

# Batting Stats

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## Q

Qualifies for batting stat leader if Y. A minimum number of plate appearances in a league are needed to be considered the champion in a hitter's statistics, for example AVG. See at the bottom an explanation on how the qualification is calculated.

## STANDARD STATS

### PA (Plate Appearances)

A plate appearance refers to a batter's turn at the plate. Each completed turn batting is one plate appearance. Plate appearances can often be confused with at-bats. But unlike with at-bats -- which only occur on certain results -- a plate appearance takes into account every single time a batter comes up and a result between batter and pitcher is obtained.

Total plate appearances are used to determine which players have qualified for the batting title; at-bats are not used for this purpose, even though at-bats are used to decipher batting average. This rule is in place because not every plate appearance results in an at-bat, and some hitters -- those who walk and are hit by pitches

more frequently -- might not qualify for certain statistical leaderboards if only their at-bats were considered.

The total plate appearances for a team in a game should equal its runs, men left on base and men put out. A batter does not receive a plate appearance if a runner is thrown out on the bases to end the inning while he is at bat, or if the game-winning run scores on a balk, wild pitch or passed ball while he is at bat.

#### AB (At-Bats)

An official at-bat comes when a batter reaches base via a fielder's choice, hit or an error (not including catcher's interference) or when a batter is put out on a non-sacrifice. (Whereas a plate appearance refers to each completed turn batting, regardless of the result.)

At-bats are used as the denominator when determining batting average and slugging percentage. Players who bat higher in the order will typically finish the season with more at-bats than players who hit toward the bottom. Similarly, players who walk infrequently also typically record a higher-than-usual number of at-bats in a season, because walks do not count as at-bats.

#### R (Runs Scored)

Number of runs scored. A player is awarded a run if he crosses the plate to score his team a run. When tallying runs scored, the way in which a player reached base is not considered. If a player reaches base by an error or a fielder's choice, as long as he comes around to score, he is still credited with a run. If a player enters the game

as a pinch-runner and scores, he is also credited with a run.

The league leaders in runs scored are generally adept at reaching safely and running the bases. But they also tend to score frequently because of favorable positions toward the top their teams' lineups -- a factor that has little to do with the run-scorer's own abilities.

### H (Hits)

Total number of hits. A hit occurs when a batter strikes the baseball into fair territory and reaches base without doing so via an error or a fielder's choice. There are four types of hits in baseball: singles, doubles, triples and home runs. All four are counted equally when deciphering batting average. If a player is thrown out attempting to take an extra base (e.g., turning a single into a double), that still counts as a hit.

Hits come in all varieties. Some can be hard-hit balls or long home runs. Others can be slow bouncers in the infield -- or even bunts -- where the batter reaches first base before the throw. (These are called "infield hits.") Hits are also credited to the batter when the ball takes an awkward bounce that a defender cannot field (provided the scorer rules that the batter didn't reach base with the help of an error).

The league leader in hits is often a batter with speed who:

Hits high in the batting order -- meaning he gets a high number of plate appearances

Doesn't walk much

Makes a lot of hard contact

Hits are a pivotal part of many statistics, such as batting average, batting average against, WHIP and H/9.

#### 1B (Singles)

Number of single hits.

#### 2B (Doubles)

Number of doubles.

#### 3B (Triples)

Number of triples.

#### HR (Home Runs)

Number of home runs.

#### XBH (Extra-base Hits)

An extra-base hit is defined as any hit that is not a single, meaning doubles, triples and home runs are all considered extra-base hits. They are a good stat to look at to evaluate an offensive player's power -- and in some cases, his speed.

An extra-base hit is typically a ball that is hit very hard, and it often goes to the outfield wall. (Obviously, in the case of a home run, it usually goes over the wall). Speedier hitters have a slight advantage in

attaining extra-base hits because they can use their foot speed to reach second base faster.

### RBI (Runs Batted In)

Number of times a run scores as a result of a batter's plate appearance.

A batter is credited with an RBI in most cases where the result of his plate appearance is a run being scored. There are a few exceptions, however. A player does not receive an RBI when the run scores as a result of an error or ground into double play.

The most common examples of RBIs are run-scoring hits. However, players also receive an RBI for a bases-loaded walk or hit by pitch. Players can earn RBIs when they make outs, as well, provided the out results in a run or runs (except, as noted above, in the case of double plays).

Along with home runs and batting average, RBIs are a part of baseball's offensive Triple Crown.

### BB (Walks or base on balls)

Total number of walks. A walk (or base on balls) occurs when a pitcher throws four pitches out of the strike zone, none of which are swung at by the hitter. After refraining from swinging at four pitches out of the zone, the batter is awarded first base. In the scorebook, a walk is denoted by the letters BB.

As a stat, walks can be used to measure two of the game's most important skills: a pitcher's control and a hitter's eye (meaning his ability to tell whether a pitch is a strike or a ball and swing -- or not swing -- accordingly). Because both of these factors are extremely important in the process, walks are looked at as a stat for both pitchers and hitters.

