



Pre-Hospital Telemedicine Video

Wednesday, June 18, 2015

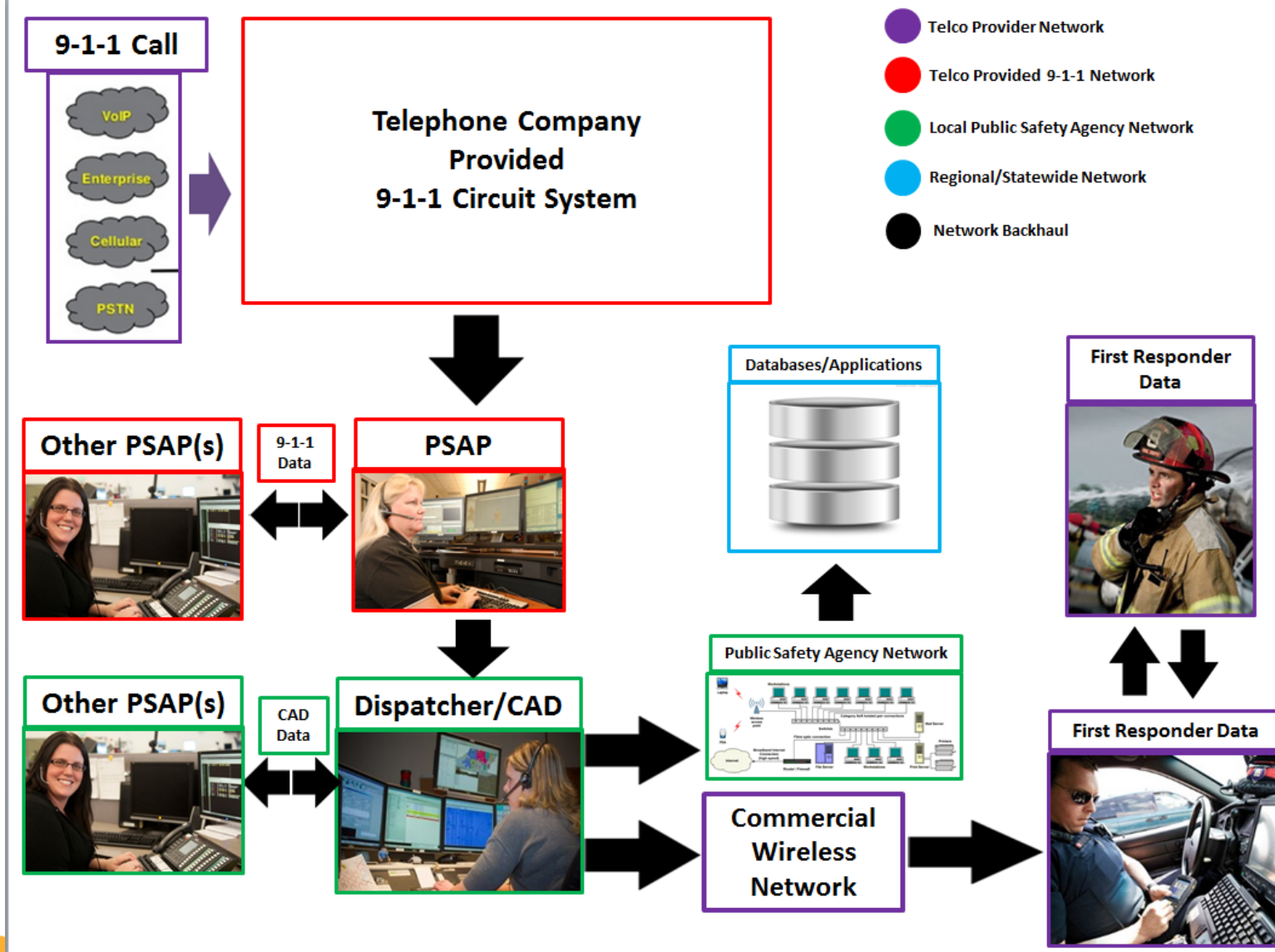
**Video Quality in Public Safety (VQiPS)
Annual Workshop
Elizabeth, New Jersey**

The member organizations of the National Public Safety Telecommunications Council are grateful to the Department of Homeland Security's Science and Technology Directorate, Office for Interoperability and Compatibility (OIC) and the National Protection and Programs Directorate, Office of Emergency Communications (OEC) Points of view or opinions expressed are those of the originators and do not necessarily represent the official position or policies of the U.S. Department of Homeland Security.

