

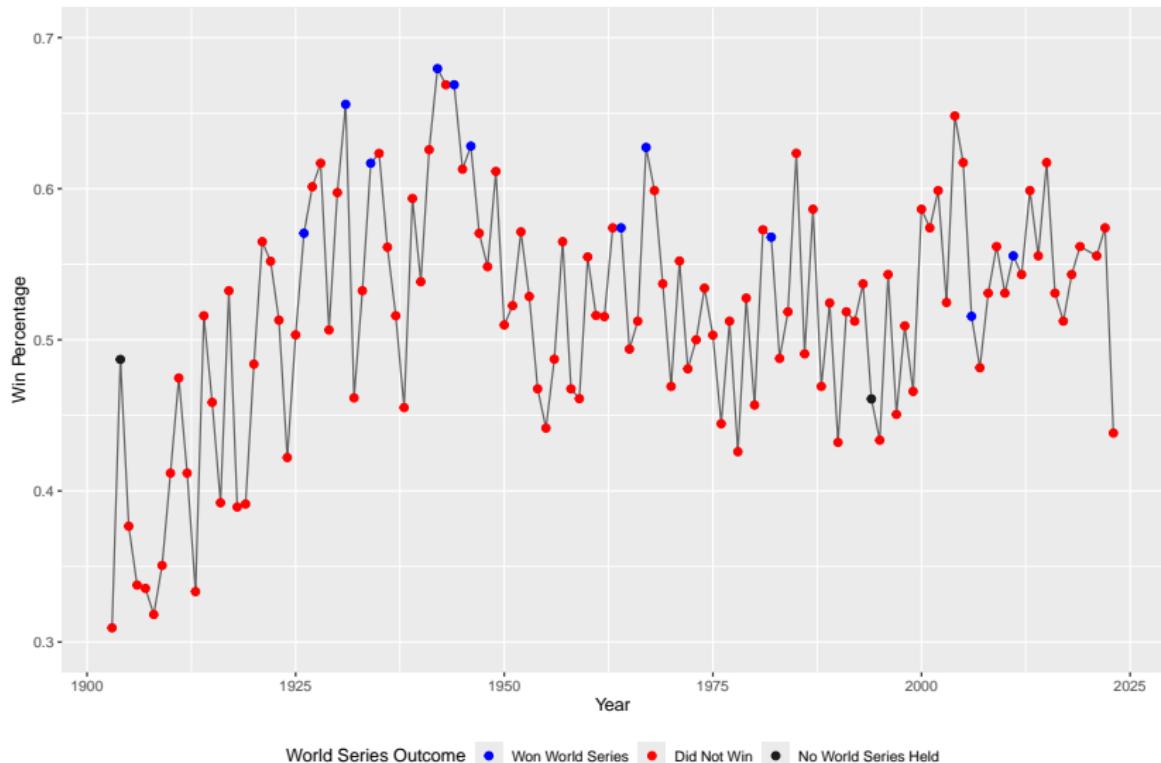
# 2023 Cardinals Case Study

Nathan Butler

# Background

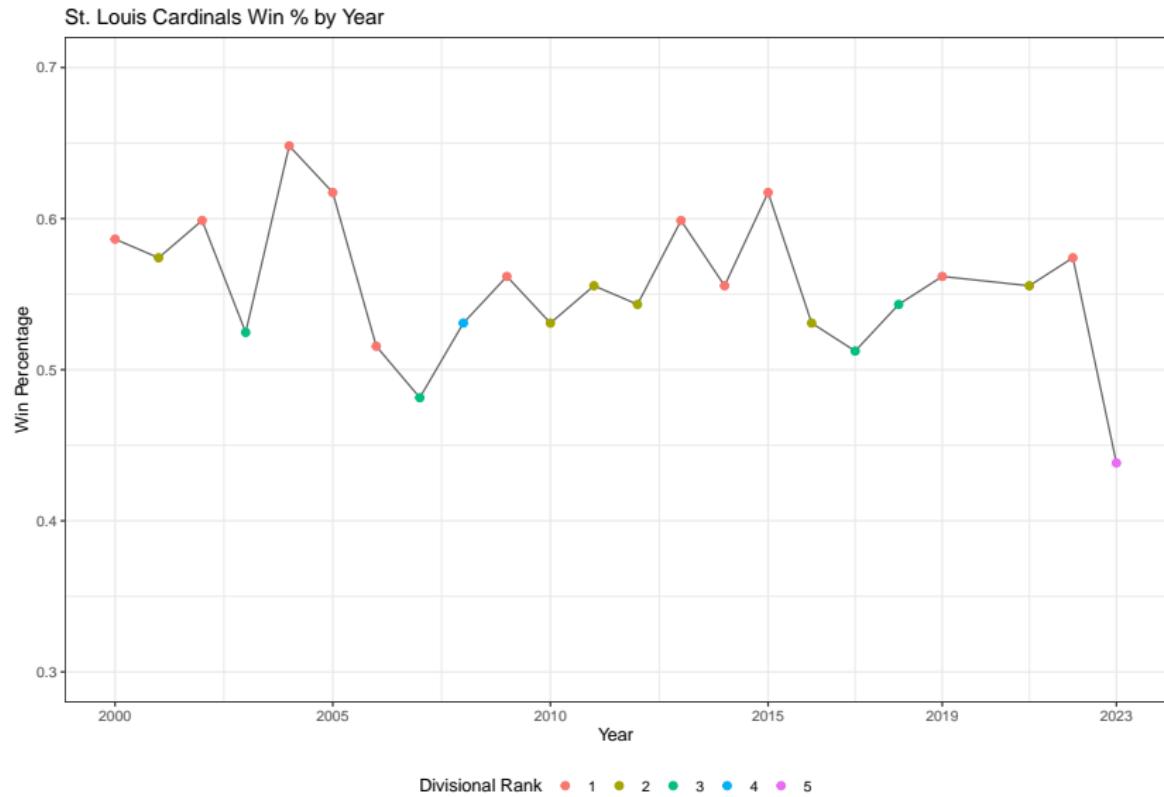
- The St. Louis Cardinals have historically been at the top of standings.

