



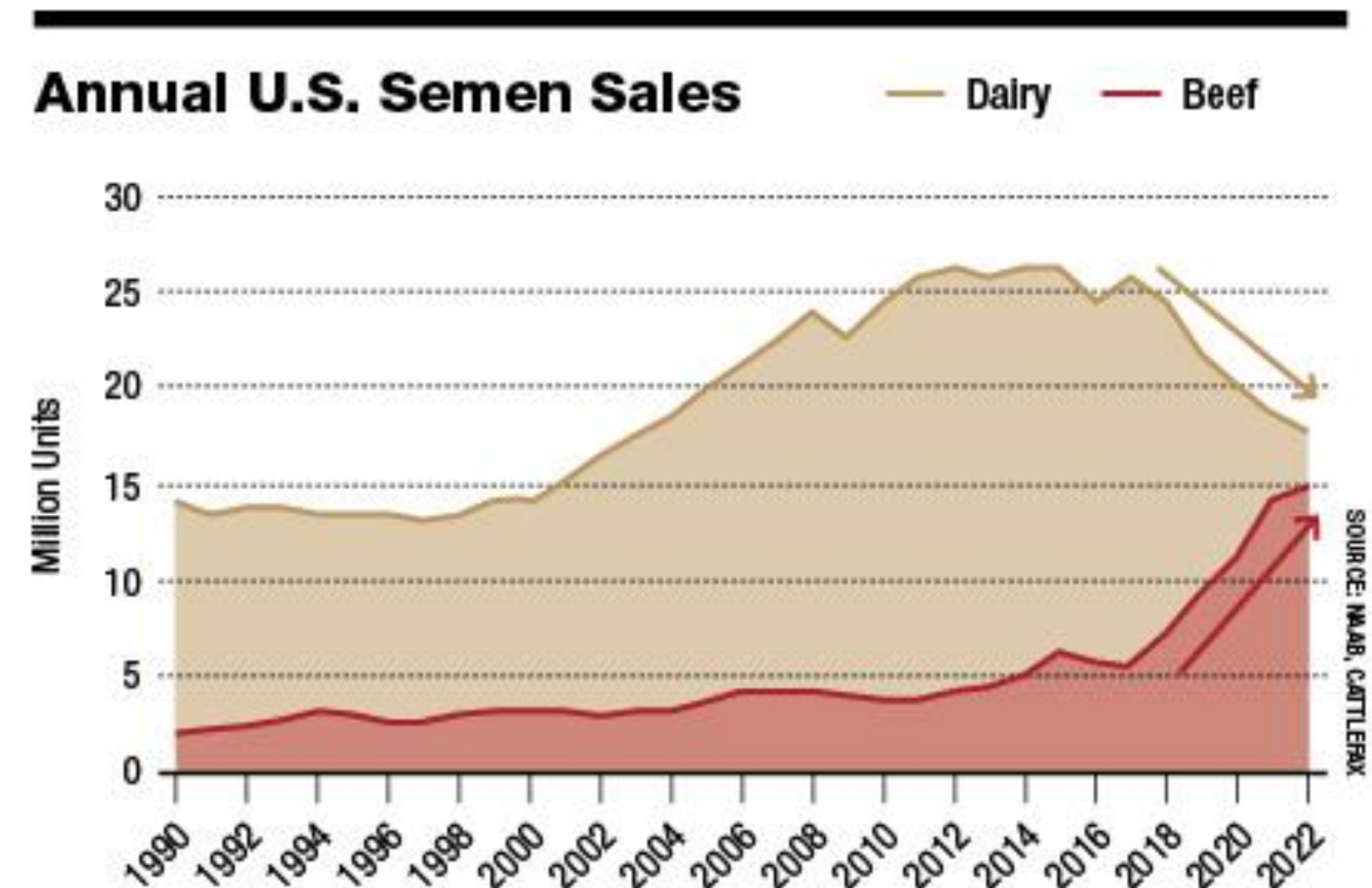
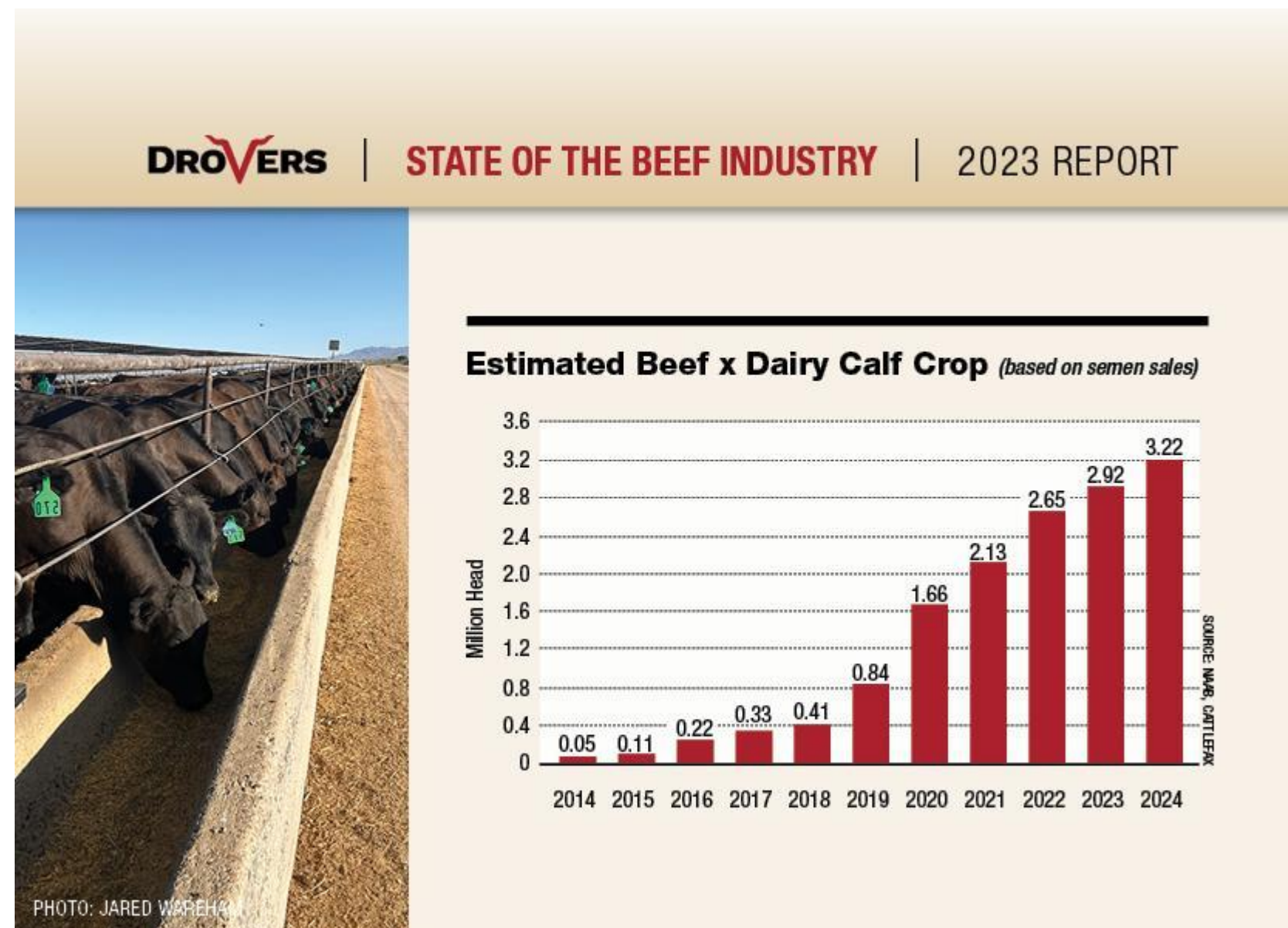
Implants for Beef x Dairy

SK Feedlot School 2025
Adam Shreck, Ph.D.



