



Minnesota Dairy Team

*Educating the dairy industry on
today's and tomorrow's dairy technologies.*

Raising Dairy Calves

(Birth to 6 months of age)

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Prepared for MN Dairy Days, 2009



This presentation centers on some of the main management principles important in raising healthy dairy replacement heifers from birth to 6 months of age. There will also be a discussion pointing out standard protocols used during research trials at the Southern Research and Outreach Center in Waseca, MN.

Raising Healthy Dairy Heifer Calves

- It's a challenging job.
- Preventing disease gets them off to a good start, reduces death losses, and is cheaper than treating sick animals.
- Even if a calf survives a disease or sickness, its potential for reaching proper weight at the proper time for calving and being successful in the dairy herd is going to be uncertain.

Raising calves on any farm and in any housing system is a challenging job. The important point in getting calves off to a good start is not only to reduce death losses, but to keep them healthy. Preventing disease is cheaper than treating sick animals. Even if a calf survives disease or sickness, there more than likely will be an economic impact because of the uncertainty of the calf reaching its potential for proper weight at the proper time for calving and make a successful contribution in the dairy herd.

5 Keys to Your Success

- 1. Calf Immunity**
- 2. Biosecurity (Disease Prevention)**
- 3. Calf Comfort**
- 4. Focus on what is MOST important to you ...
then measure it**
- 5. Maximize Your Resources**

Calf Management Services

As we go through this presentation, keep in mind 5 keys to your success in raising healthy calves. They are as follows:

Disease on the Calf Operation

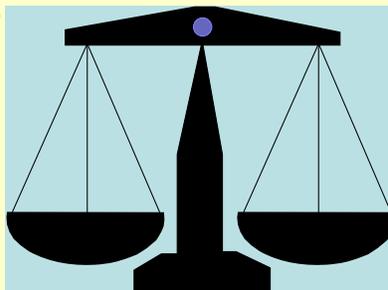
IMMUNITY

(Calf's ability to
fight off disease)

vs.

PATHOGEN LOAD

(Number of
disease-causing
bacteria and
viruses presented
to the calf)



Dr. Steve Hayes

There is an on-going battle in managing disease on the calf operation. On one side of the scale is immunity, or the ability of the calf to fight off disease. On the other side is the pathogen load, or the number of disease-causing bacteria and viruses presented to the calf. The lower the pathogen load on the right, the higher goes the ability to fight off disease on the left side.

Reduce bacterial contamination in colostrum because.....

- Pathogenic bacteria cause disease (E. coli scours, Johne's disease, etc.)
- Bacteria can block IgG absorption across the intestine

Godden, U of MN

The calf is born essentially devoid of antibodies and therefore, it is critical that colostrum be as bacteria free as possible to prevent scours, transmission of Johne's disease and other disease causing organisms. Bacteria can also block immunoglobulin absorption across the intestine. Only during the calf's first 24 hours can it absorb whole antibodies through its small intestine wall. These antibodies circulate in the animal's bloodstream to help fight off diseases and infections during the first few weeks of life.

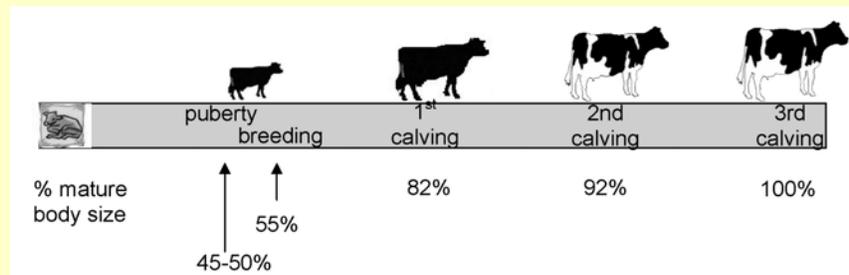
Costs of raising dairy heifers by stage of growth^a

Costs	Stage of Growth			
	Birth to 200 lbs	200 to 700 lbs	700 to 800 lbs	800 lbs to calving
Feed	\$71.75	\$210.75	\$75.05	\$343.13
Labor	\$72.31	\$75.93	\$25.27	\$78.23
All other	\$55.16	\$119.22	\$55.19	\$227.23
Total	\$199.22	\$405.91	\$155.51	\$648.59
% of total	14%	29%	11%	46%
% of growth	8%	38%	12%	35%

^aAdapted from Karszes, Cornell (2005)

Feed prices have varied a lot in recent years so this table should not be seen as the true cost to raise heifers during any growth stage. However, more than likely, the percentage of total cost for each stage of growth shown is probably pretty close. Note the percent of the cost to raise a heifer from birth to 200 lbs (14%) vs the percent from 200 lbs to 700 lbs (29%). The cost to get new born calves off to a good start should not be compromised as that is not the high cost period of raising replacements.

