Character and conditions of housing, feeding and toilet management of cats with feline idiopathic cystitis, urolithiasis and urinary tract infection

| Parameter                          | Total (n=86) | FIC (n=52) | Urolithiasis (n=21) | UTI (n=13) | P value |
|------------------------------------|--------------|------------|---------------------|------------|---------|
| **Character**                      |              |            |                     |            |         |
| **Character trait, n (%)**         |              |            |                     |            |         |
| Very shy-shy                       | 24 (27.9%)   | 12 (23.1%) | 9 (42.9%)           | 3 (23.1%)  | 0.564   |
| Calm                               | 27 (31.4%)   | 18 (34.6%) | 5 (23.8%)           | 4 (30.8%)  |         |
| Lively Curious                     | 35 (40.7%)   | 22 (42.3%) | 7 (33.3%)           | 6 (46.1%)  |         |
| **Housing**                        |              |            |                     |            |         |
| **Type of housing, n (%)**         |              |            |                     |            |         |
| Indoors                            | 18 (20.9%)   | 10 (19.2%) | 5 (23.8%)           | 3 (23.1%)  | 0.940   |
| Indoors with restricted access     | 53 (61.6%);  | 33 (63.5%);| 13 (61.9%);         | 7 (53.8%); |         |
| balcony (45), garden (3),         | balcony (29),| balcony (10),  | balcony (6),     |            |         |
| terrace (4), courtyard (1)        | terrace (2), |               | garden (1)         |            |         |
| Outdoors                           | 15 (17.4%)   | 9 (17.3%)  | 3 (14.3%)           | 3 (23.1%)  |         |
| **Space**                          |              |            |                     |            |         |
| Size of unit, median in m²         | 76.5 (40–400)| 76.5 (40–400)| 78 (40–180)       | 70 (40–100)| 0.472   |
| Number of rooms, median (range)    | 3.5 (1–7)    | 4 (2–7)    | 3 (1–7)             | 3 (2–6)    | 0.455   |
| Cats with accessibility to all rooms, n (%) | 77 (89.5%) | 50 (96.2%) | 16 (76.2%) | 11 (84.6%) | 0.022* |
| **Other pets, n (%)**              |              |            |                     |            |         |
| Cats                               | 61 (70.9%)   | 37 (71.2%) | 17 (81.0%)          | 7 (53.8%)  | 0.272   |
| Dogs                               | 13 (15.1%)   | 9 (17.3%)  | 3 (14.3%)           | 1 (7.8%)   | 0.910   |
| No other pets                      | 22 (25.6%)   | 12 (23.1%) | 4 (19.0%)           | 6 (46.2%)  | 0.189   |
| **Living together with other pets, n (%)** |          |            |                     |            |         |
| Parameter                          | Total (n=86) | FIC (n=52) | Urolithiasis (n=21) | UTI (n=13) | P value |
|-----------------------------------|--------------|------------|---------------------|------------|---------|
| No quarrelling                    |              |            |                     |            |         |
| Quarrelling                       |              |            |                     |            |         |
|                                  | 32 (50.0%)   | 20 (50.0%) | 9 (52.9%)           | 3 (42.8%)  | 0.366   |
|                                  | 24 (37.5%):  | 13 (32.5%):| 8 (47.1%):          | 3 (42.8%): |         |
| once a day (4), once a week       |              | 3 (10.0%): | once a week (6),    |            |         |
| (10), once a month (10)           |              | 1 (3.1%):  | once a month (2)    |            |         |
|                                  | 8 (12.5%)    | 7 (17.5%): | 0 (0%)              | 1 (14.3%): |         |
| Avoiding each other               |              |            |                     |            |         |
|                                  |              |            |                     |            |         |
| Feeding                           |              |            |                     |            |         |
| Percentage of dry food, n (%)     |              |            |                     |            |         |
| 0-33%                             | 21 (24.4%)   | 14 (26.9%) | 1 (4.8%)            | 6 (46.1%)  | 0.061   |
| 34-66%                            | 35 (40.7%)   | 23 (44.2%) | 9 (42.8%)           | 3 (23.1%)  |         |
| 67-100%                           | 30 (34.9%)   | 15 (28.8%) | 11 (52.4%)          | 4 (30.8%)  |         |
| Drinking facilities, n (%)        |              |            |                     |            |         |
| Water bowl                        | 85 (98.8%)   | 52 (100%)  | 20 (95.2%)          | 13 (100%)  | 0.395   |
| Other drinking facilities         | 29 (33.7%):  | 18 (34.6%):| 6 (28.6%):          | 5 (38.5%): | 0.905*  |
| running water out of the tap (11),|              | 13 (25.0%):| running water out   |            |         |
