



Who ya gonna  
call?

# PRIORITY PARITY OR DISPATCH MISMATCH?

An 'experiment' in 911 call-processing & Fire first-response

*Neal J. Richmond, M.D.*

# TWO SIMPLE OBJECTIVES

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- ✖ Try and set a new all time low for bad Eagle jokes
- ✖ Spend a few minutes talking about something or other to do with EMS





## BRIEF UPDATE FROM EAGLE CREEK

# PAUL PEPE

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***“YOU CAN’T JUST LEAVE THAT ‘LYIN THERE”***





THAT'S NOT A 'LYIN, THAT'S MY EAGLE"



# COREY SLOVIS





# Aggressive airway management

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# RAY FOWLER

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# CHEERLEADER CONVENTION AT HOTEL









# DAVE MIRAMONTES



# LOTS OF MEDIA BUZZ





# CURRENT STATUS





# PREDICTIVE MODELING

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# SIMPLE MESSAGE

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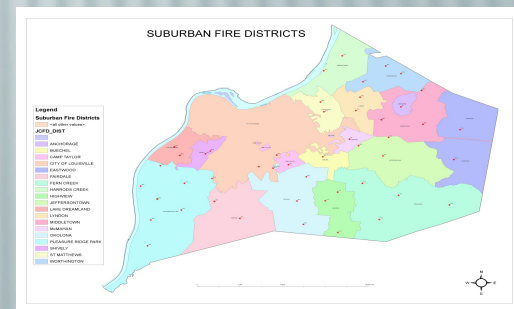
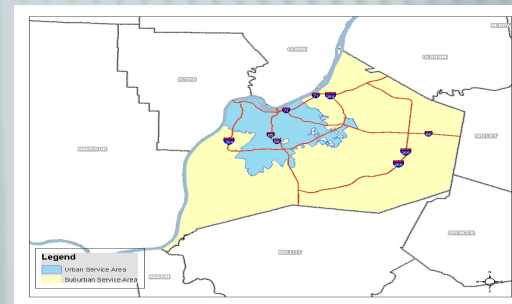
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- × Something or other to do with EMS
  - + Calls come into 911
  - + They get assigned a priority
  - + Is it reasonable use those priorities to determine how your system responds?
  - + You don't have to do this in brute force fashion



# A SNAPSHOT OF LOUISVILLE

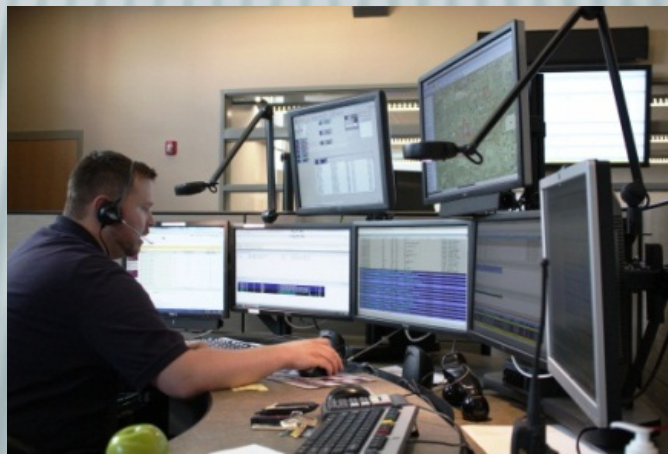
- × 16<sup>th</sup> largest city
  - + 750k population
    - × > 1 million during working hours
  - + 384 square miles
  - + 100k individual EMS calls-for-service
- × Tiered 911 EMS response
  - + 3<sup>rd</sup>-service EMS (BLS/ALS)
  - + Fire first-response (BLS)
    - × One urban fire district
    - × 18 suburban fire districts



# LOUISVILLE

## 911 call processing

- ✖ MPDS Pro-QA
- ✖ A few-hundred major call-types
  - + Over a-thousand once you count suffixes & modifiers
- ✖ 6 priority designations
  - + ECHO, DELTA, CHARLIE, BRAVO, ALPHA, OMEGA