St. Louis Cardinals Win % by Year



# Background

- ▶ Cardinals generally fare well in their division



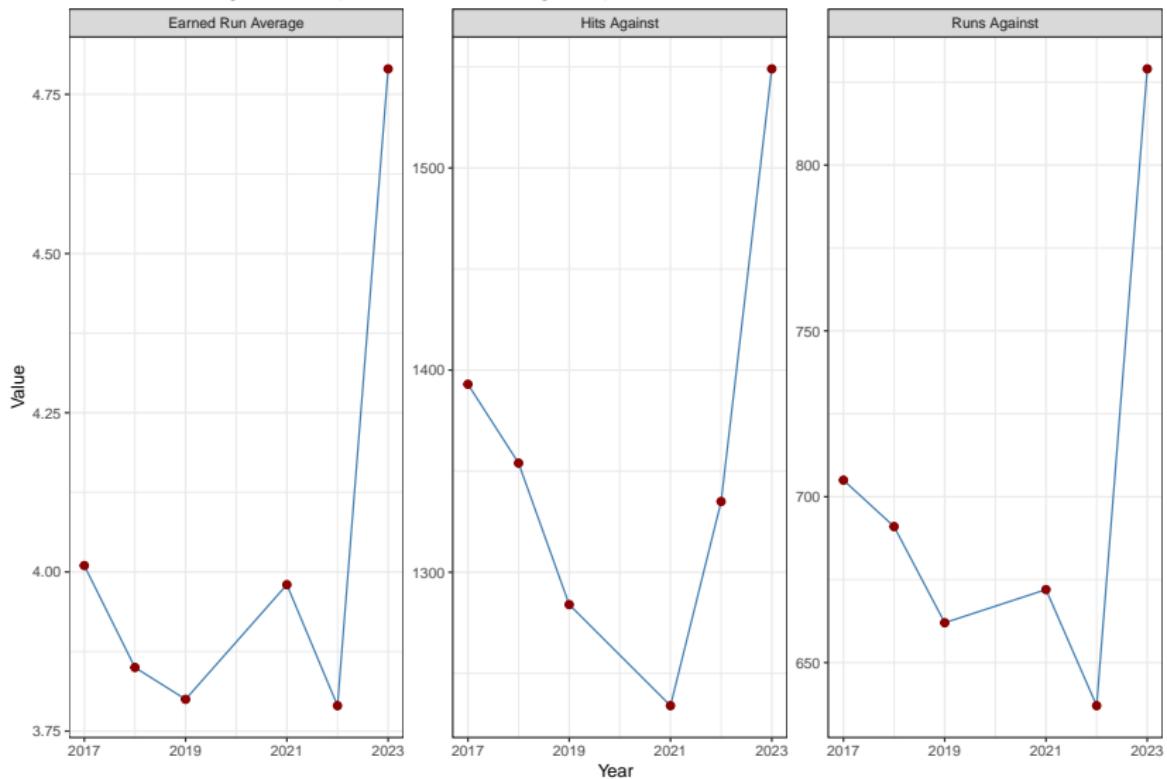
## Cardinals Roster

- ▶ Between 2022 and 2023 there were some major losses to the Cardinals.
- ▶ They lost Albert Pujols and Yadier Molina to retirement.
- ▶ The team added some young rookies and signed Willson Contreras from the Cubs as Molina's replacement.
- ▶ Less than 2 months into the season, the Cardinals announced they were benching Contreras for his bad play as a catcher.
- ▶ The front office blamed Contreras for the decline in pitching performance rather than blaming the pitchers for not being good.
- ▶ The starting rotation had 4 pitchers older than 31 years old and that included Wainwright who 40 and could not throw over 89 MPH.

# Research Question

- We will look specifically at the pitching downfall

Cardinals Pitching Statistics (2017–2023, Excluding 2020)



# Pitching

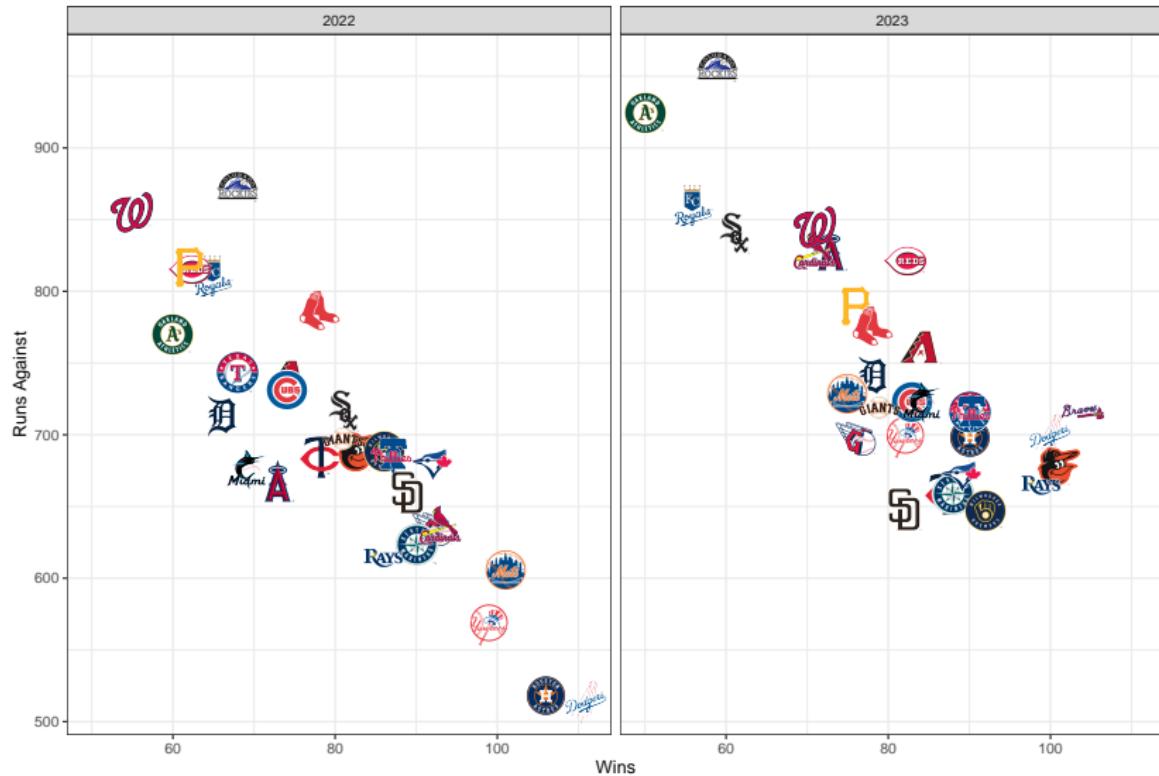
- ▶ See the difference over years

##	Year	W	L	Rank	R	RA	ERA	HRA	SOA
## 1	2017	83	79	3	761	705	4.01	183	1351
## 2	2018	88	74	3	759	691	3.85	144	1337
## 3	2019	91	71	1	764	662	3.80	191	1399
## 4	2021	90	72	2	706	672	3.98	152	1225
## 5	2022	93	69	1	772	637	3.79	146	1177
## 6	2023	71	91	5	719	829	4.79	179	1215