| drinking fountain (5), watering   |              | 3 (6.1%):  | of the tap (2),     |            |         |
| can (4), flower pots (3),         |              | 1 (2.0%):  | aquarium (1),       |            |         |
| watering of food (3), aquarium (1),|              | 1 (2.0%):  | bowl with cat milk  |            |         |
| bowl with cat milk (1), pool (1)  |              | 1 (2.0%):  | (1), drinking       |            |         |
|                                  |              |            | fountain (1),       |            |         |
|                                  |              |            | watering of food (1)|            |         |
| Number of water bowls, n (%)      |              |            |                     |            |         |
| 1 bowl                            | 50 (58.8%)   | 31 (59.6%) | 12 (60.0%)          | 7 (53.8%)  | 0.587   |
| Parameter                                | Total (n=86) | FIC (n=52) | Urolithiasis (n=21) | UTI (n=13) | P value |
|------------------------------------------|--------------|------------|---------------------|------------|---------|
| ≥2 bowls                                 | 35 (41.2%)   | 21 (40.4%) | 8 (40.0%)           | 6 (46.2%)  |         |
| Toilet management                        |              |            |                     |            |         |
| **Type of litter box, n (%)**           |              |            |                     |            |         |
| With hood                                | 45 (52.3%)   | 28 (53.8%) | 9 (42.9%)           | 8 (61.5%)  | 0.537   |
| Without hood                             | 47 (54.7%)   | 30 (57.7%) | 12 (57.1%)          | 5 (38.5%)  | 0.445   |
| **Number of litter boxes, n (%)**       |              |            |                     |            |         |
| 1 litter box                             | 54 (62.8%)   | 34 (65.4%) | 12 (57.1%)          | 8 (61.5%)  | 0.799   |
| ≥2 litter boxes                          | 32 (37.2%)   | 18 (34.6%) | 9 (42.9%)           | 5 (38.5%)  |         |
| **Type of cat litter, n (%)**            |              |            |                     |            |         |
| Clumping litter                          | 62 (72.1%)   | 40 (76.9%) | 17 (81.0%)          | 5 (38.5%)  |         |
| Other cat litter                         | 26 (30.2%):  | 14 (26.9%): | 4 (19.0%):         | 8 (61.5%):  | 0.019†  |
| silica gel litter                        | silica gel litter (5), non-clumping litter (4), wooden litter (2), sand (3) |                      |      |         |
| wooden litter (8), non-clumping litter   | silica gel litter (2), non-clumping litter (1), wooden litter (1) |                      |      |         |
| sand (3)                                 |              |            |                     |            |         |
| Frequency of removal of urine and faeces, n (%) |      |            |                     |            |         |
| ≤1x daily                                | 34 (39.5%)   | 18 (34.6%) | 9 (42.8%)           | 7 (53.8%)  | 0.518   |
| 2x daily                                 | 37 (43.0%)   | 22 (42.3%) | 9 (42.8%)           | 6 (46.2%)  |         |
| ≥3x daily                                | 15 (17.4%)   | 12 (23.1%) | 3 (14.3%)           | 0 (0%)     |         |
| Frequency of complete cleaning, n (%)    |              |            |                     |            |         |
| ≤1x monthly                              | 38 (44.2%)   | 22 (42.3%) | 11 (52.4%)          | 5 (38.5%)  | 0.884   |
| 1x weekly                                | 40 (46.5%)   | 26 (50.0%) | 8 (38.1%)           | 6 (46.1%)  |         |
| >1x weekly                               | 8 (9.3%)     | 4 (7.7%)   | 2 (9.5%)            | 2 (15.4%)  |         |
| Parameter                                | Total (n=86) | FIC (n=52) | Urolithiasis (n=21) | UTI (n=13) | P value |
|-----------------------------------------|--------------|------------|---------------------|------------|---------|
| **Location of litter boxes, n (%)**     |              |            |                     |            |         |
| Bathroom                                | 32 (37.2%)   | 19 (36.5%) | 6 (28.6%)           | 7 (53.8%)  | 0.329   |
| Toilet                                  | 18 (20.9%)   | 12 (23.1%) | 5 (23.8%)           | 1 (7.7%)   | 0.488   |
| Corridor                                | 29 (33.7%)   | 21 (40.4%) | 5 (23.8%)           | 3 (23.1%)  | 0.322   |
| Other location                          | 27 (31.4%):  | 15 (28.8%):| 5 (23.8%):          | 7 (53.8%): | 0.090   |
|                                         | balcony (10),| balcony (1),| storeroom (1),      | balcony (4),|         |
|                                         | living room  | living room (2), |   | living room (2),  |         |
|                                         | (5),         | guest bathroom (2), |   | kitchen (2),      |         |
