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Child Outcomes Research Consortium

CORC Members Forum, April 2015

Presenting your data meaningfully

Presented By; Sally Wilson (CORC Regional Support Officer)

Workshop Objectives

- Explain what system (or process) capability is, and be able to identify whether a system is acting predictably or not.

- Interpret trends shown within a capability chart (a.k.a. run charts, statistical process control (SPC) charts)

- Consider how capability charts could be used in your service – and what good might look like.

Scenario

Erinsborough CAMHS

KPI:	Target:	Cumulative to date:	On track:
Days to first appointment from referral	15 days	14 days	

This could be a typical measure within a CAMHS Performance Management Framework and one which may be being reported to their Commissioner.

In the case of Erinsborough, they are consistently meeting their target and have 'good' performance.

However, staff moral is low and stress levels are high with high sickness rates. There are also an increasing level of complaints from families about long waiting times to be seen. So what is really happening?

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Average Time

The average patient waiting times (days) in the last 5 months were:

December average:	12 days
January average:	13 days
February Average:	14 days
March Average:	15 days
April Average:	18 days

Month	D	J	F	M	A
Average	12	13	14	15	18

In which month did no patient wait longer than the target number of days?

Which month was the busiest?

In which month was the quickest appointment made?

Can any of these questions be answered based on the data we currently have?

Let's look at the data in a different way…

Percentage Late Appointments

Percentage of patients waiting over the target time:

In December 33% were over

In January 33% were over

In February 0% were over

In March 50% were over

In April 20% were over

Month	D	J	F	M	A
Percentage	33%	33%	0%	50%	20%

In which month did no patient wait longer than the target number of days?

Which month was the busiest?

In which month was the quickest appointment made?

Can any of these questions be answered based on the data we currently have?

Without the raw data we are guessing at the answers to many questions.

We can answer some, but we need to be aware of the limitations of summary data.

Raw Data

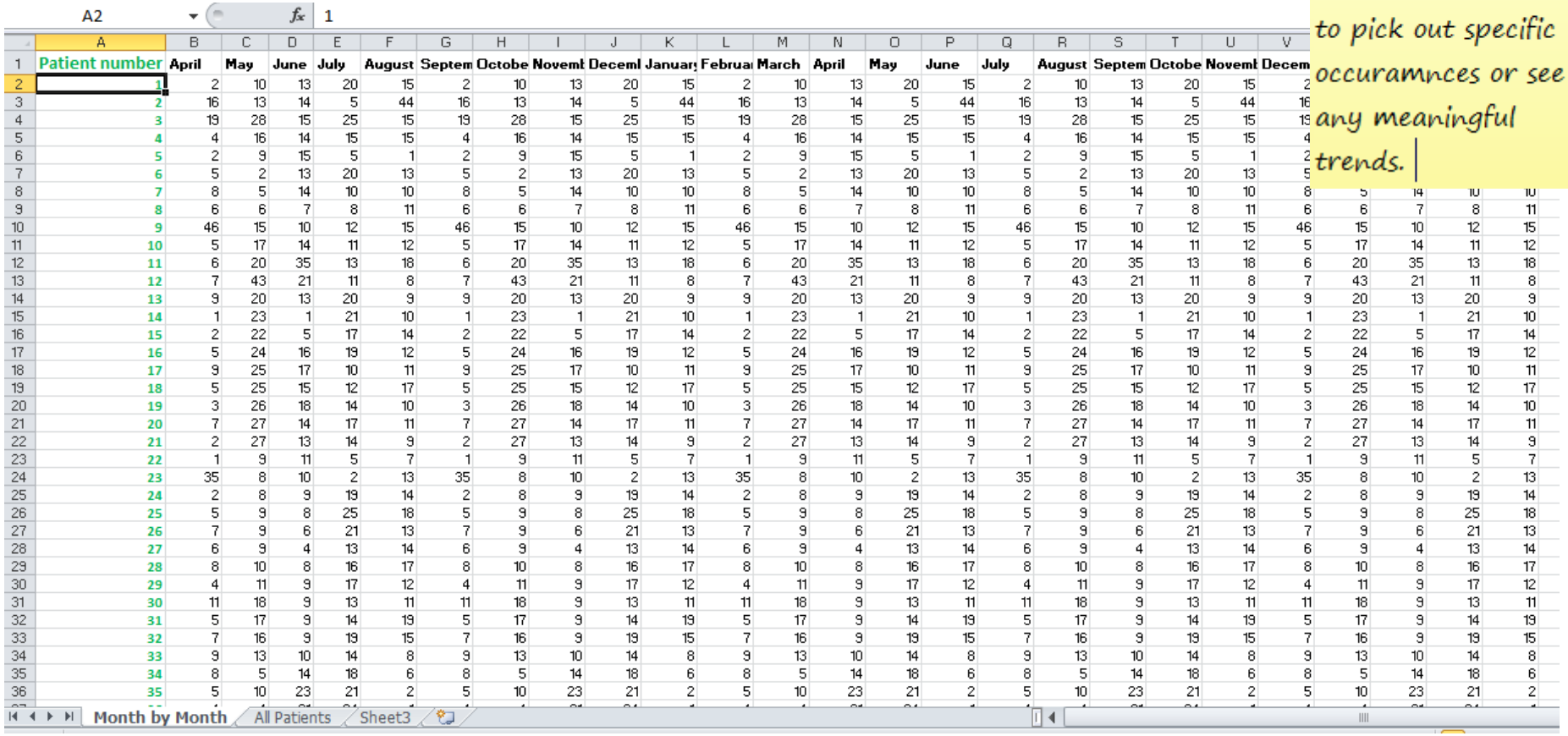
This data is rarther simple and the individual occurances and trends are easy to see...

Can you now answer all three of the previous questions?

	December	January	February	March	April
Patient 1	2	10	13	20	15
Patient 2	16	13	14	5	44
Patient 3	19	28	15	25	15
Patient 4	4	16	14	15	15
Patient 5	2	9	15	5	1
Patient 6	5	2	13	20	
Patient 7	8		14		
Patient 8	6				
Patient 9	46				
Average	12	13	14	15	18
% Late	33.3%	33.3%	0.0%	50.0%	20.0%

But what if you have this much data?

There is too much data here to be able to pick out specific occuramnces or see any meaningful trends.



