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Financial considerations when using carcass data

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Introduction

The types of information that can be generated from the carcass during the slaughter process are shown in **Table 1**.

At the University of Prince Edward Island, we have designed software to capture carcass data and make it available to the industry. The Animal Productivity and Health Information Network (APHIN) handles information from a number of commodities, including pig carcass data (www.aphin.upei.ca). **Figure 1** indicates the basic data flow.

This paper will focus on how carcass data has been used to help with financial decisions in the commercial pork industry. Several case examples of how carcass data might be used follow.

Figure 1: Data flow in the APHIN system.

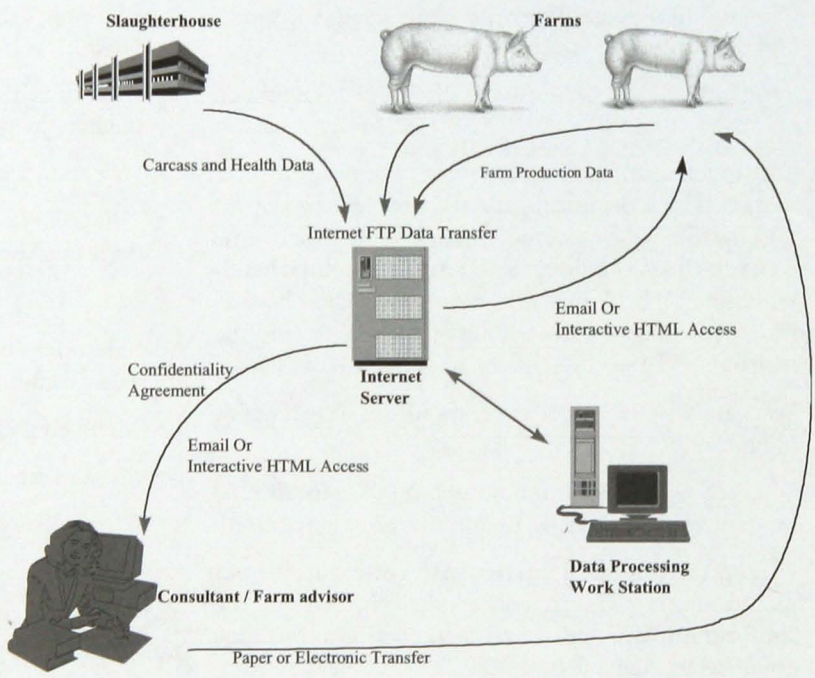


Table 1: Types of information generated during slaughter.

Parameter	Source	Purpose
Weight	On line scale	Determines carcass value and Index
Index	Calculation	Determines carcass premium (index 105 = 1.05% of market price)
Backfat depth	Grading Probe	Determines lean yield
Loin eye depth	Grading Probe	Determines lean yield and may to premium
Lean Yield	Calculation	Determines Index
Demerits	Inspection and trimming	Deductions from carcass value
Animal Health	Inspection / specific scoring	Health feedback or deduction of carcass value
Number of animals sold	Delivery manifest & kill data	Verification of inventory sold and throughput measurement

Analysis of profitability of feed choices for commercial pork production

Carcass data needs to be considered for this analysis:

- Feed 2 had fatter pigs; consequently, lean yield and premiums are reduced.
- This premium reduction made Feed 4 more profitable than Feed 2; carcass data becomes an essential part of the financial analysis shown in **Table 2**.
- Carcass data and subsequent premium payment determine financial outcome for producers. If other parameters such as meat color, marbling, or loin depth become a basis for payment, the financial outcomes change even more.

Financial considerations in the choice of genotype

See **Table 3** for genotype comparison data.

Some premium plans that pay a bonus for loin eye depth exist and also need to be considered when analyzing farm decisions.

Underweight pigs are costly, both to producers and packers. Penalties reduce the value of underweight pigs, and carcass data that documents the light pigs—and the losses they incur—are important to monitor. **Table 4** shows a raw carcass data sheet with estimated losses per pig.

Demerit data

Figure 2 shows data from a farm with a problem with demerits associated with granulomatous lymph nodes. Affected pigs need to be trimmed, usually with removal of the head. Significant losses can occur as outlined below.