# All Teams 2023

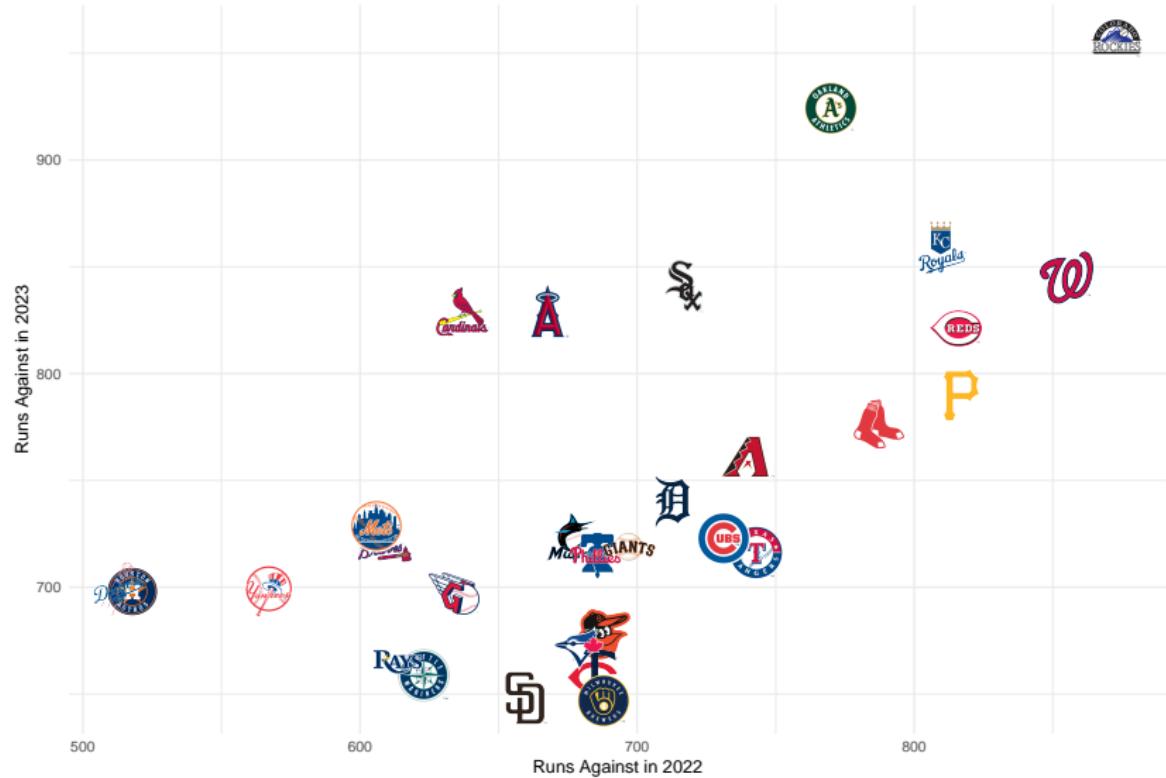
- All categories appear to be much worse than in the past, especially the Runs Against

Runs Against vs Wins (2022 & 2023)



