



NEW ENGLAND

Franklin Park Zoo • Stone Zoo



MASSACHUSETTS
GENERAL HOSPITAL

RESEARCH INSTITUTE



New World Primate Husbandry Workshop

September 30 - October 4, 2019

Early Registration Rate of \$215.00 until July 31, 2019

Hosted by:



Buttonwood Park Zoo

**“Why Continuous Improvement /
Team Problem Solving is Critical
to the Increasing Complexities of
Animal Care”**



Today's Agenda (Anne Knapp)

- Dinner
- Welcome & Introductions
- Continuous Improvement & Animal Enrichment: Jen Camacho
- Why Continuous Improvement? Gerry Cronin
- “Let's have fun”
- Lessons Learned



MASSACHUSETTS GENERAL HOSPITAL

ENTRANCE

ENTRANCE

The background image shows a zoo enclosure with a polar bear lying on a rocky ledge near a pool of water. In the foreground, the backs of two young children's heads are visible as they watch the bear. A large, semi-transparent white circle is overlaid on the left side of the image, containing text.

Zoo Environment

Responsibility to Education

- Naturalistic Environments
- Naturalistic Behaviors

Responsibility to the animals!

- Healthy conditions
- Medical treatment

Lab Environment

Medical Discoveries

- Human condition
- Healing therapies

Responsibility to the animals!

- Environments that produce natural behaviors





**United States
Department of
Agriculture**

Regulatory Requirements!
Documentation!

Show it's Working!



Animal Enclosures









Social Housing



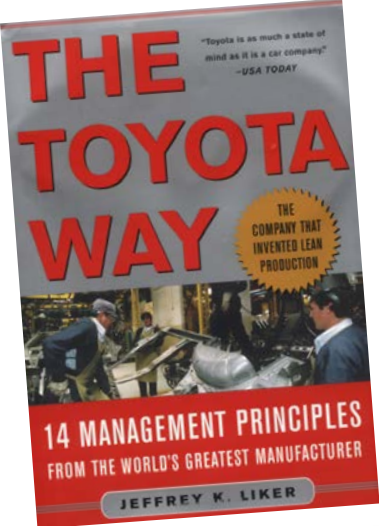


Enrichment



We all have poop!





People



*Enrichment =
Husbandry



Feeding/Cleaning/Watering/Enrichment (*fuel their minds*)



Health & Behavioral Rounds



Analysis Tool for Effectiveness 1,2,3



Enrichment Rotation & MRS



Recipes



Enrichment Queue

Standardization

Best that we know, today!

Made simple

Displayed so that everyone can be successful

Leaving time for improvements!



Visual Controls

HOW TO INSTALL



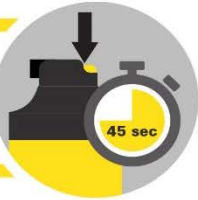
- 1 Move your car slightly so the tire puncture is at the bottom (6 o'clock position). Make sure tire is **completely deflated**.



- 2 Get shaking! Shake your can vigorously for 30 seconds. Tightly screw the clear hose onto your valve stem.



- 3 Push the yellow button down firmly for 45 seconds and watch the magic happen.



- 4 When the Fix-a-Flat hose runs clear, release the button and unscrew hose.




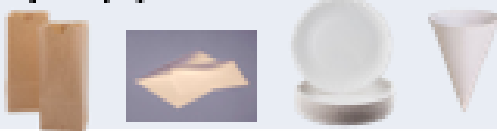


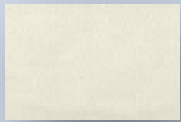

- 5 Check that the tire rim lifts off the ground.



- 6 Immediately drive your car 2 to 4 miles to help the sealant spread.



Week of : _____



Week ONE	Destructible Item
	Tennis Ball (TB) 
	Paper (P) 
	Wood (W) 
	Bio-Tunnel (BT) 
	Fleece (F) 
	Plush Toy (PT) 

Week of : _____

Week TWO	Destructible Item
	Cardboard (C)  PB/Jelly Tray
	Mixed Nuts in Shell (MN) One of Each 
	Compressed Items (CI)  CNY Only
	Z-Bones (ZB) Greenies (G) 
	Paint Roller (PR) 
	Fire Hose (FH) 




NHP Behavioral Response Plan



Abnormal Behavior Grading

Abnormal Behavior	Grade I	Grade II	Grade III
<p>Repetition: Any behavior that occurs consistently, without apparent function. +/- distinct pattern</p> <p><u>Behaviors</u> Rocking - Roc Swirling - Swl Pacing - Pa Bouncing - B Head weave - Hw Saluting – Sal</p>	<p>Occurs only in response to new/novel individual or object/procedure and stops quickly after.</p>	<p>Performs during Routine Activities. Behavior is disruptive and occurs < 50% of the day.</p>	<p>Performs during routine activities and/or during interaction with staff. Behavior is disruptive and occurs > 50% of the day</p>
<p>1st Response Treatment Plan; Give DE in response to identified behavior and evaluate if behavior persists.</p>	<p>Perform assessment with ET to evaluate source of behavior, persistence and appropriateness of treatment.</p>	<ol style="list-style-type: none">1. Give TE 3x/wk.2. Consider cage relocation.	<ol style="list-style-type: none">1. Give TE, DE, and puzzle feeding daily.2. Consider ECS if available +/- cage relocation.
<p>Contact instructions</p>	<p>Alert ET at next Behavioral Rounds</p>	<p>Alert ET at next Behavioral Rounds</p>	<p>Alert ET same day via email.</p>
<p>Documentation: Quantifiable measures</p>	<ul style="list-style-type: none">• frequency of repetition over a 5 min period and time of day.	<ul style="list-style-type: none">• frequency of repetition over a 5 min period and time of day.	<ul style="list-style-type: none">• frequency of repetition over a 5 min period and time of day.



