

Cause-and-Effect Diagram

Participant training objectives:

- To understand how Cause-and-Effect Diagrams are used during process investigation
- To be able to construct a Cause-and-Effect Diagram

Target audience:

Quality improvement (QI) project team members and other staff involved in the process investigation phase of quality improvement projects

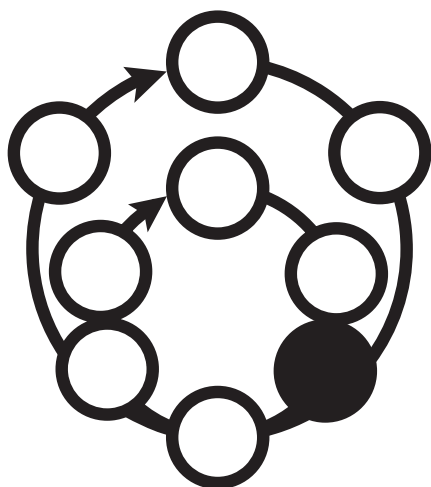
Type of exercise:

Scenario; group exercise, 60 minutes

Key concepts:

The process of constructing a Cause-and-Effect Diagram includes the following steps:

- Draw the diagram's skeleton
- Write the problem or desired outcome in the box at the end of the arrow
- Brainstorm potential causes and subcategories to fill in the "bones" of the skeleton
- Review and refine causes



The Big Picture:

In the HIVQUAL model, Cause-and-Effect Diagrams are an essential tool. It is used to map variables that may influence a problem, outcome, or effect. During process improvement, it is helpful in identifying a problem's potential causes and/or solutions.

The Cause-and-Effect Diagram is sometimes called an Ishikawa diagram, after the doctor who first developed it, or a fishbone diagram, after its skeleton-like structure.

SESSION AT-A-GLANCE	WHO	HOW LONG
1. Welcome, Learning Objectives, Agenda	Facilitator	5 minutes
2. QI Background: Flowchart Construction	Facilitator	10 minutes
3. Group Exercise: Scenario	Participants	30 minutes
4. Learning Transfer: Worksheet	Participants	10 minutes
5. Wrap-up	All	5 minutes
		60 minutes

Materials

For this group learning session, you will need the following materials:

- Participant handouts:
 - Example
 - Scenario
 - Learning Transfer Worksheet
 - Copy of slide presentation
- Flipchart paper and markers
- Overhead projector/LCD panel (optional)
- Wipeboard/chalkboard (optional)

Preparation

To prepare for the group learning session, complete the following tasks:

Familiarize yourself with the session's structure and content:

- Read through the Group Exercise notes in their entirety, including the exercise answer key, presentation slides, and participant handouts.
- Practice the presentation outlined in the Group Exercise notes.

Photocopy the Example, Scenario, Learning Transfer Worksheet, and slide presentation for each participant. Draw the answer to the exercise on flipchart paper. (optional)

Prepare your presentation slides for display:

- Photocopy the slides, or write the slide content on transparencies or on flipchart paper.
- For display using an LCD panel, enter the content into a computer file.

Prepare the training room.

- Arrange the tables and chairs in a circle or square shape, if possible.
- Tear off flipchart paper and make sure you have enough markers for the group(s) to use during the exercise.
- Set up and test equipment (e.g. overhead projector), if applicable.
- Make sure you have enough chalk or wipeboard

Notes

Cause-and-Effect Diagram: Group Exercise

Welcome and Introductions

To begin the group learning session, welcome participants and thank them for their participation. If necessary, ask individuals to introduce themselves to the group.

Learning Objectives

Tell participants that by the end of the session they will:

- Understand how Cause-and-Effect Diagrams are used during process investigation
- Be able to construct a Cause-and-Effect Diagram

Agenda

Provide a brief description of the session's primary components:

- Presentation of how to construct a Cause-and-Effect Diagram
- Group exercise on how to categorize causes using a Cause-and-Effect Diagram
- Learning Transfer Worksheet

Quality Improvement Background

Distribute a copy of the slides to each participant for note taking and/or future reference.

