An analysis of EMS and fire response times in Boone County

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General notes

- Notable findings are in bold.
- All calculations were made after filtering for calls that were received within Boone County (there's a call nature called "MUTUAL AID (OUT OF COUNTY)").
- All average time differences were calculated after filtering for observations whose time differences are greater than zero.
- When I calculated average time differences by nature of call, I filtered for types of calls that were received 10 or more times. While this number was arbitrary, some types of calls had a really high time difference because they only occurred once, therefore skewing the data. In print, we may want to give the nature of calls with the highest average regardless of count but qualify these averages by saying these types of calls were only received a few times, so the sample size isn't very large. We may think about using count >= 30 instead as this is what statisticians consider a large sample size.
- The letters in the *Nature* column are alpha characters and represent six EMS response levels ("O" = Omega, "A" = Alpha, "B" = Bravo, "C" = Charlie, "D" = Delta, and "E" = Echo). Delta and Echo indicate the most urgent types of calls, according to an email from Katy. **We probably want to verify the order of the urgency of calls (e.g., that "A" is second-least urgent, "C" third-most urgent, etc.).** I will probably recode the *Alpha* variable as 1-6, with "*6*" being the most urgent type of call.
- **The time difference columns (*Call_Dispatch*, *Dispatch_Enroute*, *Enroute_Arrive*, *Call_Arrive*)**
    - *Call_Dispatch* is the time, in minutes, between when the call was received and the dispatch, *Dispatch_Enroute* is the time between the dispatch and when the vehicle was enroute, etc.
    - A time difference of 0.5 = 1/2 minutes = 30 seconds. So, a time difference of 0 would imply 0 minutes = 0 seconds, which doesn't make any sense, especially if it's the difference between enroute and arrive time. This is why observations with time differences of less than zero were removed.
- The data is available as an Excel spreadsheet filtered for calls that were received in Boone County and time differences greater than 0, but I'm happy to provide you with any tables you would be interested in and even the R file. You can play around with it in SQL or Excel if you'd like.

Potential issues with the data

- **Zero and negative time differences**

    - 14% of calls have a difference between call and dispatch time of zero or less.
    - 19% of calls have a difference between dispatch and enroute time of zero or less.
    - 11% of calls have a difference between enroute and arrive time of zero or less.

Most frequent types of calls

- The top 10 most frequent types ("natures") of calls were:
    - ROUTINE TRANSPORT, 15,439
    - EMS RESPONSE, 8,654
    - LONG DISTANCE TRANSPORT, 5,385
    - MEDICAL EMERGENCY, 4,406
    - 17A4 FALL, 2,915
    - 6D BREATHING PROB, 2,849
    - 17B FALL, 2,328
    - 33C EMER PT TRANSFER, 2,307
    - 10D CHEST PAIN, 2,027
    - 6D2 BREATHING PROB, 1,885

Proportion of EMS calls dispatched in under two minutes

- An email we were sent in November said "Boone County Joint Communications strives to dispatch all EMS calls for service in under two minutes."
- Clearly, the Joint Communications office isn't doing a great job of meeting this goal, as **42.5%** of calls are dispatched in less than two minutes.

Averages for the time differences

- ***Call to dispatch: 1.8 minutes***
- **Dispatch to enroute:** 1.9 minutes
- **Enroute to arrive:** 4.9 minutes
- ***Call to arrive: 8.6 minutes***
- I didn't calculate time differences for arrive to transport and transport to cleared because I assumed we weren't interested in those.

Average time differences by *Service*

- **"EMS"**
    - ***Call to dispatch: 2.1 minutes***
    - **Dispatch to enroute:** 1.5 minutes
    - **Enroute to arrive:** 6.3 minutes
    - ***Call to arrive: 9.9 minutes***
- **"FIRE"**
    - **Call to dispatch:** 1.5 minutes

    - **Dispatch to enroute:** 2.2 minutes
    - **Enroute to arrive:** 4.0 minutes
    - **Call to arrive:** 7.7 minutes
- EMS calls tend to take longer to respond to than fire ones. All of the differences are statistically significant.

Average time differences by *Alpha*

- ***Call_Dispatch***
    - O, 2.8 minutes
    - A, 2.2 minutes
    - C, 2.1 minutes
    - B, 2.0 minutes
    - D, 1.6 minutes
    - E, 1.1 minutes
- ***Dispatch_Enroute***
    - E, 2.1 minutes
    - O, 2.1 minutes
    - B, 2.0 minutes
    - D, 1.9 minutes
    - C, 1.9 minutes
    - A, 1.8 minutes
- ***Enroute_Arrive***
    - O, 6.3 minutes
    - A, 5.7 minutes
    - B, 5.0 minutes
    - E, 4.8 minutes
    - D, 4.4 minutes
    - C, 4.3 minutes
- ***Call_Arrive***
    - O, 11.2 minutes
    - A, 9.8 minutes
    - B, 9 minutes
    - C, 8.3 minutes
    - E, 8.0 minutes
    - D, 7.9 minutes
- No surprises here. It seems like they respond quicker to more serious calls on average. However, it seems like there's a long time between dispatch and enroute for Echo calls.

Average time differences by *Nature*

- ***Call_Dispatch***
    - 67O1 CNTRL BURN INVEST, 5.4 minutes
    - 28C1K STROKE, 4.2 minutes
    - 67D3 LRG OUTSIDE FIRE, 4.1 minutes
    - ROUTINE TRANSPORT, 4.0 minutes
    - 53O6 ASST CITIZEN OTHER, 3.9 minutes
    - 53A3 ANML RSQ, 3.8 minutes
    - 28C2J STROKE, 3.7 minutes
    - 28C1C STROKE, 3.6 minutes
    - 28C4J STROKE, 3.6 minutes
    - 19A1 HEART PROB, 3.6 minutes
    - Strokes, which weren't called in that often, seem to be the theme here.
- ***Dispatch_Enroute***
    - SEARCH AND RSQ, 3.7 minutes
    - 77D8 VEH COL UNSTEADY VEH, 3.6 minutes
    - 67D2O NAT COV FIRE THRT OTHER, 3.6 minutes
    - 67D2U NAT COV FIRE THRT UNK, 3.5 minutes
    - 77B2F VEH COL FIRE, 3.3 minutes
    - 52B1U FIRE ALRM, 3.3 minutes
    - 67D2R NAT COV FIRE THRT RES, 3.2 minutes
    - 67D3R LRG OUTSIDE FIRE THRT, 3.2 minutes
    - 53O5 WTR MAIN BREAK, 3.2 minutes
    - 57B3 EXPLOSION INVEST, 3.2 minutes
    - Fires seem to take a while.
- ***Enroute_Arrive***
    - 23C OD WPN, 13.5 minutes
    - 23B VIOLENT OD, 9.6 minutes
    - 26O8 SICK PRSN, 9.6 minutes
    - 127 D1G SUICIDE ATMPT GUN, 9.5 minutes
    - EMS RESPONSE UNSTABLE SCENE, 9.3 minutes
    - 26O6 SICK PRSN, 8.5 minutes
    - 26O27 SICK PRSN, 8.5 minutes
    - 127D1 SUICIDE ATMPT, 8.4 minutes
    - 26O24 SICK PRSN, 8.1 minutes
    - 77D VEH COL FIRE, 8.0 minutes
    - There were 319 calls related to suicide, which is a lot for this type of call to be in the top 10. **Clearly there is a pretty big delay when it comes to suicide attempts.**
- Find suicide calls order by response time by address
- ***Call_Arrive***

- 23 OD WPN, 18.3 minutes
- 26O8 SICK PRSN,14.5 minutes
- SEARCH AND RSQ, 13.3 minutes
- 23B VIOLENT OD, 13.2 minutes
- 53A3 ANML RSQ, 13.0 minutes
- 67O1 CNTRL BURN INVEST, 13.0 minutes
- 72D2 SWIFT WTR RSQ, 12.7 minutes
- 26O24 SICK PRSN, 12.7 minutes
- 23C1V VIOLENT OVERDOSE, 12.5 minutes
- 26O11 SICK PRSN, 12.5 minutes
- It looks like rescues and overdoses take a while.

