

Estimating the Maximum Total Population of Pedigreed Cats in US Households

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Comments

There is no firm data on the total population of pedigreed cats in US households or even the number of cats of specific breeds that live in US households, including both cherished cats in registered catteries as well as those in homes as beloved pets. What follows is based on the application of actuarial principles to the data that exists. As readers will note, in almost every case, my assumptions or estimates will have the effect of increasing the number of pedigreed cats. It is for that reason I refer to the “maximum” number.

This is a work in progress. The author encourages those who read this to forward their comments to him at info@breedingpedigreedcats.com. Any suggestions for improving the approach, refining the data, etc. will be considered and incorporated, with credit, into later version of this working document.

When 2007 data comes available, this article will be updated. That will probably occur in the Summer of 2008.

Executive Summary

The limited data available, when analyzed according to established actuarial principles, indicates that the percentage of pedigreed cats in all US households, including breeders, has fallen from 4.2% in 1994 to a maximum of 3.4% in 2006. While the total population of cats living in US households is estimated to have remained relatively constant (growing only from 2.5 million to slightly under 3.0 million in 12 years), the total number of all cats, pedigreed and non-pedigreed living in US households has grown from 59 to 88 million, an overall growth of almost 50%.

The pedigreed cat population living in US households will soon reach the point of negative population growth. Anecdotal data indicates that some specific breeds of pedigreed cats may already be at that point.

The methodology developed in this article can also be used to estimate the total population of any specific breed in US households as well.

What is a Pedigreed Cat?

It should first be noted that the term pedigreed cat refers to a cat that has been registered with one or more cat registries so that its heritage is known, documented, and registered. By registry, I mean a major, recognized registry that tracks the history of the cats as well as sanctioning shows, such as CFA, TICA and ACFA in the United States.

Unless a cat is registered, and therefore is actually pedigreed, what a person has is a cat which “looks like” a particular breed, or which the person that sold it “said” was a Siamese. “To put it bluntly, you cannot be sure you have a purebred cat unless you have a pedigreed cat.” [Vella and McGonagle, 2006]

Realistically, many kittens are registered with the various registries in litter registrations, but, when sold as pets, are not finally registered as cats. They still can be registered at any point by their new owners. So, for the purposes of calculating total cat populations, we will count them as pedigreed.

One object of this paper is to come up with a methodology for estimating both the number of pedigreed cats currently in US households as well as for determining the number of pedigreed cats of any particular breed in US households.

Estimates of Cat Population

Estimates of the total population of cats living in US households, as distinguished from free-roaming or non-owned cats, have been produced since the 1980s by the American Pet Products Manufacturers Association and its predecessors, as follows:

	APPMA National Pet Survey – Number of Cats (millions)
1988	52.6
1990	60.8
1992	62.6
1994	59.4
1996	66.2
1998	64.2
2000	72.8
2002	77.6
2004	90.5
2006	88.3

Sources: [APPMA 2007]

Data on Births of Pedigreed Cats

(See Sheet 2)

Data on the birth of pedigreed cats is confused because, in the US, there are three major registries of pedigreed cats and several smaller ones. The major ones are, in order, the Cat Fanciers' Association, The International Cat Association, and the American Cat Fanciers Association.

While I know from personal experience that many breeders will register cats and kittens in more than one registry, I am assuming that the total number of registered cats is relatively unduplicated. The effect of this assumption is to slightly overstate the total number of pedigreed cats registered.

	APPMA National Pet Survey – Number of Cats (thousands)	Total Number of Pedigreed Cats Registered with CFA, TICA and ACFA (thousands)
1988	52,600.00	
1990	60,800.00	
1992	62,600.00	
1994	59,400.00	85.78
1996	66,200.00	85.74
1998	64,200.00	80.05
2000	72,800.00	66.87
2002	77,600.00	64.93
2004	90,500.00	62.46
2006	88,300.00	59.14

Registration Data: [Shelton 2007]

This data is cats registered, *not* kittens born. However, the figure I need is an estimate of the number of live births underlying these numbers, for not all kittens that are sold as pets are registered as adult cats, and not all kittens born live will survive long enough to be registered as adults.

In 2005, CFA reported that its data showed 92,496 live births of pedigreed cats. [CFA 2006]. That produced 39,971 registered cats [Shelton, 2007], or 2.3 live pedigreed kittens born for every cat finally registered. The percent of cats registered from litter registrations has probably grown slightly over the past decade, due to marketing efforts by the registries, but I will use this adjustment. Its effect is to slightly underestimate the number of kittens born several years ago.