A2 1

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	Patient number	April	May	June	July	August	Septem	Octobe	Novemt	Decemt	Januar	Februa	March	April	May	June	July	August	Septem	Octobe	Novemt	Decem
2	1	2	10	13	20	15	2	10	13	20	15	2	10	13	20	15	2	10	13	20	15	2
3	2	16	13	14	5	44	16	13	14	5	44	16	13	14	5	44	16	13	14	5	44	16
4	3	19	28	15	25	15	19	28	15	25	15	19	28	15	25	15	19	28	15	25	15	19
5	4	4	16	14	15	15	4	16	14	15	15	4	16	14	15	15	4	16	14	15	15	4
6	5	2	9	15	5	1	2	9	15	5	1	2	9	15	5	1	2	9	15	5	1	2
7	6	5	2	13	20	13	5	2	13	20	13	5	2	13	20	13	5	2	13	20	13	5
8	7	8	5	14	10	10	8	5	14	10	10	8	5	14	10	10	8	5	14	10	10	8
9	8	6	6	7	8	11	6	6	7	8	11	6	6	7	8	11	6	6	7	8	11	6
10	9	46	15	10	12	15	46	15	10	12	15	46	15	10	12	15	46	15	10	12	15	46
11	10	5	17	14	11	12	5	17	14	11	12	5	17	14	11	12	5	17	14	11	12	5
12	11	6	20	35	13	18	6	20	35	13	18	6	20	35	13	18	6	20	35	13	18	6
13	12	7	43	21	11	8	7	43	21	11	8	7	43	21	11	8	7	43	21	11	8	7
14	13	9	20	13	20	9	9	20	13	20	9	9	20	13	20	9	9	20	13	20	9	9
15	14	1	23	1	21	10	1	23	1	21	10	1	23	1	21	10	1	23	1	21	10	1
16	15	2	22	5	17	14	2	22	5	17	14	2	22	5	17	14	2	22	5	17	14	2
17	16	5	24	16	19	12	5	24	16	19	12	5	24	16	19	12	5	24	16	19	12	5
18	17	9	25	17	10	11	9	25	17	10	11	9	25	17	10	11	9	25	17	10	11	9
19	18	5	25	15	12	17	5	25	15	12	17	5	25	15	12	17	5	25	15	12	17	5
20	19	3	26	18	14	10	3	26	18	14	10	3	26	18	14	10	3	26	18	14	10	3
21	20	7	27	14	17	11	7	27	14	17	11	7	27	14	17	11	7	27	14	17	11	7
22	21	2	27	13	14	9	2	27	13	14	9	2	27	13	14	9	2	27	13	14	9	2
23	22	1	9	11	5	7	1	9	11	5	7	1	9	11	5	7	1	9	11	5	7	1
24	23	35	8	10	2	13	35	8	10	2	13	35	8	10	2	13	35	8	10	2	13	35
25	24	2	8	9	19	14	2	8	9	19	14	2	8	9	19	14	2	8	9	19	14	2
26	25	5	9	8	25	18	5	9	8	25	18	5	9	8	25	18	5	9	8	25	18	5
27	26	7	9	6	21	13	7	9	6	21	13	7	9	6	21	13	7	9	6	21	13	7
28	27	6	9	4	13	14	6	9	4	13	14	6	9	4	13	14	6	9	4	13	14	6
29	28	8	10	8	16	17	8	10	8	16	17	8	10	8	16	17	8	10	8	16	17	8
30	29	4	11	9	17	12	4	11	9	17	12	4	11	9	17	12	4	11	9	17	12	4
31	30	11	18	9	13	11	11	18	9	13	11	11	18	9	13	11	11	18	9	13	11	11
32	31	5	17	9	14	19	5	17	9	14	19	5	17	9	14	19	5	17	9	14	19	5
33	32	7	16	9	19	15	7	16	9	19	15	7	16	9	19	15	7	16	9	19	15	7
34	33	9	13	10	14	8	9	13	10	14	8	9	13	10	14	8	9	13	10	14	8	9
35	34	8	5	14	18	6	8	5	14	18	6	8	5	14	18	6	8	5	14	18	6	8
36	35	5	10	23	21	2	5	10	23	21	2	5	10	23	21	2	5	10	23	21	2	5

Month by Month | All Patients | Sheet3

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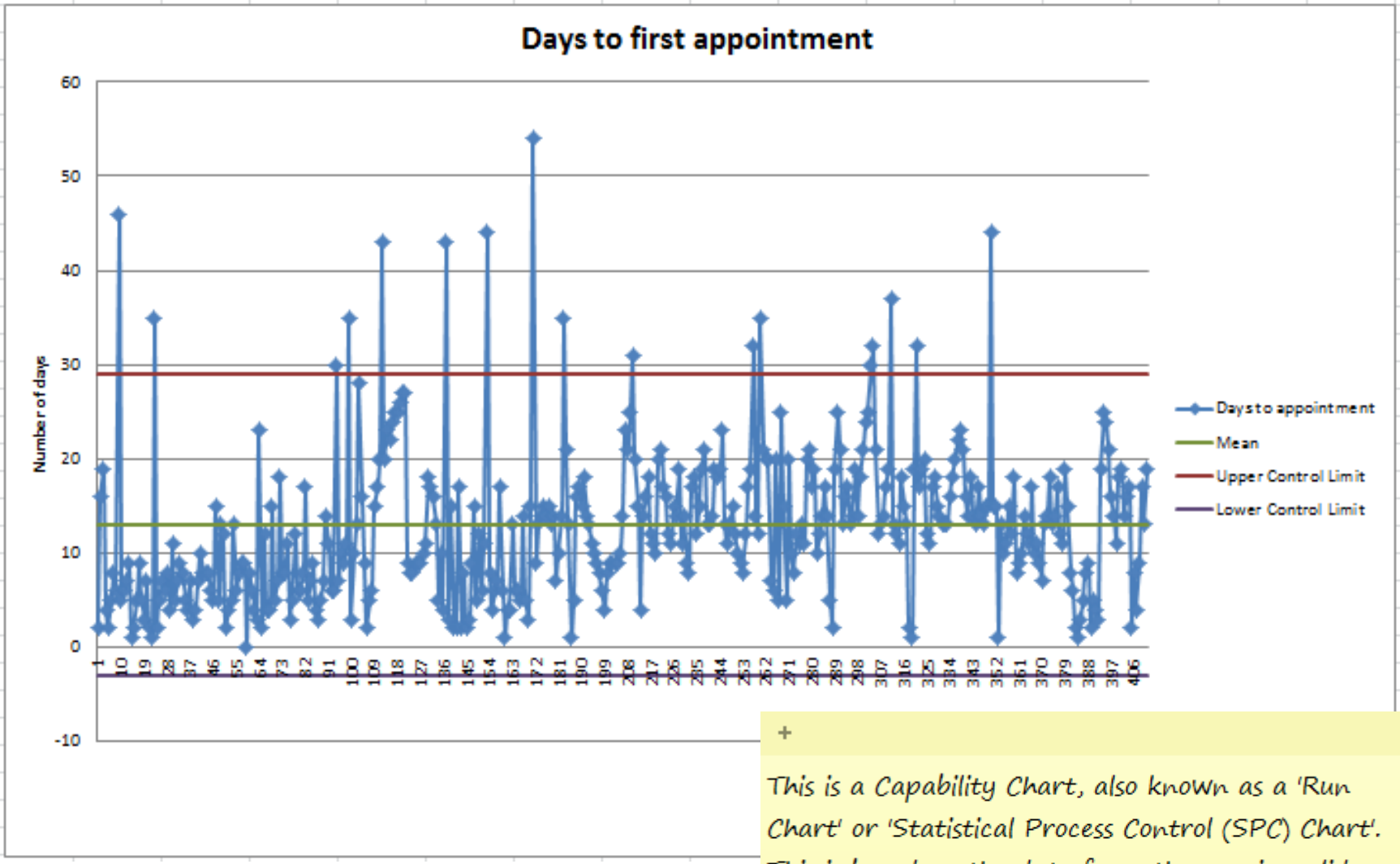
Welcome the Capability Chart…



This is a Capability Chart, also known as a 'Run Chart' or 'Statistical Process Control (SPC) Chart'. This is based on the data from the previous slide and plots each individual piece of data in time order.

