“Turned on!”: Momentum in Round-Based First Person Shooter Esports

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Game types

- Search and Destroy (SnD) in Call of Duty (COD)
- 2020-2022 Call of Duty League (CDL) matches (qualifiers and majors)
- 4v4.
- First to 6 round wins
- Teams swap sides (offense and defense) after every round

- Plant/Defuse in Valorant
- Valorant professional league, updated through January 1, 2022
- 5v5
- First to 13 round wins
- One team plays offense in 12 consecutive rounds before swapping sides
- Must win by 2 cod_rounds

How does a team win a round of COD SnD / Valorant plant/defuse?

1. One team eliminates all members of the other team prior to a bomb plant.

2. The offensive team eliminates all members of the defensive team after a bomb plant.

3. The defensive team defuses the bomb after a bomb plant.

Often the defensive team will try to eliminate all o team members prior to making the defuse, but in some cases, they may try to “ninja” defuse.

4. The offensive team does not make a plant by the time the round timer ends.

COD SnD data overview

- Total series: **784**
- Total rounds: **7,179**
- Offensive plant %: **52%**
- Offensive win %: **48%**
- Win % when planting: **66%**
- Win % when earning first blood: **73%**

Valorant data overview

- Total series: **12,043**
- Total rounds: **250,507**
- Offensive win %: **49%**

What are your chances of winning a round, given the series state in COD SnD?

Offensive Round Win %

Defensive Team's # of Pre-Round Wins	0	1	2	3	4	5
5	38% (13/34)	39% (37/95)	42% (49/118)	46% (76/166)	52% (99/192)	46% (88/192)
4	44% (28/64)	42% (47/111)	49% (83/171)	46% (91/197)	57% (117/206)	44% (72/165)
3	44% (48/109)	45% (84/188)	47% (113/240)	44% (101/229)	46% (97/212)	52% (80/155)
2	44% (90/206)	51% (143/279)	49% (140/287)	50% (115/231)	45% (78/175)	45% (56/125)
1	46% (171/374)	49% (185/375)	49% (136/280)	46% (84/184)	57% (75/132)	48% (37/77)
0	48% (373/784)	50% (206/410)	54% (109/203)	55% (64/116)	56% (34/61)	44% (16/36)

Offensive Team's # of Pre-Round Wins

CDL SnD Major and Weekly matches, 2020 - present

What are your chances of winning a round, given the series state in COD SnD?