- Begin by explaining that a Cause-and-Effect Diagram is used to map variables that may influence a problem, outcome, or effect. During process improvement, it is helpful in identifying a problem's potential causes and/or solutions.

Tell participants that they may hear the Cause-and-Effect Diagram referred to as an Ishikawa diagram, after the doctor who first developed it, or a fishbone diagram, after the diagram's structure which resembles the skeleton of a fish.

- Introduce the basic process for constructing a Cause-and-Effect Diagram:
 1. Draw the diagram's skeleton
 2. Write the problem or desired outcome in the box at the end of the arrow
 3. Brainstorm potential causes and subcategories to fill in the "bones" of the skeleton
 4. Review and refine causes



Example

Distribute the Example to each participant and review the process steps in detail.

1. Draw the diagram's skeleton. Explain that the skeleton consists of a horizontal arrow pointing to the effect, and additional arrows—representing causes—pointing to the horizontal arrow.

Major causes can be separated into four basic categories:

- Equipment
- Environment
- Procedures
- People

These are only suggestions; teams should use the categories that best fit their improvement needs. Other sets of categories could be: Methods, Materials, Resources, and Measurement. Make them fit your problem.

2. Write the problem or desired outcome in the box at the end of the arrow. As an example, read the problem from the handout: “Low show-rate for HIV medical appointments.”

3. Brainstorm potential causes and subcategories to fill in the "bones" of the skeleton. Review the potential causes in the handout. Note how major causes typically have subcategories, identified by asking: Why does this happen? For example, in the People category, patients themselves are a major cause of low show-rates. Why? The next level indicates that patients are unaware of their appointments.
4. Review and refine causes. Explain that this step helps team members come to consensus around a few ideas for further discussion and follow-up.

Getting Started

Divide the participants into teams of roughly equal size, 4-6 people per group. You can assign participants to teams yourself or ask them to count off by a given number and form teams with other participants who have the same number.



Scenario Group Exercise

Distribute the scenario to each participant and provide directions for completing the exercise:

- Read the scenario individually.
- As a group, draw the Cause-and-Effect Diagram skeleton on flipchart paper, using the first handout as a model.
- Complete the diagram with the potential causes provided in the scenario. (20 minutes)

Assist teams who have problems getting started or become stuck on a particular point. Alert participants when 5 minutes remain so that they are adequately prepared to report back.

Reporting Back

Call time and select one team to walk through the responses in one category. Ask other teams if they have anything to add. Repeat the process for the remaining 3 categories. If you chose to draw the diagram on flipchart paper, show your version to the group after all responses have been given.

Next, ask participants to pretend that they are on the improvement team and to identify what area(s) they would focus on next to increase the show-rate.



Learning Transfer Getting Started

Distribute the Learning Transfer Worksheet and give participants 5 minutes to complete it.

Debrief

If time permits, ask participants to individually share their effect and one potential cause.



