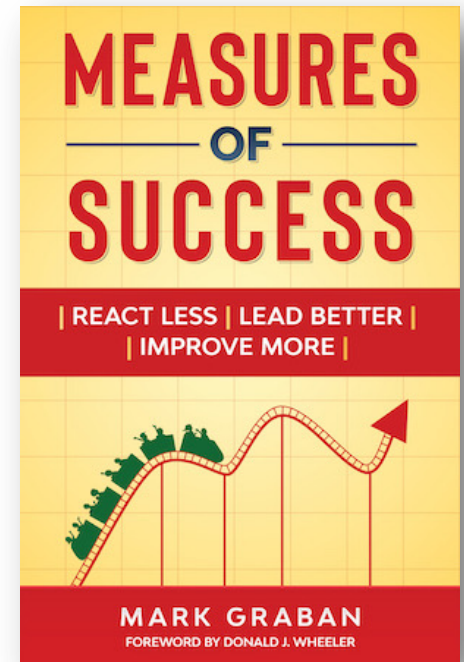



Measures of Success: React Less, Lead Better, Improve More

Slides & More: www.MarkGraban.com/BJC



Mark Graban
www.MarkGraban.com
www.LeanBlog.org



The background is a solid blue color with a subtle, abstract pattern of overlapping geometric shapes, primarily triangles and polygons, in various shades of blue, creating a textured, low-poly effect.

Be Careful When
Sharing Numbers

You Might Say or Hear

- MRI on-time starts went up from 44% to 52% last month
- Nurse Communication was 75% in August, which is below target
 - It jumped from 75% to 83% last month
 - That's the highest it's been for two years
- Ultrasound on-time starts were at an all-time high in October
- CT on-time starts % has decreased for four consecutive months

All of Those Statements are:

True

but Meaningless

You Might Say or Hear

- MRI on-time starts went up from 44% to 52% last month
- Nurse Communication was 75% in August, which is below target
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Two Data Points Are Not a Trend

	Jul-21	Aug-21	Trend
CT	44%	43%	↓
MRI	44%	52%	↑
Ultrasound	64%	68%	↑

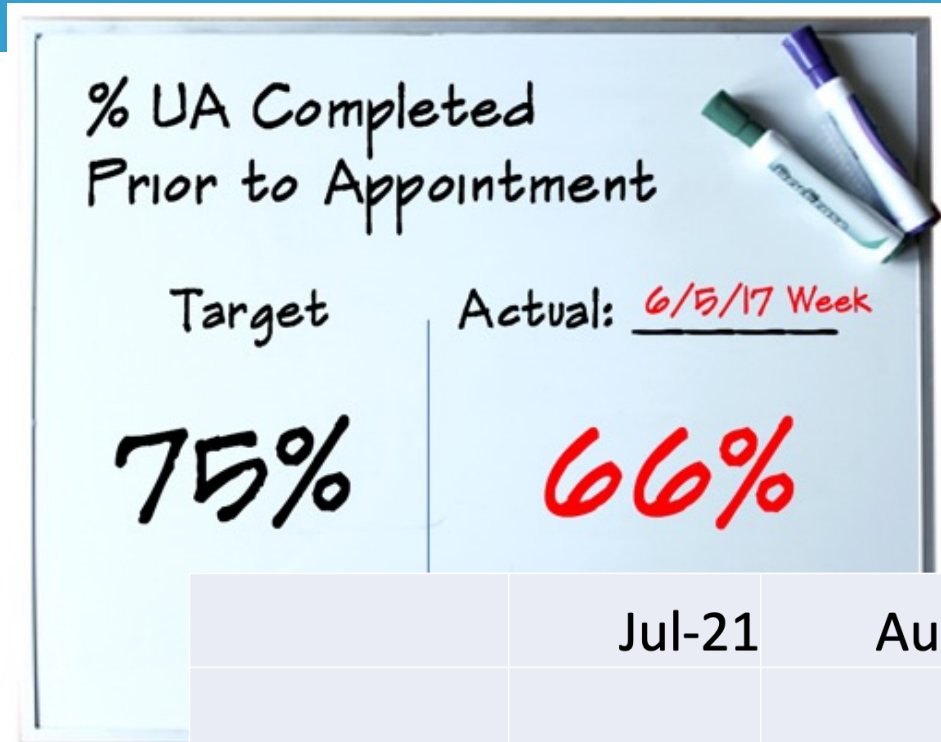
Two Data Points Are Not a Trend

	Jul-21	Aug-21	“Trend”
CT	44%	43%	↓
MRI	44%	52%	↑
Ultrasound	64%	68%	↑

What About More Numbers?

Jan 20	Feb 20	Mar 20	Jun 20	Jul 20	Aug 20	Sep 20	Oct 20	Nov 20	Dec 20	Jan 21	Feb 21	Mar 21	Apr 21	May 21	Jun 21	Jul 21	Aug 21	Sep 21
79.25	76.50	80.23	77.05	78.89	79.29	78.60	82.39	78.28	80.03	78.36	78.73	82.08	80.28	79.02	76.42	78.10	74.82	82.63

Three Key Questions



	Jul-21	Aug-21	Trend
CT	44%	43%	↓
MRI	44%	52%	↑
Ultrasound	64%	68%	↑

1. Are we achieving our target or goal?

2. Are we improving?

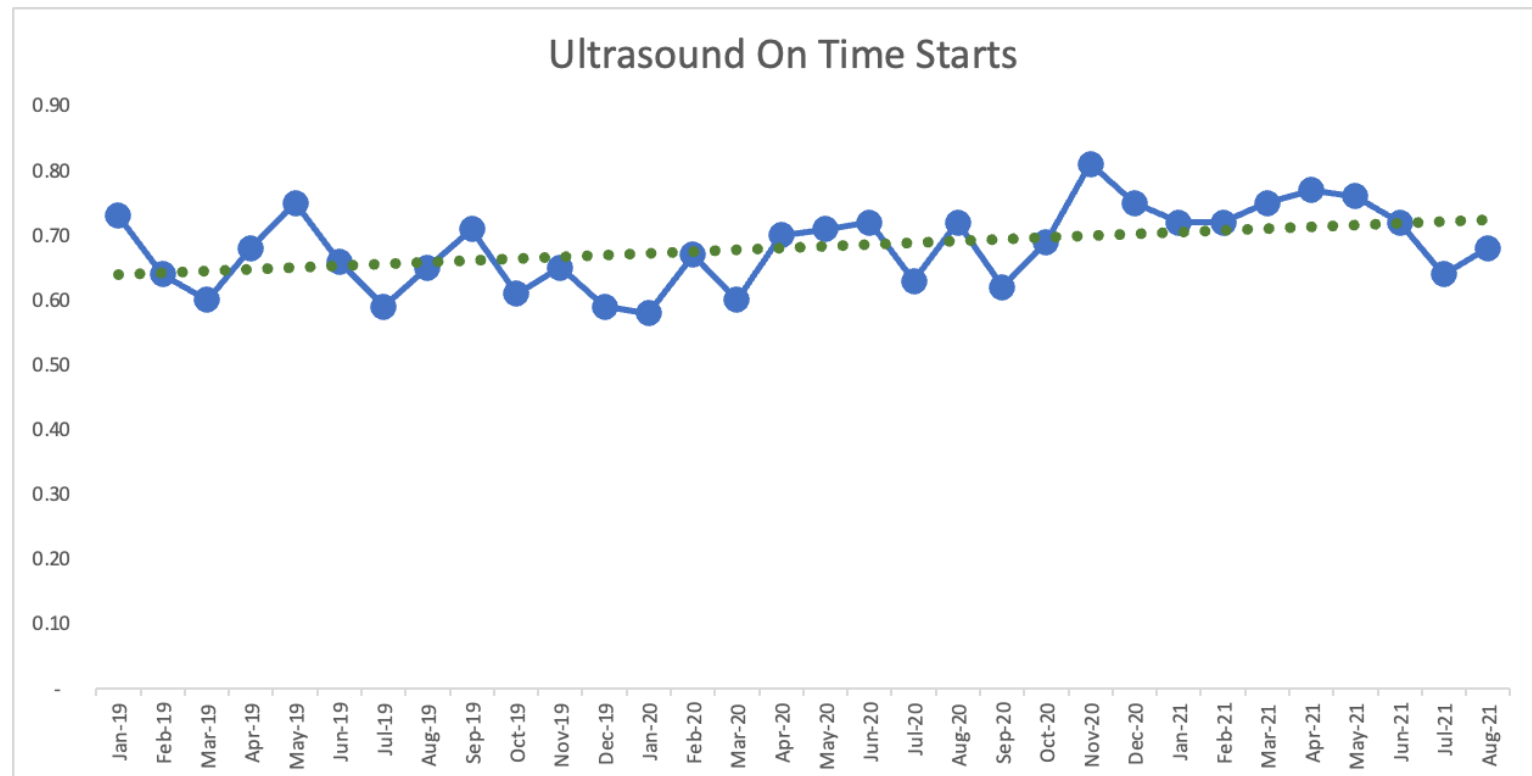
3. How do we improve?