The game's better hitters earn a higher number of walks because pitchers tend to avoid throwing them hittable pitches, and because their keen eye allows them to lay off pitches that narrowly miss the strike zone. Sometimes, a pitcher will opt not to pitch to a hitter altogether, purposely walking him. This is called an "intentional walk," though it still counts as a regular walk for record-keeping purposes

#### HBP (Hit-by-pitch)

A hit-by-pitch occurs when a batter is struck by a pitched ball without swinging at it. He is awarded first base as a result. Strikes supersede hit-by-pitches, meaning if the umpire rules that the pitch was in the strike zone or that the batter swung, the HBP is nullified.

A batter is awarded a hit-by-pitch, even if the ball only touches a portion of his uniform or protection (helmet, shin guard, etc.).

Most hit-by-pitches are unintentional. They often stem from pitchers trying to throw the ball inside but missing by a few inches. Pitchers will often throw inside to make the hitter wary, so they do not crowd the plate. However, a pitcher may sometimes throw at a hitter intentionally as a form of retaliation. If the home-plate umpire

suspects this is the case, he has the right to eject the pitcher (and the manager of the pitching team) from the game.

A hit-by-pitch does not count as a hit, but it does count as a time on base for on-base percentage purposes. Certain hitters -- specifically those who stand very close to the plate -- have a knack for earning HBPs, which can obviously be helpful because the goal of any hitter is to reach base. But hit-by-pitches can also result in injury because most pitches are thrown 80 mph or faster. Per the rules, a batter must make an attempt to avoid being hit by a pitch in order to receive first base.

#### SF (Sacrifice Flies)

A sacrifice fly occurs when a batter hits a fly-ball out to the outfield or foul territory that allows a runner to score. The batter is given credit for an RBI. (If the ball is dropped for an error but it is determined that the runner would have scored with a catch, then the batter is still credited with a sacrifice fly.)

A sacrifice fly does not count as an at-bat and therefore does not count against a player's batting average. The thinking behind the rule is that with a man on third base and fewer than two outs, a batter will often intentionally try to hit a fly ball, sacrificing his time at bat to help score a run. However, sacrifice flies count against a player's on-base percentage.

#### Origin

The sacrifice fly was adopted as an official rule in 1954, at which point it was distinguished from the

sacrifice bunt. Before 1954, Major League Baseball went back and forth as to whether a sacrifice fly should be counted statistically. In the years that it was counted (1908-31 and '39), it was grouped together with the sacrifice bunt as simply a "sacrifice."

#### SH (Sacrifice Bunts)

A sacrifice bunt occurs when a player is successful in his attempt to advance a runner (or multiple runners) at least one base with a bunt. In this vein, the batter is sacrificing himself (giving up an out) in order to move another runner closer to scoring. When a batter bunts with a runner on third base, it is called a squeeze play and, if successful, is still recorded as a sacrifice.

A sacrifice bunt does not count against a player's batting average or on-base percentage, as the decision to sacrifice often isn't made by the player. Typically, a player will be given a sign by the third-base coach, instructing a bunt attempt.

If an error is committed and the batter reaches base, he is still credited with a sacrifice. However, if the sacrifice bunt attempt turns into a single, the batter is simply credited with a hit and no sacrifice is given. An official scorer may determine that a batter was exclusively trying to bunt for a base hit and choose not to give him credit for a sacrifice. However, this is rare in sacrifice situations (with less than two outs and men on base).

#### TB (Total Bases)



The number of bases a player has gained with hits. It is a weighted sum for which the weight value is 1 for a single, 2 for a double, 3 for a triple and 4 for a home run. Only bases attained from hits count toward this total.

#### TOB (Times on base)

Cumulative total number of times a batter has reached base as a result of a hit, base on balls, or hit by pitch. This statistic does not include times reaching base by way of an error, uncaught third strike, fielder's obstruction or a fielder's choice, making the statistic somewhat of a misnomer.

$$\text{TOB} = \text{H} + \text{BB} + \text{HBP}$$

#### TA (Total Average)

It is designed to measure a hitter's overall offensive contributions, on the basis that "all bases are created equal".

The definition of the statistic is simple. A player gets a credit for every base accumulated and a penalty for every out made. So a player gets one credit for a single, walk, stolen base or being hit by a pitch; two for a double; three for a triple; and four for a home run. A player's total average is calculated by summing the accumulated bases and dividing by the number of outs the player makes.

Like OPS, total average gives credit to players who draw a lot of walks and hit with a lot of power

### SB (Stolen Bases)

Number of stolen bases. A stolen base occurs when a baserunner advances by taking a base to which he isn't entitled. This generally occurs when a pitcher is throwing a pitch, but it can also occur while the pitcher still has the ball or is attempting a pickoff, or as the catcher is throwing the ball back to the pitcher.