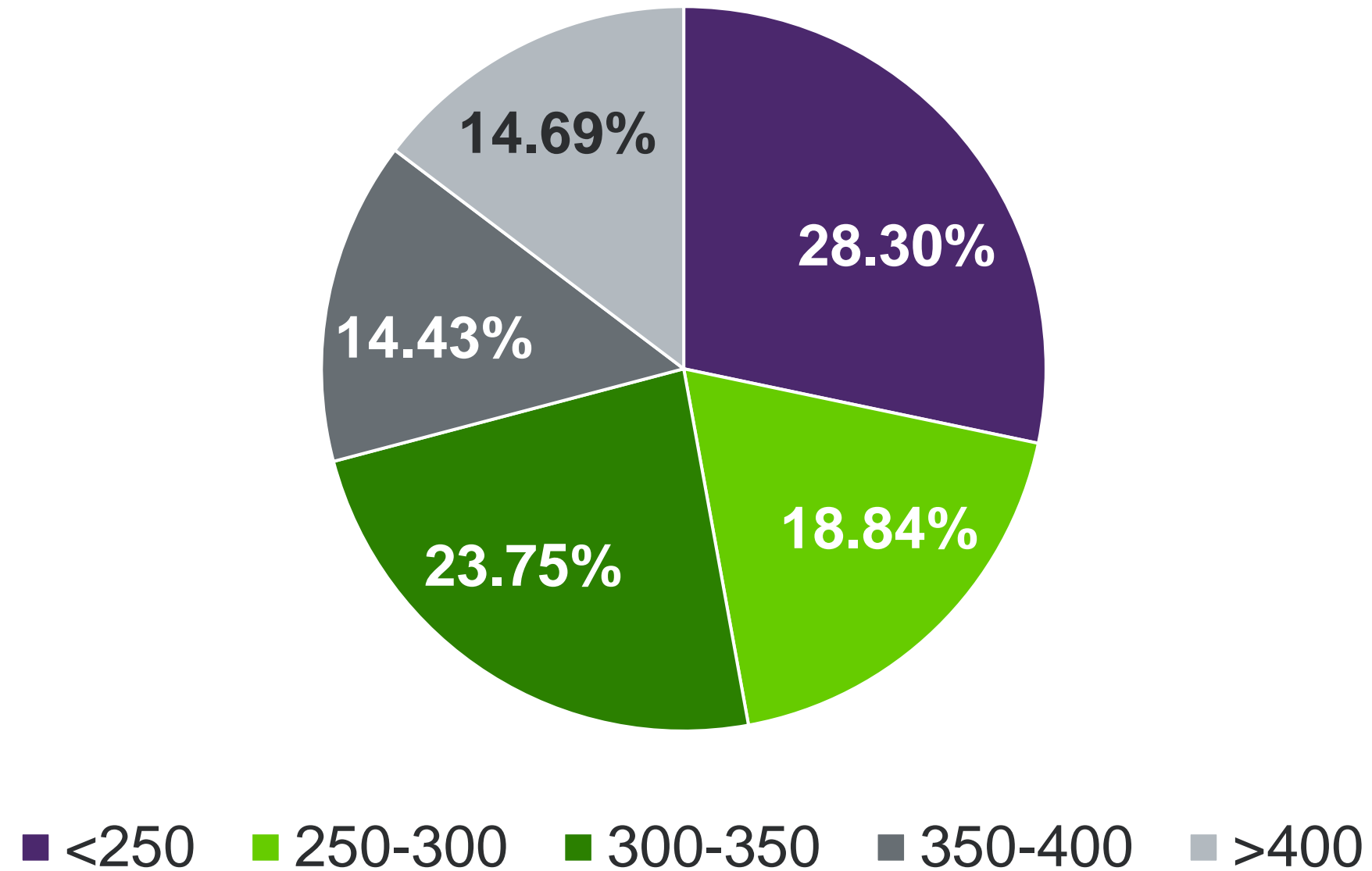
Industry size-BxD

- Believed to be >3 million head in the US, potential for up to 4 MM
- US dairy herd is ~9.4 million cows
- Canadian dairy herd is ~1.4 million cows & heifers



Arrival Weight Distribution

Feedyard Arrival Wt Distribution Telus BxD Database



Ask ChatGPT “What are better implant strategies for beef on dairy cattle compared to traditional beef breeds?”

Chatgpt Says:

Implant strategies for **beef-on-dairy** cattle (crossbred calves from beef sires on dairy cows) should be different from traditional **beef breeds** because of their distinct growth patterns, frame size, and carcass characteristics. Here are some **optimized implant strategies** for beef-on-dairy calves compared to traditional beef breeds:

1. Considerations for Beef-on-Dairy vs. Traditional Beef Cattle

- **Muscle & Frame:** Beef-on-dairy crosses tend to have larger frames (from dairy genetics) but may lack muscle thickness.
- **Fat Deposition:** Dairy influence can lead to lower marbling and different fat distribution.
- **Feed Efficiency:** Typically higher than straight dairy cattle but lower than traditional beef breeds.

2. Implant Strategy Adjustments for Beef-on-Dairy

Calf Phase (Pre-Weaning)

- **Beef-on-Dairy:** Typically **not implanted** unless in a calf-fed program because dairy influence already leads to taller, leaner animals.
- **Traditional Beef:** A low-potency implant (e.g., **Ralgro, Synovex-C**) is common in suckling calves.

Growing Phase (Backgrounding/Stocker)

- **Beef-on-Dairy:** A moderate-potency implant (**Synovex-S, Revalor-G**) helps improve muscle growth while maintaining feed efficiency.
- **Traditional Beef:** Similar implant strategy, but pasture-based cattle might delay implants.

Finishing Phase (Feedlot)

- **Beef-on-Dairy:**
 - A more aggressive implant strategy is beneficial (e.g., **Revalor-IS followed by Revalor-200** or **Synovex-Choice**).
 - Since beef-on-dairy cattle are leaner, an **extended-duration implant** (like **Encore**) can help maintain gains without excessive fat deposition.
 - Final implant should be timed **90–120 days pre-harvest** to optimize carcass yield.
- **Traditional Beef:**
 - Usually follow a **step-up** program with early moderate-dose implants (e.g., **Revalor-IS**) followed by a terminal high-dose implant (e.g., **Revalor-XS, Synovex-Plus**).

3. Special Considerations for Beef-on-Dairy

- **Avoid excessive frame growth:** Because of dairy genetics, overuse of implants early on can lead to excessive frame size without enough muscle deposition.
- **Monitor marbling:** Implants can reduce marbling, which is already a challenge in dairy-influenced cattle.
- **Optimize energy intake:** Since beef-on-dairy cattle are often leaner, ensuring high-energy rations post-implantation is critical to maximize muscle deposition.

Conclusion

- **Beef-on-dairy cattle benefit from a more tailored implant approach**—delaying the first implant, using moderate-potency implants in early feeding, and choosing longer-acting or terminal implants to finish.
- **Traditional beef breeds** can tolerate more aggressive implant programs early due to their natural muscling.
- **Proper implant timing and nutrition** are crucial to achieving optimal weight gain, feed efficiency, and carcass quality in both systems.

Ask ChatGPT “What are better implant strategies for beef on dairy cattle compared to traditional beef breeds?”

3. Special Considerations for Beef-on-Dairy

- **Avoid excessive frame growth:** Because of dairy genetics, overuse of implants early on can lead to excessive frame size without enough muscle deposition.
- **Monitor marbling:** Implants can reduce marbling, which is already a challenge in dairy-influenced cattle.
- **Optimize energy intake:** Since beef-on-dairy cattle are often leaner, ensuring high-energy rations post-implantation is critical to maximize muscle deposition.

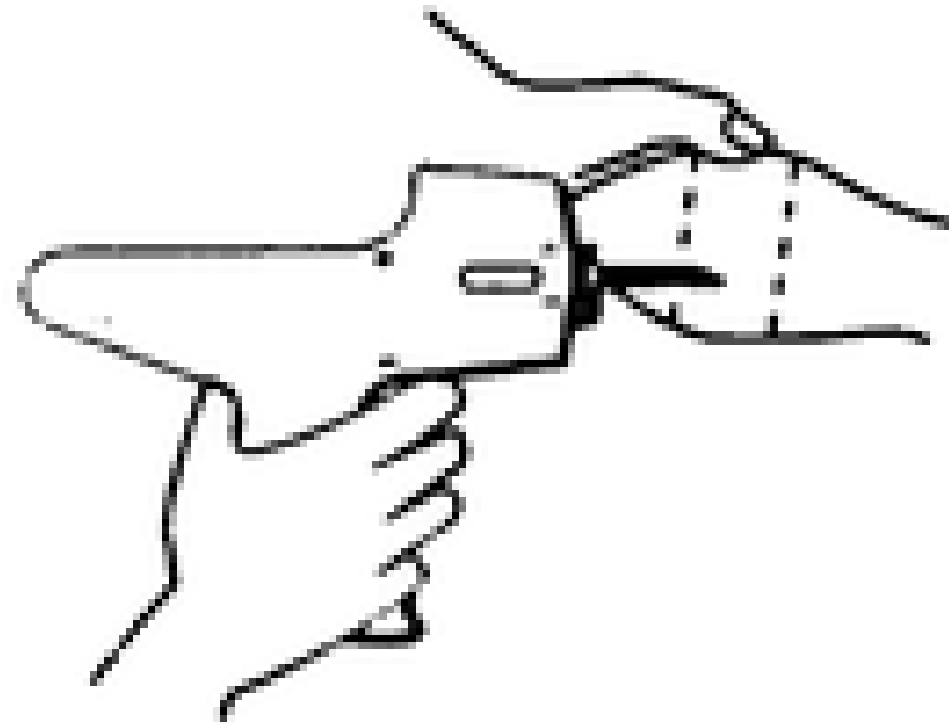
Conclusion

- **Beef-on-dairy cattle benefit from a more tailored implant approach**—delaying the first implant, using moderate-potency implants in early feeding, and choosing longer-acting or terminal implants to finish.
- **Traditional beef breeds** can tolerate more aggressive implant programs early due to their natural muscling.
- **Proper implant timing and nutrition** are crucial to achieving optimal weight gain, feed efficiency, and carcass quality in both systems.