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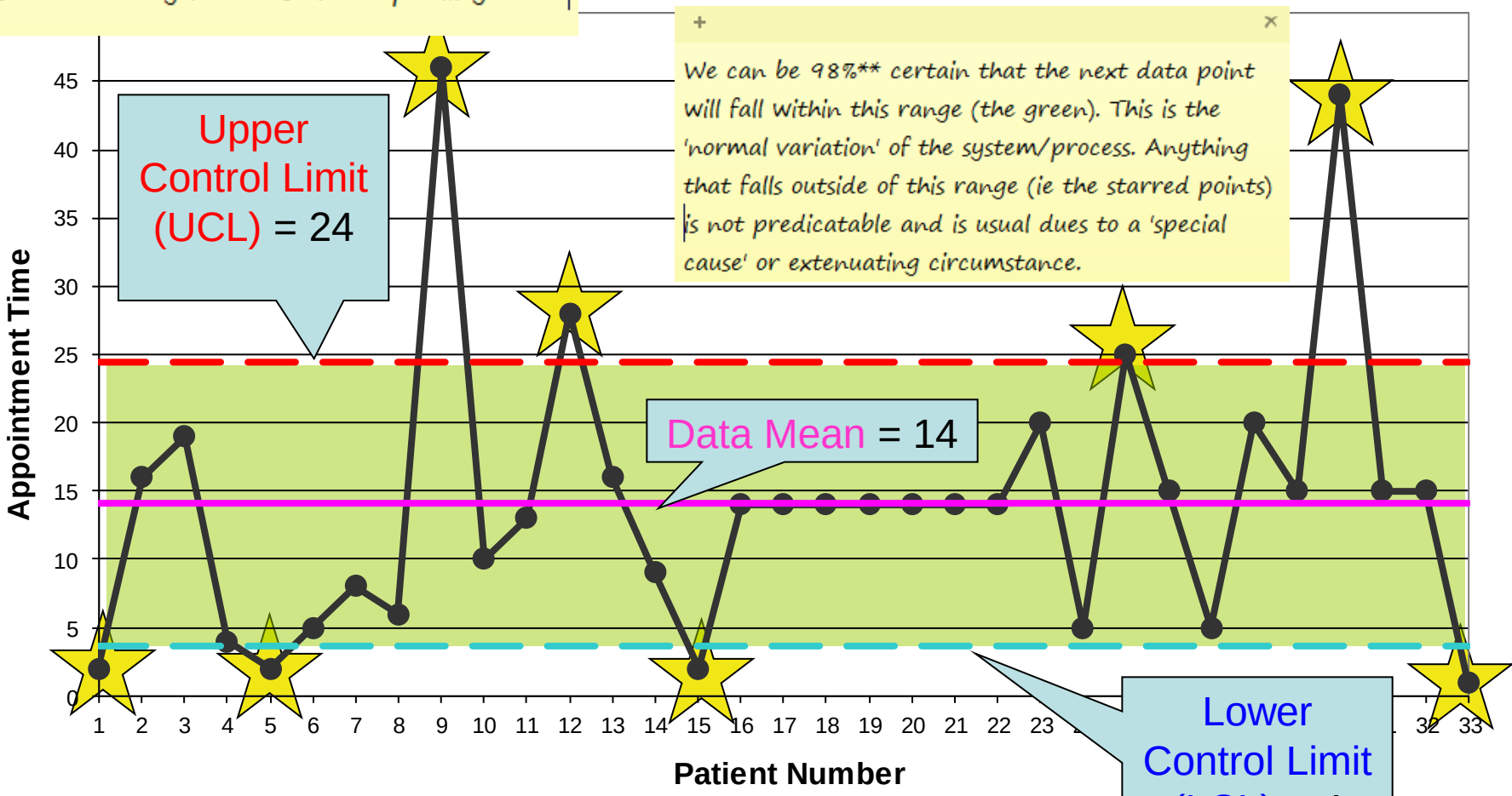
Erinsborough Capability Chart

Here we have used the simplified data from slide 11 to demonstrate the key features of a capability chart



** the 98% is used for demonstration purposes, it will vary slightly depending on the data.

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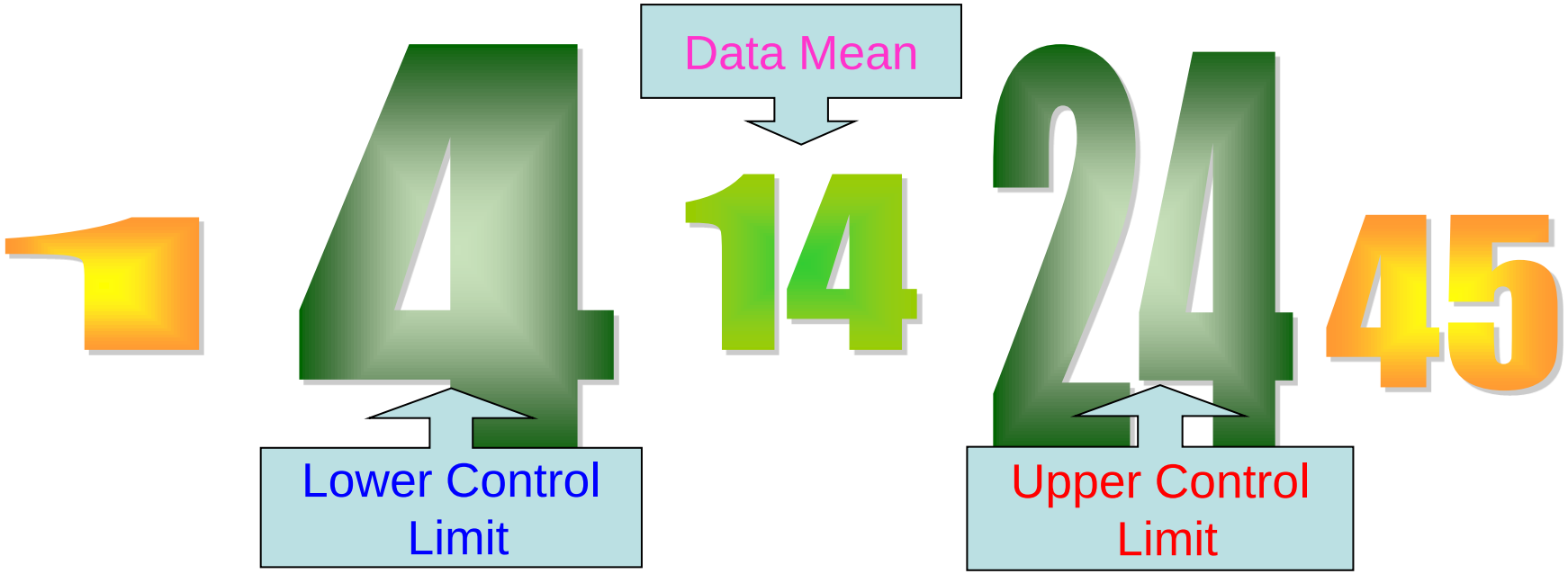
Erinsborough Key Data



To summarise, the capability chart tells us the following...
The mean is 14 days and the predicatable time until 1st appointment is between 4 and 24 days.