Jan 20	Feb 20	Mar 20	Jun 20	Jul 20	Aug 20	Sep 20	Oct 20	Nov 20	Dec 20	Jan 21	Feb 21	Mar 21	Apr 21	May 21	Jun 21	Jul 21	Aug 21	Sep 21
79.25	76.50	80.23	77.05	78.89	79.29	78.60	82.39	78.28	80.03	78.36	78.73	82.08	80.28	79.02	76.42	78.10	74.82	82.63

#PlotTheDots

Do We Hear (or Say) This in Meetings?

“Look at that positive trend!”

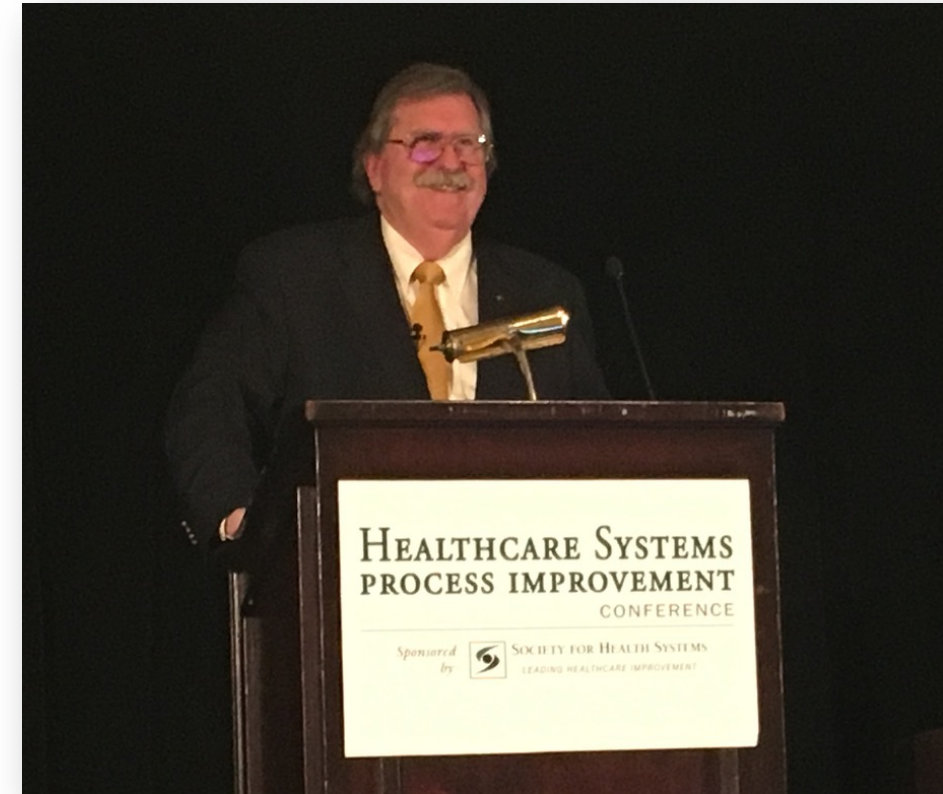


Narrator: It isn't a trend



Method We Are Here to Learn & Practice

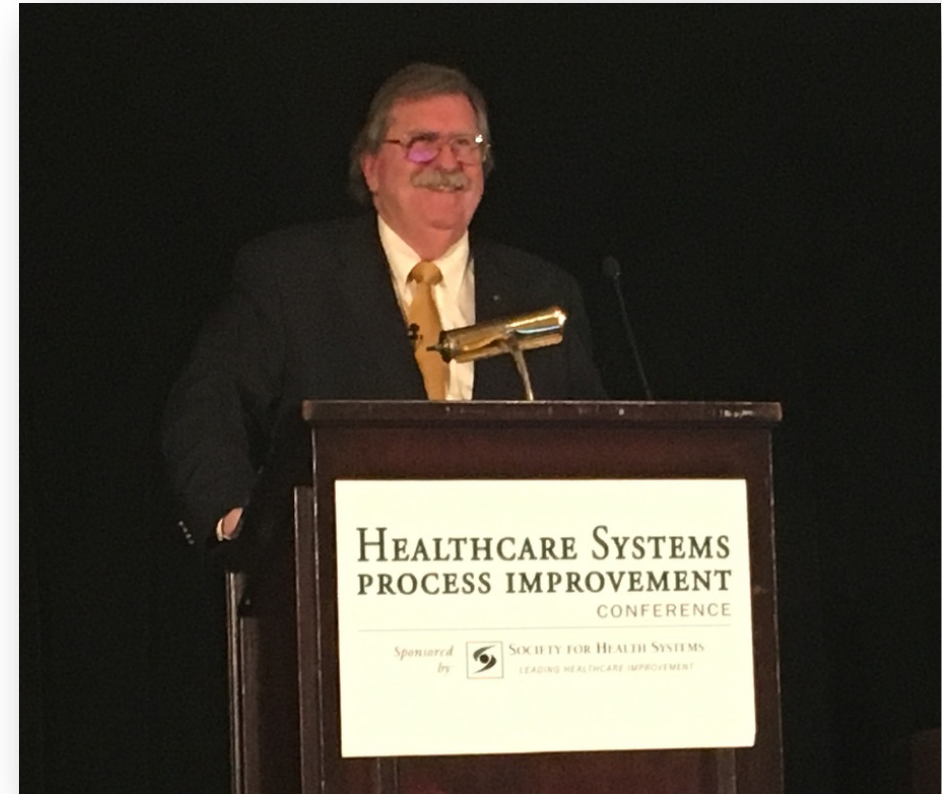
- **"SPC Chart"**
 - Statistical Process Control
- **"Control Chart"**
- **"XmR Chart"**
- **"Process Behavior Chart"**
- **The "Has the Process Changed Chart?"** (via Wheeler)
- **The "Is It Time to Fix It Chart?"** (via Wheeler)



Donald J. Wheeler, Ph.D.

Wheeler Says

**"SPC is a way
of thinking,
with some
tools attached."**



Process Behavior Chart View

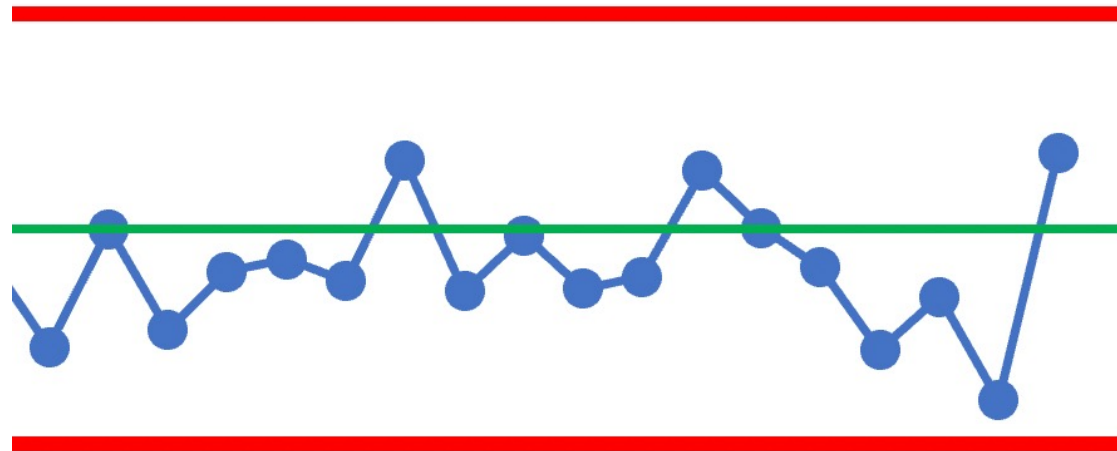
NOISE
“COMMON CAUSE”

