Daughter fertility and survival ABVs

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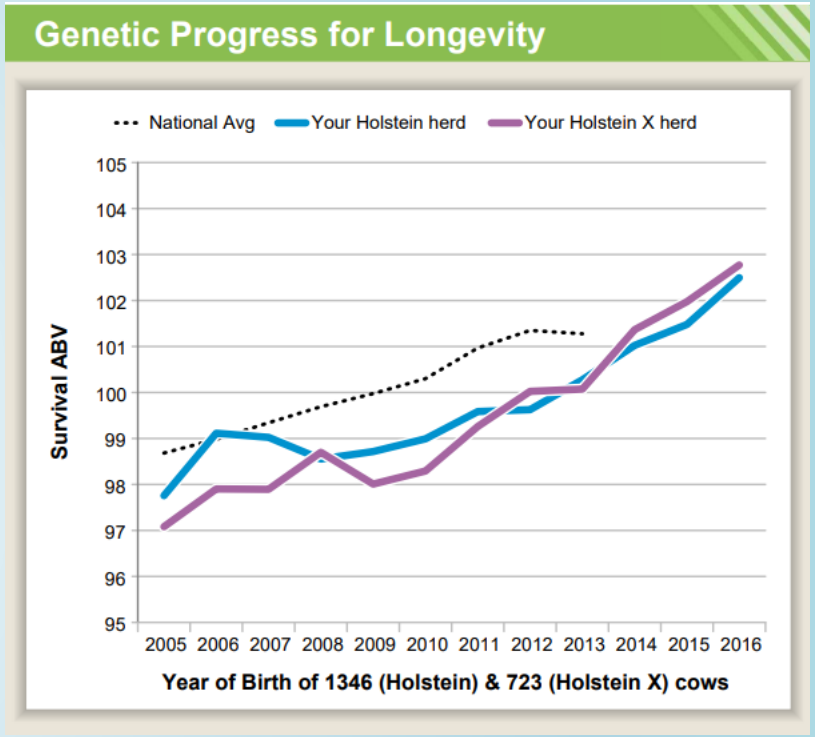
DataGene
Solutions for Herd Development

Dairy Australia

Survival ABV



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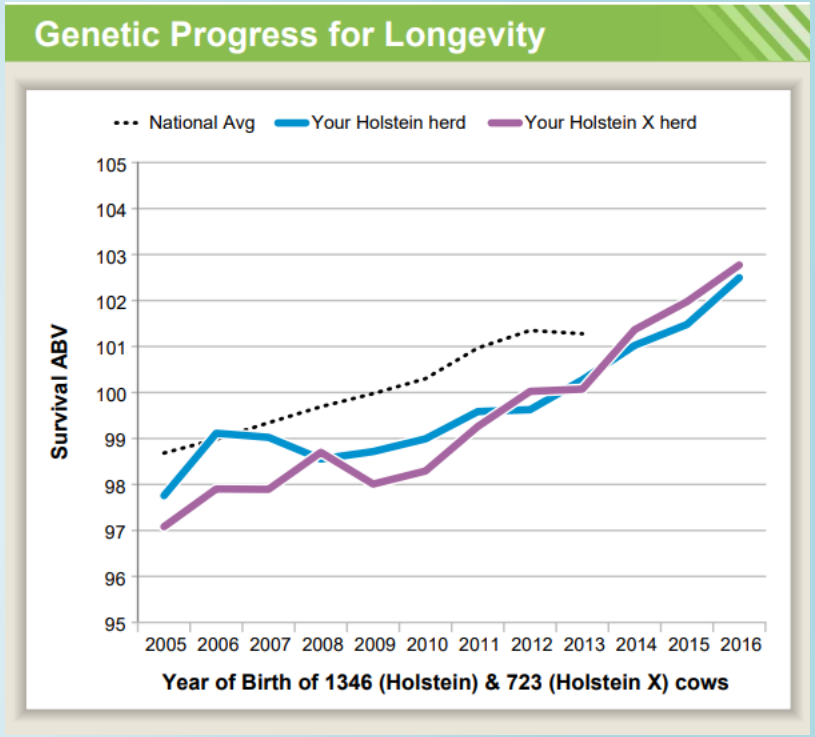
~~Survival~~ Longevity ABV



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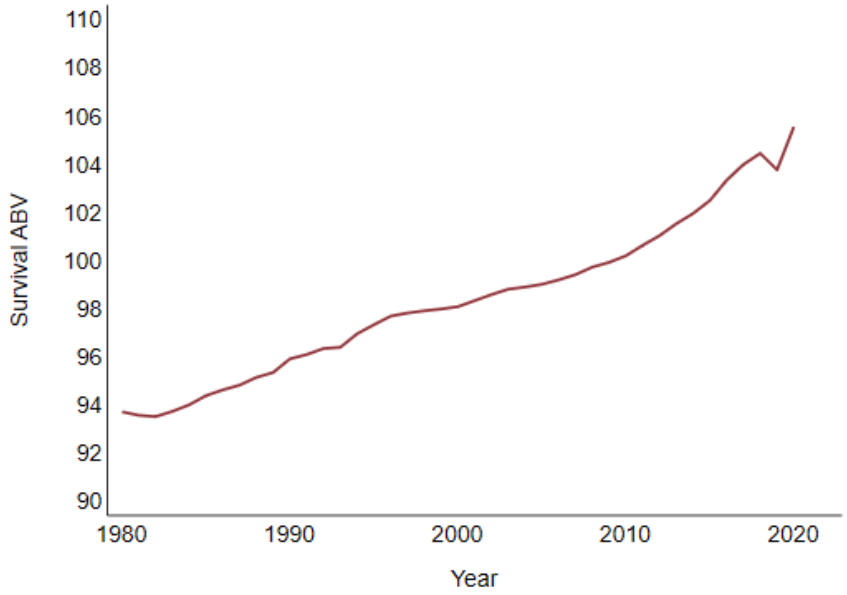
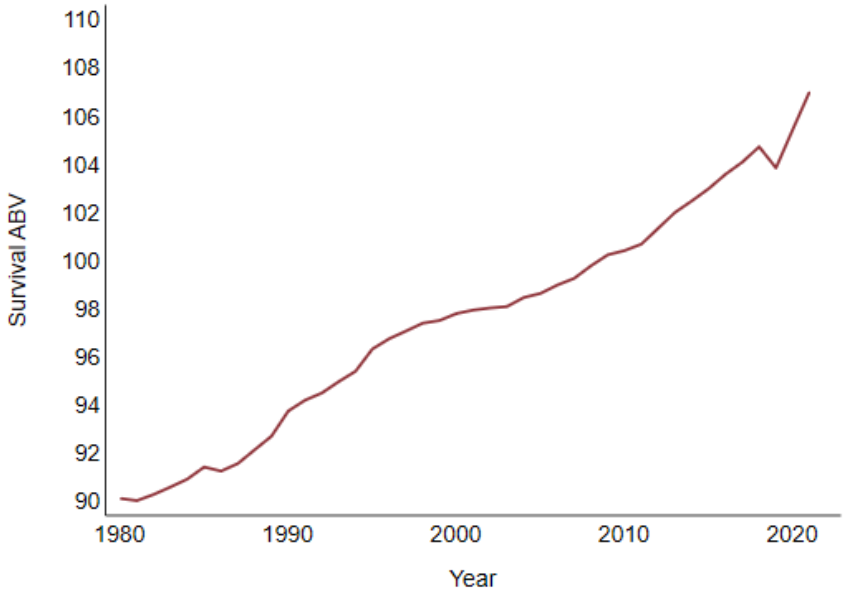
Holstein cows