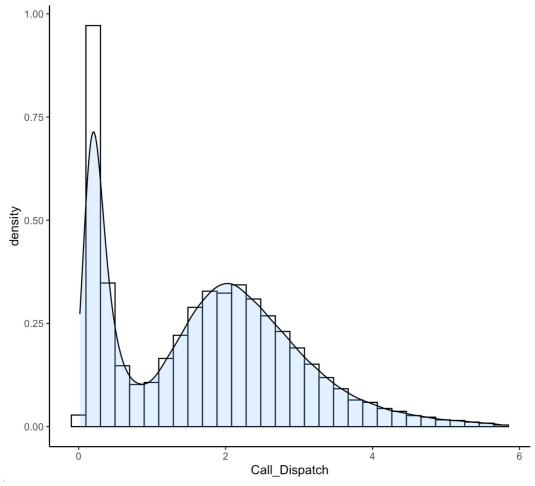
Average time differences by *Agency*

- ***Call_Dispatch***
  - BCJC, 3.9 minutes
  - BHC, 2.2 minutes
  - UHC, 2.1 minutes
  - SBCFD 1.6 minutes
  - BCFD, 1.6 minutes
  - CFD, 1.5 minutes
  - APFD, 1.3 minutes
  - CEFD, 0.7 minutes
- ***Dispatch_Enroute***
  - SPFD, 3.2 minutes
  - CEFD, 3.1 minutes
  - BCFD, 3.1 minutes
  - CFD, 2.0 minutes
  - APFD, 1.9 minutes
  - UHC, 1.5 minutes
  - BHC, 1.3 minutes
  - BCJC, 0.4 minutes
- ***Enroute_Arrive***
  - BHC, 6.6 minutes
  - UHC, 6.0 minutes
  - BCFD, 5.3 minutes
  - SBFD, 5.0 minutes
  - CFD, 3.6 minutes
  - APFD, 3.5 minutes
  - CEFD, 3.5 minutes

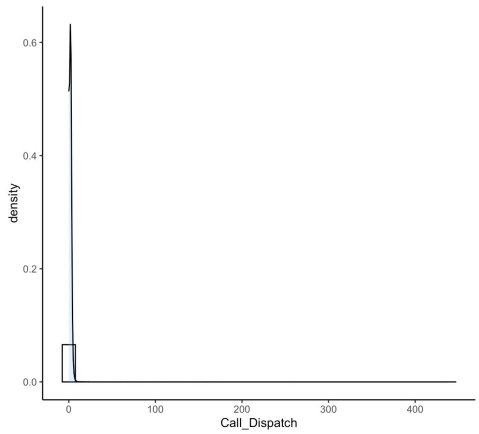
    - BCJC, 2.6 minutes
- ***Call_Arrive***
    - BHC, 10.1 minutes
    - BCFD, 9.9 minutes
    - SBFD, 9.8 minutes
    - UHC, 9.7 minutes
    - CEFD, 7.4 minutes
    - CFD, 7.1 minutes
    - BCJC, 6.9 minutes
    - APFD, 6.7 minutes

Histograms/density plots for the time differences

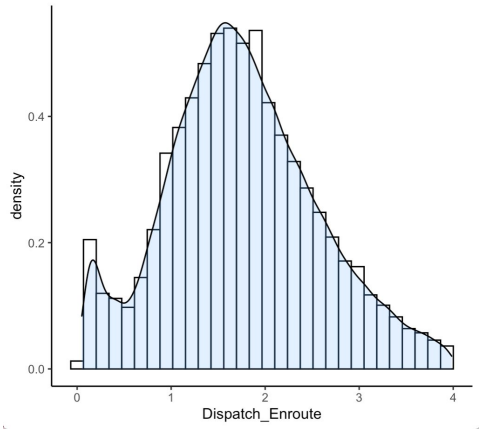
- An observation was removed and considered an outlier if its time difference was greater than Q3 + 1.5 * IQR or less than Q1 - 1.5 * IQR. This is considered common statistical practice.
- I created a separate dataframe with outliers removed that I used to plot each histogram [e.g., the dataframe I used to plot the histogram for *Call_Enroute* had all the observations in the original *ems_fire* dataset except for the observations in which the value of *Call_Enroute* was outside the range (Q1 - 1.5 * IQR, Q3 + 1.5 * IQR)].
- ***Call_Dispatch***
    - *Outliers removed*
        - 810 observations removed (1% of original dataset)
        - There seems to be a lot of calls that are dispatched in less than 30 seconds and there is another peak at two minutes.
            - Very different from the other distributions



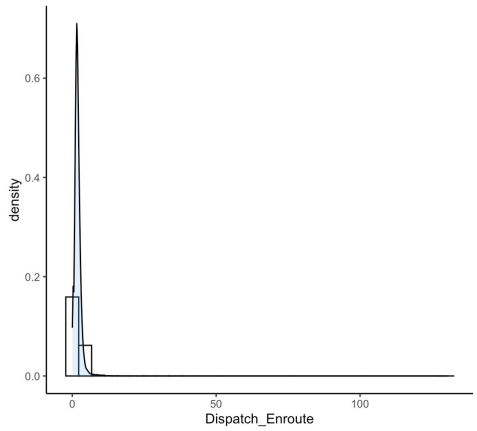
- *With outliers*
  - **There is one call with *Nature* "CITY BURN PERMIT" that has a *Call_Dispatch* of 439.2 (almost 300 minutes longer than the next call in terms of *Call_Dispatch*).**



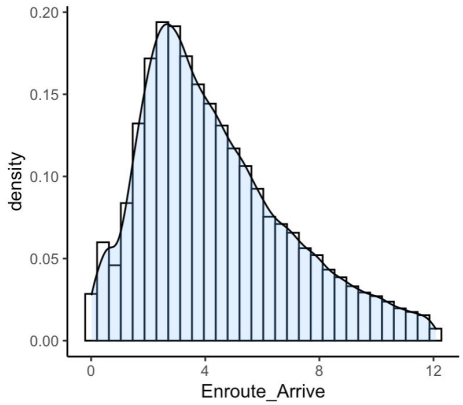
- ***Dispatch_Enroute***
  - *Outliers removed*
    - 3,406 observations removed (4% of original dataset)
    - Approximately normally distributed, with a small peak around 15 seconds



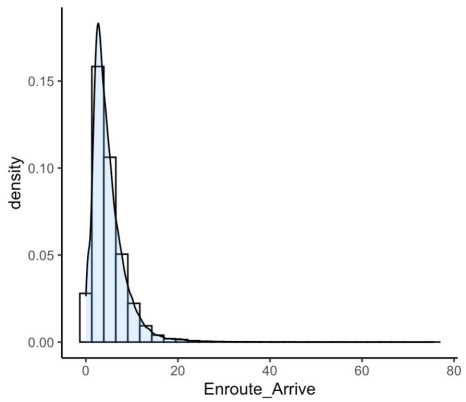
- *With outliers*
  - **There is one call with *Nature* "109C1 BOMB THRT" that has a *Dispatch_Enroute* of 130.3 (almost 100 minutes longer than the next call in terms of *Dispatch_Enroute*).**



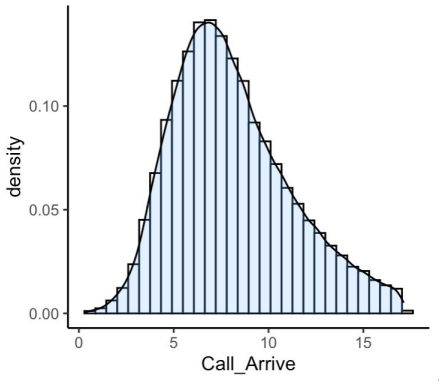
- ***Enroute_Arrive***
  - *Outliers removed*
    - 4,164 observations removed (4% of original dataset)
    - Slightly right-skewed
      - There was probably a small number of calls that were very far away.