How big should a heifer be at breeding? At calving?



BAMN2007

Here are some targets to shoot for in your calf management practices to know if you are on the right growth track to raising a heifer. At puberty the calf should be around 45-50% of its expected mature body size. At breeding, it should be around 55% of mature body size. At first calving, at 82%, at second calving, at 92% and by the 3rd calving at 100%. The next two slides will help determine the approximate weights for each stage based on the dairy breed.

Table 1. Heifer Growth Objectives

Age (Months)	Holstein & Brown Swiss		Ayrshire & Guernsey		Jersey	
	Weight (Lbs)	Height (Inches)	Weight (Lbs)	Height (Inches)	Weight (Lbs)	Height (Inches)
0	94	32	70	27	55	26
2	185	34	130	32	115	30
4	280	37	230	37	195	34
6	400	41	320	41	275	39
8	520	44	400	44	385	41
10	650	46	505	45	460	43
12	775	49	600	46	520	44
14	875	50	680	48	575	45
16	975	51	770	50	650	46
18	1050	52	860	51	730	47
20	1150	53	910	52	800	48
22	1275	54	1050	53	875	50
24	1340	54	1150	53	960	51

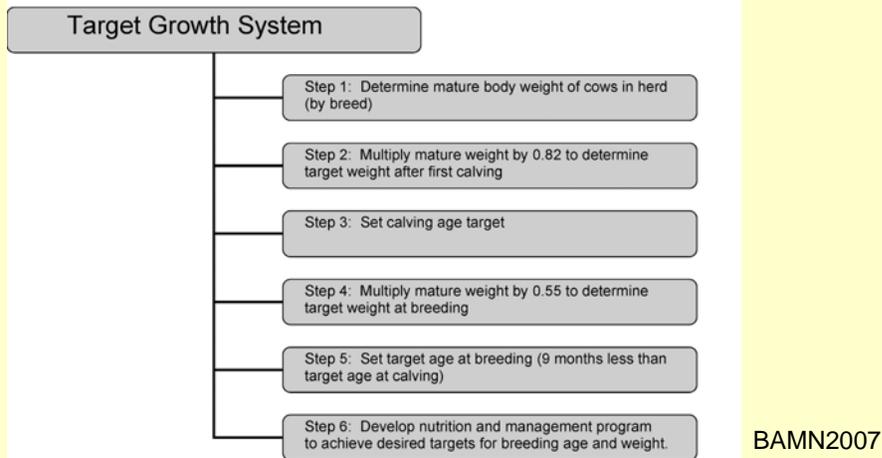
Source: Raising Dairy Replacements, NCR 206.

This table shows commonly used standards for weight and height goals for growing heifers up to 24 months of age, by breed.

Bovine Alliance on Management and Nutrition

Comprised of American Assn of Bovine Practitioners, ADSA, American Feed Industry Assn, and USDA. Charged with developing timely information for cattle producers regarding management and nutritional practices.

Figure 1



The Bovine Alliance on Management and Nutrition developed a system to help determine growth targets for heifers. The first step is to determine the mature body weight of cows using the previous slide. Step 2 is to multiply the weight determined in step 1 and multiply by 0.82 to find the target weight after first calving. Step 3 is to set the target weight at calving age. Multiply the mature weight by 0.55 to determine the target weight at breeding, then set target age at breeding. Then finally, you can develop a nutrition and management program to achieve those desired targets for breeding age and weight.

The “**ABCDEFGs**” for Healthy Calves

Attention to detail

Bedding

Cleanliness

Dry

Environment

Feeding utensils

Growth success

What does it take to raise healthy calves, all the time? The following slides provide some management principles to help meet that goal. We call them the **ABCDEFG'S** for healthy calves.

Attention to Detail

- **Colostrum.** Must feed high quality colostrum ASAP. Highest absorption is within first 4 hours. Feed 4 quarts of >5g/deciliter.
- **Consistency.** Protocols must be developed and followed
- **Vaccination program.** Evaluate to prevent dependence on vaccination.
- **Water.** Fresh, clean, easily accessible, available at least 2x/day.
- **Biosecurity.** Control/monitor all livestock, equipment, and people entering.
- **Calving Area.** Use individual maternity pens.
- **Calf temperature.** Use a rectal thermometer regularly.
- **Designated Worker.** Daily calf chores by the same person(s).
- **Calf stress.** Any changes in routine will stress calves.
- **Isolation.** Keep calves separated to prevent physical contact.

