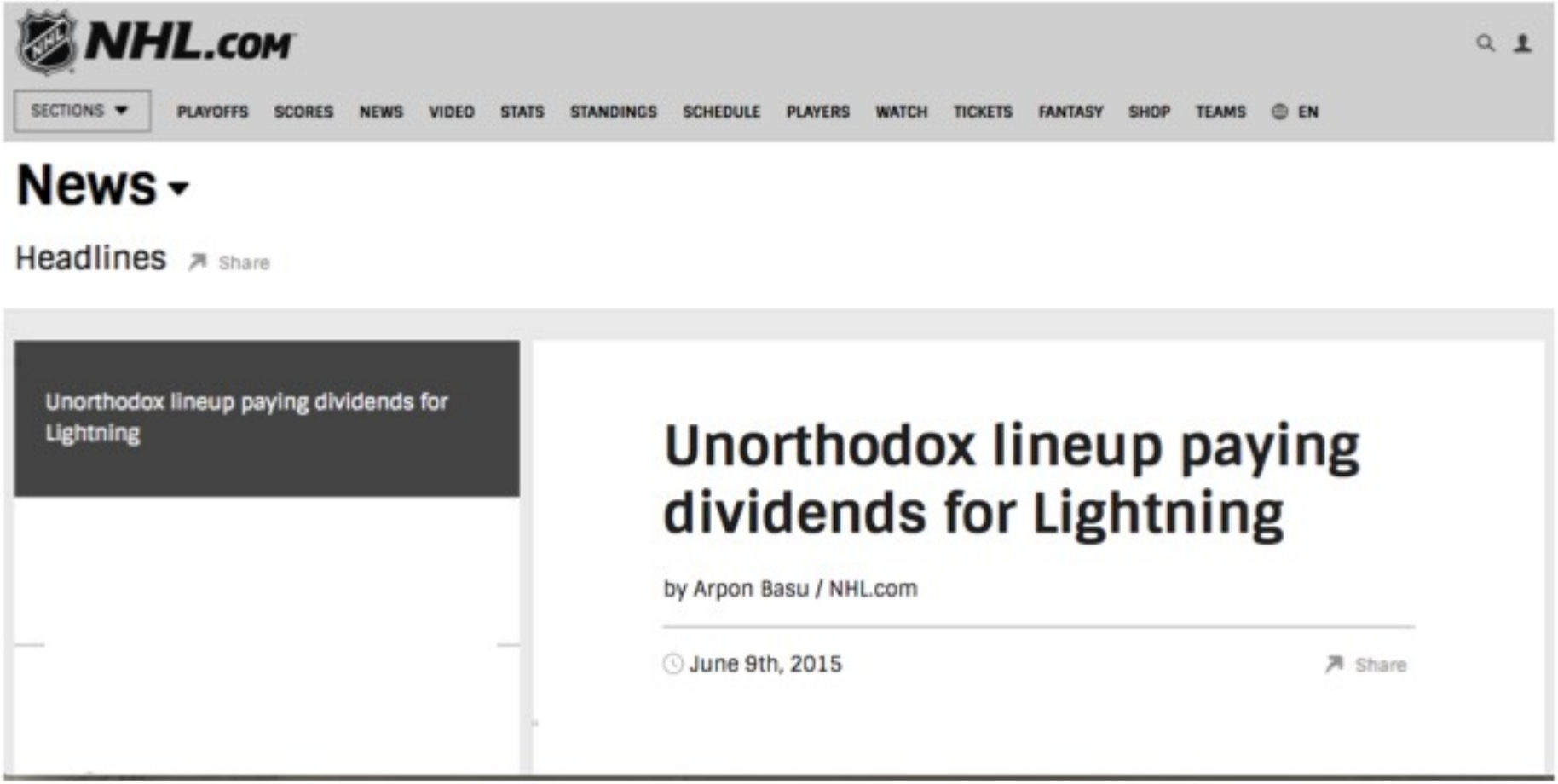
Reconsidering the Lineup:

Optimal Quantity of Defensemen

Eric Cantor

Introduction



Background

What

- Identify if performance differences exist with a roster structured with 7 defensemen rather than the traditional 6