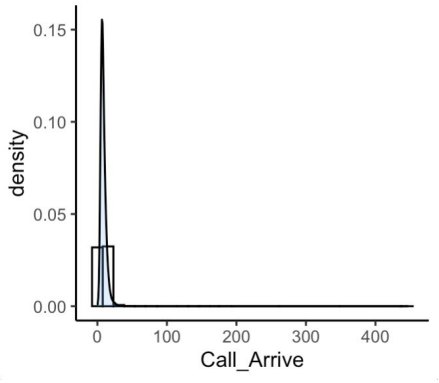
  - *With outliers*



- ***Call_Arrive***
  - *Outliers removed*
    - 3,688 observations removed (4% of original dataset)
    - Approximately normally distributed

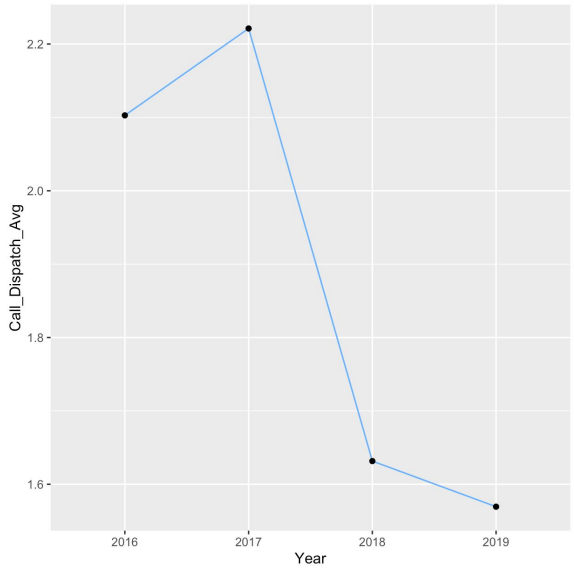


  - *With outliers*
    - **There is one call with *Nature* "CITY BURN PERMIT" (the same one as before) that has a *Call_Arrive* of 446.25 (almost 200 minutes longer than the next call in terms of *Call_Arrive*).**

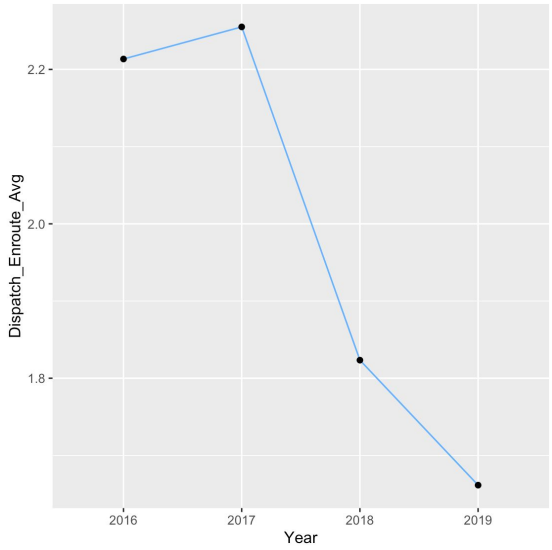


Plotting the time differences over time

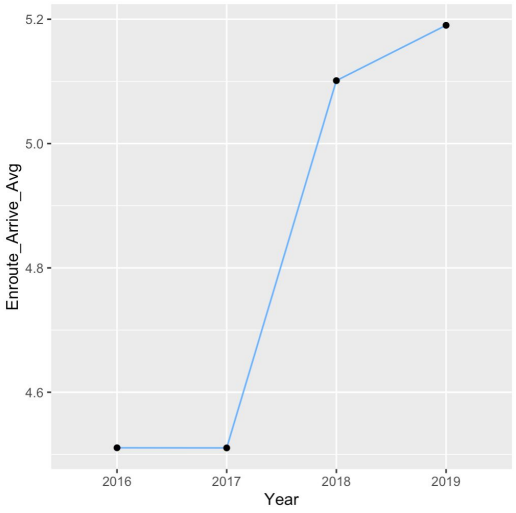
- ***Call_Dispatch***



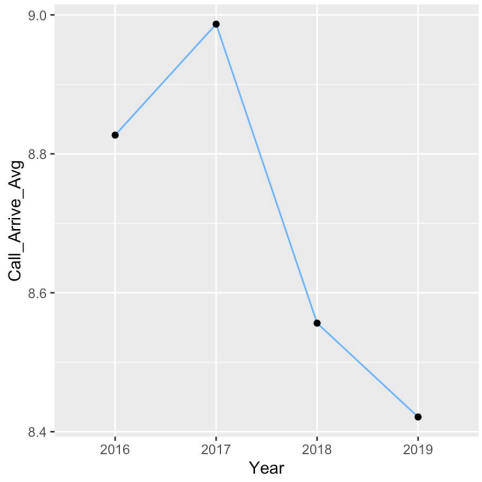
- ***Dispatch_Enroute***



- ***Enroute_Arrive***



- ***Call_Arrive***

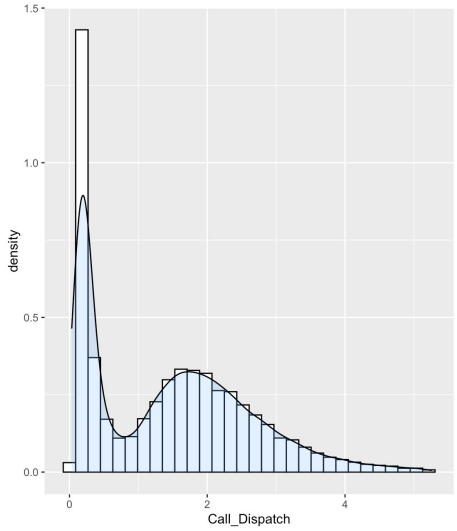


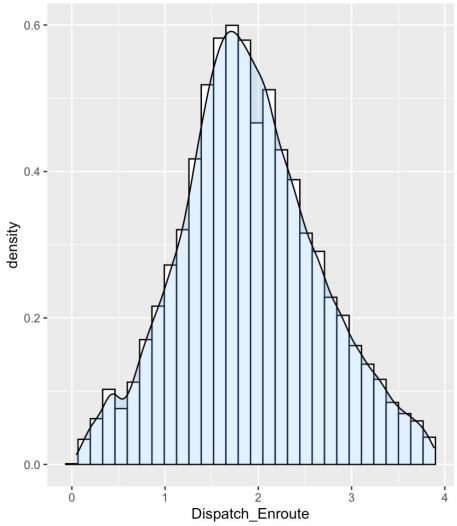
<u>Columbia Fire Department</u>

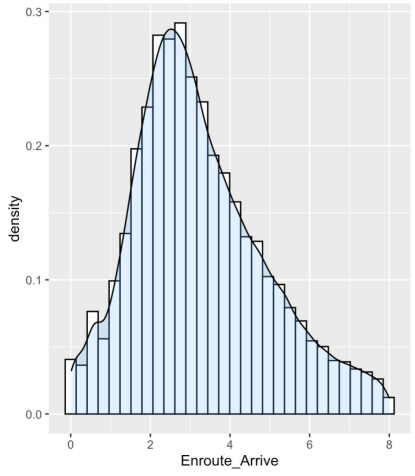
- **Most common types of calls (filtered for calls with time differences greater than zero)**
    - MEDICAL EMERGENCY, 1,595
    - 17A4 FALL, 1,210
    - 6D2 BREATHING PROB, 974
    - 6D BREATHING PROB, 914
    - 17B FALL, 849
    - 52C FIRE ALRM, 773
    - 17B1 FALL, 716
    - 10D CHEST PAIN, 683

