

Delivering Valued Genomic Products to Livestock Customers

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Veterinary Medicine Research and Development



Predict The Future Now!

Who We Are

**WORKING ON
VACCINES FOR
CHILDREN.**



**AND THOSE
WHO ACT
LIKE THEM.**



Working together for a healthier world.™

- ▶ A Pfizer business
- ▶ A leading global animal health company
- ▶ Working to assure a safe, sustainable global food supply from healthy beef and dairy cattle, swine, poultry, sheep and fish
- ▶ Helping dogs, cats and horses live healthier longer lives

What We Do



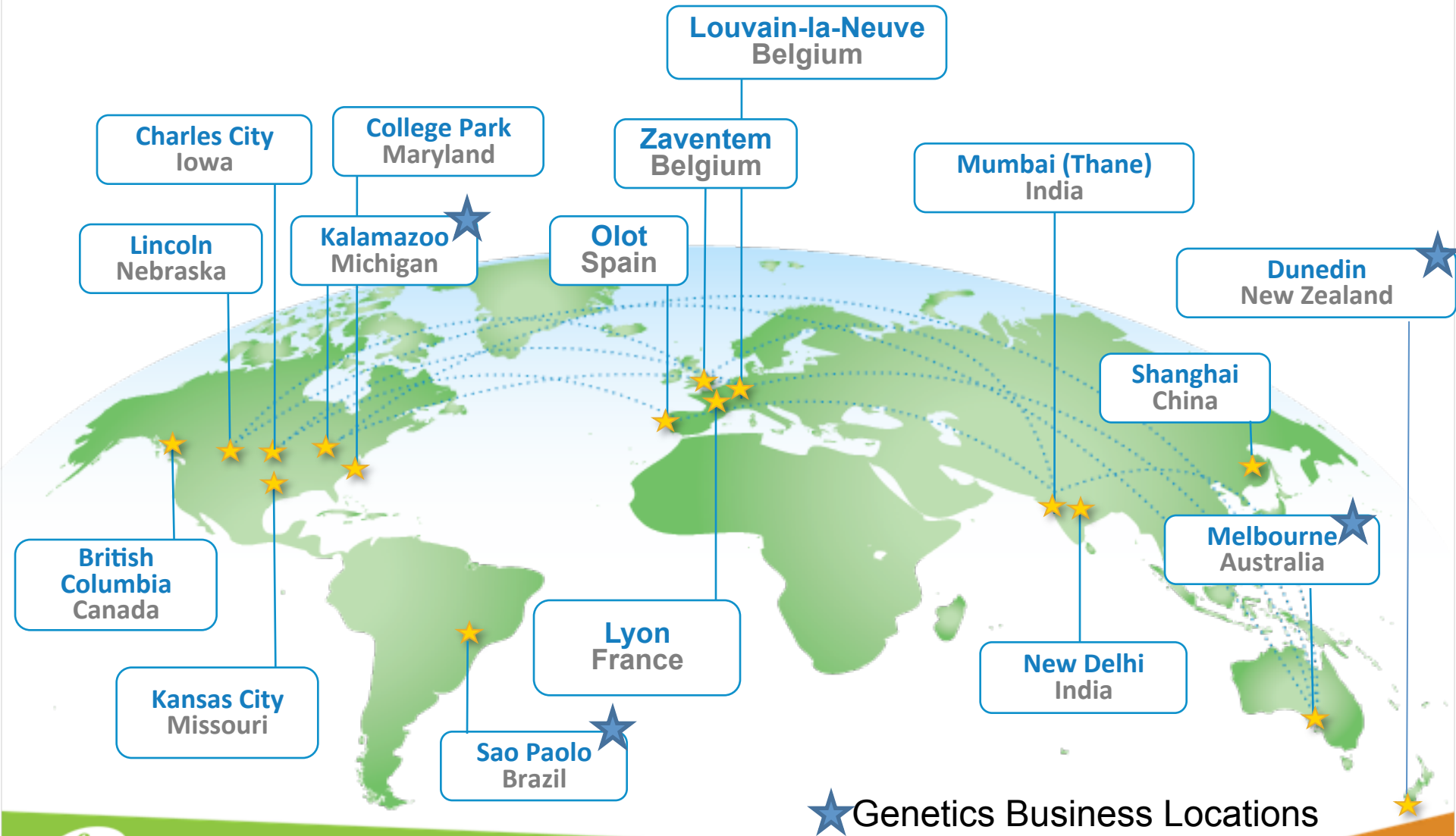
A leader in discovery, development, and manufacture of veterinary vaccines & medicines

5000+ colleagues worldwide including **800+ veterinary R&D scientists and specialists**



