Faculty of Veterinary and Agricultural Sciences
Dr Ee Cheng Ooi, BVSc (Hons)

# Improving cow reproductive performance using genetic estimates of daughter fertility

# Daughter Fertility Australian Breeding Value (ABV)

## PRODUCTION

| Code | A2 Status | NASIS ID | Pedigree | BPI | BPI Rel% | HWI | HWI Rel% | TWI | TWI Rel% | ASI | Protein (Kg) | Protein % | Milk (L) | Fat (Kg) | Fat % | Rel % | Daughters | Herds | RIP % | Milking Speed | Temperament | Likeability | Rel % | Overall Type | Mam System | Rel % | Cell Count / Rel % | Dtr Fertility / Rel % | Calving Ease / Rel % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WRANGLER | | 12FFH13 | Man-O-Man x Shottle | 304 | 69 | 213 | 64 | 285 | 69 | 235 | 30 | 0.32 | 481 | 43 | 0.32 | 76 | 45 | 24 | 17 | 100 | 102 | 102 | 67 | 106 | 104 | 75 | 129/68 | 105/67 | 102/62 |
| CHRISTMAS | A22 | 12FFE87 | Roumare x Goldbullion | 271 | 79 | 159 | 73 | 282 | 79 | 256 | 26 | 0.32 | 341 | 61 | 0.67 | 89 | 100 | 31 | 19 | 102 | 101 | 101 | 74 | 108 | 101 | 81 | 112/82 | 100/76 | 100/95 |
| GEEMCEE | | 12FFH12 | Man-O-Man x Shottle | 336 | 69 | 227 | 64 | 281 | 70 | 276 | 32 | 0.34 | 530 | 59 | 0.52 | 77 | 47 | 22 | 21 | 101 | 103 | 103 | 68 | 101 | 103 | 75 | 146/67 | 106/67 | 102/65 |
| TRICKIN | A22 | 12FFG31 | Man-O-Man x Roumare | 282 | 76 | 206 | 70 | 269 | 76 | 191 | 18 | 0.45 | -230 | 25 | 0.51 | 86 | 51 | 29 | 25 | 105 | 102 | 101 | 72 | 105 | 101 | 79 | 125/81 | 108/65 | 103/78 |
| NADAL | | 12FFH34 | Man-O-Man x Roumare | 212 | 74 | 139 | 69 | 182 | 75 | 184 | 24 | 0.20 | 524 | 37 | 0.21 | 84 | 74 | 31 | 35 | 102 | 99 | 100 | 75 | 104 | 105 | 79 | 134/70 | 104/72 | 103/71 |
| MEDALLION | A22 | 12FFB04 | Informer x Knockout | 174 | 93 | 144 | 87 | 218 | 93 | 104 | 18 | 0.16 | 360 | 9 | -0.09 | 99 | 6395 | 660 | 26 | 102 | 103 | 103 | 99 | 108 | 113 | 99 | 92/99 | 102/98 | 101/99 |
| GOLDCREST | | 12FFE85 | Goldwyn x Donor | 303 | 75 | 247 | 68 | 286 | 74 | 219 | 33 | 0.15 | 925 | 46 | 0.10 | 85 | 68 | 32 | 25 | 103 | 100 | 102 | 67 | 101 | 103 | 71 | 138/77 | 98/72 | 100/84 |
| FLASHBACK | | 12FFF64 | Shottle x Goldwyn | 216 | 74 | 180 | 68 | 221 | 74 | 116 | 30 | -0.08 | 1260 | 19 | -0.50 | 84 | 63 | 31 | 15 | 102 | 103 | 104 | 69 | 106 | 103 | 77 | 153/74 | 104/70 | 101/86 |
| JIMEO | | 12FFG16 | Legend x Shottle | 205 | 70 | 156 | 65 | 206 | 70 | 104 | 15 | 0.07 | 436 | 23 | 0.07 | 79 | 56 | 22 | 37 | 102 | 101 | 102 | 71 | 106 | 103 | 70 | 162/72 | 105/67 | 104/64 |
| PICOLA | A22 | 12FFJ01 | Delsanto x Planet | 290 | 68 | 224 | 61 | 266 | 66 | 224 | 26 | 0.18 | 627 | 58 | 0.46 | 80 | 65 | 21 | 93 | 101 | 101 | 102 | 67 | 104 | 109 | 60 | 143/70 | 103/54 | 98/95 |

