indicator of amplification efficiency and the presence or absence of DNA polymerase inhibitors (ie, it ensures that there is no inhibition of the PCR reaction by the sample). The IAC was constructed as previously described.31 It is a plasmid construct produced by PCR processing of a segment of the human β-actin gene (GenBank accession No. X00351) inserted into the pUC18 plasmid. The primers used in the IAC-producing PCR procedure were forward actin (5′-GAA AAG AAC CCT TGT TAA GGG AG-3′) and reverse actin (5′-GGG AGC CAT GTA CCC TGG CAT-3′) and reverse actin (5′-TAA GGG AG-3′). The resulting ampiclon was 138 bp. The IAC probe was used with 6-carboxyl-X-rhodamine labeled and had the following sequence: 5′-CCG ACA GGA TGC AGA AG GAGA TCA-3′.

The 25-µL volume of PCR mixture was comprised of PCR buffer (2.5 µL), MgCl$_2$ (2.5mM), the 4 deoxyribonucleotide triphosphates (0.2mM each), forward primer (0.15µM), reverse primer (0.15µM), MgCl$_2$ (2.5mM), and each probe (0.1µM). Two microliters of template DNA and 2 µL of IAC were added to each reaction tube, except for the PCR-negative controls. Two dilutions of positive-control DNA were included in each run. Positive-control DNA was extracted from a *Chlamydomphila abortus* culture or from a *Chlamydidaeae* PCR–positive sample obtained previously. To ensure that the concentration of IAC was sufficiently low, 1 tube containing 2 µL of IAC but no positive-control DNA was run whenever a new working dilution of IAC was used. The cycle threshold value for the IAC should be > 30; otherwise, it has too high of a concentration and might compete with the template and decrease sensitivity. Reaction mixtures were placed in a thermal cycler with the following settings: 94°C for 10 minutes and then 40 cycles at 95°C for 15 seconds and 59°C for 1 minute.

The sensitivity of the test was estimated by spiking samples prior to DNA extraction with 10-fold dilutions of *C. abortus* (inactivated strain S26/3 in an original concentration of 3 × 10$^8$ inclusion-forming units/mL). The spiked samples were handled separately in time and in different environments from tested samples to avoid contamination and were run in duplicate. The sensitivity was estimated to 1 inclusion forming unit/PCR reaction in a volume of 2 µL, which corresponds to detection of 10 to 100 inclusion forming units/swab sample. Samples that yielded positive results with the PCR test for *Chlamydiaceae* were sent to a veterinary diagnostic laboratory and tested with a duplex real-time PCR assay for *C. felis* and feline 28S ribosomal DNA.

**Statistical analysis**—Statistical analysis was performed by use of statistical software.4 Binary logistic regression was used to predict the probability of the presence of antibodies against *Chlamydiaceae* in relation to the following predictors: age (continuous), whether the cat had been mated, whether the cat had been shown, and whether the cat had been born in a cattery with ≥ 6 cats; the interactions between age, whether the cat had participated at a cat show, and whether the cat had been mated were examined. A Fisher exact test was used to compare the proportion of cats with reproductive disorders in the group with detectable titers of antibodies against *Chlamydiaceae* with the proportion of cats in the group without detectable antibody titers. For the APPs SAA and AGP, differences in serum concentrations between cats with antibody titers of 1,600 from which *Chlamydiaeae* were or were not detected were analyzed by use of the Kruskal-Wallis test, and values are reported as mean ± SD. Values of *P* < 0.05 were considered significant. A Pearson correlation coefficient was calculated for concentrations of SAA and AGP in the serum samples.

### Results

Thirty-four of the 62 (55%) cats had detectable serum antibodies against *Chlamydiaceae*. Only 8 (13%) cats had the

