

Elevation Trepidations:

Improving STEMI Systems of Care

EMS State of the Science XXI



↑ **EMERGENCY**

↑ Main Entrance

↑ Entrance **A | B**

General Outline

1

Unintended Consequences

2

False activation is not harmless

3

Method to improve detection

4

Importance of the Story

5

What are the Eagles Doing?



ACC/AHA Guidelines for the Management of Patients with Acute MI

- Availability of 911 Access (I)
- Availability of an EMS system staffed to treat cardiac arrest (I)
- 12 lead telemetry (IIb)

- Trained and equipped to provide early defibrillation (I)
- Administration of ASA (I)
- Perform a 12 lead ECG (IIa)
- Review a reperfusion checklist (IIa)
- Written protocol to guide destination (I)

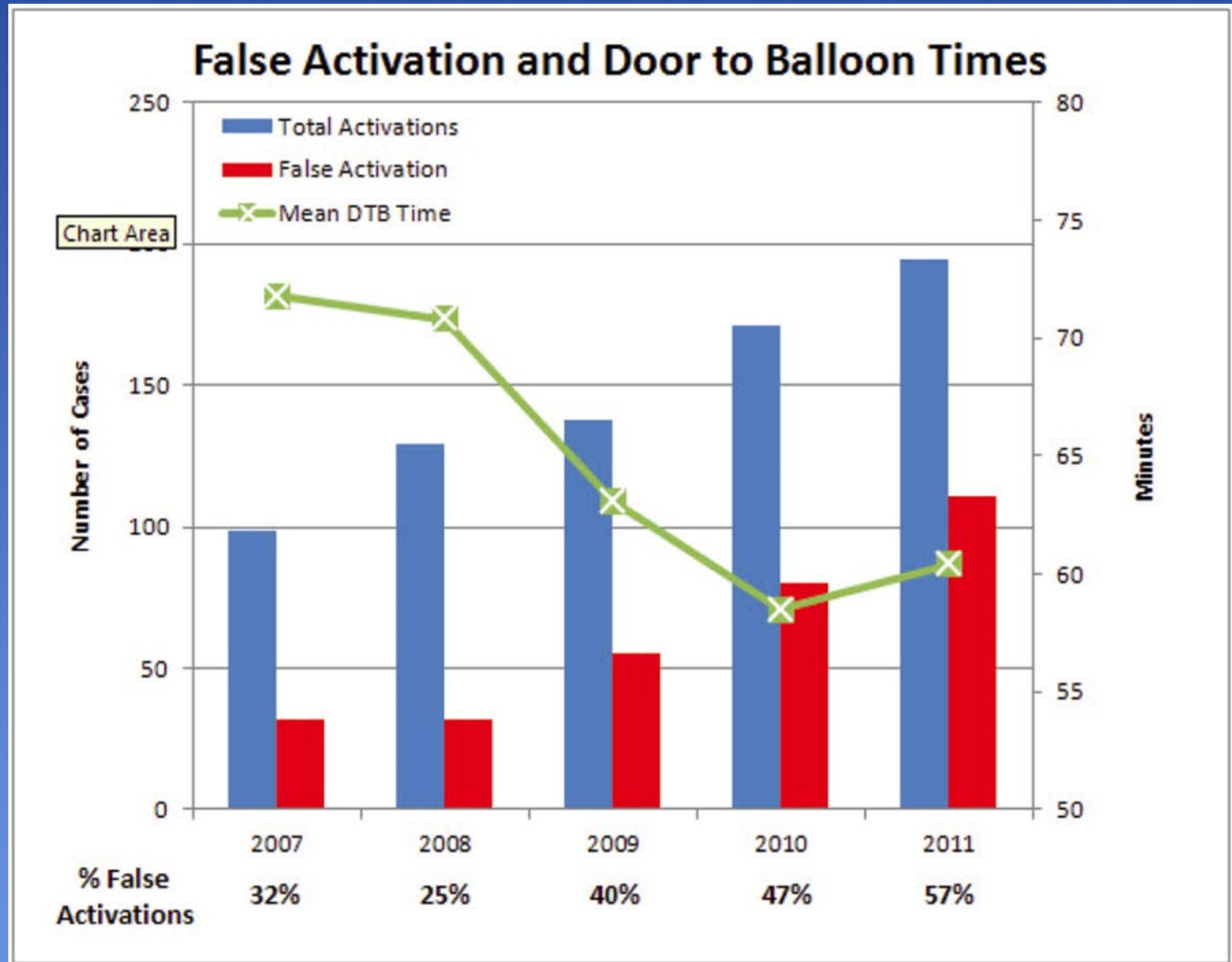


- Unchanged from 1996 Guidelines

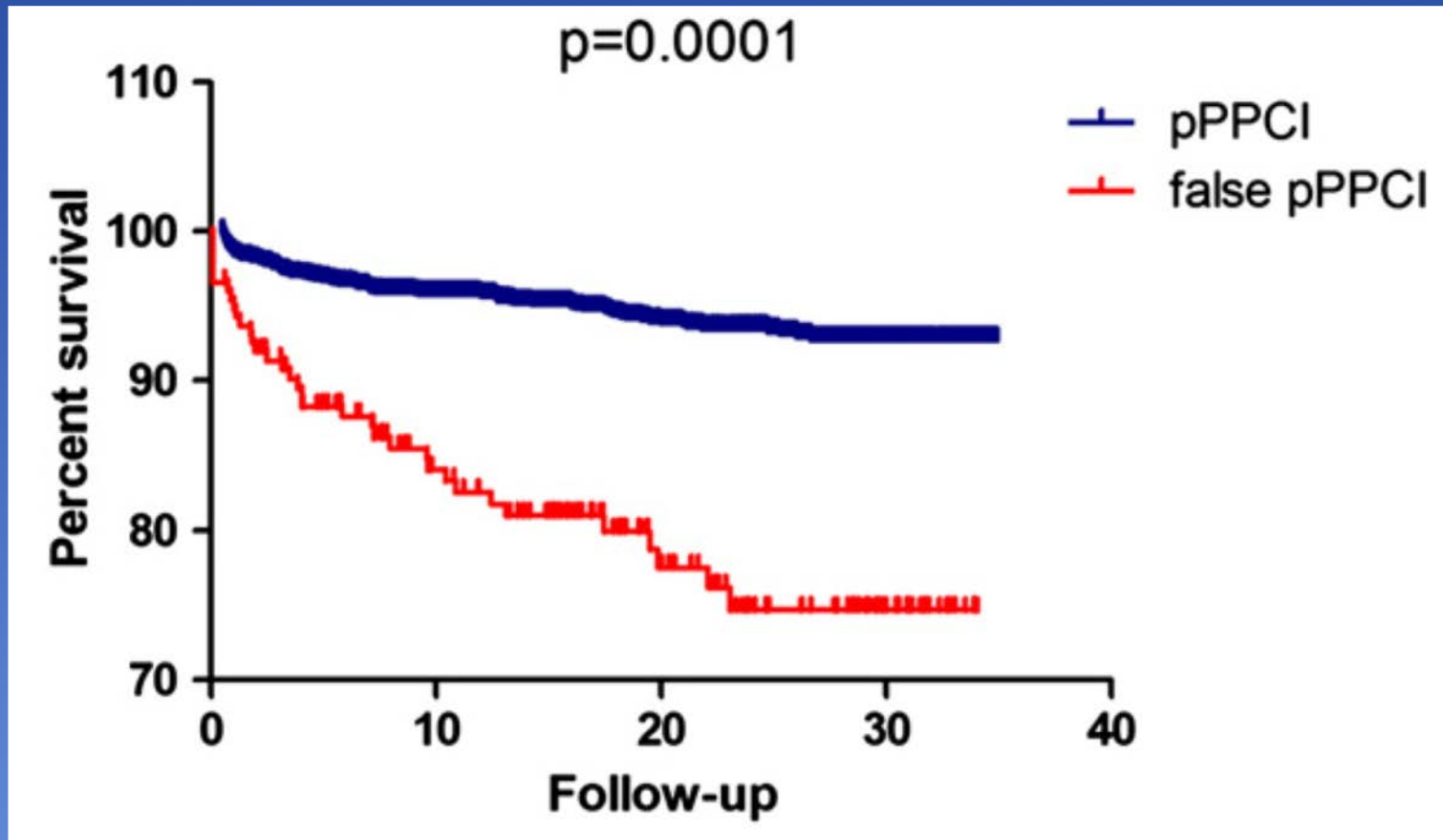
