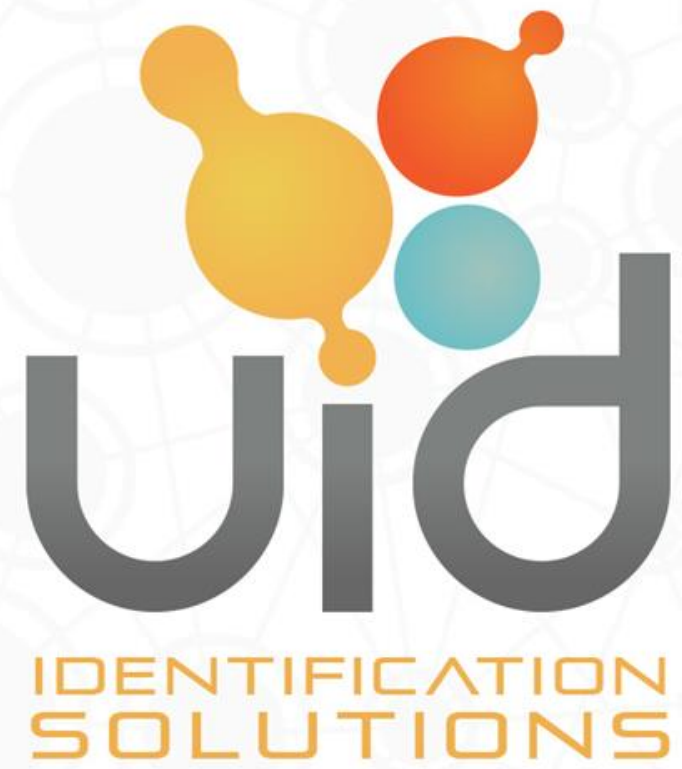




Surgery and the 3r's: Reduction, Refinement, and RFID?

How RFID can increase the 3R's while Providing Essential Data to the Researcher

Matthew Ruiter UID Identification Solutions
10/15/2017
AALAS Technical Presentation



Making the Process of Data Collection More Efficient

- π Using RFID Technology and Software to Provide Passive Data Collection in Order to Reduce or Eliminate Pen and Paper
- π Record Surgical Data Using RFID and Software to Streamline The Surgical Processes
- π Provide Data from a Animal Surgical Provider to You the Researcher
- π Other Areas where Passive Data Collection is Useful

RFID Technology and Software can Provide Passive Data Collection



**Passive Electronic
Data Collection**

Implantable
Microchips and Labels

RFID Readers

Process Based
Software

Benefits of RFID Technology and Software in the Surgical Suite

- π Reduction of Animals Used
- π Refinement of the Surgical Process
 - ∞ 100% Data capture
 - ∞ Streamlining of the surgical process
- π Replacement of Pen and Paper to Automatically Recorded Data
- π Data Analytics for Process Optimization

UID Partnered with Envigo Research Models & Services

Requirements

- π Utilize a Passive Data Collection System
- π Record All the Data Generated by Each Surgery
- π Eliminate Paper in the Surgical Suite
- π Track Surgeon Times, Success and Training
- π Improve Overall Efficiencies and Outcomes – Three R's
- π Provide Recorded Data to you the Researcher

Surgical Data Recording Surgical Worksheet

Surgical Operations Worksheet

Site 237

Procedure Date: 7/26/17
 Surgical Procedure: JVC/PVC
 Surgical Code, if applicable: STDCATH
 Strain: SD Sex: MALE
 DOB: 6/9/17
 Requested Age/Weight: 220-250G

☒ Isoflurane
☐ Ketamine + Xylazine dose (mL) N/A
☒ Ketaprofen or Buprenorphine dose (mL) 0.24
 Catheter Implantation Depth (mm)
 Catheter type/gauge: SAI-RJVC2.2-EV-10/SAI-PVC-EV-10
 Lock Solution: JVC-50:50/PVC-50:50
 Post Op Fluids (mL/kg)