How

- Analyze Tampa Bay Lightning game data from 2013-2016

Why

- Determine if a measurable advantage is obtained when implementing a roster structure with 7 defensemen

Outline

- 293 total games (2013-16)
  - 92 (7D) & 201 (6D)

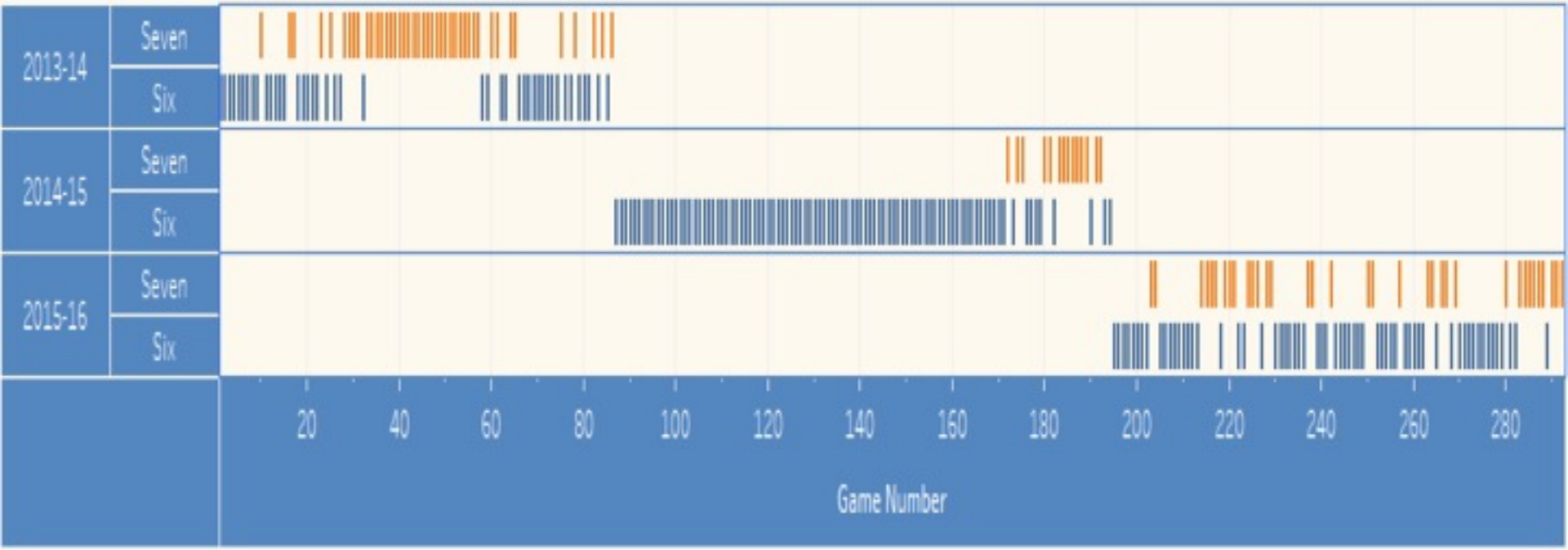
Areas of Focus:

- Relation to Injuries
- TOI distribution
- Team stats
- Defensemen stats
- Top 6 Forward stats
- Zone Entries
- Passing Project stats