- Regional system of STEMI care (I)
- 12 lead at site of FMC (I)
- Transport to a PCI capable center (I)



Door to Balloon in 120 Minutes or Less



False Activation is Not Harmless



Chaudry U, Mavroudis C, Rakhit RD. Emergency ambulance triggered “false activation” callout for primary percutaneous coronary intervention is not a benign phenomenon. *Int J Cardiol.* 2013 Oct 3;168(3):3018-9.



Who Should Interpret the ECG

Paramedic



Computer



Cardiologist

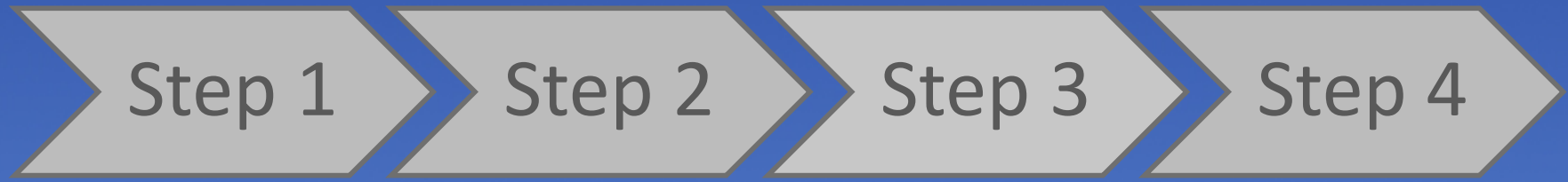


ER Physician



4 Step Algorithm in ECG Diagnosis of STEMI

Hartman SM, Barros AJ, Brady WJ. The use of a 4-step algorithm in the electrocardiographic diagnosis of ST-segment elevation myocardial infarction by novice interpreters. Am J Emerg Med. 2012 Sep;30(7):1282-1295



ST segment elevation of at least 1-2 mm in 2 anatomically oriented leads?

