

# VANCE COUNTY EMS AMBULANCE DISTRIBUTION

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Big picture: What is the problem?

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Background and context

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What are our options?

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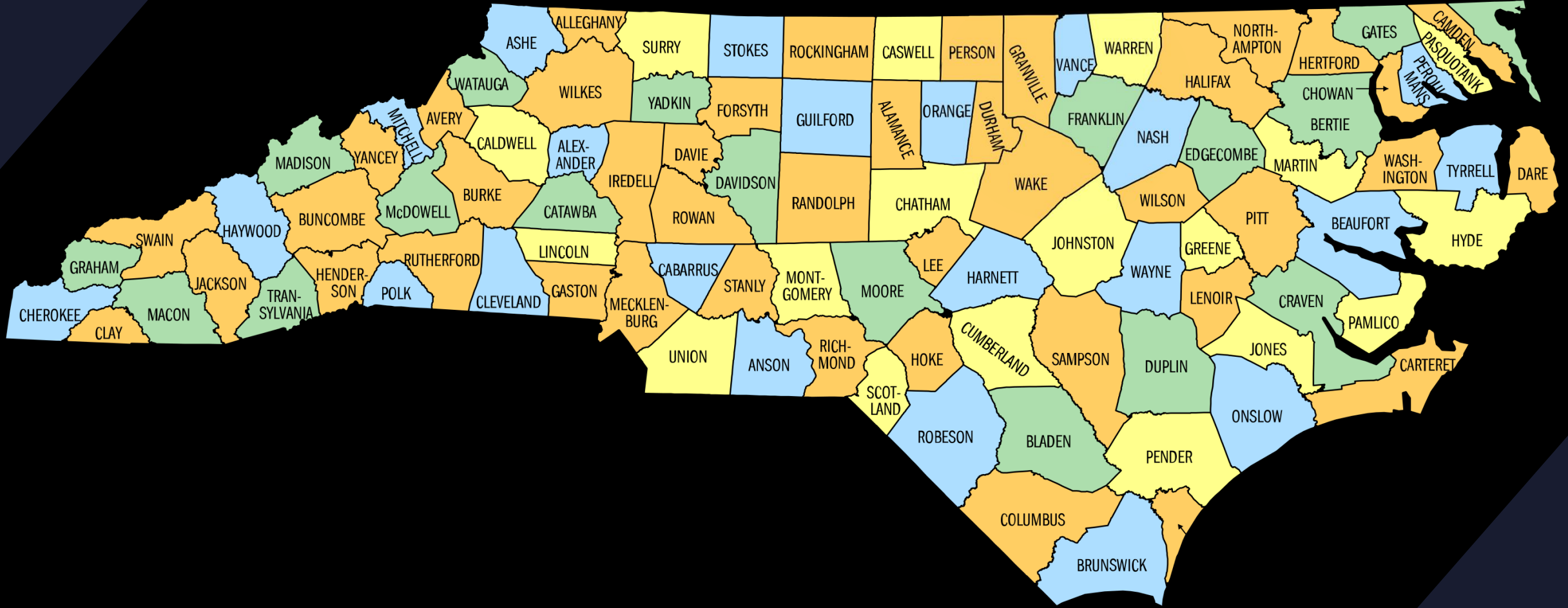
The data

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# BIG PICTURE

Vance County EMS has 4  
ambulances. Where do we  
put these trucks to best  
serve our population?

