MEASURING AND USING DATA

MEASURING AND **USING DATA**

This module focuses on using data and measurement approaches in improvement. It emphasizes the importance of collecting data over time and covers how to choose measures for a project and develop a plan to collect data.

LEARNING OBJECTIVES

By the end of this module, participants will be able to...

- Explain the importance of collecting data over time
- Define key measures
- Describe strategies to collect and display data

THIS MODULE CONTAINS:

Nineteen slides with speaking notes and questions for group discussion (45-60 minutes) including:

2 collections of custom content*

- Measures from Aim Statements
- Types of Measures

**You may choose the most relevant example from the collection provided, or create your own.*

Three optional learning activities:

- Developing a Measurement Plan - worksheet (30 minutes)
- Using a Safety Cross to Display Data - worksheet (30 minutes)
- Creating Run Charts - worksheet (30 minutes)

Remember to make this module your own! Add in examples and details that will bring the ideas to life for the learners.


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By the end of this module, you will be able to...

- Explain the importance of collecting data over time
- Define key measures
- Describe strategies to collect and display data

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Speaking Notes:

- By the end of the module, you will have learned the importance of collecting data over time - from the beginning of the project and all the way through.
- This module is specific to project work - you will learn how to use an aim statement to help understand what to measure.

MEASUREMENT

Tells us:

- Where we started at the beginning of the project
- How we change over time
- When we have reached our target

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Speaking Notes:

- One of the major foundations of improvement work is the idea that data collection is done over time.
- The purpose of data in improvement is to know your current performance and how close you are getting to your aim.
- It is very important to start collecting data for your measures early on in your project.

COLLECT DATA OVER TIME

Collecting data over time shows whether what we are trying to improve is getting better.

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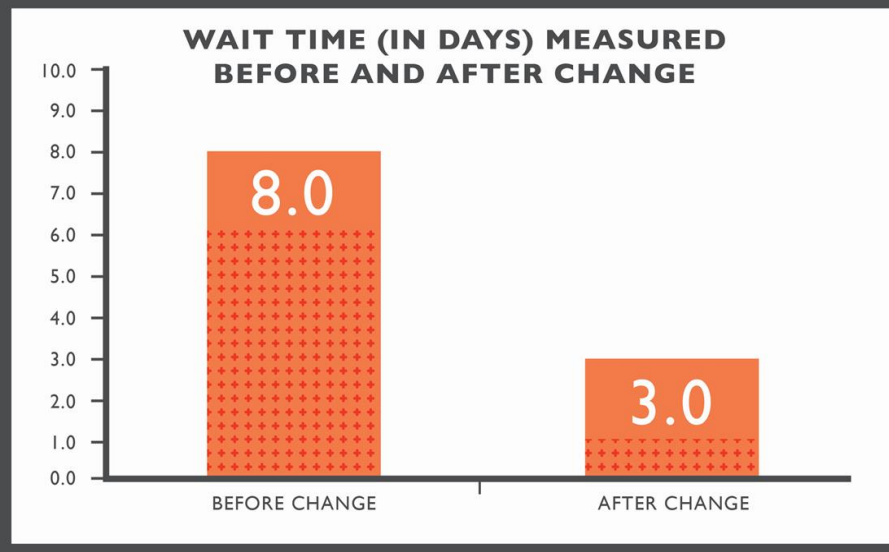
Speaking Notes:

- Start collecting data from the start of your project and measure frequently.
- This helps you to know where you started, where you are currently, and how far you have to go to reach your aim. Staying attentive to what you are leaning through PDSA cycles along the way will help guide your improvement efforts.
- The next slides demonstrate why data over time gives us more accurate information than data measured only before and after a change is implemented.

WHY NOT BEFORE AND AFTER?



