

Injury Surveillance Systems: The Importance of Data Integration

Emergency Medical Services Component



Maryland Traffic Records Forum

June 16, 2015, 1:00 – 2:00

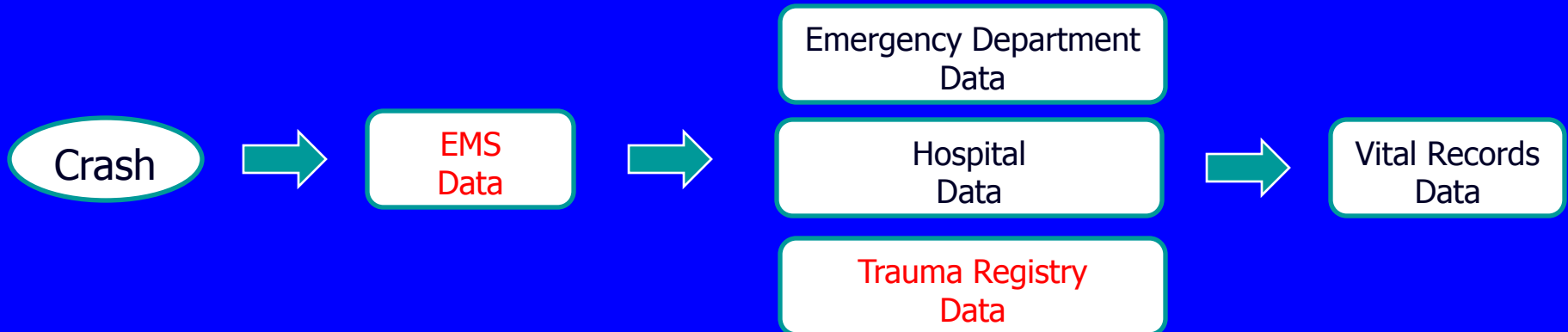
Concurrent Session 2C

Room A303 - Maritime Institute

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Injury Surveillance System (ISS)

- Provides Supplementary Crash Information through:
 - frequency, severity, nature of injuries
 - enables **integration** of data
 - permits accessibility of data



Maryland ISS Data Sets

- **EMS** - electronic Maryland Emergency medical services Data System (**eMEDS**)
- **ED and Hospital** - Health Services Cost Review Commission (**HSCRC**)
- **Trauma Registry** - Maryland Trauma Registry (**MTR**)
- **Vital Records** - Death Certificate and Multiple Cause of Death files

EMS First

Data Source

MAIS Runsheets

1984-2004

MARYLAND AMBULANCE INFORMATION SYSTEM (Rev. 07/03)

Station Run Number: _____ Jurisd Incident Number: _____ Supl: _____ Box Number: _____ District: _____ Receiving Facility: _____
 Other Units on Scene: _____

Response Location: _____ Zip Code: _____ Inc Type: _____ Occup: _____ Action: _____ Disp: _____

Patient Name: _____ Provider 1 ID Number: _____ Provider 1 Name: _____
 Parent/Guardian: _____ Provider 2 ID Number: _____ Provider 2 Name: _____
 Patient Address: _____ Provider 3 ID Number: _____ Provider 3 Name: _____
 Home Phone: _____

DATE Month Day YR
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 10509687

DOCUMENTATION OF TIMES					RESPONSE IDENTIFICATION				NO CARE RENDERED		PT. AGE	
911 Call	Amb Call	Dpt Sta	Arv Loc	Dpt Loc	Arv Hosp	Rtn Serv	Cty	Unit	High Staff			
0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	<input type="checkbox"/> IVT	<input type="checkbox"/> PDOA	<input type="checkbox"/> M	
1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	<input type="checkbox"/> Cancel	<input type="checkbox"/> False	<input type="checkbox"/> D	
2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	<input type="checkbox"/> CRT	<input type="checkbox"/> No Pt	<input type="checkbox"/> 1	
3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	<input type="checkbox"/> CRT-I	<input type="checkbox"/> Refuse	<input type="checkbox"/> 2	
4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	<input type="checkbox"/> EMT-P	<input type="checkbox"/> Unit 2	<input type="checkbox"/> 3	
5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	<input type="checkbox"/> Other	DISPATCH PRIORITY		
6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	<input type="checkbox"/> 1st Due	<input type="checkbox"/> One	<input type="checkbox"/> 4	
7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	<input type="checkbox"/> Yes	<input type="checkbox"/> Two	<input type="checkbox"/> 5	
8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	<input type="checkbox"/> No	<input type="checkbox"/> Three	<input type="checkbox"/> 6	
9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9		<input type="checkbox"/> Four	<input type="checkbox"/> 7	
										<input type="checkbox"/> N/A	<input type="checkbox"/> 8	
											<input type="checkbox"/> 9	

