Road traffic accidents: what can we do to reduce them?

Road traffic accidents (RTAs) are a common cause of death and serious injury in cats. The risk factors for being involved in a RTA include young age, male sex, non-pedigree breed and being unneutered. Preventing a cat being involved in a RTA is challenging if it is allowed access outdoors and may involve neutering, enriching the home and garden to reduce the desire to wander, confining to the garden or keeping it indoors during busy traffic periods.

In the UK, the pet cat population was estimated to be around 11 million in 2015, with approximately 2.6 million cats kept entirely indoors.¹ This leaves 8.4 million cats free to roam and the possibility arises that they could be involved in a road traffic accident (RTA).

RTAs are a very important issue for cat welfare as they lead to injuries and death. The physical consequences are numerous depending on the specific accident: neurological damage, urinary tract disruption, pelvic fractures,² shearing injuries in distal limbs,³ and even an acute ear canal separation.⁴ Even when successfully treated by veterinarians, such injuries usually involve hospitalisation of several days (up to 7), up to several months of treatment and a long physical recovery.⁵ In addition, there are psychological consequences for the cat, which could very well consider the outside environment hostile. Owner psychological consequences also occur; fearing for the cat’s life causing stress.⁶

RTAs are an economic strain on the owner, with treatment costs of on average in the UK of £200 in 2001, but can be much more costly if more surgery or a longer treatment is required.⁵

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Number of cats involved in RTAs
Quite surprisingly for such an important issue, we have little information about cats and RTAs. In the UK, they are thought to be the fourth cause of death in cats after old age, cancer and kidney failure, according to a survey distributed to members of a charity in 2001.⁷ There is an uncertainty about the number
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Figure 1: Road traffic accidents are a common cause of injury and death in cats (picture courtesy of Everything is Permuted, www.permuted.org.uk)

of cats involved in RTAs annually. In 2006, the insurance company Pet Plan, estimated from internal research that around 230,000 cats die on UK roads each year. This tremendous number of cats does not include injured cats that survived (Figure 1). This means that in every 4 years, more than 10% of the current population of owned free roaming cats in UK die after being involved in an RTA. Moreover, in the UK, a driver involved in a RTA with a cat does not have a legal obligation to report it; so the number of cats dying on roads might also be underestimated. The important information here is that being involved in a RTA has a very high risk for cats allowed to roam freely.

Factors that influence the risk of being involved in a RTA
What about factors that would influence the likelihood of a cat being involved in a RTA? Again, very few studies have investigated this specific issue and been published. In 2000–2001, Irene Rochlitz studied the factors that could predispose cats to RTAs focusing on a population of owned cats brought in to six veterinary clinics in Cambridgeshire, UK. Rochlitz showed that the cats involved in a RTA were most frequently young, male (both entire and neutered) and non-pedigree in breed, and it appeared in this study that neuter status was of less importance than being young (between 7 months and 2 years). Juvenile cats (<6 months old) were not widely involved in RTAs in this study, perhaps because, in this particular local population, owners kept their cats indoors until neutering and other preventive healthcare was complete. Pedigree cats are more likely to be indoor-only cats, due to perceived risks of outdoors (being stolen or unwanted breeding) and, hence, they are less likely to be involved in an RTA.

Rochlitz also tested the factor ‘time spent outdoors’. Younger cats appeared to spend more time outdoors, which could partially explain why they are more at risk of being involved in a RTA than older cats. However, there was no difference in the ‘time spent outdoors’ when adjusted for age between the control cats and the cats involved in RTAs. So a key factor influencing risk of RTAs could be the behaviour of the cat when it is outside. For example, although cats involved in RTAs may not travel further away from the home than other cats or spend more time outside, they may be more likely to engage in risky behaviour, such as repeated road crossings, potentially because they have less experience of ‘near misses’ compared to older cats that have survived (exposure to risk
being an inevitable consequence of longevity). These experiences may provide the opportunity for cats to learn about how to reduce risky behaviour (eg, less or more suitable road crossings). Interestingly, we know next to nothing about how much cats cross roads, ie, do cats not involved in RTAs cross roads much less than those that do (Figure 2)?

Risk taking behaviour in cats has been recently studied in Athens-Clarke County (United States). Cats (60 subjects) wore a KittyCam video camera for 7 days on average, and recordings were analysed. It was found that around 45% of cats crossed roads, and that 48% of this number (ie, 21.6% of the total number of cats) crossed roads very regularly. In the UK, we have information about road crossing of foxes, and data suggest that as part of their behaviour they specifically avoid roads sometimes, not crossing the road that is in front of them. Regarding cats crossing roads in the UK, no published research is available yet, although research is ongoing. So we have little information about the behaviour of cats around roads: how often do they cross, why do they cross, and specifically how do they cross? Do they just run through? Do they stop, and assess the environment for threats, as it might be hypothesised for an animal that prepares to cross an open environment? Further research is due to gather more information.

**Clinical consequences of RTAs**

In the same study referenced earlier, Rochlitz studied the clinical consequences of being involved in RTAs. First, about the mortality rate: 16 cats out of the 128 studied (12.5%) were dead on arrival, and 16% died later from their injuries, leading to a total mortality rate of 26.5%. This high percentage shows how serious being involved in a RTA can be for a cat. In addition, using the Pet Plan estimation, it would mean that around 865,000 cats (10% of the owned free roaming cat...
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Key point
Research shows that if a cat survives a RTA it is likely to have significant injury causing pain, prolonged recovery and significant costs to the owner.