Therefore, it is UNLIKELY Erinsborough will make an appointment in less that 4 days (although it is not impossible) the same as it is UNLIKELY that anyone will be waiting longer than 24 days (although it is not impossible).

So, when making promises to a Child or Young Person, expectations could be managed much better.

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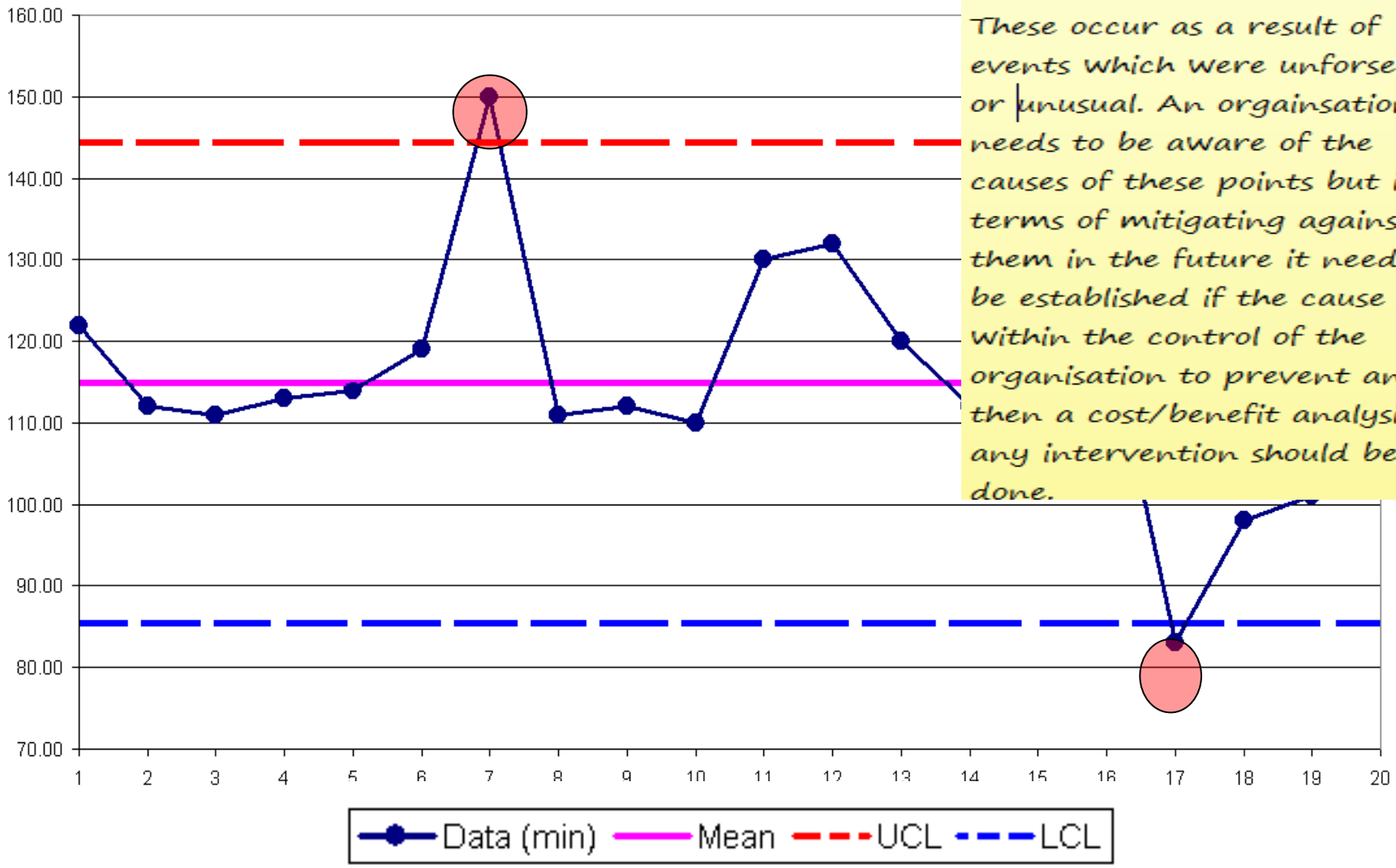
System Capability

- It's not one number – gives a range of likely outcomes.

- The capability of the system is calculated from the data itself.

What do Capability Charts Tell Us?

Special Cause Variation



These occur as a result of events which were unforseen or unusual. An orgainsation needs to be aware of the causes of these points but in terms of mitigating against them in the future it needs to be established if the cause was within the control of the organisation to prevent and then a cost/benefit analysis of any intervention should be done.