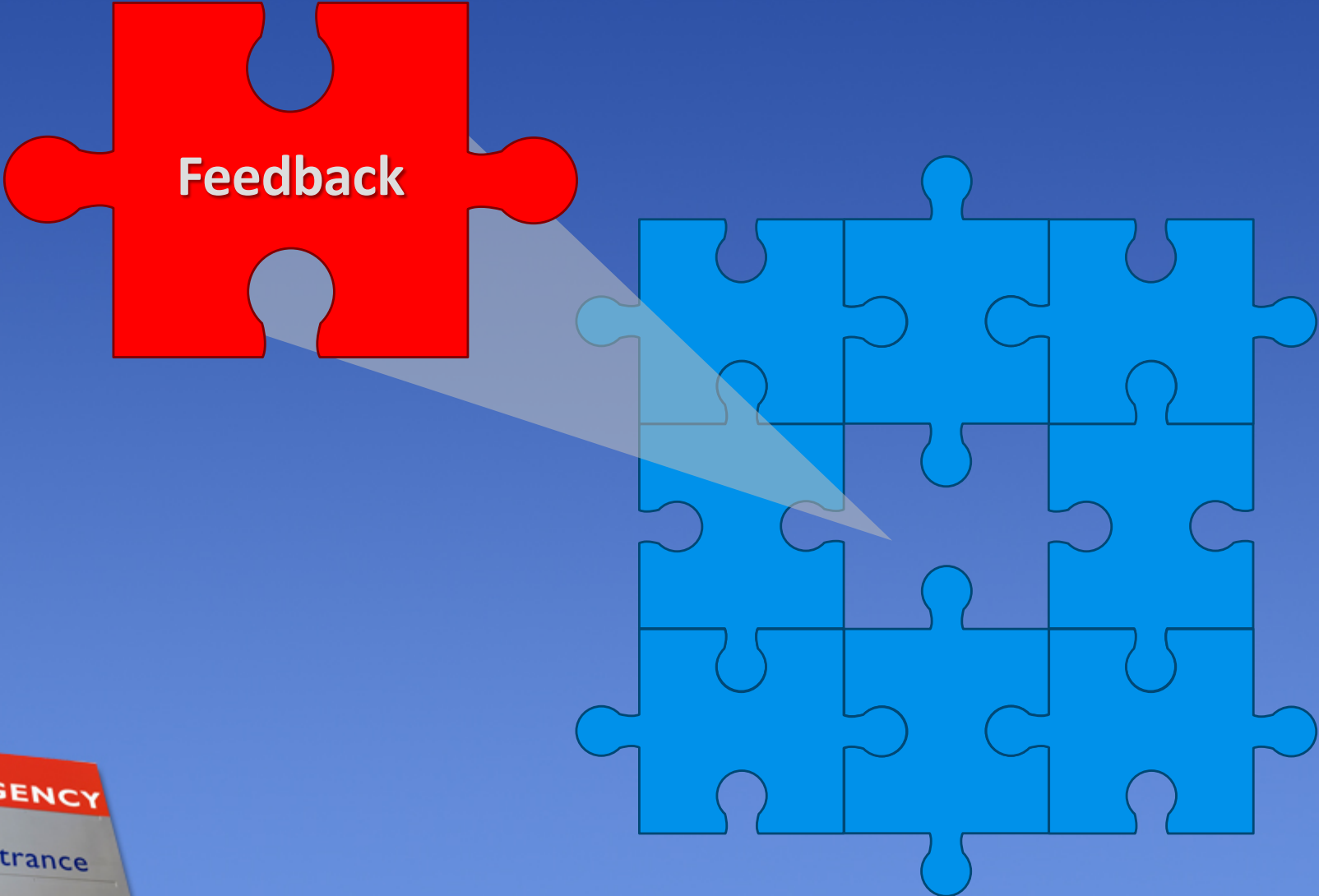
*QRS complex normal size?
Q wave in lead V1/V2 + R wave in lead V5/V6 < 35 mm*

*QRS Complex normal width?
QRS complex < 0.12 seconds*

ST segment depression present in at least 1 lead?



Missing Piece Concept



Performance Analysis

		Hospital		
		Yes	No	Total
EMS	Yes	16	2	18
	No	0	1,835	1,835
	Total	16	1,837	1,853

Sensitivity	94%
Specificity	100%
False Positive	11%
False Negative	0%



How & Why?



THE
STORY



STEMI Alert: It's not just the ECG

Story	ECG	STEMI Alert?
Convincing	Convincing	Yes
Convincing	Meh...	Yes
Meh...	Convincing	Yes
Meh...	Meh...	No



CASE 3) EMS HPI

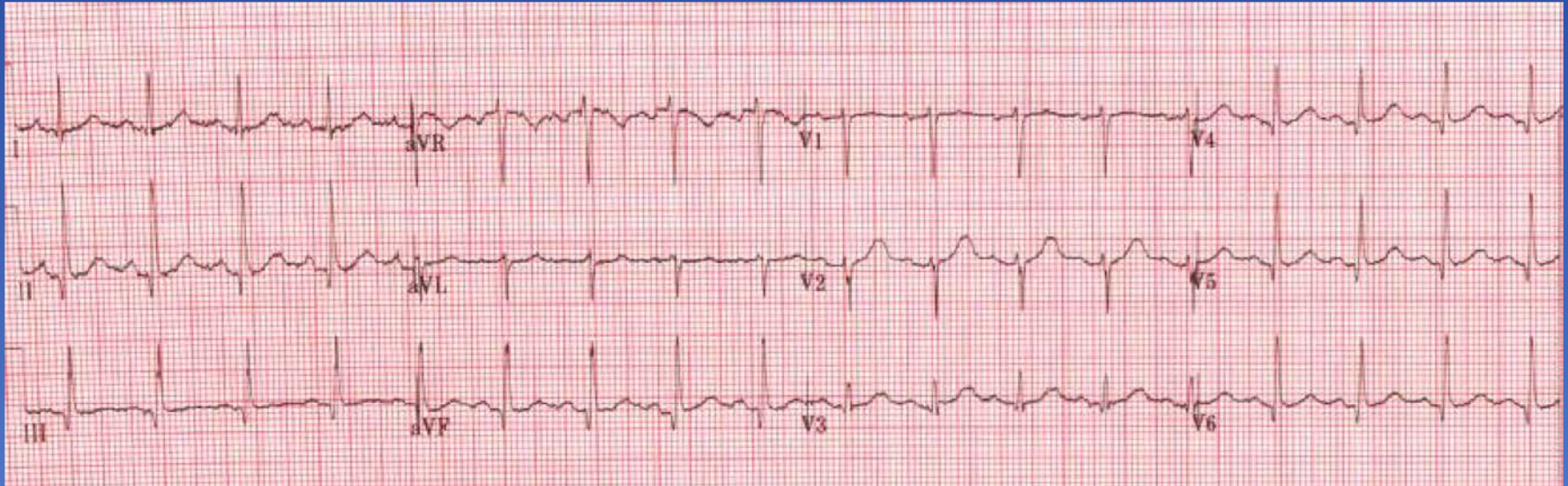
Pt is a 61YOF CC of Weakness. Pt states she was walking to the bathroom when she suddenly felt ill and weak then proceeded to have a syncopal episode and fell to the ground. Pt denies any recent illness, no Chest pain, Shortness of Breath, abd pain, vomiting, diarrhea, extremity pain. Pt states she takes morphine for diabetic neuropathy but states there is no way she took too much