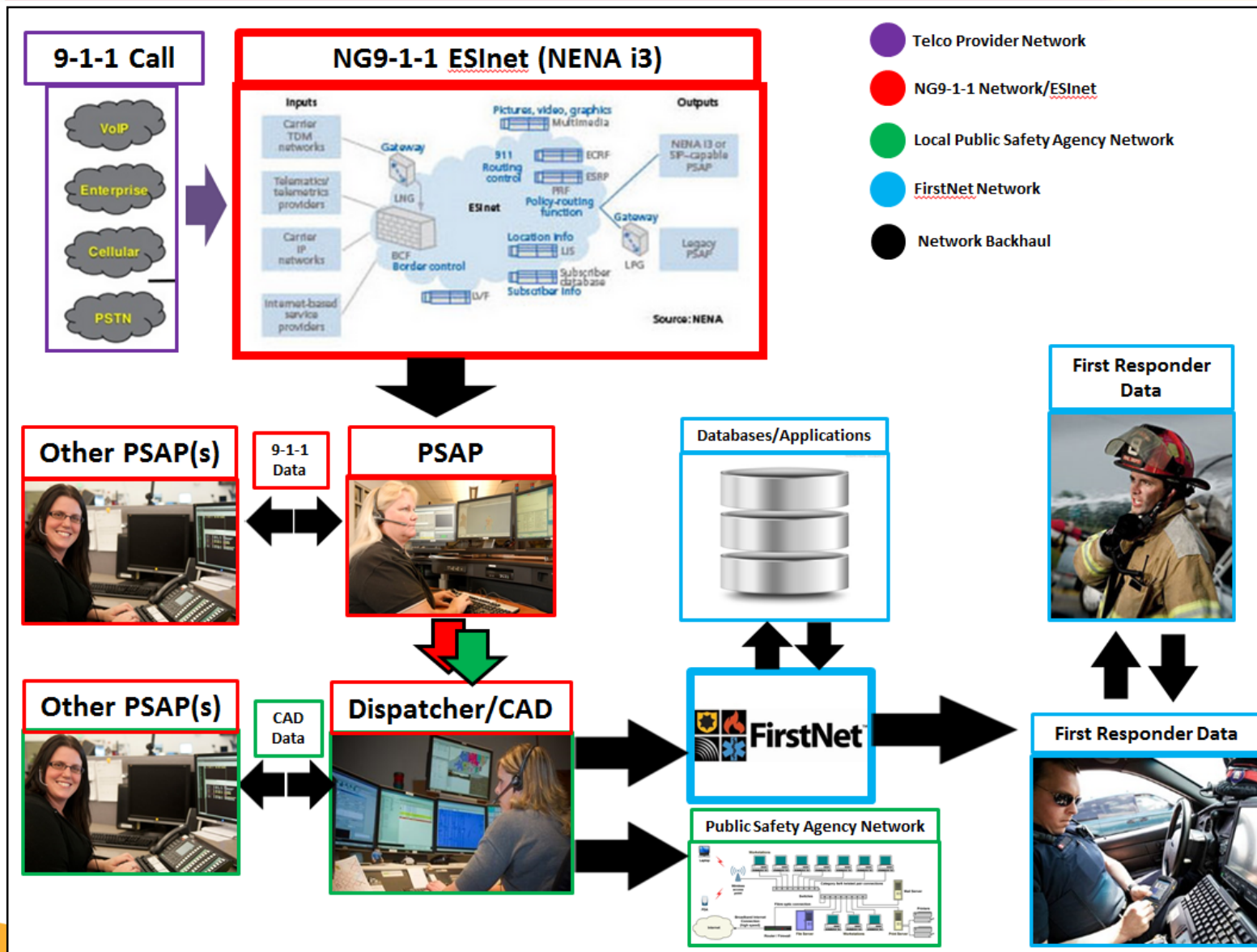
Evolution of Public Safety Video

- Public Safety and Video Today
 - Many public safety centric video programs
 - Evolving public-private partnership video programs
 - Advances in technology and analytics
- Public Safety and Video Tomorrow:
 - Next Generation 911 (NG911) capabilities
 - FirstNet, Nationwide Public Safety Broadband Network
 - Both NG911 and FirstNet will leverage interconnected networks.