Quantity for order: 15 Extras 64
 Customer: XXXXXXXXXXXX
 Envigo #: 2626006-2-82-6526
 Ship date: 7/31/17
 Catheter Lot #: RJVC22060117/PVC020317
 Closing Method: STANDARD

Start time: 7:11 End time: 7:36
 Start time: 8:14 End time: 9:51
 Catheter Lot #: N/A

Post-surgical Information														Shipping Day							
DATE: <u>7/27/17</u>														DATE: <u>7/31/17</u>							
Tech: <u>KC</u>														Tech: <u>LL/JC</u>							
Animal #	Weight (g)	Analgesic Given	Eye Ointment Applied	Blood volume (mL)	PVC Score	JVC Score	Cath	Prep	Surgery Results	Clinical Score	Weight (g)	Priority per cath	Clinical Score	Weight (g)	Priority per cath	Clinical Score	Weight (g)	Priority per cath	Actual Shipped	Animal #	
1	228	✓	0-0-0		GA	EO	EO	JC	1	01	215						27	232	CP	✓	1
2	229	✓	0-0-0		GA	EO	EO	JC	1	01	211						27	224	CP	✓	2
3	228	✓	0-0-0		GA	EO	EO	LG	1	01	215						27	232	CP	✓	3
4	223	✓	0-0-0		GA	EO	EO	LG	1	01	217						27	222	CP	✓	4
5	228	✓	0-0-0		GA	EO	EO	LG	1	01	217						27	232	CP	✓	5
6	235	✓	0-0-0		GA	EO	EO	LG	1	01	220						27	236	CP	✓	6
7	232	✓	0-0-0		GA	EO	EO	LG	1	01	222						27	232	CP	✓	7
8	234	✓	0-0-0		GA	EO	EO	LG	1	01	224						27	244	CP	✓	8
9	226	✓	0-0-0		GA	EO	EO	LG	1	27	220						27	239	CP	✓	9
10	227	✓	0-0-0		GA	EO	EO	LG	1	01	216						27	235	CP	✓	10
11	245	✓	0-0-0		GA	EO	EO	LG	1	01	241						27	260	CP	✓	11
12	239	✓	0-0-0		GA	EO	EO	LG	1	01	235						27	241	CP	✓	12
13	230	✓	0-0-0		GA	EO	EO	LG	1	01	232						27	238	CP	✓	13
14	225	✓	0-0-0		GA	EO	EO	LG	1	01	226						27	231	CP	✓	14
15	227	✓	0-0-0		GA	EO	EO	LG	1	01	218						27	226	CP	✓	15
16	244	✓	0-0-0		GA	EO	EO	LG	1	01	229						27	252	CP	✓	16
17	223	✓	0-0-0		GA	EO	EO	LG	1	01	214						27	222	CP	✓	17
18	238	✓	0-0-0		GA	EO	EO	LG	1	01	239						27	240	CP	✓	18
19	227	✓	0-0-0		GA	EO	EO	LG	1	01	224						27	240	CP	✓	19
20		✓	0-0-0																		20

OREC reviewed prior to use (initials) [Signature]

all animals given ketoprofen #3 1-17, 19
 KC/JC

- π Not Everyone has Perfect handwriting
- π Notes can be placed everywhere
- π Access to the data is difficult

Solution

- π Surgical Data Recording Platform that utilizes RFID as the Data Collection System
- π Provided RFID Components that Fit the Process and is Passive
- π Used existing Database Engine and Modified the User Interface to Recorded the Data Needed.

Pi Surgical Suite

pi Suite

APPSINVENTORIESTOOLS

READER DISCONNECTED

CHIP
PROVISIONING

WEIGHING

SURGERY

TK / PK

CAGE
TRACK

ANIMAL
RECEIVER

GENERAL
SCAN

+

+

π

=

100%
VERIFICATION

Local Time: Wednesday, October 11, 2017 10:36 AM

uid

IDENTIFICATION
SOLUTIONS

Pi Surgical Suite – Order Entry

APPSINVENTORIESTOOLS

READER DISCONNECTED

SURGERY

Surgery - New

* Personnel RFID

RFID

* Customer Name

Shipping Address

* Date Required

Surgery Date

* Species

[Species: 2]