Stolen bases have long been an integral part -- and one of the most debated aspects -- of the game. The upside to a stolen base is obvious; the runner advances a base and puts himself closer to scoring. However, the downside -- a baserunner making an out -- arguably far outweighs the upside. In this vein, a runner who steals bases at a 50 percent clip is considered to be doing his team a disservice. As a general rule of thumb, a base stealer with a stolen-base percentage of 75 or higher is helping his team by attempting steals.

There are few maneuvers in baseball more strategic than a stolen-base attempt. In some cases, the third-base coach will give the runner a sign, telling him to steal. But certain runners, who have proven to be competent base stealers, are given "the green light," whereby they can take off at their discretion. One of the most common times to steal occurs with two outs and the hitter behind in the count. In this case, the downside to stealing is minimized. If the runner is thrown out, the hitter gets a fresh count to start the next inning. But if the runner is safe, he has put himself in scoring position.

## CS (Caught Stealing)

Number of times a base runner is caught stealing.

A caught stealing occurs when a runner attempts to steal but is tagged out before reaching second base, third base or home plate. This typically happens after a pitch, when a catcher throws the ball to the fielder at the base before the runner reaches it. But it can also happen before a pitch, typically when a pitcher throws the ball to first base for a pickoff attempt but the batter has already left for second.

Many different factors go into a caught stealing. Namely: a pitcher's quick release to home plate, a catcher's quick transfer and throw, a good tag by the fielder receiving the ball and a poor jump -- or slow first step -- by the baserunner.

If a runner is thrown out trying to advance on a wild pitch or a passed ball, this does not count as a caught stealing. Similarly, a runner who is picked off while diving back to a base has not been "caught stealing" because he never attempted to steal in the first place. If a batter steals a base safely but is tagged when he comes off the base before fully gaining his balance, it still counts as a caught stealing, because he was never established on the base.

When a catcher gets an assist on a caught stealing, he is awarded a catcher caught stealing (CCS). He is also awarded a CCS if the recipient drops his throw for an error and the official scorer judges that the runner would have been out had the ball been caught. However, when a runner is thrown out trying to advance on a wild pitch or a passed ball, a catcher caught stealing is not awarded.

### SB% (Stolen Base percentage)

A player's stolen base percentage (a.k.a. SB%) measures his rate of success in stealing bases. Because stolen bases tend to help a team less than times caught stealing hurt, a player needs to have a high stolen base percentage in order to contribute much value to his team. A commonly used figure is that a player needs to succeed about 2/3 of the time to break even.

$$SB\% = SB / (SB + CS)$$

### SBR (Stolen base runs)

Statistic aimed at quantifying base-stealing. Each SB adds approximately .3 runs to a team's total runs scored which is much less than often believed while A CS deducts 0.6 runs. Rarely amounts to more than a few runs per year for each team.

$$SBR = (SB * 0.3) - (CS * 0.6)$$

### SO or K (Strikeouts)

Number of strikeouts.

### K% and BB% (Strikeout rate and Walk rate)

Strikeout rate (K%) and walk rate (BB%) are measurements of how often a hitter will walk or strike out per plate appearance. It is represented as a percentage which should make it easier to compare different players and years.

For hitters, K% and BB% is a good way to see a player's performance at the plate. A player with a high BB% suggests that they have a good eye at the plate and can get on base even if they aren't hitting for a high average. Players that get on base at a high rate obviously have a better chance to score runs or steal bases, if they have the ability. Walk percentage can also give you a good idea of the kind of approach a hitter has. Usually, a hitter with a good BB% is only swinging at pitches they can drive for hits. Strikeout percentage measures the rate at which a batter strikes out and like walk percentage, gives us an idea of the type of approach used by the player.

$$K\% = K / PA$$

$$BB\% = BB / PA$$

#### GDP (Grounded into Double Play)

A GDP (or GIDP) occurs when a player hits a ground ball that results in multiple outs on the bases. The most common double plays are ground balls where a forceout is made on the player running from first to second base, then another forceout is made on the batter running to first base.

A GDP typically occurs on a ground ball that is hit hard and directly at a fielder, although softly hit balls can also result in double plays depending on the speed of the batter running to first base. The MLB leaders in GIDP are typically slower players who hit a high number of ground balls -- often well-struck ground balls.

### AVG (Batting Average)

One of the oldest (1888) and most universal tools to measure a hitter's success at the plate, batting average is determined by dividing a player's hits by his total at-bats for a number between zero (shown as .000) and one (1.000). In recent years, the league-wide batting average has typically hovered around .250.

While batting average is a useful tool for measuring a player's ability at the plate, it isn't all-encompassing. For instance, batting average doesn't take into account the number of times a batter reaches base via walks or hit-by-pitches. And it doesn't take into account hit type (with a double, triple or home run being more valuable than a single).

Calculated as

$$\text{AVG} = \text{H} / \text{AB}.$$

### SLG% (Slugging Percentage)

Slugging percentage represents the total number of bases a player records per at-bat. Unlike on-base percentage, slugging percentage deals only with hits and does not include walks and hit-by-pitches in its equation.

