

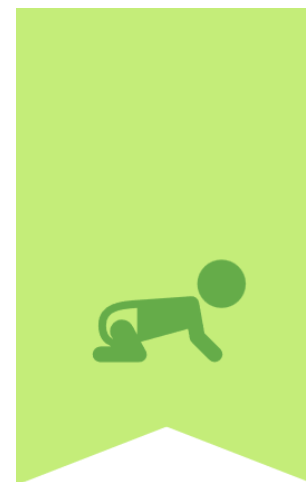
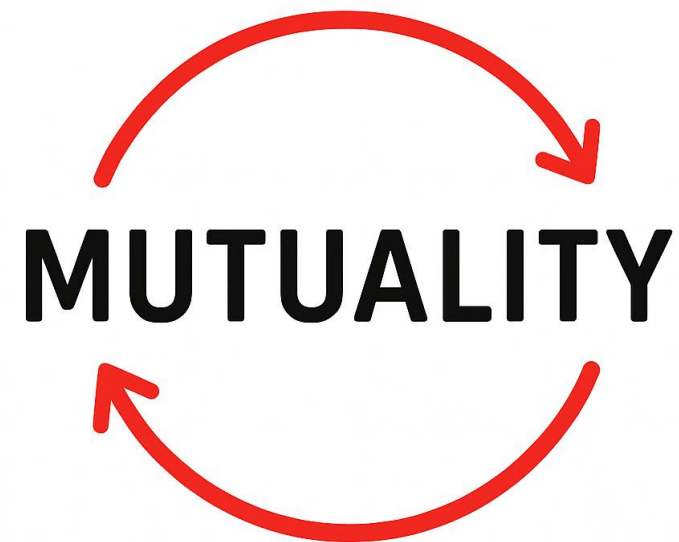


**The 2 first months of life :**  
**a crucial growth period for puppies and kittens**

**Virginie Gaillard**  
**May 12<sup>th</sup> 2025**

 **ROYAL CANIN**  
a division of Mars Petcare

**START** OF *Life*





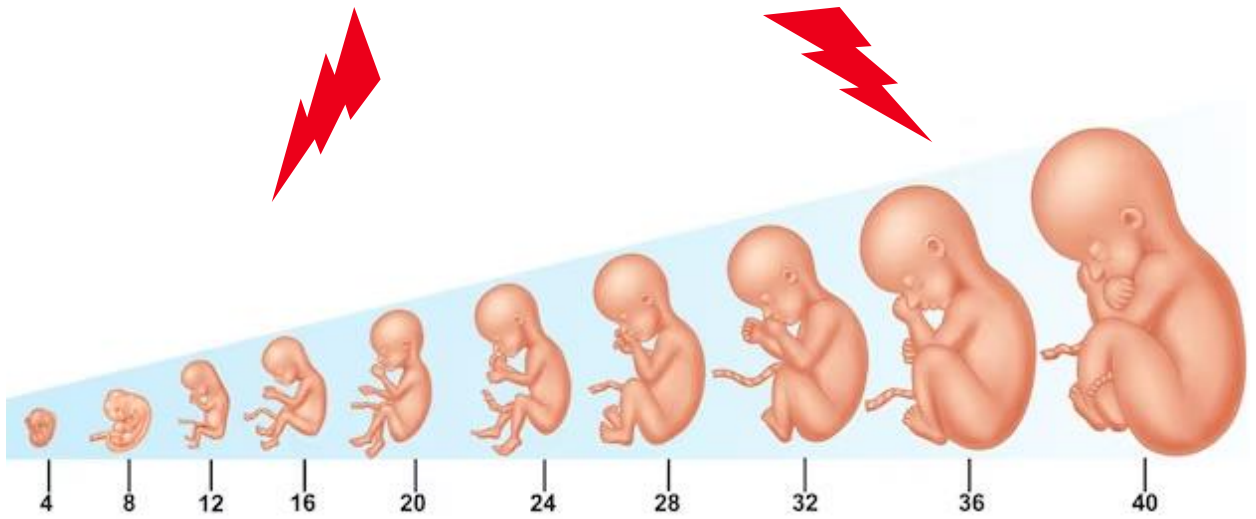


# The Dutch Famine

Nov 1944-May 1945



David Barker



### Normal birth weight

- ↑ Adult obesity
- ↑ Hyperlipidemia
- ↑ Cardiovascular diseases

### Low birth weight

- ↑ Lower stature
- ↑ Bronchial diseases
- ↑ Glucose intolerance

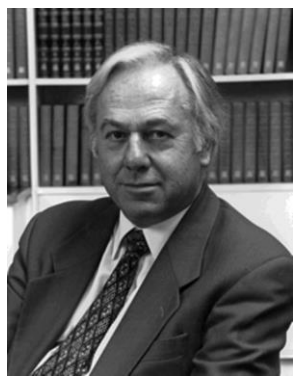
According to the period of exposition to the famine, the consequences on long-term health were different



# The Barker hypothesis

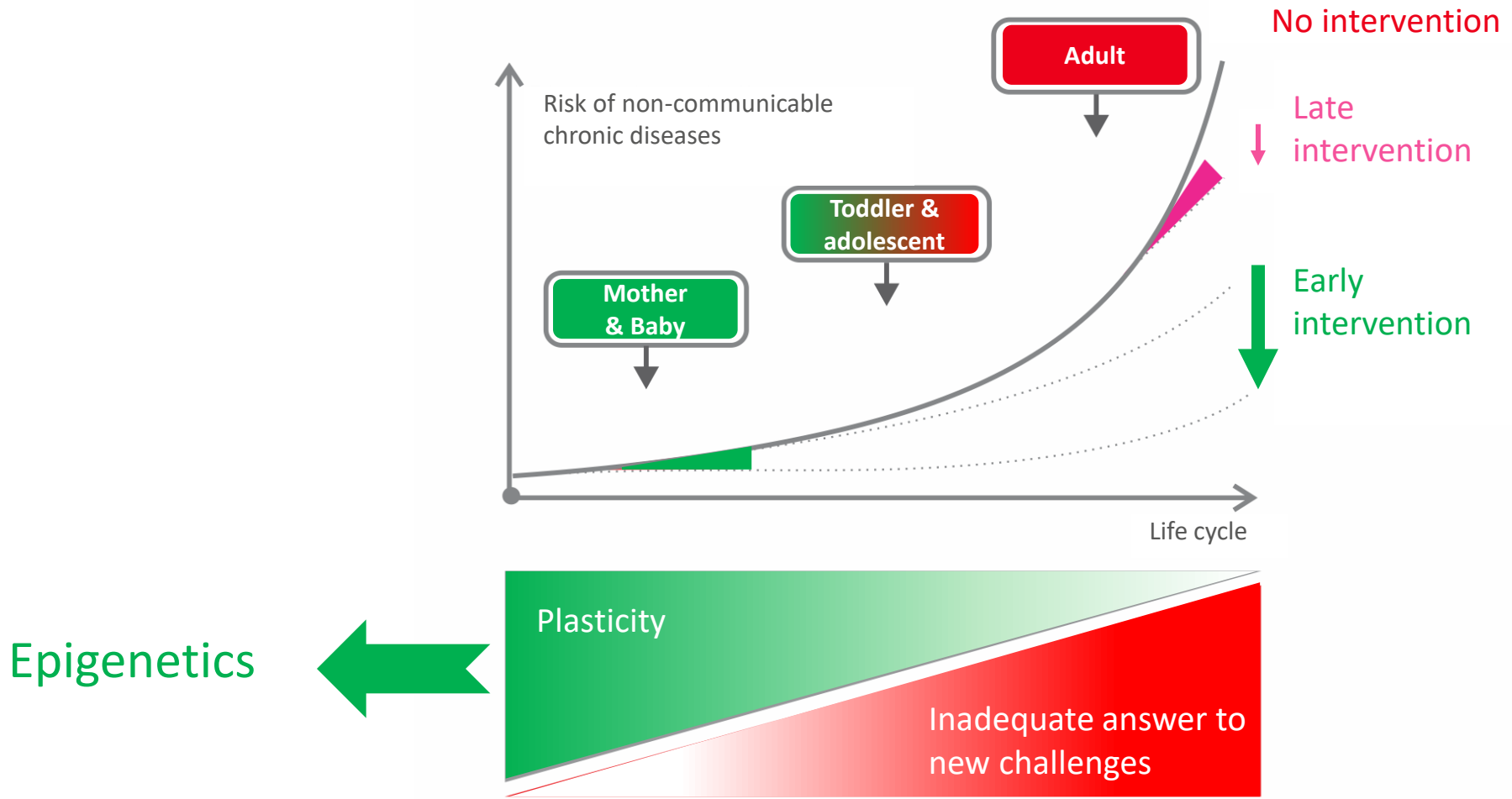


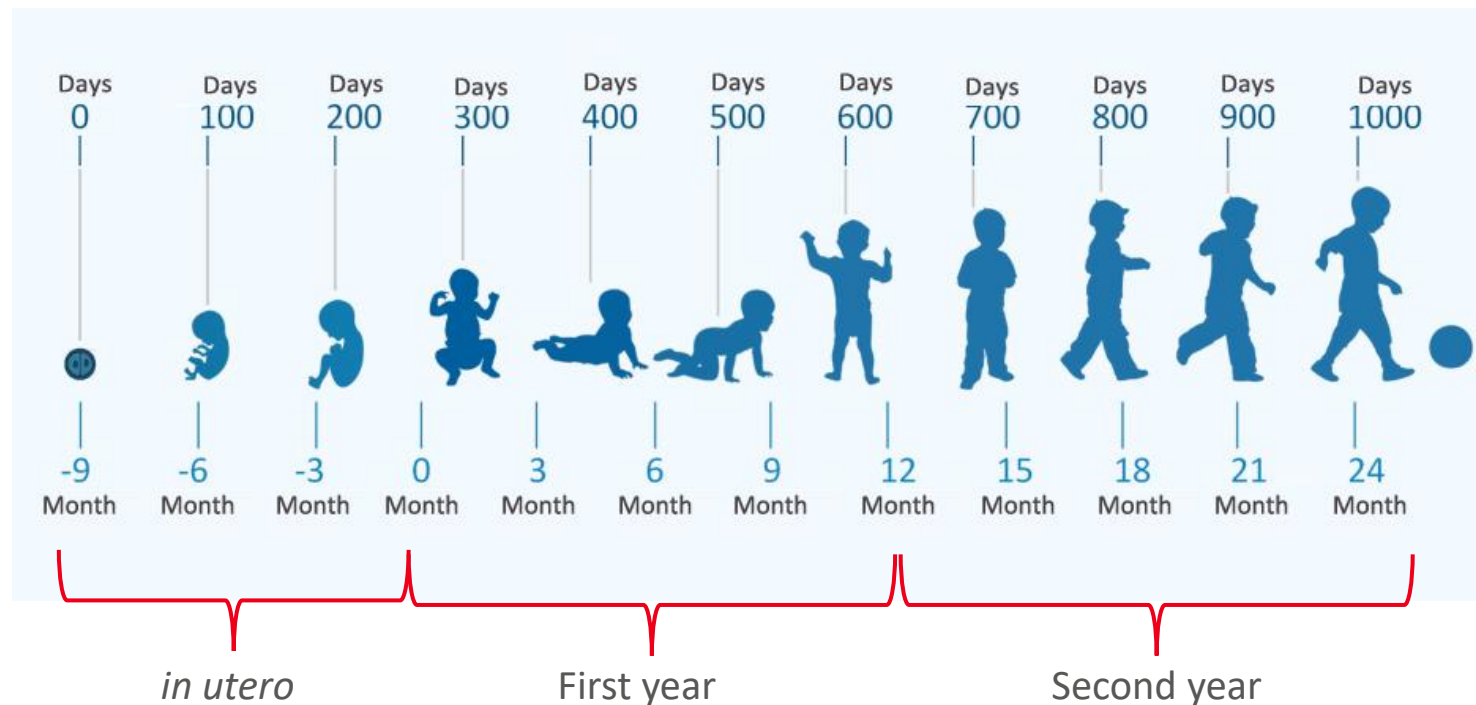
There is a **link** between  
the alteration of the intrauterine environment  
and the development of diseases at adulthood



*David Barker*



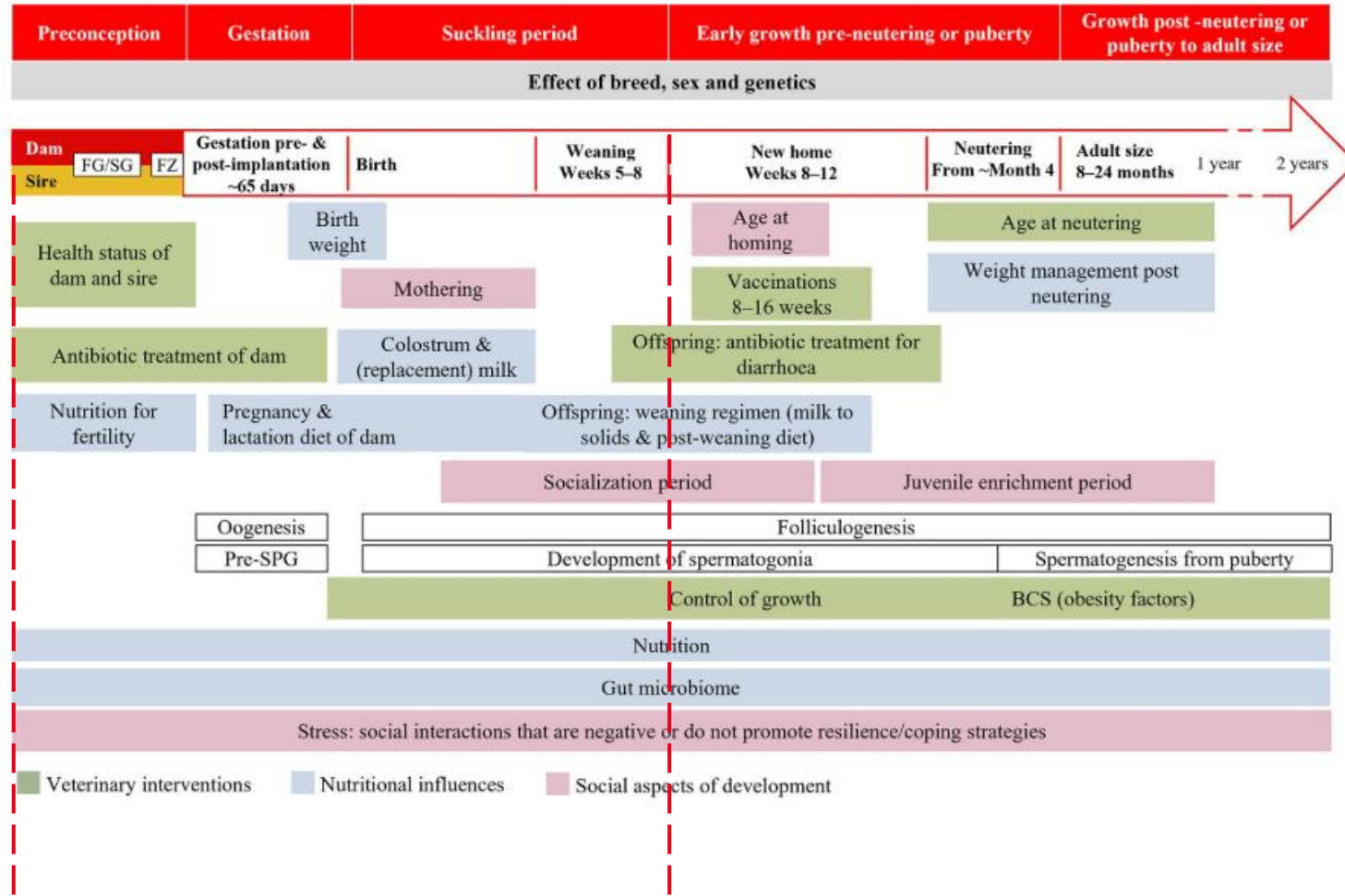




window of **opportunity/susceptibility**  
that will program **health/diseases** at adulthood

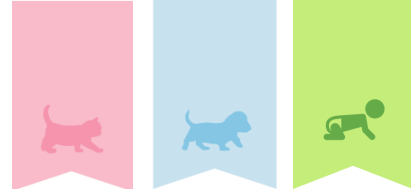
What's the equivalent  
of 1000 days  
for pets?





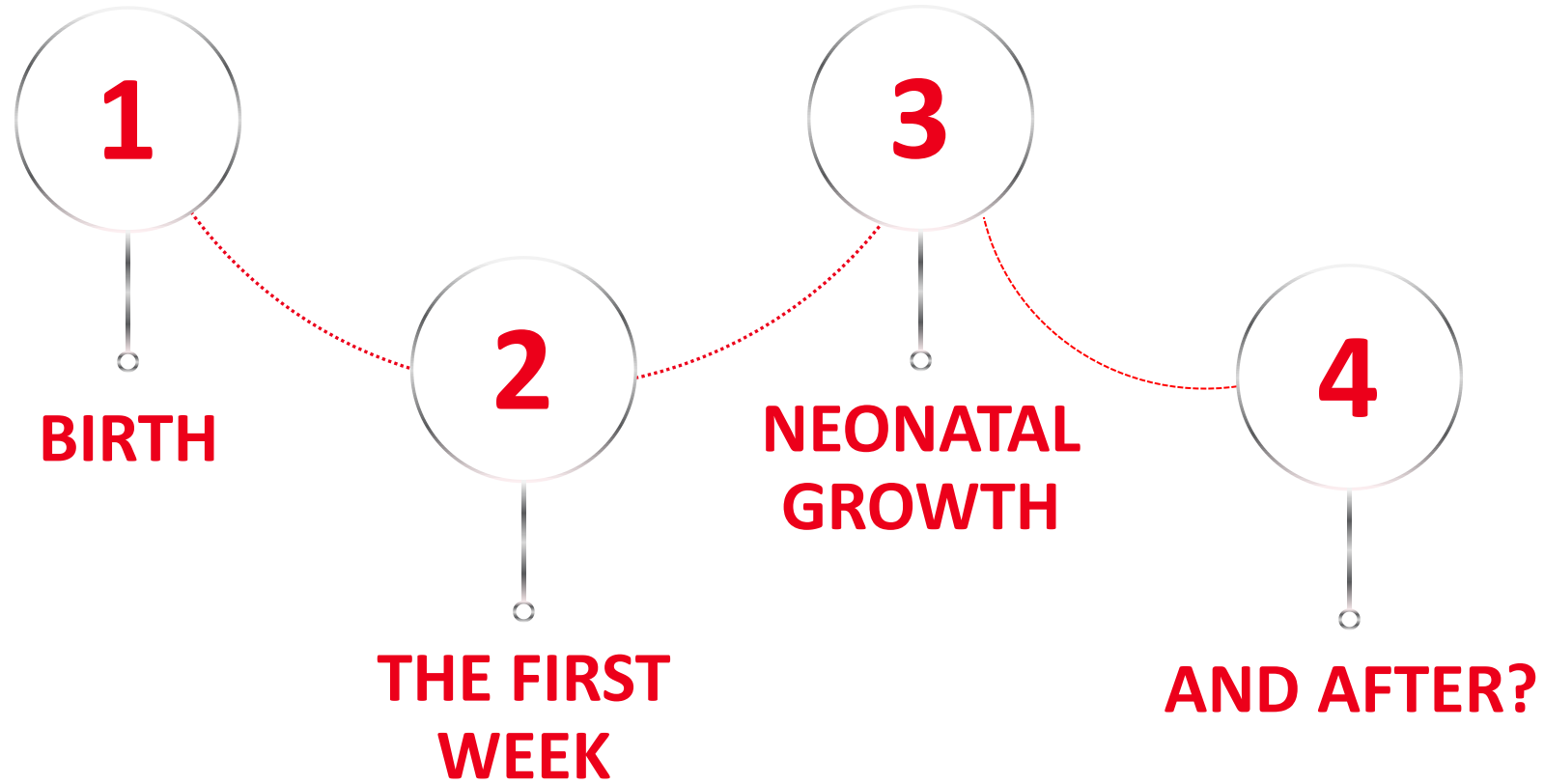
**Pets specificities**

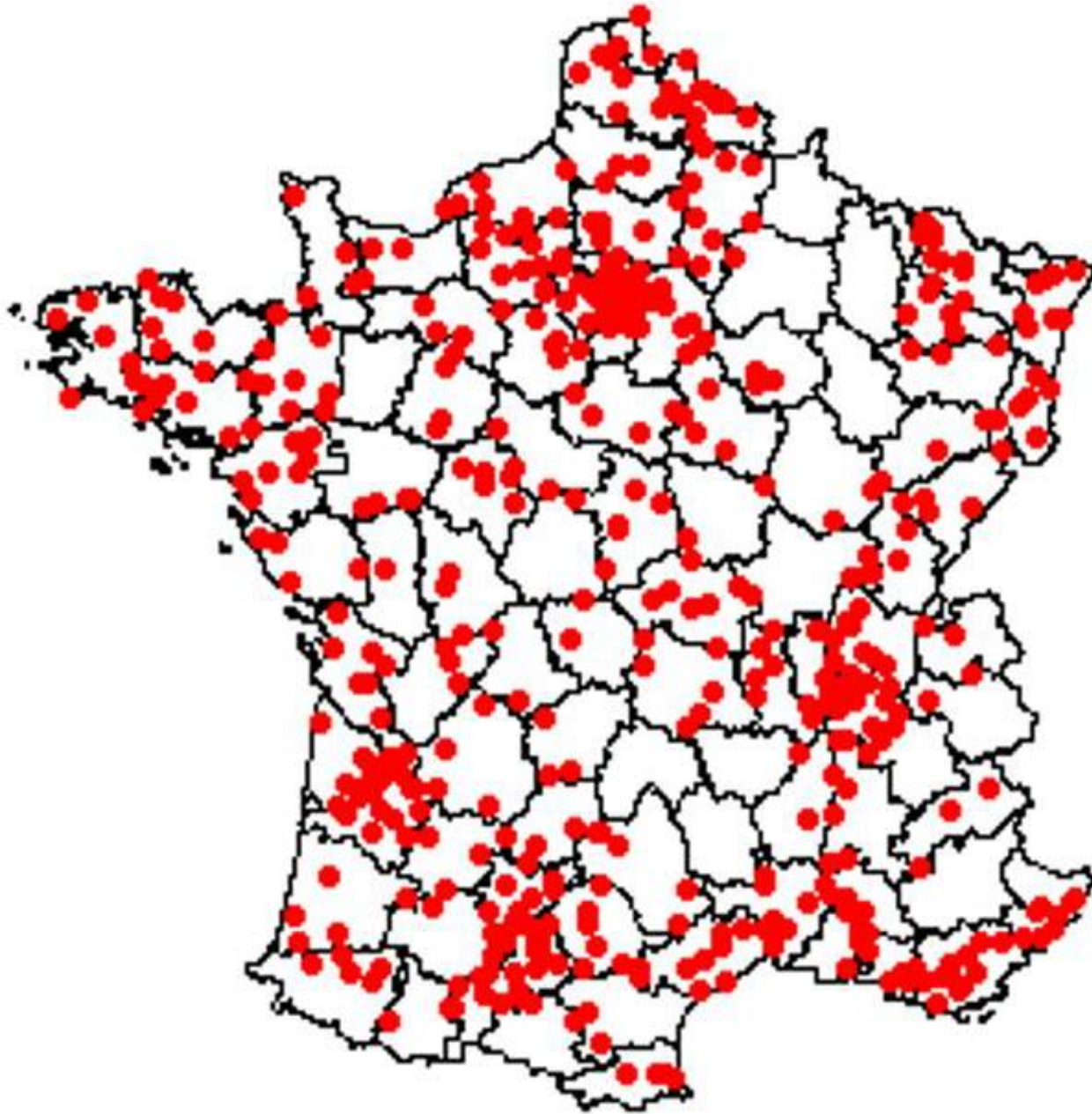
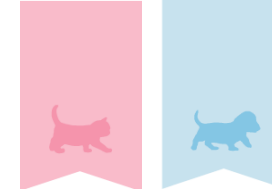
**Breeding facility at the core of the critical window of developmental programming**