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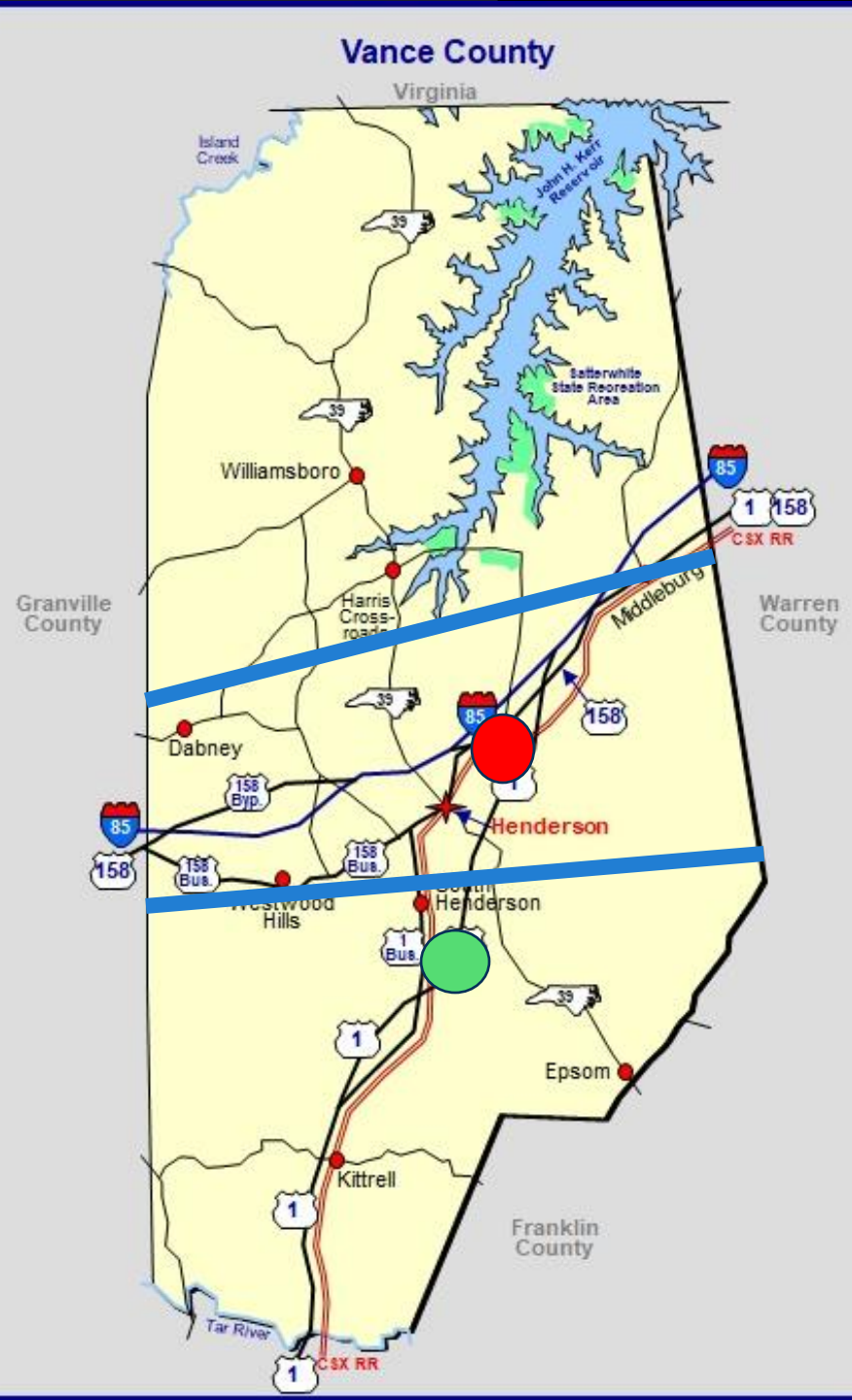




- Population of 45,000
- Landmarks
  - City of Henderson
  - Kerr Lake
  - Interstate 85
  - Route 1
  - Route 39

# Vance County EMS 101

- County-based 911 agency
- 8,000 EMS calls per year
- North, South, Central districts
- 2 EMS stations
  - central station with 3 units
  - south station with 1 unit



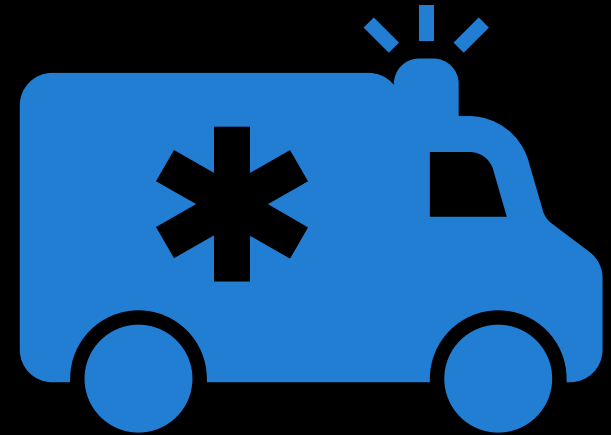
So, what is wrong?

