

Inpatient Syndromic Surveillance in Nebraska

March 8, 2012
Eryn Murphy, MS

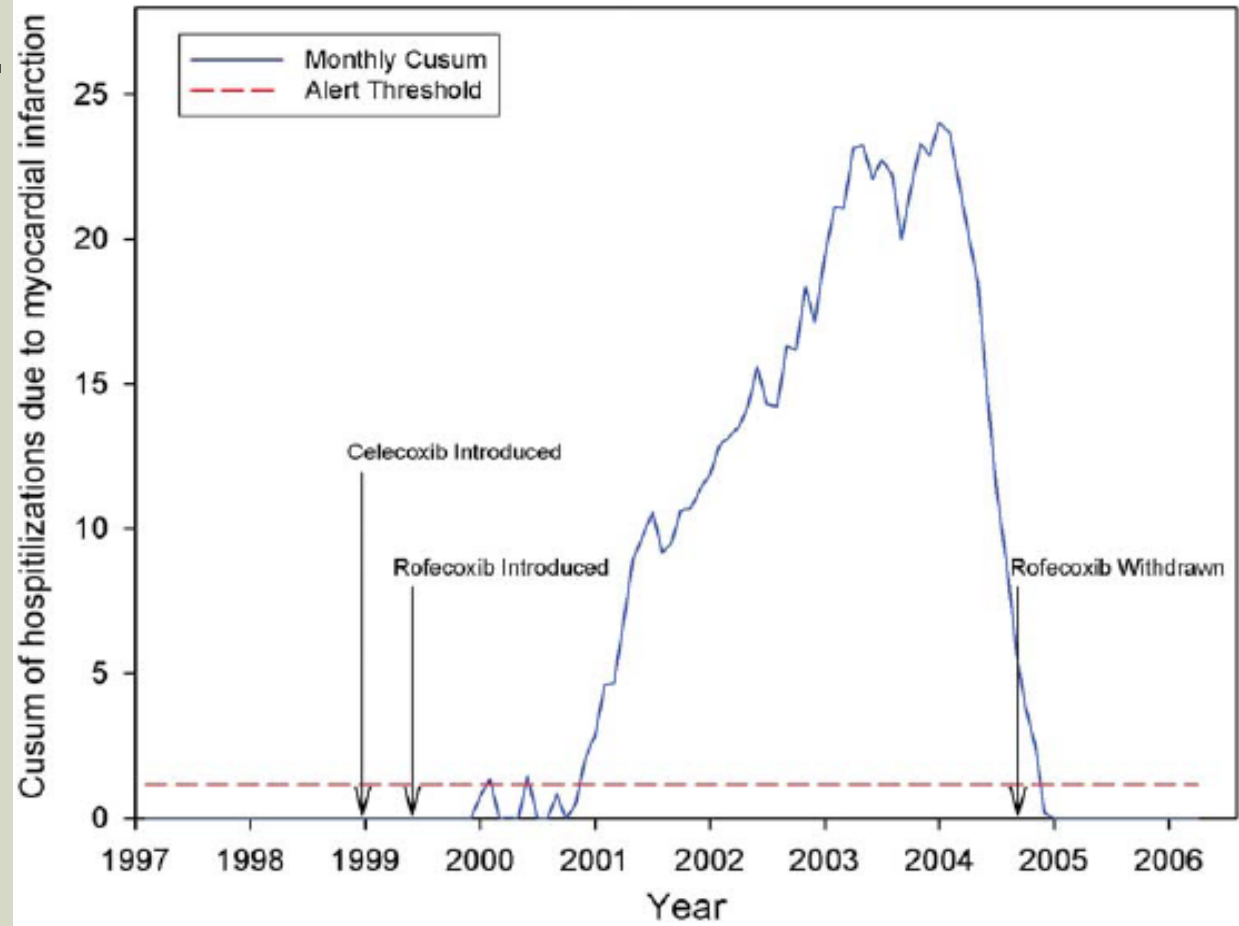


WHY REAL-TIME CHRONIC DISEASE SURVEILLANCE?

- **Timeliness**
 - Data collection
 - Public health action
- **Accuracy**
- **Completeness**
- **Patient level exposures and risk factors**

WHY REAL-TIME CHRONIC DISEASE SURVEILLANCE?