Swine Enrichment Rotation







This visual control is used to maintain a daily facility rotation for the dispersal of enrichment to swine. Should an enrichment item be unavailable for distribution the next item in the rotation should be used instead.

<u>Item</u> Toy	Monday	
Toy w. treats (apples, bananas, pears, oranges, yogurt)	Tuesday	
Exercise Or Contact Time (Socialization, soft brush rubs, scratcher)	Wednesday	
<u>Sani-Chip</u> Bags w. treats/ Novel	Thursday	
Toy	Friday	 New Trial

Scheduled items can be switched off with a nutritional trial/novel item if available.



Score	Description	Socialization Plan	Red Tag
1	Readily approaches, takes treats from staff Displays exploratory behavior	Not needed	No
2	Alert, but calm, will approach and/or take treats from staff with some encouragement	Not needed	No
3	Displays freezing behavior towards staff, may grunt at staff upon approach. Remains vigilant, does not approach staff.	Socialization 3x/wk Consult with ET/EPM after 1 wk Document in IAMR	No
4	Displays freezing behavior, is tense/apprehensive when approached, requires encouragement to take treats.	Consult with ET/EPM after 1 wk Daily Socialization Document in IAMR using socialization sticker	Yes
5	May grunt at staff, will attempt to avoid staff and may attempt to bite or charge at staff when cornered	Consult with ET/EPM Daily Socialization + DE Document in IAMR using socialization sticker	Yes

	Enter your name	Copy and paste picture or Link	Name of the product	Name of vendor	Price for each or per set/lb/etc	Enter enrichment type (e.g. Destructible Enrichment (DE), Therapeutic Enrichment (TE), Novel, Nutritional), swine or pig enrichment, species-specific behaviors that the enrichment may encourage (e.g. foraging, play behavior, exploratory behavior, etc...), any abnormal behaviors that it reduces/alleviates and any additional notes/comments
2	Staff Name	Product Picture	Product Name	Vendor	Price	Description
4	Sheena McNeil		Fire Hose	Otto Environmental	Fire Hose 50ft roll with 2" diameter @ \$124.00 or 3" diameter @ 184.00, 0.62 -	DE for Swine - chewing, play behavior, exploration
5	Winnie Chan		Straw or bales	in house		TE, Novel for Swine: Small amounts could be placed in food hoppers to encourage rooting and foraging
6	Steven Chavis		cardboard boxes/	in house http://www.cppa4pigs.org/Enrichment-Part_II.html		DE, TE, Novel for Swine: If stuffed with straw or hay and mixed with food or treats, can encourage rooting behaviors. Provides opportunity to chew, play, and shake
7	Ilka Mayorga		Crush-Resistant R	McMaster-Carr http://www.mcmast	7.60 each	TE for Swine: This bucket can encourage rooting behaviors for swine by filling it with treats- ex: apples, bananas, orange slices
8	Winnie Chan		Nibblenet "Nibble Go Around"	Otto-envrionmental	57.99 each	Novel, TE for Swine: Stuff with the round of a trailer or swine 22" tall x 13" dia 23" tall x 17" dia
9	Jen Camacho	Snow Cones				Snow cone mach
10	Emily Roberto		Porcichew or Porkyplay	Ketchum.ca or Otto-environmental		Novel for swine - is manipulated, biting and hierarc long galvanized c
			extract on	http://www.cppa4pigs.org/Enrichment-Part_II.html		Novel for Swine: P

Enrichment Queue Standard Enrichment Nutritional Enrichment Novel Therapeutic Enrichment Destructible Enrichment

Enrichment Ideas

Quantitative Ass'mt

Programmatic Implementation

Visual Controls
SOP's
Trainings

Environmental Enrichment Trials Sheet Updated - Message (HTML)

Hi there,

Updates have been made to the Pigs EE Trials Sheet.

Updates (indicated by an 'X') have been made to the following tabs:

(Please place an 'X' into the column on left to indicate which update(s) have been made, fill in the blank spaces if applicable)

X	Enrichment Queue - New item(s) have been added
	New item(s) on queue have been reviewed for trial - see approved/declined column
X	Data have been entered in the "under evaluation form" Pigs
	Enrichment Trial has been completed for [product name]
	ET/EPM have made final assessments about the [product name] Enrichment Trial and have placed it into the [indicate 'accepted' or 'declined'] sheet.

Thanks,





Materials **R**eplenishment **S**ystem

Tennis the Menace



TEENNISS!

Ingredients:

- Tennis Balls with opening
- Yogurt Drops
- Peanut Butter
- Bird Seed
- Apricots



Creator: Eli Baum

Directions:

1. Place tennis balls on a paper plate
2. Spread peanut butter on top of tennis balls
3. Add bird seed to the peanut butter
4. Put 2 drops of peanut butter – spaced out as eyes
5. Add Yogurt drops
6. Stick apricots into the openings in the tennis balls
7. Enjoy watching NHPs take on Tennis the Menace

**How Do You
Know It Works?**



	Animal Usage	Temperament	Safety	Durability	Amount Consumed	Time to Consume
1	Most or all of time spent interacting with enrichment	Readily approaches cage front Is calm, grooms & explores	Little to no safety concerns observed	Minimal or no signs of wear and tear	All of nutritional item consumed	< 5mins or immediately
2	Some attention to enrichment and/or some evidence that enrichment was used	Hesitates to approach cage front. Tense and 'freeze' behavior seen	Potential for safety issues if worn down or broken	Mild/Moderate signs of wear and tear but integrity still retained	Partial consumption (e.g. picky eaters)	5-10 mins or Some hesitation
3	No attention to enrichment and/or evidence of attention to enrichment	Stays in cage back Jagged, jumpy, abrupt Aggression directed towards tech	Safety issues observed (ingestion or injury risk)	Not durable, destroyed easily	Little to no consumption	≥ 10 mins or Next day, acclimation needed