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# An Underserved North District

- EMS response times to the north district are significantly delayed
  - Call demand is quickly growing in the north district
  - Greater travel distance puts stress on the entire EMS system
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# Delayed Emergent Response Time in the North

## Averages

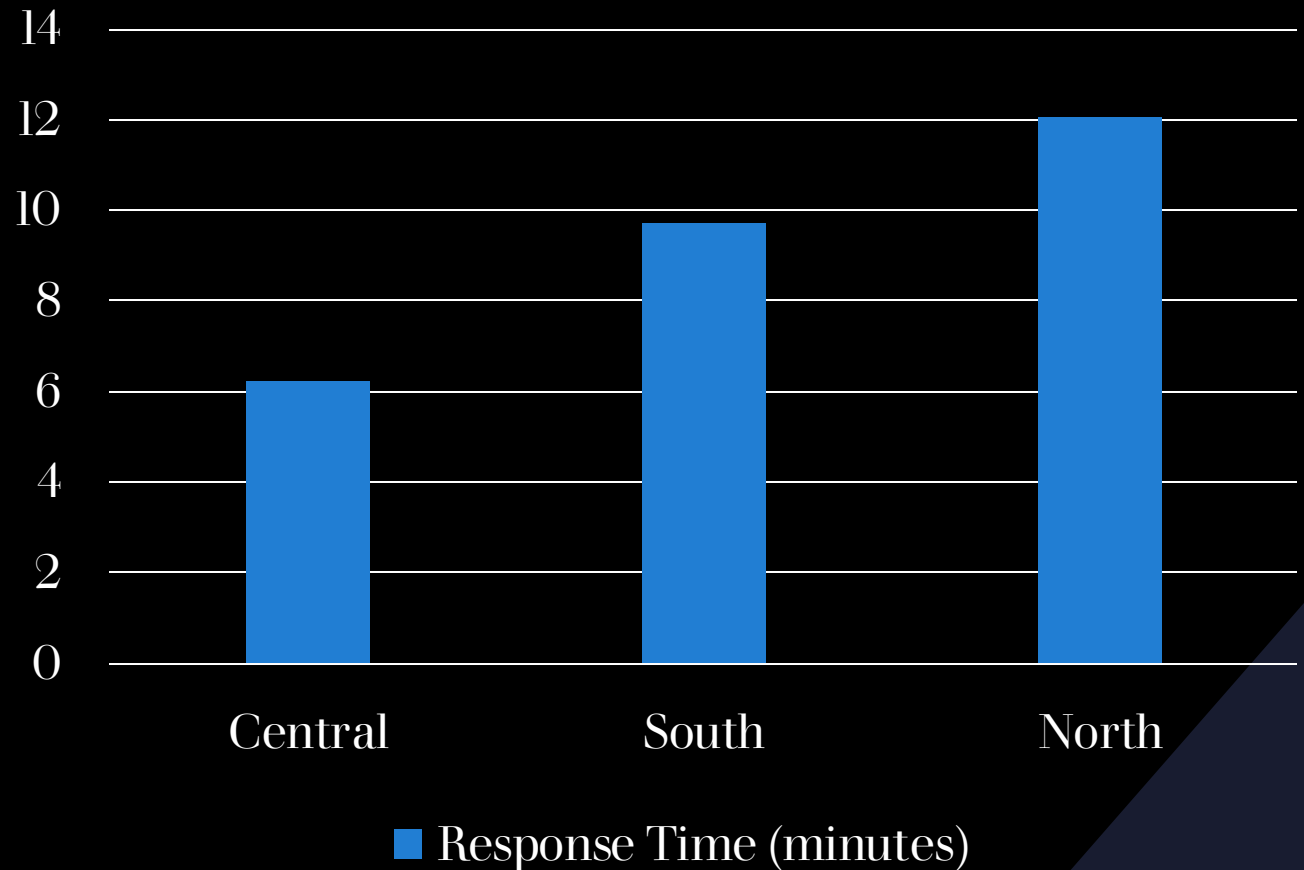
Central - 6:14

South - 9:43

North - 12:05

These are averages, north responses can take as long as 25 minutes!