Financial presumptions:

- Granulomatous lymphadenopathy demerit carries a trimming loss calculated at 6 kg.
- At peak prevalence of the outbreak (23% of pigs affected) meant a loss of 1.38 kg per pig sold.

Table 2: Feed choice comparison data.

	Feed 1	Feed 2	Feed 3	Feed 4
Cost of production				
Cost/tonne	$244.47	$245.61	$295.09	$268.20
Feed used (kg)	47,052.7	51,210.9	45,139.1	43,634.5
Feed cost	$11,502.96	$12,557.84	$13,320.30	$11,702.95
Pork produced (kg)	16,706.2	17,343.4	16,550.9	16,071.4
Feed conversion	2.816	2.952	2.727	2.715
Feed cost/kg of pork	$0.689	$0.725	$0.805	$0.728
Feed cost/pig	$59.21	$62.36	$69.21	$62.63
Index	110.75	109.83	110.69	110.85
Revenue/pig	$138.11	$136.96	$138.03	$138.23
Revenue minus feed cost	$78.89	$74.60	$68.82	$75.60
Growth rate				
Days for 23-109 kg	90.6	91.9	92.4	95.8
Average Daily Gain g/day	949.5	935.5	931.0	897.3
% Light (< 80 kg dressed)	5.1	9.8	5.6	9.1
% Heavy (> 90 kg dressed)	4.6	2.6	1.7	0.5
Meat quality				
Lean yield (%)	60.75	59.91	60.59	60.85
Backfat depth (mm)	18.52	20.19	18.94	18.14
Loin eye depth (mm)	62.5	59.99	61.90	59.13
Marbling score	1.6	2.3	1.6	1.6
Fat firmness score	1.9	2.7	1.9	2.8
Muscle firmness score	2.0	2.7	2.0	2.5
Light reflectance (%)	52.66	52.41	53.61	53.48

Table 3: Genotype comparison data.

	Genotype 1	Genotype 2	Genotype 3
Growth (kg/day)	.940	.967	1.004
Days from 25 kg to 111 kg	90.4	87.9	84.6
Lean gain (g/day)	462.34	475.5	494.0
Feed conversion	2.51	2.69	2.51
Mortality (%)	1.6	5	1.6
Index	110.68	111.06	111.09
Lean yield %	60.66	60.79	60.80
Backfat (mm)	18.60	17.81	18.17
Average carcass weight (kg)	85.37	84.96	86.10
% Underweight at closeout (< 80 kg)	9.2	21.2 p (0.03)	1.7
Revenue loss /pig @ $1.60 CAD / kg price	-$3.09	-$10.84	-$0.16
Loin depth (mm)	60.75	57.43 p (0.02)	60.29
Loin eye premium per pig	+$1.95	+$1.74	+$2.13

Table 4: Example raw carcass data sheet with estimated losses per pig.

							Calculated at $1.60 CAD/kg price	
Tattoo	Weight (kg)	Yield (%)	Fat (mm)	Loin (mm)	Ship date	Index	Revenue	Opportunity loss
66103	48.4	59	19.5	48	20010222	50	$38.72	$106.08
66323	60.4	62.5	14	55.5	20010308	50	$48.32	$96.48
66233	62	63.9	12	62	20010308	50	$49.60	$95.20
66020	62	63.7	10.5	43	20010215	50	$49.60	$95.20
66130	64.8	63.7	11.5	53.5	20010315	50	$51.84	$92.96
66110	65.8	63.2	13	59	20010301	50	$52.64	$92.16
66200	66.2	62.4	14	54	20010315	50	$52.96	$91.84
66403	66.2	62	14.5	52.5	20010308	50	$52.96	$91.84
66343	66.8	62.4	14	53.5	20010308	50	$53.44	$91.36
66220	67	61	16.5	52.5	20010315	50	$53.60	$91.20
66340	67.2	63.9	11	51.5	20010315	50	$53.76	$91.04
66213	67.2	62.2	14.5	55.5	20010308	50	$53.76	$91.04
66140	67.8	63.5	12	54.5	20010315	50	$54.24	$90.56
66043	68	62.8	12	42.5	20010315	50	$54.40	$90.40
66300	68.4	61.9	14	45	20010315	50	$54.72	$90.08
66343	68.6	64	11.5	58	20010308	50	$54.88	$89.92
66400	68.6	59	19.5	48	20010215	50	$54.88	$89.92
66200	69.6	63.3	13	62	20010315	50	$55.68	$89.12
66130	70.4	65.5	9	59	20010315	94	$105.88	$38.92
66340	70.5	63	12.5	50	20010315	90	$101.52	$43.28
66220	70.8	63.6	12	56	20010315	90	$101.95	$42.85
66020	70.8	60.8	17	52	20010315	85	$96.29	$48.51
66110	70.8	64.3	10.5	53	20010308	94	$106.48	$38.32

Figure 2: Demerit rates due to granulomatous lymph nodes.