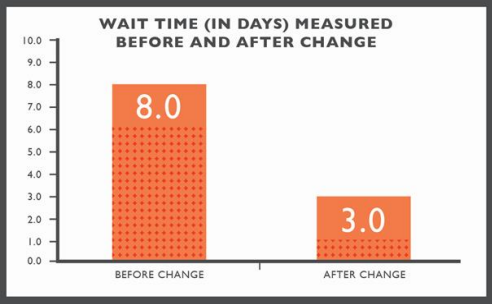
PRE: 8 days wait time POST: 3 days wait time

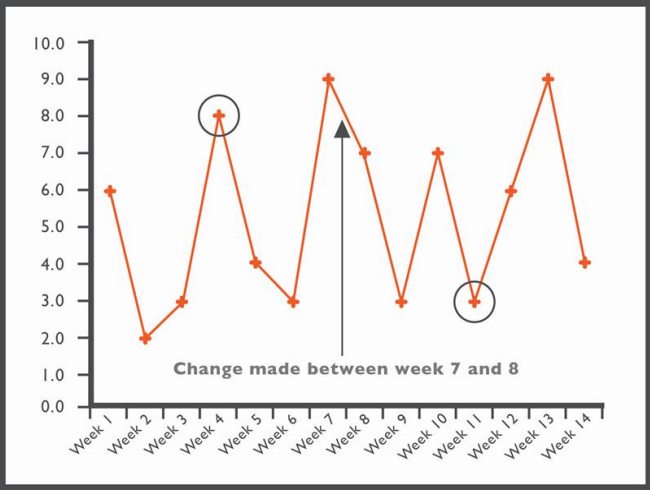
(Adapted from Provost and Murray, 2011)

Speaking Notes:

- Because quality improvement is about making changes, people are sometimes tempted to do pre-post analysis, measuring before a change and then after a change.
- In this example, there was a change that was meant to decrease wait time.
- The team measured wait time before the change and it was 8 days and then they measured it after the change and it was 3 days.
- This looks good and the team would conclude that their change was successful.
- But there is a problem with this approach…

SCENARIO 1



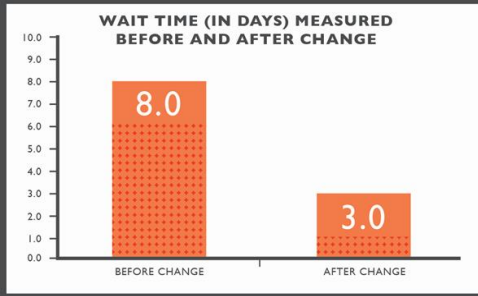


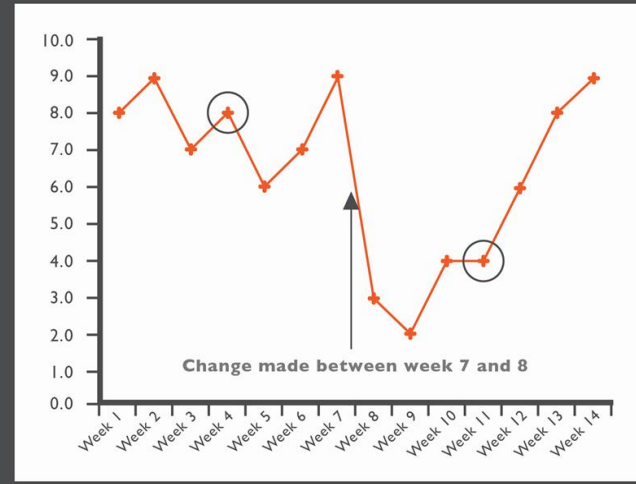
(Adapted from Provost and Murray, 2011)

Speaking Notes:

- What does this slide tell us?
- There is no obvious improvement after the change was made, just lots of variation from week to week.
- If we just measured on Week 4 and Week 11 like we did with the pre and post, our bar chart would lead us to think the wait time had improved.