Public Safety Networks - Today



Public Safety Networks - Tomorrow





Citizen Generated Video

- NG911 Technology will dramatically enhance the way in which requests for emergency assistance can reach the PSAP.
 - Citizen sharing of multi-media files and images
 - Crash data from third parties

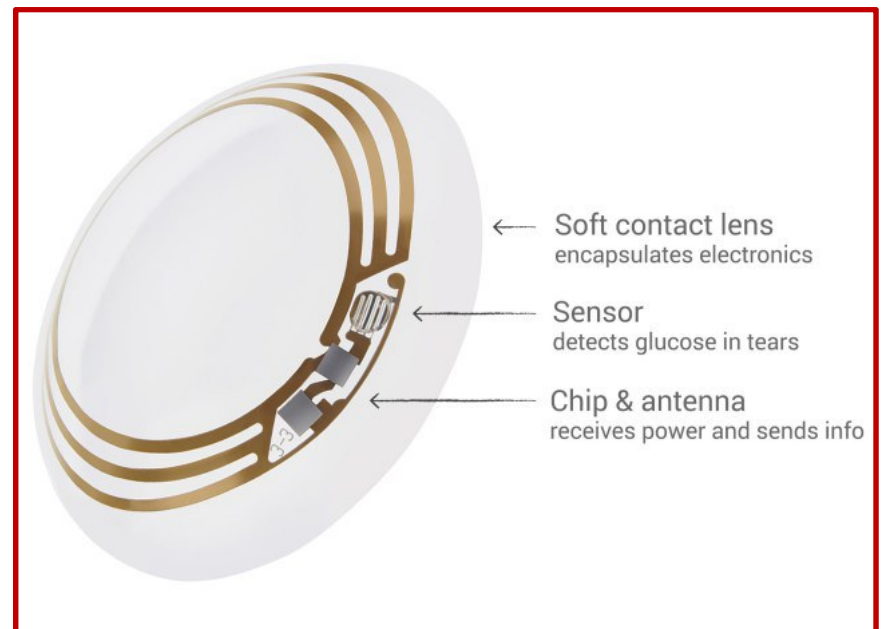
Connected Buildings & Sensors

- Video systems can share data with first responders
 - Example: Fire alarm activation on the 12th floor of the hotel will automatically open a video link at the location of the alarm.



Automatic Sensor Alerts to 911

- Medical Devices and Sensors
- Google Contact Lens
 - Measures blood glucose levels via embedded sensor
 - Will report results to the patients smart phone which can alert a physician
 - A life threatening blood sugar reading could generate a data alert to the 9-1-1 system.



Sensors and Patient Care

- Various medical sensors have been developed which can interface with personal cell phones and could trigger a 911 call:
 - A special wrist band can detect a heart attack before the person has any symptoms; and automatically call for help.
 - A watch can detect cardiac arrest and alert the 911 system.
- Identifying the location of a patient with a sensor requires an extremely accurate fix because there is no “caller on the phone” to provide additional information and context.

Video Analytics and Automatic 911

- Identifying the location of a video feed:
 - Accurate mapping of fixed camera locations
 - Accurate display of location for PTZ camera views



Video and Public Safety

- How will public safety use crew generated video?
 - Many reports have been published.
 - Video continues to represent a desired capability for first responders.
 - Video technology is advancing quickly.
 - Device size
 - Resolution, Frame Rate, Codec
 - Analytics
 - Recent urgency in adopting video for law enforcement accountability.
 - Concern has been expressed over bandwidth consumption of high resolution video

Video and Public Safety



- We know what public safety “visionaries” think about video.