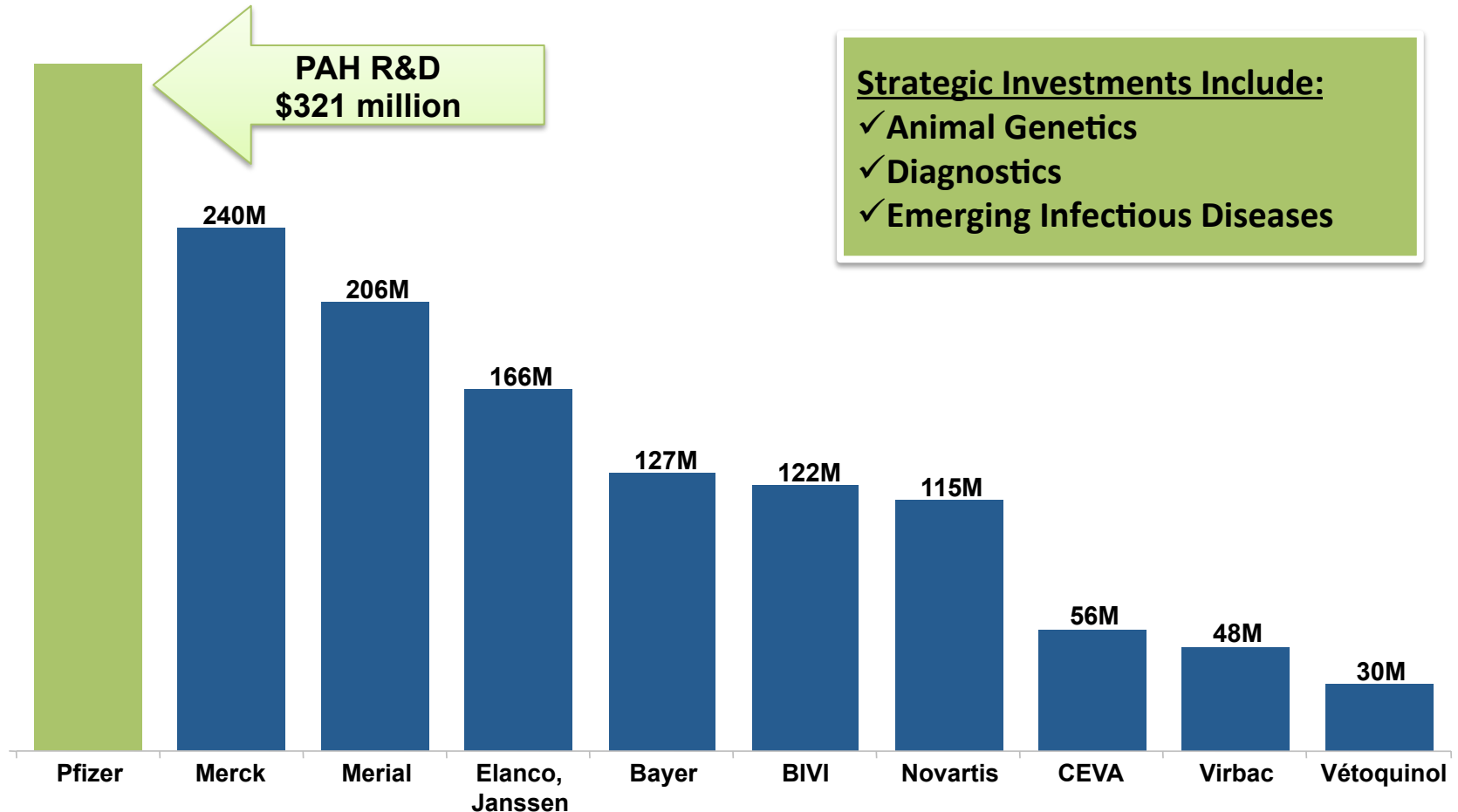
Diverse portfolio of leading veterinary products & services for livestock & companion animals