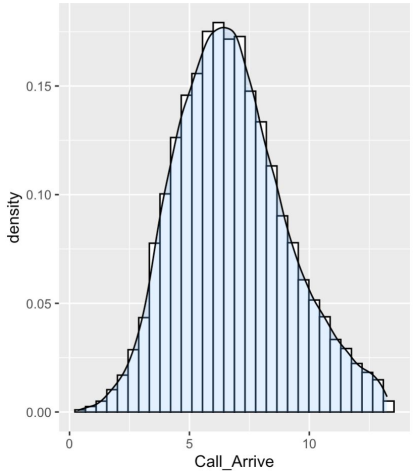
    - 17A2 FALL, 673
    - 32D1 UNK PROB, 625
- **Average time differences**
    - *Call_Dispatch*: 1.5 minutes (third fastest out of five fire departments)
    - *Dispatch_Enroute*: 2.0 minutes (second fastest)
    - *Enroute_Arrive*: 3.6 minutes (third fastest)
    - *Call_Arrive*: 7.1 minutes (second fastest)
- **Average time differences by *Nature***
    - *Call_Dispatch*
        - ROUTINE TRANSPORT, 5.2 minutes
        - 26A1 SICK PRSN, 4.9 minutes
        - 53A3 ANML RSQ, 4.6 minutes
        - 5A1 BACK PAIN, 4.5 minutes
        - 28C1K STROKE, 4.2 minutes
        - 53O6 ASST CITIZEN OTHER, 4.1 minutes
        - 26A7 SICK PRSN, 4.0 minutes
        - 33A1 PT TRANSFER, 3.9 minutes
        - 77C2N MULT VEH COL FIRE, 3.7 minutes
        - 28C4J STROKE, 3.7 minutes
    - *Call_Enroute*
        - 53O5 WTR MAIN BREAK, 3.3 minutes
        - 69D6O SMK ODOR IN RES STR, 3.0 minutes
        - 69D5O SMK ODOR IN RES STR, 2.9 minutes
        - 60B3 GAS ODOR OUTSIDE, 2.7 minutes
        - 77A2 VEH COL HZRD, 2.6 minutes
        - 60D4O GAS ODOR INSIDE, 2.5 minutes
        - 60D3O GAS ODOR INSIDE, 2.5 minutes
        - 52C4U FIRE ALRM, 2.5 minutes
        - 23C2A ACCIDENTAL POISONING, 2.5 minutes
        - 71D3 VEH FIRE THRT STR, 2.5 minutes
    - *Enroute_Arrive*
        - 26A1 SICK PRSN, 8.2 minutes
        - 52B4P PULL STATION ALRM, 7.0 minutes
        - 30A2 TRAUMATIC INJ, 6.9 minutes
        - 52B1G FIRE ALRM, 6.0 minutes
        - 52B FIRE ALRM, 5.9 minutes
        - 26A7 SICK PRSN, 5.9 minutes
        - 5A1 BACK PAIN, 5.9 minutes
        - **127D1 SUICIDE ATMPT, 5.8 minutes**

        - **23C7I INTERNATIONAL OVERDOSE, 5.7 minutes**
        - 59B2O CONT SML FUEL SPL, 5.6 minutes
    - *Call_Arrive*
        - 26A1 SICK PRSN, 14.8 minutes
        - 5A1 BACK PAIN, 12.2 minutes
        - 30A2 TRAUMATIC INJ, 11.7 minutes
        - 26A7 SICK PRSN, 11.6 minutes
        - 52B4P PULL STATION ALRM, 11.5 minutes
        - ROUTINE TRANSPORT, 11.2 minutes
        - 53A3 ANML RSQ, 11.2 minutes
        - **23C7I INTERNATIONAL OVERDOSE, 10.7 minutes**
        - **23C1V VIOLENT OVERDOSE, 10.7 minutes**
        - 59B2O CONT SML FUEL SPL, 10.6 minutes
- **Histograms/density plots for time differences**

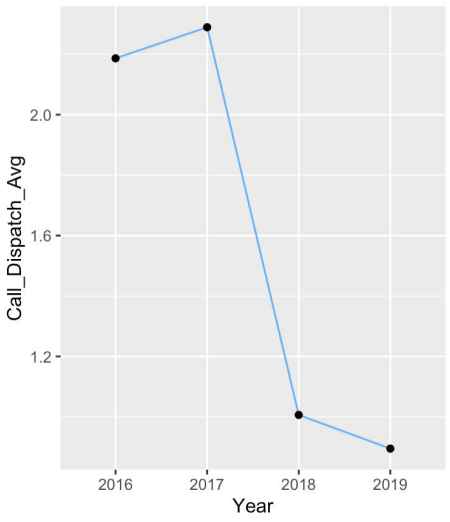


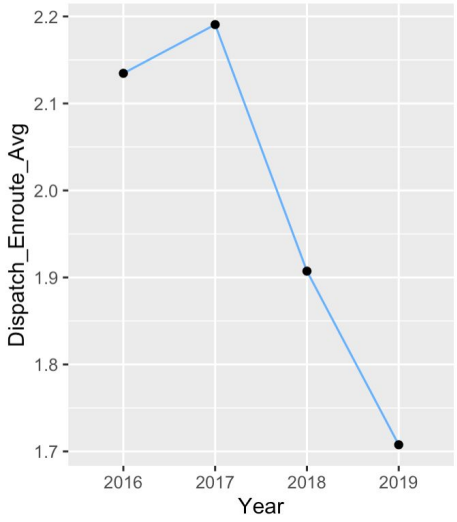


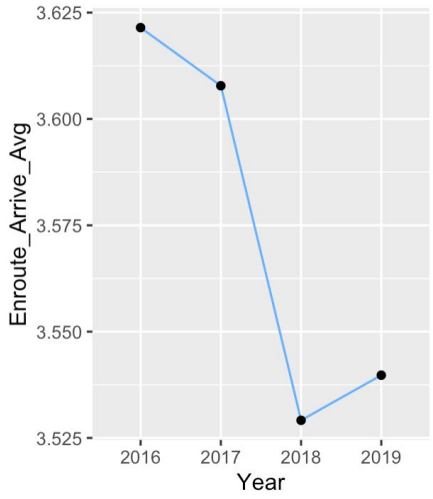


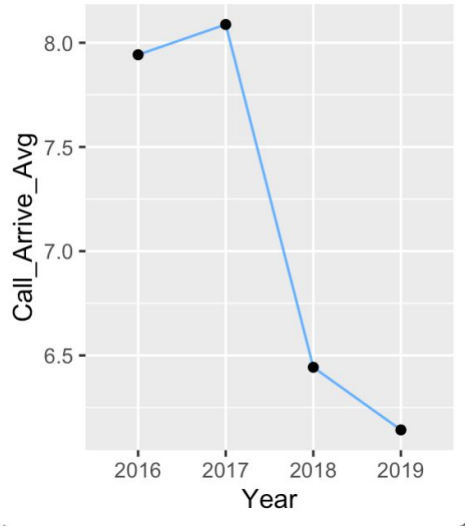


- **Plotting the time differences over time**







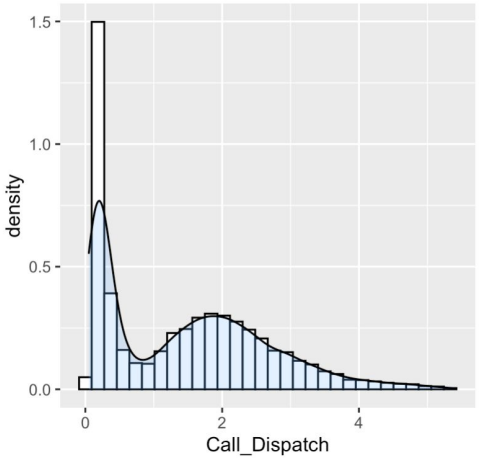


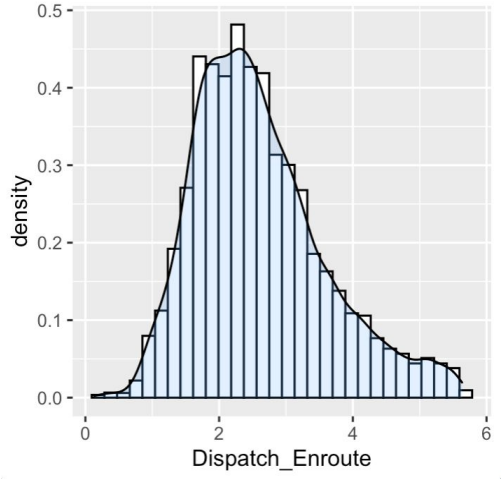
<u>Boone County Fire Protection District</u>

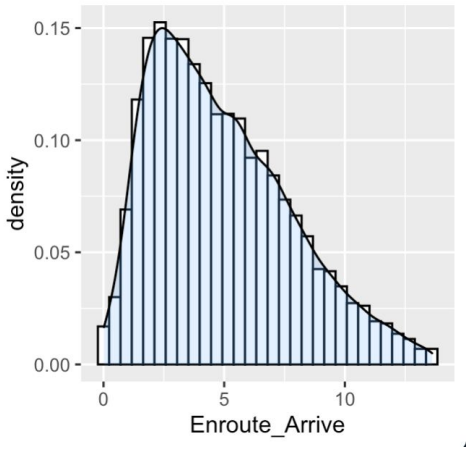
- **Most common types of calls (filtered for calls with time differences greater than zero)**
  - EMS RESPONSE, 502
  - MEDICAL EMERGENCY, 350
  - 6D BREATHING PROB, 320
  - 6D2 BREATHING PROB, 320
  - 17A4 FALL, 296
  - 10D CHEST PAIN, 195
  - 17B FALL, 185
  - 17A2 FALL, 178
  - 17A FALL, 166