Cat Ages and Human Equivalents

To this data, I then apply the estimates of cat longevity and equivalence to human ages developed by the Waltham pet food company [Waltham, n.d.] Translating that into tabular form produces the following:

Cat's Age:Equivalent Human's Age:

6 months.....	10 years
8 months.....	13 years
10 months.....	14 years
1 year.....	15 years
18 months.....	20 years
2 years.....	24 years
4 years.....	32 years
6 years.....	40 years
8 years.....	48 years
10 years.....	56 years
12 years.....	64 years
14 years.....	72 years
16 years.....	80 years
18 years.....	88 years
20 years.....	96 years
21 years.....	100 years

I applied this chart to the current US mortality statistics. {Centers for Disease Control 2007}, producing Sheet 1, even though kitten mortality is almost certainly much higher than human baby mortality. For example, the mortality rate for free-roaming domestic kittens is estimated at 75% during the first 9 months. [Nutter, et al., 2004] The only adjustment I made was to increase the effective mortality of live birth pedigreed kittens by 2.1% starting in the first (cat) year. Human figures put that at less than 1% in the first year. The effect of this is to zero out cats of any age beyond 21.

(See Sheets 1 and 3)

Number of Pedigreed Cats Living in US Households

There are no data on the relative longevity of pedigreed cats versus that of all other cats. Anecdotal evidence indicates that while some pedigreed cats have extremely long life-spans, the overall average must also reflect factors such as genetically-transmitted diseases or conditions that contribute to shorter life spans. Absent data to the contrary, I have assumed that pedigreed cats have the same mortality statistics as non-pedigreed cats do.

Thus, to determine the number of pedigreed cats in US households, you then use the 2.3 factor to convert cats registered into kittens born, and then apply the table to take the total

number of kittens born each year and estimate the number still alive in the last year, in this case, 2006. In addition, I have to insert estimates for the odd years to provide a foot total. To do so, I am taking the average between the two data points.

The results are as follows:

Total new pedigreed kittens added to total household population from 1994 through 2006 – 1,987.06 thousands (net). Add to that the number of pedigreed cats alive in 1994 and still alive in 2006, which is 999.98 thousands (see below). That produces a total pedigreed cats in 2006 of 2,987.04 thousands of 88,300.00 thousand cats, or 3.4% *maximum of the total cat population in US homes*. As noted below, *this is a decline from an estimated 4.2% in 1994*.

While the total number of pedigreed cats living in US households has increased slightly since 1994, the demographic trend shown on Sheet 2 clearly indicates that within a few years, the number of new pedigreed kittens born in a given year will not replace those born in previous years that are dying. To put it another way, *the pedigreed cat population living in US households will soon reach the point of negative population growth. Anecdotal data indicates that some specific breeds may already be at that point.*

Please see my companion paper, posted at www.breedingpedigreedcats.com for a current analysis detailing several breeds which are already “endangered”.

Technical Appendix:

To estimate the total population of pedigreed cats or pedigreed cats of a specific breed in 1994

First, take the number of kittens born in 1994 to that breed. Unless you have other data, you will have to assume that the same number of kittens were born for each of the previous 21 years. While numbers of kittens born may have been higher for the early 1990s than for 1996, almost certainly they were lower in the 1980s than in 1996. The net effect should balance out, or, at worst, slightly overstate the annual new births.

To estimate the number of pedigreed cats of any breed alive in 1994, means
 P_{1994} (population of pedigreed cats in 1994) = K_{1994} (kittens born in 1994) + $.9692K_{1993}$ +
... $0.0002 K_{1973}$.

But I have assumed K_{1994} through K_{1973} are each equal to K_{1994} . That transforms the equation into

$$P_{1994} = 15.4541 K_{1994}$$

When I tested this with the number of pedigreed kittens born in 1994, 161.29 thousand, it produces an estimate of 2,492.59 thousand pedigreed cats in US households in 1994, or 4.2% of the total APPMA estimate for that year.

Estimating the Number of Cats Alive in 1994 Still Alive in 2006

How many of the total number of cats alive in 1994 would survive to 2006? Here I used the mortality tables. Thus, for example, taking Kittens born in 1990, K_{1990} , to determine how many are alive in 1994 produces $K_{1990} = .9545K_{1994}$, and only 81.75% of the kittens born in 1990 would be alive in 2006, or $.8175K_{1990}$.

Pedigreed cats that were alive in 1994 and that are still alive in 2006 =

$$(0.8567)K_{1994} + (0.8175)K_{1993} + (0.7660)K_{1992} + (0.6988)K_{1991} + (0.6126)K_{1990} + (0.5064)K_{1989} + (0.3818)K_{1988} + (0.2501)K_{1987} + (0.1319)K_{1986} + (0.0463)K_{1985} + (0.0200)K_{1984}$$

For simplicity, I have also assumed that only kittens born after 1983, that is in 1984 or later, may still be alive in 2006.