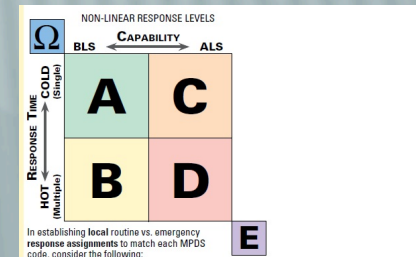
# FIRE FIRST-RESPONSE TO EMS CALLS

- ✗ Prior to the new 3<sup>rd</sup>-service
  - ✗ No universal standardized Fire response to EMS calls
- + Subsequently standardized using MPDS Pro-QA
- ✗ Since then, Suburban Fire Districts have reduced responses
  - ✗ ECHOs, some DELTAS & a few CHARLIES, etc
- ✗ July 1, 2013, most SFDs → ECHOs only (1% of all calls)
  - ✗ Limited personnel and financial resources
  - ✗ Focus on calls where “we can make a difference”
- ✗ Good or bad idea?



# CALL-TAKING AND DISPATCH 101

- ✖ Variety of call-processing platforms
  - + MPDS/Pro-QA, APCO, Powerphone, etc.
- ✖ Assign a call-type and corresponding priority designation
- ✖ Sickest patients get the fastest/most appropriate response
  - + Who goes first and what resources gets dispatched
    - ✖ BLS, ALS, or both; Fire, EMS, or both
- ✖ Use precious resources efficiently
  - + Don't divert resources to less sick patients when sicker ones are waiting
  - + Don't spend precious resources where they're not needed





# IN A PERFECT WORLD...

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## Louisville

- ✖ ECHO call-type would be highly 'sensitive'
  - + All cardiac/respiratory arrests typed & dispatched as ECHOs
  - + No arrests categorized as lower priority call-types
    - ✖ Where they might not get the fastest response
  - + Ideally, you want the
- ✖ ECHO call-type would be very 'specific'
  - + No lower priority non-arrests typed & dispatched as ECHOs
  - + Patients who aren't very sick don't get a high-priority response



# A LITTLE LIKE FISHING

- ✗ You'd want your net (ECHOs) to be fine enough to catch all the big ones (arrests) without letting any slip through
- ✗ But you wouldn't want the net (ECHO) to be so fine that you'd glom things by up catching all the little ones too (non-arrests)





# THE SAD TRUTH

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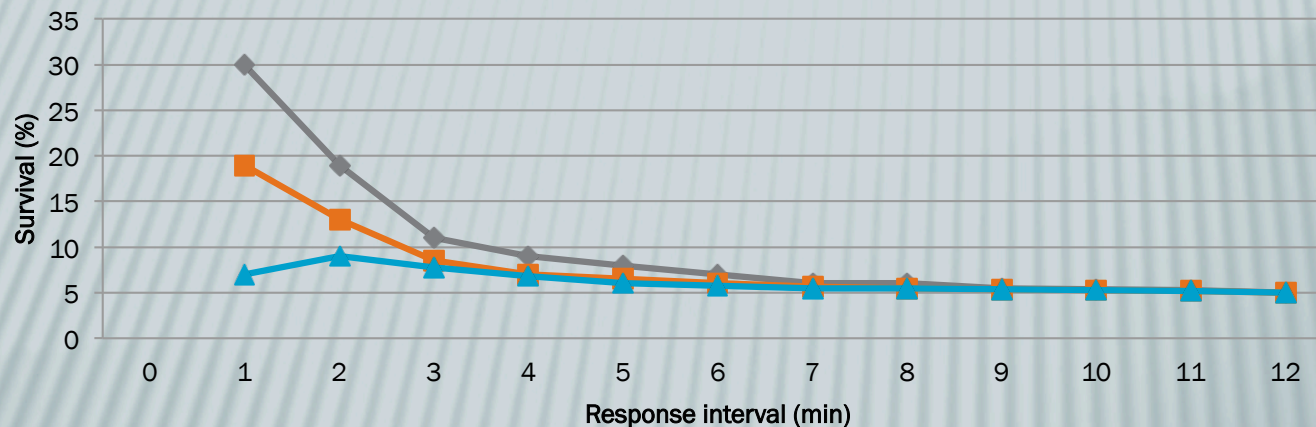
## No perfect 911 call-processing system

