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May 20th, 3:00 PM - 4:30 PM

## Data, Data Everywhere: But Not a Drop to Analyze

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*Data, Data Everywhere....*



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Quantitative Health Sciences  
May 20, 2011



# *DISCLOSURE*

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**I have no actual or potential conflict of interest in relation to this program or presentation.**

# *Abundance of clinical data*



# *Diligent data entry*

- ◆ Quality improvement
- ◆ State/national mandate
- ◆ Billing/coding



# *Patients and data yield research ideas*



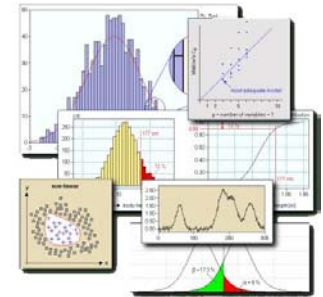
“We are charting clinical data anyway so why not put it in a database?”

“The data exists so why not analyze it?”

*As the saying goes....*



# *Data, entry, & analysis don't always flow*





*Not everything is as easy as it seems*



# *UMass Trauma Registry*

- ◆ 20+ years
- ◆ Prospective data collection
- ◆ Demographic, clinical, and outcome variables
- ◆ >40K records
- ◆ Ready for analysis and publication
- ◆ Not utilized previously for lack of time

# UMass Trauma Registry

**TRAUMA SERVICE ABSTRACT SHEET**

Last Name: \_\_\_\_\_ Date Reviewed \_\_\_\_\_ CDU E/D\* \_\_\_\_\_

CIM \_\_\_\_\_ Date Entered \_\_\_\_\_

TRIAGE				DEMOGRAPHICS			
Hosp Arrival date:	///	Last Name	Street:				
Hosp Arrival time:	:	First Name					
Category Level:	1 2 3 4	DOB/Age	///	City:			
Notified/Response:	:	Gender	M F	State:			
TS Attending:	TE BS NK UT	Race		Zip:			
Covering attending:		Ethnicity		Country:			
Admit Service:		SS#		Country:			
<b>FINANCIAL INFORMATION</b>							
Consult:	:	Medicaid	Private	Worker's Comp			
Notified:	:	Not billed	No fault Auto	BC/BS			
Rsp time:	:	Self-pay	Medicare	Other			
Med Record#:		Other Gov't					
Account#:							
INJURY EVENT				TRANSPORT MODE			
Injury Date:	///	Land Helicopter	Private Police Other				
Injury Time:	:	PRE HOSP (EMS)	Scene EMS	Referral EMS			
Injury City:		Run Sheet Available:	Y N	Y N			
Injury State:		Agency:					
Injury Zip:		Transport Mode:	ALS BLS	ALS BLS			
Injury Country:		Dispatch Date:	///	///			
Work Related?:	Y N	Scene Arrival Date:	///	///			
Industry:		Scene Arrival Time:	:	:			
Occupation:		Scene Depart Date:	///	///			
Mechanism:	B P Burn	Scene Depart Time:	:	:			
Primary E-code:	E	Time @ Destination:	:	:			
Cause Code:		Destination Facility:					
Details:				Referring Facility			
				Discharge Date			
<b>Co-Morbidities</b>							
Injury Location:							
Protective Device							
Child Restraint							
Air Bag							
ETOH?	N (not suspected)	Y (trace levels)	Drug Use?	N (not suspected)	Y (Rx drug)		
	N (tested)	Y (beyond legal)	N (tested)	Y (illegal drug)			
Patient Room Locations							
Unit#	IN time/date	OUT time/date	Dispo	Unit#	IN time/date	OUT time/date	Dispo