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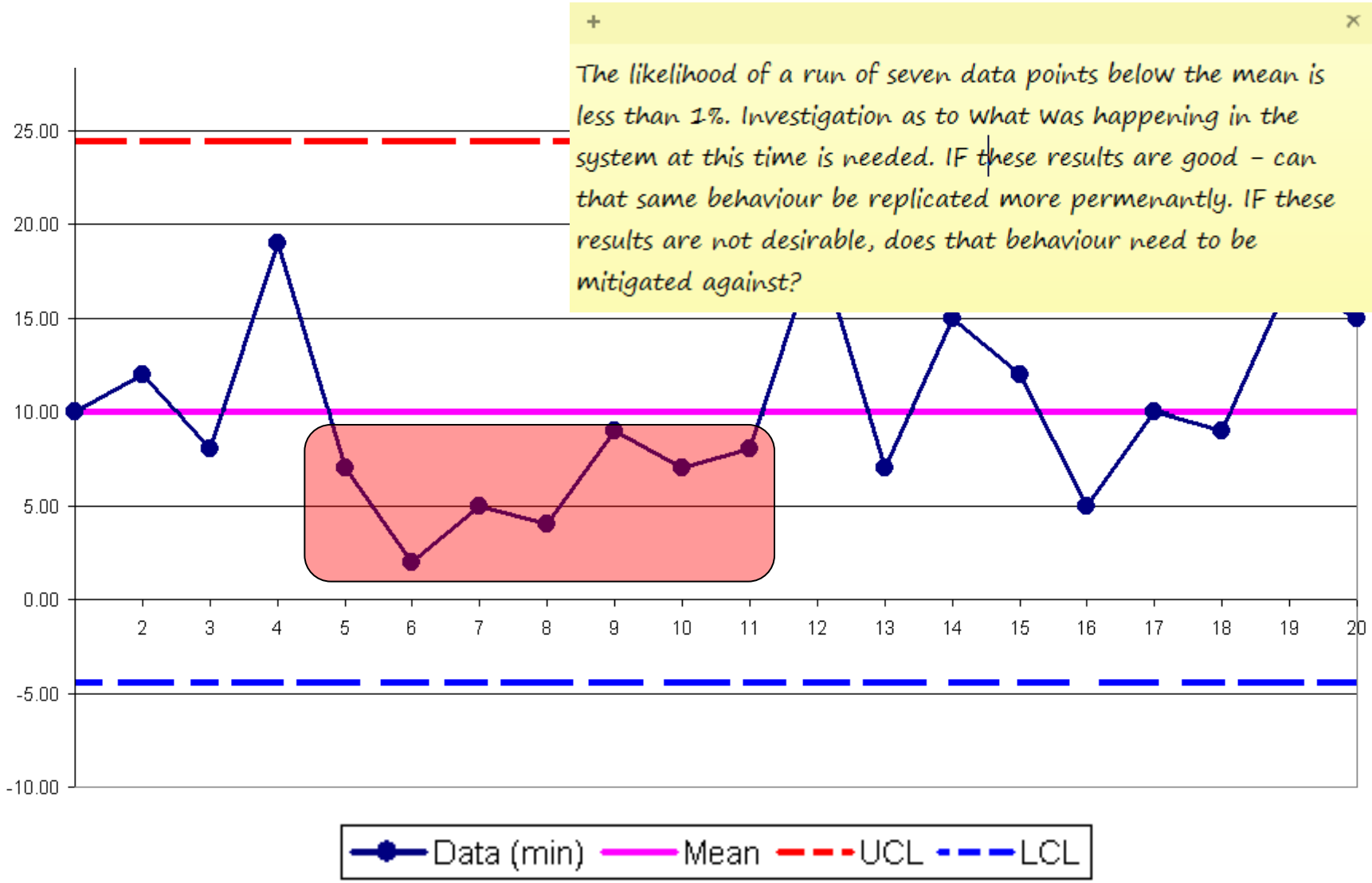
What else should you look out for?

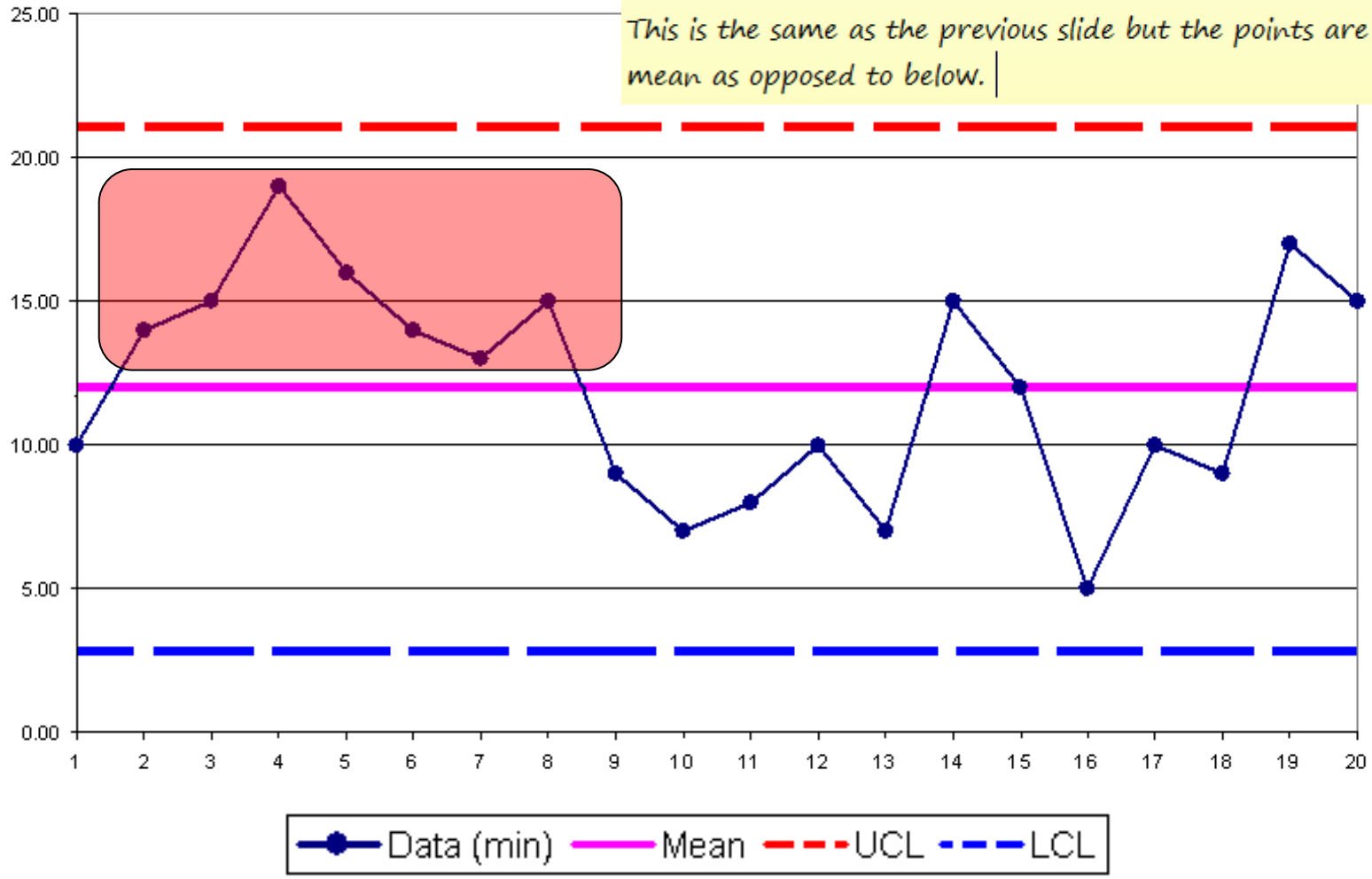
There are other things that should be watched out for in a capability chart which are not 'normal' data behaviour. When these things occur, deeper investigation and dicussion is needed to unearth the cause...

