The Welfare and Suitability of Primates Kept as Pets

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Published online: 23 Dec 2008.

To cite this article: Carl D. Soulsbury, Graziella Iossa, Sarah Kennell & Stephen Harris (2009) The Welfare and Suitability of Primates Kept as Pets, Journal of Applied Animal Welfare Science, 12:1, 1-20, DOI: 10.1080/10888700802536483

To link to this article: http://dx.doi.org/10.1080/10888700802536483
Amid growing concern about keeping exotic species as companion animals, non-human primates have been highlighted as inappropriate for private ownership. However, there has been no comprehensive review of the suitability of primates as pets, using a framework such as Schuppli and Fraser’s (2000). Schuppli and Fraser incorporate welfare of the individual, of others, and of the environment. This article (a) examines the numbers, origins, ages, and ownership trends of primates kept as pets in the United Kingdom and (b) identifies a number of welfare, health, and environmental concerns. Overall, strong evidence supports the argument that primates are not suitable pets; it is unlikely that the welfare of pet primates can be adequately addressed in normal households. Finally, using unpublished data on complaints and inquiries received by the Royal Society for the Prevention of Cruelty to Animals, the study assesses the degree of public concern about the welfare of primates kept as pets in England and Wales. The article identifies a wide range of concerns about keeping pet primates and concludes that this practice should end.

In many countries, there has been growing concern about the increase of exotic species kept as companion animals (American Veterinary Medical Asso-
This concern stems from several reasons. Wild, nondomesticated species are ill equipped to live in close contact with humans, and many caregivers (owners) lack the necessary knowledge about the ecology and behavior—and hence requirements—of the species they keep, thereby causing poor welfare for many exotic pets (Duarte-Quiroga & Estrada, 2003; Engebretson, 2006; Jacobson, 1993). Some exotic species such as large carnivores (Diesch, 1982; Nyhus, Tilson, & Tomlinson, 2003) or venomous snakes, fishes, and spiders (de Haro & Pommier, 2003; Diesch, 1982) may pose a physical threat to human health, whereas many commonly kept exotic pets, such as reptiles, can pose a significant disease risk if keepers do not follow simple health precautions (Ward, 2000; Woodward, Khakhria, & Johnson, 1997).

A further concern is that some exotic pets are sourced from the wild, thereby contributing to threats to the survival of wild populations (Cuarón, Martínez-Morales, McFadden, Valenzuela, & Gompper, 2004; Duarte-Quiroga & Estrada, 2003; Eudey, 1994; O’Brien et al., 2003; Perälä, 2005; T. F. Wright et al., 2001). Some unwanted exotic pets have been released or escaped into the wild, allowing the establishment of species outside their native range, such as Burmese pythons (*Python molurus*), Nile monitors (*Varanus niloticus*), and Gambian pouched rats (*Cricetomys gambianus*) in North America (Enge, Krysko, Hankins, Campbell, & King, 2004; Perry et al., 2006; Reed, 2005). Concern has now been raised about their potential as invasive species and the likely disruption to the native fauna and flora (Enge et al., 2004; Perry et al., 2006). Drawing on these concerns, Schuppli and Fraser (2000) developed a systematic analysis to evaluate the suitability of different species as companion animals based on three main criteria: welfare of the animal, welfare of others (including humans and other nonhuman animals), and welfare of the environment (including threats to wild populations through trade and introduced species).