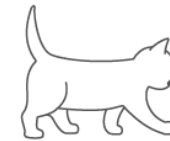
# WEIGHT







**400** French breeding facilities



**7,700+** kittens

**36** breeds

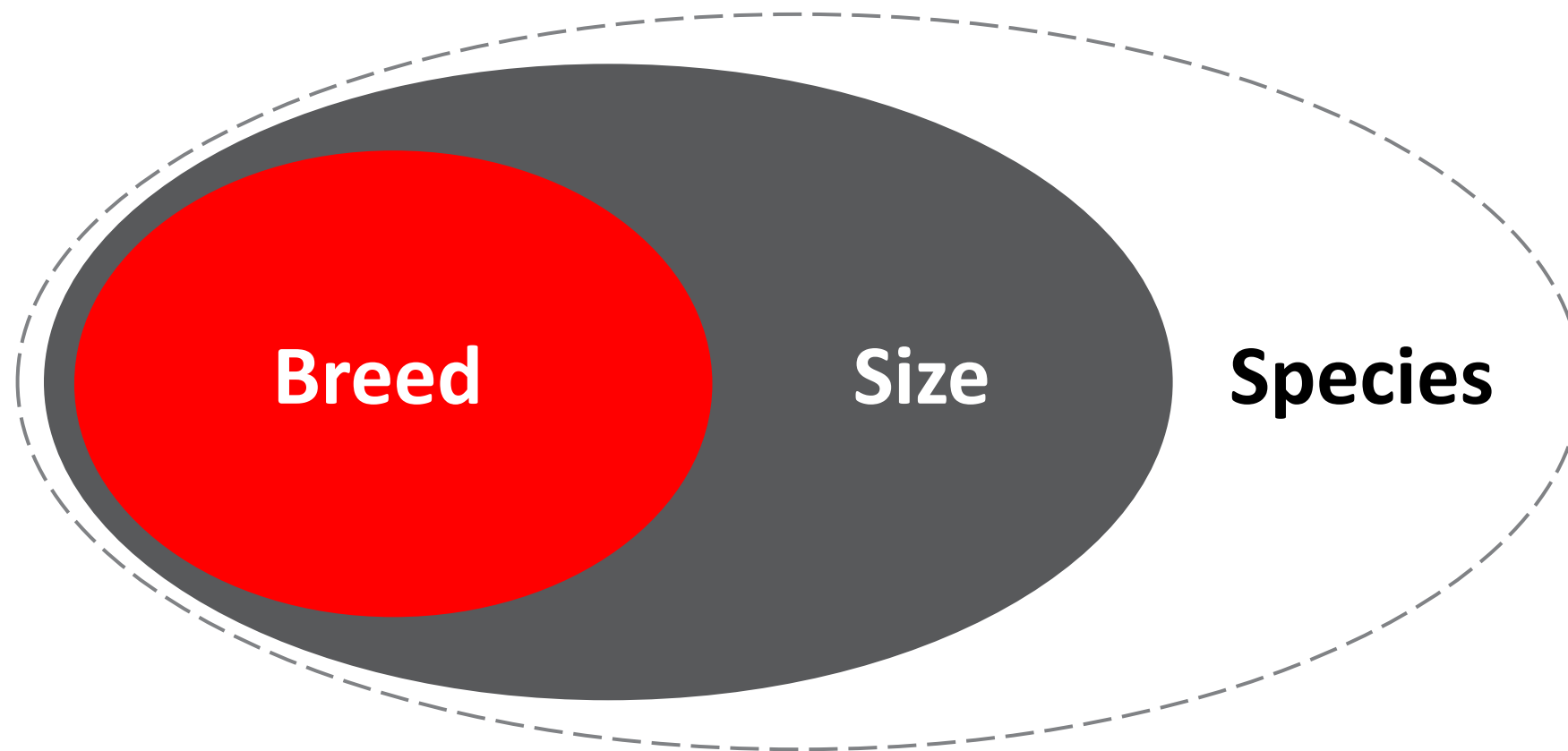
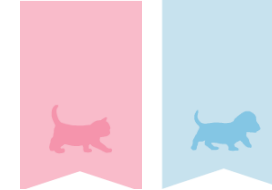
**320,000** body weights



**19,000+** puppies

**119** breeds

**430,000** body weights



**1**

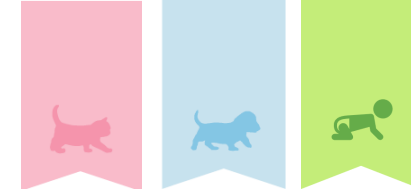


**BIRTH**

# *The Starting Point*



# Birth weight, a key health indicator



**Very low birth weight  
VLBW**

Very high neonatal  
mortality risk

**Low birth weight  
LBW**

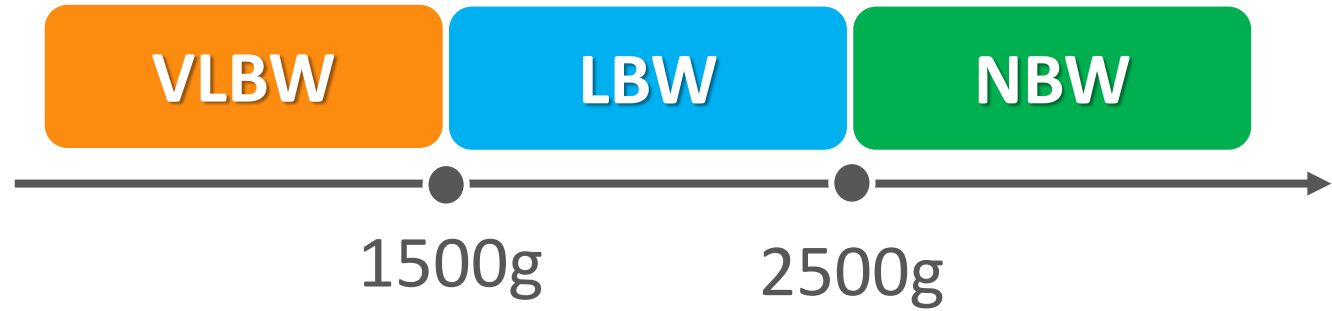
Moderate neonatal  
mortality risk

**Normal birth weight  
NBW**

Low neonatal  
mortality risk



# Birth weight thresholds in humans



## Intra-Uterine Growth Restriction IUGR

- **Premature:** baby born small and physically immature
- **Full term:** baby born small and physically mature

# Birth weight in puppies

**Table 2**

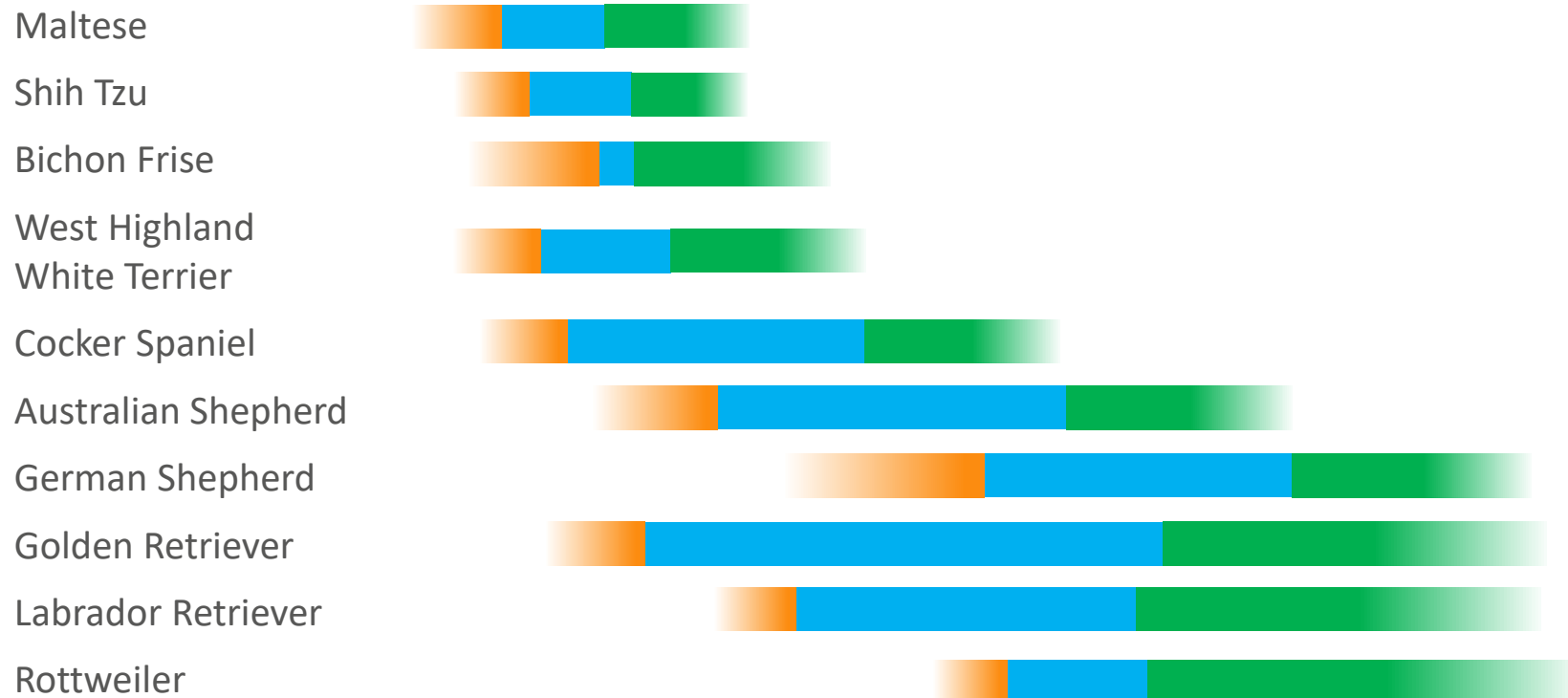
Birth weight, litter size, sex ratio, litter heterogeneity and mortality rates by breed for 6694 purebred puppies born in France (27 breeds).

Breed	Breed size <sup>a</sup>	Number of puppies included	% of the total population	Mean birth weight, grams (± SD)	Mean litter size (± SD)	Sex ratio	Litter heterogeneity, % (IQR)	Litters with at least one stillborn (%)	Neonatal mortality (%)
Alaskan Malamute	Large	104	1.6	562.5 (± 93.3)	6.1 (± 1.9)	0.9	8.6 (6.7-11.1)	11.8	0.0
Australian Shepherd	Medium	420	6.3	363 (± 82)	7 (± 1.8)	1.0	11 (8.1-15.1)	23.3	5.7
Beagle	Medium	124	1.9	309 (± 50.4)	6.4 (± 1.6)	1.0	9.8 (6.2-11.9)	18.2	7.3
Bernese Mountain dog	Giant	265	4.0	490.1 (± 77.6)	6.7 (± 2.7)	1.0	9.1 (6.4-11.6)	34.1	9.8
Bichon Frise	Small	107	1.6	189 (± 37.5)	5.6 (± 2.2)	1.1	12 (9.3-16.6)	23.8	21.5
Boxer	Large	123	1.8	464 (± 71.7)	6.7 (± 1.5)	0.8	7.7 (6.2-10.1)	31.6	9.8
Cavalier King Charles Spaniel	Small	155	2.3	225.4 (± 39.7)	4.8 (± 2.2)	1.0	9.9 (7.4-11.6)	42.9	13.5
Chihuahua	Small	157	2.3	119.6 (± 25.6)	2.8 (± 1)	1.2	9.4 (7-14.7)	8.6	1.3
Cocker Spaniel	Medium	477	7.1	266.1 (± 64.1)	5.3 (± 2)	1.1	11 (8.3-16)	23.4	11.7
Coton de Tulear	Small	159	2.4	187.9 (± 35.5)	4.4 (± 1.6)	0.7	11.5 (7-14.4)	13.9	3.1
Dachshund	Small	152	2.3	184 (± 36.5)	3.6 (± 1.6)	0.8	9.2 (5.3-15.6)	18.6	7.2
English Bulldog	Medium	123	1.8	315.9 (± 68.1)	5.4 (± 2)	0.8	14.2 (8-15.9)	52.4	11.4
French Bulldog	Small	111	1.7	237.6 (± 42.6)	5.1 (± 2.4)	1.1	11.4 (9.1-16.4)	15.4	15.3
German Shepherd	Large	197	2.9	506.2 (± 93.8)	6.5 (± 2.7)	1.0	7.9 (5.9-9.9)	32.0	10.2
Golden Retriever	Large	483	7.2	395.4 (± 71.7)	7.2 (± 2.7)	1.0	9.4 (7-14)	39.7	8.1
Jack Russell Terrier	Small	122	1.8	202.1 (± 36.2)	3.6 (± 1.7)	1.0	11.7 (8.9-20.8)	26.3	9.8
Labrador Retriever	Large	1,846	27.6	410.2 (± 69.7)	7.3 (± 2.6)	1.0	8.6 (6.7-11.7)	34.1	6.2
Leonberger	Giant	216	3.2	516.7 (± 104.1)	7.9 (± 3.8)	0.8	10.2 (6.9-13.8)	17.9	10.2
Lhasa Apso	Small	153	2.3	187.5 (± 40)	4.5 (± 1.8)	1.2	9.2 (6.8-13.3)	20.6	12.4
Maltese	Small	178	2.7	164.7 (± 35.6)	4.9 (± 1.5)	1.1	11.8 (7.8-15.5)	27.0	13.5
Newfoundland	Giant	163	2.4	630.3 (± 112.1)	5.4 (± 2.2)	1.1	9.7 (6.7-14.3)	30.0	4.3
Pomeranian	Small	117	1.7	152.1 (± 40)	3.4 (± 1.5)	1.4	11.5 (6.3-15.8)	31.6	17.1
Rottweiler	Giant	111	1.7	403.8 (± 58.6)	7.6 (± 2)	1.4	9 (6-16.8)	37.5	18.9
Shih Tzu	Small	225	3.4	176.4 (± 27.9)	4.8 (± 2.1)	1.0	9.6 (6.3-12.3)	30.4	19.1
White Swiss Shepherd	Large	114	1.7	473.4 (± 80.7)	6.5 (± 2.4)	0.9	7.5 (5.5-10.3)	22.2	6.1
West Highland White Terrier	Small	164	2.4	196.3 (± 37.5)	4.2 (± 1.5)	1.4	8.6 (6.3-11.9)	38.7	16.5
Yorkshire Terrier	Small	128	1.9	142.3 (± 30.9)	4.3 (± 1.8)	0.9	11.3 (10.2-14.5)	22.2	7.0
Total		6,694		345.4 (± 142.1)	6.3 (± 2.7)	1.0	9.6 (6.8-14)	28.4	9.0

Variability/overlap in birth weight according to adult size



# Birth weight thresholds in puppies



**Tolerance to LBW is different even for similar breed at adulthood**

**Mortality risk 0-21 days**

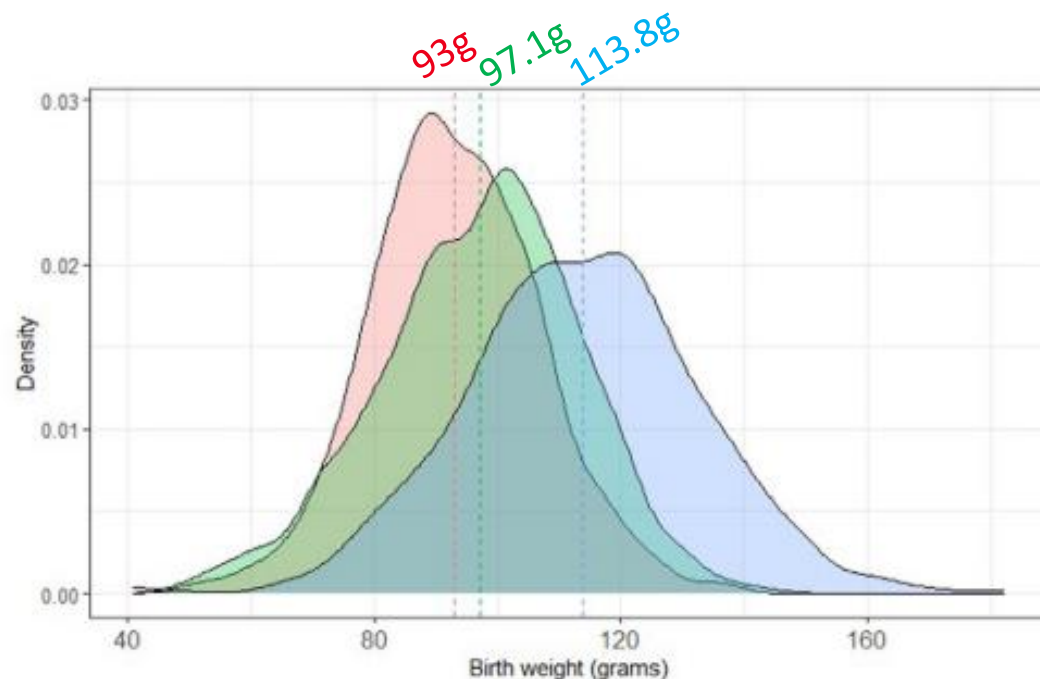
**VLBW**  
**HIGH RISK**

**LBW**  
Moderate risk

**NBW**  
Low risk



# Birth weight in kittens



**Fig. 5.** Distributions of birth weights in the three clusters of breeds identified in feline species.

**Cluster 1:** *small litter sizes and average birth weights*

Abyssinian/Somali, Persian/Exotic, Sphynx, Birman

**Cluster 2:** *average litter sizes and average birth weights*

Russian Blue/Nebelung, Egyptian Mau, Ragdoll, Siberian, Bengal, Scottish/Highland, British, Balinese/Mandarin/Oriental/Siamese

**Cluster 3:** *average litter sizes and high birth weights*

Maine Coon, Norwegian Forest, Chartreux



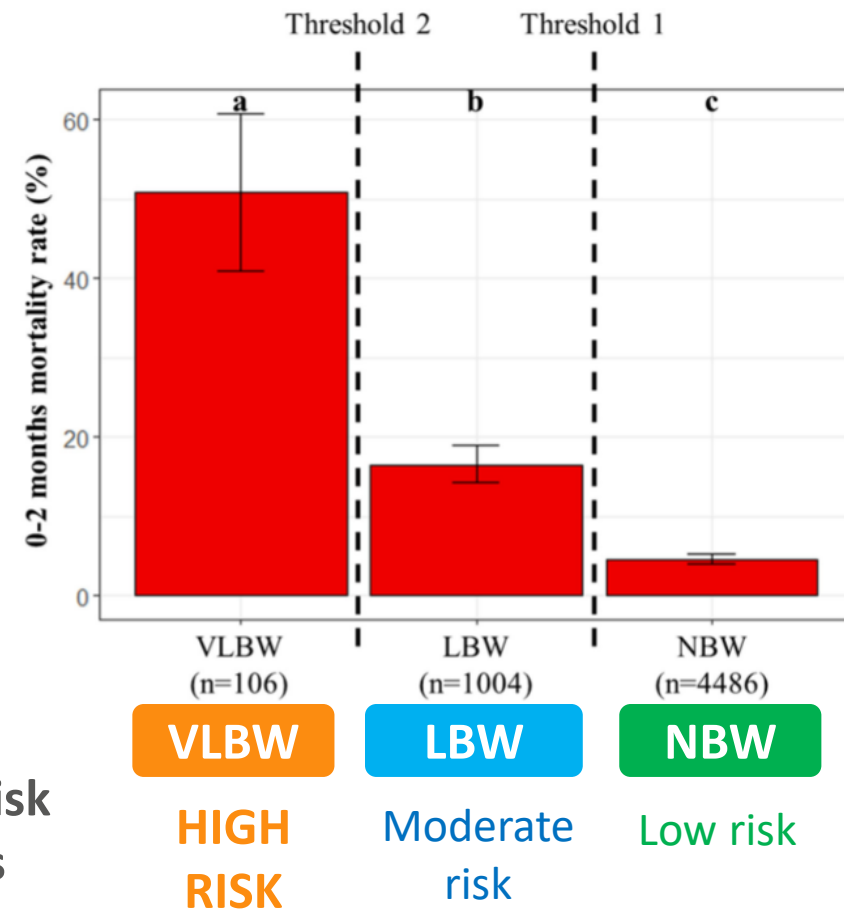
# Birth weight thresholds in kittens

**LBW**

**VLBW**

Group	Mean BW, Grams	Threshold 1 (Identification of LBW Kittens)		Threshold 2 (Identification of VLBW Kittens)	
		In Grams	% of Mean BW	In Grams	% of Mean BW
Abyssinian/Somali	97.2	94	96.7	60 *	61.7
Balinese/Mandarin/Oriental/Siamese	95.4	82 *	85.9	78	81.8
Bengal	88.2	84	95.2	60 *	68.0
Birman	95.8	74	77.3	60 *	62.7
British	98.4	87	88.4	61	62.0
Chartreux	110.4	100	90.6	60 *	54.3
Egyptian Mau	92.3	104	112.6	61	66.1
Maine Coon	119.1	81	68.0	75	63.0
Norwegian Forest	109.9	94	85.5	60 *	54.6
Persian/Exotic	85.5	82	95.9	60 *	70.2
Ragdoll	100.3	84	83.8	60 *	59.8
Russian Blue/Nebelung	92.7	86	92.8	60 *	64.7
Scottish/Highland	89.5	77	86.0	60 *	67.0
Siberian	99.3	90	90.7	63	63.5
Sphynx	90.3	76	84.2	60 *	66.5

\* Threshold established at the species level. BW: birth weight; LBW: low birth weight; VLBW: very low birth weight.