Nurse Communication

Upper Limit = +3 sigma

Average

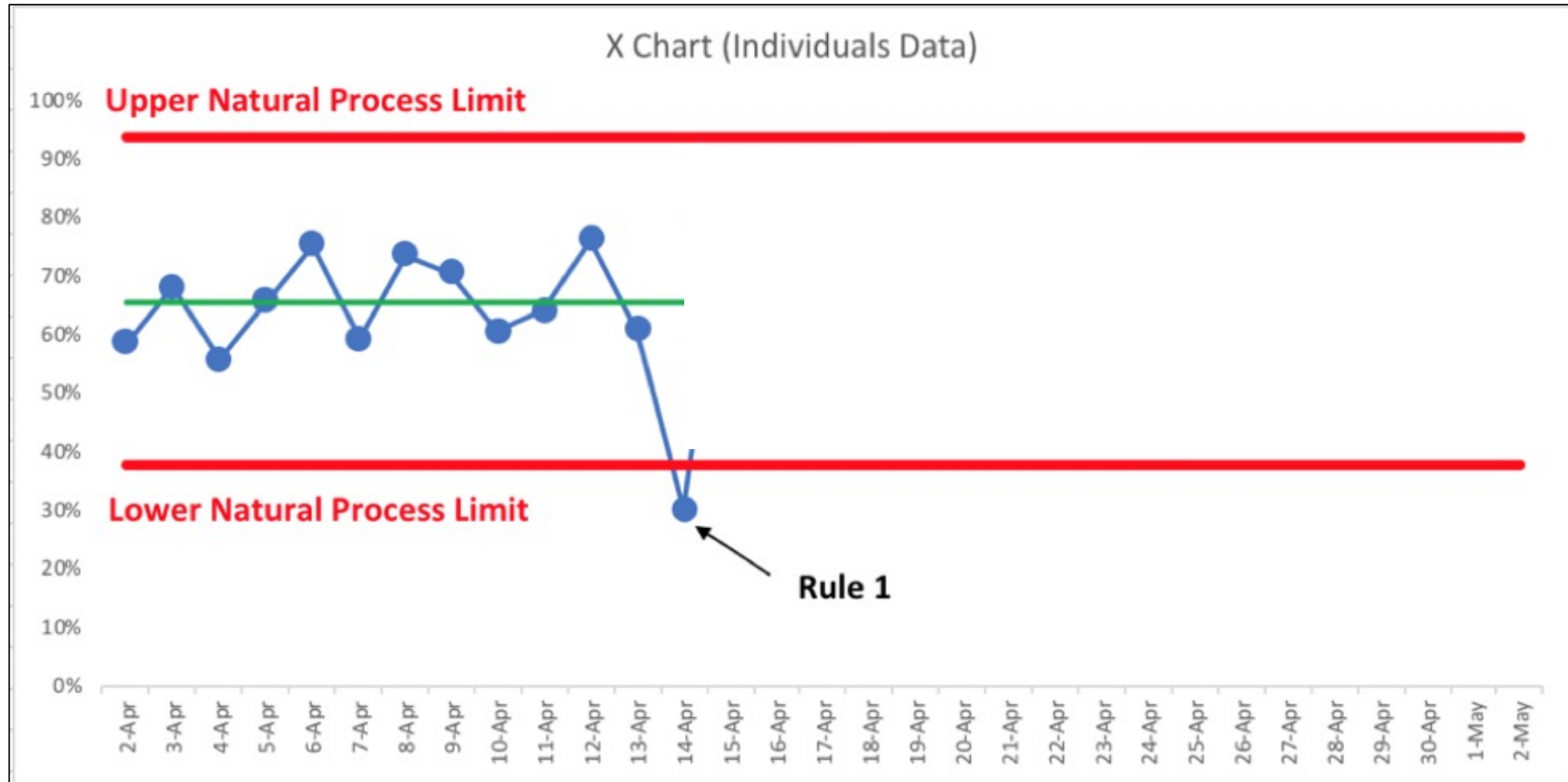
Lower Limit = -3 sigma



Feb 20 Mar 20 Jun 20 Jul 20 Aug 20 Sep 20 Oct 20 Nov 20 Dec 20 Jan 21 Feb 21 Mar 21 Apr 21 May 21 Jun 21 Jul 21 Aug 21 Sep 21



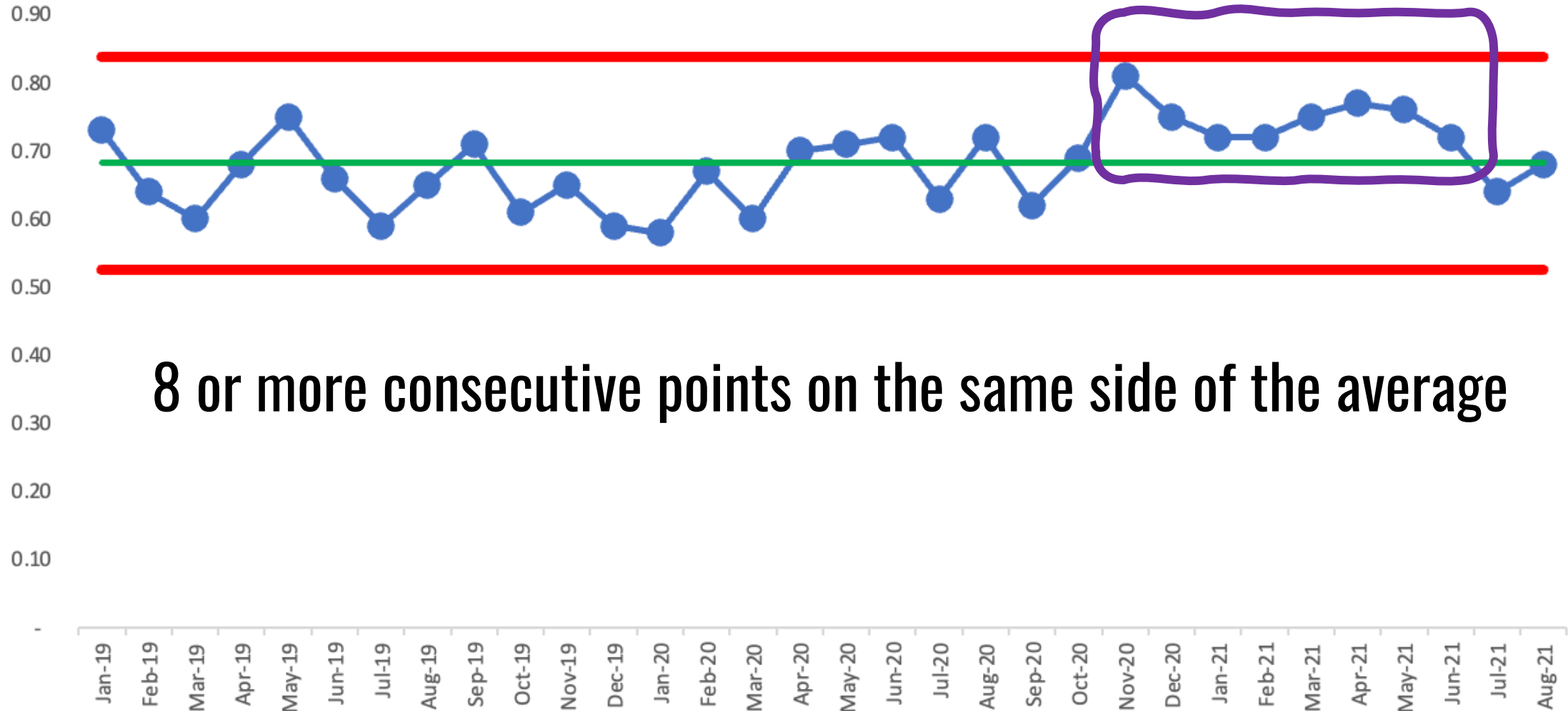
3 Rules for Finding a Signal Signal — Rule 1



3 Rules for Finding a Signal — Rule 2

What Changed?