Video Analytics and Response Impact



PROCESS SEGMENT	Emergency Occurs	Detection	Activate 9-1-1	Call Routed to PSAP	Call Taker Questions/ CAD Entry	Dispatcher Assessment/ Assign Units	Turn Out Time	Travel To Address	Arrival At Scene	Assess Conditions	Initiate Action
TIME (MIN:SEC)	TIME START	1:00	:30	:10	1:00	:30	:10	6:00	3:00	:30	TIME STOP
CUMULATIVE LAPSE TIME	0:00	1:00	1:30	1:40	2:40	3:10	3:20	9:20	12:20	12:50	
KEY FUNCTIONS	A fight breaks out in a high school and one of the suspects is holding a large knife.	* A teacher is a nearby classroom is alerted to the fight and runs into the hallway.	* Teacher alerts the school front desk. * Front desk dials 9-1-1	*9-1-1 System routes call to PSAP	*Call Taker determines location, type of emergency, and details. * Front desk has minimal information * Call Taker enters data into CAD	* Dispatcher reviews/confirm which units should respond * Dispatcher alerts units to respond.	* Units receive CAD data on MDT * Units review information * Units plan response	* Units travel to scene * Units arrive at address, front door of school	* Officers enter school, determine route to specific wing. * Arrival at scene	* Officers at scene, differentiate suspects from bystanders.	* Officers take action.
Next Generation First Responder Improvements		*video analytics detect fight in progress; identify a probable weapon	* Sensor alert to PSAP via NG911	* Data call routed directly to PSAP	* Automatic call entry using ASAP protocol, reviewed by Call Taker. (Call taker also processes 911 call from school)	* Rapid dispatch to officers, with building plan and image/video file.	* Automatic Route suggestions	* Enhanced GIS data to ID building and access	* 3D building plans available prior to arrival	* video imagery provides complete suspect description	
TIME (M:SS)	TIME START	:05	:00	:05	:15	:15	:10	5:30	2:00	:30	
NEW CUMULATIVE LAPSE TIME	0:00	:05	:05	:10	:25	:40	:50	6:20	8:20	8:50	

Video and Public Safety



- What are the current thoughts among “regular” first responders?

Prehospital Video Telemedicine Use



- Emergency Medical Services Working Group – Paul Patrick, Chair
 - Adopted an EMS video work plan in January.
 - Previewing prehospital video capabilities
 - Reviewing existing EMS use cases involving video
 - Launched a nationwide “EMS Video Telemedicine Questionnaire” for 30 days, ended April 24th

Prehospital Video Telemedicine Use



- EMS Video Telemedicine Questionnaire
 - 679 total responses received
 - Majority were from EMS agencies
 - 10% were from physicians, medical directors, hospitals and trauma centers.
 - Respondents were asked to rate options:
 - Video Capability Matrix
 - Scenario based case study
 - Questionnaire allowed the selection of “other” and also allowed free form comments.

Prehospital Video Telemedicine Use



- EMS Video Telemedicine Questionnaire
 - Wide range of responses
 - *“A picture CAN be worth 1000 words but that doesn't mean the words are accurate or necessary”.*
 - *“AV monitoring of pts and situations in the prehospital setting would be most beneficial in order to assess patient situation and prepare receiving medical facility for rapid assessment, such as clearing a CT scanner for assessing trauma injuries, etc.”*
 - *“Benefits of the ability to stream live video are endless.”*
 - *“NO NO NO”*

Impact of EMS Video User/Consumer



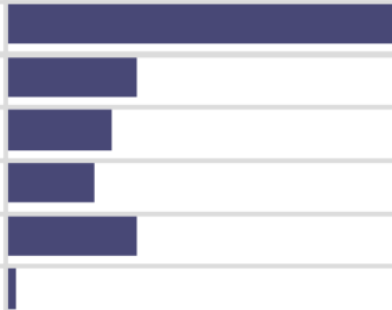
Are you a/an:

Answer	0%	100%	Number of Response(s)	Response Ratio
EMS System Responder.	<div><div></div></div>		402	59.2 %
EMS System Medical Director.	<div><div></div></div>		113	16.6 %
Hospital Emergency Department or Trauma Center Director.	<div><div></div></div>		22	3.2 %
Hospital ED online medical control physician.	<div><div></div></div>		8	1.1 %
Other	<div><div></div></div>		128	18.8 %
No Response(s)			6	<1 %
Totals			679	100%

Impact of Area Served



Please describe the population of the area served by your EMS organization or hospital:











Answer	0%	100%	Number of Response(s)	Response Ratio
< 50k.			310	45.6 %
50k to 100k.			104	15.3 %
100k to 250k.			84	12.3 %
250k to 500k.			68	10.0 %
> 500k.			106	15.6 %
No Response(s)			7	1.0 %
Totals			679	100%