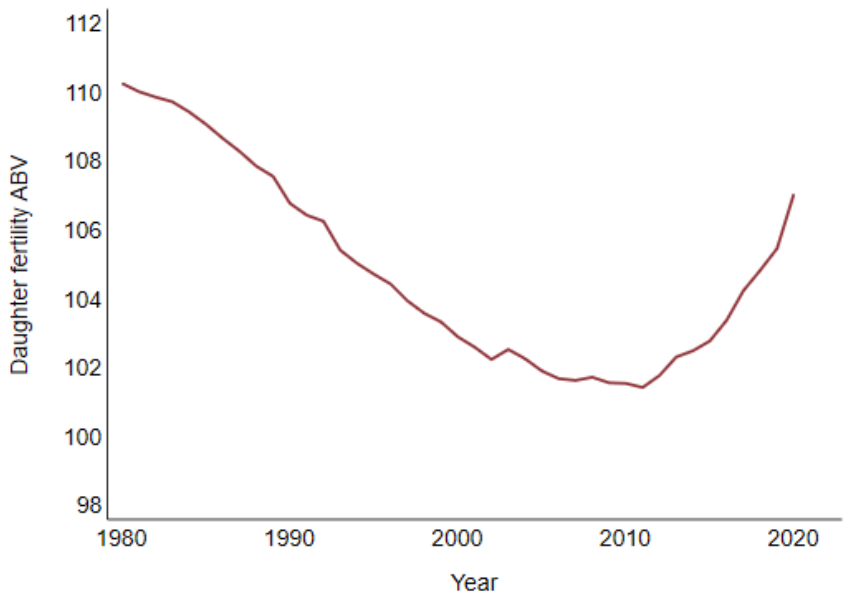
Jersey cows

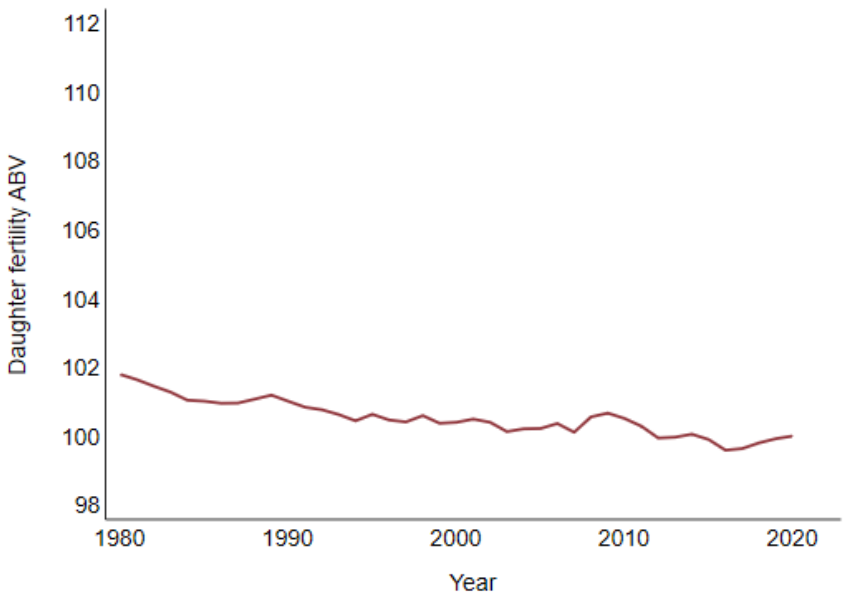
Survival ABVs

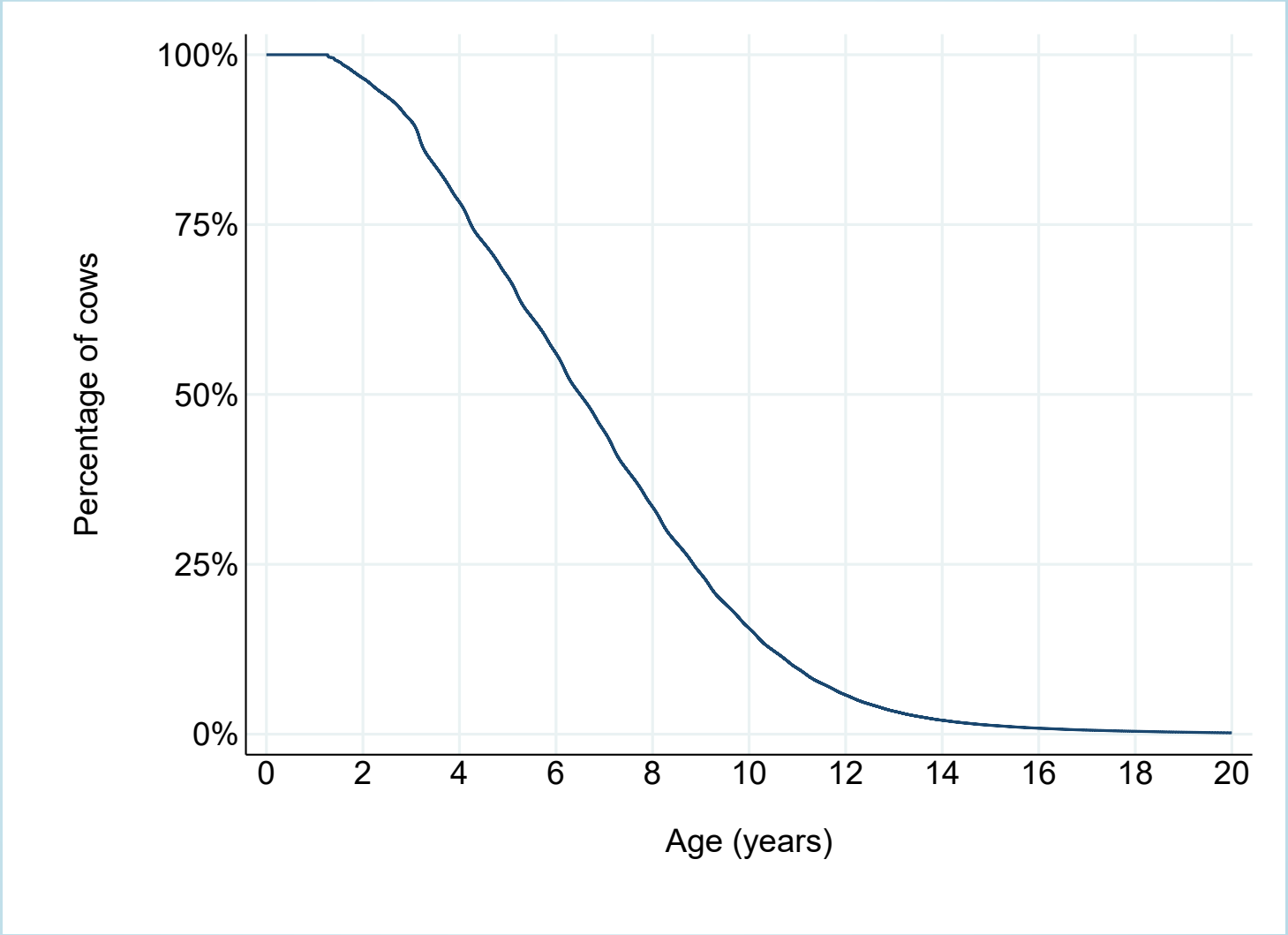




Daughter fertility ABVs

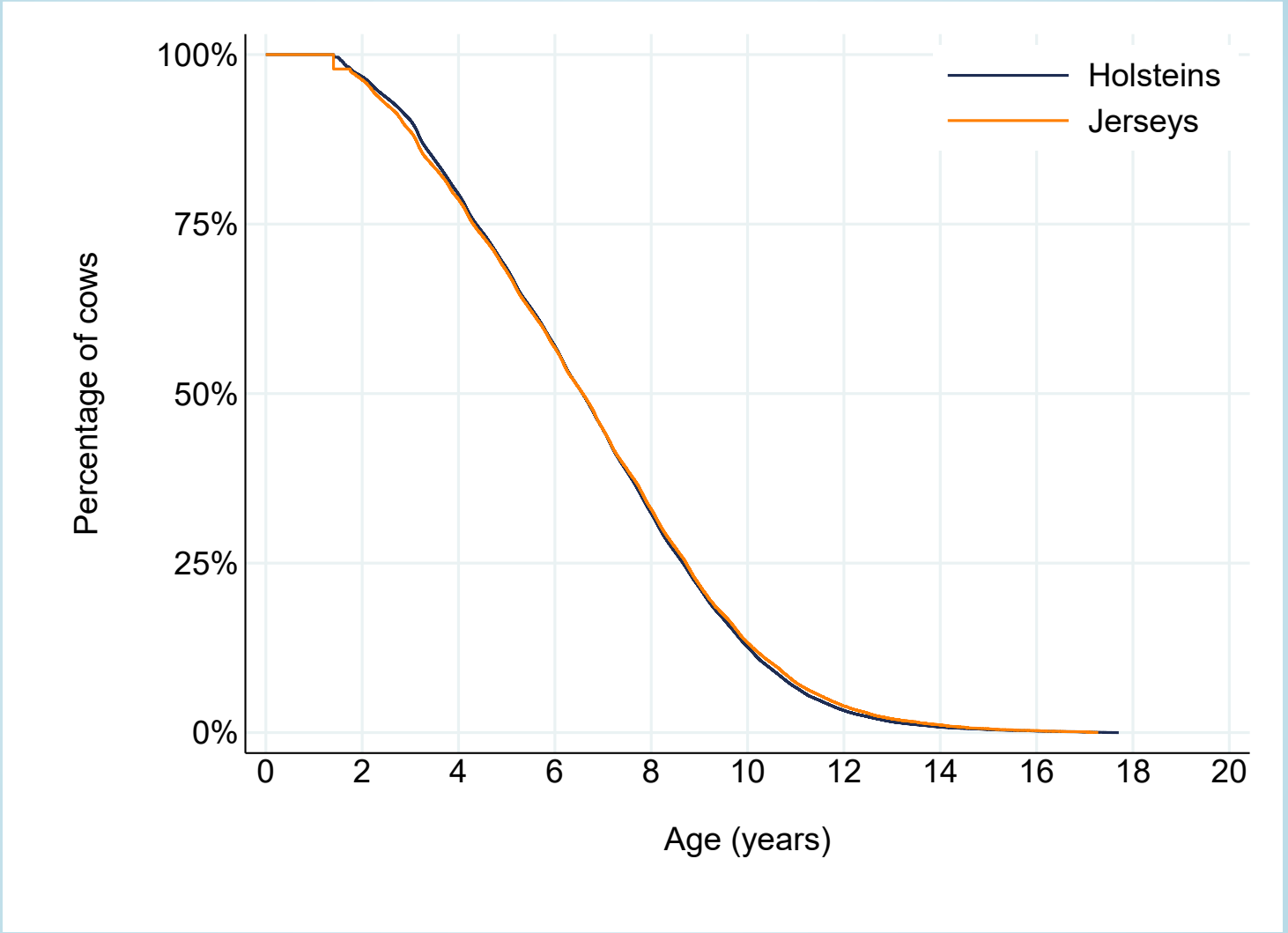






All cows born from 1990

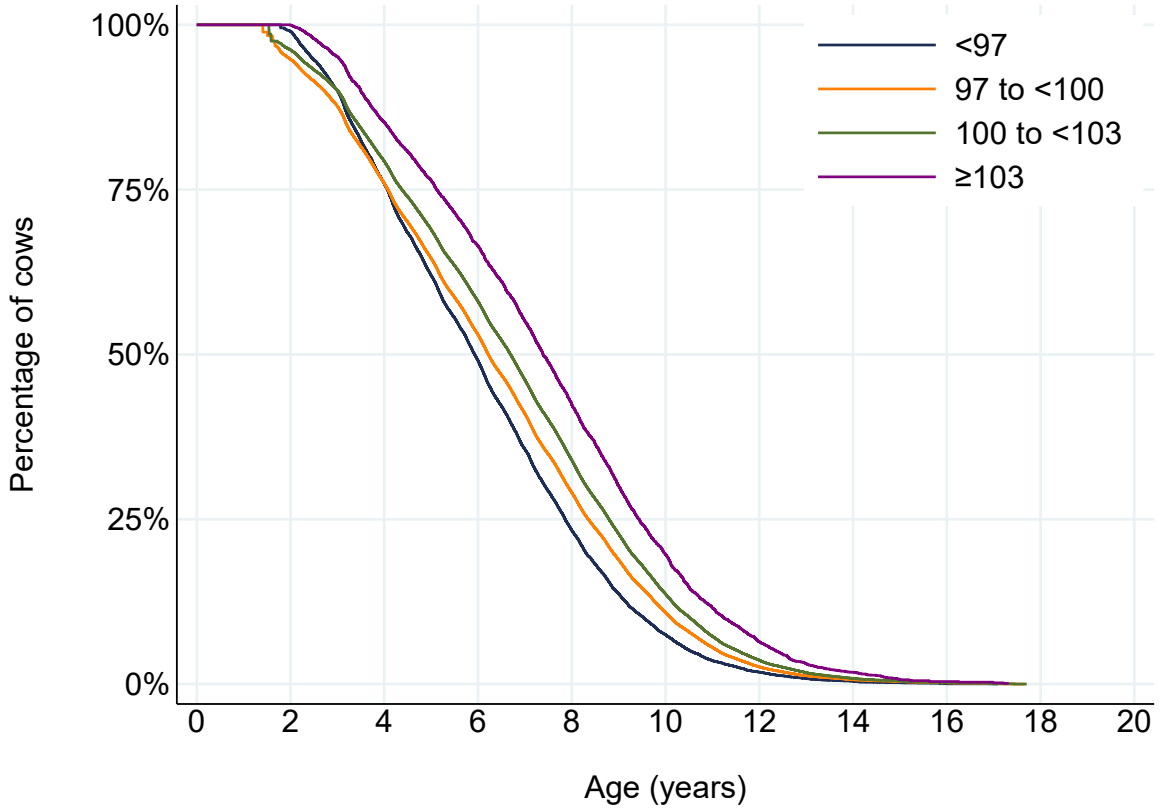
Breed



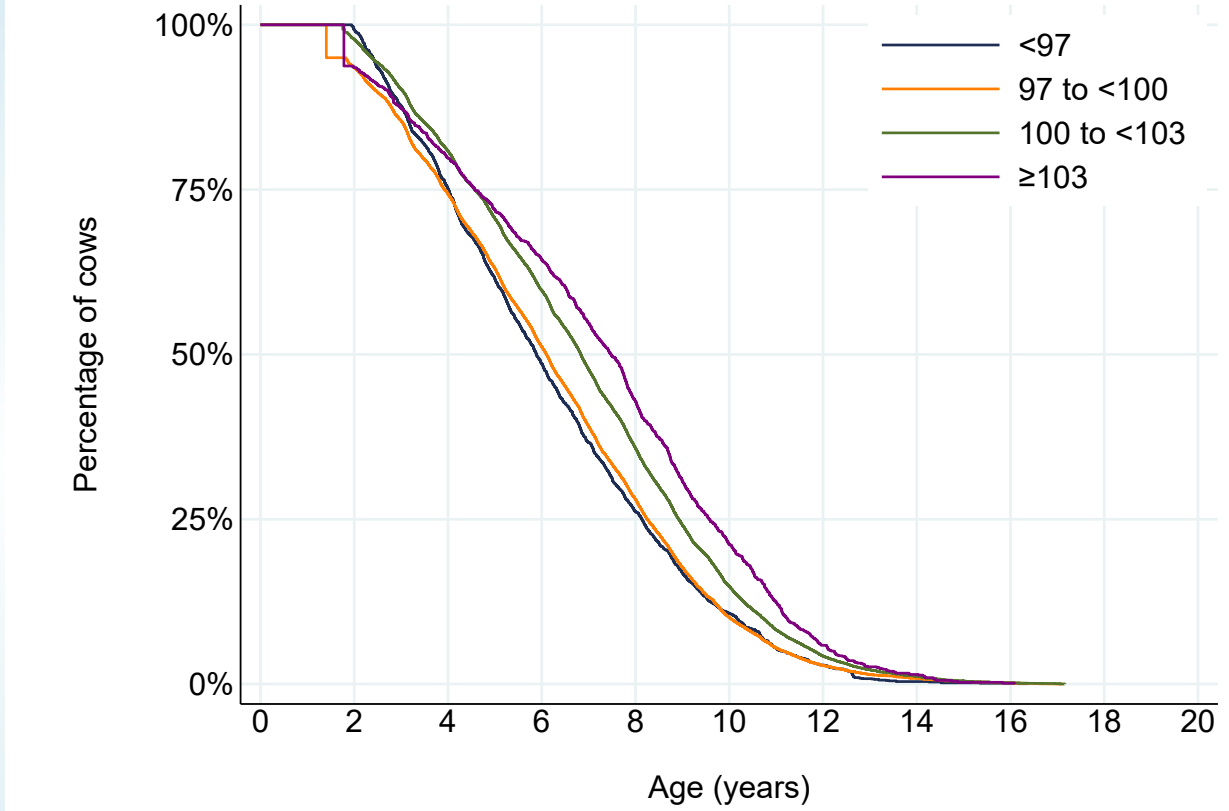
All cows born from 2005 to 2008

Survival ABV

Holsteins



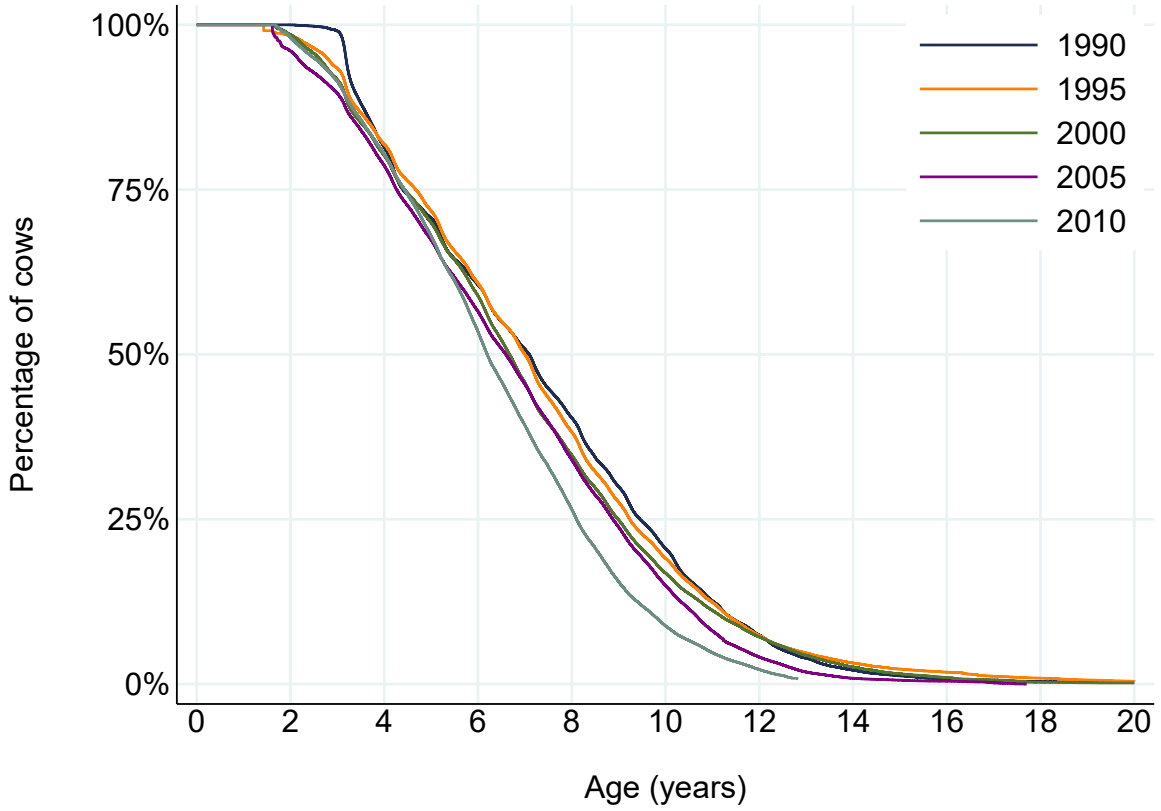
Jerseys



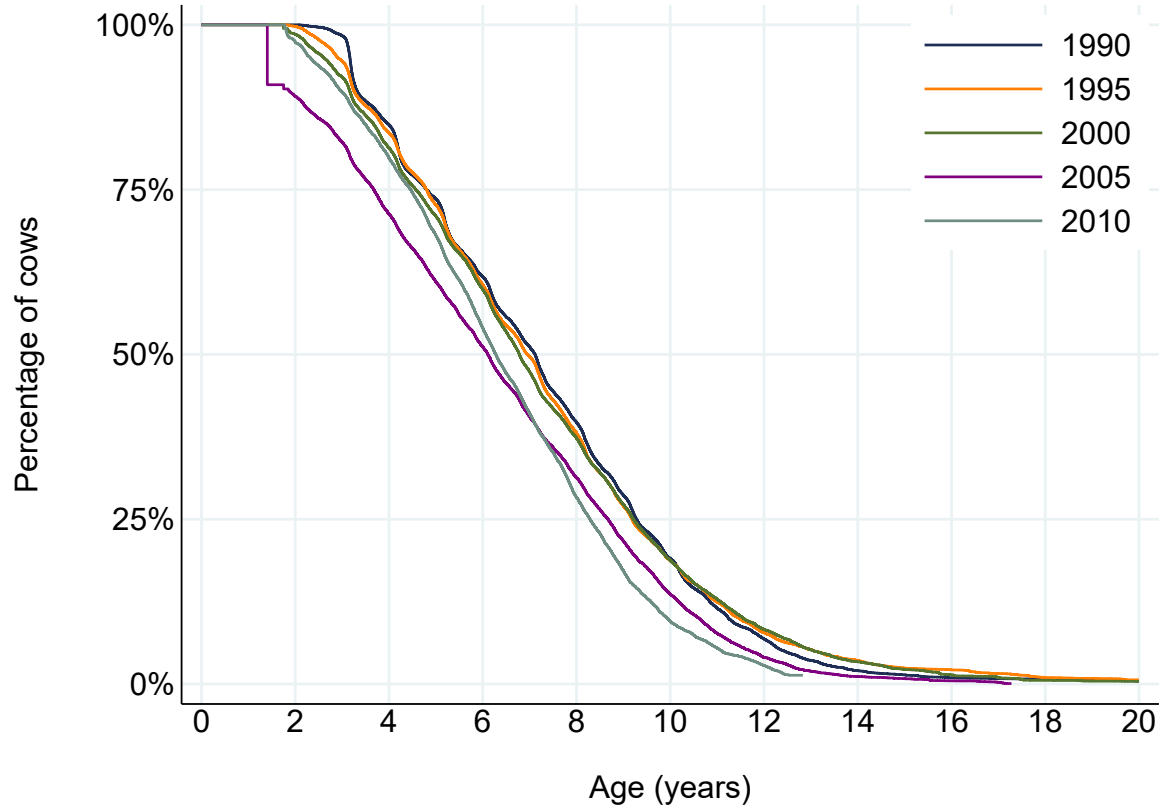
All cows born from 2005 to 2008

Cow’s year of birth