Where I lack actual data for the kittens going this far back, I will have to use the kittens born in 1994 and work back as above. This assumption and complete substitution produces a formula as follows:

$$(0.8567)K_{1994} + (0.8175)K_{1994} + (0.7660)K_{1994} + (0.6988)K_{1994} + (0.6126)K_{1994} + (0.5064)K_{1994} + (0.3818)K_{1994} + (0.2501)K_{1994} + (0.1319)K_{1994} + (0.0463)K_{1994} + (0.0200)K_{1994}$$

This, in turn, reduces to the number of pedigreed cats alive in 1994 and still alive in 2006 equals $5.0686K_{1994}$, where $K_{1994} = 197.29$ thousand kittens, or 999.98 thousands.

When dealing with specific breeds, where cumulative data across all three major US registries is not available, I would use CFA data, assuming that CFA represents at least 60% of the total. Again, this estimate probably overstates the total number of kittens for some breeds that are registered in multiple registries.

Key Resources

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Centers for Disease Control, National Vital Statistics Reports, Vol. 54:14, revised as of March 28, 2007.

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SHEET 1

Cat Age (x)	Human Age	Number Surviving to age x [CDC]	% of births surviving to age x	Adjusted by increase in 2.1% for 1st year mortality
0.00	0	100,000	100.00%	100.00%
1.00	15	99,022	99.02%	96.92%
2.00	24	98,315	98.32%	96.22%
3.00	28	97,940	97.94%	95.84%
4.00	32	97,551	97.55%	95.45%
5.00	36	97,080	97.08%	94.98%
6.00	40	96,442	96.44%	94.34%
7.00	44	95,555	95.55%	93.45%
8.00	48	94,338	94.34%	92.24%
9.00	52	92,719	92.72%	90.62%
10.00	56	90,595	90.59%	88.49%
11.00	60	87,774	87.77%	85.67%
12.00	64	83,854	83.85%	81.75%
13.00	68	78,705	78.70%	76.60%
14.00	72	71,982	71.98%	69.88%
15.00	76	63,362	63.36%	61.26%
16.00	80	52,743	52.74%	50.64%
17.00	84	40,283	40.28%	38.18%
18.00	88	27,113	27.11%	25.01%
19.00	92	15,289	15.29%	13.19%
20.00	96	6,734	6.73%	4.63%
21.00	100	2,118	2.12%	0.02%
				1545.41%

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SHEET 2

	American Pet Products Manufacturers Associations National Pet Survey – Number of Cats (thousands)	Total Number of Pedigreed Cats Registered with CFA, TICA and ACFA (thousands)	Estimated Number of Pedigreed Kittens born (thousands)	Percent of births surviving to 2006	Estimated Number of Pedigreed Kittens born this year and alive in 2006
1994	59,400.00	85.78	197.29	81.75%	161.29
	62,800.00	85.76	197.25	85.67%	168.98
1996	66,200.00	85.74	197.20	88.49%	174.50
	65,200.00	82.90	190.66	90.62%	172.77
1998	64,200.00	80.05	184.12	92.24%	169.83
	68,500.00	73.46	168.96	93.45%	157.89
2000	72,800.00	66.87	153.80	94.34%	145.10
	75,200.00	65.90	151.57	94.98%	143.96
2002	77,600.00	64.93	149.34	95.45%	142.54
	84,050.00	63.70	146.50	95.84%	140.40
2004	90,500.00	62.46	143.66	96.22%	138.23
	89,400.00	60.80	139.84	96.92%	135.53
2006	88,300.00	59.14	136.02	100.00%	136.02

TOTAL

1987.06

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SHEET 3

Cat Age (x)	Number Surviving to age x [CDC]	Adjusted in 2.1% for increase in 1st year mortality	In percentages
0.00	100,000	100,000	100.00%
1.00	99,022	96,922	96.92%
2.00	98,315	96,215	96.22%
3.00	97,940	95,840	95.84%
4.00	97,551	95,451	95.45%
5.00	97,080	94,980	94.98%
6.00	96,442	94,342	94.34%
7.00	95,555	93,455	93.45%
8.00	94,338	92,238	92.24%
9.00	92,719	90,619	90.62%
10.00	90,595	88,495	88.49%
11.00	87,774	85,674	85.67%
12.00	83,854	81,754	81.75%
13.00	78,705	76,605	76.60%
14.00	71,982	69,882	69.88%
15.00	63,362	61,262	61.26%
16.00	52,743	50,643	50.64%
17.00	40,283	38,183	38.18%
18.00	27,113	25,013	25.01%
19.00	15,289	13,189	13.19%
20.00	6,734	4,634	4.63%
21.00	2,118	18	0.02%

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