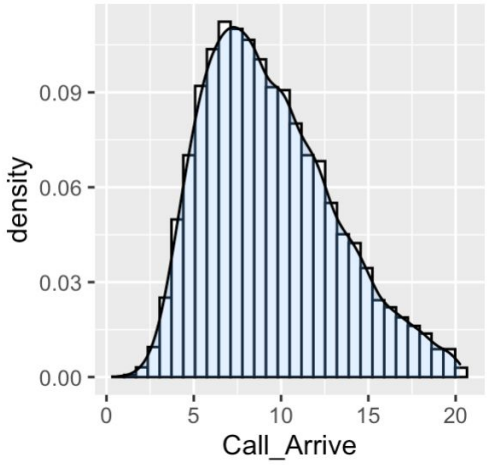
    - 26C SICK PRSN, 153
- **Average time differences**
    - *Call_Dispatch*: 1.6 minutes (fourth fastest out of five departments)
    - *Dispatch_Enroute*: 3.1 minutes (third fastest)
    - ***Enroute_Arrive*: 5.3 minutes (slowest)**
    - ***Call_Arrive*: 9.9 minutes (slowest)**
- **Average time differences by *Nature***
    - *Call_Dispatch*
        - 67O1 CNTRL BURN INVEST, 9.5 minutes
        - 67D3 LRG OUTSIDE FIRE, 7.4 minutes
        - NAT COV FIRE, 6.2 minutes
        - 28C1K STROKE, 3.7 minutes
        - 67B OUTSIDE FIRE INVEST, 3.4 minutes
        - 77D8 VEH COL UNSTEADY VEH, 3.4 minutes
        - 67D2O NAT COV FIRE THRT OTHER, 3.3 minutes
        - 55B5 ELCTRL HZRD INVEST, 3.2 minutes
        - 68A1 SMK INVEST OUTSIDE, 3.2 minutes
        - 77C1 VEH COL INJ, 3.2 minutes
    - *Dispatch_Enroute*
        - 52B1G FIRE ALRM, 4.8 minutes
        - 77D8 VEH COL UNSTEADY VEH, 4.8 minutes
        - 52C1S SMK ALRM, 4.7 minutes
        - SEARCH AND RSQ, 4.6 minutes
        - 67D2O NAT COV FIRE THRT OTHER, 4.6 minutes
        - 28C1K STROKE, 4.6 minutes
        - 77D4M VEH COL EXT, 4.6 minutes
        - 67D2U NAT COV FIRE THRT UNK, 4.5 minutes
        - LINES DOWN, 4.5 minutes
        - 77B1M VEH COL INJ, 4.5 minutes
    - *Enroute_Arrive*
        - 68A1 SMK INVEST OUTSIDE, 8.3 minutes
        - 53A3 ANML RSQ, 8.3 minutes
        - ASST OFFICER, 7.9 minutes
        - RES STR FIRE, 7.8 minutes
        - 69D6 RES STR FIRE, 7.8 minutes
        - 127D1 SUICIDE ATMPT, 7.7 minutes
        - INVESTIGATION, 7.7 minutes
        - 66A1 UNK ODOR INSIDE, 7.6 minutes
        - SEARCH AND RSQ, 7.5 minutes

        - 67D3 LRG OUTSIDE FIRE, 7.5 minutes
    - *Call_Arrive*
        - 67O1 CNTRL BURN INVEST, 19.2 minutes
        - 67D3 LRG OUTSIDE FIRE, 19.0 minutes
        - NAT COV FIRE, 17.9 minutes
        - 53A3 ANML RSQ, 15.4 minutes
        - 68A1 SMK INVEST OUTSIDE, 14.3 minutes
        - SEARCH AND RSQ, 14.1 minutes
        - 67D2U NAT COV FIRE THRT UNK, 14.0 minutes
        - 66A1 UNK ODOR INSIDE, 14.0 minutes
        - 66A2 UNK ODOR OUTSIDE, 13.7 minutes
        - 53A2 ASST CITIZEN, 13.6 minutes
- **Histograms/density plots for time differences**

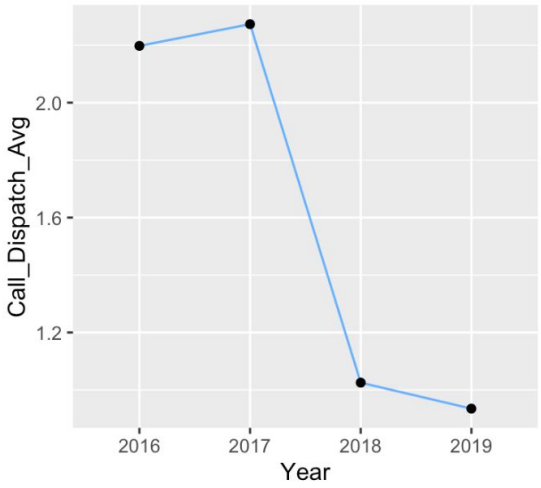


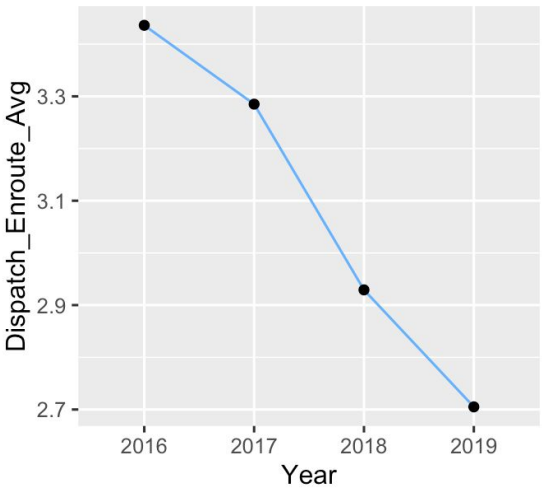


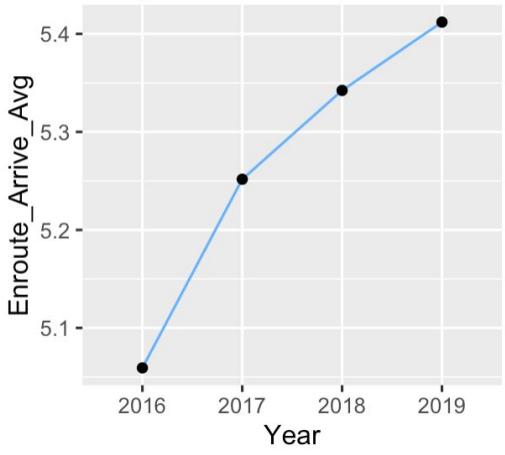


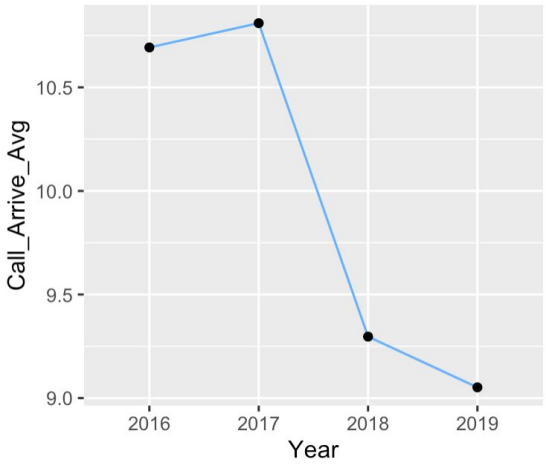


- **Plotting the time differences over time**



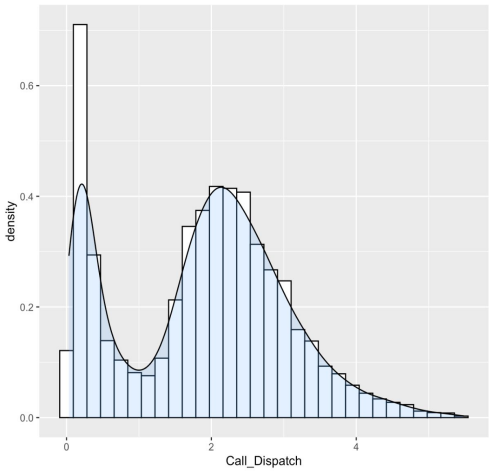




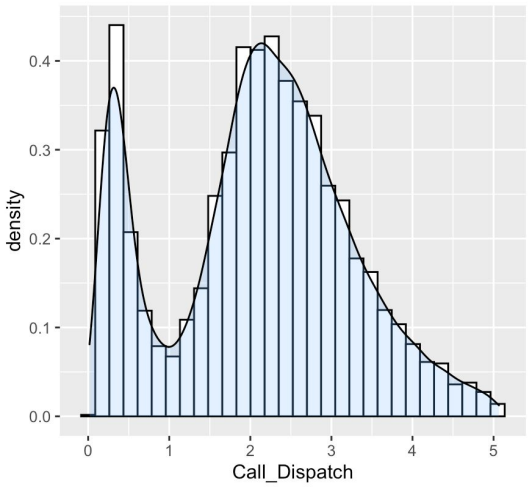


<u>Histograms/density plots for time differences before and after the new CAD system was put into place (EMS only)</u>