The debate regarding the keeping of nonhuman primates (primates hereafter) as pets has been ongoing for a number of years; several studies have highlighted specific aspects of primate husbandry, welfare, and the associated risks to human health as being important reasons not to keep primates as pets (Keymer, 1972; Renquist & Whitney, 1987). Veterinarians commonly oppose keeping pet primates and try to dissuade potential owners (Johnson-Delaney, 1991; Rosenthal, 2000). Recently, there has been renewed debate about keeping pet primates, including a proposal either to regulate or ban the keeping of primates as pets in the United Kingdom (Anonymous, 2005a) and the proposed prohibition of interstate movements of pet primates in the United States (Anonymous, 2005b). Despite this debate, there is no comprehensive assessment of the suitability of primates as companion animals within a framework such as that advocated by Schuppli and Fraser (2000). Hence, this article aims to (a) examine the numbers,
origin, ages, and social conditions of primates offered for sale within the United
Kingdom and, where possible, globally; (b) review the literature about primates
kept as pets; (c) use the three criteria suggested by Schuppli and Fraser to
assess whether primates make suitable pets; and (d) assess the degree of public
concern about the welfare of primates kept as pets in captivity, using previously
unpublished data on complaints and inquiries received by the Royal Society for
the Prevention of Cruelty to Animals (RSPCA).

SOURCES OF PRIMATES IN THE PET TRADE

Primates kept as pets are derived from three sources primarily, wild individuals
and captive breeding and also from surplus zoo stock. The Convention on
International Trade in Endangered Species of Wild Fauna and Flora (CITES)
lists 49 species of primates in Appendix I, which effectively bans all interna-
tional trade; all other species are in Appendix II, which requires trade to be
regulated (CITES, 2006). In the United Kingdom, an estimated 57% of about
24,000 primates used for research and testing during 1994–2000 were imported
(Prescott & Jennings, 2004). Between 2000 and 2004, about 8,400 primates were
imported into the United Kingdom. Of those imported, 99.3% were destined
for biomedical research or commercial or captive breeding facilities—with just
0.69% for zoo-based captive-breeding and conservation programs. Only one
primate was imported for personal reasons (Parliamentary Questions, 2004).
Consequently, legal importation is not an important source of pet primates in
the United Kingdom.

In the United States, 20% of 383,800 primates used in research and testing
during 1995–2001 were imported (Prescott & Jennings, 2004), but importation
for private use has been illegal since 1975 (Anonymous, 1975). However, accord-
ing to CITES, 828 primates were imported to the United States for “personal
use” between 1975 and 2006, of which 78% were macaques (Macaca spp.;
CITES, 2006). Furthermore, this has done little to reduce the sale of primates
as pets, as captive-bred offspring of animals purportedly imported before 1975
continue to be sold (Ostrowski, Leslie, Parrott, Abelt & Piercy, 1998). Better
regulatory systems in some countries make the importation of primates for the
pet trade harder or unlikely, but illegal smuggling does occur (Hansard, 2005).

Local species are typically kept as pets in countries with native primate
populations. For example, 82% of pet primates in Mexico City belonged to
three native species sourced from the wild (Duarte-Quiroga & Estrada, 2003).
Most species kept as pets in Indonesia were also native to the region (J. Wright,
2005). Many of the primates traded locally were a by-product of the bush-meat
trade (Cowlishaw & Dunbar, 2000; Teleki, 1989), but deliberate targeting of
youngsters or valuable or rare species can occur (Mittermeier, 1987; Nijman,

Modern zoos are increasingly successful in maintaining and breeding primates, leading to the production of “surplus” animals (Lindburg, 1991). There are a number of options open to zoo managers on how to deal with surplus animals, one of which is to make surplus stock available for trade through animal dealers (Glatston, 1998; Lewandowski, 2003; Travers & Turner, 2005). Although zoos often go to considerable efforts to limit second-party transactions, to prevent unqualified persons from obtaining animals (Lewandowski, 2003), some animals enter private ownership via this route (Green, 1999). Although the extent of this problem is unclear, it is likely to be limited.

Because captive breeding by private breeders and dealers is believed to be the main source of primates in the United Kingdom (Greenwood, Cusdin, & Radford, 2001) and in other countries without native primates, we examined the number, species, and age of primates offered for sale on 4 days in 2006 (July 11, August 15, October 19, and December 14) in classified ads on two UK-based Web sites. There were three principal taxa: capuchin monkeys, marmosets, and tamarins (Figures 1a, 1b). Most of the capuchins were infants, usually at the age of weaning, whereas the marmosets and tamarins were of mixed ages. Given their age when offered for sale, it seems likely that most primates are being bred in captivity for the UK pet trade. A recent spate of thefts of primates from British zoos may be one source of unusual species, or the thefts may augment captive breeding groups (Hevesi, 2005).