How do implants work?

Implant effects in cattle

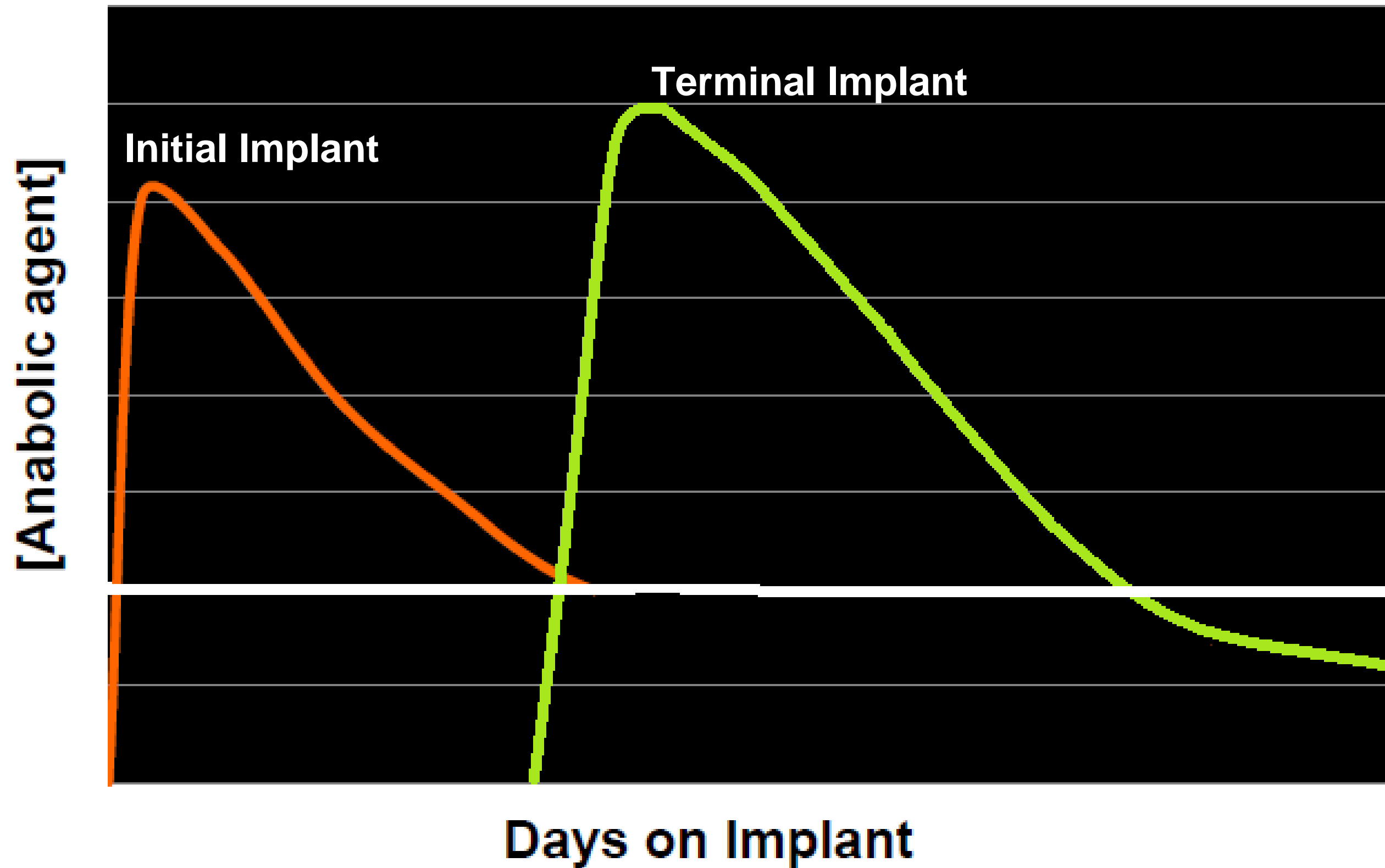
Improve ADG and F:G due to greater IGF-1 and growth hormone



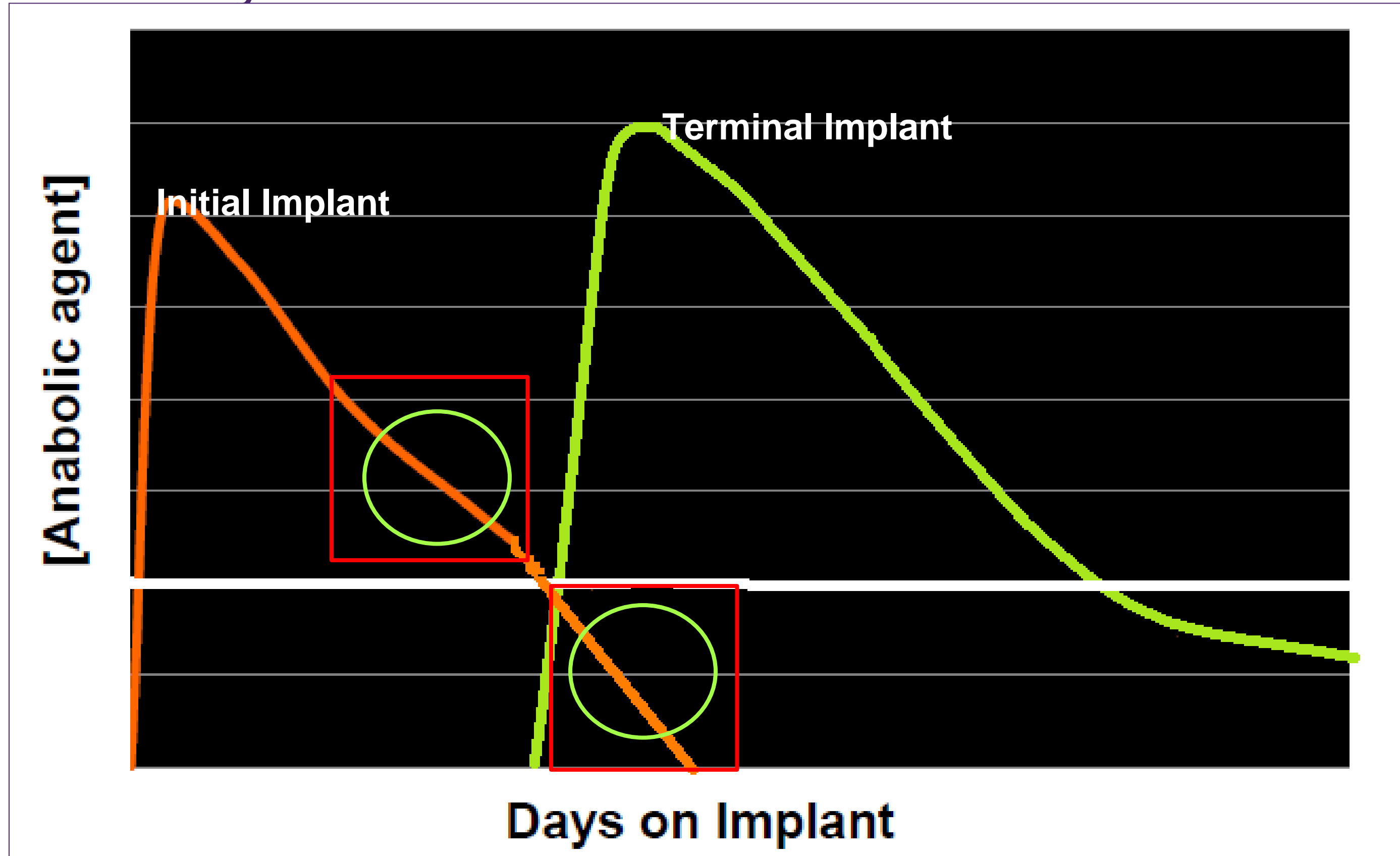
Cost, \$/hd	Benefit, \$/hd
\$5-10	\$75-100+

Best ROI there is!

