Presenters & Contact Info

(will show again at end of presentation)

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Agenda

- **Quick Introduction**

- **Overview of EMS Data Sources**

- **Hospital Diversion Research**

- **Research from structured EMS Call-taking**

- **Q&A and collaboration discussion**

EMS Data Sources

and Variation

Todd Stout
President, FirstWatch
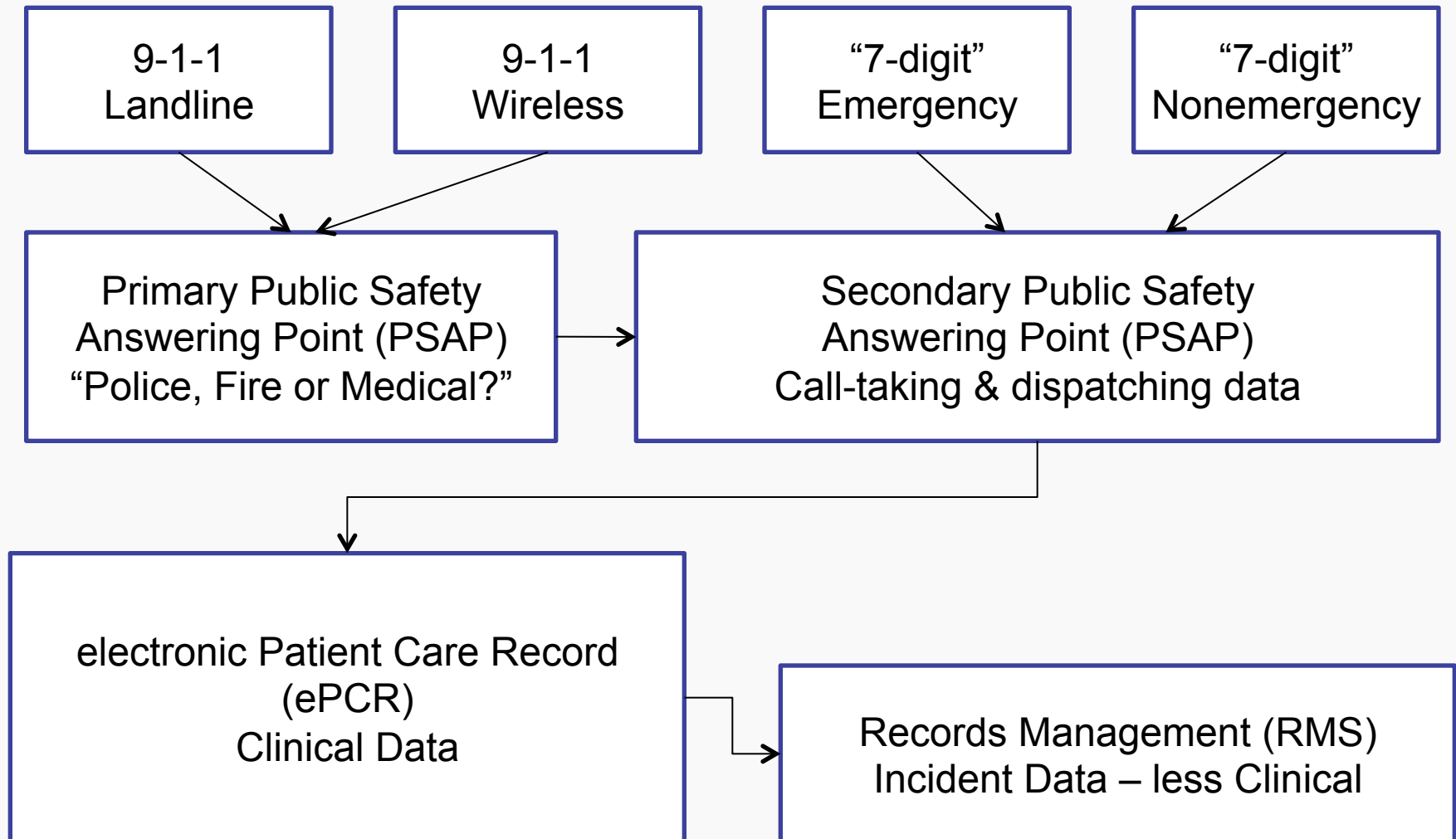
Todd Stout background

- **Former paramedic, EMS manager & consultant**
  - Ran thousands of emergency & nonemergency EMS ground and air calls as a paramedic
- **Developed FirstWatch system in 1999**
  - Monitor approximately 35,000 public safety calls per day in near real time
  - Get data from 40+ types of EMS data systems
  - Across 90+ communities that serve over 74 million people