- ✗ 2<sup>nd</sup>, 3<sup>rd</sup> or 4<sup>th</sup>-party callers with limited to no medical training
- ✗ Communicate subtle findings by phone
- ✗ From an often difficult scene
- ✗ The difference between an arrest getting typed & dispatched as an ECHO vs. DELTA only a mouse click away
- ✗ Arrest taking last few agonal respirations perceived as 'patient is breathing' → DELTA
- ✗ COPDer not in arrest, but about to stop breathing → DELTA



# BOTTOM LINE: WHAT WE TRIED TO EXPLAIN

CPR & defibrillation < 4-5 minutes



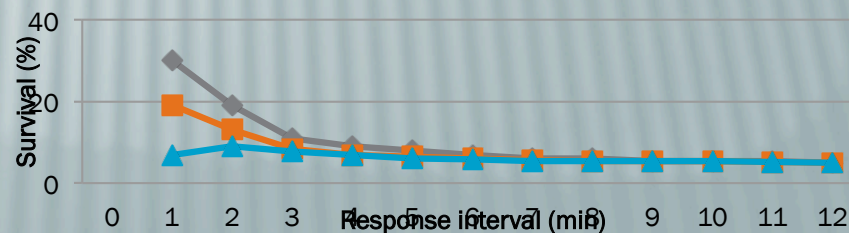
- × EMS transport resources not designed for this
- × Fire systems built to handle first-response
  - + Battalions in every neighborhood/on every corner
  - + Resources typically more available
    - × Declining suppression demand



# WHAT WE TRIED TO EXPLAIN

## 911 call-processing algorithm

- ✗ Never made to catch all arrests in highest priority type (ECHOs)
- ✗ ECHO not all that sensitive for arrests
- ✗ So, if you only send Fire on ECHOs, then many patients in cardiac arrest are never going to see a first-responder
- ✗ Lose valuable time in doing early CPR and rapid defibrillation



# To add insult to injury

- + For those who are about to, or already have stopped breathing (respiratory failure/arrest) some of those are going to become cardiac arrests without early aggressive airway intervention
- + Bottom line: a whole lot of these cases are going to show up in a variety of other call-types (BRAVOs & CHARLIEs, as well as DELTAs)





# DATA COLLECTION/ANALYSIS

July 1, 2012–June 30, 2013

- ✗ No matter how these calls get typed, prioritized & dispatched
- ✗ EMS crews verified patient in cardiac arrest/respiratory failure
- ✗ Query the EMS electronic patient care reporting system
  - + (Zoll RescueNet)
- ✗ All patients who got CPR or assisted ventilations:
- ✗ “Arrests”



# DATA COLLECTION/ANALYSIS

Correlated these runs with the 911 CAD system

- ✗ On how many was Fire 1°- dispatched?
- ✗ Based on this data, project how many will Fire be 1°- dispatched on when they go to ECHO-only
- ✗ How much delay is introduced when Fire is not 1°- dispatched?