- Brownstein, et al. 2007
- COX-2 selective inhibitors associated with myocardial infarctions (MI)
- Timelier detection possible with real-time data



Brownstein JS, et al (2007) The Tell-Tale Heart: Population-Based Surveillance Reveals an Association of Rofecoxib and Celecoxib with Myocardial Infarction. PLoS ONE 2(9): e840. doi:10.1371/journal.pone.0000840

NEBRASKA'S PILOT INPATIENT SURVEILLANCE PROJECT

- One pilot hospital in Omaha
- 128 data elements
- 10% of all discharges in Nebraska

HOSPITAL A



5 days after admission

PHINMS

Clinical File

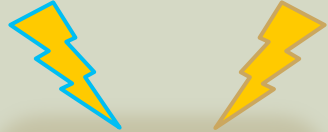
24 hours after ICD9CM coding complete

PHINMS

Demographic File



Converted to Excel files



Files merged using SAS

Inpatient Database



CLINICAL DATA ELEMENTS

- Highest systolic reading and test date
- Highest diastolic reading and test date
- Active medication list
- Height
- Weight
- BMI calculated
- Smoking status
- EKG Interpretation and test date
- Cause of death
- Discharge medications
- Troponin test result and date/time
- Working diagnosis
- High-density lipoprotein (HDL) test result and test date
- Low-density lipoprotein (LDL) test result and test date
- Triglycerides test result and test date
- Hemoglobin A1C result and test date
- Heart rate
- Respiratory rate
- Body temperature
- Pulse Ox

CLINICAL ELEMENTS

Visit ID	Admit Date	Discharge Date	Admit BP (BP)	Admit BP Date	Highest systolic Reading	High systolic Date	Highest diastolic reading	Active Medication List	Height	Weight	BMI Calculated	Smoking Status	EKG Interpretation	High-density lipoprotein (HDL) Test Result	Low-density lipoprotein (LDL) Test Result	HDL Test Date	Triglyceride Test Result	Triglyceride Test Date	Hemoglobin A1C Result	Hemoglobin A1C Test Date	Heart Rate	Respiratory Rate	Body Temp	Pulse Ox	Troponin Test Result
2039	01AUG2011	02AUG2011	126/74	02AUG2011	114	01AUG2011	55	Norco 5/325 ^Tylenol ^bacitracin-polymyxin^	66	214	34.54	N	Sinus Tachycardia^Sinus Rhythm^	27	N/A	12/02/2011	911	12/02/2011			99	18	98	88	
2039	15JUL2011	15JUL2011	105/47	15JUL2011	100	15JUL2011	47		65		0.00	N		51	163	11/15/2011	200	11/15/2011	6.1	11/15/2011	80	16	97.5	82	
2040	07JUL2011	15JUL2011	138/63	15JUL2011	105	13JUL2011	42	Coumadin^Diflucan^DuoNeb Inhalation so^Lasix Oral^Mucinex ^Toprol-XL ^predniSONE^simvastatin ^	74	197	25.29	N	Paced Rhythm^Paced Rhythm, Other: underlying a flutter^Paced Rhythm^	51	74	09/09/2011	76	09/09/2011			94	24	97.7	73	0.02^
2040	07JUL2011	08JUL2011	113/68	08JUL2011	113	08JUL2011	68		68	169	25.69	N	Sinus Rhythm^	58	95	09/06/2011	109	09/06/2011				18	97.9	53	0.00^
2040	02AUG2011	03AUG2011	109/52	03AUG2011	104	03AUG2011	48	Motrin 800 mg oral t^Norco 5/325 ^Vitamin B Complex 10^Vitamin D3 (cholecalciferol) calcium (as carbonate)^	64	163	27.98	N	Sinus Rhythm^	70	100	11/23/2011	171	11/23/2011	5.4	11/23/2011	61	14	96.8	55	
2040	11JUL2011	11JUL2011	125/62	11JUL2011	122	11JUL2011	55	FiberCon^Lasix 40 mg oral tab^	69	182	26.87	N	Paced Rhythm^	56	167	11/30/2011	146	11/30/2011			65	18	97.7	68	
2040	08JUL2011	10JUL2011	129/82	10JUL2011	104	08JUL2011	63	Keflex^NovoLOG ^Percocet 7.5/325^insulin aspart. ^insulin glargine^torsemide ^		332		N		36	66	10/24/2011	93	10/24/2011	7.4	10/23/2011	73	22	98.2	74	
2040	08JUL2011	16JUL2011	109/69	16JUL2011	104	14JUL2011	55	Allegra ^Nasal rinse with cre^azithromycin^budesonid 0.5 mg/2 ^guaifenesin ^predniSONE^theophylline^	68	256	38.92	N	Sinus Rhythm, Other: initial strip^Sinus Rhythm^Sinus Bradycardia, Other: w/notched p-waves present^Sinus Rhythm^Sinus Bradycardia^	39	69	09/27/2011	211	09/27/2011	5.9	09/27/2011	62	20	97.2	73	0.00^
2040	08JUL2011	11JUL2011	129/51	11JUL2011	100	10JUL2011	40	Effient 10 mg oral t^Pepcid^Protonix^Tylenol ^aspirin ^pravastatin 10 mg or^	62	165	30.18	Y	Sinus Rhythm^Sinus Bradycardia^Sinus Rhythm^Sinus Bradycardia^Sinus Rhythm^Sinus Bradycardia^Sinus Rhythm^	31	83	11/03/2011	110	11/03/2011			77	20	97.2	62	0.00^
2041	08JUL2011	12JUL2011	141/72	12JUL2011	100	09JUL2011	50	Claritin^Roxicodone 5 mg oral^Ultram 50 mg oral ta^albuterol-pratropiu^	73	269	35.49	N	Sinus Rhythm, Bundle Branch Block^Sinus Rhythm^Sinus Rhythm, Bundle Branch Block, Other: episodes of 3rd degree heart block on 9th floor between 2 and 3 pm^Sinus Rhythm, Other: episodes of 3rd degree heart block on 9th floor between 2 and 3 pm^Sinus Rhyth	28	81	10/08/2011	201	10/08/2011			100	20	98.2	73	0.00^0.02^0.00
2041	09JUL2011	09JUL2011	114/65	09JUL2011	102	09JUL2011	47		63		0.00	N		53	165	10/25/2011	161	10/25/2011	6.7	10/25/2011		20	98.2	65	
2041	09JUL2011	09JUL2011	141/90	09JUL2011	110	09JUL2011	29	Duricef500 mg oral^Norco 5/325 ^Norco 7.5/325 ^Pyridium 200 mg oral^ Benicar HCT ^Co-Q10^Glucosamine & Chondr^Levoxyl ^Probiotic and bilio^Vitamin B Complex or^Welchol ^calcium carbonate ^zinc gluconate^	5	189	5314.68	N	Sinus Rhythm^	44	92	11/23/2011	270	11/23/2011			58	20	97.5	78	
2041	09JUL2011	10JUL2011	157/81	10JUL2011	126	09JUL2011	62	Levaquin^NF - Inhalant ^PrlLOSEC^Vitamin D3 2000	63	118	20.90		Sinus Rhythm^	75	135	12/05/2011	109	12/05/2011			86	18	97.4	77	0.00^
2041	09JUL2011	13JUL2011	162/78	13JUL2011	121	10JUL2011	55	Levaquin^NF - Inhalant ^PrlLOSEC^Vitamin D3 2000	67	282	44.16	Y		50	63	11/07/2011	127	11/07/2011	7.1	11/07/2011		16	98.2	65	