VS: BP 65/41, HR 92, RR 30, SpO2 93%, EtCO2 37

Tx: ASA, IV 500 ml



EMS ECG



Meh Story + Meh ECG =

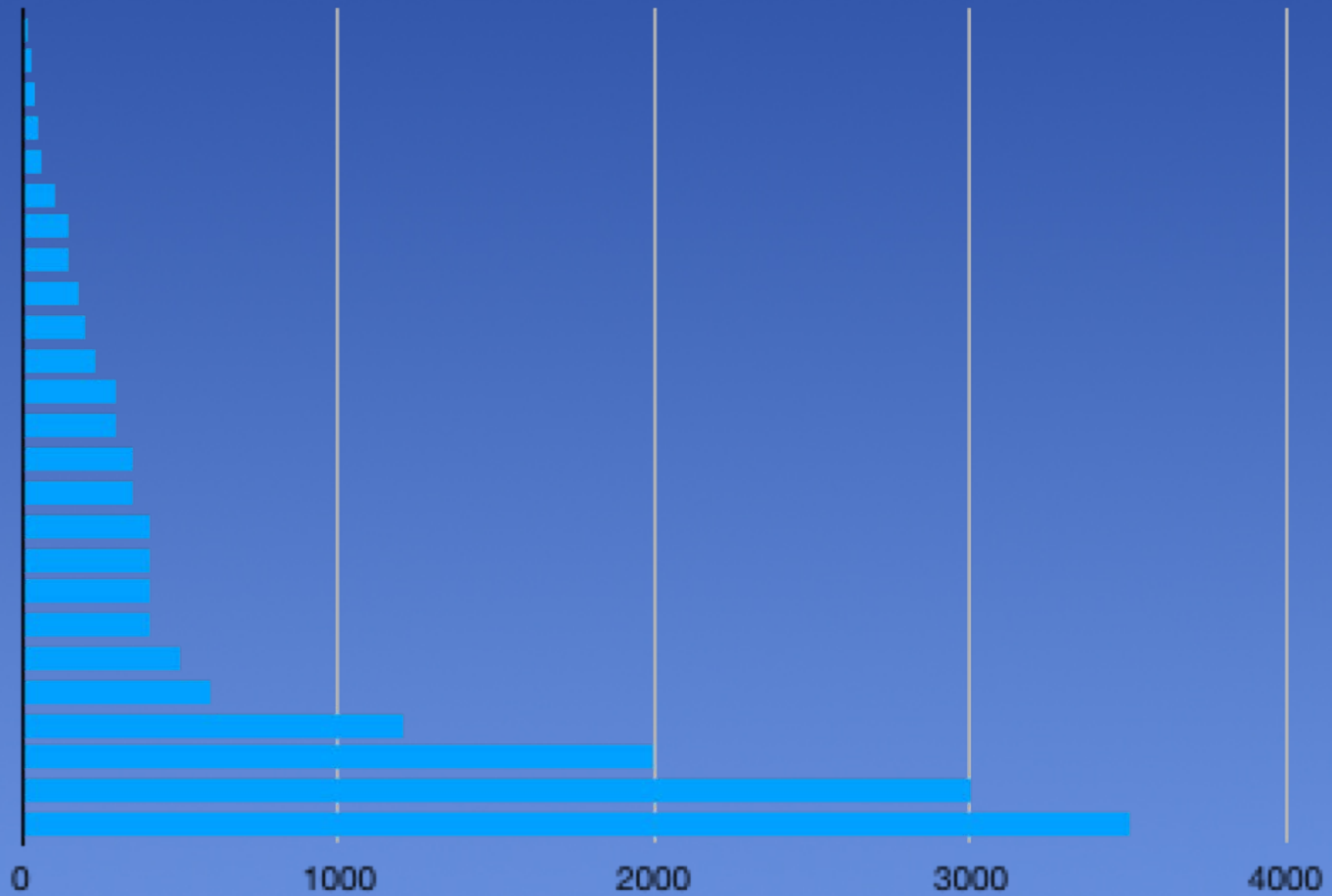
~~STEMI~~





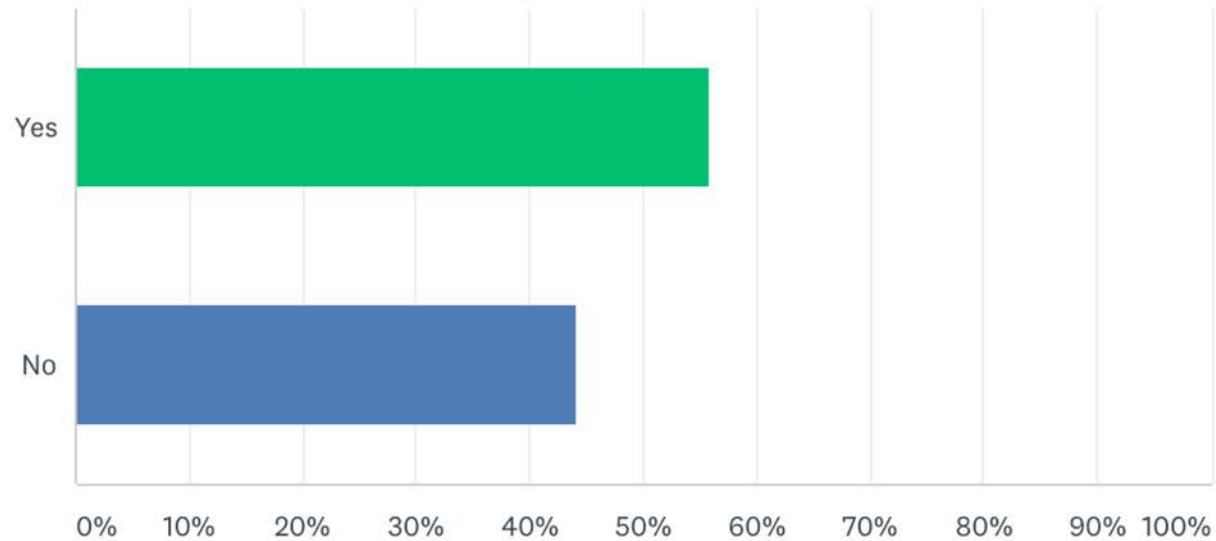
Informal Eagles' Survey
STEMI and EKGs
N=34

■ Number of Annual Alerts



Are cardiology and cath lab activated solely on EMS call (or is activation determined by ED)?

