

How (agile) charts lie

Nick Brown (@nbrown02) | nick.brown@asos.com | #agilecam | 29th June 2022

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AGILE
CAMBRIDGE

Tell me how you measure me,
and I will tell you **how I will behave**

(Goldratt)

What gets measured, gets managed

(Drucker)

What gets measured, gets managed

(Peter Drucker did not say this)

Drucker Never Said

“What gets measured, gets managed.”

Drucker Did Say

“Unless we determine what shall be measured and what the yardstick of measurement in an area will be, the area itself will not be seen.”

Source: [Drucker Institute – Did Peter Drucker Say That?](#)

The answer to Woody's question 😊

Drucker Never Said

“So much of what we call management consists in making it difficult for people to work.”

Drucker Did Say

“Management by objectives works if you know the objectives. Ninety percent of the time you don't.”

Source: [Drucker Institute – Did Peter Drucker Say That?](#)

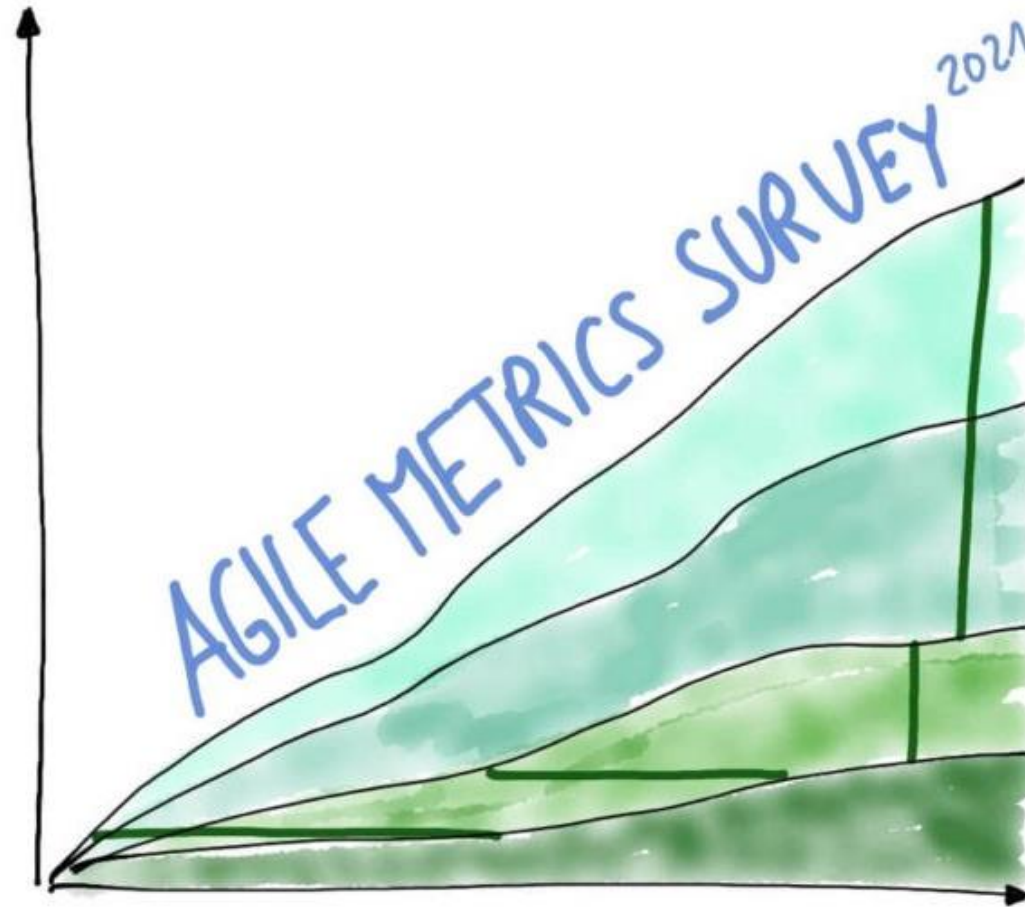
Without data you're just another
person with an opinion

(Deming)

Measurement has “crossed the chasm”

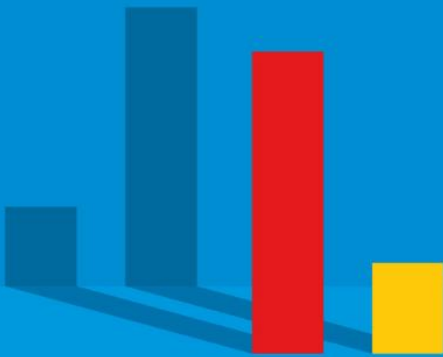


Measurement has “crossed the chasm”



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How Charts Lie



Getting Smarter about
Visual Information

Alberto Cairo



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What do Tory voters think?

Q Given the choice, would you prefer that Boris Johnson was still Prime Minister in a year's time, or would you prefer someone else?

Johnson to remain Prime Minister

25%

I would prefer someone else to be PM

60%

Don't know

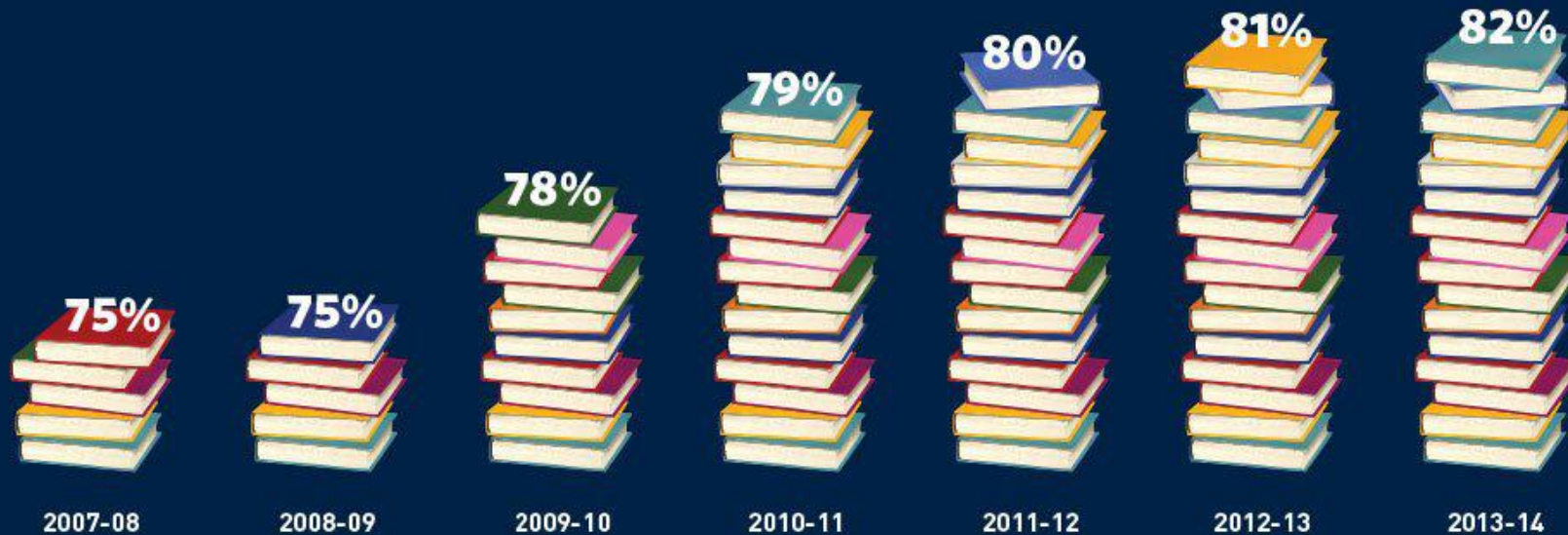
15%

Source: YouGov, June 22-23.
1,671 adults. Results show
those who voted
Conservative in 2019.

Source: [Will Bailey Watson](#)

UNDER PRESIDENT OBAMA, **MORE STUDENTS ARE EARNING** THEIR HIGH SCHOOL DIPLOMAS THAN EVER BEFORE

HIGH SCHOOL GRADUATION RATE



#LeadOnEducation

SOURCE: U.S. DEPARTMENT OF EDUCATION,
NATIONAL CENTER FOR EDUCATION STATISTICS

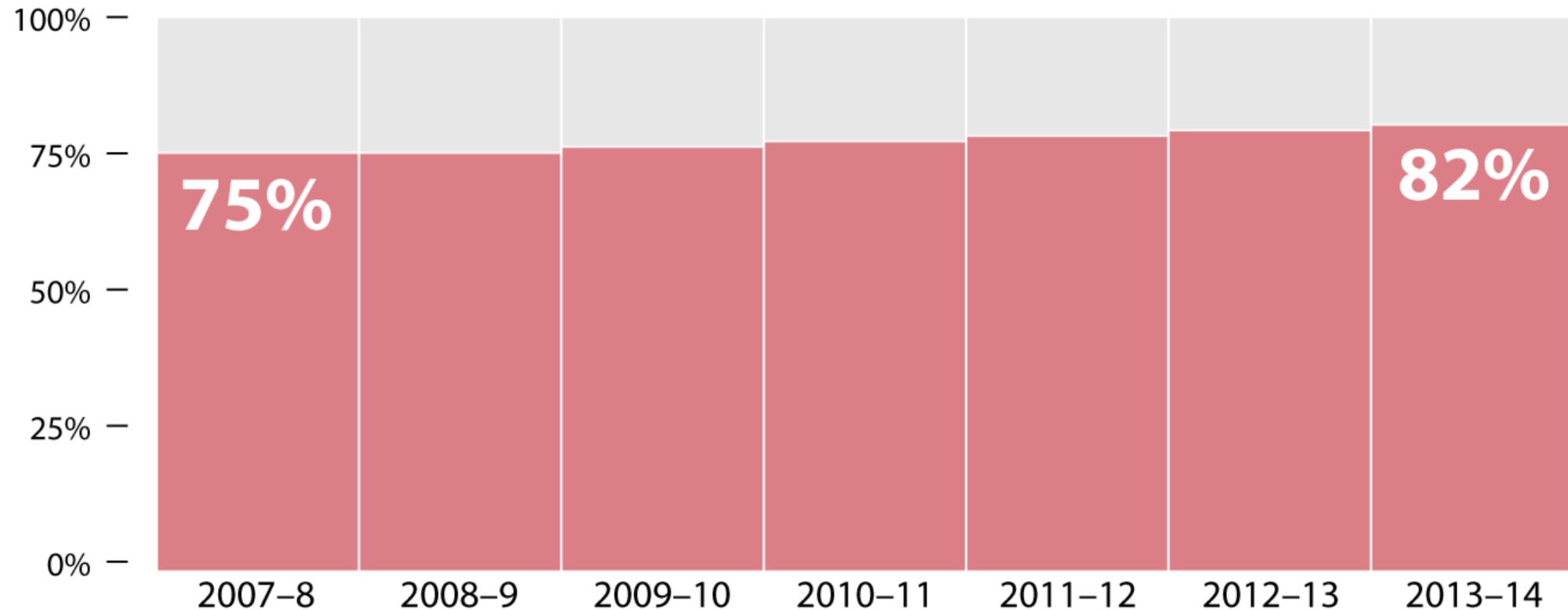
Source: [White House Archived](#)

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Under President Obama,
more students are earning their high school diplomas than ever before.

High school graduation rate

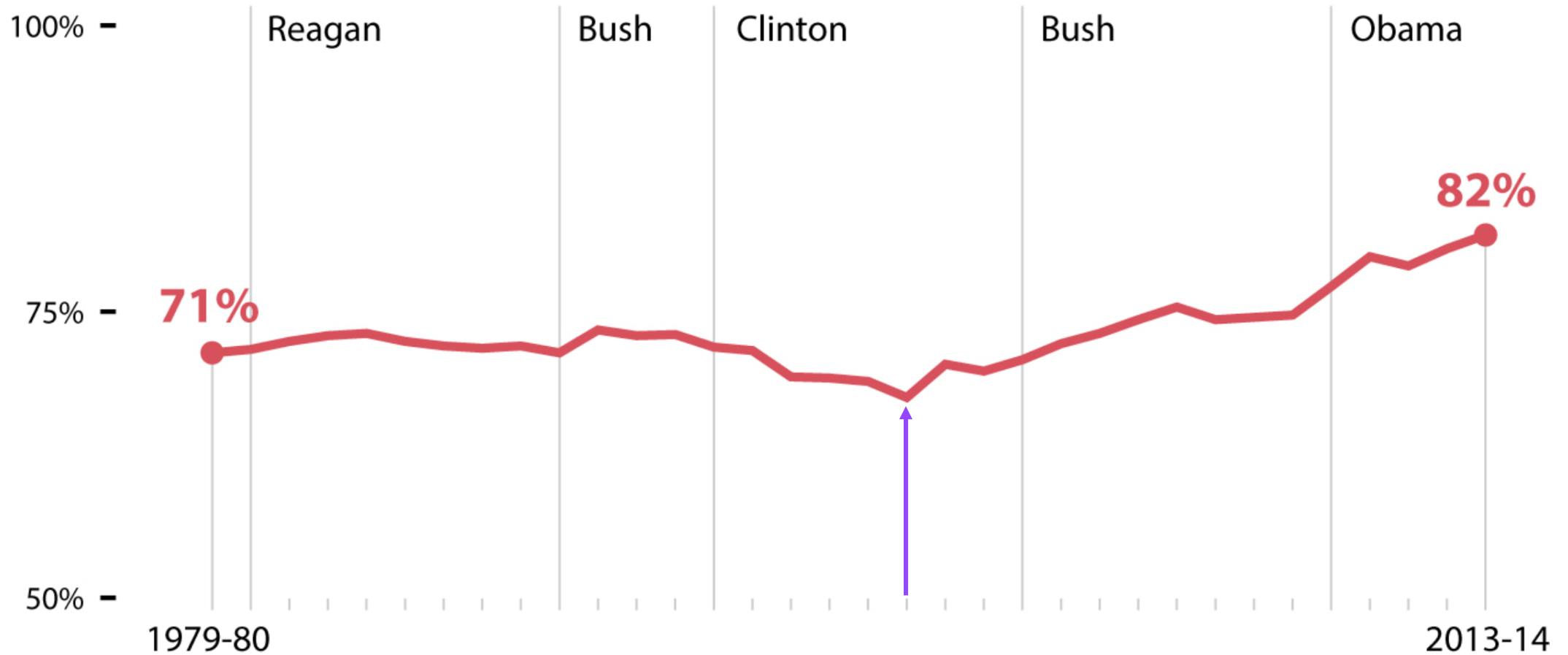


Source: [Alberto Cairo – How Charts Lie](#)

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High school graduation rates under each president



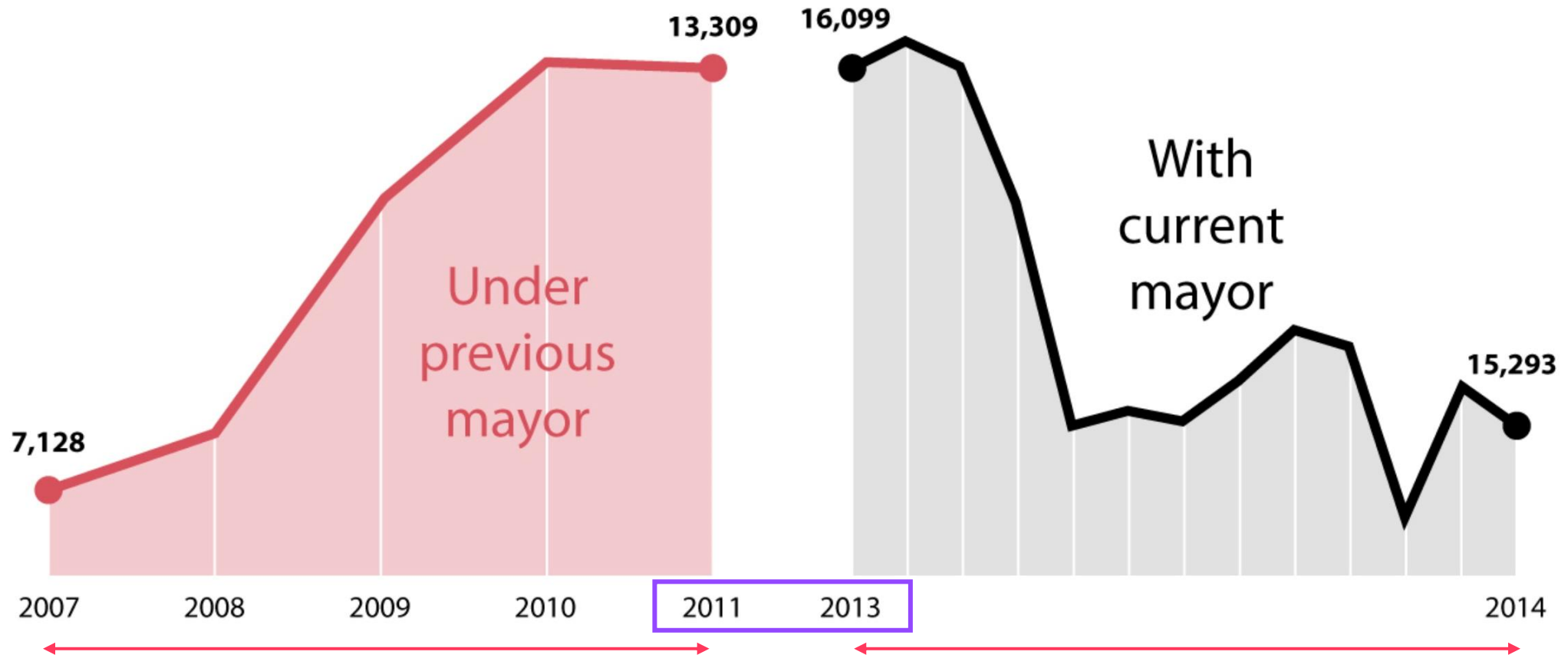
(Source: National Center for Education Statistics)

Source: [Alberto Cairo – How Charts Lie](#)

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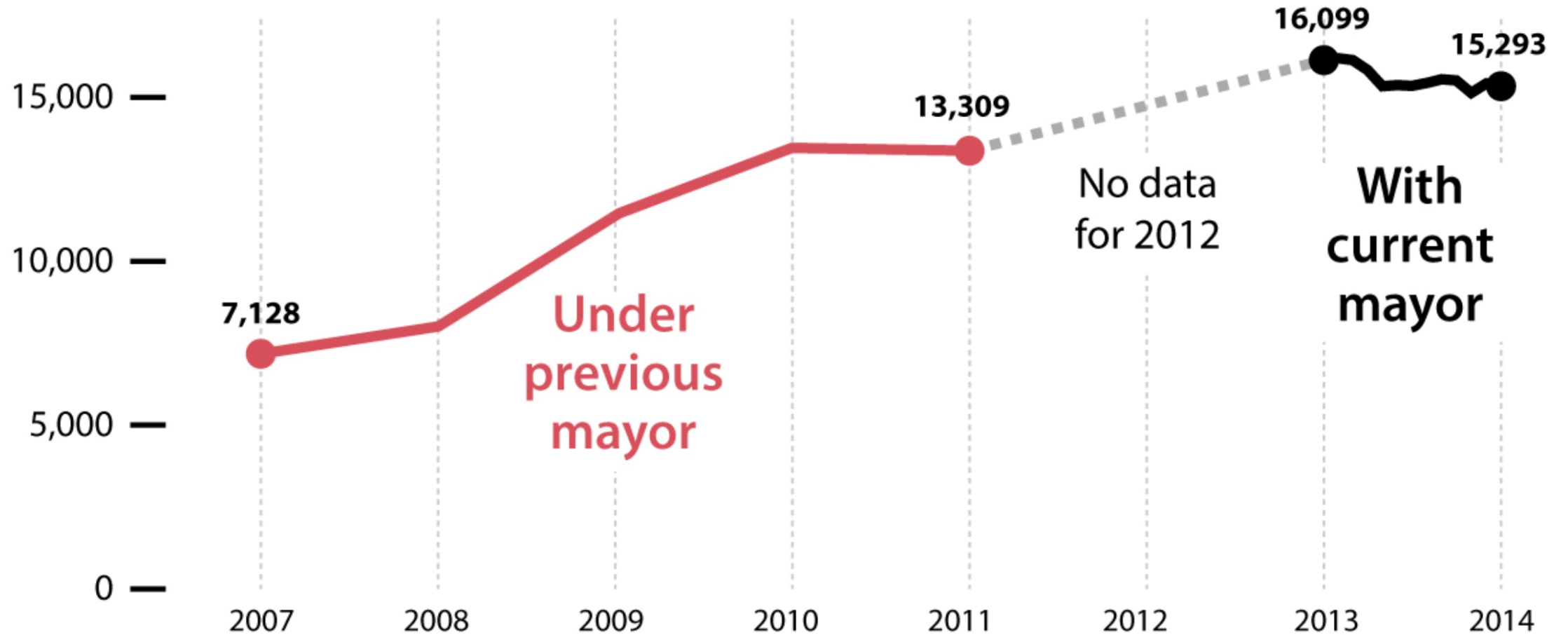
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Unemployed adults in Alcorcón