### Numbers of Primates Kept as Pets

There are no accurate figures on the number of primates kept as pets because most countries do not have a recognized body recording the number or species of privately owned primates. In Great Britain, the private possession of primates is currently governed by the Dangerous Wild Animals Act 1976 (DWAA), which originally exempted certain primates (Callithrix spp., Cebuella pygmaea, Hapalemur spp.) from licensing (Department for Environment Food and Rural Affairs, 2005). However, in October 2007, Avahi laniger, Aotus spp., Callicebus spp., Samiri spp., and Saguinus spp. were also exempted (Department for Environment Food and Rural Affairs, 2007). As a consequence, the number of primates held under license does not reflect the actual number of captive primates. Furthermore, hobbyist groups and the pet trade have estimated noncompliance with DWAA licenses to be 85–95% (Greenwood et al., 2001). Because the number of primates held legally under DWAA licenses in England and Wales ranges between 519 and 655 (Greenwood et al., 2001; Travers &...
FIGURE 1a The number of pet sales of adult and infant primates (see Figure 1b note).

FIGURE 1b Groups or individual primates. Note: Figure 1a and Figure 1b include only those for sale in classified advertisements in searches carried out on 4 days in 2006: July 11, August 15, October 19, and December 14.
Turner, 2005), if noncompliance with DWAA licensing is as high as suggested earlier, the true number is likely to be an order of magnitude higher. With this exempting of extra species in October 2007, the exact number of primates in private ownership will be even harder to estimate. Based on the breakdown of species held under license in 2005, the number of registered primates would drop from 519 to 337.

Similar problems occur in the United States. Depending on municipality, state, and/or species involved, owners may be required to have certain licenses; however, many owners avoid this regulatory system (Animal Protection Institute, 2005; Johnson-Delaney, 1991). The number of primates kept as pets in the United States is as high as 15,000 (Born Free USA, 2005). A considerable number of primates were believed to have been kept as pets in The Netherlands prior to this being made illegal in 1977, after which the number dwindled (van der Helm & Spruit, 1988). Japan imported 16,000 primates for the pet trade every year pre-CITES (Matsubayashi, Gotoh, & Suzuki, 1986). Post-CITES, this number dropped: between 1981 and 1983, about 7% (569 of 8,553) of primate importation into Japan was for the pet trade (Matsubayashi et al., 1986).

Within the European Union, imports of live primates represent by far the largest number amongst CITES-listed mammals (93%), but it is thought that the pet trade represents only a small market for primates and that the vast majority are used in biomedical research (Swanson & Luxmoore, 1997).

In countries with wild primate populations, ownership of primates is widespread but difficult to quantify (Fuentes, 2006). However, the scale of the problem is indicated by the number of individuals in rescue centers who were former pets or were offered for sale in markets. In Africa, 75% of 561 rescued bonobos (Pan paniscus), chimpanzees (Pan troglodytes), and gorillas (Gorilla gorilla) were either being offered for sale or were previous pets (Farmer, 2002). Despite being illegal in South Africa, the keeping of pet vervet monkeys (Chlorocebus aethiops) is common, with sanctuaries holding upward of 3,000 confiscated or donated individuals (Grobler et al., 2006). In 3 years, 14.5% (40/276) of all seized or donated wildlife taken to one Mexican zoo were primates, while in the same period 97 howler monkeys (Alouatta spp.) were received by five Mexican zoos (Cuarón, 2005). In Costa Rica, 3.2% of 1,021 households reported keeping or having kept a primate (Drews, 2001). Of the 142 households that reported keeping a wild mammal species, the most common (31.6%) were primates (Drews, 2001). There is a similar high level of primate ownership in Indonesia; Shepherd et al. (2004) recorded 1,175 primates for sale between 1997 and 2001 in the Medan markets of Sumatra, and 30% of respondents in Sulawesi owned or had previously owned a primate (J. Wright, 2005). Despite being illegal in India, many primates are offered for sale at markets as pets (Ahmed, 2001).