RACE Hispanic or Latino? Mark all that apply American Indian or Alaska Native Asian Black or African American White
 Native Hawaiian or Other Pacific Islander

FIRST VITALS			SIGNS/SYMPOMS			INJURY TYPE			CONDITIONS			ECG			
SYS 0 0 0	DIA 0 0 0	RES 0 0 0	<input type="checkbox"/> Agitated	<input type="checkbox"/> Airway Obs	<input type="checkbox"/> Cyanotic	<input type="checkbox"/> Dehydrated	<input type="checkbox"/> Diaphoretic	<input type="checkbox"/> Hemorrhage	<input type="checkbox"/> Hypothermic	<input type="checkbox"/> Laceration	<input type="checkbox"/> Nausea	<input type="checkbox"/> Pain	<input type="checkbox"/> Head	<input type="checkbox"/> Neck	<input type="checkbox"/> Back
10 1 10 1	10 1 10 1	10 1 10 1	<input type="checkbox"/> Atv Crash	<input type="checkbox"/> Beating	<input type="checkbox"/> Bike	<input type="checkbox"/> Burn	<input type="checkbox"/> Drowning	<input type="checkbox"/> Fall	<input type="checkbox"/> Farm	<input type="checkbox"/> GSW	<input type="checkbox"/> Industrial	<input type="checkbox"/> Lawn Mwr	<input type="checkbox"/> Motorcycle	<input type="checkbox"/> M V Crash	<input type="checkbox"/> Pedestrian
20 2 20 2	20 2 20 2	20 2 20 2	<input type="checkbox"/> Allergic Rxn	<input type="checkbox"/> Asthma	<input type="checkbox"/> Behavioral	<input type="checkbox"/> Cardiac Arst	<input type="checkbox"/> CHF	<input type="checkbox"/> COPD	<input type="checkbox"/> CVA	<input type="checkbox"/> Diabetes	<input type="checkbox"/> DNR	<input type="checkbox"/> Environmental	<input type="checkbox"/> GI Disorder	<input type="checkbox"/> Med. Illness	<input type="checkbox"/> Mi/Cardiac
30 3 30 3	30 3 30 3	30 3 30 3	<input type="checkbox"/> Nor Sinus	<input type="checkbox"/> Sinus Tach	<input type="checkbox"/> A-Fib	<input type="checkbox"/> SVT	<input type="checkbox"/> Sinus Brad	<input type="checkbox"/> Block degree	<input type="checkbox"/> Asystole	<input type="checkbox"/> PEA	<input type="checkbox"/> PVC'S	<input type="checkbox"/> Vent Fib	<input type="checkbox"/> Vent Tach	<input type="checkbox"/> Other	<input type="checkbox"/> 3 Lead
40 4 40 4	40 4 40 4	40 4 40 4	<input type="checkbox"/> Furosemide	<input type="checkbox"/> Glucagon	<input type="checkbox"/> Glucose Paste	<input type="checkbox"/> Haloperidol	<input type="checkbox"/> Ipecac	<input type="checkbox"/> Ipratropium	<input type="checkbox"/> Lidocaine	<input type="checkbox"/> Lidocaine Gel	<input type="checkbox"/> MARK I	<input type="checkbox"/> Midazolam	<input type="checkbox"/> Morphine	<input type="checkbox"/> Na Bicarb	<input type="checkbox"/> Naloxone