PAH Global R&D Network – Genetics Businesses



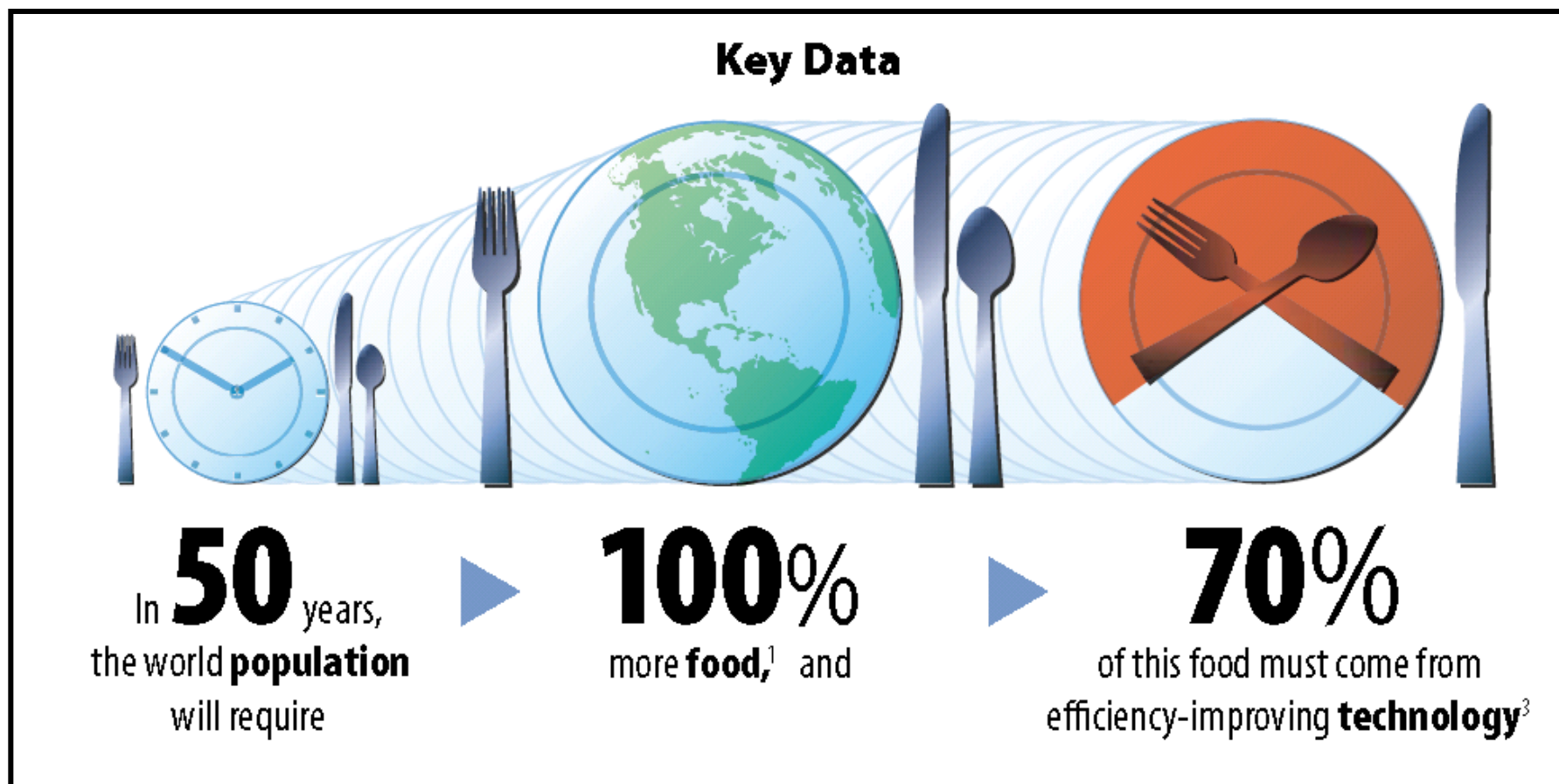
PAH Leads Industry in Global R&D Investment

R&D Spend (in \$Millions)



Sources: Pfizer Animal Health actual 2010 R&D spend. Vetnosis July 29, 2011 Income Statement Report of 2010 R&D spend for other animal health companies.