Impact of Transport Time

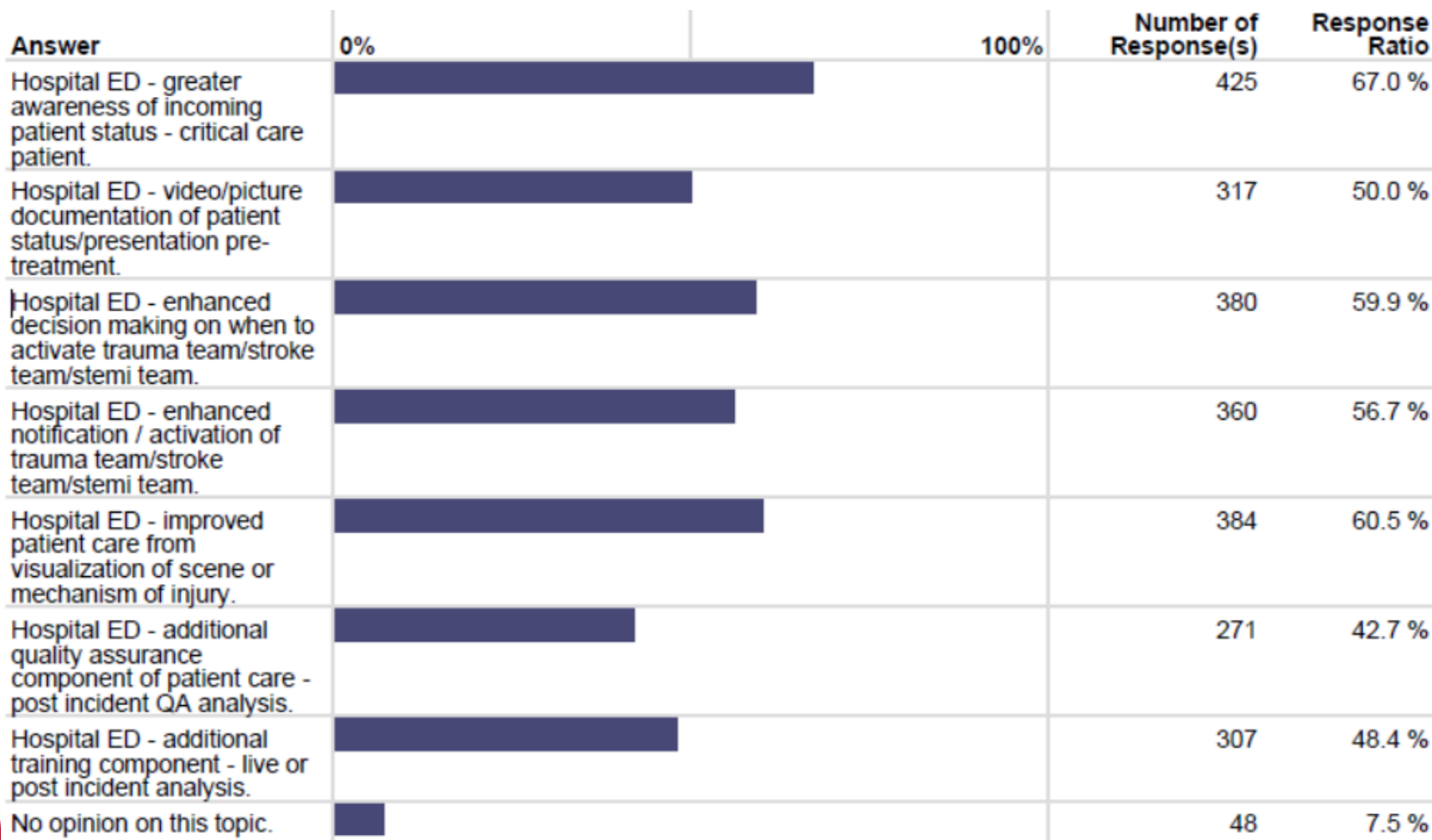
What are the typical transport times from the scene to the receiving hospital?

Answer	0%	100%	Number of Response(s)	Response Ratio
< 15 minutes.			300	44.1 %
15-30 minutes.			303	44.6 %
> 30 minutes.			66	9.7 %
No Response(s)			10	1.4 %
Totals			679	100%













Video Use by Medical Control

Answer	0%	100%	Number of Response(s)	Response Ratio
Medical Control - better decision making/risk mitigation on patient refusal requests.			389	60.5 %
Medical Control - better decision making on termination of resuscitation in the field.			248	38.6 %
Medical Control - better decision making on patient treatment and enhanced paramedic voice report.			286	44.5 %
Medical Control - physician assisted, real time, critical care support, and direction to field personnel.			411	64.0 %
Medical Control - better decision support on transport destination.			194	30.2 %
Medical Control - better decision support on transport modality (ground vs air).			160	24.9 %
Medical Control - better decision support for field triage.			181	28.1 %
Medical Control - physician assisted decision support/management for wounds or rash following chemical/biological hazard.			228	35.5 %
Medical Control - better decision support / direction for mobile health / community paramedicine visits.			368	57.3 %
No opinion on this topic.			49	7.6 %