# More Team differences

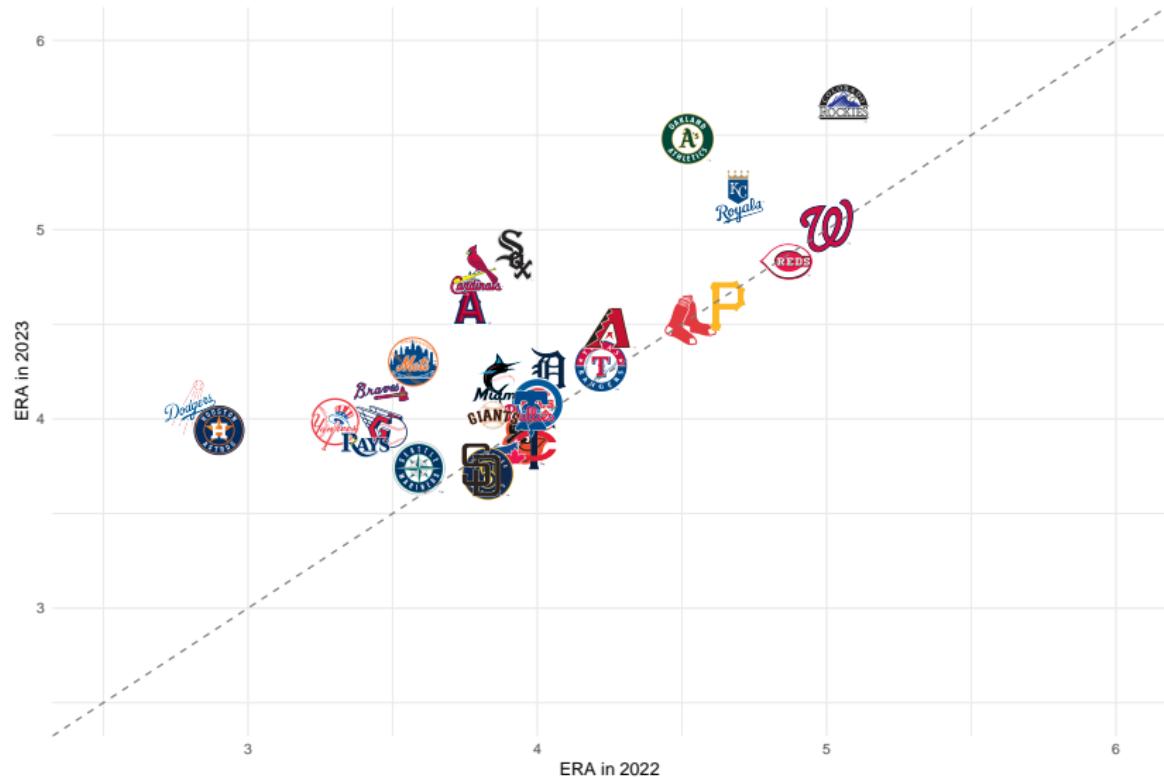
2023 vs 2022 Runs Against by Team



# More Team Differences Again

- ▶ Cardinals grouped in a category with the Athletics, Angels, and White Sox

2023 vs 2022 ERA by Team

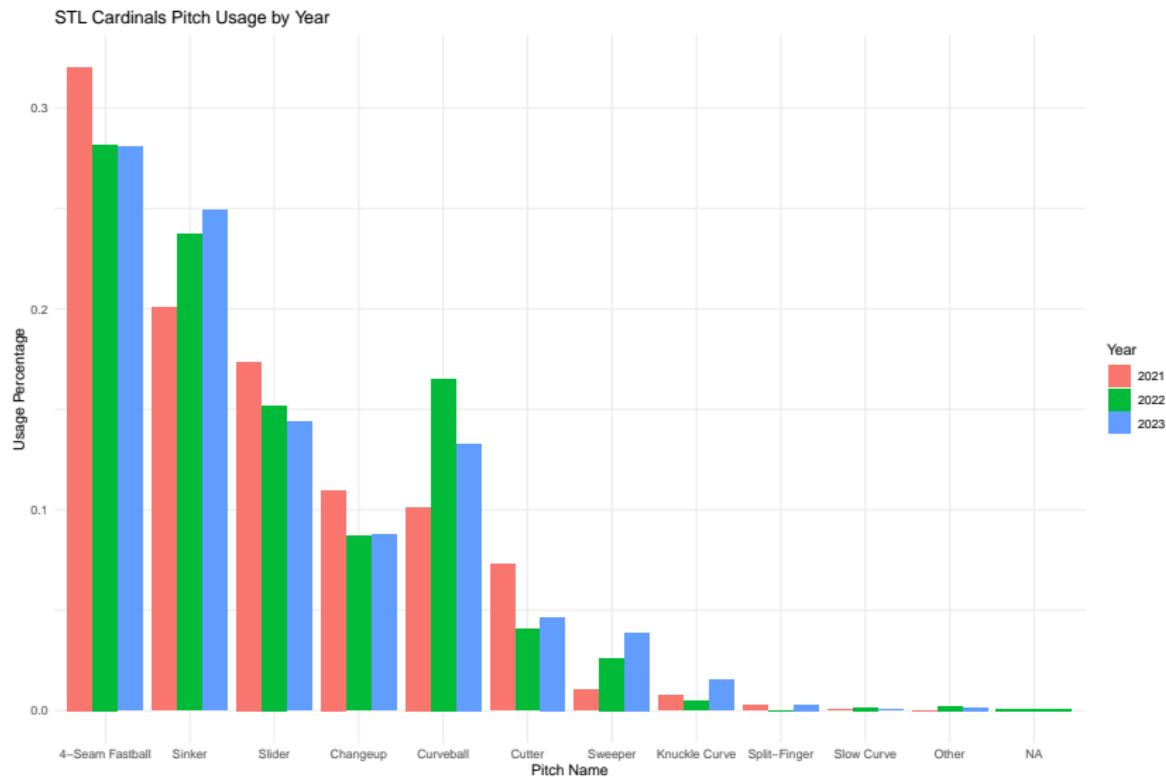


## Statcast Data

- ▶ We will look into the 2021-2023 pitching data from Statcast.
- ▶ This will give us 2 years of baseline performance before a bad year where we can look into the differences.
- ▶ We will compare the differences between the Cardinals past years and the differences between better teams during those years to see how they compare.

# Pitching Usage

- One of the first things we will look into is pitching usage



## Pitch Usage

- ▶ As you can see there was a decrease in the usage of 4-Seam, Slider, and Changeup while there was an increase in the usage of Sinker and Curveball.
- ▶ I know that there was a change in the pitching coach between 2022 and 2023 so that could indicate some of the arsenal changes.
- ▶ In the past the Cardinals have always been a pitch for contact team that does not get a lot of strikeouts.
- ▶ Seeing that over 50% of pitches are Fastballs of some sort really shows the idea that the Cardinals do not throw off speed a lot compared to other teams.

## Starting Pitching

- ▶ We will specifically look at the Starting Pitchers and look into their stats to see what they were like

```
## # A tibble: 3 x 4
##   yearID RA_starters RA_team Run_percent
##   <int>     <int>    <int>      <dbl>
## 1 2021        439      672      0.653
## 2 2022        463      637      0.727
## 3 2023        548      829      0.661
```

- ▶ Starters account for around 66% of all runs scored on the Cardinals

## Starters

- ▶ Analyze the players that pitched in 2023 and also pitched in 2022

```
## # A tibble: 22 x 2
##   player_name      years_started
##   <chr>            <chr>
## 1 Adam Wainwright 2021, 2022, 2023
## 2 Andre Pallante   2022
## 3 Carlos Martinez  2021
## 4 Dakota Hudson    2021, 2022, 2023
## 5 Daniel Ponce de Leon 2021
## 6 Drew Rom          2023
## 7 J. A. Happ         2021
## 8 Jack Flaherty     2021, 2022, 2023
## 9 Jake Woodford     2021, 2022, 2023
## 10 Johan Oviedo      2021, 2022
## # i 12 more rows
```

## Starters Named

- ▶ 9 starters that pitched in both years

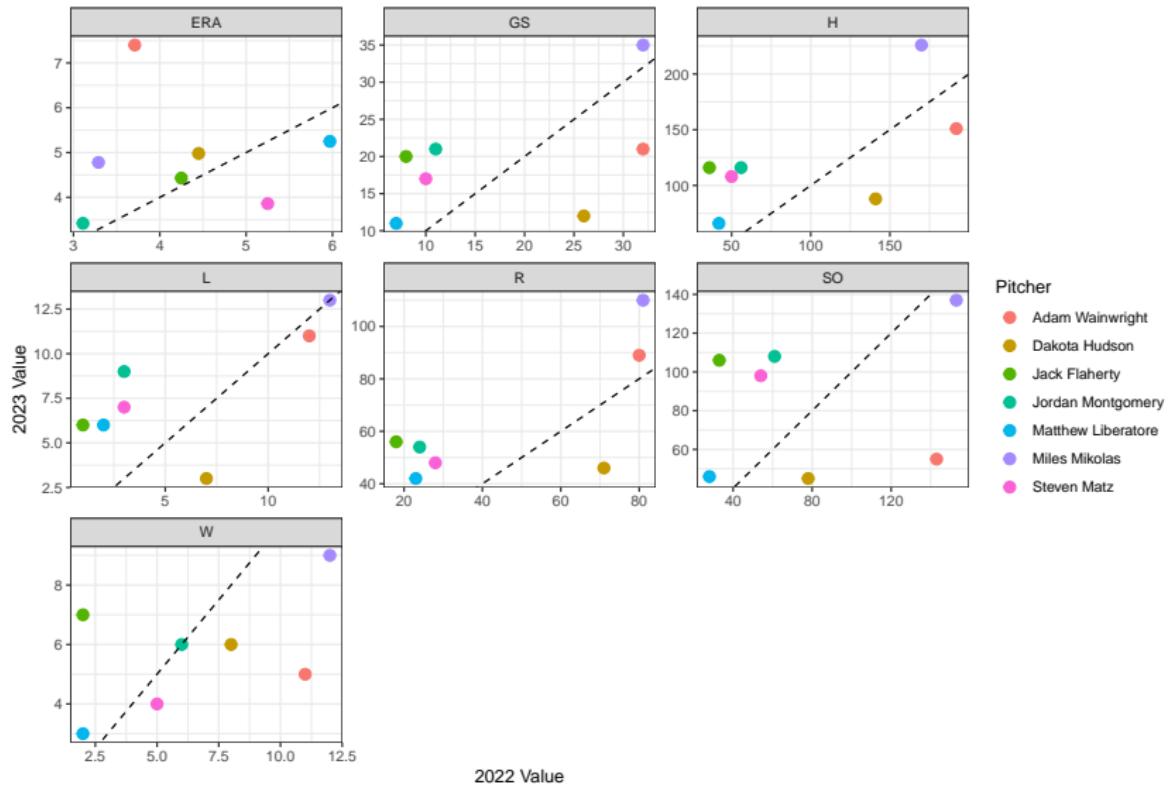
```
## # A tibble: 9 x 2
##   player_name      years_pitched
##   <chr>            <chr>
## 1 Adam Wainwright 2021, 2022, 2023
## 2 Dakota Hudson    2021, 2022, 2023
## 3 Jack Flaherty    2021, 2022, 2023
## 4 Jake Woodford    2021, 2022, 2023
## 5 Jordan Montgomery 2022, 2023
## 6 Matthew Liberatore 2022, 2023
## 7 Miles Mikolas     2021, 2022, 2023
## 8 Steven Matz       2022, 2023
## 9 Zack Thompson      2022, 2023
```