Seven Plus Below

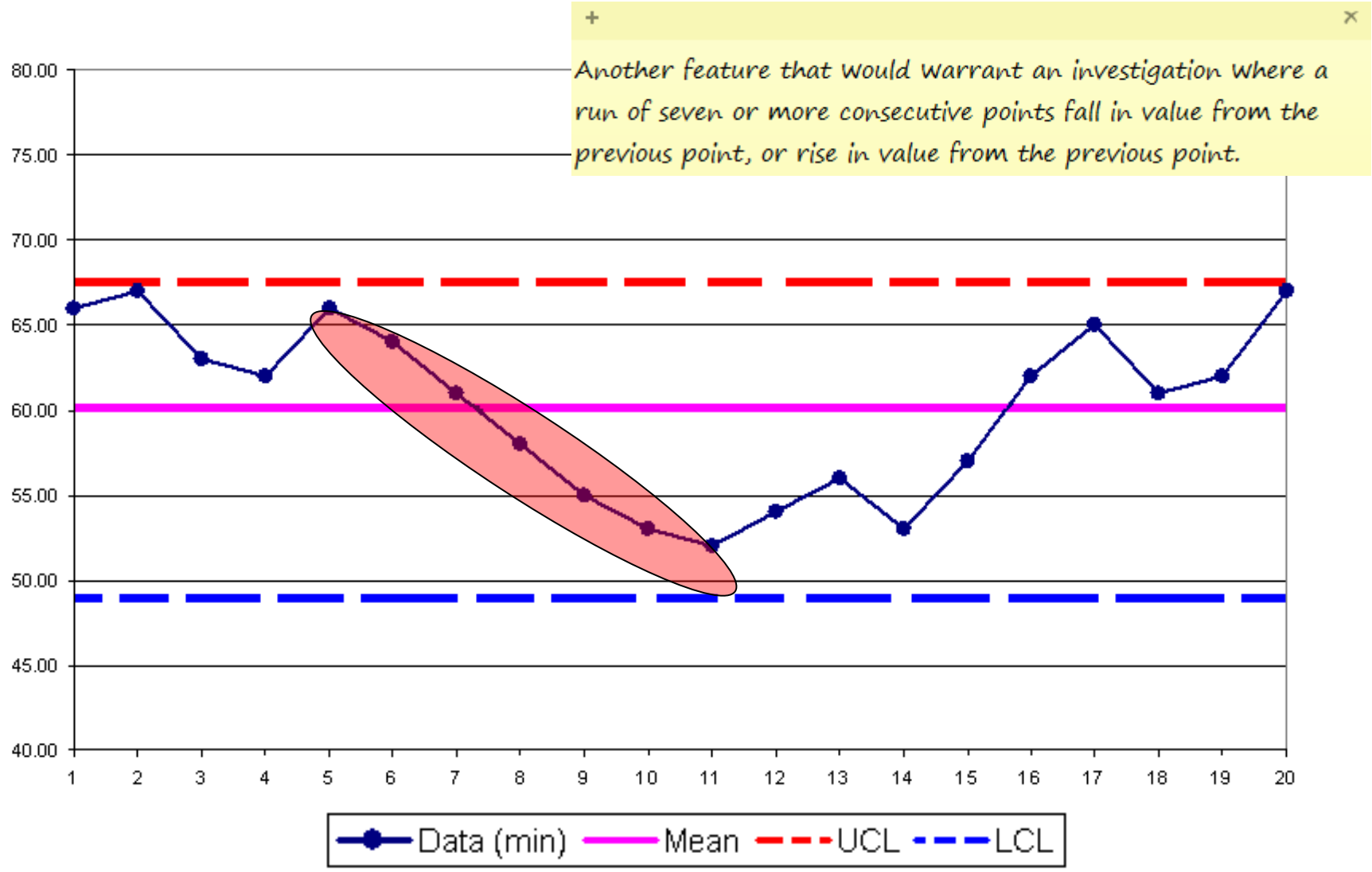


Seven Plus Above

This is the same as the previous slide but the points are above the mean as opposed to below.