SCENARIO 2



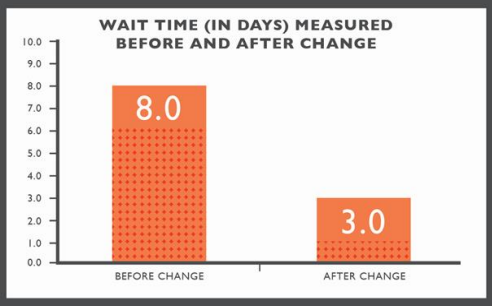


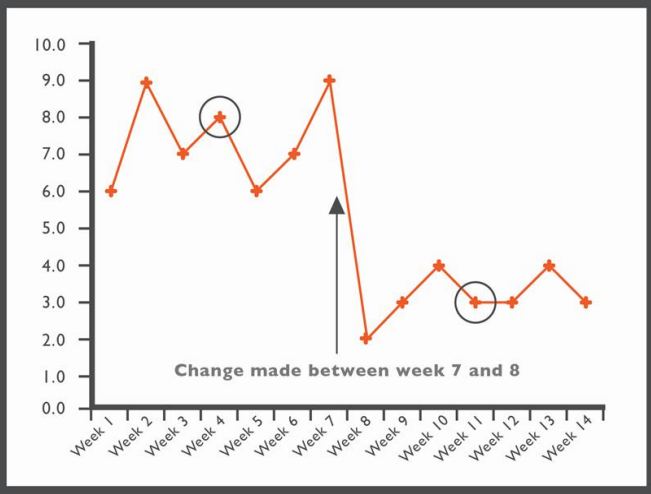
(Adapted from Provost and Murray, 2011)

Speaking Notes:

- What does this slide tell us? Does it look like the change was successful?
- It does actually, but it was only temporary. Again, we don't see that on the bar chart.
- All of these scenarios have the exact same bar chart, but when you collect more data and it gets displayed every week, the data tells a very different story.

SCENARIO 3





(Adapted from Provost and Murray, 2011)

Speaking Notes:

- From this simple example, we can see the importance of collecting data over time.
- We need to see data over time to analyze the fluctuation or variation. There will always be some up and down, and we need to determine what that variation means:
    - Is it just random fluctuation and therefore not really showing anything?
    - Is it actually evidence of improvement? Is the data going up (or down) in a way that it is not random?
    - If it is improved, does it stay at that level?
- Data over time helps us identify signs of improvement.

TYPES OF MEASURES

Outcome Measures:

Show if changes are leading to improvement and achieving the overall aim of the project

Process Measures:

Show whether a specific change is having its intended effect

Balancing Measures:

Help ensure that changes to improve one part of the system are not causing new problems in other areas

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Speaking Notes:

- The aim of a project helps determine what to measure, but you need a few different measures to tell the whole story.
- Improvement projects have three kinds of measures:
    - **Outcome:** Tell us if what we are trying to improve is really getting better.
    - **Process:** Tell us if we are consistently doing things we said we were going to do.
    - **Balancing:** Tell us if there is anything else that has changed, or is different, because of the change we introduced. Have we impacted anyone positively or negatively through the changes we are making? Consider resources, time/workload, or money.
- As a guideline, try to include between 3-8 measures per project, including at least one outcome measure and one process measure.

CHOOSING MEASURES

The project charter will help specify the measures.

Go back to your aim statement - what are you trying to accomplish?

- What will improve?
- By how much?
- By when?
- For whom?

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Speaking Notes:

- So if you were to change something – how will you know that change is an improvement?
- Knowing what to measure is easier when the project has a clearly defined and measurable aim statement.

Some is not a number, soon is not a time. - **Don Berwick**

CHOOSING MEASURES

AIM STATEMENT:

The wait time for the *Get Better Clinic* will decrease from an average of 135 days to less than 60 days by the end of this year.

MEASURE: ?

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Speaking Notes:

- Based on this aim statement, what do you think would be an appropriate outcome measure?

Anticipated Response:

- Wait time in days

FOR EXAMPLE…

AIM STATEMENT:

MEASURE:

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Speaking Notes:

- Based on this aim statement, what do you think would be an appropriate outcome measure? *(Copy an example from the next page into this slide, or create your own example.)*

If participants are part of a specific project team, take some time for the group to draft a measure for their aim statement in their project.