'A' is for paying **A**ttention to detail. So much of good management is in the details of how tasks and practices are handled every day for every calf. These details include:

Bedding



Dirty calves can become sick calves.

- Bedding should always be replaced between calves.
- Remove soiled bedding from pens and add fresh bedding as often as necessary to maintain a clean, dry bed.
- Clean, wash, disinfect and dry out individual hutches, stalls or pens between calves.

'**B**' for **B**edding. Bedding needs to be kept clean and dry, or it needs to be replaced. Dirty calves can become sick calves. Bedding should always be replaced when moving a calf out of the pen and replaced with a new calf. Hutches, stalls and pens should be cleaned, washed, disinfected and allowed to dry between calves.

Cleanliness



- Colostrum, milk replacer, dry feed and water sources should always be clean.
- Keep maternity pens clean, sanitized and freshly bedded.
- Clean maternity pens between births.
- Remove calf from maternity pen ASAP.
- Prevent spread of Johne's. Can acquire it when calves ingest contaminated feces or colostrums.

'C' is for Cleanliness. All feed and water made available to calves should always be clean, and the maternity pen should be clean, sanitary and freshly bedded. The calf should be removed immediately from the maternity pen after it is born as this can help prevent the spread of Johne's disease by keeping the calf from ingesting contaminated feces or colostrums.

Dry

Calves are more comfortable and healthier when dry.

- Dryness lessens virus and bacteria growth.
- Rub calf dry when it is born with a clean, sanitary cloth or towel.
- Constantly check the bedding to see if it is wet. Get down with calf to investigate.
- Design hutches and locate for good drainage of water and urine, inside and outside.

Continuing our way through the ABCDEFG's for healthy calves, 'D' is for Dry. Calves are much more comfortable and healthier when they are dry. There is less virus and bacteria growth. When the calf is born, it should be rubbed dry with a clean, sanitary cloth or towel. It is important to keep checking the bedding for wetness, even if you need to get down on your knee to investigate. If using hutches, they should be designed and located where there is good drainage of water and urine, both inside and outside the hutch.

Environment



Adequate ventilation --

- Provide fresh air
- Use switches, thermostats, timers
- Prevent drafts.



Temperature –

- Comfort range – 50-85 F

Control Humidity --

- Humidity makes calves damp and sick.
- Optimal RH is around 65-75%.

'E' is for Environment. One of the biggest causes of calf illness, especially in an enclosed facility, is the environment in which the calf is placed. There needs to be adequate ventilation. Use switches, thermostats and timers to keep the inside environment as consistent as possible and provides fresh air and proper air exchanges per hour. However, drafts on the calves need to be prevented and the humidity must be controlled. The most comfortable temperature for calves is between 50-85 F and the optimal relative humidity should be around 65-75%.

Environment

Adequate ventilation --

Mechanical Ventilation Rates

Ventilation needs increase as animal age and temperatures rise.

<u>Age (months)</u>	(cu. ft/min/animal)		
	<u>Cold*</u>	<u>Mild</u>	<u>Hot**</u>
Calves 0-2	15	50	100
Heifers 2-12	20	60	130
Heifers 12-24	30	80	180

*Alternate recommendation = 4 air changes/hr

**Alternate recommendation = 40 air changes/hr

To be more specific on ventilation, here are the recommendations for the amount of cubic feet per minute per animal needed for the various age groups of calves. Ventilation needs do increase as the animal age and temperatures rise.

Environment

Shade --

- Provide shade. Heat-stressed calves and heifers will go off feed.
- Need enough square footage of shade for all calves and heifers if in a group.
- Prevent shaded area from becoming manure-laden disease breeding ground.



If animals are out in a pasture or lot, providing shade and having access to shade is a good management practice as heat stressed calves and heifers will go off feed. In order to prevent shaded areas from becoming manure-laden and a disease breeding ground, enough square footage of shade should be provided for all calves and heifers.

Calf Housing and Environment

Table 11.1. Replacement heifer resting area space requirements per animal.

Resting space does not include walk alleys for animal movement to and from feeding areas. Group pens for calves are usually fully bedded to provide as much dry resting space as possible. Free-stall sizes can be found in Table 11-5.