|                                         | storeroom    | hobby room (2),   |   | living room (1)   |         |
|                                         | (3),         | living room (2),   |   |                       |         |
|                                         | guest        | conservatory (1), |   |                       |         |
|                                         | bathroom    | kitchen (1),      |   |                       |         |
|                                         | (2),         | study (1),        |   |                       |         |
|                                         | hobby room  | conservatory (1), |   |                       |         |
|                                         | (2),         | study (1),        |   |                       |         |
|                                         | living room (1), |                  |   |                       |         |
|                                         | bedroom (1), |                  |   |                       |         |
|                                         | conservatory |                  |   |                       |         |
|                                         | (1)          |                  |   |                       |         |
| **Position of litter boxes, n (%)**     |              |            |                     |            |         |
| ≤2 sides accessible                     | 52 (60.5%)   | 29 (55.8%) | 15 (71.4%)          | 8 (61.5%)  | 1.000   |
| ≥3 sides accessible                     | 40 (46.5%)   | 26 (50.0%) | 6 (28.6%)           | 8 (61.5%)  | 0.354   |
|                                        |              |            |                     |            | 0.236   |
|                                        |              |            |                     |            | 0.338   |
|                                        |              |            |                     |            |         |
| **Presence of two litter boxes in the same room, n (%)** | 15 (46.9%) | 7 (36.8%) | 6 (66.7%)           | 2 (40.0%)  | 0.381   |

* No significant difference between groups in consideration of the Bonferroni correction with P ≤ 0.017
† Owners of cats with UTI used significantly more often wooden litter than those of cats with FIC (P = 0.003)
Questions and response options of the questionnaire

| Question | Response options |
|----------|------------------|
| **1. General information** | |
| 1.1. Breed | 1.1. DSH; Persian; Maine Coon; etc |
| 1.2. Age | 1.2. 1 year; 2 years; 3 years; etc |
| 1.3. Sex | 1.3. Male; female |
| 1.4. Castration status | 1.4. Neutered; intact |
| **2. Character** | |
| Which character trait applies best to your cat? | Very shy; shy; calm; lively; curious |
| **3. Housing** | |
| 3.1. Which type of housing is your cat kept in? | 3.1. Indoors; indoors with access to the balcony; indoors with restricted access outside (e.g., garden, terrace); outdoors |
| 3.2. How much space does your home offer to your cat? | 3.2. Please specify number of rooms, number of rooms being accessible for the cat, number of m² |
| 3.3. Are there other pets living in your home? How does the living together of your cat with the other pets work? | 3.3. No; yes; if yes, please specify which other pets |
| | No quarrelling; once a day quarrelling; once a week quarrelling; once a month quarrelling; avoiding each other |
| 3.4. Has a modification of housing been performed because of urination problems? | 3.4. No; yes; if yes, please specify which modification |
| **4. Feeding** | |
| 4.1. Which type of food does your cat get? | 4.1. Canned food; dry food; both; if both, please specify which percentages |
| 4.2. How many drinking facilities are available for your cat? | 4.2. Please specify number of water bowls, number of drinking fountains, other drinking facilities; if other drinking facilities, please specify which ones |
| 4.3. Has a modification of feeding been performed because of urination problems? | 4.3. No; yes; if yes, please specify modification of feeding, feeding of a diet, modification of drinking facilities |
| **5. Toilet management** | |
| 5.1. How many litter boxes are available for your cat? | 5.1. Please specify number of litter boxes with hood, number of litter boxes without hood |
| 5.2. Which cat litter do you use? | 5.2. Clumping litter; wooden litter; silica gel litter; sand; other litter; if other litter, please specify which one |
| 5.3. How often do you clean the litter box/es? | 5.3. Please specify frequency of daily removal of faeces and urine, frequency |
| Question                                                                 | Response options                                                                                       |
|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 5.4. Where is/are the litter box/es positioned?                         | 5.4. Please specify room, position in the room, accessibility of the litter box/es                        |