Holsteins



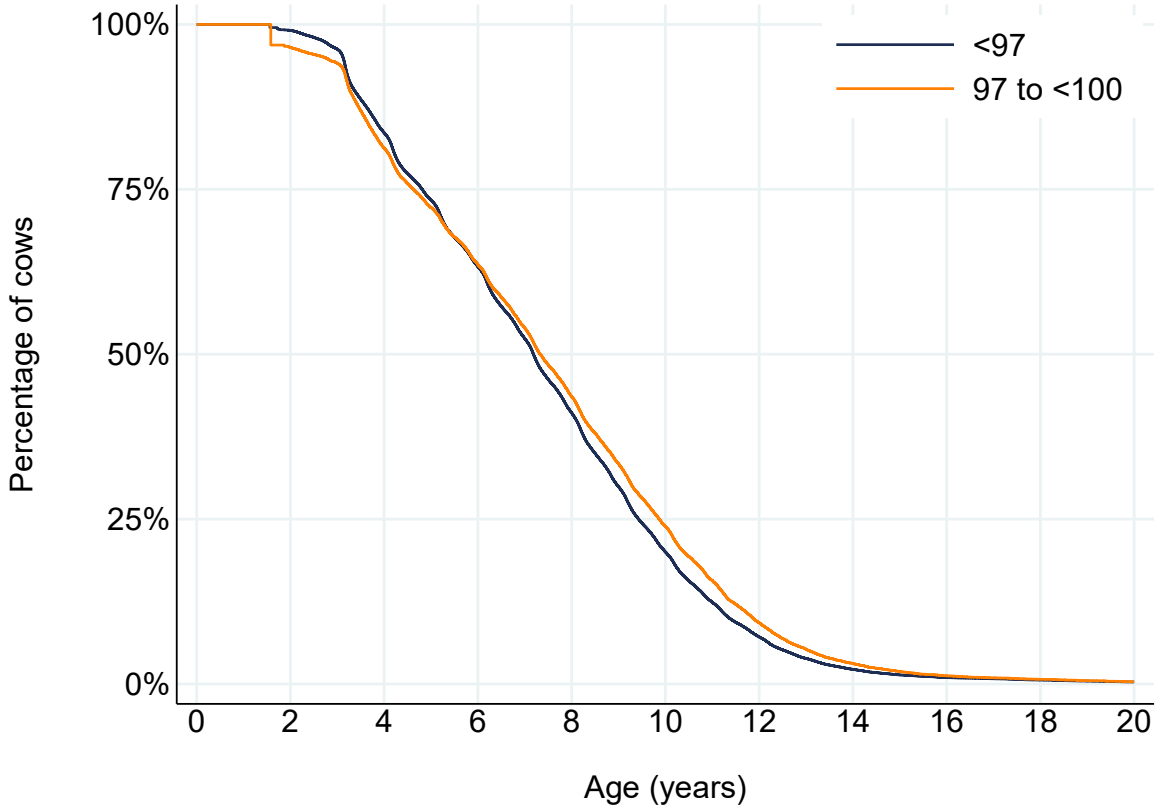
Jerseys



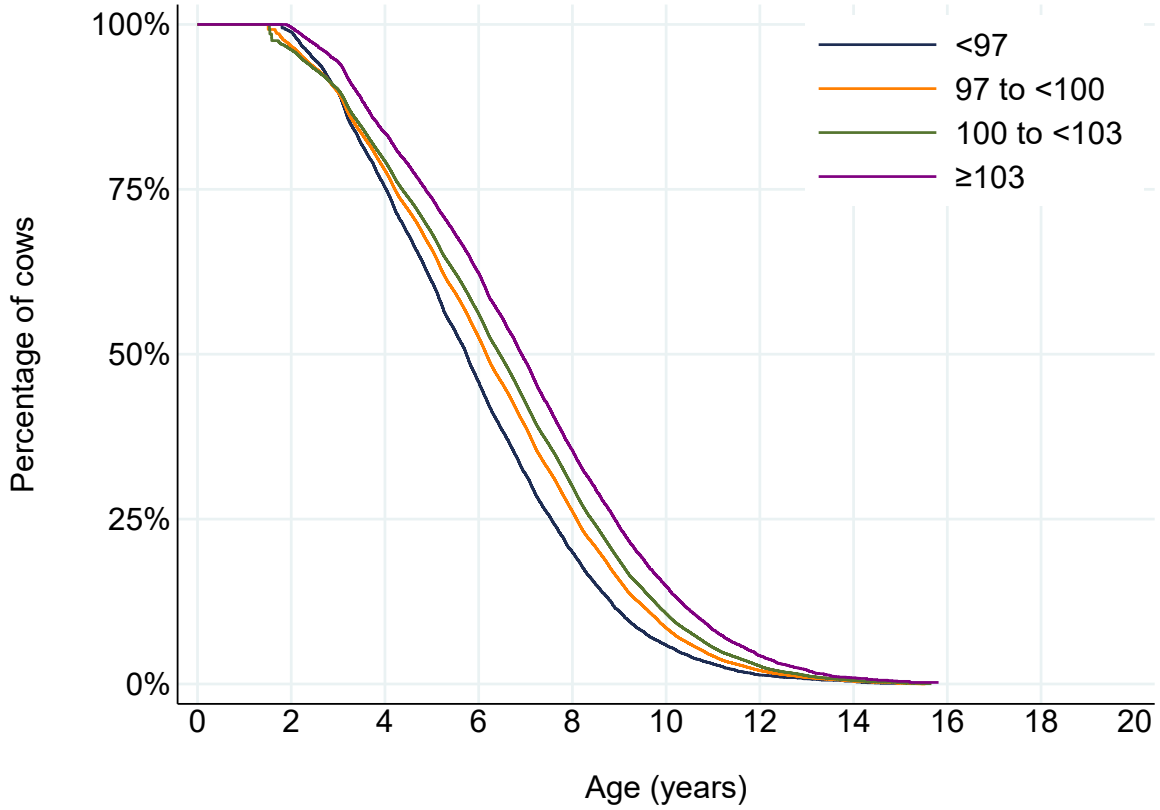
Survival ABV within year of birth

Holsteins

Cows born from 1990 to 1994



Cows born from 2007 to 2010



1. Survival ABVs have increased over time
2. Cow level:

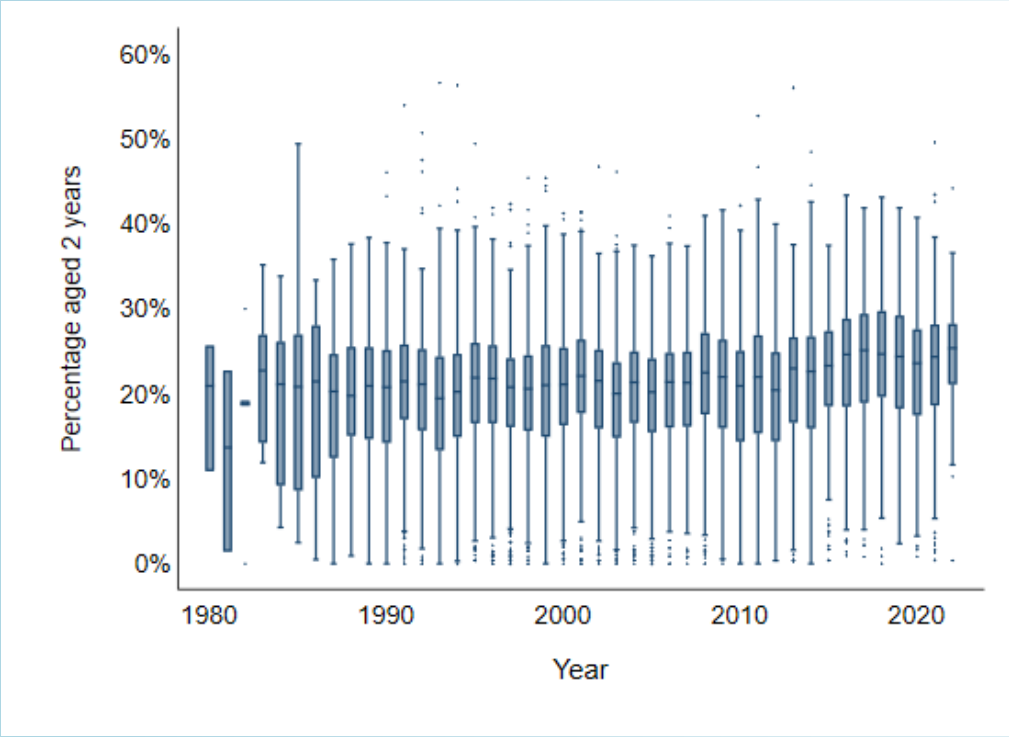
   Cows that last longer have higher survival ABVs/cows that have higher survival ABVs last longer

3. Population level:

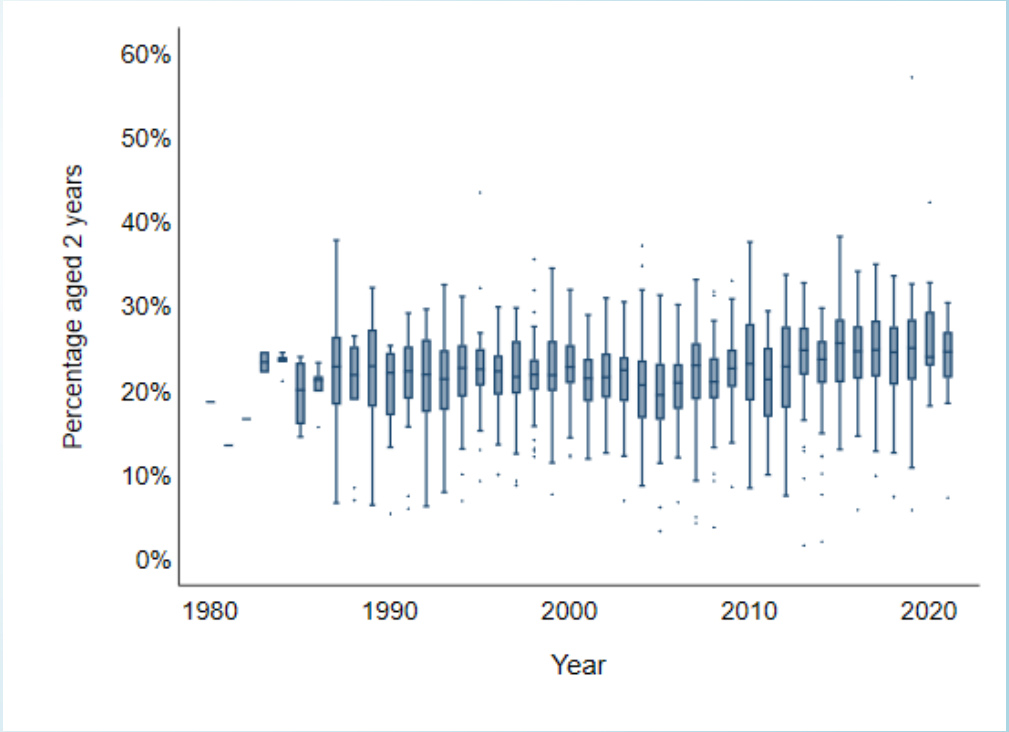
   Survival has decreased over time

Replacement rates (% calvings by 2-year olds) by year