“DEMOGRAPHIC” DATA ELEMENTS

- Source of Admission
- Type of Admission
- ICD9-CM Codes for 25 Diagnoses
- Discharge Disposition
- Condition Present on admission indicator for each diagnosis
- DRG (Diagnosis Related Group)
- Emergency room visit (Y/N)
- Visit reason
- Type of patient visit
- Education Level
- Race of Patient
- Hispanic ethnicity
- Zip code of patient
- County of patient
- State where patient resides
- Gender of patient
- Patient DOB
- Type of primary payer
- ICD9-CM codes for 10 procedures
- Total charges
- Medical service
- Employer of patient
- Occupation of patient
- Employment status of patient
- Employment work hazards of patient
- Activity level at employment
- Operate Hazardous Equipment

DEMOGRAPHIC ELEMENTS

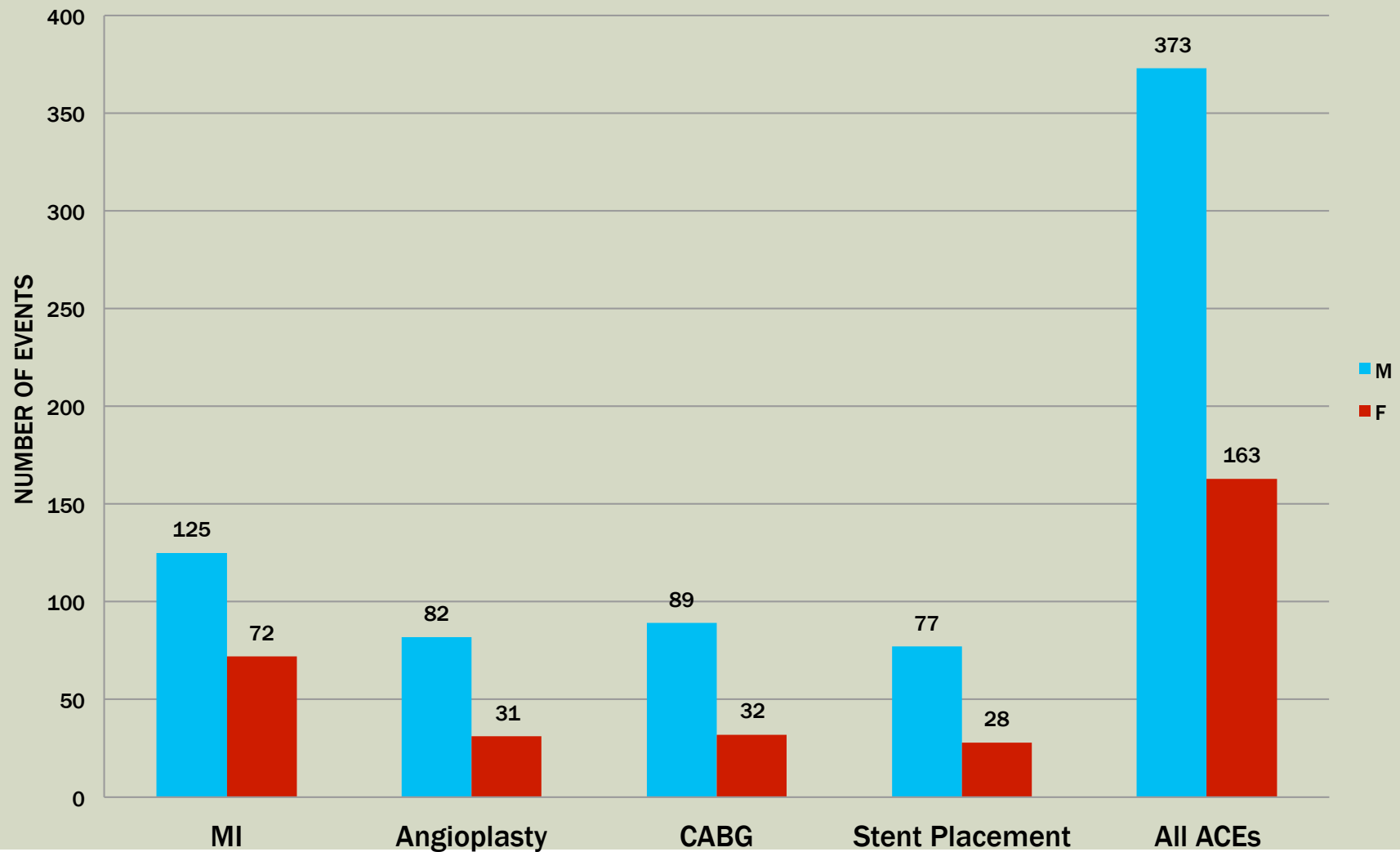
Visit ID	Admit Date	Discharge Date	Source of Admission	Type of Admission	Primary final diagnosis	Secondary diagnosis 1	Secondary diagnosis 2	Discharge Disposition	Condition POA indicator for primary final diagnosis	Condition POA indicator for secondary diagnosis 1	DRG	Emergency room visit (Y/N)	Visit reason	Type of patient visit	Education Level	Race of Patient	Hispanic ethnicity	Zip code of patient	County of patient	State when patient reside
2043	15JUL2011	17JUL2011	Newborn born inside the hospital	Newborn	V30.00			Discharged to home care or self care (routine discharge)			795	N	Newborn	I		White	N	68134	Douglas	NE
2043	24AUG2011	29AUG2011	Clinic	Elective	715.35	285.1	401.9	Discharged/transferred to home under care of organized home health service organization in anticipation of covered skilled care	Y	N	470	N	RIGHT HIP DEGENERATIVE JOINT DISEASE	I		White	N	68107	Douglas	NE
2043	15JUL2011	18JUL2011	Newborn born inside the hospital	Newborn	V30.01	775.6	774.6	Discharged to home care or self care (routine discharge)		N	793	N	Newborn	I		UTD	N	68137	Douglas	NE