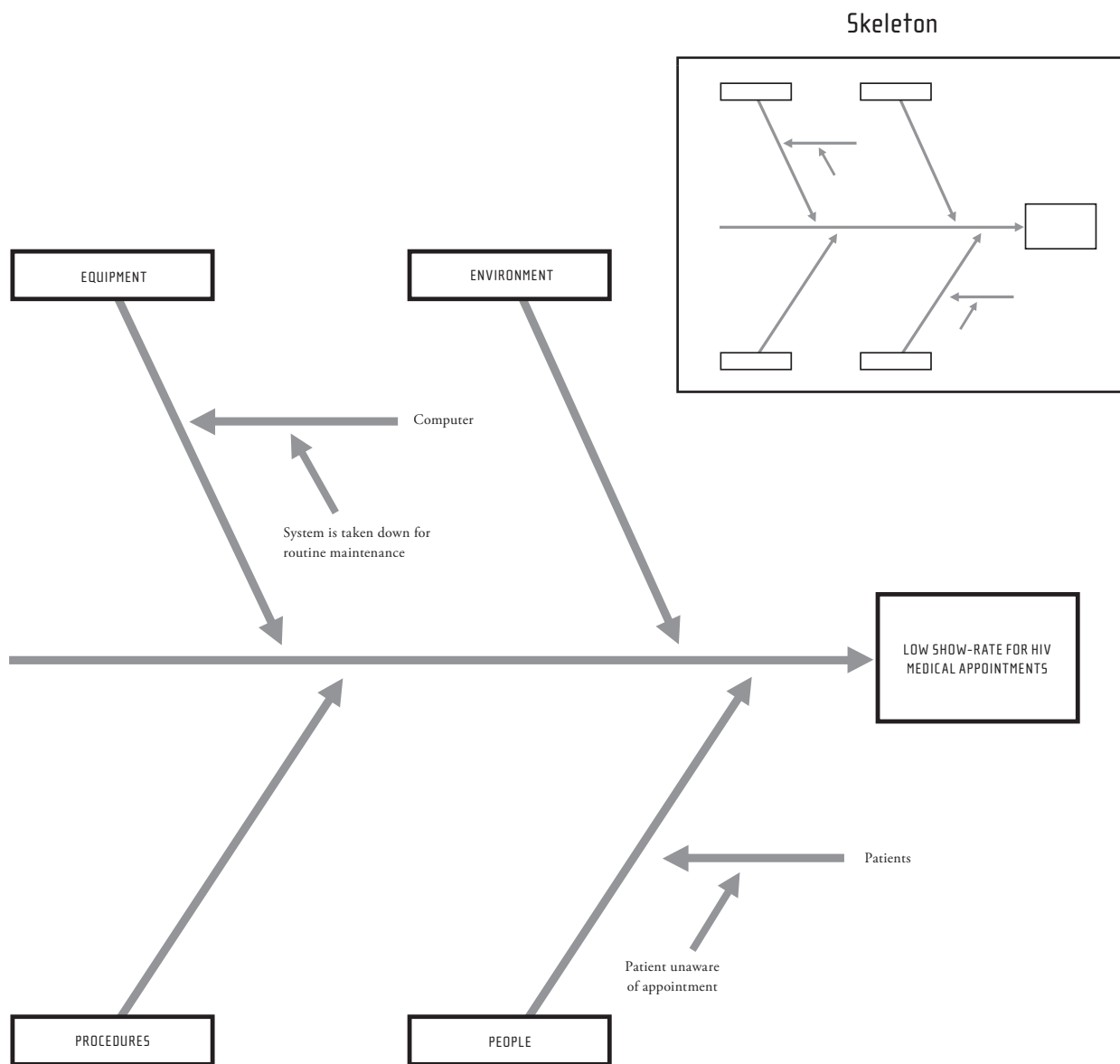
Wrap-up

Ask participants to provide feedback on whether or not they have achieved the objectives introduced at the beginning of the group learning session:

- To understand how Cause-and-Effect Diagrams are used during process investigation
- To be able to construct a Cause-and-Effect Diagram

Schedule an informal follow-up session with any participant(s) who has not reached the objectives.

Cause-and-Effect Diagram: Example



Cause-and-Effect Diagram: Scenario

Instructions:

Read the scenario and create a Cause-and-Effect Diagram on flipchart paper using the potential causes listed below. Reference the diagram structure from the first handout to help get you started.

Background

A project team investigated the show-rate for HIV medical appointments and presented their results to the quality committee: 49% for routine medical appointments and 31% for initial medical appointments. In a subsequent meeting, the members brainstormed potential causes to the lower than desired show-rate.