Trauma Registry 5/10

**TRAUMA SERVICE ABSTRACT SHEET**

	Time Date	SBP	Pulse	Resp rate	Asst rate	GCS Eye	GCS verbal	GCS motor	GCS total	O2 SAT	Temp °C
Scene											
Amb											
E/D											
O2 given:		Y	N	GCS Qualifier:		Innabated	Sedated	Eye obstruction			
RADIOLOGY (All Initial Diagnostic Studies)											
*Record date/time to initial CT only											
Study	Body Part	Results (+/-)	Study	Body Part	Results (+/-)						
ALL PROCEDURES -Invasive and blood bank products											
Procedure	Descript	Location	Start time/date	Procedure	Descript	Location	Start time/date				
ICD-9	DIAGNOSIS				AIS	COMPLICATIONS/ SI					
ORGAN PROCUREMENT INFO											

Trauma Registry 5/10

## Patient Quality and Outcomes Research Tools

A New Paradigm in Trauma Registry

### Introducing TraumaBase 7.0

*A revolutionary revision in Trauma Registry Software.  
Making the most of technology  
while remaining true to the day-to-day rigors  
of the Trauma Registry professional.*

**Often imitated but never surpassed!**

Once again, TraumaBase with Version 7.0  
raises the bar to which all other registries can only hope to



# *Early research plans*

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- ◆ Three study questions
- ◆ Three abstracts/manuscripts by end of year
- ◆ Facilitate research by colleagues using same data

# *Some examples of what I found*



# *Data, data everywhere....*

- ◆ Examine mortality patterns



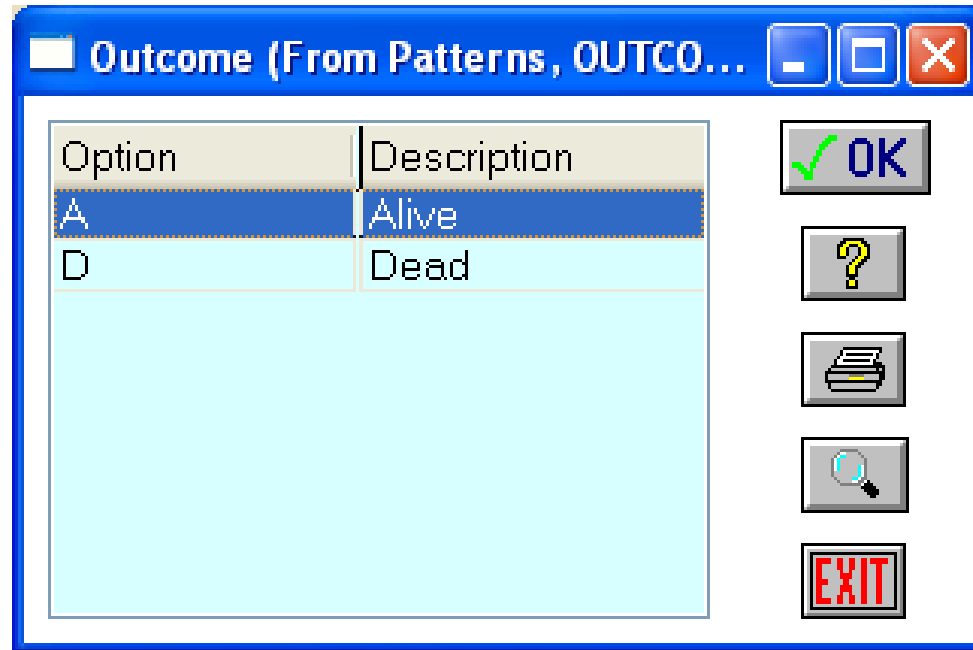
*....Not a drop can be analyzed*

◆ Mortality variable?