EMS data sources

- **Telephone**
  - 9-1-1, 7-digit (emergency & nonemergency)
- **Call-taking & dispatch**
  - ProQA or other call-taking processes
  - Dispatch & resource management
- **ePCR and/or RMS**
  - Electronic Patient Care Records
  - Record Management System

EMS Data Flow

9-1-1 Landline	9-1-1 Wireless	"7-digit" Emergency	"7-digit" Nonemergency

Primary Public Safety Answering Point (PSAP) "Police, Fire or Medical?"

Secondary Public Safety Answering Point (PSAP) Call-taking & dispatching data

electronic Patient Care Record (ePCR) Clinical Data

Records Management (RMS) Incident Data – less Clinical

Telephone / Calls for Help

- **9-1-1 telephone calls**
  - Landline
  - Cellular
  - VOIP (Vonage, etc.)
  - SMS, Text, Video, etc.
- **Primary PSAP vs Secondary PSAP data**
  - "Police, Fire or Medical?"
- **"7-digit" access**
  - Emergency calls
  - Nonemergency calls

Telephone / Calls for Help

- **Limited data set, but increasingly available**
- **Location can be misleading, if available**
- **Normal to have multiple calls for single incident**
- **Some research done**

   (UCSD San Diego Super Computer Center)

Telephone data example

- **Landline**

- **Wireless**

Positron Display [Pinned]

```
(818) 886-1384       10:50      07/27
     8726            AMESTOY AV

NOR                  CA 117 RESD
DUBOW BERNICE
                     (818) 886-1384

PB911

LAPD - DEVONSHIRE
L.A. CITY FIRE DEPT

LAT              LON
METERS                 PERCENT
```


Positron Display [Pinned]

```
(619) 997-4867       13:29      07/27
     5113            SUNSET BL

LA                   CW 626 WPH2
VERIZON WIRELESS 800 451 5242 4
                     (213) 511-3128
LA TB 0593 J4            N
VZW

LAPD HOLLYWOOD DIV
QUERY CALLER
FOR LOCATION
LAT 34.10191700 LON -118.300459
METERS 16              PERCENT 095
```

Dispatch Center Sources

- **Call-taking data approaches**
  - Unstructured process
  - Structured process, usually locally developed
  - Standardized process
    - International Standard (www.EmergencyDispatch.org)
    - 3,200+ Communications Centers around the world use this international standard system (ProQA)
    - Can be available as soon as call-taking is ended

ProQA data example – p1

Case Info

fwCust_ID	38	Age_Pt	102y/o
Operator_Number	GG	Sex_Pt	Male
IncidentNum	0010010625	Conscious	Yes
Internal_Inc_Number	1100010629	Breathing	Yes
dt_Case_Started	5/26/2010 4:19:05 PM	Case_Status	Initialized
dt_Case_Ended		Orig_Chief_Comp_Code	6
dt_Of_Dispatch	5/26/2010 4:19:42 PM	dt_Key_Qs_Started	5/26/2010 4:19:17 PM
Secs_PAI	0	dt_Key_Qs_Ended	5/26/2010 4:19:55 PM
Problem_Desc		Secs_Case_Entry	12
Location	From CCCFPD	Secs_Key_Qs	38
Phone_Num_Of_Caller	From CCCFPD	Secs_PDIs	1
Disp_Chief_Comp_Code	6	Secs_ABCs	0
Disp_Level_Num	Delta	dt_1st_PDIs_Entered	5/26/2010 4:19:55 PM
Disp_Deter_Num	4	dt_1st_ABCs_Entered	
Disp_Deter_Suff		dt_1st_PAIs_Entered	5/26/2010 4:19:56 PM
Rcnfg_Level_Num	Delta	dt_1st_CaseSumm_Ent	5/26/2010 4:19:42 PM
Rcnfg_Deter_Num	4	Shunted_2_Other_Card	False
Rcnfg_Deter_Suff	A	Shunted_2_This_Card	False
Last_Rec_Level_Num	Delta	Rcnfg_On_Other_Card	False
Last_Rec_Deter_Num	4	ChiefCompCodeLstRcnf	6
Last_Rec_Deter_Suff	A	Response_Desc	Delta
First_Rec_Level_Num	Delta	Case_ReEval	False
First_Rec_Deter_Num	4	Lang_Oper_Used	0
First_Rec_Deter_Suff		FWTimeStamp	5/26/2010 4:20:57 PM
Rec_Level_Overrid	False	FWDeterminant1	6D4
Num_Pts	1	FWDeterminant2	06D04