Ultrasound On Time Starts

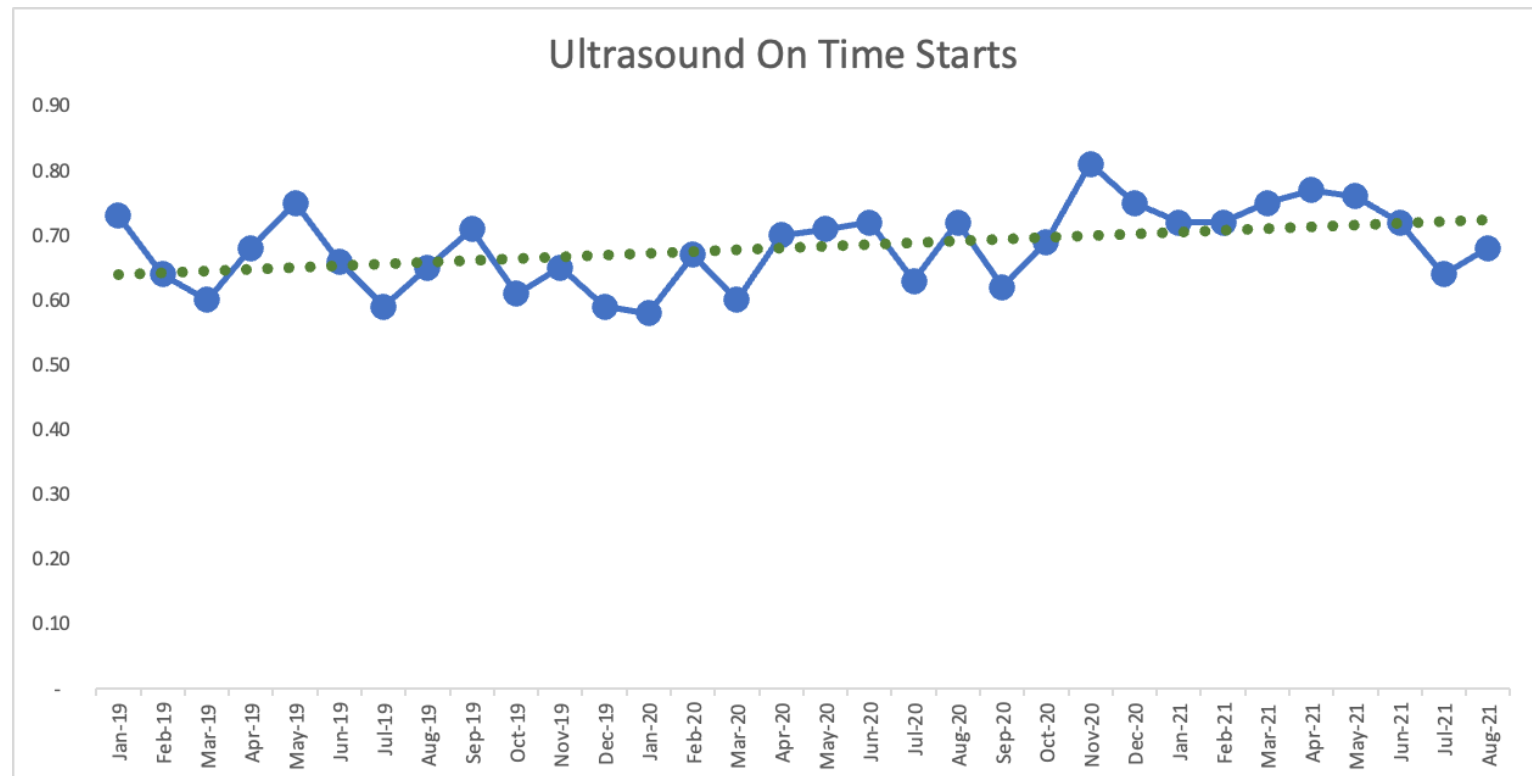


8 or more consecutive points on the same side of the average



Do We Hear (or Say) This in Meetings?

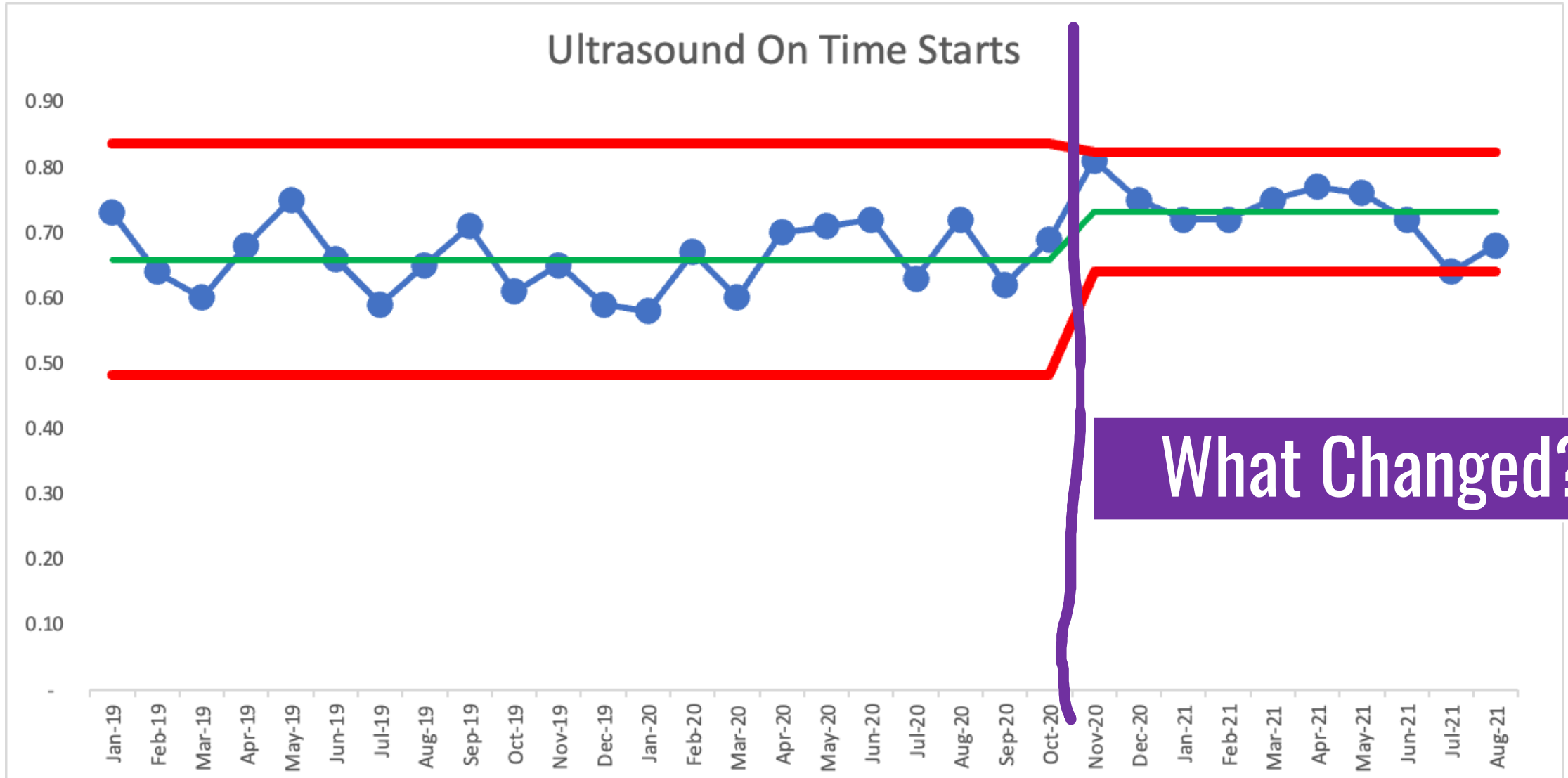
“Look at that positive trend!”



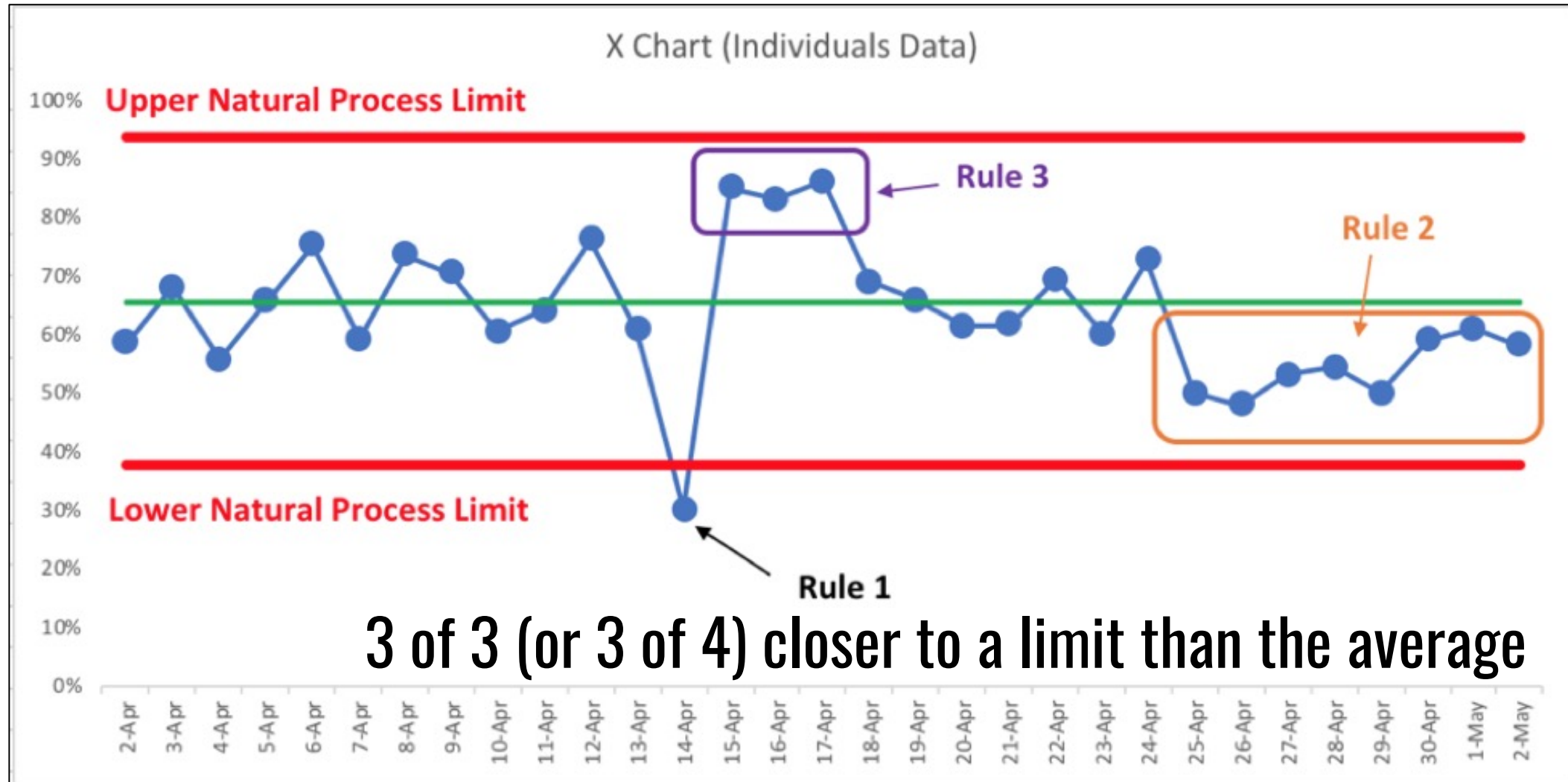
Narrator: It isn't a trend



A “Trend” or a “Shift”?