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<table>
<thead>
<tr>
<th>Cat</th>
<th>Age (y)</th>
<th>Breed</th>
<th>Sex</th>
<th>Conjunctival swab PCR assay results*</th>
<th>Previous conjunctivitis</th>
<th>Serum SAA (mg/L)</th>
<th>Serum AGP (µg/L)</th>
</tr>
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<tr>
<td>1</td>
<td>0.83</td>
<td>Oriental Shorthair</td>
<td>M</td>
<td>Positive</td>
<td>Never</td>
<td>3.8</td>
<td>0.68</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Birman</td>
<td>F</td>
<td>Negative</td>
<td>Never</td>
<td>1.0</td>
<td>0.18</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>British Shorthair</td>
<td>F</td>
<td>Positive</td>
<td>Never</td>
<td>5.2</td>
<td>0.24</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>Oriental Shorthair</td>
<td>F</td>
<td>Negative</td>
<td>Never</td>
<td>2.9</td>
<td>0.60</td>
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<tr>
<td>5</td>
<td>5</td>
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<td>F</td>
<td>Negative</td>
<td>&gt; 1 year earlier</td>
<td>0.7</td>
<td>0.30</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>Cornish Rex</td>
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<td>Intermittently</td>
<td>2.8</td>
<td>0.44</td>
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<tr>
<td>7</td>
<td>1</td>
<td>Cornish Rex</td>
<td>F</td>
<td>Positive</td>
<td>2 mo earlier</td>
<td>3.8</td>
<td>0.28</td>
</tr>
<tr>
<td>8</td>
<td>6</td>
<td>Cornish Rex</td>
<td>F</td>
<td>Negative</td>
<td>2 mo earlier</td>
<td>0.9</td>
<td>0.30</td>
</tr>
</tbody>
</table>

*Conjunctival swabs underwent PCR analysis to detect DNA of bacteria in the family *Chlamydiaceae*. F = Female. M = Male.
highest titer (ie, 1,600; Table 1). Among the remaining cats, 6 had a titer of 800, 14 had a titer of 400, 6 had a titer of 200, and 28 were seronegative. Chlamydiae were not detected in swab samples collected from the genital tract of any cat. For 4 of the 8 cats with an antibody titer of 1,600, chlamydiae were detected in conjunctival swab samples via PCR assay (cycle threshold, 27 for 1 cat and 33 or 34 for the others). By use of the species-specific PCR procedure, the chlamydiae were identified as *C. felis*, which were present in low amounts in 1 cat (cycle threshold, 38 for *C. felis* [normalized value]) and moderate amounts in 3 cats (cycle threshold, 27 to 31 for *C. felis*). No chlamydiae were detected in 54 cats with serum antibody titers ≤800 or with no detectable serum antibodies against chlamydiae.

Thirty of the 62 (48%) cats had been mated, and of these, 9 (30%) had developed reproductive disorders. These disorders included fetal resorption, stillborn kittens, postnatal kitten death or malformed kittens (n = 4), poor libido or infertility (3), and dystocia (2). Reproductive disorders were as common among cats with serum antibodies against chlamydiae (5/22) as they were among cats without serum antibodies against chlamydiae (4/8; *P* = 0.20). None of the previously mentioned predictors (age, whether the cat had been mated, whether the cat had been shown, or whether the cat had been born in a cattery with ≥6 adult cats) significantly predicted the presence of detectable serum antibodies against chlamydiae in the cats.

Although serum samples were obtained from all of the study cats and used for serologic analysis, there was not always a sufficient quantity remaining for analysis of concentrations of SAA and AGP. Serum amyloid A concentration was assessed for 54 cats, and serum AGP concentration was assessed for 57 cats. Median SAA concentration was 2.8 mg/L (range, 0.3 to 51.4 mg/L; Figure 1). Serum amyloid A concentrations were >5 mg/L in 16 cats. Of these 16 cats, 11 did not have any detectable serum antibodies against chlamydiae; 3 had a titer of 200, 1 had a titer of 400, and 1 had a titer of 1,600. There was no significant difference in mean age between cats with SAA concentrations >5 mg/L or ≤5 mg/L. Among cats with high titers (ie, 1,600), SAA concentrations were significantly (*P* = 0.04) higher in those for which chlamydiae were detected (3.9 ± 1.0 mg/L), compared with SAA concentrations in those for which no chlamydiae were detected (1.4 ± 1.0 mg/L).

Median serum concentration of AGP was 0.4 g/L (range, 0 to 1.2 g/L; Figure 2). Nine cats had serum AGP concentrations >0.65 g/L. Of these 9 cats, 4 were <1 year old, 1 was 10 years old, and 4 were 2.5 to 5 years old. Three of these cats also had SAA concentrations >5 mg/L. The Pearson correlation coefficient for SAA concentration versus serum AGP concentration among 43 cats for which data were available was 0.596 (*P* < 0.001; Figure 3).