## Starters

- ▶ After looking into this a little more we can see that Jake Woodford and Zack Thompson both only started in 1 game in 2022
- ▶ So the pitchers we will look into are Adam Wainwright, Dakota Hudson, Jack Flaherty, Jordan Montgomery, Matthew Liberatore, Miles Mikolas, and Steven Matz.

# Starters Stats 2022 vs 2023

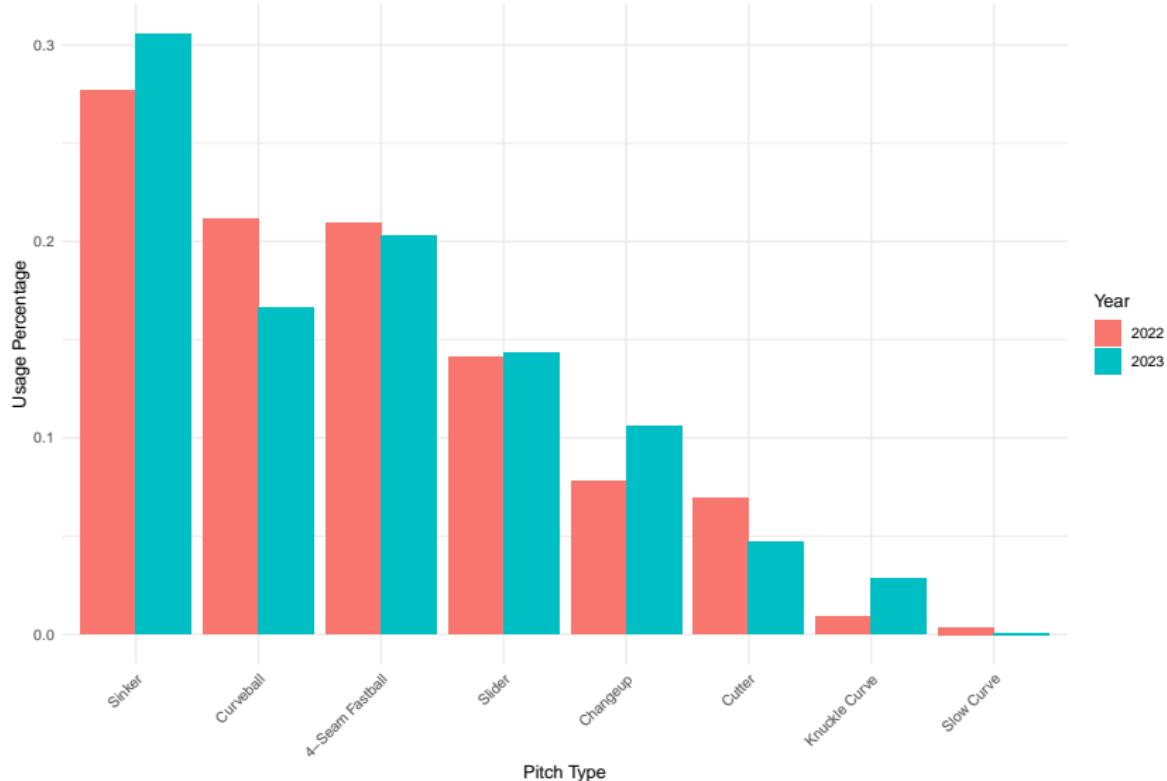
Pitching Stats: 2022 vs 2023 by Pitcher



# Starter Usage

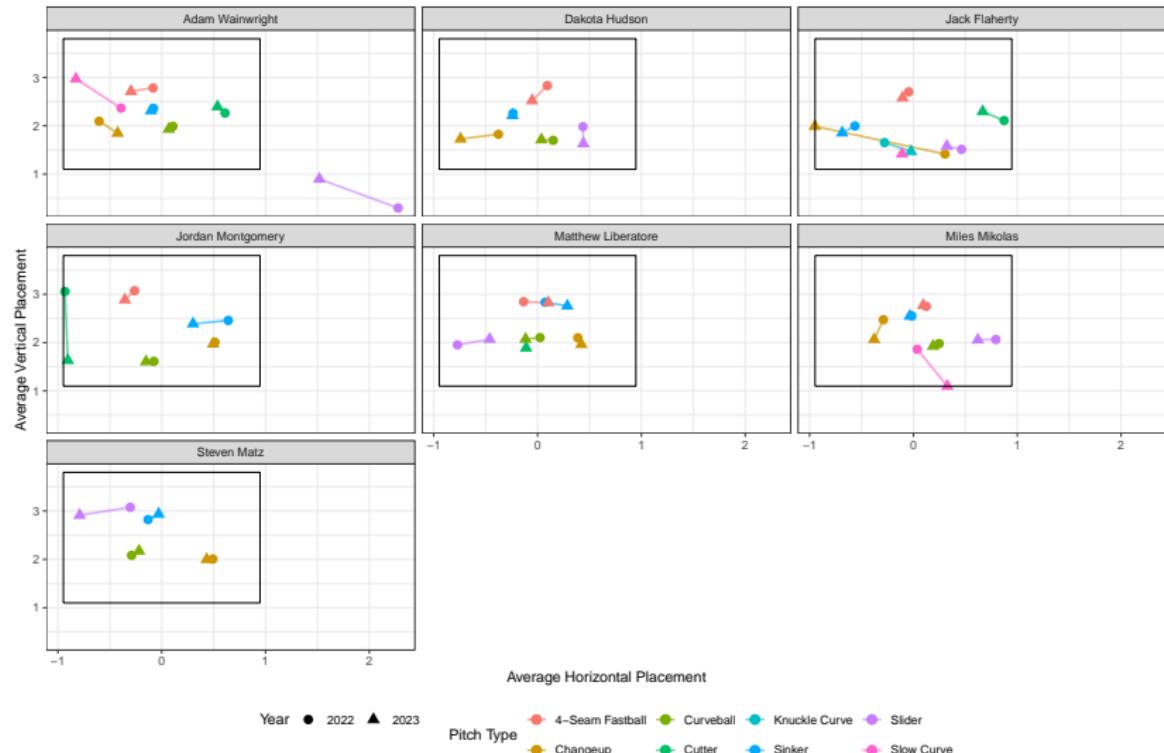
- Here you can find that starters use Sinker considerably more and started to decrease in Curveball.