Custom Examples

Choose an example from the list below, or create your own example, and add it into the previous Measures slide.

MEASURES FROM AIM STATEMENTS

AIM STATEMENT	POTENTIAL MEASURE
We will decrease the number of falls for all residents on **Mountain View Care Centre's** North wing from an average of 10 per month to 2 per month by December 31.	Number of falls
We will reduce waiting time to see a physician at **Coast View Clinic** to less than 30 minutes by May 31.	Minutes to see physician
On 7-West Medical Unit at **Cedar View Hospital**, the number of pressure ulcers per patient day will decrease by 30% by September 30.	Number of ulcers per patient day
At **Park View Emergency Department**, we will reduce the time that nurses spend searching for supplies by 50% by December 31.	Time spent searching
To increase the appropriate timing of prophylactic antibiotics in colorectal cases in the **Ocean View Hospital** operating room to 95% by June 30.	Percent of colorectal cases with timely prophylactic antibiotic administration
By March 31, the Schizophrenia Unit at **Valley View Mental Health Centre** will have reduced the number of violent incidents on the unit from an average of 15 to 5 or fewer per month.	Number of violent incidents

Or create your own: _____

CHOOSING MEASURES

AIM STATEMENT:

The wait time for the *Get Better Clinic* will decrease from an average of 135 days to less than 60 days by the end of this year.

Outcome Measure: ?

Process Measure: ?

Balancing Measure: ?

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Speaking Notes:

- Based on this example aim statement, what do you think the measures in this project could be?

Anticipated Response:

- **Outcome Measure:** Number of days until appointment
- **Process Measure:** Number of cancelled appointments filled from cancellation call list
- **Balancing Measure:** Clinician satisfaction score

FOR EXAMPLE…

AIM STATEMENT:

Outcome Measure: ?

Process Measure: ?

Balancing Measure: ?

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Speaking Notes:

- Based on this example aim statement, what do you think the measures in this project could be? *(Copy an example from the next page into this slide, or create your own example.)*

If participants are part of a specific project team, take some time for the group to draft measures for their project.

Custom Examples

Choose an example from the list below, or create your own example, and add it into the previous Types of Measures slide.

TYPES OF MEASURES

	POTENTIAL MEASURE	PROCESS MEASURE	BALANCING MEASURE
Mountain View Care Centre	Number of falls	Number of residents who have had a mobility assessment	Number of restraints being used
Coast View Clinic	Minutes to see physician	Minutes to clean and prepare appointment rooms between appointments	Clinic staff satisfaction score
Cedar View Hospital	Number of pressure ulcers per patient day	Percent of patients with completed skin assessment	Time staff spend documenting skin assessments
Park View Emergency Department	Time spent searching	Number of supplies out of stock	Time ward aides spend stocking and organizing supply rooms
Ocean View Hospital	Percent of colorectal cases with timely prophylactic antibiotic administration	Percent of colorectal cases in which surgical checklist was completed	Cost of antibiotics per month
Valley View Mental Health Centre	Number of violent incidents	Percent of patients with completed behavioural assessments	• Number of patients in physical restraints • Number of patients on chemical restraints

Or create your own: _____

_____

_____

_____

_____

DATA COLLECTION

- Start right away
- Small, frequent measures
- Integrate into workload
- Timely

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Speaking Notes:

- You need to know where you are starting from in order to know when you start to see improvement. Start collecting data right away and consider getting baseline data from previous months or years.
- Often you don't need to measure everything. You can use sampling to lessen effort and the sample size will build over time.
- Try to make data collection as easy as possible. Minimize the amount of extra effort required.
- Collect data as close to real time as possible to learn about the current performance.

DISPLAYING YOUR DATA

- Data shows where you are starting from and how close you are to reaching your aim
- Data helps you:
  - Know how you're doing
  - Learn what is and isn't working
  - See the impact of changes
  - Share your progress
- Start displaying data as soon as you have it

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Speaking Notes:

- Data can help you determine how well you are doing and what you will have to improve.
- You can use data as a communication tool, both within your improvement team and with external stakeholders, so everyone knows how things are going.

