AVCA - BADGER REGION EDUCATIONAL TIP OF THE WEEK

PERFORMANCE BENCHMARKS (STATS) FOR THE REST OF US

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The more coaching clinics you attend, the more you are encouraged to take stats. The "Moneyball" trend has reached volleyball. Using stats to drive decisions is a given at the elite level and is moving into the high school and club segments.

Taking stats is one thing but what does it actually mean to have a 55% Side Out rate? Whenever clinicians are asked, the answers they give are based on benchmark stats for the National Team, FIVB and Collegiate DI. But what about the rest of us? What are the relevant benchmarks for club and high school teams?

Stats for the Rest of Us

The good news is that Rotate123 LLC has been collecting stats from matches played by the rest of us through its SoloStats product for five years. We have identified the key stats and have done a correlation analysis to show which stats matter the most for winning. This data is broken down by age and level of play ranging from 12U to college, and is based on more than 20 million stat entries and over 500,000 sets from matches played. This article will take you through this in a step-by-step manner.

How We Analyzed the Data

First we purged the database of scrimmages, incomplete matches and teams with less than 10 matches. This was to ensure that we had a full season of stats. Next we scanned our data to review the reliability of in-rally stats. We found that other than receive ratings, the in-rally touches were recorded in an inconsistent manner. Hence, we will not have percentage-based calculations, other than Side Out and Point Scoring. We won't have, for example, hitting efficiency and kills %.

To "normalize" the stats, we chose games that were played to 25 points – not 15-point tie-breakers and no matches greater than 25 points. This way, we are able to provide Kills per Set numbers that are based on a consistent 25 points.

We divided the stats by level of play. Below is a breakdown of the number of sets in each level of play:

- High School Varsity: 152,842
- Club 16: 62,673
- High School JV: 45,139
- Club 14: 43,759

- Club18: 37,977
- University: 22,452
- Club 12: 10,900
- Junior College: 6,255

A couple clarifications are important. These are girls' stats, and the club age groups are double – so 12s includes 11s, and 18s includes 17s, etc.

To prioritize the stats, we did a Pearson correlation and looked at the stats' impact on winning or losing. Also, we prioritized the stats according to this correlation and ranked stats based on high-to-low correlations of a stat to winning or losing.

Here are the stats that we used:

- Serve Attempts
- Aces
- Serve Errors
- Passing Rating
- Passing Errors
- Digs
- Dig Errors
- Attack Attempts
- Kills
- Attack Errors
- Blocks
- Block Errors
- Side Out %
- Point Score %

Which Stats Matter for Winning?

Let's take a look at the high school varsity stats as an example of Win-Loss Correlation.
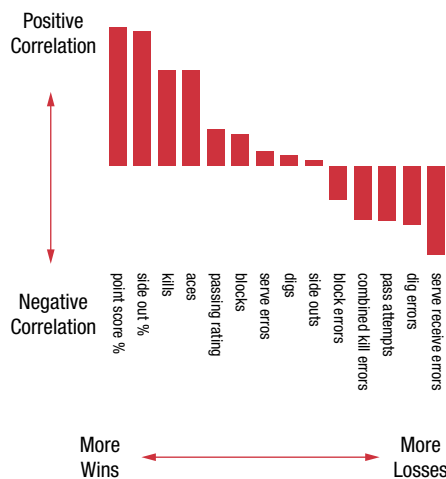
As you can see from the table, Point Scoring % and Side Out % are the most correlated to winning – which is pretty obvious. If you have a high Side Out %, your chance of winning goes up. This is

followed by Kills and Aces. The fact that Pass Rating is less important is a bit of a surprise. The issue is that this contact does not immediately result in a point. This "loose" coupling to the point makes it a lower priority than, for example, Receive Errors – which results in an immediate point loss. And hence, it is very important relative to losing. This makes sense since it's the flip side of Aces.