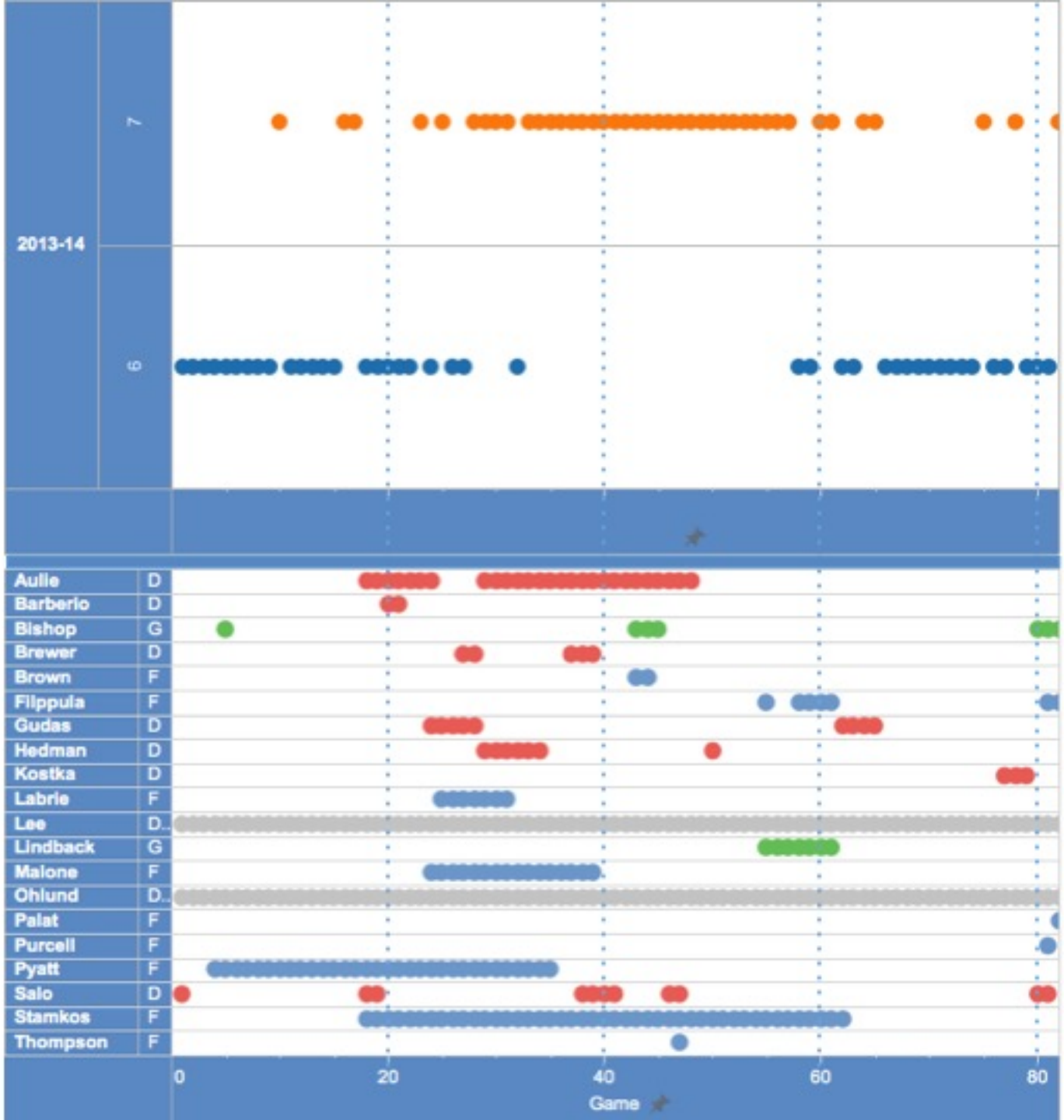
7D Games Distribution

Season	Regular (7D)	Playoffs (7D)	Total (7D)
13-14	82 (41)	4 (2)	86 (43)
14-15	82 (0)	26 (14)	108 (14)
15-16	82 (25)	17 (10)	99 (35)
Totals	246 (66)	47 (26)	293 (92)