Video Use by Hospitals



Video Use by EMS Agencies

Answer	0%	100%	Number of Response(s)	Response Ratio
EMS System - quality assurance component of patient care - post incident QA analysis.			410	61.4 %
EMS System - additional training component - live or post incident analysis.			430	64.4 %
EMS System - video/picture documentation of access to stored narcotics.			190	28.4 %
EMS System - video/picture documentation of patient status/presentation pre-treatment.			346	51.8 %
EMS System - risk management on patient refusals.			458	68.6 %
EMS System - risk management - documentation regarding patient's valuables.			237	35.5 %
EMS System - risk management - documentation of unruly patient behavior on scene.			452	67.7 %
EMS System - enhanced crew safety.			338	50.6 %
EMS System - better decision support for field triage.			264	39.5 %
EMS System - better decision support for critical care transport.			345	51.7 %
EMS System - better decision support / direction for mobile health / community paramedicine visits.			382	57.2 %
No opinion on this topic.			28	4.1 %

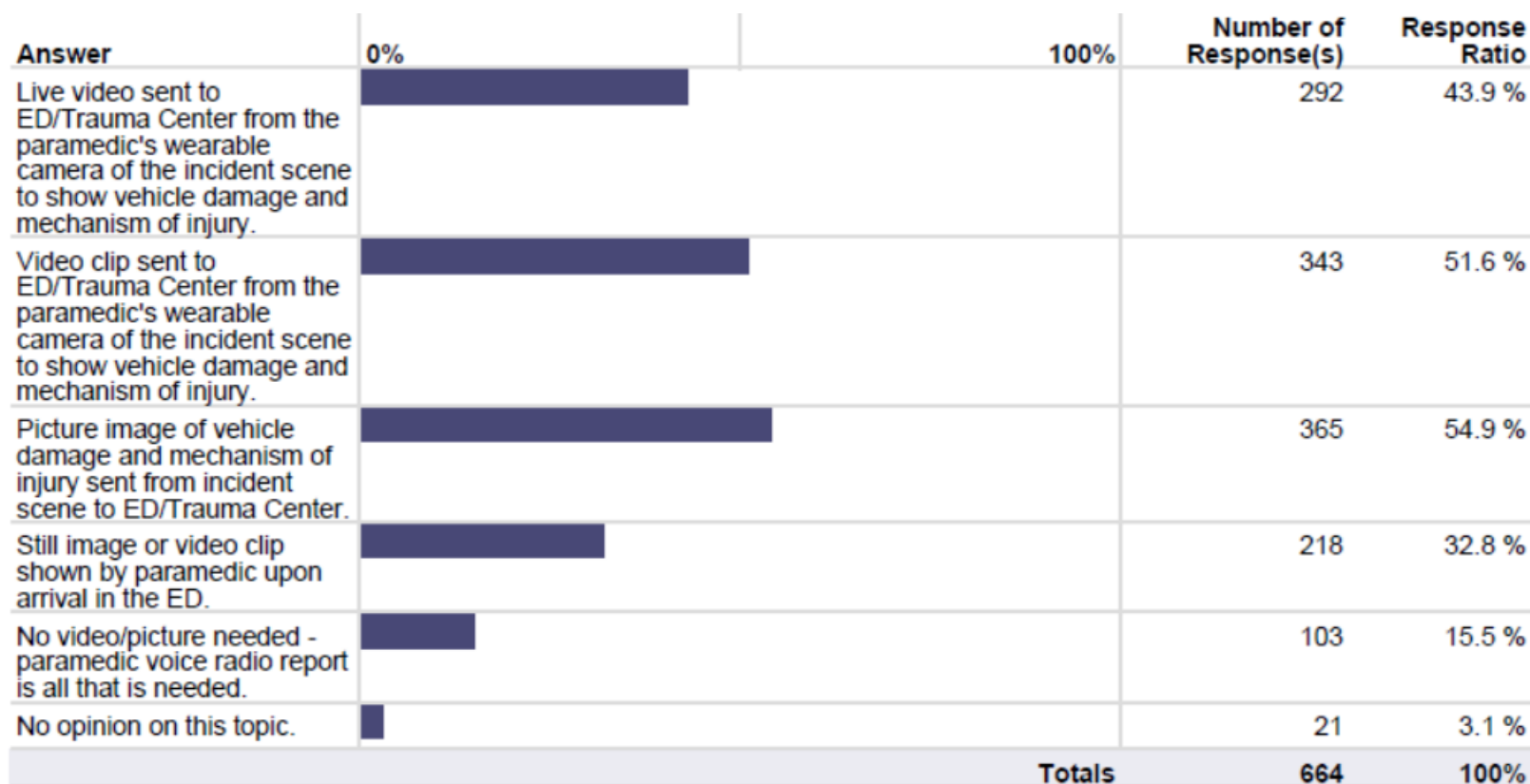
Video Scenario #1

Patient Refusal Scenario. EMS personnel have arrived at the scene of an adult diabetic patient who is unconscious. They start an IV and administer glucose and the patient is now awake and refusing transportation to the hospital. The paramedic advises that the patient is being monitored by family and will contact their primary care physician.

Answer	0%	100%	Number of Response(s)	Response Ratio
Live video - consultation directly with the physician and patient.	<div></div>		334	50.0 %
Live video - from paramedic (allows doctor to see the patient, but no interaction).	<div></div>		125	18.7 %
Picture image of the patient (to see skin color and overall condition).	<div></div>		104	15.5 %
Video clip to document the summary and refusal acknowledgement.	<div></div>		284	42.5 %
No video/picture is needed, voice consultation is fine.	<div></div>		184	27.5 %
No opinion on this topic.	<div></div>		50	7.4 %
Totals			667	100%

Video Scenario #2