Pitch Usage by Year (Filtered Starters)



# Effects of Each Pitch

- ▶ Look into the details of each pitch type

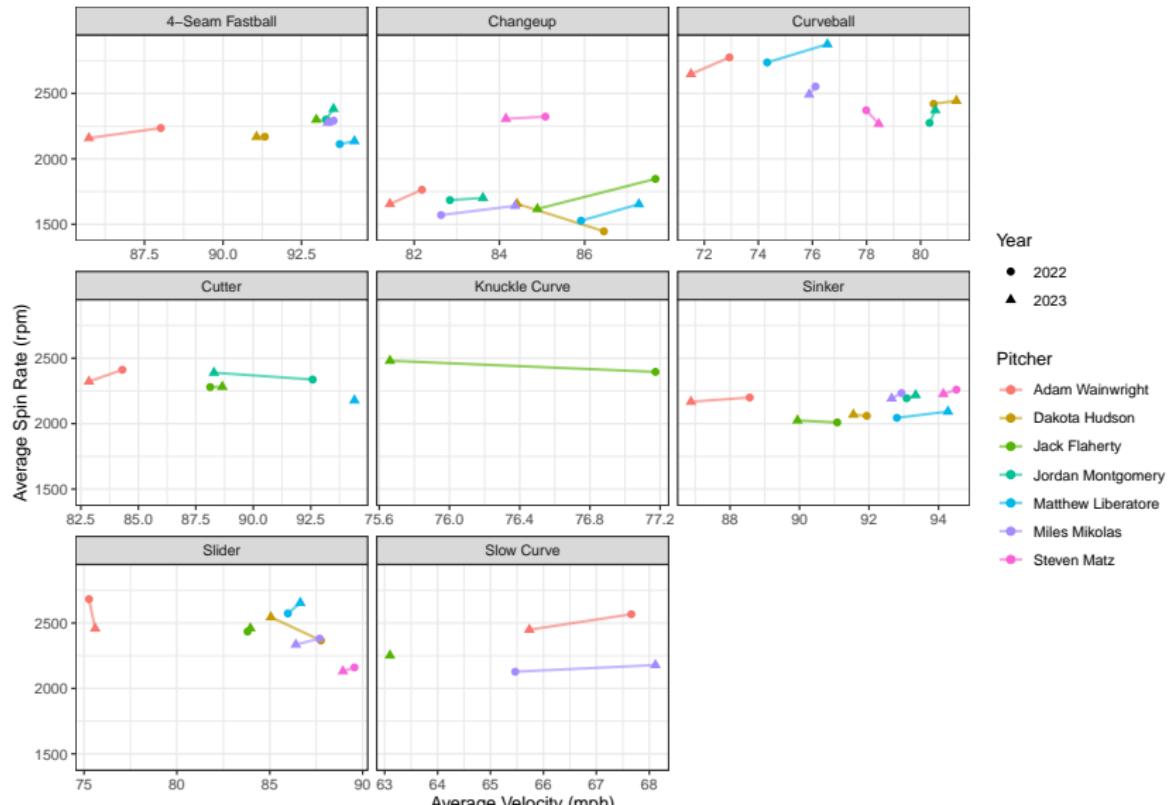


## Pitch Location

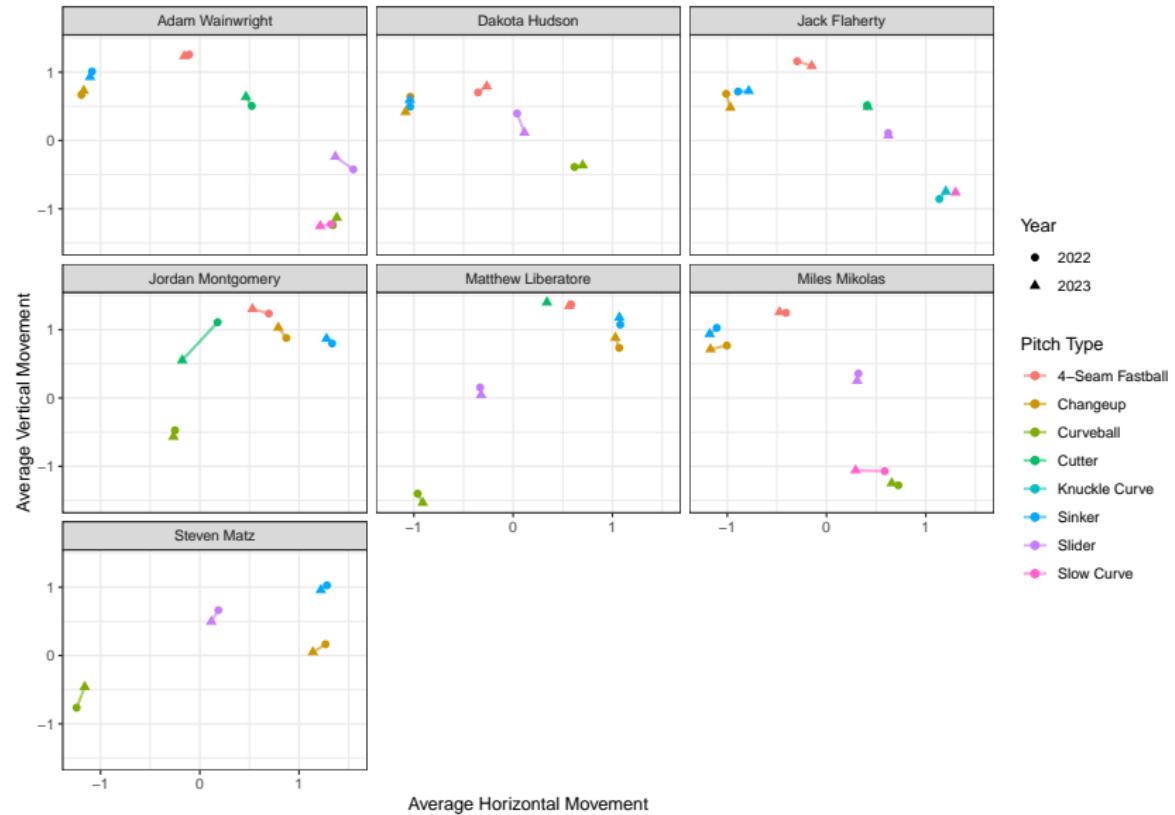
- ▶ Plot showed the differences in average pitch location between years.
- ▶ As you can see most of the pitchers average location for each pitch moved towards the middle or towards the inside of right handed hitter.
- ▶ These locations are from the catchers perspective and thus can show the difference in where a catcher calls a pitch.
- ▶ Looking at Flaherty you can see major changes in changeup location and Matz has huge differences in slider location.
- ▶ These changes in location most likely have to do with changes in strategy of game calling by these pitchers and how they want to attack hitters.