Slugging percentage differs from batting average in that all hits are not valued equally. While batting average is calculated by dividing the total number of hits by the total number of at-bats, the formula for slugging percentage is:  $(1\text{B} + 2\text{B} \times 2 + 3\text{B} \times 3 + \text{HR} \times 4) / \text{AB}$ .

Although a double is not worth exactly twice as much as a single in the context of scoring runs, slugging

percentage is still one of the best evaluators of power, because it accounts for more than just home runs.

Also calculated as:  $SLG = TB / AB$ .

### OBP (On Base Percentage)

OBP refers to how frequently a batter reaches base per plate appearance. Times on base include hits, walks and hit-by-pitches, but do not include errors, times reached on a fielder's choice or a dropped third strike.

(Separately, sacrifice bunts are removed from the equation entirely, because it is rarely a hitter's decision to sacrifice himself, but rather a manager's choice as part of an in-game strategy.)

A hitter's goal is to avoid making an out, and on-base percentage shows which hitters have accomplished that task the best.

$$OBP = (H + BB + HBP) / (AB + BB + HBP + SF) .$$

### OPS (On Base Plus Slugging)

OPS adds on-base percentage and slugging percentage to get one number that unites the two. It's meant to combine how well a hitter can reach base, with how well he can hit for average and for power.

$$OPS = OBP + SLG.$$

## ADVANCED STATS

### wOBA (Weighted On Base Average)

Combines all the different aspects of hitting into one metric, weighting each of them in proportion to their actual run value. While batting average, on-base percentage, and slugging percentage fall short in accuracy and scope, wOBA measures and captures offensive value more accurately and comprehensively.

WOBA =

$$\begin{aligned} & (0.69 * uBB \\ & + 0.72 * HBP \\ & + 0.89 * 1B \\ & + 1.27 * 2B \\ & + 1.62 * 3B \\ & + 2.10 * HR) \end{aligned}$$

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$$AB + BB - IBB + SF + HBP$$

(\*\*) IBB are not recorded at this moment, assuming BB only.

### OPS+ (On-base Plus Slugging Plus)

OPS+ takes a player's on-base plus slugging percentage and normalizes the number across the entire league. It accounts for external factors like ballparks. It then adjusts so a score of 100 is league average, and 150 is 50 percent better than the league average.

For example, Miguel Cabrera's .895 OPS in 2014 was 50 percent better than the MLB average after being adjusted for league and park factors. As a result, his OPS+ was 150.



$$\text{OPS+} = 100 \times ((\text{OBP} / \text{lgOBP}) + (\text{SLG} / \text{lgSLG}) - 1)$$

Why it's useful

OPS does not tell you how much a player was affected by factors such as his home ballpark's dimensions or altitude. OPS+ attempts to adjust for those factors to give you a context-neutral number.

#### BB/K (Walk to Strikeout Rate)

Ratio of walks to strikeouts.

$$\text{BB/K} = \text{BB} / \text{K}.$$

#### ISO (Isolated Power)

Measure of a hitter's raw power and tells you how often a player hits for extra bases. Around .140 is league average and hitters in the .200+ range are typically the premier sluggers.

$$\text{ISO} = \text{SLG} - \text{AVG}.$$

#### GPA (Gross Production Average)

GPA attempts to solve two frequently cited problems with OPS.

First, OPS gives equal weight to its two components, on-base percentage (OBP) and slugging percentage (SLG). In fact, OBP contributes significantly more to scoring runs

than SLG does. Sabermetricians have calculated that OBP is about 80% more valuable than SLG.

A second problem with OPS is that it generates numbers on a scale unfamiliar to most baseball fans. For all the problems with a traditional stat like batting average (AVG), baseball fans immediately know that a player batting .365 is significantly better than average, while a player batting .167 is significantly below average. But many fans do not immediately know how good a player with a 1.013 OPS is.

$$\text{GPA} = ((1.8 * \text{OBP}) + \text{SLG}) / 4$$

#### BABIP (Batting Average on Balls in Play)

Measures how often non-home runs batted balls (called "balls in play") fall for hits. BABIP is important because the frequency with which a player gets a hit on a ball in play or allows a hit on a ball in play is very telling. Three main factors influence BABIP and all three of those factors tell us something important about that player's overall stat line. Those factors are defense, luck, and talent level.

BABIP can be used to provide some context when evaluating both pitchers and hitters. The league average BABIP is typically around .300. Pitchers who have allowed a high percentage of hits on balls in play will typically regress to the mean, and vice versa. In other words, over time, they'll see fewer (or more) balls in play fall for hits, and therefore experience better (or worse) results in terms of run prevention. The same applies for batters who have seen a high or low percentage of their balls in play drop in for hits.

$$\text{BABIP} = (\text{H} - \text{HR}) / (\text{AB} - \text{K} - \text{HR} + \text{SF})$$

### PA/SO (Plate Appearances per Strikeout)

In baseball statistics, plate appearances per strikeout (PA/SO) represents a ratio of the number of times a batter strikes out to their plate appearance.