Optional Activity

SAFETY CROSS

Purpose

For participants to use a safety cross to track improvement and display data.

Time

30 minutes

Materials

- Safety Cross worksheet and Safety Cross Case Study worksheet
- Red and green felts

Preparation

Print a copy of each worksheet for each participant.

Instructions

Read the description on the Safety Cross Case Study and fill in the Safety Cross. Colour the square for each day of the month according to whether they met their goal or not. Use green for days that they met or exceeded their goal and red for days they did not.

Debrief

Discuss the features of viewing data in a Safety Cross format. Discuss any other examples from your area of work where a Safety Cross may be useful to track and display data about improvement.

Notes

You may want to demonstrate this on a flip chart or use a projector and complete an electronic version as a team.

Optional Activity

RUN CHARTS

Purpose

For participants to create simple run charts to track and display data over time.

Time

30 minutes

Materials

Run Chart worksheet(s) and Run Chart Case Study worksheet

Preparation

Print a copy of each worksheet for each participant. Print extra Run Chart worksheets, if necessary.

Instructions

Using the case study, plot the data points on the run chart template(s).

Follow up instructions: There are rules for a formal analysis of a run chart that are based on the median. Add in a straight line across the chart to represent the median.

Note: Analyzing run charts is beyond the scope of EPIQ. If you are interested to learn more about this analysis, consult the resources below or contact a Quality Improvement leader in your organization, or check out the resources below.

Debrief

Discuss the benefits of using a run chart, such as it is eye-catching, efficient and quick to create, and easy to understand.

Resources

- IHI Run Chart Tool http://bit.ly/1MhWTeD
- NHS Scotland, Quality Improvement Hub, Run Chart http://bit.ly/1H4Nok3

Notes

You may want to demonstrate this on a flip chart or use a projector to complete an electronic version as a team.

STEPS TO BUILDING A MEASUREMENT PLAN

- Define what you are going to measure.
- Determine when you are going to measure and what your sample will be.
- Determine how you are going to collect data.
- Determine how to display and analyze data.
- Disseminate information.

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Speaking Notes:

- There needs to be enough detail so everyone has the same understanding of what is being measured.
- Consider different types of details, such as:
    - What time frame?
    - Which patients?
    - What diagnosis?
    - What constitutes "met the guideline"?
    - Are you going to sample or include all patients/charts/staff etc.?
    - Who is going to collect, who is going to analyze?
    - Do you need a data collection form or some sort of audit tool?
- Your data does not need to be comparable to other organizations. It needs to make sense to you and your team.
- Don't let data collection stall your project. Start collecting data at the outset; you can always change your data collection plan later on if needed.

Optional Activity

MEASUREMENT PLAN

Purpose

For project team(s) to determine what they will measure and how they will collect data for these measures.

Time

30 minutes

Materials

- Measurement Plan worksheet
- Pens

Preparation

Print a copy of the worksheet for each participant.

Instructions

Consider the focus of the work that your team would like to do. As a team, begin to define the measures you need to include and how you plan to collect data for these measures.

Debrief

Discuss any challenges participants encountered in doing this activity. Review the benefits of having a plan for collecting measures at the outset. Discuss what participants' next steps might be.

Notes

You may want to use a projector and complete an electronic version as a team.

KEEP IN MIND…

- Small, frequent measures
- Timely data collection
- Integrate data collection into workload

Measurement should speed things up, not slow things down.

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Speaking Notes:

- Use sampling and collect data as close to real time as possible to learn about performance quickly and find out if changes are working.
- Try to find ways to build data collection into the work that is already happening to avoid causing additional strain on staff.
- Often, it's not necessary to measure everything, but it is important to have some key measures that will tell you if things are improving or not.

Optional Discussion Questions:

What stood out for you today? What do you want to remember about this session?