50 5 50 5	50 5 50 5	50 5 50 5	<input type="checkbox"/> Adenosine	<input type="checkbox"/> Albuterol	<input type="checkbox"/> Aspirin	<input type="checkbox"/> Assist Meds	<input type="checkbox"/> Atropine	<input type="checkbox"/> Benadryl	<input type="checkbox"/> Benzocaine	<input type="checkbox"/> Calcium	<input type="checkbox"/> Charcoal	<input type="checkbox"/> Dextrose	<input type="checkbox"/> Diazepam	<input type="checkbox"/> Diltiazem	<input type="checkbox"/> Dopamine
60 6 60 6	60 6 60 6	60 6 60 6	<input type="checkbox"/> Epi 1:10 K	<input type="checkbox"/> Epi 1:1 K	<input type="checkbox"/> Epi Nebulizer	<input type="checkbox"/> EpiPen	<input type="checkbox"/> Factor VIII or IX	<input type="checkbox"/> Furosemide	<input type="checkbox"/> Glucagon	<input type="checkbox"/> Glucose Paste	<input type="checkbox"/> Haloperidol	<input type="checkbox"/> Ipecac	<input type="checkbox"/> Ipratropium	<input type="checkbox"/> Lidocaine	<input type="checkbox"/> Lidocaine Gel
70 7 70 7	70 7 70 7	70 7 70 7	<input type="checkbox"/> Glucocorticoid	<input type="checkbox"/> GCS	<input type="checkbox"/> LOC PTA	<input type="checkbox"/> E M V	<input type="checkbox"/> LUNGS	<input type="checkbox"/> Normal	<input type="checkbox"/> Wheeze	<input type="checkbox"/> Rales	<input type="checkbox"/> Rhonchi	<input type="checkbox"/> Safety Seat	<input type="checkbox"/> Airbag	<input type="checkbox"/> Helmet	<input type="checkbox"/> Belt/Harn
80 8 80 8	80 8 80 8	80 8 80 8	<input type="checkbox"/> Glucocorticoid	<input type="checkbox"/> GCS	<input type="checkbox"/> LOC PTA	<input type="checkbox"/> E M V	<input type="checkbox"/> LUNGS	<input type="checkbox"/> Normal	<input type="checkbox"/> Wheeze	<input type="checkbox"/> Rales	<input type="checkbox"/> Rhonchi	<input type="checkbox"/> Safety Seat	<input type="checkbox"/> Airbag	<input type="checkbox"/> Helmet	<input type="checkbox"/> Belt/Harn
90 9 90 9	90 9 90 9	90 9 90 9	<input type="checkbox"/> Glucocorticoid	<input type="checkbox"/> GCS	<input type="checkbox"/> LOC PTA	<input type="checkbox"/> E M V	<input type="checkbox"/> LUNGS	<input type="checkbox"/> Normal	<input type="checkbox"/> Wheeze	<input type="checkbox"/> Rales	<input type="checkbox"/> Rhonchi	<input type="checkbox"/> Safety Seat	<input type="checkbox"/> Airbag	<input type="checkbox"/> Helmet	<input type="checkbox"/> Belt/Harn