Why Genetics – The Challenge

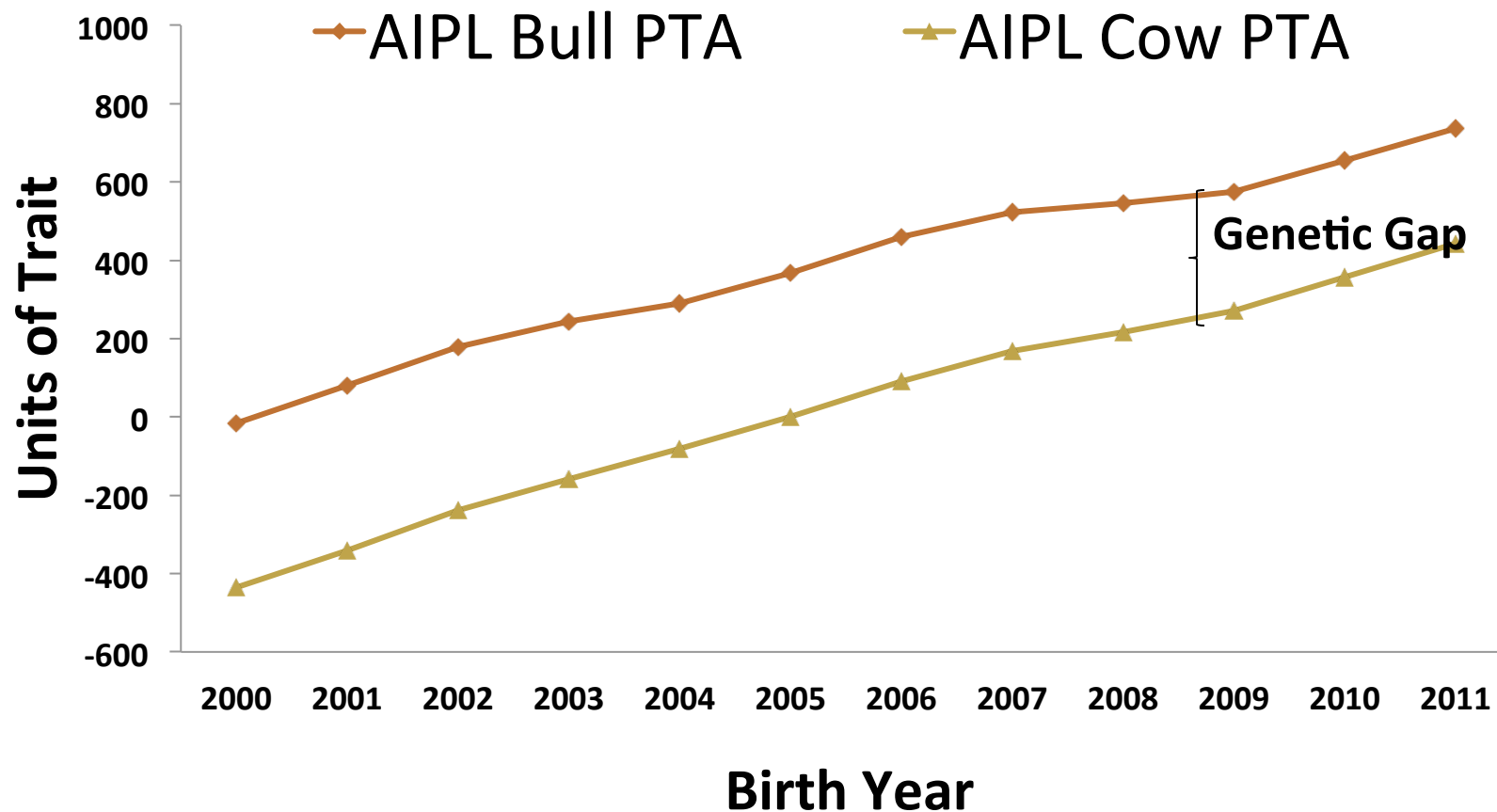


Source: Food Economics and Consumer Choice (Simmons, 2008)

Genomic Tools for Dairy Cattle



U.S Holstein Genetic Trend – Sires and Elite Dams



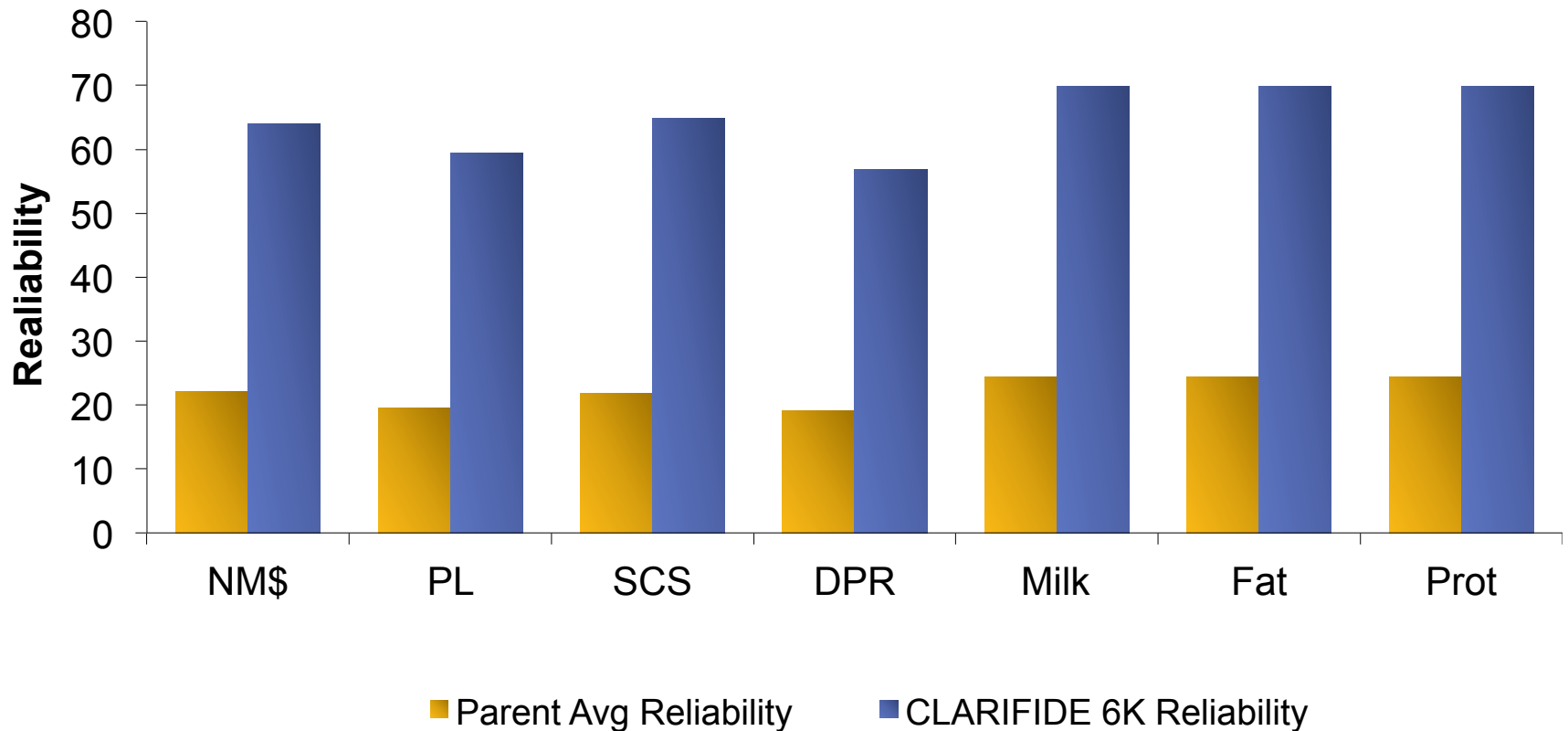
What is CLARIFIDE® for Dairy?