Source: [Alberto Cairo – How Charts Lie](#)

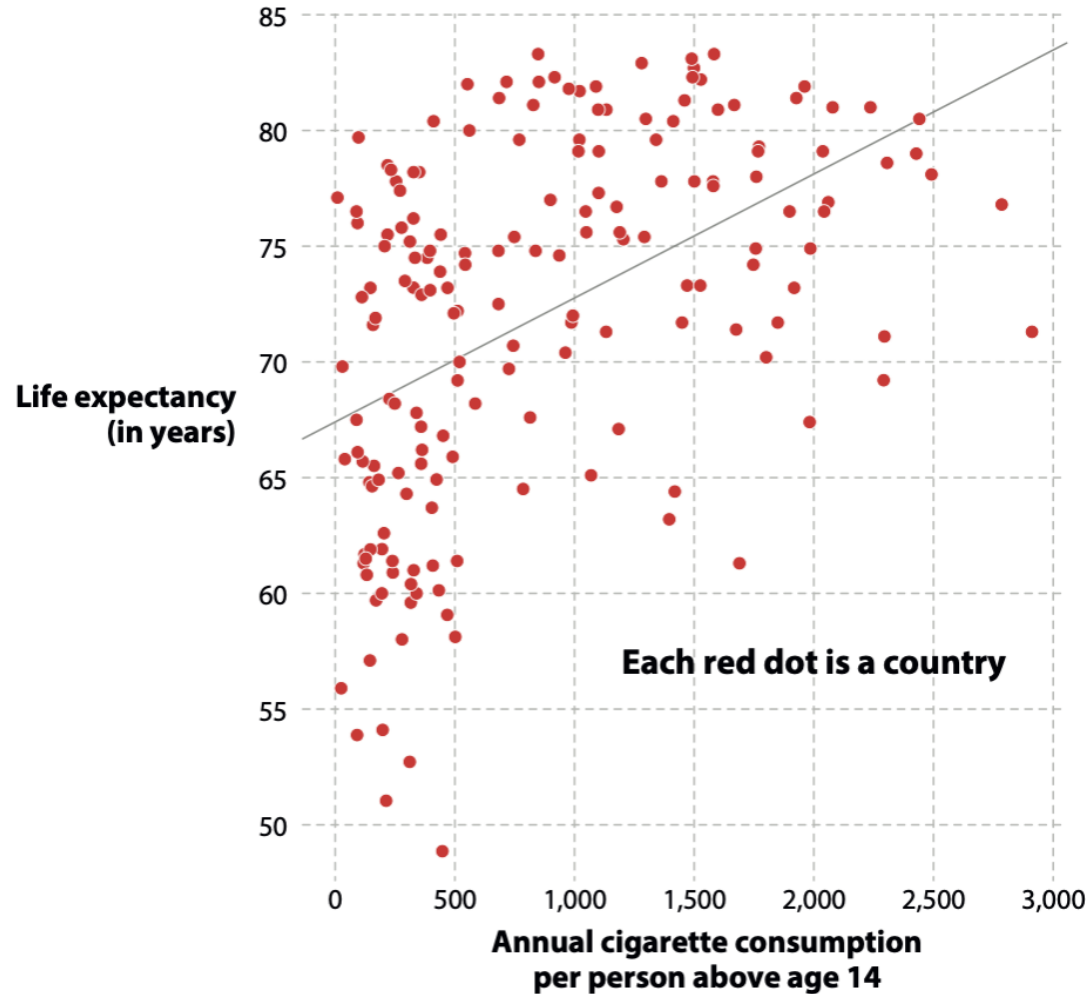
Unemployed adults in Alcorcón



Source: [Alberto Cairo – How Charts Lie](#)

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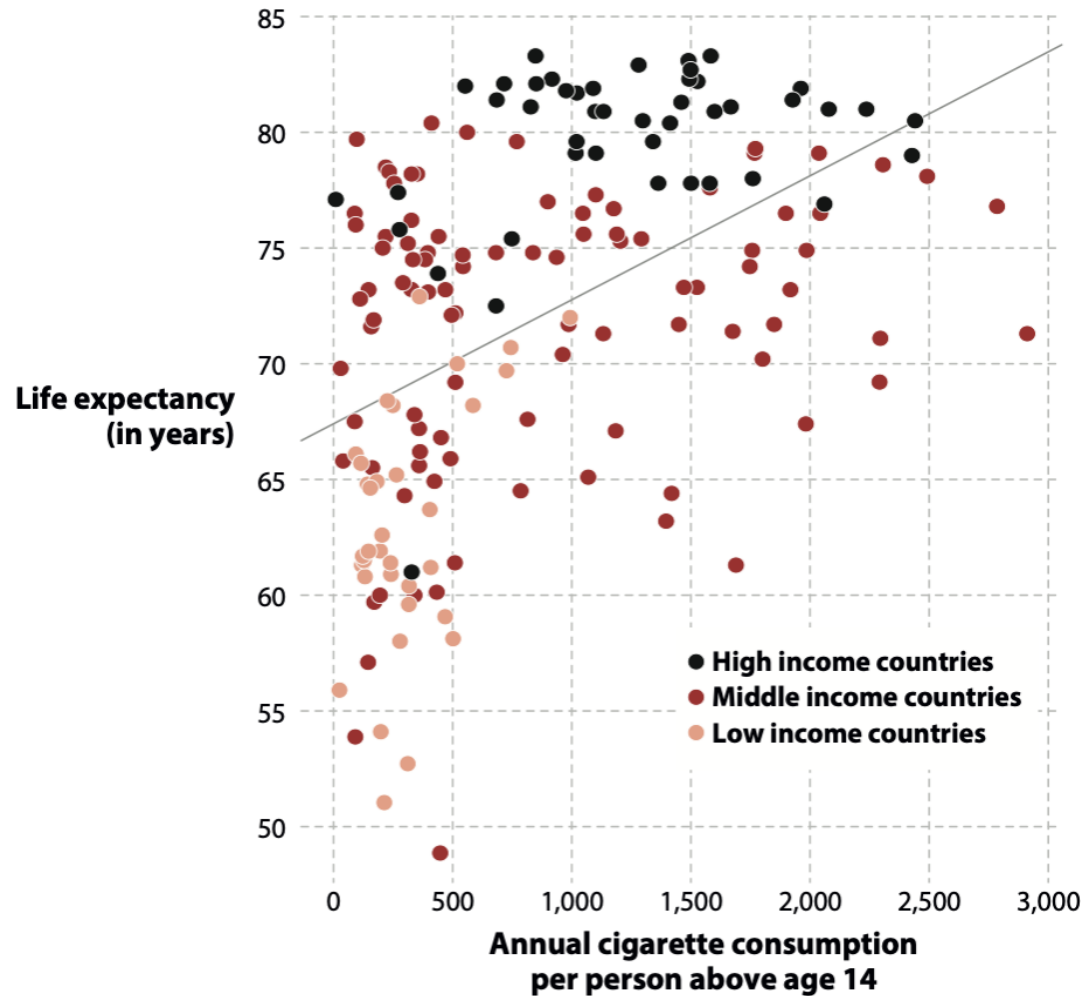


Smoking
cigarettes
can help you
live longer!!!

Example provided by
Heather Krause
<https://idatassist.com>

Alberto Cairo • University of Miami • www.thefunctionalart.com • Twitter: @albertocairo

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Remember:
A chart shows only what
it shows *and nothing else*

Smoking
cigarettes
can help you
live longer??

Example provided by
Heather Krause
<https://idatassist.com>

Alberto Cairo • University of Miami • www.thefunctionalart.com • Twitter: @albertocairo

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How Charts Lie



Getting Smarter about
Visual Information

Alberto Cairo

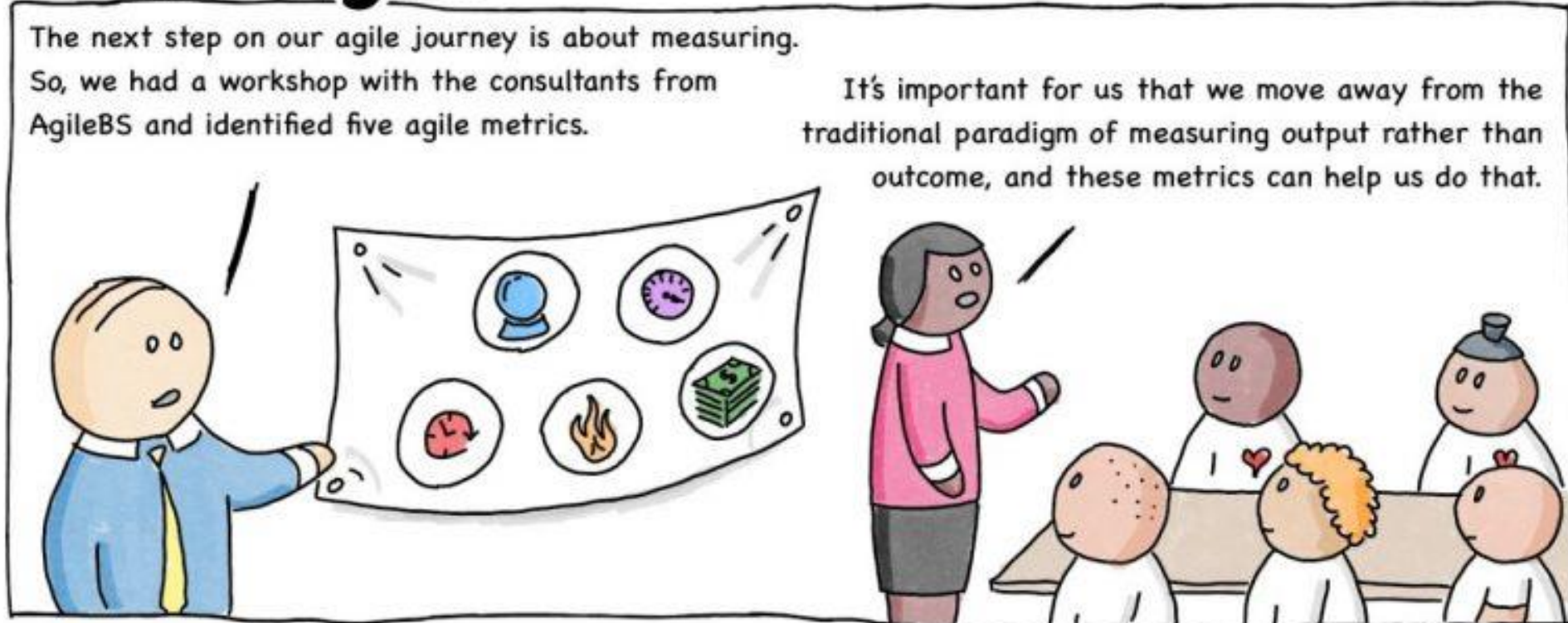
How charts lie by Alberto Cairo

Charts lie through:

- Being poorly designed
- Displaying dubious data
- Concealing or confusing uncertainty
- Displaying insufficient data
- Suggesting misleading patterns

Where your organisation may be at right now

Comic Agilé



Source: [Comic Agile #60 – Agile Metrics](#)

MICHAEL KEATON PETER SARSGAARD MICHAEL STUHLBARG WITH KAITLYN DEVER AND ROSARIO DAWSON

hulu
DOPESICK

INSPIRED BY THE TRUE STORY OF HOW
AMERICA GOT HOOKED ON A LIE



ORIGINAL SERIES **hulu**

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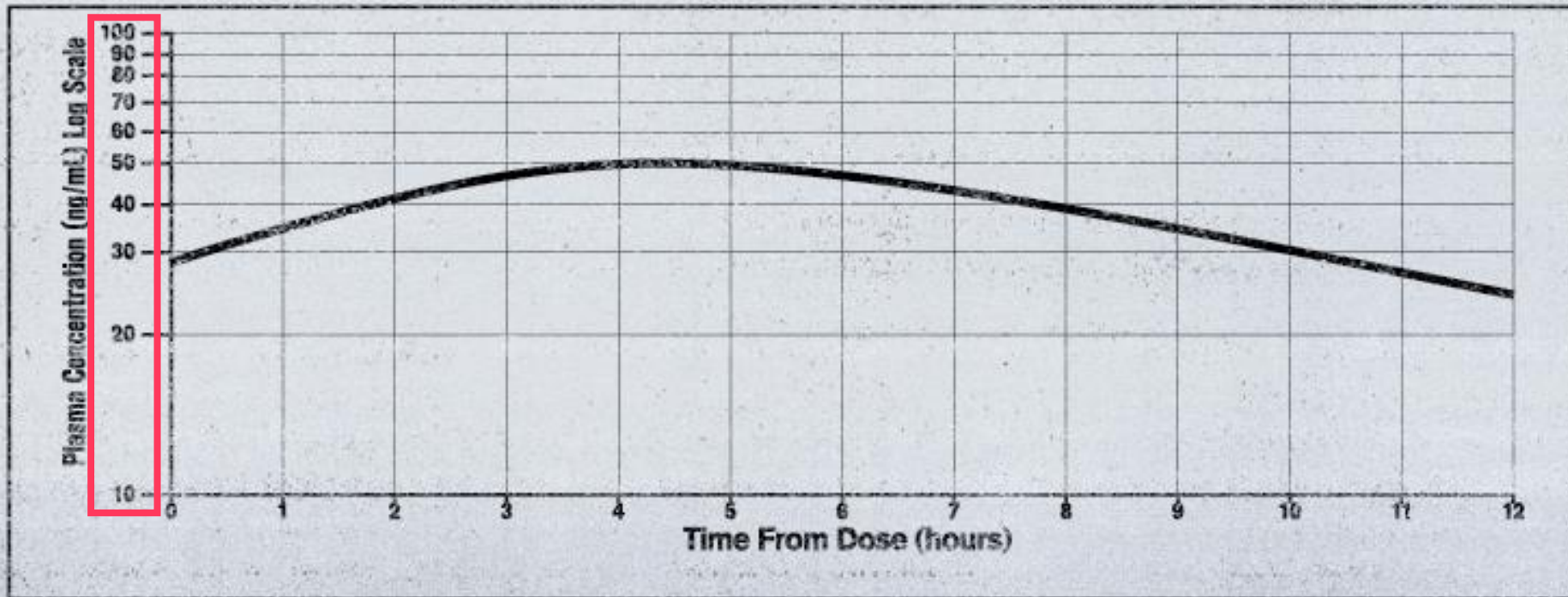
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Source: [Dopesick logarithmical scale deception for policymakers](#)

**Q12h dosing
provides smooth and
sustained blood levels.**

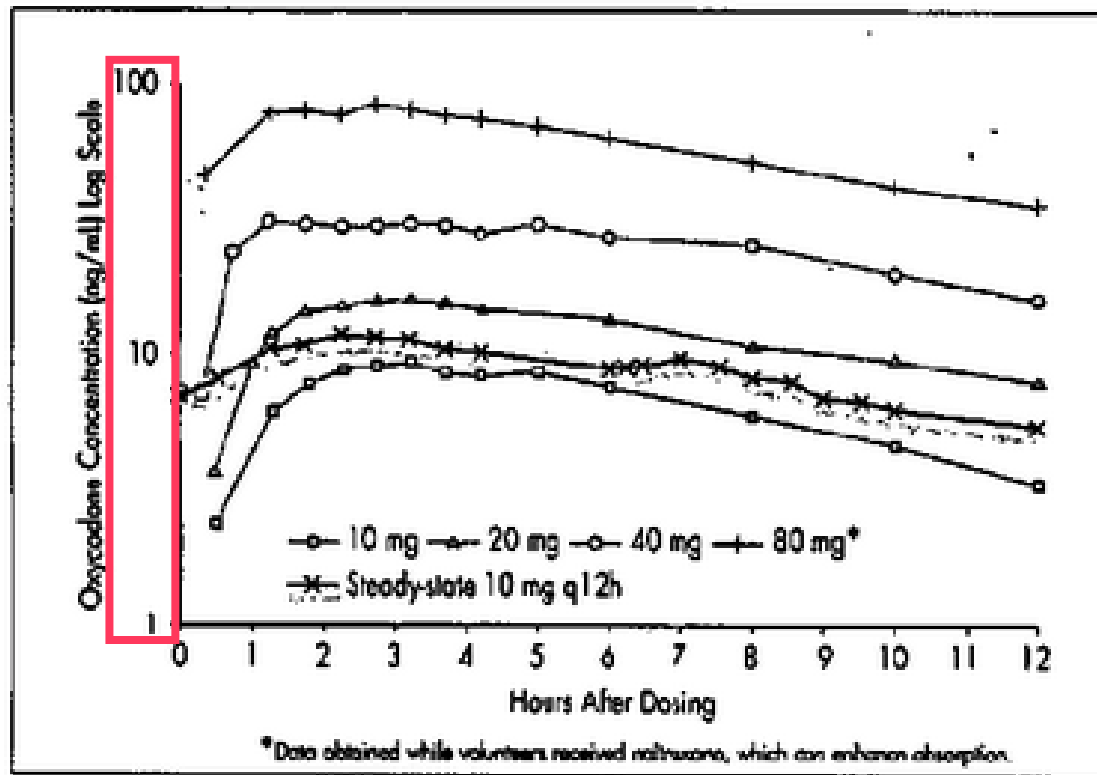


– Fewer “peaks and valleys” than with immediate-release oxycodone

For moderate to severe pain when a continuous, around-the-clock analgesic is needed for an extended period of time

Consistent Plasma Levels Over 12 Hours

Plasma concentrations (ng/mL) over time of various dosage strengths

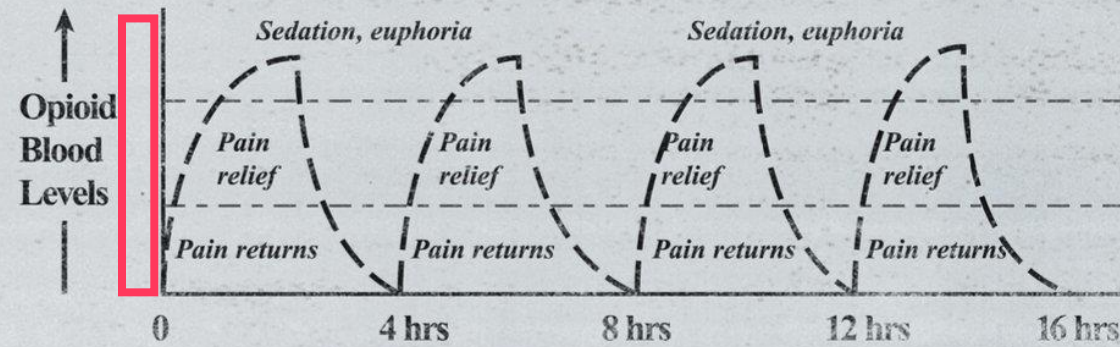


- OxyContin® 80 and 160 mg Tablets FOR USE ONLY IN OPIOID-TOLERANT PATIENTS requiring minimum daily oxycodone equivalent dosages of 160 mg and 320 mg, respectively. These tablet strengths may cause fatal respiratory depression when administered to patients not previously exposed to opioids

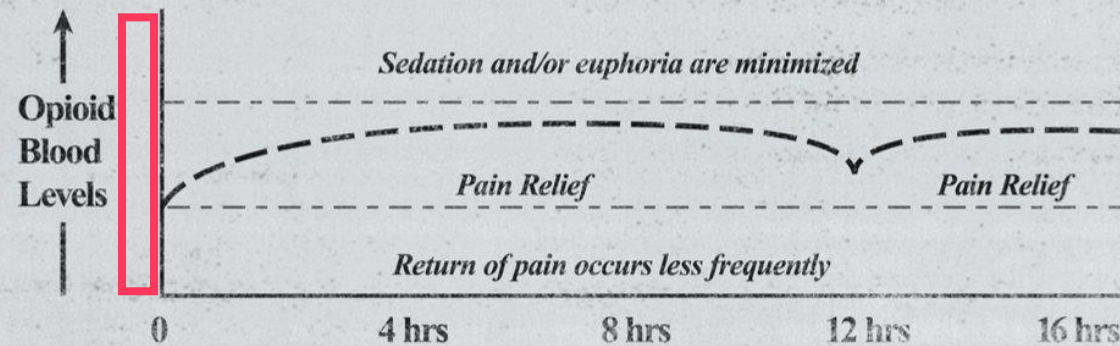
Steady state achieved within 24 to 36 hours