# Objectives

- Part 1: ABV analysis
  - Explore the relationship between genetic estimate + phenotypic outcomes

- Part 2: Social research
  - Explore farmer attitudes, intentions and behaviours re: the selection of high daughter fertility ABV bulls

# 1. Materials and methods – ABV analysis

Retrospective cohort study


**Herds**
- 37 herds
- Farm data

**Cows**
- 82,932 cows (1965 – 2017)
- 31,083 Holstein-Friesian
- 6327 Jersey

**Lactations**
- 214,406 calving records
- 423,934 mating and preg test records
- 902,015 herd test records

# 1. Materials and methods – ABV analysis

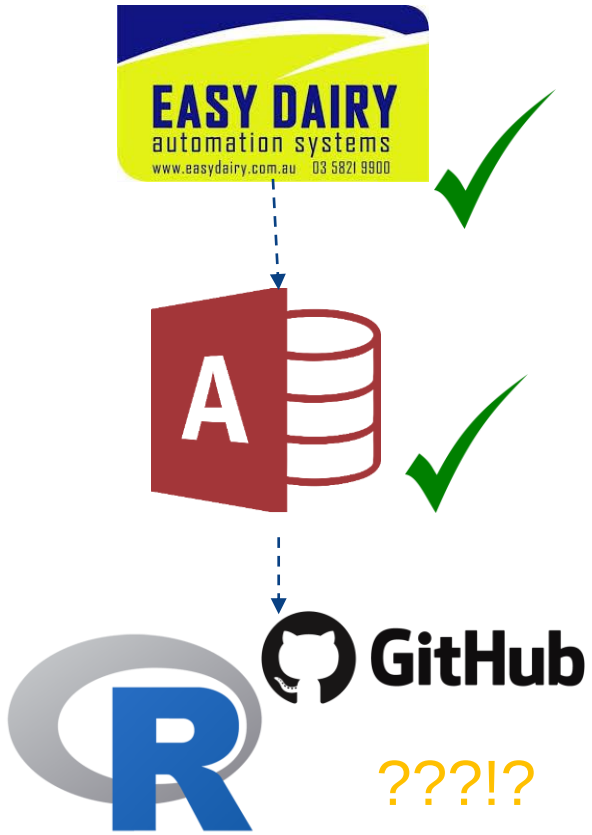
Daughter Fertility ABV

genetic estimate, calculated from sire (0.5) + dam sire (0.25) daughter fertility ABV