Mortality risk  
0-21 days

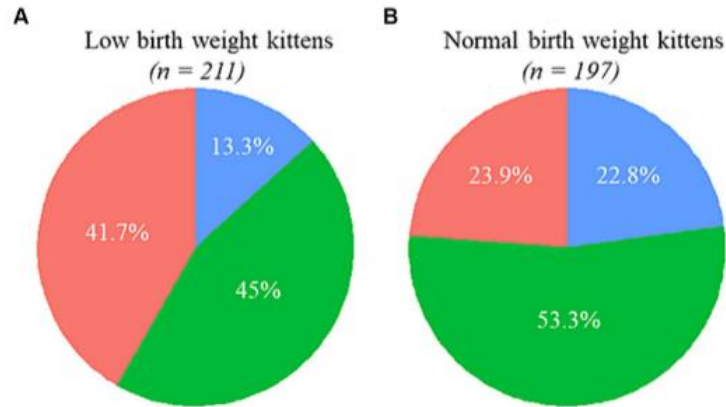


# Occurrence of death according to birth weight



**LBW**

**NBW**



Period of death

- During the first two days of life
- Between Day 3 and Day 21
- After the first three weeks of life

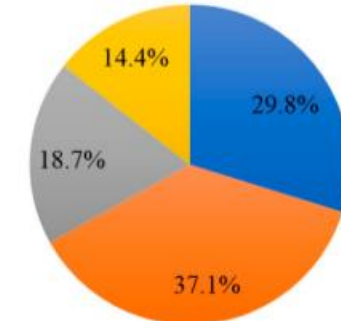
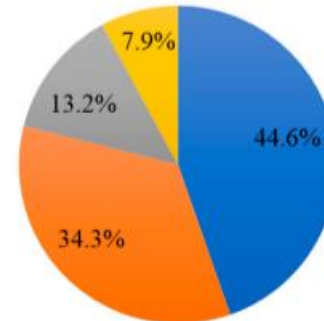


**LBW**

**NBW**

a. Low birth weight puppies (n = 318)

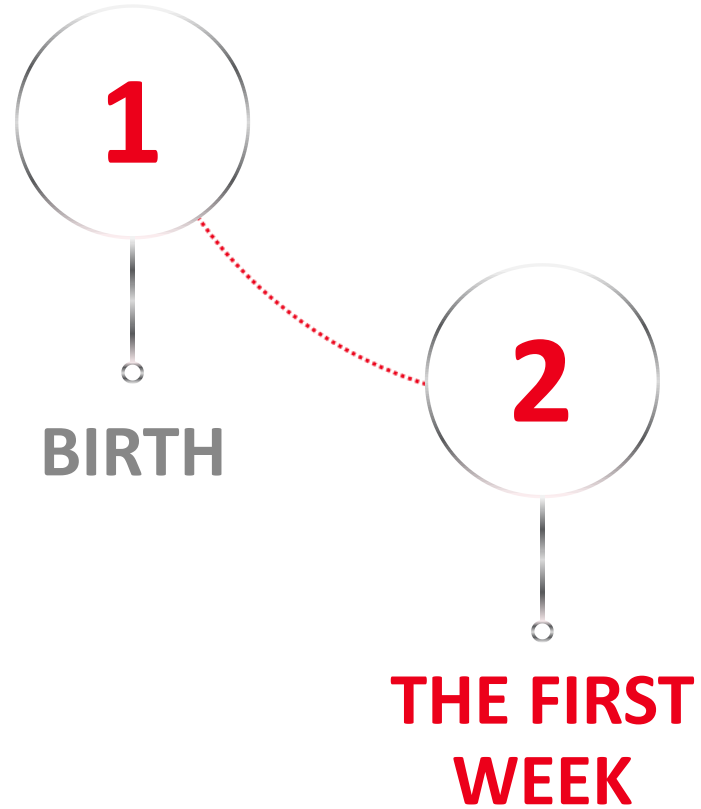
b. Normal birth weight puppies (n = 440)



Period of death

- Between Birth and Day 2
- Between Day 3 and Day 7
- Between Day 8 and Day 21
- After Day 21

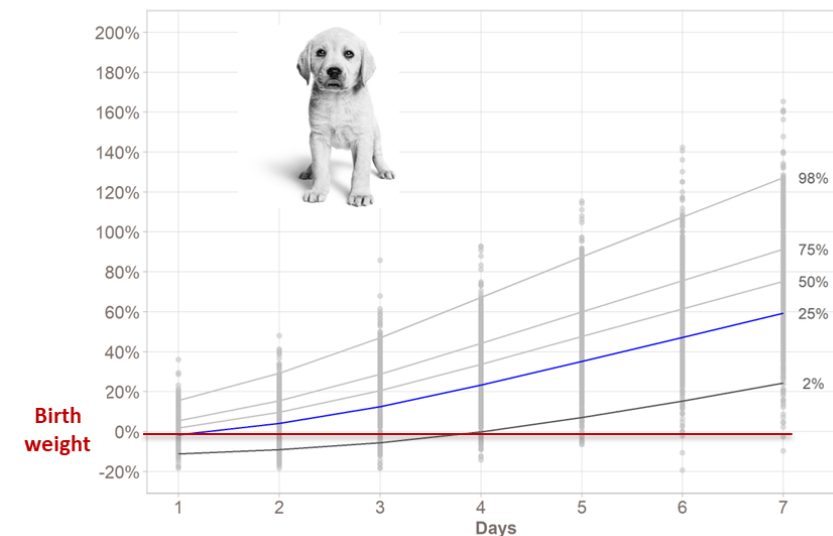
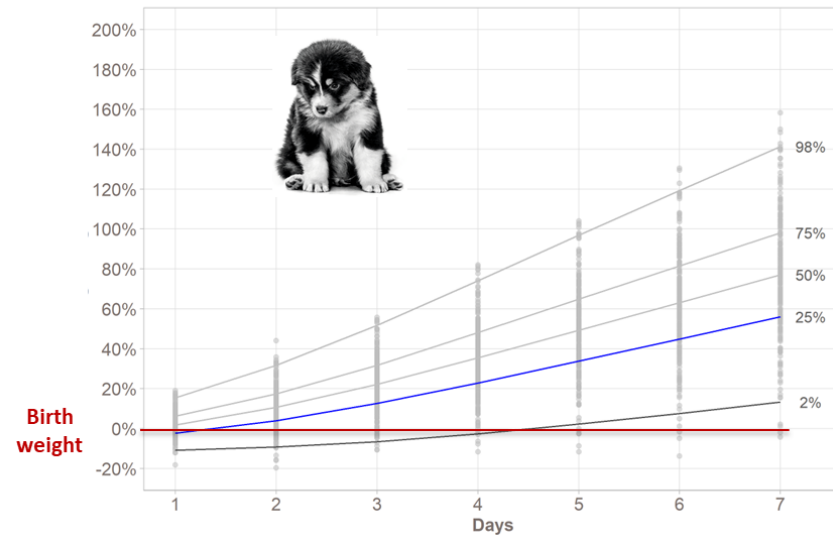
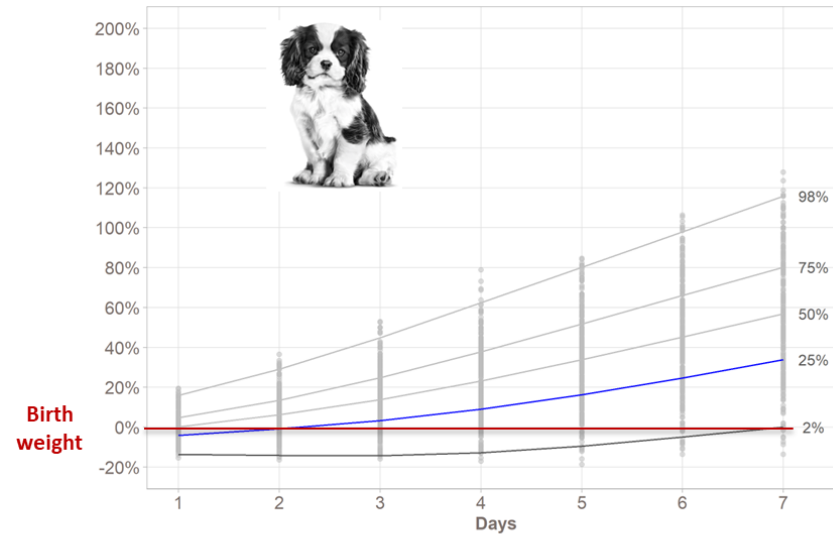
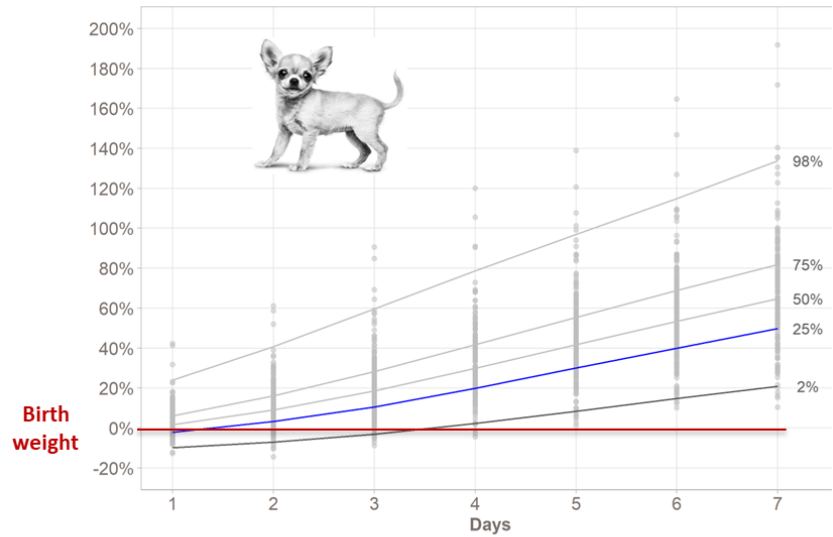
Death of LBW occurs earlier, especially during the first week



## *The catch-up growth*

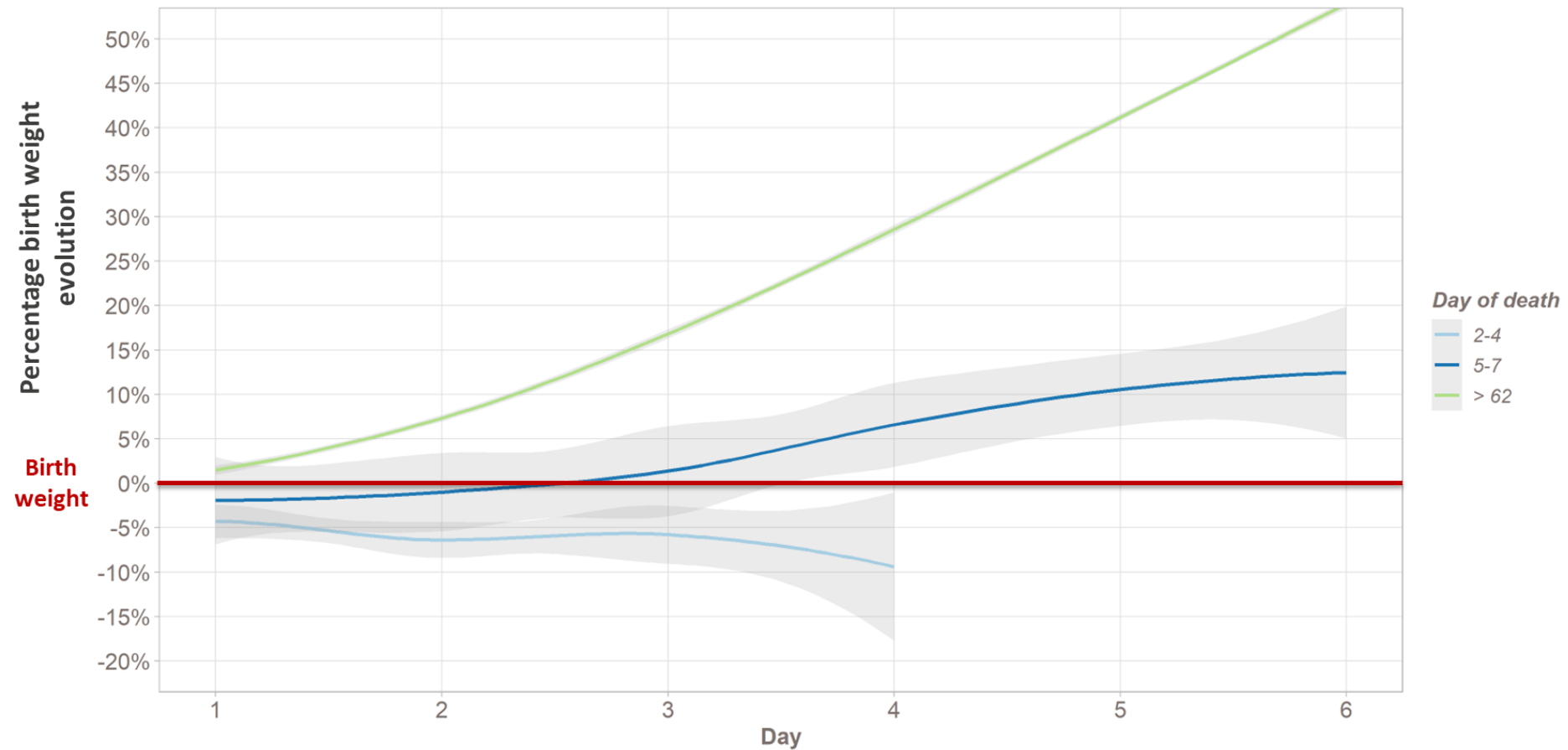


# Weight gain during the first week in healthy puppies





# Weight gain during the first week in case of mortality



# Compensatory growth in puppies

Birth-Weight Category	Growth Rate	n	Growth-Rate Threshold, % (CART Analysis)	Mortality Over the 2 First Months of Age		
				For All Puppies	For Puppies with Growth Rate below the Threshold	For Puppies with Growth Rate Equal or Greater than the Threshold
LBW	GR 0-1	975	-1.8	21%	36% (n = 359)	12% (n = 616)
	GR 1-2	898	-2.6	17%	53% (n = 131)	11% (n = 767)
	GR 0-2	1038	-0.4	17%	37% (n = 284)	9.2% (n = 754)
	GR 2-7	818	31	6.8%	28% (n = 106)	3.7% (n = 712)
	GR 0-7	892	31	6.7%	25% (n = 117)	4% (n = 775)
NBW	GR 0-1	5528	-4.1	5.4%	14% (n = 1002)	3.6% (n = 4526)
	GR 1-2	5350	-7.1	4.5%	39% (n = 137)	3.6% (n = 5213)
	GR 0-2	6351	-8.7	4.5%	23% (n = 404)	3.2% (n = 5947)
	GR 2-7	5519	18	1.9%	13% (n = 156)	1.6% (n = 5363)
	GR 0-7	5919	26	2%	6.3% (n = 474)	1.7% (n = 5445)

Cumulative effect of LBW and poor weight gain

$$GR\ 0 - 1 = \frac{\text{weight Day 1} - \text{weight Day 0}}{\text{weight Day 0}} \times 100$$

# Compensatory growth in kittens



TABLE 2 Thresholds of early growth rates discriminating for mortality rate over the first 2 months of life in kittens (CART analysis).

Birth weight category	Growth rate	n	Growth rate threshold, %	Mortality over the first 2 months of age			
				For all kittens included	For kittens with growth rate below the threshold	For kittens with growth rate equal or greater than the threshold	Mortality multiplication term between NBW and LBW
<b>LBW</b>	GR 0-1	925	1.3	17.2%	32.5% (n = 203)	12.9% (n = 722)	2.5
	GR 1-2	868	8.6	13.9%	23.3% (n = 339)	7.9% (n = 529)	2.9
	GR 0-2	891	9.5	13.7%	27.9% (n = 197)	9.7% (n = 694)	2.9
	GR 2-7	804	42	8.2%	28.4% (n = 81)	5.9% (n = 723)	4.8
	GR 0-7	844	58	8.1%	36.6% (n = 71)	5.4% (n = 773)	6.8
<b>NBW</b>	GR 0-1	3,831	1.1	4.1%	8.8% (n = 616)	3.2% (n = 3,215)	2.8
	GR 1-2	3,723	1.3	3.7%	13.4% (n = 403)	2.5% (n = 3,320)	5.4
	GR 0-2	3,825	1.7	3.7%	13.8% (n = 290)	2.9% (n = 3,535)	4.6
	GR 2-7	3,580	56	1.8%	3.1% (n = 1723)	0.7% (n = 1857)	4.4
	GR 0-7	3,848	67	1.8%	5.3% (n = 718)	1% (n = 3,130)	5.3

**No tolerance to early weight loss**

## B

Growth rate 0-2

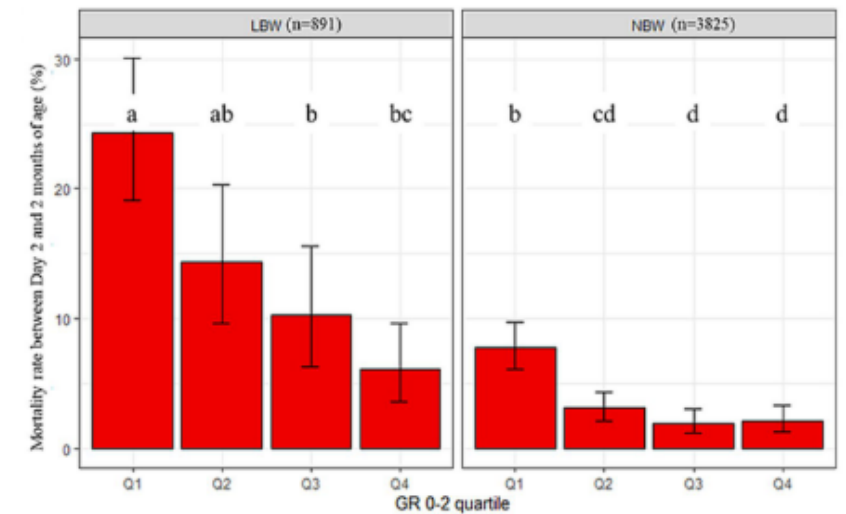
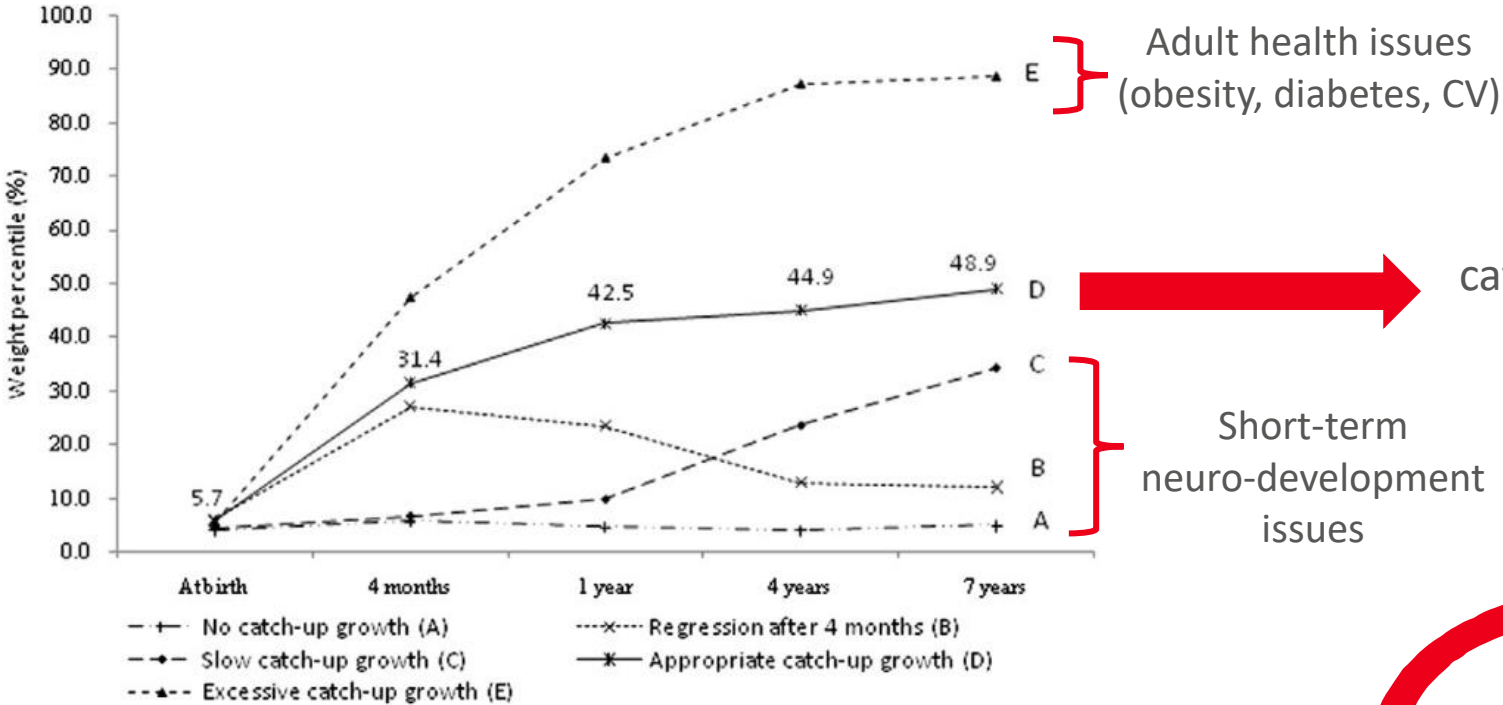


FIGURE 3

Cumulative impact of birth weight and early growth on mortality rates of kitten



# Optimal catch-up growth: neonatologist's dilemma



Adult health issues (obesity, diabetes, CV)