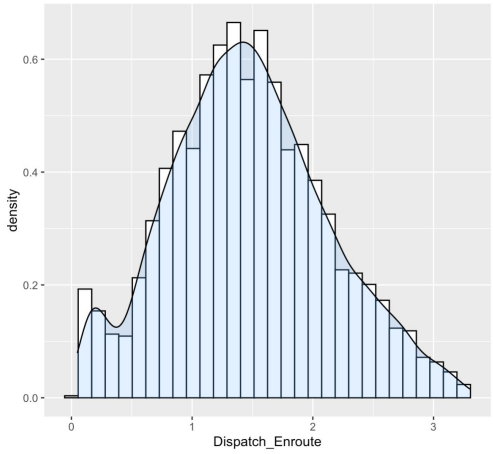
- ***Call_Dispatch***
  - *Before*



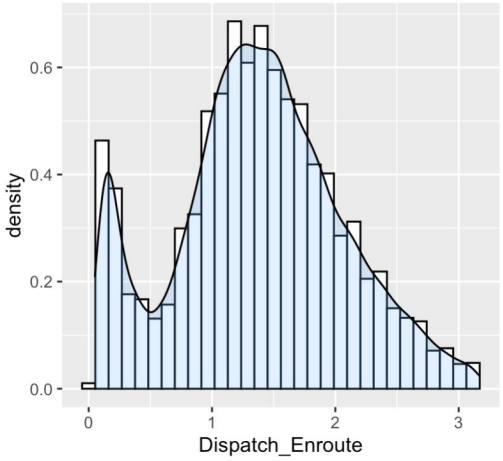
After



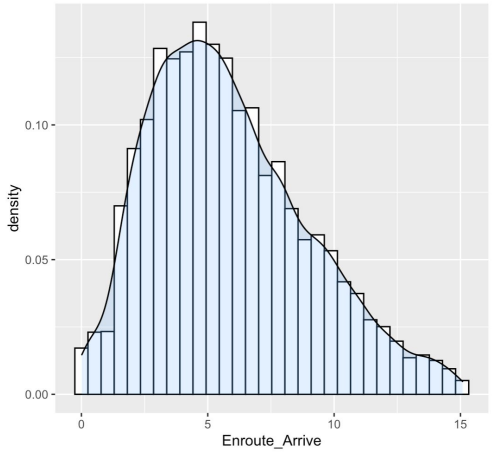
- ***Dispatch_Enroute***
  - *Before*



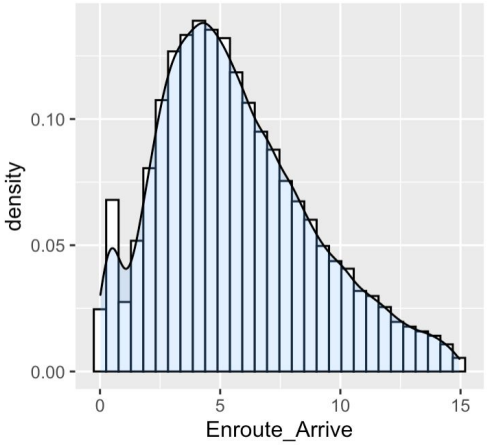
After



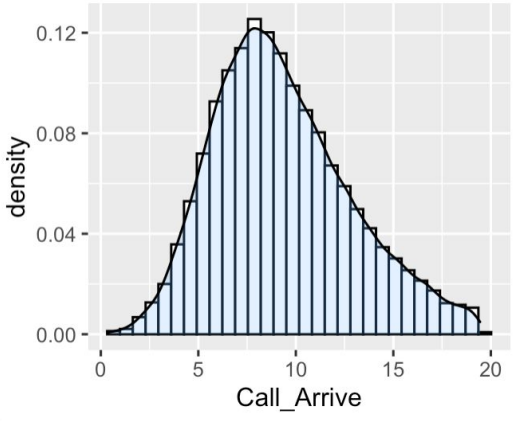
- ***Enroute_Arrive***
  - *Before*



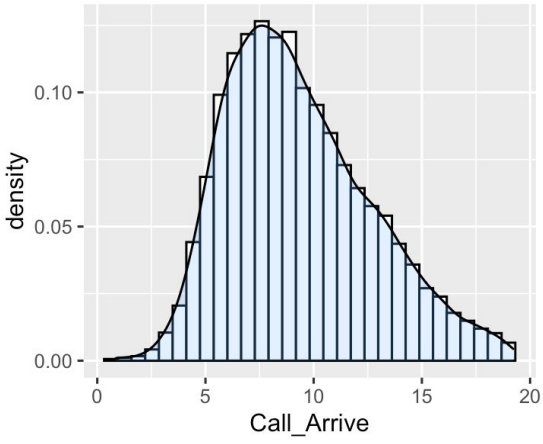
After



- ***Call_Arrive***
  - *Before*



After

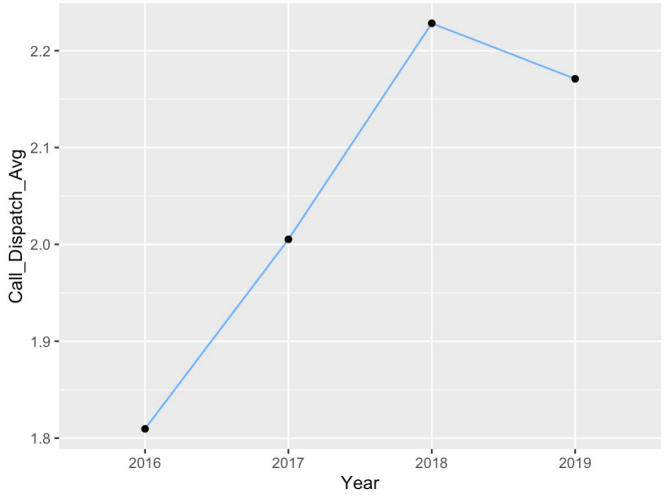


Comparing average time differences before and after the new CAD system was put into place (EMS only)

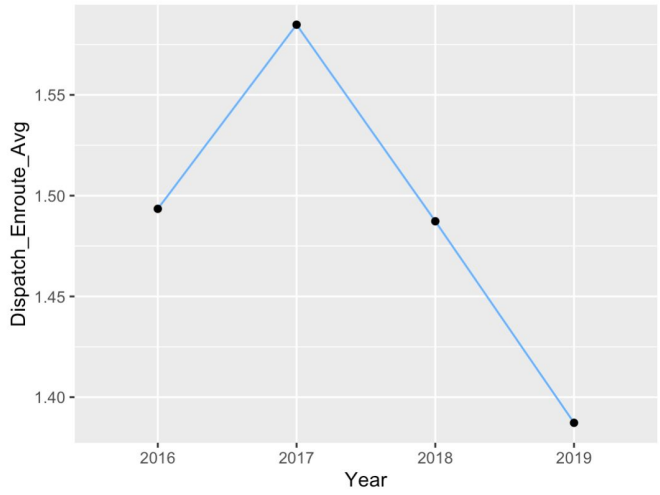
- ***Call_Dispatch***
  - **Before: 1.9 minutes**
  - **After: 2.2 minutes**
  - **This difference is statistically significant.**
- ***Dispatch_Enroute***
  - Before: 1.5 minutes
  - After: 1.4 minutes
  - This difference is statistically significant.
- ***Enroute_Arrive***
  - Before: 6.4 minutes
  - After: 6.3 minutes
  - This difference is statistically significant.
- ***Call_Arrive***
  - Before: 9.8 minutes
  - After: 9.9 minutes
  - This difference is not statistically significant.