Effect

Low show-rate for HIV medical appointments

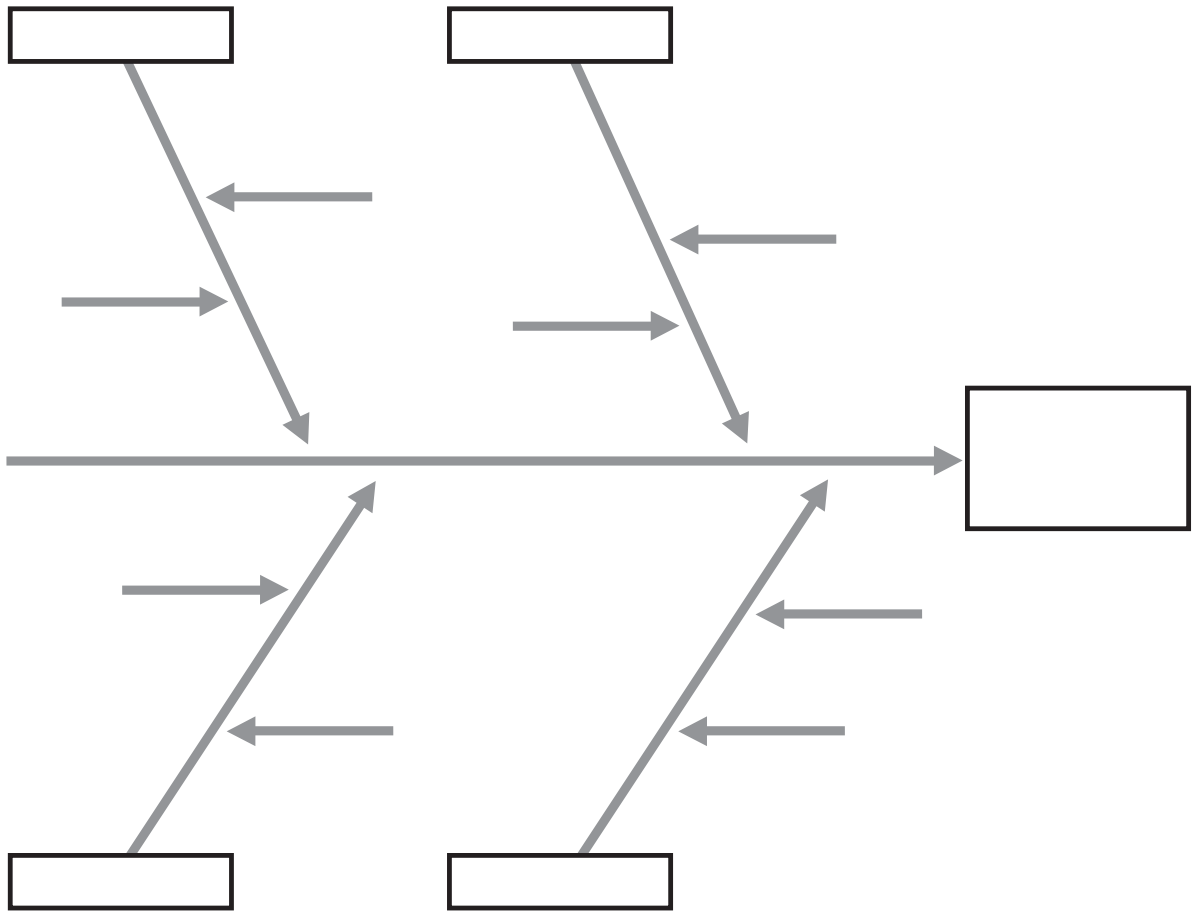
Potential Causes

- Staff does not give patient printed appointment card
- Patients unaware of appointments
- Lack of childcare for patients
- Staff gives patient wrong appointment information
- Difficult to reach patients directly by phone due to wrong number
- Computer system taken down for routine maintenance
- Appointment cards do not include exact clinic address
- Reminder calls placed by someone patient doesn't know
- Computer can only print reminders for appointments within 3 months
- No procedure in place to reschedule appointments
- Remote location of clinic
- Only one appointment can be listed on appointment card

