

Summer Institute of Nursing Informatics



The Process to Capture Code Blue Data Has a Ripple Effect in Improving Patient Care Outcomes

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Objectives

- **Compare and contrast use of a spreadsheet vs. a relational database to collect, aggregate and analyze process improvement and/or research data.**
- **Discuss at least two methods used to ensure data integrity in the Code Blue Project.**



Objectives

- **Apply the use of the process changes used in the Code Blue Project to other process improvement/research projects in your setting.**



Introduction

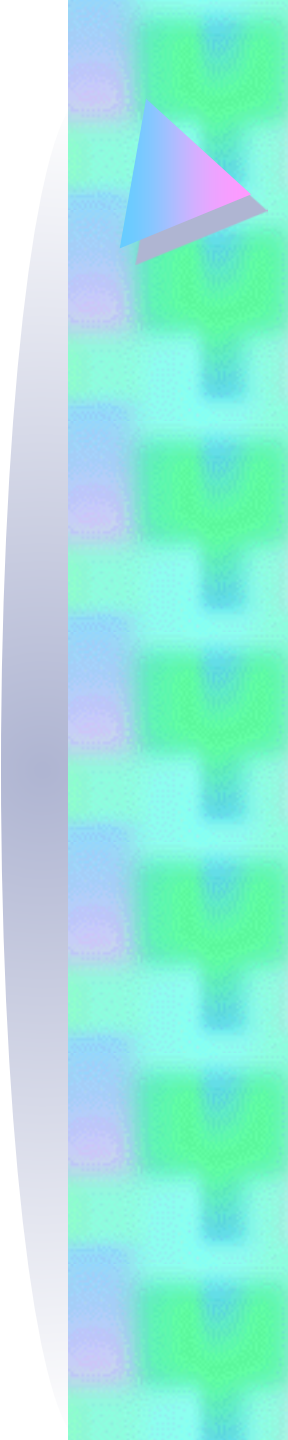
Stakeholders in the Code Blue project

- A Clinical Nurse Specialist
- A physician conducting research
- Nurse practice committees



Planning & Analysis

- **Where we started...**
 - Literature review
 - Analysis of needs
- **Questions we asked...**
 - What?
 - Why?
 - How?