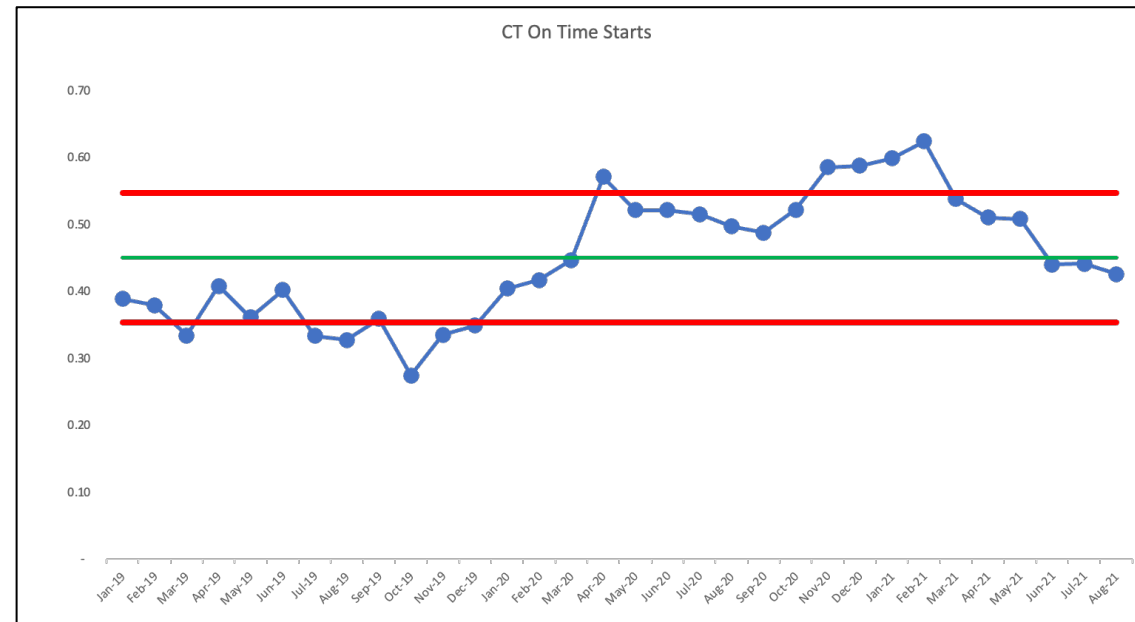
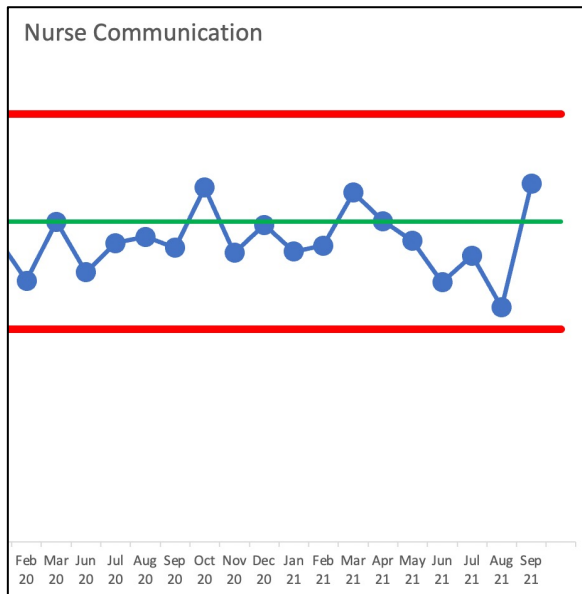


3 Rules for Finding a Signal — Rule 3



Which Type of Cause?

Common	Special
Routine	Exceptional
Noise	Signal



Calculate the Average and Moving Ranges

- Calculate average of the first 20 points

C3: =AVERAGE(B3:B22)

(if data is in column B)

- Calculate the moving range of the first 20 points

D4: =ABS(B4-B3)

	A	B	C	D
1	Process Behavior Template provid			
2	Date	Page Loads	Average	Moving Range (MR)
3	1/2/12	999	1,576.20	
4	1/3/12	1,654	1,576.20	655.00
5	1/4/12	1,773	1,576.20	119.00
6	1/5/12	1,523	1,576.20	250.00
7	1/6/12	1,275	1,576.20	248.00
8	1/9/12	2,225	1,576.20	950.00
9	1/10/12	1,916	1,576.20	309.00
10	1/11/12	1,798	1,576.20	118.00
11	1/12/12	1,622	1,576.20	176.00
12	1/13/12	1,385	1,576.20	237.00
13	1/16/12	1,604	1,576.20	219.00
14	1/17/12	1,551	1,576.20	53.00
15	1/18/12	828	1,576.20	723.00
16	1/19/12	1,502	1,576.20	674.00
17	1/20/12	1,201	1,576.20	111.00

Calculate Natural Process Limits

- Calculate “MR-bar”
 - Average of the 1st 19 MRs
 - E3: =Average(D4:D22)
- Calculate the Limits (+/– 3 sigma)
 - Lower = Average – 3*(MR bar)/1.128
 - F3: = C3-3*E3/1.128
 - Upper = Average + 3*(MR bar)/1.128
 - G3: = C3+3*E3/1.128

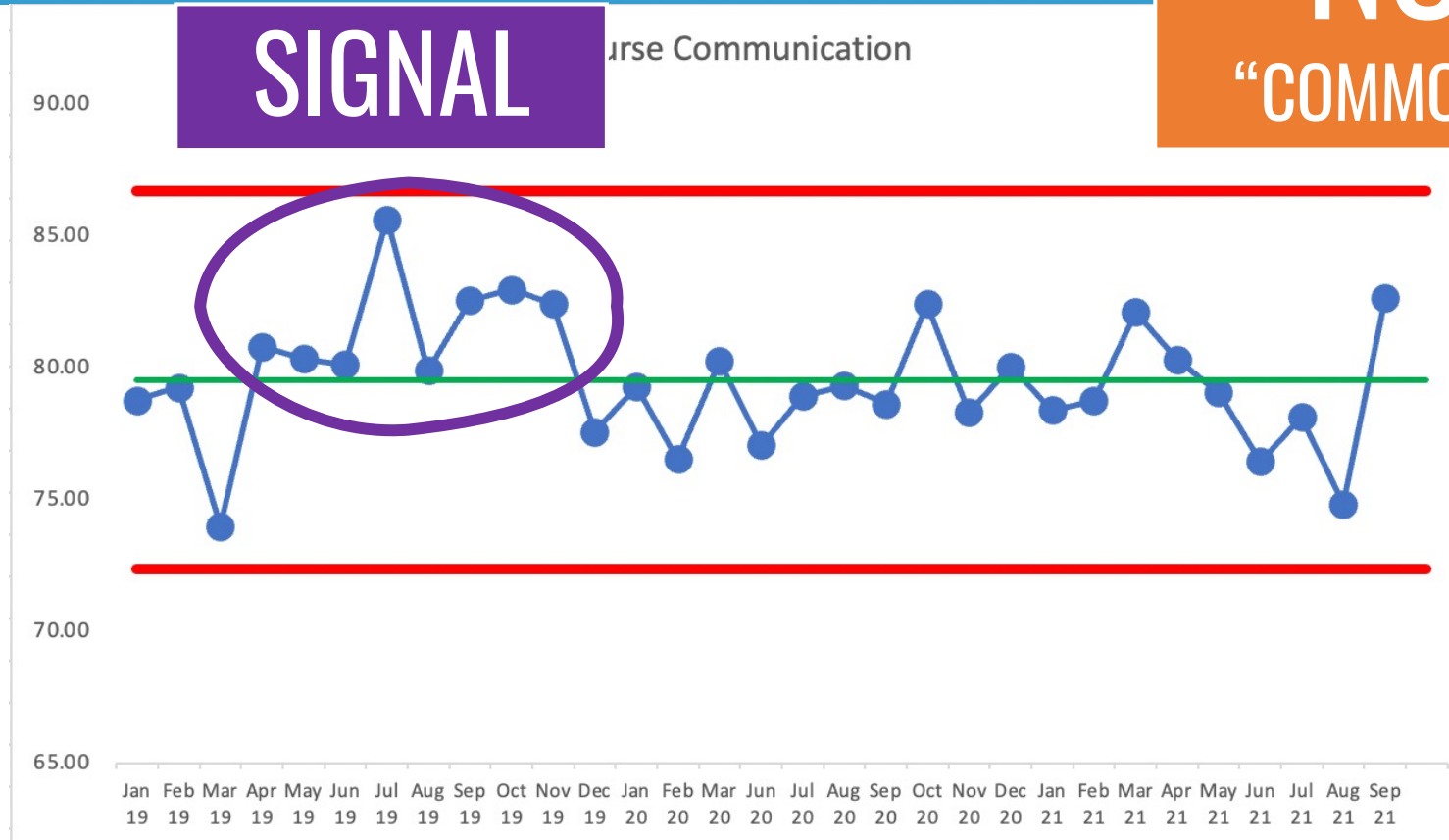
	A	B	C	D	E	F	G
1	Process Behavior Template provided by Mark Graban, author						
2	Date	Page Loads	Average	Moving Range (MR)	MR Bar	Lower Natural Process Limit	Upper Natural Process Limit
3	1/2/12	999	1,576.20		293.16	796.52	2,355.88
4	1/3/12	1,654	1,576.20	655.00	293.16	796.52	2,355.88
5	1/4/12	1,773	1,576.20	119.00	293.16	796.52	2,355.88
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10	1/11/12	1,798	1,576.20	118.00	293.16	796.52	2,355.88
11	1/12/12	1,622	1,576.20	176.00	293.16	796.52	2,355.88