Model / Strain

[Strains: 0]

Food Type

[Food Types: 0]

☐ Is DOB the same for all animals

Qty. Animals	Qty. Required	Qty. Extra	Total
Males	0	0	0
Females	0	0	0
Total	0	0	0

Animal Ranges	Measure Unit	Surgery Range	Surgery Min	Surgery Max
Age	d - Days	☐	0	0
Weight	g - Grams	☐	0	0

Surgeries

Soft Tissues

Additional Details

* = Mandatory field (Cannot be empty)
* = Unique field

Reset

Cancel

Save

- Order Entry
- Animals, Drugs, Bodyweights
- Surgeries
- Ship date

Pi Surgical Suite - In Surgery



Surgeon	Closer
 Surgeon	 Closer
* Animal RFID: 11483F4B	* Animal RFID: 11480AB9
Species / Strain: Rat / Sprague Dawley Sex: ♂	Species / Strain: Rat / Sprague Dawley Sex: ♂
Additional Details:	Additional Details:
Surgeries: RJVC	Surgeries: RJVC
Soft Tissues:	Soft Tissues:
* Surgeon RFID: [] RFID	* Closer RFID: Craig Jordan
Start Time: 11:08:10	Start Time: 11:08:06
Stop Time: 00:00:00	Stop Time: 00:00:00

- π Scan the animal
- π Record Times and Surgeons
- π Maintain Sterility

Pi Surgical Suite – BW, Observations, and Patency Checks

Surgery - Animal Management: BioTech - Customer #11541 - UID-1001

Animal Information

Animal RFID

11483F4B

Vital Condition

Alive

Surgical Card Information

Surgical Card RFID

E00401506C472679

Surgical Operations

Customer: BioTech - Customer #11541
Total Animals: 2 M 0 F 1 EM 0 EF
Envigo #: Demo-1001
Tattoo #: 0003
Strain: Rat / Sprague Dawley
Sex: Male
D.O.B: 2017/09/04
Procedure: RJVC, ROVX
Surgery Date: 2017/09/08
Ship Date: 2017/09/29
Feed Type: 20185

Clinical Score

Surgery	Clinical Score
RJVC	♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥
ROVX	♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥