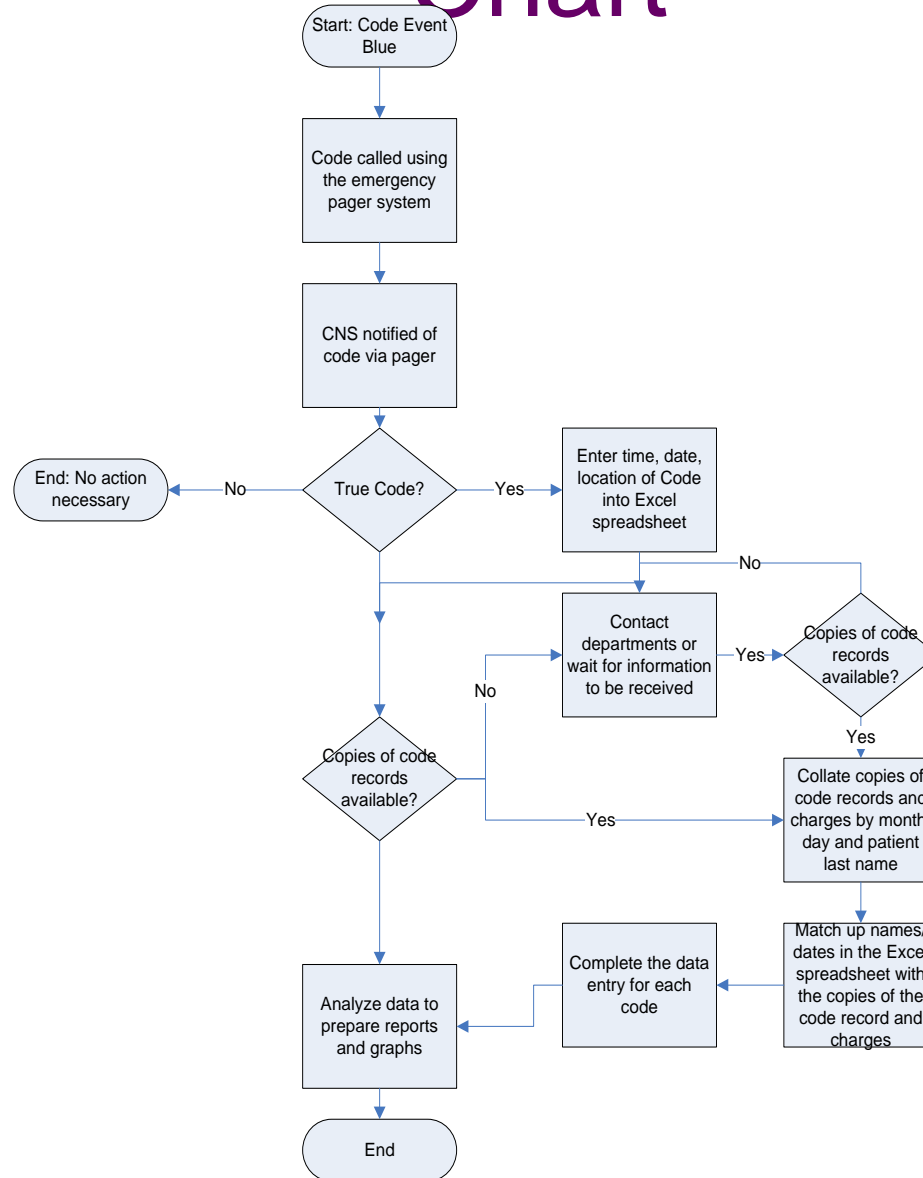


Problems & Solutions

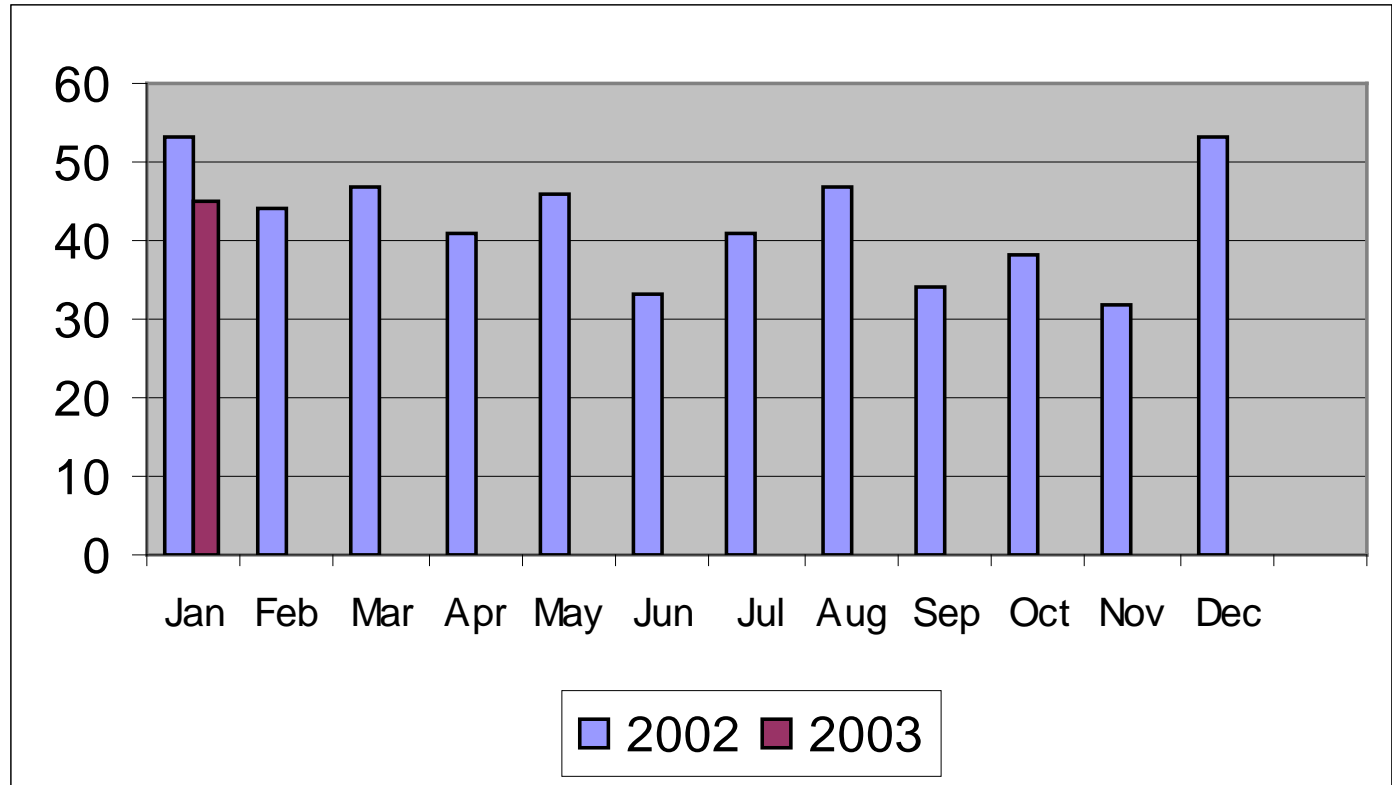
Excel TM vs. Access TM

- Duplication
- Yes/No fields
- Data analysis difficulties
- Data aggregation issues
- Ease of creating charts
- Data integrity
- Accurate field entry
- Data aggregation solutions
- Dynamic report writing
- Ability to export data to Excel