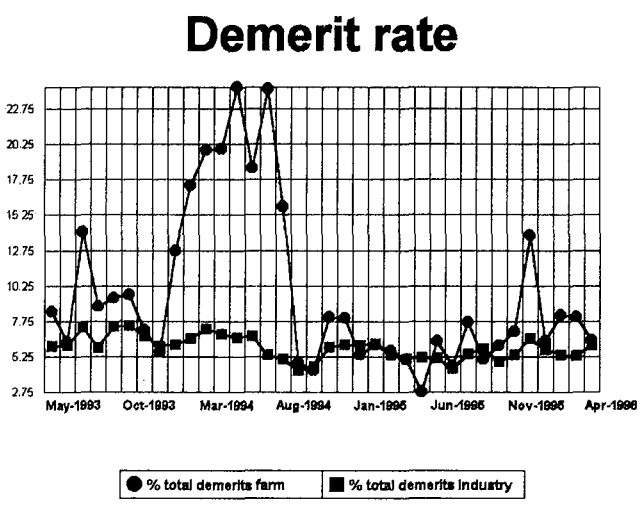
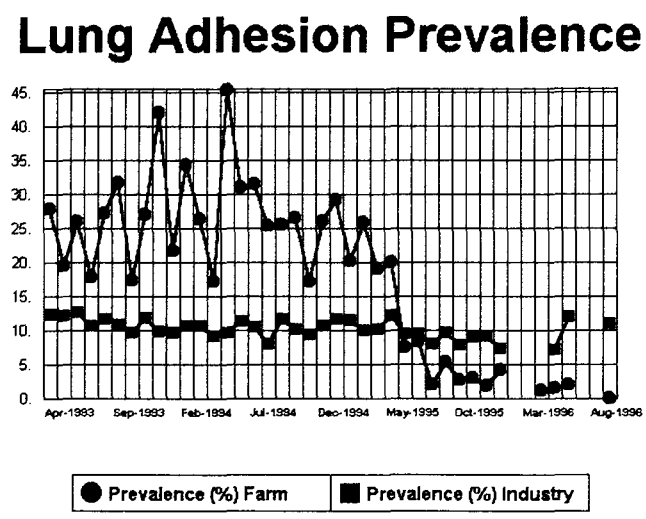


Figure 3: Lung adhesion prevalence from *Actinobacillus pleuropneumoniae.*



- 1.83 kg of pork @ $ 1.60 CAD/kg pork price x index 109 = $3.19 per pig.

The bottom line is that trimmable demerits carry a financial burden, and monitoring of carcass data to estimate losses and farm trends is worth considering.

Health data

As an example of the value of carcass health data, a case involving active *Actinobacillus pleuropneumoniae* is documented in **Figure 3**. The farm implemented a vaccination policy that resolved the disease problem. Carcass data are able to document the effect of the intervention.

Vaccination of pigs resulted in resolution of clinical signs and losses from APP and resulted in changes in biological parameters as shown in **Table 5**.

Table 6 shows a cost benefit analysis of the intervention.

Losses not included in the analysis are plant losses associated with extra labor for pleural stripping and handling carcasses with lesions. Monitoring pig health via carcass data can clearly indicate what is happening with clinical

Table 5: Changes in biological parameters as a result of vaccination.

Parameter	Pre-vaccination	Post-vaccination
Growth, birth to market (g/d)	0.589	0.636
Mortality	4.5%	1.5%

Table 6: Cost benefit analysis of vaccination intervention.