Traditional Implant Release



Effect of Payout Pattern



Extended Payout Implants

- Revalor-XS
- Synovex One Feedlot
- Revalor-XH
- Revalor-XR
- Encore

Longer periods-200 DOF
Vary release pattern due to different coatings

Implant effects in cattle

Improve ADG and F:G due to greater IGF-1 and growth hormone

Response well documented in nearly all classes of cattle production (with varying magnitude-greater as BW increases)

Implant Response by Production Segment

Suckling Calf:
5.1-6.3%
improved ADG

Stocker:
12.4-16.4%
improved ADG

Finisher:
16.4-20.1%
improved ADG

Duckett and Andrae, 2001

Implant effects in cattle

Improve ADG and F:G due to greater IGF-1 and growth hormone

Response well documented in nearly all classes of cattle production (with varying magnitude-greater as BW increases)

Historical lack of interaction demonstrated between beef breed types or dairy and response to implants.

Evidence that dairy influenced animals may respond differently to implants?

Major Factors to Consider for BxD & Implants



Ownership length

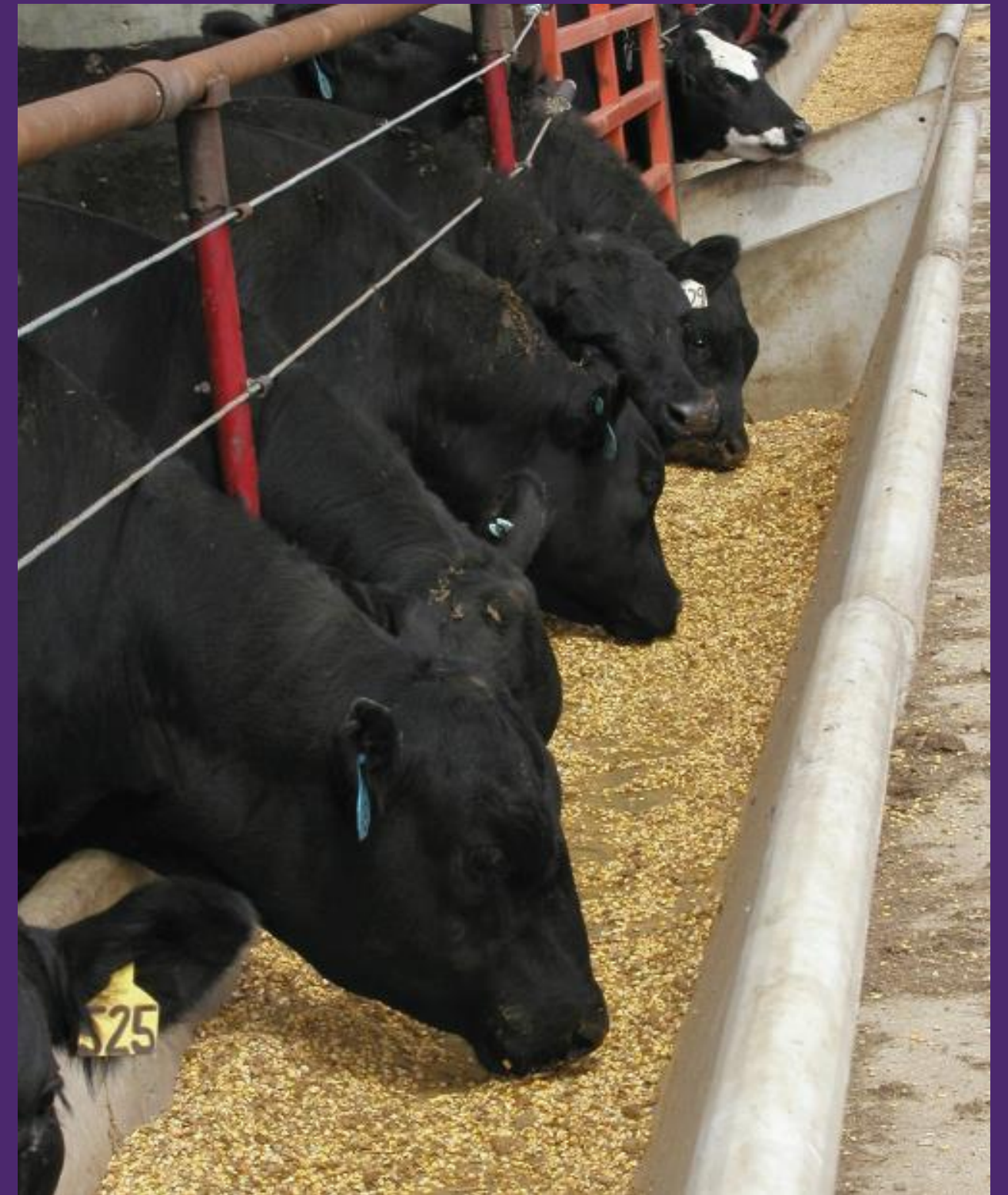
Yard logistics

Marketing-Quality Grade

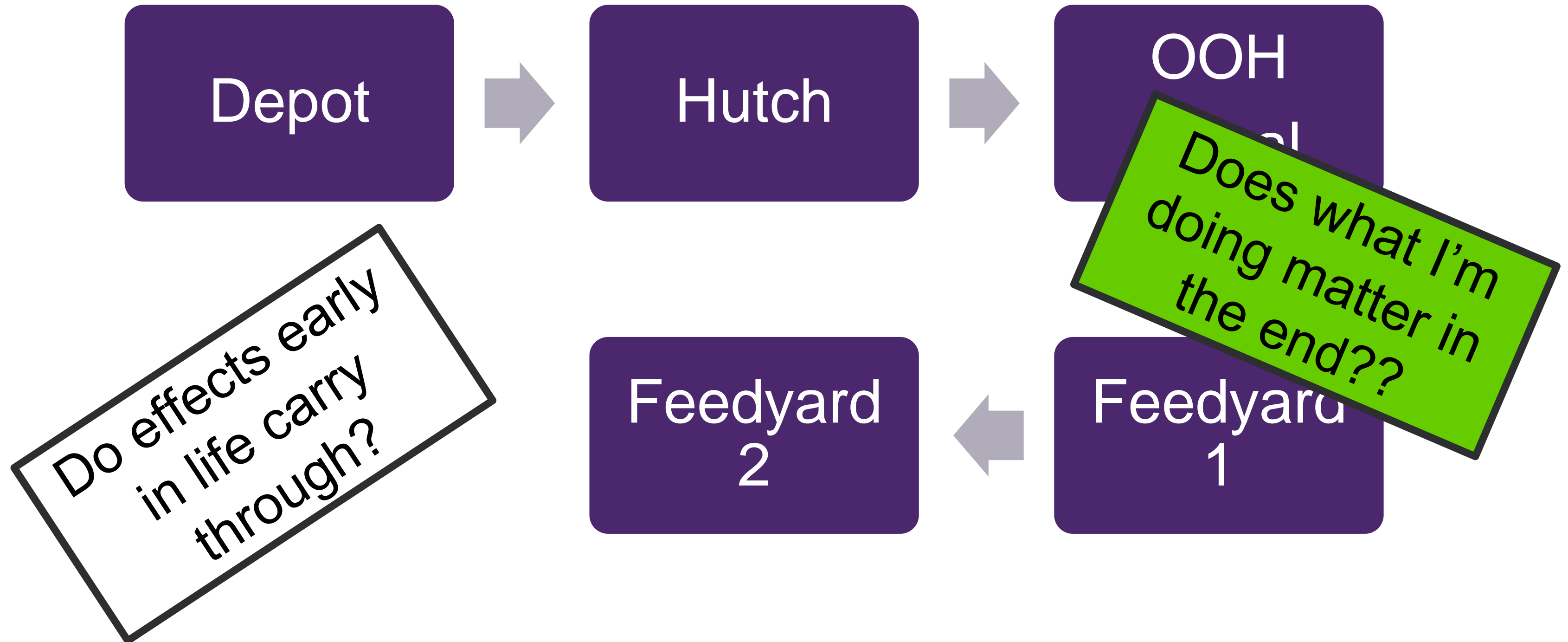
Health & Behavior



What part of the production cycle are you?



Example Segments in BxD Production



Production Systems BxD

Body Weight

100	200	400	600	800	1000	1200	1400
------------	------------	------------	------------	------------	-------------	-------------	-------------



Calf-Ranch	Feedlot						
-------------------	----------------	--	--	--	--	--	--

Calf-Ranch	Feedlot						
-------------------	----------------	--	--	--	--	--	--

Calf-Ranch	Feedlot						
-------------------	----------------	--	--	--	--	--	--

Calf-Ranch	Grower	Feedlot					
-------------------	---------------	----------------	--	--	--	--	--

Production Systems Traditional Beef Cattle

Body Weight

100	200	400	600	800	1000	1200	1400
------------	------------	------------	------------	------------	-------------	-------------	-------------



Cow-Calf/Pasture	Feedlot						
-------------------------	----------------	--	--	--	--	--	--

Cow-Calf/Pasture	Background	Feedlot					
-------------------------	-------------------	----------------	--	--	--	--	--

Cow-Calf/Pasture	Background	Grass	Feedlot				
-------------------------	-------------------	--------------	----------------	--	--	--	--

Implant effects in cattle

Historical Dogma:

- Thou shalt provide all cattle an implant actively paying out 365/24/7
- Consequences are decreased performance and lost \$\$\$

Implants

- In the US, implant label updates have changed the game...