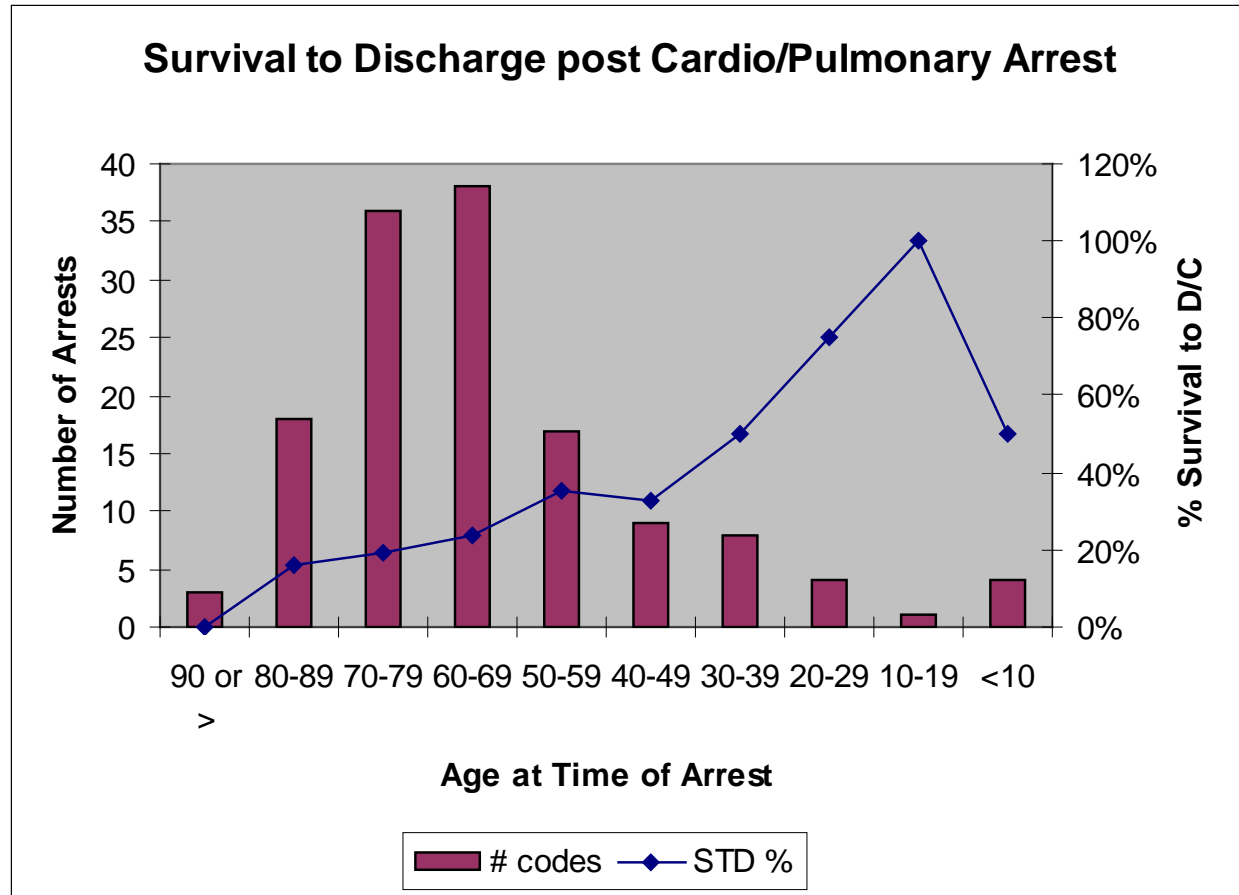
Data Collection Process Flow Chart



Existing Reports in Excel



Survival to Discharge (Excel)



Excel Data with Fictitious Names

Microsoft Excel - Code PINK REVIEWED FOR FIN

File Edit View Insert Format Tools Data Window Help

Type a question for help

Reply with Changes... End Review...

