# Using Control Charts to Monitor Quitline Enrollment Trends: A COVID-19 Case Study

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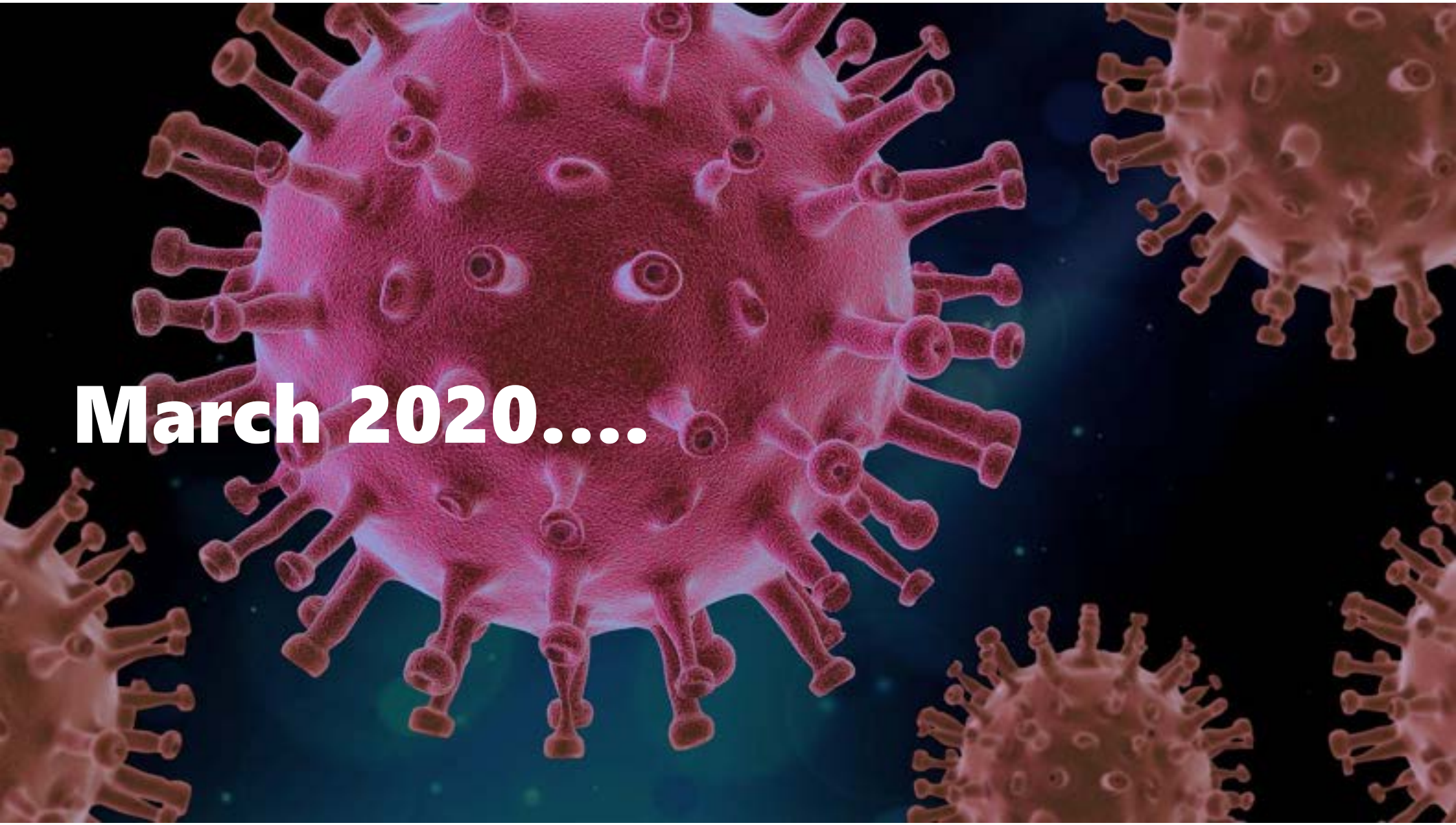
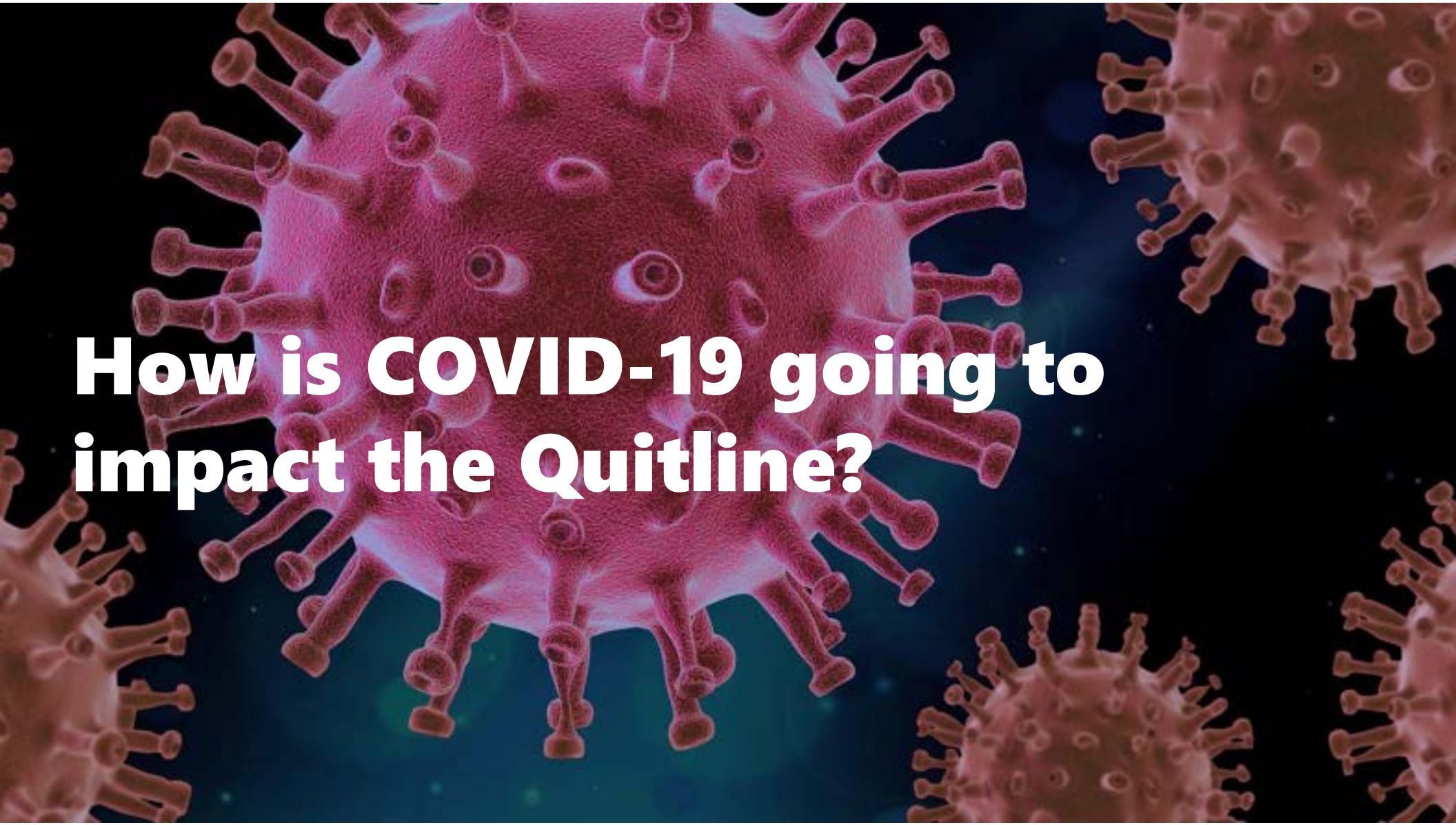
NCTOH 2022