Source: [Benjamin Rubin](#)

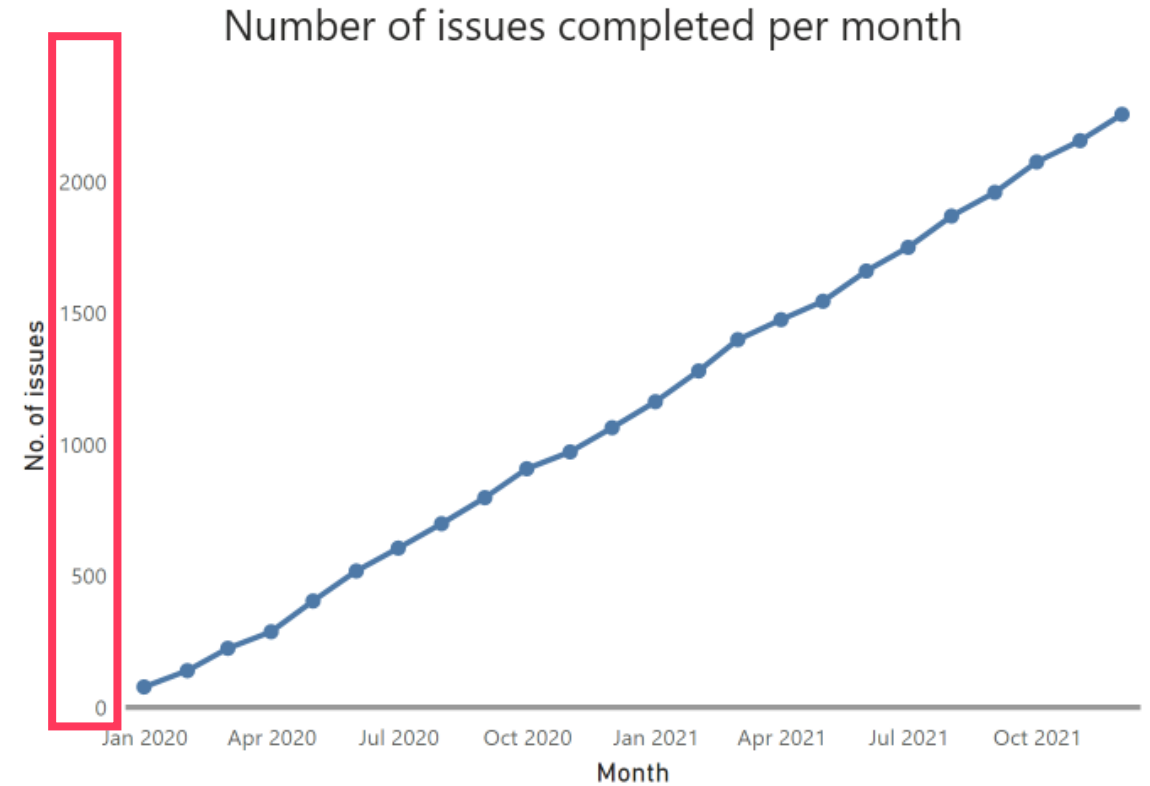
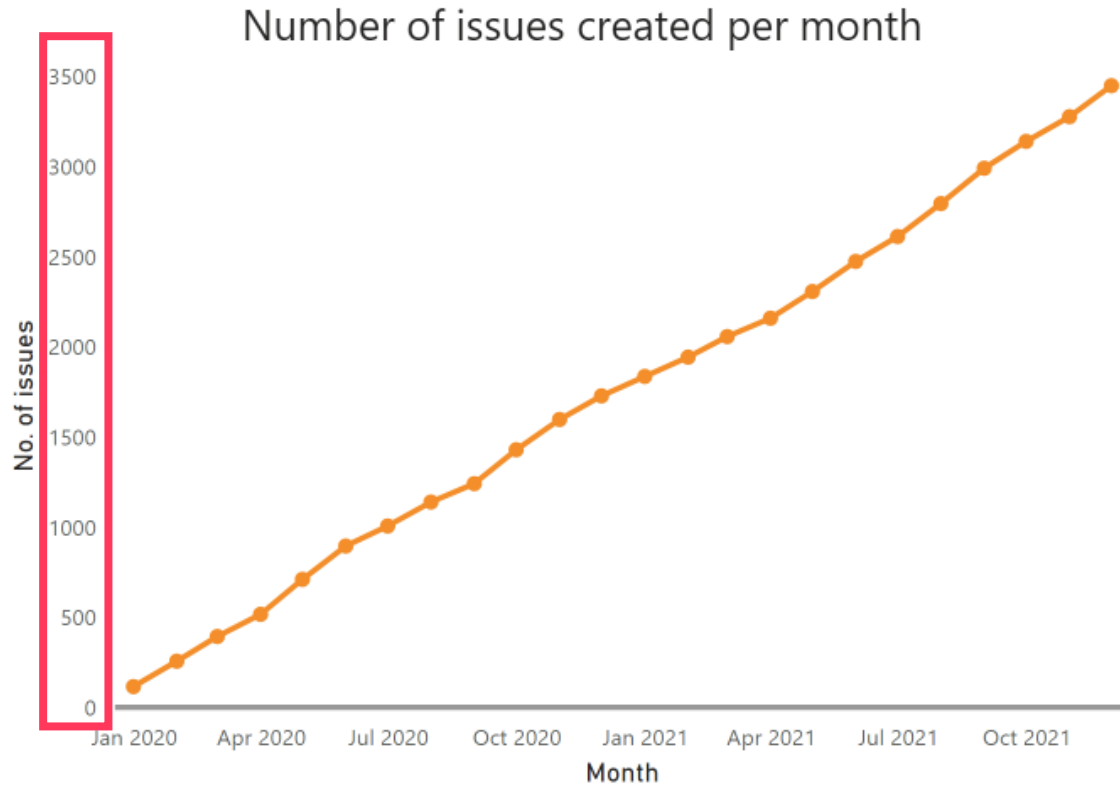
The inappropriate use of short-acting opioids (taken on a Q 4 H basis)



The appropriate use of long-acting opioids (taken on a Q 12 H basis)



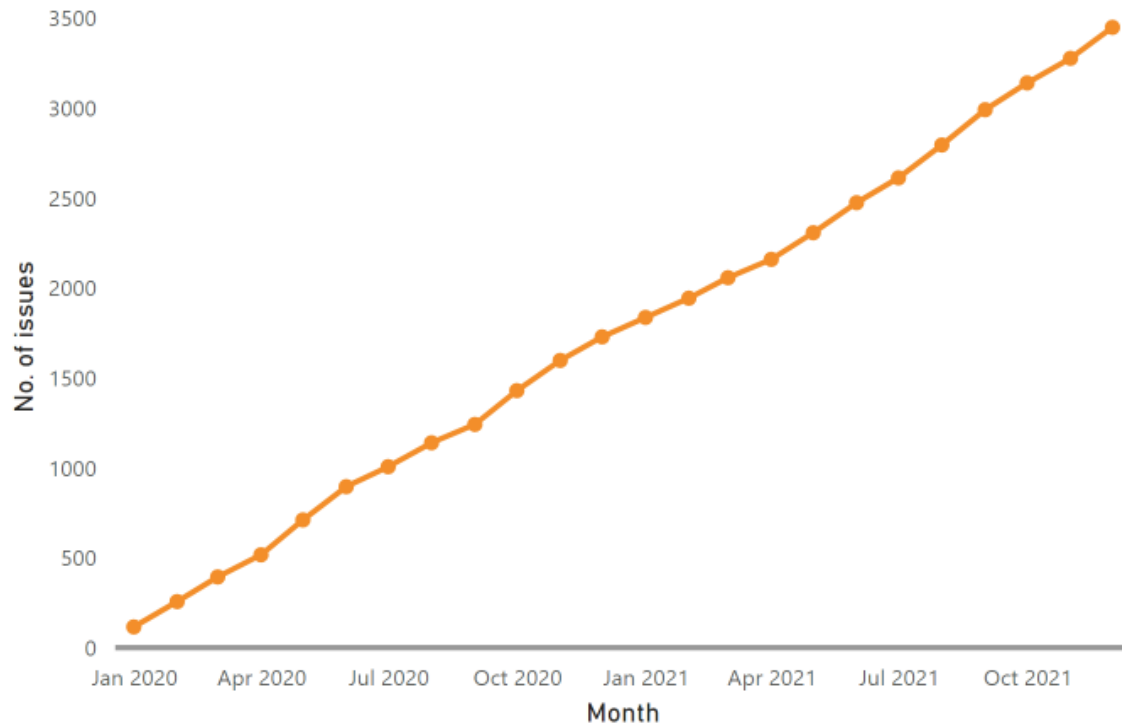
Created Vs. Completed Issues (Work Items) per month



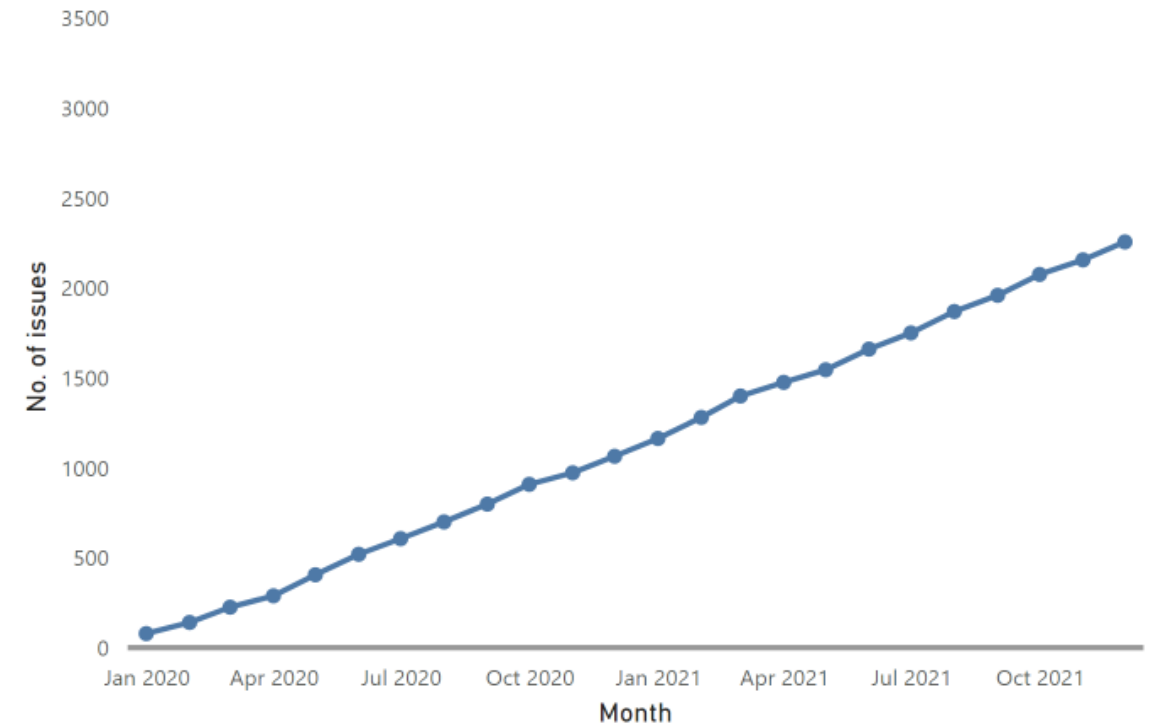
These charts lie by being poorly designed

Created Vs. Completed Issues (Work Items) per month

Number of issues created per month

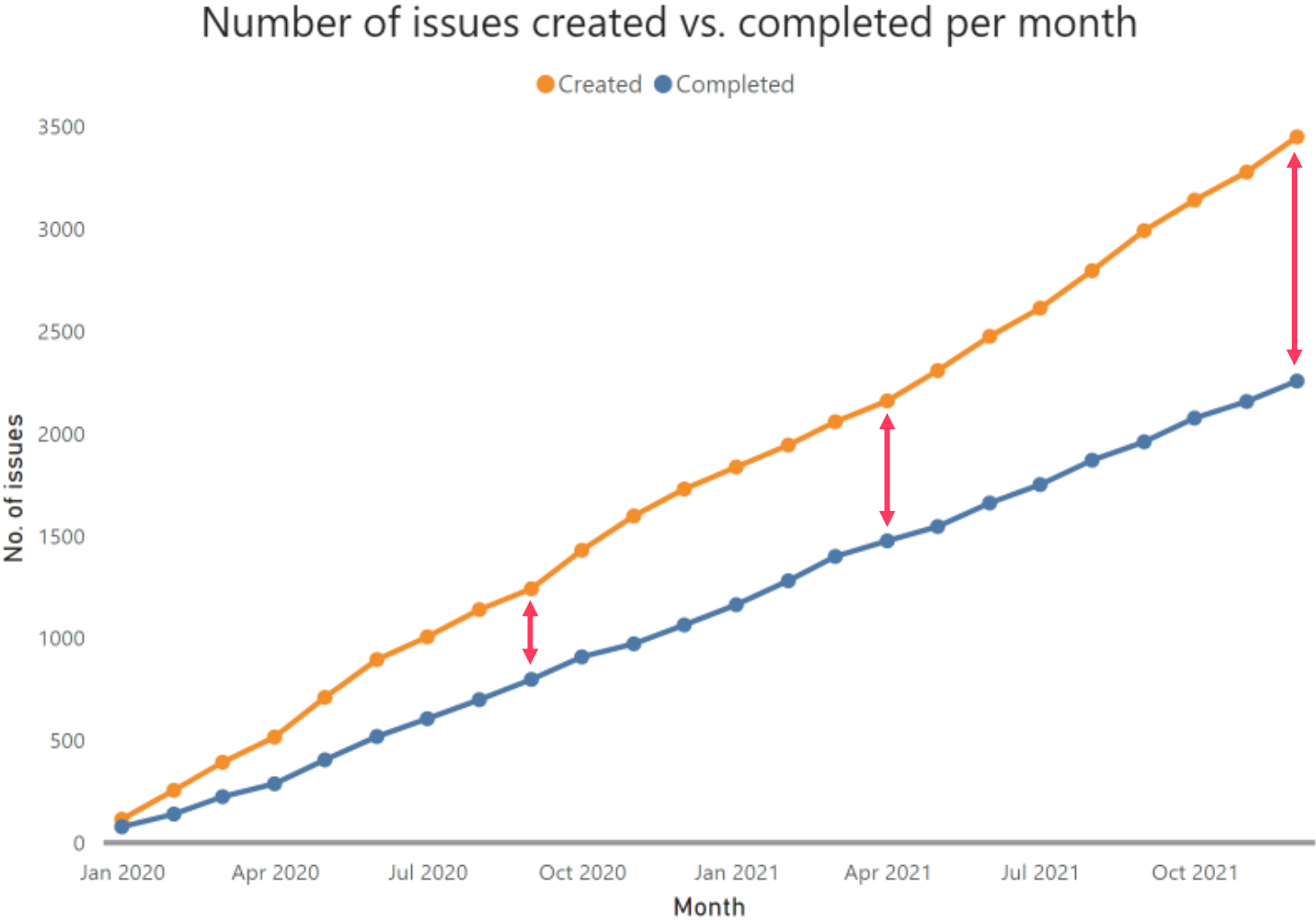


Number of issues completed per month



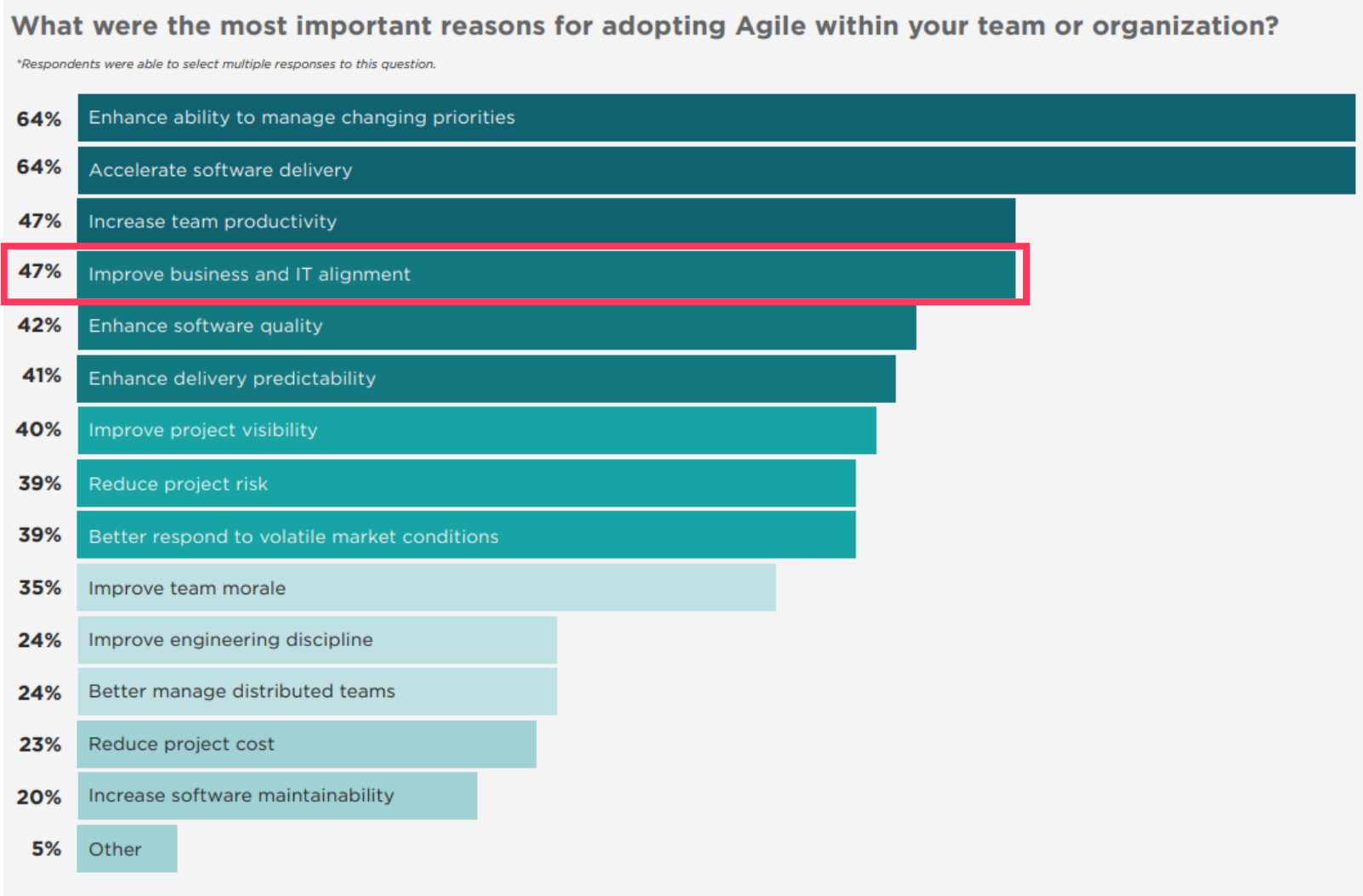
#agilecam
@nbrown02

What you should use...and why it's a cause for concern!