District Average Response Time



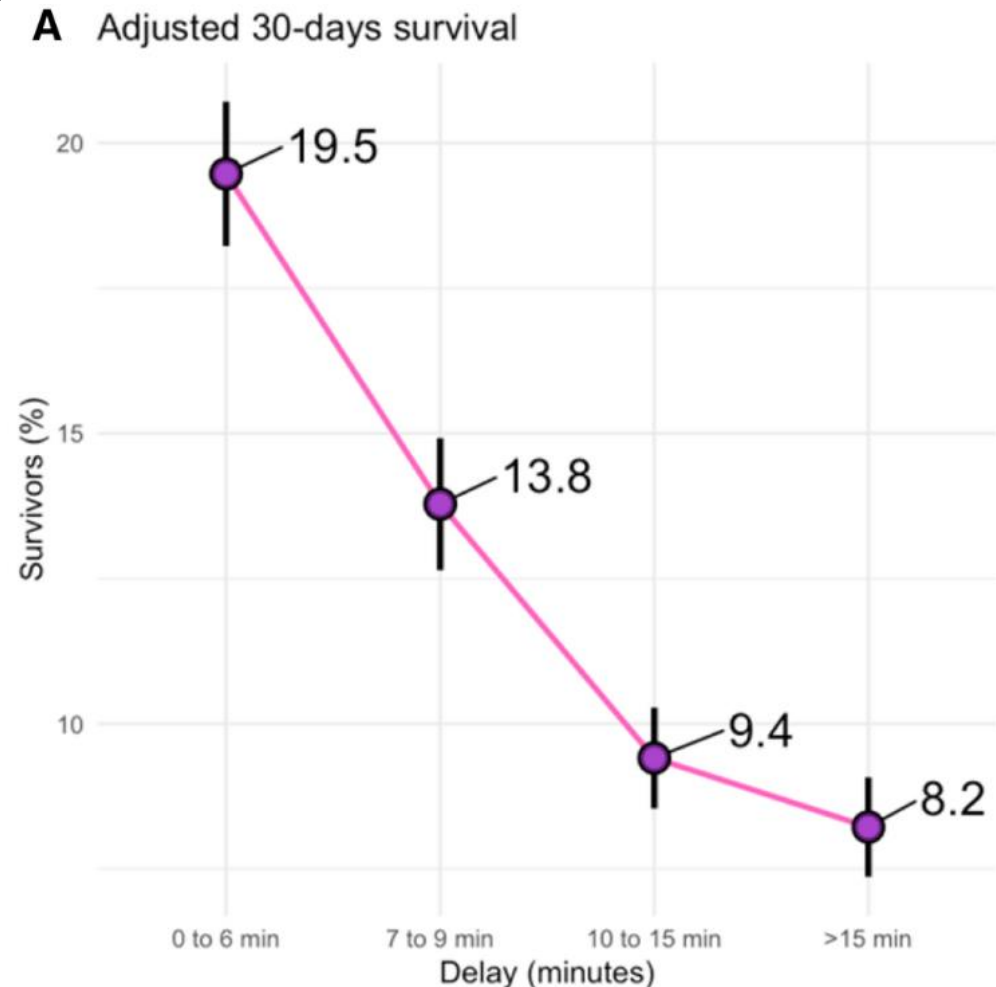
Data from 2019-2022

# RESPONSE TIME MATTERS

EMS response time has significant impact on cardiac arrest, penetrating trauma, brain injury, stroke, overdose, and many other emergencies

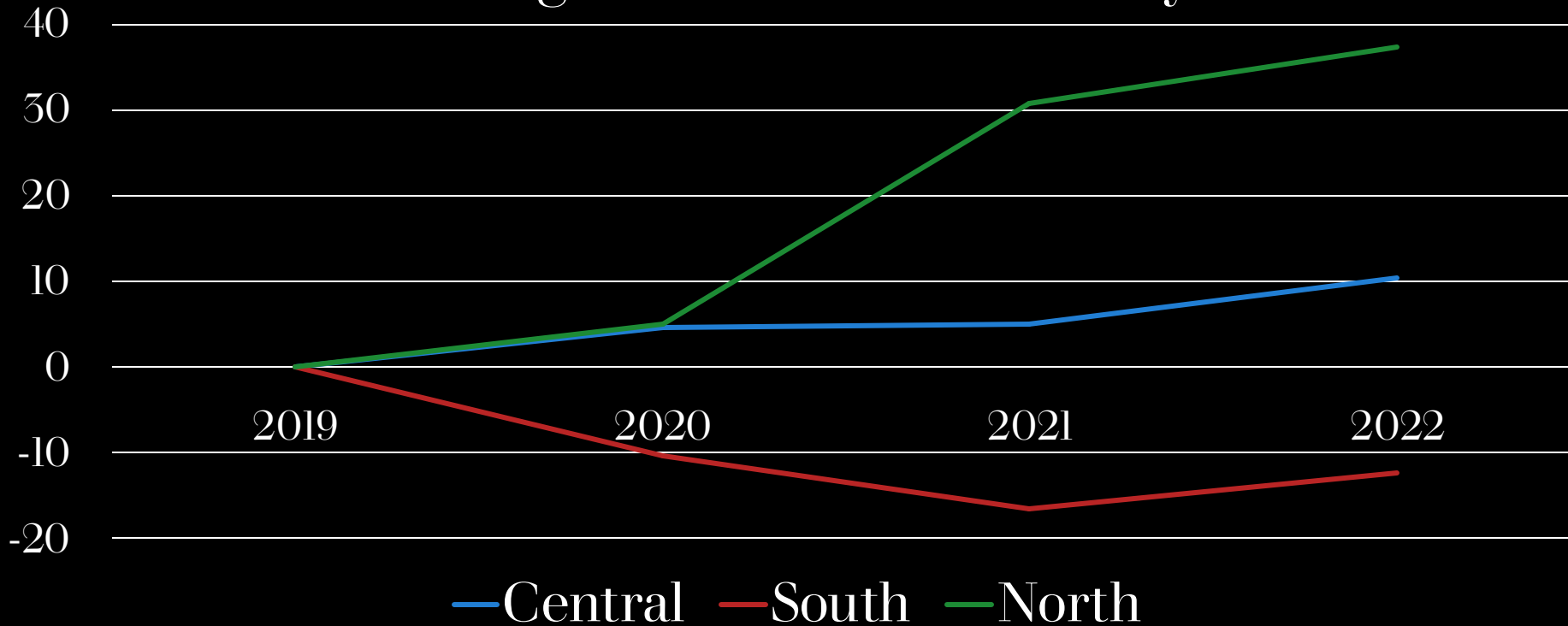
(Rawshani et al., 2020)