Event	Cost per pig	Benefit per pig
APP vaccine cost	$0.81	
Labour (assuming vaccination cost = treatment cost)	0	
Reduced feed cost		$2.40
Reduced housing cost		$1.02
Mortality saving		$ 3.60
Net benefit		+$6.21

Figure 4: Monthly production of pigs on Farm 1.

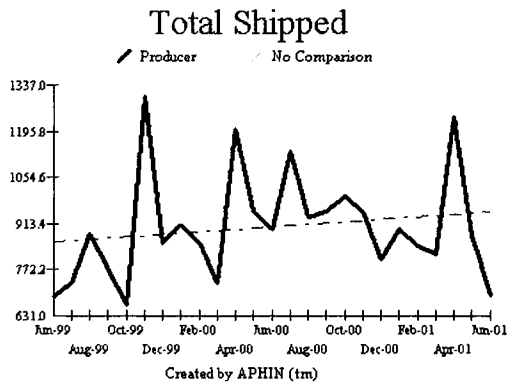


Figure 5: Cumulative yearly production on Farm

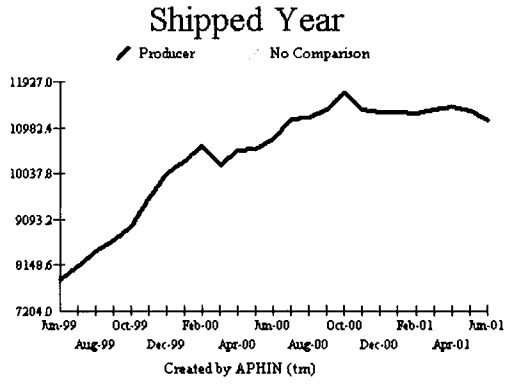


Figure 6: Monthly pig output from Farm 2.

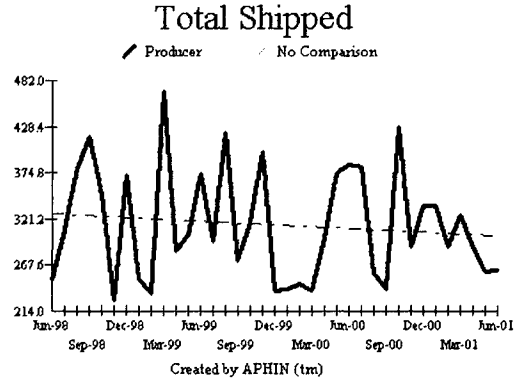


Figure 7: Cumulative yearly production on Farm 2.

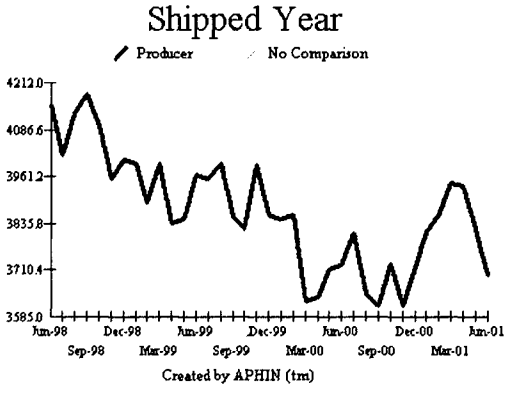


Table 7: Data sheet generated 25 Jul 2001 03:04:09 PM AST. Selections: Total shipped, No comparison, Monthly, 24, Jun-2001, Trend, No target.

694 NIL	996 NIL	853 NIL
878 NIL	950 NIL	907 NIL
1242 NIL	931 NIL	853 NIL
818 NIL	1135 NIL	1304 NIL
843 NIL	893 NIL	664 NIL
896 NIL	954 NIL	778 NIL
803 NIL	1203 NIL	884 NIL
949 NIL	732 NIL	732 NIL

and sub-clinical disease, and it is, in our experience, an excellent tool for monitoring health and productivity.

Throughput

Throughput correlates well with profitability. All fixed costs are divided by the output of pigs; production and efficiency are optimal with a high throughput. Throughput data are easy to generate via shipment and carcass data. The information is generally already in electronic format from several sources and is easily accessible. The APHIN database can readily produce a production report, but long term trends are not readily apparent. (See **Table 7** for an example.)

In our experience, it has been valuable to make the data available in a secure electronic environment and give producers and consultants the ability to download and view carcass information to help identify subtle trends. See **Figures 4-7**.