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Why organisations adopt agile

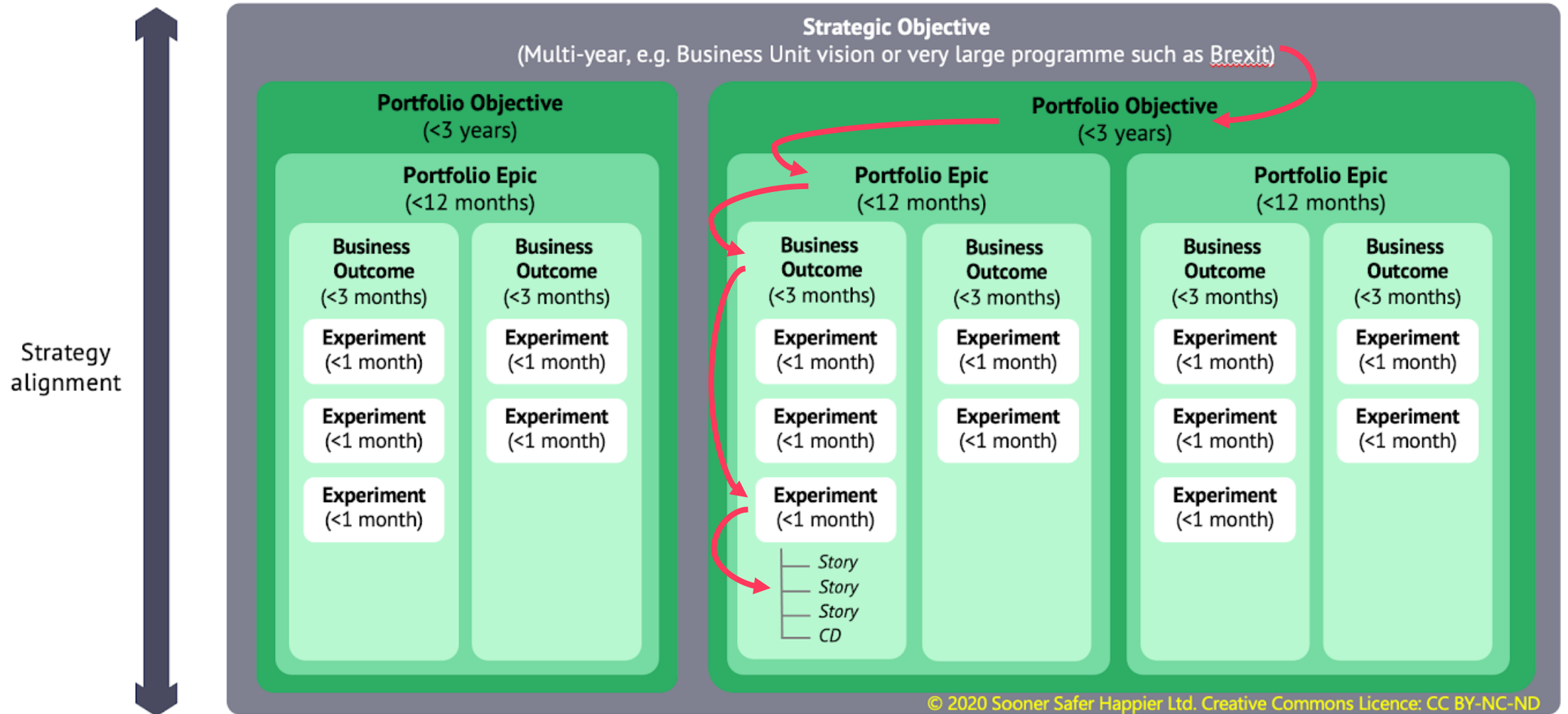


Source: [15th Annual State of Agile Report \(2022\)](#)

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Organisational alignment



Source: [Sooner Safer Happier – Outcome Hypothesis – a Primer](#)

Item hierarchy

Strategic Objective

Portfolio Objective

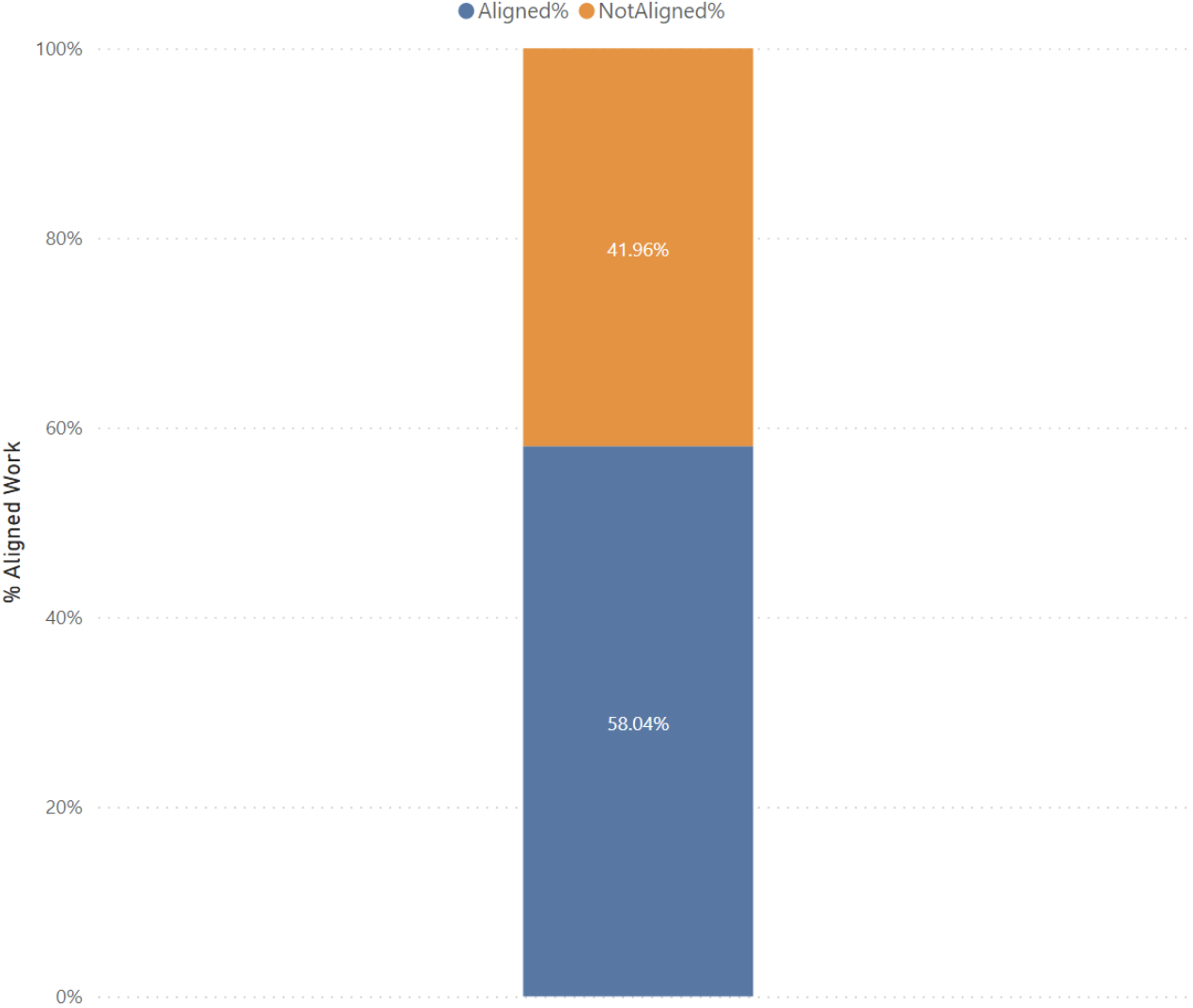
Objectives & Key Results (OKRs)

Epics

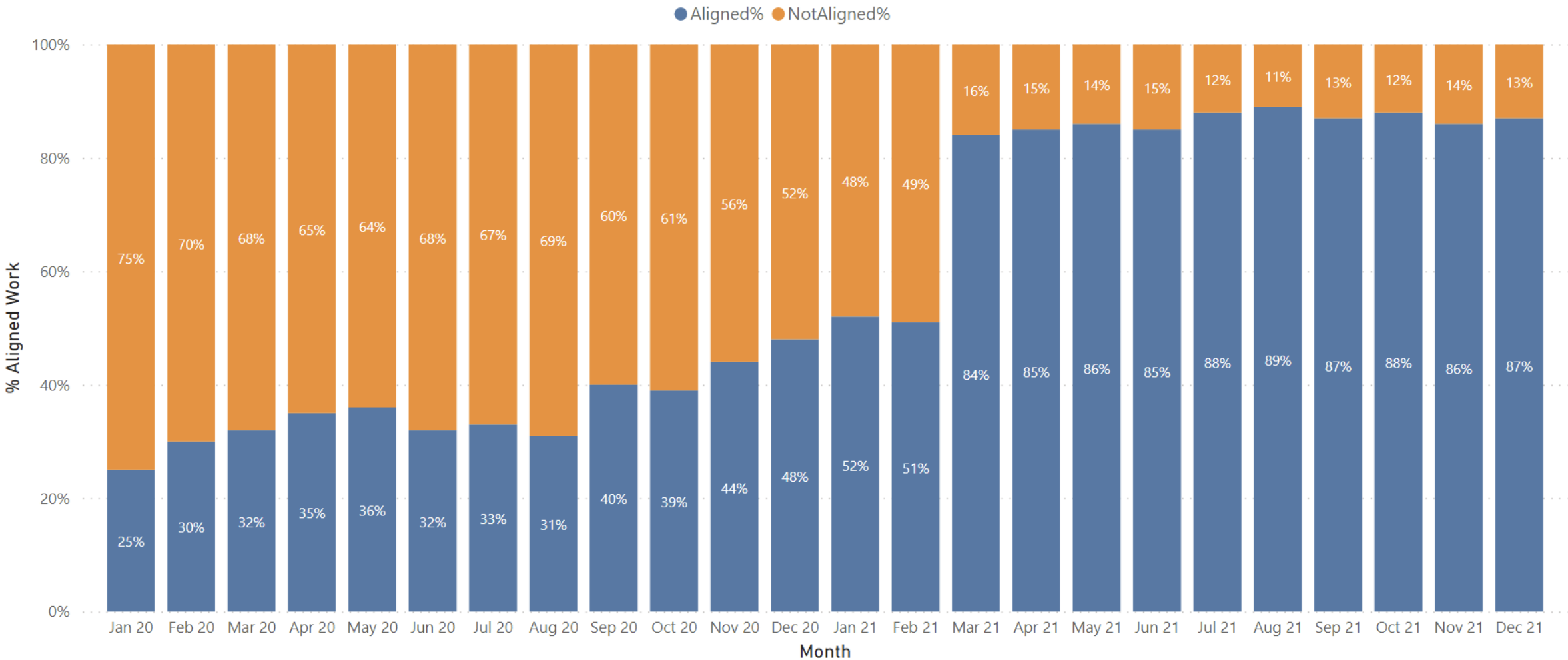
Features

Stories / Product Backlog Items (PBIs)

Measurement of your golden thread

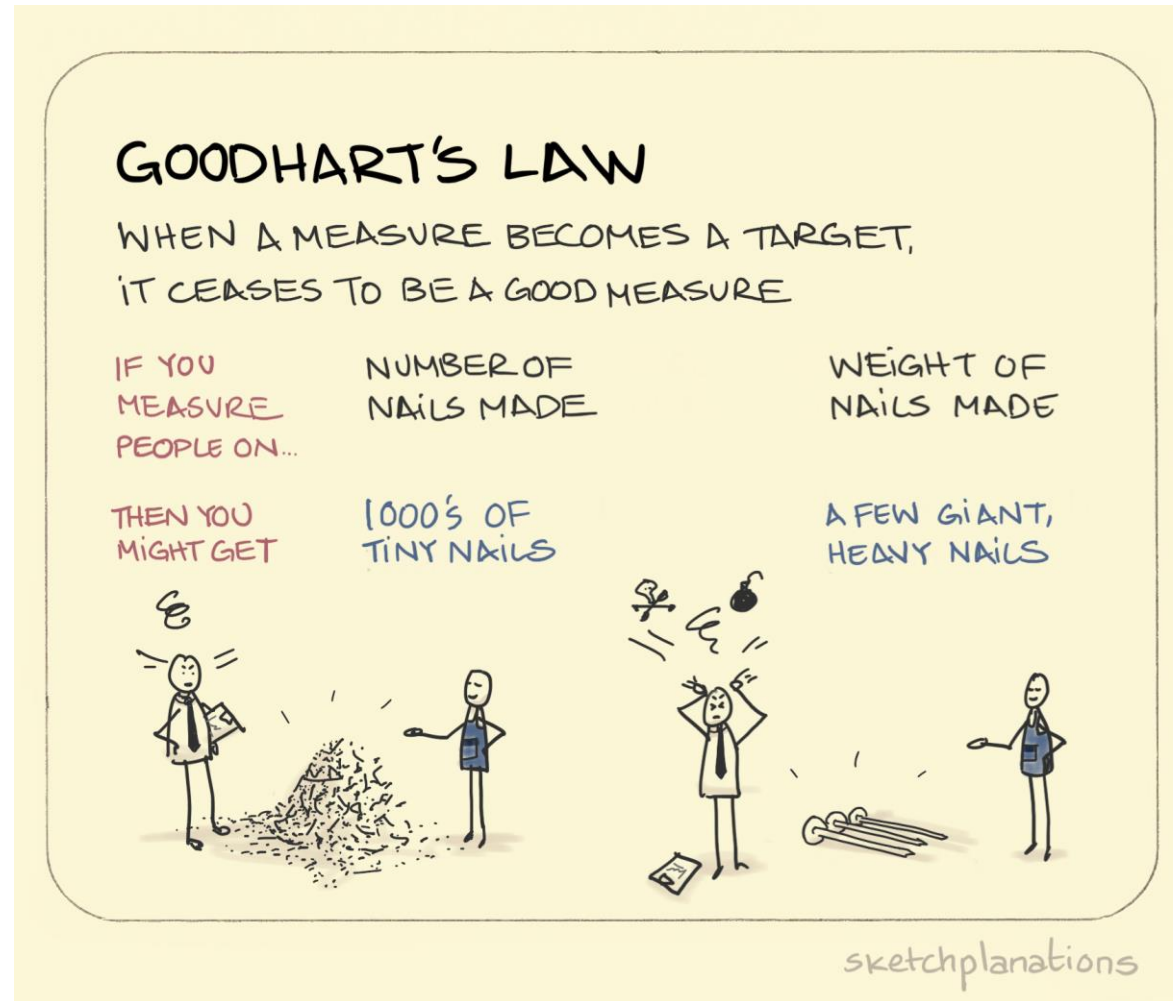


Measurement of your golden thread



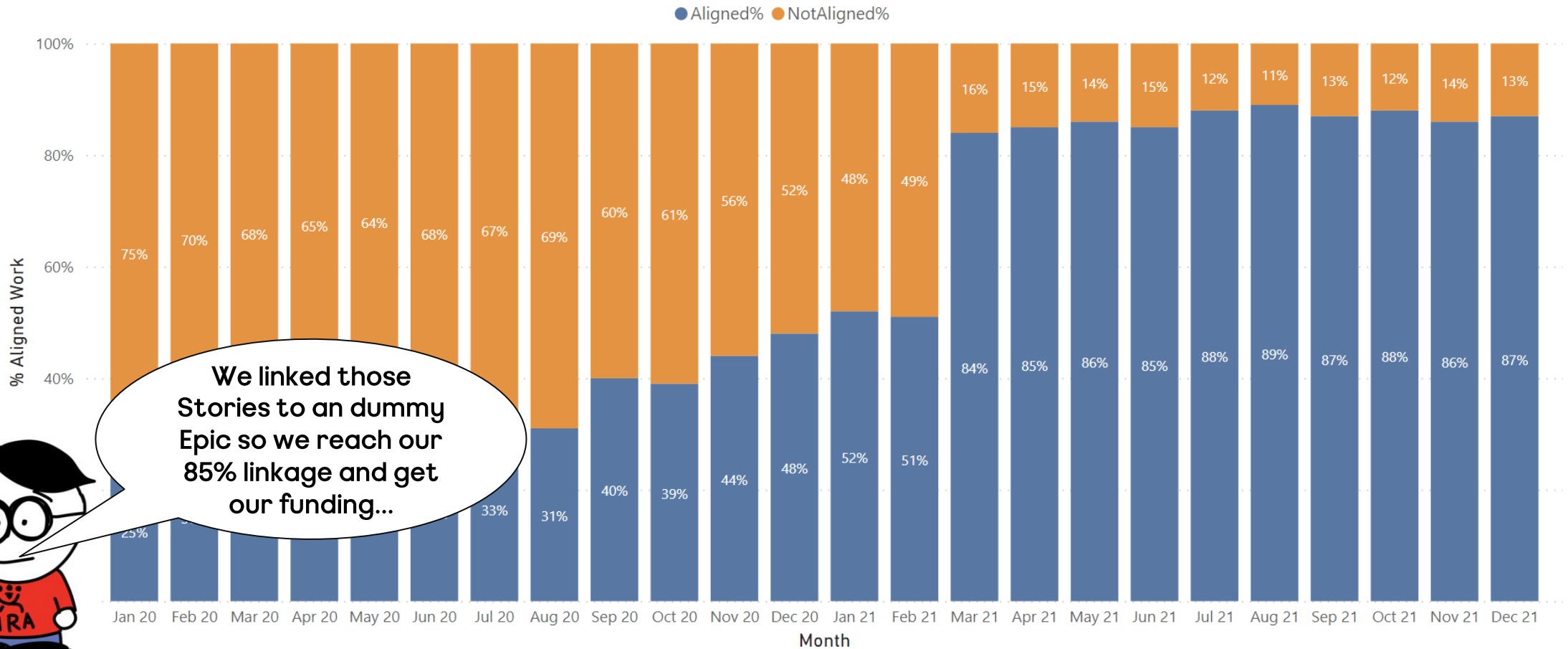
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Target % alignment only leads to one thing...



Source: [Sketchplanations – Goodhart's Law](#)

Placeholder Epics

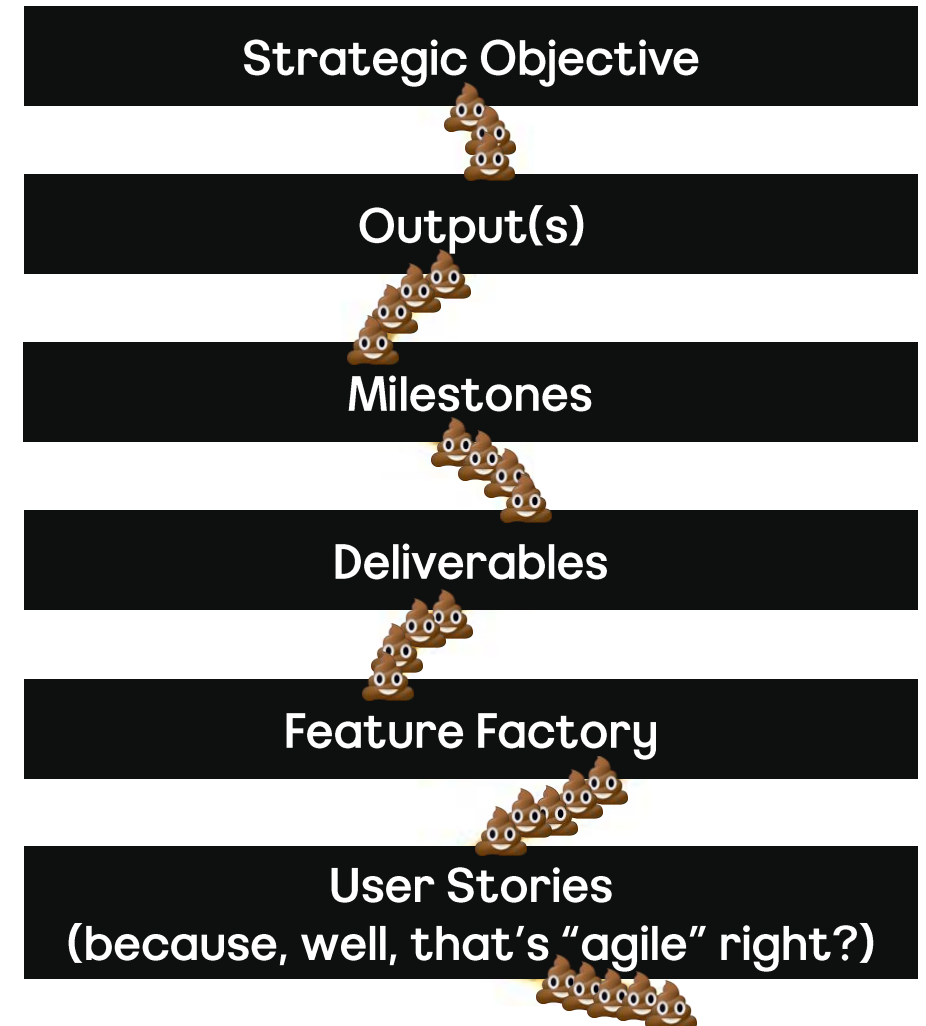
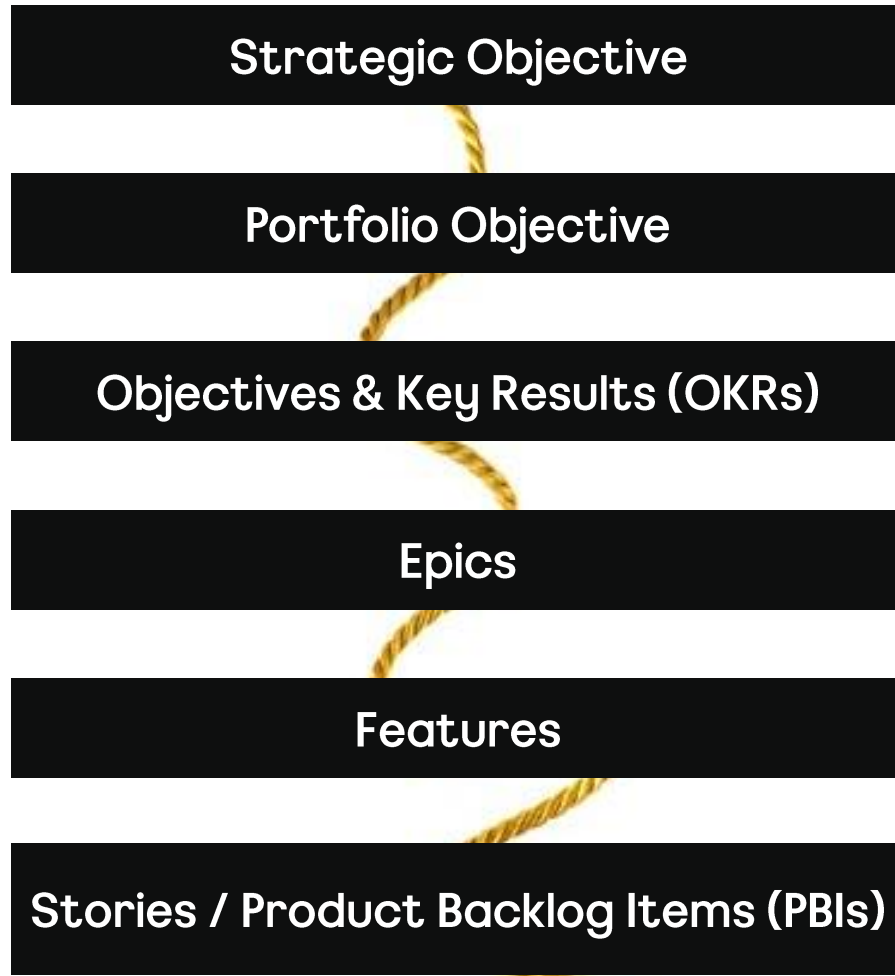