# Velocity and Spin Rate

- Average dropping around 1-2 MPH, not a good direction for aging starting rotation

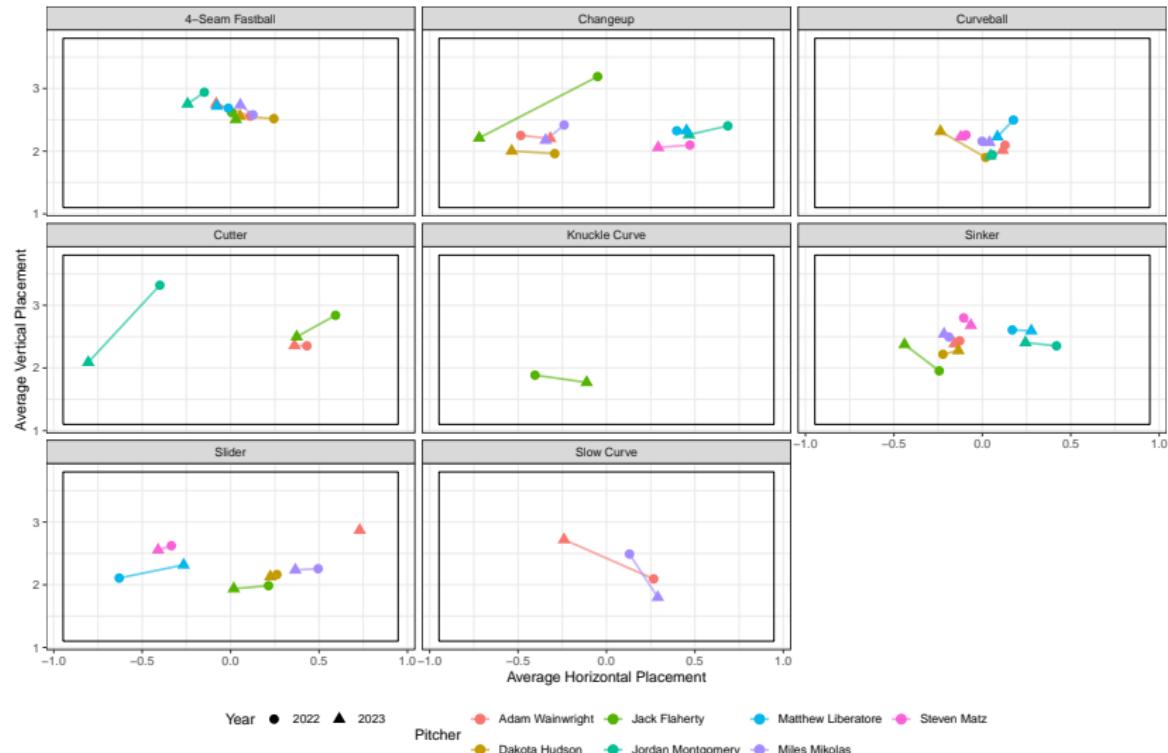


# Horizontal and Vertical Movement

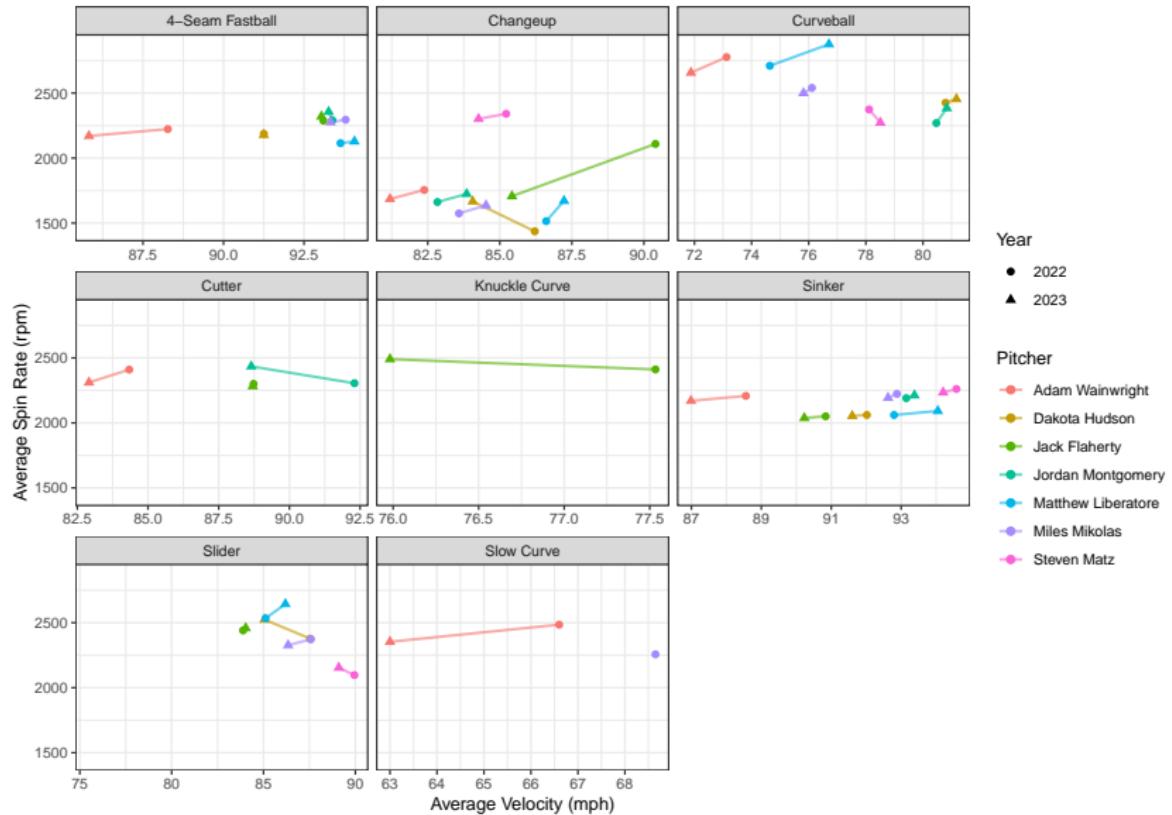


# Balls in Play Statcast

- ▶ 4 seam stayed about the same with being middle middle,  
Sinkers moved towards left side of home plate