Plotting the time differences over time (EMS only)

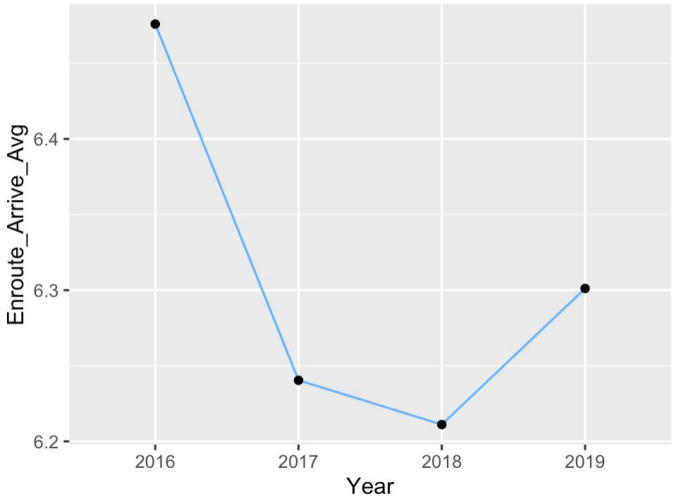
- ***Call_Dispatch***



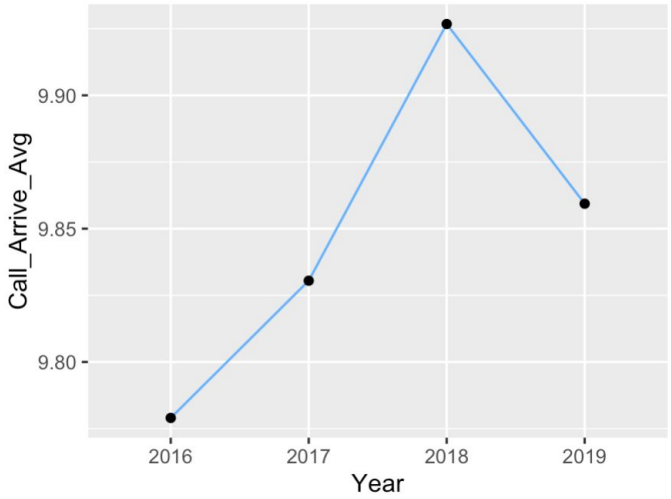
- ***Dispatch_Enroute***



- ***Enroute_Arrive***



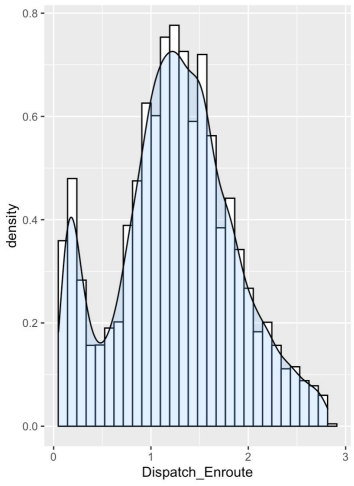
- ***Call_Arrive***

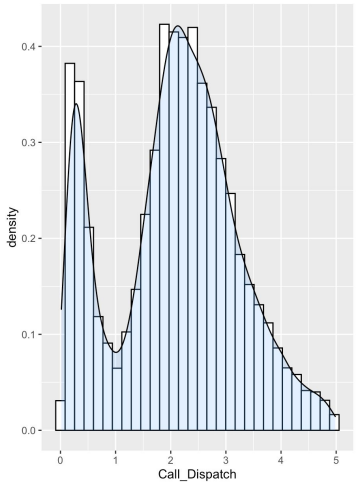


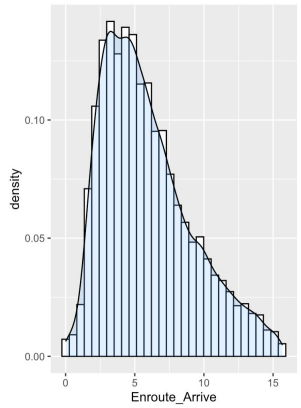
Boone Hospital Center

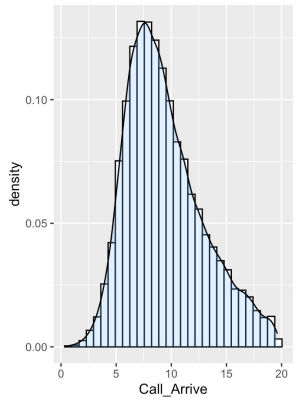
- **Most common types of calls (filtered for calls with time differences greater than 0)**
  - EMS RESPONSE, 2,140
  - 33C EMER PT TRANSFER, 898
  - 33A1 PT TRANSFER, 684
  - 26A SICK PRSN, 580
  - 6D BREATHING PROB, 563
  - 10D CHEST PAIN, 441
  - 33C1 EMER PT TRANSFER, 440
  - MEDICAL EMERGENCY, 437
  - 33A PT TRANSFER, 416
  - 17B FALL, 392
- **Average time differences**
  - *Call_Dispatch*: 2.2 minutes (slowest overall)
  - *Dispatch_Enroute*: 1.3 minutes (fastest overall)
  - *Enroute_Arrive*: 6.6 minutes (slowest overall)
  - *Call_Arrive*: 10.1 minutes (slowest overall)
- **Average time differences by *Nature***
  - *Call_Dispatch*
    - 23C INTENTIONAL OVERDOSE, 3.9 minutes
    - 28C STROKE, 3.9 minutes
    - 25B6 PSYC PROB, 3.8 minutes
    - 25D PSYC PROB, 3.6 minutes
    - 23C INTENTIONAL OD, 3.5 minutes
    - 23C ACCIDENTAL POISONING, 3.5 minutes
    - 5C BACK PAIN, 3.5 minutes
    - 12B1 SEIZURE, 3.3 minutes
    - 10D5 CHEST PAIN, 3.3 minutes
    - 23O1A ACCIDENTAL POISONING, 3.3 minutes
  - *Dispatch_Enroute*
    - 30B1 TRAUMATIC INJ, 1.8 minutes
    - 12D4 SEIZURE, 1.7 minutes
    - 26A9 SICK PRSN, 1.7 minutes
    - 31A1 FAINTING, 1.7 minutes
    - 10A1 CHEST PAIN, 1.7 minutes
    - 12D2 SEIZURE, 1.6 minutes
    - 69E RES STR FIRE, 1.6 minutes
    - 12B1 SEIZURE, 1.6 minutes
    - 17B3 FALL, 1.6 minutes

        - 31D2 UNCONSCIOUS, 1.6 minutes
    - *Enroute_Arrive*
        - 26B SICK PRSN, 11.2 minutes
        - 23O1A ACCIDENTAL POISONING, 11.2 minutes
        - 127D1W SUICIDE ATMPT WPN, 10.0 minutes
        - 25B6 PSYC PROB, 9.6 minutes
        - 21B1 HEMORRHAGE, 9.6 minutes
        - 26O SICK PRSN, 9.4 minutes
        - 26C1 SICK PRSN, 9.2 minutes
        - 17A2 FALL, 9.1 minutes
        - 6D1 BREATHING PROB, 9.0 minutes
        - 77D VEH COL HIGH MECH, 9.0 minutes
    - *Call_Arrive*
        - 23O1A ACCIDENTAL POISONING, 15.6 minutes
        - 26B SICK PRSN, 15.2 minutes
        - 25B6 PSYC PROB, 14. 9 minutes
        - 23C INTENTIONAL OVERDOSE, 14.1 minutes
        - 26O SICK PRSN, 13.8 minutes
        - 21B1 HEMORRHAGE, 13.4 minutes
        - 26C1 SICK PRSN, 13.4 minutes
        - 25D PSYC PROB, 13.2 minutes
        - 17A2 FALL, 13.2 minutes
        - 12B1 SEIZURE, 13.0 minutes
- **Histograms/density plots for time differences**