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	
1	Code	Date	Time	Unit	RM	Name	MR#	age	Sex	s/d	DOA	DOD	STD	A?	R	chg	P?	rhythm	CA?	note
2	1-Jan-03	437	STICU			Diggs, Elder W	98173	70	m	s	29-Dec-02	1-Jan-03	n			x				
1	Code	Date	Time	Unit	RM	Name	MR#	age	Sex	s/d	DOA	DOD	STD	A?	R	chg	P?	rhythm	CA?	note
2	1-Jan-03	437	STICU			Diggs, Elder W	98173	70	m	s	29-Dec-02	1-Jan-03	n			x				
3	4-Jan-03	2028	4E	401		Smith, Susan	98165	61	f	s	18-Oct-02	19-May-03	y		x		x			
4	4-Jan-03	2307	6M	659		Clinton, William	98099	60	m	s	18-Dec-02	8-Jan-03	n		x		x			
5	5-Jan-03	349	6e	631		Walters, Del	98053	55	m	s	5-Jan-03	29-Jan-03	y	x	x		x			
6	5-Jan-03	1024	4e	401		Cheney, Rick	98165	68	m	s	18-Oct-02	19-May-03	y		x	x	x			
7	6-Jan-03	407	6M	648		Tice, Condaleeza	98020	35	f	s	3-Jan-03	26-Mar-03	y		x	x	x			
8	6-Jan-03	1736	NICU	7		O'Malley, Martin	98334	44	m	s	14-Dec-02	7-Jan-03	n		x	x	x			
9	9-Jan-03	1407	6M	659		Brown, Henry	98182	50	m	s	5-Jan-03	12-Jan-03	n	x	x		x			
10	9-Jan-03	1617	STICU	18		Pratt, Joan M	98098	45	f	d	9-Jan-03	9-Jan-03	n	x	x		x			
11	10-Jan-03	145	3W	382		Ehrlich, Robert	98336	0.001	m	s	9-Jan-03	15-Jan-03	y		x	x				Code PALS ?if coded later
12	10-Jan-03	633	4e	405		Steele, Michael	98066	49	m	s	8-Jan-03	14-Jan-03	y		x	x				
13	11-Jan-03	1553	4w	486		Pitts, Velma	98337	73	f	s	5-Jan-03	7-Feb-03	y		x		x			
14	11-Jan-03	1717	4s	435		Winfrey, Opal	98311	71	f	d	11-Dec-02	11-Jan-03	n		x	x	x			
15	11-Jan-03	1925	4e	412		Gates, Will	98308	78	m	d	9-Jan-03	11-Jan-03	n		x					
16	11-Jan-03	1950	4w	493		Cheney, Rick	98333	68	m	d	30-Nov-02	11-Jan-03	n		x		x			
17	12-Jan-03	150	nicu	8		Ford, Robert	98115	70	m	d	31-Dec-02	12-Jan-03	n		x		x			
18	13-Jan-03	159	4w	497		Johnson, Sherrie	98239	33	f	s	3-Jan-03	21-Jan-03	y		x	x	x			
19	13-Jan-03	2044	6m	659		Kidman, Nikole	98273	65	f	s	6-Dec-02	21-Jan-03	y		x		x			
20	14-Jan-03	2233	4s	452		Wood, Brian	98021	66	m	d	14-Jan-03	14-Jan-03	n		x	x	x			
21	15-Jan-03	930	msicu	32		Batulis, Melissa	98016	62	f	d	26-Dec-02	15-Jan-03	n		x	x	x			code called 4 times, but re died sev hours later on floo
22	15-Jan-03	1029	8M	844		Olson, Ashley K	98162	23	f	s	31-Dec-02	15-Jan-03	n	x	x	x	x			
23	16-Jan-03	2141	4w	490		Davis, Jody	98337	60	m	s	6-Jan-03	10-Feb-03	y	x	x	x	x			
24	17-Jan-03	1131	4w	480		Height, Dorothy	98337	84	f	d	13-Jan-03	17-Jan-03	n		x	x	x			regained pulse after pronou
25	18-Jan-03	245	4s	449		Adams, Osceola	98052	60	f	d	17-Jan-03	18-Jan-03	n			x	x			
26	18-Jan-03	1500	ec	3		Murphy, Vashti	98194	71	f	s	18-Jan-03	26-Jan-03	n		x					
27	19-Jan-03	1526	msicu	33		Quander, Nellie	98093	63	f	d	18-Jan-03	19-Jan-03	n			x				
28	19-Jan-03	2048	nicu	9		Coleman, Frank	98181	48	m	d	15-Jan-03	19-Jan-03	n		x		x			
29	20-Jan-03	157	5e	529		White, Madree	98027	79	f	s	19-Jan-03	21-Jan-03	y			x	x			

Ready

start | Inbox - ... | Sell Si... | Microso... | Sewell ... | S.I.N.I | SewellC... | 11:53 AM



Database Development

- **Solutions**
 - Improve data entry, tracking, and reporting
 - Regulatory compliance
- **Rapid Application Development**



Database Development

- **Scope Creep**
 - **Patient Care Events Database**
 - **Collaboration with School of Medicine**

Patient Care Events Database

Code Information

Search:

New Patient

Undo

Delete Patient

MR#

Last Name:

First Name:

Gender

F

M

DOB:

Code

First Event

Next Event

Undo Event

Delete Event

EventID

Complete

Admit No

Unit:

Status

CalcAge:

If less than 2 yrs. age
in months (does not
include neonates)

Room#

Hosp Adm Date

Hosp D/C Date

Survived To Hosp D/C

Code Date

Time Called

Time Ended

Code Outcome:

Time CPR Started

Time Intubated

Initial Rhythm?

Pulse Present?

Yes

No

Unknown

PEA?

Yes

No

Defibrillated?

Yes

No

Paced?

Yes

No

CPR Initiated?

Yes

No

Intubated Prior to Code?

Yes

No

Cardiac Monitoring?

Yes

No

C/P Arrest?

Yes

No

Code Paged?

Yes

No

Audited?

Yes

No

Code Record?

Yes

No

Charge?