## Cardiac Arrest



# North District EMS Demand is Quickly Growing

Percent Change in 2019 Call Volume by District



Call volume county wide increased by 9% while north calls increased by 37%

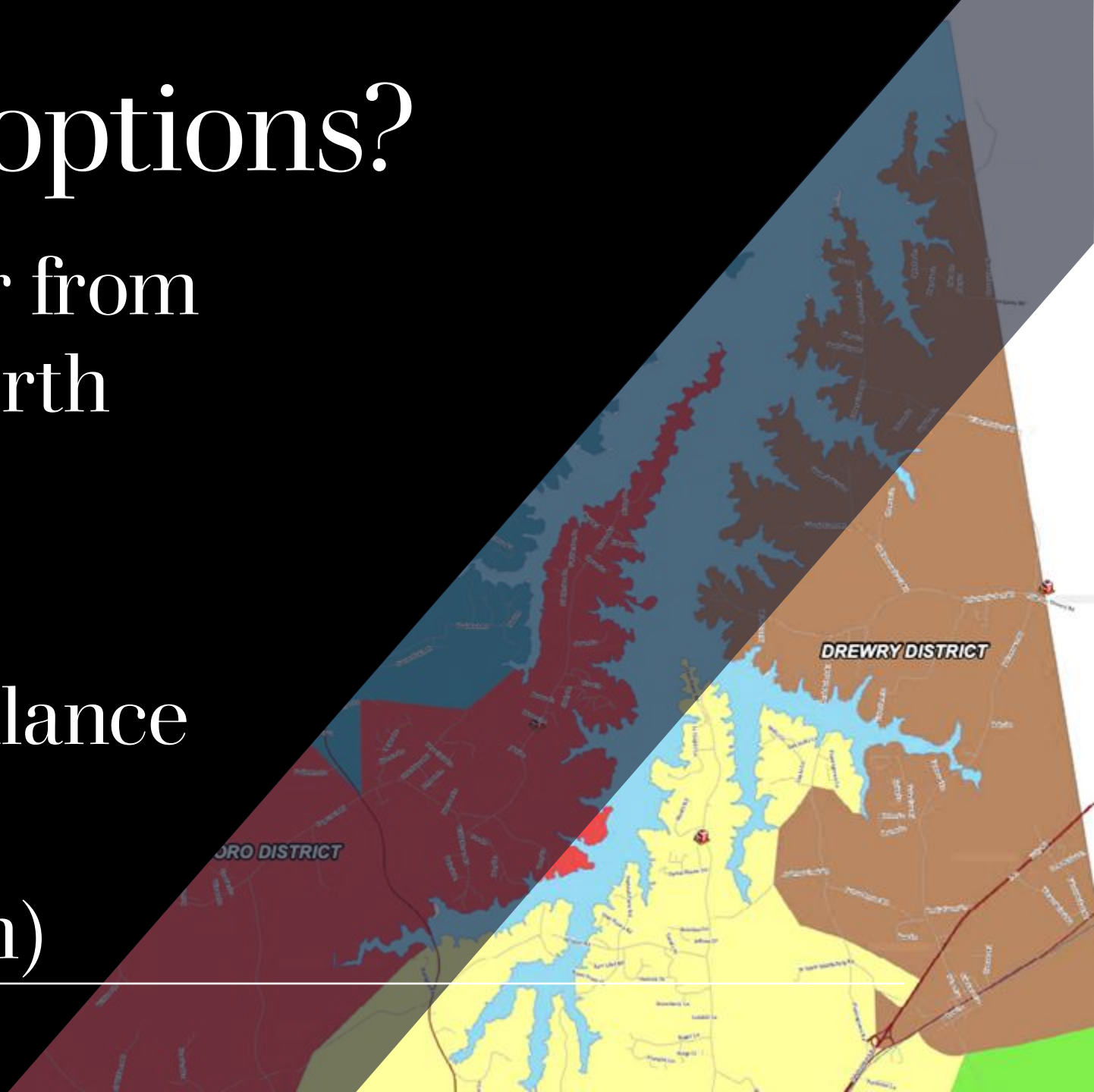
# What are our options?