2043	12AUG2011	18AUG2011	Clinic	Elective	278.01	571.8	V85.43	Discharged/transferred to home under care of organized home health service organization in anticipation of covered skilled care	Y	Y	621	N	MORBID OBESITY	I		White	N	68154	Douglas	NE

Sex	Type of primary payer	Age	Primary procedure	Secondary procedure 1	Total charges	Medical service	Employer of patient	Occupation of patient	Employment status of patient	Employment work hazards of patient	Activity level at employment	Operate Hazardous Equipment
M	1	92				Emerg to Inpt Acute Care	Retired		Retired			
F	.	25	75.69	73.01		Inpatient Acute Care	Not Employed		Not employed			
F	1	93	44.43	99.04		Inpatient Acute Care	Retired		Retired			
F	1	67	45.72	65.61		Inpatient Acute Care			Full Time Employed			
M	1	59	81.54	04.81		Inpatient Acute Care	Unknown		Not employed			
F	.	24	33.24			Inpatient Acute Care	Childrens Hospital		Full Time Employed			
F	1	70	50.22	40.29		Inpatient Acute Care	Not Employed		Not employed			
M	4	58				Emerg to Inpt Acute Care	Unknown		Not employed			
F	1	65	00.72	99.04		Inpatient Acute Care	H and R Block		Not employed			
M	.	49	45.62	99.15		Emerg to Inpt Acute Care	Game Plan Technologies		Full Time Employed			
M	.	62	37.22	88.53		Inpatient Acute Care	Goodkind and Goodkind		Full Time Employed			
F	1	65				Emerg to Inpt Acute Care	Unknown		Unknown			
F	.	33	73.6	73.09		Inpatient Acute Care	University of NebraskaMed Ce		Full Time Employed			
M	.	80	92.29			Emerg to Inpt Acute Care	Retired		Retired			
F	.	30	75.69	73.09		Inpatient Acute Care	Metropolitan Utilities Distric		Full Time Employed			
M	1	79				Emerg to Inpt Acute Care	Retired		Retired			
F	2	29	73.59	73.09		Inpatient Acute Care	Not Applicable		Not employed			
F	1	91	86.09	97.49		Emerg to Inpt Acute Care	Retired		Retired			