Cancellation/Abort

ProQA data example – p2

Summary/History/Instructions

Oper	Date & Time	Cmnt	Action Description	Key Question	Key Ans	Seq
GG	5/26/2010 4:19:05 PM		:Location			0
GG	5/26/2010 4:19:05 PM		:Location			1
GG	5/26/2010 4:19:05 PM		:Call Back entry			2
GG	5/26/2010 4:19:05 PM		:Call Back entry			3
GG	5/26/2010 4:19:10 PM		:Number of patients entry			4
GG	5/26/2010 4:19:12 PM		:Age entry			5
GG	5/26/2010 4:19:13 PM		:Gender entry			6
GG	5/26/2010 4:19:13 PM		:Consciousness entry			7
GG	5/26/2010 4:19:13 PM		:Breathing status entry			8
GG	5/26/2010 4:19:17 PM		:Chief complaint selected			9
GG	5/26/2010 4:19:17 PM		:ECHO was not selected from Case Entry.	:Case Entry ECHO	:ECHO was not selected from Case Entry.	10
GG	5/26/2010 4:19:17 PM		:The caller is with the patient.	:Are you with the patient now?	:Yes	11
GG	5/26/2010 4:19:17 PM		:Key Question answered			12
GG	5/26/2010 4:19:17 PM		:There is a single patient.	:Number of patients (auto-answered by ProQA)	:Single	13
GG	5/26/2010 4:19:22 PM		:He is completely alert (responding appropriately).	:Is he completely alert (responding appropriately)?	:Yes	14

ProQA data example – p3

GG	5/26/2010 4:19:25 PM	:He does not have any difficulty speaking between breaths.	:Does he have difficulty speaking between breaths?	:No	15
GG	5/26/2010 4:19:25 PM	:Addition Information			16
GG	5/26/2010 4:19:32 PM	:He is changing color.	:Is he changing color?	:Yes	17
GG	5/26/2010 4:19:34 PM	:His color change is red.	:Describe the color change.	:Red	18
GG	5/26/2010 4:19:34 PM	:Addition Information			19
GG	5/26/2010 4:19:39 PM	:He is not clammy.	:Is he clammy (cold sweats)?	:No	20
GG	5/26/2010 4:19:41 PM	:He is clammy.	:Is he clammy (cold sweats)?	:Yes	21
GG	5/26/2010 4:19:41 PM	:Recommend dispatch			22
GG	5/26/2010 4:19:42 PM	:Dispatched			23
GG	5/26/2010 4:19:42 PM	:Modify a medical response			24
GG	5/26/2010 4:19:42 PM	:Display Case Summary Information			25
GG	5/26/2010 4:19:43 PM	:He has asthma.	:Does he have asthma?	:Yes	26
GG	5/26/2010 4:19:43 PM	:Recommended reconfigure			27
GG	5/26/2010 4:19:44 PM	:Reconfigure dispatch			28
GG	5/26/2010 4:19:44 PM	:Modify a medical response			29
GG	5/26/2010 4:19:44 PM	:Display Case Summary Information			30
GG	5/26/2010 4:19:53 PM	:He has a prescribed inhaler.	:Does he have a prescribed inhaler?	:Yes	31
GG	5/26/2010 4:19:54 PM	:He has used a prescribed inhaler.	:Has he used it yet?	:Yes	32

Dispatch Center Sources

- **Incident & response data**
  - Chief Complaint
  - Call & Unit Times
  - Origin and Destination Lats/Lons
  - Narrative (free text)
- **Resource management data**
  - Unit availability, Hospital system activity
- **Many different software systems**
  - Can be available in real time, as call in progress