A Portfolio of Predictions and Tools to Implement Genetic Improvement of Commercial Dairy Females

- A panel of 6,900 (LD) and 50,000 (50K) genetic markers
 - USDA Animal Improvement Programs Laboratory (AIPL)
 - Derived from 54,001 (50K) marker panel test
- Delivers genomic predictions for:
 - Holstein, Jersey, and Brown Swiss
 - 30 production, health and type traits
 - 9 composite indexes
- Includes markers to:
 - Authenticate parentage
 - Bolster reliability of genetic predictions
 - Help manage inbreeding

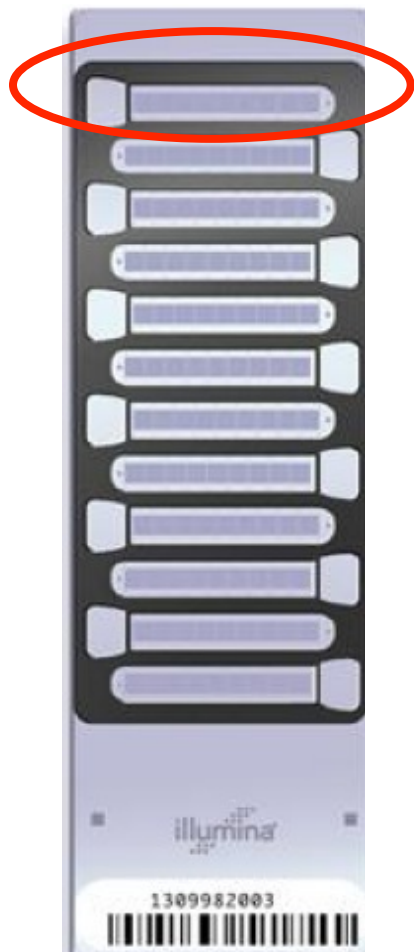


CLARIFIDE® Empowers Female Selection



Based on CLARIFIDE in Holstein Cattle. Pfizer Animal Genetics, Data on File

What's a SNP Genotype Worth?



Pedigree is equivalent to information on about 7 daughters



For the protein yield ($h^2=0.30$), the SNP genotype provides information equivalent to an additional **34** daughters