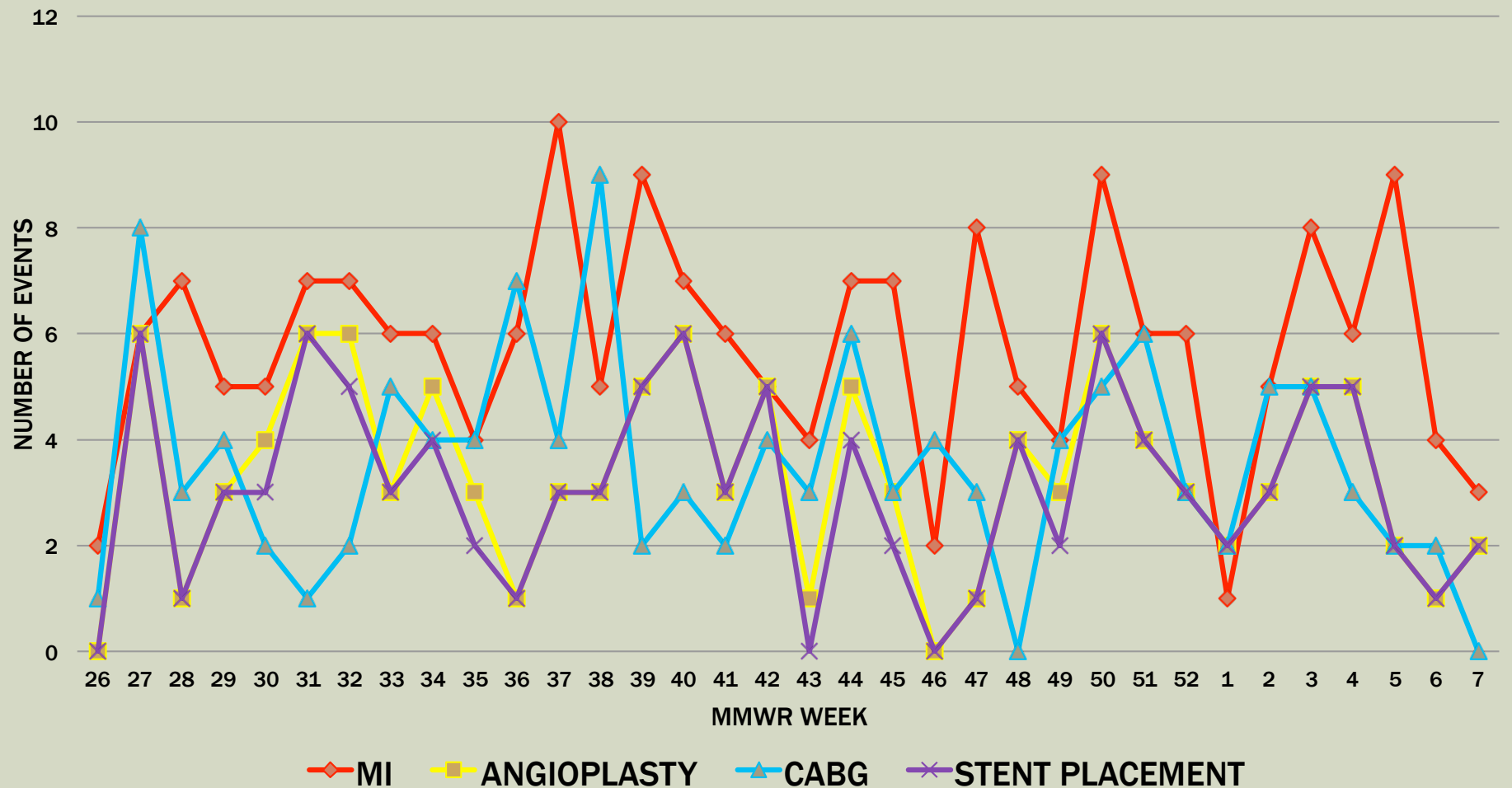
CURRENT DATA USE

- **Acute Cardiovascular Events (ACEs)**
 - Acute myocardial infarction (MI)
 - Coronary artery bypass graft (CABG)
 - Percutaneous coronary intervention
 - Angioplasty
 - Stent Placement