Offensive Round Win % Over Expected

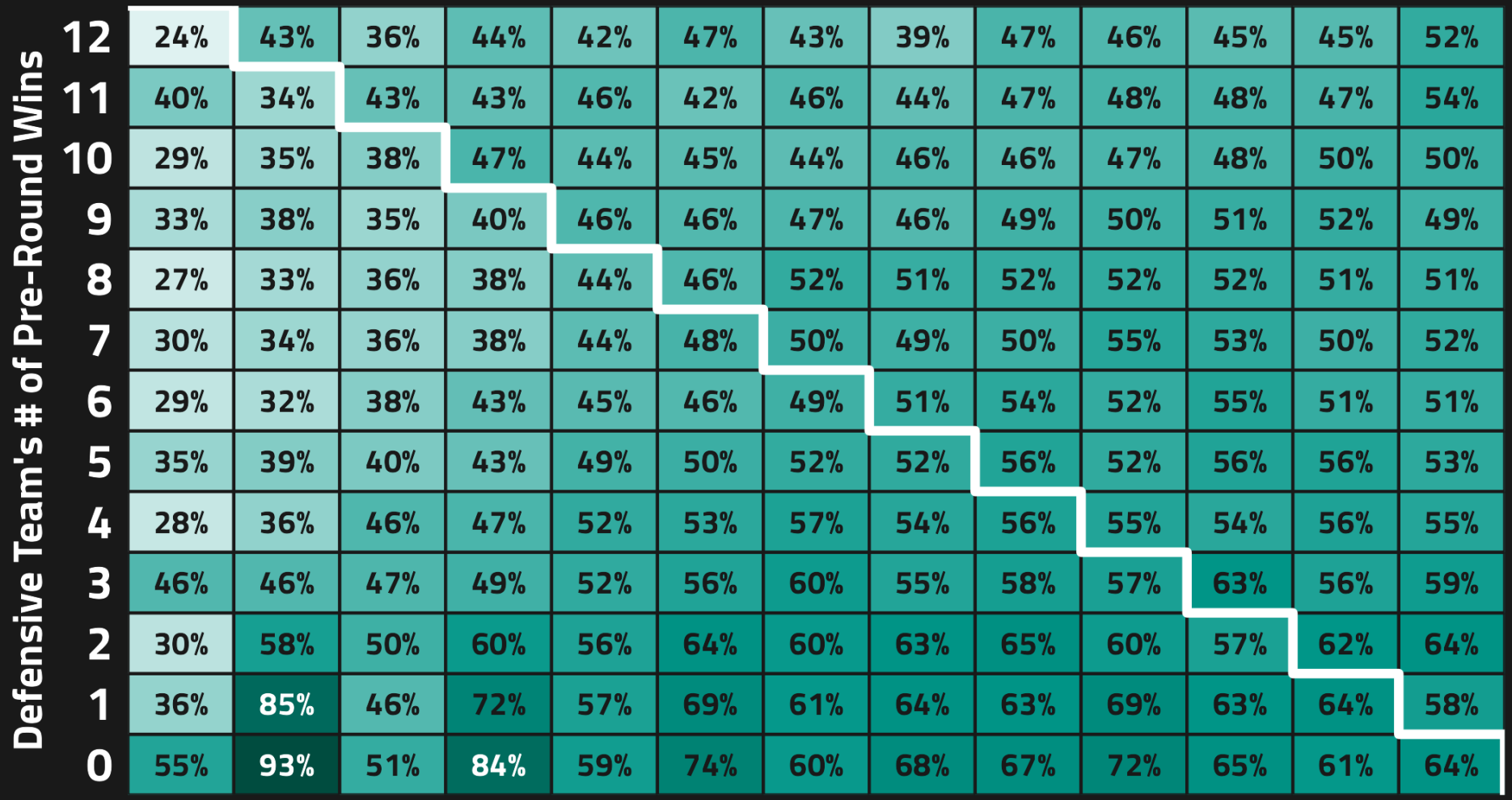
Defensive Team's # of Pre-Round Wins	0	1	2	3	4	5
5	-9.6 (34)	-8.9 (95)	-6.3 (118)	-2.1 (166)	+3.7 (192)	-2.0 (192)
4	-4.1 (64)	-5.5 (111)	+0.7 (171)	-1.7 (197)	+8.9 (206)	-4.2 (165)
3	-3.8 (109)	-3.2 (188)	-0.8 (240)	-3.7 (229)	-2.1 (212)	+3.8 (155)
2	-4.2 (206)	+3.4 (279)	+0.9 (287)	+1.9 (231)	-3.3 (175)	-3.0 (125)
1	-2.1 (374)	+1.5 (375)	+0.7 (280)	-2.2 (184)	+9.0 (132)	+0.2 (77)
0	-0.3 (784)	+2.4 (410)	+5.8 (203)	+7.3 (116)	+7.9 (61)	-3.4 (36)

Offensive Team's # of Pre-Round Wins

CDL SnD Major and Weekly matches, 2020 - present

What are your chances of winning a round, given the series state in Valorant?