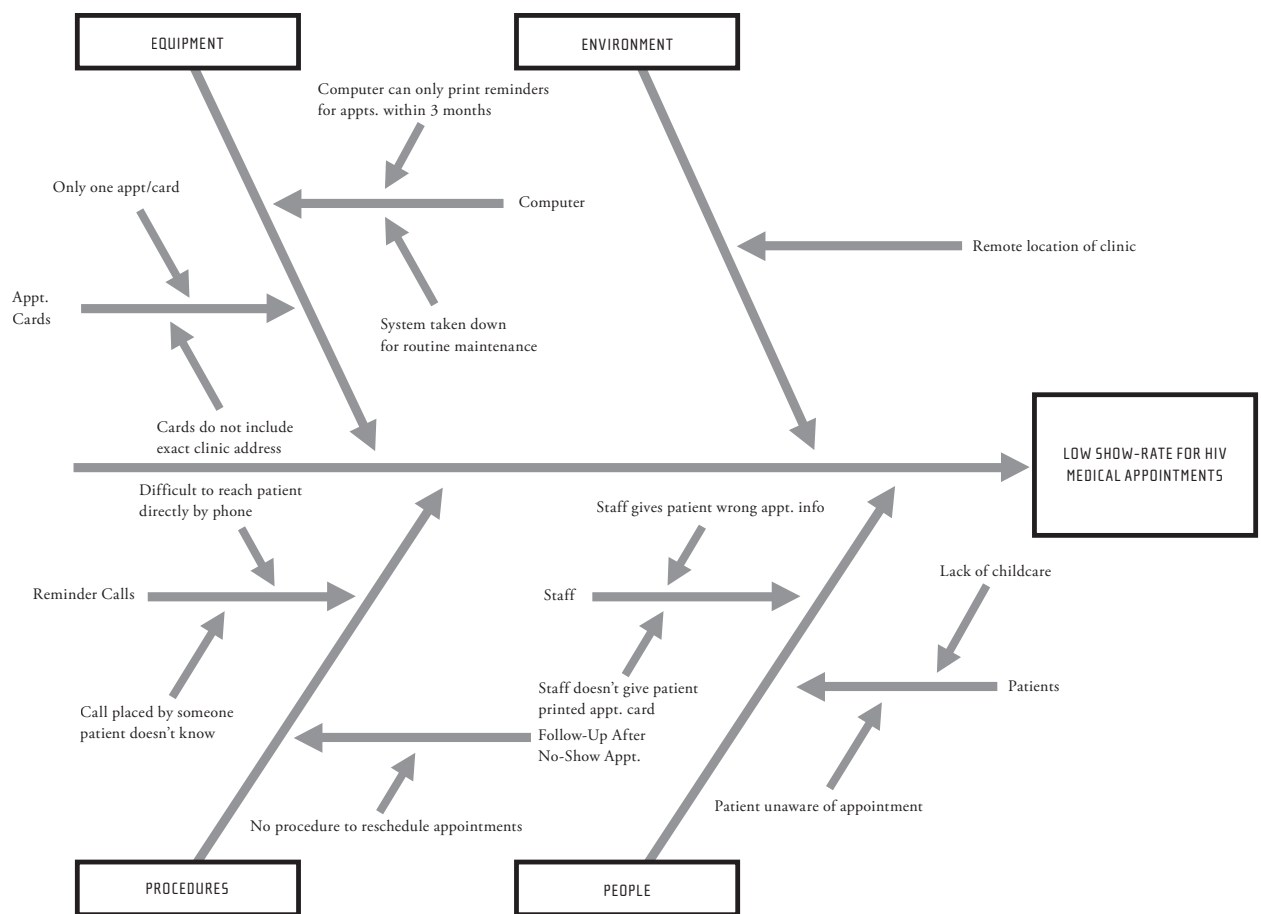
Cause-and-Effect Diagram: Learning Transfer Worksheet

Instructions:

Select a current problem or challenge in your job and fill in the skeleton "bones" with potential causes. When finished, circle the area(s) that could be the focus of a future improvement project.



Cause-and-Effect Diagram: Answer Key



Cause-and-Effect Diagram