Tipping Point

It is important to understand the sensitivity of a small change in a stat relative to winning or losing. If the relationship is linear, then each incremental change in the value – for example, aces – will result in an incremental increase in wins. Compare the curves below:
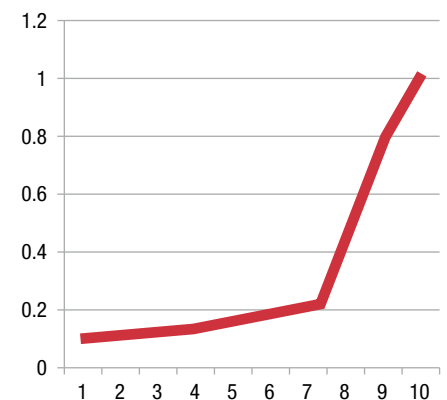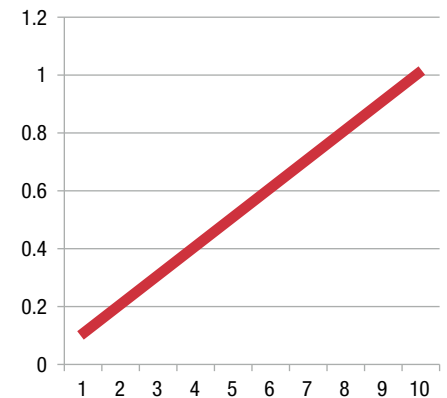

The curve on the top is linear. The curve on the bottom is a "hockey stick" where at a value of 7, the win rate goes up dramatically. We will look at each stat to understand where the "tipping point" is. This is the magic number where your win rate will increase dramatically.

The Stats that Will Win More Games

In this section we will look in detail at high school benchmarks in order of most important to winning and losing.

Point Scoring %

50% PS = 60% wins
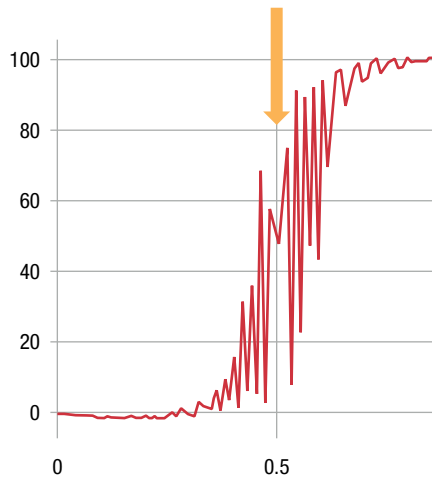
Unlike lower levels of play, at the high school play level, the receiving side is stronger than the serve/point scoring side. So by getting to a 50% Point Scoring percentage, your win rate will go to 60%. If you draw a straight line through this curve, it has a steep upward angle. Any slight increase above 50% will dramatically improve your win rate.
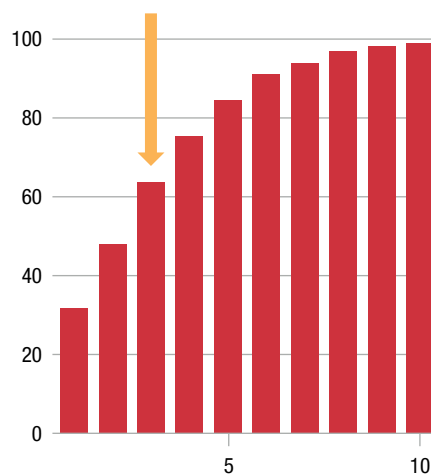
Side Out %

50% SO = 50+% wins
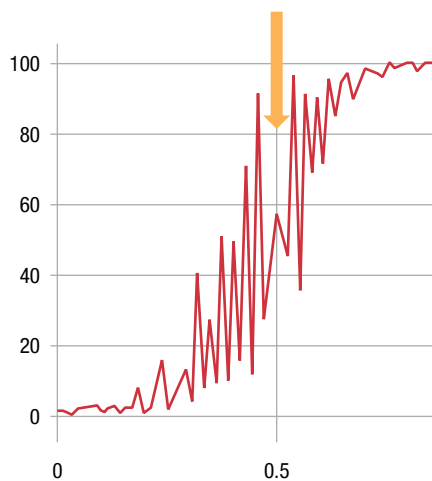
The Side Out curve is also steep. However, since most teams are pretty good at this level of play, a 50% Side Out percentage only provides a 50% win rate. As you improve your Side Out percentage, you win rate will increase dramatically.

Aces per Set

3 aces = 60+% wins

You can see that the left side of this graph is steep, so that each incremental ace results in many more wins. At 2 aces, the team is at about 50%. However, at 3 aces, the win rate jumps to more than 60%. This makes sense, as it is much harder to get aces at high school levels of performance because the serve receive and side out capabilities of the average team exceeds the point scoring rate of teams.