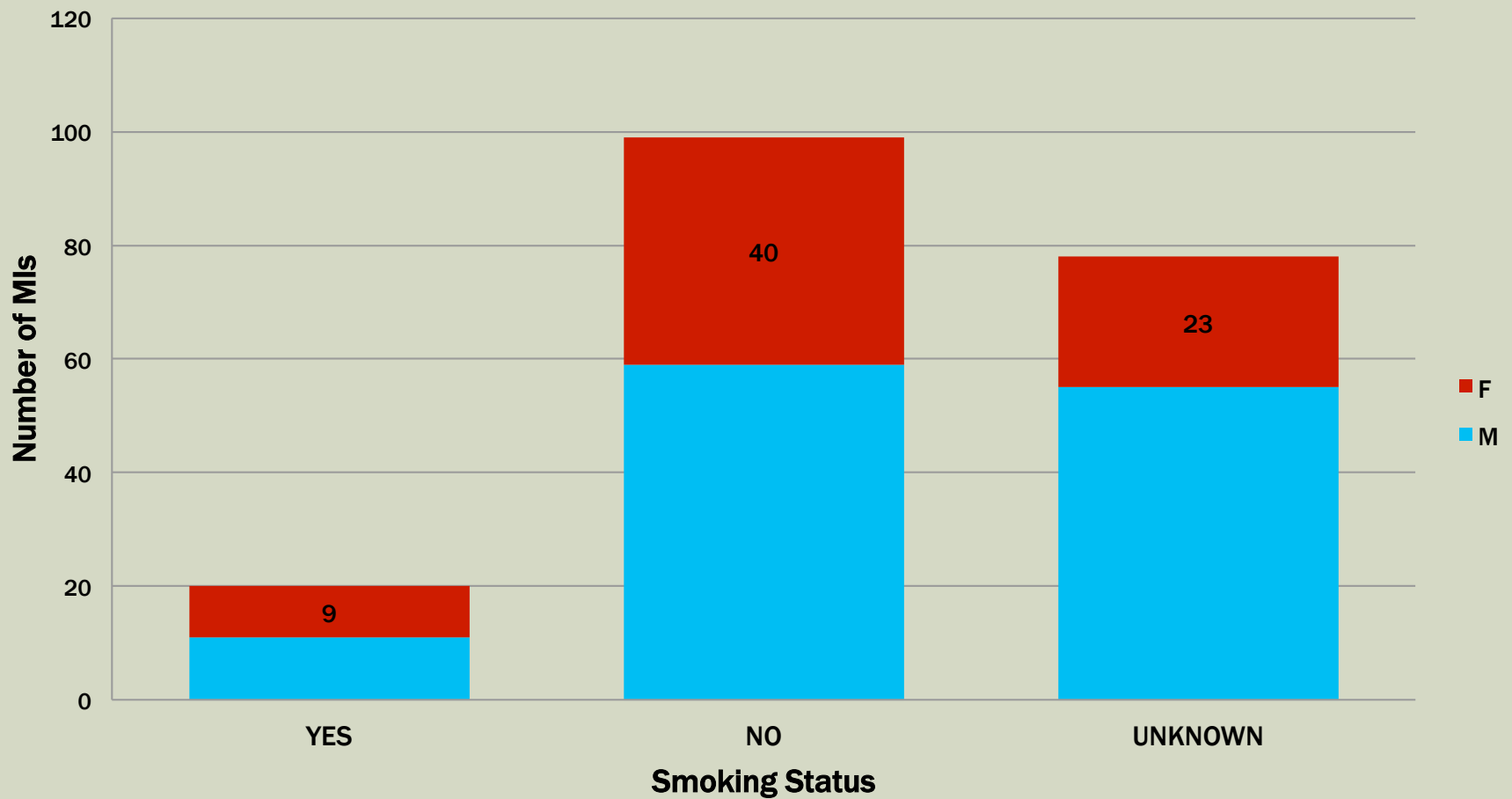
ACES IN NEBRASKA JULY 1, 2011 TO FEBRUARY 22, 2012