Professional Data Analysts

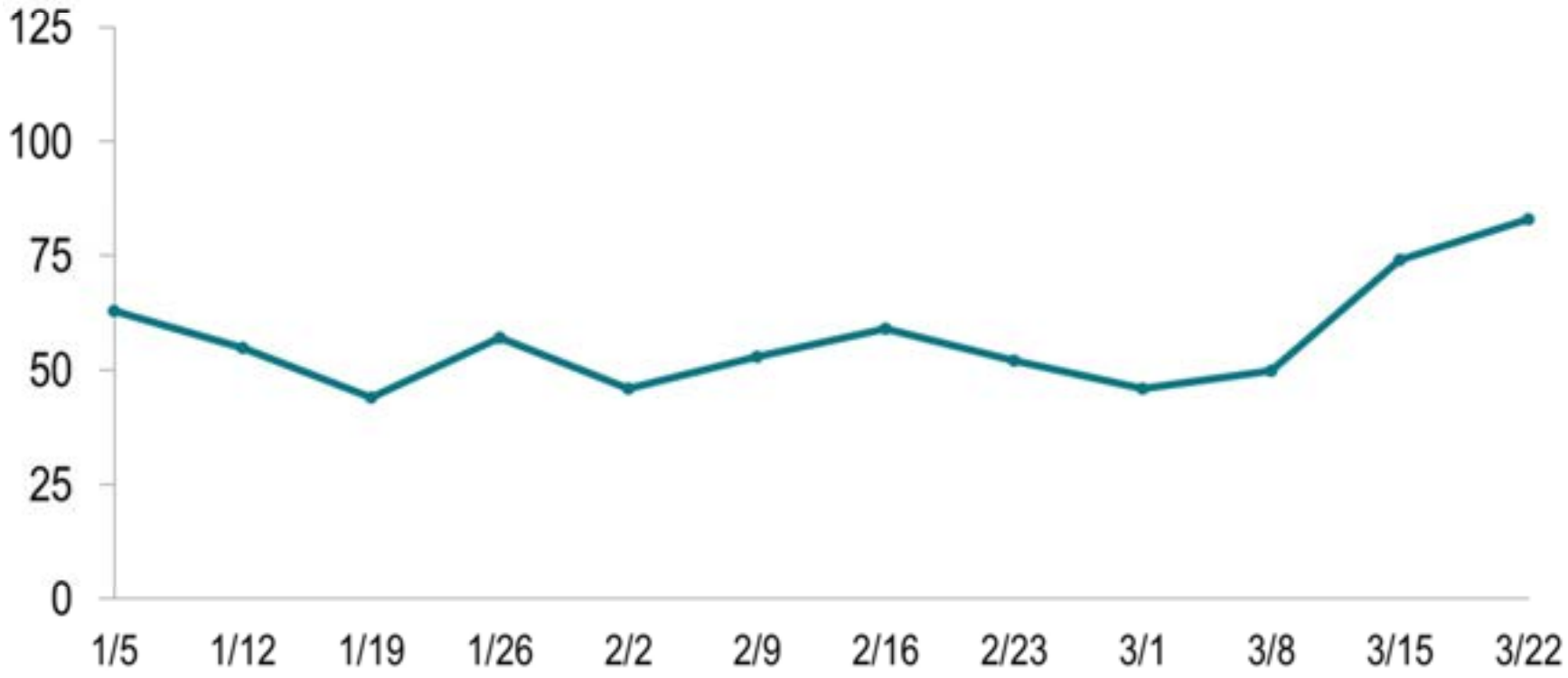
# Thank you to the North Dakota Department of Health Tobacco Prevention and Control Program


March 2020....

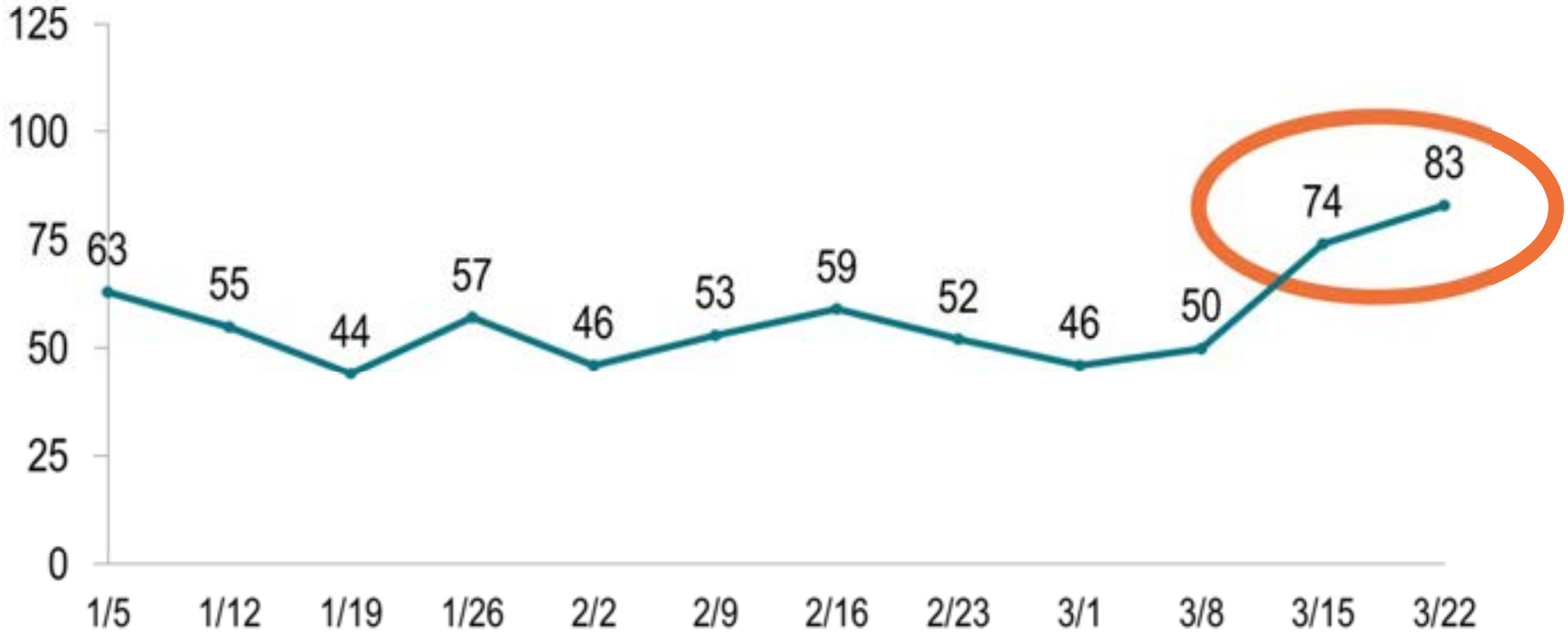

How is COVID-19 going to impact the Quitline?

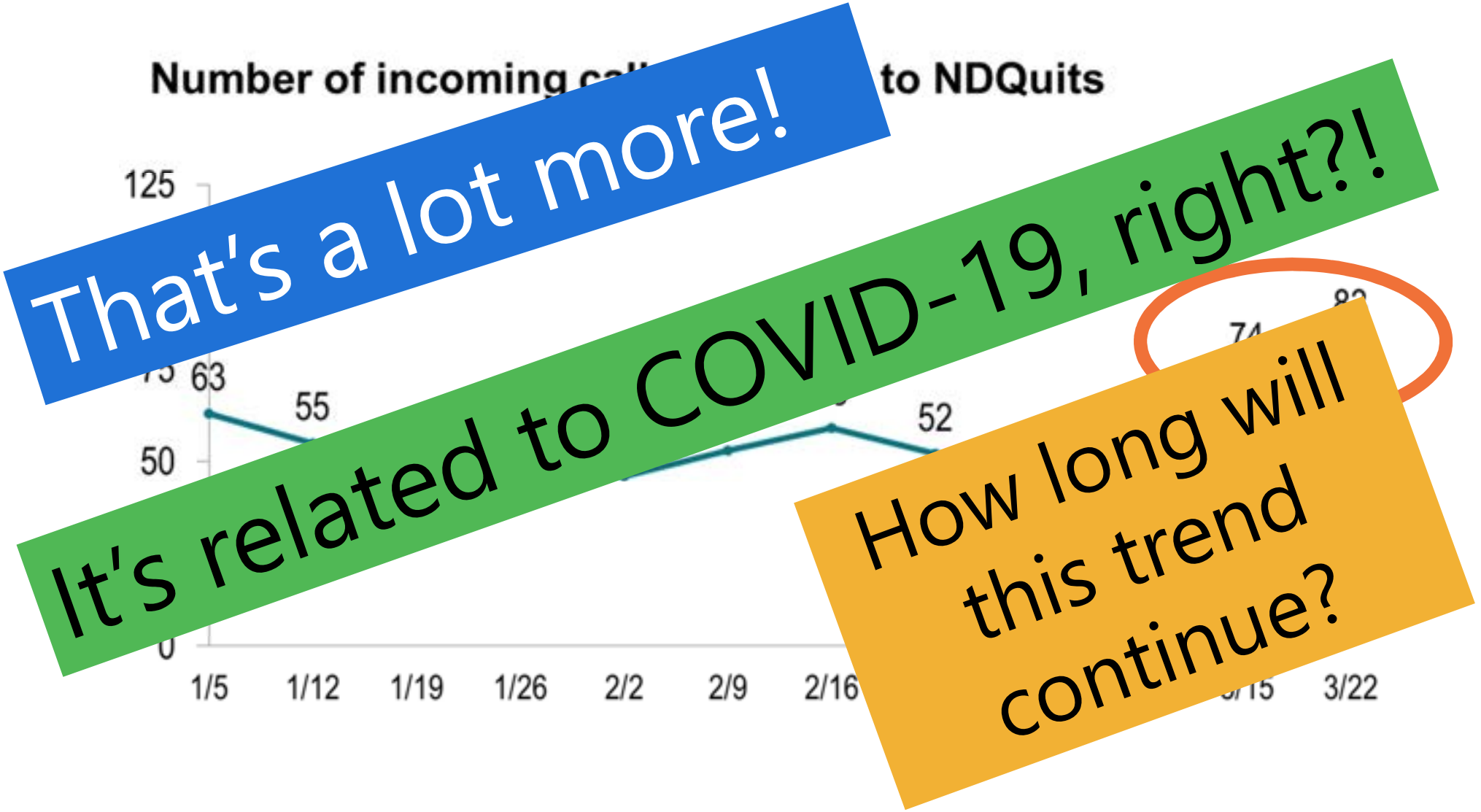
Incoming calls to the Quitline jumped from 50 to 74!