Answered: 34 Skipped: 0

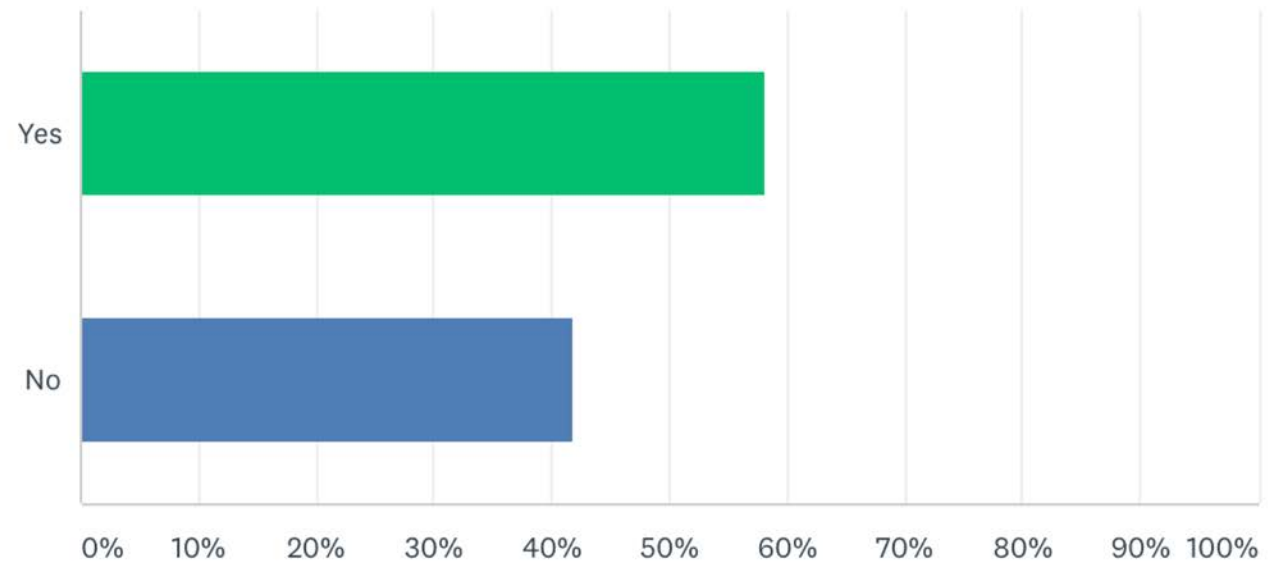


ANSWER CHOICES	RESPONSES	
Yes	55.88%	19
No	44.12%	15
TOTAL		34



If yes, does someone else other than EMS read to activate?