| 5.5. Has a modification of toilet management been performed             | 5.5. No; yes; if yes, please specify which modification                                                  |
|   because of urination problems?                                        |--------------------------------------------------------------------------------------------------------|
| 6. Disease process                                                      |--------------------------------------------------------------------------------------------------------|
| 6.1. How many times did your cat have to be treated by a veterinarian    | 6.1. Once; twice; third time; etc                                                                        |
|   due to urination problems?                                            |--------------------------------------------------------------------------------------------------------|
| 6.2. How many times did your cat have to be treated as an inpatient      | 6.2. Once; twice; third time; etc                                                                        |
|   due to urination problems?                                            |--------------------------------------------------------------------------------------------------------|
| 6.3. When was your cat treated respectively due to urination problems?  | 6.3. Please specify month and year of presentation to the veterinarian                                  |
| 6.4. Which kind of urination problems did your cat show?                | 6.4. Pain during the act of urination; bloody urine; increasing urination of little amounts; pressing  |
|   Did your cat show each time the same urination problems?              |   during the act of urination; urination outside the litter box; lack of urination                      |
| 6.5. Which diagnosis did the veterinarian make?                         | 6.5. Idiopathic inflammation of the bladder; uroliths; bacterial urinary tract infection; inflammatory |
|   Was the diagnosis each time the same?                                |   plug in the urethra; severe crystalluria; bladder tumour; no specific diagnosis                        |
| 6.6. Which treatment did your cat get?                                 | 6.6. Fluid therapy; pain reliever; drugs for relaxing the urethra; antibiotics; glycosaminoglycans;    |
|   Was the treatment each time the same?                                |   replacement of urinary catheter; amputation of the penis; other treatment; if other treatment,      |
|                                                                           |   please specify which one                                                                             |
| 7. Other clinical signs                                                 | 7.1. No other clinical signs; sickness; diarrhoea; increasing grooming; conspicuous behaviour; skin   |
| 7.1. Have you noticed other health-related problems of your cat?        |   irritation; other clinical signs; if other clinical signs, please specify which ones                   |
| 7.2. Did these problems recede without                                 | 7.2. Yes; no                                                                                           |
| Question                                                                 | Response options                                                                                           |
|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| 8. Other diseases                                                       |                                                                                                            |
| Has your cat been diagnosed with other diseases?                         | No other known diseases; thyroid hyperfunction; diabetes mellitus; kidney disease; other diseases; if other diseases, please specify which ones |
| 9. Death                                                                |                                                                                                            |
| 9.1. Did your cat die or had to be euthanased?                           | 9.1. No; death or euthanasia due to FLUTD; death or euthanasia due to another reason; if due to another reason, please specify which reason |
| 9.2. When did your cat die?                                             | 9.2. Please specify month and year of death                                                               |
| 10. Permission to contact the private veterinarian                      |                                                                                                            |
| Do you agree with contacting your private veterinarian?                  | Yes; no; if yes, please specify contact information of the veterinarian                                    |

DSH = domestic shorthair