Intervention Enrichment Assessment (IEA)

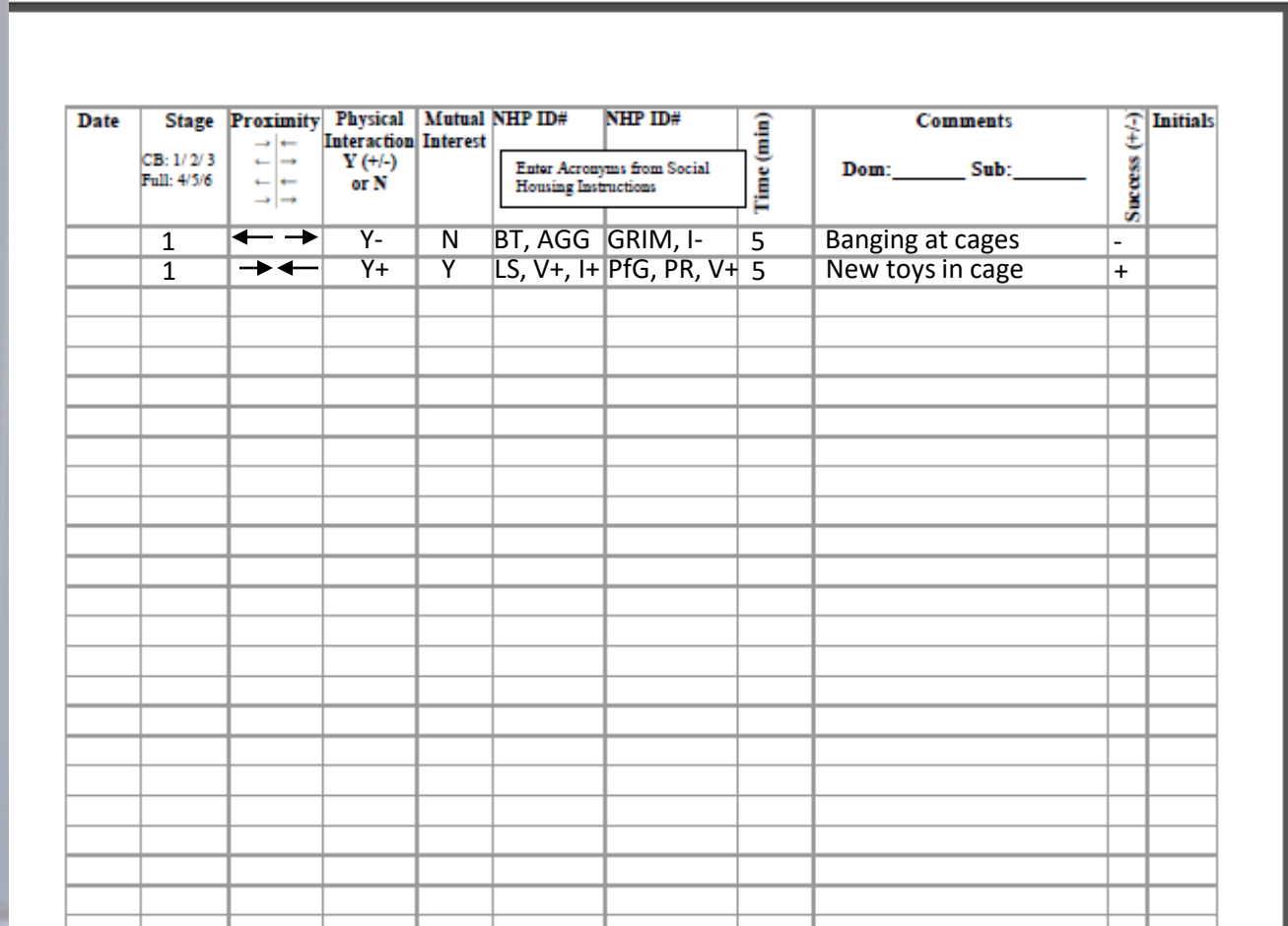
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Intervention	When to assess?	1	2	3
DE	Next day (before husbandry)	Completely Manipulated and/or Destroyed	Partially Manipulated and/or Destroyed	Did NOT Manipulate and/or Destroy
TE	Next day (before husbandry)	Fully Consumed	Partially Consumed	Did NOT consume anything
TR	Next day (before husbandry)	Engagement with toy seen on multiple days.	Engagement in toy seen only on first day.	Did NOT engage with Toy.
Finger Paint (FP)	Next day (before husbandry)	Utilizes paint; Smears may or may not be on cage walls and NHP may have consumed some. There is little or no paint remaining.	Partially utilized paint; some smear may be present but evidence that paint either dribbled out or NHP consumed without smearing	Does NOT utilize paint; no smearing present, no consumption. Paint is present or dribbled out.
ECS	Monthly	Spends equal time in both cages.	Spends most of time in ECS.	Spends most of time in HOME cage.
PF	Monthly	Utilizes PF and removes all Biscuits	Utilizes PF but dropped 1 or 2 on floor or does not get all of the biscuits out.	Did NOT get biscuits out of PF or dropped most biscuits on floor.
Soc For Fear	During Soc session	Full engagement in Soc with noticeable progress made towards the goal (Taking Treats from hand, Coming to cage front)	Partial engagement in Soc with minimal progress made towards goal (Inconsistently taking treats from hand, Partially coming to cage front).	Did NOT engage in Soc (NOT taking Treats from hand, NOT approaching cage front) -or- A visible increase in fear or avoidance behaviors.
Soc for Aggression	During Soc session	Full engagement in Soc with noticeable progress made towards the goal (Taking Treats from hand, Coming to cage front)	Partial engagement in Soc with minimal progress made towards goal (Inconsistently taking treats from hand, Partially coming to cage front).	Did NOT engage in Soc (NOT taking Treats from hand, aggressive approach to cage front) -or- Increasing frequency/severity of behaviors.
Co-op Feeding	During co-op feed session	Both NHP received equal amount of treats.	Dominant received most of treats, no aggression present.	Dominant received most of treats, and aggression is present.