Daily Observation

Acceptable

Other

Additional Details

Patency Check

Catheter	Patency
RJVC	Full Partial Blocked

Animal Body Weight

Weight

24.19 g

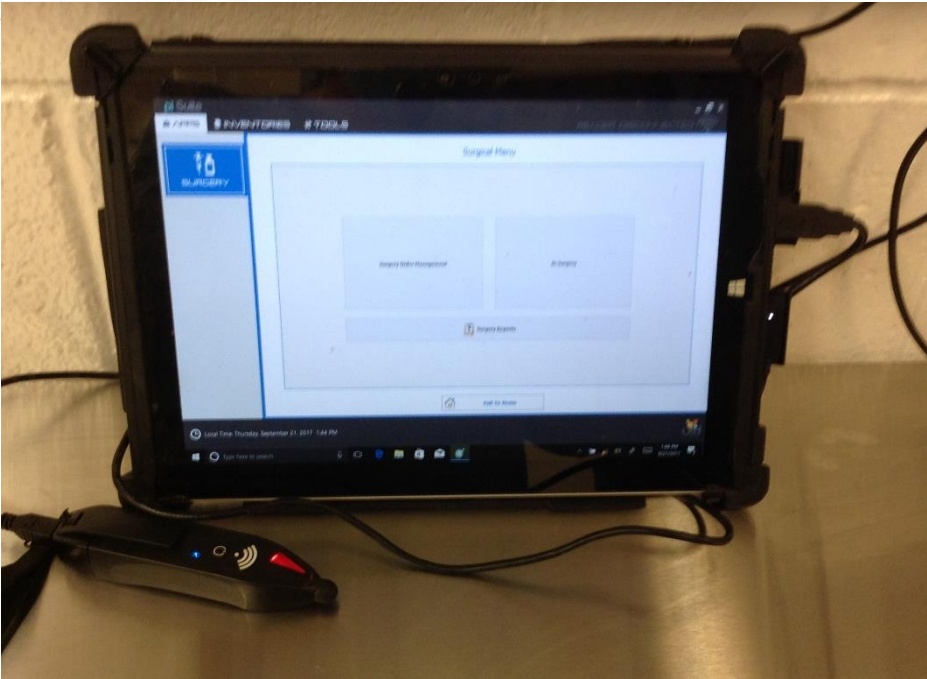
Weighing Options

Automatic Weight Capture

Wait Interval (secs) 2

Stable Weight Required

Timeout (secs) 5



Bodyweights, Patency, and Shipping



- π Record Bodyweights
- π Check Patency
- π Verify Shipping

Pen and Paper Recording – Old Way

Surgical Operations Worksheet

Site: 237

Procedure Date: 7/26/17
 Surgical Procedure: JVC/PVC
 Surgical Code, if applicable: STDCATH
 Strain: SD Sex: MALE
 DOB: 6/9/17
 Requested Age/Weight: 220-250G

☒ Isoflurane
☐ Ketamine-Xylazine dose (mL): N/A
☒ Ketoprofen or Buprenorphine dose (mL): 0.24
 Catheter Implantation Depth (mm):
 Catheter type/gauge: SAI-RJVC2 2-EV-10/SAI-PVC-EV-10
 Lock Solution: JVC-50.50/PVC-50.50
 Post Op Fluid(s)/rate(s):

Quantity for order: 15 Extras: 64
 Customer: XXXXXXXXXXXX
 Envigo #: 222005-2826526
 Ship date: 7/31/17
 Catheter Lot #: RJVC22060117/PVC020317
 Closing Method: STANDARD

Start time: 7:11 End time: 7:36
 Start time: 8:14 End time: 9:51
 End time (mL): N/A

Post-surgical Information												Shipping Day								
DATE: <u>7/27/17</u>						DATE:			DATE:			DATE: <u>7/31/17</u>								
Tech: <u>KC</u>						Tech:			Tech:			Tech: <u>LC/JC</u>								
Animal #	Weight (g)	Anesthetic Given	Eye Ointment Applied	Rescue volume (mL)	PVC Score	JVC Score	Cath	Prep	Surgery Results	Clinical Score	Weight (g)	Fluorescence (per cath)	Clinical Score	Weight (g)	Fluorescence (per cath)	Clinical Score	Weight (g)	Fluorescence (per cath)	Animal Shipped	Animal #
1	228	✓	0-0-0		GA	EO	EO	JC	1	01	215					27	232	CP1	✓	1
2	229	✓	0-0-0		GA	EO	EO	JC	1	01	211					27	224	CP1	✓	2
3	228	✓	0-0-0		GA	EO	EO	LG	1	01	215					27	232	CP1	✓	3
4	223	✓	0-0-0		GA	EO	EO	LG	1	01	217					27	222	CP1	✓	4
5	228	✓	0-0-0		GA	EO	EO	LG	1	01	217					27	232	CP1	✓	5
6	235	✓	0-0-0		GA	EO	EO	LG	1	01	220					1	236	CP1	✓	6
7	232	✓	0-0-0		GA	EO	EO	LG	1	01	222					27	232	CP1	✓	7
8	234	✓	0-0-0		GA	EO	EO	LG	1	01	224					27	244	CP1	✓	8
9	226	✓	0-0-0		GA	EO	EO	LG	1	27	210					27	239	CP1	✓	9
10	237	✓	0-0-0		GA	EO	EO	LG	1	01	216					1	235	CP1	✓	10
11	245	✓	0-0-0		GA	EO	EO	LG	1	01	241					27	260	CP1	✓	11
12	239	✓	0-0-0		GA	EO	EO	LG	1	01	225					27	241	CP1	✓	12
13	230	✓	0-0-0		GA	EO	EO	LG	1	01	232					1	238	CP1	✓	13
14	225	✓	0-0-0		GA	EO	EO	LG	1	01	216					1	231	CP1	✓	14
15	227	✓	0-0-0		GA	EO	EO	LG	1	01	218					24	226	CP1	✓	15
16	244	✓	0-0-0		GA	EO	EO	LG	1	01	219					27	252	CP1	✓	16
17	223	✓	0-0-0		GA	EO	EO	LG	1	01	219					27	220	CP1	✓	17
18	238	✓	0-0-0		GA	EO	EO	LG	1	01	219					27	220	CP1	✓	18
19	227	✓	0-0-0		GA	EO	EO	LG	1	01	224					27	240	CP1	✓	19
20		✓	0-0-0																✓	20