John Cole: aipl.arsusda.gov/publish/presentations/.../
NCSU_2012_jbc.pptx

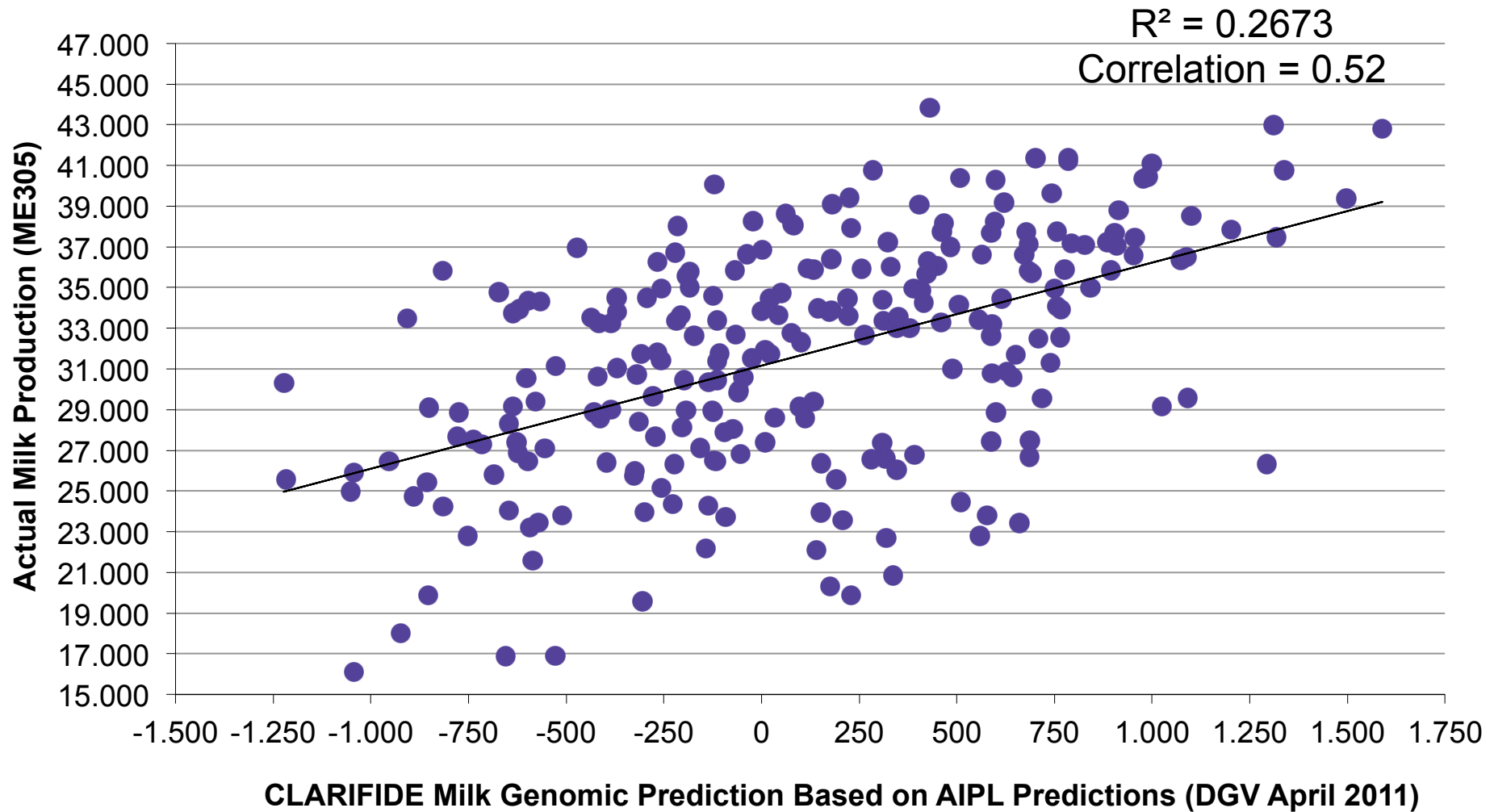
What's a SNP Genotype Worth?

And for daughter pregnancy rate ($h^2=0.04$), SNP = 131 daughters



Genomic Predictions Upper Midwest Dairy

(n=240)