SAFETY EQUIPMENT USED Airbag Helmet Belt/Harn None

TRAUMA ID			AIRWAY/VENTILATION			PROCEDURES			AED START BY						
<input type="checkbox"/> Shock	<input type="checkbox"/> Multi Sys	<input type="checkbox"/> Severe S Sys	<input type="checkbox"/> CNS Injury	<input type="checkbox"/> Mechanism	<input type="checkbox"/> Other Fatal	<input type="checkbox"/> Suction	<input type="checkbox"/> Orophar	<input type="checkbox"/> Nasophar	<input type="checkbox"/> Face Mask	<input type="checkbox"/> N C	<input type="checkbox"/> NR Mask	<input type="checkbox"/> Pulse Ox	<input type="checkbox"/> BVM	<input type="checkbox"/> Mech Vent	<input type="checkbox"/> CPAP
<input type="checkbox"/> Pen Wnd	<input type="checkbox"/> Age		<input type="checkbox"/> Deformity	<input type="checkbox"/> Entrap	<input type="checkbox"/> Fall > 3 X Height	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection
<input type="checkbox"/> Deformity	<input type="checkbox"/> Entrap	<input type="checkbox"/> Fall > 3 X Height	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection	<input type="checkbox"/> Ejection

MECHANISMS Deformity Entrap Fall > 3 X Height Ejection

TRANSPORT BY No Transport This Unit Other Unit Other Air

REASON HOSPITAL CHOSEN Closest Spec Ref Rerte-Alert Rerte-Consult Stroke Care

SPECIAL PURPOSE Multi Pats Seen Multi Pats Trans Hazmat Call Addit Narr

PROV. EXP 05 08 00

On-line Physician: _____ Hospital Signature: _____

Provider Signature: _____ EMS Reviewer: _____

MILEAGE: _____

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EMS Current



Comprehensive Report

*eMEDS Testing/Demo Site
653 West Pratt Street
Baltimore, MD 21201

Incident Date: 03/11/2014 Call #: TEST140311DEMO01034 Patient Care #: 09914001236

Patient Information		
Name: Doe, John	Age: 15 Years	D.O.B.: 07/29/1998 (mm/dd/yyyy)
Address: 161 Arthur Ave Port Deposit, Cecil, MD 21904	Gender: Male Weight: KG / LB	SSN: Race:
	Phone:	Ethnicity:

Call Type and Location	Call Disposition	Response Times and Mileage	
Call Type: Resp. Mode: Lights and Sirens Urgency: Response: 911 Response Location: Home/Residence Address: 161 Arthur Ave Port Deposit, Cecil, MD 21904	Disposition: Treated, Transported by This Unit Resp. Mode: No Lights or Sirens Destination: Harford Memorial Hospital - 220, 501 S. Union Ave., Havre De Grace, MD 21078 Dest. Determ.: Closest Facility Diverted From: Response Delay: None Scene Delay: None Transport Delay: None TurnAround Delay: None Patient Barriers: None	1st Resp. Arr.: PSAP: 01:14 Disp. Notified: Unit Disp.: 01:14 Enroute: 01:20 At Scene: 01:27 At Patient: 01:27 Depart: 01:45 Arrive Dest: 02:06 PT Released: 02:06 In Service: 02:23 In Quarters: Cancelled:	Incident #: 14003342 Start Miles: Scene Miles: To Scene: Dest. Miles: To Dest: End Miles: To End: Call Sign: Not Reporting Veh. #: Ambulance 51 Veh. Type: Ambulance Primary Role: Transport - BLS Care Provided

Unit Personnel		
Crew Member	Crew Member Level	Crew Member Role
Dillard, Justin	Paramedic	Primary Patient Caregiver
CRT Jones, John	CRT (Cardiac Rescue Technician)	

Call Information	
Destination Name: Harford Memorial Hospital - 220 Destination Type: Hospital (or Free-standing ED) Destination Determination: Closest Facility Vehicle Type: Ambulance	Response Request: 911 Response (Scene) Response Disposition: Treated, Transported by This Unit Lights Sirens To Scene: Lights and Sirens Lights Sirens From Scene: No Lights or Sirens

Factors Affecting Response
None

Patient Condition
Provider Impression: Respiratory Distress Chief Complaint: Tightness in chest and throat X Minutes Onset Date/Time: Alcohol/Drug Use: Injury Intent: Cause of Injury: Dispatch Reason:

Primary Symptom
Breathing Problem

Data Source

eMEDS Runsheets

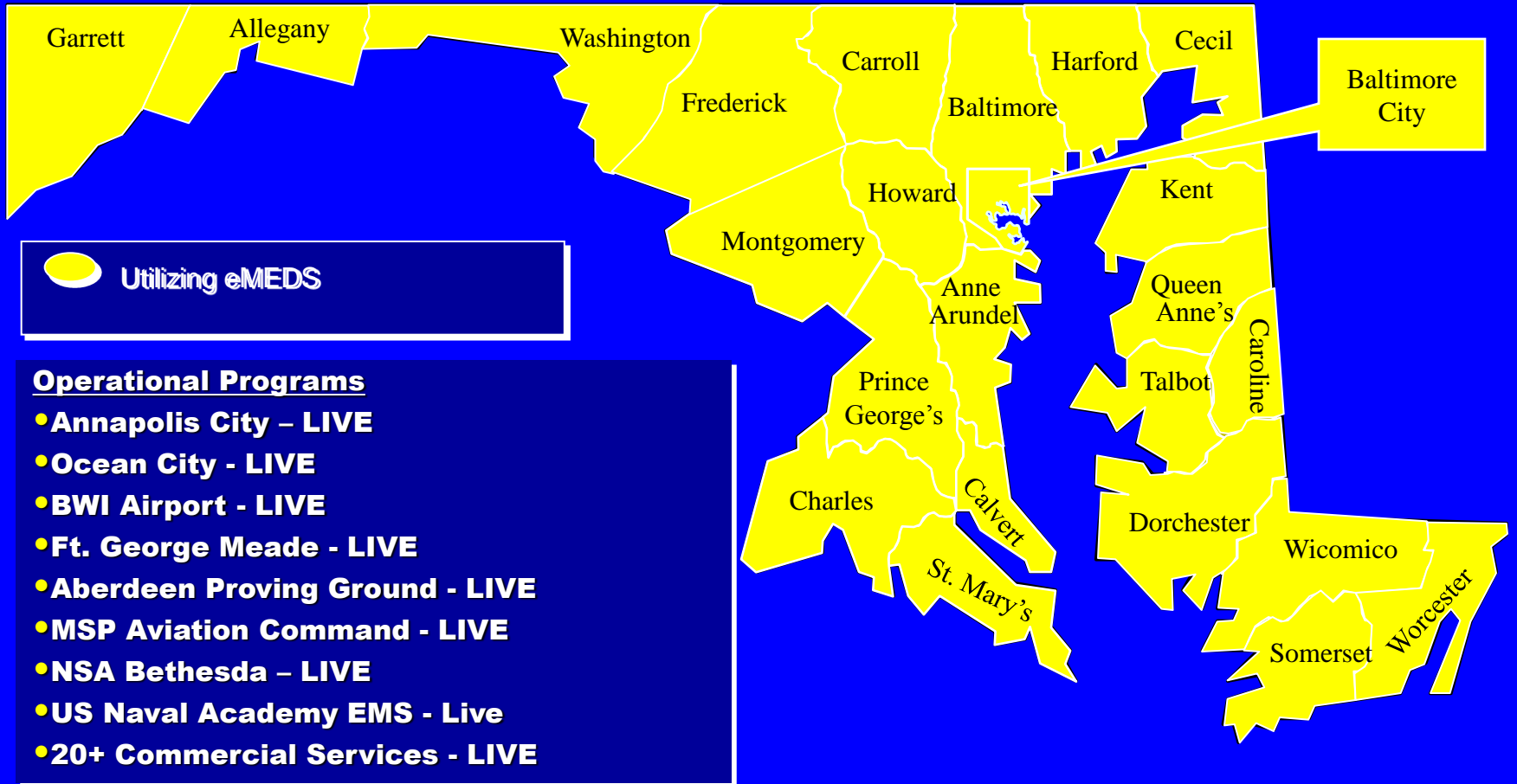
2012-Present

eMEDS Characteristics

- Procured Application thru ImageTrend Inc. (2012)
 - Supported through MHSO/TRCC for RFP
- Meets National EMS Information System (NEMESIS) version 2.2.1 standards
- EMS Unit Based per 911 Call Response (EMS Demand)
- Includes per Patient Encounter Documentation (EMS Response & Outcome)

Existing eMEDS Implementation

Phased-in starting March, 2012



eMEDS Patient Care Record

IMAGETREND
EMS SERVICE BRIDGE

*eMEDS Testing/Demo Site

Dashboard Incidents Modules Staff Setup

Search Actions Reports Options History About Mark Run As Completed eMEDS

Save Status: In Progress Locked: Unlocked Patient: _____

Dispatch Info	Call Conditions	Patient Info	History	Assessment	Vitals/Treatment
Injury/Trauma	Cardiac Arrest	STEMI	Transport	Narrative	Billing
				AMA	Signatures

Cardiac/Trauma

Possible Injury? Yes

Cardiac Arrest?