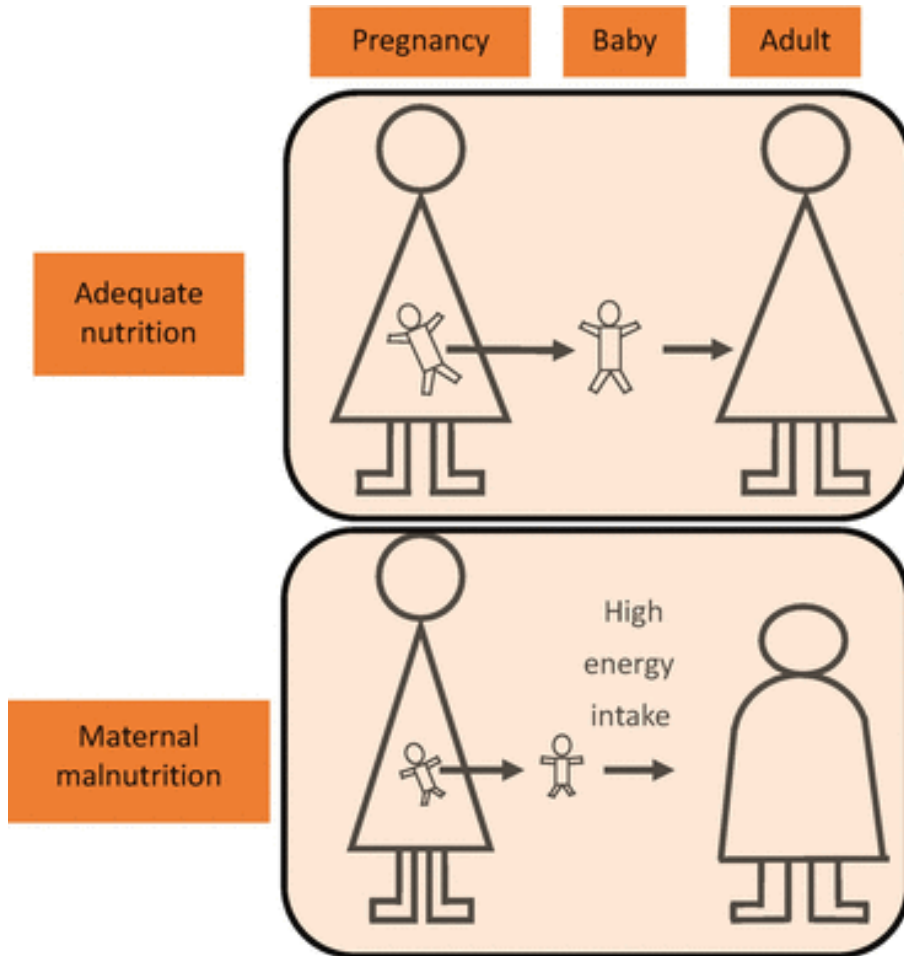


**Optimal growth trajectory:**  
catching-up to the 30<sup>th</sup> centile at 4 months then moderate catch-up thereafter to the 50<sup>th</sup> centile at 7 years

Short-term neuro-development issues

**While beneficial in the short term, the catch-up growth may be harmful in the long term**

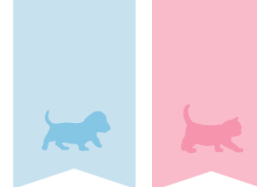
# The Thrifty Phenotype



Adaptation to early environmental exposure through  
**epigenetic mechanisms**  
leading to health consequences later in life

The foetus has adapted to survive in a nutrient-poor  
conditions *in utero*.

But once born, he's not prepared to live in  
an abundant rich food environment  
fostering later obesity and metabolic diseases



# What about pet's birth weight dilemma?

**Early mortality**



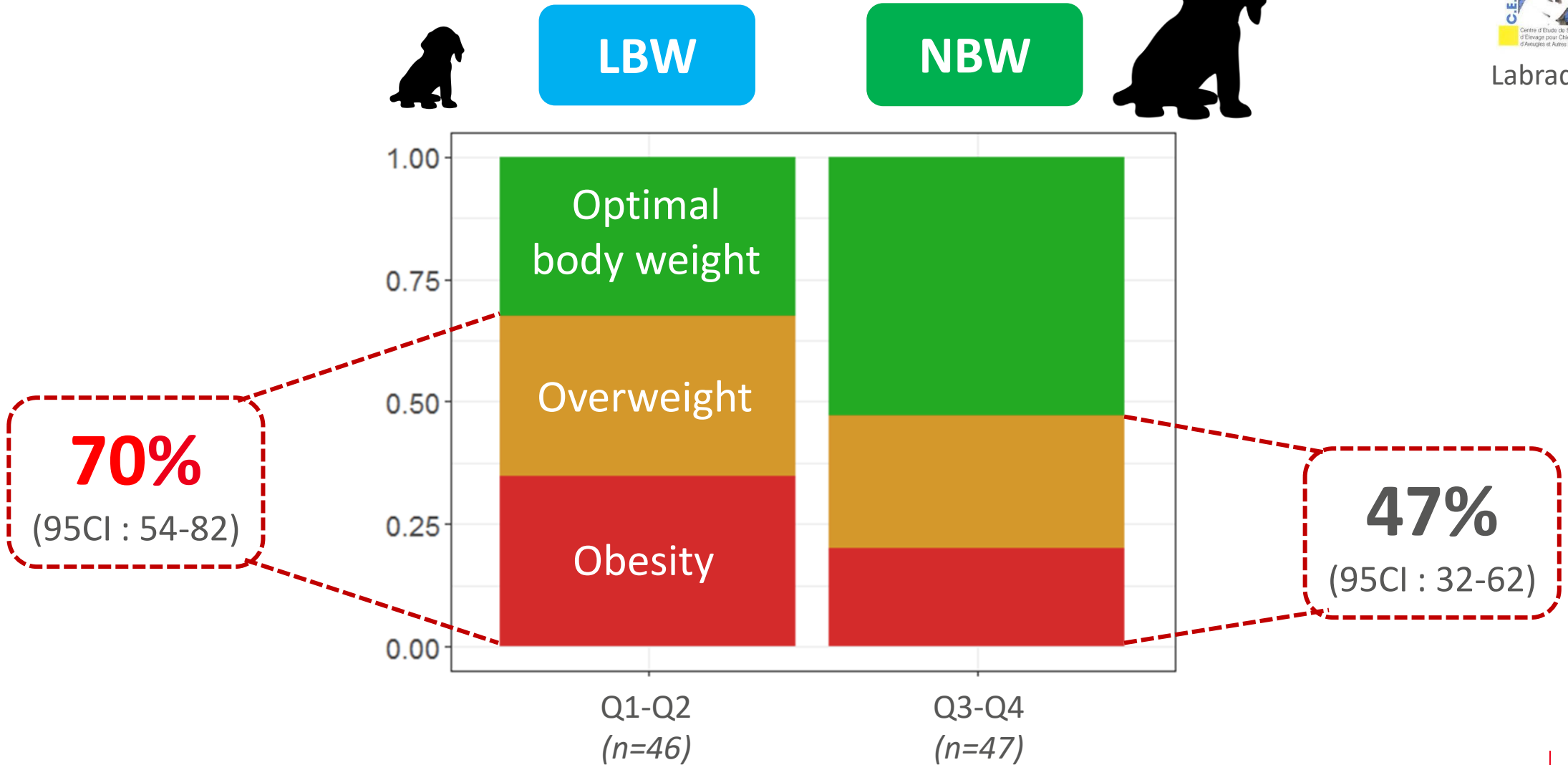
**Obesity**



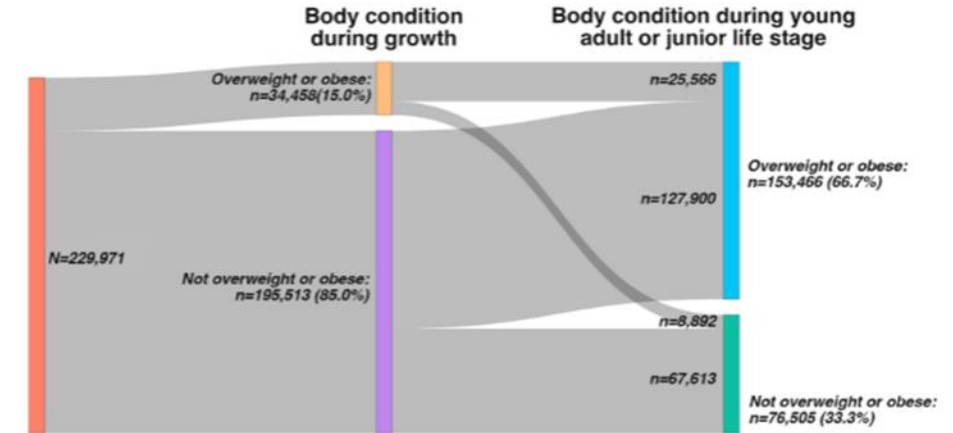
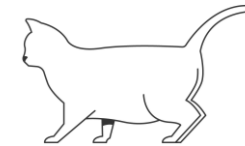
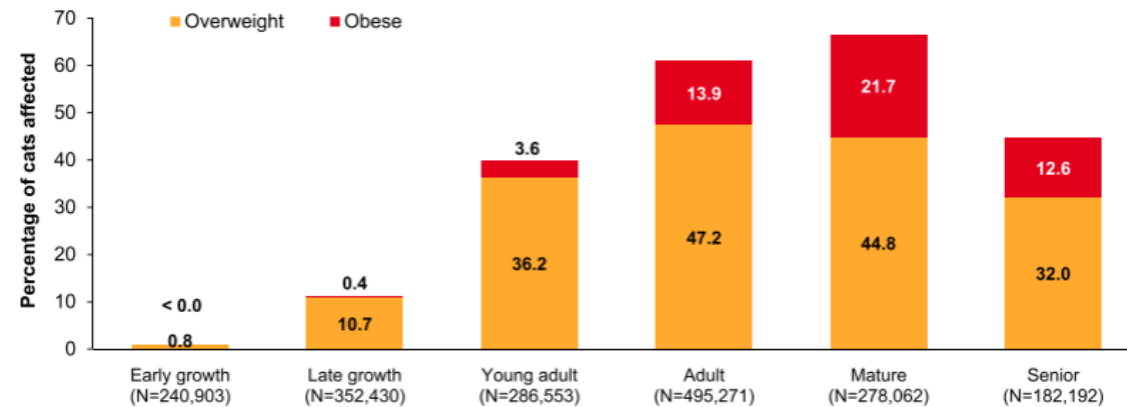
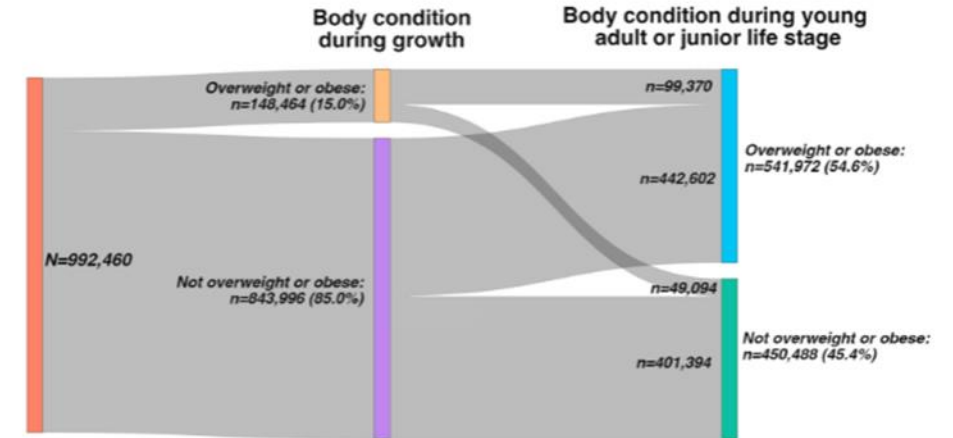
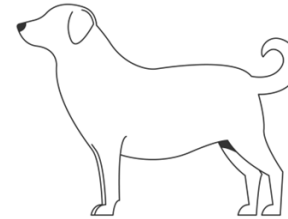
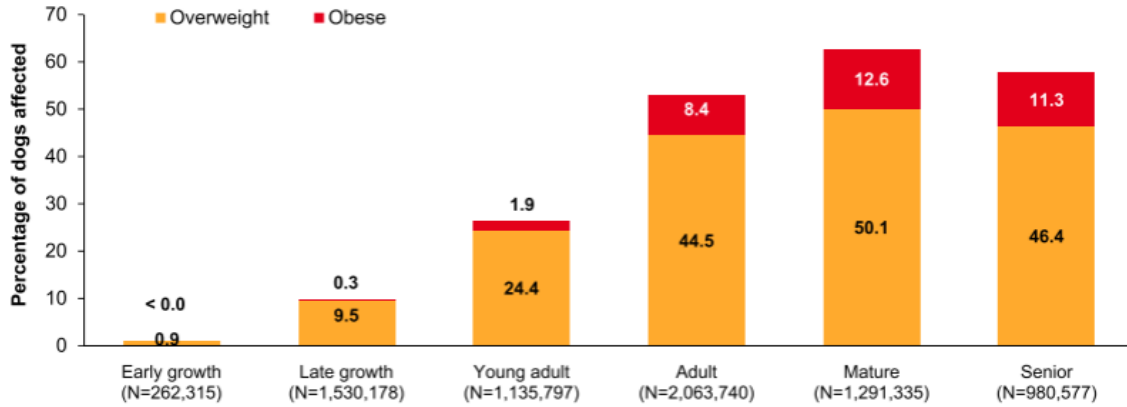
# LBW and obesity in dog

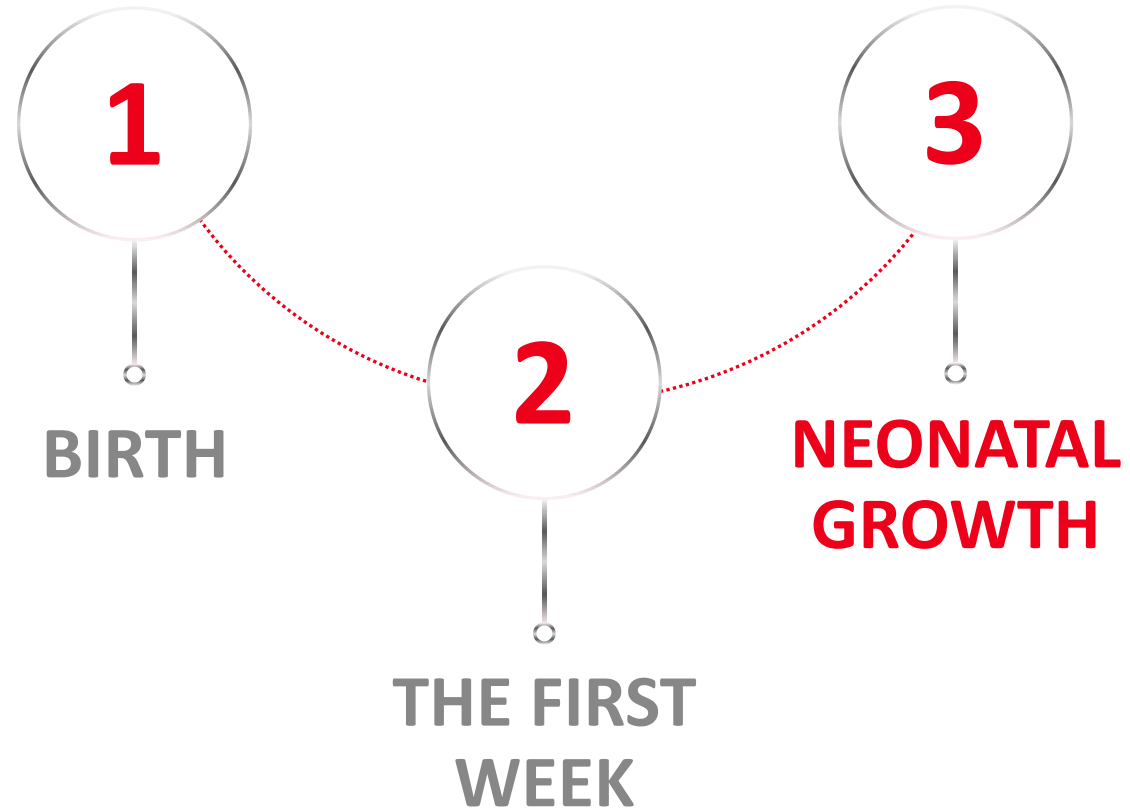


Labradors



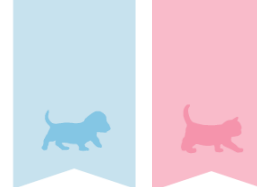
# Overweight and obesity by lifestages



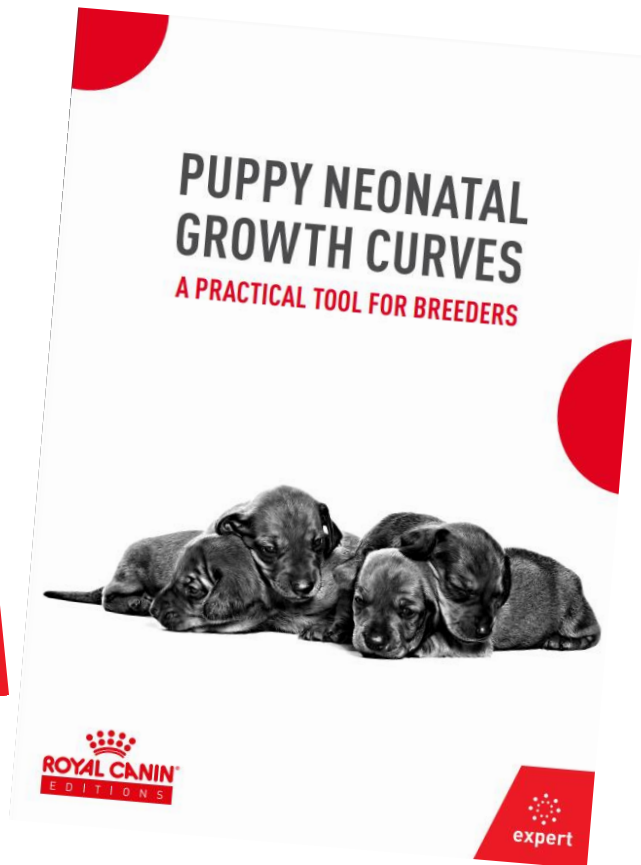
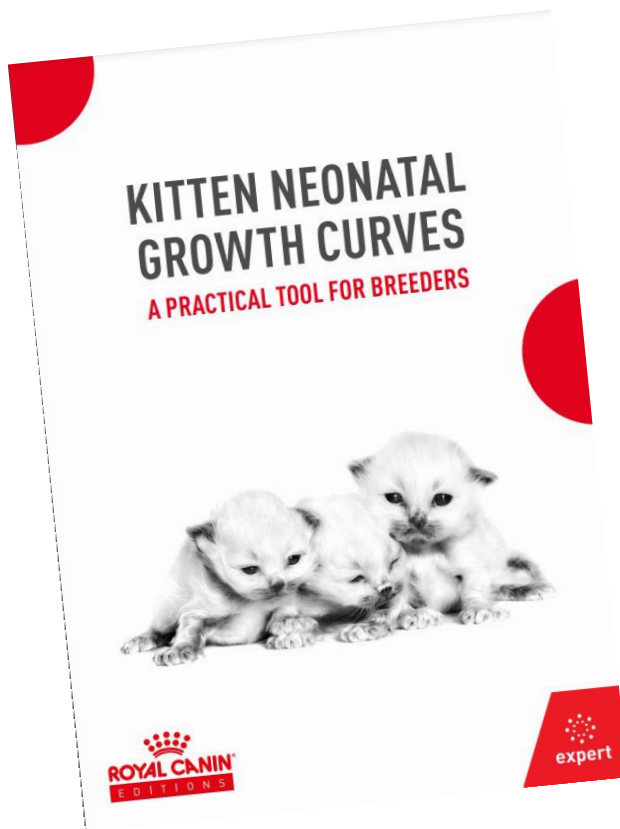