Allows a defensive team to examine the opposing team's lineup for hitters who are more prone to strikeout. Such players, when batting, are typically more aggressive than the average hitter. This knowledge permits the pitcher to approach the batter with more pitching options, often throwing more balls out of the strike zone in the hope that the batter will swing and miss.

The number of this statistic can be calculated by dividing a player's total number of plate appearances by their total number of strikeouts. For example, Reggie Jackson collected 2,597 strikeouts and 11,418 plate appearances in his 21-year baseball career, recording a 4.39 PA/SO, which suggests that for every 4.39 plate appearance Jackson had one strikeout.

$$\text{PA/SO} = \text{PA} / \text{SO}$$

### AB/HR (At Bats per Home Runs)

In baseball statistics, at bats per home run (AB/HR) is a way to measure how frequently a batter hits a home run. It is determined by dividing the number of at bats by the number of home runs hit.

$$AB/HR = AB / HR$$

### HR/H (Home Runs per Hit)

In baseball statistics, home run per hit (HR/H) is the percentage of hits that are home runs. It is loosely related to isolated power (ISO), which is the ability to hit for extra-base hits, including home runs. Power hitters, players who readily hit many home runs tend to have higher HR/H than contact hitters. A player hitting 30 home runs and have 150 hits in a season would have HR/H of .200, while a player who hit 8 home runs and have 200 hits in a season would have H/HR of .040.

$$HR/H = HR / H$$

### RC (Runs Created)

Estimate the number of runs a hitter contributes to their team. It combines a player's ability to get on base with his ability to hit for extra bases.

From Bill James' book:

"With regard to an offensive player, the first key question is how many *runs* have resulted from what he has done with the bat and on the basepaths. Willie McCovey hit .270 in his career, with 353 doubles, 46 triples, 521 home runs and 1,345 walks -- but his job was not to hit doubles, nor to hit singles, nor to hit triples, nor to draw walks or even hit home runs, but rather to put runs on the scoreboard. How many runs resulted from all of these things?"

$$RC = OBP * TB$$

or

$$RC = OBP * SLG * AB$$

### RP (Runs Produced)

Runs produced is a baseball statistic that can help estimate the number of runs a hitter contributes to his team.

Unlike runs created (RC), runs produced (RP) is a teammate-dependent stat in that it includes Runs and RBIs, which are affected by which batters bat near a player in the batting order. Also, subtracting home runs seems logical from an individual perspective, but on a team level it double-counts runs that are not home runs.

To counteract the double-counting, some have suggested an alternate formula which is the average of a player's runs scored and runs batted in.

$$RP = (R + RBI) / 2$$

Here, when a player scores a run, he shares the credit with the batter who drove him in, so both are credited with half a run produced. The same is true for an RBI, where credit is shared between the batter and runner. In the case of a home run, the batter is responsible for both the run scored and the RBI, so the runs produced are  $(1 + 1)/2 = 1$ , as expected.

### SBR (Stolen Base Runs)

This Total Baseball statistic is aimed at quantifying base-stealing. Numerous statistical studies done by Total Baseball have shown that the break even success rate for steals (the rate at which an attempt to steal is neither helping nor hurting the team in terms of total runs

scored) is about 67%. Each successful steal adds approximately .3 runs to a team's total runs scored which is much less than often believed. Therefore, the statistic is meant to estimate the impact of base-stealers, which, other than the elite base-stealers, rarely amounts to more than a few runs per year for each team.

Whenever the number of stolen bases is twice the number of caught stealing, the SBR will be zero, the breaking even point. So long as SB is more than twice CS, this figure will be positive.

$$\text{SBR} = (0.3 * \text{SB}) - (0.6 * \text{CS})$$

## Pitching Stats

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### Q

Qualifies for pitching stat leader if Y. A minimum number of innings must be pitched in a league to be considered the champion in a pitcher's statistics, for example ERA. See at the bottom an explanation on how the qualification is calculated.

## STANDARD STATS

### R (Runs Allowed)

Number of runs allowed by the pitcher.

### ER (Earned Runs Allowed)

Number of earned runs allowed by the pitcher, determined by the official scorer. If no errors and no passed balls occur during the inning, all runs scored are automatically earned (assigned responsible to the pitcher(s) who allowed each runner to reach base).

### IP (Innings Pitched)

Number of innings a pitcher has completed, measured by the number of batters and baserunners that have been put out while the pitcher is on the pitching mound in a game. Three outs made is equal to one inning pitched. One out counts as one-third of an inning, and two outs as two-thirds of an inning. The statistic is written 34.1, 72.2, or 91.0, for example, to represent 34+1/3 innings, 72+2/3 innings, and 91 innings exactly, respectively.