## Number of incoming calls per week to NDQuits



## Number of incoming calls per week to NDQuits




Number of incoming
to NDQuits
125
50
0
63
55
52
74
1/5
1/12
1/19
1/26
2/2
2/9
2/16
3/22
That's a lot more!
It's related to COVID-19, right?!
How long will this trend continue?

# Statistical Process Control (SPC)

# Commute Process

# High-level

Define the steps in your process
Identify a meaningful metric

# High-level

Define the steps in your process
Identify a meaningful metric
Understand the **variation** in that metric

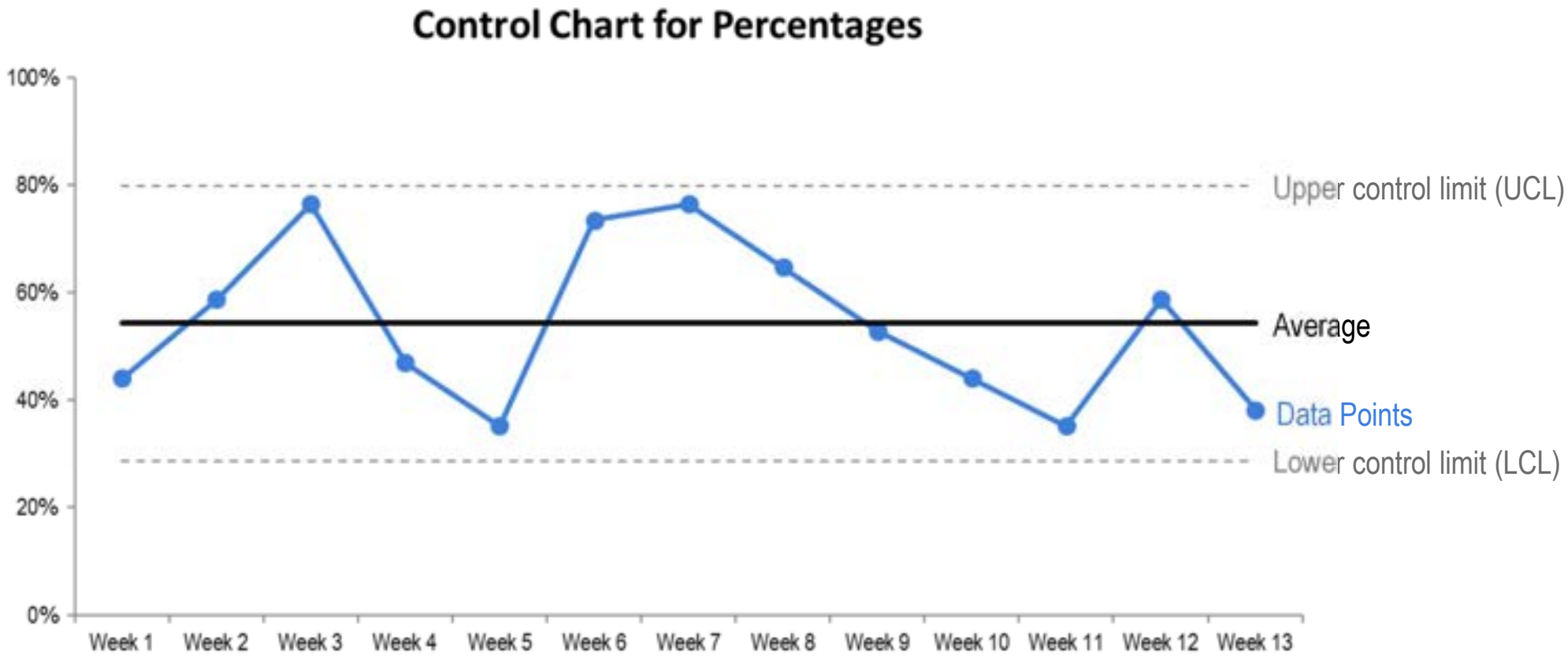
Random

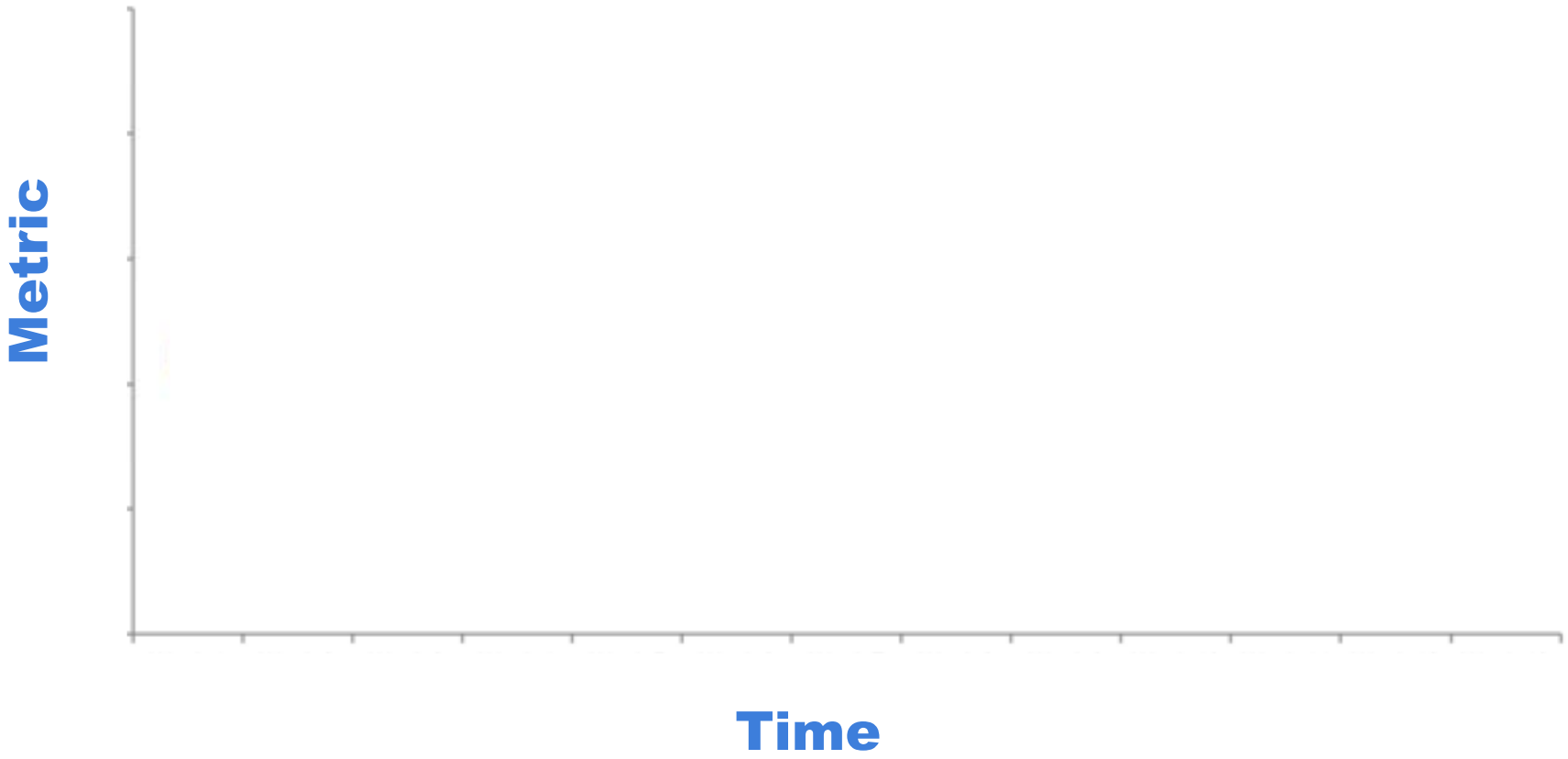
Special cause

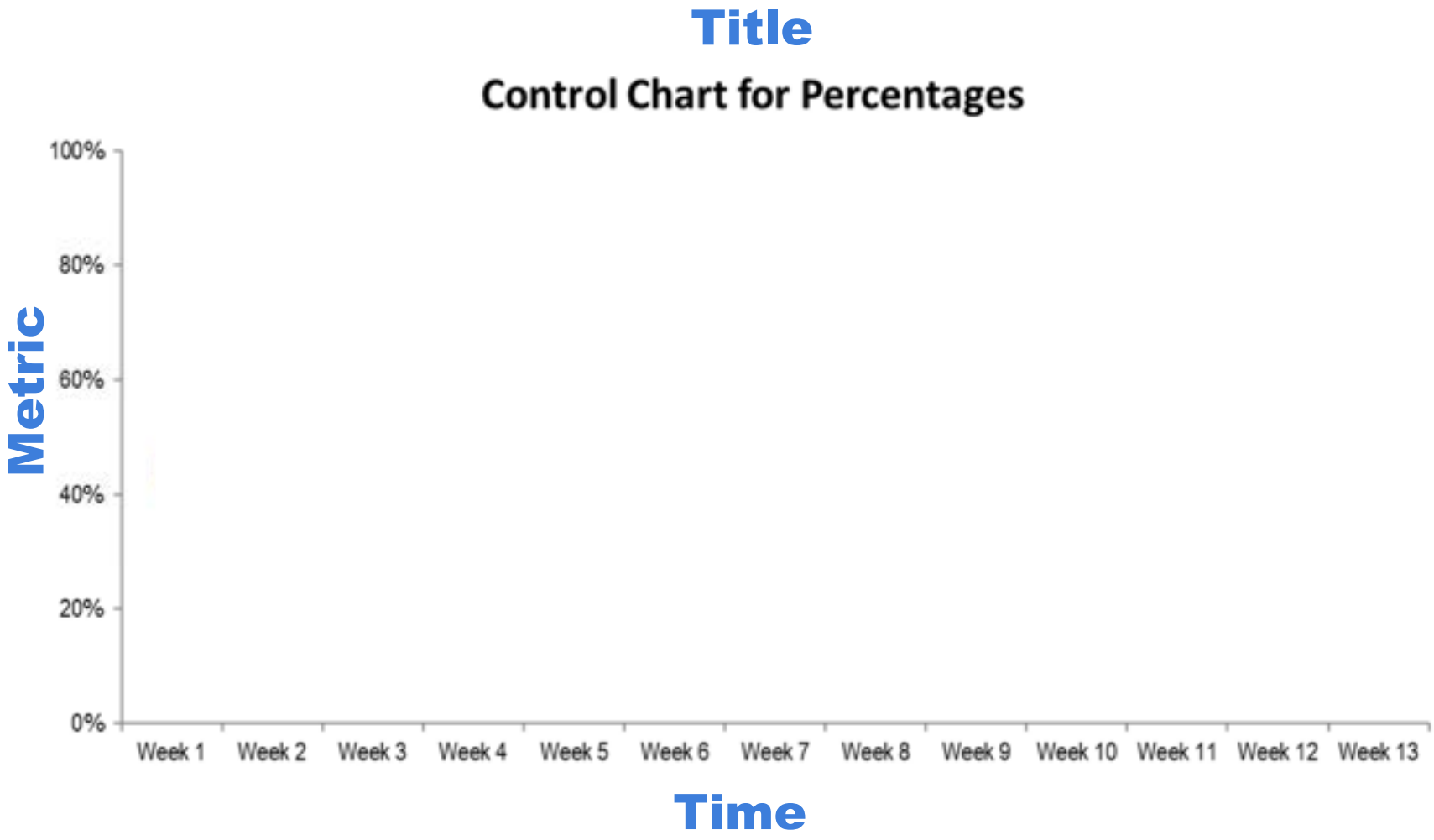
# We want to…

- measure the **extent of the variation**,
- establish to **what degree the variation matters**,
- and **to whom** it matters.

# What is a control chart?


Control Chart for Percentages
100%
80%
60%
40%
20%
0%
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
Week 13
Upper control limit (UCL)
Average
Data Points
Lower control limit (LCL)