# Trauma Registry Outcomes Screen



Generate new variable = Died

Died = 1 if outcome = D

Died = 0 if outcome = A

# *Data, data everywhere....*

- ◆ Adjust for co-morbidities



*....Not a drop can be analyzed*

◆ Co-morbidity variable



# Trauma Registry Co-morbidities Screen

Option	Description
BACK	Backseat passenger
CALIBER	Caliber of bullet
DASH	Dashboard damage
DEFORM	Major external vehicle damage
EJECT	Ejected out of enclosed vehicle
FATAL	Death of same car occupant
FRONT	Front seat passenger
HEIGHT	Height of fall (in feet)
MED	Medical problems: MI;CVA;COPD;cancer;diabetes
PEDES	Speed of vehicle which struck pedestrian
PREG	Pregnancy
ROLL	Vehicle Rollover
SELF	Self inflicted injury
SPEED	Vehicle speed (not pedestrian injuries)
STEER	Steering wheel damage
THROWN	Distance thrown (pedestrian;bicyclist;motorcyclist)
TRAP	Extrication time (in minutes)
WIND	Windshield damage: "starring"
Angina p	History of angina within past 4 months
Ascites	Ascites within 30 days
Bleeding	Bleeding disorder
Chemo	Chemotherapy for cancer within 30 days
Congenital anomalies	Congenital anomalies
Congestive HF	Congestive heart failure
CVA w/deficit	CVA with residual neurological deficit

# *Data, data everywhere....*

- ◆ Abbreviated Injury Scale (AIS)
  - Standardized injury terminology
  - Facilitate comparisons of injury studies
  - Rank injuries by severity
  - Describe injuries anatomically



# ....Not a drop can be analyzed

AIS Region	
Head/Neck	Includes C-spine
Face	Facial skeleton, nose, mouth, eyes, ears
Chest	Included T-spine and diaphragm
Abdomen	Includes pelvic contents and L-spine
Extremities	Includes pelvic skeleton
External	Abrasions, contusions, superficial injuries

AIS Code	Injury
0	Not Injured
1	Minor
2	Moderate
3	Serious
4	Severe
5	Critical
6	Fatal
9	Not further specified

# Trauma Registry AIS Body Region Screen

Body Region (From Patterns, REGION) <AREA >

Code	Description
9	Unspecified
ABD	Abdomen/PMC Contents
ARM	Upper Extremities
CHEST	Thorax
CS	Cervical Spine
EXT	External
FACE	Face
HEAD	Head
LEG	Lower Extremities
LS	Lumbar Spine
NA	Unspecified
NECK	neck
SPINE	Spine Unspecified
TS	Thoracic Spine
UNSPEC	Unspecified

OK ? Print Search EXIT

# *Data, data everywhere....*

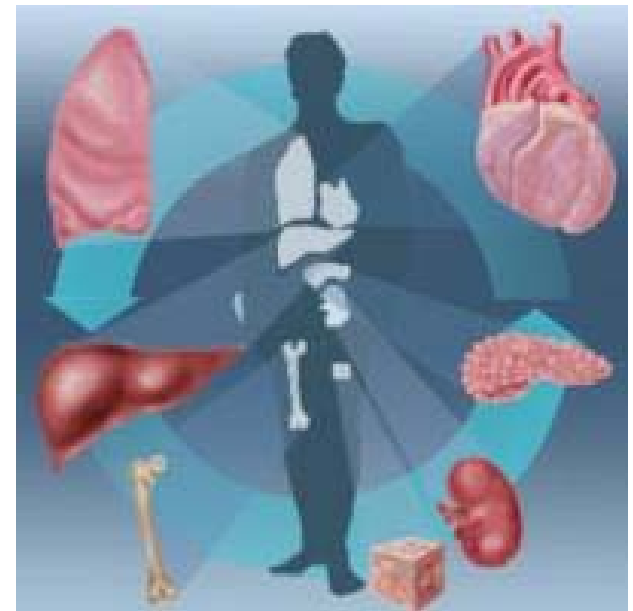
## ◆ Transplant procurement





*....Not a drop can be analyzed*

◆ Organs donated variable



# Trauma Registry Organs Donated Screen

These are the organs that were donated by the pat...