Intervention Behavioral Assessment (IBA) DE, TE & PF

	1 - Engaged	2 - Disinterest/Apathy	3 - Anxiety/Frustration
Ability of NHP	CAN utilize enrichment as intended	CAN utilize enrichment as intended	Can NOT utilize enrichment as intended
Task difficulty/challenge level <i>(as it pertains to that specific NHP)</i>	Poses a HIGH (+) difficulty/challenge	Poses LOW/NO difficulty/challenge	Poses a HIGH (-) difficulty/challenge
Observed Behavior(s)	Engaged, Focused, Item retains attention for ↑ time. Ability level matches task requirement.	Quickly dismisses item. Has ability to accomplish a task but not reaping any benefit to doing so. +/- disinterested.	Aggression, Likely to throw or hit object, others or self or repetition increase. Some engagement in the task given but the task is to difficult to complete.




Positive (Affiliative) Behaviors	Negative (Aggressive) Behaviors	Hierarchal Behaviors
<ul style="list-style-type: none"> •Lip-smack LS •Positive vocalizations (Coos, Rumbles) V+ •Grooming GR •Playing/romping/playful wrestling PL •Mounting/mating behaviors MB+ •Interest in other monkey's toys/cage I+ •Cooperative feeding observed CF+ •Presenting rear PR •Leaning/present for groom PfG •Sharing Space (Perch) SS •Positive Grasping PG •Hugging/grasping each other and Lip-smacking 	<ul style="list-style-type: none"> •Open Mouth/Bear Teeth/Yawn BT •Aggression AGG •Banging, Biting, Grabbing/Hair pulling •Threatening TH •Scratching, Hair Bristling, Teeth Grind •Negative vocalizations (Bark, Grunt, Crackle) V- •Cooperative feeding not observed CF- •Unwarranted mounting/mating behaviors MB- •No interest in other monkey/toys/cage I- 	<p><u>Dominant</u></p> <ul style="list-style-type: none"> •Open Mouth/Bear Teeth BT •Confident & Prominent •+/- control resource access <p><u>Submissive</u></p> <ul style="list-style-type: none"> •Grimacing GRIM •Lip-smack LS •Present rear/Present for groom PfG •Seeks pair approval SPA •Reserved



Veterinary Care



Otitis externa	CLINICAL SIGNS	CLINICAL SIGNS	CLINICAL SIGNS	"Otitis"
	Red; swollen. Tips of ear scabbed. WHAT TO DO: Monitor weekly and treat with Benadryl in water (2.7ml/450ml)	Swollen; scabbed; ≥50% pinna affected. WHAT TO DO: Send e-mail, note if ear tag present. Monitor and treat w/ Benadryl in water (2.7ml/450ml) + topical triple antibiotic ointment 3X/week for 2 wks	Swollen; inflamed; ulcerated; bloody discharge WHAT TO DO: Euthanasia required between 1:00pm - 3:00pm next day	mild: 24 hour response required moderate: 24 hour response required severe: response required by 1:00pm next day* *CCM will euthanize between 1:00-3:00pm


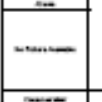


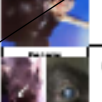


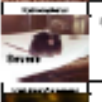


Health Check CC#: 12345678

PI: Moore UD Furpluck Result (circle one): + or -

Date	# of Affected/In Cage	Severity	Clinical Problem	Location	Rec Tx	Initials
6/1/13	1/3	Mod	Otitis L ear.		Rec tx: Monitor and treat with ARO 3x/wk for 2 wks and Benadryl in H ₂ O. JB	
6/2/13	NC, ARO		Benadryl in H ₂ O. JB			