TIME TO REFLECT
Can you...

- Explain the importance of collecting data over time?
- Define key measures?
- Describe strategies to collect and display data?

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Speaking Notes:

- Overall, this module is meant to demonstrate how data can help in achieving improvement. Measures should be well-defined with a clear plan for collecting and displaying data.

Use any remaining time for questions and discussion.

Also, be sure to get feedback from your participants on the session. There is an evaluation form that you can use in the appendix.

SAFETY CROSS

WORKSHEET

Measure:

		1	2		
		3	4		
		5	6		
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
		25	26		
		27	28		
		29	30/31		

Safety Cross Case Study

The staff at the Get Better Clinic have decided to try and improve their service for their clients. Together, they are working on an improvement project to decrease wait times.

Their aim statement is: The wait time for the Get Better Clinic will decrease from an average of 135 days to less than 60 days by the end of this year.

To achieve this aim, the clinic staff team is working hard on a number of changes to help increase flow through their clinic. They tracked the average wait time for patients each day and marked whether or not this average was within their stated goal using a Safety Cross.

The averages from their third month of the project are listed below. Fill in the Safety Cross template using this data.

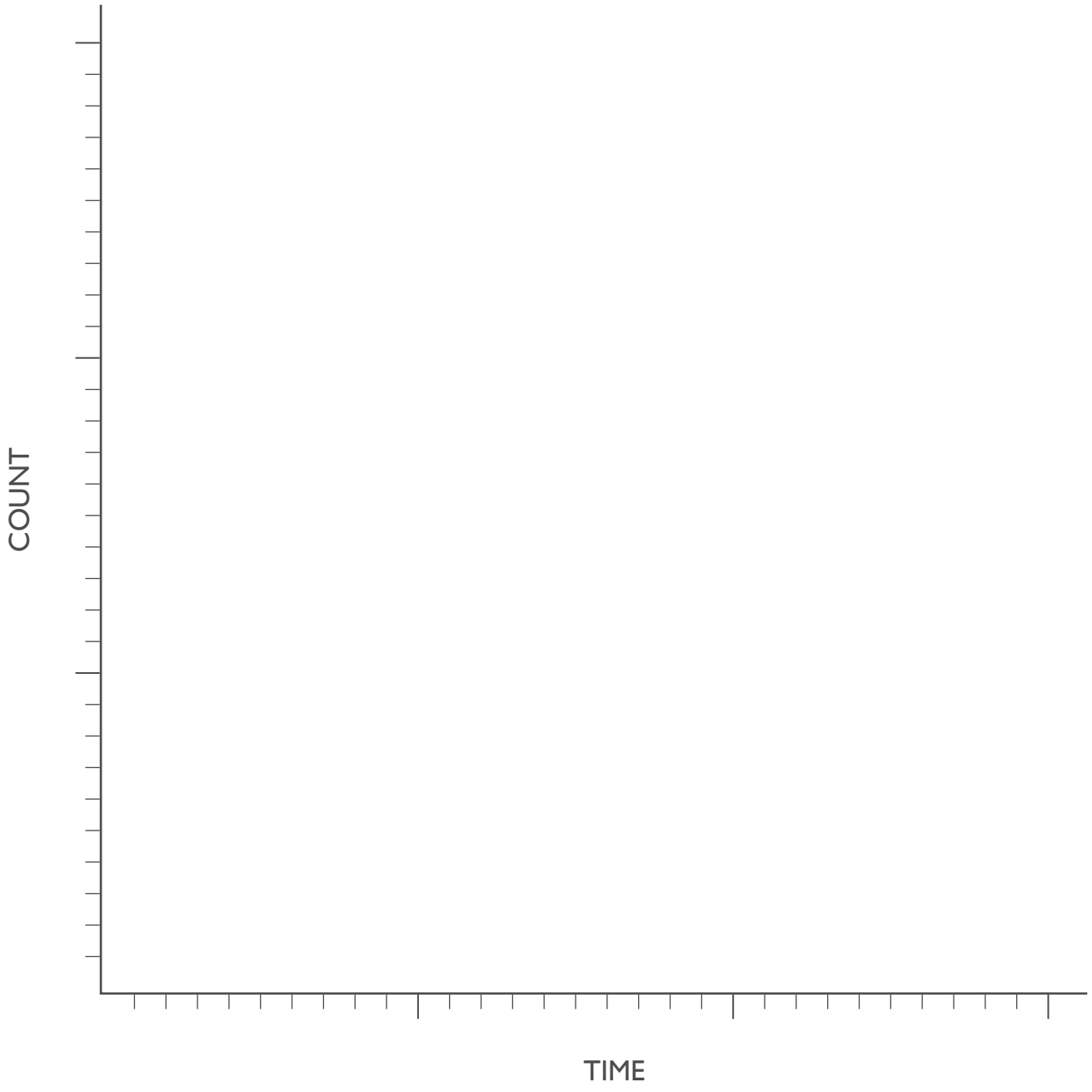
Are they achieving improvement?