Move ambulance four from  
the south to the north  
district

or

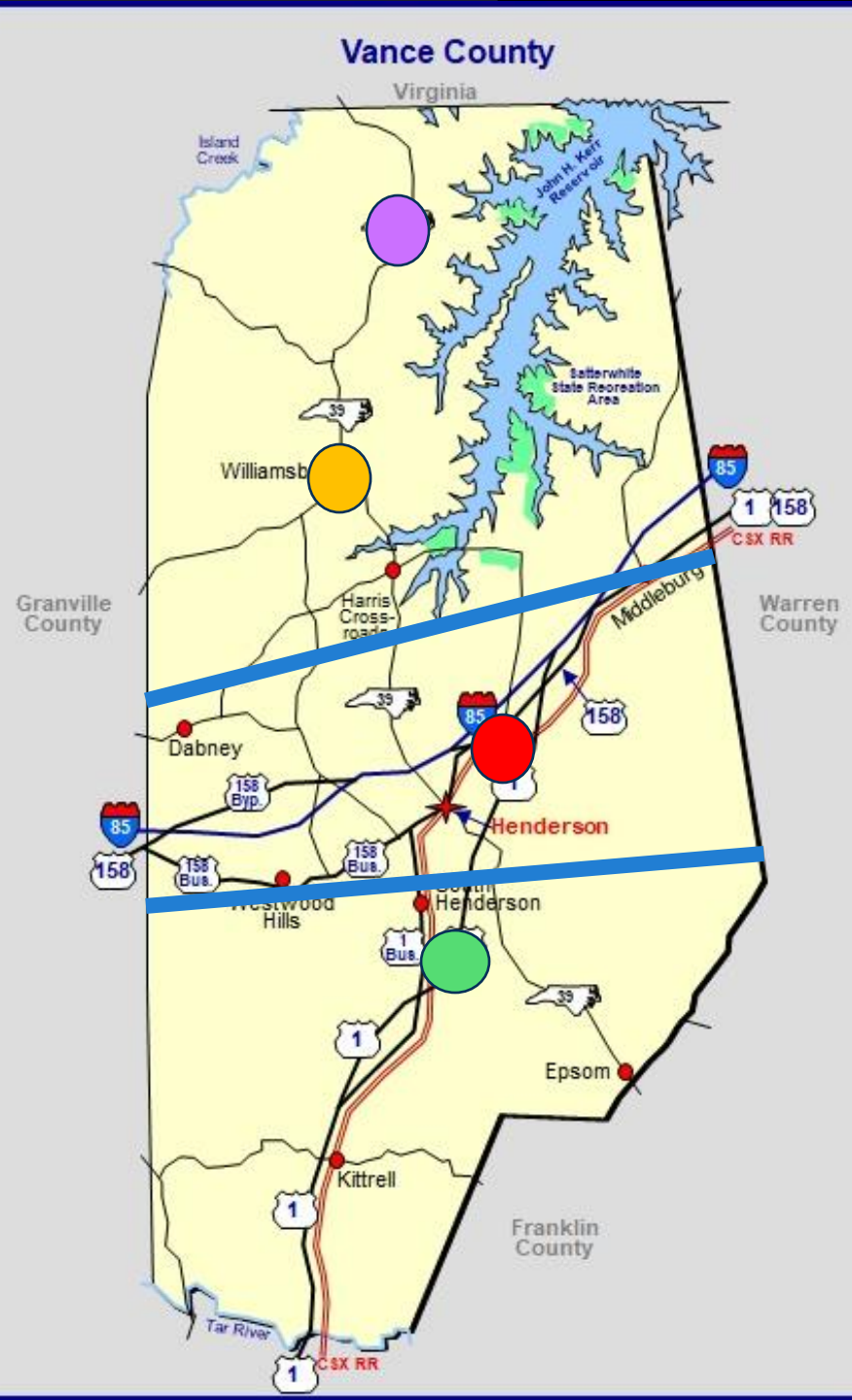
Move a central ambulance  
up north  
( 1:2:1 distribution)