Holstein herds



Jersey herds



Example herd
Seasonal calving
500 cows to calve annually

	Calving period	Calving period		Mating period				Calving period
Cows		500	10 deaths/compulsory culls	490	392 pregnant	387 retained	3 abort	384 calved
						5 culled		
					98 not pregnant (20%)	98 culled		
Calves/yearlings	120 reared			120	117 pregnant		1 aborts	116 calved
					3 not pregnant (3%)			
								500

Replacement rate 23%

Example herd
Seasonal calving
500 cows to calve annually

	Calving period	Calving period		Mating period				Calving period
Cows		500	10 deaths/compulsory culls	490	416 pregnant	387 retained	3 abort	384 calved
					74 not pregnant (15%)	29 culled 74 culled		
Calves/yearlings	120 reared			120	117 pregnant		1 aborts	116 calved
					3 not pregnant (3%)			
								500

Replacement rate 23%

Increased herd reproductive performance:

1) Change calving system/start of calving date
2) Shorten mating period(s)
3) **Increase culling pressure**
4) Reduce replacement rate

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Replacement rate 23%

Increased herd reproductive performance:

1) Change calving system/start of calving date
2) Shorten mating period(s)
3) Increase culling pressure
4) Reduce replacement rate**

Replacement rate 20%

Genetic correlations for Holstein sires

Increases in survival ABV are not increasing longevity, but are these increases causing other benefits?

?Changing which cows are retained

?Retain better cows

?As per genetic correlations

?Culling causes retention of high survival ABV cows

Weightings for survival ABV in BPI and HWI too high?