STEMI Triage Criteria

Unit Delays During Call (Check all That Apply)

1st Responding Agencies and Times

Prior Aid to Patient

Received Care From

Response Times
Validation: 70
Active Protocols

eMEDS Patient Care Record

IMAGETREND
EMS SERVICE BRIDGE

← *eMEDS Testing/Demo Site

Dashboard Incidents Modules Staff Setup

Search Actions Reports Options History About Mark Run As Completed eMEDS

Save Status: In Progress Locked: Unlocked Patient:

Dispatch Info Call Conditions Patient Info History Assessment Vitals/Treatment
Injury/Trauma Cardiac Arrest STEMI Transport Narrative Billing AMA Signatures

Injury

Type of Injury (Mechanism of Injury)

Cause of Injury

Injury Intent

Patient Safety Equipment Used

Trauma

Trauma Decision Tree Category

Trauma Referral Center Notified

Response Times
Validation: 70
Active Protocols

eMEDS Injury Types

Cause of Injury

Aircraft Related
Assault
Bicycle
Bites
Chemical Poisoning
Child Battering
Drowning
Drug Poisoning
Electrocution / Electric Shock (Non-Lightning)
Excessive Cold
Excessive Heat
Explosion
Falls
Fire and Flames
Firearm Assault
Firearm Injury (Unintentional)
Firearm Self Inflicted
Lightning

Machinery
Mechanical Suffocation
Motor Vehicle Non-Traffic
Motor Vehicle - Traffic
Motorcycle (E81X.1)
Non-Motorized Vehicle (E848.0)
Not Applicable
Other Injury
Pedestrian - Traffic
Radiation Exposure
Sexual Assault
Smoke Inhalation
Stabbing/Cutting Unintentional (E986.0)
Stabbing/Cutting Intentional
Struck by Blunt/Thrown Object (E968.2)
Venomous Stings (Plants, Animals)
Water Transport Accident

eMEDS Safety Equipment Used

Patient Safety Equipment Used

Protective Safety Belt
Child Restraint
Eye Protection
Helmet Worn
Lap Belt
No Safety Equipment/Devices Used
Other
Personal Floatation Device
Protective Clothing Gear
Protective Non-Clothing Gear
Shoulder Belt
Not Applicable

Integration vs. Interface Linkage

- **Integration:** *The discrete linking of databases for analytical purposes.*
- **Interface:** *A seamless, on-demand connectivity and high degree of interoperability between systems that supports critical business processes and enhance data quality.*

The Benefits of Integration

- NHTSA “6 Pack” performance measures
 - Timeliness (How soon are records available)
 - Accuracy (Percentage of records with no errors)
 - Completeness (Percentage of records with missing critical elements)
 - Uniformity (NEMESIS compliant)
 - **Integration** (Percentage of records linked to other datasets)
 - Accessibility (Demonstration of shared access)
- EMS – Knowledge of injury severity and triage thought process at the scene.
- MTR – Knowledge of conditions (BAC) and outcomes (z/w scores)