Card Only To Be Removed By CCM

Common Health Concerns of Laboratory Mice and Rats

Location/Problem	CLINICAL SIGNS	CLINICAL SIGNS	CLINICAL SIGNS	CLINICAL SIGNS
 Skin Lesion	Adhesions larger than normal; non-elastic; pigmented; crustal; moderate to severe; inflamed.	Adhesions larger than normal; non-elastic; pigmented; crustal; moderate to severe; inflamed.	Adhesions larger than normal; non-elastic; pigmented; crustal; moderate to severe; inflamed.	Adhesions larger than normal; non-elastic; pigmented; crustal; moderate to severe; inflamed.
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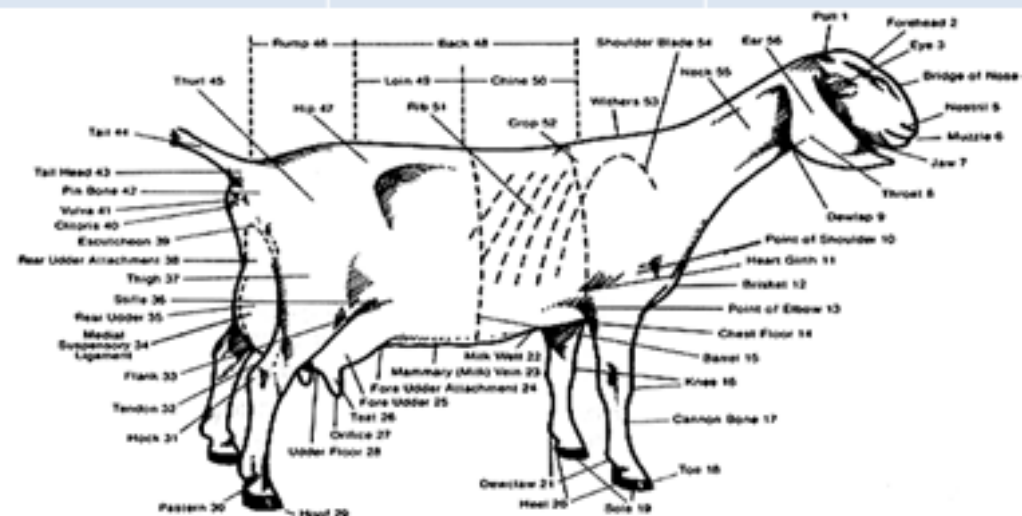
Health Concern	Mild	Moderate	Severe	Resolved
Trauma	Mild scratches or bruising	Full thickness laceration or wound	Severe active bleeding	All wounds dry, pink healed, scarring present
What To Do		Monitor and clean wound 1x/day Apply ABO as needed	Exert pressure if possible to stop bleeding	
Contact Instructions	Email Vet via Clinical Rounds	Call Vet same day	Call Vet immediately	Email Vet via Clinical Rounds
Where and What to Document	Document "size* and location of trauma" on Clinical Rounds *in cm	Open Case and document "Moderate wound*", monitor and clean wound daily until healed" on Clinical Rounds and IAMR Document "Moderate wound*" on Clinical Rounds and IAMR daily *Note location of wound, size in cm and description of discharge if present	Vet will document in IAMR Send update to Clinical Rounds*Note location of wound, size* and description of discharge if present *in cm	Close case and document "Wound healed*", no further observations" on Clinical Rounds and IAMR *Note location of wound



Use ruler to approximate size



Health Concern	Mild	Moderate	Severe	Resolved
Lameness	Weight bearing lameness/favoring of leg	Lameness/ favoring limb +/- swollen painful joints	Non-weight bearing lameness +/- bleeding or swelling	Normal weight bearing on all 4 limbs for 2 days
What To Do	Monitor 1x/day	Monitor 1x/day	Monitor 1x/day	
Contact Instructions	Email Vet via Clinical Rounds	Call Vet same day	Call Vet immediately	Email Vet via Clinical Rounds
Where and What to Document <i>Favoring = hurt leg</i>	Open case and document "Mild lameness of (R/L-Front or hind leg), monitor daily" on Clinical Rounds and IAMR Document current state of lameness and location of lameness on Clinical Rounds and IAMR daily	Open case and document "Moderate lameness of (R/L-Front or hind leg, monitor daily" on Clinical Rounds and IAMR Document current state of lameness and location of lameness on Clinical Rounds and IAMR daily	Send update to Clinical Rounds	Close case and document "Normal weight bearing all 4 limbs, no further observations" on Clinical Rounds and IAMR



Rodent Flip Chart & Procedure Card

EXAMPLE – Rodent Record Cage Card

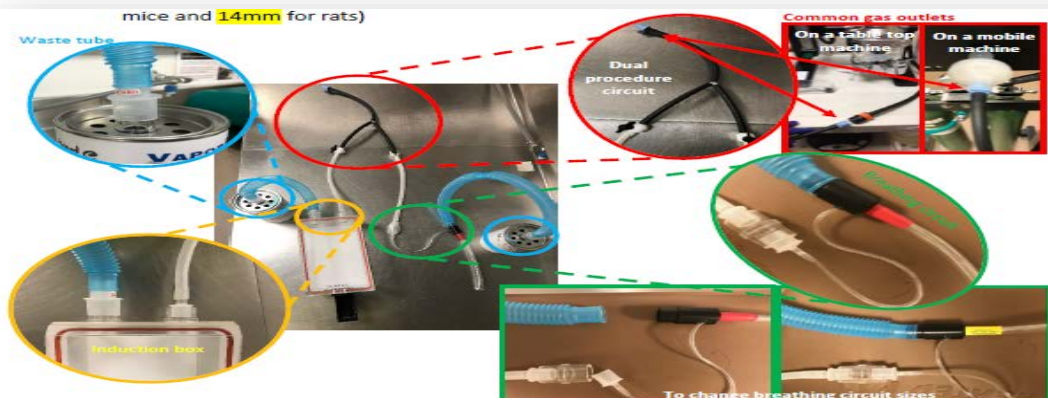
<h2 style="margin: 0;">Rodent Record</h2>			
PI: <u>Mali</u>		Protocol #: <u>20150000000</u>	
Contact Person/Phone #: <u>Kristin Matthews 617-643-5069</u>			
Date	AM/PM	Procedure/Treatment/Observation	Initials
8/26/15	AM	Get tissue - start BP & Respiration Monitors	KRM
8/27/15	AM	8/4 8/7: Monitor N, Respir & Temp 24/7, 8/4 Temp 36	KRM/KRM
8/28/15	AM	8/4 Respir 32, 8/4 Respir 32	KRM/KRM
8/31/15	PM	8/4 Respir 32, 8/4 Respir 32	KRM/KRM
	AM/PM		
	AM/PM		
	AM/PM		
	AM/PM		

☒ I will monitor and treat all animals in accordance with the IACUC protocol.