Yes

No

Patient Form

Access

Insert Format Records Tools Window Help

Type a quest

MS Sans Serif 8 B I U

Code Pink Information

Search: [] [New Patient] [Undo] [Delete Patient]

MR# [098765432] Last Name: [Colbert] First Name: [Jeanne]

Gender: F M DOB: [2/24/1978]

[First Event] [Next Event] [Undo Event] [Delete Event]

Admit No [1] Status [Inpatient] Age: [27] If less than [] 1 yr. age in months

Admission Date [7/20/2005] Date of Discharge [7/23/2005]

Code Date [7/21/2005] Time [11:00] Unit: [MSICU] Room# [7]

Initial Rhythm? [A fib / flutter] PEA? Yes No Defibrillated? Yes No Paced? Yes No

Code Paged? Yes No Cardiac Arrest? Yes No Survived Code? Yes No Survived to Discharge? Yes No

Audited? Yes No Code Record? Yes No Charge? Yes No Note []

Record: [] of 16

Patient Reports

Access - [Event 1]

ew Tools Window Help Type a question for h

Fit Close Setup ?

Code Pink Sample Report with Fictitious Information

Unit	Date	Status	Survived Code	Survived To Discharge	Cardiac Arrest	Paged	Rhythm
Inpatient			-	-	-	-	
Summary for 'Unit ID' = (1 detail record)							
Sum			0	0	0	0	
Avg			0	0	0	0	
<hr/>							
4E							
	1/20/2004	Inpatient	-	-	Y	-	
Summary for 'Unit ID' = 4E (1 detail record)							
Sum			0	0	1	0	
Avg			0	0	1	0	
<hr/>							
4M							
	1/2/2004	Outpatient	-	-	-	-	2nd degree AVB type I (Wenchebach)
	1/20/2004	Staff Member	-	-	Y	Y	1st degree AVB
	1/25/2004	Inpatient	Y	Y	Y	Y	Axystole
Summary for 'Unit ID' = 4M (3 detail records)							
Sum			1	1	2	2	
Avg			0.3333333333	0.3333333333	1	0.6666666667	
<hr/>							
4S							
	2/16/2004	Inpatient	Y	Y	-	-	
Summary for 'Unit ID' = 4S (1 detail record)							
Sum			1	1	0	0	
Avg			1	1	0	0	
<hr/>							
6E							
	2/1/2004	Inpatient				-	VF (pulseless)

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Access Database Features

Improved
Outcomes

Improved
Efficiency &
Workflow

Case
Management

Documentation

Data
Aggregation

Calculated and
Narrative Fields





Code Blue Research Project

- Longitudinal study - began in 1987
- A “flat file” in Access
- Data analysis done with SAS statistical software