FDA/CVM Published the below statement on April 13th, 2021

All approved steroid implant products have a zero day withdrawal. This means that the meat from the animal is safe for humans to eat at any time after the animal is treated.

Unless otherwise approved and labeled for reimplantation, only one ear implant may be given to an animal during a specific stage of growth. No steroid hormone implants are approved for growth purposes in dairy cows, veal calves, pigs, or poultry. All of the steroid hormone implants are available for over-the-counter purchase in the U.S. and are generally given by the livestock producer at specific stages of the animals' growth.

Implant Studies with Holstein/BxD/Light Calves



Studies

1. Delay implanting in native beef steer calves-4wt/280 DOF
2. 3 Implant combinations in calf-fed Holsteins-3 wt/365+ DOF
3. 3 Implant combinations in calf-fed Holsteins-3 wt/365+ DOF
4. 3 Implant combinations in BxD steers-3 wt/365+ DOF
5. Delay implanting in calf-fed Holsteins-5 wt/224 DOF

Studies

- 1. Delay implanting in native beef steer calves-4wt/280 DOF**
2. 3 Implant combinations in calf-fed Holsteins-3 wt/365+ DOF
3. 3 Implant combinations in calf-fed Holsteins-3 wt/365+ DOF
4. 3 Implant combinations in BxD steers-3 wt/365+ DOF
5. Delay implanting in calf-fed Holsteins-5 wt/224 DOF

From Merck Tech Bulletin MS-Revalor XS-1-22

	XS-0	XS-60	XS-80	XS-100	IS/XS
Arrival	XS				IS
60 DOF		XS			
80 DOF			XS		XS
100 DOF				XS	
Total TBA/E2	200 mg TBA 40 mg estradiol	200 mg TBA 40 mg estradiol	200 mg TBA 40 mg estradiol	200 mg TBA 40 mg estradiol	280 mg TBA 56 mg estradiol

All boxes represent trips through the chute

Performance Results-Deads Out

Item	XS-0	XS-60	XS-80	XS-100	IS/XS	P-value
DOF	280	280	280	280	280	--
Initial BW, lb	428	431	433	432	430	0.40
Final BW, lb	1,310	1,306	1,314	1,294	1,310	0.25
ADG, lb/d	3.15 ^a	3.13 ^{ab}	3.15 ^a	3.08 ^b	3.14 ^a	<0.001
DMI, lb/d	17.55 ^a	17.03 ^{bc}	16.86 ^{bc}	16.71 ^c	17.24 ^{ab}	<0.001
F:G	5.57 ^a	5.45 ^{ab}	5.36 ^b	5.43 ^b	5.49 ^{ab}	<0.001

From Merck Tech Bulletin MS-Revalor XS-1-22

Carcass Results

Item	XS-0	XS-60	XS-80	XS-100	IS/XS2	P-value
HCW, lb	839	836	839	826	839	0.28
Dressing percent	64.02	63.99	63.85	63.87	64.04	0.51
Prime, %	4.65	3.63	5.15	4.56	1.51	
Choice, %	66.55	66.42	70.50	69.34	69.89	0.33
Select	28.53	29.21	23.56	25.32	27.64	

From Merck Tech Bulletin MS-Revalor XS-1-22

Animal health results

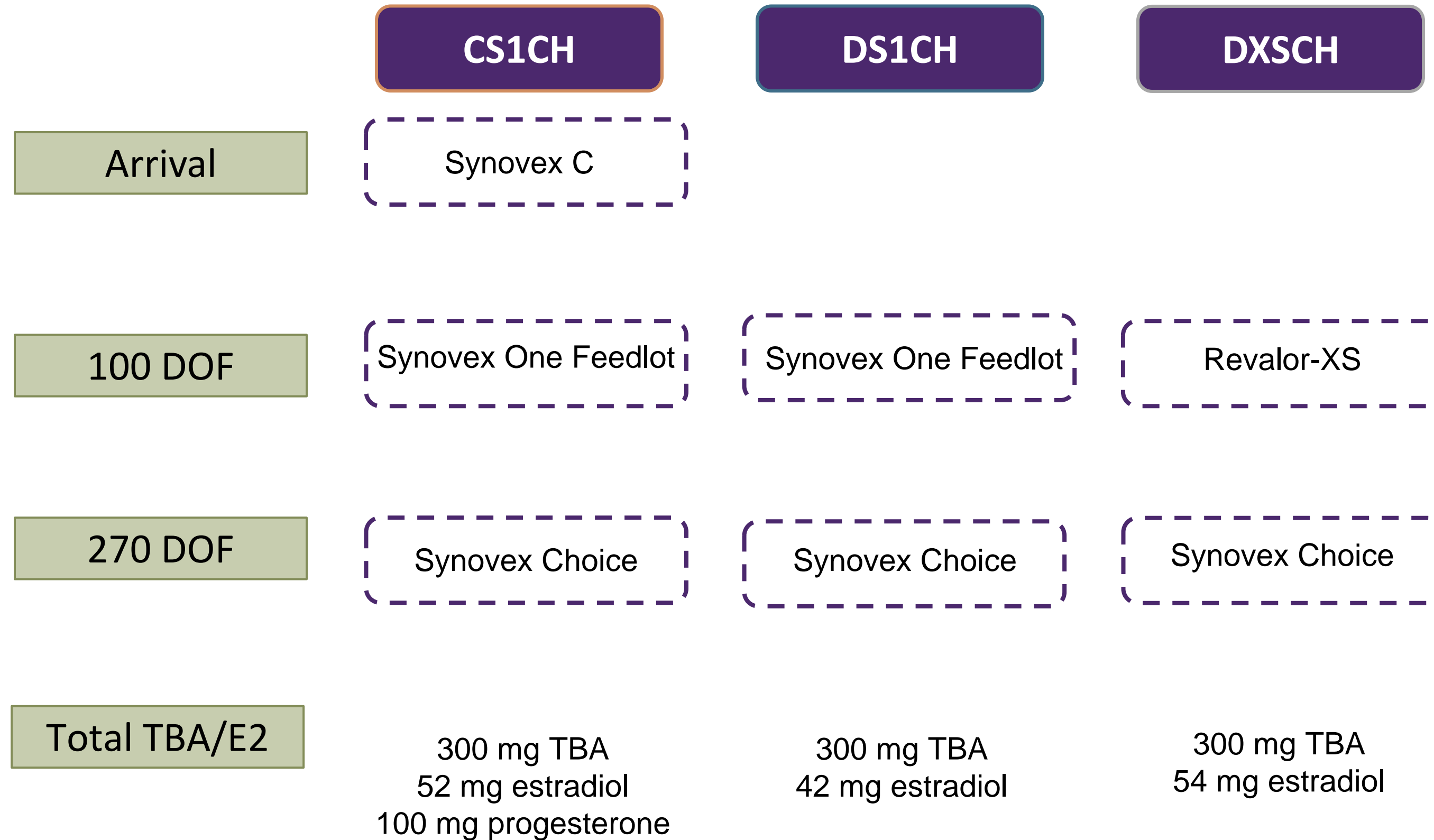
Item	XS-0	XS-60	XS-80	XS-100	IS/XS2	P-value
Calves Enrolled, n	694	694	695	694	695	--
BRD Morbidity, n (%)	35.82 ^a	28.62 ^{bc}	33.59 ^{ab}	28.15 ^c	32.82 ^{abc}	0.02
Buller, %	None Reported					
Total Died, % (n)	14.26 ^a	10.73 ^{ab}	10.99 ^{ab}	9.60 ^b	12.54 ^{ab}	0.07
Total Outs, % (n)	16.18 ^a	12.91 ^{ab}	13.17 ^{ab}	11.20 ^b	14.30 ^{ab}	0.09

From Merck Tech Bulletin MS-Revalor XS-1-22

Studies

1. Delay implanting in native beef steer calves-4wt/280 DOF
2. **3 Implant combinations in calf-fed Holsteins-3 wt/365+ DOF**
3. 3 Implant combinations in calf-fed Holsteins-3 wt/365+ DOF
4. 3 Implant combinations in BxD steers-3 wt/365+ DOF
5. Delay implanting in calf-fed Holsteins-5 wt/224 DOF