*Up to 2  
months of age*

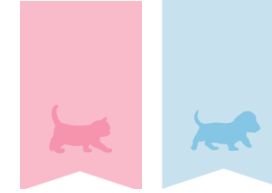




# Neonatal breed growth charts

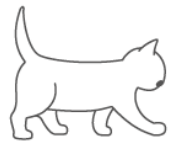


**From birth to  
2 months of age**



# A unique dataset

400 French breeding facilities



**7,700+** kittens  
**36** breeds  
**320,000** body weights

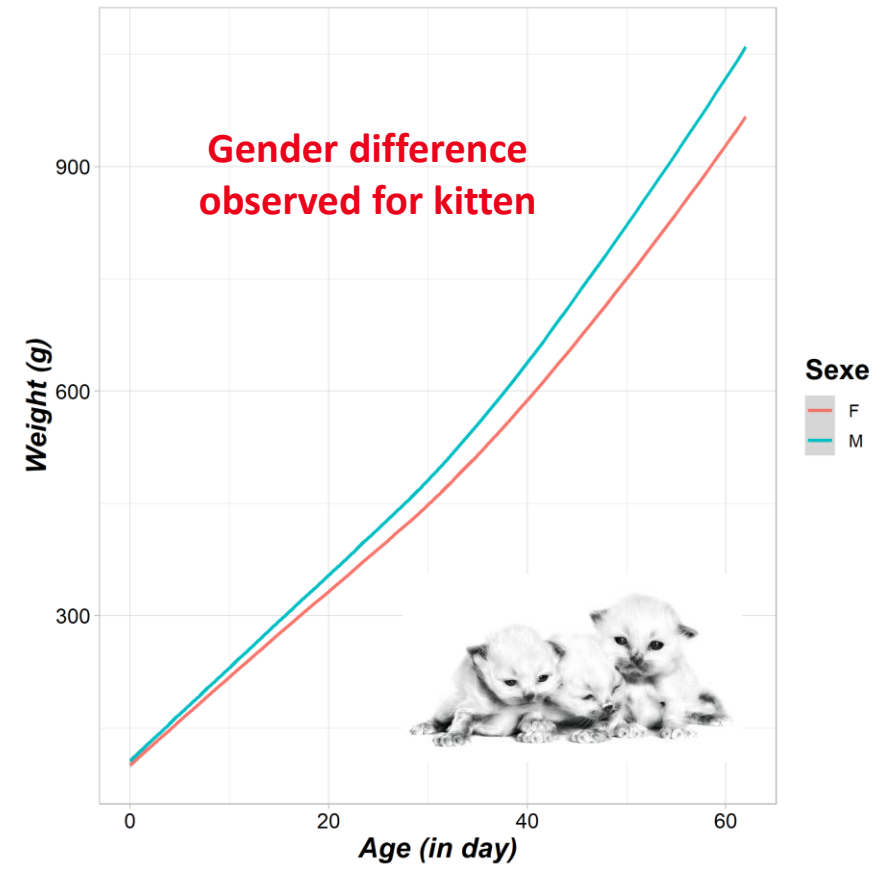
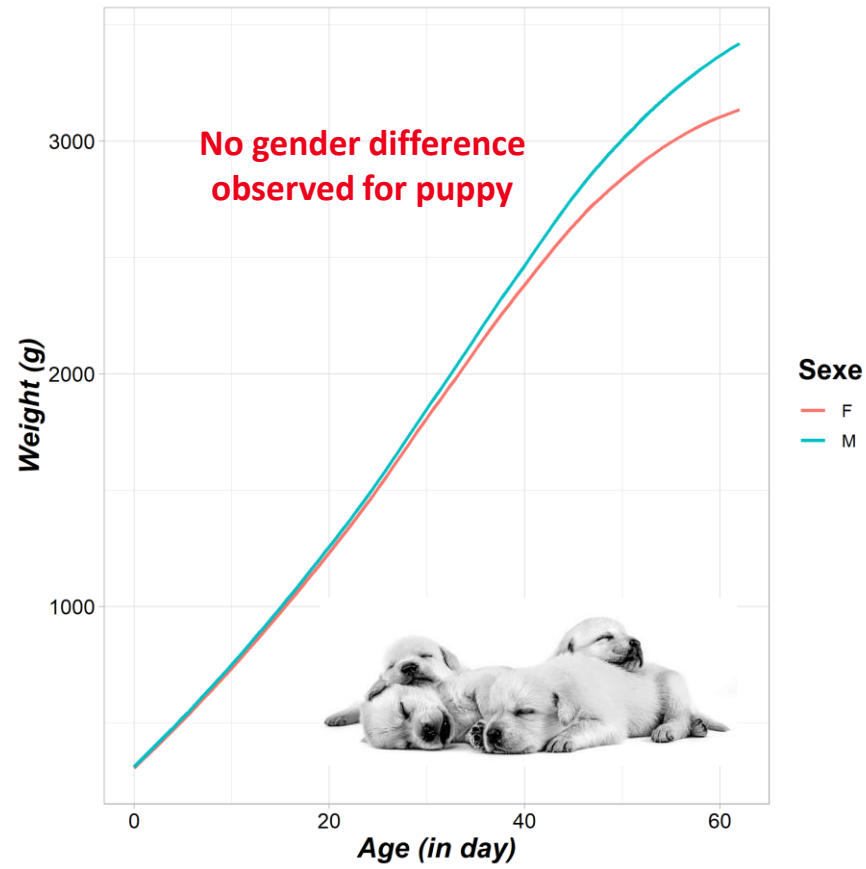
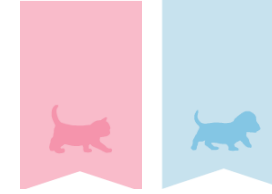


**19,000+** puppies  
**119** breeds  
**430,000** body weights

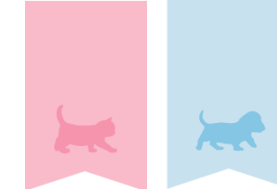
Each weight measure is associated with a:

- Day of measure
- Size
- Breed
- Animal ID
- Sex
- Breeding facility

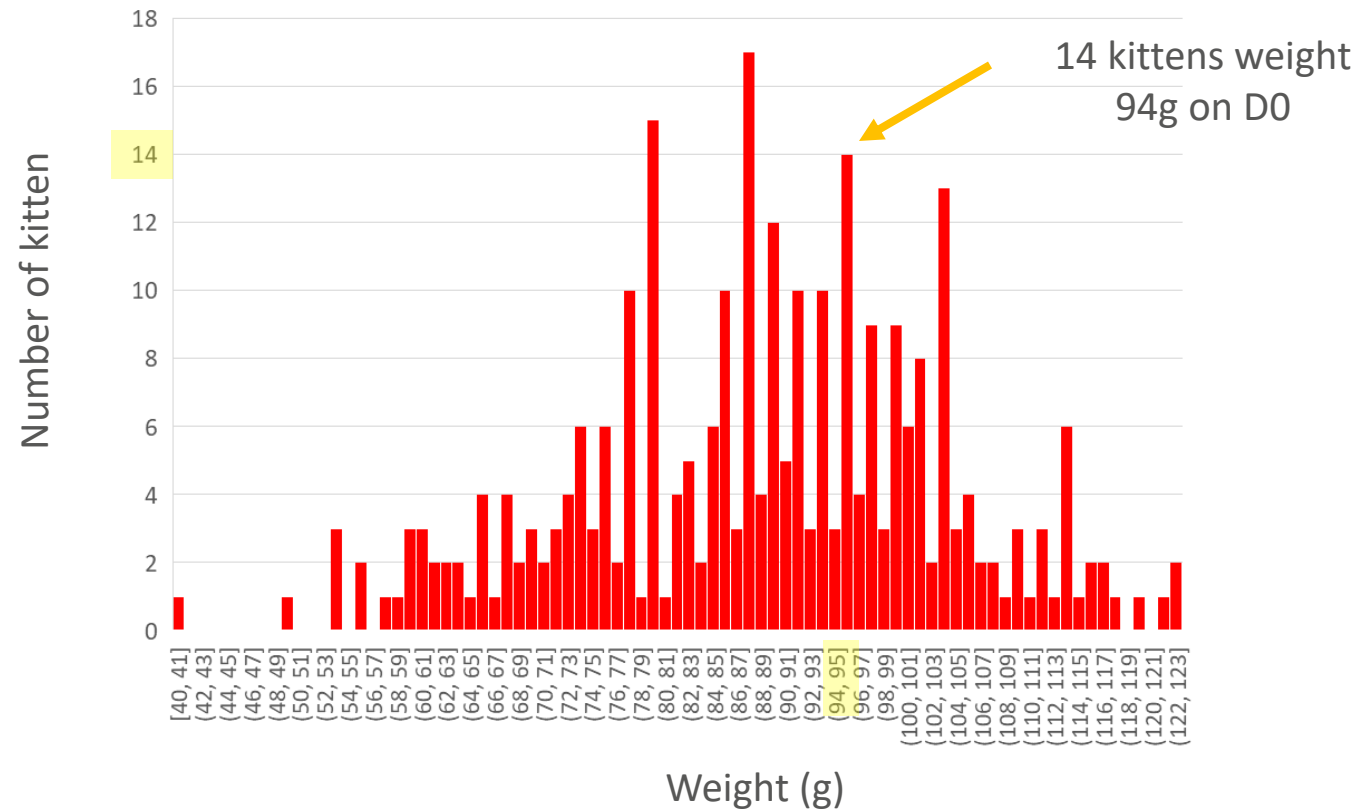
# Sex differences



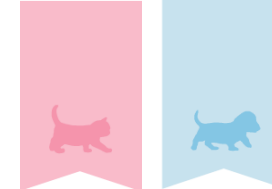
# Modelling of growth charts



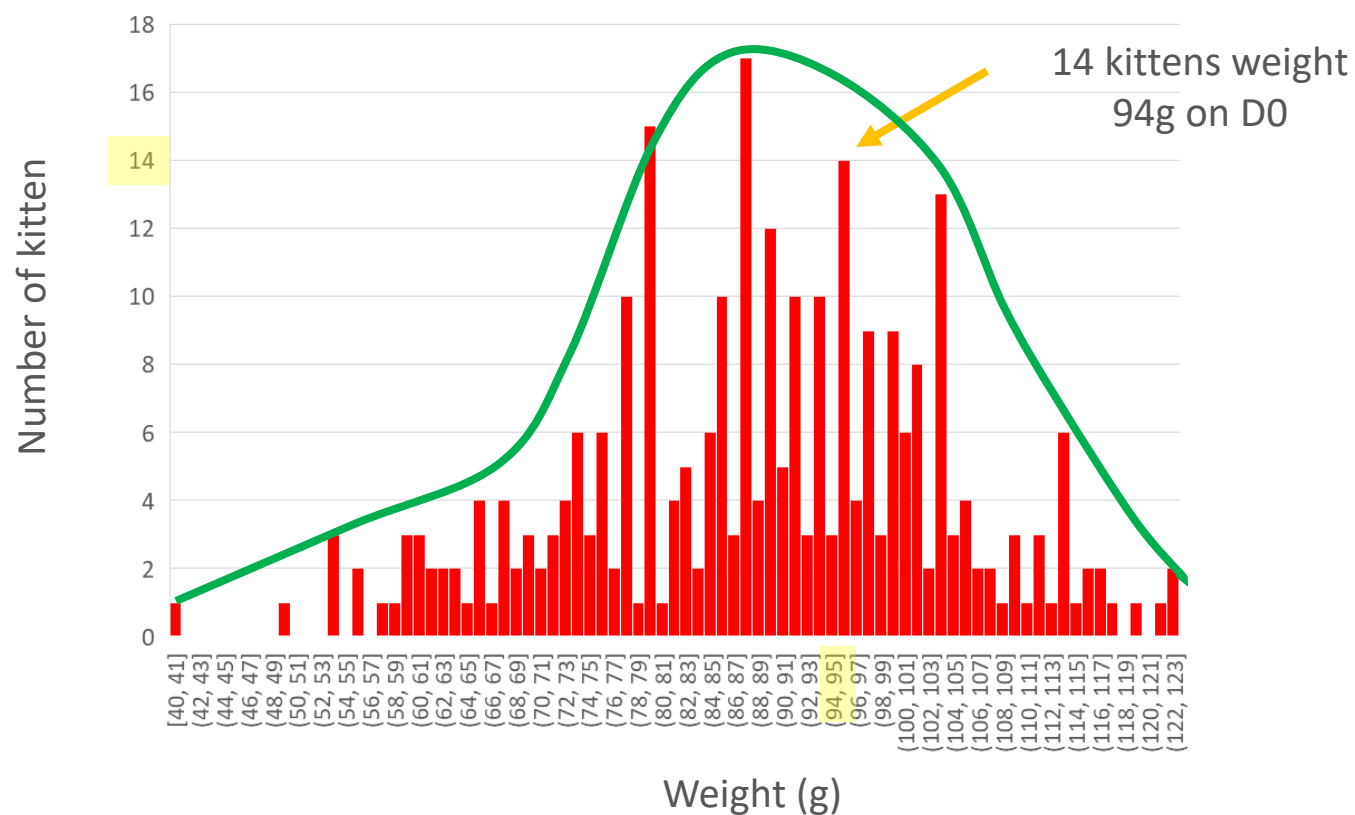
Bengal kitten on D0 (birth weight) → 287 measures, ranging from 40 g to 123g



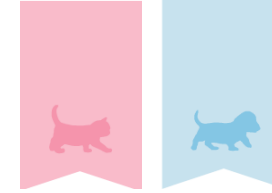
# Modelling of growth charts



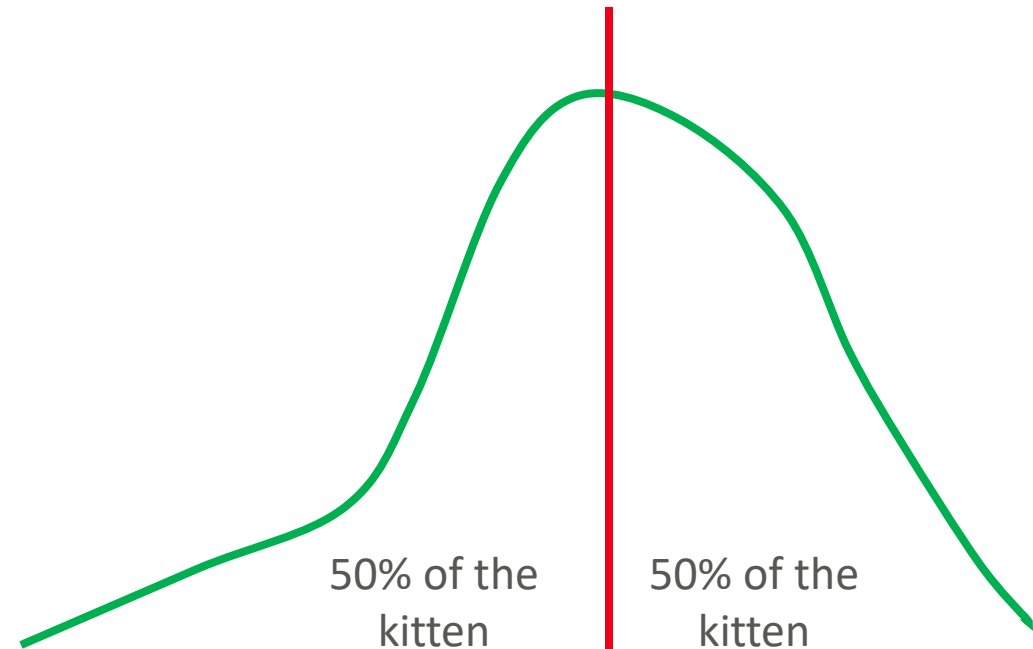
Bengal kitten on **D0** (birth weight) → 287 measures, ranging from 40 g to 123g



# Modelling of growth charts



Bengal kitten on **D0** (birth weight) → 287 measures, ranging from 40 g to 123g

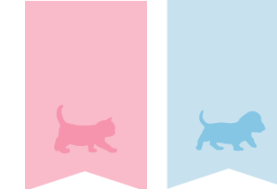


**Median**  
**90g**

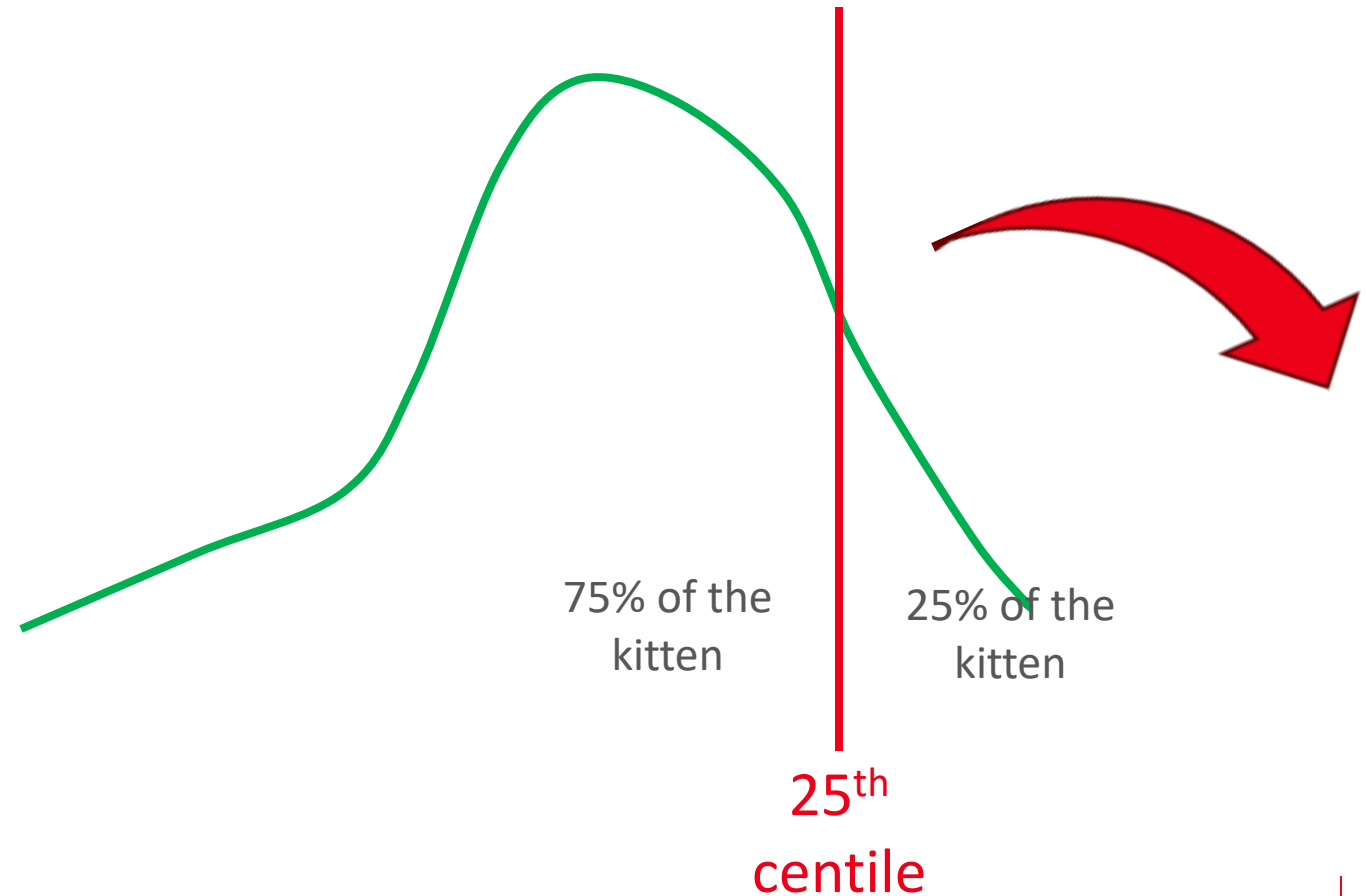


Also called 50th  
centile

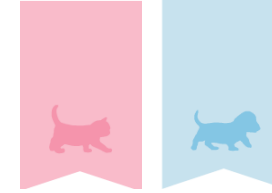
# Modelling of growth charts



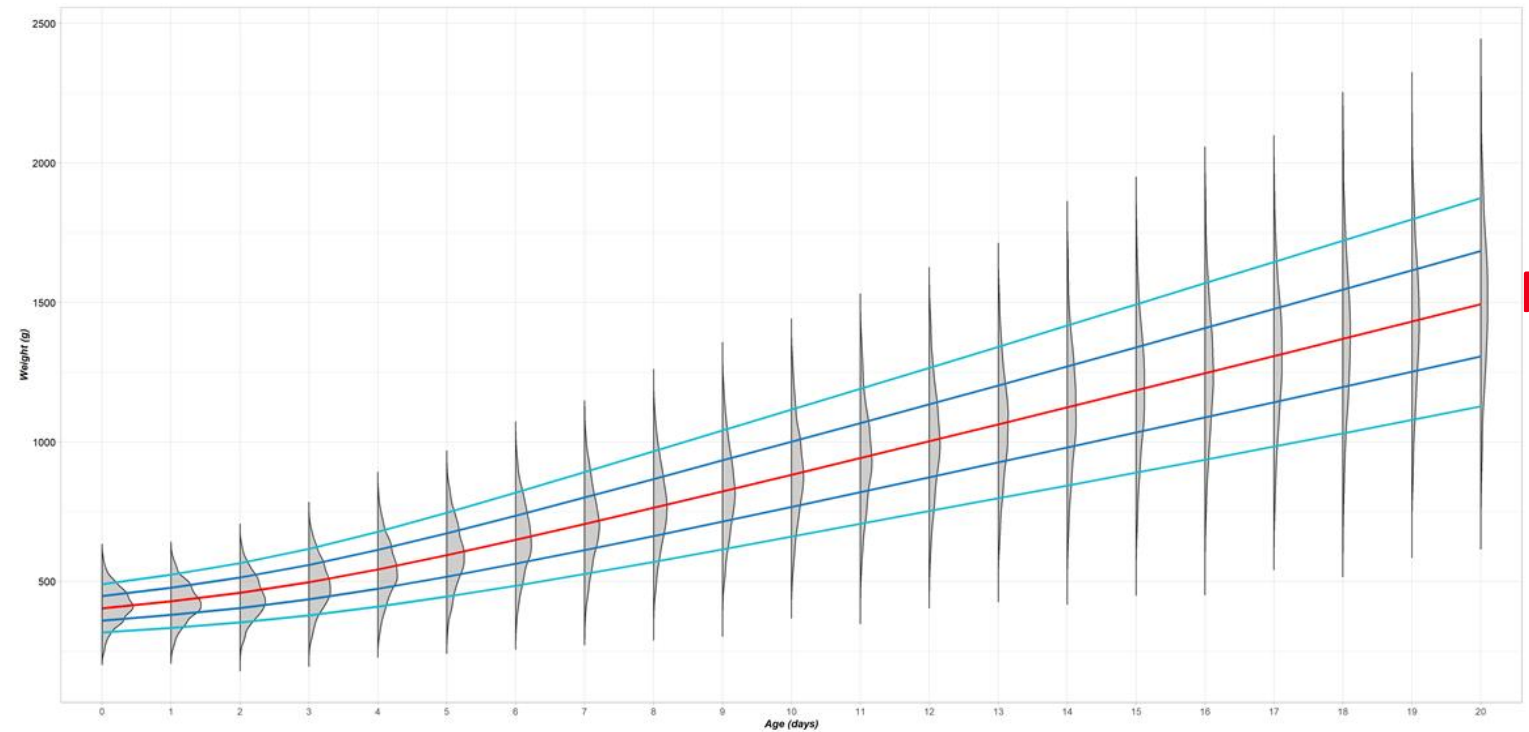
Bengal kitten on **D0** (birth weight) → 287 measures, ranging from 40 g to 123g



# Modelling of growth charts



Same exercise for each time-points up to D62: even if the shape of the distribution changes the centiles are connected