- 3 week submission rate
- First service conception rate
- 6 week in-calf rate

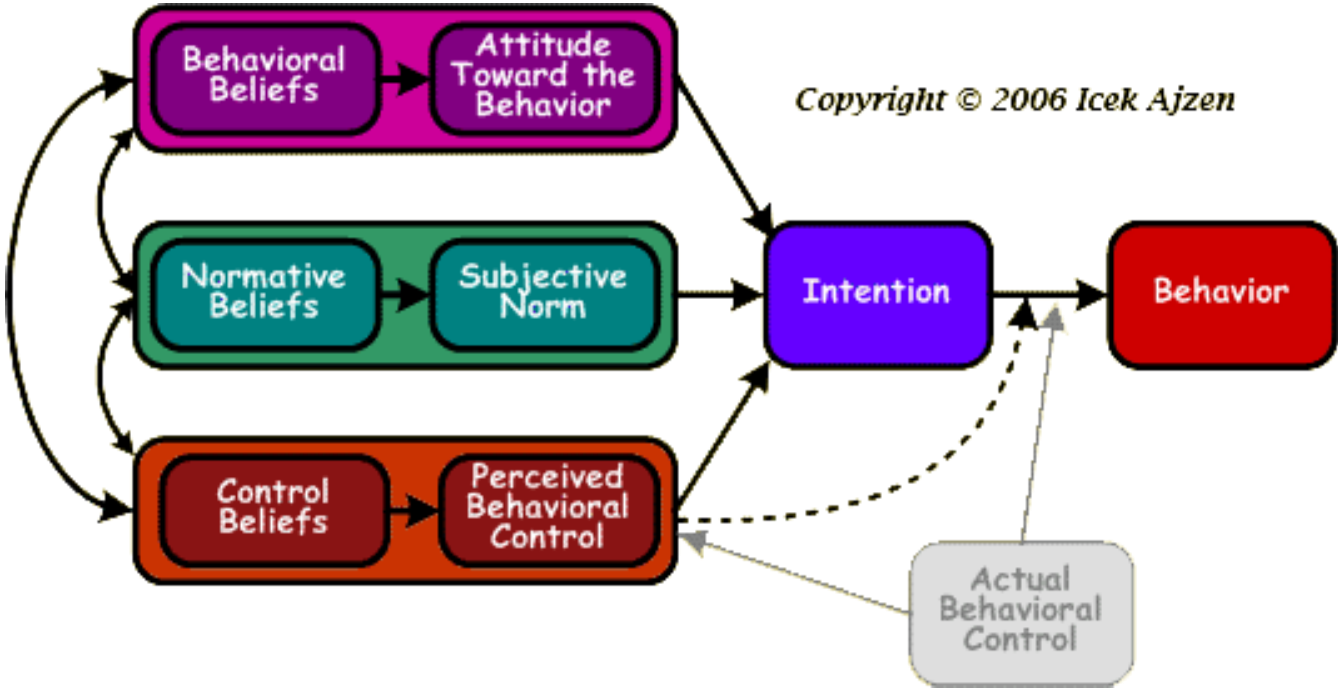
Phenotypic measures of reproductive performance