Culturally, ownership of pet primates is most widespread in south and southeast Asia, southern Africa, and Central and South America (Fuentes, 2006). Although
clearly considerable, the total number of primates kept as pets worldwide is impossible to quantify.

**Trends in Numbers of Pet Primates**

Although it is difficult to quantify the number of primates kept as pets, estimating trends in primate ownership is even harder. In The Netherlands, where primate ownership was common in the 1970s, a ban led to a significant decline in the numbers of pet primates (van der Helm & Spruit, 1988). In contrast, in the United Kingdom, the number of primates held under licenses increased until 2001 and has remained stable since then (Greenwood et al., 2001; Travers & Turner, 2005). Furthermore, the species kept have altered; the number of lemurs (Lemur spp.) in particular held in private ownership has increased from 10 in 1988 to 120 in 2004 (Baker, 1990; Travers & Turner, 2005).

Primate ownership has also increased substantially in the range states in recent years (Eudey, 1994; J. Wright, 2005). Thus, globally it is unclear whether primate ownership is increasing or decreasing. Although the enforcement of regulative legislation in developed countries may decrease the number of primates kept as pets, primate ownership continues in the range states despite legislation (Ahmed, 2001; Grobler et al., 2006).

**WELFARE OF THE ANIMAL**

To assess the welfare of exotic pets, Schuppli and Fraser (2000) considered the range of factors described by the Farm Animal Welfare Council (1992). These include the following:

1. Freedom from hunger, thirst, and malnutrition;
2. Freedom from disease and injury;
3. Freedom from physical forms of thermal discomfort;
4. Freedom from fear, distress, and negative psychological states; and
5. Freedom to carry out normal behaviors.

An important criterion for consideration is that these welfare factors should be covered for the individual’s entire life span, which may be problematic in long-lived species such as primates. Schuppli and Fraser also incorporate other factors in a welfare assessment, including whether there is adequate knowledge of the species and the impact of keeper knowledge/expertise and whether the keeper loses interest in, or commitment to, the animal. Although these are important within the context of individual welfare, such things are difficult to quantify;
thus, although using the framework set out by Schuppli and Fraser, we focus on more tangible issues to assess whether primates make suitable pets.

Diet

The correct diet is important to ensure primate welfare. For example, New-world monkeys have high vitamin D$_3$ requirements, as their frugivorous diet contains more phosphorus than calcium (Krook & Barrell, 1962). Most captive primates are housed indoors, which means they have insufficient access to sunlight (Hatt & Sainsbury, 1998) and, in some cases, are clothed by their owners, preventing sunlight from reaching their skin (Kim, Abbe, & Wolf, 1978); consequently, their vitamin D$_3$ requirements must be met through supplements. Without supplements, skeletal diseases such as rickets can occur (Liu, 1996; Resnick, 1971).

Nutrition-related bone diseases are common; over a 4.5-year period from early 1966, 20.3% of 64 necropsied pet primates had some form of bone disease (Keymer, 1972). Bone disease in primates kept as pets is a recurrent issue (Hatt & Sainsbury, 1998; Kim et al, 1978; Resnick, 1971). Other vitamin or mineral deficiencies include zinc or vitamin C (Chadwick, May, & Lorenz, 1979), and 18.8% of 64 necropsied pet primates had some other general nutritional disorder (Keymer, 1972).

Although there are now many commercially available primate foods, their nutritional content does not account for species-specific requirements; thus, keeping some species in captivity still remains problematic (Crissy & Pribyl, 1997). Moreover, commercial foods are not always provided by owners, and the provision of poor and inappropriate diets for pet primates appears to be a common problem (Hatt & Sainsbury, 1998; Hevesi, 2005). Primates kept as pets may also be given inappropriate items to consume, including coffee, tobacco, and marijuana (Duarte-Quiroga & Estrada, 2003) or, as in one study, left to starve; 7 of 36 (19%) pet primates with known fates starved to death (J. Wright, 2005).