Trauma Patient - Mechanism of Injury Scenario. Paramedics are at a vehicle crash scene and report a 40-year-old female with low blood pressure complaining of abdominal pain.








Video Scenario #3

Patient Assessment Scenario. A basic life support unit is on the scene of a patient who is semi-conscious and was reported by the family to have stroke like symptoms.

Answer	0%	100%	Number of Response(s)	Response Ratio
Live video - consultation directly with doctor and patient's family while viewing the patient.	<div><div></div></div>		388	58.1 %
Live video - from EMT (allows doctor to see the patient, but the only interaction is with the EMT).	<div><div></div></div>		293	43.9 %
Video clip of the stroke assessment showing how patient presented on scene.	<div><div></div></div>		302	45.2 %
Still image of patient.	<div><div></div></div>		43	6.4 %
No video/picture is needed, voice consultation is fine.	<div><div></div></div>		96	14.3 %
No opinion on this topic.	<div><div></div></div>		32	4.7 %
Totals			667	100%

Video Scenario #4

Physician Assisted Patient Care Scenario. EMS personnel are transporting a pediatric asthma patient from a rural area with an extended transport time. The paramedic sees that the patients condition is deteriorating and is requesting advice on the proper course of treatment.

Answer	0%	100%	Number of Response(s)	Response Ratio
Live video consultation with paramedic using a helmet camera, allowing physician to visualize patient's overall condition and provide step by step instructions if necessary (ie: video laryngoscope).			424	63.7 %
Video clip from paramedics camera showing patient condition (skin color, degree of respiratory distress).			316	47.5 %
Still image patient.			41	6.1 %
No video or image data is necessary; the physician can talk the paramedic through the necessary procedure.			100	15.0 %
No opinion on this topic.			37	5.5 %
Totals			665	100%

Video Scenario #5

Mass Casualty Incident Scenario. A paramedic supervisor contacts medical control and/or local hospitals from the scene of a school bus crash to provide an update on the number and severity of a range of patients.