From Quinn et al. 2020 Applied Animal Science 36:537-549



All boxes represent trips through the chute

Baseline and ancillary production results

Production Variable	CS1CH	DS1CH	DXSCH	SEM	1 vs 3	2 vs. 3	1 vs. 2
Initial Weight (lb)	322.7	322.7	323.5	± 2.1	0.186	0.183	0.992
Slaughter Weight (lb)	1393.6	1400.5	1377.8	± 6.0	0.015	0.001	0.250
Weight Gain (lb)	1070.9	1077.8	1054.3	± 5.1	0.013	0.001	0.255
Carcass Weight (lb)	848.5	853.2	840.4	± 3.6	0.036	0.003	0.202
Dressing Percentage (%)	60.89	60.93	61.00	± 0.12	0.349	0.515	0.767
Days on Feed (day)	369.4	369.1	370.0	± 1.3	0.313	0.136	0.602
Daily Dry Matter Intake (lb/animal/day)	17.91	17.62	17.80	± 0.14	0.433	0.223	0.056

From Quinn et al. 2020 Applied Animal Science 36:537-549

Feedlot performance results

Production Variable	CS1CH	DS1CH	DXSCH	SEM	1 vs 3	2 vs. 3	1 vs. 2
Average Daily Gain (lb/day)							
Live Weight Basis	2.87	2.88	2.82	± 0.02	0.004	< 0.001	0.383
Carcass Weight Basis	2.84	2.85	2.79	± 0.02	0.009	0.001	0.337
Dry Matter Intake to Gain Ratio							
Live Weight Basis	6.24	6.11	6.32	± 0.04	0.084	< 0.001	0.007
Carcass Weight Basis	6.32	6.18	6.38	± 0.05	0.191	< 0.001	0.011

From Quinn et al. 2020 Applied Animal Science 36:537-549

Carcass characteristic results

Production Variable	CS1CH	DS1CH	DXSCH	SEM	1 vs 3	2 vs. 3	1 vs. 2
Quality Grade							
Prime (%)	3.38	3.84	1.75	± 0.25	< 0.001	< 0.001	0.182
Choice (%)	68.52	68.72	60.66	± 1.34	< 0.001	< 0.001	0.879
Select (%)	24.86	24.38	33.69	± 1.27	< 0.001	< 0.001	0.694
No Roll/Standard (%)	2.52	2.58	3.11	± 0.38	0.089	0.124	0.852
Dark Cutter (%)	0.65	0.43	0.69	± 0.24	0.782	0.112	0.179

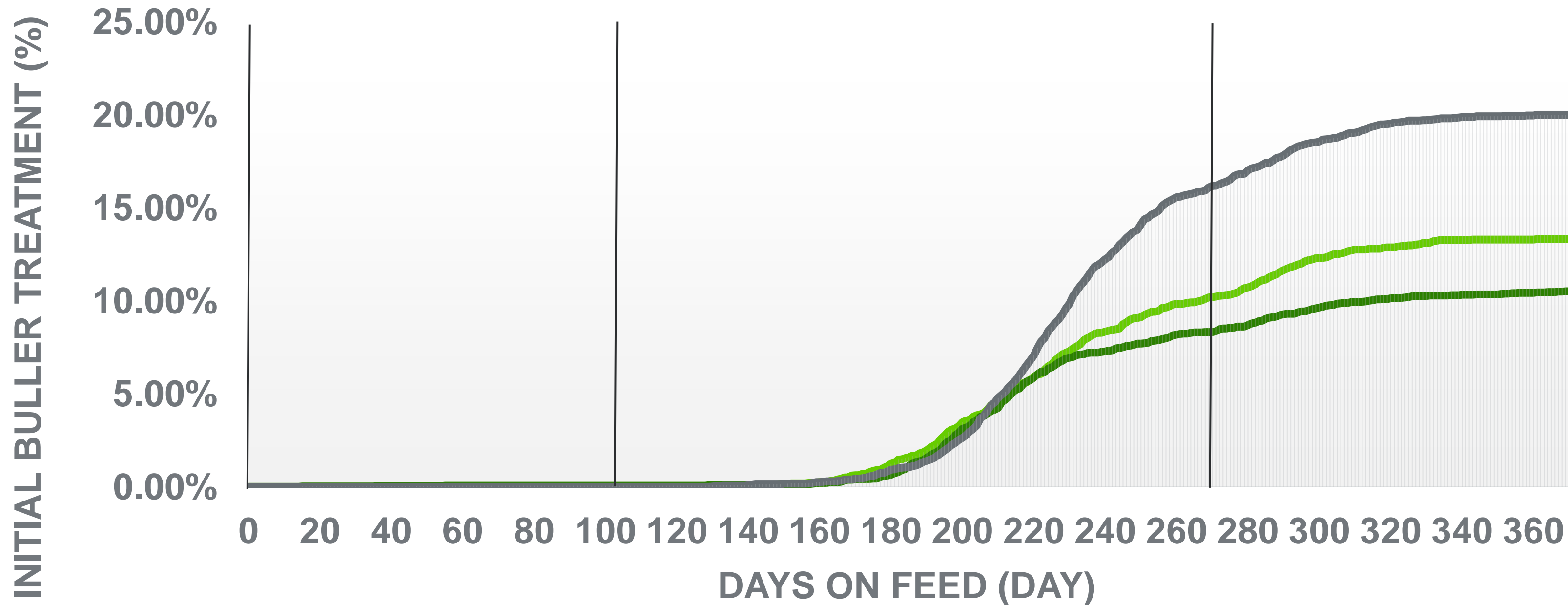
From Quinn et al. 2020 Applied Animal Science 36:537-549

Animal health results

Production Variable	CS1CH	DS1CH	DXSCH	1 vs 3	2 vs. 3	1 vs. 2
Morbidity						
Initial RID Treatment (%)	13.38	10.53	20.04	< 0.001	< 0.001	0.021
First RID Relapse (%)	9.83	7.57	12.87	0.098	0.001	0.267
Chronicity (%)	3.74	3.01	4.41	0.519	0.075	0.340
Wastage (%)	3.14	2.53	4.08	0.360	0.034	0.433

From Quinn et al. 2020 Applied Animal Science 36:537-549

Buller Cases



From Quinn et al. 2020 Applied Animal Science 36:537-549

—CS1CH —DS1CH —DXSCH

Animal health results

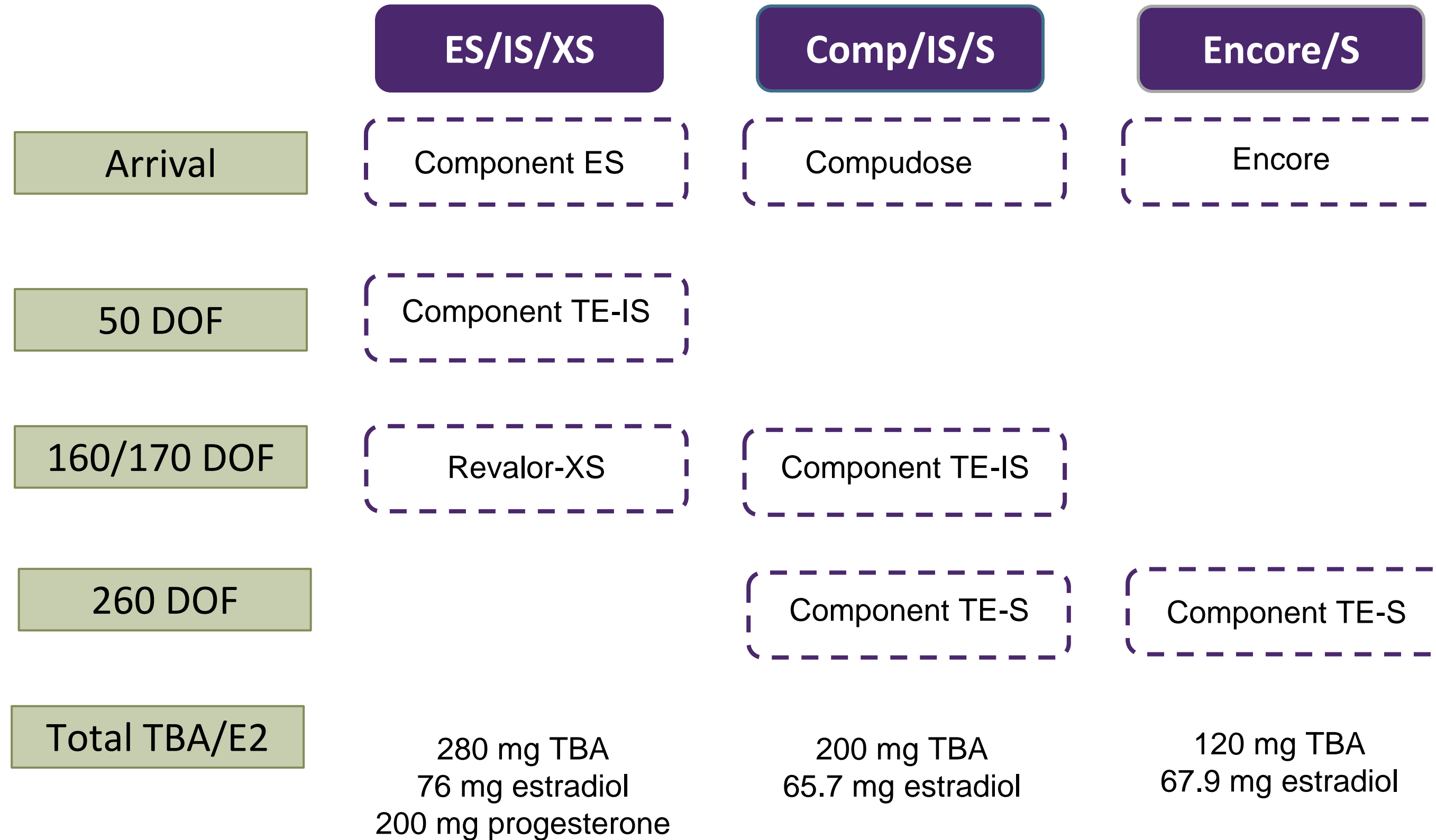
Production Variable	CS1CH	DS1CH	DXSCH	1 vs 3	2 vs. 3	1 vs. 2
Mortality						
Overall Mortality (%)	5.94	5.26	6.33	0.498	0.055	0.111
BRD Mortality (%)	1.78	1.57	1.54	0.384	0.939	0.349
Histophilosis Mortality (%)	0.17	0.21	0.29	0.109	0.294	0.587
Lameness Mortality (%)	0.02	0.06	0.08	0.166	0.619	0.291
Metabolic Mortality (%)	1.00	0.92	0.98	0.928	0.769	0.696
Other Mortality (%)	2.97	2.51	3.42	0.042	0.002	0.037