Run of Seven Plus



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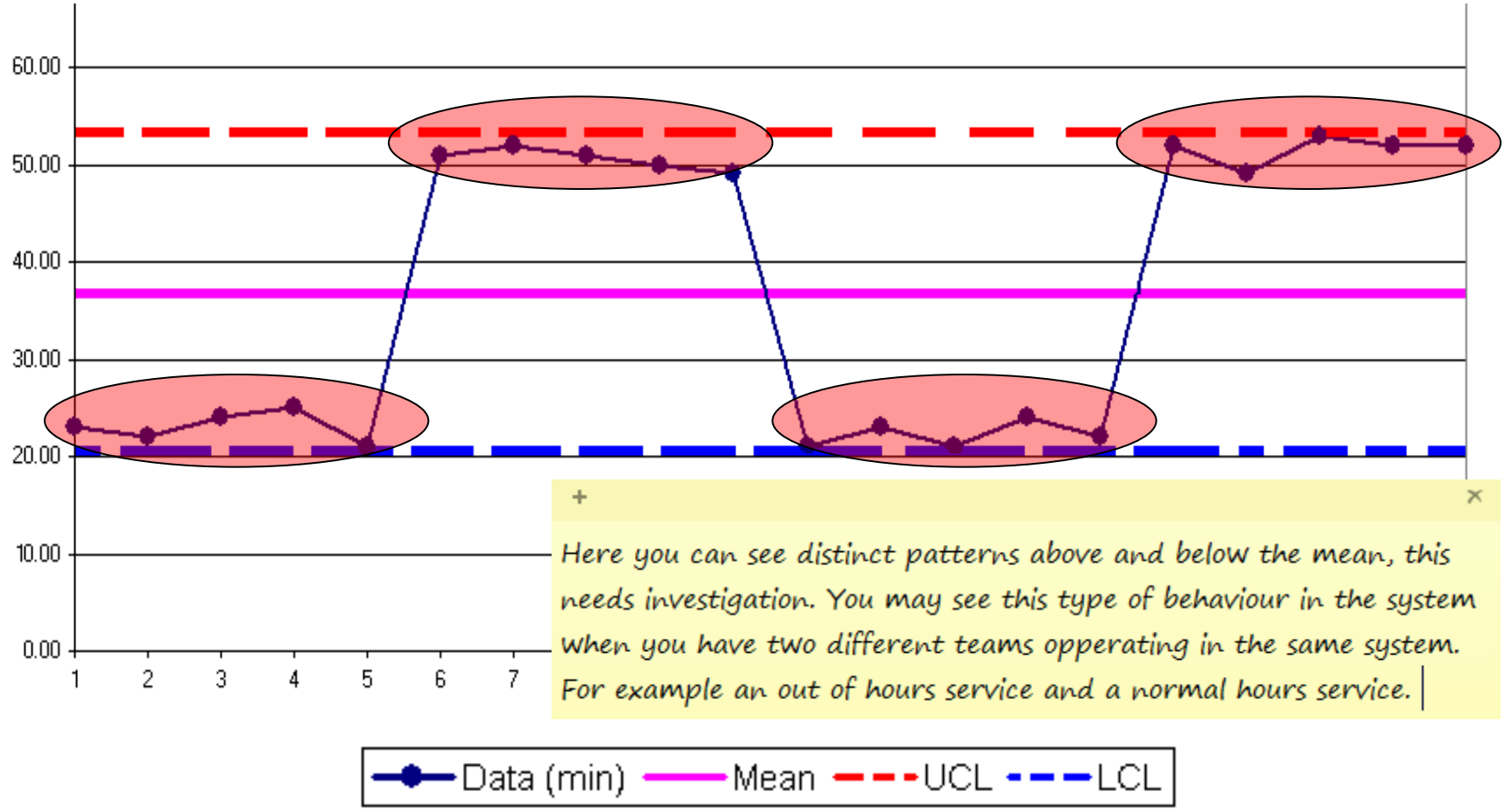
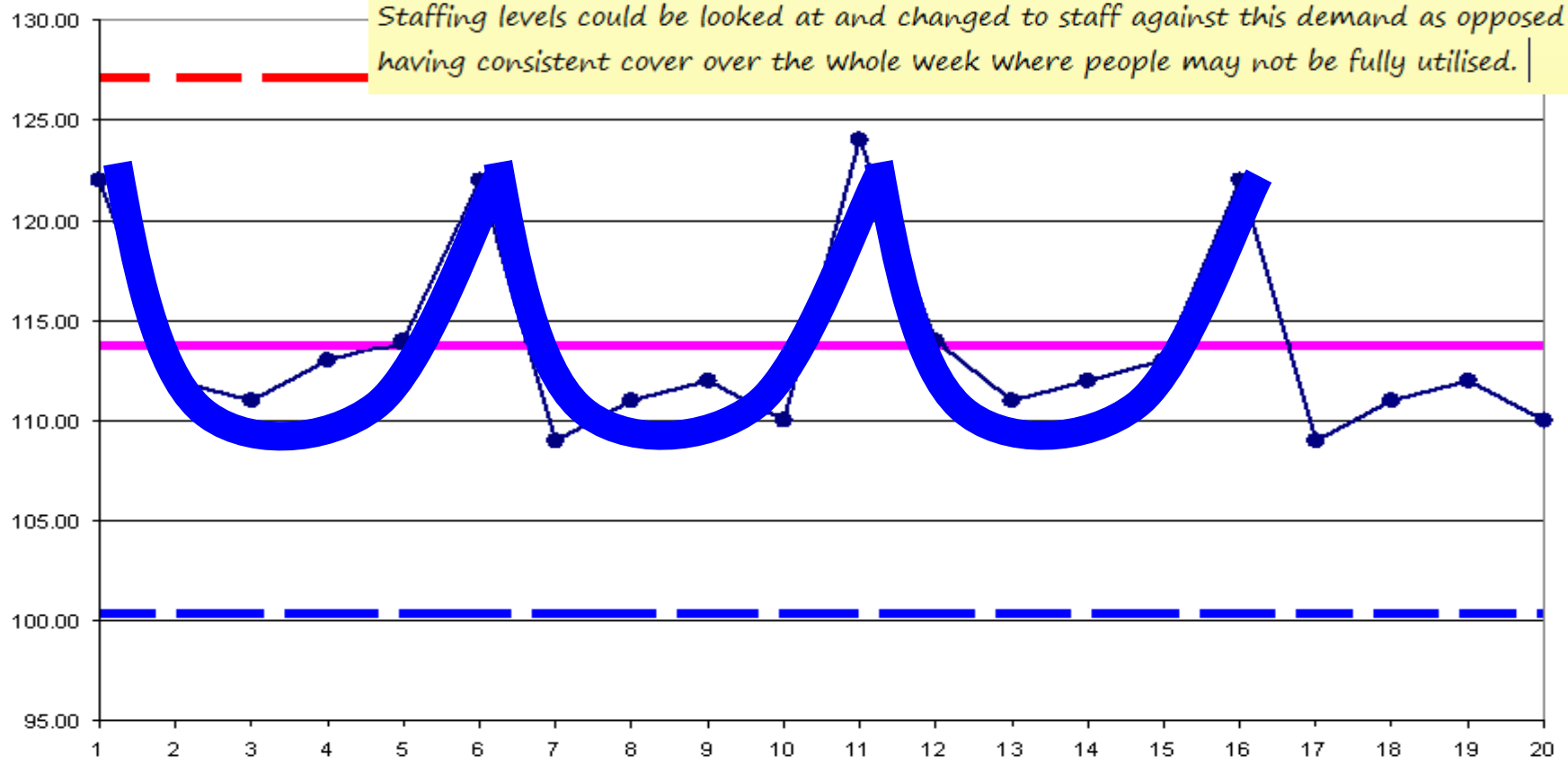
Bunching


60.00
50.00
40.00
30.00
20.00
10.00
0.00
1
2
3
4
5
6
7
Here you can see distinct patterns above and below the mean, this needs investigation. You may see this type of behaviour in the system when you have two different teams opperating in the same system. For example an out of hours service and a normal hours service.
Data (min)
Mean
UCL
LCL

Cyclical

Here the distinct pattern is showing that the system is working in a cycle where the performance is consistently increasing and decreasing. For example, this could be showing referals into a service and highlights that there is more demand on a Monday morning. Staffing levels could be looked at and changed to staff against this demand as opposed to having consistent cover over the whole week where people may not be fully utilised.