Answer	0%	100%	Number of Response(s)	Response Ratio
Live video - showing the crash scene, the number of patients, and a general indication of the status of the patients.	<div><div></div></div>		383	57.3 %
Video clip - sent to ED/Trauma Center showing the number of patients and general conditions at the scene.	<div><div></div></div>		315	47.1 %
Picture image or series of pictures of the crash scene sent to the Emergency Department to assist in triage or preparation.	<div><div></div></div>		250	37.4 %
No video or pictures are needed, radio voice report is sufficient.	<div><div></div></div>		134	20.0 %
No opinion on this topic.	<div><div></div></div>		24	3.5 %
Totals			668	100%

Questionnaire Results

All Respondents



SCENARIO	Video Use Helpful	Video Use Not Indicated	No Opinion
Patient Refusal	65.1%	27.5%	7.4%
Mechanism of Injury	81.4%	15.5%	3.1%
Patient Assessment	81.0%	14.3%	4.7%
Physician Assisted Patient Care	79.5%	15.0%	5.5%
Mass Casualty Incident	76.5%	20.0%	3.5%
Summary/Total	76.7%	18.5%	4.8%

Questionnaire Results EMS Agencies



SCENARIO	Video Use Helpful	Video Use Not Indicated	No Opinion
Patient Refusal	66%	26%	8%
Mechanism of Injury	85%	12%	3%
Patient Assessment	80%	15%	5%
Physician Assisted Patient Care	79%	15%	6%
Mass Casualty Incident	77%	19%	4%
Summary/Total	77.4%	17.4%	5.2%

Questionnaire Results Physicians



SCENARIO	Video Use Helpful	Video Use Not Indicated	No Opinion
Patient Refusal	62%	33%	5%
Mechanism of Injury	75%	23%	2%
Patient Assessment	89.4%	10%	0.6%
Physician Assisted Patient Care	86%	12%	2%
Mass Casualty Incident	77%	21%	2%
Summary/Total	77.9%	19.8%	2.3%

Feedback Themes - General

- ✓ Live video is needed for stroke assessment validation/enhancement
- ✓ Best use for Community Paramedicine and “gray zone” patient presentations
 - χ Less helpful in critical care situations
- ✓ Best use for patient refusals and risk management documentation
- ✓ Situational awareness from EMS to PSAP and ED will be enhanced
- ✓ Best use in rural areas with extended transport times, EMS staff who do not have high call volumes for skills maintenance.
- ✓ Cameras create a more professional interaction
 - (EMS and patients “behave” better)
- χ Time delay for EMS to use the equipment (activation time, process time)
- χ Time needed in ED to conduct video consultations (physicians are too busy)
- χ Big Brother syndrome, surveillance, over reach by Medical Control
- χ Liability, HIPPA
- χ Cost (purchase, O&M, training)
- χ Will not improve medical care outcome (protocols handle all situations now)

Feedback Themes - Physician

- ✓ Physician and Hospital responses tracked EMS results
- ✓ Physicians and ED's expressed more interest in live video than in a video clip or still image
 - ✓ Especially true for stroke patient assessment
- ✓ Physicians saw the greatest benefit in:
 - ✓ Community Paramedicine Programs
 - ✓ Patient diversion to Urgent Care or Clinic vs. ED
 - ✓ Patient Refusal risk management
 - ✓ Enhanced patient care documentation
- ✓ Respondents expressed concern:
 - ✓ HIPPA compliance and encryption
 - ✓ Potential for increased litigation
 - ✓ Time to manage video conference calls (staffing)

Video Policy Issues:

- 10 EMS agencies indicated they were already doing video trials. Several indicated they have no policies in place during their trial.
- Concern about an EMTALA* violation if the physician directly communicated with the patient via video.
- Concern video could not be used for training without violating HIPPA.
- Does the hospital “own” the video once it receives it, or is it a consumer of video and not obligated to store a copy?
- How does physician know that the camera image is truly representative of the patient condition (can they discern skin color, level of difficulty in breathing, etc.)
- How to implement “customer care best practices” to make patients feel at ease with the technology.
- When should camera be turned on? (always, as per policy, or at the discretion of the EMS crew)

* **EMTALA**, Emergency Medical Treatment and Active Labor Act – 1986

* **HIPAA**, Health Insurance Portability and Accountability Act - 1996

NPSTC Report



- **“EMS Video Telemedicine Report”** is scheduled to be completed by September 2015.
 - All respondents to the questionnaire will receive an email copy of the report.
 - The document will be posted to the NPSTC web site with an accompanying media release.



Thank you!

www.NPSTC.org

**Click “Participate-Volunteer” to join a
Committee or Working Group**

The member organizations of the National Public Safety Telecommunications Council are grateful to the Department of Homeland Security's Science and Technology Directorate, Office for Interoperability and Compatibility (OIC) and the National Protection and Programs Directorate, Office of Emergency Communications (OEC) Points of view or opinions expressed are those of the originators and do not necessarily represent the official position or policies of the U.S. Department of Homeland Security.