Primate health is intrinsically linked to diet (Barnard, Knapka, & Renquist, 1988). In addition to nutritional disorders (Hatt & Sainsbury, 1998; Keymer, 1972; Resnick, 1971), inappropriate or inadequate diet can increase susceptibility to diseases (Hubbard, 1995; Keymer, 1972), including those of human origin (Johnson-Delaney, 1991). In Mexico City, of 97 pet primates with ailments, 33% had respiratory, 24% gastrointestinal, 16% skin, and 14% viral disorders; the other 12% were undefined (Duarte-Quiroga & Estrada, 2003). Though poorly reported in the scientific literature, cases of fatal transmission of common diseases from humans to pet primates have been noted (Huemer, Larcher, Czedik-Eysenberg, Nowotny, & Reifinger, 2002; Johnson-Delaney, 1991). A survey of 190 veterinarians in England and Wales found that, in 1 year, 3.5% of treated
exotic pets were primates (RSPCA, 2004). Given the purportedly low number of primates kept as pets in the United Kingdom, this small veterinarian sample suggests a serious problem.

Environmental Housing

Good husbandry for primates is challenging for a number of reasons. In particular, primates require temperature, humidity, and light levels not found in normal private households (Hevesi, 2005). Although tolerance of suboptimal temperature and humidity may vary with species, inappropriate conditions contribute to health problems. For example, temperature fluctuation is thought to contribute to the high incidence of respiratory diseases in pet primates in Mexico City, although lack of access to sunlight may contribute to skin disorders (Duarte-Quiroga & Estrada, 2003).

Primates have large home ranges, ranging from 0.4 km\(^2\) in marmosets to 170 km\(^2\) in the largest primates (Mendes Pontes & Oliveira Monteiro da Cruz, 1995; Milton & May, 1976). In captivity, good housing of adequate size and quality is necessary to ensure good welfare (Prescott & Buchanan-Smith, 2004). In laboratories, standard cage sizes can be adjusted to body mass (Reinhardt, Liss, & Stevens, 1996), although species-specific space requirements should be used to determine optimal cage size (Buchanan-Smith, Prescott, & Cross, 2004; Prescott & Buchanan-Smith, 2004). To the best of our knowledge, there are no published data on cage and enclosure sizes for pet primates; thus, it is not possible to comment directly on their impact on primate welfare. It is, however, necessary to highlight the importance of cage and enclosure sizes in captive primate welfare and consider whether these provisions can be met in private households. Keeping primates free roaming in houses or tied outside can be major causes of injury or mortality. In Mexico City, 30\% of primates suffered injuries or death due to burns, falls, or electrocution (Duarte-Quiroga & Estrada, 2003). Many primates are kept tied up (Duarte-Quiroga & Estrada, 2003; J. Wright, 2005); in one study, 39\% of mortality was due to asphyxiation caused by the rope tied around the animal’s neck (Duarte-Quiroga & Estrada, 2003).

Social Interactions

Behavioral problems resulting from poor social housing are frequently noted in pet primates (Johnson-Delaney, 1991). This can stem from two problems: individual housing and/or separation from maternal or familial care at a young age. In our search of primates offered for sale in the United Kingdom, 63\% of those on sale were infants (Figure 1a), and 78\% were single individuals (Figure 1b). Similarly, 44\% and 66\% of the two most common species kept in Mexico
City were infants or juveniles (Duarte-Quiroga & Estrada, 2003). Two studies in Indonesia found that 58% of pet primates were juveniles (Jones-Engel et al., 2004) and 44% were infants (J. Wright, 2005).