Age (months)	Weight (pounds per head)	Self-cleaning Resting Area ^a (square feet per head)	Minimum Bedded Resting Area (square feet per head)	Slotted Floor (square feet per head)	Paved Outside ^e Lot (square feet per head)
0-2 ^c	90-170	Do not use.	32 (4 feet x 8 feet hutch with 4 feet x 6 feet outdoor run) 28 (4 feet x 7 feet pen in barn)	Do not use.	Do not use.
3-5 ^{c, d}	170-330	Do not use.	28 ^b	Do not use.	Do not use.
6-8	330-500	10	25 ^b	12	35
9-12	500-710	12	28 ^b	13	40
13-15	710-860	15	32 ^b	17	45
16-23	860-1240	18 ^b	40 ^b	25	50
Springing heifer	1270	Do not use.	50 ^b	Do not use.	50
Dry cow					
• Far-off	> 1300	20 ^a	50 ^b	35	55
• Close-up	> 1300	Do not use.	100 ^b	Do not use.	Do not use.

^a 8 percent slope (1 inch per foot).

^b Assumes access to 10-foot wide scraped feed alley or paved outside lot.

^c House separately from older animals.

^d Groups up to six head in pens or super calf hutch.

^e Heifers and dry cows in late pregnancy may have difficulty breathing if they lie facing downhill on self-cleaning floors.

^f Provide proper treatment for concentrated runoff.

Source: MWPS-7 Dairy Free-stall Housing and Equipment, Table 1-4.

Calves and heifers that are housed in a pen or a lot need to have adequate space for eating, drinking and resting. This table shows the resting area space requirements per animal based on size and/or age with four alternative housing systems.

Calf Housing and Environment

Table 11.3. Minimum bunk space requirements.

Type	Age (months)					Mature Cow
	3-4	5-8	9-12	13-15	16-24	
Feed always available	inches per animal					
Hay or silage	4	4	5	6	6	6
Mixed ration or grain	12	12	15	18	18	18
All animals eat at once						
Hay, silage, or ration	12	18	22	26	26	26-30

Source: MWPS-7, 7th Edition, 2000.

This table shows the minimum bunk space requirements per animal based on age with feed always available or all animals eating at once.

Environment

Housing –



- Large-group pen housing increases the odds of more respiratory disease, increases the odds of diarrhea and increases its severity.
- Prevent older and younger calves from physical contact.
- Best to have calf facilities completely separate from other animal facilities.

Large-group pens increases the odds of more respiratory disease, increases the odds and severity of diarrhea. A standard management practice should be to prevent older and younger calves from any physical contact. It is also advised to have calf facilities separate from other animal facilities

Environment

Housing –



- Convenient manure removal and good access to bedding supplies.
- Group post-weaned calves by age and size with 3 to 5 animals per group.
- At about 4 months of age, groups of 6 to 12 are acceptable.

A housing system for calves and heifers should have convenient manure removal and good access to bedding supplies. After all, cleanliness is a high priority. Post-weaned calves should be grouped together by age and size with 3 to 5 animals per group. Then, at about 4 months of age, groups of 6 to 12 calves are acceptable.

Environment



Hutches

- Locate far enough apart to prohibit intermingling of calves.
- Design to keep calves dry, protected from environmental conditions.
- Calf manager needs to have ease of cleaning and sanitation, ability for good observation and access.
- *Super calf hutches are great after weaning*

Hutches should be located far enough apart to prohibit calves from touching one another. Hutches should be designed to keep calves dry and protected from extreme or uncomfortable environmental conditions. Hutches should be constructed and placed for ease of cleaning and sanitation, and so the calf manager has the ability for good observation and access. Super calf hutches, such as the one shown on the right, are great for calves after weaning.

Environment

Greenhouses



- Proper temperature and air quality must be maintained. Therefore, someone must be monitoring the condition inside the greenhouse throughout the day.
- Move pens away from the sidewalls if blowing rain is a problem.

Greenhouses that are well managed can work well in raising calves. However, it takes good management because proper temperature and air quality must be maintained throughout the day and night, year around. It is important that the calf manager monitor the condition inside the greenhouse at various times of the day as temperatures can change dramatically from early morning to noon to mid-afternoon to night fall. During rainy weather, make sure the pens are away from the sidewalls if there is a chance that blowing rain could enter the pen.

Feeding Utensils

- *Time* must be allowed for washing and sanitizing the calf feeding equipment.
- A good wash-up job means clean, wholesome and nutritious feed and healthy calves.
- If nipples or buckets are shared by multiple calves during a feeding, they must be disinfected between calves.