One cat with an AGP concentration of 0.66 g/L had a titer of serum antibodies against chlamydiae of 1,600, and the PCR test result for the conjunctival swab sample collected from this cat was positive. The other cats with AGP serum concentrations >0.65 g/L had low titers (400 [n

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**Figure 1**—Serum amyloid A concentrations in cats with no signs of ocular or other infectious disease that had titers of serum antibodies against chlamydiae ≤800 and were not shedding chlamydiae (black circles; n = 46) and cats that had titers of serum antibodies against chlamydiae of 1,600 and were (gray triangles; 4) or were not (white triangles; 4) shedding chlamydiae. Although serum samples were obtained from all 62 study cats and used for serologic analysis, there was not a sufficient quantity of some samples remaining for analysis of SAA concentration.

**Figure 2**—Serum AGP concentrations in cats with no signs of ocular or other infectious disease that had titers of serum antibodies against chlamydiae ≤800 and were not shedding chlamydiae (black circles; n = 49) and cats that had titers of serum antibodies against chlamydiae of 1,600 and were (gray triangles; 4) or were not (white triangles; 4) shedding chlamydiae. Although serum samples were obtained from all 62 study cats and used for serologic analysis, there was not a sufficient quantity of some samples remaining for analysis of AGP concentration.

**Figure 3**—Scatterplot of SAA concentration versus serum AGP concentration in 43 cats with no clinical signs of ocular or other infectious disease that had titers of serum antibodies against chlamydiae of ≤800 and were not shedding chlamydiae (gray circles; n = 35) and cats that had titers of serum antibodies against chlamydiae of 1,600 and were (black triangles; 4) or were not (white triangles; 4) shedding chlamydiae. The solid line represents a fitted linear regression line (regression fit, $\text{SAA} = -3.366 + 26.13 \text{AGP}$; Pearson correlation coefficient, 0.596 $[P < 0.001]$).
A study of C. trachomatis has revealed evidence for a correlation between polymorphisms in polymorphic membrane proteins and tissue tropism. In contrast, for C. felis, an apparent lack of genetic diversity in polymorphic membrane protein genes among different strains has been described, and it has been suggested that the uniformity of clinical disease in cats is related, at least in part, to this fact.

Although C. felis infection in cats is mainly associated with ocular disease, systemic spread of the organism after experimental ocular or nasal infection with development of fever, detection of chlamydiae in the bloodstream, and infection of several internal organs has been described. During this systemic phase, increases in circulating concentrations of interleukin-6 and AGP have been detected.

In humans, the combination of seropositivity for C. trachomatis and concentrations of CRP that are at the higher end of (but still within) the reference range (detected by use of a high-sensitivity CRP assay) in subfertile women indicates persistent C. trachomatis infection. In addition, a high concentration of IgG against C. trachomatis with a concomitantly high concentration of CRP has been associated with an increased risk of preterm delivery.

To our knowledge, no assay for evaluating slight increases in concentrations of APPs that remain within the reference range as a means of detecting persistent infections has been used in cats. α1-Acid glycoprotein concentration is commonly determined by use of radial immunodiffusion assays, although immunoturbidimetric assays have also been described. Increases in serum AGP concentration have been suggested to be potentially valuable in the diagnosis of clinical disease, especially feline infectious peritonitis. A drawback with the most commonly used AGP assay is that it is an immunodiffusion kit, which increases cost when analyzing AGP in single clinical samples. In the present study, there was a widespread distribution of serum AGP concentrations in healthy cats, although values were mostly less than the cutoff value for an acute-phase response. This may indicate that the method is less suitable for determining small changes in AGP concentration (ie, minor changes within the reference values), such as those detected with the high-sensitivity CRP assay in humans.