Based on CLARIFIDE in Holstein Cattle. Pfizer Animal Genetics, Data on File

Strategies for Accelerating the Female Genetic Improvement



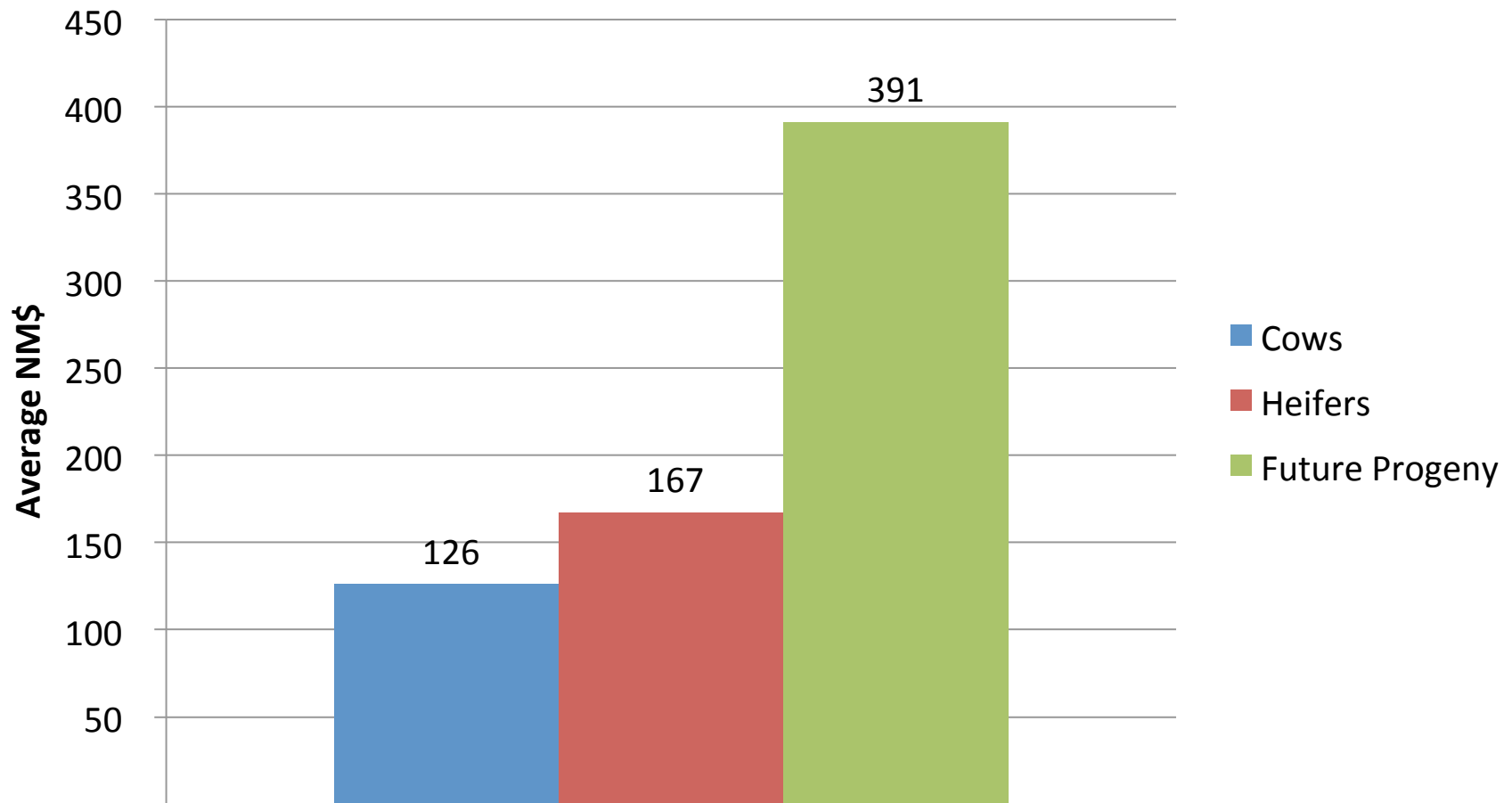
Real World Example: Strategic Breeding

- California Dairy Customer is using sexed semen in better heifers to improve quality of future female progeny
- Strategic allocation of sexed semen in top 50% of gPTA heifers for Net Merit \$



Real World Example: Strategic Breeding

- Future progeny of California Dairy *will increased genetic progress 134%* or *\$ 224 Net Merit* in the next heifer generation



Dairy Solutions Provider



- Comprehensive portfolio of products and services
- Deliver solutions for technical business challenges
- Strive to earn a place in dairy management teams

Partnering to Deliver Genomic Products



American Angus Assoc. ANCP Red Angus Assoc NAPCo Ovita

Features of HD 50K for Angus

Parentage – HD 50K

Traits – GE-EPDs & Ranks

AMERICAN ANGUS ASSOCIATION® — THE BUSINESS BREED
 3201 Frederick Avenue • St. Joseph, MO 64506 • (816) 383-5100 • Fax (816) 233-9703 • E-mail: angus@angus.org

SydGen Trust 6228 Reg: AAA 15354674 Bull
 [AMF-CAF-NHF]

Birth Date: 02/07/2006 **Pat:** 6228
 Parentage: Microsatellite, SNP
 Genomic: IG384, PF50

Breeder: 552400 - Sydenstricker Angus Frms, Mexico MO
Owner: 1188686 - Sydenstricker Genetics Inc, Mexico MO
(s): 1196584 - JMJ Ranch, Gould OK

C A Future Direction 5321 **AAA #12493607** [AMC-NHC-CAF]
 C A Miss Power Fix 308 **AAA 12054694** [AMF]
 SCR Promise 4042 **AAA 14851313** [AMF-CAF-NHF]
 SCR Queen 2167 **AAA 14331991**
 S A Bando 5175-1290 **AAA 13674311**
 S A V Queen 9406 **AAA 13328384**
 B/R New Design 036 **AAA #11418151** [AMF-CAF-NHF]
 AAA #12783540 [AMF-CAF-NHF]
 Bon View New Design 1407 **AAA 12139985**
 Bon View Pride 664 **AAA #+11747039** [AMF-CAF-NHF]
 S A F Neutron **AAA +13569349**
 S A F Forever Lady 0182 **AAA 11781043**
 G D A R Forever Lady 246

Pathfinder + Embryo Transplant

As of 04/01/2011

Production								Maternal						
CED Acc	BW Acc	WW Acc	YW Acc	RADG Acc	YH Acc	SC Acc	Doc Acc	CEM Acc	Milk Acc	MkH MkD	MW Acc	MH Acc	\$EN	
+11.44	+3.66	+59.53	+97.48	+17.33	+4.61	+73.52	+24.55	+11.14	+28.19		+34.05	+7.05	-7.76	

- Calving Ease Direct
- Birth Weight
- Weaning Weight
- Yearling Weight
- Dry Matter Intake (RADG)
- Residual Feed Intake
- Yearling Height
- Scrotal Circumference
- Docility
- Calving Ease Maternal
- Milking Ability
- Mature Weight
- Mature Height
- Carcass Weight
- Fat Thickness
- Ribeye Area
- Marbling Score
- Tenderness

HD 50K Information is Integrated into EPDs, Indexes and Accuracy Values

1

Lot 1 Pfizer Example

Reg. No:

DOB: 1/8/2011

CONNEALY CO
CONNEALY CONSENS
BLUE
EXAR EVAS 7

Act. BW

82

Adj. WW

882

Adj. YW

1,495

Adj. SC

39.22

Adj. IMF

7.50

Adj. REA

16.70

GE-EPDs simplify selection, mating and marketing because all available data is integrated, removing the need to consider individual sources of trait information.