Metric
Time


Title
Control Chart for Percentages
100%
80%
60%
40%
20%
0%
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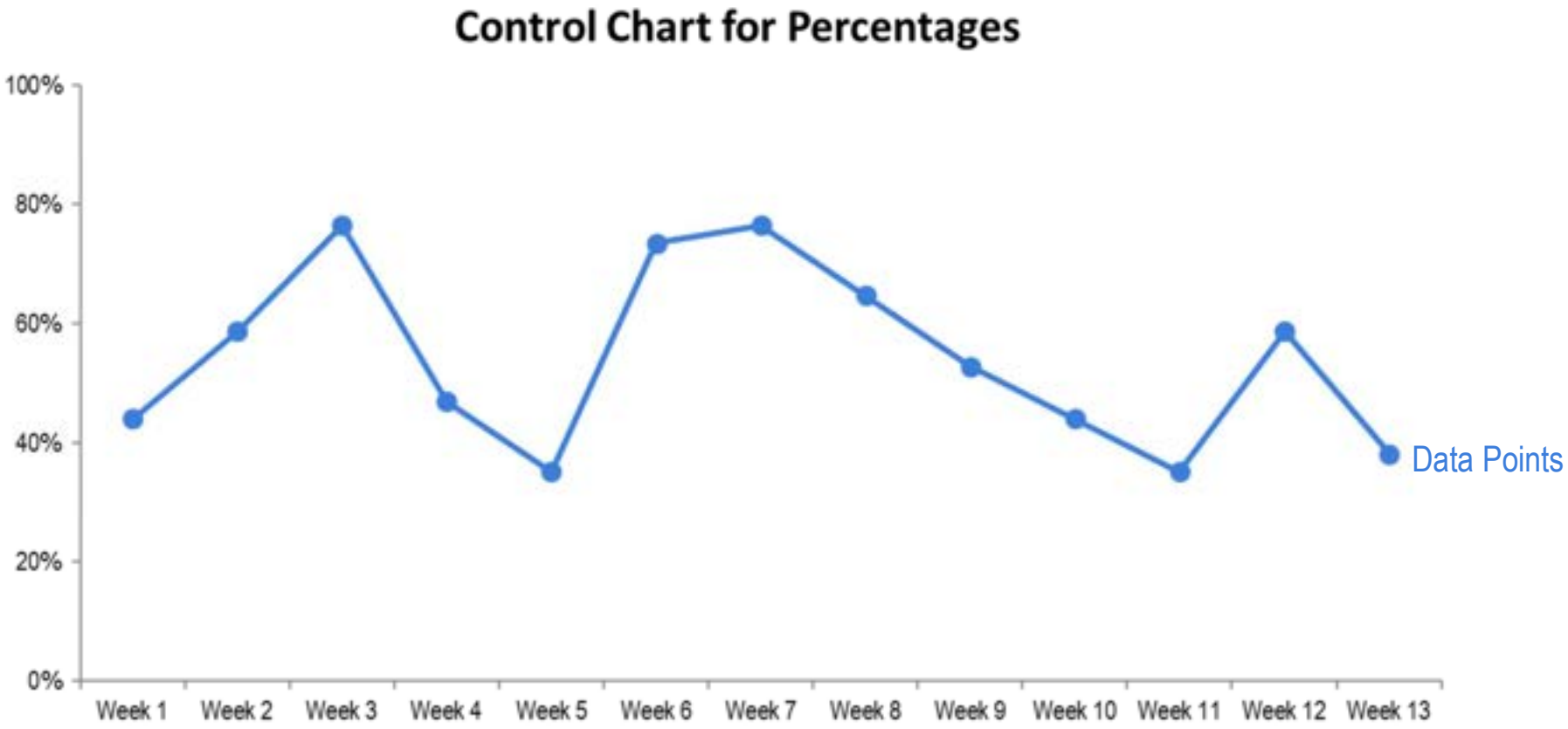
Week 8
Week 9
Week 10
Week 11
Week 12
Week 13
Time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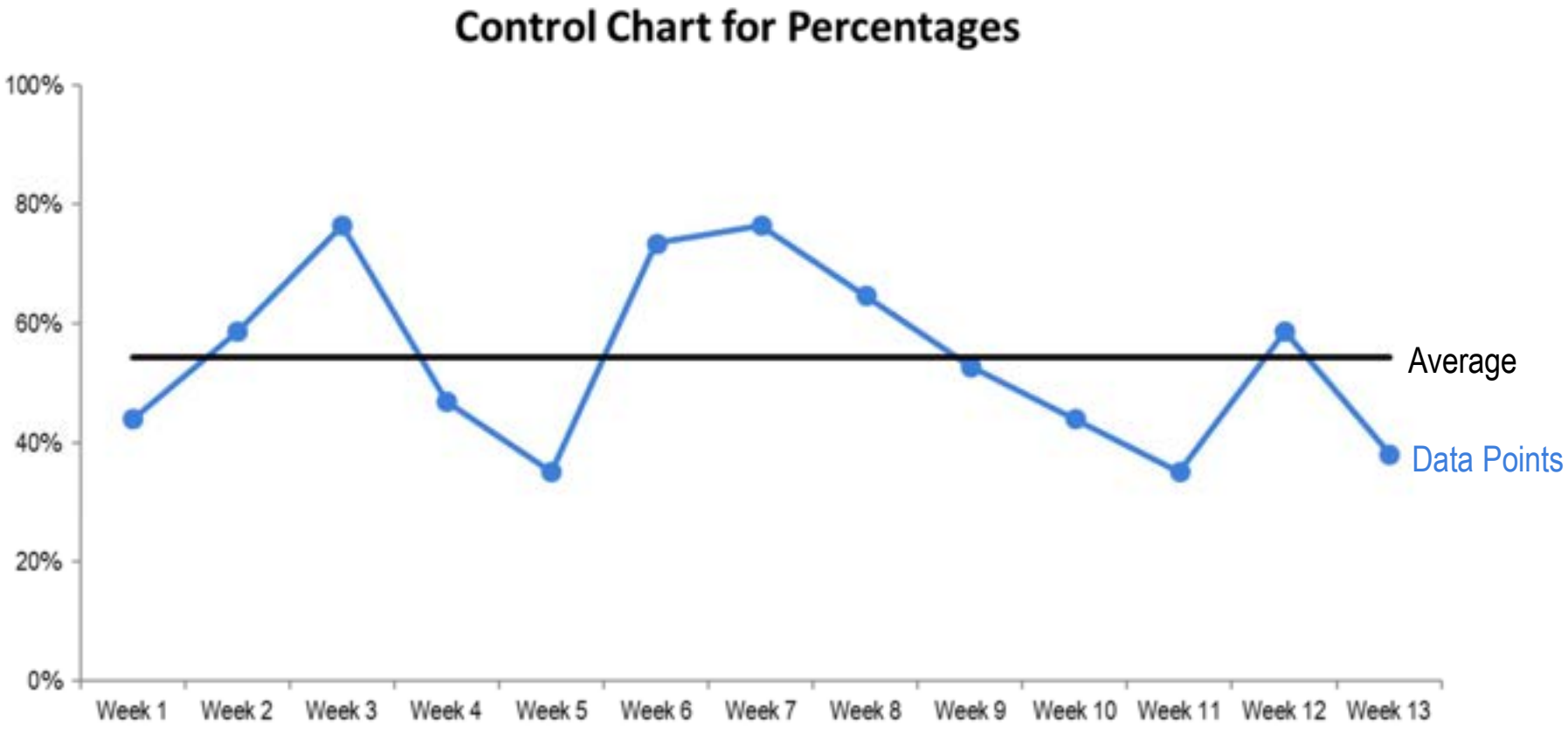
Week 12
Week 13