(front)

[illegible]

(back)




If your anesthetic procedure requires specific equipment or customization that this machine is not set up for, please contact MGHCCMRodentAnesthesia@partners.org

- ☐ Surgical area (area free of clutter with limited access) must be cleaned and disinfected before surgery. (TABLE 1)
- ☐ Assure adequate lighting.
- ☐ Provide heat source. (FIGURE A)
- ☐ Make sure necessary instruments are ready. Instruments must be sterile. (TABLE 2)



Surgery Room/Area

- ❑ Have all required IACUC-approved anesthetic drugs ready.
 - If using a controlled substance, make sure appropriate DEA, State and MGH dispensing and recording procedures are followed. (ITEM a)
 - Make sure all drugs being used are within the use period allowed by the expiration date indicated on the drug's box or label. Refer to FIGURE C for dilutions or combinations.
 - If using inhalant anesthetics (ex. Isoflurane), check the machine and scavenging system to make sure all are working appropriately. (FIGURE B)
 - If using injectable anesthetics, calculate amounts based on each individual animal's weight.
$$\text{Volume (ml)} = (\text{weight (kg)} \times \text{dose (mg/kg)}) / \text{concentration (mg/ml)}.$$
 - ❑ Administer pre-operative analgesics as described in your IACUC protocol.

Calculate volumes and draw them up prior to start of procedure. Make sure appropriate DEA, State and MGH dispensing and recording procedures are followed if any agents being used are controlled drugs. (ITEM a)
 - ❑ Make sure you have a system (i.e. form/cage card) for anesthesia and analgesia documentation available and ready for use. (FIGURE H)
- 



Anesthesia Check

- ☐ Don appropriate PPE for rodent users. (FIGURE D)
- ☐ Anesthetize animal according to the methods outlined in your approved IACUC protocol.
- ☐ Remove hair from the intended procedural site. (FIGURE E)
- ☐ Place non-medicated ophthalmic ointment in eyes. (FIGURE E)
- ☐ Transfer animal to surgical area. Position animal so that anesthesia can be maintained and monitored, yet at the same time, the animal can be appropriately approached for the intended procedure.
- ☐ Check for appropriate depth of anesthesia prior to starting surgical procedure. (FIGURE E)
- ☐ Scrub intended surgical site with surgical soap scrub and alcohol rinses. (FIGURE F)



Animal and Surgeon Preparation Prior to Working in Sterile Area

- ☐ Scrub hands, dry, and don **sterile gloves**. (FIGURE D)
- ☐ Whenever possible, create a sterile field by covering the surgical site/animal with a sterile drape.
A hole can be made in the drape to access the specific area of the animal that will be worked on. (FIGURE G)
- ☐ Anything touching the sterile field/drape or the portion of the animal surgically prepared must be sterile.
- ☐ Sterile technique and gentle handling of tissues are required.
- ☐ The smallest gauge suture material should be selected to perform closure/ligation adequately.



Preparation and Work in Sterile Area

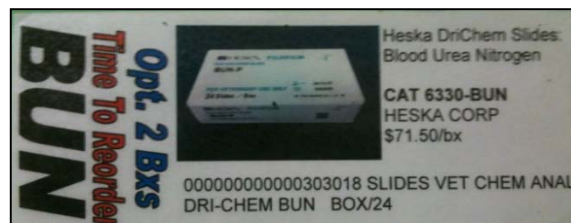
- ☐ Administer any post-operative analgesics or other supportive care items (ex. fluids) as outlined in your protocol.
- ☐ Provide heat support to animal (via heating pad or by placing recovery cage half-on, half-off heating pad) until ambulatory; animal must be continuously monitored by a member of the investigative team.
Animal can only be placed back in housing area once completely ambulatory.
- ☐ Complete surgical records, including anesthetic monitoring and all analgesics given. (FIGURE H)
- ☐ Mark cage cards with date of surgery and procedure performed. Make sure correct contact information is present. (FIGURE H)
- ☐ Perform post-operative monitoring and analgesic administration as outlined in your protocol.
Develop a system for recording this monitoring and drug administration. (FIGURE H)