### K or SO (Strikeouts)

Number of strikeouts. A strikeout occurs when a pitcher throws any combination of three swinging or looking strikes to a hitter. (A foul ball counts as a strike, but it cannot be the third and final strike of the at-bat. A foul tip, which is caught by the catcher, is considered a third strike.)

The batter is automatically out on a strikeout, unless the catcher does not cleanly hold onto the baseball or if the baseball hits the dirt. If the catcher does not catch

the third strike, the batter may attempt to run to first base -- if it is open or if there are two outs. However, even if the batter reaches first base safely, the pitcher and the batter are still credited with a strikeout in the scorebook.

In the scorebook, a strikeout is denoted by the letter K. A third-strike call on which the batter doesn't swing is denoted with a backward K.

### Origin

Before 1858, the strikeout required three pitches be offered at and missed. However, in 1858, the addition of the called strike was implemented and the strikeout rule has changed very little since.

### BB (Walks)

Number of walks allowed by the pitcher.

### W/L (Wins and Losses)

Number of wins and losses.

### SV (Saves)

Number of games where the relief pitcher enters a game led by the pitcher's team, finishes the game without surrendering the lead, is not the winning pitcher, and either (a) the lead was three runs or fewer when the pitcher entered the game; (b) the potential tying run was on base, at bat, or on deck; or (c) the pitcher pitched three or more innings.



### GO (Ground outs)

Number of ground out balls.

### FO (Fly outs)

Number of fly out balls.

### BF (Batters Faced)

The number of batters a pitcher has faced, akin to plate appearances.

### BK (Balks)

Number of times pitcher commits an illegal pitching action while in contact with the pitching rubber as judged by umpire, resulting in baserunners advancing one base.

### WP (Wild Pitches)

Number of times when a pitch is too high, low, or wide of home plate for the catcher to field, thereby allowing one or more runners to advance or score.

### ERA (Earned Run Average)

ERA is a rudimentary metric designed to assess how well a pitcher has prevented runs in the past.

$$\text{ERA} = (\text{Earned Runs} / \text{Innings Pitched}) * 9$$

An earned run is essentially any run that was charged to the pitcher which did not score as the result of an error by the defense.

ERA is popular because it seems to be answering a very important question. We want to know how many runs the pitcher gave up that were his fault, but unfortunately, despite the name, ERA does not properly answer that question. Simply put, the distinction between unearned and earned runs is not an accurate demarcation between the runs that were the pitcher's fault and the runs that were not his fault. There are two main reasons for this.

**First, the official scorer determines if something was an error or not and official scorers do not hand out errors consistently, meaning that the same botched play might be scored an error one day and a hit another. Second, and more importantly, bad defense occurs in forms beyond rule book errors.**

If a fielder is chasing down a fly ball and trips right before he's about to catch it, that is not an error in the eyes of the league and the official scorer even though it was a routine fly ball that he obviously should have caught. The defense can fail the pitcher by making an error and the defense can fail the pitcher by not making a relatively easy play. Neither is the pitcher's fault, but only error-induced runs are stripped out of ERA.

**Fielding Independent Pitching (FIP), provides a better approach to the question ERA wants to answer, see below.**

### RA9 (Runs Allowed per nine innings pitched)

Runs allowed per nine innings pitched -- the title says it all. It's basically ERA with the E removed.

$$RA9 = R / IP * 9$$

### WHIP (Walks and Hits Per Inning Pitched)

WHIP is one of the most commonly used statistics for evaluating a pitcher's performance. The statistic shows how well a pitcher has kept runners off the basepaths, one of his main goals. The formula is simple enough -- it's the sum of a pitcher's walks and hits, divided by his total innings pitched.

The pitchers with the lowest WHIPs are generally the best pitchers in the league -- which makes sense, because the best pitchers should be able to prevent baserunners. However, WHIP does not consider the way in which a hitter reached base. (Obviously, home runs are more harmful to pitchers than walks.)

Hit batsmen, errors and hitters who reach via fielder's choice do not count against a pitcher's WHIP.

### Origin

Daniel Okrent, a writer who invented rotisserie league fantasy baseball, coined the term in 1979, initially calling it innings pitched ratio. The term eventually developed into WHIP.

### GO/AO (Groundout-to-Airout Ratio)

Groundout-to-airout ratio is obtained by dividing the total number of ground balls converted into outs (not including bunts) by the total number of balls in the air (fly balls and line drives) converted into outs.

For pitchers, GO/AO can often be an indicator of success, because a pitcher generally aims to induce more ground balls than balls in the air (seeing as how these batted balls can turn into the most harmful result of all, a home run). But at the same time, certain pitchers can thrive while still allowing a high percentage of balls in the air, as long as they're inducing weak contact and/or striking out hitters.