Data Points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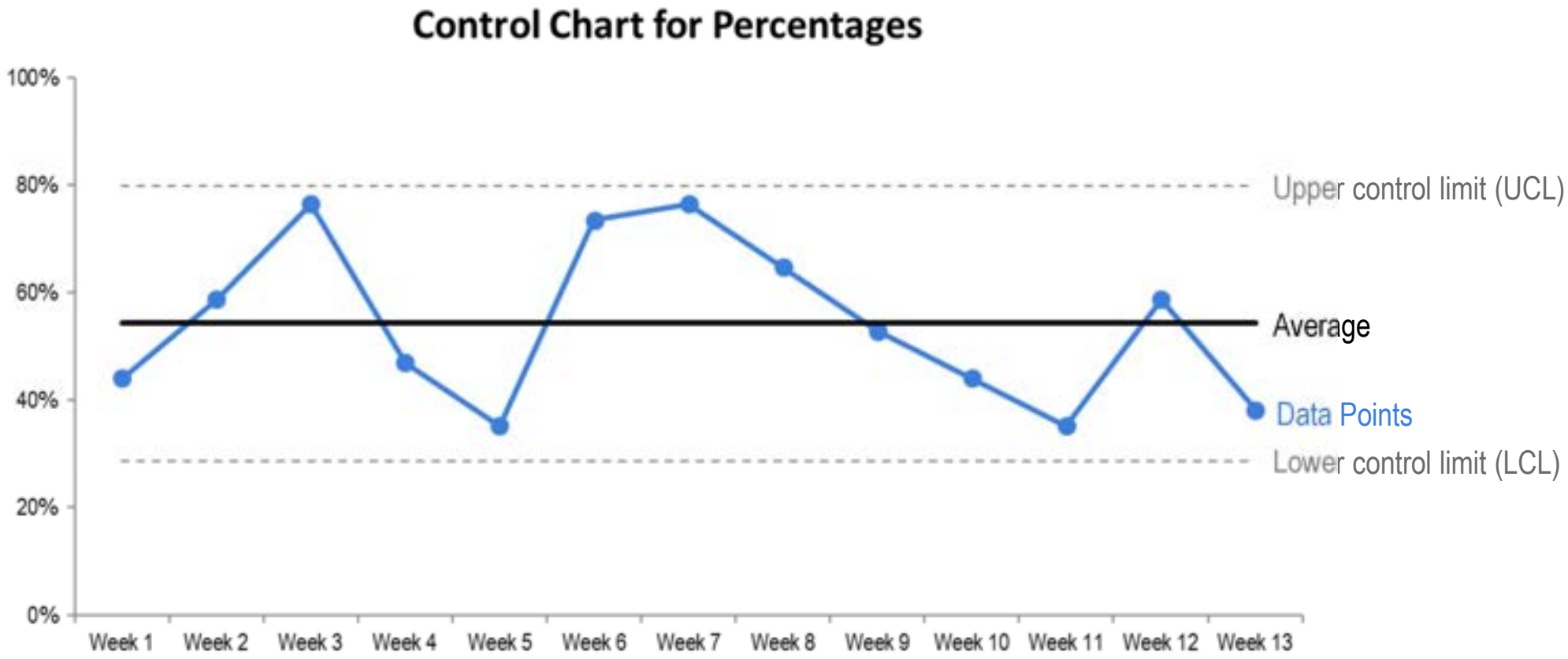
Week 13
Average
Data Points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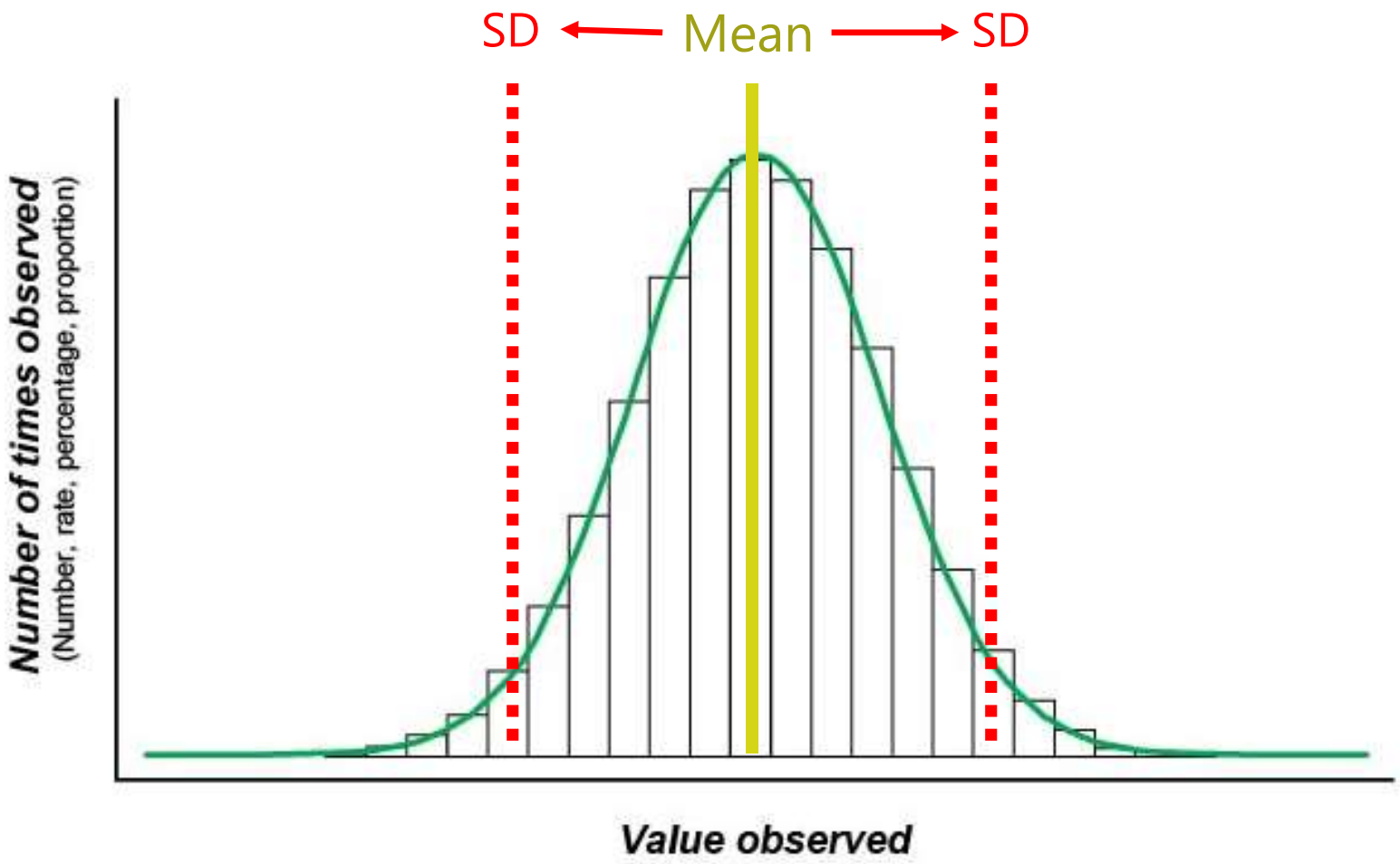
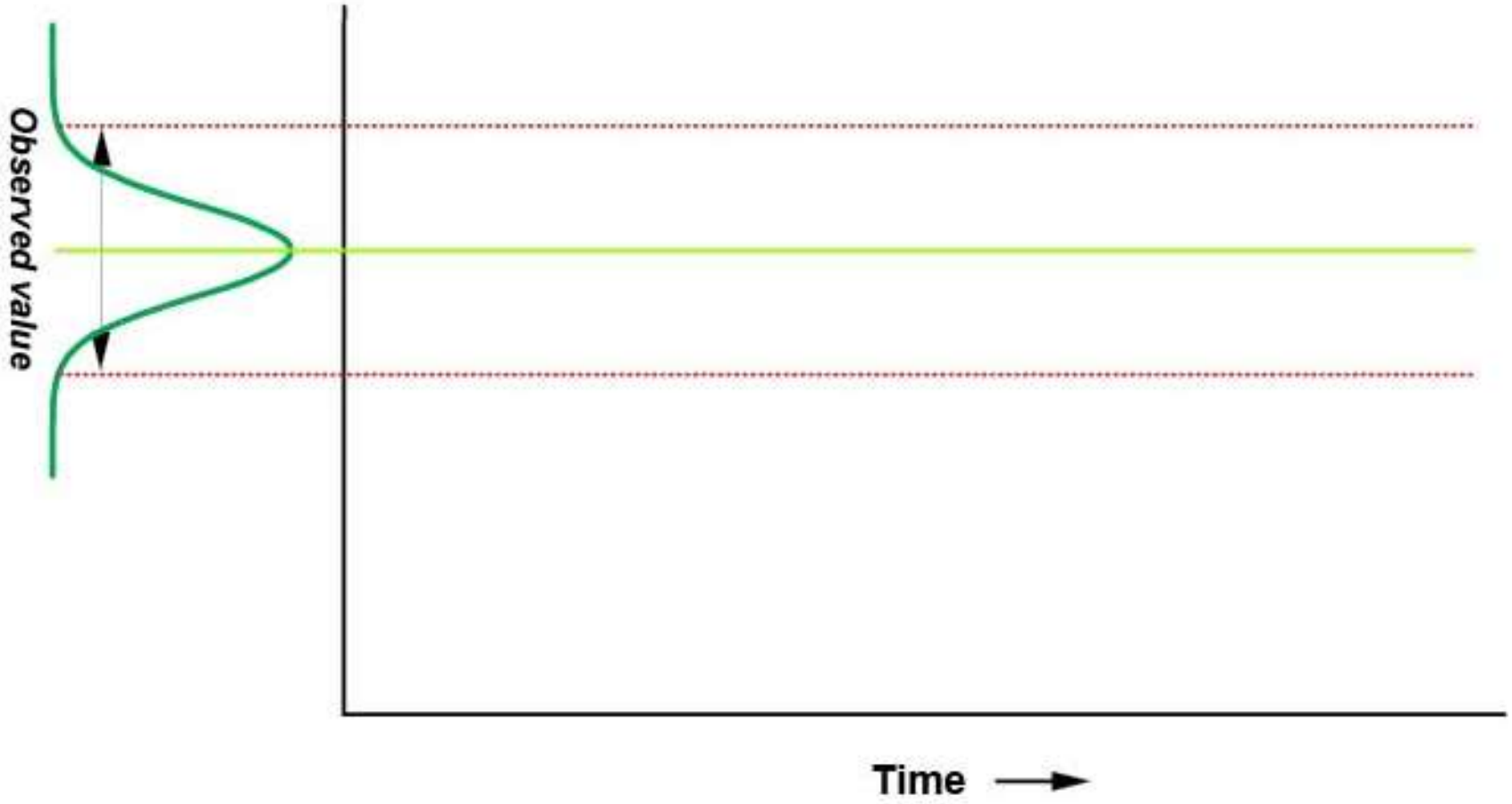
Week 12
Week 13
Upper control limit (UCL)
Average
Data Points
Lower control limit (LCL)