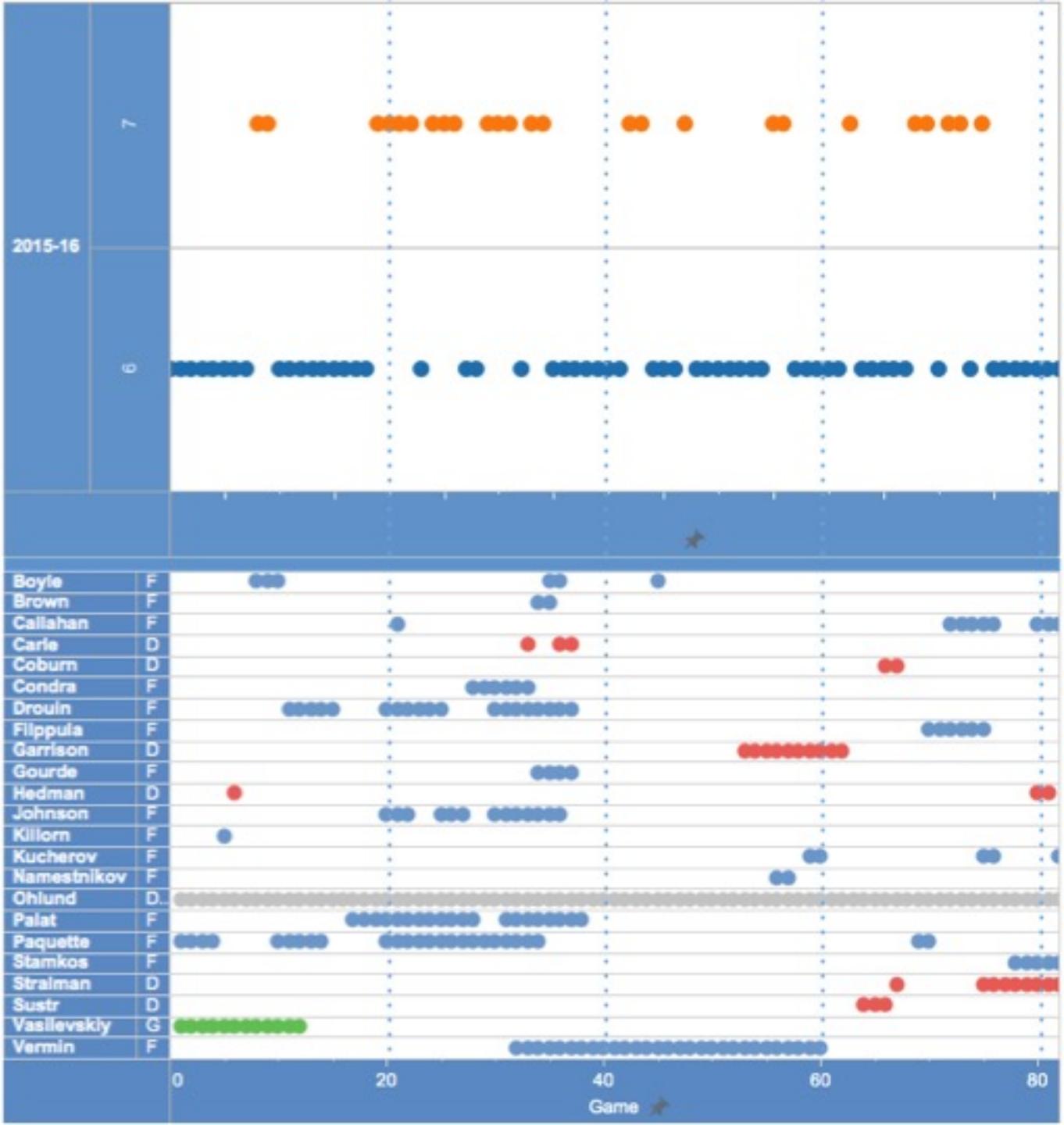
7D Games Distribution



Injuries (2013-14)