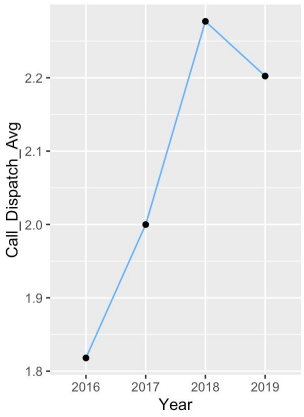


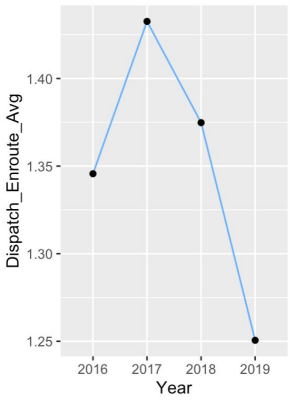


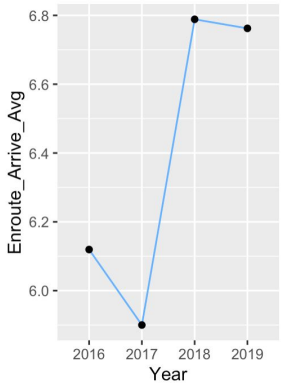


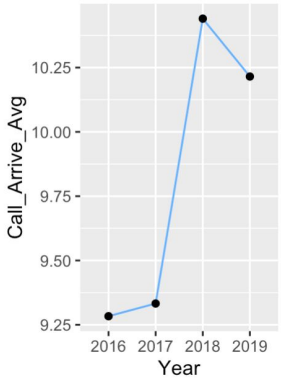


- **Plotting the time differences over time**





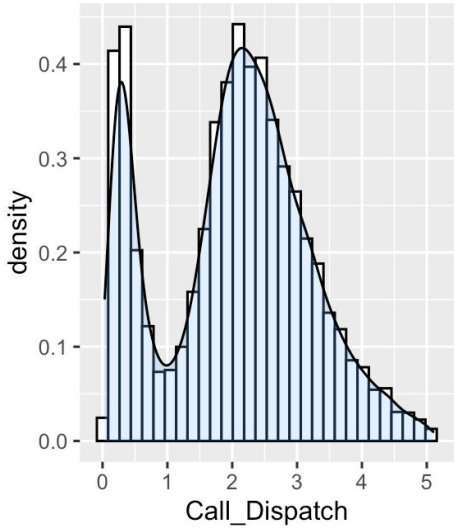


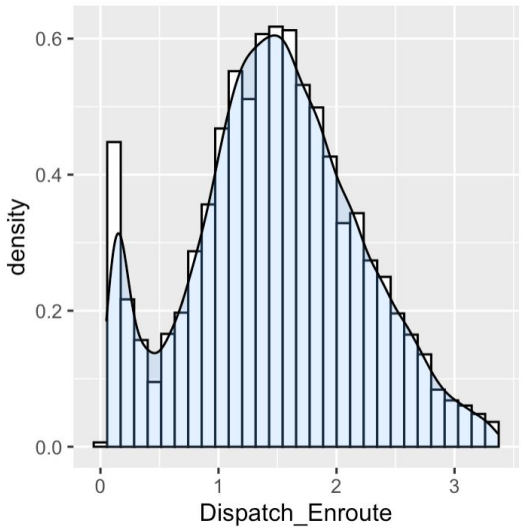


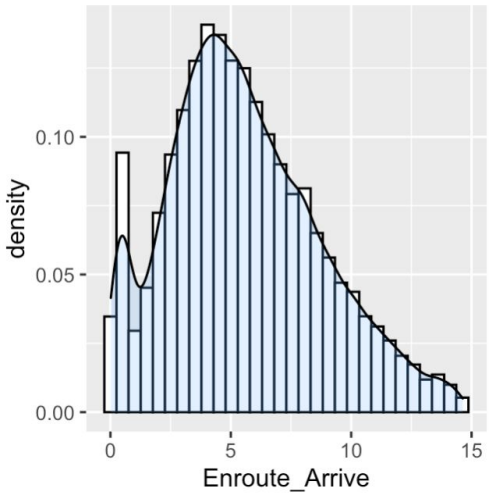
University Hospital

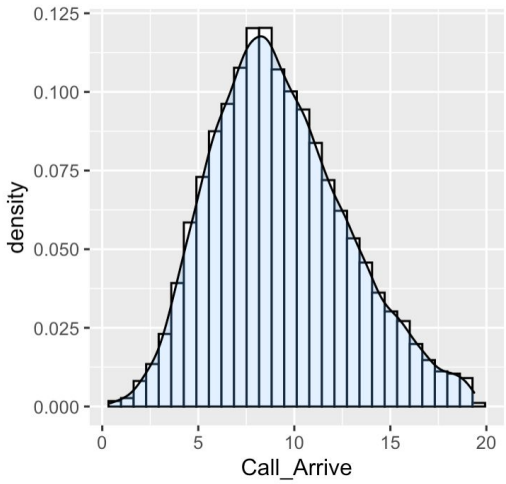
- **Most common types of calls (filtered for calls with time differences greater than 0)**
    - EMS RESPONSE, 3,148
    - 33C EMER PT TRANSFER, 1,065
    - 26A SICK PRSN, 934
    - 6D BREATHING PROB, 807
    - 33A1 PT TRANSFER, 763
    - MEDICAL EMERGENCY, 681
    - 17B FALL, 656
    - 10D CHEST PAIN, 557
    - 33A PT TRANSFER, 487
    - 26C SICK PRSN, 473
- **Average time differences**
    - *Call_Dispatch*: 2.1 minutes (faster than BHC)
    - *Dispatch_Enroute*: 1.5 minutes (slower)
    - *Enroute_Arrive*: 6.0 minutes (faster)
    - *Call_Arrive*: 9.7 minutes (faster)
- **Average time differences by *Nature***
    - *Call_Dispatch*
        - 28C STROKE, 3.8 minutes
        - 23B1I INTENTIONAL OD, 3.8 minutes
        - 24D CHILDBIRTH, 3.8 minutes
        - 25B6 PSYC PROB, 3.7 minutes
        - 23C1I INTENTIONAL OVERDOSE, 3.6 minutes
        - 23C ACCIDENTAL POISONING, 3.5 minutes
        - 28CIL STROKE, 3.5 minutes
        - 24B CHILDBIRTH, 3.5 minutes
        - 25A1 PSYC PROB, 3.5 minutes
        - 26O11 SICK PRSN, 3.3 minutes
    - *Dispatch_Enroute*
        - 69E5 RES STR FIRE, 2.2 minutes
        - SUICIDE ATTEMPT, 2.1 minutes
        - 21D4 HEMORRHAGE , 2.0 minutes
        - 26B1 SICK PRSN, 2.0 minutes
        - 26A3 SICK PRSN, 2.0 minutes
        - 26O11 SICK PRSN, 2.0 minutes
        - 6D1 BREATHING PROB, 2.0 minutes
        - 17B3 FALL, 1.9 minutes
        - 69E6 RES STR FIRE, 1.9 minutes

        - 26A6 SICK PRSN, 1.9 minutes
    - *Enroute_Arrive*
        - 77D5 VEH COL EJCT, 10.7 minutes
        - EMS RESPONSE UNSTABLE SCENE, 10.3 minutes
        - 26O6 SICK PRSN, 9.2 minutes
        - 127D1 SUICIDE ATMPT, 9.0 minutes
        - 26A7 SICK PRSN, 8.9 minutes
        - 69E6 RES STR FIRE, 8.6 minutes
        - 1A1 ABDOMINAL PAIN, 8.6 minutes
        - 26O11 SICK PRSN, 8.6 minutes
        - 25D PSYC PROB, 8.5 minutes
        - 26A5 SICK PRSN, 8.4 minutes
    - *Call_Arrive*
        - 26O11 SICK PRSN, 13.8 minutes
        - 25D PSYC PROB, 13.2 minutes
        - 26O6 SICK PRSN, 13.2 minutes
        - 1A1 ABDOMINAL PAIN, 13.1 minutes
        - 26A7 SICK PRSN, 13.1 minutes
        - 25A1 PSYC PROB, 12.8 minutes
        - 77D5 VEH COL EJCT, 12.7 minutes
        - 26O24 SICK PRSN, 12.7 minutes
        - EMS RESPONSE UNSTABLE SCENE, 12.6 minutes
        - 26A11 SICK PRSN, 12.4 minutes
- **Histograms/density plots for time differences**









- **Plotting the time differences over time**