Individually housed primates show stereotypic behaviors more than group-housed primates (Spring, Clifford & Tomko, 1997). Furthermore, primates kept alone also show increased rates of negative or unwanted behaviors including self-injury, autoerotic stimulation, coprophagia, and excessive locomotion (Hones & Marin, 2006; Reinhardt & Rossell, 2001). Separation from maternal and familial conspecifics in primates causes stress-induced physiological changes, such as elevated cortisol levels and prolonged decreases in leukocyte levels (Coe, 1993; Norcross & Newman, 1999; Shannon, Champoux & Suomi, 1998). During offspring development, early postnatal parental care is pivotal in primates; the absence of sensory stimulation and two-way interactions with the biological mother can lead to short- and long-term psychological and behavioral problems (Harlow & Harlow, 1962; Kaufmann & Rosenblum, 1967; Mallapur & Choudhury, 2003; Pryce, Rüedi-Bettschen, Dettling, & Feldon, 2002). Juvenile primates learn through social facilitation and interactions with similar-age and older conspecifics. This is particularly evident with regard to food. Juvenile primates show high levels of food neophobia; the presence of familial conspecifics facilitates the acceptance of novel food items and increases ingestion rates (Wiens & Zitzmann, 2003; Yamamoto & de Araújo Lopes, 2004). As a consequence, separation of young primates from maternal and familial bonds can often also lead to feeding problems.

These “early life” experiences have far-reaching consequences throughout a primate’s life, as primates separated from their mothers often show reduced or no reproductive success, increased aggression, decreased survival, and reduced immunity (King & Mellen, 1994; Lewis, Gluck, Petitto, Hensley, & Ozer, 2000; Meder, 1989). Hand-reared primates show higher levels of abnormal behaviors and reduced reproductive success (Marriner & Drickamer, 1994; Roy, 1981). However, if given appropriate social groupings in later life, some pet primates can reintegrate into primate groups and show comparatively natural behavior (Anaya-Huertas & Mondragón-Ceballos, 1998).

The importance of social interaction during infancy is not restricted to contact with the mother (Harlow & Harlow, 1962). Harlow (1969) reviewed several studies and highlighted the need for social interactions with similar age conspecifics for normal development. Without conspecific interactions, individuals show abnormal social and nonsocial behaviors (Coelho & Bramblett, 1981). As a consequence, zoos are increasingly recognizing the importance of appropriate social interaction at a young age, with hand-rearing itself being minimized and greater emphasis being placed on encouraging maternal competence prepartum; where primates are hand-reared, they are reintegrated into primate groups earlier to minimize behavioral problems in later life (Porton & Niebruegge, 2006).
Normal Behaviors

To express normal behaviors, captive primates require appropriate social conditions and adequate housing, including the provision of environmental enrichment. We have already shown that the social conditions of primates kept as pets are likely to be poor, and adequate housing, such as space to express normal behaviors, is likely to be limited. Primates are highly active and require a varied and stimulatingly environment. In the wild, primates may spend 10–30% of their time resting and 30–40% feeding/foraging (Fragaszy, 1990; Isbell & Young, 1993; Passamani, 1999). There are no quantitative data about primates kept as pets; however, in zoos which apply a wide range of enrichments, captive primates have similar time budgets to those living in the wild (Dalton & Buchanan-Smith, 2005). It seems reasonable to expect that primates kept as pets, with less provision for enrichment and social interactions with conspecifics, have markedly different behavioral time budgets. Pet primates are normally housed in small, bare environments (Hevesi, 2005) and so are unable to express normal behavioral budgets. Bare environments lacking enrichment can lead to boredom, frustration, and the development of abnormal behaviors such as self-directed biting and stereotypic behaviors (Tarou, Bloomsmith, & Maple, 2005).

WELFARE OF OTHERS

Less consideration is usually given to the interaction between pets and their owner(s) and/or other animals or the community. However, Schuppli and Fraser (2000) highlighted that the welfare of others should focus on the (a) physical and (b) disease risks of the animal to the owner(s), other pets, and/or the community.