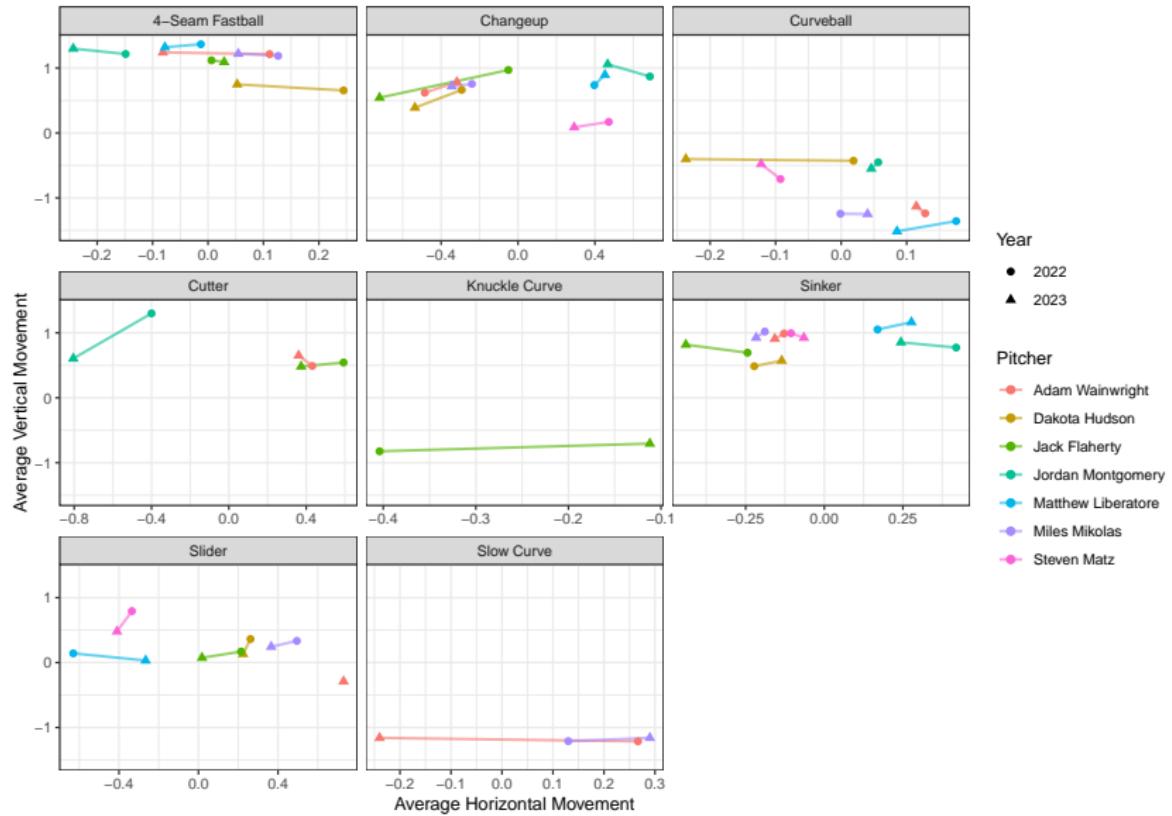
# Balls in Play Spin



## Balls in Play Spin

- ▶ When looking deeper into balls in play you can see the major differences in the spin rates and velocity.
- ▶ Looking at Adam Wainwright's fast balls, he was averaging around 87 for his sinker while having average spin rates.
- ▶ For the rest of the pitchers you can see that changeups all decreased in their spin rates causing the ball to be able to pick up easier and thus more easily hit.
- ▶ These decreases in pitching velocity and spin rates did likely cause the ball to be hit more as these trends show that the pitchers were pitching slower with less spin on the ball.

# Balls in Play Movement



## Balls in Play Movement

- ▶ Finally looking into balls in play movements we can see the differences between how these pitchers moved the ball.
- ▶ We already mentioned the decrease in spin rates for pitchers, so it is no surprise that for sliders we see the movements trending toward no movement.
- ▶ The decreased spin rates of the changeup and slider lead to less horizontal movement and vertical movement on pitches that are supposed to be moving during the pitch.
- ▶ These are breaking balls and off speed that do not seem to move.
- ▶ Looking at the sinker which the Cardinals seem to love so much, you can see that the movement is very small with pitches only moving 0.25 ft compared to cutters and changeups moving far more.

## Starters Sinkers

- ▶ A sinker needs to have run for the pitch to fool the batters eyes and miss judge the ball.
- ▶ It is weird that sinkers appear to be having positive vertical movement when they are supposed to run arm side and fall slightly.
- ▶ The Cardinals seem to throw standard two seams that sometimes tend to rise more than they run.
- ▶ You can see with spin rates and velocity dropping that it is not surprising that they do not run as much as they would probably like to.

## No More Shift?

- ▶ Looking at all of the data that came from the Cardinals 2023 season, it appears that the Cardinals got 'caught' and 'exposed' during the 2023 season.

```
## # A tibble: 8 x 3
##   year if_fielding_alignment tot
##   <dbl> <chr>                <int>
## 1 2022 Infield shade        295
## 2 2022 Infield shift       3773
## 3 2022 Standard           6385
## 4 2022 Strategic          1248
## 5 2023 Infield shade       3076
## 6 2023 Standard           8680
## 7 2023 Strategic          1169
## 8 2023 <NA>                 184
```

## Conclusion

- ▶ Looking back at the Statcast data you can see an aging rotation that had decreased velocity, spin rates, and movement on pitches.
- ▶ This roster was already old before the season started and there were worries about whether the old guys could do it, but it just seems like they were getting exposed with all of their flaws about their mindset of pitching and execution of pitches.
- ▶ Although there were lots of other problems with this team such as a lack of power and consistent hitting, the pitching was by far the worst problem on that field and was something that was not addressed.
- ▶ The pitching staff was one of the worst in the MLB with very low strikeout numbers, high runs against, and being one of the oldest rotations in the league.

## Conclusion

- ▶ You can see from all the graphs that the pitching continued to be worse than any previous year before it.
- ▶ Many people blamed the loss of Yadier Molina for why the pitching was so bad.
- ▶ During the 2023 season almost all pitchers saw some sort of loss of velocity or spin rate on their pitches resulting in a lack of execution and declining performance.
- ▶ The problems with location and game calling do play a factor, but it still does not account for multiple MPH losses on fastballs and less movement on their pitches than in previous years.

## Conclusion

- ▶ There is still a lot of data to explore and other aspects of this team to look at, but looking at the starting pitchers data, it was easily seen that they were performing worse and some causes that could have led to it.
- ▶ I do not believe it was Willson Contreras's fault that the pitching was so bad at the start of the season, he was a scapegoat for the pitchers and there is data to show that they were not as good.