OREC reviewed prior to use (initials): [Signature]

all animals given ketoprofen #5 1-17, 19
 KC/JC

Passive Data Recording – New Way

Surgery History By Surgery Order



Order Number: 2873728
Customer Name: BioTech 1
Customer Email: Info@biotech1.com

Order Date: 2017-08-29
Required Date: 2017-09-02
Shipping Date: 2017-09-02

ANIMAL RFID	ANIMAL #	SPECIES	SEX	VITAL COND.	WEIGHT (G)	SURGEON NAME	SURGERY TYPE	SURGERY DATE	SUGERY DURATION	SHIPPED
11477C79	1	Rat	Male	Alive	347.65 g	Surgeon 1	RJVC	2017-08-30	692	N/A
11483488	2	Rat	Male	Alive	346.15 g	Surgeon 2	RJVC	2017-08-30	323	N/A
11486B2B	3	Rat	Male	Alive	361.60 g	Surgeon 1	RJVC	2017-08-30	656	TRUE
11483F9A	4	Rat	Male	Alive	309.75 g	Surgeon 2	RJVC	2017-08-30	646	TRUE
1147F1AF	5	Rat	Male	Alive	350.75 g	Surgeon 1	RJVC	2017-08-30	470	N/A
11486B63	6	Rat	Male	Alive	314.65 g	Surgeon 2	RJVC	2017-08-30	525	TRUE
11477DBE	7	Rat	Male	Dead	350.40 g	Surgeon 1	RJVC	2017-08-30	428	N/A
11477039	8	Rat	Male	Alive	356.05 g	Surgeon 2	RJVC	2017-08-30	647	TRUE
11487D02	9	Rat	Male	Alive	339.00 g	Surgeon 1	RJVC	2017-08-30	344	TRUE
11480B68	10	Rat	Male	Alive	333.35 g	Surgeon 2	RJVC	2017-08-30	9	TRUE