The Pairing of X and MR Charts

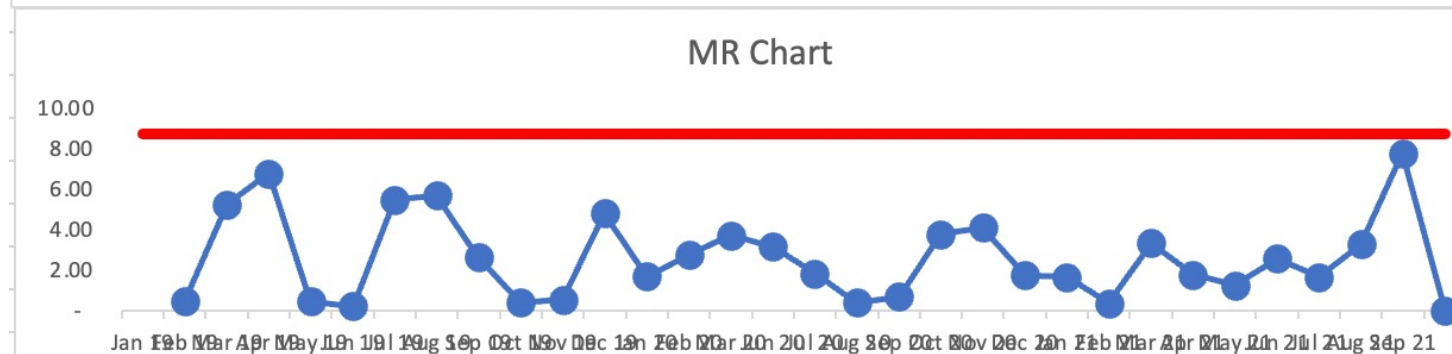
NOISE

“COMMON CAUSE”