Now we come to the 'F' which stands for **F**eeding Utensils. Any individual that is feeding calves must take the time to wash and sanitize the calf feeding equipment after every feeding. A good wash-up job of feeding utensils will help immeasurably to be able to offer clean, wholesome and nutritious feed to calves and keep them healthy. If nipples or buckets are shared by multiple calves during a feeding, they must be disinfected between calves to prevent the spread of bacteria from one calf to the next.

Feeding Utensils

Cleaning and Sanitizing:

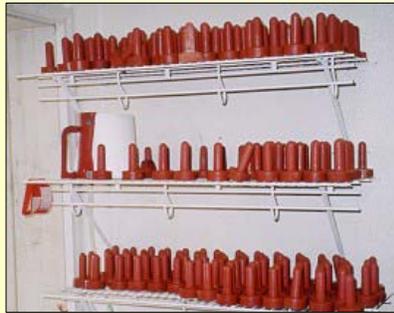
- Rinse containers with lukewarm water.
- Then, use +120° F water with chlorine and soap.
- Dump nipples into the solution. Fill the bottles with it.
- Use a wash acid.
- Sanitize balling guns and stomach tubes, which go into the calf's mouth.
- Make sure boots, hand tools, skid steers and any other equipment are clean.



This slide shows a good cleaning and sanitizing protocol for nipples, balling guns, stomach tubes. Also, make sure boots, hand tools, skid steers and any other equipment are clean to prevent the spread of bacteria from one animal to the next and from one pen to the next or from one building to the next.

Feeding Utensils

- After cleaning and sanitizing, allow containers, nipples, balling guns, stomach tubes to completely dry.
- Avoid stacking pails inside each other until completely dry.



After containers, nipples, balling guns and stomach tubes have been cleaned and sanitized, allow them to completely dry before using again. Avoid stacking pails inside each other otherwise they may not completely dry.

Growth Rates



Success of calf raising --

- % survival and *growth rates*.
- Growth rate affects the timing of puberty, age of first freshening, and even first lactation milk production.

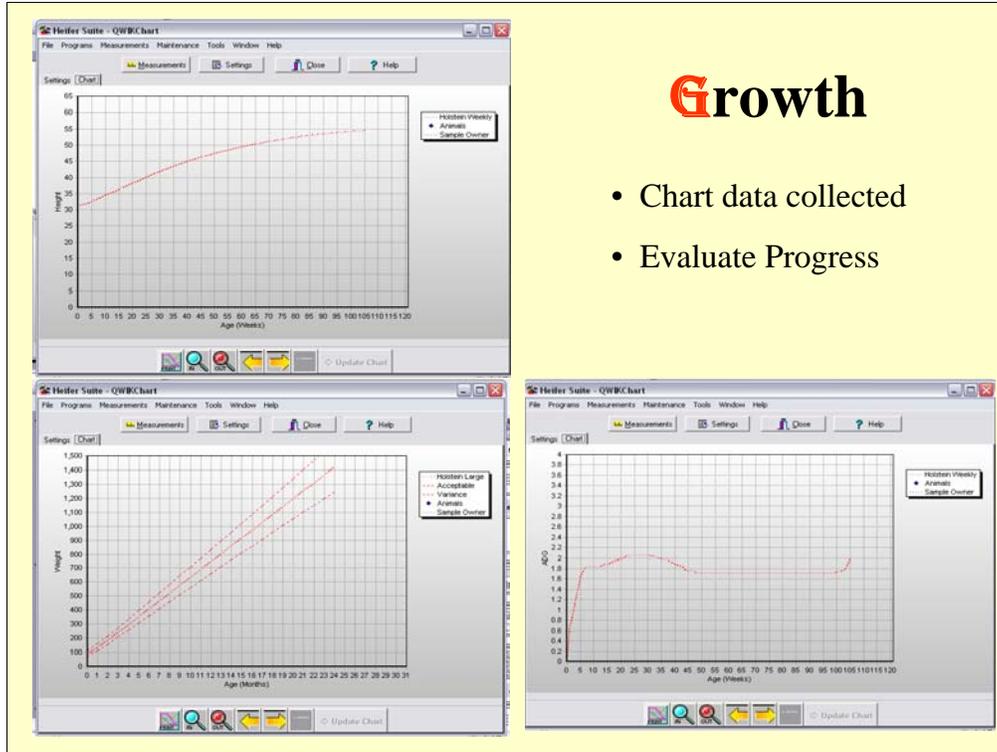
Successful calf raising can be measured by how healthy calves are, what the percent survival rate is in the calf operation and what the growth rate is for each animal. 'G' is for **G**rowth rate. Growth rate affects the timing of puberty, the age of first freshening and even affects first lactation milk production.

