This article is based on the results and findings of an online survey that was put together by Dr. Mills, International Cat Care and members of The Cat Group. International Cat Care asked members and supporters about their experiences of hand-rearing kittens. Nearly 500 participants helped to provide valuable information for analysis. These are the preliminary results, and further analysis is currently being carried out.

Introduction
It is estimated that there are approximately 8.5 million domestic cats (*Felis catus*) in the UK. Typically, a kitten’s environmental and nutritional requirements are met by the mother. However, in some instances a kitten may require extra care and hand-rearing may become necessary. Examples of these situations include death of the mother, maternal rejection of her young, maternal ill health or too many offspring for the mother to feed adequately, perhaps due to her not producing milk effectively (hypogalactia) or suffering mastitis. The number of kittens which are hand-reared is unknown; nonetheless it is believed to be increasing.

Literature review
There are several sources available from which information on hand-rearing kittens can be obtained. Books such as *Hand raising the orphaned kitten* suggest that kittens need to be separated from birth until they are weaned, as it is believed that unless kittens are separated, they will chew or suck each other’s ears, tails and genitalia. However, in contrast, *Bottlekatz: a complete care guide for orphan kittens* states that kittens should not be separated, as littermates need one another and should always stay together.

Why is this a problem?
This conflicting advice concerning how kittens should be hand-raised is at best confusing and at worst could result in serious disturbance of behavioural development. Generally the current literature largely ignores the kittens’ behavioural and psychological health and how these needs can be met, perhaps because it is largely unknown. The different types of hand-rearing practice and the effects of this on feline development (from physical, behavioural and cognitive perspectives) are fundamentally under-researched. Indeed, very little is known about what practices are actually adopted.

The online survey
Therefore, International Cat Care, in association with the University of Lincoln, launched an international survey of kitten-rearing practices. Special areas of interest included:

- feeding and toileting practice;
- weaning and socialisation methods;
- prevalence of health-related problems and early death.

The survey consisted of a total of 102 questions, divided into 11 sections which included: respondent details; litter detail; feeding kittens; toileting; weaning; litter tray; socialisation; play; health; environment; and final comment.
At the time of reporting, a total of 487 respondents had undertaken the survey, with over 70% (343) completing it. The first response was collected in 2012 and the survey can be found at: https://www.surveymonkey.com/s/fab-kittens.

Results
We report below some of the initial findings, although analysis is ongoing.

- Respondents reported having hand-rearing kittens for between 1 and 20 years; however, the norm was around 1–5 years.

- Nearly half of the respondents (42%) had raised more than a whole litter.

- 63% of respondents had raised multiple kittens that were kept together.

- Over two-thirds (68%) of those who had hand-reared kitten(s) had gone on to keep at least one, with about two-thirds doing so because they had simply become attached to the individual; however, many were kept because they had medical problems (e.g., cerebellar hypoplasia, skeletal deformity, malocclusion, deafness or a respiratory infection).

- A total of 1374 kittens were assigned to hand-rearing, with 1330 personally hand-reared by the respondents.

- Of these, 235 died before weaning (18% death before weaning). A further 88 kittens died after weaning and before 6 months of age (6%).

- 21% of the kittens were hand-reared due to the mother’s health (sick or caesarean) or the mother having insufficient milk.

- 29% were reared due to the mother being assumed to have neglected/abandoned the kitten(s) or the mother having died.

- Just over 50% of kittens were found abandoned without a mother.

Feeding
During the first 4 weeks, the feeding bottle was the most popular method of feeding. At 5–7 weeks feeding by a saucer/dish was the favoured method. Respondents predominantly used commercial milk replacers to feed the kittens (91%).

Schedule
The typical feeding schedule started at 6am; this appeared to be normally distributed between 4am and 10am. For the daytime feeding schedule, kittens (for the first to second week of life) tended to be fed at 2-hour intervals. On week 3, kittens tended to be fed after a 3-hour interval. At 4–5 weeks, kittens tended to be fed at 4-hour intervals. From 6–7 weeks, kittens were fed on intervals of 4-hours plus. However, nearly 5% of kittens, even this early in their life, were only fed when they were hungry. The majority of the respondents (69%) started their night-time feeding schedule at midnight ± 2 hours, but early in the kitten’s life this may follow the same schedule as the daytime feeding regime.

Order of feeding
Approximately two-thirds (70%) of the respondents fed the kittens by random choice or systematic choice (either via proximity to the carer or by rotation), while others respondents fed the kittens according to the kitten behaviour; 4% fed the quietest first and 26% fed the loudest first when there was no difference in size or strength of the kittens. However, when there was a difference in size and strength between the kittens, the respondents’ choices for the order in which the kittens were fed changed. Approximately two-thirds (65%) of the respondents chose on the basis of the size and strength of the kittens; of this 24% fed the smallest kitten first and 36% fed the weakest first.

Weaning
Kitten food was the preferred food used for weaning the kittens. A total of 89% used a kitten food during weaning; 15% used dry kitten food, 26% used dry kitten food soaked in milk/water and 49% used tinned kitten food. A small number (4%) used an adult food to wean the kittens.

Weaning schedule
Over half of the respondents (58%) aimed to have completed the weaning process by 6 weeks of age or older. Moreover, 30% of the respondents had no planned age to have completed weaning the kittens.

Post-weaning food choice
Once the kittens had been weaned, approximately half the respondents offered dry food (kitten or adult food, moistened and non-moistened), while the other half preferred to use wet food (adult/kitten) or home cooked meat/fish based foods.