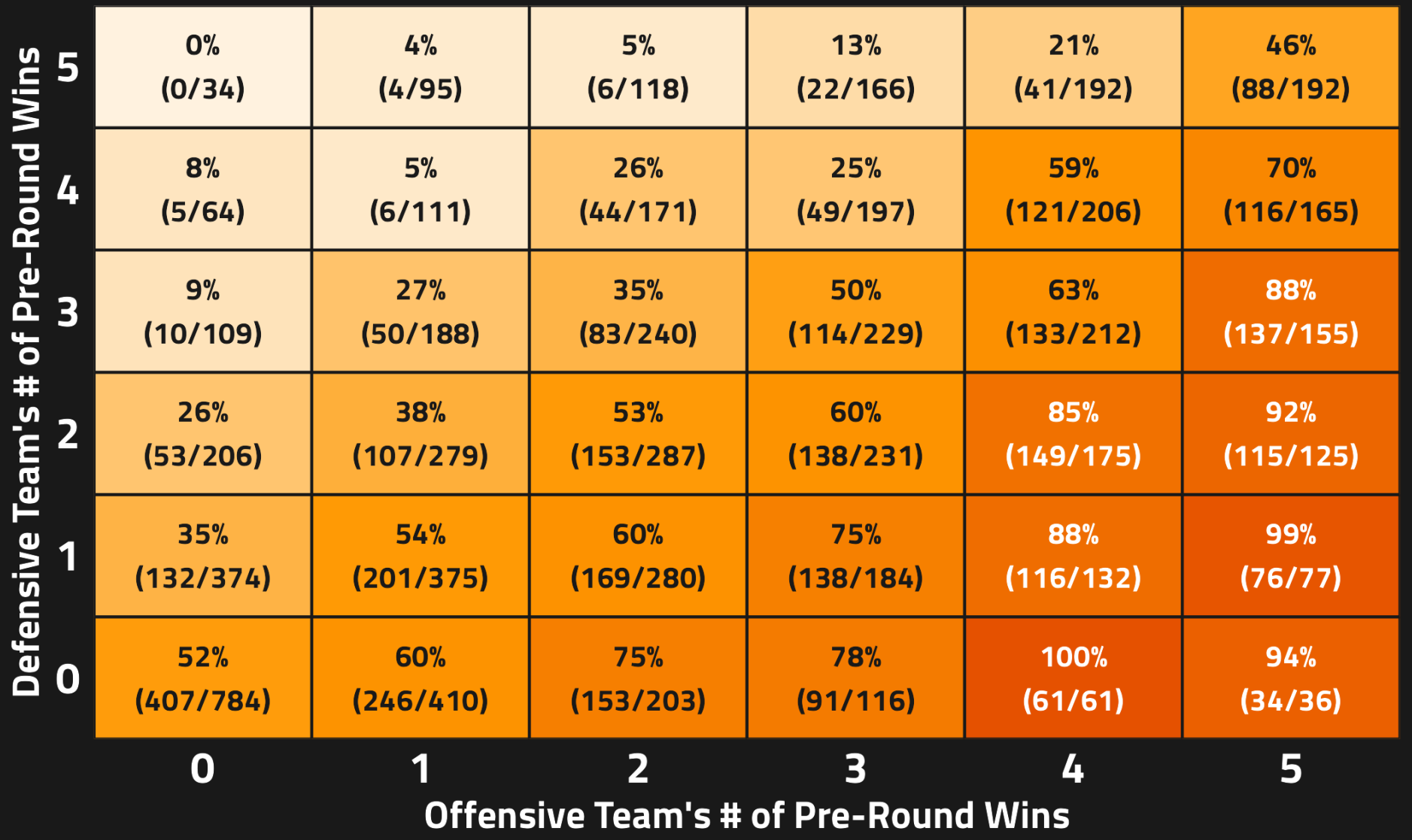
Offensive Round Win %



Pro Valorant matches, 2020 - Jan 1, 2022

What are your chances of winning the series, given the series state?