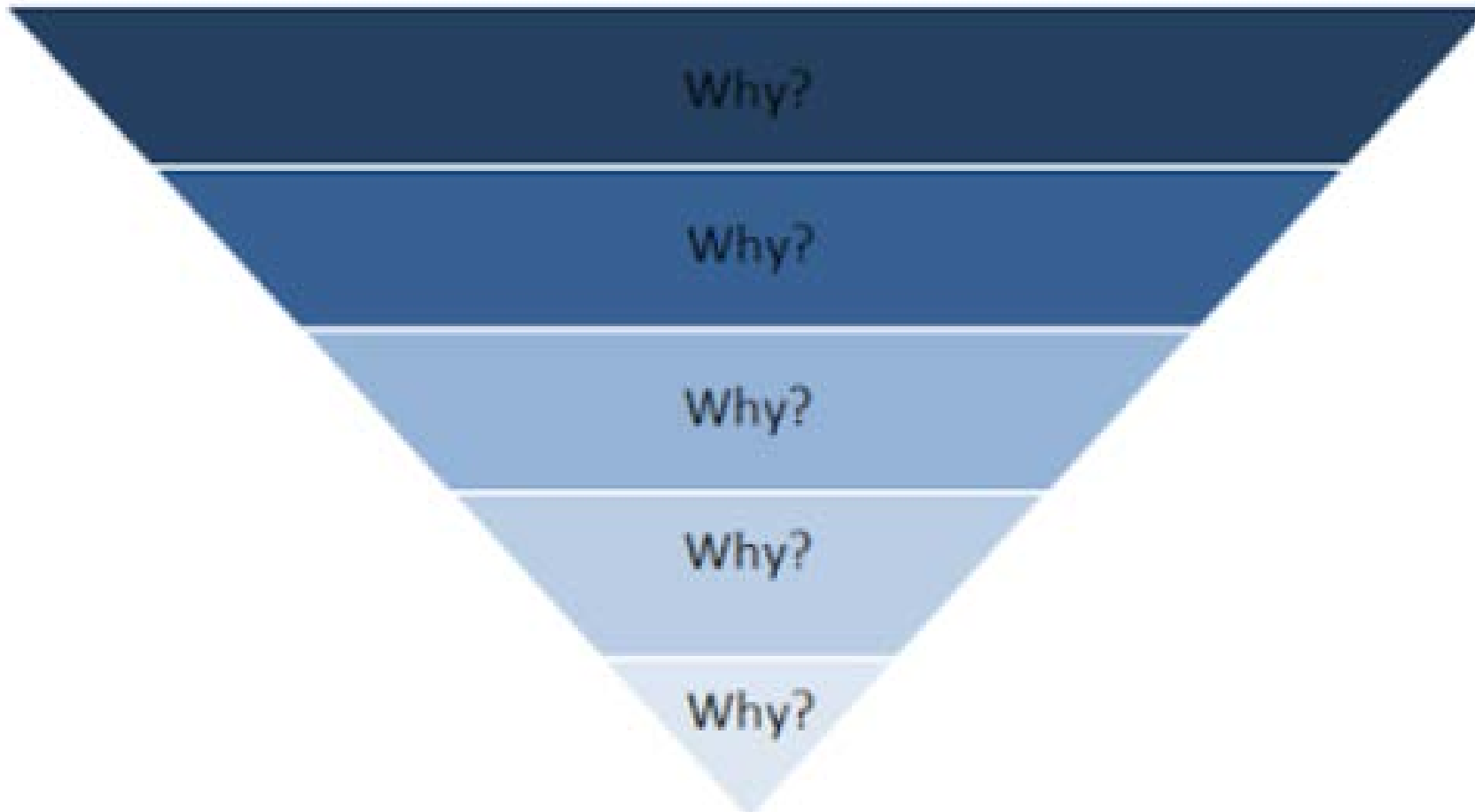
Post-Operative Care



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Analyzer	Sample ID	Test Date	Species	Test Name	Result	Test Units	Ref Range Low	Ref Range High	Comment				
1														
2	DriChem	1	8/6/2018 11:58	Mouse	AST (GOT)	1880	U/l	10	380	*Dilution			Milo	
3	DriChem	1	8/6/2018 11:25	Mouse	ALT (GPT)	664	U/l	10	190				Page 2 of 2	
4													Results Color Key	
5	DriChem	2	8/6/2018 12:10	Mouse	ALT (GPT)	8410	U/l	10	190	*Dilution			In Range	Green
6	DriChem	2	8/6/2018 11:59	Mouse	AST (GOT)	4960	U/l	10	380	*Dilution			Above Range	Red
7													Below Range	Blue
8	DriChem	3	8/6/2018 12:00	Mouse	ALT (GPT)	2980	U/l	10	190	*Dilution			No Ref Range	Purple
9	DriChem	3	8/6/2018 11:27	Mouse	AST (GOT)	994	U/l	10	380					
10														
11	DriChem	4	8/6/2018 11:28	Mouse	ALT (GPT)	96	U/l	10	190					
12	DriChem	4	8/6/2018 11:28	Mouse	AST (GOT)	262	U/l	10	380					
13														
14	DriChem	5	8/6/2018 12:01	Mouse	AST (GOT)	2845	U/l	10	380	*Dilution				
15	DriChem	5	8/6/2018 12:00	Mouse	ALT (GPT)	4125	U/l	10	190	*Dilution				
16														
17	DriChem	6	8/6/2018 11:30	Mouse	ALT (GPT)	186	U/l	10	190					
18	DriChem	6	8/6/2018 11:30	Mouse	AST (GOT)	306	U/l	10	380					
19														
20	DriChem	7	8/6/2018 11:31	Mouse	AST (GOT)	408	U/l	10	380					
21	DriChem	7	8/6/2018 11:30	Mouse	ALT (GPT)	239	U/l	10	190					
22														
23	DriChem	8	8/6/2018 11:32	Mouse	AST (GOT)	320	U/l	10	380					
24	DriChem	8	8/6/2018 11:31	Mouse	ALT (GPT)	172	U/l	10	190					
25														
26	DriChem	9	8/6/2018 11:33	Mouse	AST (GOT)	784	U/l	10	380					
27	DriChem	9	8/6/2018 11:32	Mouse	ALT (GPT)	296	U/l	10	190					
28														
29	DriChem	10	8/6/2018 11:34	Mouse	AST (GOT)	365	U/l	10	380					
30	DriChem	10	8/6/2018 11:33	Mouse	ALT (GPT)	153	U/l	10	190					
31														
32	DriChem	11	8/6/2018 11:37	Mouse	ALT (GPT)	219	U/l	10	190					
<div> <div></div> <div>Milo</div> <div>Results</div> <div>+</div> <div></div> </div>														