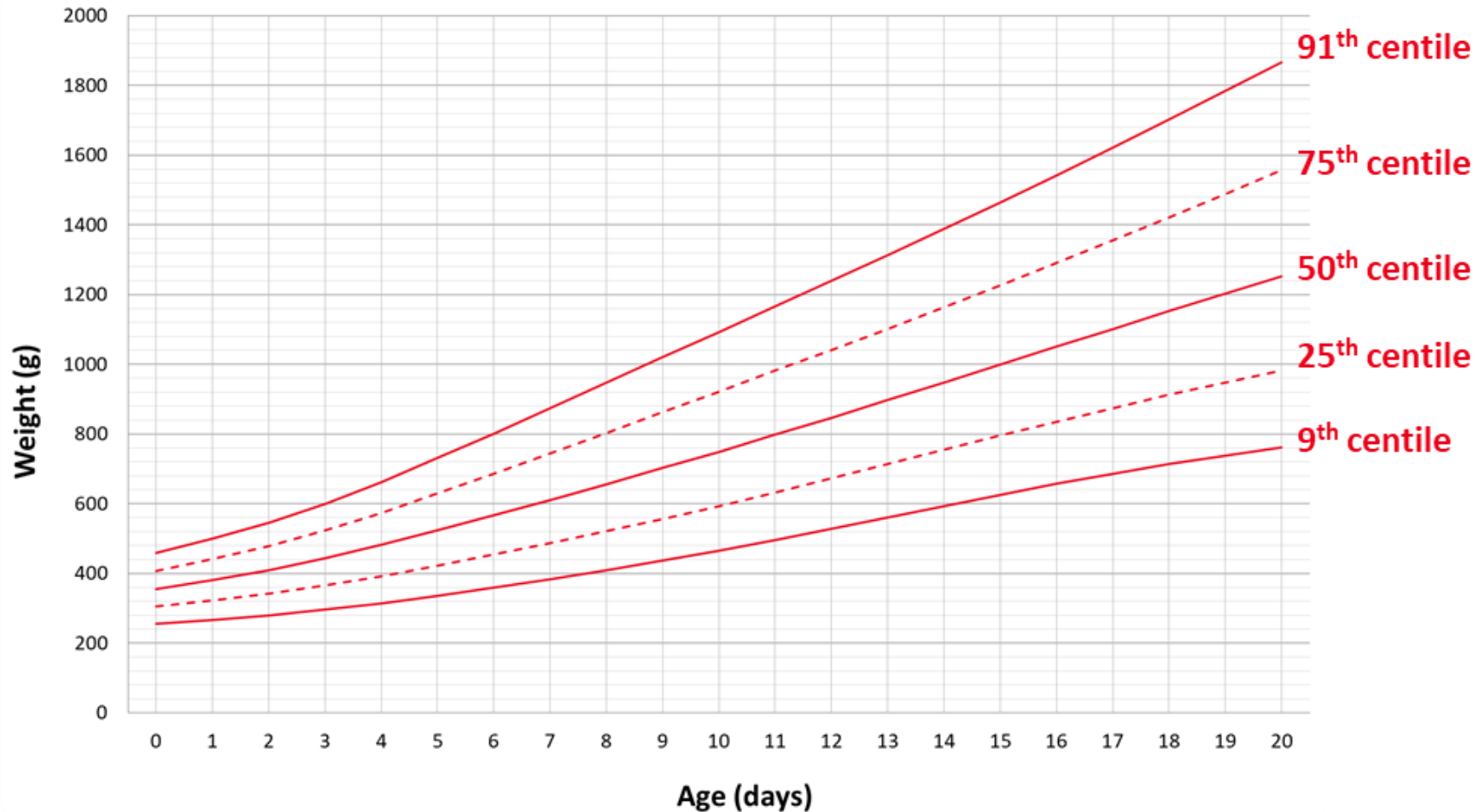
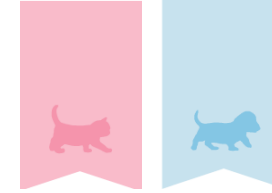


Median

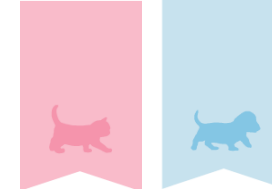
D0

D20

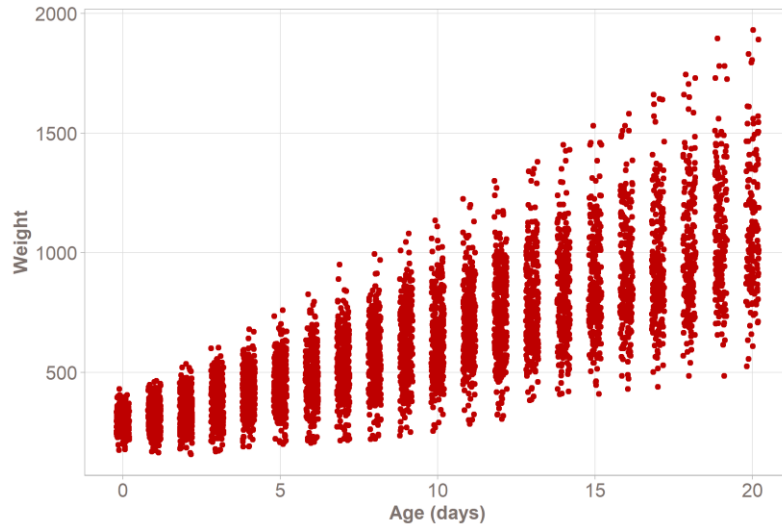
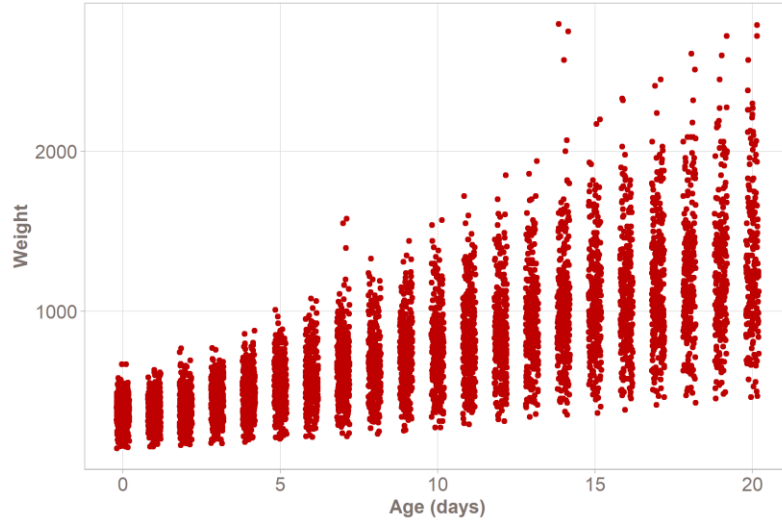
# Modelling of growth charts



0-20 days



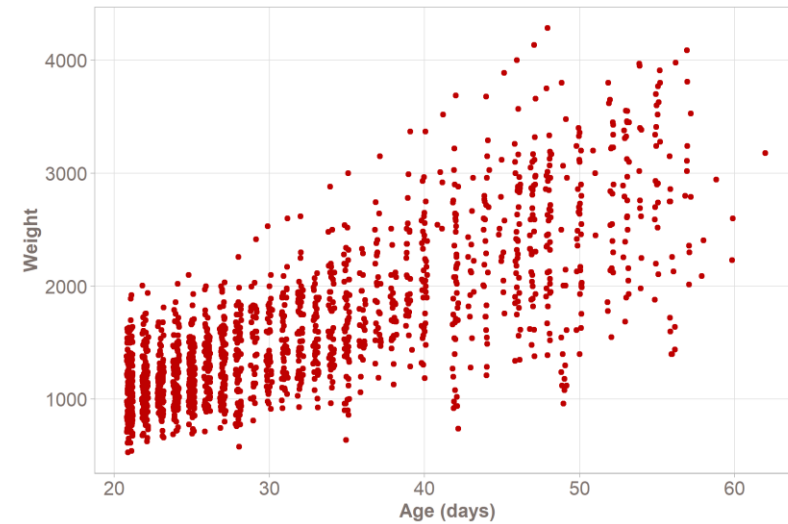
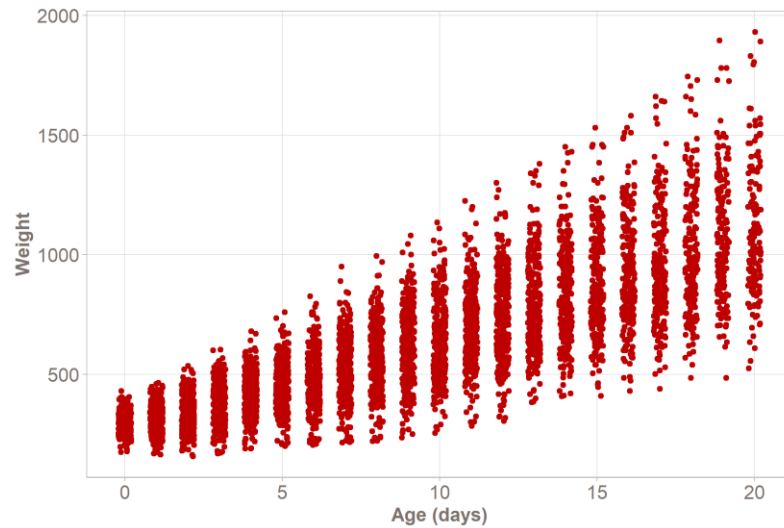
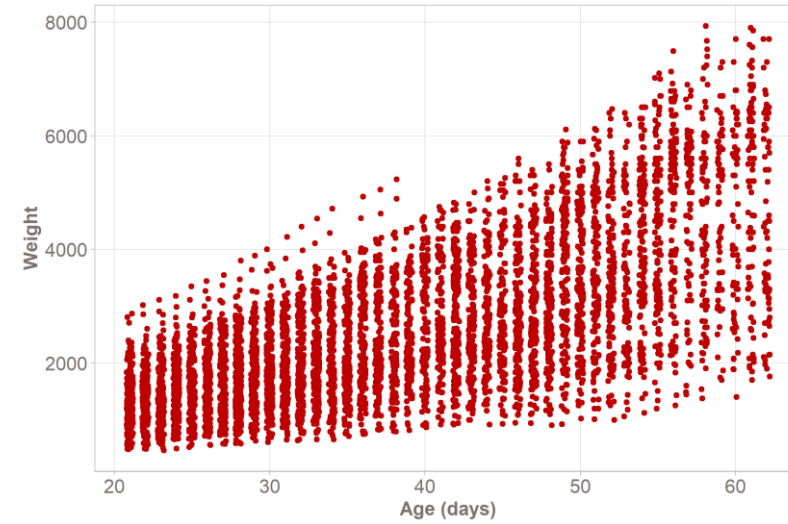
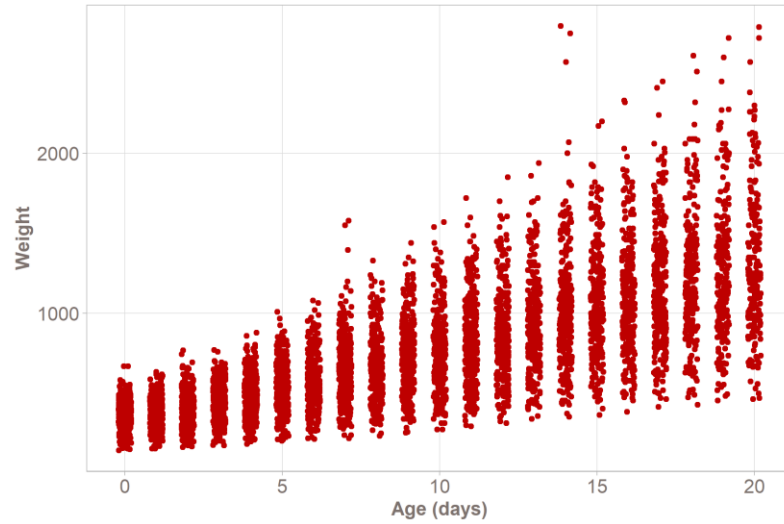
**ROYAL CANIN**  
a division of Mars Petcare



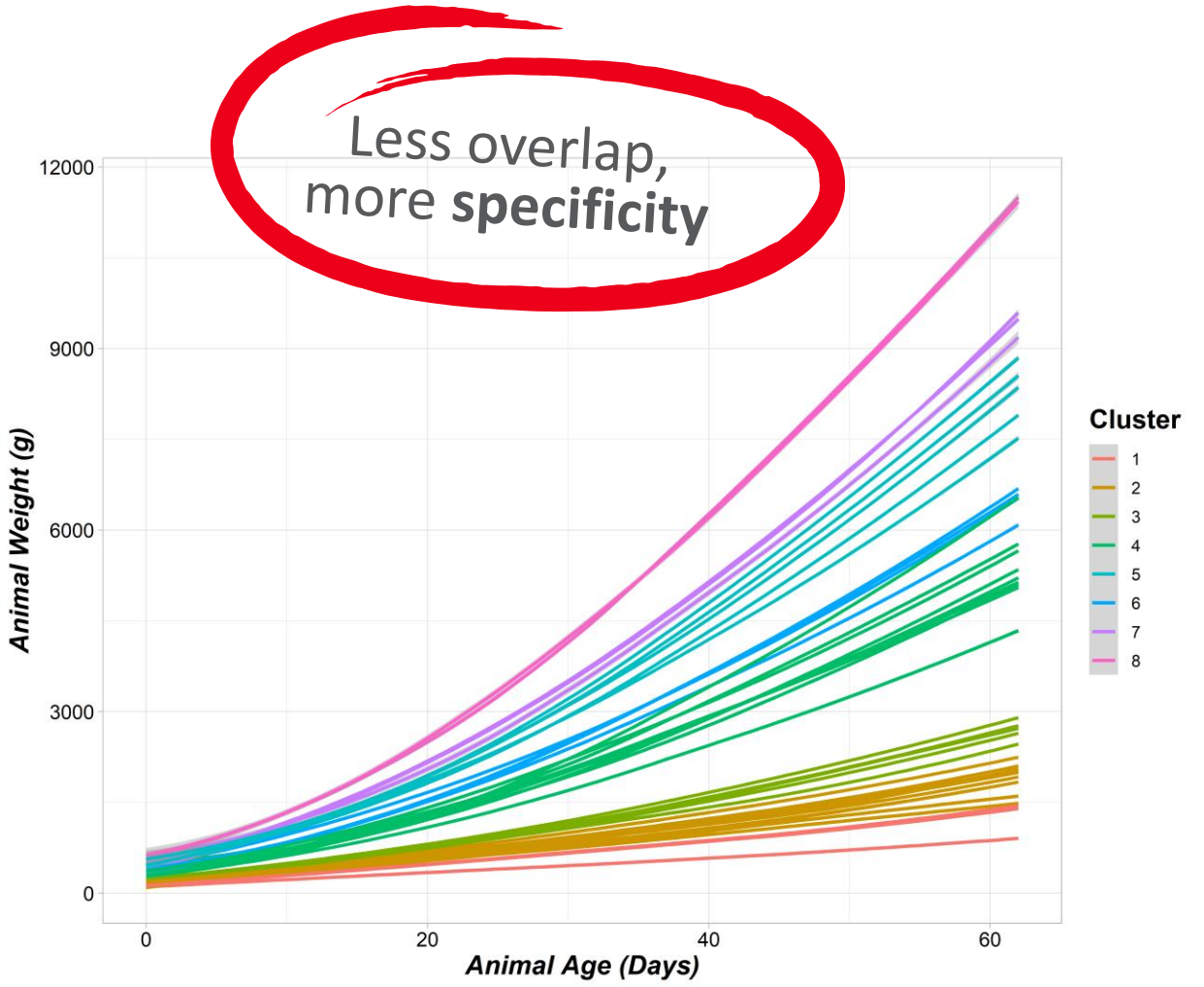
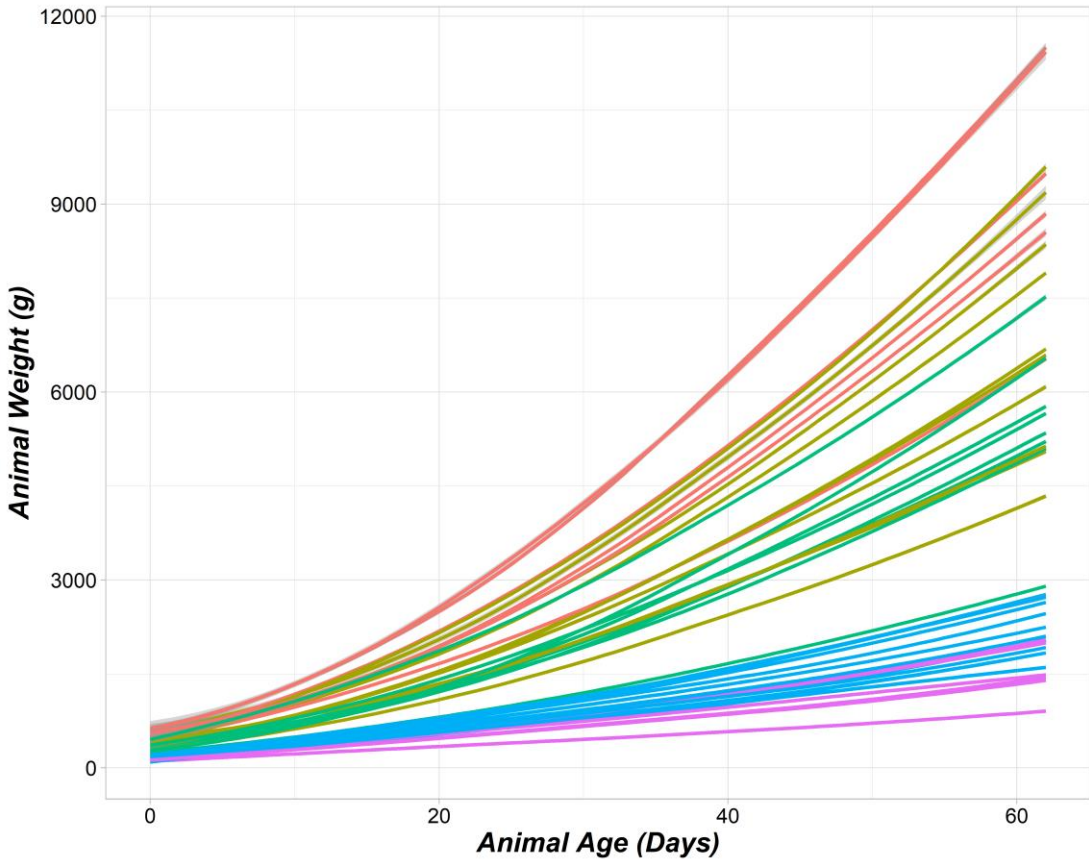
0-20 days

21-62 days

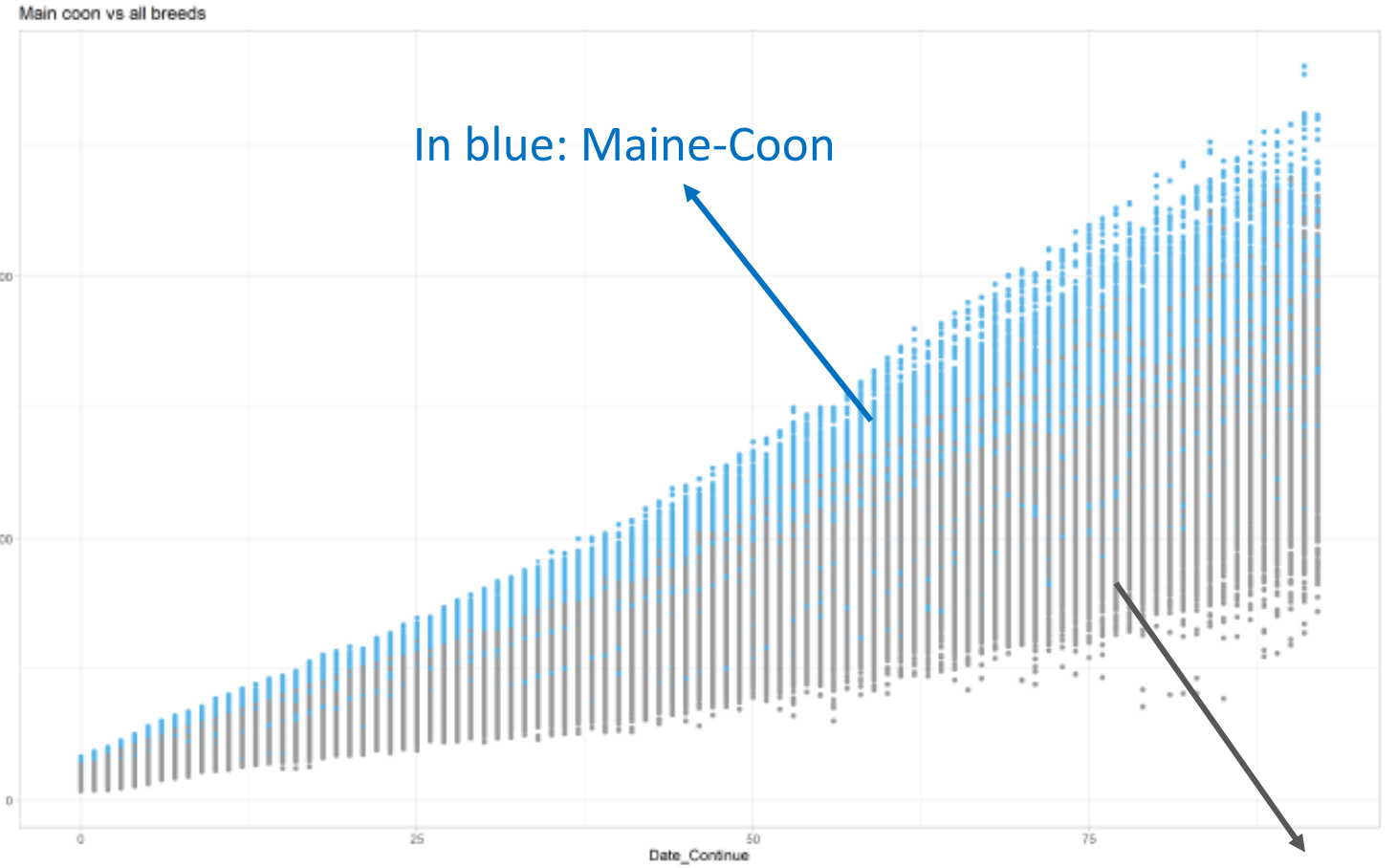
ROYAL CANIN  
a division of Mars Petcare



# Grouping breeds



# The Maine-Coon: a special case!



In grey: all other breeds



**TABLE OF CONTENT**

- : How these growth curves have been built?..... 4**
- : How to use these neonatal growth curves?..... 5**
- : Kitten breed neonatal growth curves..... 6**