Kills per Set

9 kills = 60+% wins
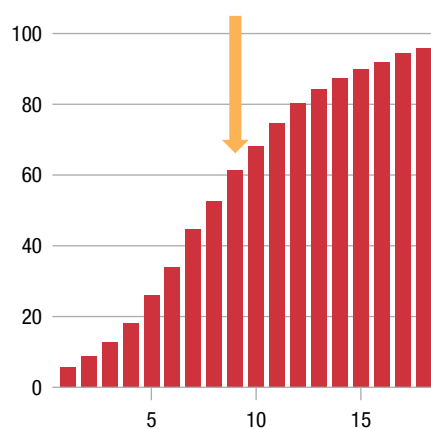
At 8 Kills per Set, your team would be slightly above the 50% win rate. At 9 Kills per Set, the win rate exceeds 60%

Serve Receive Errors per Set

2 errors = 55% wins
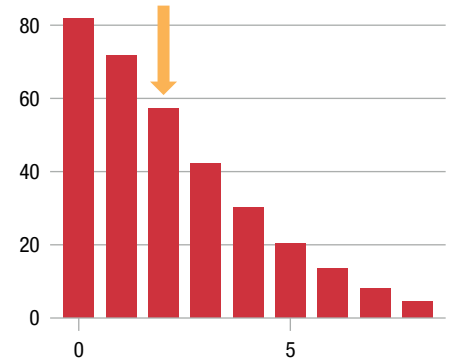
On the negative side, Receive Errors are costly and lead towards more losses. This is the inverse of Aces, so it makes sense. 2 Receive Errors per Set looks like the limit of what you want for your team as your win rate is still at 55%. At 3 Receive Errors per Set, you win rate drops below 45%.

Attack Errors per Set

5 attack errors = 50% wins
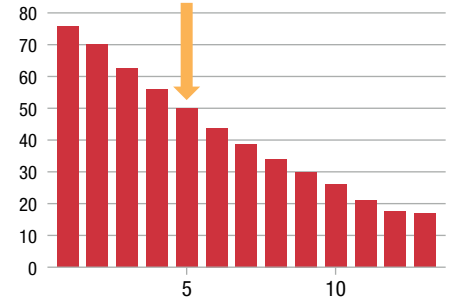
5 Attack Errors per Set will provide a 50% win rate. Thus, more hitting errors will result in an increase in losses.

Dig Errors per Set

5 dig errors = 50% wins

5 Dig Errors per Set is the limit before losses will exceed wins.

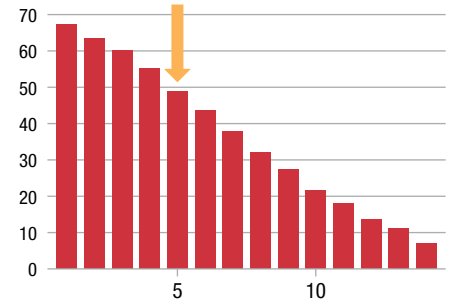| Club 12	Club 14	Club 16	Club 18	HS JV	HS Varsity	Jr. College	University
Pt Scoring %	Pt Scoring %	Pt Scoring %	Pt Scoring %	Pt Scoring %	Pt Scoring %	Side Out %	Pt. Scoring %
Side Out %	Side Out %	Side Out %	Side Out %	Side Out %	Side Out %	Pt Scoring %	Side Out %
Aces	Aces	Aces	Kills	Aces	Kills	Kills	Kills
Kills	Kills	Kills	Aces	Kills	Aces	Aces	Aces
Pass Rating	Pass Rating	Pass Rating	Blocks	Pass Rating	Pass Rating	Blocks	Blocks
Blocks	Blocks	Blocks	Pass Rating	Blocks	Blocks	Pass Rating	Pass Rating
Serve Errors	Serve Errors	Digs	Digs	Serve Errors	Serve Errors	Digs	Serve Errors
Digs	Digs	Serve Errors	Serve Errors	Digs	Digs	Serve Errors	Digs
Block Errors	Block Errors	Block Errors	Block Errors	Block Errors	Block Errors	Dig Errors	Block Errors
Attack Errors	Attack Errors	Attack Errors	Dig Error	Attack Errors	Attack Errors	Block Errors	Attack Errors
Dig Errors	Dig Error	Dig Error	Attack Errors	Dig Error	Dig Error	Attack Errors	Dig Error
Srv Rec Errors	Srv Rec Errors	Srv Rec Errors	Srv Rec Errors	Srv Rec Errors	Srv Rec Errors	Srv Rec Errors	Srv Rec Errors

Stats by Age and Level of Play

Above is a chart showing the relationship of certain stats to winning and losing by level of play and age.