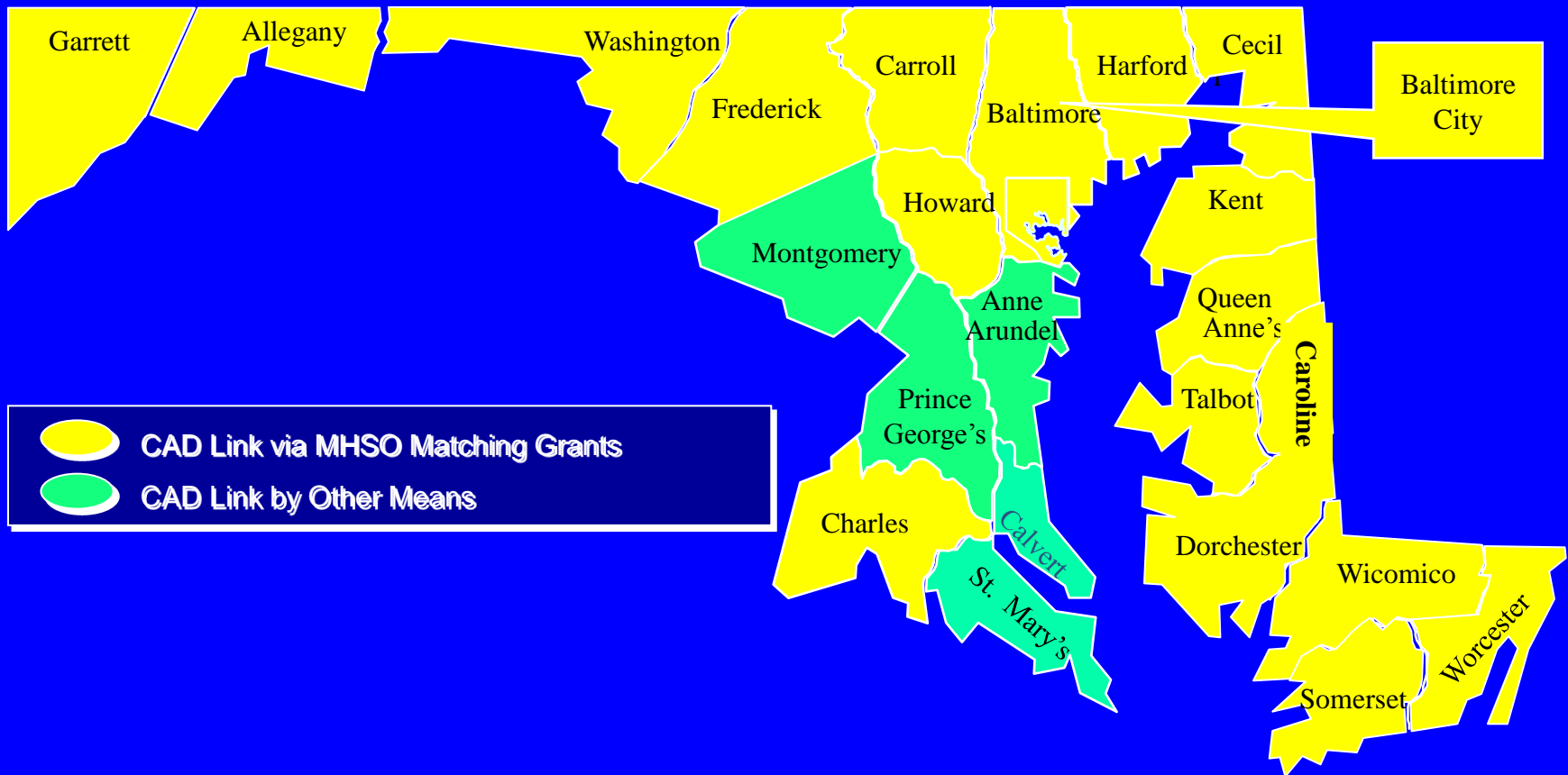
eMEDS Integration Capabilities

- **Crash Outcomes Data Evaluation System (CODES)**
- **In-Patient/Out-Patient Hospital Discharges (HSCRC)**
 - Linked spinal cord injuries MTR – unlinked case pointed out higher rate of false positives than first thought.
- **Fatal Accident Reporting System (FARS)**
 - Meet reporting requirements established by NHTSA