Offensive Series Win %



CDL SnD Major and Weekly matches, 2020 - present

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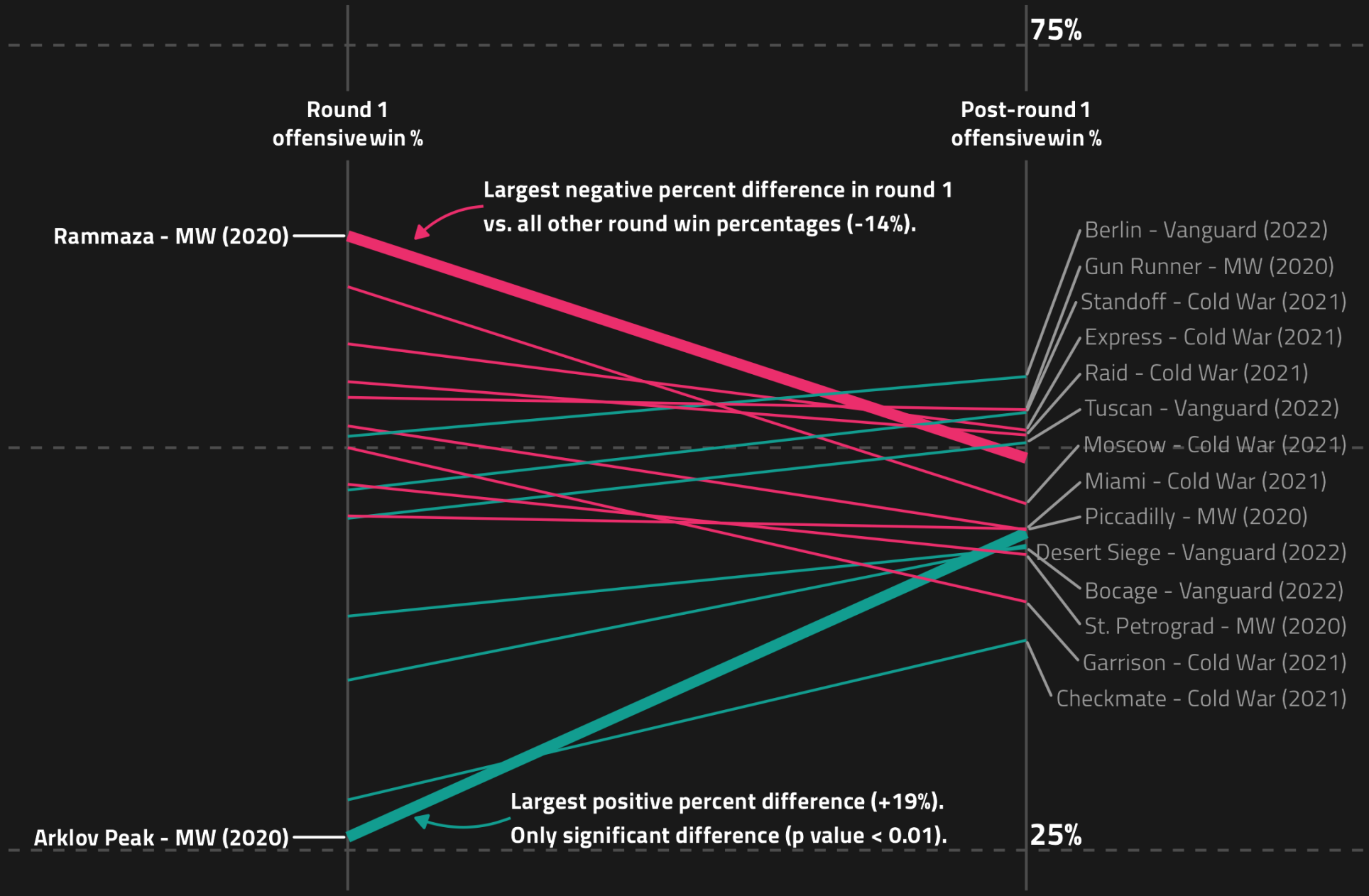
Offensive Team's # of Pre-Round Wins