for each cow per mating period

- Survival analysis
- Regression model



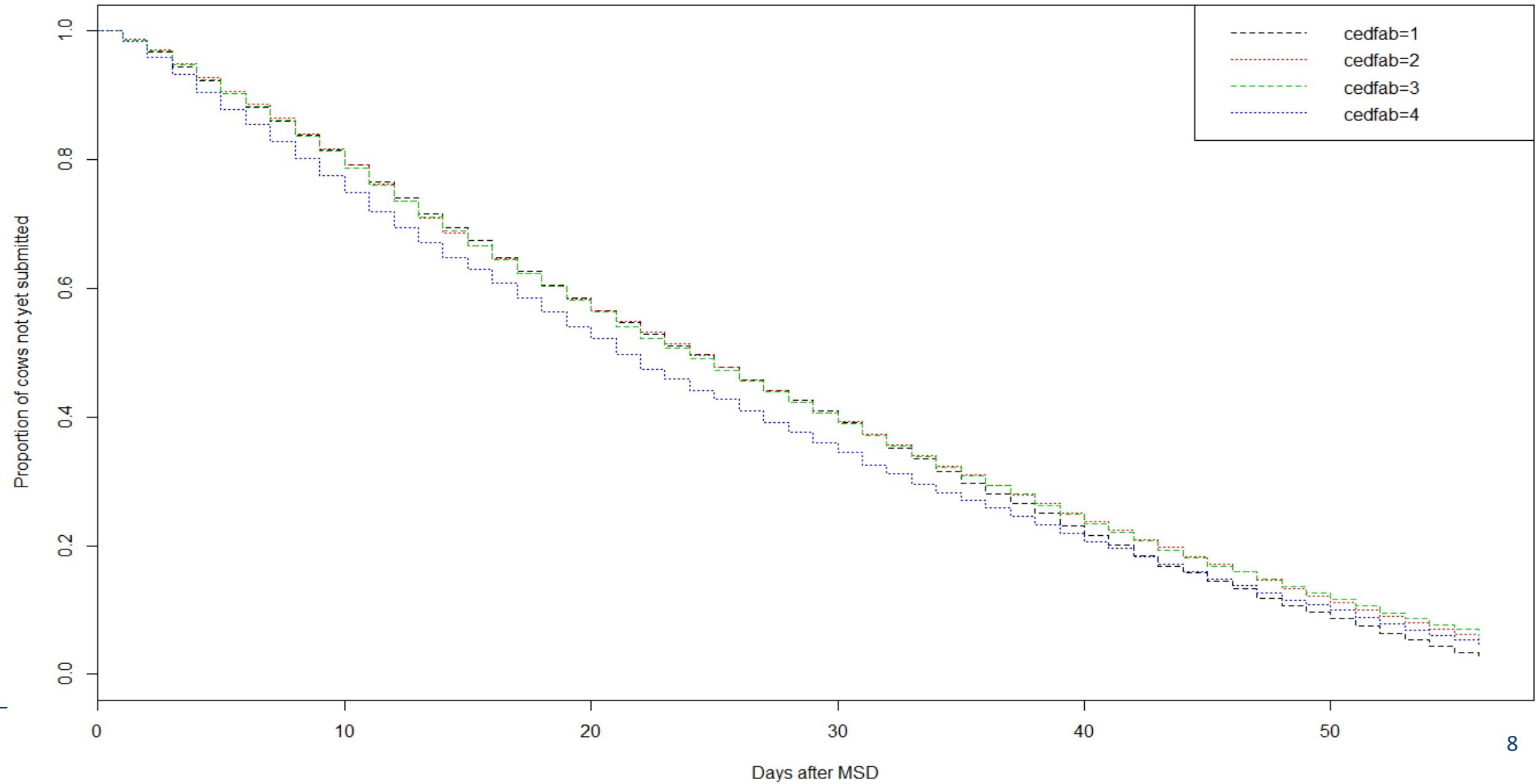
# 2. Materials and methods – social research