Growth



- **Weighing** -- use scale or tape
- **Check height** -- use altimeter stick with parallel level bar
- Calculate ADG
- Heifer target growth curves available by breed.

Growth should be monitored periodically by weighing the animal, either using a scale or tape, and by checking the hip height using an altimeter stick with a parallel level bar. Average daily gains can be calculated and written down to keep track of how a number of the heifers are doing from time to time. There are growth curves available by breed which can be used to see if your heifers are on target.



Growth

- Chart data collected
- Evaluate Progress

Data that is collected can be entered into a computer program which, over time, will show the growth chart of an individual animal. This allows the opportunity to evaluate progress and to see if the heifers are on target to meet the goals set by the owner.

**University of Minnesota
Southern Research and Outreach Center
Waseca**



**Applied Calf Research
from
Birth to Six Months**

At the University of Minnesota Southern Research and Outreach Center in Waseca facilities that opened in April, 2004 are used to conduct applied research on calves from birth to six months of age. In the foreground of the photo, the first two barns are the calf nurseries and directly behind them is a grower barn for the calves when they reach 8-10 weeks of age until they leave Waseca.

Calf and Heifer Research and Extension Facility

A University of Minnesota and Ridley Inc. partnership focused on applied nutrition and management research for replacement heifers, from birth to 6 months of age.

“Developing tomorrow’s dairy cow”



UNIVERSITY OF MINNESOTA



A partnership was formed to construct the three barns and to conduct dairy calf research. The research focuses on applied nutrition and management for replacement heifers from birth to 6 months of age. The central goal in the Center's research efforts is “developing tomorrow’s dairy cow.”

Calf and Heifer Research and Extension Facility



- Two 30 ft x 200 ft calf barns
- 40 calves/room all-in/all-out
- 160 individual pens (birth to 10 weeks of-age)

The first two barns in the photo are 30 ft x 200 ft nurseries. Each barn is divided into two 40 calf rooms with individual pens.

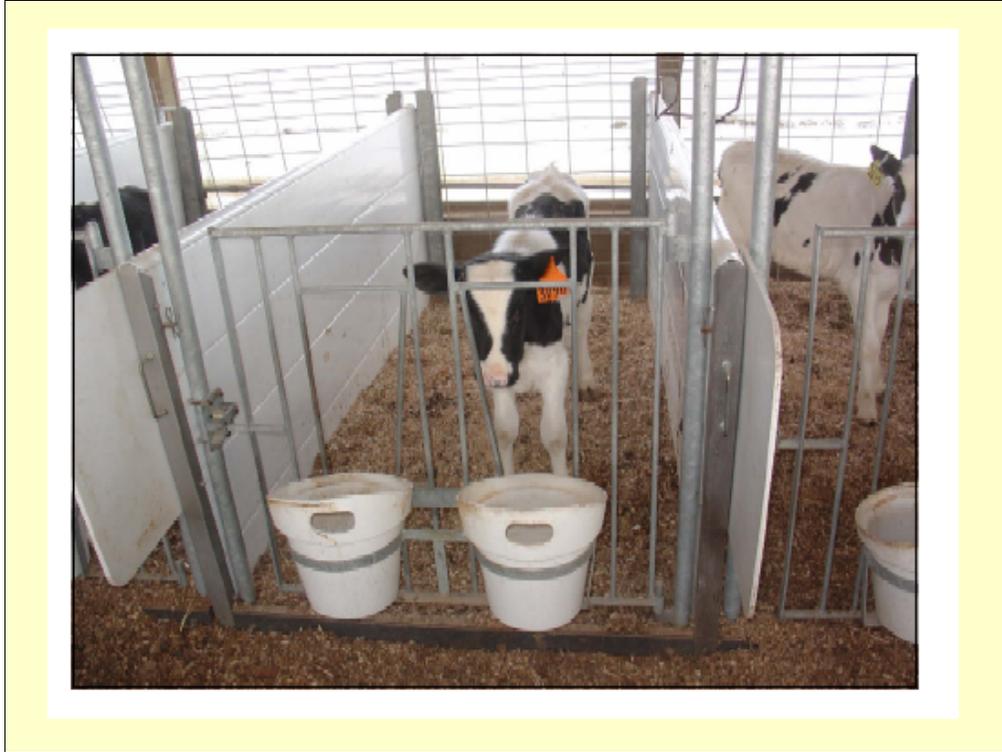
Calf management before arrival at SROC at 2-4 days of-age:

- **Getting calves off to a good start = feeding colostrum**
- **Prior to pick-up all calves will have received at least 3 feedings of high quality colostrum, navel dipped twice, ear tagged and administered an agreed health program protocol.**
- **Unthrifty calves will be not sent.**



Calves picked up each Monday and Thursday up to 25/week.