This chart lies by displaying dubious information

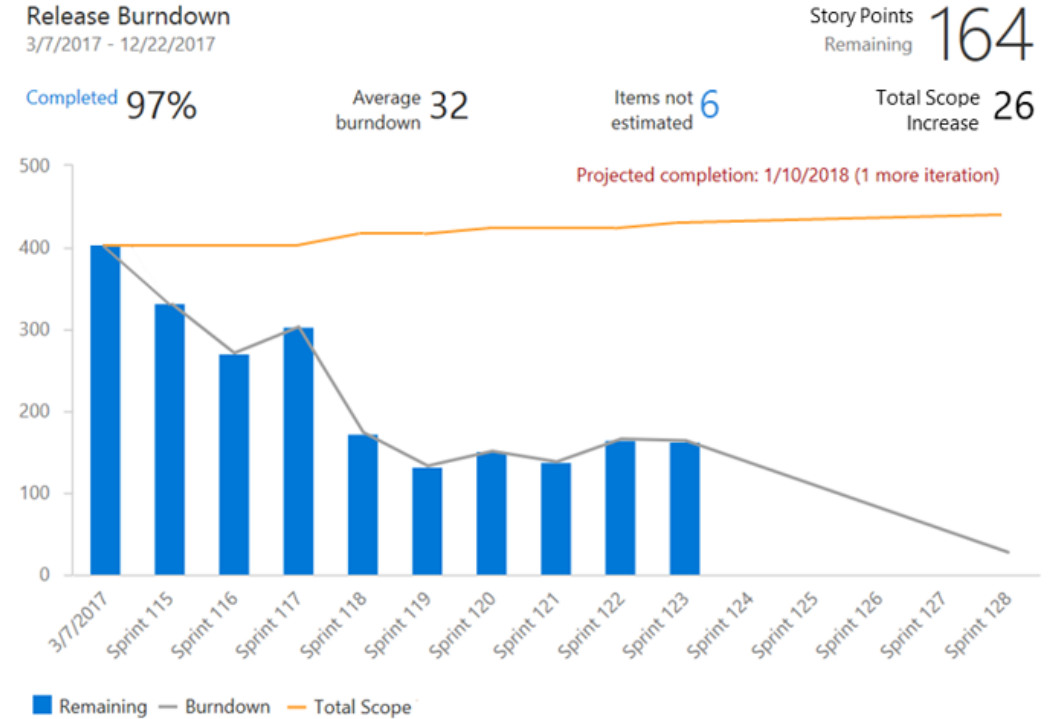
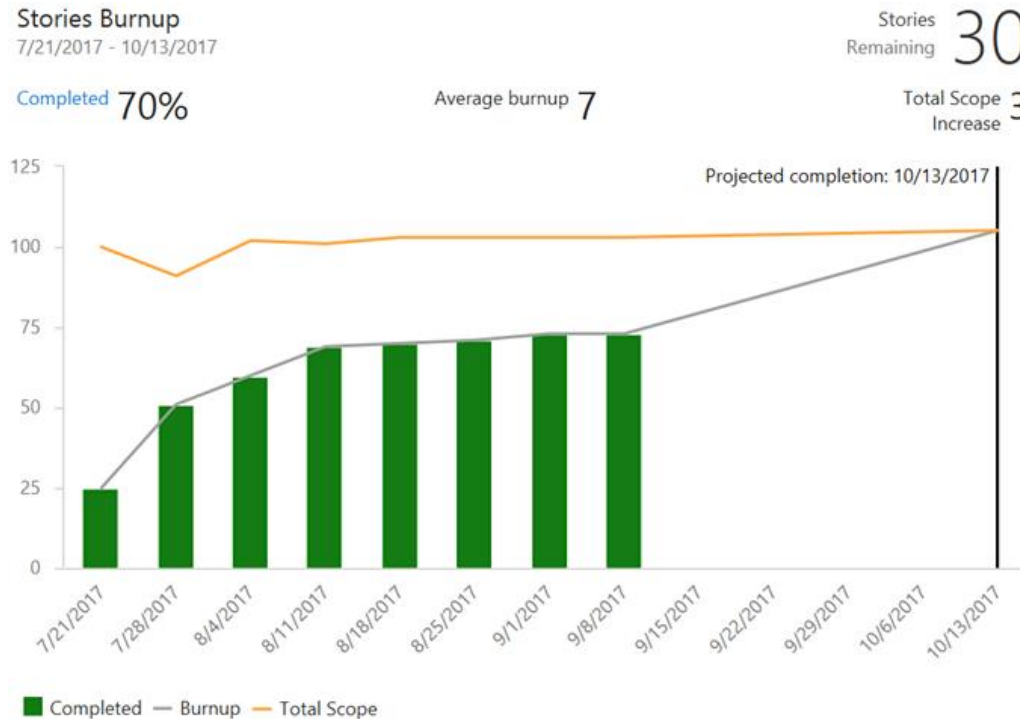
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What it leads to...



Every Scrum Masters favourite charts!



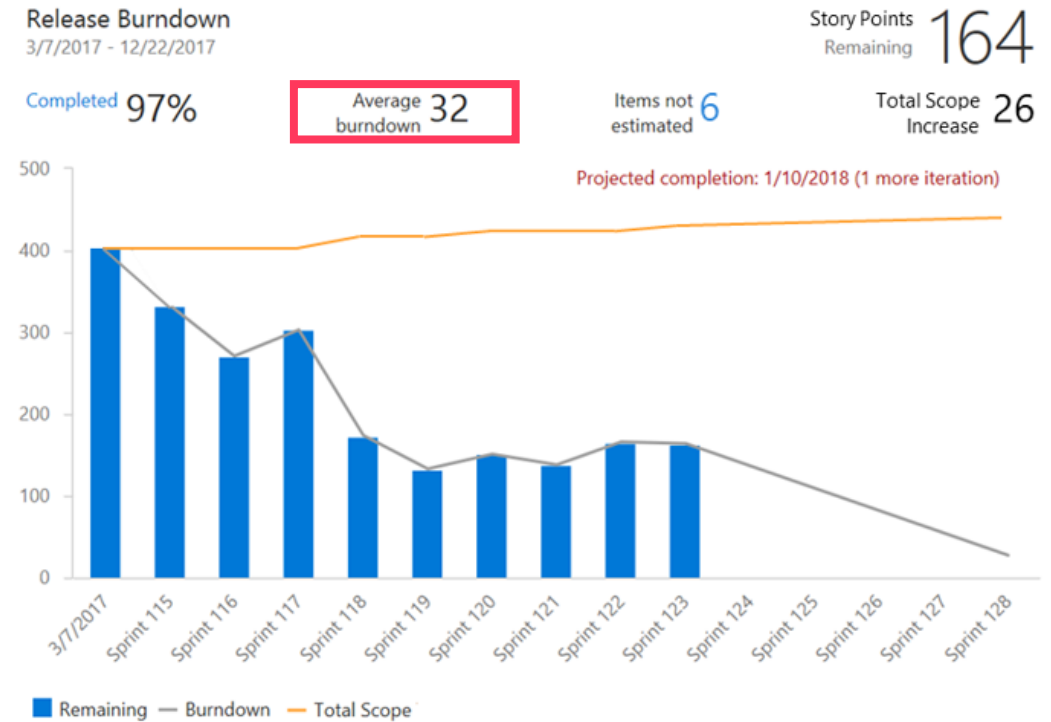
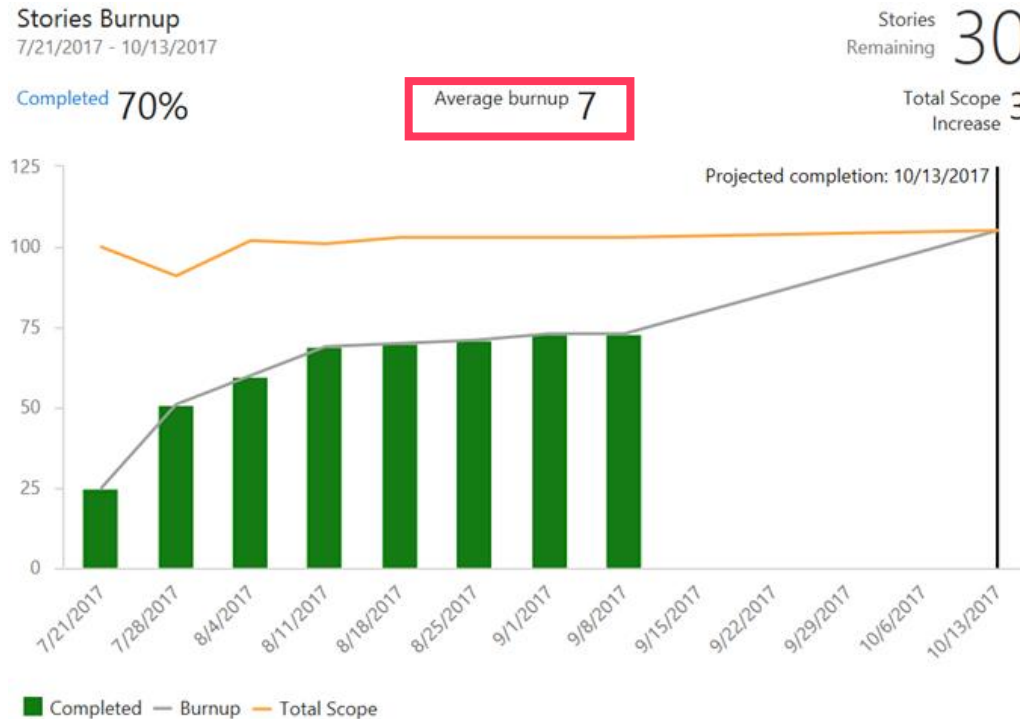
Source: [Microsoft - Configure a Burndown or Burnup widget](#)

These charts lie by **confusing or concealing uncertainty**

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Averages are not the way forward!



Source: [Microsoft - Configure a Burndown or Burnup widget](#)

Plans based on average, fail on average

(Sam L. Savage)

Flaw of averages

What would my
starting salary be?



I'll put it this way
our average starting
salary is \$80,000



you → \$ 30,000

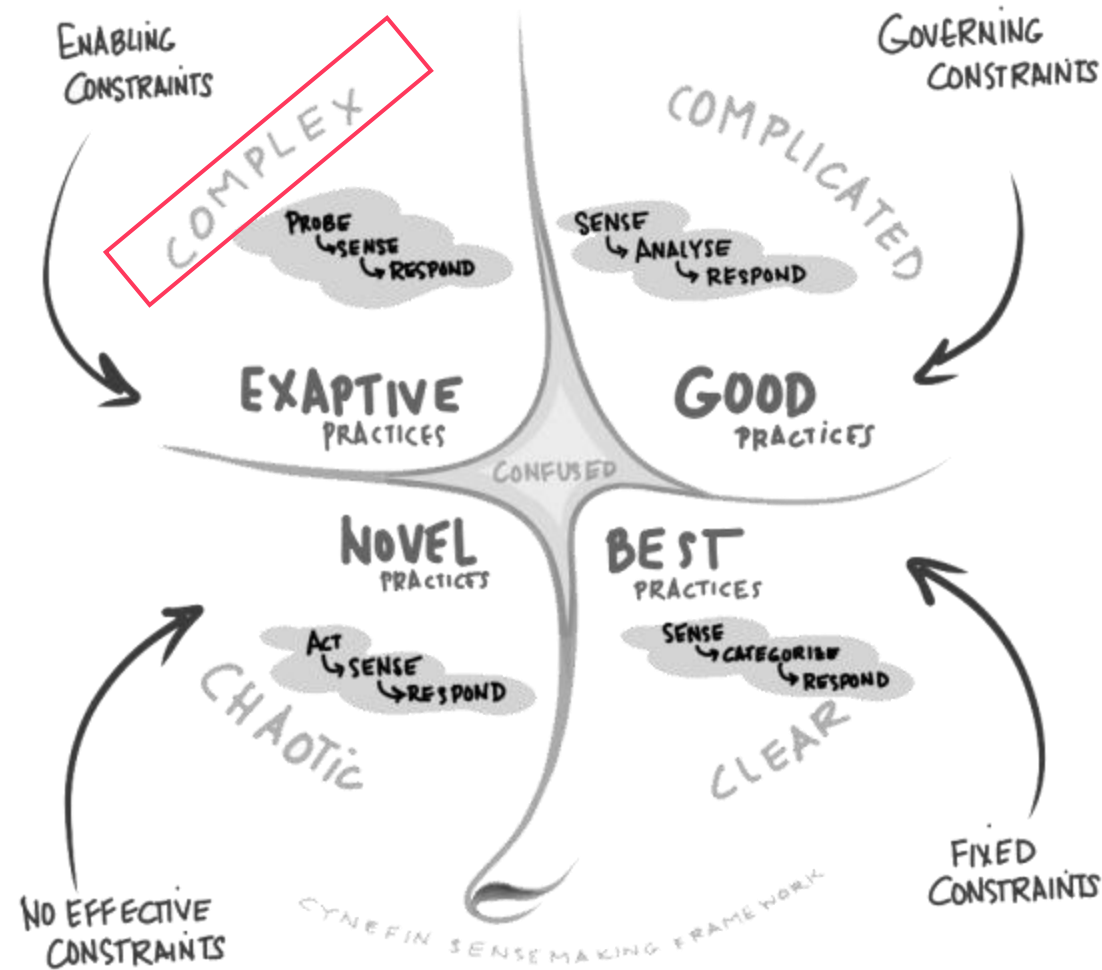
all your coworkers {
\$ 30,000
\$ 30,000
\$ 30,000
\$ 30,000
\$ 30,000
\$ 30,000

CEO's son → \$ 430,000

Average: \$80,000.



Why deterministic estimates simply do not work



Source: [The Cynefin Co – About – Cynefin Framework](#)

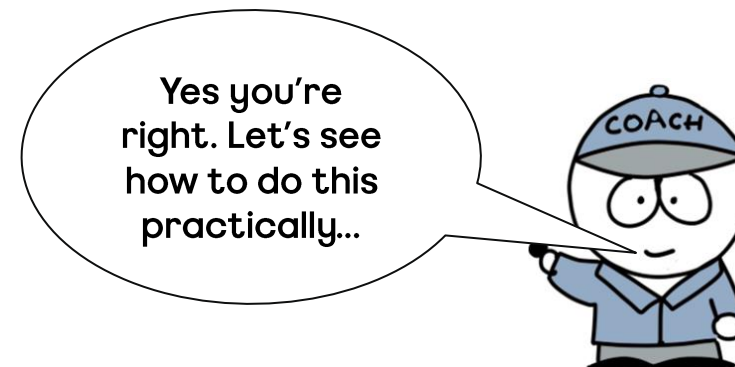
Use ranges not absolutes

Deterministic approach

$$\text{Duration} = \frac{\text{Total Backlog Size (Story Points)}}{\text{Average Velocity}} = \frac{25}{5} = 5 \text{ Weeks}$$

Probabilistic approach

$$\text{Duration} = \frac{\text{Range of Total Backlog Size (Story Count)}}{\text{Range of Historical Throughput}} = \frac{20 - 30}{1 - 5} = 4 - 30 \text{ Weeks}$$



What this means practically

Instead of this:

Total Backlog Size (Sum of Story Points)

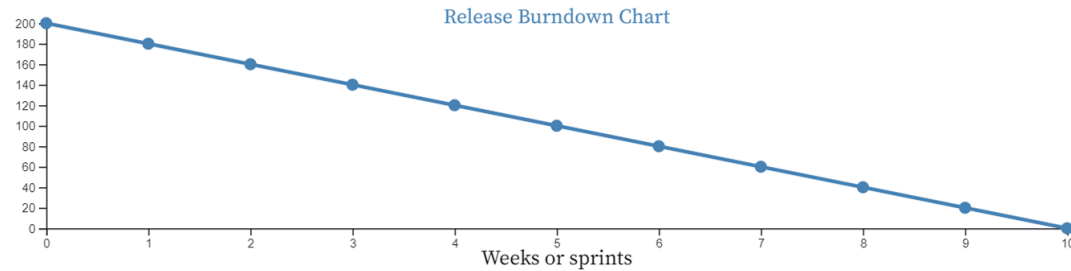
200 points to be completed

The total sum of story points to be completed

Average Velocity

20 average velocity per sprint (or week)

The rate of story points completed on average per sprint or week



We do this:

Total work range

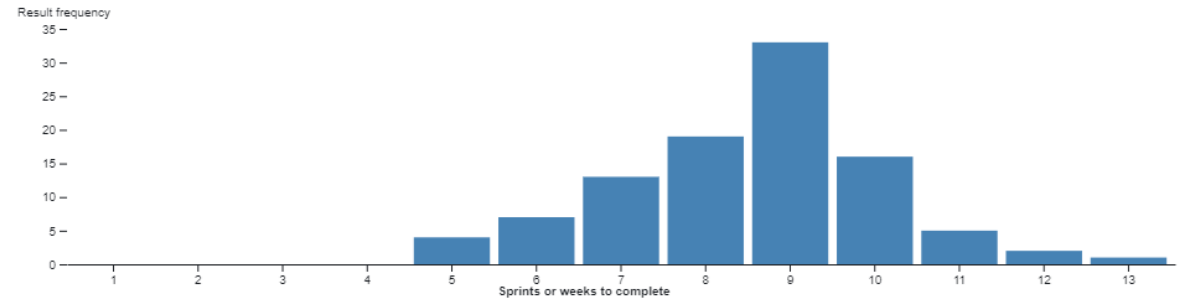
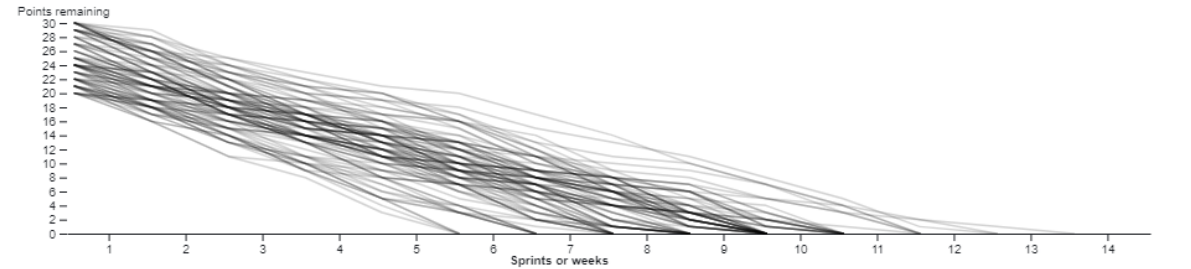
20 points (or stories) ... 30 points (or stories)

The range from lowest to highest of total backlog points or count of stories to be completed

Delivery pace range

1 points (or stories) per sprint ... 5 points (or stories) per sprint

The range from lowest to highest of points or count of stories completed per sprint or week



Show first 100 burndown Monte Carlo trials

The total sum of backlog points or count of stories to be completed

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Source: [Troy Magennis – Introduction to Monte Carlo Forecasting](#)