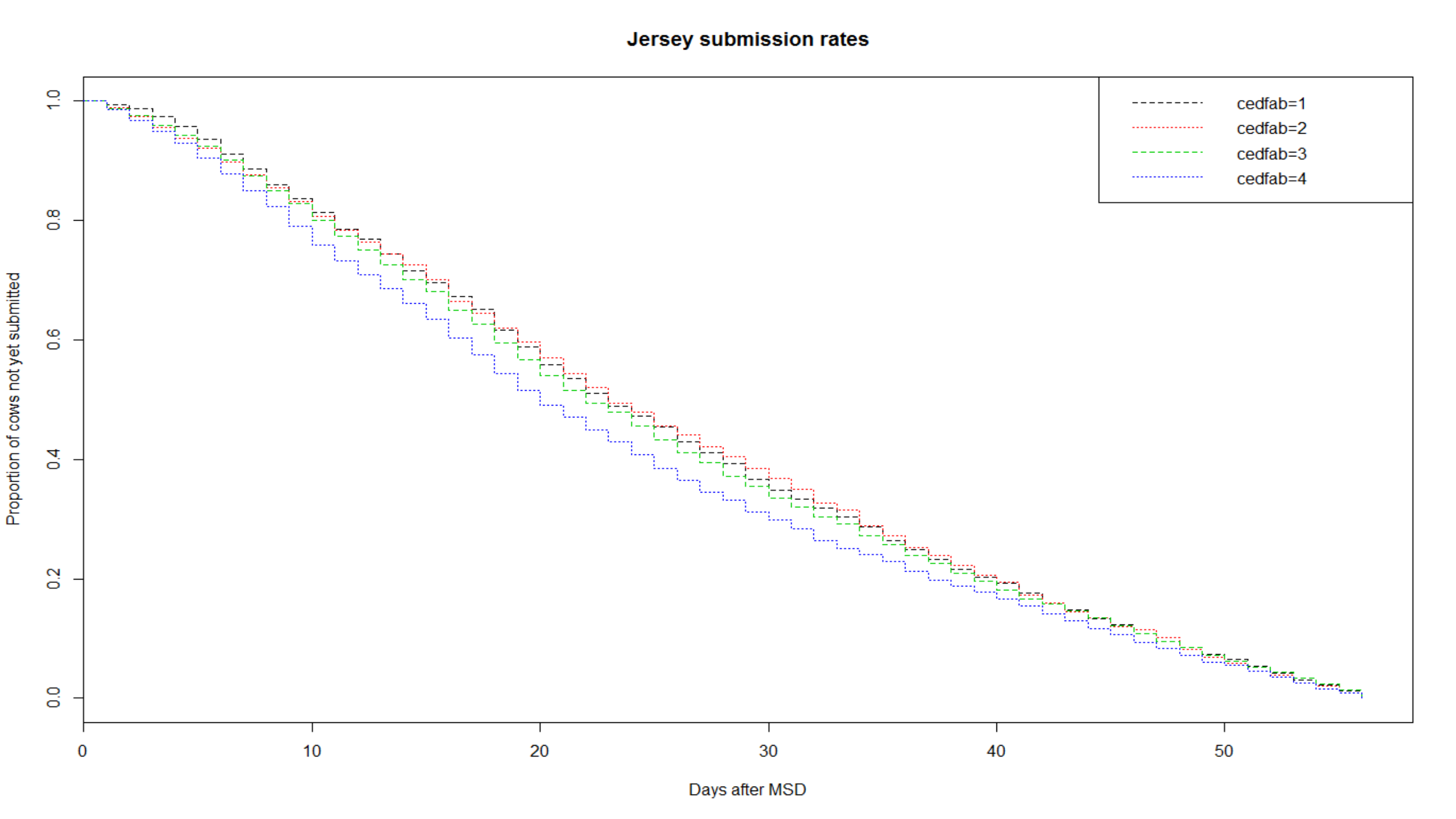
- Elicitation study + questionnaire



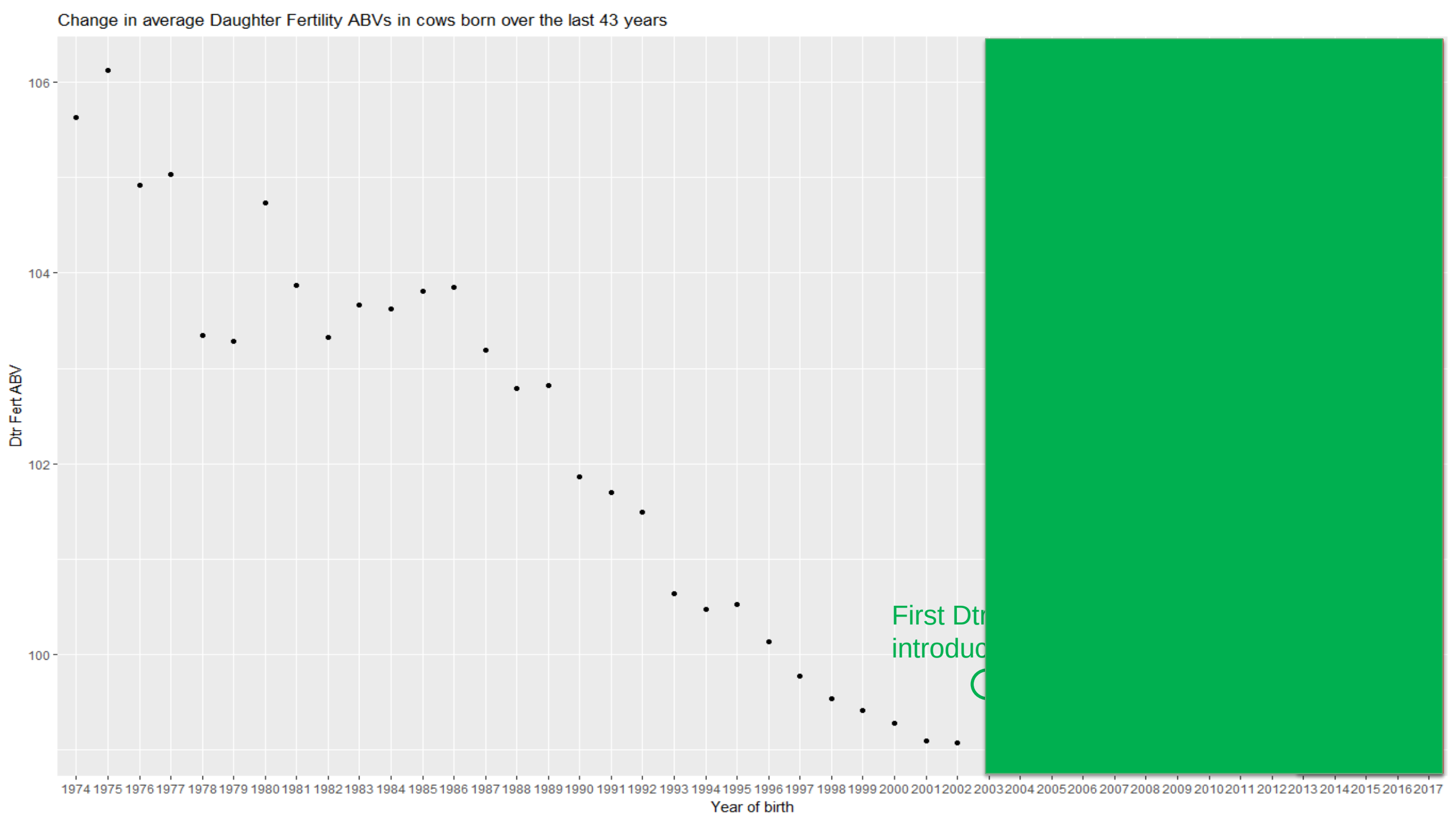
# 3. Results – ABV analysis

- 3 week submission rate


Holstein-Friesian submission rates
cedfab=1
cedfab=2
cedfab=3
cedfab=4
Proportion of cows not yet submitted
0.0
0.2
0.4
0.6
0.8
1.0
0
10
20
30
40
50
Days after MSD


Jersey submission rates
cedfab=1
cedfab=2
cedfab=3
cedfab=4
Proportion of cows not yet submitted
0.0
0.2
0.4
0.6
0.8
1.0
0
10
20
30
40
50
Days after MSD

| Summary of data collected so far | |
|---|---|
| **Salient beliefs**<br>'If I select high daughter fertility ABV sires, I will…' | Have improved overall herd fertility.<br>Gain better culling flexibility.<br>Gain more heifer replacements.<br>Gain better cow longevity.<br>Have better profitability and/or lower costs.<br>Have less reproductive wastage and better AI efficiency.<br>Have less frustration and/or headaches about particular cows not getting in calf.<br>Feel like I'm improving my herd and breeding towards a better animal.<br>Have restrictions on my bull choices.<br>Have compromised progress in non-fertility traits such as type or production. |