As you look from left to right – younger players to older players – you can see that the game goes from stronger serving to stronger receiving. Aces are the key way to win at lower levels of play while Kills are critical for winning at higher levels of play. This is consistent with our experiences. If you watch a 12s match, you will see ace after ace. Sometimes the game will end after only a few rotations as two or three servers will have long serving runs. This rarely happens in older, more experienced levels of play. The receivers get better, and now it becomes an attacking game.

You notice that Kills become a higher priority in the high school JV to Club 18s level. So at this 17–18s age level the receive part of the game is stronger than the serving part of the game.

You will notice a few other changes – at upper levels of play, Attack Errors become slightly more important that Dig Errors.

In all cases, Pass Rating, Blocks, Serve Errors and Digs are much less correlated to Winning or Losing.

General Coaching Thoughts

Doing rotation-based analysis makes a lot of sense for receive but possibly not so much for serving. What I've found is that the Point Scoring capabilities of your team are not just a matter of having a strong defensive lineup and a strong serve, but also your opponent. As lineups against opponents vary so much, except in school league play, it's tough to plan your matchups by rotation. I typically try to make sure that the best servers are in all rotations.

Receive rotations are different. By looking at your Side Out Percentage by rotation (any good volleyball stat app should provide this), you should work on improving your worst side out rotations. These "pot holes" will cause your team to get stuck and lose points. Instead of spending an hour at practice on all rotations, focus on the one or two rotations that are the weakest and make progress.

Aces and Kills

At a high level of play, one more ace or kill can have substantial impact on your win rate – upwards of 10-20%. Training your team to accomplish this goal is top priority.

Digs and Pass Ratings

Just because these skills don't correlate highly to winning does not mean they aren't important. Good execution of these skills set up the offense and your ability to score. Think in terms of reducing errors vs. improving quality. For example, you should prefer a 1.70 rating passer with 5% error rates over a 2.0 passer with 10% error rates. Remember, this is not a 5% increase in errors; it is doubling the error rate. In a typical set, 5% = 1 receive error. That could be the difference between winning and losing.

Key Stats by Level

For each level of play, we will look at the seven key stats that impact winning the most. We will point out the tipping point stat for a skill and possible places to focus your coaching.

Club 12 – Key Stats

Priority	Key Stat	Tipping Pt	Win %
1	Pt Scoring %	60%	60%
2	Side Out %	50%	60%
3	Aces	6	65%
4	Kills	5	57%
5	Srv Rec Errors	6	38%
6	Dig Errors	5	43%
7	Attack Errors	7	40%

- This is a Serving and Receive only kind of game where there's not much in-rally play
- You need to work on a lot of serving and receiving and probably not that much else
- When serving, go for low error since opponent's side out capabilities are poor
- When receiving, forget quality; just get the ball up and avoid "duck and cover" volleyball
- Scrambling and saving balls is way more important than attacking for kills (it only takes 4 kills to be at 50% but probably very hard to achieve this)

Club 14 – Key Stats

Priority	Key Stat	Tipping Pt	Win %
1	Pt Scoring %	60%	55%
2	Side Out %	50%	60%
3	Aces	4	62%
4	Kills	6	57%
5	Srv Rec Errors	5	35%
6	Dig Errors	6	41%
7	Attack Errors	8	38%

- At this level, the game is starting to look more like volleyball. Kill rates exceed Ace rates
- You need to think about long term development vs. winning today
- To improve Side Out, get Lower Rec Errors and Attack Errors
  - Go for every ball aggressively and get it up rather than pinpoint the pass
  - Set off the net, let hitters learn to hit well from off the net, and avoid hitting errors