# Control limits….

Mean ± 3 standard deviations


SD
Mean
SD
Number of times observed
(Number, rate, percentage, proportion)
Value observed


Observed value
Time

# Control limits….

Mean ± 3 standard deviations

# Control limits….

… help distinguish
**random variation** from
**special cause variation**

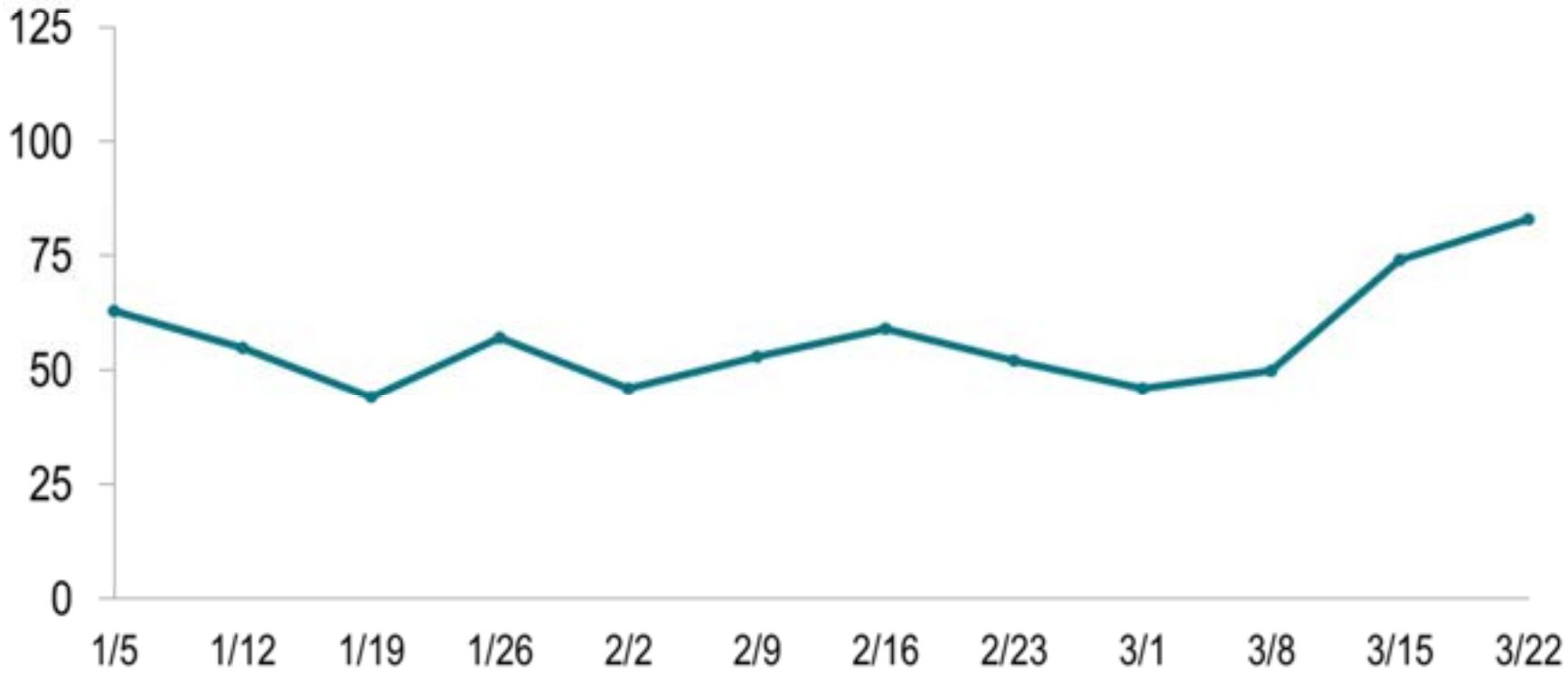
# Control limits….