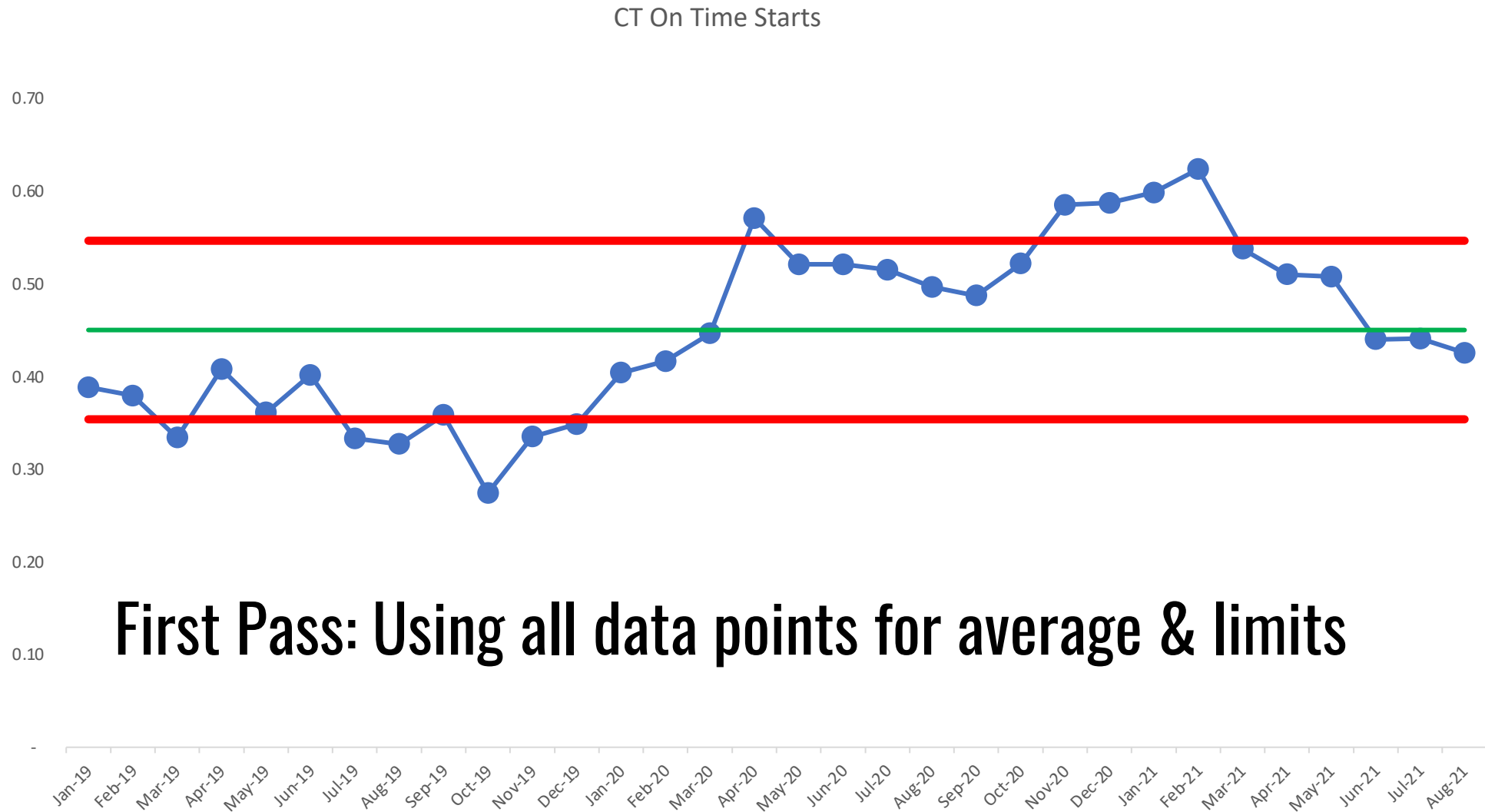
**X Chart
(the Data)**



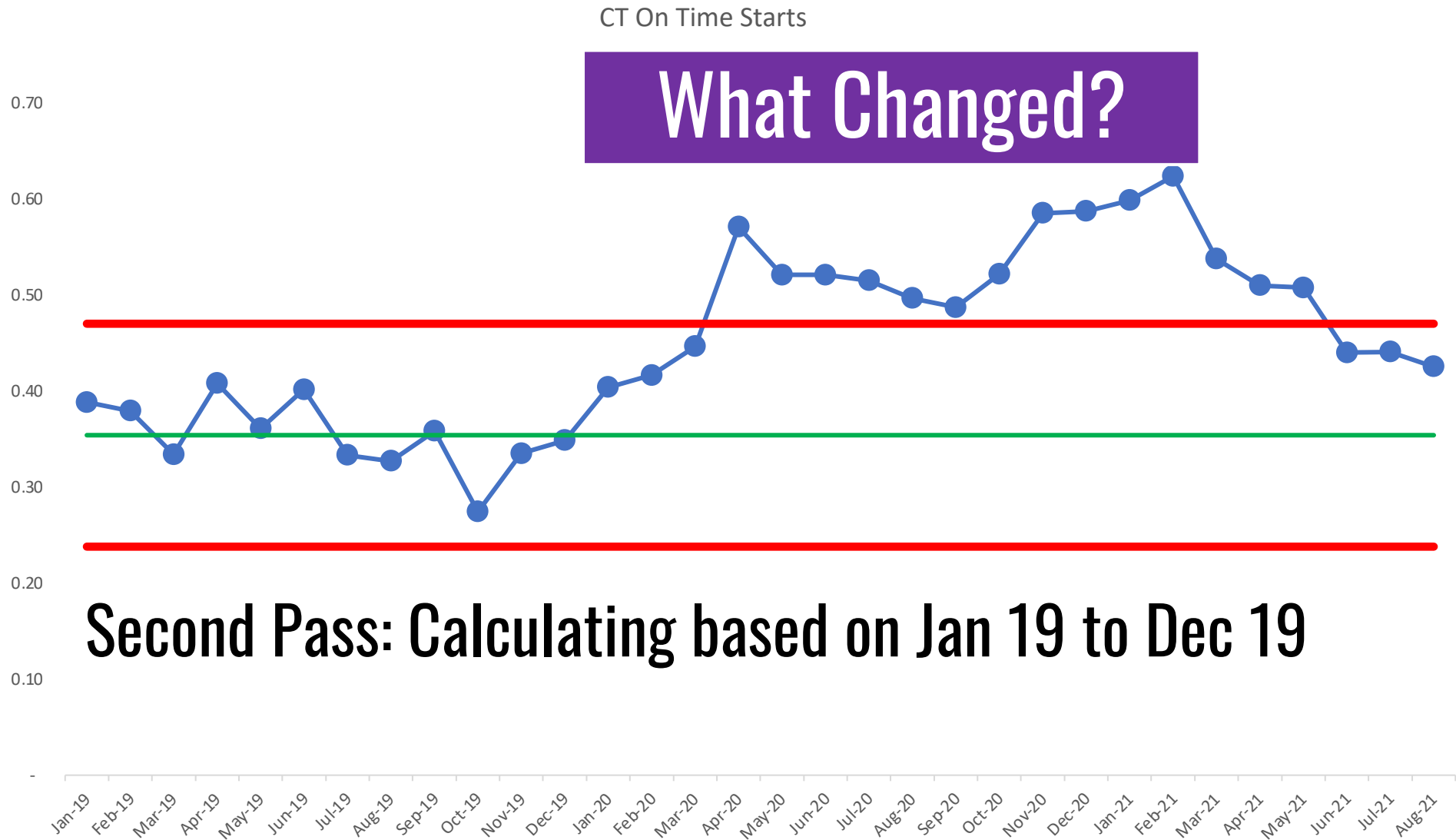
**MR Chart
(the Variation)**



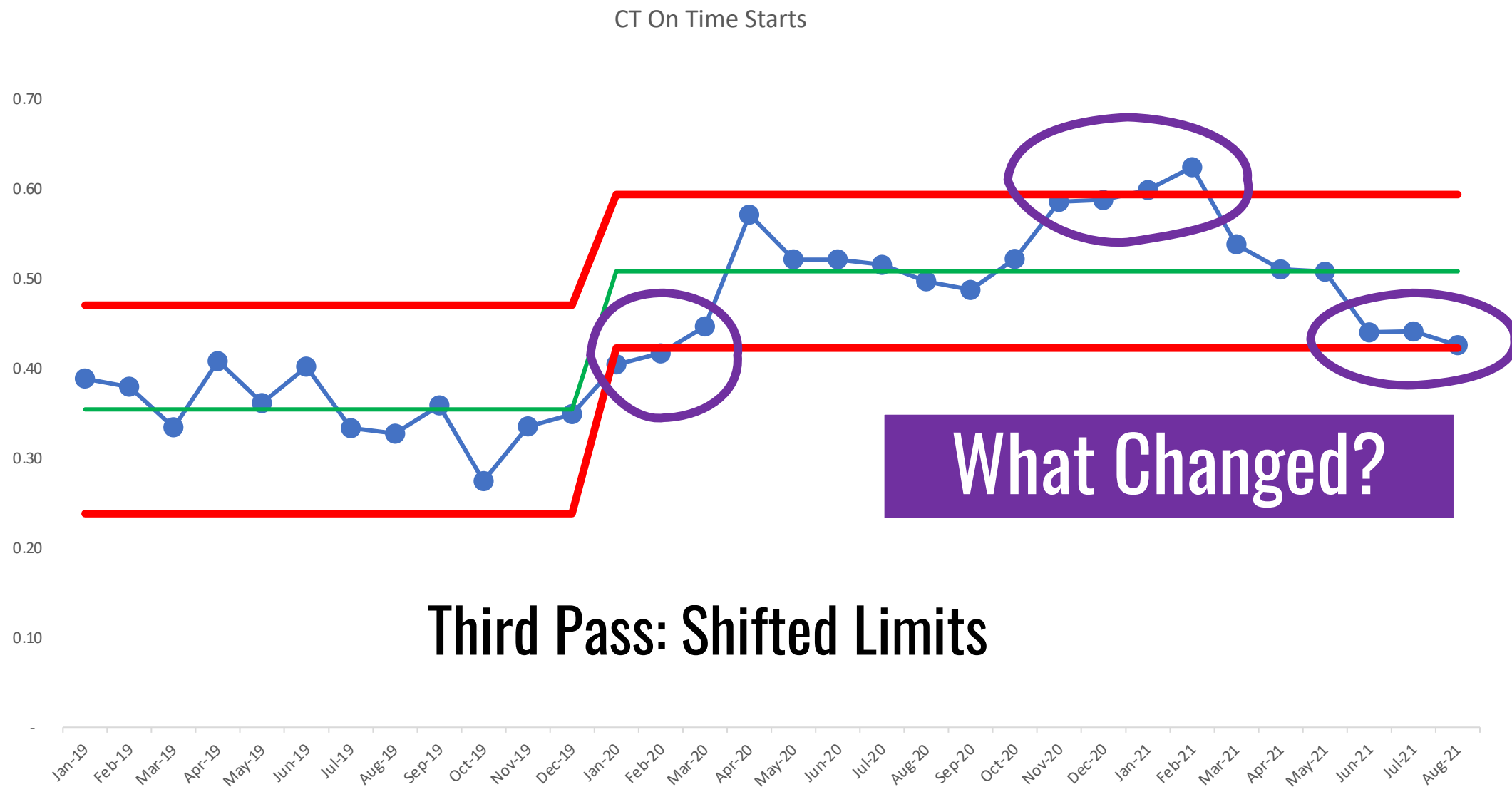
PBC Example: CT On-Time Starts



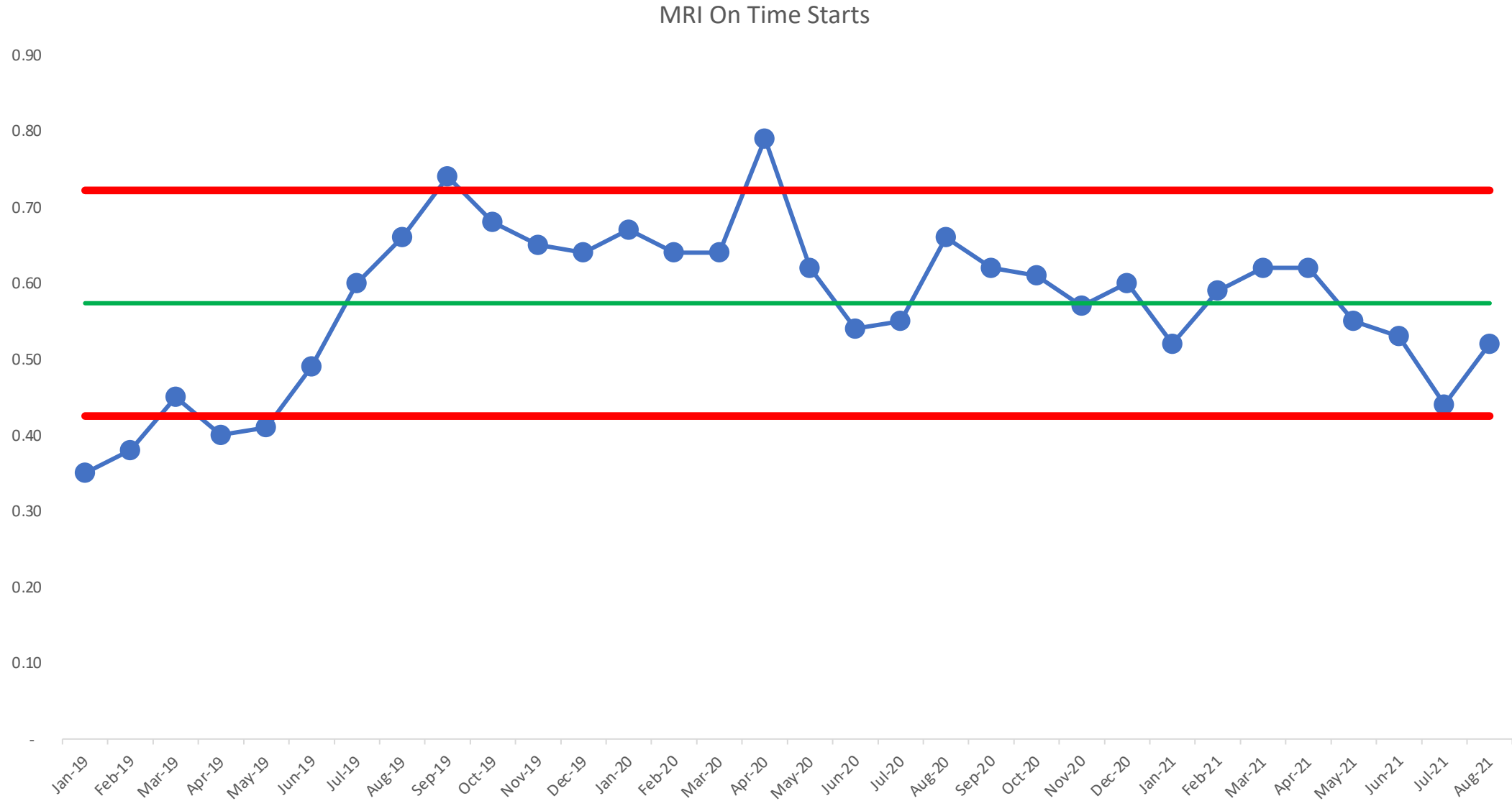
PBC Example: CT On-Time Starts



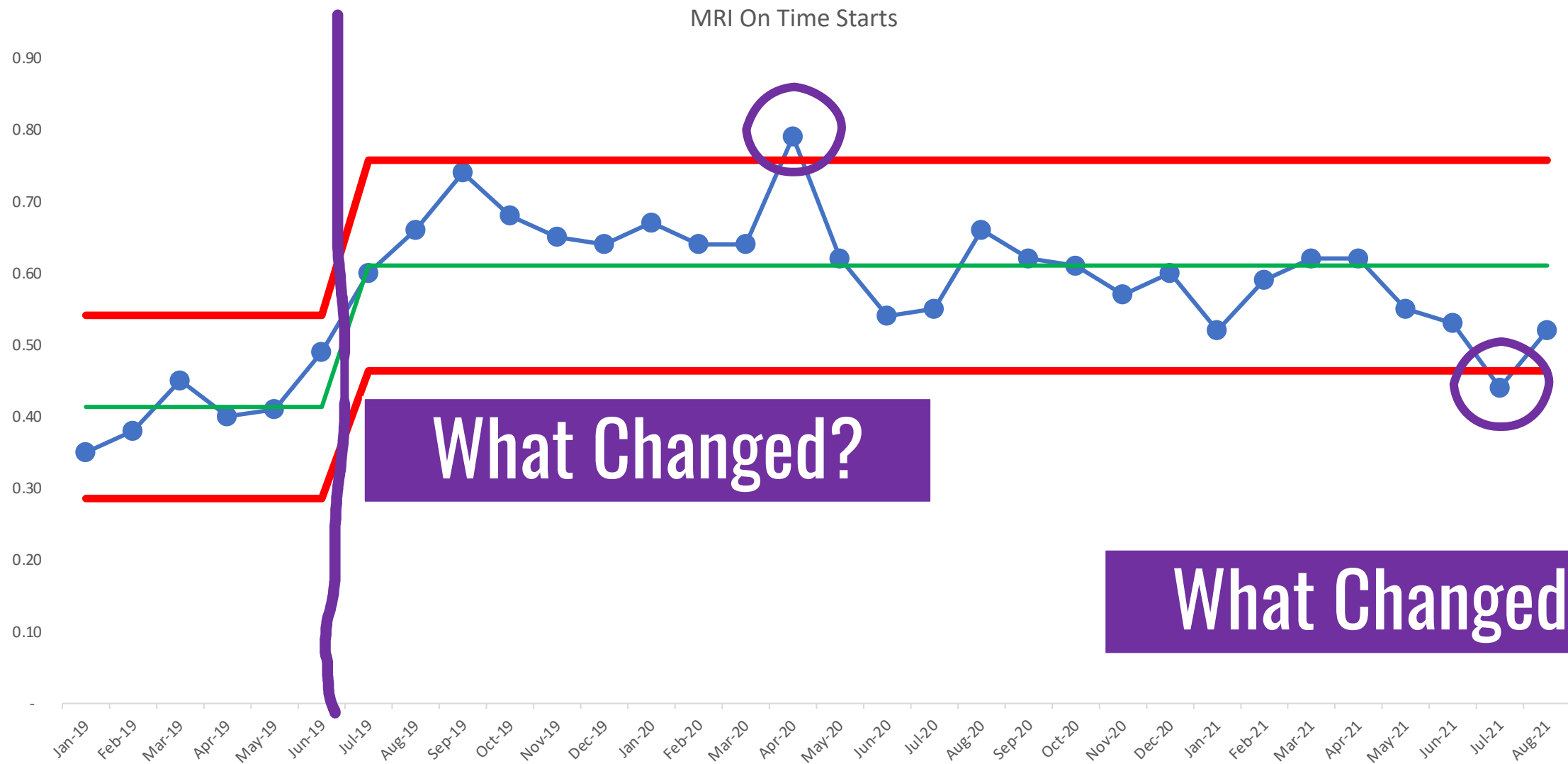
PBC Example: CT On-Time Starts



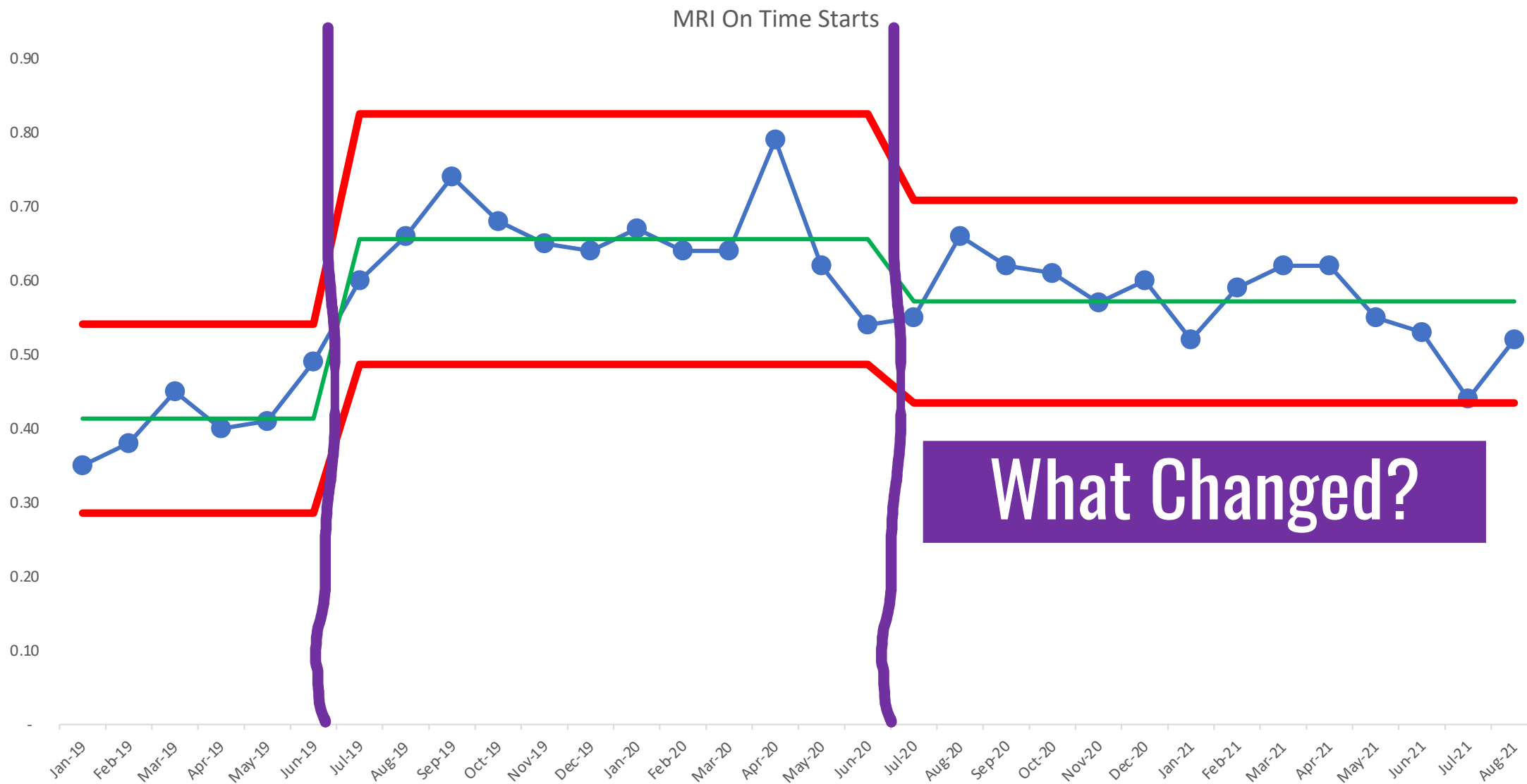
PBC Example: MRI On Time Starts



PBC Example: MRI On Time Starts



PBC Example: MRI On Time Starts



React Less
Lead Better
Improve More

Q&A Time

Book: www.MeasuresOfSuccessBook.com
Slides: www.MarkGraban.com/BJC2021

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 - mark@markgraban.com
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 - www.LeanBlog.org
 - www.MarkGraban.com



Mark Graban