LAST ROW

Records Count: 10

Data for Surgical Times

YTD Surgeries 840 of 10,000

0K 1K 2K 3K 4K 5K 6K 7K 8K 9K

Shipped XXX of 840 – YY% Shipped

0K 1K 2K 3K 4K 5K 6K 7K 8K 9K

Euthanized in Surgery - xxx of 840

0K 1K 2K 3K 4K 5K 6K 7K 8K 9K

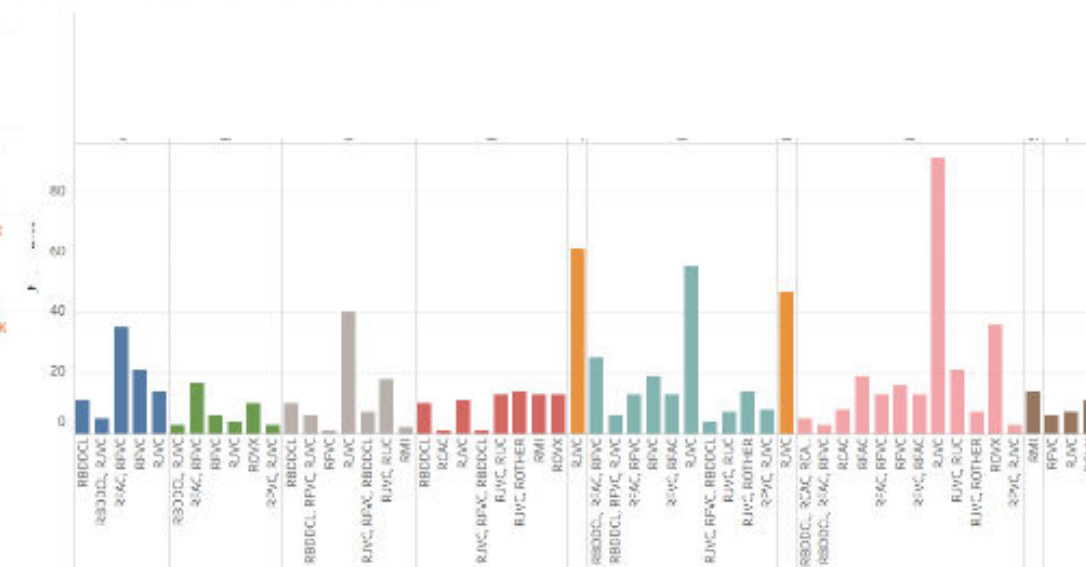
Extras SOLD xxx of 840

0K 1K 2K 3K 4K 5K 6K 7K 8K 9K

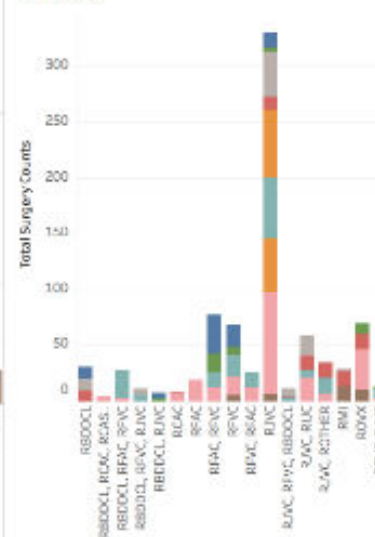
RMS YTD
Average Surgery Times

Combo Surgery Codes	
RBDDCL, RCAC, RCASTR	00:00:51
ROVX	00:04:13
RFVC	00:05:16
RFAC	00:07:00
RJVC	00:07:04
RJVC, ROTHER	00:07:21
RFVC, RFAC	00:08:22
RFAC, RFVC	00:09:46
RCAC	00:10:01
RBDDCL, RFAC, RFVC	00:10:50
RBDDCL	00:11:11
RMI	00:14:09
RJVC, RUC	00:15:07
RBDDCL, RFVC, RJVC	00:22:00
RFVC, RJVC	00:22:14
RJVC, RFVC, RBDDCL	00:25:05
RBDDCL, RJVC	00:26:00

YTD-Total Surgeries by "Surgeon then Type"



YTD-Surgerys by "Type & Surgeon in (COLOR)"



YTD-Surgeries Totals by Surgeon

Combo Surgery Codes									
RBDDCL			11		10	10			
RBDDCL, RCAC, RCASTR	5								
RBDDCL, RFAC, RFVC	25	3							
RBDDCL, RFVC, RJVC	6				6				
RBDDCL, RJVC			5	3					
RCAC	8						1		
RFAC	19								
RFAC, RFVC	13	13	35	17					
RFVC	19	16	21	6	1				6
RFVC, RFAC	13	13							
RJVC	55	91	14	4	40	11	61	47	7
RJVC, RFVC, RBDDCL	4					7	1		
RJVC, RUC	7	21			16	13			
RJVC, ROTHER	14	7				14			
RMI						2	13		14
ROVX	36			10		13			11
RFVC, RJVC	8	3		3					

Average Surgery Time by Surgeon (HR:MIN:SEC)