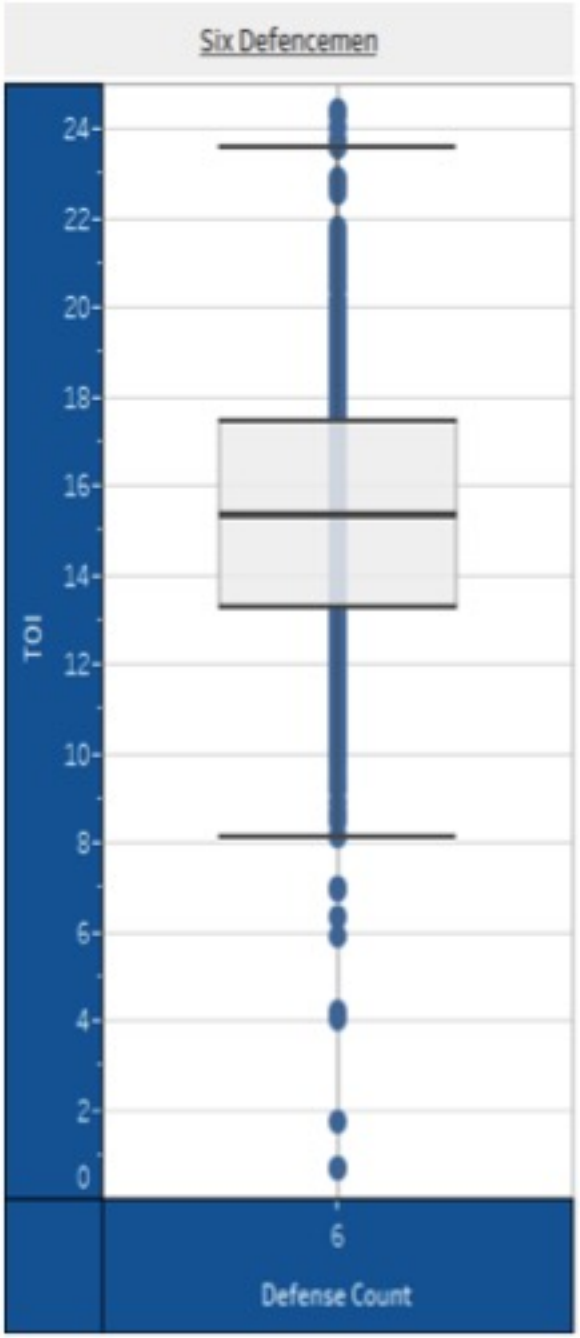


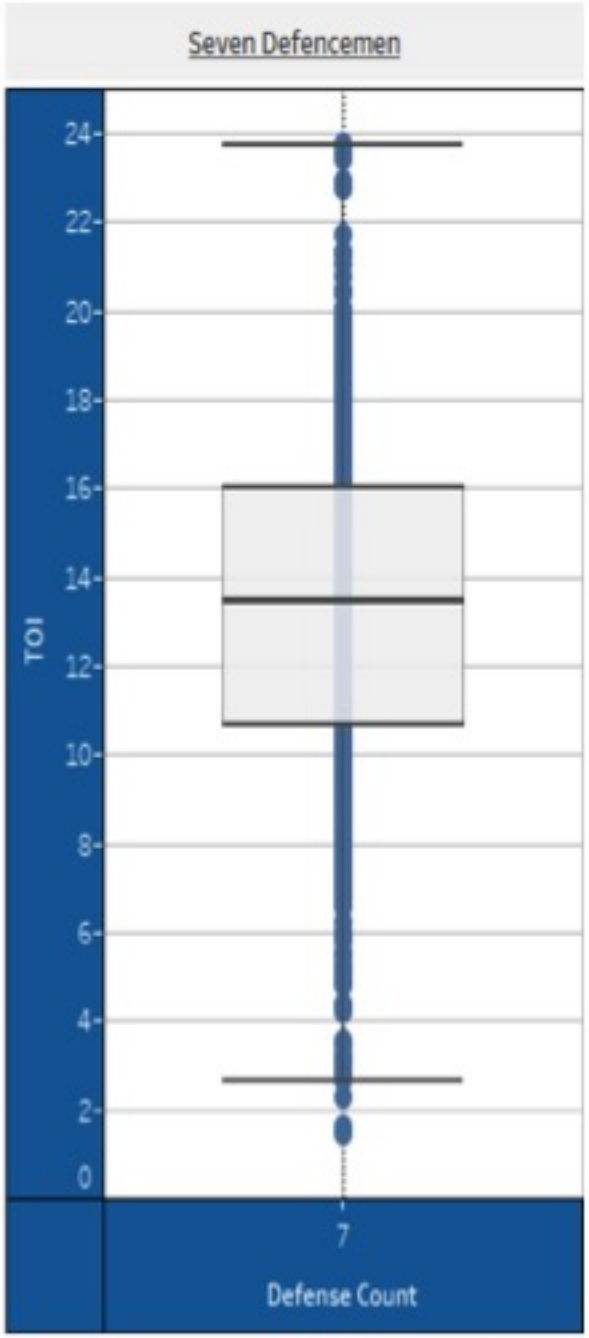
INJURIES (2015-16)