From Quinn et al. 2020 Applied Animal Science 36:537-549

Studies

1. Delay implanting in native beef steer calves-4wt/280 DOF
2. 3 Implant combinations in calf-fed Holsteins-3 wt/365+ DOF
3. **3 Implant combinations in calf-fed Holsteins-3 wt/365+ DOF**
4. 3 Implant combinations in BxD steers-3 wt/365+ DOF
5. Delay implanting in calf-fed Holsteins-5 wt/224 DOF

From Kayser et al. 2019 Translational Anim Sci. 3: 1733-1738



All boxes represent trips through the chute

Performance Results-Deads Out

Item	ES/IS/XS	Compudose/IS/S	Encore/S	P-Value
DOF	383	383	383	0.39
Initial BW, lb	333	335	333	0.22
Final BW, lb	1459 ^b	1439 ^a	1450 ^{ab}	0.01
ADG, lb/d	2.93 ^b	2.89 ^a	2.91 ^b	0.01
DMI, lb/d	18.65	18.76	18.45	0.14
F:G	6.36 ^b	6.50 ^a	6.34 ^b	0.01

From Kayser et al. 2019 Translational Anim Sci. 3: 1733-1738

Carcass Results

Item	ES/IS/XS	Compudose/IS/S	Encore/S	P-Value
HCW, lb	409 ^a	405 ^b	406 ^b	0.01
Dressing percent	61.87	61.96	61.68	0.14
Prime, %	2.13 ^a	2.12 ^a	4.29 ^b	0.06
Choice, %	63.41 ^a	58.40 ^a	69.86 ^b	< 0.001
Select	30.90 ^b	34.63 ^b	22.47 ^a	< 0.001

From Kayser et al. 2019 Translational Anim Sci. 3: 1733-1738

Animal health results

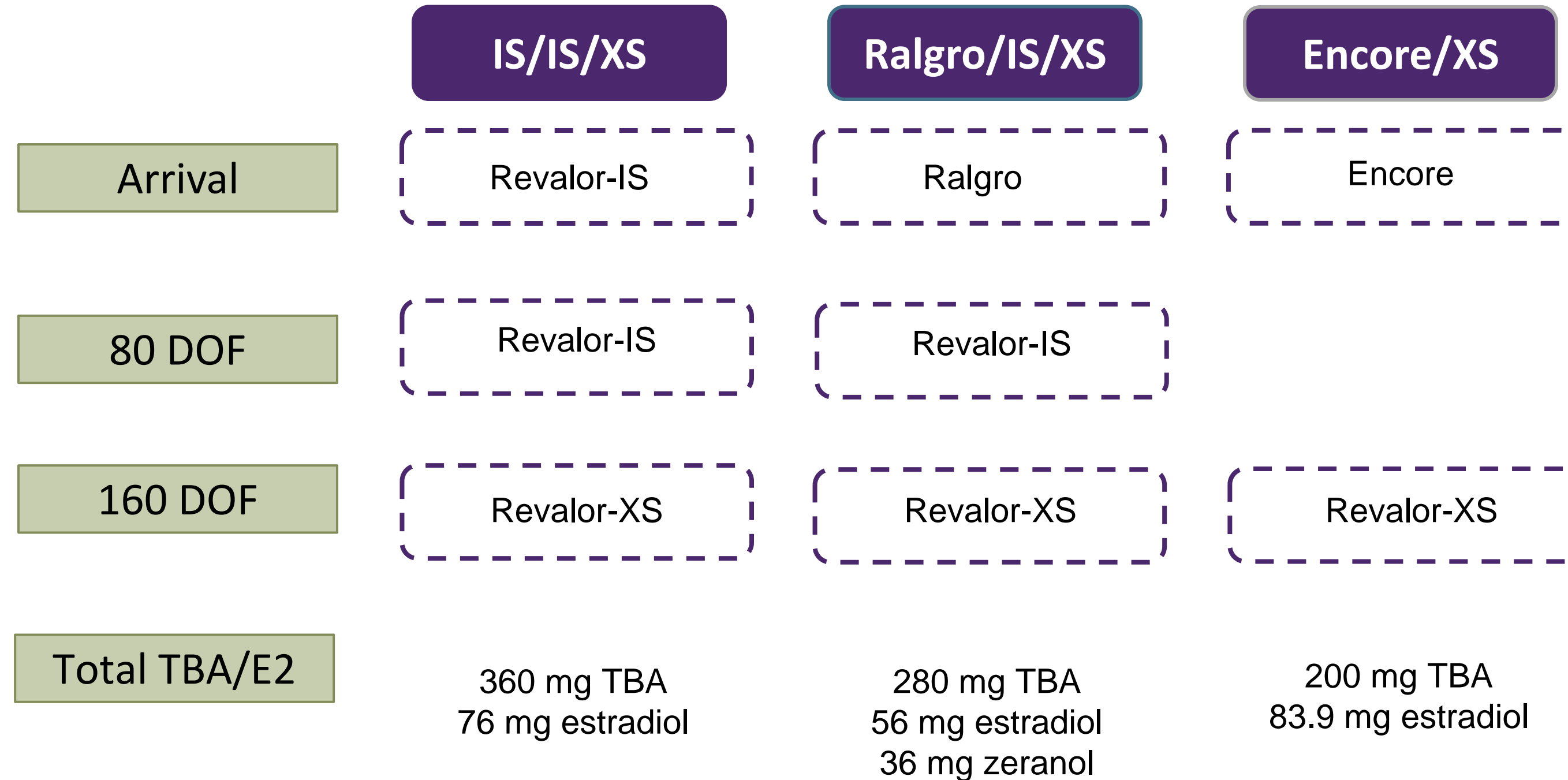
Item	ES/IS/XS	Compudose/IS/S	Encore/S	P-Value
Calves Enrolled, n	2435	2434	2432	
Morbidity, %	13.31	12.84	13.83	0.88
Buller, %	3.44 ^a	6.17 ^b	2.79 ^a	<0.001
Mortality, %	6.98 ^b	5.54 ^a	4.90 ^a	0.02
DOF at Death	152	168	165	0.20
Removals, %	1.10	2.03	1.80	0.16

From Kayser et al. 2019 Translational Anim Sci. 3: 1733-1738

Studies

1. Delay implanting in native beef steer calves-4wt/280 DOF
2. 3 Implant combinations in calf-fed Holsteins-3 wt/365+ DOF
3. 3 Implant combinations in calf-fed Holsteins-3 wt/365+ DOF
4. **3 Implant combinations in BxD steers-3 wt/365+ DOF**
5. Delay implanting in calf-fed Holsteins-5 wt/224 DOF