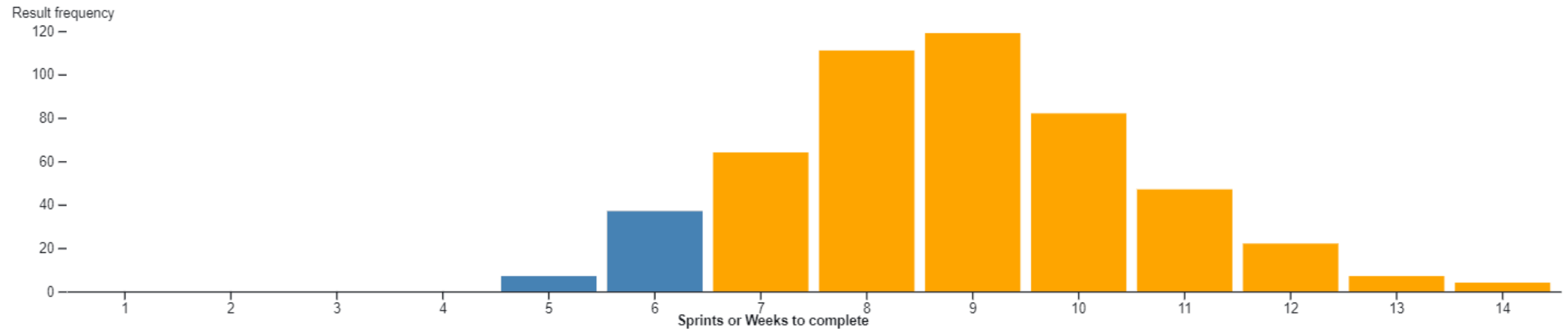
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Making uncertainty clear

Outcome Probability Percentage

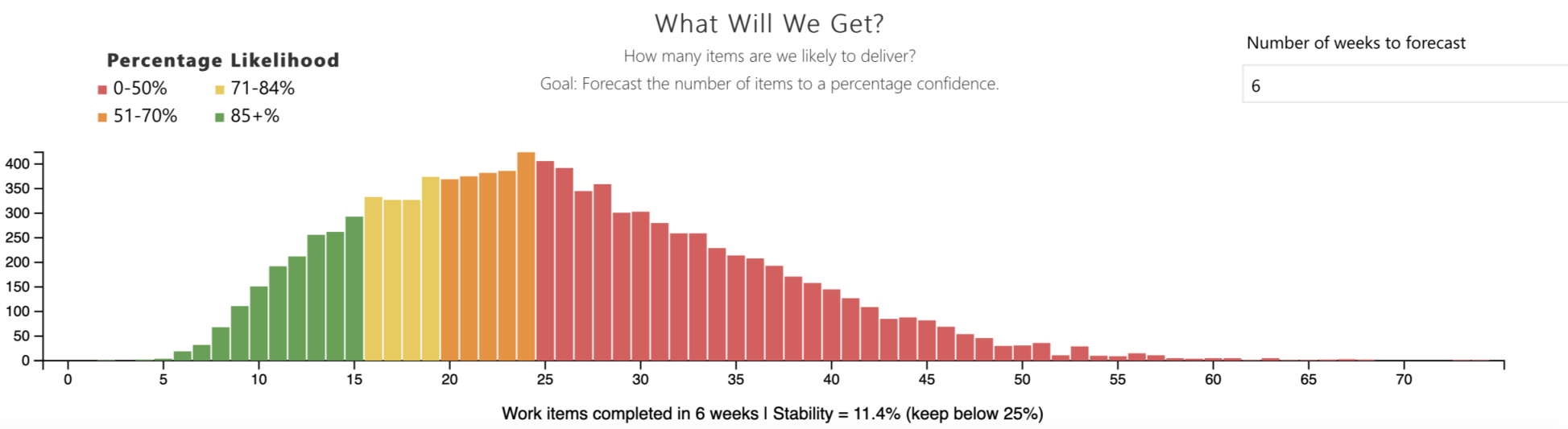


How confident do you want the duration answer to be? Higher = more certain (pessimistic) - Blue = percentage likelihood in Sprints or Weeks to complete

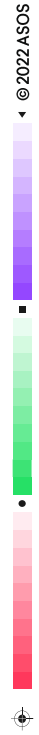


Source: [Troy Magennis – Introduction to Monte Carlo Forecasting](#)

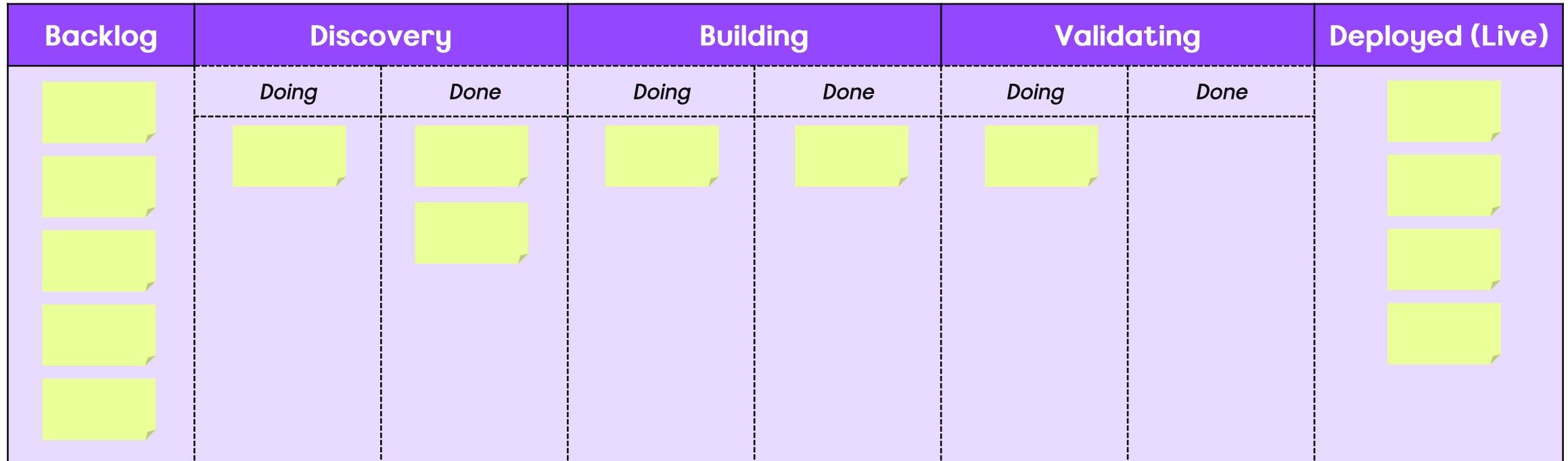
What you should use - probabilistic forecasts make uncertainty transparent



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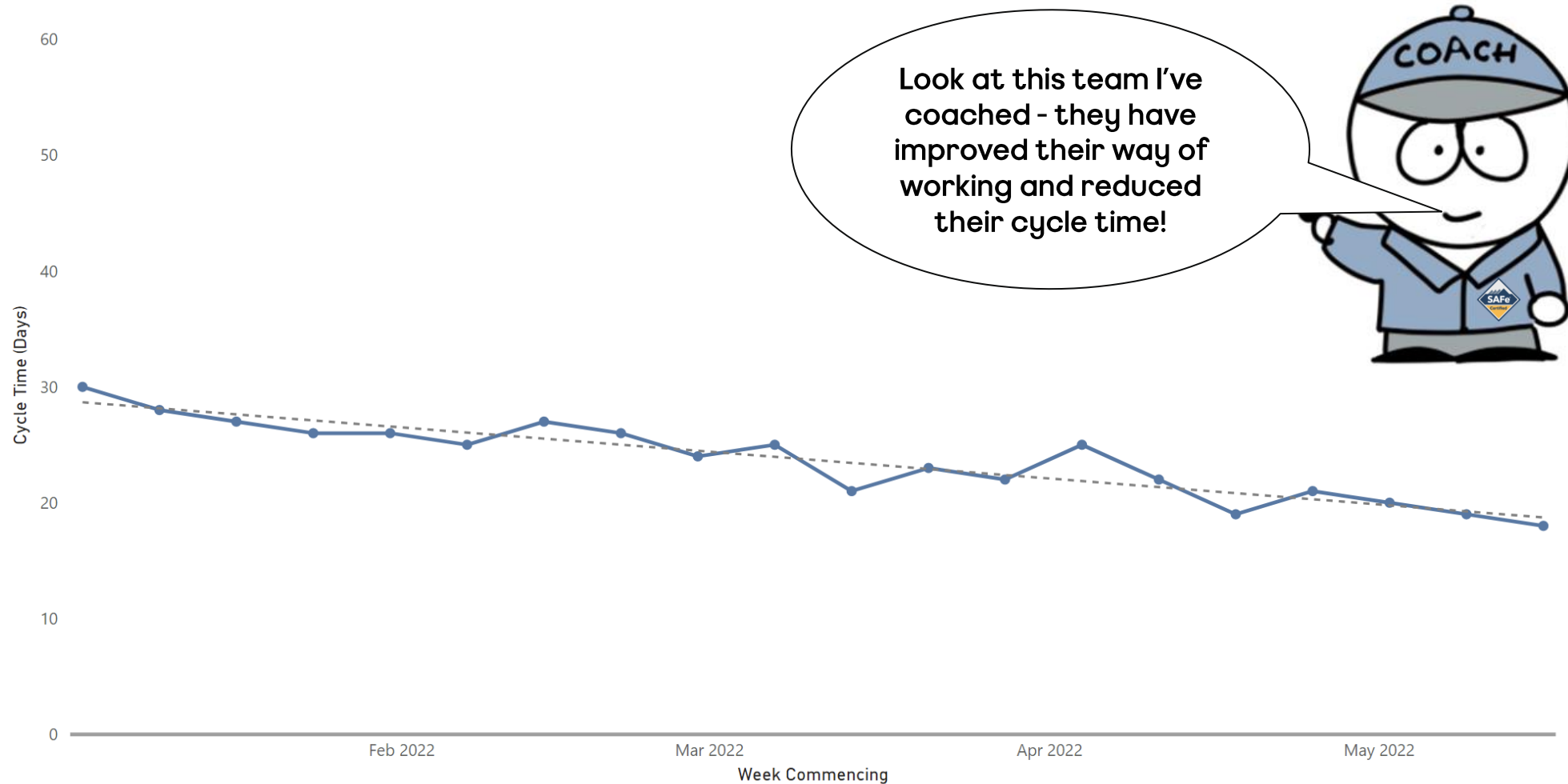


Every ~~Scrum~~ Masters Agile Coaches favourite chart metric!



Cycle Time - the amount of elapsed time (in calendar days) between when an item started and when an item finished.

Average (Median) Cycle Time per Week

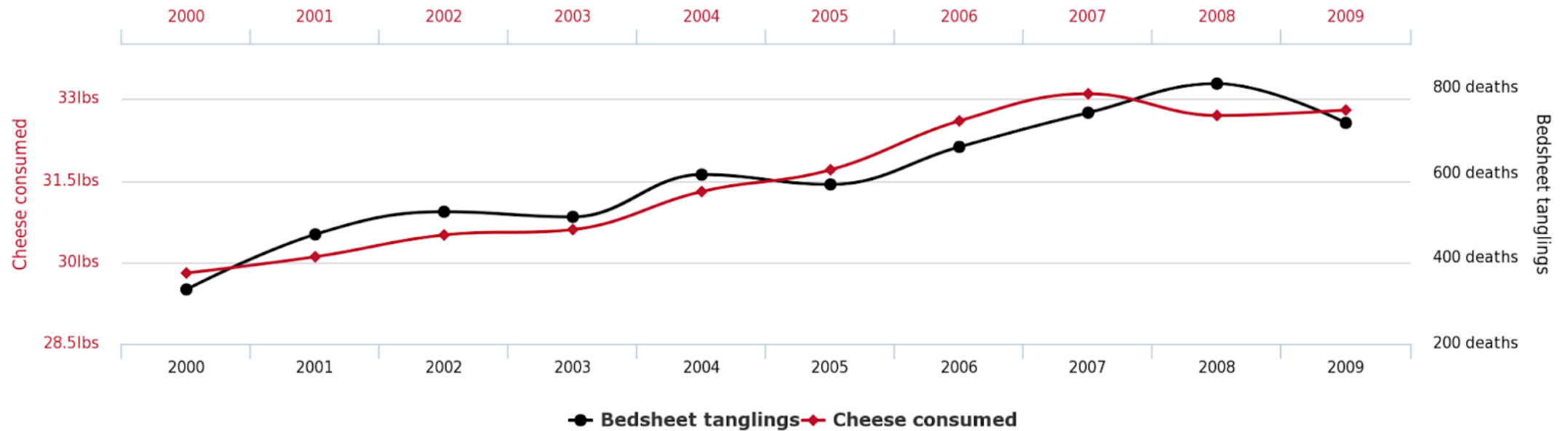


Correlation $\neq$ Causation

Per capita cheese consumption

correlates with

Number of people who died by becoming tangled in their bedsheets



tylervigen.com

Source: [Spurious Correlations – Tyler Vigen](#)

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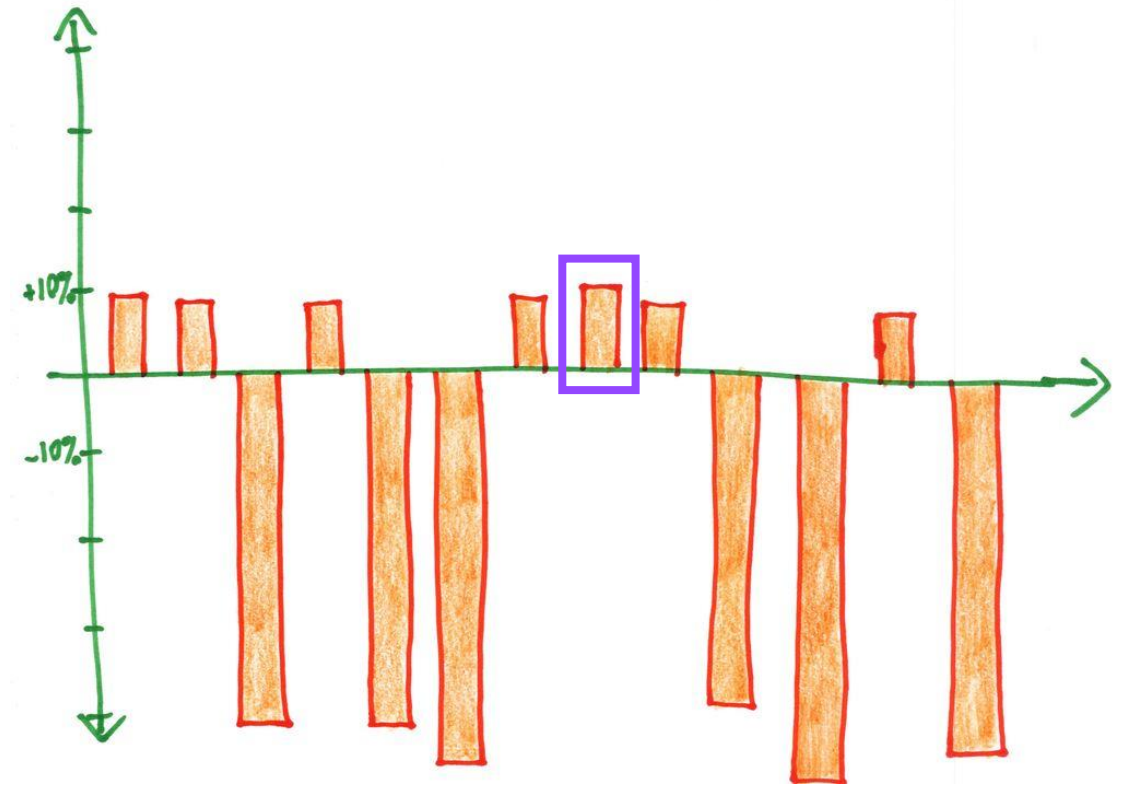
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Be careful when using median

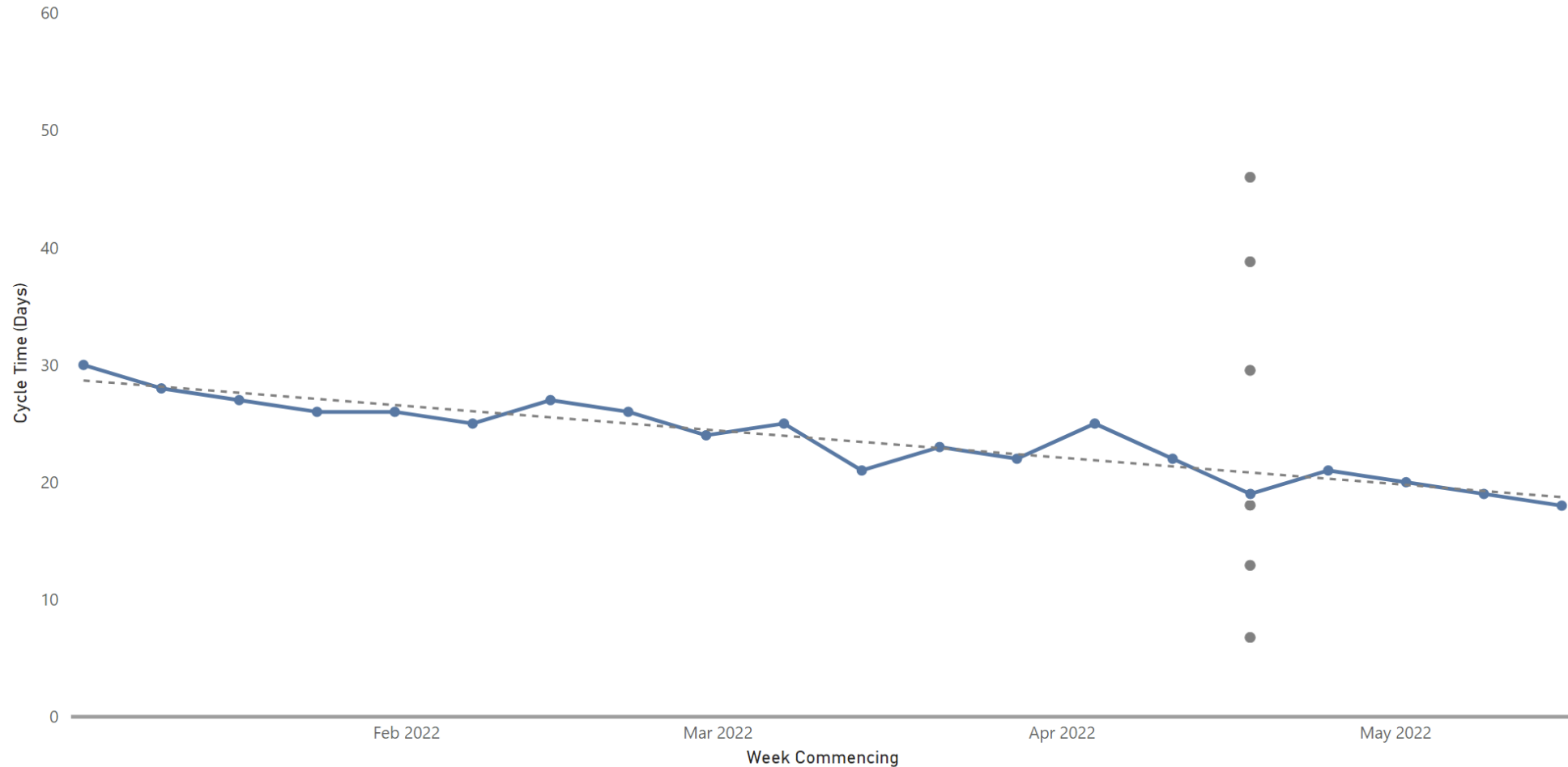
So, why should I
invest with you?



Well, not to brag, but
my fund has a median
gain of 8% per year!