Calves are picked up from the three cooperating commercial dairy operations that supply heifer calves to SROC.



When calves arrive, they are put into individual pens.

Calf and Heifer Research and Extension Facility



Weighing calves



Weigh back of feed

Calves are weighed, measured for hip height when they arrive. While on a trial the unused feed from every calf is weighed back to determine the actual amount of feed consumed.



This is the work room, wash area, and storage area that is located between a calf barn wing on the left and on the right.



When calves all leave one wing of a calf barn, the individual pen panels are removed, cleaned and sanitized. Manure and bedding is removed from the floor.



A new bedding base is added once the pens are cleaned



Panels are washed outside the calf barn.

Post weaning group housing



- 65 ft x 150 ft grower barn -- 9 to 27 weeks of age
- 120 head in 20 pens

At 8 weeks of age, 2 weeks after weaning, calves are moved to the grower barn and placed in group pens.



A view of the Grower Barn at SROC where 120 post-weaned calves are grouped 6/pen in 20 pens.



Weight scales in the grower barn makes it convenient for monitoring growth of the heifer calf.



A older shed at SROC is also used as a grower barn.

SROC vaccination protocol:

Upon arrival at 2-4 days of-age:

- Intranasal – modified live for IBR/PI3 (TSV2) 2ml in each nostril
- *Salmonella (S) Newport* SRP vaccine 2 ml sc– SRP technology by AgriLabs (proteins - siderophore receptors and porins from cell walls of gram negative bacteria salmonella – efficacy for *S. dublin* as well)

2 weeks and 6 weeks after arrival:

- IBR, BVD (Types 1 & 2), PI3, BRSV (Bovishield gold 5 – 2 ml i.m.in neck)
- SRP 2 ml dose sc.

Vaccination protocol at SROC

SROC vaccination protocol (cont'd)

Other calf barn protocols:

- Dehorning and tail docking (if requested) at approx 30 days after arrival
- Prior to moving to groups pens TSV2.

Group pens: 4 and 5 months after arrival:

- Leptospira serovar hardjo-bovis and borgpetersenii (Spirovac L5- 2 ml sc)
- Clostridium species (Ultrabac 7 – 5 ml sc)
- LA-200 antibiotic 5 ml/100lb BW with Spirovac at 4 months only.

Standard Feeding Protocol

- Starts with a strong healthy calf.
- Standard control program –
 - 20:20 medicated all-milk protein milk replacer fed at 1.25 lb/day for 35 days, then
 - 0.625 lb/day from day 36 to weaning at 42 days (12.5% solids).
- A texturized 18% calf starter is offered free choice plus fresh water

Standard feeding program and protocol at SROC

Reduce Potential Calf Stressors:

- Dehorning
- Vaccinations
- Tail docking
- Socialization / grouping
- Feed changes
- Environmental changes

Adapted from Hayes, SROC workshop 2006

There are a number of stressors that can affect calf growth and development if not managed properly. One good management practice is to limit the stressors to as few as possible at any one time. Spread out the tasks that need to be done and changes that need to be made.

A. Upon arrival 3456 calves	Farm A	Farm B	Farm C
Number of heifers	885	1,593	978
Initial BW. lb	88.8	86.7	87.2
Initial serum protein, g/dl	5.4	5.4	5.2
Initial serum protein profiles:			
< 4.0 g/dl, %	0.9	2.7	1.3
4.0-4.5 g/dl, %	8.2	12.2	13.7
4.6-5.0 g/dl, %	22.8	22.5	33.2
5.1-5.5 g/dl, %	24.8	20.5	23.4
5.6-6.0 g/dl, %	28.5	22.8	20.7
> 6.0 g/dl, %	14.8	19.3	7.7
<ul style="list-style-type: none"> • Heifers 5 or < g/dl = 39.2%; Heifers 5.1 or > 60.2% • Goal of working with cooperating dairies -- to improve SP profiles. 			

A quick look at the serum protein data based on 3456 calves that arrived at SROC. Serum protein levels are checked on every calf at time of arrival at SROC.