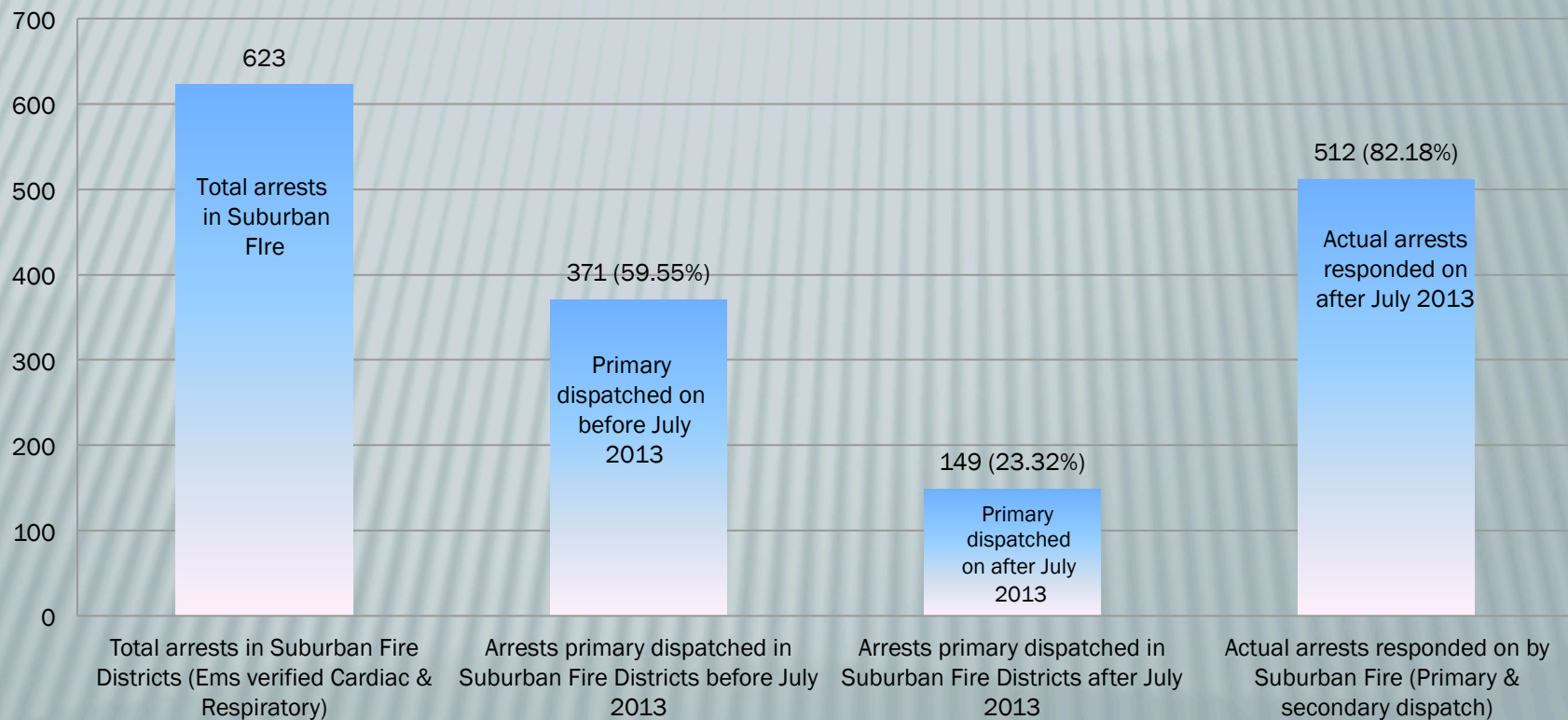


John Zimmerman of the Durham 911 center



# ARREST DEMAND BEFORE & AFTER

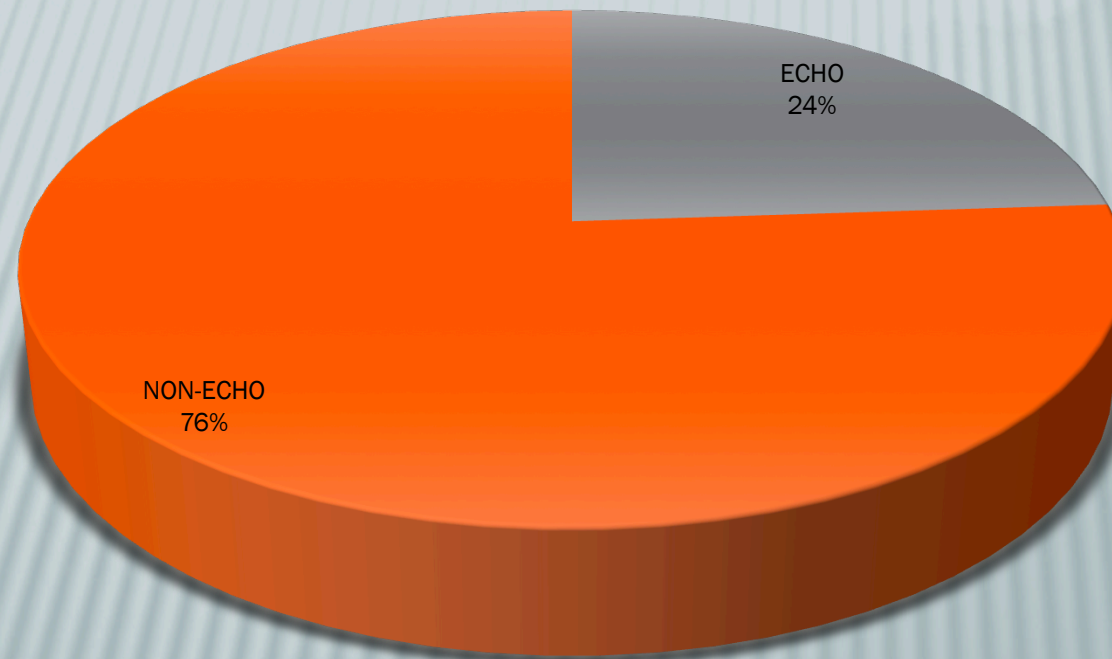
## Arrest demand for Suburban Fire Districts before and after July 2013