EPDs current as of

CED	BW	Calving-Ease	Fat									
8	0.9	★★★★	.059									
CED	BW	WW	ADG	YW	REA	FAT	Tend					
6	10	6	14	5	34	92	67	21	19	65	86	43

Trait	Average Change in EPD from HD 50K ¹	Average Change in Accuracy with HD 50K from .05 ² Accuracy	Approximate Progeny Equivalents
CED	±1.6 units	.24	14
BW	±.45 lb	.25	8
WW	±2.2 lbs	.23	16
YW	±3.1 lbs	.27	20
RADG	±.03 lbs/day	.27	13
YH	±.10 in	.29	8
SC	±.12 cm	.30	9
Doc	±2.9 units	.25	8
Milk	±1.2 lbs	.15	12
MW	±14 lbs	.29	7
CW	±4.1 lbs	.17	7
Marb	±.08 units	.24	12
RE	±.10 in ²	.23	9
FAT	±.01 in	.23	11

¹Derived from animals with ≤ .30 accuracy. ²Accuracy from pedigree only



Acquiring Technology

- Sponsored Research
 - Academic Institutions
 - CSIRO
- License Technology
 - Ovita
 - Australian CSIRO
 - Genetic Conditions
- Internal R&D
 - Nelore predictions
 - Global Angus predictions
- Collaborative research
 - Angus Genetic, Inc.
 - Large Pastoral Companies

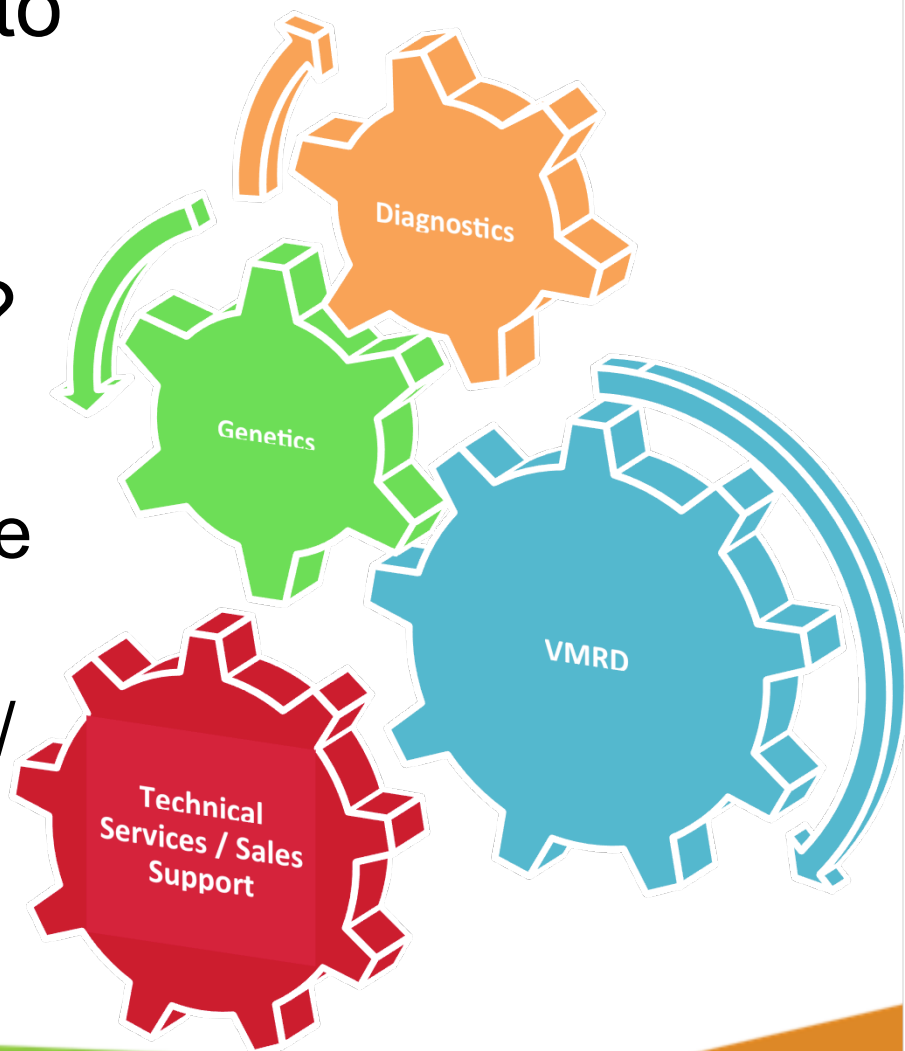


R&D Pipeline Decisions
“Customer focused”

Integrated Solutions Path Forward

❖ Can we use synergies to develop complete solutions for our customer's challenges?

- ❖ Health Traits
- ❖ Diagnostic tools to refine genomics
- ❖ Rational use of Pharma/biopharma products



Thank
You