Aggression

Aggressive behavior toward humans is particularly common among pet primates and may lead to serious injuries or death; the risk of injuries is not related to the size of the primate (Animal Protection Institute, 2005; Captive Wild Animal Protection Coalition, 2005; Corning, 2005; Diesch, 1982). Children may be more vulnerable than adults because of inappropriate handling or because, in the wild, aggression is directed toward the smaller members of the group (Diesch, 1982; Ostrowski et al., 1998). Aggressive behavior is a pivotal component of social interactions within wild primate groups, leading to the creation and maintenance of a social hierarchy (Pereira, 1995; Tokuda & Jensen, 1969). Aggression increases during puberty and is mainly directed toward older conspecifics (Moura, 2003) or, in the case of pet primates, their owners (Duarte-Quiroga & Estrada, 2003). In some species, especially Old-world monkeys, the serious nature of
bites and aggression may be further exacerbated by the significant risk of transmitting diseases such as rabies or B-virus (Diesch, 1982; Janda, Ringer, Hilliard, Hankin, & Hankin, 1990; Ostrowski et al., 1998). Aggression also has significant welfare implications for the primate; 11% of pet-primate mortality was due to owners killing pets following an aggressive incident (Duarte-Quiroga & Estrada, 2003).

Disease Risk

Primates are biologically and physiologically similar to humans, allowing relatively easy disease transmission between primates and humans. Surveys of pet macaques revealed the presence of antibodies to several human pathogens and a high proportion (59.1%) had human-derived enteric parasites (Jones-Engel, Engel, Schillaci, Babo, & Froehlich, 2001; Jones-Engel et al., 2004). Disease transmission from pet primates to humans is viewed as a major public health concern (Ostrowski et al., 1998; Renquist & Whitney, 1987) as primates can harbor many dangerous parasitic, bacterial, or viral pathogens (Ialeggio, 1997; Keymer, 1972; Ostrowski et al., 1998; Renquist & Whitney, 1987; Wolfe et al., 1998).

These pathogens can be readily transmitted to owners; for example, an outbreak of drug-resistant *Shigella* and *Salmonella* in humans was sourced to their primate pets (Fox, 1975; Juan-Sallés, Vergés, & Valls, 1999). Several serious emerging human pathogens such as Marburg virus, Ebola, monkeypox, and simian immunodeficiency virus (SIV) originated from, and are harbored in, primates (Gao et al., 1999; Marx et al., 1991). The close contact afforded by keeping them as pets and the likelihood of being bitten mean that disease crossover is highly likely (Wolfe et al., 2004); indeed, pet primates are one possible route of transmission of human immunodeficiency virus (HIV-1 and HIV-2) to humans (Gao et al., 1999; Marx et al., 1991).

The risk of zoonotic disease transmission is a key argument against keeping primates as pets (Juan-Sallés et al., 1999; Renquist & Whitney, 1987). Legally imported primates have been the source of several human epizootics in Europe and the United States (Brown, 1997). Whereas certain diseases are screened for in legally imported primates, thereby reducing the chances of infection (Brown, 1997), many important human diseases are common in wild primate populations. Because monkeys are also smuggled into countries such as the United Kingdom (Hansard, 2004), the illegal importation of primates is one route for new diseases to be introduced into previously unexposed countries (Stephenson, 2003).

Risk to the Environment

In most countries without native primate populations, the majority of pet primates appear to be sourced through captive breeding. However, in the range
states, the majority of primates come from the wild. This can involve killing several individuals for a single infant (Duarte-Quiroga & Estrada, 2003; Eudey, 1994; Teleki, 1989). Local and international transport can incur high rates of mortality (Duarte-Quiroga & Estrada, 2003; Kavanagh, Eudey, & Mack, 1987). Consequently, both the local and, to a lesser extent, the international trade in primates are contributing to the decline in some species (Duarte-Quiroga & Estrada, 2003; Eudey, 1994).