Defense TOI

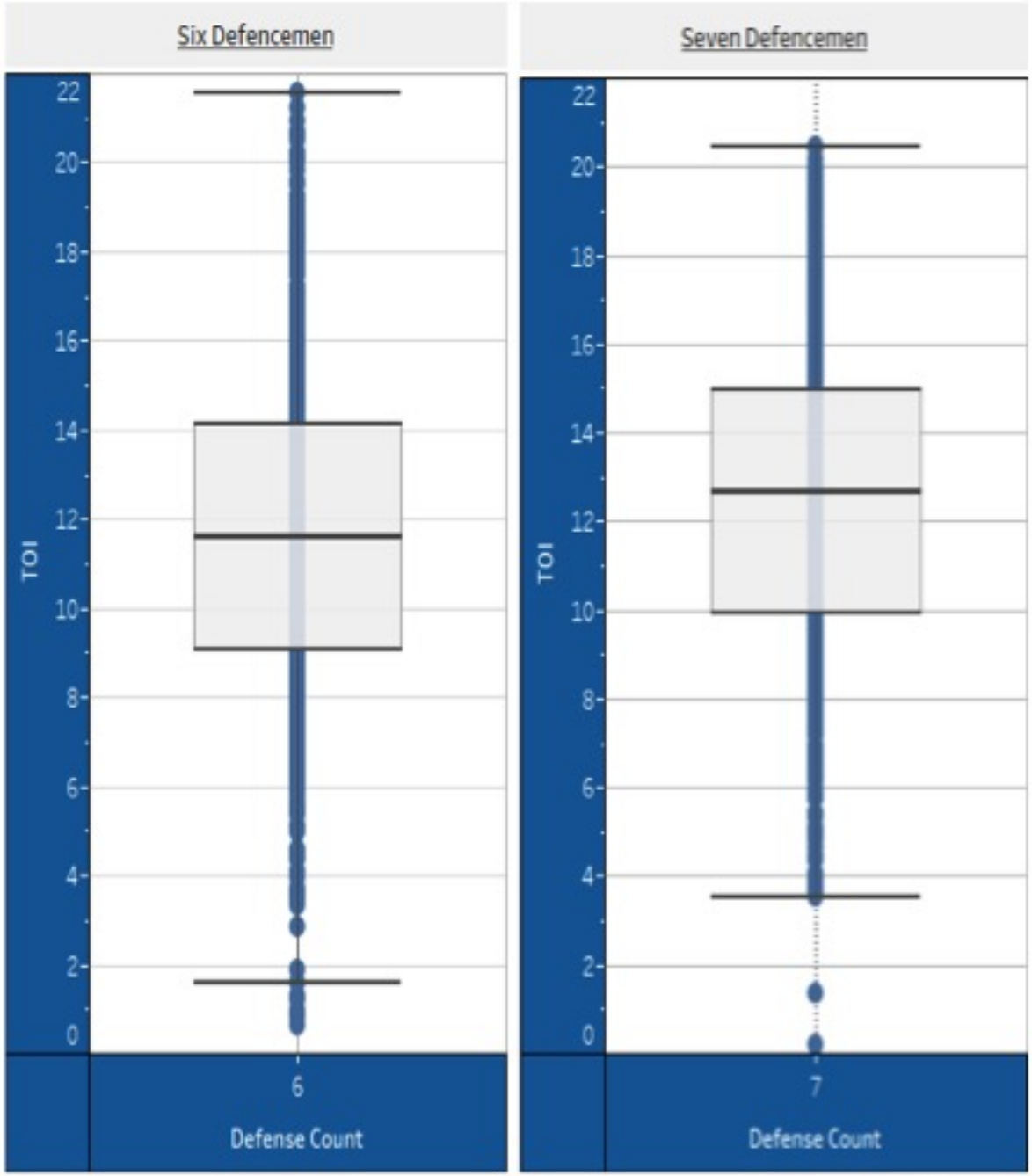
Statistic	6D	7D
Upper Whisker	23.60	23.73
Upper Hinge	17.42	16.05
Median	15.35	13.50
Lower Hinge	13.25	10.66
Lower Whisker	8.11	2.65





Top Six Forwards TOI

Statistic	6D	7D
Upper Whisker	21.55	20.94
Upper Hinge	14.16	14.96
Median	11.64	12.72
Lower Hinge	9.07	9.55
Lower Whisker	1.57	3.56