<b>A</b>	<a href="#">Abyssinian</a> ..... 6	<b>O</b>	<a href="#">Oriental</a> ..... 28
	<a href="#">American Curl</a> ..... 7	<b>P</b>	<a href="#">Persian Female</a> ..... 29
<b>B</b>	<a href="#">Bengal</a> ..... 8		<a href="#">Persian Male</a> ..... 30
	<a href="#">Bombay</a> ..... 9		<a href="#">Peterbald</a> ..... 31
	<a href="#">British Longhair</a> ..... 10	<b>R</b>	<a href="#">Ragdoll Female</a> ..... 32
	<a href="#">British Shorthair Female</a> ..... 11		<a href="#">Ragdoll Male</a> ..... 33
	<a href="#">British Shorthair Male</a> ..... 12		<a href="#">Russian</a> ..... 34
	<a href="#">Burmese</a> ..... 13	<b>S</b>	<a href="#">Sacred Birman Female</a> ..... 35
<b>C</b>	<a href="#">Chartreux Female</a> ..... 14		<a href="#">Sacred Birman Male</a> ..... 36
	<a href="#">Chartreux Male</a> ..... 15		<a href="#">Savannah</a> ..... 37
	<a href="#">Cornish Rex</a> ..... 16		<a href="#">Scottish Fold</a> ..... 38
<b>D</b>	<a href="#">Devon Rex</a> ..... 17		<a href="#">Scottish Straight</a> ..... 39
<b>E</b>	<a href="#">Egyptian Mau</a> ..... 18		<a href="#">Selkirk Rex</a> ..... 40
	<a href="#">Exotic Shorthair</a> ..... 19		<a href="#">Sphynx</a> ..... 41
<b>J</b>	<a href="#">Japanese Bobtail</a> ..... 20		<a href="#">Siamese</a> ..... 42
<b>K</b>	<a href="#">Kurilian Bobtail</a> ..... 21		<a href="#">Siberian Female</a> ..... 43
<b>M</b>	<a href="#">Maine Coon Female</a> ..... 22		<a href="#">Siberian Male</a> ..... 44
	<a href="#">Maine Coon Male</a> ..... 23		<a href="#">Somali</a> ..... 45
	<a href="#">Manx</a> ..... 24		
	<a href="#">Munchkin</a> ..... 25		
<b>N</b>	<a href="#">Norwegian Female</a> ..... 26		
	<a href="#">Norwegian Male</a> ..... 27		

**KITTEN NEONATAL  
GROWTH CURVES**

A PRACTICAL TOOL FOR BREEDERS



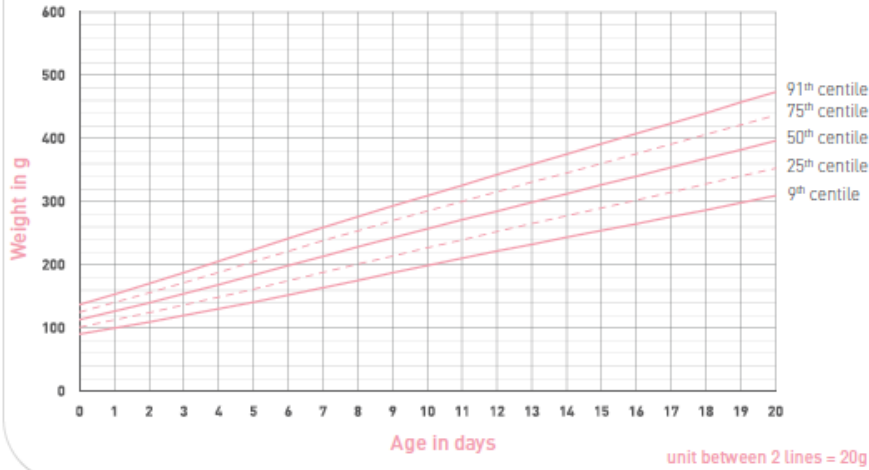


### KITTEN EARLY GROWTH CHART MAINE COON FEMALE

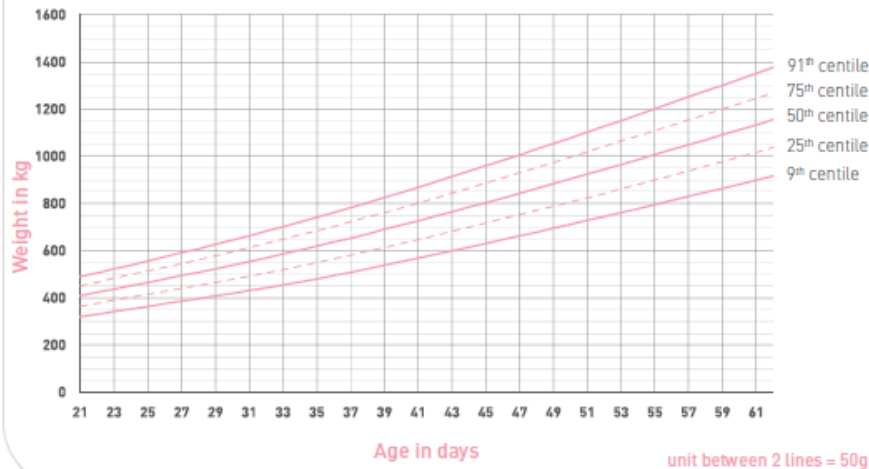


Kitten's name: ..... Date of birth : ..... / ..... / .....  
Mother's name: ..... Father's name : .....

0-20 days



21-62 days

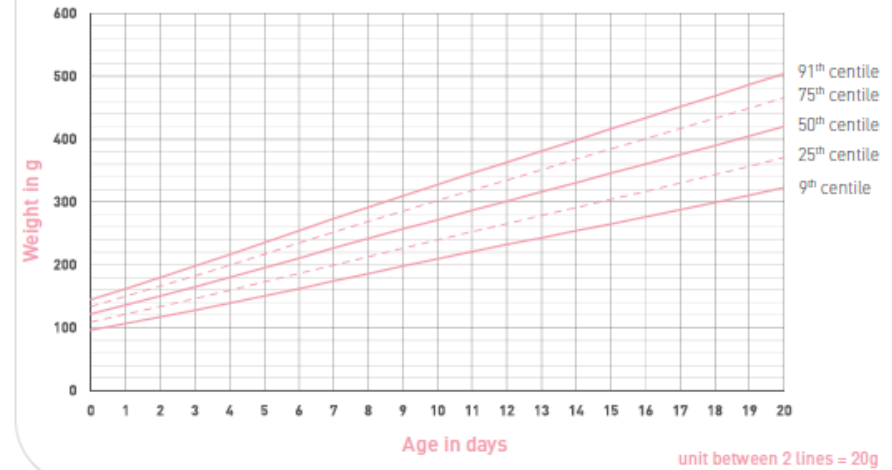


### KITTEN EARLY GROWTH CHART MAINE COON MALE

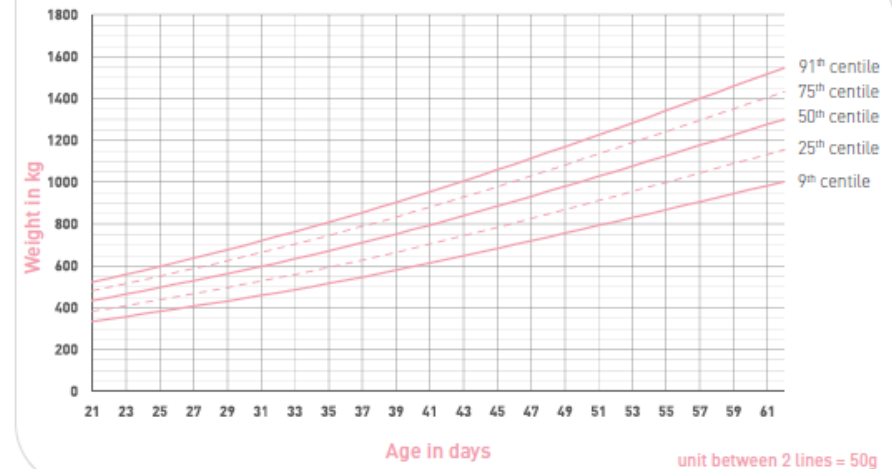


Kitten's name: ..... Date of birth : ..... / ..... / .....  
Mother's name: ..... Father's name : .....

0-20 days



21-62 days



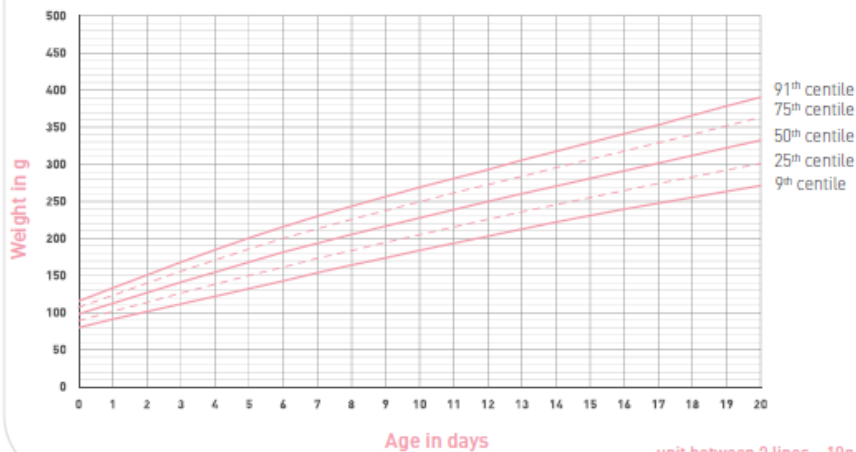


# KITTEN EARLY GROWTH CHART ABYSSINIAN

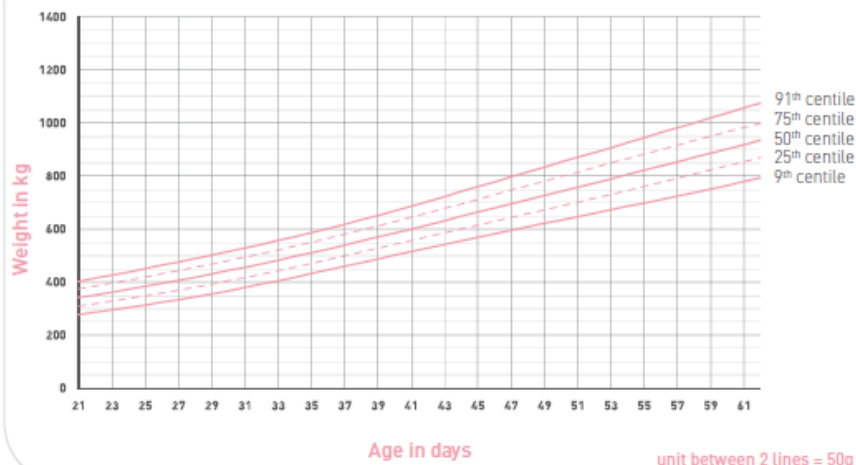


Kitten's name: ..... Date of birth : ..... / ..... / .....  
Mother's name: ..... Father's name : .....

0-20 days



21-62 days



© Royal Canin SAS 2024. All rights reserved.



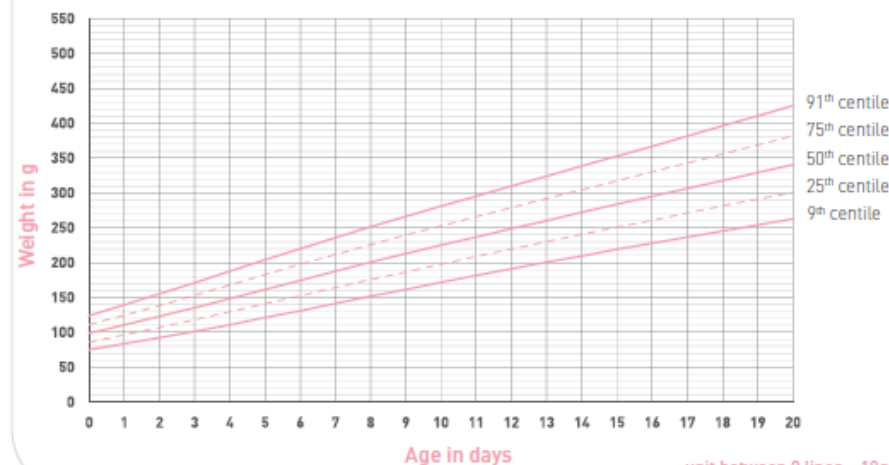
# KITTEN EARLY GROWTH CHART



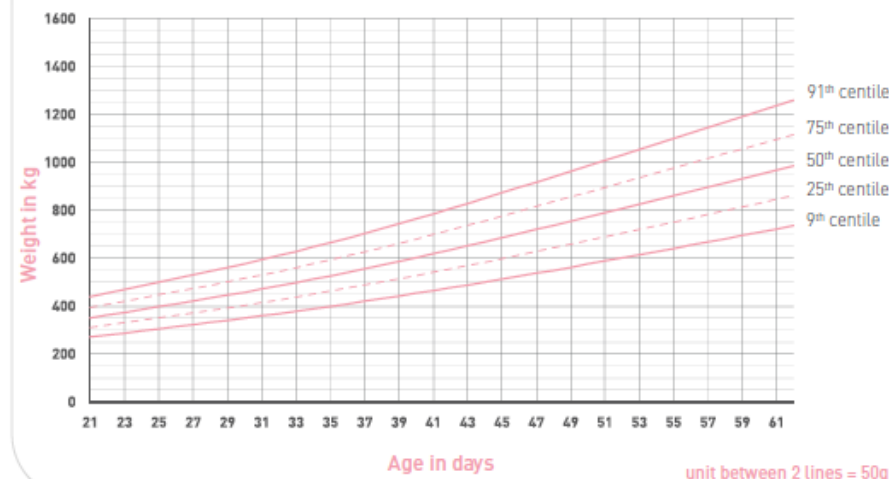
**CANIN**  
ion of Mars Petcare

Kitten's name: ..... Date of birth : ..... / ..... / .....  
Mother's name: ..... Father's name : .....

0-20 days



21-62 days



© Royal Canin SAS 2024. All rights reserved.

## TABLE OF CONTENT



# PUPPY NEONATAL GROWTH CURVES

A PRACTICAL TOOL FOR BREEDERS



• How these growth curves have been built?	5
• How to use these neonatal growth curves?	6
• Puppy breed neonatal growth curves	7
<b>A</b>   <a href="#">Airedale terrier</a> .....	7
<a href="#">Akita</a> .....	8
<a href="#">Alaskan malamute</a> .....	9
<a href="#">American akita</a> .....	10
<a href="#">American cocker spaniel</a> .....	11
<a href="#">American staffordshire terrier</a> .....	12
<a href="#">Australian cattle dog</a> .....	13
<a href="#">Australian shepherd</a> .....	14
<a href="#">Australian silky terrier</a> .....	15
<a href="#">Auvergne pointer</a> .....	16
<b>B</b>   <a href="#">Basenji</a> .....	17
<a href="#">Basset hound</a> .....	18
<a href="#">Beagle</a> .....	19
<a href="#">Bearded collie</a> .....	20
<a href="#">Beauce sheepdog</a> .....	21
<a href="#">Belgian groenendael</a> .....	22
<a href="#">Belgian laekenois</a> .....	23
<a href="#">Belgian malinois</a> .....	24
<a href="#">Belgian tervueren</a> .....	25
<a href="#">Bernese mountain</a> .....	26
<a href="#">Bichon frise</a> .....	27
<a href="#">Border collie</a> .....	28
<a href="#">Border terrier</a> .....	29
<a href="#">Boston terrier</a> .....	30
<a href="#">Boxer</a> .....	31
<a href="#">Briard</a> .....	32
<a href="#">Brittany spaniel</a> .....	33
<a href="#">Bulldog</a> .....	34
<a href="#">Bullmastiff</a> .....	35
<a href="#">Bull terrier</a> .....	36
<b>C</b>   <a href="#">Cairn terrier</a> .....	37
<a href="#">Cavalier King Charles spaniel</a> .....	38
<a href="#">Chihuahua</a> .....	39
<a href="#">Chinese crested dog</a> .....	40
<a href="#">Chow chow</a> .....	41
<a href="#">Clumber spaniel</a> .....	42
<a href="#">Collie rough</a> .....	43
<a href="#">Collie smooth</a> .....	44
<a href="#">Continental bulldog</a> .....	45
<a href="#">Continental toy spaniel</a> .....	46
<a href="#">Coton de Tulear</a> .....	47
<b>D</b>   <a href="#">Dachshund</a> .....	48
<a href="#">Dalmatian</a> .....	49
<a href="#">Dobermann</a> .....	50
<a href="#">Dogo argentino</a> .....	51
<a href="#">Doque de Bordeaux</a> .....	52
<b>E</b>   <a href="#">English cocker spaniel</a> .....	53
<a href="#">English pointer</a> .....	54
<a href="#">English setter</a> .....	55
<a href="#">Entlebuch cattle dog</a> .....	56
<a href="#">Eurasian</a> .....	57
<b>F</b>   <a href="#">Field spaniel</a> .....	58
<a href="#">Flat coated retriever</a> .....	59
<a href="#">Fox terrier wire</a> .....	60
<a href="#">French bulldog</a> .....	61
<a href="#">French spaniel</a> .....	62
<b>G</b>   <a href="#">German shepherd</a> .....	63
<a href="#">German short haired pointing dog</a> .....	64
<a href="#">Giant schnauzer</a> .....	65
<a href="#">Golden retriever</a> .....	66
<a href="#">Gordon setter</a> .....	67
<a href="#">Great dane</a> .....	68
<a href="#">Great swiss mountain dog</a> .....	69
<a href="#">Greyhound</a> .....	70
<b>H</b>   <a href="#">Hungarian wire haired pointer</a> .....	71
<b>I</b>   <a href="#">Irish red setter</a> .....	72
<a href="#">Irish wolfhound</a> .....	73
<a href="#">Italian greyhound</a> .....	74
<b>J</b>   <a href="#">Jack russel terrier</a> .....	75
<b>K</b>   <a href="#">Kerry blue terrier</a> .....	76
<b>L</b>   <a href="#">Labrador retriever</a> .....	77
<a href="#">Lakeland terrier</a> .....	78
<a href="#">Landseer european continental type</a> .....	79
<a href="#">Leonberger</a> .....	80
<a href="#">Lhasa apso</a> .....	81
<a href="#">Little lion dog / Lowchen</a> .....	82
<a href="#">Long haired pyrenean sheepdog</a> .....	83
<b>M</b>   <a href="#">Maltese</a> .....	84
<a href="#">Mastiff</a> .....	85
<a href="#">Medium poodle</a> .....	86
<a href="#">Miniature pinscher</a> .....	87
<a href="#">Miniature schnauzer</a> .....	88
<b>N</b>   <a href="#">Newfoundland</a> .....	89
<b>O</b>   <a href="#">Old english sheepdog</a> .....	90
<b>P</b>   <a href="#">Parson russell terrier</a> .....	91
<a href="#">Pekingese</a> .....	92
<a href="#">Petit basset griffon vendeen</a> .....	93
<a href="#">Picardy shepherd</a> .....	94
<a href="#">Polish lowland sheepdog</a> .....	95
<a href="#">Pomeranian</a> .....	96
<a href="#">Poodle royal</a> .....	97
<a href="#">Pug</a> .....	98
<b>R</b>   <a href="#">Rottweiler</a> .....	99
<a href="#">Russian toy</a> .....	100
<b>S</b>   <a href="#">Saarloos wolfhond</a> .....	101
<a href="#">Samoyed</a> .....	102
<a href="#">Schipperke</a> .....	103
<a href="#">Scottish terrier</a> .....	104
<a href="#">Schnauzer</a> .....	105
<a href="#">Schar pei</a> .....	106
<a href="#">Shetland sheepdog</a> .....	107
<a href="#">Shiba</a> .....	108
<a href="#">Shih tzu</a> .....	109
<a href="#">Siberian husky</a> .....	110
<a href="#">Small munsterlander pointer</a> .....	111
<a href="#">Staffordshire bull terrier</a> .....	112
<a href="#">St Bernard</a> .....	113
<b>T</b>   <a href="#">Tibetan spaniel</a> .....	114
<b>W</b>   <a href="#">Welsh corgi pembroke</a> .....	115
<a href="#">West highland white terrier</a> .....	116
<a href="#">Whippet</a> .....	117
<a href="#">White swiss shepherd dog</a> .....	118
<b>Y</b>   <a href="#">Yorkshire terrier</a> .....	119

## TABLE OF CONTENT

• Puppy Size neonatal growth curves	120
X-small – Adult weight up to 4kg	120
Mini – Adult weight 4 to 10kg	121
Medium – Adult weight 11 to 25kg	122
Maxi – Adult weight 26 to 44 kg	123
Giant – Adult weight over 45kg	124

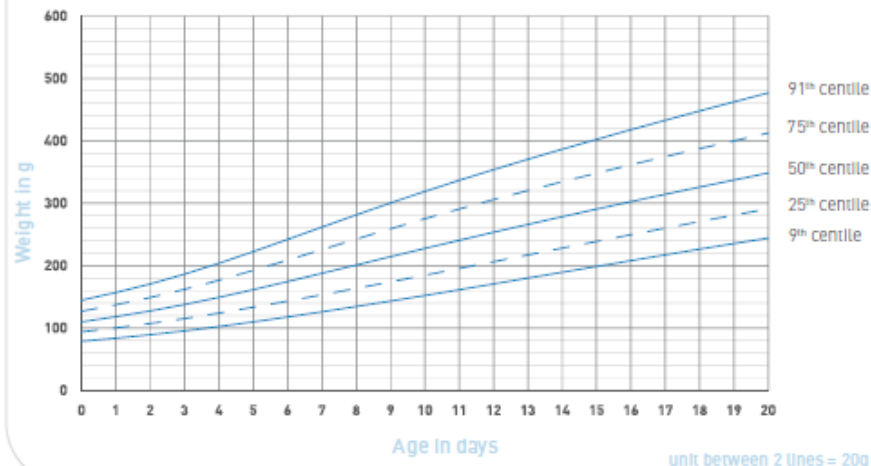


### PUPPY EARLY GROWTH CHART CHIHUAHUA

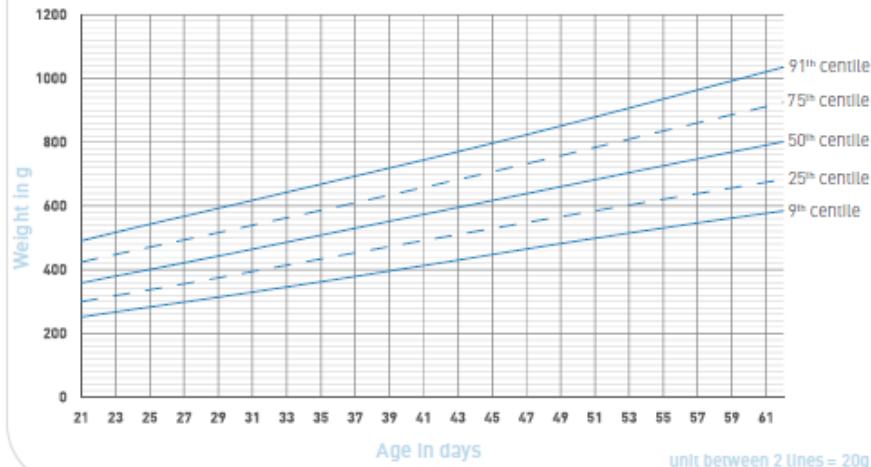


Puppy's name: ..... Date of birth : ..... / ..... / .....  
Mother's name: ..... Father's name : .....