eMEDS Interface Capabilities

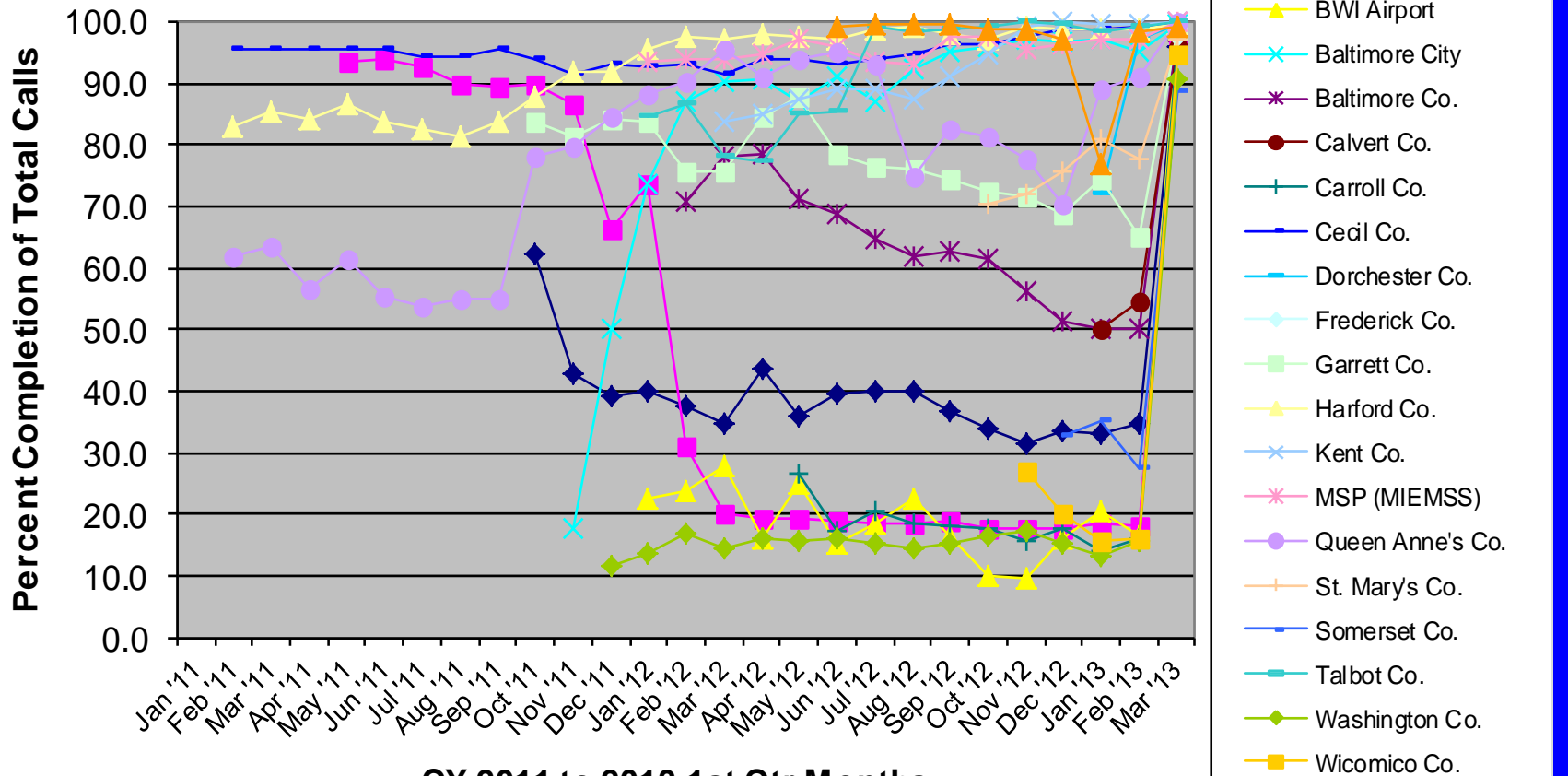
- Computer Aided Dispatch (CAD)
- Hospital Dashboard (ePCR exchange)
 - Initial transport record link (JHH Pediatrics)
 - Non-Transport record(s) link (STEMI)
- MTR – eMEDS record retrieval
- Advance Automatic Crash Notification (AACN) - Pilot
- Cardiac Arrest Registry to Enhance Survival (CARES) - Pilot
- Health Information Exchange – Grant Application

eMEDS - CAD Interface Linkage



911 Call Time Performance Measurement

eMEDS EMSOPS 911 Time Completion Percent



CY 2011 to 2012 1st Qtr Months

eMEDS and Maryland HIE

- Push eMEDS records through CRISP
- Meet the hospital standard for data transfer (HL7)
- Utilize master patient index algorithm to link
- Hospital Benefit – Potential
 - Move data directly into hospital registry systems
 - Have all EMS encounters as part of the patient EMR
- EMS Benefit – Potential
 - Knowledge/tracking of expose incidents
 - Linkage to hospital medical records through primary key
 - Answer: Does what we do make a difference?