Dispatch System Example – p1

Incident Details

fwCust_ID	15 (c)	Time_CallTakingComplete	5/26/2010 12:53:01 PM
ID	2007031	Time_CallClosed	5/26/2010 1:48:04 PM
Response_Date	5/26/2010 12:47:05 PM	Time_First_Unit_Assigned	5/26/2010 12:47:39 PM
Master_Incident_Number	FS10051721	Time_First_Unit_Arrived	5/26/2010 12:52:11 PM
Agency_Type	Fire	Cancel_Reason	
Jurisdiction	San Diego	Call_Disposition	1-CALL COMPLETE
Division	Zone 4	EMD_Used	1
Response_Area	21-NSR-01	CIS_Used	
Problem	Convulsions / Seizures (L1)	Determinant	12B01
Priority_Number	1	ProQA_CaseNumber	0010046268
Location_Name	[De-Identified]	Call_Is_Active	0
Address	[De-Identified]	CreatedbyPrescheduleModule	
Apartment	[De-Identified]	Caller_Type	
City	SAN DIEGO	Location_Type	
State	CA	Priority_Description	Level 1 Medical
Postal_Code	92109	ClockStartTime	5/26/2010 12:47:05 PM
Map_Info		MultiAgency_Ptr	2007031
County	San Diego	CallTaking_Performed_By	[De-Identified]
Longitude	[De-Identified]	Calc_Latitude	[De-Identified]
Latitude	[De-Identified]	Calc_Longitude	[De-Identified]
Time_PhonePickUp	5/26/2010 12:47:03 PM	FWCreateTime	5/26/2010 12:48:40 PM
Time_FirstCallTakingKeystroke	5/26/2010 12:47:05 PM	FWTimeStamp	5/26/2010 1:50:15 PM
Time_CallEnteredQueue	5/26/2010 12:47:13 PM	FWClientTimeStamp	5/26/2010 8:49:15 PM

Dispatch System Example – p1

Incident Comments

Performed By	Date/Time	Comment
Automatic by System	5/26/2010 12:47:05 PM	
BGH	5/26/2010 12:51:21 PM	
BGH	5/26/2010 12:52:57 PM	
CRJ	5/26/2010 1:05:49 PM	

Unit Assignment and Transport

fwCust_ID	15	Cancel_Type	
ID	3080085	Cancel_Reason	
Master_Incident_ID	2007031	Call_Disposition	1-CALL COMPLETE
Response_Number	034968	Time_Call_Cleared	5/26/2010 1:48:04 PM
Radio_Name	M21	Location_At_Assign_Time	ALLEY\MISSION
Time_Assigned	5/26/2010 12:47:39 PM	FWCreateTime	5/26/2010 12:49:26 PM
Time_Enroute	5/26/2010 12:48:55 PM	FWTimeStamp	5/26/2010 1:49:29 PM
Time_Staged		FWClientTimeStamp	5/26/2010 8:49:09 PM
Time_ArrivedAtScene	5/26/2010 12:52:11 PM	Assign_Performed_By	[De-Identified]

fwCust_ID	15	Apartment	
ID	1226078	City	SAN DIEGO
Master_Incident_ID	2007031	State	CA
Vehicle_Assigned_ID	3080085	Postal_Code	92123
Time_Depart_Scene	5/26/2010 1:03:00 PM	County	San Diego
Time_Arrive_Destination	5/26/2010 1:18:00 PM	Longitude	[De-Identified]
Time_Delayed_Availability		Latitude	[De-Identified]
Time_ClearedThisDest	5/26/2010 1:48:04 PM	FWCreateTime	5/26/2010 1:03:54 PM
Location_Name	[De-Identified]		
Address	[De-Identified]		

fwCust_ID	15	Cancel_Type	
ID	3080086	Cancel_Reason	
Master_Incident_ID	2007031	Call_Disposition	1-CALL COMPLETE
Response_Number	034969	Time_Call_Cleared	5/26/2010 1:24:14 PM
Radio_Name	E21	Location_At_Assign_Time	ALLEY\MISSION
Time_Assigned	5/26/2010 12:50:02 PM	FWCreateTime	5/26/2010 12:51:30 PM
Time_Enroute	5/26/2010 12:50:11 PM	FWTimeStamp	5/26/2010 1:25:40 PM
Time_Staged		FWClientTimeStamp	5/26/2010 8:25:40 PM
Time_ArrivedAtScene	5/26/2010 12:53:13 PM	Assign_Performed_By	[De-Identified]

EMS vs. Hospital Data

- **San Diego MMWR vs. EMS Dispatch**
  - Anecdotal Comparison Example
- **Linkage to diversion /delay discussed later**
- **Often far fewer EMS providers in an area than hospitals**
- **Eventually will be linked in most communities so spectrum of patient care will be available, but several years away except in a few places**

Patient Care Data

- **Records Management Systems**
  - Traditional & Fire or Police-Based
  - Typically less patient care oriented
- **Paper / scanned forms**
- **Billing system data**
  - ICD9