Before Process Redesign

STUDYNUM	PTID	MOD	CHARGES	UNITS	HAVE	BAL	AGE	ADMISDT	DCDATE	FINSTAT	FinStart	TIME	SHIFT	DATE	ROOMNUM	NSGAREA	NsgUnit
100	998233386	3134				0	70	5/14/2003	5/24/2003	8	23	1/0/1900	1	5/17/2003	530	5E	32
240	998166389	3134	23582	723	723	0	43	5/14/2003	5/16/2003	9	25	1/0/1900	1	5/16/2003	ICU29	ICUT	60
102	998986496	3280	58123	723	723	0	54	10/7/2003	10/17/2003	0	1	1/0/1900	3	10/16/2003	NICU7	ICUB	
103	998321823	3031	291501	676	676	0	78	1/31/2003	3/6/2003	8	23	1/0/1900	3	2/8/2003	499	4W	31
104	998321823	3031	291501	676	676	0	78	1/31/2003	3/6/2003	8	23	1/0/1900	3	2/8/2003	ICU18	ICUG	
105	998321823	3031	291501	676	676	0	78	1/31/2003	3/6/2003	8	23	1/0/1900	3	3/6/2003	483	4W	31
106	998364681					0		8/27/2003				1/0/1900	1	8/27/2003			
107	998296991	3051	28959	676	676	0	33	2/20/2003	2/22/2003	9	25	1/0/1900	1	2/21/2003	ICU27	ICUT	60
108	998363199	3141				0	37	5/21/2003	5/21/2003			1/0/1900	2	5/21/2003	ECT1	ER	4
109	998199916	3028	52337	676	676	0	72	1/30/2003	2/9/2003	8	23	1/0/1900	2	2/2/2003	ICU19	ICUG	
240	998976934	3206	38759	723	723	0	57	7/26/2003	8/1/2003	2	17	1/0/1900	1	7/28/2003	516	5E	32
24	998337136	3006	183496	2028	2028	0	60	1/6/2003	2/10/2003	2UHC		1/0/1900	2	1/16/2003	490	4W	31
242	998176466	3004	223229	676	676	0	65	1/4/2003	2/3/2003	8	23	1/0/1900	3	2/3/2003	STICU15	ICUG	
243	998319926	3020	145721	676	676	0	83	1/20/2003	2/11/2003	8	23	1/0/1900	2	1/22/2003	437	4S	
244	998319926	3020	145721	676	676	0	83	1/20/2003	2/11/2003	8	23	1/0/1900	1	2/11/2003	ICU14	ICUG	
245	998319926	3020	145721	676	676	0	83	1/20/2003	2/11/2003	8	23	1/0/1900	1	2/11/2003	ICU14	ICUG	
246	998319926	3020	145721	676	676	0	83	1/20/2003	2/11/2003	8	23	1/0/1900	2	2/11/2003	ICU14	ICUG	
247	998143664	3287				0	39	10/14/2003				1/0/1900	2	10/14/2003	TRAUMA2	ER	4
248	998999742	3020				0	42	1/20/2003				1/0/1900	3				
249	998968393	3264				0	47	9/22/2003	9/22/2003			1/0/1900	1	9/22/2003	EXPRESS7		
120	998911862	3115	16519	1352	1352	0	45	4/26/2003	4/27/2003	8	23	1/0/1900	1	4/27/2003	943	9M	45
242	998911862	3115	16519	1352	1352	0	45	4/26/2003	4/27/2003	8	23	1/0/1900	1	4/27/2003	ICU17	ICUG	
122	998367829	3180	40098	723	723	0	93	6/29/2003	7/2/2003	8	23	1/0/1900	3	7/2/2003	ICU14	ICUG	
123	998366491	3255	259999	723	723	0	82	9/15/2003	10/28/2003	8	23	1/0/1900	1	9/23/2003	491	4W	31
124	998366491	3255	259999	723	723	0	82	9/15/2003	10/28/2003	8	23	1/0/1900	3	10/9/2003	ICU21	ICUG	
125	998366334	3254				0	49	9/11/2003	9/13/2003			1/0/1900	1	9/13/2003	840	8M	43
126	998374664	3322	100476	723	723	0	43	11/18/2003	11/25/2003	3	18	1/0/1900	3	11/25/2003	ICU25	ICUG	
127	998116776	3061	84618	676	676	0	87	3/2/2003	4/3/2003	8	23	1/0/1900	1	3/27/2003	453	4S	



Steps Used in Redesign

- **Review of literature**
- **Analyze existing data**
- **Deconstruct, then reconstruct the database**
- **Test the database**
- **Test exported data in SAS**

MR Number Last Name First Name SSN DOB Race: Sex:

Add a New Patient

Delete

First Code

Previous Code

Next Code

Last Code

Add New Code

Undo

Delete Code

Code DemographicsCode # for pt Study No MR# Admission# Age Admission Date Discharge Date LOS Charges Units Have Financial Status DRG # Date Time called Shift Room # Unit Time Terminated Length of code On Monitor? Called By Reason? **Code Details**Initial Rhythm Type of Arrest? Category *If Category = ORG, note blood pressure and heart rate*Heart rate: Blood Pressure: Intubation Time intubated #min until intub Total # ABGs Time 1st ABG #min until 1st ABG **Chest Compressions**Start End Difference # Chest Compressions # Defibrillations # Cardioversions



Conclusion

- **Implications for Nursing Informatics**
- **Implications for Future Research**



Questions?

- *Thank you for your time and attendance*