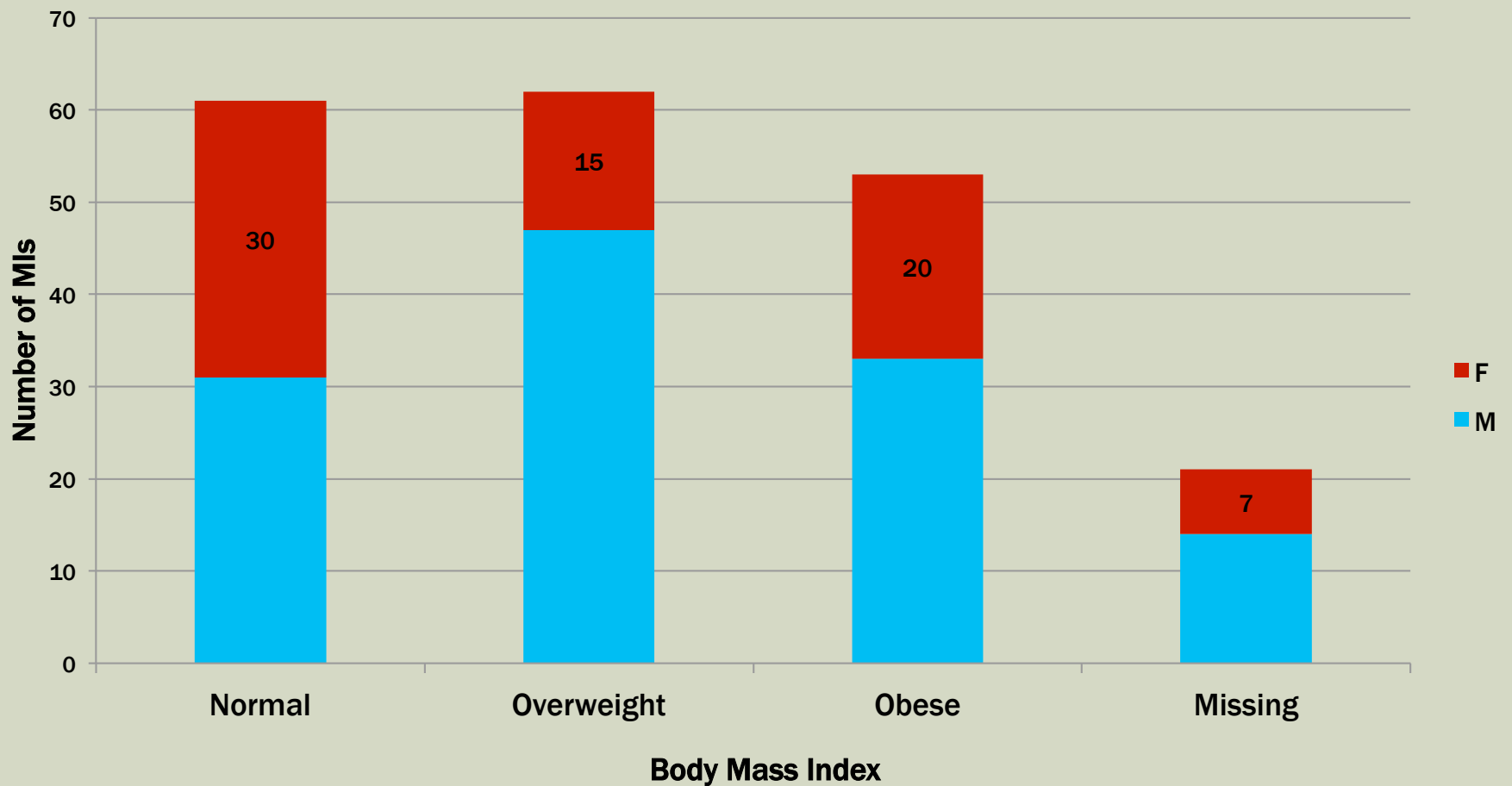
ACES IN NEBRASKA BY MMWR WEEK, JULY 1, 2011 TO FEBRUARY 22, 2012



MI BY SMOKING STATUS AND SEX



MI BY BODY MASS INDEX AND SEX



LEGAL SETTING SURROUNDING PUBLIC HEALTH SYNDROMIC SURVEILLANCE

■ LB 591

- Provides explicit coverage to hospitals for sharing EHR data with public health and to make it clear that our agency has a statutory responsibility to do so and that participating hospitals can share data without violating HIPAA or patient privacy
- Non-infectious causes of illness was specifically mentioned in this bill to encourage and protect hospitals participating in this project
- Rules and Regulations for the bill have recently been completed
 - “Injury” was specifically mentioned