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population) would be involved in a RTA each year in UK.

In the study mentioned, medical treatment was necessary for most of the cats, and around 45% of cats needed surgery. Fifteen cats did sustain very minor injuries such as skin abrasions and broken claws, but the majority of the surviving cats (around 33) sustained ‘moderate injuries’ on the injury score used, which included for example ‘simple closed fractures, dislocation, eye enucleation, large skin wounds’. Of course the prognosis is better for these cats than those with more severe injuries (open compound fractures, rupture of diaphragm and pelvic fractures) but significant in terms of pain for the cat, so its welfare is severely impaired.

Length of hospitalisation ranged from 2 to 7 days, and length of treatment from 1 day to 3 months. Twenty-three cats out of 92 required 1–3 months of treatment, so the recovery after a RTA can be very long. Therefore, the consequences of being involved in a RTA are serious most of the time, for the cat and for the owner, as not every owner can afford such intensive and prolonged veterinary treatment.

RTA prevention
The obvious solution for an owner is to keep the cat indoors. In the UK, 2.6 million cats have an indoor-only lifestyle,¹ (Figure 3) and will, therefore, never be in a RTA unless they escape. However, living indoor-only can lead to obesity,¹² which is associated with a variety of serious diseases: diabetes mellitus, cardiovascular problems, and osteoarthritis,¹³,¹⁴ leading to a reduced life expectancy. A review of external and internal influences on disease in cats found that an indoor lifestyle was associated with an increased risk of lower urinary tract disease, dental disease and obesity.¹⁵ Therefore, keeping the cat indoors may not be the optimal solution. For those owners that do not want to keep their cat indoors, what can be done to reduce the risk of being involved in a RTA?

Neutering
The first step would be to neuter the cat. Although there was no difference in the risk of a RTA in the Rochlitz study between entire and neutered young males; studies carried out on cats’ home ranges (ie, the area they roam regularly) show that home ranges of wild cats, or feral cats that do not have any provision of resources, such as food or shelter, are larger than home ranges of owned cats.¹⁶
In addition, seeking access to another cat (male or female) to

Figure 3: Keeping a cat indoors prevents involvement in a RTA, but may predispose the cat to other health issues

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breed may motivate an entire cat, regardless of its sex, to cross a road that it does not usually cross. Both reasons should prompt owners to neuter cats that are not destined to breed.

**Provide resources at home in the house and garden**

The second step would be to provide essential resources for the cat close to home. Even if it has not been specifically focused on, the activity pattern of owned cats suggest that the provision of resources by the owner is a strong determinant of the cat’s home range.

What resources are we talking about? It is not food. Food can be provided inside the house for owned cats, if food is provided outside it can attract other animals (cats, foxes) and trigger conflict between the owned cats and the other animals. But there are other resources important to cats: water, shelter, toys, places to toilet, observation platforms. If an owner manages to provide several items of each resource, then the outside space of the cat will be enriched, and the cat may be less prone to wander far from home (Figure 4). For example, an owner could provide several bowls of water at different levels in the garden, some sheltered bedding so the cat can feel dry and warm even when it rains, bedding could also be placed at different levels.

**Key point**

To keep cats closer to home ensure the home and garden contain all essential resources so wandering and crossing roads is less attractive, reducing the risk of a RTA.

Places to toilet are equally important: provide several places, with fresh soil, woodchips, and maybe sand. Of course, it involves effort on the owner’s part because the ‘outside litter tray’ would have to be scooped and is likely to attract other cats, but the advantage is that it directs the toileting behaviours, avoiding inappropriate locations like flower beds. This provision of resources, although it is not yet scientifically proven, may encourage the cat to focus on the home and the property’s garden.

**Confinement during busy traffic periods**

A third possibility would be to schedule the cat’s feeding in order to keep the cat in at times when local roads are busy. It is a very sensible thing to do but involves having to be home at such times or to put in place a time-release feeding mechanism associated with a microchip cat flap that would allow the cat to enter and be fed at
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designated times. It would also be necessary to devise a strategy to keep the cat inside for the one to two rush hours if the owner is not there to lock the cat flap.

Garden containment systems
Finally, there is the solution of a containment system, to contain the cat to the boundaries of its owner’s property. Several systems are available, from cat outdoor enclosures, cat proof fencing, to electronic containment systems. Each of them has advantages and inconveniences, and owners are advised to gather information about their efficacy and impact on cat welfare before making a decision.

All those steps are not mutually exclusive and owners have to choose the ones that better suit their needs, the welfare needs of their cat and the circumstances.

Conclusions
The risk of being involved in a RTA is very high for free roaming cats. Depending on the estimation, the number of cats involved in RTAs in the UK each year could be as high as 865,000 cats. Consequences of RTAs are usually clinically serious and the mortality rate is higher than 20%. Preventing a cat from being in a RTA while ensuring a high standard of welfare is difficult and it involves lots of effort from the owner. Veterinary nurses are ideally placed to give advice on the matter and help owners make decisions that will improve the cats’ and owners’ quality of life.

References
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