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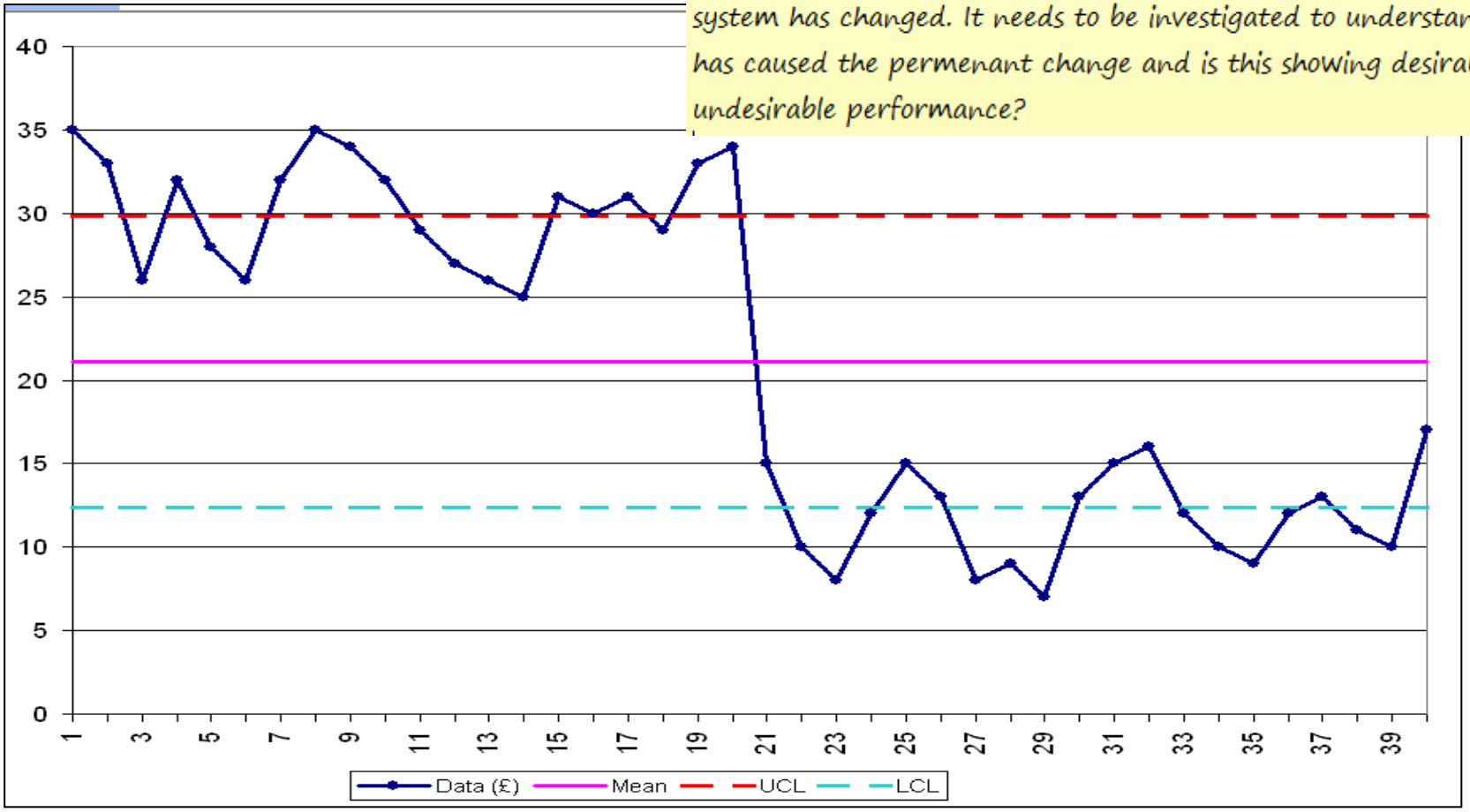
So Capability Charts tell us…

- The average system response
- The predictable range – the capability of the system to respond to demand
- Out of Control Points
- It enables trends to be spotted
  - 7 above/below
  - Run of 7
  - Bunching
  - Cyclical

What if the system has changed?

Here, this is not a case of bunching, it has been established that the system has changed. It needs to be investigated to understand what has caused the permenant change and is this showing desirable or undesirable performance?



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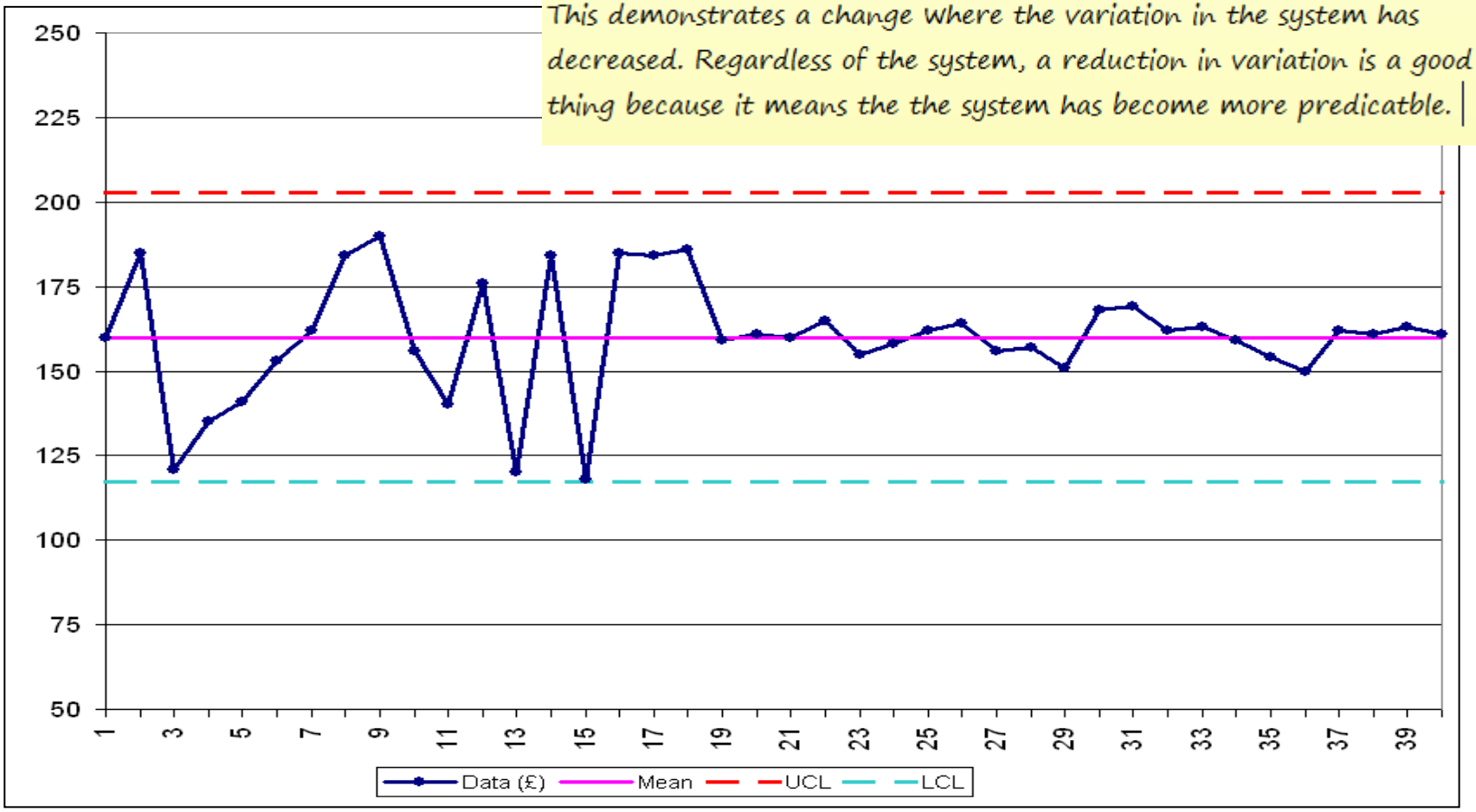
Another Example of a System Change

This demonstrates a change where the variation in the system has decreased. Regardless of the system, a reduction in variation is a good thing because it means the the system has become more predicatble.



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Pause for Thought

What measures could you use a capability chart for?

Uses in a CAMHS service could include...
Waiting times
Refferal rates
Timescales in smaller sections of a system (e.g. data collection to data input)
Length of time in service
Number of sessions per person
ROM results

What would your ideal capability chart look like?

CORC Support

- More information on capability charts
- Help you decide how these could be used

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Question Time

- Understood what system capability is, and can identify whether a system is acting predictably or not.
- Interpreted trends shown within capability charts.
- Consider how capability could be shown in your service – and what good might look like