For hitters, this number is used much less frequently as an evaluation tool, although speedier hitters typically strive for a higher ratio of ground balls to fly balls. That's because over the course of a season, some would-be groundouts become infield hits for batters who are fast enough to beat the throw.

$$GO/AO = GO / FO$$

## ADVANCED STATS

### FIP (Fielding Independent Pitching)

This statistic estimates a pitcher's run prevention independent of the performance of their defense. FIP is based on outcomes that not involve defense: K, BB, HBP and HR. While is not a complete accounting of pitchers performance, it is generally a better representation of performance than ERA. The constant is solely to bring FIP onto an ERA scale and is generally around 3.10 for MLB. Because FIP is designed so that league average ERA and league average FIP are the same, to find the constant for any year, all you need to do is the following:

$$FIP\ Constant = lgERA - (((13 * lgHR) + (3 * (lgBB + lgHBP)) - (2 * lgK)) / lgIP)$$

*Ultimately, we want to use statistics that allow us to isolate the performance of the player we are attempting to analyze. ERA does a terrific job telling us how many runs were scored while the pitcher was on the mound, but they do not necessarily tell us how well the pitcher performed because the number of runs a pitcher allowed is also dependent on their defense, luck, and the order in which events happened (often called sequencing).*

**Imagine two pitchers who always throw the same quality pitches to identical hitters, but one pitcher throws in front of a vastly superior defense. The pitcher with the better defense will allow fewer hits, and therefore fewer runs, but the two pitchers performed identically.**

**In one sense, using FIP is extremely easy because it's designed to look exactly like ERA. This means that you can read and use FIP exactly like you would typically use ERA. If a pitcher has a 3.15 FIP, that's just like saying they have a 3.15 ERA as far as making comparisons among players is concerned. You don't have to learn a new scale to interpret a player's FIP.**

$$FIP = ((13 * HR) + (3 * (BB + HBP)) - (2 * K)) / IP + FIP\ constant$$

**ERC (Component ERA)**

Component ERA or ERC is a baseball statistic invented by Bill James. It attempts to forecast a pitcher's earned run average (ERA) from the number of hits and walks allowed rather than the standard formula of average number of earned runs per nine innings. ERC allows one to take a fresh look at a pitcher's performance and gauge if his results are more or less than the sum of its parts.

First Component PTB component (when IBB is not available)  
scale down

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| extra base allowed | BB+HBP don't advance runners |

v v v

$$(H + BB + HBP) * (0.89 * (1.2555 * (H - HR) + (4 * HR)) + 0.475 * (BB + HBP))$$

ERC = 9 \*

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----- - 0.56

ERA context -> BF \* IP

The point of the first component is to represent the number of baserunners allowed. The PTB component combines an estimate of extra bases allowed (first half) with the fact that walks and hit by pitches do not advance unforced baserunners (second half). The division places the computation into an ERA context, and the final subtraction moves that scale down into its normal range.

DICE (Defense-Independent Component ERA)

Defense-Independent Component ERA (DICE) is a 21st-century variation on Component ERA, one of an increasing number of baseballsabermetrics that fall under the umbrella of defense independent pitching statistics. DICE was created by Clay Dreslough in 2001.

$$\text{DICE} = 3.00 + \frac{(13 * \text{HR}) + (3 * (\text{BB} + \text{HBP})) - (2 * \text{K})}{\text{IP}}$$

In that equation, "HR" is home runs, "BB" is walks, "HBP" is hit batters, "K" is strikeouts, and "IP" is innings pitched. That equation gives a number that is better at predicting a pitcher's ERA in the following year than the pitcher's actual ERA in the current year.

Component ERA was created by Bill James to create a more accurate way of evaluating pitchers than earned run average (ERA). Whereas ERA is significantly affected by luck (such as whether the component hits are allowed consecutively), Component ERA eliminates this factor and assigns a weight to each of the recorded 'components' of a pitchers performance. For CERA, these are singles, doubles, triples, home runs, walks and hit batters.

DICE is an improvement on CERA that removes the contribution of the pitcher's defense, instead estimate a pitcher's ERA from the components of his pitching record that don't involve defense. These are home runs, walks, hit batters and strikeouts.

### BB/9 (Walks Per Nine Innings)

Walks per nine innings tells us how many walks a given pitcher allows per nine innings pitched -- using the formula walks divided by innings times nine.

Obviously, a pitcher's goal is to keep opposing batters off the bases -- and a walk does just the opposite of that. If he allows a ball in play, he at least puts the outcome in the hands of his defense -- and luck. But a walk gives the team behind him no chance to help.

$$BB/9 = BB / IP * 9$$

### K/BB (Strikeout-to-walk Ratio)

K/BB ratio tells us how many strikeouts a pitcher records for each walk he allows. The number is found simply by dividing a pitcher's total number of strikeouts by his total number of walks. It's an essential tool for evaluating pitchers.

$$K/BB = K / BB$$

### H/9 (Hits Per Nine Innings)

H/9 represents the average number of hits a pitcher allows per nine innings pitched. It is determined by dividing a pitcher's hits allowed by his innings pitched and multiplying that by nine. It's a very useful tool for evaluating pitchers, whose goal is to prevent runs, which are usually scored by hits.