DAY OF THE MONTH	AVERAGE WAIT TIME IN DAYS	DAY OF THE MONTH	AVERAGE WAIT TIME IN DAYS	DAY OF THE MONTH	AVERAGE WAIT TIME IN DAYS
1	146	11	82	21	63
2	157	12	79	22	130
3	90	13	74	23	124
4	93	14	60	24	52
5	85	15	125	25	58
6	88	16	151	26	49
7	87	17	63	27	50
8	151	18	62	28	49
9	140	19	60	29	120
10	79	20	58	30	130

On Wednesdays and Thursdays, the clinic had evening appointments available, which were very popular with their clients. Can you see evidence of this demand in the data?

RUN CHART

WORKSHEET



Run Chart Case Study

The staff team at the Get Better Clinic have decided to try and improve their service for their clients. Together, they are working on an improvement project to decrease wait times. Their aim statement is: The wait time for the Get Better Clinic will decrease from an average of 135 days to less than 60 days by the end of this year.

1. To achieve this aim, the clinic staff team is working hard on a number of changes to help increase flow through their clinic. They tracked the average wait time for patients each day. The averages from their fifth month of the project are listed below. Can you plot them in a run chart?

DAY OF THE MONTH	AVERAGE WAIT TIME IN DAYS	DAY OF THE MONTH	AVERAGE WAIT TIME IN DAYS	DAY OF THE MONTH	AVERAGE WAIT TIME IN DAYS
1	146	11	82	21	63
2	157	12	79	22	130
3	90	13	74	23	124
4	93	14	60	24	52
5	85	15	125	25	58
6	88	16	151	26	49
7	87	17	63	27	50
8	151	18	62	28	49
9	140	19	60	29	120
10	79	20	58	30	130

MEDIAN: 83.5

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1. Over time, the project team amalgamated their data to show the average wait time per month. The averages from nine months of their project are listed below. Plot these averages in a run chart.

   Are they achieving improvement? How do you know? What do you predict their average will be in January?

DAY OF THE MONTH	AVERAGE WAIT TIME IN DAYS	DAY OF THE MONTH	AVERAGE WAIT TIME IN DAYS
April	135	September	95
May	137	October	80
June	124	November	75
July	125	December	62
August	93	January	?

MEDIAN: 95

MEASUREMENT PLAN

WORKSHEET

TARGET RESULT					
BASELINE RESULT					
FREQUENCY OF DATA COLLECTION					
DATA COLLECTION STRATEGY					
OUTCOME, PROCESS OR BALANCING					
MEASURE					

Module References

IHI (Institute for Healthcare Improvement) *Run chart tool.* http://bit.ly/1MhWTeD

NHS Scotland Quality Improvement Hub, *Run chart.* http://bit.ly/1H4Nok3

Provost, Lloyd P., and Sandra Murray. *The health care data guide: learning from data for improvement.* John Wiley & Sons, 2011.