# RESULTS

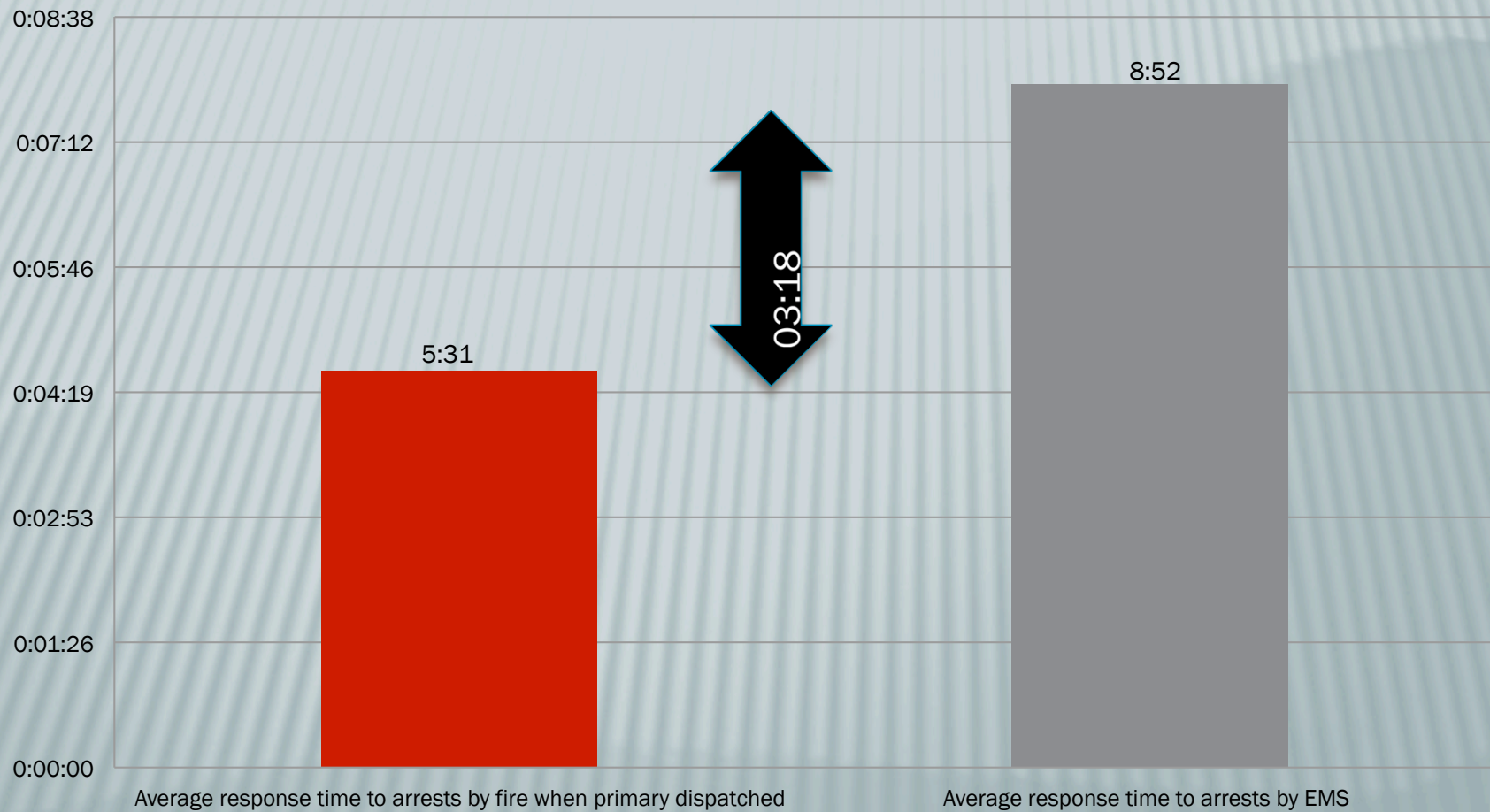
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Cardiac & respiratory arrests by call-type & priority