Average (Median) Cycle Time per Week

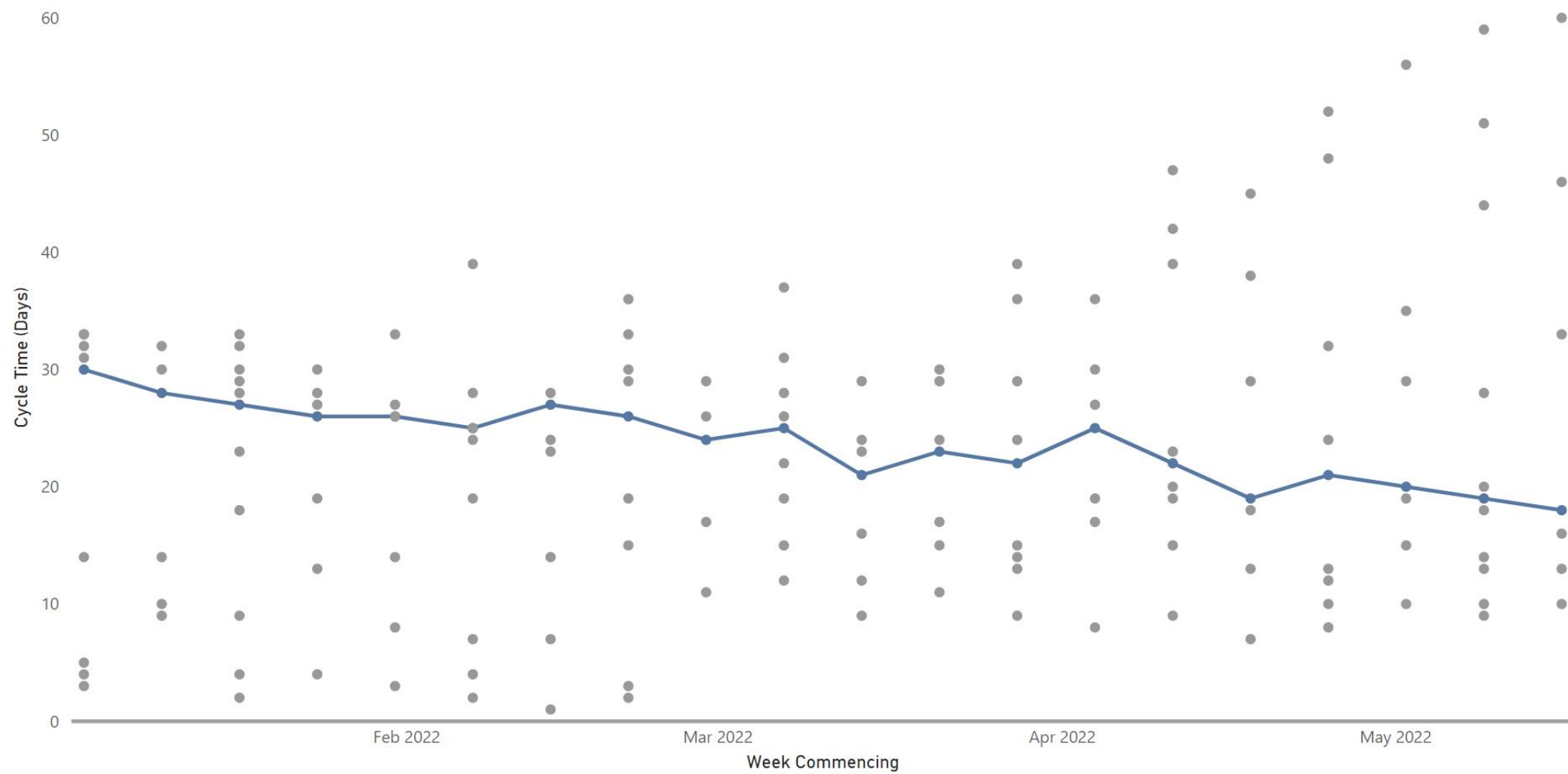


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This chart lies by suggesting misleading patterns

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The full dataset

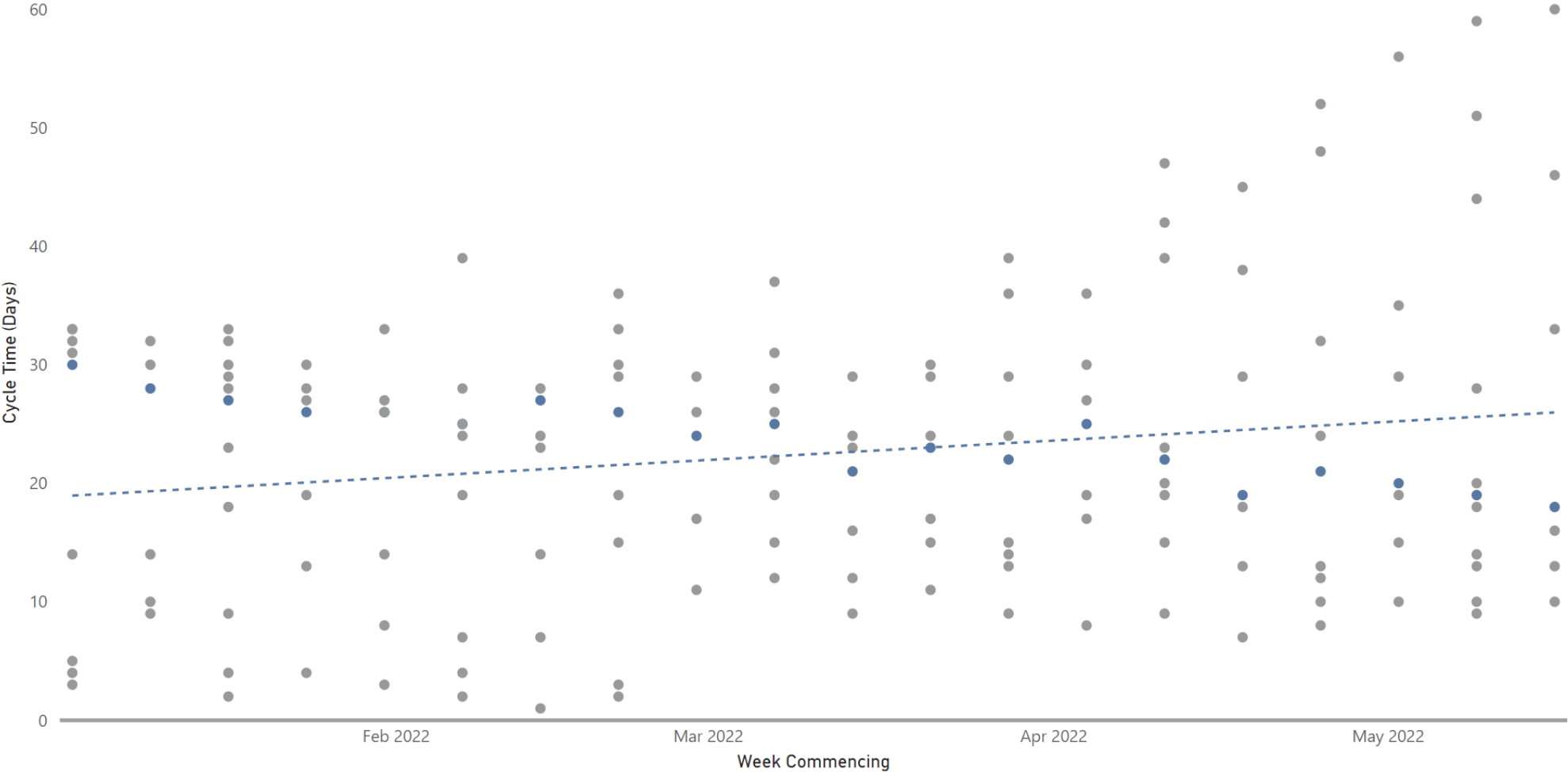


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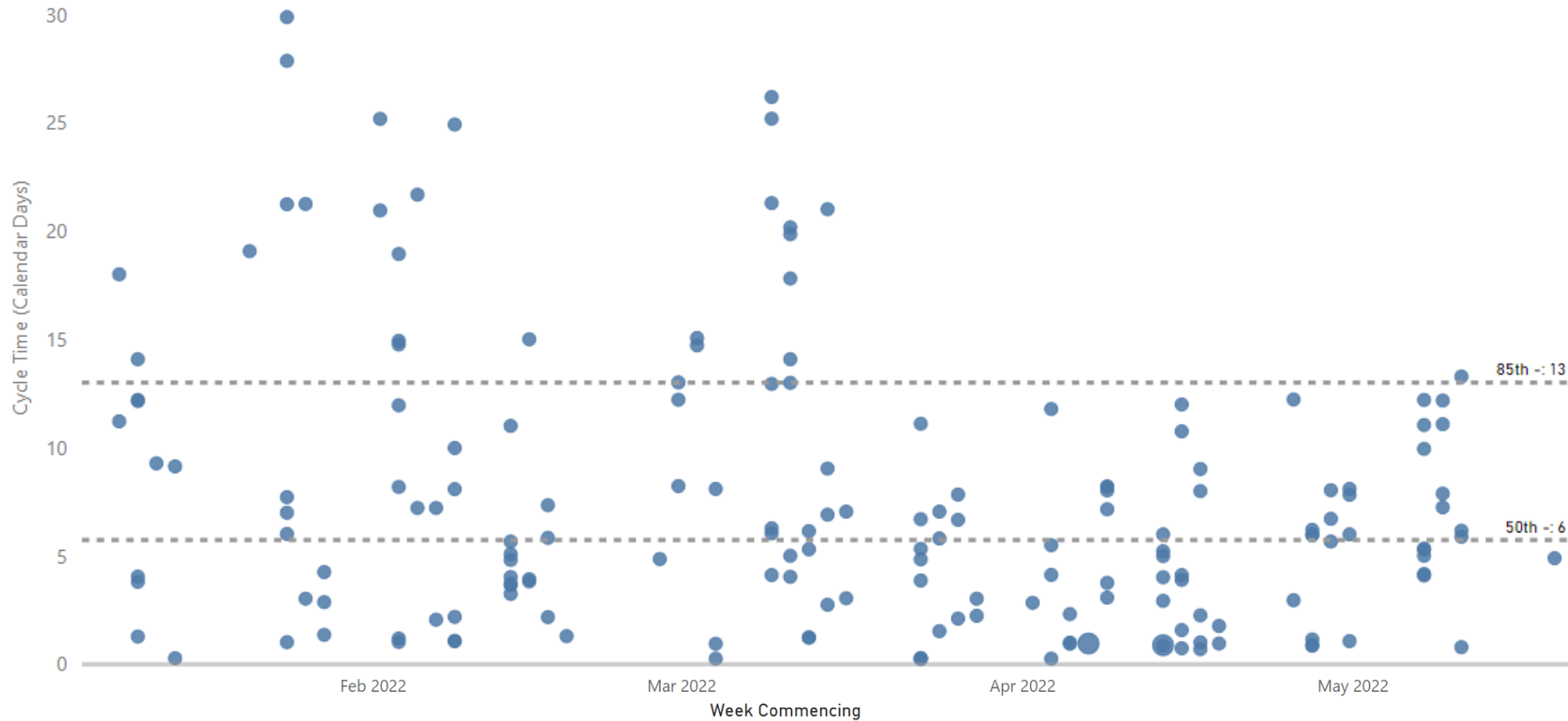
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Cycle time is increasing!

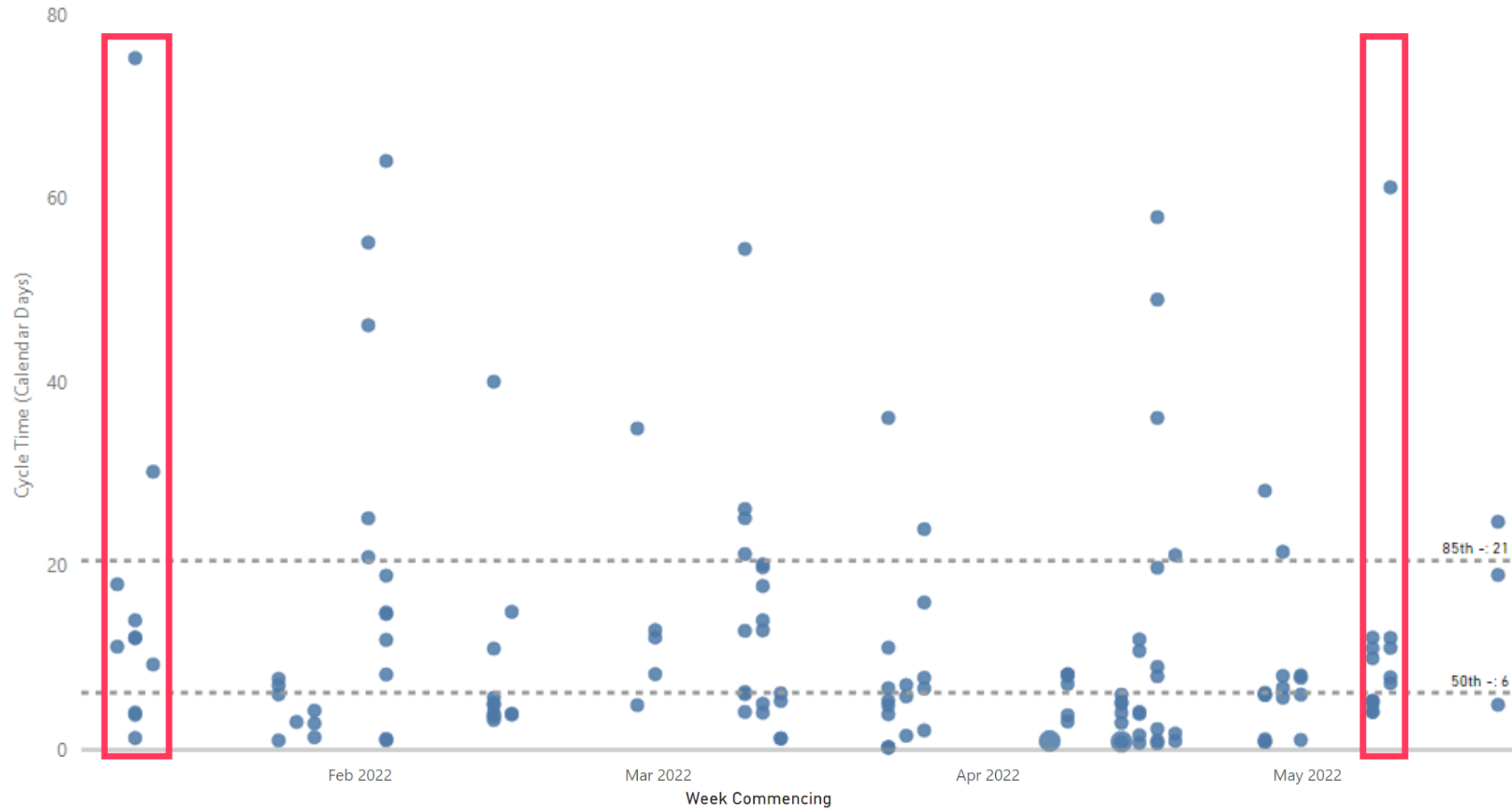


What you should use – Cycle Time Scatter Plot



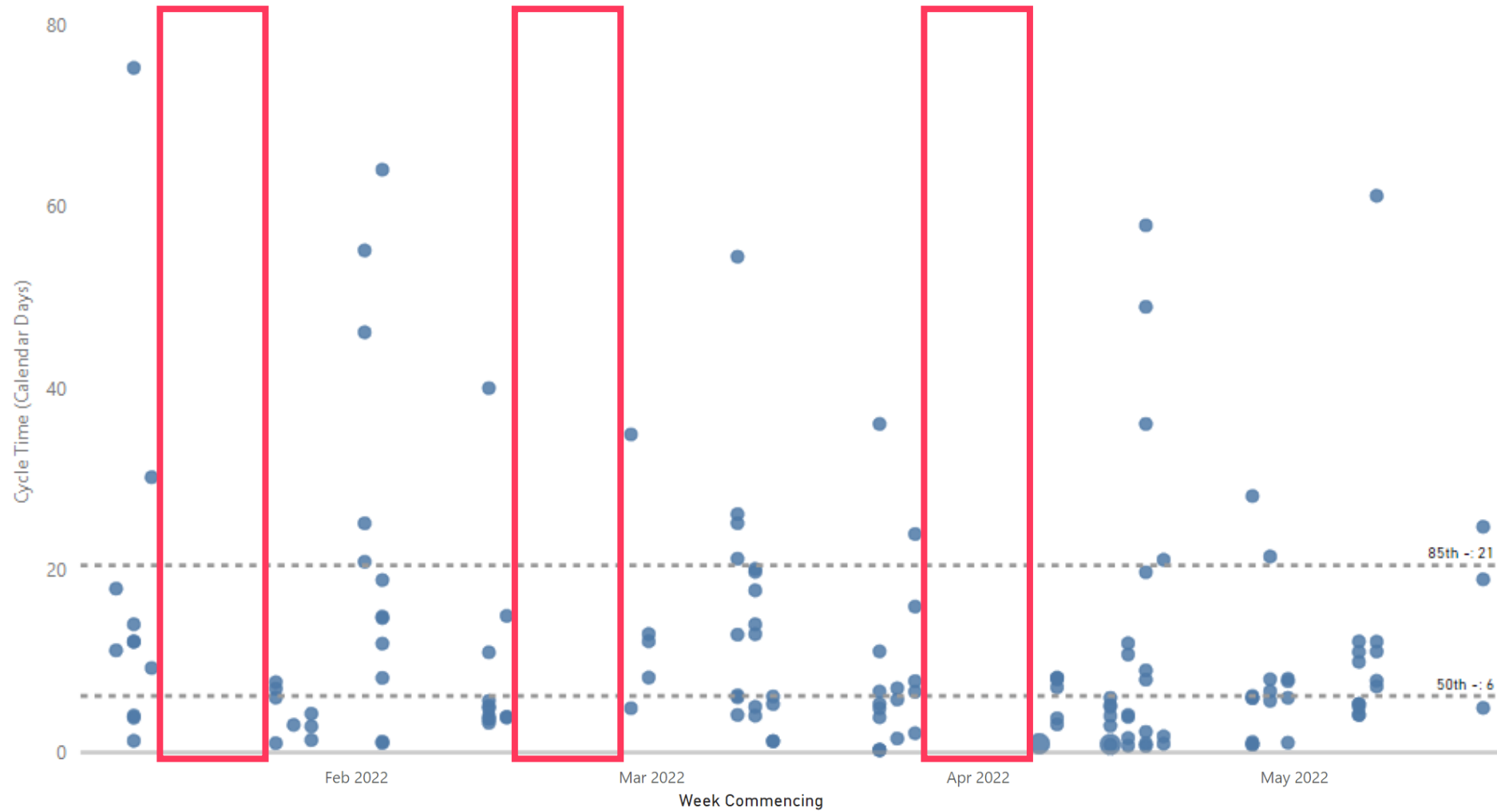
#agilecam
@nbrown02

Cycle time patterns to look out for – clusters



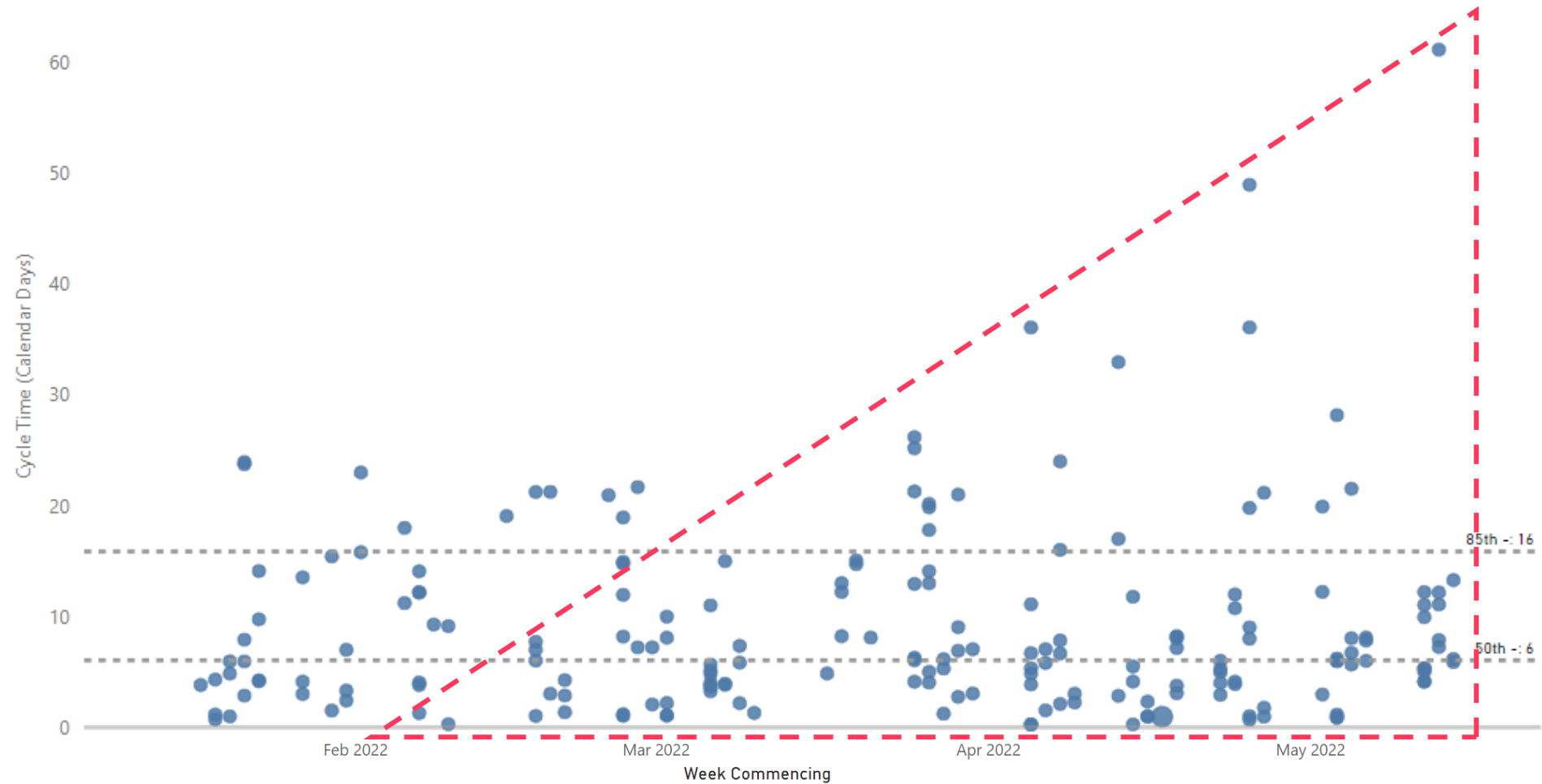
#agilecam
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Cycle time patterns to look out for – gaps