NEBRASKA ATHLETICS

Club 16 – Key Stats

Priority	Key Stat	Tipping Pt	Win %
1	Pt Scoring %	60%	75%
2	Side Out %	50%	85%
3	Aces	3	57%
4	Kills	8	57%
5	Srv Rec Errors	4	36%
6	Dig Errors	6	43%
7	Attack Errors	7	41%

- This is an inflection point in the level of play where the game shifts from Acing to Killing for points
- Receive control is better for all teams
- More emphasis on setting and hitting but a lot of emphasis on doing this out of system
- Teach players to hit hard but over the net; long is OK while learning
- Learning to serve aggressively but consistently is always important

Club 18 – Key Stats

Priority	Key Stat	Tipping Pt	Win %
1	Pt Scoring %	50%	60%
2	Side Out %	60%	85%
3	Kills	9	56%
4	Aces	3	66%
5	Srv Rec Errors	3	41%
6	Attack Errors	6	43%
7	Dig Errors	6	44%

- Now Kills correlate more to winning than Aces because it's hard to get an Ace since the Receive is better
- Systems will matter more to get an extra 1 or 2 kills. So receive and setting accuracy will be more important than before
- Dig Errors – must practice aggressive defense

High School JV – Key Stats

Priority	Key Stat	Tipping Pt	Win %
1	Pt Scoring %	60%	70%
2	Side Out %	50%	60%
3	Aces	4	66%
4	Kills	7	59%
5	Srv Rec Errors	4	39%
6	Dig Errors	6	42%
7	Attack Errors	7	43%

- A blend of Club 14 and 16
- Same suggestions apply
  - This is an inflection point in the level of play where the game shifts from Acing to Killing for points
  - Receive control is better for all teams
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High School – Key Stats

Priority	Key Stat	Tipping Pt	Win %
1	Pt Scoring %	60%	80%
2	Side Out %	55%	60%
3	Kills	9	61%
4	Aces	3	63%
5	Srv Rec Errors	3	42%
6	Dig Errors	7	38%
7	Attack Errors	7	39%

- A blend of Club 16 and 18
- Point Scoring highly connected to serving – aggressive serving is key since serve errors have lower impact on losing vs aces to winning
- Side Outs and Receive Error + Kills tie together
  - Teach team to go after every serve and get the ball up vs. make perfect passes
  - Attack smart, avoid errors
- Dig Errors – must practice aggressive defense

Junior College – Key Stats

Priority	Key Stat	Tipping Pt	Win %
1	Side Out %	60%	70%
2	Pt Scoring %	55%	70%
3	Kills	11	64%
4	Aces	3	66%
5	Srv Rec Errors	2	46%
6	Attack Errors	6	38%
7	Dig Errors	5	41%

- Continue to work on receive and serve
- Develop more sophisticated attack and blocking
- Still need to focus on out-of-system play

University – Key Stats

Priority	Key Stat	Tipping Pt	Win %
1	Pt Scoring %	50%	60%
2	Side Out %	60%	70%
3	Kills	11	57%
4	Aces	2	61%
5	Srv Rec Errors	2	45%
6	Attack Errors	6	38%
7	Dig Errors	7	42%

- Aces count is lowest here
  - but serve aggressively to force out-of-system play – watch where the received pass goes – if it doesn't break the 10ft line then you have eliminated their middle attack
- Must control receive and attack for efficient kills
- Out-of-system attacking skills are critical for staying in the game

Using Stats

It's important to note that these are statistical averages, and since a rally is a continuous series of touches, each stat has an impact on another. Thus, when you think about improving your stats and your win rate, you need to think in terms of holding all other stats the same and improving one. For example, if you increase your Kills per Set, you need to make sure you aren't also increasing your Attack Error per Set. This last action would negate the win rate caused by more kills.

Conclusion

Performance benchmarks vary by age and level of play. Hopefully, this list of benchmarks will be helpful in guiding your play. Rotate123 LLC will continue to collect and expand its stats database, and by 2018 we hope to have regional breakdowns so that you can look at how you stack up locally.

This is a very early-stage analysis and your input is very welcome. We hope to provide more insights rather than data as we work with these numbers and get your feedback. ☾

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High School JV – Key Stats

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- A blend of Club 14 and 16
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High School – Key Stats

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