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# North Station Options

- Central station
- South station
- North option 1
- North option 2



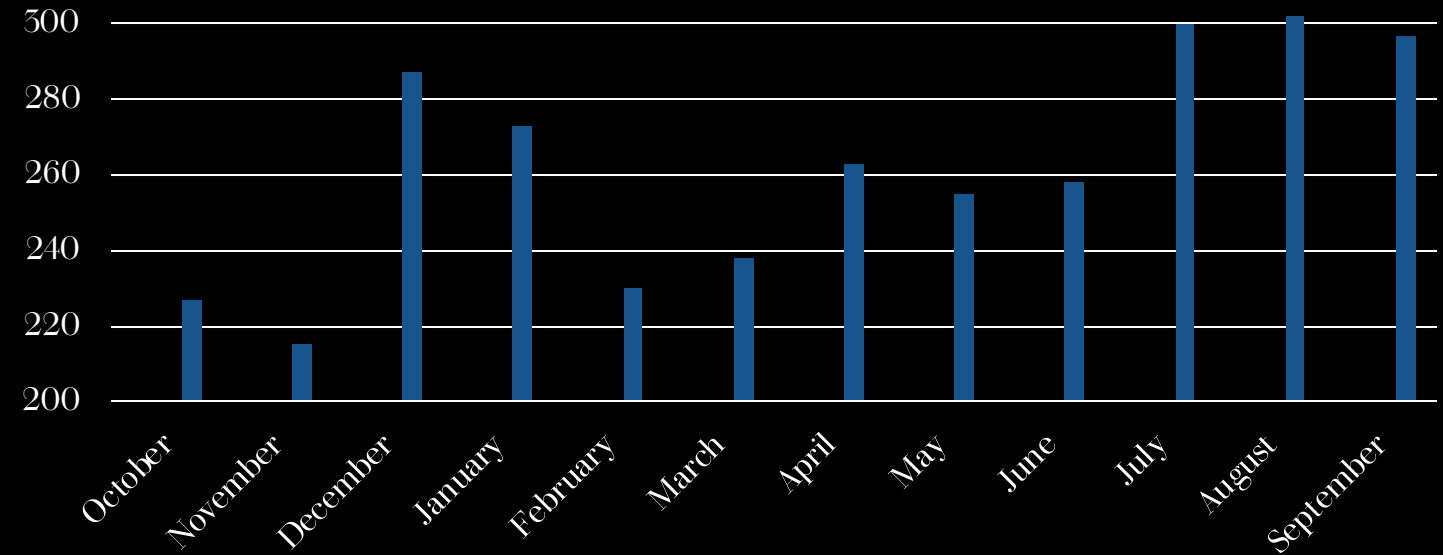
# What do I hope you will be able to tell us?

1. Which north station would result in faster response times?
  2. Would it be better to move the south truck up north or a central truck up north?
  3. How much benefit does having that north station offer? Is it even worth it?
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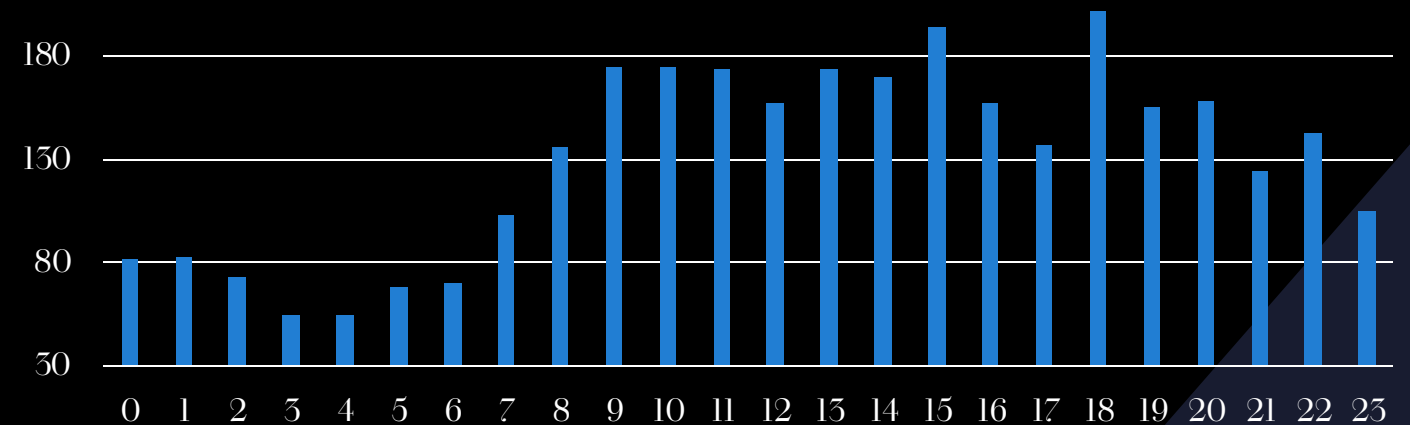
# Predictable Call Fluctuations