Toileting
It appears most of the carers actively encouraged their kittens to toilet, with the most common method being the use of moist cotton wool, cloth or tissue to stimulate the anogenital area. Approximately 23% of respondents toileted the kittens immediately before feeding them, 65% toileted the kittens immediately after feeding them and 3% toileted the kittens both before and after feeding them.
Toileting method
At least 12 different methods had been reportedly used to try to litter train kitten(s). The most popular method was to place the kitten in the tray when the carer saw the kitten toileting. The least popular method was to cover the ground in newspaper or similar and gradually remove to guide the kitten(s) to the tray. By 5 weeks of age, 81% of the kittens were using the litter trays successfully by themselves.

Litter choice
The most popular type of litter used for kittens was woodchip/sawdust (29%), followed by clumping-type litters (25%). Garden soil was the least favourable type used (1%). There was roughly an equal divide between the proportion of kittens that tried eating the litter (49%) and kittens that had not (51%). The type of litter used did not affect whether the kittens tried to eat the litter or not.

Rehoming
Few, (12%) of the respondents tried to rehome the kitten(s) before 7 weeks of age. The common age to rehome kittens was between 8–9 weeks of life (58%); however 22% were rehomed at more than 11 weeks of age.

Socialisation
For socialising kittens a variety of methods were used. The most popular method was regular contact with family/household members, followed by regular contact with other visitors, regular contact with work colleagues, and then by carrying the kitten around to introduce to people. For the responses concerning regular contact with family/household members, nearly half (49%) used this method from birth. For the responses concerning regular contact with other visitors, 21% allowed this from birth. Carrying the kitten around was used by 15% from birth; however, approximately one-third (33%) did not use this method.

Socialising kittens with people
Almost one-third (30%) of the respondents said that they usually socialised their kittens with between four and 10 people. A small proportion of kittens (14%) were socialised with more than 10 people, while 30% of the respondents said they let their kittens interact with a small range of around three people. Roughly one-quarter (26%) had no target number to socialise their kittens with. Kittens were found to be introduced to a range of different people, all at a similar frequency; however, considerably more kittens were introduced to adults; women, men and fosters compared with teenagers, and fewer kittens were introduced to young children. Approximately 22% had no specific target group to whom the kittens were introduced.

Socialising kittens with other cats
The most popular method used for cat–cat socialisation was to allow the kitten to mix with littermates. The next most popular method was to allow the kitten to interact with at least one adult cat (not the mother) – this most commonly occurred from 3–4 weeks of age (24%) – and 14% did not use this method. Overall, 20% did not use at least one of the measures described for cat–cat socialisation at any stage.

Socialising kittens with other animals
Three-quarters (74%) of the kittens were introduced to dogs, rabbits and other small animals; roughly one-half (48%) were introduced to dogs alone.

Vaccination status
Approximately a third of respondents (30%) restricted contact with other cats until after the first vaccination or until after the second vaccination, to protect against easily-contracted kitten diseases. However, most respondents (70%) answered that the vaccination status of the kitten(s) did not affect the socialisation, or the carer was at least careful when socialising the kitten before it was vaccinated.

Play and other behaviours
The survey revealed appear that the majority of kittens were allowed to play with more than one person; only 5% of respondents allowed the kitten(s) to play with only the carer. Allowing younger children to play with the kittens was the least favoured option – only 14% of respondents let this group play with the kitten(s).

Play item choice
The most popular items used to play with kittens were commercial toys (31%), followed by home-made toys (27%). A smaller proportion of people (14%) used their fingers, toes and hair to play with the kittens, and a minority (7%) used laser pointers or similar.

Aggressive/injurious behaviour
Just over half (55%) of the respondents said their kitten(s) did not show any aggressive/injurious behaviour, while 45% said their kittens, either frequently or sometimes, expressed aggressive or injurious behaviour. Whether the carer had played with the kitten with their fingers or not did not affect the likelihood of aggressive/injurious behaviour being exhibited. Playing with lasers or similar items also did not affect the frequency of such behaviours. However, the number of kittens/litters the carer had raised did affect the frequency of aggressive/injurious behaviour shown.

Age and aggressive/injurious behaviour
The age at which kittens started to display aggressive or injurious behaviour appeared to be normally distributed between 1–10 weeks of age, peaking...
at around 5–6 weeks, when approximately 40% of kittens started showing such behaviour.

Responding to aggressive/injurious behaviour
Twelve different ways in which the carer might respond if a kitten was to bite them aggressively during play were suggested, but an initial analysis has suggested no association between the carers’ preferred reaction and the likelihood of kittens showing any aggressive or injurious behaviour.

Health issues
Diarrhoea and constipation were the two most commonly encountered health problems. The use of either commercial milk substitutes or home-prepared milk substitutes was not associated with occurrence of diarrhoea or constipation. However, the method used by the carer in order to decide how much to feed the kittens was related to the problem of diarrhoea. No significant relationship was found between the method used to decide how much to feed the kitten(s) and constipation occurrence.

Summary
It appears the most common environments for hand-reared kittens are within the home. The main environment kittens experienced from 3 weeks of age was not associated with any aggressive/injurious behaviour towards the main caregiver at any stage of development.

To conclude, the current survey has provided a snapshot of the methods used to hand-rear kittens internationally. A small number of associations have been identified through statistical analysis and it is hoped that further analysis may reveal a more detailed insight into the relationship between hand-rearing practice and the risk of a range of problems.

The results will also be used to design more targeted surveys in the future, so that we can start to replace best intention with the best science to benefit kittens that are hand-reared and reduce their high morbidity and mortality rate.

We would like to thank everyone who took the time to complete the detailed questionnaire. We hope in time to be able to give advice on the best way to hand-rear kittens – we have started!

References

Further reading