In contrast, the SAA assay is a fully automated immunoturbidimetric assay that can be easily used for analysis of single samples. The distribution of SAA concentrations in the healthy cats in the present study was more concentrated in the very low range than was the distribution of serum AGP concentration. Although SAA concentrations were low, cats with serum antibody titers of 1,600 that were excreting chlamydiae had higher concentrations than did those in which shedding of chlamydiae could not be detected. This might be a normal variation within the low range. It might also be interpreted as a sign of subclinical infection associated with a slight acute-phase response, similar to the situation in humans with chlamydial infections. However, compared with the number of individuals in large epidemiological studies in humans, the number of cats in this study was very small. A larger cohort of cats

Discussion

The present study was designed to assess chlamydial shedding from cats without clinical signs of ocular infection or other infectious disease in relation to their titers of serum antibodies against chlamydiae and changes in serum concentrations of 2 APPs. The relatively high number of seropositive cats (34/62 [55%]) in the study is not representative of the general cat population but is a reflection of our intent to include seropositive cats in the study. Ocular shedding of chlamydiae from seropositive cats was detected only in those with the highest antibody titer. Of those 8 cats with a titer of 1,600, 4 were shedding chlamydiae; this finding was similar to results of a previous study in cats in which chlamydiae were detected via bacterial isolation.

In other studies, 13% to 20% of cats with lower titers of serum antibodies against chlamydiae were determined to be positive for chlamydiae by use of bacterial isolation or PCR testing. However, most of the cats in those studies had clinical signs of chlamydiosis; hence clinical signs precede development of serum antibodies in detectable quantities. Samples may have been collected from those cats during an early phase of increasing antibody titers. High circulating concentrations of IgG antibodies have been detected 26 days after experimental infection with Chlamydia psittaci in cats. In an earlier study, some cats with chronic low-grade conjunctivitis did not have any detectable complement-fixing antibodies in circulation. According to the results of the present study, healthy cats that do not have high titers of serum antibodies against chlamydiae are not likely to be shedding chlamydiae. However, chlamydiae are known to have a persistent form; therefore, it cannot be excluded that a cat with a lower antibody titer can undergo reactivation of a persistent infection at a later time.

In humans, genital infection with Chlamydia trachomatis is a sexually transmissible disease, with venereal spread by asymptomatic carriers being the major route of transmission. In cats, chlamydial infection is more common in sexually intact animals than it is in spayed or neutered animals, and prolonged genital shedding of chlamydiae after experimental infection has been described by several authors. However, based on the results of the present study in naturally infected cats, venereal spread from animals that have no clinical signs does not appear to be an important route of infection. In addition, although the number of cats in the present study was limited, there was no association between the titer of serum antibodies against chlamydiae and development of reproductive disorders, suggesting that C. felis infection is not a significant cause of reproductive tract disease in cats, which is in concordance with previous publications.
with subclinical infections should be studied before any conclusions can be drawn as to whether variations in SAA concentration that remain within the reference range and are detected by use of the immunoturbidimetric assay can be used for studying subclinical chlamydial infections.

High concentrations of APPs are nonspecific findings, and high SAA concentrations in cats with various inflammatory conditions (including feline infectious peritonitis) have been described. In cats exposed to feline coronavirus that did not develop feline infectious peritonitis (healthy in-contact cats), transient increases in APP concentrations, including SAA concentration, have also been detected. Serum amyloid A concentrations >5 mg/L in the healthy cats in the present study could have been caused by subclinical infections with feline coronavirus, for example, especially in the young cats, but the anti-feline coronavirus antibody status of the cats in the present study was not known. Although SAA and serum AGP concentrations in the present study were significantly correlated, the Pearson correlation coefficient was rather low (0.596), suggesting that the 2 APPs provide slightly different information.

Results of the present study indicated that healthy cats with high serum antibody titers against chlamydiae can shed C. felis, thereby contributing to the transmission of the bacterium in groups of cats. Transmission may occur via shedding from the conjunctiva in healthy animals, whereas venereal spread seems less common. Subclinical shedder cats have low serum concentrations of APPs. Among the cats with titers of 1,600 in the present study, SAA concentrations were higher in small clinical shedder cats than they were in cats that did not shed chlamydiae, although the number of cats was small. Serum concentrations of AGP did not differ in cats with high titers regardless of whether they were shedding chlamydiae or not. The use of SAA concentration, in combination with other variables, as a marker of subclinical infections in cats remains to be further investigated.

References

27. Hansen AE, Schaap MK, Kjelgaard-Hansen M. Evaluation of a commercially available human serum amyloid A (SAA) turbidi-