| **Salient referents**<br>'Groups or people with an opinion about selecting high daughter fertility ABV sires include…' | Other commercial dairy farmers.<br>Other stud breeding dairy farmers.<br>My herd improvement centre.<br>My local vet.<br>Breed societies.<br>My AI tech and/or breeding consultant.<br>Dairy Australia.<br>My semen seller/AI company.<br>People who buy (or will buy) my stock. |
| **Perceived barriers**<br>'Things that make it hard for me to select high daughter fertility ABV sires include…' | Lack of confidence in daughter fertility ABV data.<br>Lack of confidence in daughter fertility ABV reliability.<br>Too much information to sort through.<br>Price – high daughter fertility ABV sires are more expensive than other sires.<br>Difficulty looking up a bull's daughter fertility ABV.<br>Lack of confidence that genetic selection for fertility will have a measurable impact on my herd. |


Change in average Daughter Fertility ABVs in cows born over the last 43 years
Dtr Fert ABV
106
104
102
100
First Dtr
introduc
1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017
Year of birth

# Acknowledgements


- Dairy Australia
- University of Melbourne
  - Associate professor Michael Pyman
  - Associate professor Peter Mansell
  - Dr David Beggs
  - Professor Mark Stevenson
- Rochester Veterinary Practice
  - Dr Alistair Murray
  - Dr Mitch Crawford
- Farmer participants