Pet primates frequently escape. Escapes in Britain (Baker, 1990) are unlikely to pose a risk to the environment, but the same cannot be true for many other countries. In Indonesia, of 36 primates with known fates, 33% were released or escaped (J. Wright, 2005). Escapes of pet macaques (*Macaca fascicularis*) in Mauritius led to the establishment of this invasive species on the island (Sussman & Tattersal, 1986). Similarly, in New Guinea, where the same species is imported to keep or sell as pets, the risk of escapes forming new populations is significant (Kemp & Burnett, 2003). Several diseases of anthropogenic origin have afflicted and threatened the persistence of some primate populations (Wallis, 2000); in addition, the release of pet primates in countries with natural primate populations, or interactions between wild and pet populations, may facilitate transmission of human diseases into wild primate populations (Jones-Engel et al., 2001).

**Public Concern**

To assess the extent of public concern about the welfare of primates kept as pets in England and Wales, we analyzed unpublished data from the RSPCA regarding primate-related complaints. Between 2000 and 2005, a total of 191 primate-related cruelty complaints were received by the RSPCA. The majority concerned neglect: These complaints involved 446 animals or approximately 70% of the primates then held legally in England and Wales under DWAA licenses (Greenwood et al., 2001; Travers & Turner, 2005). Because we have shown that noncompliance with DWAA licensing is likely to be high (up to 85–95%), these complaints are probably related to a smaller proportion of the total number of primates kept as pets. Even so, the number of complaints highlights a significant welfare issue and indicates that the British public is concerned about the welfare of pet primates.

We then analyzed those 103 complaints in which an RSPCA inspector gave advice to address welfare concerns. Of these, 64% referred to husbandry issues such as lack of space or access to food, water, and shelter from adverse weather. Worryingly, 11.5% of calls regarded some aspect of the primate’s health, including mental health (2%). The high proportion of complaints about primate husbandry and health is consistent with our assumption that these factors are likely to cause poor welfare for primates kept as pets.
The concept of “suitability” as discussed here takes into account animal and owner welfare. We have examined the available scientific evidence relating to the welfare of pet primates and identified three main areas of concern.

First, primate husbandry demands a specialized diet alongside environmental and social conditions not normally available in common households. As a consequence, the welfare of many pet primates is likely to be poor.

Second, primates pose a significant physical and disease threat to the owner(s) and vice versa. Many emerging human pathogens originate from primates; thus, disease transmission is a major public health concern (Ostrowski et al., 1998; Renquist & Whitney, 1987). Because of daily owner-pet contact, the risk of disease transmission is high for primate owners, and many veterinarians advise against keeping pet primates (Canadian Veterinary Medical Association, 2003; Johnson-Delaney, 1991; Rosenthal, 2000). On the other hand, pet primates are equally at risk of disease transmission from their owners (Huemer et al., 2002; Johnson-Delaney, 1991).

Third, in the United Kingdom, the majority of primates appear to be captive bred; thus, the trade in pet primates poses little direct threat to wild populations. However, in developing countries, keeping pet primates is a significant threat to the persistence of wild populations (Meijaard & Nijman, 2000; Nijman, 2005).

Schuppli and Fraser (2000) used a five-tier system to assess the suitability of species as companion animals. According to their system, primates fall into category E: “Species that are unsuitable as companion animals because of undue risk to one or more of: the animal, the owner, the community or the environment” (p. 366). In essence, Schuppli and Fraser outlined ethical objections to keeping companion animals that arise from benefits to the owner to the detriment of the animal if the animal poses a health or safety risk or if the acquisition or possession poses a risk to the environment. On the basis of the evidence gathered in the United Kingdom and worldwide, there appears to be detriment to the welfare of primates kept as pets, health and safety hazards to the owner(s), and considerable environmental risk in many countries. With this range of concerns, it is clear that keeping primates as pets should end.

ACKNOWLEDGMENT

We thank the Royal Society for the Prevention of Cruelty to Animals for funding this study and Dr. Rob Atkinson for constructive advice.
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