Combo Surgery Codes									
RBDDCL	00:13:33		00:11:17	00:14:48					
RBDDCL, RCAC, RCASTR								00:00:51	
RBDDCL, RFAC, RFVC							00:11:03	00:09:04	
RBDDCL, RFVC, RJVC				00:18:15			00:25:45		
RBDDCL, RJVC	00:24:56	00:27:47							
RCAC				00:07:03				00:10:23	
RFAC								00:07:00	
RFAC, RFVC	00:07:49	00:15:14					00:07:26	00:10:12	
RFVC	00:04:18	00:05:19	00:00:05				00:05:17	00:06:55	00:05:57
RFVC, RFAC							00:08:40	00:08:03	
RJVC	00:07:49	00:10:34	00:04:39	00:08:35	00:09:14	00:07:05	00:04:23	00:07:28	00:08:00
RJVC, RFVC, RBDDCL			00:17:31	00:36:39			00:35:28		
RJVC, RUC			00:11:41	00:15:39			00:15:06	00:17:44	
RJVC, ROTHER				00:06:19		00:07:31		00:09:06	
RMI			00:18:03	00:13:39					00:14:04
ROVX		00:05:40		00:03:57				00:03:47	00:04:40
RFVC, RJVC		00:29:19				00:21:08		00:18:06	

RFID Surgical Data Collection

Results using RFID in Surgery from 2 months of data collection

- π Significant animal reduction
- π Inventory usage reduction
- π Paperless data recording in Surgery
- π Surgeon training and optimization
- π Improved Customer interactions

Advantages to YOU the Researcher

- π Data Starts at the Animal Supplier
- π All Data is Valuable and can be provided to YOU
- π Show Drugs or items were or were NOT given
- π Positively ID the Animal – Customer Programmable Microchip
- π Your Research can Start Easier, Faster, and 100% Accurate

Easy Import of Collected Data From Animal Provider

Provided by the Surgical Vendor

Surgery History By Surgery Order

Order Number: 2873728
Customer Name: BioTech 1
Customer Email: info@biotech1.com

Order Date: 2017-08-29
Required Date: 2017-09-02
Shipping Date: 2017-09-02



ANIMAL RFID	ANIMAL#	SPECIES	SEX	VITAL COND.	WEIGHT (G)	SURGEON NAME	SURGERY TYPE	SURGERY DATE	SUGERY DURATION	SHIPPED
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11486B2B	3	Rat	Male	Alive	361.60 g	Surgeon 1	RJVC	2017-08-30	656	TRUE
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11477039	8	Rat	Male	Alive	356.05 g	Surgeon 2	RJVC	2017-08-30	647	TRUE
11487D02	9	Rat	Male	Alive	339.00 g	Surgeon 1	RJVC	2017-08-30	344	TRUE
11480B68	10	Rat	Male	Alive	333.35 g	Surgeon 2	RJVC	2017-08-30	9	TRUE

LAST ROW

Records Count: 10



Your Laboratory
Information
Management System

Efficiency is Key for the Three R's

Relying on hand written paper notes is not effective.

- π Data Collection Starts with the Animals ID/Microchip from the Supplier
- π RFID Readers that Work with the Process – Not Interfere
- π Add RFID Cage Cards, Vial Labels, Item Labels, and even Technicians!
- π Software Written for the EXACT Process You Require.

Other Processes where RFID Can Eliminate Pen and Paper and Streamline Work Flow

π Animal Dosing and TK Sampling

- ∞ Verify Dose, Time Points, Sample Vials, and Automatically Record Times

π Cage Sanitation

- ∞ Track Caging Inventory, Location, Sanitation Records, Maintenance,

π Body weighing

- ∞ Simply Scan the Animal and place it on the Scale. The software records everything: Animal Number, Sex, Strain, Species, Date, Tech, Bodyweights and More!

π Inventory and assets

- ∞ Track all your assets and automatically send emails for calibrations!

RFID and Data Collection

- π RFID Is Proven Technology in the laboratory space
- π Customized software solutions to enhance your process
- π Clean, Accurate, and Electronically Captured Data
- π Start your data collection at the Animal Supplier

Replace your Pen and paper to Refine your data collection process while Reducing your work load and animal usage with better data collection. RFID.

Questions

Thank you to Brad Gien at Envigo and his Surgical Team for the data presented.





IDENTIFICATION
SOLUTIONS

UIDEVICES.COM