From Wesley et al. 2023 Translational Anim Sci. 7: txad124



All boxes represent trips through the chute

Performance Results

Item	IS/IS/XS	Ra/IS/XS	Encore/XS	P-Value
Initial BW, lb	344	346	346	0.50
Final BW, lb	1289	1292	1281	0.78
DMI, lb/d	18.82	18.67	18.40	<0.01
ADG, lb/d-Deads in	3.13	3.11	3.06	0.12
ADG, lb/d-Deads out	3.37	3.33	3.31	0.08
F:G-Deads in	6.01	6.01	6.01	0.92
F:G-Deads out	5.58	5.61	5.57	0.34

From Wesley et al. 2023 Translational Anim Sci. 7: txad124

Carcass Results

Item	IS/IS/XS	Ra/IS/XS	Encore/XS	P-Value
Prime, %	0.9 ^b	0.9 ^b	2.0 ^a	< 0.01
Choice, %	68.8	69.5	70.9	0.34
Select. %	28.7 ^a	26.9 ^{ab}	23.9 ^b	< 0.01
CAB, %	18.2 ^b	20.6 ^{ab}	22.5 ^a	< 0.01

From Wesley et al. 2023 Translational Anim Sci. 7: txad124

Animal health results

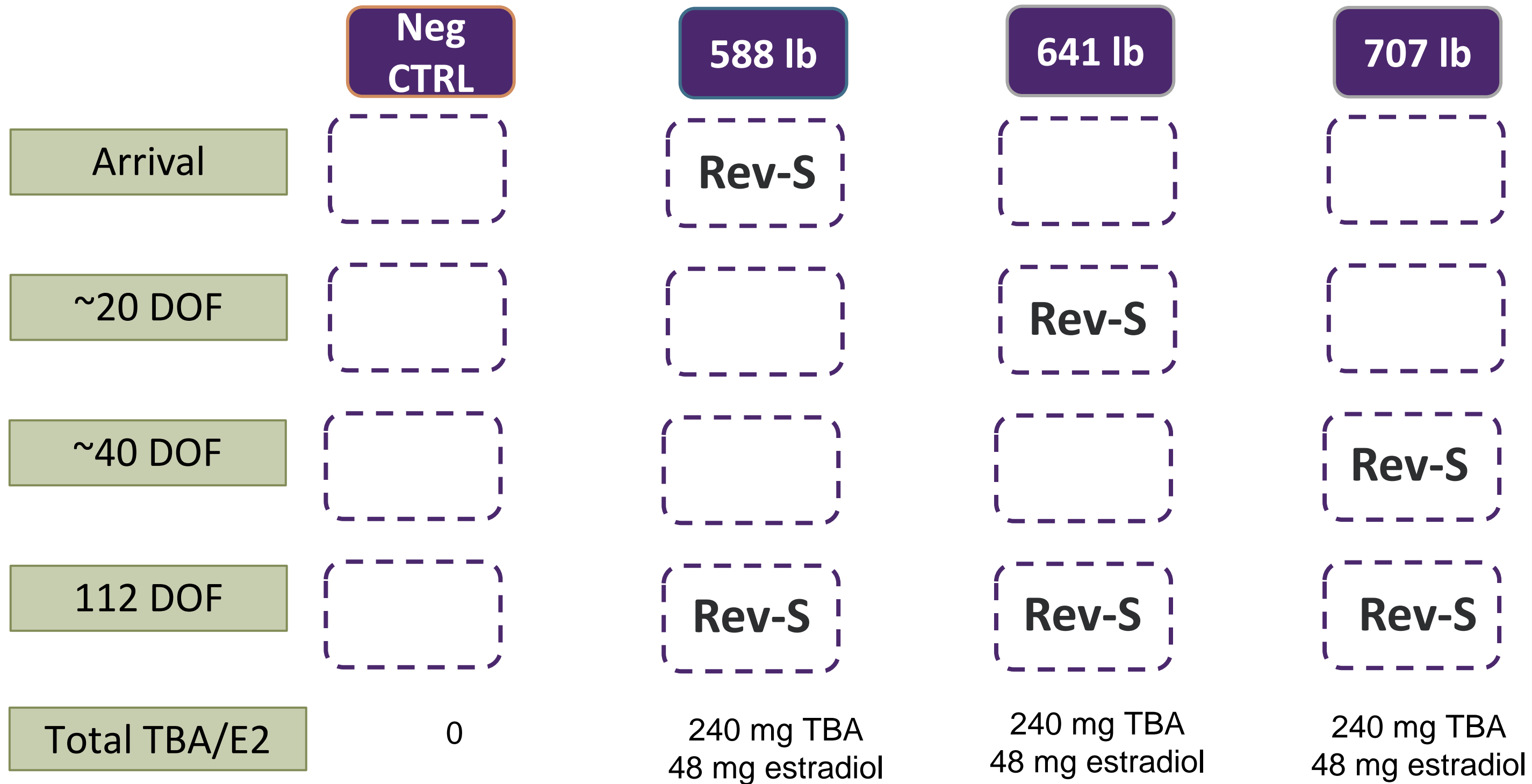
Item	IS/IS/XS	Ra/IS/XS	Encore/XS	P-Value
Calves Enrolled, n	2299	2299	2297	
Morbidity, %	13.41	13.76	13.45	0.95
Buller, %	6.86 ^a	5.18 ^{ab}	2.40 ^b	< 0.01
Mortality, %	9.32	8.69	9.50	0.53
Removals, %	3.32	2.88	2.69	0.45

From Wesley et al. 2023 Translational Anim Sci. 7: txad124

Studies

1. Delay implanting in native beef steer calves-4wt/280 DOF
2. 3 Implant combinations in calf-fed Holsteins-3 wt/365+ DOF
3. 3 Implant combinations in calf-fed Holsteins-3 wt/365+ DOF
4. 3 Implant combinations in BxD steers-3 wt/365+ DOF
5. **Delay implanting in calf-fed Holsteins-5 wt/224 DOF**

From Torrentera et al. 2016 J. App Anim Res



All boxes represent trips through the chute

Baseline and ancillary production results

Production Variable	Neg CTRL	588	641	707	SEM	P-Value IMP vs. None	P-Value Linear	P-Value Quad
Initial Weight (lb)	581	588	582	581	3.52	0.60	0.15	0.69
Slaughter Weight (lb)	1209	1333	1324	1299	12.56	<0.01	0.09	0.59
ADG, lb/d	2.82	3.33	3.33	3.22	0.07	<0.01	0.17	0.48
DMI, lb/d	17.08	18.54	18.05	17.68	0.20	<0.01	0.01	0.85
F:G	6.05	5.57	5.42	5.49		<0.01	0.69	0.32

From Torrentera et al 2016

Studies with Various Implant Regimes Summary

- Limited/no response to added TBA early in feeding period on feed efficiency and generally worse QG outcomes in cattle <500 lb
- Some delay in initial implant is possible or even preferred, especially in cattle <500 lb
- Implant TBA potency, payout, and timing affect bullers and may negatively affect animal health

Ask ChatGPT “What are better implant strategies for beef on dairy cattle compared to traditional beef breeds?”

3. Special Considerations for Beef-on-Dairy

- **Avoid excessive frame growth:** Because of dairy genetics, overuse of implants early on can lead to excessive frame size without enough muscle deposition.
- **Monitor marbling:** Implants can reduce marbling, which is already a challenge in dairy-influenced cattle.
- **Optimize energy intake:** Since beef-on-dairy cattle are often leaner, ensuring high-energy rations post-implantation is critical to maximize muscle deposition.

Conclusion

- **Beef-on-dairy cattle benefit from a more tailored implant approach**—delaying the first implant, using moderate-potency implants in early feeding, and choosing longer-acting or terminal implants to finish.
- **Traditional beef breeds** can tolerate more aggressive implant programs early due to their natural muscling.
- **Proper implant timing and nutrition** are crucial to achieving optimal weight gain, feed efficiency, and carcass quality in both systems.

If you remember nothing else, remember:

Table 1. Estrogenic activity of common foods (ng/500g)

Food	Estrogenic Activity
Soy flour defatted	755,000,000
Tofu	113,500,000
Pinto beans	900,000
White bread	300,000
Peanuts	100,000
Eggs	555
Butter	310
Milk	32
Beef from implanted steer	7
Beef from non-implanted steer	5

Hoffman and Eversol (1986), Hartman et al (1998), Shore and Shemesh (2003), USDA-ARS (2002). Units are nanograms of estrone plus estradiol for animal products and isoflavones for plant products per 500 grams of food

Table 2. Estrogen production in humans, and potential estrogen intake from implanted beef

Item	Estrogen Amount
Pregnant woman	19,600,000 ng/day
Non-pregnant woman	513,000 ng/day
Adult man	136,000 ng/day
Pre-puberal children	41,000 ng/day
500 g of beef from implanted cattle	7 ng

Hoffman and Eversol (1986)

From: Loy, 2011



telus.com/agcg

 @TELUS_AGCG

 @TELUS Agriculture & Consumer Goods