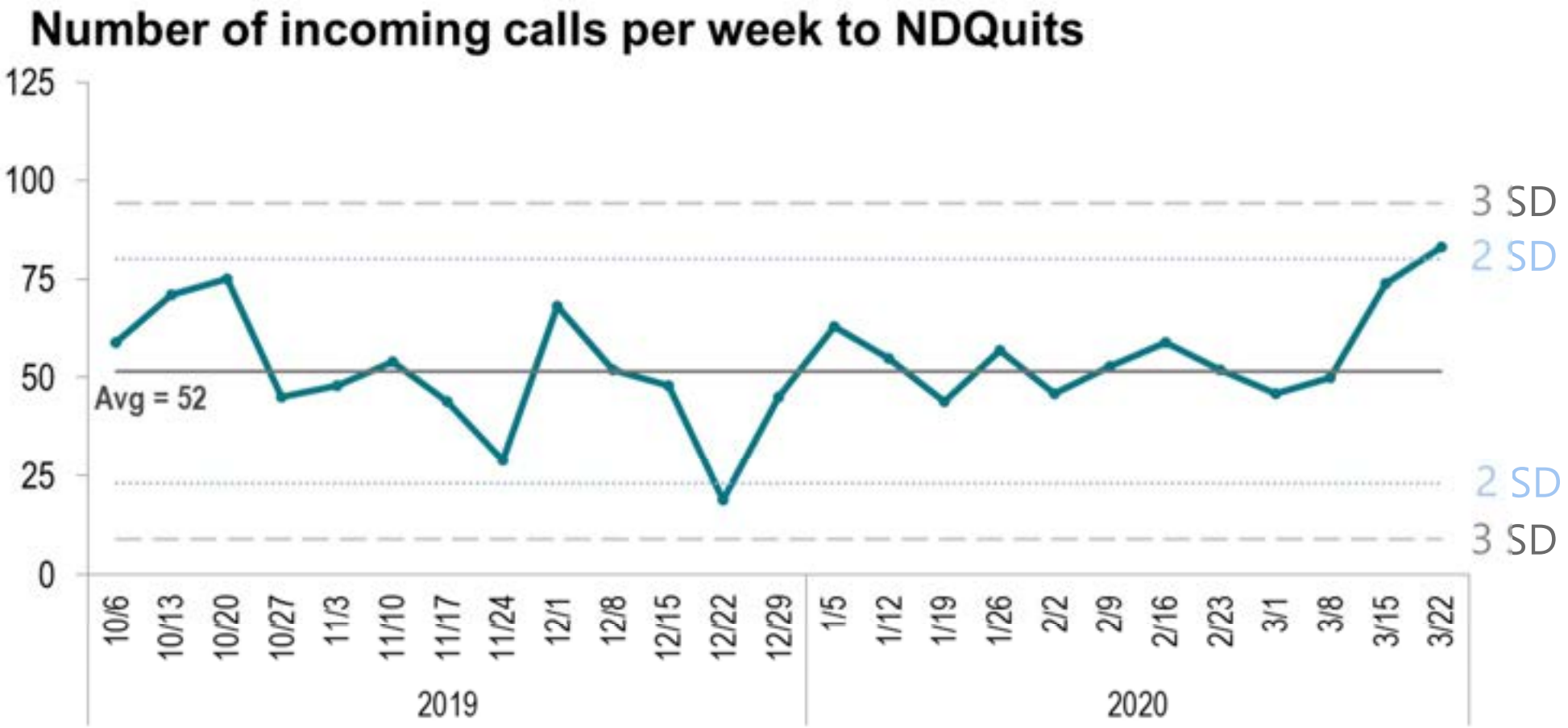
… give an acceptable range for a metric

… provide action/decision thresholds

… are calculated from the data

## Number of incoming calls per week to NDQuits




Number of incoming calls per week to NDQuits
125
100
75
50
25
0
Avg = 52
3 SD
2 SD
2 SD
3 SD
10/6
10/13
10/20
10/27
11/3
11/10
11/17
11/24
12/1
12/8
12/15
12/22
12/29
1/5
1/12
1/19
1/26
2/2
2/9
2/16
2/23
3/1
3/8
3/15
3/22
2019
2020

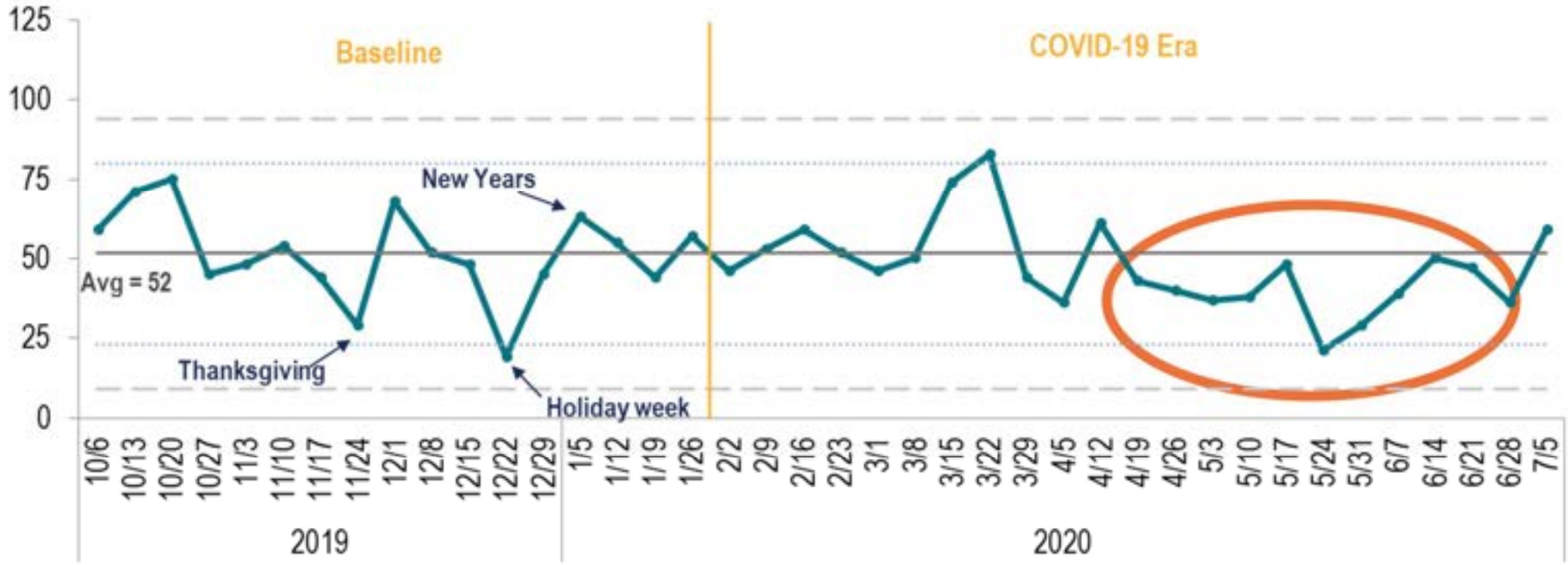
# What do I do with it?