A peak-load truck  
could be utilized by  
season to maximize  
coverage and  
minimize unused  
resources

North Calls by Month from 2019-2022



North Calls by Hours of the Day 2019-2022





# The Data

- Originates from EMS provider written charts
  - Each row is a chart
  - HIPAA protected data so you will be working with a mock dataset
  - Methods you deliver will be applied to the real dataset and used to inform policy
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		DISPATCH	REF	REF									
INDEX	CALL GRID	PRIORITY	GPS LAT	GPS LON	BASE NAME	UNIT	UNIT GPS	DISPATCHED	ENROUTE	ARRIVE	LEAVE REF	ARRIVE REC	CLEAR
1	2 Central	Non Emergency	36.33	-78.402	Company 9	Medic 2	36.345055,- 78.390426	1/1/01 00:04	1/1/01 00:04	1/1/01 00:09			1/1/01 00:29
2	2 Central	Emergency	36.317	-78.36	Company 9	Medic 1	36.345055,- 78.390426	1/1/01 01:19	1/1/01 01:20	1/1/01 01:32	1/1/01 01:37	1/1/01 01:50	1/1/01 01:59
3	2 Central	Emergency	36.341	-78.413	Company 9	Medic 6	36.345055,- 78.390426	1/1/01 02:07	1/1/01 02:08	1/1/01 02:11	1/1/01 02:40	1/1/01 03:01	1/1/01 04:02
4	1 North	Emergency	36.482	-78.423	Company 9	Medic 2	36.345055,- 78.390426	1/1/01 02:26	1/1/01 02:27	1/1/01 02:44	1/1/01 03:04		1/1/01 03:04
5	2 Central	Emergency	36.358	-78.457	Company 9	Medic 1	36.345055,- 78.390426	1/1/01 02:30	1/1/01 02:31	1/1/01 02:48	1/1/01 03:06		1/1/01 03:06
6	2 Central	Emergency	36.331	-78.41	Company 1	Medic 3	36.276142,- 78.401741	1/1/01 02:41	1/1/01 02:41	1/1/01 02:52	1/1/01 03:15	1/1/01 03:32	1/1/01 04:06
7	2 Central	Emergency	36.331	-78.449	Company 9	Medic 6	36.345055,- 78.390426	1/1/01 04:19	1/1/01 04:19	1/1/01 04:25	1/1/01 04:37	1/1/01 04:55	1/1/01 06:31
8	3 South	Emergency	36.289	-78.437	Company 1	Medic 3	36.276142,- 78.401741	1/1/01 06:03	1/1/01 06:04	1/1/01 06:16	1/1/01 06:37	1/1/01 06:45	1/1/01 07:10
9	2 Central	Non Emergency	36.321	-78.394	Company 9	Medic 2	36.345055,- 78.390426	1/1/01 06:49	1/1/01 06:50	1/1/01 06:57	1/1/01 07:08	1/1/01 07:19	1/1/01 07:32
10	2 Central	Emergency	36.323	-78.417	Company 9	Medic 1	36.345055,- 78.390426	1/1/01 08:16	1/1/01 08:16				1/1/01 08:20

# Odd things you may encounter

- Out of order units
  - Multiples lines for the same call = multiple patients
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# How might you approach this question?

- Google Maps API to estimate response and transport times
  - Assumptions can be applied to simplify
    - Units always responding from their home station
    - No traffic
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# Questions?