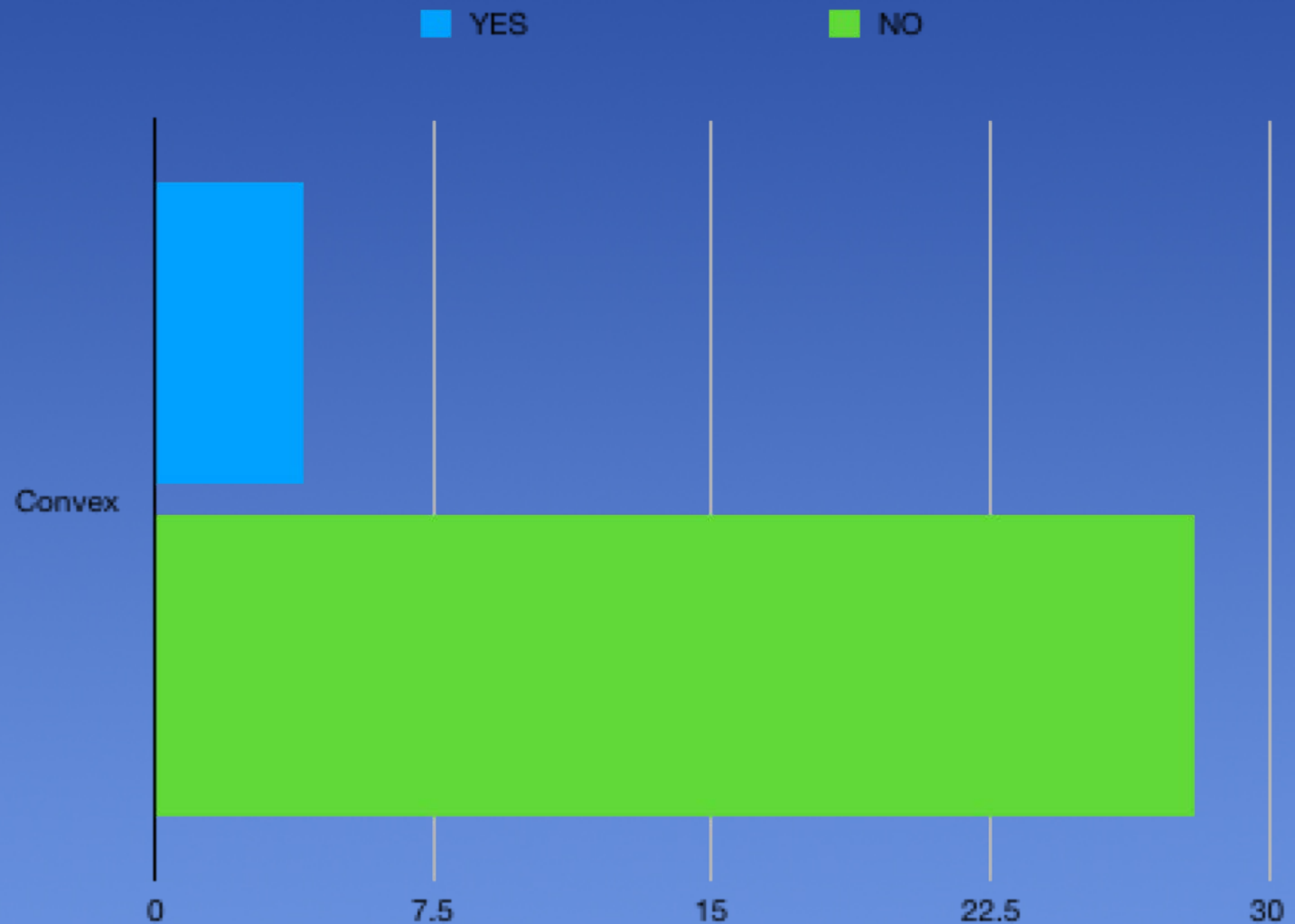
Answered: 31 Skipped: 3



ANSWER CHOICES	RESPONSES	
Yes	58.06%	18
No	41.94%	13
TOTAL		31

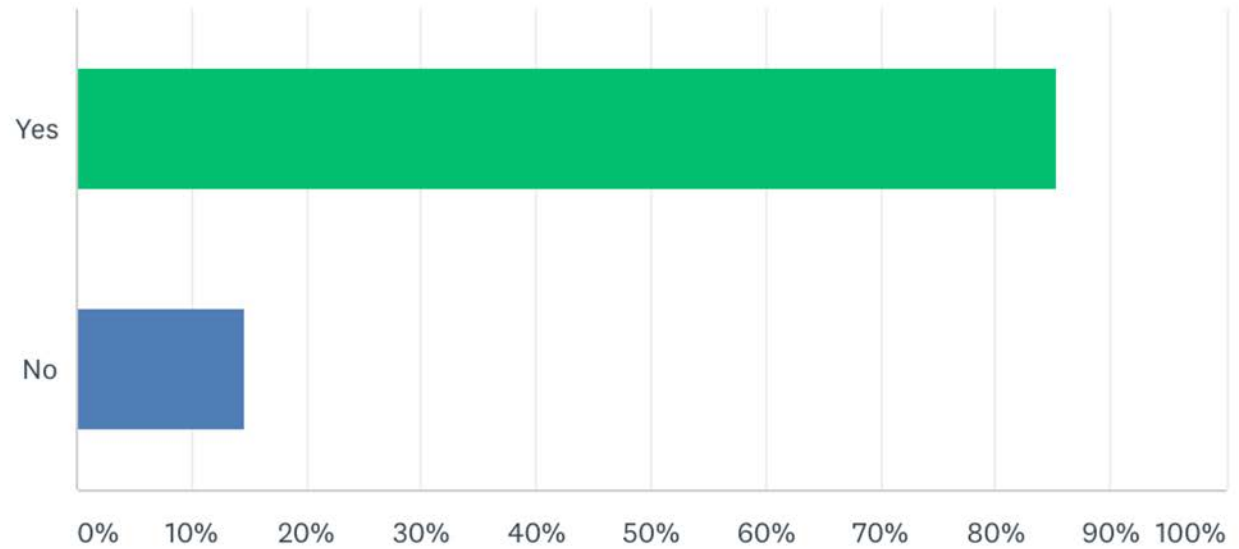


Require Specific ST Morphology?



Do you transmit EKGs?

Answered: 34 Skipped: 0

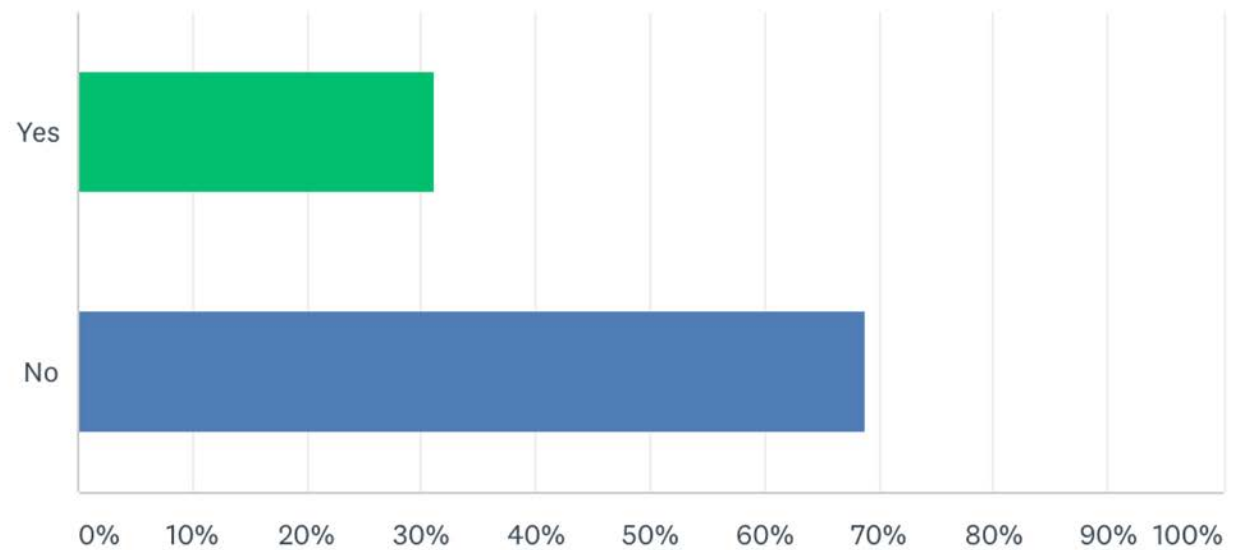


ANSWER CHOICES	RESPONSES	
Yes	85.29%	29
No	14.71%	5
TOTAL		34



Do you transmit EKGs directly to cardiology?