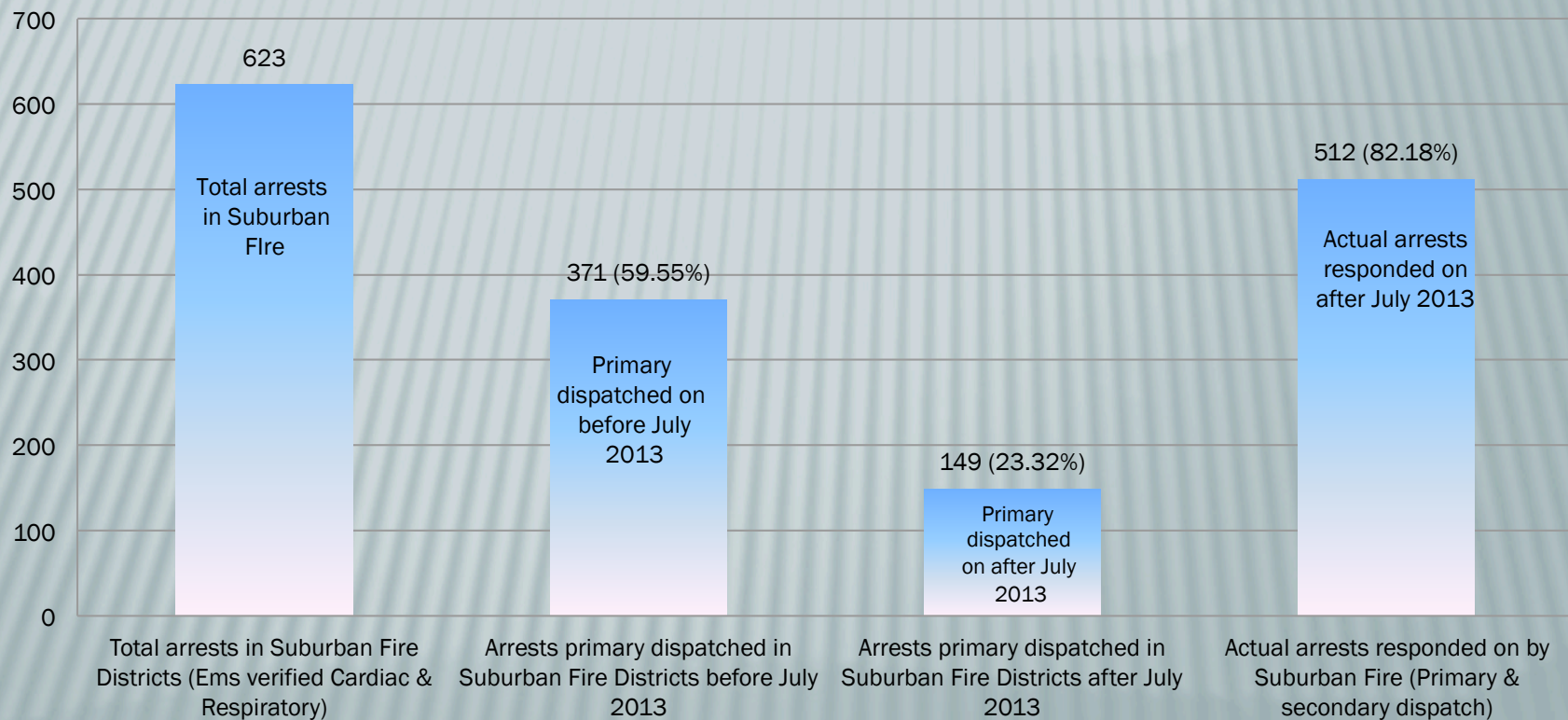


# FIRST ON-SCENE RESPONSE TIME



# ARREST DEMAND BEFORE & AFTER

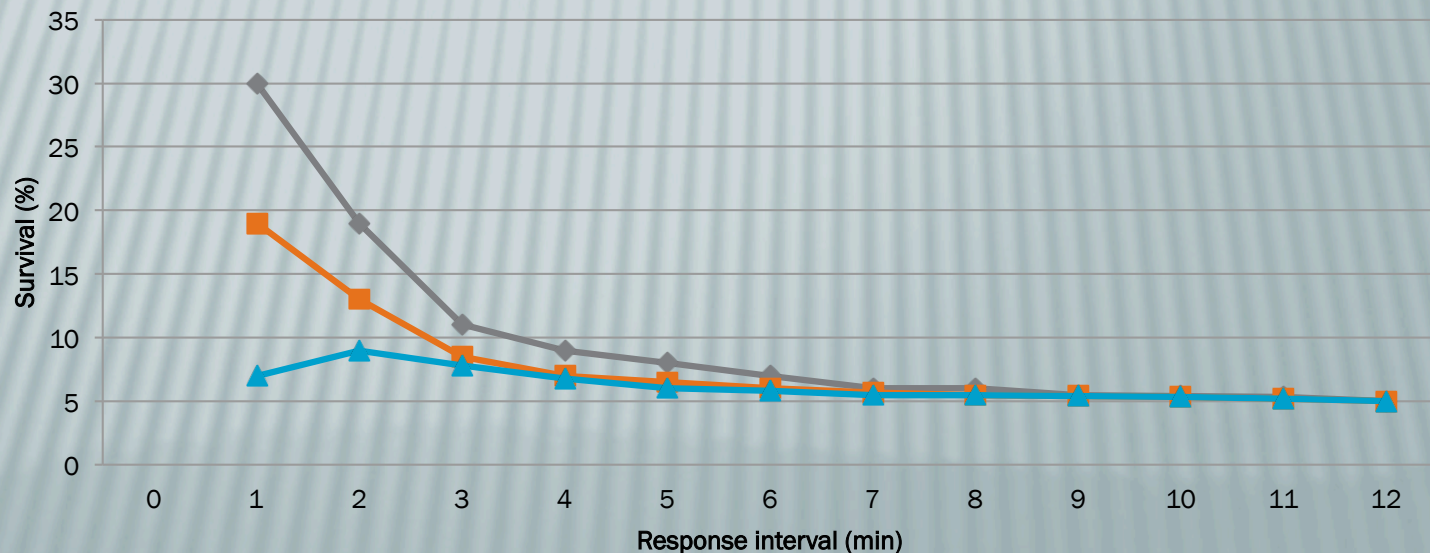
## Arrest demand for Suburban Fire Districts before and after July 2013





## and to add DOUBLE INSULT TO INJURY

- + Even though First-responders don't get 1° dispatched on these non-ECHO cardiac and respiratory arrests
- + They're still going to end up getting 2° dispatched once EMS arrives on-scene and calls for back-up
- + But now it's a lost opportunity