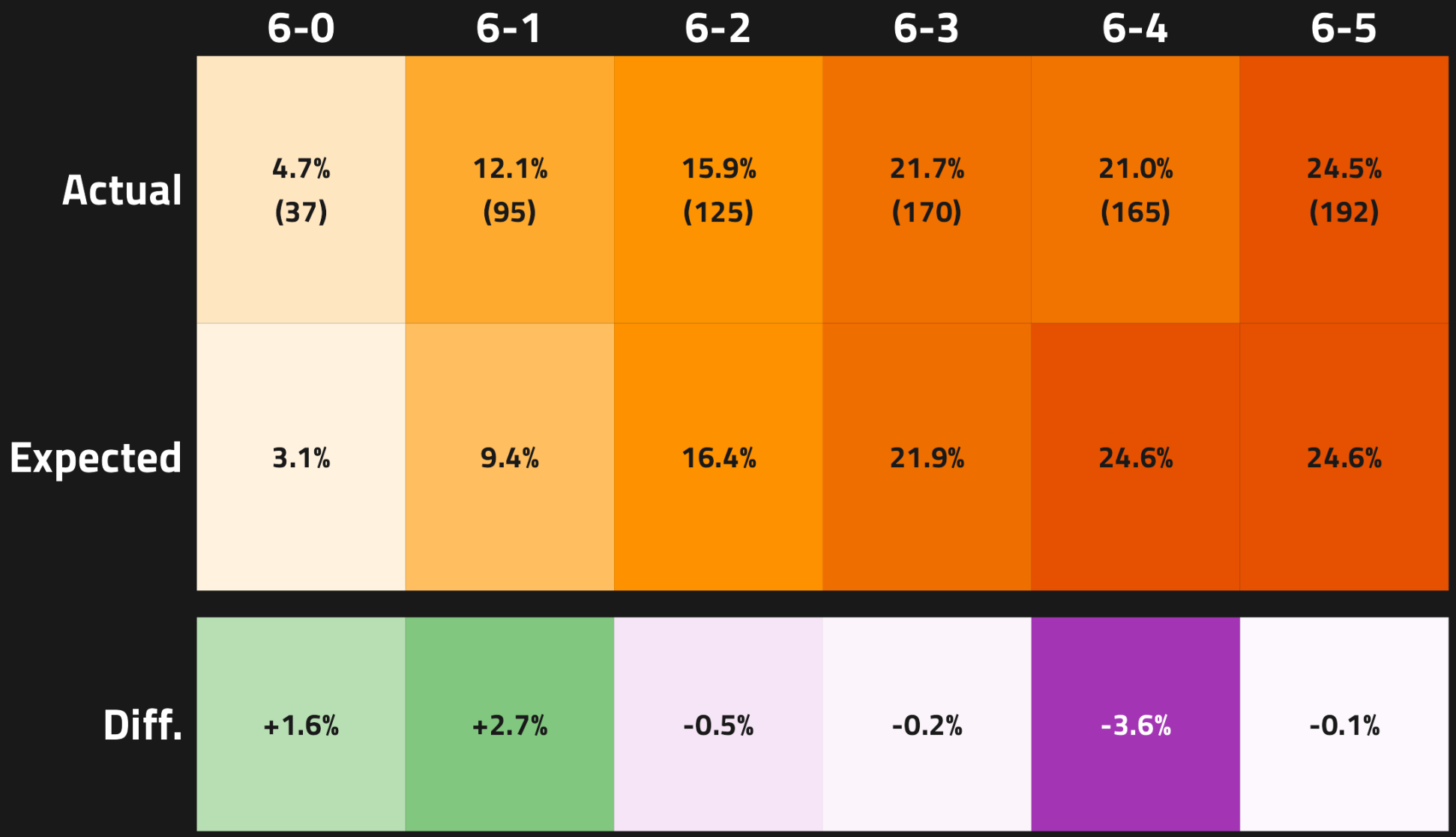
CDL SnD Major and Weekly matches, 2020 - present

Are offensive win %’s different in round 1?


75%
Round 1 offensive win %
Post-round 1 offensive win %
Largest negative percent difference in round 1 vs. all other round win percentages (-14%).
Rammaza - MW (2020)
Berlin - Vanguard (2022)
Gun Runner - MW (2020)
Standoff - Cold War (2021)
Express - Cold War (2021)
Raid - Cold War (2021)
Tuscan - Vanguard (2022)
Moscow - Cold War (2021)
Miami - Cold War (2021)
Piccadilly - MW (2020)
Desert Siege - Vanguard (2022)
Bocage - Vanguard (2022)
St. Petrograd - MW (2020)
Garrison - Cold War (2021)
Checkmate - Cold War (2021)
Largest positive percent difference (+19%).
Only significant difference (p value < 0.01).
Arklov Peak - MW (2020)
25%