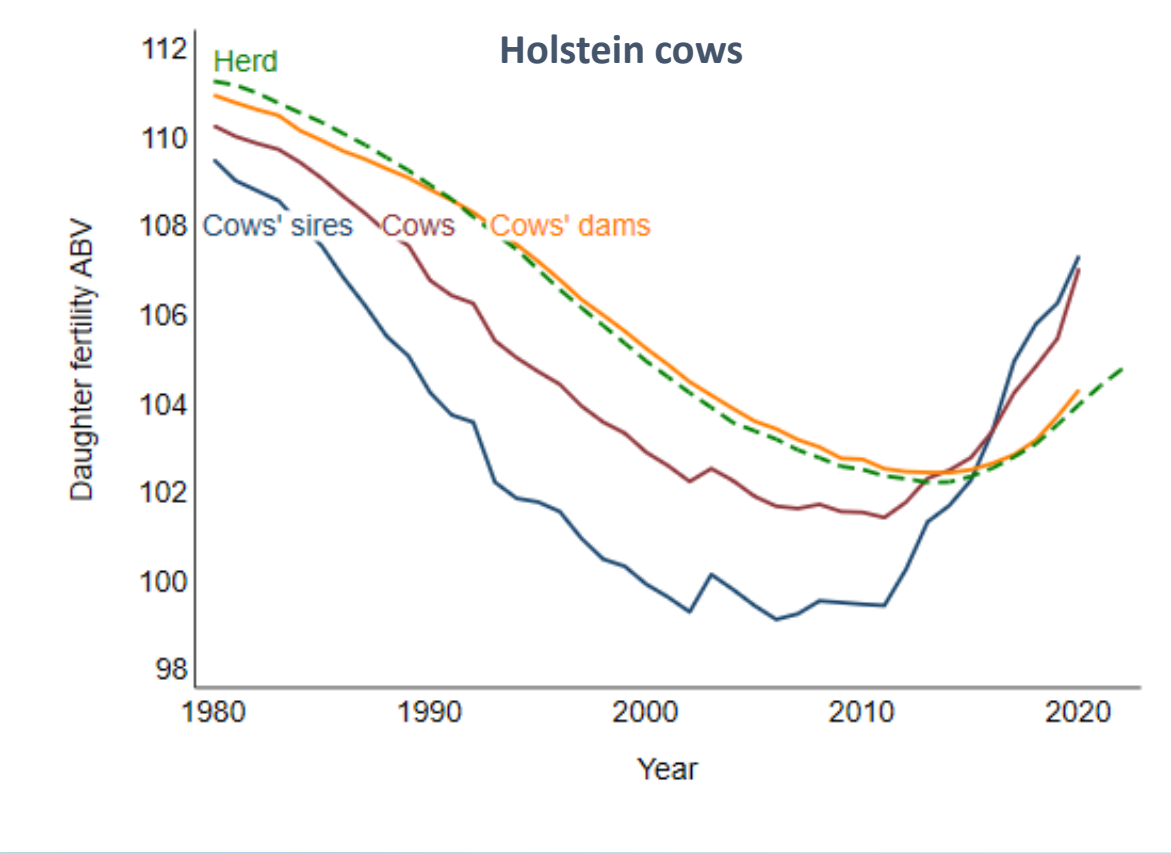
	PROT	FAT	MILK	SURV	FERT	SCC	MAS
PROT	1.00	0.30	0.67	0.04	-0.16	-0.03	-0.13
FAT	0.30	1.00	0.05	0.11	-0.12	0.08	-0.03
MILK	0.67	0.05	1.00	0.26	-0.13	0.15	-0.05
SURV	0.04	0.11	0.26	1.00	0.52	0.67	0.33
FERT	-0.16	-0.12	-0.13	0.52	1.00	0.43	0.29
SCC	-0.03	0.08	0.15	0.67	0.43	1.00	0.68
MAS	-0.13	-0.03	-0.05	0.33	0.29	0.68	1.00
MSPEED	-0.02	0.12	0.00	0.13	-0.04	-0.15	-0.21
TEMP	0.16	0.18	0.18	0.29	-0.10	0.11	0.00
MAMM	0.00	0.11	0.22	0.41	-0.10	0.23	0.03
UDDEP	-0.19	-0.05	0.06	0.73	0.41	0.55	0.29
OTYPE	-0.01	0.08	0.17	0.33	-0.19	0.18	0.03
PINSET	-0.04	-0.09	-0.05	-0.04	-0.08	-0.14	-0.07
FOREA	-0.23	-0.05	0.01	0.47	0.08	0.28	0.12
LWT	0.10	0.10	0.13	-0.08	-0.35	-0.08	-0.10
FEEDEF	-0.21	-0.23	-0.22	-0.05	0.19	-0.01	0.10
PROTP	0.18	0.26	-0.61	-0.30	0.00	-0.22	-0.07
FATP	-0.35	0.59	-0.78	-0.14	0.03	-0.07	0.03
OFEET_LEGS	-0.08	0.08	0.09	0.21	-0.07	0.17	0.01
LIKE	0.22	0.30	0.33	0.50	-0.09	0.22	-0.01
EASE	0.09	0.09	0.04	0.30	0.40	0.24	0.13
RUMP	-0.06	-0.04	-0.01	-0.08	-0.24	-0.12	-0.06
DAIRY_S	0.12	0.12	-0.04	-0.50	-0.57	-0.43	-0.26
HEAT_T	-0.53	-0.32	-0.10	0.22	0.28	0.24	0.17
GEST_L	-0.22	-0.14	-0.20	-0.28	-0.20	-0.20	-0.07

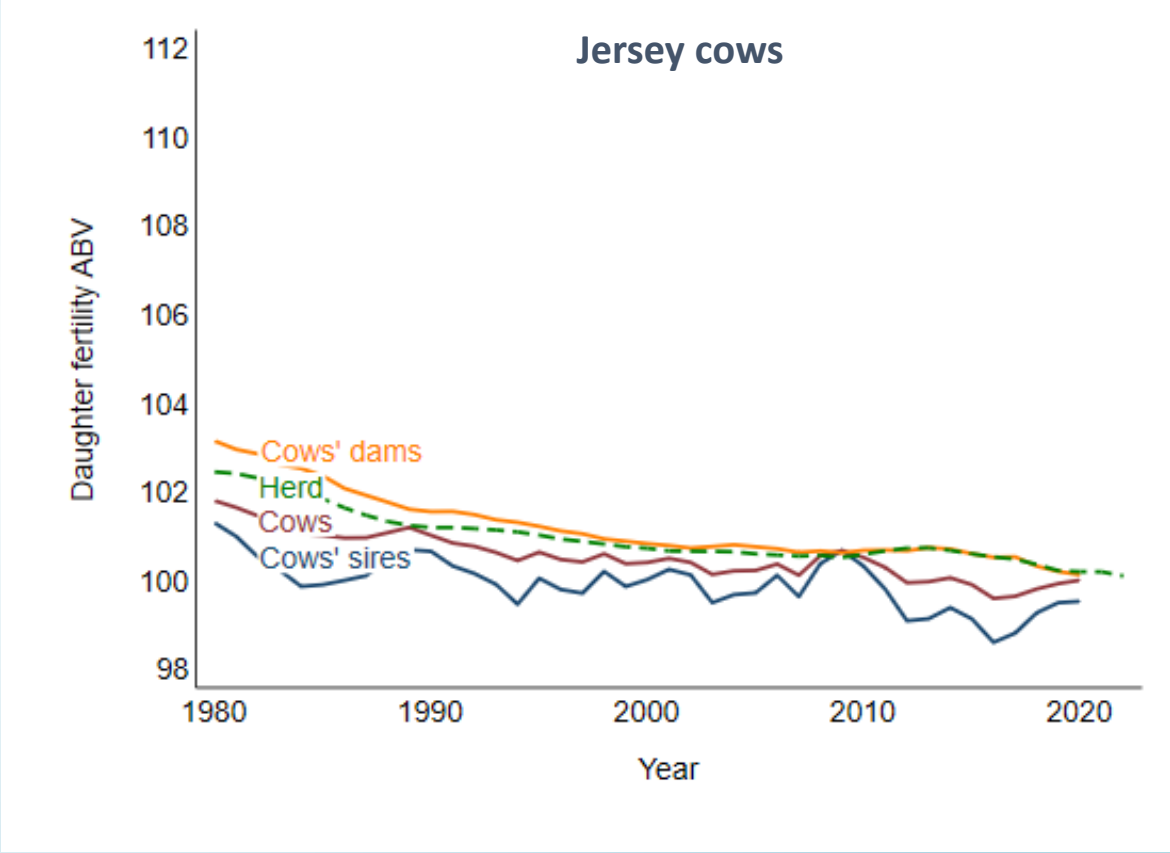
1. Longevity is important for social license
2. Lower replacement rates can increase herd profitability and reduce herd carbon emissions
3. Longevity will increase only if herd manager chooses to decrease replacement rate