Though it's closely correlated with opponents' batting average, hits per nine is based solely on the number of outs a pitcher records, rather than the number of at-bats by his opponents. This is important because H/9 takes into account the second out on double plays, sacrifices and other outs that occur without an official at-bat being recorded -- such as outfield assists. Walks, hit by



pitches and other means of reaching base do not play a factor in H/9.

$$H/9 = H / IP * 9$$

### K/9 (Strikeouts Per Nine Innings)

K/9 rate measures how many strikeouts a pitcher averages for every nine innings pitched. It is determined by dividing his strikeout total by his innings pitched total and multiplying the result by nine.

Because a strikeout is so straightforward -- with no chance of error or bad luck, like on a ball in play -- a pitcher's K/9 rate reveals a lot about his success. However, there are many successful pitchers who get by with lower K/9 rates by inducing a high rate of ground balls and/or soft contact.

K/9 rate tells us a lot, but it's important to note the difference between starters and relievers within the statistic. Because relievers generally pitch for such a short period of time and aren't as concerned about conserving pitches, they can throw with higher intensity for each batter. As a result, relief-pitcher K/9 numbers are generally higher than those of starting pitchers.

$$K/9 = K / IP * 9$$

## Minimum Standards for Individual Championships

<https://baseballrulesacademy.com/official-rule/mlb/9-22-minimum-standards-individual-championships/>

To assure uniformity in establishing the batting, pitching and fielding championships of professional leagues, such champions shall meet the following minimum performance standards:

(a) The individual batting, slugging or on-base percentage champion shall be the player with the highest batting average, slugging percentage or on-base percentage, as the case may be, provided the player is credited with as many or more total appearances at the plate in league championship games as the number of games scheduled for each Club in his Club's league that season, multiplied by 3.1 in the case of a Major League player and by 2.7 in the case of a National Association player. Total appearances at the plate shall include official times at bat, plus bases on balls, times hit by pitcher, sacrifice hits, sacrifice flies and times awarded first base because of interference or obstruction.

Notwithstanding the foregoing requirement of minimum appearances at the plate, any player with fewer than the required number of plate appearances whose average would be the highest, if he were charged with the required number of plate appearances shall be awarded the batting, slugging or on-base percentage championship, as the case may be.

Rule 9.22(a) Comment:

For example, if a Major League schedules 162 games for each Club, 502 plate appearances qualify (162 times 3.1 equals 502) a player for a batting, slugging or on-base percentage championship. If a National Association league schedules 140 games for each Club, 378 plate appearances qualify (140 times 2.7 equals 378) a player for a batting, slugging or on-base percentage championship. Fractions of a plate appearance are to be rounded up or down to the closest whole number. For example, 162 times 3.1 equals 502.2, which is rounded down to a requirement of 502. If, for example, Abel has the highest batting average among those with 502 plate appearance in a Major League with a .362 batting average (181 hits in 500 at-bats), and Baker has 490 plate appearances, 440 at-bats and 165 hits for a .375 batting average, Baker shall be the batting champion, because adding 12 more at-bats to Baker's record would still give Baker a higher batting average than Abel: .365 (165 hits in 452 at-bats) to Abel's .362.

(b) The individual pitching champion in a Major League shall be the pitcher with the lowest earned-run average, provided that the pitcher has pitched at least as many innings in league championship games as the number of games scheduled for each Club in his Club's league that season. The individual pitching champion in a National Association league shall be the pitcher with the lowest earned-run average provided that the pitcher has pitched at least as many innings in league championship season games as 80% of the number of games scheduled for each Club in the pitcher's league.

Rule 9.22(b) Comment:

For example, if a Major League schedules 162 games for each Club, 162 innings qualify a pitcher for a pitching championship. A pitcher with  $161\frac{2}{3}$  innings would not qualify. If a National Association league schedules 140 games for each Club, 112 innings qualify a pitcher for a pitching championship. Fractions of an inning for the required number of innings are to be rounded to the closest third of an inning. For example, 80% of 144 games is 115.2, so  $115\frac{1}{3}$  innings would be the minimum required for a pitching championship in a National Association league with 144 games scheduled and 80% of 76 games is 60.8, so  $60\frac{2}{3}$  innings would be the minimum required for a pitching championship in a National Association league with 76 games scheduled.

(c) The individual fielding champions shall be the fielders with the highest fielding average at each position, provided:

(1) A catcher must have participated as a catcher in at least one-half the number of games scheduled for each Club in his league that season;

(2) An infielder or outfielder must have participated at his position in at least two-thirds of the number of

games scheduled for each Club in his league that season;  
and

(3) A pitcher must have pitched at least as many innings as the number of games scheduled for each Club in his league that season, unless another pitcher has a fielding average as high or higher and has handled more total chances in fewer innings, in which case such other pitcher shall be the fielding champion.