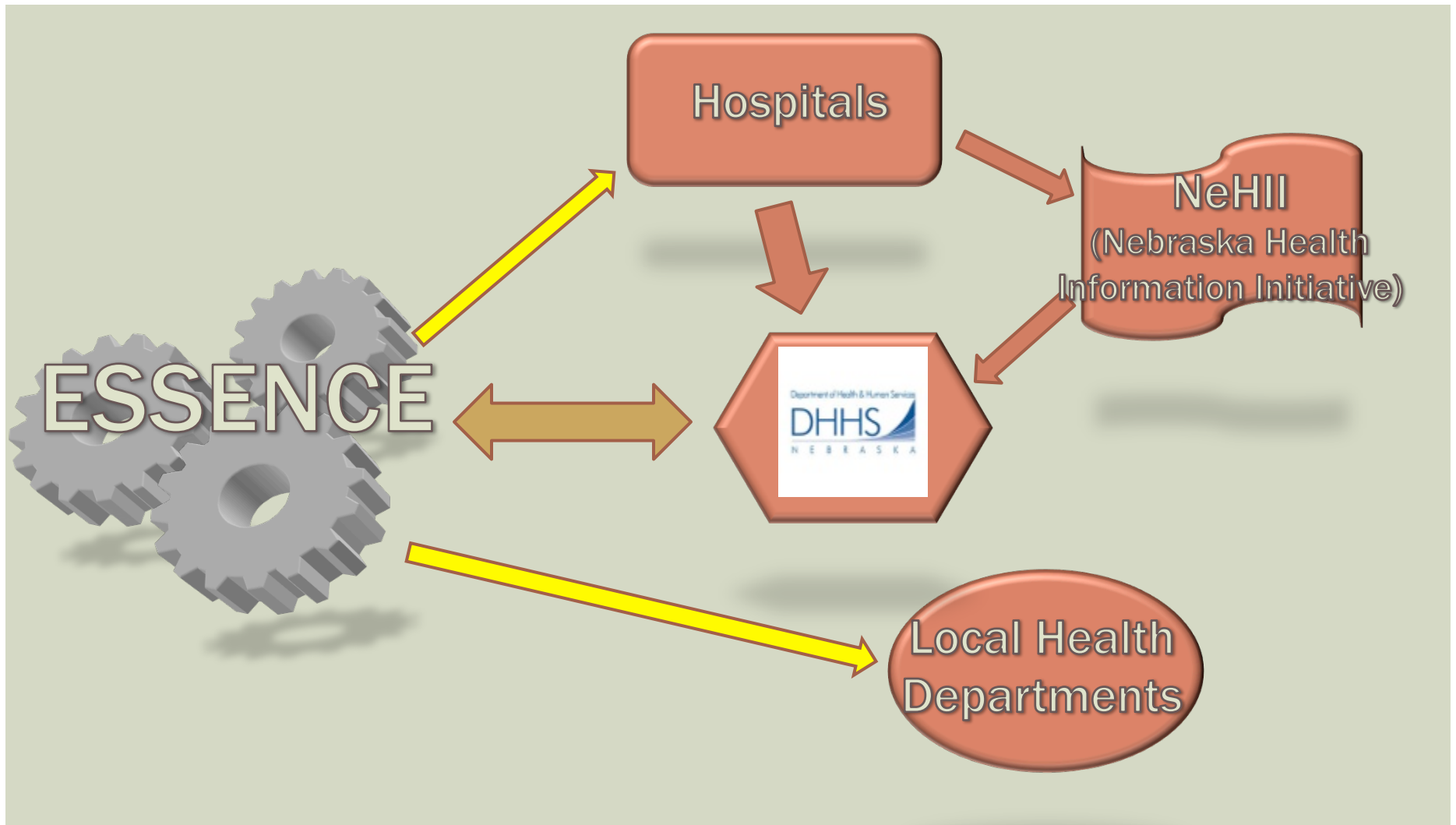
BEST PRACTICES IMPLEMENTATION

- Measure CVD and other chronic disease outcomes, severity, and economic impact
- Facilitate expansion of EHR usage for public health goals
- Identify policies in cardiovascular health promotion and CVD prevention
 - Implement public health programs and policies
 - Develop best practices

ESSENCE

- **Electronic Surveillance System for Early Notification of Community-based Epidemics**
- **Syndromic surveillance system**
 - Captures and analyzes indicators to detect syndromes
 - Creates charts, tables, graphs, and time series reports
 - Combines temporal and spatial anomaly detection
- **Web-based information distribution back to providers and health departments**

PROPOSED DATA EXCHANGE



COLLABORATORS FOR EVALUATION ASSISTANCE

- **December 2011**, EIS Officer Dr. Kristin Yeoman conducted an evaluation of CVD case reporting
 - CVD registry at Hospital A
 - Chart review
- **March 2012**, evaluation of risk factors
 - 50 records for each ACE
 - Risk factor presence and accuracy
 - Which are self reported

CHALLENGES

- **Competing interests**
 - Meaningful use requirements
- **Privacy concerns with data sharing**
- **Time and resources**

FUTURE STEPS

- Recruit additional hospitals for inpatient data
- Implement ESSENCE
- Work with Nebraska Health Information Initiative to transfer EHR data to Division of Public Health
- Analyze current CVD data
 - Evaluate current CVD health promotion programs
 - Evaluate inpatient surveillance system
- Conduct evaluation of inpatient surveillance data
- Identify and implement one or more best practices

CONTACT INFORMATION

Eryn Murphy
Syndromic Surveillance Coordinator
Eryn.Murphy@Nebraska.gov