Answered: 32 Skipped: 2



ANSWER CHOICES

RESPONSES

Yes	31.25%	10
No	68.75%	22

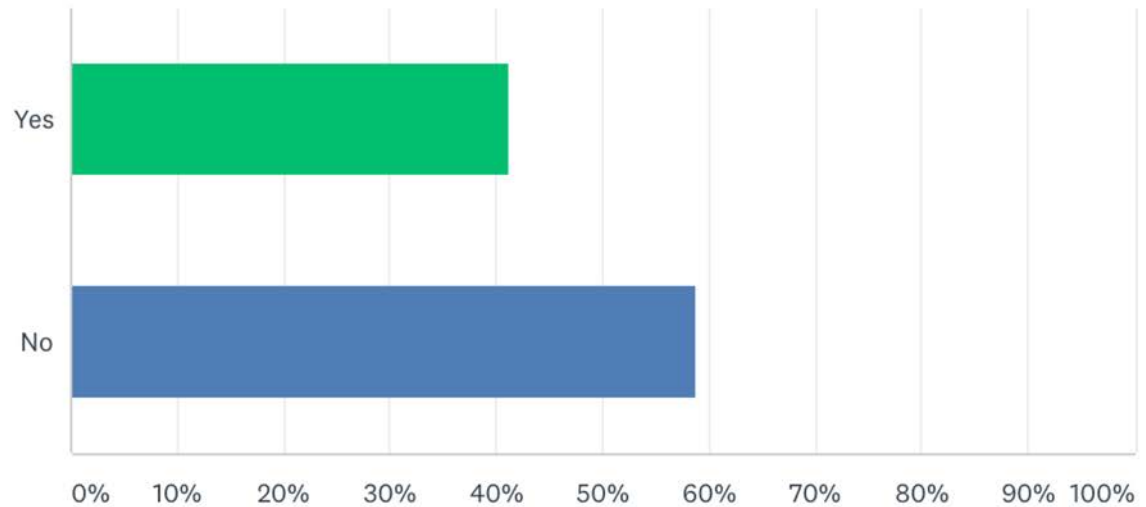
↑ EMERGENCY

↑ Main Entrance

↑ Entrance A | B

Do you bypass ED in most or all cases and go directly to cath lab?