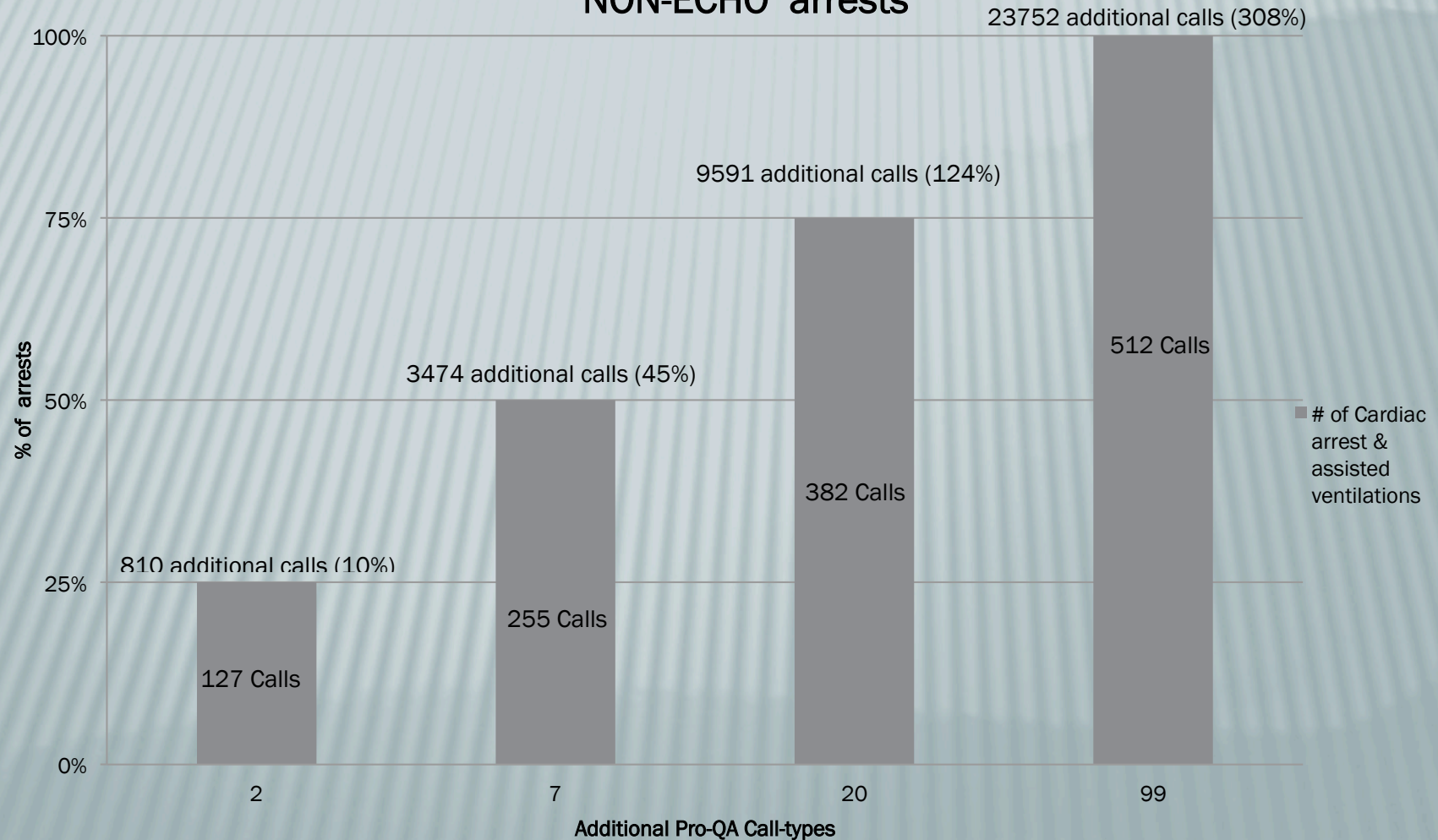
# SO WHAT DO YOU NEXT NEXT?

- × How to pick-up more of these non-ECHO arrests?
- × Without picking up too much demand?
- × Do you just brute force it
  - + Blindly starting adding on some or all of the DELTAs & maybe CHARLIEs too
- × Or can you use our own data to tailor make your responses
- × Focus specifically on those call-types where the really time sensitive calls--cardiac & respiratory arrests hang-out?



# Pick-out arrest call-types

Predicted added 911 call-volume & call-types required to pick-up  
NON-ECHO arrests



# MORE TO FOLLOW

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- × Completed a pilot
- × Currently negotiating picking up more demand, but in a more focused fashion, to pick up more arrests