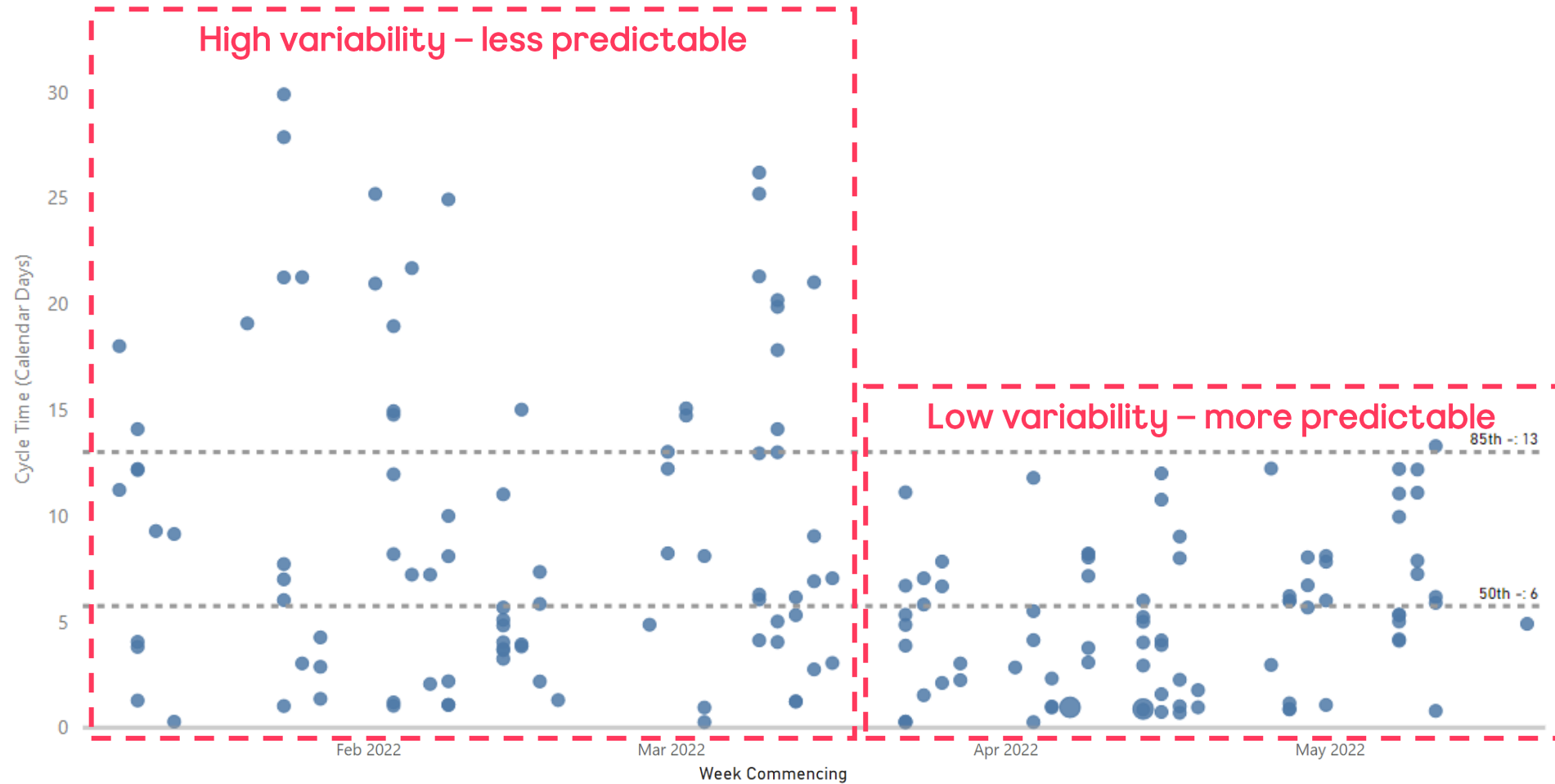
#agilecam
@nbrown02

Cycle time patterns to look out for – the triangle



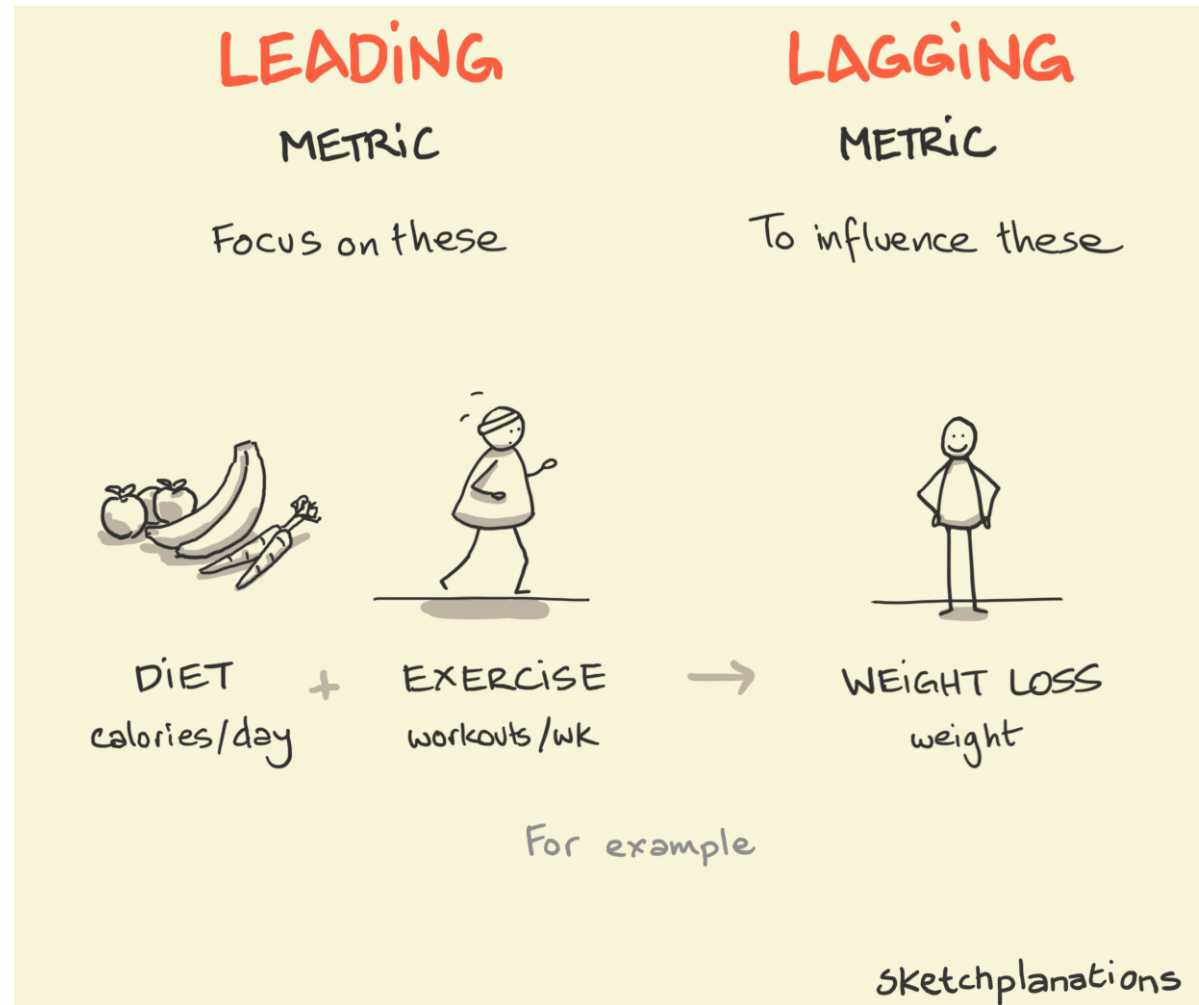
#agilecam
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Cycle time patterns to look out for – variability

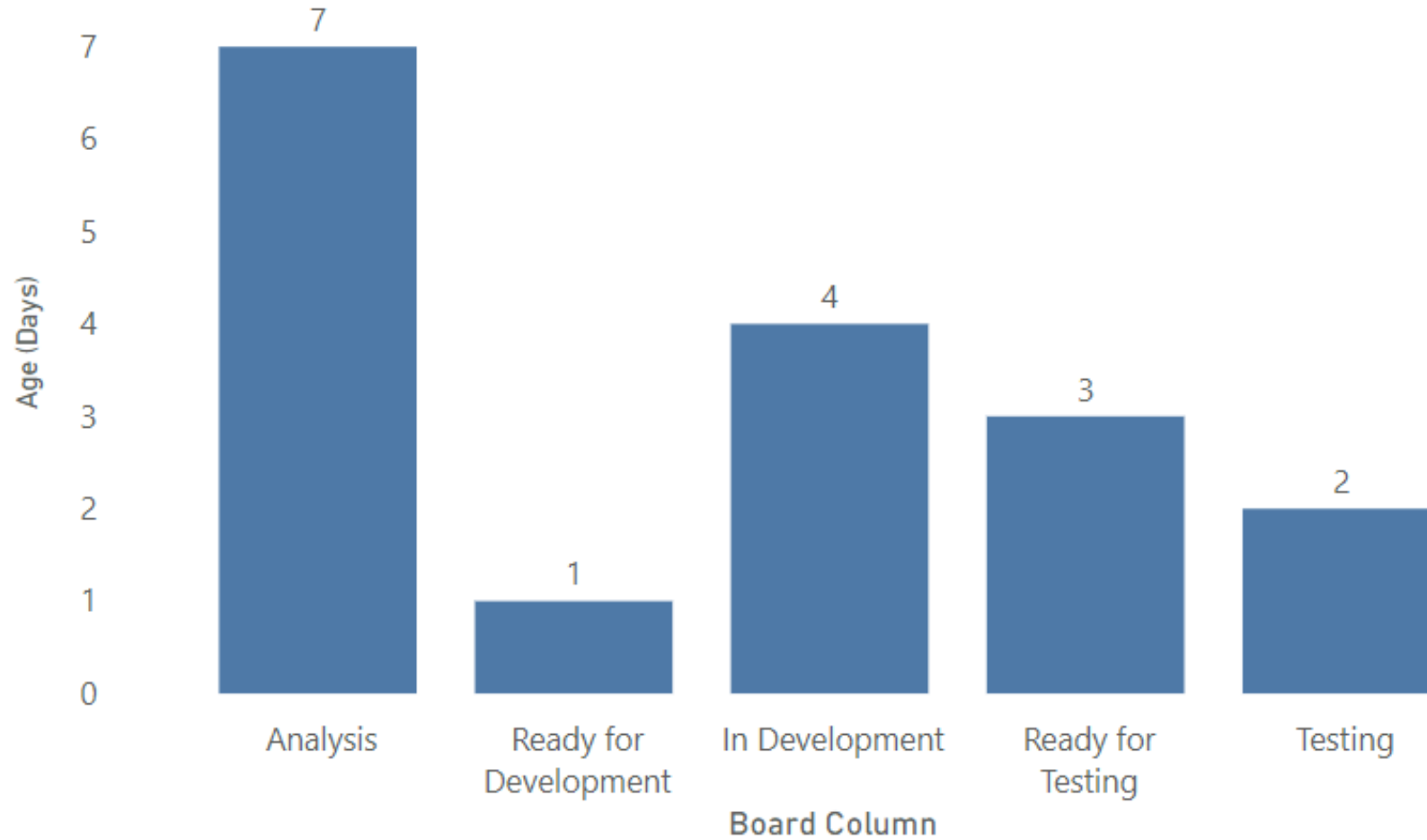


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Leading and lagging metrics

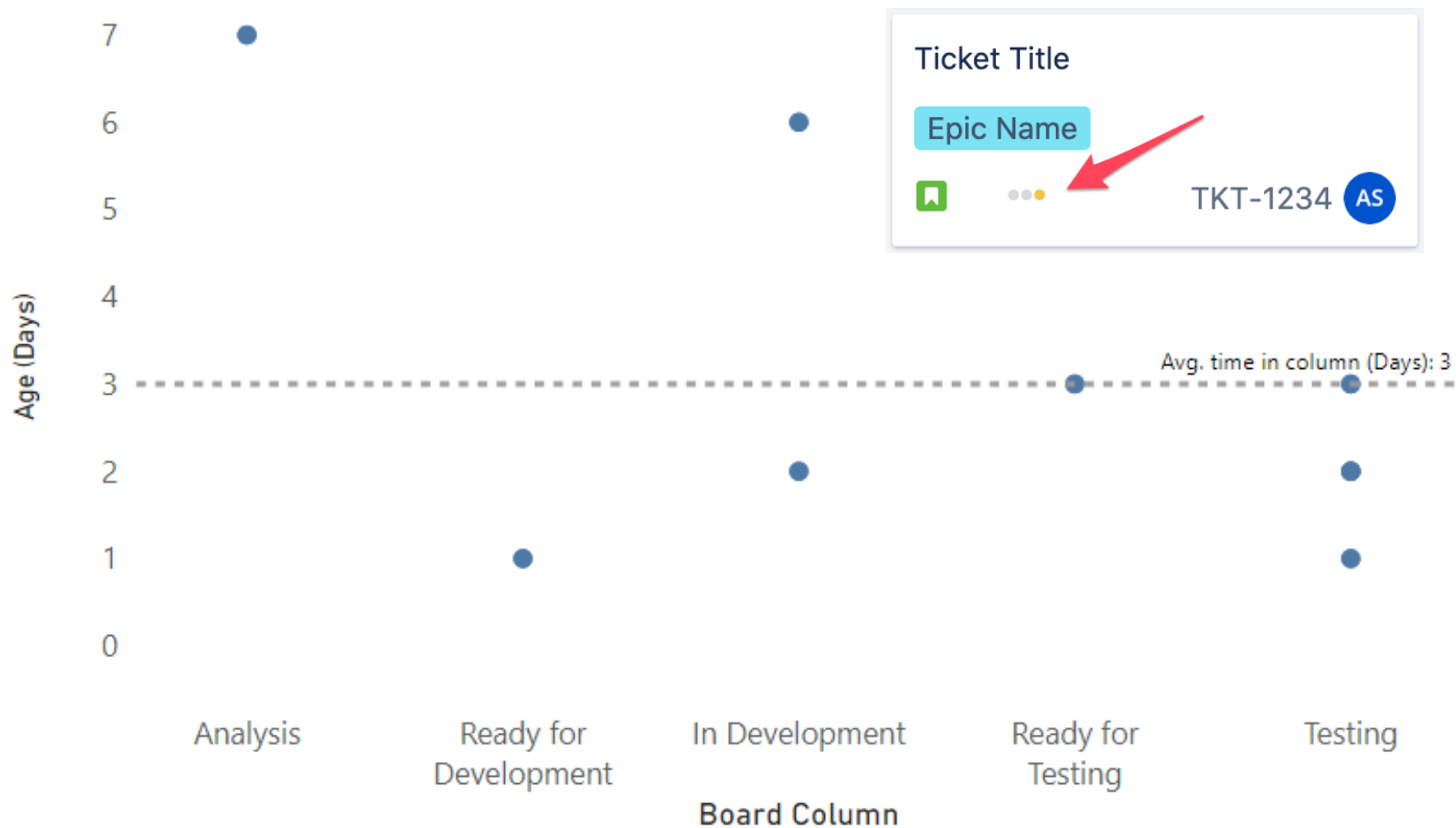


Average time in status (days)



This chart lies by displaying insufficient data

Time in status (days)

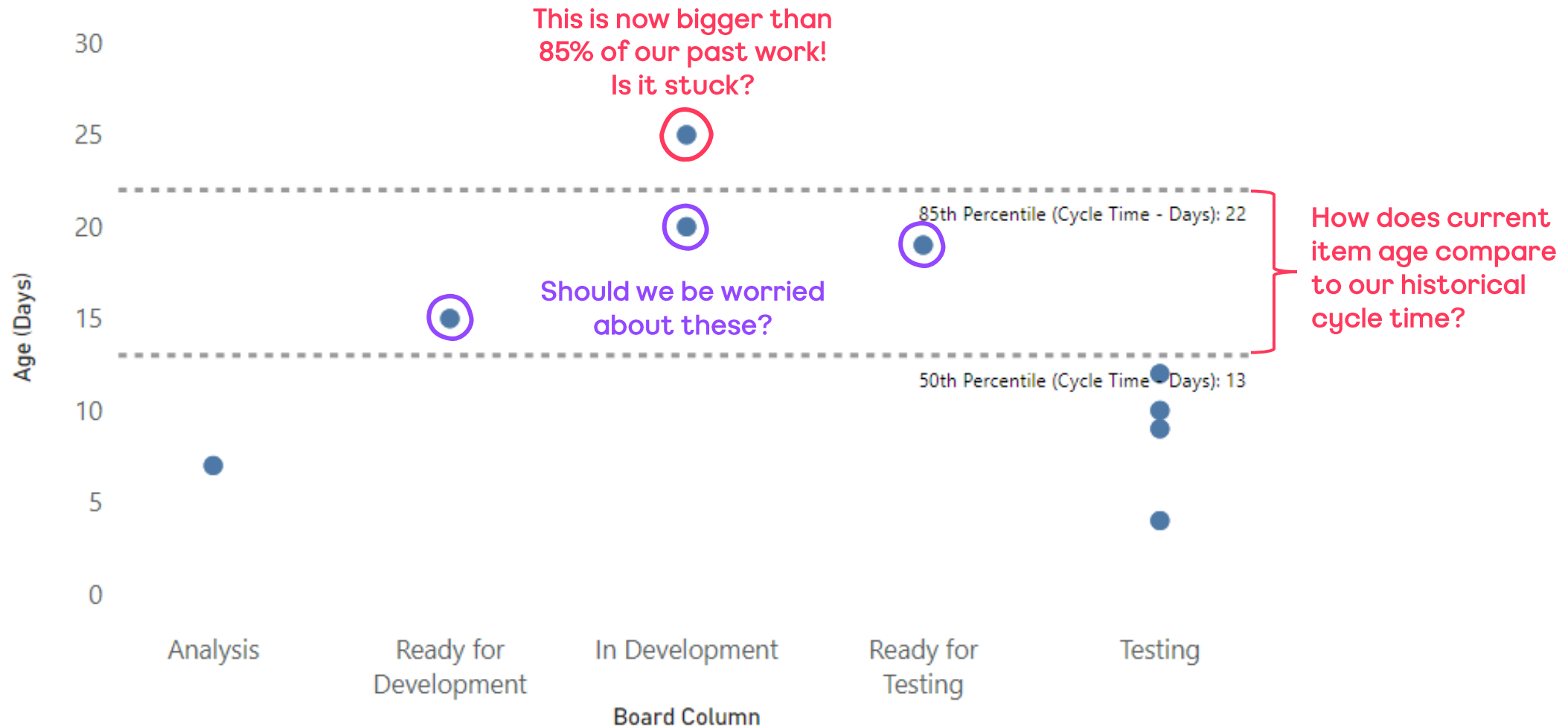


This chart lies by displaying insufficient data

This chart lies by displaying insufficient data



What you should use – work item age chart



Summary

How to avoid lying with (agile) charts



Metrics enable

Conversations amongst teams



Better charts

Enable better conversations



Avoid using averages

For forecasts, watch out using them for trends



Remember how charts lie

When visualising data and metrics

A chart shows only
what it shows *and*
nothing else

Alberto Cairo