Answered: 34 Skipped: 0

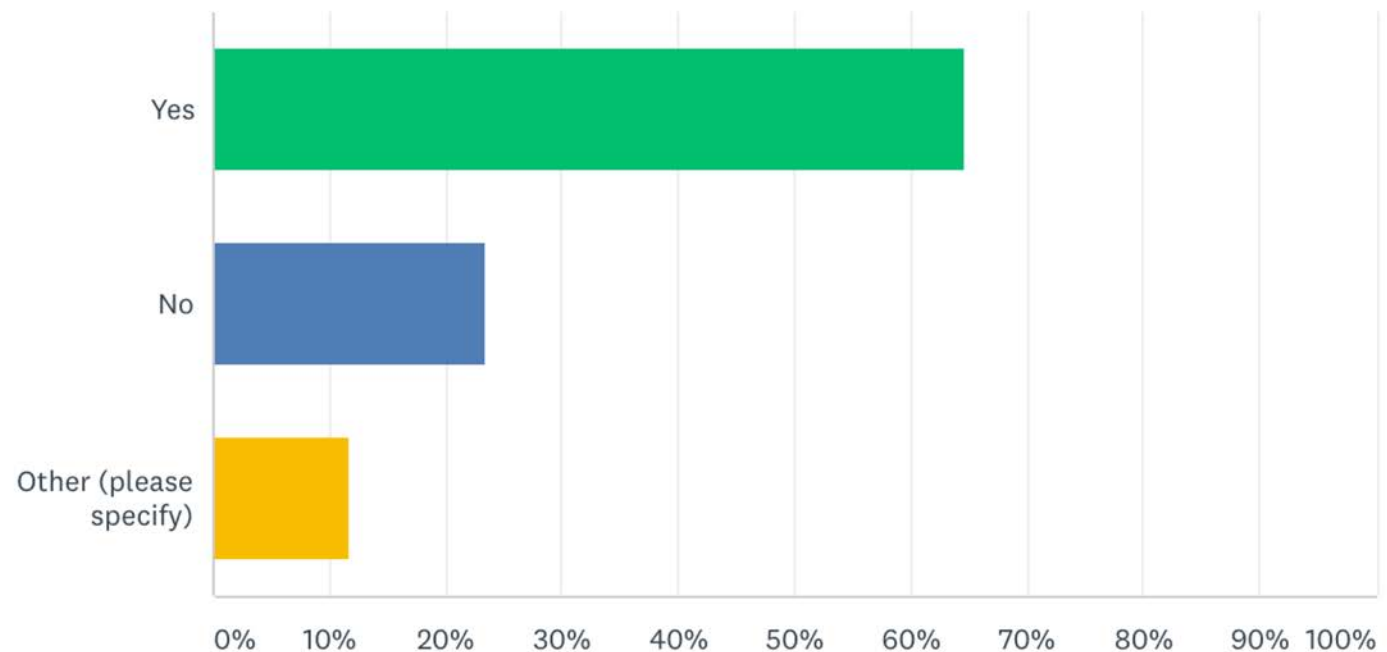


ANSWER CHOICES	RESPONSES	
Yes	41.18%	14
No	58.82%	20
TOTAL		34



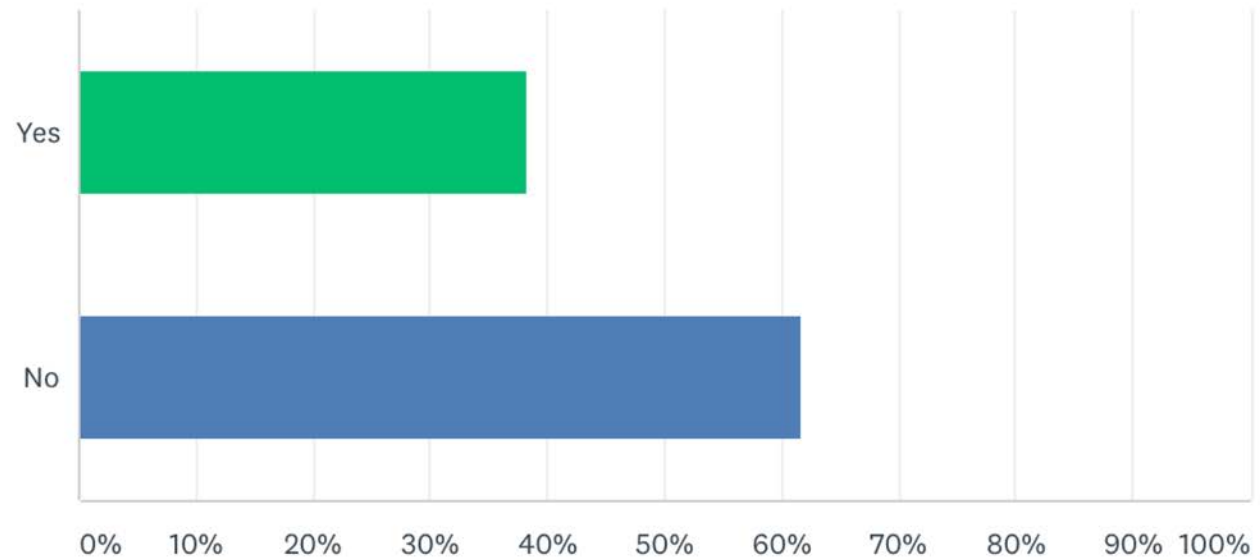
Do you use STEMI criteria of 1mm in contiguous limb leads, precordial 2mm V2V3 (males) 1.5 mm V2V3 (females) AHA/ACC criteria?

Answered: 34 Skipped: 0



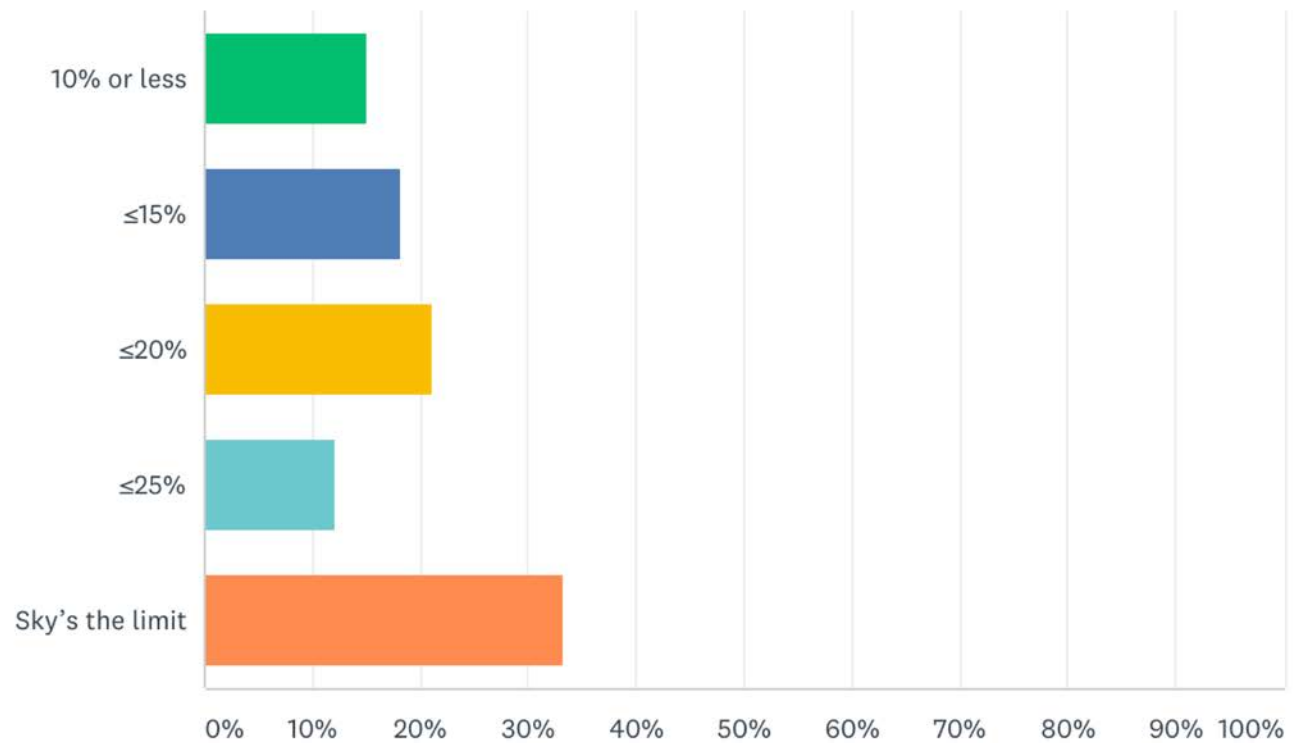
Is chest pain/pressure or anginal equivalent such as SOB required for activation?

Answered: 34 Skipped: 0



What level of “overtriage”, alerts without intervention are considered tolerable in your system?

Answered: 33 Skipped: 1



Do you have
any questions?





For More Information

W. Scott Gilmore
gilmorew@stlouis-mo.gov
@EMSMD

Jeffery L. Jarvis
jjarvis@wilco.org
@DrJeffJarvis

Michael K. Levy
mike.levy@anchorageak.gov
@mklevy10