0-20 days



21-62 days

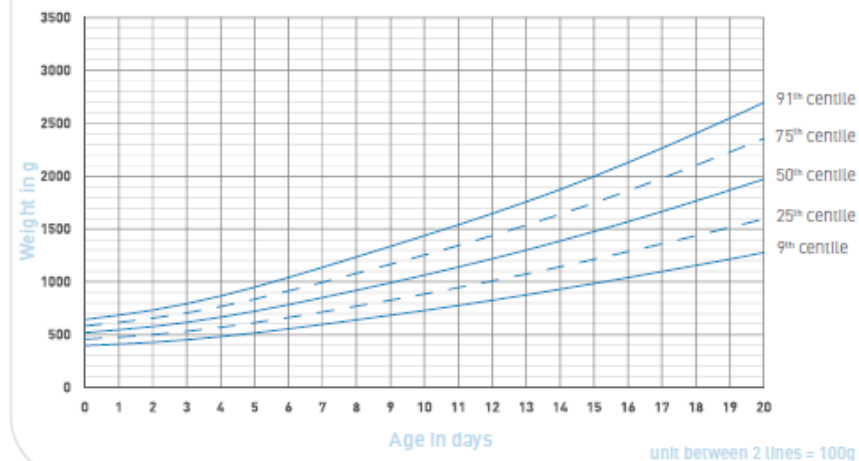


### PUPPY EARLY GROWTH CHART NEWFOUNDLAND

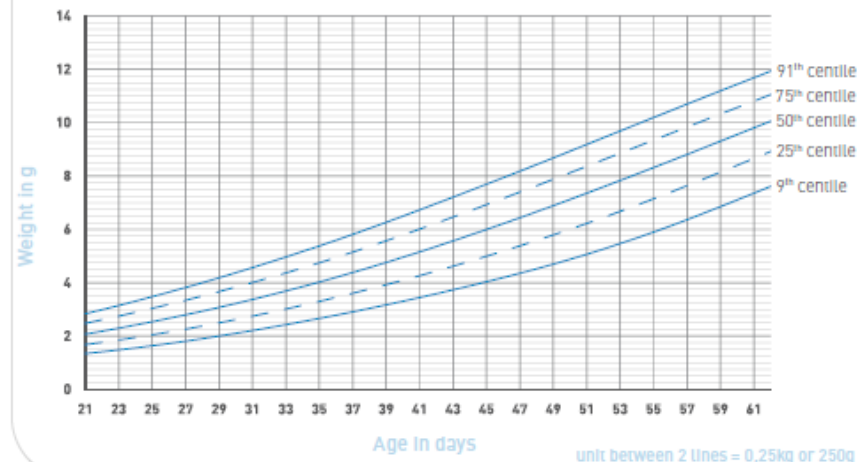


Puppy's name: ..... Date of birth : ..... / ..... / .....  
Mother's name: ..... Father's name : .....

0-20 days



21-62 days





### PUPPY EARLY GROWTH CHART X-SMALL BREED



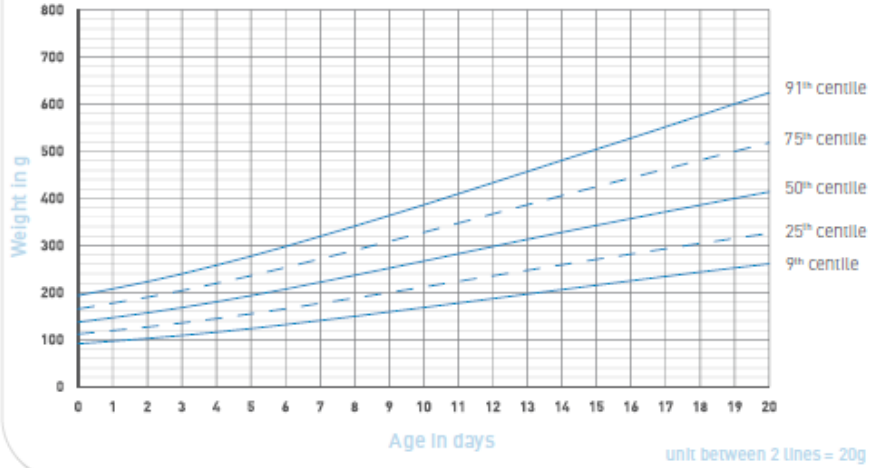
### PUPPY EARLY GROWTH CHART GIANT BREED



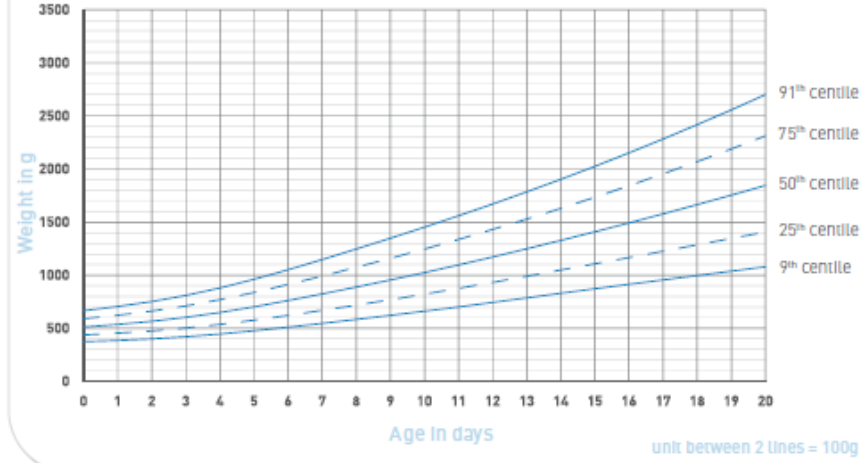
Puppy's name: ..... Date of birth: ..... / ..... / .....  
Mother's name: ..... Father's name: .....

Puppy's name: ..... Date of birth: ..... / ..... / .....  
Mother's name: ..... Father's name: .....

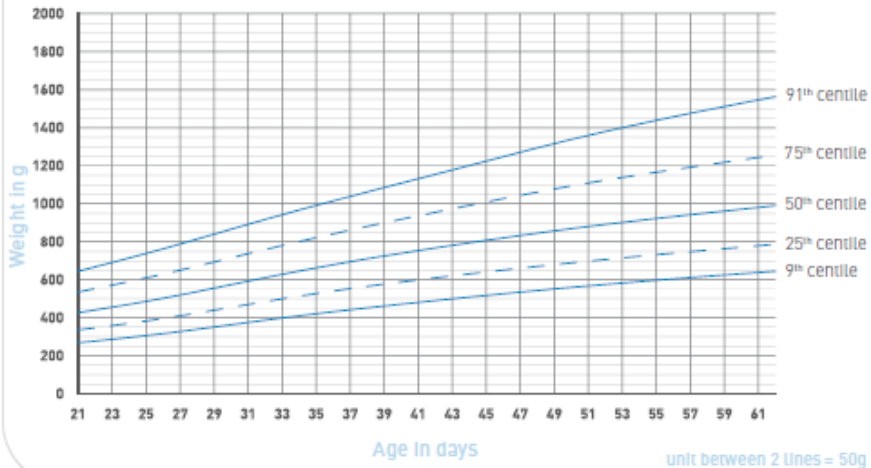
0-20 days



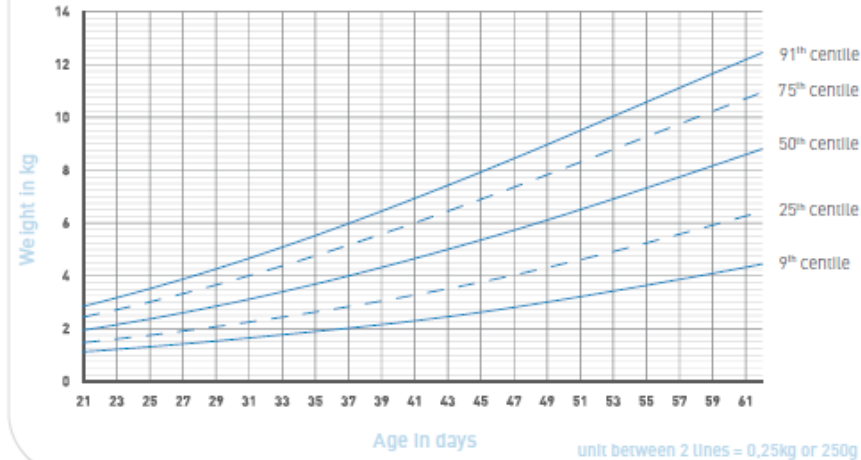
0-20 days

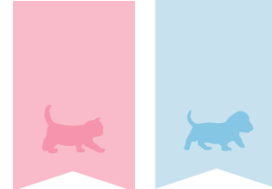


21-62 days



21-62 days





# How to use the Neonatal Growth Curves?

This booklet presents the most accurate neonatal growth charts, available at the date of publication of this booklet, from birth up to 2 months of age for more than 30 kitten breeds.

A growth chart allows you to track how a kitten's weight evolves from birth until 2 months old. For practicality reasons, the growth chart is displayed into 2 graphs, firstly from birth up to 20 days of age, then from 21 to 62 days of age.

On a graph, you can see **5 reference lines** which correspond to the **9, 25, 50, 75 and 91 centiles** from bottom to top respectively. The bottom reference line is the 9th centile curve. It indicates that 9% of kittens (of a given population) have a weight below this curve. The upper reference line is the 91th centile curve. It indicates that 91% of kittens (of a given population) have a weight below this curve.

One kitten's weight can be anywhere on the graph, and even sometimes outside the weight curves represented. Nevertheless, it should smoothly increase across time. To have the best visualization of your kitten's weight evolution we advise you to monitor it on a regular basis. Weight loss or the absence of weight gain for 2 consecutive days should alert you and encourage you to seek advice from your veterinarian.



## Here are few tips using the neonatal growth charts:

1. Select the corresponding growth charts for your kitten breed, phenotype and sex when available.

If the breed is not available, please use the generic kitten growth chart (page 46).

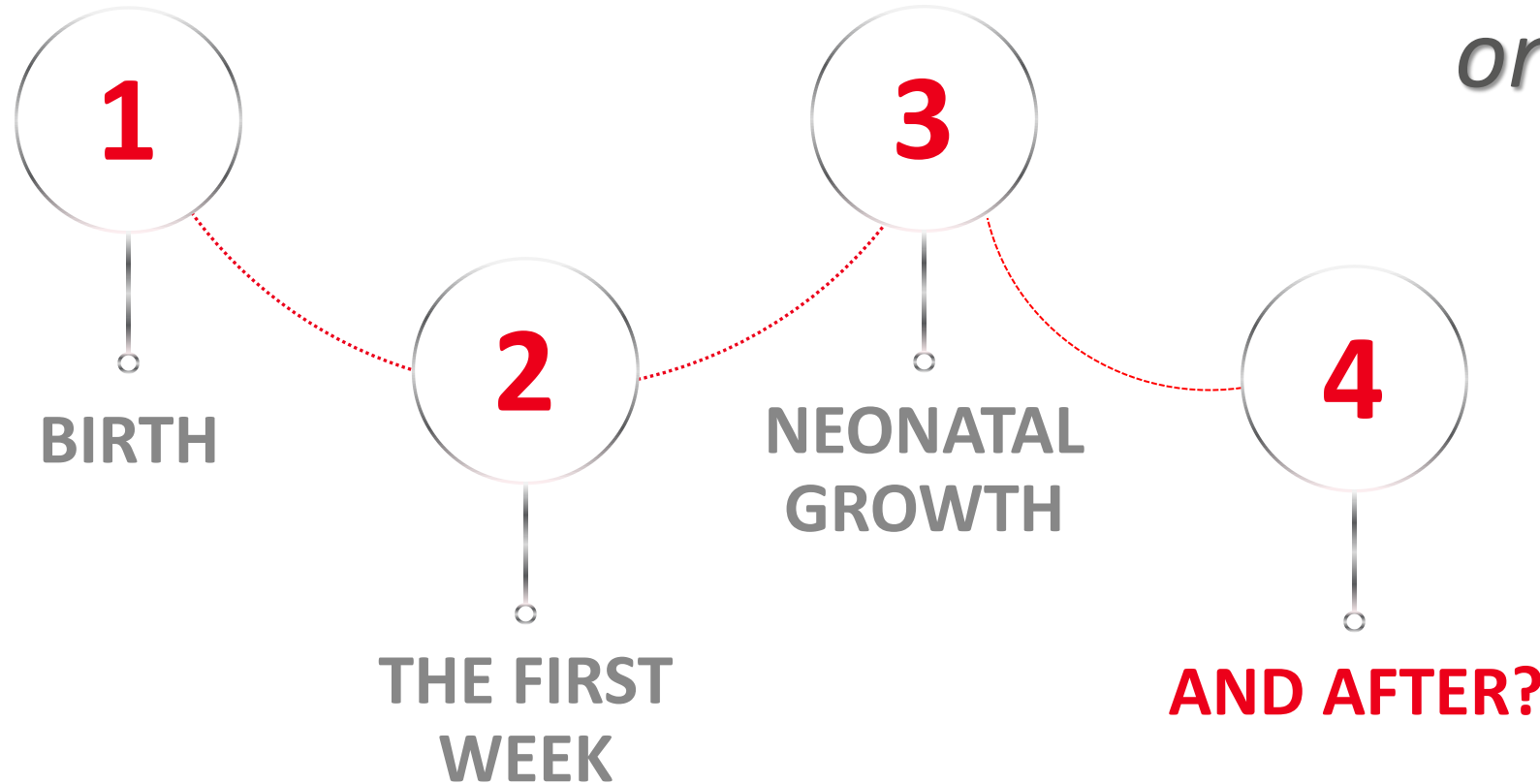
2. Print one page for each kitten of the litter and fill in the identity information.

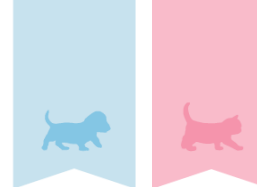
3. Weigh the kitten and plot the body weight on the growth charts:

4. It is important to use a scale that is accurate to at least 5 g. We recommend that you weigh the kittens at regular intervals at the same time each day.

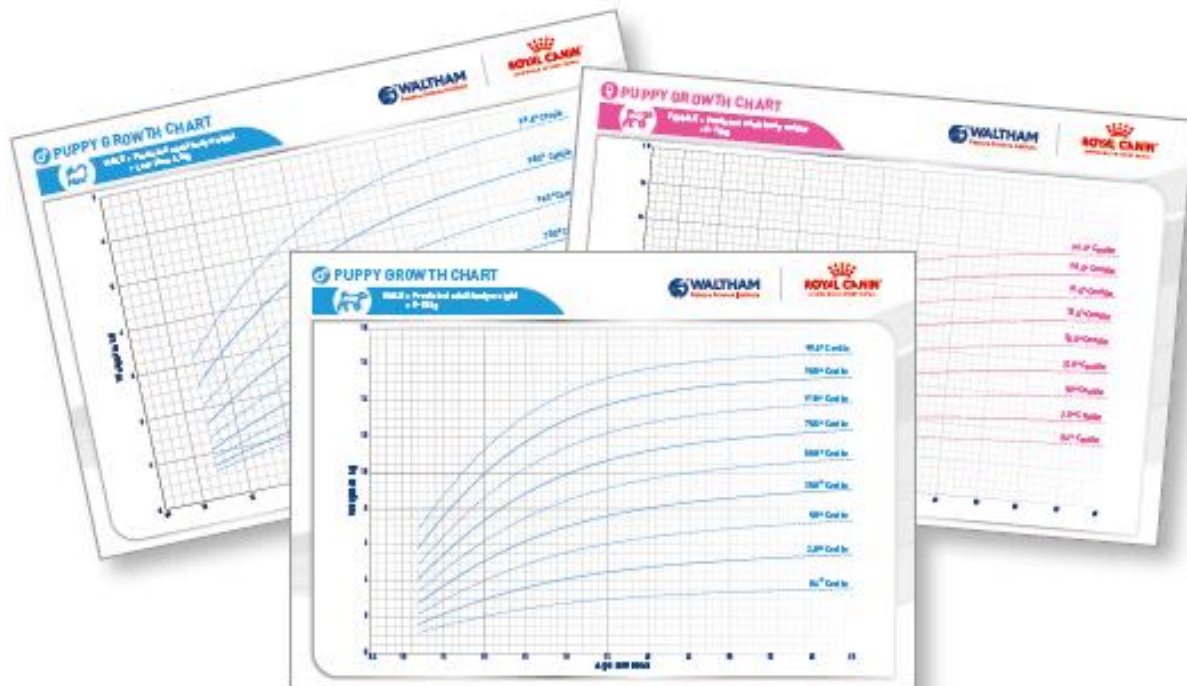
5. We advise to weigh the kitten at birth then each day at least up to day 20 (graph on top). Then, continue to weigh the kitten every other day as much as possible up to the end of the follow-up period (graph on the bottom).

*From 2 months of age  
onwards*





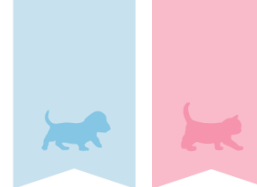
# Pediatric growth charts



From 2 months of age up to adulthood

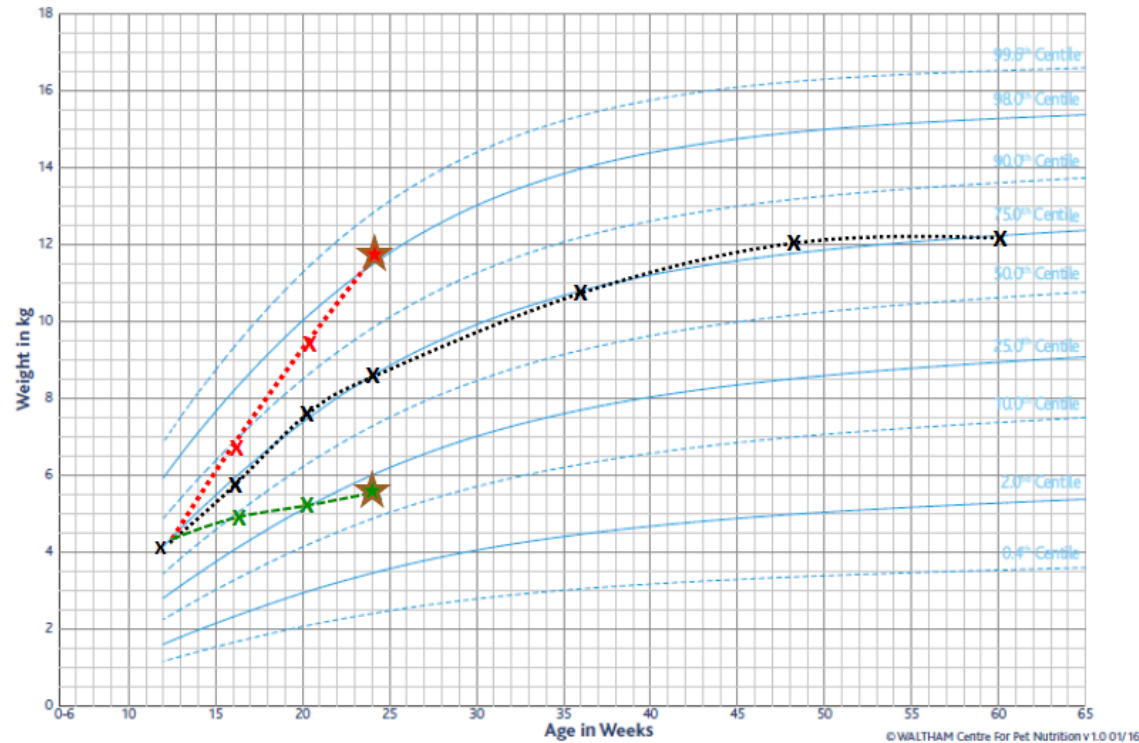


[www.waltham.com](http://www.waltham.com)



# WALTHAM Puppy Growth Chart

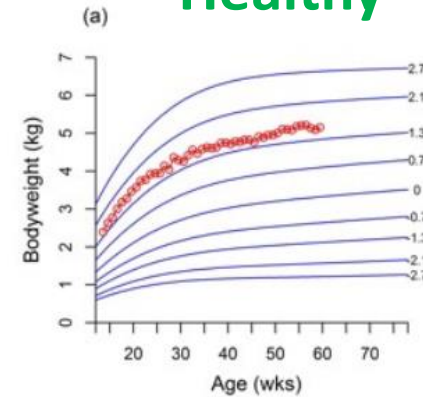
**MALE**  
Predicted adult body weight  
9-15kg 



At least **monthly until 6 months of age** then at least **every 3 months until adult**

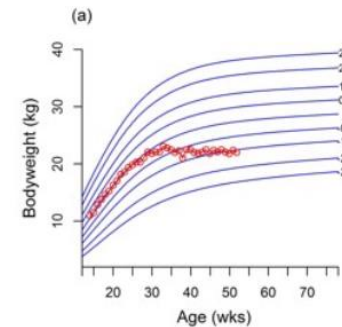
Interpretation alongside **health and body condition**

## Healthy

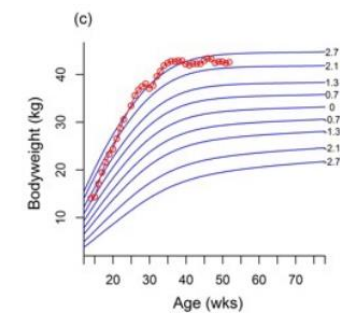


- Follow centile lines
- Usually  $\pm 1$  centile line
- May bounce around

## Too slow



## Too fast



- Weights above or below the chart
- Faster or slower than the centile lines
- $\approx 2$  centile lines or more deviation

## Growth alert

# Take-home messages

- Breeders can positively impact the health of puppies and kittens once adults
- Weighing is essential from birth
- Catch-up growth must be managed cautiously to limit mortality
- Use and share the growth charts with the pet owner: prevention is crucial in weight management



 **ROYAL CANIN**  
a division of Mars Petcare

[virginie.gaillard@royalcanin.com](mailto:virginie.gaillard@royalcanin.com)