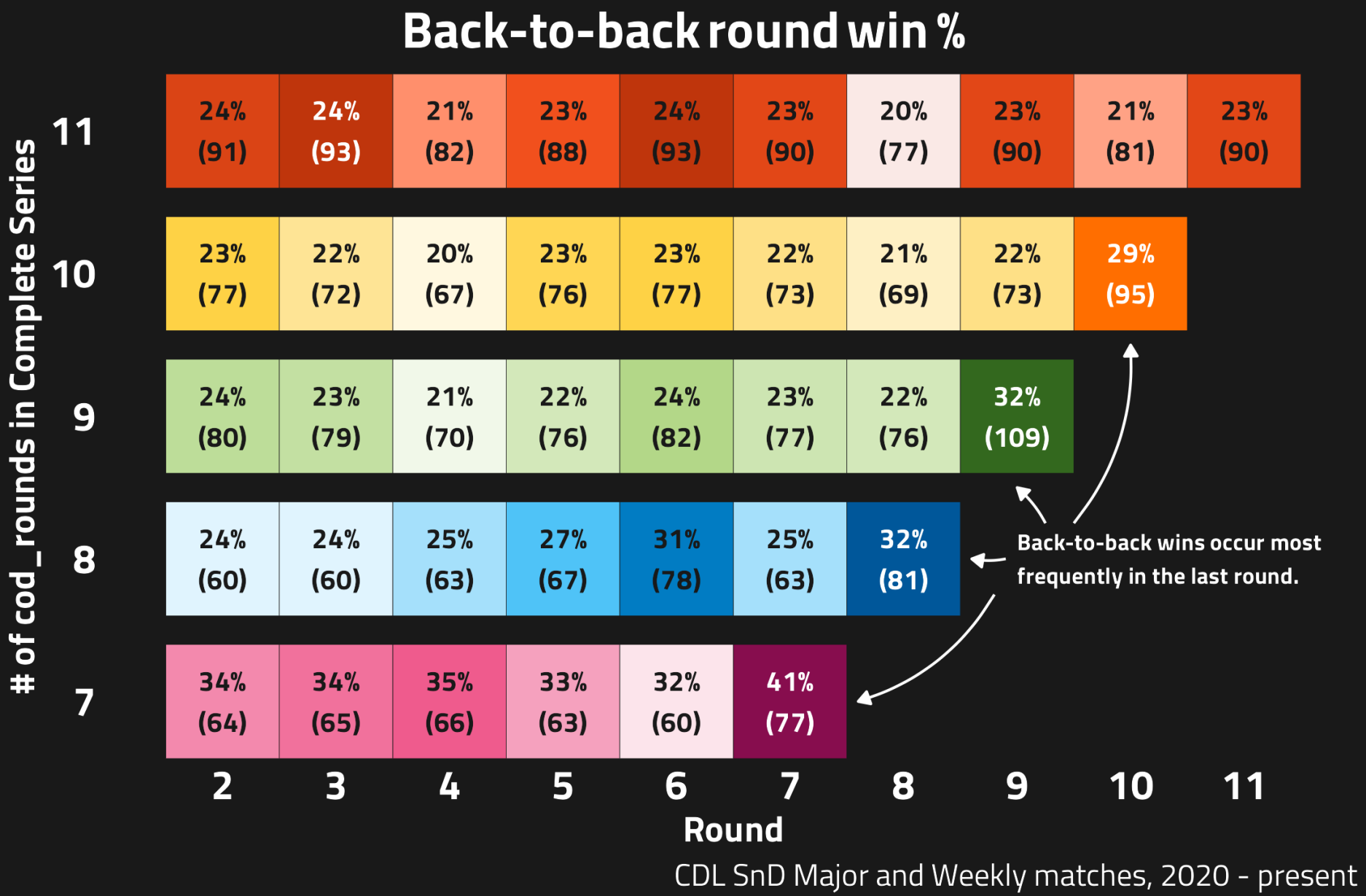
What are the most common series winning states?

Series outcome %



CDL SnD Major and Weekly matches, 2020 - present

When do back-to-back round wins occur?



CDL SnD Major and Weekly matches, 2020 - present

Is there evidence for the “hot hand”?

- Round win % after a streak of 3 round wins:
- Expected: **38.4%**
- Actual: **54%** (621 / 1150)

Is planting at one site better than the other?

Plant site	%
Primary	60.9%
Secondary	39.1%

Plant site	Win %
Primary	47.4%
Secondary	48.5%