Option	Description
BATH	Bathing
BEHAVE	Behavior
BRRAIN	BRRAIN
COG	COGNITION
COM	COMMUNICATION
CORNEA	CORNEA
DIET	DIET
DRESS	DRESSING
EARBONES	Ear bones
EXP	EXPRESSION
FEED	FEEDING
HEAR	HEARING
HEART	HEART
HL	HEART AND LUNGS
KIDNEY	KIDNEY
LIVER	LIVER
LOC	LOCOMOTION
MARROW	BONE MARROW
MS	MUSCULOSKELETAL
OTHER	OTHER ORGAN DONATION
PANCREAS	PANCREAS
SKIN	SKIN
SPEECH	SPEECH
SPINE	SPINAL CORD
VIS	VISION

OK ? Print Search Filter Help Exit

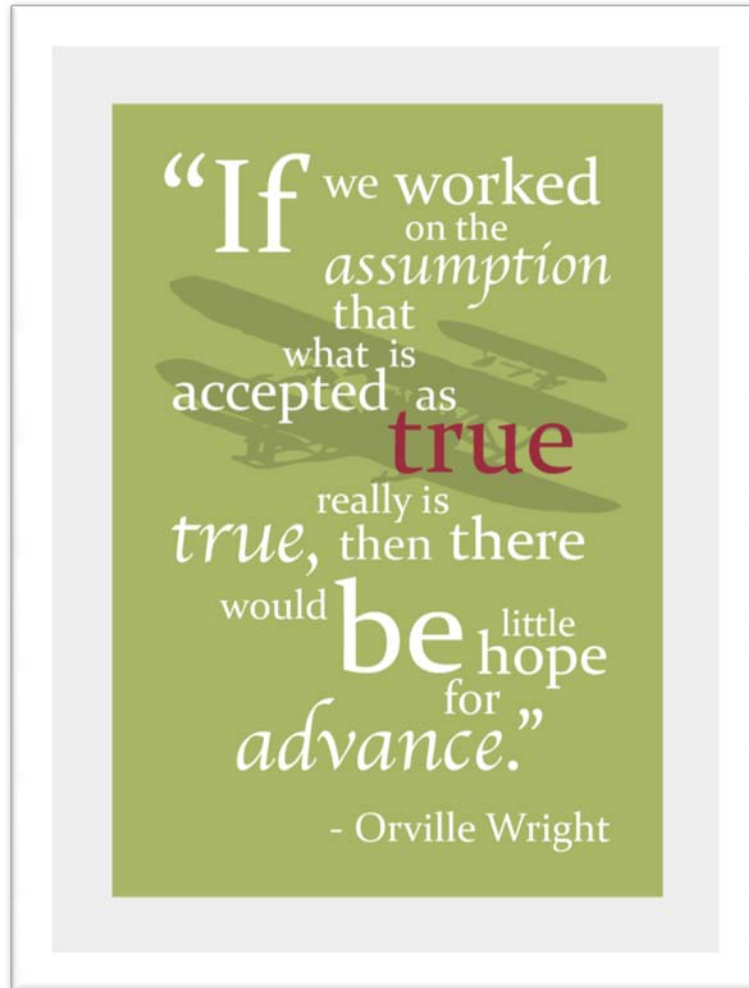
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KIDNEY	KIDNEY
LIVER	LIVER
LOC	LOCOMOTION
MARROW	BONE MARROW
MS	MUSCULOSKELETAL
OTHER	OTHER ORGAN DONATION
PANCREAS	PANCREAS
SKIN	SKIN
SPEECH	SPEECH
SPINE	SPINAL CORD
VIS	VISION

OK ? Print Search Filter Help Exit

# Research with clinical data



“Do not assume that recorded data is suitable for research.”

# Issues

## ◆ Variables

- Unclear names
- Applicable to more than one true measure
- Unnecessary data

## ◆ Values

- Too much free text
- Inconsistent coding across variables
- Unclear
  - Missing vs. unknown
  - Not applicable vs. missing
- Non-numeric coding



# Recommendations

## ◆ Variables

- Define narrowly
- Avoid overlap (collinearity)
- Use dummy variables (1/0)

## ◆ Data dictionary

- Variable/Value
- Creation date

## ◆ Values

- Numeric
- Used consistently across database
- Rarely free text
  - “other” value
- Specify codes for missing vs. unknown vs. not-applicable

# *Road to successful research*





*Thank you*