Patient Care Data

- **ePCR**
  - Electronic Patient Care Record / Report
  - Usually very medical / clinical
  - Increasingly used
  - Evolving systems
  - High software turnover rate
  - Very limited standardization
  - Rarely linked to hospital data (so far)

Patient Care Data

- **ePCR Output**
  - Application-specific
    - Often information rich, but non-standard
    - Usually available at end of call or end of shift
  - NEMSIS (www.nemsis.org)
    - National EMS Information System
    - Usually available weekly, monthly, some next day
    - Transitioning to HL7 integration
  - Many State variations of NEMSIS

ePCR Data Example – p1

Incident Drill-down

Incident

fwCust_ID	3	DELETED	0
PATIENTID	368408	STATEEXPORT	
DATECREATED	5/26/2010 2:14:49 PM	MANAGEBITS	
LASTMODIFIED	5/26/2010 2:14:49 PM	TESTPATIENT	0
MASTERINCIDENT		VERSIONCREATED	3.07.0038
RESPONSENUMBER	10073196	VERSIONMODIFIED	3.07.0038
UNITNUMBER	266	BATCHID	201005-26
CHIEF_COMPLAINT	Seizures / Convulsions	PCRSTATUS	
TRANSPORTPRIORITYID	100013	TRANSPORTED	0
TRANSPORTPRIORITY	3	MANDATORIESNOTFILLED	
ADDRESS1	From EMSA	DELETEDONTABLETBY	
ADDRESS2	From EMSA	DELETEREASONID	
ZIP	From EMSA	DELETEREASONOTHER	
COUNTRY	From EMSA	TRANSFERCONTROL	0
STATE	From EMSA	TRANSFERTOUSERID	0
CITY	From EMSA	ORGANIZATIONID	1
LONGITUDE	From EMSA	PATIENTCOPY	
LATITUDE	From EMSA	ISBILLABLE	1
PATIENTGUID	{A1E540DD-3FFA-440B-BE05-BB4DDBB7C01C}	FWCreateTime	5/26/2010 12:17:52 PM
FINALIZED	1	FWTimeStamp	5/26/2010 1:18:10 PM
LOCKED	0	FWClientTimeStamp	5/26/2010 8:17:24 PM
LOCKEDBYUSERID		FWBCS_FullID	94263296
DELETEDONTABLET	0		

COMMENTS

From EMSA

ePCR Data Example – p2

	Date/Time	Type	Summary
Summary			
	Date/Time	Type	Summary
1	5/26/2010 2:19:20 PM	IV / IO Access	From **EMSA**
2	5/26/2010 2:44:21 PM	Location Patient Found	From **EMSA**
3	5/26/2010 2:44:24 PM	Scene Findings	From **EMSA**
4	5/26/2010 2:44:24 PM	Barriers to Patient Care	From **EMSA**
5	5/26/2010 2:44:27 PM	Emergency Info Form	From **EMSA**
6	5/26/2010 2:44:35 PM	Alcohol/ Drug Use Indicators	From **EMSA**
7	5/26/2010 2:44:35 PM	Level Of Consciousness	From **EMSA**
8	5/26/2010 2:44:49 PM	Odor	From **EMSA**
9	5/26/2010 2:44:49 PM	Airway Status	From **EMSA**
10	5/26/2010 2:44:49 PM	Airway Signs	From **EMSA**
11	5/26/2010 2:44:49 PM	Breathing Sounds	From **EMSA**
12	5/26/2010 2:44:52 PM	Breathing Signs	From **EMSA**
13	5/26/2010 2:44:55 PM	Breathing Quality	From **EMSA**
14	5/26/2010 2:45:56 PM	Skin	From **EMSA**
15	5/26/2010 2:46:04 PM	Pulse	From **EMSA**
16	5/26/2010 2:46:10 PM	Neck Veins	From **EMSA**
17	5/26/2010 2:46:10 PM	Estimated Blood Loss	From **EMSA**
18	5/26/2010 2:46:30 PM	Pupils	From **EMSA**
19	5/26/2010 2:46:36 PM	Mental Status	From **EMSA**
20	5/26/2010 2:46:40 PM	Distal CMS	From **EMSA**
21	5/26/2010 2:46:41 PM	LOC	From **EMSA**
22	5/26/2010 2:47:05 PM	Altered Mental Status	From **EMSA**
23	5/26/2010 2:47:16 PM	IV Fluid	From **EMSA**
24	5/26/2010 2:47:19 PM	Attach/ Monitor ECG	From **EMSA**

Thank You & Contact Info

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