Overall Team Statistics

Statistic	6D	7D	Change
CF60	56.04	60.07	+4.03
CA60	53.25	54.79	+1.53
CF%	51.28%	52.31%	+1.03
FF60	41.50	44.92	+3.42
FA60	40.28	40.99	+0.71
FF%	50.88%	52.30%	+1.42
SCF60	7.37	8.01	+0.64
SCA60	7.21	7.65	+0.44
SCF%	51.01%	51.12%	+0.11
xGF60	2.32	2.54	+0.22
xGA60	2.24	2.36	+0.13

Overall Team Statistics

Statistic	6D	7D	P-Value
CF60	56.04	60.07	*0.001954*
CA60	53.25	54.79	*0.1331*
CF%	51.28%	52.31%	*0.1415*
FF60	41.50	44.92	*0.000942*
FA60	40.28	40.99	*0.2616*
FF%	50.88%	52.30%	*0.07876*
SCF60	7.37	8.01	*0.1296*
SCA60	7.21	7.65	*0.2228*
SCF%	51.01%	51.12%	*0.4798*
xGF60	2.32	2.54	*0.01687*
xGA60	2.24	2.36	*0.1152*

Top Six Forwards

Statistic	6D	7D	Change
CF%	50.92%	52.73%	*+1.81*
FF%	50.42%	52.65%	*+2.22*
xGF	0.53	0.63	*+0.10*
xGA	0.53	0.59	*+0.06*
xGF60	2.35	2.60	*+0.25*
xGA60	2.35	2.40	*+0.05*

Defense

Statistic	6D	7D	Change
CF%	51.09%	52.17%	*+1.08*
FF%	50.58%	52.04%	*+1.46*
xGF	0.59	0.55	*-0.04*
xGA	0.58	0.52	*-0.05*
xGF60	2.31	2.51	*+0.20*
xGA60	2.26	2.40	*+0.14*

Top Six Forwards

Statistic	6D	7D	P-Value
CF%	50.92%	52.73%	*0.04154*
FF%	50.42%	52.65%	*0.02437*
xGF	0.53	0.63	*0.000038*
xGA	0.53	0.59	*0.01839*
xGF60	2.35	2.60	*0.01489*
xGA60	2.35	2.40	*0.3391*

Defense

Statistic	6D	7D	P-Value
CF%	51.09%	52.17%	*0.1318*
FF%	50.58%	52.04%	*0.07444*
xGF	0.59	0.55	*0.9449*
xGA	0.58	0.52	*0.982*
xGF60	2.31	2.51	*0.02488*
xGA60	2.26	2.40	*0.09575*

Zone Entries (2013-14)

Statistic	6D	7D	Change
5V5 Entry%	50.65%	50.89%	*+0.24*
Carry-in%	49.61%	57.02%	*+7.41*
Shots per entry	0.44	0.50	*+0.06*
OPP Carry-in%	47.07%	47.15%	*+0.07*
OPP Shots per entry	0.46	0.47	*+0.01*

Passing (2015-16)

Statistic	6D	7D	Change
A1	42.67	44.41	*+1.75*
SC	15.41	16.71	*+1.30*

*Passing data limited to 56 games from 2015-16 season

Zone Entries (2013-14)

Statistic	6D	7D	P-Value
5V5 Entry%	50.65%	50.89%	*0.4133*
Carry-in%	49.61%	57.02%	*0.00001426*
Shots per entry	0.44	0.50	*0.00275*
OPP Carry-in%	47.07%	47.15%	*0.4839*
OPP Shots per entry	0.46	0.47	*0.3423*

Passing (2015-16)

Statistic	6D	7D	P-Value
A1	42.67	44.41	*0.2606*
SC	15.41	16.71	*0.167*

*Passing data limited to 56 games from 2015-16 season

Future Exploration

- Ideas for future exploration include:
  - The factor of fatigue
  - Additional injury analysis
  - Individual player analysis
  - Further zone entry and exit analysis
  - Other forms of tracking data
  - Informative models
  - Predictive models

Conclusion

- The potential competitive advantage of the 7D roster structure should hold much intrigue and appeal for hockey management of all levels
- Many potential applications and complements exist for the 7D strategy
  - Current trend of more mobile defensemen
  - Injury situations
  - Much more…

Acknowledgements & info

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Data Sources:

- Corsica.Hockey
- Corey Sznajder's All Three Zone Project
- Ryan Stimson's Passing Project
- NHL Injury Dataviz