   (or increase herd size with minimal increase in replacement numbers)
4. Better repro performance can drive decreased replacement rate

   (if herd manager chooses that option)
5. Thus management plus daughter fertility ABV (rather than survival ABV) are the key for increased longevity
6. Need better understanding:
   a) effects of increased survival ABV on herd age structure, cow quality, profit
   b) with increased reproductive performance:
      i. relative merits of increased culling versus decreased replacement rate
      ii. how herds can safely move to lower replacement rates
      iii. ?strategies to reduce disease risks in middle-aged cows
7. In the interim, keep modest selection pressure on survival ABV

Daughter fertility ABV trends



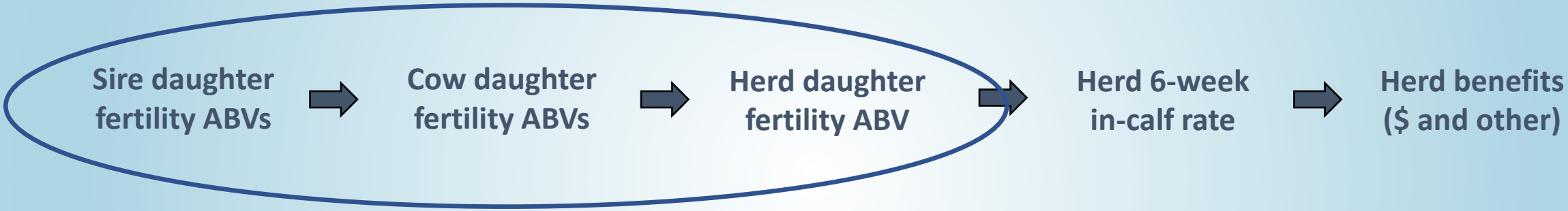


How long are our cows lasting?

		Last calving date for herd
Cow 1		
Birth date	24feb2012	
Calved	10apr2014	
Calved	16apr2015	
Calved	24mar2016	
Calved	25mar2017	
Culled	03aug2017	
Cow 2		
Birth date	06feb2012	
Calved	19apr2014	
Calved	16apr2015	
Calved	27mar2016	
Calved	25mar2017	
Calved	08jun2018	
		30sep2018
Cow 3		
Birth date	19sep2019	
Calved	08aug2021	
Calved	14aug2022	
		30sep2022

Conclusion: Use survival analysis rather than averages


Sire daughter fertility ABVs
Cow daughter fertility ABVs
Herd daughter fertility ABV
Herd 6-week in-calf rate
Herd benefits ($ and other)


Sire daughter fertility ABVs
Cow daughter fertility ABVs
Herd daughter fertility ABV
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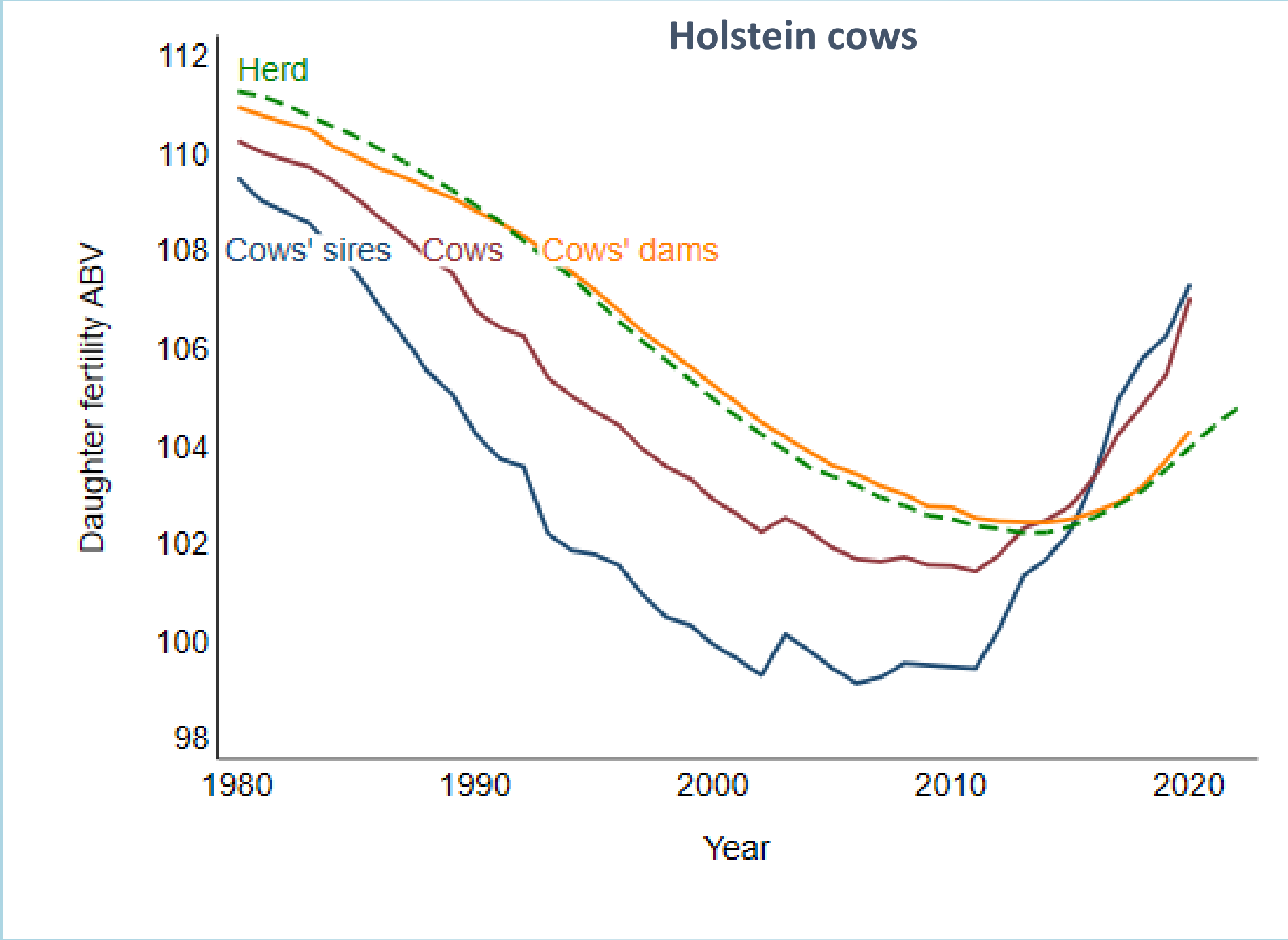
Holstein cows
Herd
Cows' sires
Cows
Cows' dams
Daughter fertility ABV
112
110
108
106
104
102
100
98
1980
1990
2000
2010
2020
Year

Other non-production traits:

- Monitoring
- Early detection and action if decline

For example:

- Heat tolerance ABV
- Sustainability Index
- Cow contentment ABV??
- etc
- etc