B. 6 month profile of 2,397 heifers	Farm A	Farm B	Farm C
Final BW, lb	476	462	451
Final Hip Height, in	45.5	44.9	45.1
Total ADG, lb	1.92	1.91	1.91

Body weights, hip heights and average daily gain on 2397 heifer calves at 6 months of age at SROC. The calves come from three commercial dairy farms.

Farm A

SP range	% in range	No.	Initial BW	Serum Protein	Final BW	Final HH	ADG	Final 305 ME
<4.0	7.7	29	85.4	3.8	441	44.68	1.84	25202
4.1 - 4.5	9.6	36	87	4.3	465	45.27	1.93	28135
4.6-5.0	22.7	85	84.3	4.9	457	45.1	1.93	26192
5.1-5.5	20.8	78	86	5.3	453	44.81	1.91	26334
5.6-6.0	24.8	93	86.5	5.9	462	45.18	1.96	26271
>6.0	14.4	54	81.7	6.6	442	44.92	1.87	26665
	100	375						

Three commercial dairy farms supply dairy heifer calves to SROC. These are the serum protein test results, weights and heights for just 375 calves the day they arrived at SROC from one of the three farms, then the 6 month weights and hip heights when they left SROC, and the 305 Mature Equivalent milk level after those calves completed their first lactation.

Farm B

SP range	% in range	No. Heifers	Initial	Serum	Final	HH	Total ADG	Final
			BW	Prot.	BW			305 ME
<4.0	7.6	16	90.4	3.9	483	45.45	2.01	27258
4.1-4.5	8.6	18	88.4	4.2	472	44.93	1.96	26463
4.6-5.0	38.3	80	87.8	4.9	471	45.33	1.95	27137
5.1-5.5	22.5	47	88.2	5.3	467	44.96	1.93	27043
5.6-6.0	15.4	32	88.1	5.8	486	45.59	2.01	28024
>6.0	7.6	16	84.1	6.6	457	44.55	1.89	25614
	100	209						

Results of 209 calves from Farm B that have completed their first lactation.

Farm C

SP range	% in range	No.	Initial BW	Serum	Final BW	HH	Total ADG	Final 305 ME
				Prot.				
<4.0	6.5	18	88.8	3.8	476	45.74	1.93	28063
4.1-4.5	9.7	27	86.8	4.3	464	45.34	1.87	31746
4.6-5.0	26.5	74	91.2	4.9	482	45.72	1.95	29794
5.1-5.5	25.1	70	89.4	5.3	466	45.22	1.9	29531
5.6-6.0	23.3	65	88.1	5.9	474	45.36	1.92	30051
>6.0	8.9	25	90.5	6.5	482	45.42	1.92	32266
	100	279						

Results of 279 calves from Farm C that have completed their first lactation.

Summary:

- SROC applied research programs have investigated options to support an improvement in the consistency of nutritional management for commercial dairy heifers from 2-4 days up to 6 months of age.
- Following the heifers back to their respective dairies to monitor first lactation performance allows a complete systems approach to establish a relationship between calf health and performance up to 6 months of age to first lactation milk production parameters.

Dairy calf research at SROC has investigated nutritional management options since 2004 for calves up to six months of age. Following the calves through their first lactation provides the opportunity to analyze relationships between calf health, performance and first lactation milk production parameters.

Cost of Raising Replacement Dairy Heifers

M. T. Gabler, P. R. Tozer, A. J. Heinrichs and T. Beck.



Print Menu	This takes you to a page where you can choose to print some or all of the sheets
Summary	Summarises all the individual sheets and allows you to see costs of each input and the cost/day to raise a heifer.
Feed	This worksheet calculates the feed costs to raise a heifer up through various age classes
Labor	This worksheet calculates the labor costs to raise a heifer up through various age classes
Breeding	This worksheet calculates the cost of breeding a heifer either by AI or bull service.
Bed	This worksheet calculates the bedding costs for a heifer through various age classes
Health	This worksheet calculates the health costs to raise a heifer up through various age classes
> Buildings	This worksheet calculates the building and housing costs for a heifer through various age classes
Equipment	This worksheet calculates the equipment costs for a heifer through various age classes
Mortality	This worksheet calculates the mortality costs for a heifer through various age classes
Interest	This worksheet calculates the interest or opportunity cost of ownership for a heifer through various age classes
Manure	This worksheet calculates the manure storage and spreading costs for a heifer through various age classes

Heifer growers need to know the cost of raising their replacements. This is a copy of an interactive worksheet from Penn State to help make those important calculations.