# Assess {and monitor} the process

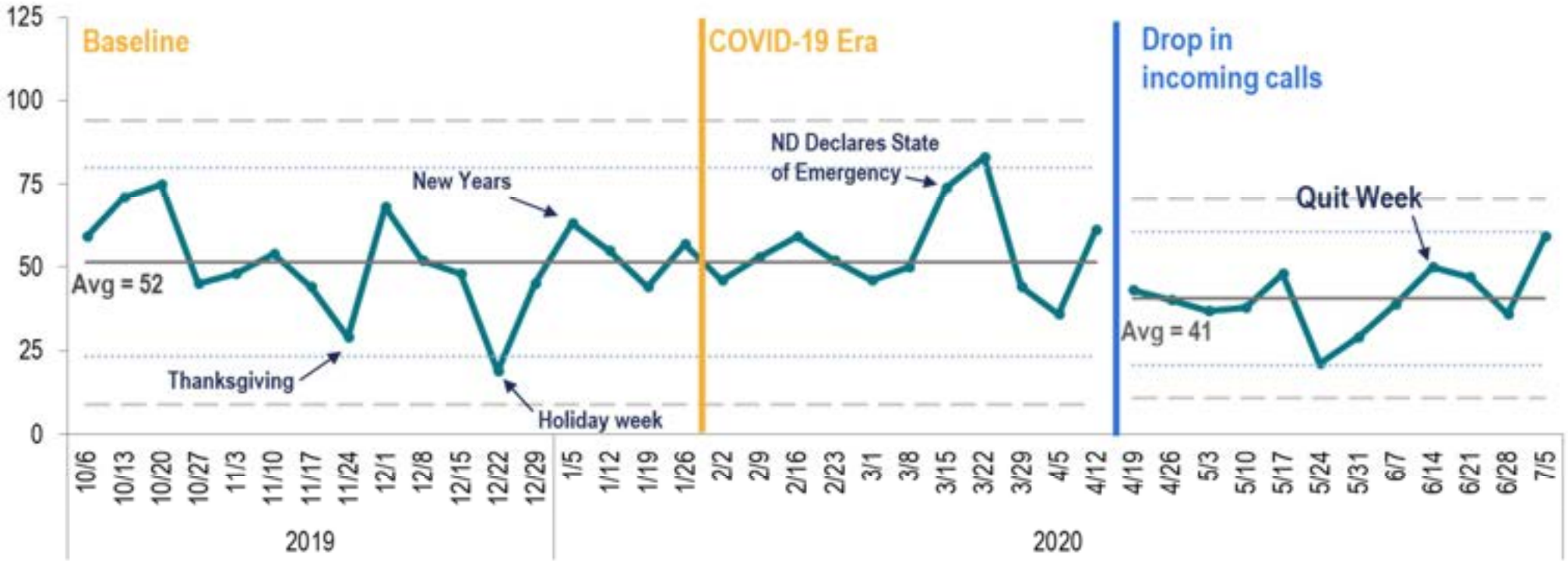
# Assess {and monitor} the process

# Identify outliers/special cause

# Identify trends

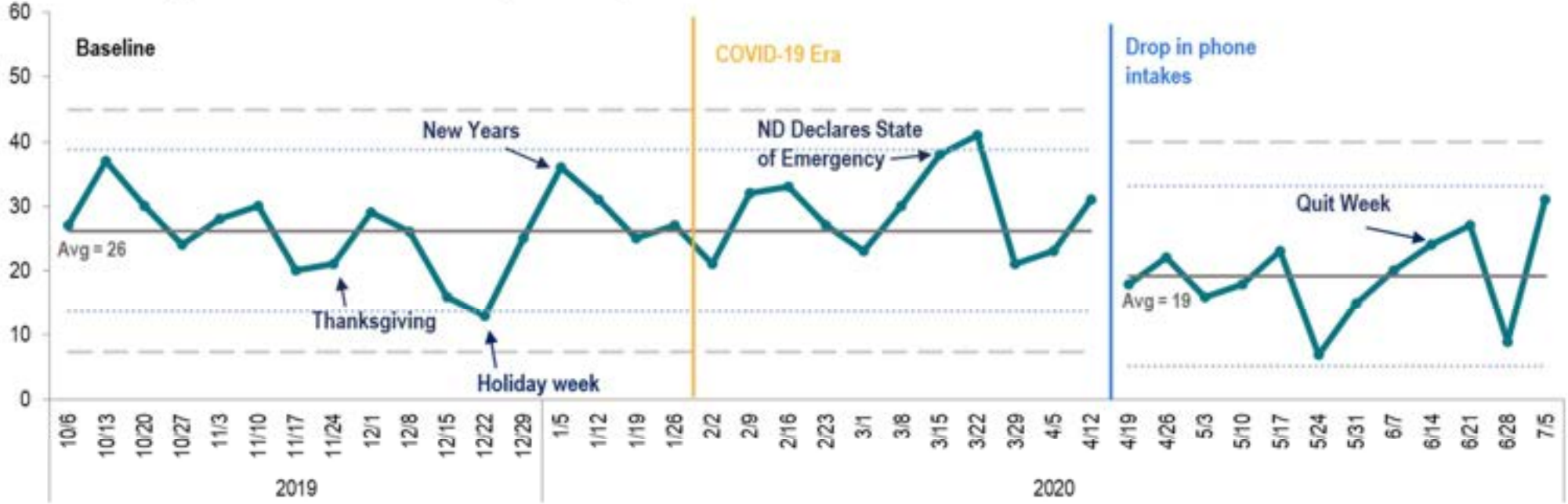


# Identify trends

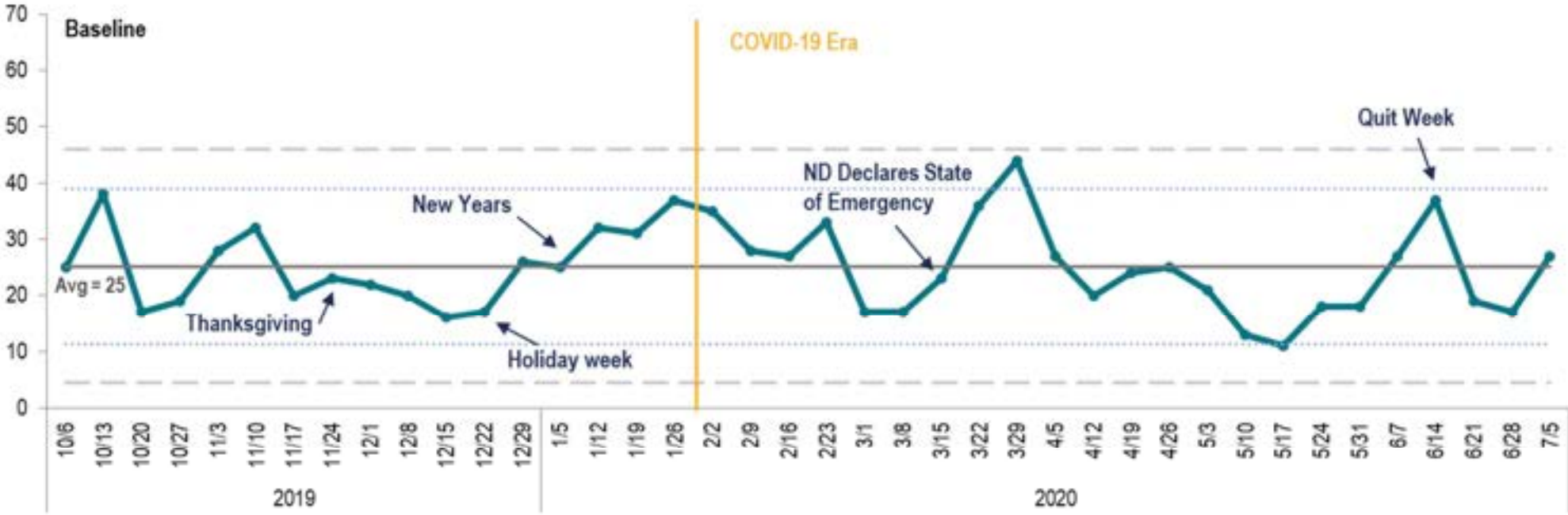


# Other metrics showed similar patterns

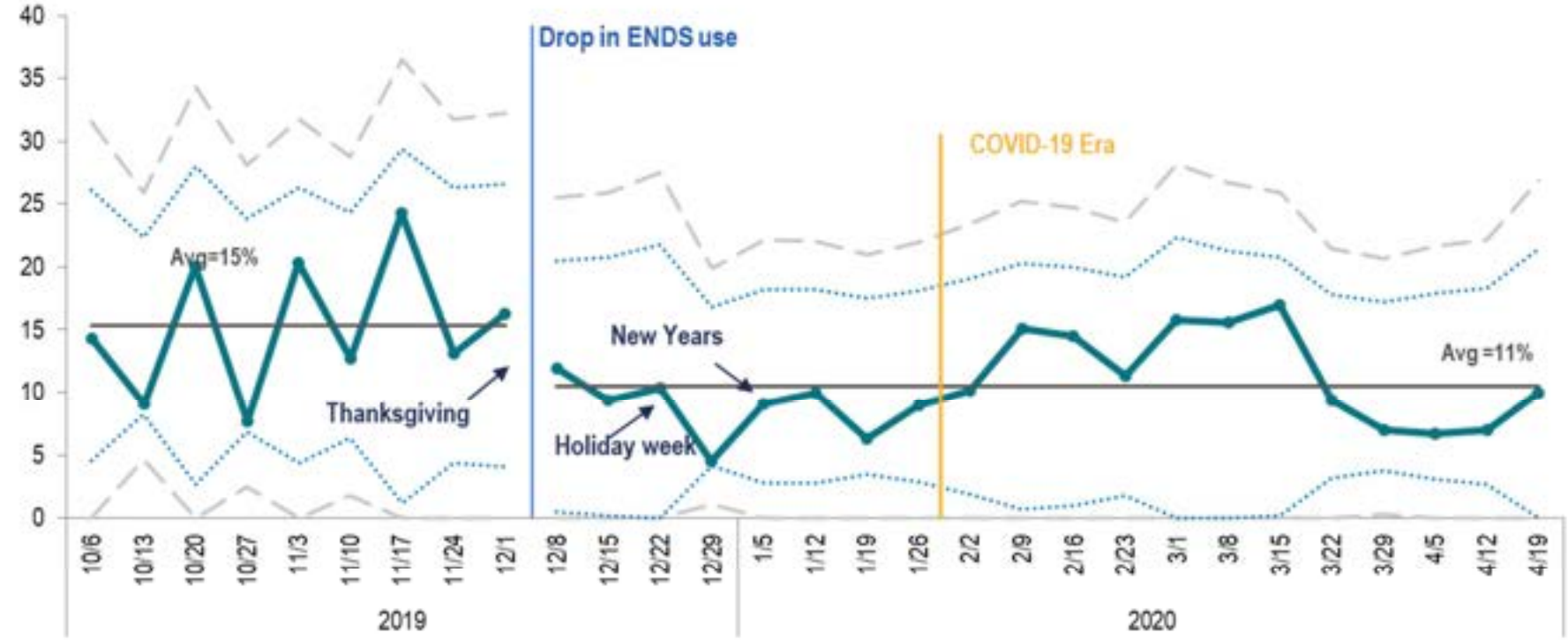
## Number of phone intakes completed per week for NDQuits



## Number of web intakes completed per week for NDQuits



## Past-30-day ENDS use on web and phone intake forms by week (%)



**Control charts are a great tool for:**

- **Assessing and monitoring a process**
- **Identifying outliers (distinguishing random variation from special cause variation)**
- **Identifying trends**

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