PROBLEM: _____



ROOT CAUSE



Problem: Animal wont come onto exhibit/ Wont come down

W? Showing signs of fear on ramp

W? Neg association --> Desensitization training --> Coping Mechanism

W? Tripped on the broom

W? Broom was in the isle

W? No place to put broom away

Root Cause: Broom has no defined location for storage

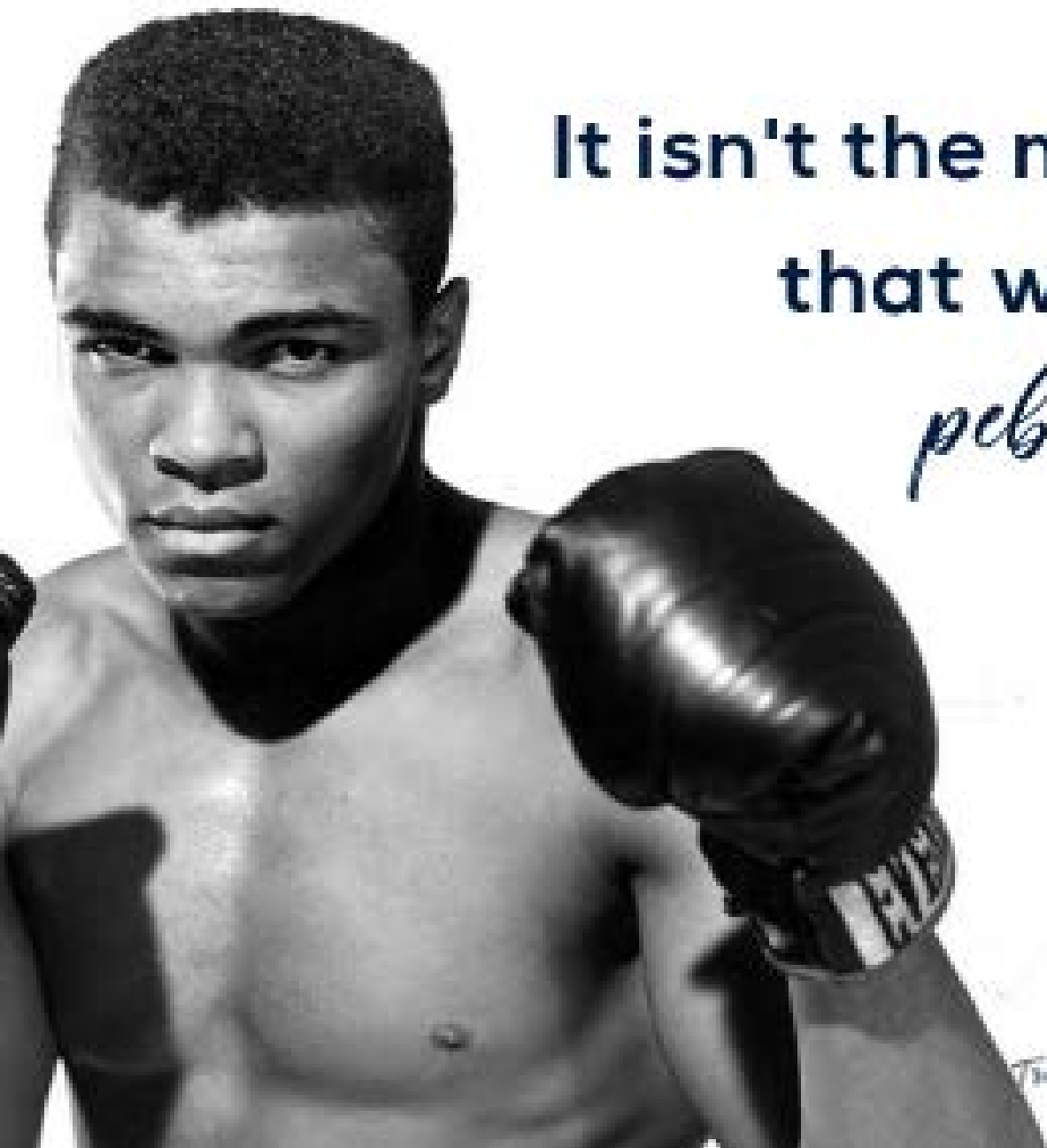
Solution: Defined Location & VC



The background image shows a monkey enclosure. On the left, a large circular white overlay contains text. The enclosure itself features wooden beams, red straps hanging from the ceiling, and a wire mesh fence on the right. A cardboard box is visible in the middle ground, and a black barrel is on the floor in the foreground.

How a Lean Approach can help
you do
the ***fun*** stuff!

Jennifer Camacho
jncamacho@mgh.harvard.edu



It isn't the mountains ahead to climb
that wear you out; it's the
pebble in your shoe

- MUHAMMAD ALI -

Accept For the sake of enjoying it, we

EMBLEM OF THE JACK

For the sake of this part of the process

Jacobs

Benefits of Continuous Improvement

- Housing Room Set-Up Time Study (149-8):

- 7 Items Missing:

- Cages
- H2O
- Food
- Wires
- Pen
- Scissors
- Clidox

40 minutes X 5 Rooms = 843 hours / year
32 seconds = 21 weeks per year!

- 4 Items Missing:

- Paper Towels
- Scissors
- Food
- Cages

24 minutes X 5 rooms = 500 hours / year
0 seconds = 12.5 weeks / year!

- 0 Items Missing:

- 5S in-place

6 minutes X 5 rooms = 135 hours / year
14 seconds = 3 weeks / year!



D. O. W. N. T. I. M. E.



Snake Handlers

- **Anne Knapp**, Director Animal Resources, ZNE
- **Andrea Lewicki**, Animal Care Coordinator, ZNE
- **Michelle Farmerie**, Trainer, Pittsburgh Zoo
- **Jen Camacho**, Enrichment Manager, MGH
- **Gerry Cronin**, Kaizen Promotion Office, MGH, VOE-Network

